NATIONAL COOPERATIVE SOIL SURVEY

Southern Regional Conference Proceedings

Jekyll Island, Georgia
March 14-l 7, 1978

PROCEEDINGS
OF SOUTHERN REGIONAL TECHNICAL WORK - PLANNING CONFERENCE OF THE COOPERATIVE SOIL SURVEY

JEKYLL ISLAND, GEORGIA
MARCH 14-17, 1978

U.S. DEPARTMENT OF AGRICULTURE
COMPILED BY
SOIL CONSERVATION SERVICE
AND
STATE AGRICULTURAL EXPERIMENT STATIONS

PROCEEDINGS OF SOUTHERN REGIONAL TECHNICAL WOR

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
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Telephone: 404-546-2278 (FTS 250-2278)

SUBJECT: 1978 Southern Regional Technical Work Planning Conference of the National Cooperative Soil survey

DATE: April 3, 1978

TO: Recipients of Proceedings

The conference convened at 8:30 a.m., Tuesday, March 14, 1978, at the Holiday Inn, Jekyll Island, Georgia.

The Program Committee extends their special thanks and appreciation to guest speakers who addressed the sessions. A copy of their talk is a part of the proceedings.

The committee chairmen and members are commended for the sincere work during the conference and the resulting reports which are a part of the proceedings.

Oklahoma was chosen as the host state for 1980. Mr. Bobbie Birdwell, State Soil Scientist, SCS, is the chairman for the conference and Dr. Fenton Gray, Oklahoma State University will serve as vice-chairman.

The conference adjourned at 11:30 a.m., March 17, 1978.

H. F. Perkins
Chairman

M. E. Shaffer
Vice-Chairman

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INTRODUCTION

The purpose of the Southern Regional Soil Survey Technical Work-Planning Conference is to provide a forum for Southern States representatives of the National Cooperative Soil Survey and participants for discussion of technical and scientific developments. Through the actions of committees and conference discussions, experience is summarized and clarified for the benefit of all; new areas are explored: procedures are proposed; and ideas are exchanged and disseminated. The Conference also functions as a clearing house for recommendations and proposals received from individual members and State conferences for transmittal to the National Cooperative Soil Survey Technical Work-Planning Conference. The proceedings indicate trends of work; therefore, they do not represent official views per se. Certain information developed by technical committees and recommendations of the general session may be adopted; thus, form the basis for revising the National soil survey procedures.

AGENDA

1978 SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE OF THE NATIONAL COOPERATIVE SOIL SURVEY

Holiday Inn
Jekyll Island, Ga.
March 13-17, 1978

Monday PM, March 13

4:00 - 7:00	Registration

Tuesday AM, March 14

8:00 - 8:30	Registration
8:30 - 8:40	Introductory Remarks
8:40 - 8:55	We 1 come Mrs. Lynn Cheek Executive Director Jekyll Island Promotional Assn. Jekyll Island, Georgia
8:55 - 9:15	The Significance of Agriculture to Georgia's Economy Henry W. Garren Dean and Coordinator The University of Georgia Agricultural Experiment Stations Athens, Georgia
9:15 - 9:35	Management and Production is Only Half the Story Dwight M. Treadway State Conservationist USDA-Soil Conservation Service Athens, Georgia
9:35 - 9:50	Break
9:50 - 10:10	Report from South Technical Service Center Asst. Director South Technical Service Center Fort Worth, Texas

Wednesday AM, March 15

	Discussion Group 1	Discussion Group 2	Discussion Group 3	Discussion Group 4
8:00 - 9:20	6	7	1	2
9:20 - 10:40	3	4	5	6
10:40 - 10:55	Break			
10:55 - 12:15	7	1	2	3
12:15 - 1:30	Lunch			

Wednesday PM, March 15

1:30 - 3:oo	4	5	6	7
3:oo - 3:15	Break			
3:15 - 5:00	Special Committee Meetings (To be Announced)			
7:00 - 8:00	Social Hour (Cash Ear)			
8:00	Banquet			

Thursday, March 16 All Day

8:00 - 5:00 Field Trip to University of Georgia Sapelo Island Marine Institute

Friday AM, March 17

8:00 - 10:20 Committee Reports (Nos. l-7)

10:20 - 10:35 Break

10:35 - 10:45 Report of Committee on Soil Taxonomy

10:45 - 10:55 Comments from Directors Representative

D. M. Gossett
Dean of Agriculture
University of Tennessee
Knoxville, Tennessee

10:55 - 11:05 Comments from STSC

Joe Nichols
Principal Soil Cot-relator
USDA - Soil Conservation Service
Fort Worth, Texas

11:05 - 11:30 Business Session

11:30 Adjourn

10:10 - 10:30	Resource Data for Coastal Zone Management Robert W. Oertel Asst. State Conservationist USDA-Soil Conservation Service Athens, Georgia
10:30 - 10:50	Cooperative Research in Soil Survey with the Southern States Warren Lynn National Soil Survey Laboratory USDA-Soil Conservation Service Lincoln, Nebraska
10:50 - 11:10	Status of National Wet Lands Inventory Blake Parker Soil Scientist Department of Interior (IPA) St. Petersburg, Florida
11:10 - 11:35	Progress Report on Remote Sensing and its Relationship to Soil Survey George Murrell Staff Leader, Remote Sensing USDA-Soil Conservation Service Reston, Virginia
11:35 - 12:00	Recent Developments in Cooperative Soil Survey Victor G. Link, Director Soil Survey Operations Division USDA-Soil Conservation Service Washington, D.C.

Tuesday PM, March 14

12:00 - 1:15 Lunch

	Discussion Group 1	Discussion Group 2	Discussion Group 3	Discussion Group 4
1:15 - 2:35	1*	2	3	4
2:35 - 2:50	Break			
2:50 - 4:10	5	6	7	1
4:10 - 5:30	2	3	4	5

*-Refers to committee

MINUTES

The conference convened at 8:30 a.m., March 14, 1978, at the Holiday Inn, Jekyll Island, Georgia, with Chairman Perkins presiding. Ms. Lynn Cheek, Executive Director, Jekyll Island Promotional Association, welcomed the group.

The following persons addressed the group:

Dr. H. W. Garren
Mr. Dwight M. Treadway
Mr. Robert L. Wilkes
Dr. Warren Lynn
Mr. Blake Parker
Mr. George Murrell
Mr. Victor G. Link

A copy of their presentations is enclosed as a part of the proceedings.

Beginning at 1:00 p.m. on March 14, the conferees formed four discussion groups for the purpose of reviewing and discussing the work of each technical committee. The chairman and/or vice-chairman for each of the seven technical committees reviewed the drafts of the reports. Constructive inputs from the discussion groups became a part of the final reports. Discussions proceeded through Wednesday.

Conferees participated in a field trip to Sapelo Island Marine Institute on Thursday. The coordination of the trip was under the able direction of Ms. Ann Pearson, Georgia Department of Natural Resources. Dr. Jim Henry, Marine Institute, University of Georgia gave a slide presentation on the formation and transformation of parts of the coastal islands. The principles are applicable to many shorelines and coastal environments. This was followed by a guided tour of the Marine Institute laboratory. Conferees had a" opportunity to experience the dynamics of the coastal dunes adjacent to the beaches, previously discussed by Dr. Henry. In addition, Mr. Robert Wilkes, District Conservationist, Hinesville, Georgia led a discussion of the marshland soils and associated vegetation.

Drafts of the final reports were presented by the chairmen of the technical committees on Friday morning. The conferees accepted the reports. Chairman Perkins called for a final copy of the reports, ready for the proceedings, by April 3, 1978.

At the general session, four members were added to the work group for amendments to Soil Taxonomy. Two were selected from the Experiment Station representatives and two from participating Federal Agencies. Since the conference meets once each two years, members were added that start their three-year term in 1978 and 1979. Morris Shaffer, SCS, and Gray Aydelott, USFS, were elected to serve terms beginning in 1978 and 1979, respectively. Drs. Larry Wilding and David Pettry, of the Experiment Station representatives, were elected to serve terms beginning in 1978 and 1979, respectively. Thus far, members that have served and those elected are listed for the record.

1975

Experiment Station Representatives	Federal Representatives
S. W. Buol	H. J. Byrd
Max Springer	D. F. Slusher
Ben Hajek	W. W. Fuchs (Bobby Birdwell filled vacancy)

1976

Experiment Station Representatives	Federal Representatives
Max Springer	D. F. Slusher (Arville Touchet filled vacancy)
Ben Hajek	Bobby Birdwell
Fenton Gray	R. W. Johnson

1977

Experiment Station Representatives	Federal Representatives
Ben Hajek	Bobby Birdwell
Fenton Gray	R. W. Johnson
E. M. Rutlege	Richard Guthrie

1978

Experiment Station Representatives	Federal Representatives
Fenton Gray	R. W. Johnson
E. M. Rutlege	Richard Guthrie
Larry Wilding	Morris Shaffer

1979

Experiment Station Representatives	Federal Representatives
E. M. Rutlege	Richard Guthrie
Larry Wilding	Morris Shaffer
David Pettry	Gray Aydelott

1980[1/]

Experiment Station Representatives	Federal Representatives
Larry Wilding	Morris Shaffer
David Pettry	Gray Aydclott
vacancy	vacancy

1/ Two members from the Experiment Station representatives and two from Federal Agencies are to be elected at the next conference. One member from each group will begin a term in 1980 and the other in 1981.

Dr. D. M. Gossett, Experiment Station Director's Representative, called and expressed regrets that he could not attend. He commended the participants on their activities and the cooperative exchange of information among a varied group.

Dr. H. H. Bailey, University of Kentucky, representing the Southern Region, gave a report of State Agency soil mapping program support in the Southern Region. A copy is attached.

Dr. Fenton Gray extended an invitation for the conference to meet in Oklahoma in the spring of 1980. The conference accepted the invitation. The exact time and location is to be announced; however, the conference indicated a preference of Tulsa over a university campus. The chairman for the 1980 conference is B. T. Birdwell, SCS, and Dr. Fenton Gray, Oklahoma State University, the vice-chairman.

Much time was devoted to a thorough discussion of the need and means of promoting greater participation in committee work. All too often, the chairman and vice-chairman find themselves doing the greater part of the work. In addition, when responses do come, they are too late to be most beneficial. Most committee chairmen expressed this sentiment.

Another point that was discussed was the method of determining the appropriateness of the technical. committees and the charges and whether or not committee members could adequately respond to the charges.

Still another point of discussion was the assignment of people to the committees. The consensus was that once the committees are identified, members of the work planning conference should have an opportunity to indicate their preference of committees on which to serve.

It was the consensus that committees and charges be drafted as soon as practicable, in order that committees could be determined and work planned. In an effort to implement the recommendations and add importance, Dr. Pettry moved that the steering committee appoint a committee by July 1978 to advise on technical committees and charges on which to begin work for 1979 and 1980. The motion carried.

Recommended changes to Soil Taxonomy generated a significant discussion. A procedure to alert committee members of proposed changes is most important. The general agreement is that the Principal Correlator will notify members of the proposed changes, in order that amendments can be adequately evaluated. The procedure for making amendments to Soil Taxonomy is not universally understood. Procedures should be made readily available to members.

Many new committee members have joined the Southern Region in the last few years. A need is apparent for a good look at the conference by-laws. A better understanding of who constitutes the legitimate membership and their responsibilities is needed. It was agreed that a copy of the by-laws be made a part of the proceedings.

A most important aspect of the committee proceedings is what is the best procedure to see that conference recommendations are carefully considered and, where appropriate, implemented into the National Cooperative Soil Survey. Clear cut procedures did not emerge.

Chairman Perkins strongly urged full support to the new chairman and vice-chairman and expressed appreciation for the excellent cooperation during the last two years.

The conference adjourned at 11:30 a.m., March 17, 1978.

Respectfully submitted,

M. E. Shaffer
Conference Recorder

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THE SIGNIFICANCE OF AGRICULTURE TO GEORGIA'S ECONOMY

Agriculture is Georgia's largest industry. In a normal year, agriculture accounts for about ten percent of our state's gross income with farmers receiving nearly 2.5 billion dollars annually. We have approximately 75,000 farms involving 17,000,000 acres of our land.

Agriculture is also a rapidly growing industry in Georgia. The most recent decade for which we have statistical data (1963-1973) reveals that the production of livestock has increased 230%, poultry 130%, field crops 100%, horticultural crops 150%, and other commodities 50%. In the nation, Georgia ranks number one in the production of poultry and poultry products, peanuts, and pecans. I" recent years, there has been a rapid influx of greenhouse enterprises into Georgia. We now rank fourth in the nation in terms of total greenhouse space and it is predicted that by 1980 WE will rank second.

No other area of our country has greater agricultural potential than the southeast. No other area has the unique combination of resources that will make it possible to develop the kinds of agricultural enterprises that will provide future needs for food and fiber. WC have the climate, the soil, and most of all, much of the southeast is resting on one of the largest underground water supplies to be found anywhere in the world. This large supply of underground water will not only be a" important advantage in agricultural production, but will also be an important advantage in the processing of agricul-

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Presentation by Dr. Henry W. Garren, Dean and Coordinator, The University of Georgia, Agricultural Experiment Stations, Athens, Georgia at the Southern Regional Technical Work Planning Conference of the National Cooperative Soil Survey, at Jekyll Island, Georgia, March 13-17, 1978.

tural products. Georgia is particularly blessed with a large underground water supply. Eighty percent of the underground water found in the Coastal Plains Region of the southeast is under South Georgia.

By the 21st century, which is only one generation away, food and fiber production in this country will have to double. Many states of our nation with the available agricultural technology are much closer to reaching their maximum potential in agricultural production than WE here in the south. If production must double by the 21st century, then it may perhaps triple or more in the south. In 1976, over 20 farmers in Georgia produced more than 200 bushels of corn per acre. Our state's largest cooperative is reported to have moved twice as much grain that year than in the previous year. Georgia and other southern states are definitely becoming a grain producing area.

Georgia and other southern states also have great potential as an exporter of agricultural products. There is a need to improve our port facilities such as ours in Savannah, Georgia. At the present time, we have at that location grain storage facilities for only about 600,000 bushels. If some of the grain-carrying ships require 1.6 million bushels for a complete load, these large ships, of course usually will not come to a port where they cannot obtain capacity load.

Another advantage the southeast, and particularly Georgia, has in agricultural production and processing is location. It is estimated that, when wc reach the year 2,000, some 60% of our people are expected to be concentrated on about 7% of the land mass and will bc found in three large metropolitan areas. One of these will be in California, the other in Florida, and the third in a triangle formed by Chicago, Boston, and Washington, D.C. The southeastern farmer will be in an ideal position to provide much of the food and fiber utilized by the growing population to the north and to the south in Florida.

If some weather experts arc correct in their predicitons, still another advantage may be in the making for southern agriculture. Although I hope that they are wrong, some of these experts are predicting that thr farmbelt may be entering the early stages of a very long dry period. Also, some believe that the northern temperate zones arc cooling and that, as a result, the growing season there may become shorter

Recently, Russian climatologists reported that the temperatures in the Russian Arctic have dropped three degrees centigrade in the last 50 years. The growing period in some parts of Russia has dropped from 17 to 18 weeks down to 13 weeks. Even now, Russia only has one good agriculture year out of three. In all of Russia, there is really no good combination of soil, moisture, and climate. A one degree centigrade drop in temperature for either Russia or Canada would result in a 30% decrease in their capacity to produce food.

In 1976, the average increase in farmland prices for the nation was up 17%. In seven states, none of which was in the southeast, the average increase in price ranged from 20 to over 40%. When one considers our agricultural potential during the next decade, it can only be concluded that our southern farmland is selling at bargain basement prices. As more folks begin to realize this, the demand for southern land will increase sharply. During the last 12 to 18 months, there has been extensive land purchases in Georgia by foreign investors. I expect this is also occurring in other states throughout the southeast.

One of the main concerns we should all have about the future of American agriculture is energy. While our form of agriculture is widely recognized as the most successful means for producing food and fiber, it requires extensive inputs of fossil energy. At the farm level, the energy input is quite small in terms of the percentage of the total energy consumed in this country. Only 4% is required to produce the food and fiber at the farm level. However, when one adds to this 48 the energy required for processing, distribution and utilization of farm and forestry products, the input approaches 23%. If we were to try to feed and clothe the world with our form of agriculture, it has been estimated that the known fossil fuel supply would be exhausted within 30 years.

Because ours is an energy oriented agriculture, some folks predict that we will start moving toward smaller farms and more labor intensive farms. Some even suggest that there may be a return to the use of more draft animals and the use of organic fertilizers in our farming operations. I do not share this view to any great extent. We may have some, but not much of this in the foreseeable future. Because of the tremendous financial investments required, we may, on the contrary, see more corporate fanning.

In the April 1976 edition of Chemical and Engineering News, there appeared an article containing this paragraph:

"To turn back to farming with no commercial chemicals or fertilizers and to use draft animals instead of tractors in this country, would take about 61 million horses and mules to produce the same amount of food we turned out in 1974. It would take about 31 million workers on farms working at hard labor for long hours at low pay. It would take 180 million acres of prime cropland just to feed those extra horses and mules. That's nearly twice the amount of United States land that is growing food and fiber for export sales and food assistance to starving people in foreign lands."

There're not many of us who would be willing to produce our food without fossil energy or who would be willing to pay the costs that would be incurred if others produced it for us without fossil energy.

But that's not the solution to the problem anyway.

The solution rests with energy conservation, coupled with research to find more efficient ways to utilize energy in agricultural production practices and in all other energy requiring operations. And, of course, everyone realizes we need to find alternative sources of energy.

We're running out of agricultural technology. Food supplies are qrowinq at a rate of 2.6% a year, a bit lower than in the early 1970's. If we are to close the gap between supply and demand for food between now and 1986, the food supplies must grow at a rate of at least 4.25%. In 1940, our federal government was spending 40% of its research and development funds for agricultural research. Today, only 2.2% of the federal funds for research development is going to agricultural research. This means that less than five hundred million dollars is spent per year on federally sponsored agricultural research. This is indeed a small amount when one considers that this country produces over two hundred billion dollars worth of food and fiber per year and exports various agricultural commodities at a value exceeding twenty-two billion dollars annually.

We need an increased agricultural research and Extension effort more today than ever before in the history of our nation. Had it not been for prior agricultural research and Extension program*, we would have two-thirds less food today than we have.

As mentioned earlier, we need research in energy conservation. Here we are not concerned just with conservation of energy used to operate the equipment, but the development of agricultural technology which will require less energy input. No-till cultivation is one example in this area. The development of plants that are more efficient in the utilization of sunlight would be still another example. Plants other than the legumes with the capacity to fix nitrogen would save substantial amounts of energy. Tremendous amounts of fossil energy are used in producing nitrogen. Dr. Glenn Burton at the Coastal Plain Experiment Station is working on a Bahiagrass that possesses the capacity to fix nitrogen. Similar research is taking place at other institutions (e.g., North Carolina State University). It is hoped by Dr. Burton and other plant scientists that ways will be found to cause other plants, such as corn, wheat, etc., to fix nitrogen.

We need drought rcsistent plants. Research in this area is already underway, but needs to be expanded.

We need plants, particularly here in the south, that are more adaptable to acid soils. Some research is already underway in this area, but this too needs to be expanded.

We need earlier maturing plants. These would be useful not only in areas where the growing season seems to be getting shorter, but would also be very useful in multiple cropping programs presently being explored in the south, particularly Georgia.

We need irrigation research to find ways of using water more effectively and efficiently in crop production. At our Coastal Plain Experiment Station in Tifton, it has been shown that, by use of trickle irrigation, the production of some crops can be increased three to four hundred percent.

There is need to investigate the possibility of recycling more of the agricultural by-products generated both on the farm and in the processing operations. Some of our animal scientists have shown that cattle feed consisting of 75% grain and 25% poultry litter produced beef of essentially the same quality where 100% grain was fed.

Pest control is becoming a serious problem. The problem is also being compounded by new federal regulations regarding the use of various chemicals in pest control. We need research to find more acceptable methods to control pests (e.g., biological means).

Simple stomached animals, such as the chicken and pig, compete with humans for food. Diets consumed by these animals are essentially the same as that consumed by humans. Research is needed perhaps through fermentation or other means to find different sources of nutrients for these animals.

Presently, 50% of beef consumed in this country is produced on forages. It has been estimated that, within the next two decades, this will increase to 90%. Expanded research thus is needed to find more palatable forages for our cattle.

In closing, I want to come back to energy. Agricultural problems today may seem insignificant with those that may confront our country by the 21st century. If alternative sources of energy are not found, there will be drastic: changes in the dietary habits of the people of this nation. In addition, hundreds of thousands and perhaps even millions of people will face starvation during the next century.

MANAGEMENT AND PRODUCTION IS ONLY HALF THE STORY

Conservation programs today are probably in the greatest transition in our history.

Throughout our large cities these days, there is a new fascination about what is happening in rural America. Our communication media reflects this fascination, but they are not quite sure what it means and do not know exactly how to handle it.

The metropolitan newspapers, national news magazines, and the television networks all share a sort of dilemma. In large measure, they continue to write about America as if most of it was in New York, Washinqton, or Los Angeles; but they are vaguely aware that something is happening out beyond the suburbs and are starting to write about it.

Georgia has been a shining example of how local people can take the lead - how our own leaders can show the way when something needs to be done.

It is happening in Georgia and it is happening all over America. Our people are rediscovering the countryside.

For more years than most of us care to remember, it has been traditional for young people to grow up on the farm in rural areas, or in small towns and to leave for the cities to seek their fortunes. In the first half of the 1970's that trend was turned around. Whether it is a temporary thing or a new thing we cannot say. No one can say with certainty.

Presentation by Dwight M. Treadway, State Conservationist, Soil Conservation Service, Georgia at the Southern Regional Technical Work Planning Conference of the National Cooperative Soil Survey, at Jekyll Island, Georgia, March 13-17, 1978.

But in the last five years, nearly two million more people moved into nonmetropolitan areas than the other way around. There is evidence in many places across the nation that rural counties are gaining population through migration.

The enrollment in agricultural colleges is increasing. The number of young people in high school vocational agricultural programs is at an all-time high. Twice as many college graduates are going back to the farms as a decade ago. Farm population in 1976 was 600,000 fewer than in 1975. Farm population is 15 percent below 1970. The south has lost more farm residents than any other area in the United States - one-fourth since 1970.

Last year a gallop poll showed that 58 percent of all Americans would prefer to live in small towns or rural areas as opposed to big cities. Per capita income is growing faster in rural areas than in cities or suburbs. That's factural evidence. Numbers prove the case. Rut there is other evidence and that is the impression one gets in visiting rural towns throughout this country. There is a new spirit of pride and community spirit in towns throughout rural America.

Industry is finding more and more advantages in the countryside. Their employees find it more relaxing and more satisfying.

Better transportation, improved communications, and other modern-day conveniences are as common in rural areas as they once were in the cities. The differences are narrowing and main-street stores are being fixed up and not boarded up. Farmers are remodeling their homes and building new ones. Communities are building new water and sewer systems or upgrading the ones they have had. All of this is happening and all of us are part of the picture. Every town and every community that has a success story is a town that wanted to succeed.

so far, I have not mentioned the federal role. It is an important part of the picture, but it can work only when local people lead the way. The success of a federal program cannot be measured in dollars. I" fact, in many cases, it is the other way around. The success of a federal program has a direct relationship to the involvement of local people and this is particularly true over the years of the programs of the U. S. Department of Agriculture. Conservation is a good example. There would be no hope at all for a successful soil and water conservation program if it was directed from the top down. The local conservation district supervisors and landowners themselves are what make these programs work.

The success of the basic commodity farm programs is due in large measure to the local administration of county-elected committeemen and so it goes.

Another great thing has happened in rural America in the last four or five years. For many years, we have heard military power. Now we hear food power. Not only are we feeding America, but also a large segment of the world.

We are tempting to balance payments with food.

But this is causing major amounts of land to be brought back into cultivation setting up a greater need for help in installing conservation programs. How do we deal with it?

Soil conservation districts and SCS's forty-plus year history has been to deal with soil erosion primarily to protect the land's ability to produce food and fiber. We have prided ourselves with soil conservation districts on the successes.

I think we can all be proud of this effort because the record shows that landowners in Georgia treated more than twice the cropland acreage with conservation practices in 1977 than in 1976 despite the fact that they had drought followed by armyworms. Your state may have a similar story.

Our four basic programs have been very successful. For example, the conservation operations program is the basic program where SCS and the district provide technical assistance for planning and application to landowners. Our other basic program, the soil survey program is to furnish resource information for land-use decisions. Presently in Georgia, about 30 million of our 37 million acres have been mapped and classified into a specific unit. We all know the story of the watershed program and the resource conservation and development program in that these two have been successful although at times controversial.

An wc look down the road into the future of how our staffiny changes and program direction should be, we see some major conflicts. We see competition developing for prime agricultural land in terms of need for maintaining this land to produce food and fiber. While at the same time, this land is being used by urban development because that is the cheapest and easiest place to build new roads, homes, shopping centers, airports, etc.

I don't intend to be a profit of doom because there are ways we can deal with it. We have some techniques, some expertise, and the skills; hut we must create public awareness before WE will be very effective in getting the job done. Developing new conservation techniques such as no-till farming and getting state and local governments to furnish manpower in applying conservation programs are only two examples of things we arc working toward.

Use of soils information is one of the key elements in making land-use decisions. "Consider the Soil first" should be our theme song.

You are very knowledgeable of the history of NCSS Program. YOU are aware that Public Law 46 (1935) and (P.L. 89-560) Soil Survey Act of 1966 is the basis for NCSS. The Soil Conservation Service furnishes soil scientists who prepare the soil surveys. Others are heqinninq to do the same.

As WE define the words in the title of my subject "management and product i on," we mean the actual production of the survey. The SCS has been "under the gun" since its inception to accelerate surveys and we've made strides of progress.

It has long been the goal of the SCS and our cooperators in NCSS to provide a soil survey of the Nation that is complete and current.

In order to get the job done, we have to improve productivity while at the same time maintaining and improving quality. There are large differences in productivity among survey areas in individual states and among states. We believe if all soil surveys were managed like the best 25% of our current soil surveys, national production could be increased by 50 percent. Although soil survey enjoys continuing strong support by the Administration and Congress, it is not likely that funding will increase greatly in the future. Hence, we will have to do with what wc have and manage better.

Increased productivity is not achieved by putting pressure on soil scientists to work harder, but by helping them to work more efficiently. We have made much progress in the designing of soil surveys for the need of individual areas.

Too often in the past, and we still do, spend our time hitting the soil scientist over the head while preaching "map more acres -- lower the unit cost." Have you ever heard that before?

I congratulate you however because the record shows that NCSS has made as much progress or more than any program SCS has. One and four tenths billion of the 2.4 billion acres in this nation are now mapped and one-third of the surveys are published.

The new demands for soil surveys go back to the national concern for the preservation of our natural resources. At the Federal level, SCS needs soil surveys not only for an increased emphasis on conservation planning, but also for implementing the Soil and Water Resources Conservation Act of 1977, certain provisions of the Surface Mining Act, and the Rural Clean Water Act. Our sister agency, the Forest Service, is engaged in the second phase of the Resources Planning Act. The Fish and Wildlife Service is conducting a wetland inventory and the Bureau of Land Management is under obligation to develop environmentally sound management practices for many millions of acres of public land. At the state and local levels, many agencies such as the Agricultural Experiment Stations have programs that supplement the federal efforts and require soil surveys.

Our record of production is only half the story. The other half is "accelerating the use of the survey" -- put emphasis on interpretations.

My first point is there is a lack of availability of our soils mapping to the user. We're pretty typical in Georgia, but out of 37 million acres, 30 million are mapped. Only 13 million or less than 50 percent is published.

We must accelerate publication, but not just the same efforts we've made during the past few years to reduce the backlog. We must be selective in our field mapping, thus permitting survey areas to be completed. This will mean concentrating our staff. This will mean more transferring of personnel than we have been use to in the past, and it may not be easy.

Soil survey priority areas must be in complete harmony with USDA priorities as well as state and local agencies. Who would have believed a few years ago that we would have today's emphasis such as 208, Surface Mining Act, Rural Clean Water Act, prime farm land policy, Resources Planning Act, Resources Conservation Act, and on it goes.

The SCS state conservationist has an important role of coordination with other aqcncies. I hope we're not asking our state soil scientist to do this alone.

My third point is, we must stress interpretations.

a. Making the survey is only a part of the total job.

b. This is not to take away from the significance of quality control in the basic mapping.

c. It is the availability, usability, applicability of data that determines the fulfillment of the intended purpose.

d. Soil taxonomy and the National Cooperative Soil Survey provide the basis for collecting the needed data.

e. The number of valid interpretations that can be made from a soil survey is almost unlimited. Compare the interpretations that were significant a few years ago with the number that is possible now. The SOILS-5 is only limited suggestions.

Fourth, we must have our data in a display system. We are using MIADS in Georgia. You may be using something similar.

a. Coastal Zone Management.

b. Work with State Soil and Water Conservation Committee.

c. Important Farmlands Maps by MIADS. Once encoded, the ease of additional interpretations.

d. Storing according to UTM Coordinates - retrieval important.

e. Central storage in the future - terminals in states.

f. State profited by others mistakes - 4 hectare - 10 acre cells.

In Georgia, we're ten years from being once over. Although it's a worthy objective to complete once over, it may be more important to concentrate on using what we already have.

My four points this morning --

1. Accelerate publications by selective mapping.

2. Keep the publication priorities in tune with agency priorities (not just SCS).

3. Stress interpretations.

4. Get the information into a display system.

I congratulate you on your record, but we're depending on you for our future.

Thank you.

RESOURCE DATA FOR COASTAL ZONE MANAGEMENT

1. Need - Two facts that accelerated the need for resource data.

    a. Public became environmental conscious in late 1960's, resulting in actions involving resources.

        (1) National Coastal Zone Management Act of 1972.

        (2) National Environmental Policy Act

        (3) Georgia Coastal Zone Management Act

        (4) Georgia Erosion and Sediment Control Act

        (5) Increased land use planning from standpoint of environment.

        (6) Georgia Marshlands Protection Act

    b. Georgia coast has unique features that generated interest by environmental conscious people.

        (1) The most undeveloped part of the Atlantic Seaboard.

        (2) A large percentage of the area is environmentally unique.

            (a) Estuary 500,000 acres in size.

            (b) Over 90 miles of coastal beach.

            (c) High percentage of wildlife wetland (25-35%).

            (d) High desirability for recreational use.

            (e) Humid climate and long growing season promote very high tree growth rates.

2. Resources that need to be inventoried.

    a. Soil resource - The National Cooperative Soil Survey.

    b. Land use - Geological Survey Bulletin 671.

Presentation by Robert L. Wilkes, District Conservationist, Soil Conservation Service, Hinesville, Georgia at the Southern Regional Technical Work Planning Conference of the National Cooperative Soil survey, at Jekyll Island, Georgia, March 13-17, 1978.

c. Wildlife wetland - Fish and Wildlife Circular 39.

3. MIADS (Map Information Assembly and Display System) selected to process inventory data.

   a. Cell size can be varied to suit need. Four hectare cell selected.

   b. Multi-layered data can be interrelated.

   c. Encoding did not require skilled personnel

4. Soil, land use and wildlife wetland inventories were made and recorded on controlled base maps, published soil survey where available.

5. Resource data generated by MIADS system will produce important resource data for SCS and other interested agencies. The map data, with simultaneously produced tabular data, will be of two general types:

   a. Cartoqraphically produced display maps.

   b. Raw computer printouts that when used with a transparent base map, can be used as rough work maps.

6. Questions land use planners are asking that can be answered are:

   a. Is there undeveloped land that can be developed, and where is it?

   b. Where are the areas that have environmental restraints on use?

COOPERATIVE RESEARCH IN SOIL SURVEY WITH THE SOUTHERN STATES

Two southern regional work groups are meeting this spring that have interests related to the Cooperative Soil survey.

- South Region Soil Water Work Group will meet April 12-14, 1978 in Fayetteville, Arkansas. The group is composed principally of soil physicists in Land Grant Colleges. Soil Survey personnel should follow the activities of the Soil Physics Work Group and make sure representatives to that group are aware of needs and interests of the Soil Survey.

- South Region Soil Mineralogy Work Group will meet May 1-4 at Mississippi State University. The group has completed a coordinated mineralogical analysis of several regional soils. At their last meeting the group considered the preparation of a regional soil mineralogy map. As a first step, they decided to inventory present soil mineralogy data in the region. Forms have been prepared and distributed for encoding information so that it will be compatible with the pedon data system.

South Region Soil Survey Investigations List of Projects (attached). The list is intended to he for the Cooperative Soil Survey, and is largely a revision of a list of projects presented to the 1976 Southern Regional Soil Survey Work Planning Conference. The present list was categorized by Gordon Decker and Warren Lynn. Placement of projects in active, completed, or inactive is based on our own awareness of

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Presentation by Dr. Warren C. Lynn, Research Soil Scientist, National Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebraska, at the Southern Regional Technical Work Planning Conference of the National Cooperative Soil Survey, at Jekyll Island, Georgia, March 13-17, 1978.

activity or completeness. We welcome additions or comments. We hope the list is viewed as cooperative property that anyone can participate in and learn from. An update every two years seems a [redacted] goal.

A status report is attached for Project 2 - River Terraces, North Texas.

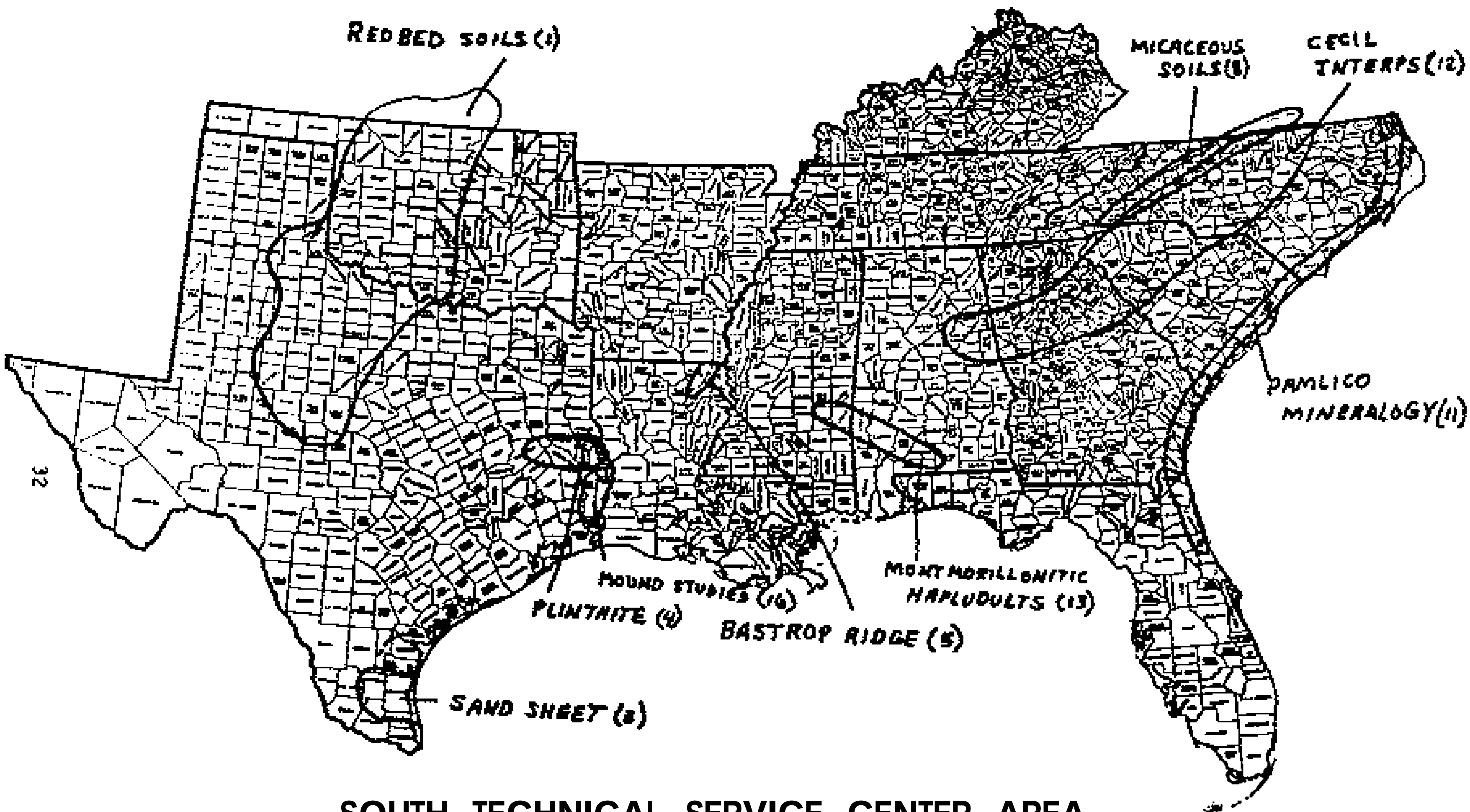
SOUTH REGION

Soil Survey Investigations

List of Projects

Draft March, 1978
(Revised from Draft March 19, 1976)

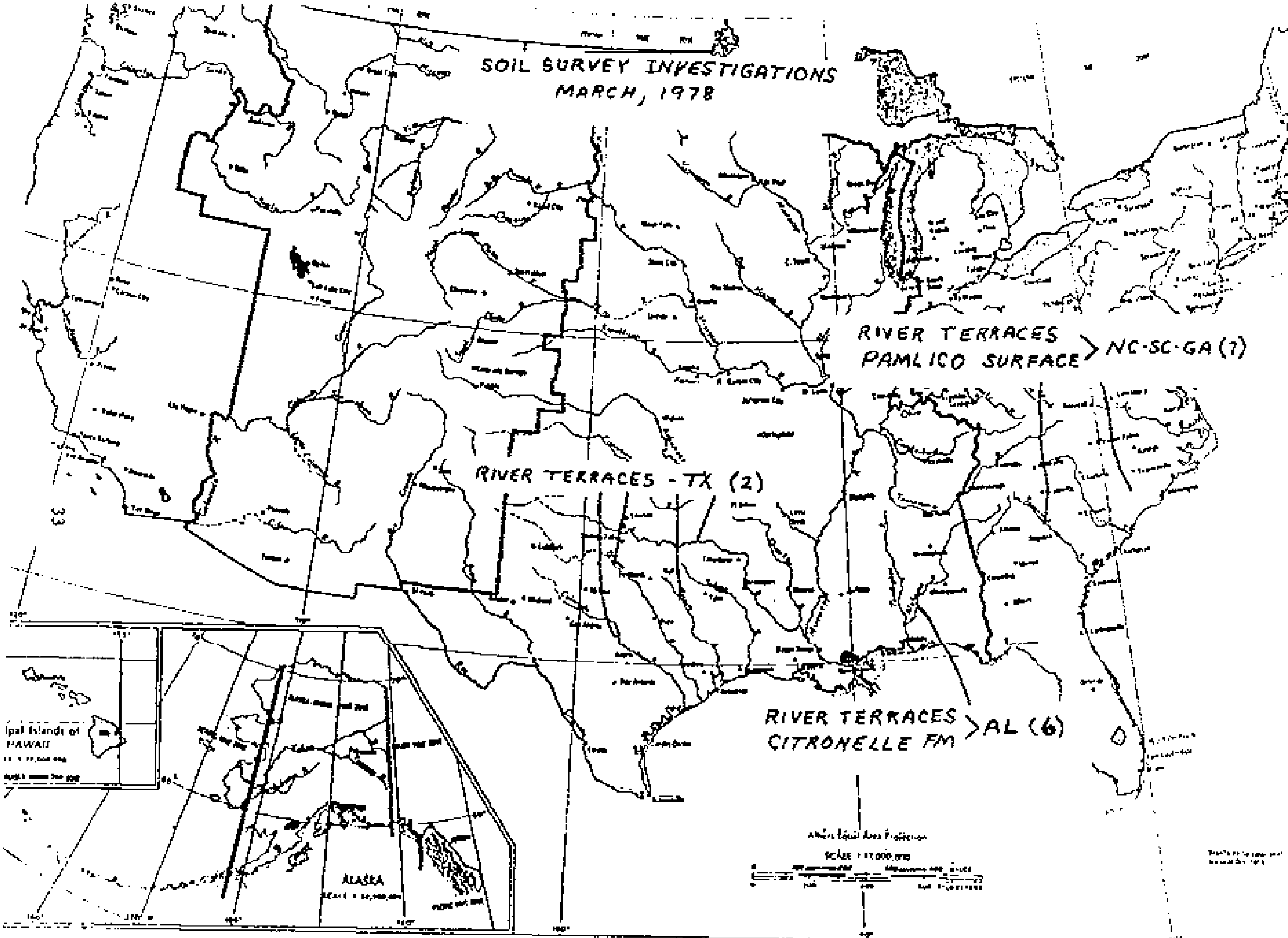
SOIL SURVEY INVESTIGATIONS -- MARCH 1978



SOUTH TECHNICAL SERVICE CENTER AREA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

5,N-35,989


SOIL SURVEY INVESTIGATIONS
MARCH, 1978
RIVER TERRACES
PAMLICO SURFACE
NC-SC-GA (7)
RIVER TERRACES - TX (2)
RIVER TERRACES
CITRONELLE FM
AL (6)
ALASKA

ACTIVE PROJECTS

1. TX-OK, Red Bed Soils

Soils of interest are developed on Triassic, Permian, and upper Pennsylvanian parent materials. The area is located in west central Texas and north and western Oklahoma. Physiographically the area abuts the high plains on the west and on the east merges into other Pennsylvanian materials. A meeting was held in January 1978, involving personnel from the STSC and the states of Texas and Oklahoma to assess current data and to look at possibilities for future action. It was considered that a study transect from west to east in northwestern Texas would be useful. One aspect we are interested in is the clay mineralogy, another is the erodibility of red bed soil materials.

2. TX, River Terraces

This is a study of terraces along the major rivers in northern Texas; i.e., the Brazos, Trinity, Colorado and Red Rivers. Principal studies have taken place on the Brazos and Trinity Rivers. The main purpose is to identify soils, soil development, and soil mineralogy on the respective terrace levels. A summary of present data is available.

3. TX, Sand Sheet Study

The area of interest is south Texas along the coast of the Gulf of Mexico. Characterization samples were collected in May 1977, and in December 1977. Cooperating on the project are scientists from Texas A&M, Texas A&I, Lamar Tech and the SCS. There have been grid transect studies and drill studies in conjunction with characterization sampling.

4. TX, Plinthite

East Texas has a considerable area of plinthite soils that range from a humid into a subhumid climatic regime. There is tentatively scheduled a sampling trip in fiscal year 1978 in Angelina County to examine some of the plinthite soils.

5. LA, Macon and the Bastrop Ridges

The sampling is scheduled April 1978 to examine and characterize soils on the Bastrop Ridge and on parts of the Macon Ridge. Both NSSL and LSU have been interested in soils on the Macon Ridge and have done considerable small project sampling. The present study extends the study eastward onto the Bastrop Ridge.

6. AL, River Terraces and Citronelle Formation

The main thrust of the project is to examine soils on the Citronelle Formation and their relationship to soils on the higher river terraces along the Alabama River. Geomorphic groundwork has been laid by scientists in the state of Alabama along the Alabama River. Sampling is tentatively scheduled for July 1978 to examine field relationships and to sample some of the soils involved. Likely the project will continue for a number of years with periodic assessment of the needs.

7. GA-SC-NC, Pamlico and River Terraces

The main thrust is to examine soil series on the Pamlico in relation to soil series mapped on river terraces upstream from the Pamlico Terrace. Of interest is to follow the kinds of parent materials and soil mineralogy on a given river system to see if they are comparable on the coastal deposition and in the river terrace depositions. Talbert, Gerald of the STSC is coordinating the project,

8. NC-VA-SC-GA, Micaceous Soils

The Bt and C horizons of several sites have been sampled in North Carolina and some in Virginia as indicators of the problems likely to occur on micaceous soils. The principal questions are how much mica is necessary to influence soil properties and what effect does the size of mica have upon soil properties. Work is currently underway on characterization and mineralogical analyses.

9. FL-SC, Spodic Horizons

Florida has gathered information on morphology and a field assessment of water permeability in spodic soils. Ortstein families have been identified and appear related to permeability. NSSL has been involved in the reference sampling in Georgetown County, South Carolina. One of the general questions is an assessment of soil taxonomy criteria for spodic horizons. For example, are the chemical criteria developed to identify spodic materials in the northern states also adequate for defining spodic horizons in the deep sands along the south Atlantic Coast? Also, can some spodic horizons in the southeast be identified by field morphology alone?

10. Southeast, Regional Soil Mineralogy Map

This is a project undertaken by the Southern Region Soil Mineralogy Work Group, The first step, possibly leading to a soil mineralogy map, is making an inventory of soil mineralogy data in the Southeast. A form has been developed for computer input that is compatible with the pedon data record and we are currently involved in gathering data.

11. GA-SC-NC, Pamlico Terrace

Pamlico Terrace has mixed sand mineralogy in some areas and siliceous sand mineralogy in other areas. The thrust of this project is to collect information up and down the seaboard of the Atlantic Coast on the Pamlico surface to assess the mineralogical trends. The project fits closely with project number 7 above, but has slightly different thrust. Results of analyses on several small projects are available.

12. GA-SC-NC, Cecil Soil Survey Interpretations for Buildings

The present soil survey interpretations for buildings indicate a moderate limitation on Cecil and similar soils. Experience with the soils indicates little if any problems associated with foundations or buildings and it is felt that interpretations limitations should be listed as slight. This project is to gather background information, particularly COLE, on Cecil and similar soils in several states where the soils occur. Gerald Latshaw of the STSC is coordinating the project.

13. AL-MS, Montmorillonitic Hapludults

It recently came to the attention of the Correlation Staff, STSC, that montmorillonitic Hapludults occur on Coastal Plains soils in Alabama and likely in Mississippi. Several reference samples were collected to assess the extent of such soils. Dr. Ben Hajek of Auburn University has noted the occurrence of such soils for some time and has gathered a considerable body of information on them. Our intent is to coordinate with his findings and assess the extent of such soils.

14. KY, Characterization of Strip Mines Soils

With the mining interests and the upturn of land areas associated with mining efforts, there is interest in revegetation and utilization of strip mined areas. We are cooperating with the University of Kentucky in characterizing two soils on strip mine lands.

15. MS-Others, Stream Channel Stability (Tractive Force)

This study is undertaken principally by the ARS Sedimentation Laboratory in Oxford, Mississippi. We have cooperated in their studies by providing some characterization data, particularly COLE and moisture properties, on samples that they have collected. We anticipate some activity in the future in this area.

16. AH-LA-OK-TX, Mound Studies

Mounds on the soil landscape have created interest in the eyes of soil scientists for some time. There are currently active field investigations in Jasper and Newton Counties, Texas, to assess composition and soil characteristics of some mounds in that area.

17. AL-GA-Others, Oxidic Mineralogy

There has been considerable interest in reevaluating the definitions of oxidic mineralogy in Soil Taxonomy. Oxidic mineralogy is principally a characteristic of tropical soils and could not be tested very thoroughly on United States soils at the time Soil Taxonomy was written. There have been recent conferences and studies in tropic regions resulting in proposals of Kandiudults. We need to assess these proposed criteria and study how they impinge upon the classification of soils in the southeast region.

18. KY-TN, Aspect. Influence, Forested Soils

This study area centers in the eastern mountainous region of Kentucky and Tennessee. There has been an indication that aspect of the soil on the landscape influences the soil properties. An alternative has been suggested that a cove vs. nose landscape position may have more influence on soil properties than aspect. There have been field investigations by state and regional staffs to look at the problems.

COMPLETED PROJECTS

19. TX, Bailey County

Characterization analyses on soils sampled in Bailey County in 1975 are essentially complete. The active SCS personnel have retired or moved out of the area and it is doubtful that the project will be extended as once proposed.

20. TN, Low Terraces

Characterization analyses on soils sampled in McNairy County are nearly complete. Plans to extend the study to other areas in western Tennessee have been delayed for now.

21. KY, New Albany Shales

The University of Kentucky has completed a sampling project on shales in central Kentucky. A study trip is scheduled in May 1978 on similar shales in southern Indiana. The information gathered on the Kentucky project should be of use.

22. AL-GA-FL, Plinthite Study

A field study of plinthite soils was held in March 1976 in southwestern Georgia, southeastern Alabama, and northern Florida. There were no specific characterization projects that were developed out of that study.

23. SC, Sand Hills

Characterization sampling was completed in Aiken and Kershaw Counties, South Carolina in 1975. The bulk of the analyses were done by Clemson University with some additional information provided by NSSL. The characterization studies are nearly complete.

24. NC, Outer Bank

Studies of soils on the outer bank in North Carolina were undertaken principally by North Carolina State University. The project is essentially complete.

25. TX-OK, **Natric** Subgroups

Soil Taxonomy does not provide for natric subgroups, yet there are soils that logically fit as intergrades to natric great groups. An assessment is needed of the acreage involved, and if sufficient, criteria for natric subgroups should be developed and tested. An **assessment is** also needed on how natric soils and the proposed natric subgroups affect the **K** factor in the soil loss equation.

26. TX-OK, COLE on Loamy Soils

Considerable data for clayey soils substantiates a good correlation of COLE and management, but similar relations for fine-loamy and fine-silty soils have not been examined. Available data should be collected and evaluated to determine what relationship exists and what further study is needed.

27. OK, Chickasha Soil Moisture

Existing data on precipitation soil moisture by neutron probe and soil descriptions for a small watershed need to be analyzed with respect **to** the **udic-ustic** criteria and the results with similar data at other sites. A procedure for analyzing the data needs to be developed. Ron Paetzold, Joe Nichols, and Frank **Newhall** visited the ARS station at Chickasha recently. John **Newhall** may have a computer program utilizing weather station data that can be incorporated to calculate **soil** moisture regimes. This possibility needs **to** be followed up.

28. OK, Oxygenated Water

The problems aligned with this project include soils that appear gray or to have reduced soil colors, but without evidence of soil water table on one hand, and, on the other hand, soils that appear to have oxidized colors but are known to have water table conditions. This may not be one study as such but the two kinds of situations need to be looked into. Part of the problem impinges on classification of wetlands that is not a part of the Soil Taxonomy system.

29. TX, Coastal Plains

Soils of the Coastal Plains in east Texas appear to have the same morphology as soils of the North Carolina and South Carolina Coastal Plains. Soil behavior is considerably different in the two regions. Differences presently are considered climatic. The data are needed to see if there are morphological differences that can be determined in the field or laboratory.

30. t&Others, Loess in the Lower Mississippi River

An effort is needed to pull together data and studies presently available on loess in the southern **Mississippi River** to get a better picture of loess stratigraphy across state boundaries and along the river system. A number of studies have been undertaken in scattered areas, however, in other areas perhaps additional studies are needed to fill in gaps.

31. LA-FL, Marsh Soils

There is a need for additional information on coastal marsh soils for coastal zone planning, management, and development. Work is needed to determine landscape relationships and morphological, physical, and chemical properties of the soils, and the extent and distribution of Histosols, Hydraquents, and firm mineral soils. The salinity, the potential for sulphide induced acidity, and the hydraulic conductivity need to be assessed. The work needs to be coordinated with the studies by Coultas in Florida.

32. AR-LA-TN, Clayey Terrace Soils

The principal area of study is along the Red River in the vicinity of Texas, Arkansas, and Louisiana boundaries. The study is intended to assess taxonomic mineralogy placements on the terrace soils of the Red River (and similarly along the Arkansas River). Similar assessment is needed on the sand mineralogy. It is principally a matter of coordinating assessment of soil mineralogy across state boundaries.

33. MS, High Sodium Soils

The project is centered on the Rosella series in Lownes County, Mississippi. Dr. Vic Nash of Mississippi State University has some studies underway or planned, including characterization and field water studies.

34. MS-OK-Others, Erosion of Dam Sites

This is principally a problem of dispersion or piping or jugging associated with earthen dams such as those constructed by the Soil Conservation Service. George Holmgren of NSSL has been working in conjunction with the Soil Mechanics Laboratory in Lincoln for **several years** in trying to assess the problem and ways of determining materials that will be susceptible to dispersion.

35. TN, Cumberland Mountains

Kentucky, Tennessee, and West Virginia show some differences in mineralogy of soils in the boundary region among the three states, for instance, Anderson and Hamilton Counties, Tennessee. It is principally a study of the weatherable mineral content of the soils and the consequent placement of soil mineralogy groups in Soil Taxonomy.

36. AL, Pre-Miocene

There is a strong correlation between soils and characteristics of outcropping Miocene and older sedimentary formations in the Alabama Coastal Plain. In some areas, there is little relation of soil-geomorphic surface because there is an overriding control of parent material. In other areas, soils can be related to specific landscape positions. These relations within the county need to be firmly established during the early part of the soil survey. Once the soil scientists are trained to understand and gain confidence in their ability to recognize the soil-geomorphic relations, the concepts can be quickly applied to adjacent areas, modified as needed.

37. FL, Thick Reddish B1 Horizons

Some Arenic and Grossarenic Paleudults in Florida (Lake County) have thick reddish B1 horizons in the position where A2 horizons commonly occur. B1 horizons are identified because of their high chroma. A genesis problem arises concerning the formation and persistence of the reddish B1 horizons. As far as utilization is concerned, it is questioned whether the B1 horizons have an effect upon the water holding and transmission properties. Some of these Florida soils are considered high phosphate soils. The Americus series in Georgia has similar properties, but is not so thick.

38. GA-AL, Middle Coastal Plain

Some deposits in the Middle Coastal Plain exhibit tiered arrangements. Soils such as Troup, Lucy, and even fairly uniform looking soils develop in more than one tier. Laboratory data could help in understanding the soil forming processes.

39. Southeast, Halic Horizons

Some soils along the coast of the Gulf of Mexico have properties that show the impingement of the sea on the soil. Proposed halic horizons and halic subgroups of certain taxonomic units have been proposed in a publication by Bartelli, et al. (SSAP 39:703-706, 1975). Persons dealing with soil correlation and field investigations have been urged to assess the possibilities in usefulness of delineating halic soils on landscape and of utilizing hedic criteria in the Soil Taxonomy. At present there is no study dedicated to the collection of data on halic soils.

40. Southeast, Fragipans

Much confusion still exists in the field mapping of fragipans. Studies are needed to (1) develop better criteria for field identification of soils having fragipans, (2) determine if a chronological sequence of fragipan developments and degradation can be recognized and used in describing soils, (3) relate differences in fragic properties to differences in materials in which the soils are developed, and (4) study water regimes and water movement in soils with fragipans.

41. FL, Quartzipsamments

Uncoasted classes of Quartzipsamments are defined in Soil Taxonomy as having a moisture equivalent less than two percent. Moisture retained at 0.5 bar may be substituted for moisture equivalent. If moisture retention data are not available, the silt plus clay is utilized and an amount less than five percent indicates uncoated Quartzipsamments. Data are needed to relate the above properties to visual observations of coatings on grains in Quartzipsamments as assessed by miscroscopic identification.

42. Southeast Data By LRA

We need to look into the possibilities of storing and retrieving data by land resource areas. This can be accomplished most readily once the pedon data record system is operating.

Soil Survey Investigations
Project 2 Texas, River Terraces
Summary: March 1978

Purpose: To study soil mineralogy in relation to soil development, terrace level (geomorphic position), and sediment source.

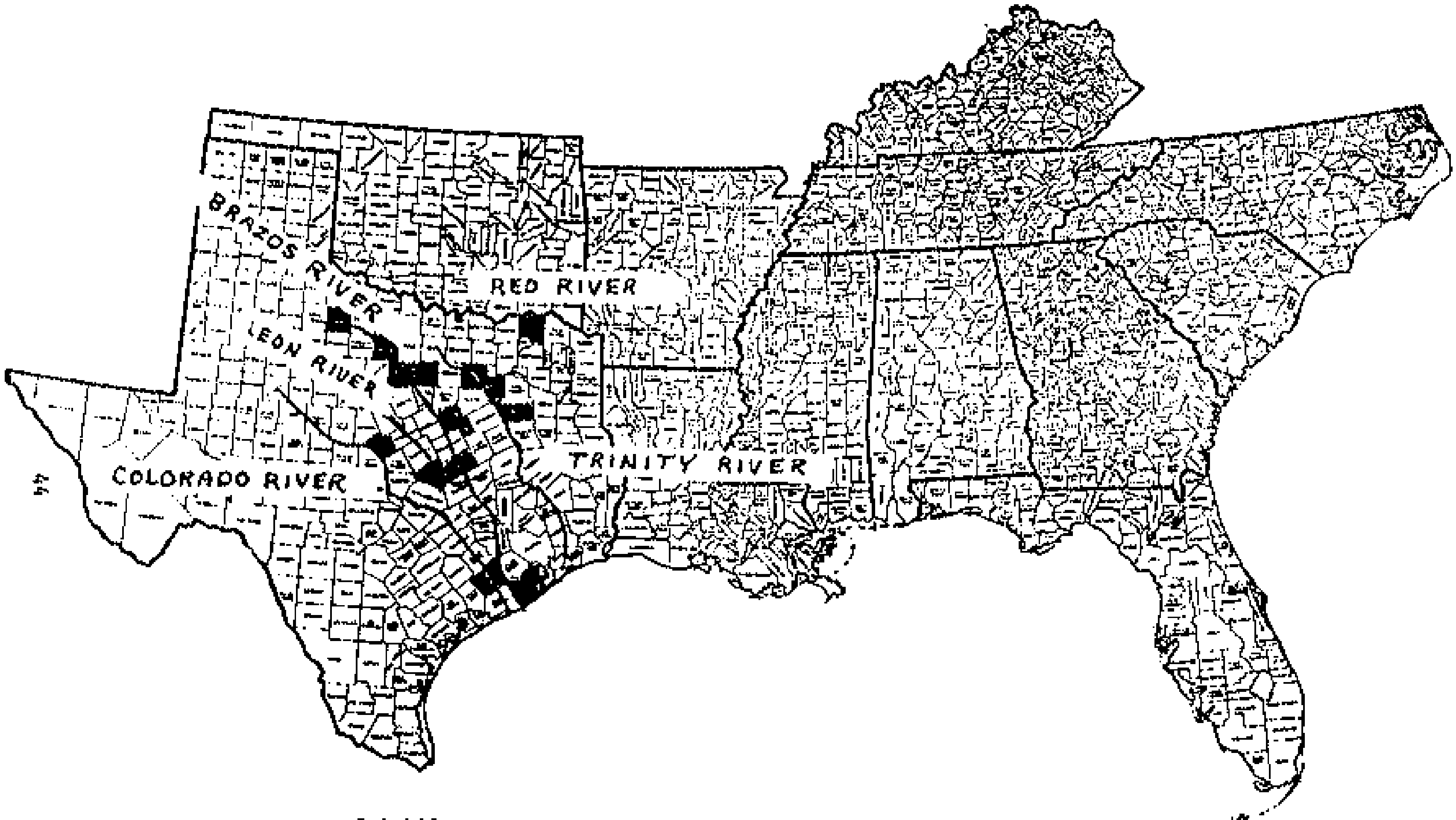
Soils for which sand mineralogy data are available are listed subsequently for studies on the Brazos, Trinity, Colorado, Leon, and Red River Systems. The most extensive work has been on the Brazos and Trinity Rivers.

Information includes series name, soil number, the height of the site (surface) above the adjacent river, landscape position or terrace level, mineralogy family and percent of resistant minerals in the very fine sand fraction.

Soils on the Upper Brazos are in a mixed mineralogy family. Soils on the Lower Brazos, the Trinity, Colorado, and Leon Rivers are in a siliceous mineralogy family. One soil on the Red River is borderline between mixed and siliceous. The Upper Brazos may have a higher contribution from Permian and High Plains sources, whereas the Lower Brazos and Trinity may have a higher contribution from cretaceous sources.

One can pick out some indications of more resistant minerals in the higher terrace levels, but the absolute differences are not large.

TEXAS - RIVER TERRACES (Proj 2)
SITE LOCATIONS



SOUTH TECHNICAL SERVICE CENTER AREA
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

5-N-35,989

Brazos River

County	Soil (Soil No.)	Height Above River (meters) [1/]	Mineralogy Family [2/]
Knox	Miles (S76TX-275-1)	Highest Quat	mixed (RE84)
	Enterprise (S76TX-275-2)	12 (FP)	mixed (RE78)
Young	Enterprise (S76TX-503-1)	3 (FP)	mixed (RE78)
Palo Pinto	Lincoln (S74TX-363-7)	3 (FP)	mixed (RE80) (siliceous-84)[3/]
	Lincoln (S74TX-363-10)	4.5 (FP)	mixed (RE79)
	Yahola (S74TX-363-6)	4.5 (FP)	mixed (RE81)
	Yahola (S74TX-363-11)	11 (FP)	mixed (RE82)
	SND (S74TX-363-3)	9 (T1)	mixed (RE77)
	SND (S74TX-363-5)	11 (T1)	mixed (RE74)
	Bastrop (S74TX-363-4)	15 (T2)	mixed (RE88)
	Decordova (S74TX-363-2)	18 (T2-T3)	mixed (RE84)
	Minwells (S74TX-363-1)	37 (T3)	mixed (RE90)
Parker	Lincoln (S74TX-367-3)	4.5 (FP)	mixed (RE79) (siliceous-82)[3/]
	Bastrop (S74TX-367-2)	11 (T2)	mixed (RE84)
Hill	Aquilla (S73TX-109-2)	9-12	siliceous (RE92)
	Bastsil (S73TX-109-1)	12-15	siliceous (RE96)
	Kopperl (S73TX-109-3)	46-49	siliceous (RE96)
Falls	Desan (S74TX-145-1)	38	siliceous (RE91)
	Silawa (S74TX-145-2)	39	siliceous (RE92)
Brazoria	Brazoria (S76TX-039-1)	FP	siliceous (RE95)[4/]
	Surfside (S76TX-039-2)	FP	mixed (RE80)[4/]
	Velasco (S76TX-039-3)	FP	mixed (RE80)[4/]

Trinity River

County	Soil (Soil No.)	Height Above River (meters)	Mineralogy Family
Dallas	Aquilla (S75TX-113-1)	9 (FP)	siliceous (RE97)
	Energy (S75TX-113-11)	9 (FP)	siliceous (RE96)
	Silstid (S75TX-113-2)	9 (T1)	siliceous (RE91)
	Bastsil (S74TX-113-1)	4 (T1)	siliceous (RE95)
	Dutek (S74TX-113-4)	3 (Tl)	siliceous (RE97)
	Silstid (S75TX-113-9)	11 (T1)	siliceous (RE94)
	Bastsil (S75TX-113-3)	11 (T1)	siliceous (RE96)
	Bastsil (S75TX-113-8)	17 (T1)	siliceous (RE97)
	Silawa (S75TX-113-4)	12 (T1)	siliceous (RE94)
	Silawa (S75TX-113-5)	9 (T1)	siliceous (RE96)

Trinity River (cont'd)

County	Soil (Soil No.)	Height Above River (meters) 1/	Mineralogy Family 2/
	Silawa (S75TX-113-6)	18 (T2)	siliceous (RE98)
	Silawa (S75TX-113-7)	15 (T2)	siliceous (RE97)
	Bastsil (S74TX-113-2)	18 (T2)	siliceous (RE99)
	Silawa (S74TX-113-2)	14 (T2)	siliceous (RE95)
	Bastsil (S75TX-113-10)	32 (T4)	siliceous (RE97)
Kaufman	Styx (S76TX-257-1)	11 (T1)	siliceous (RE95)
Henderson	Dutek (S76TX-213-1)	6 (T1)	siliceous (RE94)
	Silawa (S76TX-213-2)	15 (T1)	siliceous (RE96)
	Eufaula (S76TX-213-4)	12 (T1)	siliceous (RE94)
	Styx (S76TX-213-3)	24 (T2)	siliceous (RE95)
Colorado River			
Mills	Desan (S74TX-333-1)	21	siliceous (RE92)
Wharton	Kenny (S73TX-241-1		siliceous (RE89) 5/
Leon River			
Bell	Kopperl (S73TX-241-1)	high	siliceous (RE92)
Ked River			
Lamar	Konawa	high	borderline

1/ Landscape position or terrace designation in parentheses.
2/ Percentage of resistant minerals (RE) in the very fine sand fraction listed in parentheses)
3/ Sands contain carbonates. On a carbonate-free base the family mineralogy is siliceous. Fine sands contain more resistant minerals than the very fine sands, making the mineralogy siliceous on a carbonate-free base.
4/ Soils are clayey. Sand mineralogy based on small components.
5/ Coarser sands contain enough resistant minerals to make a siliceous family.

Project 2. Texas-River Terraces
Classificarion of Soils

Series	Classification (Soils are in thermic families unless indicated otherwise)
Aquilla	sandy, siliceous, Psammentic Paleustalfs
Bastrap	fine-loamy, mixed, Udic Paleustalfs
Bastsil	fine-loamy, siliceous, Udic Paleustalfs
Brazoria	very fine, mixed, Typic Chromuderts
Decordova	coarse-loamy, mixed, Udic Paleustalfs
Desan	loamy, siliceous, Grossarenic Paleustalfs
Dutek	loamy. siliceous, Arenic Haplustalfs
Energy	fine-loamy, mixed (calcareous), Typic Ustifluvents
Eufaula	sandy, siliceous, Psammentic Paleustalfs
Kenney	loamy, siliceous, Grossarenic Paleudalfs
Konawa	fine-loamy, mixed, Udic Paleustalfs
Kopperl	loamy-skeletal, siliceous, Udic Haplustalfs
Lincoln	sandy, mixed, Typic Ustifluvents
Minwells	fine, mixed, Udic Paleustalf
Silawa	fine-loamy, siliceous, Ultic Haplustalfs
Silstid	loamy, siliceous, Arenic Paleustalfs
Surfside	very fine, mixed, hyperthermic, Vertic Haplaquolls
Velasco	very fine. mixed (calcareous), hyperthermic, Cumulic Haplaquolls
Yahola	coarse-loamy, mixed, Typic Ustifluvents
SND	coarse-silty, mixed, Udic Ustochrepts

STATUS OF NATIONAL WETLANDS INVENTORY

I appreicate the opportunity to be a part of this biannual conference, and especially the opportunity to inform the group of the activities of the National Wetlands Inventory Project.

First, let me give you a little background of the project.

The National Wetlands Inventory is a part of the Office of Biological Services of the U. S. Fish and Wildlife Service, Department of the Interior.

The National Office is located in St. Petersburg, Florida.

I am constantly being asked, "Why is the National Office located in St. Petersburg?"

John Montanari, the Project Leader, gives several reasons:

1. To be near an area with several different types of wetlands.

2. To be located where field trips can be made easily to these wetlands during training.

3. To be easily accessible to travelers:

to name just a few reasons.

The National Wetlands Inventory Project has six employees in the St. Petersburg office and seven regional wetland coordinators in seven regions throughout the United States.

The NWI is responsible for inventorying the wetlands throughout the entire country. Three other agencies are cooperating in the project and have representatives located at the St. Petersburg office

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Presentation by Blake Parker, soil Scientist, Soil Conservation Service on IPA Assignment to the Department of Interior, St. Petersburg, Florida at the Southern Regional Technical Work Planning Conference of the National Cooperative Soil Survey, at Jekyll Island, Georgia, March 13-17, 1978.

of the NWI. These agencies are: The Corps of Engineers; the U.S. Geological Survey; and the Soil Conservation Service.

I am a liaison between Fish and Wildlife Service and the Soil Conservation Service to help provide SCS expertise for the inventory.

Activities the SCS will be actively included in:

1. Quality Control.

a. Review of maps and material at draft stage by SCS state staffs.

b. Assistance in developing a statistical sampling procedure.

c. Field checking, ground truthing, testing wetland maps for accuracy.

2. Field testing of new wetland classification system.

3. Developing a list of "Hydric Soils" to be published as an appendix to the wetland classification system.

a. Hydric Soils are soils that are saturated with water at or near the surface long enough during the growing season to result in soil characteristics associated with wetness within 10 inches of the soil surface.

Wetland: Land where the water table is at, near, or above the land surface long enough to promote the formation of Hydric Soils or to support the growth of Hydrophytes.

Hydrophyte: Any plant growing in a soil that is at least periodically deficient in oxygen as a result of excessive water content (plants typically found in very wet habitats).

How wetland Maps are Made:

(1) Photo interpretation of existing aerial

photography. Color IR by 6X stereoscope.

(2) Wetlands transferred to 1:24,000 U.S.G.S. quads by zoom transfer scope. Minimum field checking.

(3) Published at 1:100,000 maps.

(4) Collateral data - existing wetland maps, soil surveys, et".

b. Eight states were selected for extensive soils and vegetation studies to help develop a list of Hydric Soils:

(1) Arizona

(2) Florida

(3) Louisiana

(4) Maine

(5) Michigan

(6) North Dakota

(7) Oregon

(8) south Carolina

and additional studies in Alaska.

c. The reasons for utilizing these states are as follows:

(1) States with work on NWI project.

(2) One state in each USFWS and SCS region.

(3) States with considerable wetland.

(4) Present pressing problems:

(a) Prime Farmland vs. Wetland.

SCS making prime farmland maps and NWI making wetland maps on same area. Is this possible?

(b) Farmed wetland.

1) Permanently drained - not wetland.

2) Partially drained - pumped, etc.

3) Rice - soybean - rotation. Is this wetland?

Slide presentation followed.

PROGRESS REPORT ON REMOTE SENSING AND ITS

RELATIONSHIP TO SOIL SURVEY

We should start by defining remote sensing as the science of making observations and measurements of objects from a distance without coming into contact with them. In the past, remote sensing has been used as a tool to help soil scientists delineate soil boundaries. In recent years, several new remote sensing techniques have been tried with various degrees of success; therefore, it is increasingly important that we understand these techniques and know when to apply them.

Lets look at some recent events that indicate the importance that the Soil Conservation Service has placed on remote sensing technology.

1. Three years ago, a remote sensing specialist was assigned to the Washington Office to help coordinate SCS remote sensing activities.

2. Shortly thereafter, a multi-disciplined team was placed in Reston to look at developing remote sensing applications in their fields. The original team consisted of a" agronomist, and engineer (myself), and the soil scientist team leader.

3. SCS is almost ready to release a memorandum that assigns responsibility at the State, TSC, and Washington Office level for coordinating remote sensing activities.

4. SCS has recently assigned, for the second time, a soil scientist with the Laboratory for Application of Remote Sensing (LARS)

Presentation by George Murrell, Engineer, Soil Conservation Service, Remote Sensing Team, Reston, Virginia at the Southern Regional Technical Work Planning Conference of the National Cooperative Soil Survey, at Jekyll Island, Georgia, March 13-17, 1978.

Purdue University.

There have been several studies completed in recent years that some of you, I'm sure, arc familiar with. Here are some of the studies that we think are worth mentioning.

-The SCS in Missouri entered into an agreement with Purdue and LARS to look at Landsat satellite digital data as an aid in mapping soils. Ival Persinger was the principle investigator for SCS. They classified by computer techniques one frame of Landsat multi-spectral scanner data in this pilot study. The output was a 1:24,000 scale line printer map. Fourteen classes of soil reflectance were separated, using the four wave length bands available. This procedure, although not adequate for detailed surveys, does show promise for more general studies. The improvement of the resolution on future satellites may make the procedure even more effective.

-Horace Huckle (SCS) and Thomas Hammond (NASA) were the principle investigators of a study in Florida to compare color infrared (CIR), black and white, Landsat and aircraft multispectral scanner, and skylab imagery on two different study areas. Analysis equipment, such as the Image 100 and Digicol, were tested in addition to visual image interpretation. Twelve transects were used to test the accuracy of the various delineations. It was concluded that Landsat could not bc used for detailed soil maps, hut could be used to mark potential soil delineations for subsequent field examination. Landsat would become more useful for more generalized maps. The authors believed that CIR photography provided the best delineations using visual comparisons, although they pointed out that other authors had preferred true color. We suspect that atmospheric conditions at the time of the overflight would affect these judgements. Also, soils in some areas may show more contrast with infrared wave lengths, while in other areas, soils delineate easier in the visable spectrum. Certainly the ability of infrared wave length energy to penetrate haze would indicate its superiority on hazy days. The authors also concluded that transparencies were of more value than prints. Finally, they stated that skylab CIR imagery could be used as a cost effective base map for soil survey publication.

-Louis Cullipher, SCS soil scientist in Virginia, led a study in the Barrier Islands using CIR photography. This study was unique in the fact that reflectance of naturally occurring vegetation was the key to determining the soil mapping units.

-Bird, Daniels, and Birdwell of SCS and Buol of North Carolina State completed a study in Dare Co., North Carolina evaluating the use of CIR and black and white infrared photographs for soil survey. In this study, the CIR photographs were excellent for separation of vegetative types; however, the larger scale photographs were a little too bulky for field use. In this study, the researchers also noted that changes in vegetation corresponded to changes in the soil. In some areas, the photographs alone were not sufficient to allow the team to separate contrasting soils. With some ground truth, they were able to make the distinctions necessary for third order surveys.

-Larry Humphrey, with the Bureau of Land Management, has been using spectral reflectance maps as another tool in soil surveys. Among the advantages he listed for using this tool is the increased speed of mapping. Among the disadvantages is the possible confusion from the mass of data available to the inexperienced user.

-Dr. Peck, with the National Weather Service has done some soil moisture studies using gamma radiation. Dr. Peck has shown that the naturally emitted gamma radiation from the upper portion of the soil profile can be measured and that the moisture content of the surface is directly proportional to the attenuation of these gamma rays. This method is restricted to low level aircraft and therefore is suited to relatively small areas.

-Dr. Peck's work and other remote sensing studies in recent years have indicated a strong desire to improve our methods for measuring soil moisture. Some studies have been undertaken to relate soil temperature to soil moisture. The soil temperature is measured using naturally emitted thermal infrared radiation. Another remote sensing tool being tested is the measurement of microwave radiation. One project using this scheme is the microwave experiment being planned by ARS, SCS, and NASA. This experiment is one of several low altitude experiments in preparation for microwave use in deep space; for example, the space shuttle. Six different microwave and radar sensors are to be flown over Chickasha, Oklahoma area at three different times, Within an hour of the overflight, intense ground sampling will be done in the target areas. It is hoped that one or a combination of these sensors will provide soil moisture information. I must point out that the soil moisture being determined is only the surface soil moisture because microwave radiation only penetrates the upper few centimeters of the soil profile. Although this soil moisture determinant may not be useful to some soil scientists because of its depth, it will certainly be significant to persons working with soil erosion and rainfall runoff.

What does the future hold for remote sensing in soils?

1. First, we should expect better quality and more recent imagery. We should expect to use more color and CIR imagery. We should also expect the use of remote sensing for soil moisture determination.

2. I think the future looks bright for the use of satellite imagery. Just last week, Landsat 3 was launched. Landsat D, scheduled for launch in 1981, will have 30 meter resolution rather than the 80 meter of Landsat, 1, 2, and 3. It will have six bands; four visable, one middle infrared, and one thermal. Each band will be able to distinguish between 256 levels of intensity or levels of grey. So you can see the possiblities that will exist to develop reflectance signatures for earth surface features such as soil.

3. It is hoped that, in the future, soil scientists will be able to relate the physical and chemical properties to their multispectral signatures. SCS is cooperating with LARS at Purdue and NASA to look at 255 benchmark soils to (a) determine the wave length bands highly correlated with soil properties important to soil mapping, and (b) to correlate the soil properties with spectral response in different climatic regions.

4. In the future, we might be able to infer soil properties by methods such as variation of soil moisture with time.

5. We expect in SCS to emphasize training and better coordination

coordination of remote sensing activities in the future. The training effort has already begun by introducing slide/tape mini-courses on the fundamentals of remote sensing.

In summary, remote sensing has been used by soil scientists for years; however, we feel that the science is in its infancy. As the new techniques are improved, we must keep abreast of the state of the art. As we are called upon to do more work, we must realize that although remote sensing probably will never replace the person in the field, it will, when used as a tool, increase our efficiency.

RECENT DEVELOPMENTS IN THE NATIONAL COOPERATIVE SOIL SURVEY

The National Cooperative Soil Survey has always been a dynamic program and the past two years since your last conference have not been different. Adjustments have been made to accelerate the making and publishing of soil surveys to meet the expanding need for soils information. The progress made has been the result of excellent cooperation by participants in the National Cooperative Soil Survey. New adjustments and a continued cooperative effort will be needed to meet current and future challenges.

Last week we held a workshop in Chicago for State soil scientists and representatives of principal cooperating agencies. This was the first time all State soil scientists and representatives of cooperating agencies had assembled to discuss soil survey subjects and problems of mutual concern. The objective of the workshop was to review the job remaining to complete the soil survey nationwide and evaluate key program elements affecting the completion. Discussions centered primarily on two broad subjects, planning needed to complete the soil survey and how to meet new and varied demands for related soils information. Reflecting on the discussions, many new ideas were presented that will lead to recommendations to increase the efficiency and effectiveness of the National Cooperative Soil Survey.

At present, soil mapping is completed for about 63 percent of the Nation. Puerto Rico, the District of Columbia, and the States of Maryland, Delaware, Hawaii, and Rhode Island are completed. An exploratory soil survey of Alaska has also been finished. Of the approximately 3,100 recognized soil survey areas, soil mapping has been completed for about 1,400 and more than 1,000 have been published. The rate of soil mapping has increased from about 43 million acres in 1970 to 57.5 million acres in 1977. During the same period, publications increased from 32 to 97. Increased participation and contributions by State and local agencies have been significant in achieving this acceleration.

The task is far from completed. There still remains about 850 million acres to be surveyed, and about 1.5 billion acres to be published. The Soil Conservation Service made some organizational adjustments to improve the efficiency of handling the increased workload due to overall acceleration. The States have received increased responsibilities for soil survey activities. The Technical Service Center staffs have received additional quality control responsibilities. For similar reasons, the Cartographic functions for National Cooperative Soil Survey work were also decentralized to the Technical Service Centers. The Spartansburg unit was closed in September 1977. These adjustments were made to be more responsive to workload needs and to increase management efficiency

We have generally considered the useful life of a soil survey to be about 25 years. As States near completion of soil mapping, priorities will change, Some of the earlier surveys will need to be evaluated for possible updating and remapping. Nationwide, the priorities for these needs must be balanced against those for completing once-over mapping. As priorities change, staffing patterns and funding level adjustments will also be required. To maintain expertise and efficiency, these changes will need to be planned and carried out in an orderly manner.

More interest and greater concerns about our natural resources and environmental quality are increasing the demands for soil surveys. New legislation, such as the Soil and Water Resources Conservation Act of 1977, the Surface Mining Act, and the Rural Clean Water Act are expanding the applications of soil surveys. Other Federal and State agencies have similar responsibilities and needs for soil survey information. A large volume of soil data has been collected while making soil surveys. Unfortunately, much of this data are not well organized and readily available for extension to areas other than that where it was obtained or for developing new kinds of interpretations. Information about soil performance when used for waste disposal or response to practices for overcoming soil limitations for various uses are some examples of the need for better use of existing data or the need for additional data.

We not only must develop a soil data system to organize our soil survey information to strengthen soil interpretations but we must also evaluate how the information can best be presented to those who use it. We still have the need to furnish soil information about specific sites for the land manager and this is expected to continue. There is a” expanding use of soil survey information for evaluating areas for best use and those having potential for use improvement. To best meet these later needs, a change in publication format or supplemental publication may be desirable.

The National Cooperative Soil Survey is a viable program. It has successfully met many tests in the past through unselfish efforts of all cooperators. The opportunities for a successful future are equally good.

Southern Regional Technical Work Planning Conference
of the National Cooperative Soil Survey
Jekyll Island, Georgia
March 13-17. 1978

The following report was presented, by invitation, to the National State Soil Scientist Workshop, Chicago, Illinois. March 6-8, 1970. It should be of interest to this Conference.

Summary of State Agency Soil Mapping Program Support in Southern Region*

The following summary is for 12 states in the Southern Region. exclusive of Virginia and Puerto Rico, as of 1 March 1978.

Each state has an experiment station representative for soil survey. This person may devote as little as 1/4 time equivalent (FTE) or up to full time on the work. Most states have other personnel working with him in such work as map compilation, laboratory procedures, and correlation activities. Over 32 FTE's were so reported, in total, for this category.

No state reported actual sail mappers as experiment station employees, but two states (FL, NC) reported state funding for the cost of SCS mappers. Florida reported some $360,000 funded end North Carolina reported funds (amount unspecified) for six SCS mappers on winter assignment.

Six states (KY, LA, NC, OK, SC. TN) reported that other state agencies employ soil mappers. The agencies can be generally described as related to conservation and natural resource type organizations. Forty-seven. plus, FTE's were so reported plus at least one FTE in a supervisory position (KY).

All but one state reported cooperative work with their highway departments in providing laboratory support in processing engineering samples. This estimates to a total of about four FTE's for the reporting states.

I" summary, the several Southern Region Agricultural Experiment Stations tend to put more emphasis on providing correlation and laboratory support rather than on actual soil mapping operations. However, a significant numbers of soil mappers are provided by other state agencies in over half of the states. State highway department laboratories are active in processing engineering samples provided by the cooperative soil survey. I" total. by conservative estimate, over 85 FTE's are provided from "on-SCS sources in support of the National Cooperative Soil Survey program in the Southern Region. exclusive of the dollar fundings in Florida ."d North Carolina. This equates to over seven FTE's average, for each of the 12 reporting states.

H. H. Bailey, University of Kentucky
Representing the Southern Region

*Data verified at 1978 Southern Regional Technical Work-Planning Conference of the National Cooperative Soil Survey, Jekyll Island, Georgia. March 13-17, 1978.

Southern Regional Soil Survey Work Planning Conference
March 13-17, 1978

Committee 1 - Updating Soil Surveys

Chairman - Richard 1.. Guthrie
Vice-Chairman - M.E. Springer

Charges to Committee:

1. Develop simple and easy to comprehend descriptions, tabular and graphic illustrations, including photographs, diagrams, charts. tables and maps to clarify published surveys for layman usage.'

2. Categorize soil surveys according to validity of information on a regional basis and determine necessary inputs (general) to make the summary more usable.

3. Explore economical and practicable means of updating soil maps.

   a. New photo basis using old line works.

   b. MIADS using small cell size (4 hectares or smaller).

   c. How can soil maps be updated to reflect urban growth without extensive map compilation and finishing?

   d. Can AMS be used effectively to update all maps?

Committee Report

Charge 1

Methods to improve the usability of published soil surveys.

1. Modify the present method of listing tables in the soil survey. Place the table number after the subject head in the "Contents," i.e. *Climate (Table 1). A footnote would read: *See the summary of tables for the location and content of the tables referred to in this section. The "Summary of Tables," which follows the "Index to Soil Map Units" in the present format, would list the tables in numerical order rather than by subject matter. This method would make it easy for the user to locate the narrative and the tables.

   There was a suggestion to have the tables with the text, as done prior to the revised format. Most comments indicated they prefer all the tables together at the end of the text.

2. It was suggested to show the brief soil description for the mapping unit in an abbreviated block form rather than in the narrative. Most reviewers suggest keeping the narrative description. Several suggested that the "brief soil description" in many cases has become too long and detailed. One reviewer suggested making more combinations in describing the typical soil rather than describing so many individual horizons with specific details about each. An example of the abbreviated format would be:

   > "Typically, the surface layer is brown loamy sand 8 inches thick. The subsoil from 8 to 52 inches is mottled brown, gray, and red sandy clay loam. The substratum from 52 to 65 inches is mottled gray and brown sandy loam."

   This brief description would provide adequate information about the typical soil. The more detailed discussion of the individual horizons can be self-defeating if the lay reader cannot or will not make the effort to read and comprehend the significance of all the soil characteristics and qualities. There was a suggestion to include diagrams (attachment) of each soil profile to accompany the brief description. Profile diagrams are usually more illustrative than photos and may help users to understand soil morphology.

   Another advantage of the briefer description is that it could be culled from the report for use in special resource inventory reports, conservation plans, etc. Many descriptions are being rewritten in a briefer format for these uses. More detailed information about the typical profile is available with series descriptions in the section "Soil Series and Morphology."

Charge 1 (cont'd)

Summary

Additional suggestions for charge 1 from the committee members and from the conference were not extensive. This is an indicator that the members of the conference are not too dissatisfied with the overall format of the soil survey and the degree of flexibility available to the author in preparing the manuscript. Although this seems to indicate satisfactory progress in improving the publication, there is a continuing need to explore the needs of the user and improve the content and usability of the soil survey. Most of the discussion at the conference centered around the "brief soil description" and the importance of conscientiously surveying users needs. A plea was made for making soil maps easier to use by compiling those cultural features which are familiar to local people.

Recommendat ions

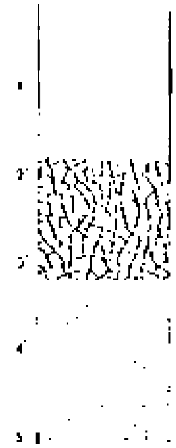
1. The "brief soil description" should be simplified as much as possible while retaining a definite reference to the representative profile described in detail in the soil classification section.

2. Properly referenced profile diagrams should be considered as a means of illustrating "brief soil descriptions."

Ap	[illegible]	[illegible] brown silt loam; [illegible]
A12	[illegible]	[illegible] brown silt loam; [illegible]
B1	[illegible]	Reddish [illegible] silty clay loam; subangular blocks
B21t	22-30	Reddish brown silty clay loam; subangular blocks
B22t	30-46	Reddish brown heavy silty clay loam, subangular blocks
B3	46-60	Reddish brown heavy silty clay loam; subangular blocks

MAIN USES AND LIMITATIONS: Cropland; severe erosion on slopes; moderately slow permeability.

Figure 10. Profile of Pond Creek.



A1	0-14"	Reddish brown silt loam; granules
B1	14-21	Reddish brown silty clay loam; granules
B21t	21-32	Reddish brown silty clay loam; granules
B22t	32-39"	Reddish brown silty clay loam; subangular blocks
C	39-46	Red partially weathered silty red beds

MAIN USES AND LIMITATIONS: Cropland; severe erosion on slopes; moderately slow permeability.

Figure 11. Profile of Kingfisher.

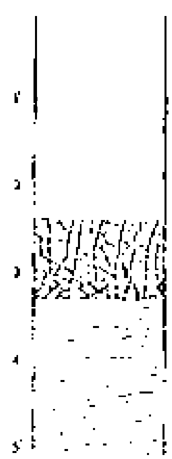
Natrustoll

Ap	0-9"	Brown silt loam; granules
B21t	9-17"	Brown silty clay; prisms and blocks; alkaline
B22t	17-22	Brown silty clay; blocks; slickensides; alkaline
B31	22-39"	Brown heavy silty clay loam; blocks; slickensides; alkaline
B32	39-49"	Brown heavy silty clay loam; blocks; slickensides; alkaline

MAIN USES AND LIMITATIONS: Cropland; very slow permeability; droughty; erosion on slopes; high shrink-swell potential.

Figure 12. Profile of Foard.

Haplustoll



A11	0-16"	Brown silt loam; granules
A12	16-27	Reddish brown silty clay loam; granules
B2	27-35	Reddish brown silty clay loam; subangular blocks
C1	35-54"	Reddish brown silty clay loam; massive
C2	54-60"	Red silt loam, massive, calcareous

MAIN USES AND LIMITATIONS: Cropland and improved pastures; slow permeability, some flooding.

Figure 13. Profile of Port.

Charge 2

Categorize soil surveys according to validity of information on a regional basis and determine inputs (general) to make the summary more usable.

Tentative classification of soil surveys according to kind and date

Recent (Correlated since 1 Jan 1965)
- D detailed
- D-R detailed-reconnaissance
- R reconnaissance

Photobase maps - 1957 to recent

Line maps - 1957 to recent

1941 to 1956
1935 to 1940
Before 1935

When status is displayed on maps, more than one map will be necessary in those states where new surveys overlie older ones. Depending upon the kinds of surveys available each state can regroup or simplify the legend to fit its condition. Perhaps some states will describe each of these classes in terms of the interpretations that can bc made or in terms of what interpretations should be updated.

There is no easy way to handle those counties which have two surveys e.g. Henry County, Tennessee which has a line map published in 1958 and an older survey dated 1925. Perhaps preparation of one historical map would take care of the past. Then further effort could bc devoted to updating modern status maps each year. The modern status map could delete the older surveys and handle them with a footnote or reference to the historical map.

Recommendation

No action was recommended for this charge. The concensus of the conference is that there is no need for a regional summary based on validity of information. The committee offers the above classification for the use of states as they see fit.

Charge 3

Explore economical and practicable means of updating soil maps.

Transferring old line maps to new photo bases

The soil survey of Limestone County, Alabama is currently being updated by transferring the published survey to a photobase. Fieldwork for this survey was completed in 1941. but it was not published until 1953. Although the soils were mapped on aerial photos (1:15,840), photos were not used as the map base for publication. Instead, the base map for publication is a line map which was constructed from USGS 7½' quadrangles. The publication scale is 1:24,000.

Limestone County is a small county where the production of cotton and cash grain crops is very extensive. A small percentage of the land is used for woodland and urban development. An evaluation of the existing survey revealed that it is adequate for planning the use of most of the land in the county, although the lack of a photographic background limits the usefulness of the soil maps.

The procedure for updating the soil maps consists of transferring the published line map data to soil survey photobase atlas sheets (attachment) on a light table, preparing a symbols overlay, and making litho copies from the completed photobase and symbols overlay. High altitude photography, acquired in 1976, was used by the Fort Worth Cartographic Unit to prepare atlas sheets for the county at 1:24,000 scale.

As soon as the first atlas sheet was completed, it was sent to a soil scientist for field checking. The evaluation of the transfer work indicated that this kind of update is satisfactory. The transfer work is being done by a technician who is experienced in soil map compilation.

In addition to updating the soil maps, the soil survey interpretations (attachment) were also updated. Forms SCS-6 were completed for each soil mapping unit in the list of mapping units. For those soil series names which are not currently recognized, the file code number for a very similar currently recognized soil series was used. Critical phases were altered from the ranges given in the published name, if necessary, in order to enable the computer to generate interpretations for every mapping unit. The computer generated tables were revised as necessary by typewritten entries, then reduced to page size for duplication.

The costs incurred in this update are:

$200.00 per atlas sheet for map transfer
(46 sheets x $200.00 = $9,600.00)
per 100 copies of each atlas sheet for local use
(46 sheets x $19.00 = $874.00)
$2,500.00 for acquisition of aerial photography
$80.00 for computer generated interpretive tables
$80.00 for 100 copies of interpretive tables
$2,000.00 for preparation of map compilation materials

Total cost = $15,134.00

Soil surveys for three watersheds in Louisiana have recently been updated by transferring older surveys from one photobase to newer photography. A total of 144,000 acres was manually transferred from 1:15,840 photos to 1:20,000 photos, then field checked. Each atlas sheet (8,000 acres) required about 2 hours to transfer. Field checking required 2 days to 1 week for each atlas sheet. The entire job required about one year to complete. About three years would have been required to remap the area.

Louisiana reports that all watershed areas are being updated in the same manner. Transferring lines to atlas sheets and field checking is 2 to 4 times less expensive than remapping, depending on the quality of the original survey.

Most states indicated that updating surveys to newer photography usually is limited to small tracts and generally consists of remapping.

<u>MIADS maps using small cell sizes (less than 4 hectares)</u>

Most states reported some use or interest in using MIADS maps, but most have not used small cell sizes. SCS in South Carolina has digitized one county using 16 hectare cells, but have no plans to do other counties. The South Carolina Land Resources Commission plans to computerize soil maps by topographic quadrangle, but only one quadrangle has been completed. No maps have been updated using this procedure.

Soil surveys for several counties in the 7-state Tennessee Valley Authority service area are being digitized in 2½ acre cells in a cooperative program with TVA. SCS in Kentucky is digitizing new soil surveys using 2½ acre cells. The main purpose of these activities is to acquire a data base for interpretive maps. So far, soil maps have not been updated using these procedures.

How can soil maps be updated to reflect urban growth without extensive map compilation a-finishing?

Most states did not respond to this item. Others indicated that updating surveys in urban areas has not been needed.

Can AMS be used effectively to update all maps?

The answer to this question appears to be yes, maybe. The hardware appears to have this potential but the software has not yet been developed. Capabilities of the' AMS system are still largely unknown. Perhaps AMS will be ready when pressures for updating maps become great.

Summary

Very little interest in updating soil maps is apparent among states in the South. In some states it is felt that so little is gained by transferring lines from one base 'to another that more is accomplished by updating interpretations for the old mapping units and producing single purpose maps. As so little has been done, it is probably not realistic to compare costs, advantages, disadvantages, etc. of updating versus remapping, although the methods discussed do appear to be less expensive than remapping. Map transfer and field checking certainly are less costly than remapping and may be all that is needed to update many soil maps. MIADS and AMS do not presently offer the capability to update maps, but mainly have potential for preparing interpretive maps.

Recommendation

Updating soil maps should be assigned a lower priority than updating interpretations. Unless a survey is re-published, original soil names and symbols should be retained so as not to make the published survey obsolete. If maps are updated, the transfer of old lines to a new photobase produces a new map of reasonable quality at a very low cost.

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…L EXPERIMENT STATION
…AGRICULTURE AND INDUSTRIES

APPROX. SCALE 2.64" = 1 MILE

SOIL SURVEY FIELD SHEET
LIMESTONE COUNTY, ALABAMA
ADVANCE COPY SUBJECT TO CHANGE

ATLAS SHEET NO. 2

TABLE 55.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. The estimates were made in 19__. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Cotton lint	Soybeans	Corn	Wheat	Pasture	Grass hay
	Lb	Bu	Bu	Bu	AUM*	Ton
AE, AmF, AmD----- Abernathy	1,000	45	110	50	11.0	4.3
BaH----- Baxter	---	---	---	---	5.0	3.0
BaN----- Baxter	450	20	62	35	6.0	3.4
BaF----- Baxter	---	---	---	---	---	---
BaE----- Baxter	700	25	68	50	8.0	4.5
BaL----- Baxter	---	---	---	---	5.5	3.3
BxD----- Baxter	450	20	62	35	6.0	3.4
BxJ----- Baxter	---	---	---	---	---	---
BxQ----- Baxter	700	25	68	40	8.0	4.0
ByE----- Baxter	---	---	---	---	5.0	3.0
ByD----- Baxter	400	17	50	30	5.5	3.3
BfE----- Bodine	---	---	---	---	4.0	2.4
BiL----- Bodine	---	---	---	---	4.5	2.7
Bf----- Bruno	---	---	---	---	4.0	2.4
Cl----- Capshaw	650	30	65	35	8.0	4.8
CkB----- Cookeville	775	34	86	45	8.0	4.8
CkE, CkD----- Cookeville	850	38	92	50	10.0	6.0
CcD----- Cookeville	725	30	75	40	7.5	4.5
CdE, CfD----- Cumberland	900	30	80	40	9.5	5.7
CgE----- Cumberland	800	30	60	35	8.0	4.4
CmF----- Cumberland	1,000	35	90	45	10.0	6.0

See footnote at end of table.

Southern Regional Technical Soil Survey
Work Planning Conference

March 13-17, 1978
Jekyll Island, Georgia

REPORT OF
COMMITTEE II - WASTE DISPOSAL ON LAND

A. Charges to the Committee

1. Identify parameters that must be met for safe waste disposal, comparing state guidelines with EPA guidelines. Explore categories of waste that can be considered together for land disposal and list.

2. Prepare a list of different kinds of waste and determine the need for the development of guidelines for disposal of these wastes.

3. Summarize available data on morphological effects of waste disposal on or in the soil.

4. Determine the experimental work now under way in the region and prepare a summary for the conference.

5. Determine, and list by priority, current research needs relative to fitting waste disposal to specific soil conditions.

B. A Summary of Recommendations to the Charges

1. The charges for the most part were to gather information, thus do not lend themselves to specific recommendations by the committee. We did find areas that need implementation or further exploration. They are as follows:

   a. We recommend that a team of interdisciplinary personnel be administratively assigned the task of developing guidelines for rating soils for disposal of the various kinds of wastes by the various processes developed for waste disposal on land. (See Charge 1, item 5)

   b. We recommend that in conjunction with or upon completion of the development of a complete set of guidelines for waste disposal on land a computer storage program be developed for rating soils for waste disposal. (See Charge 1, item 6)

c. We recommend studies as to means for establishing long-term monitoring programs to record changes to soil morphology as various wastes are applied to that soil. Analyses should consider in situ behavior of the soil as well as currently developed characterization procedures. We also recommend that the soil in question be classified by the criteria used in Soil Taxonomy so that information obtained can be projected to similar classes of soils. (See Charge 3, item 2)

d. We recommend that Committee II be discontinued in favor of the recommendation given in Bla, above. If the steering committee overrides our recommendation to drop the committee, we suggest that future charges be narrowed to specific topics that are within the capabilities of a committee of this kind.

Discussion of Charges

C. Charge 1 - Identify parameters that must be met for safe waste disposal, comparing state guidelines with EPA guidelines. Explore categories of waste disposal that can be considered together for land disposal of waste and list.

1. Washington Advisory SOILS-14, issued May 8, 1973, (referred to hereafter as Advisory 14) lists interim guides for rating limitations of soil for disposal of waste. Tables 1 and 2 from that advisory are included in this report as Appendix 1. The parameters listed have been tested and recommendations for improvement are given in the various 1976 Regional Technical Work Planning Conferences and in the 1977 National Work Planning Conferences.

2. The Environmental Protection Agency has distributed a manual entitled "Process Design Manual for Land Treatment of Municipal Wastewater, EPA 625/1-77-008" (hereafter referred to as EPA Manual). The parameters used there meet EPA standards and conform to those listed in Advisory 14.

3. The parameters given in the SCS manual "Agricultural Waste Management Field Manual" dated August 1975 also conform to those listed in Advisory 14.

4. Categories or processes of waste disposal that can be grouped together for land disposal of wastes are as follows:

Liquid	Solid
Slow rate	Surface application
Rapid infiltration	Landfills
Overland flow	Conposting

The categories for liquid disposal are described and discussed in Chapter 2 of the EPA Manual. Those for solid disposal are self explanatory and are discussed in many texts on solid waste disposal on land.

5. Although the documents listed in items Cl, 2 and 3 above are adequate for disposal of certain kinds of wastes by certain processes, they do not provide adequate guidelines to rate soil limitations for all combinations of these factors. For example, Table 1 in Appendix 1 is not designed for disposal of liquids by overland flow, a process which is favored by slow impermeability and which would not penalize slowly permeable and/or poorly drained soils. The EPA manual deals only with municipal wastewater and the Agricultural Waste Management Manual deals only with agricultural wastes.

   In view of the complexities involved, we feel that it is not within the capability of committee assignments to meet charges of the kind assigned to this committee. Regional and national committees have explored these topics for several years without arriving at a final solution for disposal of the various kinds of wastes by all of the processes available for waste disposal. We feel that a team of experts from the disciplines concerned with waste disposal should be assigned the tasks previously assigned to committees and that they be charged with providing guidelines for rating soils for safe waste disposal, including various kinds of wastes by the various processes used for disposal.

6. During discussions of the committee report there was a proposal to provide space on the SCS-SOILS-5 for waste disposal ratings. It was pointed out that considerable space would be required to rate a particular soil for various categories of waste by each of the processes that could be used to dispose of the waste on the land. Also, waste disposal is an "area" proposition which calls for consideration of the size of a map unit, its location, and other considerations in addition to the soil per se. There were also questions as to how often the information would be needed within a given area. Finally, it was pointed out that present guidelines are not adequate to develop an ADP storage and rating program.

There was general agreement, however, that computer storage of coordinated ratings of soils for waste disposal would be highly desirable, regardless of whether printed on the form 5 or used to print special tables upon request. The committee feels that such a program should be developed in conjunction with or on completion of the development of satisfactory guidelines.

7. Recommendations to Charge 1 are given in item B of this report.

D. Charge 2 - List different kinds of waste and determine the need for the development of guidelines for disposal of these wastes.

1. Most references to "kinds" of waste are listed in terms of origin of wastes, such as animal wastes, cannery wastes, sewage sludge, etc., and the committee interprets the charge to mean listing these with suggestions for the need to develop guidelines for the disposal of each. But the composition of each kind of waste is variable, depending upon source of input, pretreatment efficiency, management changes and other considerations. For example, how can one characterize cannery wastes which today involve tomato soup, tomorrow beef soup and the next day alkalies to clean the system?

   A more logical approach would be to characterize waste by origin and, under each type, indicate the following components:

   a. Hydraulic load
   b. Oxygen demand
   c. Salt concentration and composition
   d. Heavy metals and potentially toxic inorganic ions
   e. Toxic organic compounds
   f. Pathogens

   These components are defined in most standard references to waste disposal. In the opinion of the committee, the guides in Advisory 14 and in the EPA Manual are designed to predict the interaction of these waste components with soil parameters, except that Advisory 14 considers only non-toxic wastes. Thus we did not list "kinds" of waste *per se*.

E. <u>Charge 3 - Summarize available data on morphological effects of waste disposal on or in the soil.</u>

1. The committee found very little published work on this subject which suggests a possible area of research needs. Many publications document the successes, failures and limitations of using soil as a waste disposal medium. But most reports or releases document what leaves the soil, either through the soil, over the soil surface, or what is removed by crops. Apparently little has been reported on soil monitoring *per se* to determine if physical, chemical and/or mineralogical changes take place over a period of time as soil is subjected to waste disposal.

   Of the physical aspects, changes in permeability would be highly significant because of its role in the design of disposal systems. Chemical changes could affect the ion transport ability of the soil which is significant from the standpoint of application rates, rest periods, plant removal and rainwater dilution. There is a possibility that changes in clay mineralogy could change ion balances through the addition of wastes over a period of time.

2. For the reasons given above, the committee recommends studies as to means for establishing long-term monitoring programs to record changes to soil morphology and associated properties as various wastes are applied. We also recommend that the soils used for study be classified according to the criteria in Soil Taxonomy so that the information obtained could be projected to similar classes of soils.

   It is also noted that research is needed to determine the effectiveness of the morphology as in situ bodies to serve as filtering media. What, for example, is the effective surface area and adsorption characteristics of a soil for waste disposal as related to morphology that exists in the field? *In situ* behavior might differ considerably from that of samples modified during preparation for laboratory analyses.

F. <u>Charge 4 - Determine the experimental work now under way in the region and prepare a summary for the conference.</u>

1. A summary, under the headings wastewater, sludge disposal, landfills and animal waste disposal, is attached as Appendix 2. The summary is given by states in the southern region and shows the title of the project and the project officer.

G. Charge 5 - Determine, and list by priority, current research needs relative to fitting waste disposal to specific soil conditions.

1. A list is attached as Appendix 3. To this list the committee would add the need for monitoring soils subjected to waste disposal over a period of time. See discussion under the report on Charge 3 of this report. We realize that a list of this nature reflects the bias of the members concerned.

H. Addendum to the Report - During our studies it was noted that the Southern Regional Project S-82 has a committee working on Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality. This project has been in effect for some time and, no doubt, will be of interest to those in the field of waste disposal management. The part on fertilizers was edited by Dr. Grant Thomas and is now available through the Public Information Section, Texas A&M, College Station. The part on organic wastes is scheduled for publication during the spring of 1978. Drs. Fred Boswell, B. L. Carlile and Zane Lund, participants in this work planning conference, can be contacted for details.

Committee Members:

Fred Arms*	D. C. Erinakes 1/
Fred Boswell 1/	C. L. Girdner
B. L. Carlile 1/	Ralph Leonard*
V.C. Carlisle*	Zane Lund 1/
Gordon Decker 1/*	B. R. Smith 3/*
J. A. DeMent 2/*	W. I. Smith

1/ Subcommittee chairmen
-/Chairman
3/ Vice chairman
* Attended conference at Jekyll Island

Table 1

soil Limitations for Accepting Nontoxic Biodegradable Liquid-Waste for Nutrient Removal by Plants 1/

Item Affecting Use		Degree or Soil Limitation: Slight	Moderate	Severe
Permeability of the most restricting layer between 60 inches and the Ap or similar surface horizon		Moderately rapid and moderate 0.6-6.0 in./hr.	Rapid and moderately slow 2/ 6-20 and 0.2-0.6	Very rapid, slow, and very slow > 20 and < 0.2 in./hr.
Infiltration Rate		Very rapid, rapid, moderately rapid, and moderate > 0.6 in./hr.	Moderately slow 0.2-0.6 in./hr.	Slow and very slow < 0.2 in./hr.
Soil Drainage 3/ Class		Well drained and moderately well drained	Somewhat excessively drained and somewhat poorly drained	Excessively drained, poorly drained, and very poor4 drained
Runoff 4/		Nom, very slow, and slow	Medium	Rapid and very rapid
Flooding		NOM	Soils flooded only during non-growing season	Soils flooded during growing season
Available Water Capacity from 0 to 60 inches or a limiting layer 6/	Temporary Installation	>7.8 inches	3-7.8 inches	< 3 inches
	Permanent Installation 5/	> 3 inches		< 3 Inches

1/ For regional interpretive groupings assign no better than moderate limitation to mesic and frigid soils; assign severe limitation to cryic, pergelic, and isofrigid soils. (See [illegible])

2/ Assign severe limitation to moderately slowly permeable soils in which any horizon has an electrical conductivity of 8 millimhos or greater.

3/ For class definition see Soil Survey Manual, pp. 169-172.

4/ For class definition see Soil Survey Manual, pp. 166-167 (amended to use "None" for "Ponded").

5/ Permanent installations should have ground water monitoring systems.

6/ A limiting layer is a lithic or paralithic contact, duripan, fragipan, petrocalcic horizon, or other horizons of low permeability.

Table 2

Soil Limitations for Accepting Nontoxic Biodegradable Solids for Nutrient Removal by Plants 1/

Item Affecting Use	Degree of Soil Limitations		
	Slight	Moderate	Severe
Permeability of the most restricting layer above 60 inches	Moderately rapid and moderate 0.6-6.0 in./hr.	Rapid and moderately slow 2/ 6-20 and 0.2-0.6 in./hr.	Very rapid, slow, and very slow >20 and < 0.2 in./hr.
Soil Drainage Class 3/	Well drained and moderately well drained	Somewhat excessively drained and somewhat poorly drained	Excessively drained, poorly drained, and very poorly drained
Runoff 4/	None, very slow, and slow	Medium	Rapid and very rapid
Flooding	None		Soils flooded
Available Water Capacity from 0 to 60 inches or to a limiting layer 5/	> 7.8 inches	3-7.8 inches	< 3 inches

1/ For regional interpretive groupings assign no better than moderate Limitation to mesic and frigid soils; assign severe limitation to cryic, pergelic, and isofrigid soils.

2/ Assign severe limitation to moderately slowly permeable soils in which any horizon has an electrical conductivity of 8 millimhos or greater.

3/ For class definition see Soil Survey Manual, pp.169-172.

4/ For class definition see Soil Survey Manual, pp. 166-167 (amended to use "None" for "Ponded").

5/ A limiting layer is a lithic or paralithic contact, duripan, fragipan, petrocalcic horizon, or other horizons of low permeability.

CHARGE 4: Current Research on Land Application for Disposal of Waste

Wastewater

State	Contact	Title of Project
Oklahoma	Dr. Carl G. Enfield RSKERL, Ada, OK 74820	1. Develop design data for infiltration. percolation. 2. Design model for soil systems to treat wastewater 3. Optimization of nitrogen removal by denitrification for soil systems treating municipal wastewater.
	Mark S. Coleman Okiahoma State Department of Health NE 10th end Stonewall Oklahoma City, OK 73105	1. Spray-runoff treatment of municipal wastewater.
	Dr. Bert E. Bledsoe RSKERL, Ada, OK 74820	1. Evaluate soil treatment of wastewaters.
	Dr. William A. Franks Langston University P. 0. Box 779 Langston, OK 73050	1. Reclamation of heavy-metal contaminated soils.
Texas	Dr. Richard W. Weaver Department of Soil and Crop Science Texas A & M University College Station, TX 77843	1. Sewage disposal on land-chemical and microbial implications.
	Dr. B. P. Sagik University of Texas San Antonio, Texas 78284	1. Human enteric virus survival in soil foilowing irrigation with sewage plant effluents.
	Dr. E. D. Black Department of Soil end Crop Science Texas A 6 M University College Station, TX 77843	1. Phosphorus sorption from municipal wastewater by calcareous overland flow systems.
Louisiana	Dr. W. H. Patrick Center for Wetland Resources Louisiana State University Baton Rouge, LA 70803	1. Study of N and P reactions during overland flow of wastewater.
Mississippi	Dr. Charles R. Lee Department of Army, Corps of Engineers WES, Vicksburg, MS 39180	1. Field demonstration-overland flow waste treatment system.

state	contact	Title cf Project
South Carolina	Dr. A. Douglas Wilson South Carolina Department of Health and Environmental Control 2600 Bull street Columbia, SC 29201	1. South Carolina overland flow project.
North Carolina	Dr. W. R. Overcash North Carolina State University Raleigh, NC 27607	1. Soil assimilation of toxic amionic waste constituents.
Florida	Dr. Allen R. Overman Agricultural Engineering Department University of Florida Gainesville, FL 32601	1. wastewater renovation by sprinkler irrigation at Tallassee.
	Dr. Howard T. Odum Agricultural Engineering Department University of Florida Gainesville, FL 32601	1. Effect of effluent disposal on swampy areas.

Sludge Disposal

Texas	Steve Jones K. W. Brown Texas A 6 M University College station, TX 77843	1. Influence of rainfall on the persistence of metals on grasses following applications of liquid sewage sludge.
Louisiana	R. P. Dick E. P. Duniger Louisiana State University Baton Rouge, LA 70803	1. The quality of surface runoff waters from fertilized and sewage sludge treated soils.
Georgia	Dr. R. E. Burns Georgia Agricultural Experiment Station Experiment, Georgia 30212	1. Heavy metal dispersion by sod produced on sewage sludge.
	Dr. F. C. Boswell Agronomy Department University of Georgia Georgia Station Experiment, GA 30212	1. Comparson of sewage sludge and other organic wastes with Inorganic fertilizer for agronomic crop use.
Florida	Dr. C. C. Hortenstine Department of Soil Science University of Florida Gainesville, FL 32611	1. Effect of heavy metals (Cd. Zn) on vegetation growing on sewage sludge-treated soil. They also feed sludge and plant materials grown on sludge-treated soil to animals.

State	Contact	Title of Project
Florida	Dr. J. M. Davidson Department of Soil Science University of Florida Gainesville, Florida 32611	1. Disposal of sewage sludye.

Landfills

Virginia	Dr. J. Nick Jones Agricultural Engineering Department Virginia Polytechnic Institute Blacksburg, "A 24060	1. Vegetative stabilization of landfill sites. 2. Characterization of landfill leachates.

Animal Waste Disposal

Oklahoma	Dr. Jeff Powell Department of Agronomy Oklahoma State University Stillwater, OK 74074	1. Rangeland watershed water budget and grazing cattle waste nutrient cycling.
	Dr. M. L. Rowe School of Environmental Science Oklahoma State University Ada, OK 74820	1. Dissemination of information concern-animal production effects on environmental quality.
Texas	Dr. Richard W. Weaver Texas A & M University Collage Station, Texas 71843	1. Salmonellae in feedlot manure and its survival and movement in soil.
	Director Water Research Center Texas Tech University Lubbock, TX 79409	1. Analyses of state laws and regulations impacting the management Of animal wastes.
	Dr. B. A. Stewart, Director USDA-Southwestern Great Plains Research Center Bushland, TX 79012	1. Utilization of feedlot manure on land. 2. Feedlot manure application to calcareous soil.
Louisiana	Dr. Jackie W. D. Robbins, Head Agricultural Engineering Dept. Louisiana Tech University Box 4535 Ruston, LA 71270	1. Best management practices for unconfined animal production.

state	contact	Title of Project
Mississippi	Mr. Harold E. Crier Alcorn A 6 M University P. 0. Box 621 Lorman, MS 39096	1. Overland recycling system for animal waste treatment.
Alabama	Hr. Zane F. Lund, USDA-ARS Department of Agronomy and Soils Auburn University Auburn, AL 36830	1. Residual effects of large applications of dairy cattle manure.
Georgia	S. R. Wilkinson Southern Piedmont Research center Watkinsville, GA 30677	1. Residual effects on pollution of runoff and soil water from Coastal bermudagrass.
North Carolina	Dr. K. R. Reddy M. R. Overcash North Carolina State University Box 5906 Raleigh, NC 27607	1. Evaluation Of nitrogen and phosphorus transformations in the soil-manure system.
	Mt. P. W. Westerman North Carolina Stats University Box 5906 Raleigh, NC 27607	1. Mechanism and control of rainfall impact from land application sites.
Virginia	Dr. R. R. Weil Wybe Krcontze Virginia Polytechnic Institute Blacksburg, VA 24060	1. The alteration of some physical' properties of a Davidson clay loam by heavy poultry manure additions.
South Carolina	Dr. Clyde L. Barth Department of Agricultural Engineering Clemson university Clemsom, SC 29631	1. Utilization of cattle feedlot waste through land application.
	V. L. Quisenberry Soils Department Clemson University Clemson, SC 29631	1. Manurial nitrogen movement in a Norfolk loamy soil.
Florida	Dr. Donald A. Graetz University of Florida IFAS Soil Science Department Gainesville, FL 32611	1. Nitrogen transformations in animal waste disposal.

Southern Regional Soil Survey Work Planning Conference
Jekyll Island, Georgia
March 13-17, 1978

Committee Assignment: II - Waste Disposal on Land

Charge 5: Determine and list by priority current research needs relative to fitting waste disposal to specific soil conditions.

Current research needs for land application of waste materials relative to this report are based on four major catagories for organic wastes: sewage sludge, animal manures, solid municipal refuse, and industrial waste.

Research needs by priority are:

(1) Sewage sludge

Since all sewage sludge contains heavy metals which may influence one's health when introduced into the food chain, the fate of heavy metals should be researched further even though considerable data are being accumulated. Specific areas of study should include reversion mechanisms and rates for heavy metals; nitrogen transformation rates as related to specific soils and environmental conditions; chemical and physical soil property changes resulting from sewage sludge application; long term effects, including retention mechanisms of elements from land application of sewage sludge; both short term and long term effects from bacteria and viruses; use as an energy source by direct combustion and/or energy supplement; establishment of tolerance levels of certain heavy metals in plants that are ultimately consumed by animals; economic aspects of land treatment; odors and aerosol movement from land application; and public acceptance and sociological aspects.

(2) Animal Manures

Since a majority of the animal manures is associated with feed lot operations, comments are more applicable to the southwest. Suggested areas of research are: ammonia loss evaluation for soil surface and subsurface applications of manures; salt tolerance levels of various plant species and cultivars; management considerations for land application of animal wastes; and economic evaluations as related to types and management practices of manures.

(3) Solid Municipal Refuse

Since solid municipal refuse management usually involved disposal to a greater extent than utilization, the research needs extend to a wider range of concern as compared to sewage sludge and animal manures. Some of the research areas are: economic evaluations; separation techniques based on physical properties; energy conversion techniques; soil bulk density changes; effects of leachate on ground waters; soil compaction studies, degradation processes, and compatability with other waste materials for land application.

(4) Industrial Waste

This catagory of waste is probably the most complex for fitting to specific soil conditions. Often these materials are very heterogenous and contain certain components not generally found in other waste products, i.e. synthetic organic compounds. Specific areas of needed research include economic evaluations, degradation time and processes, pretreatment processes prior to land application, long-tern soil reactions such as sorption or imobilization, and energy conversion techniques.

Numerous areas of research have applicability to all catagories listed above. These specific areas include: environmental effects on degradation (rainfall, temperature, sunlight, numbers and types of soil organisms, etc.); soil texture and aeration influences on BOD and COD phenanenon; water table depth effects, water infiltration evaluations, oxidation and reduction effect studies; sorption and precipitation reactions; soil dispersion and flocculation changes influenced by land application; economic evaluations as related to transportation and application; and effects on food chain products produced on soil utilized for land application. Many additional areas of research may be suggested, however, priorities must be selected due to economic and personnel input limitations.

COMMITTEE REPORT

1978 Southern Regional Soil Survey
Technical work Planning Conference
Jekyll Island, Ga.
March 13-17. 1978

Committee III - Soil Potential Ratings

Chairman - B. J. Miller
Vice-Chairman - R. W. Johnson
Committee Members:

R. Rehner	B. L. Harris
J. F. Brasfield	F. F. Wheeler
J. T. Hood	Ted Miller
F. F. Bell	H. D. Scott
W. W. Frye	C. McElroy
Ed Lewis	P. L. Lorio, Jr.
J. L. Richardson	E. Cole

Charges

1. Review the revised policy guide potential as set forth in National Soils Handbook 404 and determine the applicability of this guide to the Southern region.

2. Test soil potential ratings proposed in 1976 under as wide a range as possible where the ratings have been developed and are in "se.

3. ldentify organizations and/or discipline specialists that should be involved in developing potential ratings by land uses. (Select those dominant in the South).

4. Propose a format for publication to include a listing of procedural guidelines, laws, rules, regulations and contributing sources.

5. Determine ways of categorizing soils within a use potential class according to the ease of overcoming soil limitations or the potential after removal of the limitations.

Charge 1:

Review the revised policy guide potential as set forth in National Soils Handbook 404 and determine the applicability of this guide to the Southern region.

Committee Report

1. The guide is generally applicable to the Southern region.
There is general agreement with the overall concept of the soil potential ratings as outlined in the draft and as applied in

areas where the ratings have been developed. The ratings have the advantage of providing a method for presenting the material in a positive manner, for specifically identifying know" treatments for overcoming the soil limitations, and for identifying limitations that remain after the treatments have been made.

2. The flexibility now present in the system is essential to the development and use of soil potential ratings that will be most useful in a local area.

    (a) One advantage of the ratings is that a soil may have a different rating in different areas. For example, possible corrective treatments for some soils will be affected by the landscape and surrounding soils. Drainage or water control measures can vary for the same soil from one survey area to another, depending on access to existing structures or canals. Extensive areas of wet soils may not be possible to drain due to existing laws or lack of cooperation by adjacent land owners. Rural and urban economies may differ appreciably resulting in different potential ratings eve" though the soils corrective treatments, and other factors may be essentially identical. Differences in local yield and/or performance standards can result in wide differences in potential ratings.

    (b) The Soil Potential Ratings within a" area can be expected to change over periods of time. For example, any changes in technology or changes in the costs of labor and supplies can reasonably be expected to change the cost input for corrective treatments to differing degrees for soils requiring different corrective measures. Development and legal acceptance of corrective measures such as above ground on-site sewage disposal techniques can result in large changes in potential ratings for soils with restricted drainage in some areas. For these and possibly other reasons widespread coordination of a single potential rating would be difficult and, for some soils, inaccurate.

3. Some clarification and/or revision is needed in the Draft Guide for Preparing Soil Potential Ratings.

    (a) There is some question concerning the degree of flexibility in determining whether soil potential ratings will be prepared in all survey areas. Some feel that their preparation and use is optional while others feel the policy indicates a" intent to prepare and use the ratings in all 1st and 2nd order soil surveys.

    (b) The Guide for Preparing Soil Potential Ratings should contain a section discussing the relationship of soil potential ratings to the soil limitations. These two may, in some cases, appear to be inconsistent or contradictory to users.

For example, differences in cost of treatment or continuing limitation costs can result in soils with severe limitations for a use having a higher potential rating than other soils having a moderate limitation.

(c) Discussion groups felt that potential ratings should be developed and based on an objective evaluation of the factors involved without regard to local rules and regulations. The committee recommends that policy guidelines be developed on how local regulations should enter into the development of soil potential ratings. Policy guidelines would enable local personnel to be consistent in developing ratings under such circumstances.

Charge 2:

Test soil potential ratings proposed in 1976 under as wide a range as possible where the ratings have been developed and are in use.

committee Report

1. soil potential ratings have been developed for a limited number of uses and published in soil survey reports or as supplements to reports for counties in Texas and Florida. Ratings for some uses have been developed and included in soil survey report manuscripts in Louisiana and possibly other states. The ratings should be developed for a large number of uses and have more extensive testing in these and other areas before they can be satisfactorily evaluated.

2. One important test of the ratings is their acceptance, use, and value to users of the soil survey. In both Texas and Florida, user response to the ratings has been positive. They have been widely accepted and are the method generally preferred by users in evaluating soils for the land uses rated. Soil scientists and others report that the positive approach and added information in the ratings tables enables them to be more effective in working with users.

3. Some of the strengths, weaknesses, and needed changes that became apparent during the development of ratings in these areas are discussed in the Committee III report for Charge 1. Additional comments are given in the following sections.

   (a) Soil potential ratings will be most useful in areas where the competition for different land uses is greatest and/or in areas comprised mostly of soils with severe limitations. At this time, those areas where the ratings have been developed have soils with predominantly severe limitations for several uses. These areas may provide an adequate test of the ratings in soils with some kinds of limitations.

   (b) The interdisciplinary approach is essential in developing the ratings . Soil scientists cannot be expected to provide the time and expertise required to determine treatment costs or the kind and extent of treatment needs and continuing limitations. Continuing limitation factors are difficult or in some cases impossible to identify and establish. Reasonable values can be assigned maintainence, assessments, and other costs in most areas. Limitations assigned on the basis of inconvenience, aesthetics, or environmental effects are typically rather arbitrary and difficult to defend.

(c) There appears to be a need in some areas for a No Potential class. Some soils have no potential for certain uses as a result of soil characteristics. Sharkey soils, for example, have no potential as sources of sand and gravel. The present alternatives are to not rate the soils for these uses or place them in the lowest use potential class. A preferred alternative might be to place them in a No Potential class and identify the reason for the placement as a continuing limitation.

4. At this time, the limited number of areas for which soil potential ratings have been published prevents any evaluation of the following:

(a) User reaction to different ratings for identical mapping units in different areas.

(b) User reaction to changes in the relative ratings within an area resulting from changes in technology or economic factors.

Charge 3:

Identify organizations and/or discipline specialists that should be involved in developing potential ratings by land uses. (Select those dominant in the South).

Committee Report

1. The names of many similar organizations and titles of discipline specialists differ from state to state and between areas within a state. These include service, research, educational, regulatory, and enforcement agencies and organizations that should be involved in some phases of developing soil potential ratings. The large number that results essentially prohibits a meaningful detailed listing. Some, such as the Environmental Protection Agency, have regional responsibilities and can be specifically identified. Others, such as the numerous governmental health bodies can be adequately identified in terms of their areas of interest and responsibility.

2. Several organizations and discipline specialists should be involved in developing nearly all Soil Potential Ratings. They are:

Organizations

Local, State, and/or Regional Planning Commission
USDA-Soil Conservation Service
State Soil and Water Conservation Committee
U.S. Environmental Protection Agency
State Agricultural Experiment Station
Cooperative Extension Service

Discipline Specialists

Soil Scientists in the area
Engineer with knowledge of the use being rated
Economist with knowledge of the use being rated

These organizations and discipline specialists should, to varying degrees be involved in all the phases of the preparation of soil potential ratings outlined in NSH-404.

3. The tables that follow also identify additional organization and discipline specialists that should be involved in developing certain soil potential ratings. Some of the organizations listed may serve mostly as a possible source of discipline specialists. In most cases, organizations and discipline specialists identified with a land use should only be involved in developing certain of the specific ratings that might be developed under that general land use. For example, under the Building Site Development land use, highway departments and highway engineers would be involved in ratings for local roads and streets but probably not in ratings for dwellings without basements.

Organizations That Should or Could be Involved in Developing Soil Potential Ratings

LAND USE \ ORGANIZATION	State Dept. of Agriculture	Cooperative Extension Service	U.S. Forest Service	State Forestry Commission	State Dept. of Public Works	Farmers Home Administration	Federal Housing Administration	Housing and Urban Development	State and/or Local Health Bureau	State Parks Commission	State and Local Highway Department	U.S. Bureau of Public Roads	Construction firms	Fur, Fish and Game Commission	U.S. Geological Survey	ASCS	Local Interest Groups (Farm Bur. Civic groups, etc.)	Planning Commissions	EPA	State Soil & Water Conservation Comm.	Agricultural Exp. Stations	SCS	Extension Service
1. Cropland	x	x														x	x	x	x	x	x	x	x
2. Pasture land	x	x														x	x	x	x	x	x	x	x
3. Wood land	x	x	x	x													x	x	x	x	x	x	x
4. Range land	x	x	x											x			x	x	x	x	x	x	x
5. Wildlife habitat			x	x										x			x	x	x	x	x	x	x
6. Urban use					x	x	x	x	x		x		x		x		x	x	x	x	x	x	x
7. Sanitary facilities					x	x	x	x	x				x		x		x	x	x	x	x	x	x
8. Building site development		x			x	x	x	x			x	x	x		x		x	x	x	x	x	x	x
9. Water Management		x									x		x	x		x	x	x	x	x	x	x	x
10. Recreational development									x	x			x				x	x	x	x	x	x	x
11. Construction material					x					x	x	x					x	x	x	x	x	x	x

Discipline Specialists That Should or Could be Involved in Developing Soil Potential Ratings

LAND USE / DISCIPLINE	Crop Scientist	Soil Fertility Soil Chemistry Specialists	Irrigation Specialists	Forester	Range Specialist	Biologist	Urban Planners	Recreation Specialists	Hydrologists	Geologists	Drainage Specialists	Landscape Architect	Turf Specialists	Soil Scientist	Engineer with knowledge of use being rated	Economist with knowledge of use being rated	Private Contractor		
1. Cropland	x	x												x	x	x			
2. Pasture land	x	x												x	x	x			
3. Wood land				x										x	x	x			
4. Range land				x	x									x	x	x			
5. Wildlife habitat				x		x								x	x	x			
6. Urban use							x			x				x	x	x	x		
7. Sanitary facilities		x		x			x		x	x				x	x	x	x		
8. Building site development		x	x				x					x	x	x	x	x	x		
9. Water management	x	x	x								x			x	x	x	x		
10. Recreational development				x			x	x				x	x	x	x	x	x		
11. Construction material		x											x	x	x	x	x		

Charge 4:

Propose a format for publication to include a listing of procedural guidelines, laws, rules, regulations and contributing sources.

This charge was modified as follows to place emphasis on a general format for publication in soil survey reports. ". . . suggests that major emphasis be placed on the general format for publication in soil survey reports. What should be included, how detailed should the information be, where should it appear in the report, and in what order should it be presented? Is there a need for a seperate technical (or popular?) publication dealing with the items listed in Charge 4. If so, to what group(s) should it be aimed, and what should be the general format? Should a highly technical publication be prepared for 'in-house' use? If so, what should be the general format and who should prepare it?

Committee Report

1. Should a highly technical publication be prepared for 'in-house' "se and, if so, what should be the general format and who should prepare it?

   (a) A publication of this nature is not needed at this time for several reasons.

      (1) The soil potential ratings are still in the developmental stages. They need to be tested in more areas and over a wider range of conditions to determine if such a publication is needed and what should be included.

      (2) The NSH-404 draft is now being revised. It, together with existing guides such as NSH-403. may meet the needs at the regional level.

      (3) Most of the variables that enter into soil potential ratings depend on local conditions. Any highly technical material that applies to local conditions needs to be prepared in the local area.

      (4) Changes in technology and economic conditions occur at a rapid rate. Some sections of a detailed publication that deal with these could become outdated during preparation of the publication.

2. Is there a need for a seperate technical (or popular) publication dealing with the items listed in the charge? If so, to what group(s) should it be aimed and what should be the general format?

   (a) There is no real need apparent for a seperate technical publication if the ratings are included in the soil survey report.

(b) The format outlined for the soil survey report can also serve for presenting the ratings as a supplement or interim report.

3. For publication in soil survey reports, what should be included, how detailed should the information be, where should it appear in the report, and in what order should it be presented?

(a) The format outline that follows will permit optional inclusion of soil potential ratings in soil survey reports as an added section complete in itself. The section would follow the map unit description and require essentially no changes in the format of the remainder of the report.

SOIL USE POTENTIALS

(Introductory statement and definition of soil potential)

This section gives information about the potential of the soils for some important land uses in the survey area. The soils are rated according to their potential for use in agriculture, as septic tank filter fields, ----. The soil potential is a rating of the ability of the soil, with application of modern technology, to produce, yield, or support a given structure or activity.

(Basis of the ratings and how they were developed)

The soil potential ratings for the various uses are given in Tables __, __, and __. The ratings are based on a system developed for this survey area that included consideration of (1) yield or performance levels, (2) the difficulty or relative cost of treatments or practices for minimizing the effects of any soil limitations, and (3) adverse effects or continuing limitations, if any, on social, economic or environmental values. The ratings were developed by specialists trained in many different areas. These included soil scientists, foresters, ... and engineers familiar with the soils and conditions in the area. Persons from a number of local or state organizations such as . . . . ..assisted in developing the ratings.

(Uses rated and their definition)

The different land uses for which soil potential ratings were developed are defined in a different section of this report. Septic tank filter fields and sanitary landfill uses are defined on page ___, roadfill and topsoil on page _ ......, and picnic areas on page ___.

(Definition of categories of potentials used)

The soil potential classes for the various uses are defined as follows:

High potential, (The definitions in NSH-404 can be used here or they can be modified to fit local conditions)

Medium potential

Low potential

(Special conditions and considerations)

The ratings of the soils in the survey area depend, in part, on the existing major flood control measures. For example, soil mapping units with levee protection have higher potentials for most uses than mapping units comprised of identical soils without flood protection, ------. The soil potential ratings depend on soil properties and on factors involving economic and technologic factors and may change as a result of changes in either of these.

(How to use the potential ratings tables)

Each soil mapping unit is identified in Tables ___, ___ and ___. The column headed 'Limitations and restrictions' is not a potential rating but identifies the limitations and restrictions of the soils for that use without corrective treatments. The column headed 'Potential and corrective treatment' gives the potential rating and identifies the kind of corrective treatment or treatments necessary to achieve the potential. The column headed 'Continuing limitation' indicates the nature of any use limitation that could reasonably be expected to continue after the corrective treatments have been made.

The ratings do not constitute recommendations for soil use. They are to assist individuals, planning commissions and others in arriving at wise land use decisions. Treatment measures are intended as a guide to planning and are not to be applied at a specific location without onsite investigations for design and installation.

The soil potential ratings indicate the comparative quality of each soil in the area for the specified uses. As comparisons are made only among soils in this survey area, ratings of a given soil in another area may differ.

(Tables of potential ratings)

Tables similar to Exhibit 404.8 numbers 2 and 3 in NSH-404 for each use rated,

4. The option of including the soil potential ratings in the soil survey report should remain with the individual states.

   (a) The demand from local units of government and other users may not be great enough to justify development of the ratings in some areas.

   (b) Some areas may prefer to provide ratings as a supplement to soil survey reports so they can be updated as changes occur in the technology, economics, and other factors involved.

   (c) It may be desirable to limit the distribution of soil potential ratings in some areas such as those where land use restrictions are based on soil properties. The added terminology, different ratings for a soil in different areas, and possible changes in the relative ratings of soils over time could result in confusion or misunderstanding if the ratings have widespread distribution in the area.

Charge 5:

Determine ways of categorizing soils within a use potential class according to the ease of overcoming soil limitations or the potential after removal of the limitations,

Committee Report

1. The soil potential ratings are in various stages of development in most states in the region. So far, most efforts have been aimed at developing reliable ratings to place soils in the existing use potential classes. Except for arraying the soils in order of decreasing potential, little has been done to develop and organize categories within classes. There is general agreement that the categories needed within a class can be developed from information used to develop the potential ratings.

2. Categories and arrays of soils within a class could be developed from several bases such as SPI values, kind of restriction, kind and cost of corrective treatment, or kind and degree of continuing limitation. For example, categorizing or arraying the soils within a class by treatment costs provides a grouping according to the economic ease of overcoming soil limitations.

   At the present stage of development of ratings in the region there appears to be a need for two kinds of categories to provide information not included in the use potential classes.

   (a) In soil survey report manuscripts or supplements, the categories and arrays should be based on the SPI values. These values indicate the overall potential of the soil after removal of limitations and the potential classes should be arrayed in order of decreasing potential as indicated by the SPI values. The table should have a footnote either indicating this array or stating that there are no appreciable differences between soils having the same rating. In some cases, potential classes may contain some soils with nearly identical SPI's and others that are appreciably different. A letter key can be used to identify those that are essentially identical. An explanatory footnote might be 'Soils in the same potential rating class are listed in order of decreasing potential. Soils potential class names followed by a letter a, b, c,..., do not have potentials appreciably different from other soils in that class followed by the same letter.'

(b) Economic factors involved in making land use decisions may be such that users in some areas will want to evaluate the extent to which treatment costs and continuing limitation costs contribute to the rating in soils where continuing limitations exist after treatment. The relative contribution of these factors can be shown by expressing the relative costs as a ratio. For example, if a rating for a given soil is

$$SPI = P - C_t - C_L$$

and

$P = 100$

$C_t = 20$

$C_L = 10$

then, $70 = 100 - 20 - 10$

and the ratio $C_t/C_L = 20/10 = 2$

In this case, the treatment costs are twice the continuing limitation costs.

The example table below indicates how negative values for Ct or values of zero for C_L or C_t can be treated.

Symbol and Soil Name	C_t	CL	Potential and corrective treatment	C_t/C_L
convent silt loam	-10	5	Very high:	CL*
Commerce silt loam	0	5	High:	C_L*
Tunica silty clay	20	0	Medium	C_t √√
Sharkey clay	20	10	Low:	2

√√No continuing limitation would reasonably be expected after treatment.

*Essentially all the costs incurred under this land use are due to continuing limitations after treatment.

The negative and zero values would be very rare and likely would not have to be considered in most areas. The columns headed Ct and CL would be omitted and the corrective treatments added for distribution to users.

Recommendation concerning Committee III - Soil Potential Ratings.

In view of the limited number of areas where ratings have been developed and the present status of NSH-404, it is recommended that a small committee of four or five members who are working with soil potential ratings be appointed to:

1. Keep the Regional group informed on the status of the ratings development and the experiences of those working with them.

2. Suggest needed changes with regard to guides applicable to the ratings or with regard to other aspects of the soil potential ratings system.

1978 SOUTHERN REGIONAL SOIL SURVEY TECHNICAL WORK-PLANNING CONFERENCE

Jekyll Island. Georgia March 13-17, 1978

committee IV: Kinds of Soil Maps

E. Moye Rutledge, Chairman
Telbert R. Gerald, Vice Chairman

Charges:

1. Investigate the feasibility of developing a land "se map of the Southern region and if feasible, develop a procedure to accomplish the objective. Suggest land use categories that can be mapped.

2. Determine the feasibility and application of slope maps prepared by USGS for improving legend design and accuracy of mapping.

3. Continue to review. evaluate, and test all proposals relative to naming mapping units in the five orders of soil surveys.

Committee Report:

Charge 1: Regarding land use map of the South

The committee members do not feel it advisable to make a land use map of the Southern region. Two points seem to dominate the thinking. 1) Maps should not be made until users and their needs have been identifled. This has not been done in the case of a regional land use map. 2) The production of soil surveys is mote Important than the production of land use maps and we, therefore, should not divert our resources from the production of soil surveys to the production of land use naps. Since the committee is recommending that we not make a regional land use map. we did not consider land use catagories or a procedure for developing a regional land.

The committee recognizes that both soil surveys and land use maps, as well as other types of maps, are major components of basic resource information. In many, If not moat. cases more than one of these components is needed In the decision making process. For example. if the potential production of a specific crop is to be evaluated In a given area one must know the acres of soils suited to the crop as well as the acres of theae soils which are available for production. Thus, for decisions of thla nature. land use information must be available on soil mapping units. This type information la normally obtained at a low level of generalization, such as a county. rather than a regional level as outlined in our charge.

Charge 2: Regarding use of USGS slope maps

Most committee members agree that slope maps could be useful in areas where there is substantial slope, rough terrain. inaccessibility, or vegetation is dense and obstructs movement and visual terrain analysis. Under these conditions, a elope map would save considerable time. How much, no one knows, but we feel enough time could be saved to justify the cost involved.

Slope maps would be helpful in design of mapping units, especially for order 3 surveys. But before ordering elope maps, test mapping of the landscape ahould be made to determine the natural break in slope and the slope breaks that are needed by the user. We need to Set away from predetermined slope breaks. especially when such slope packaging increases the amount of inclusions in mapping unite.

Once mapping units are designed to fit the landscape in an area, the mapping should be speeded up considerably by the use of slope maps. The slope map can be produced on a transparency with the same scale as the field sheets. By using the slope map to delineate the slopes, it could possibly be done with more accuracy and consistency.

A slope map is also helpful when using a stereoscope to calibrate one's eyes to the slope breaks of mapping units. This calibration can then be extended to areas for which there are no slope maps.

A slope map can be produced with up to five elope groups ond the breaks can be at any percent desired. e.g. O-2, 2-5, S-12, 12-20, 20-40. The main factors to be considered in determining the number and range of slope groups on a slope map are the natural slope breaks on the landscape (mapable slope breaks) and the intended use of the competed survey (management slope breaks).

Topographic maps will provide most of the same information as a slope map, but will take more time to Interpret. We believe the time saved. improved quality of mapping, and the determination of slope inclusions in mapping unite may justify the cost in rough and inaccessible terrain.

We understand the cost of a slope map is about $350.00 for five slope groups per 7.5 minute quadrangle. Color separations are available but more costly. The 7.5 minute topographic quad sheets must be available for slope maps to be generated.

Experience with USGS slope naps has been primarily in California. They were well pleased with them in the rough terrain area. Georgia evaluated slope maps from about two quadrangle sheets. The area was in the piedmont and had elopes up to 30%, but most were under 20%. Georgia found notable error In the maps, mainly in the 2 to 15% slope ranges. Some committee members pointed out that as resource maps are stored in computers, both soil maps and USGS slope maps will be stored. Thus. if conflicts occur between slope disignations on the two maps we should be aware of them as early as possible.

Charge 3: Regarding naming mapping units in the five orders

Some states are having difficulty placing mapping units within the five orders of soil survey and felt additional effort was needed in bringing the definitions into sharp focus. Other committee members thought the use of both the terns "orders of soil surveys" and "soil orders" was unnecessarily confusing. They suggest orders of soil surveys be changed to level of... or intensity of... or intensity level of soil surveys. They suggest these terms would be more connotative as well as less confusing.

The committee discussed the criteria on orders of soil surveys in Exhibit 301.5(b)(4) of NSH Part XI, as outlined in Advisory Soils - 7. Some members indicated this table was not as detailed as information presented in previous work group reports, but essentially the same. Various members discussed problems with applying these criteria to mapping units. Others pointed out that use of these criteria hod drifted since it was not initially intended for application to mapping units. However, it was noted that it is presently being applied to mapping units. The committee agreed that replacement of the heading "Orders of Soil Surveys" with "Levels of Mapping Unit's" would clearify the application.

Committee Members:

B. L. Allen
James Brown
H. J. Byrd
R. E. Caldwell
Joe Elder
Talbert Gerald
J. H. Newton
J. D. Nichols
L. Moye Rutledge
R. P. Sims
K. H. Tan
A. Tiarks
Billy J. Wagner

Recommendations:

Charge 1: Regarding land use nap of the South

1-1) The committee recommends that a Southern regional land use map not be made at this time by the MCSS.
1-2) Production of land use maps should be evaluated with respect to resources diverted from the production of soil surveys.
1-3) Continued evaluation should be made of the need for and potential users of land use information that interfaces with soil mapping units (primarily order 2 & 3 units).

Charge 2: Regarding use of USGS slope maps

2-1) Information from other areas indicates slope maps CR" improve the quality of soil surveys "nd increase speed of production, especially in rough terrain and dense, tall vegetation. We recommend that slope maps be evaluated within the southern states. It is recommended that the south TSC cartographic staff take leadership in selecting the study area(s), determining the availability of slope maps and coordinating the study.

Charge 3: Regarding naming of soil mapping unite in the five orders

3-1) The committee recommends that the heading "Orders of Soil Surveys" in Exhibit 301.5(b)(4) of NSH Part II, as outlined in Advisory Soils- 7 be changed to "Levels of Mapping Units".

Committee V - Improving Soil Survey Field Procedures

Chairman: B. A. Toucher

Vice Chairman: B. F. Hajek

Members:
R. L. Googan
F. G. Calhoun
Jaun Colom-Airles
S. W. Buol
H. H. Bailey
L. A. Quandt
L. Brockman
G. L. Brsmlett
G. Aydelott
W. L. Cockerham
J. W. Frie

Charges to Committee:

I. Develop specific guidelines in the Southern Region for designing broadly defined mapping units and establish a system of training soil scientists in mapping these broadly defined units.

Design according to predicted land use:

General - In designing broadly defined mapping units one should use the general soil map to establish test areas. Two or three mapping unit designs can be developed in the same area (about 1 square mile) for review by potential users and an interdisciplinary team from the National Cooperative Soil Survey. These mapping units and alternatives should be developed for consideration at the initial field review. The mapping unit design chosen by the potential users and NCSS team should be documented and appear as a supplement to the new work plan.

Transects should be used in the test area to determine the landscape components and positions. From this data an initial mapping unit description can be written for review at the initial review.

The number of trial plots will depend on the complexity of the soil survey area. If clayey, loamy, and sandy soils occur within the survey area, at least three mapping unit test plots should be established. The test plots will be set up by the party leader with guidance from the state office.

Statistical analysis of the ❑ appiag units during the survey will be made by transects across delineations which the party leader will designate as representatives. The transect method as outlined by Steers and Hajek will be used.

A. Happing units for rangeland

1. Guidelines used for development of mapping units should be for refinement for range use. This will indicate the carrying capacity of animal units per certain size area. Range site conditions should be evaluated but not used as a design rule but rather as a guide for proper use. Realization of the ecosystem and its endurance capacity for range production without harm to the environment should be closely analyzed in developing the mapping unit. The mapping unit delineation (natural landscape component) and tbe range management delineation (manmade component) should both be taken into consideration in the design. In designing broadly defined units for range the two components should be in harmony. The units should be soil associations, consociations and in some cases undifferentiated units, and the maps can be made at whatever scale needed. The cost of mapping increases as the amount of detail idcreases. User's input in the design should have much weight. I" this case, the soil survey can be designed to meet the specific needs of the range managers.

2. Training the soil scientist in mapping broadly defined units in arid rangelands not only encompasses soil training but also plant science training. If the soil scientist is to map soil for range management, he should totally understand the range plants, their behavior and production capabilities. The collection of data on the ecosystem -- soil, plants, terrain, slope aspect and condition -- should be documented for decision making and verification. Prediction of soil pattern needs verification. Traverse method of verification of predictions should be used. Teaching the transect method for evaluation of a predicted and verified unit is also very important in the training.

B. flapping units for forestry

1. In developing guidelines for designing broadly defined units for forested areas, one should first consider the woodland user's needs. Other things to consider are the physical limitations imposed by soil patterns and landscape features, size of the landscape component and the management component, and the cost of mapping. None of the above can be take" ligbtly. For example, a woodland manager may

want the toe slope of a hill closely delineated because this may be the area on the landscape with the highest productivity. The woodland manager might not be interested in separating the ridgetop and sideslopes, yet, the ridgetop may be prime farmland. In designing mapping units one has to keep all of these things in mind. One set of broadly defined units for forested area, private or public, should suffice.

As with maximum size for narrowly defined units, one should hesitate to insert minimum size for delineations because components are more important than size. In designing the survey if the woodland manager has the input and understanding of the survey, be will design his management components to fit the landscape components. In this case Paleudults and Hapludults can be combined and Alfisols separated and placed in a separate association.

Designing broadly defined surveys for woodland is a real challenge, but educating woodland managers for proper usage is a greater challenge.

2. Training the soil scientist in mapping broadly defined units in forested areas requires the use of a stereoscope in plotting just about any kind of lines. Recognizing photographic signatures on the aerial photo is a must. Knowledge of geology and geomorphology in the fluvial process is invaluable because the landforms are invisible to one sweep of the eye. Position and slope aspect are very important. One has to look through trees. Plant identification is a must, because the ecosystem encompasses the interactions of the system. Indicator plants are very important in identifying soils.

   One must learn to map by prediction, verify by traverse, and analyze by the transect method as outlined by Steers and Hajek. Learning statistics is a must.

C. Units for marshlands and swamplands in wet areas

1. In developing guidelines for designing mapping units in marshland and swampland, again one must first consider the user. Soil maps may be designed for use in planning and developing land uses such as wildlife or range. These needs can be met with

mapping units that are named as associations of soil series. In a few survey areas, the soil maps are designed for detail planning for urbanization. Interpretations for the taxonomic units are the same for both kinds of surveys. I" soil surveys designed for wildlife or rangeland uses, the soil associations should be designed so that the mapping "nits can be interpreted as single interpretative units. Coastal marshland mapping unit design should consider fresh, brackish, and salt marshland along with mineral and organic materials. Organic soils should follow the soil classification system. The system has much use interpretation built in. Vegetative patterns are the best key in recognizing fresh, brackish, and salt, but is weak in mineral versus organic or organic thickness. Designing by landforms even in very subdued topography is a must. This is established strictly by observation. The use of color infrared or color enhanced Landsat imagery is a good aid keying out vegetative patterns, but is not very suitable for differentiating organic from inorganic soils. Method of mapping should also be considered when designing mapping ""its for marshland. Will airboats be used? Helicopters? ATV's? Boats? How much verification will be necessary to substantiate the predictions? How much documentation will be necessary to evaluate the verification? Coastal marshes with limited access should be mapped using helicopters.

In designing soil surveys for large areas of swamp, associations of soil series are generally used. The cost of delineating single taxa mapping unit design at the series level probably cannot be justified. We should try to design units to meet the needs for operational planning for woodland or wildlife areas. If ever the swamps are drained sod cultivated or urbanized, it will be necessary to map the area again "sing more detailed survey.

2. Training the soil scientist in mapping broadly defined units in marshland is the same as training for fur trapping. There is no easy way. The field scientist must become a "marsh rat". one must learn the plants, because therein lies the key to the soil. One must learn a whale new procedure of mapping -- from tools to transportation, from attitude to attire. One must face adverse conditions everyday from mosquitoes to moccasins, tides to thunderstorms, and keeping the maps dry at all cost.

Committee V - Improving Soil Survey Field Procedures

Recommendation:

The committee recommends that these guidelines be used in designing broadly defined mapping units.

II. Continue to investigate means for better field note taking techniques. (Use of different techniques and equipment).

A. Techniques

1. Good shorthand abbreviated notes on lined paper or 232's is still one of the best alternatives if a clerk is available to decipher the information. Duplicates are easily made and filed with copies sent to clerks for decoding. Order of priority system in taking notes should be consistent with decoding system to avoid confusion.

2. Field cassettes work well but reference to primary notes is hard to come back to. It is quick but hardly systematic. Deciphering becomes a problem. No duplicate records are kept at hand and whole cassettes of notes may become lost.

B. Equipment

1. Notebook and soft pencil are hard to replace. Working in swamps and marshes and set conditions eliminates ink notes. Conversely, note taking in high winds is nearly impossible. Electronic equipment is more desirable under windy conditions.

2. Electronic equipment is easily destroyed when dunked or soaked. All reference notes become lost.

3. Computer card should be developed.

4. Mark sensing system should be refined.

5. Woodland data form for storing and retrieving data deserves more attention.

The Committee recommends that field scientists be encouraged to exchange ideas by publishing them in technical notes and Soil Survey Horizons.

Tbe committee also recommends that a committee be established on field procedure for note taking techniques and equipment usage. This committee should solicit and circulate examples on how to gather, record, and retrieve field notes when mapping.

Committee V - Improving Soil Survey Field Procedures

III. Propose field trips on special projects of interest to more than one state.

A. Field trip to Louisiana coastal marshes to observe mapping unit design (possible sites)

1. Soft Marshes

2. Firm marshes

B. Field trips to forested areas to observed mapping unit design (possible sites)

1. Alabama

2. Mississippi

3. Louisiana

4. Arkansas

5. East Texas

C. Field trips to arid areas to observe mapping unit design (possible sites)

1. Panhandle of Texas and Oklahoma

2. Desert region of Texas

3. Big Bend area of Texas

4. Surface mine reclamation

The Committee recommends that field trips be held in conjunction with meetings and conferences and that a committee be made to give guidance to the people in charge of the conferences or meeting.

IV. Develop better guidelines for photo interpretations -- perhaps including color coded IR and Landsat imagery.

A. Color IR

1. High altitude color IR gives broader views of gradual changes not visible in low flights.

2. Color enhanced Landsat imagery with colors assigned to different map tone values tends to modify similar signatures that can be in broad areas similar to color IR. This procedure is applicable in native vegetated areas such as marsh and desert and can only be used in the correlation of vegetation and soil and not necessarily the soils.

3. Color prints for map tone differences can be used to help refine delineations on maps.

4. Black and white IR imagery can be used for the same purpose.

Cost breakdown?

The Committee recommends that if needed color film transparency be ordered from EROS Data Center, Sioux Falls, South Dakota 57198. At a scale of about 1" = 1 mile, a 10" x 10" sheet cost about $7.00. Give coordinates when placing your order, and the latest photographs obtained or seasonal flights over your area if interest will be furnished to you.

Committee V - Improving Soil Survey Field Procedures

V. Test the use conformity and economy of high altitude photography rather than orthophotography as base imagery for 7½ minute quadrangle soil survey publication format.

A. There seems to be no advantage of orrhophotography in areas of lov relief. Rectification of areas great relief gives much better ground control of points. The cost-benefit ratio is debatable.

B. Most all land use planners use 1:24,000 or multiples thereof. Scale of 1:20,000 seems to fit only our program, but since most of our surveys are published on 1:20,000 the users have adapted to tbe scale, therefore no format changes are recommended. Areas that are using 7½ minute quads and 1:24,000 scale should continue to do so since planners are use to this scale. Economica cannot justify a change to either scale.

. Using a coastal plain county, make a comparative study of the adequacy of a published soil survey for a) general agriculture, and b) community development; compiling from field work at a scale of 1:15,840 and publishing at 1:15,840, 1:20,000, and 1:24,000.

A. Any evaluation of a specific county would apply almost entirely to the chosen county. The conittee recommends that a more generally applicable evaluation procedure be considered. Attached is a copy of a soil map evaluation method presented at a workshop organized by the Soil Resource Inventory Study Group at Cornell University April 4-7, 1977.

B. This committee reconends that a soil survey report and map evaluation committee be appointed and charged with recommending methods for evaluation.

The attached method or others can be used as a guide.

1978 SOUTHERN REGIONAL SOIL SURVEY
TECHNICAL WORK-PLANNING CONFERENCE

Jekyll Island, Georgia March 13-17, 1978

Committee VI - Soil Yield Potentials

L. P. Wilding, Chairman
C. A. McGrew, Vice Chairman

Charges:

1. Identify those soil factors considered most responsible for evaluating crop yields with assigned relative values for respective soil factors.
2. To explore the utilization of a sequential testing scheme in the Southern Region as a means to deduce those soil factors that are responsible for yield differentials between contrasting soils.
3. To develop a procedure for predicting and testing yield potentials for common crops on the same or very similar soils across a wide geographic range. (Charge not addressed).

Committee Report:

Charge 1: Identify those soil factors that are responsible for corn yield responses.

G. J. Buntley, Chairman
C. W. Thomas
D. E. Lewis, Jr.
J. H. Steigler
J. M. Soileau

This charge was narrowed by the subcommittee to identify those soil factors that are responsible for corn yield responses. Corn was chosen as the test crop because it ws a major crop in the southern-region and because of its sensitivity to soil changes in contrast to a crop such as soybeans. It was agreed that fertility considerations would be held constant in identifying soil factor determinants (i.e., management practices held constant under a specified management level). Correspondence among subcommittee members strongly indicated that the water supplying capacity of the soil was the primary soil factor controlling corn yields (see attached correspondence pertinent to this matter). Rationale for soil factors as identified by the subcommittee are outlined in the attachment presented by Chairman Buntley. A second factor not mentioned by the subcommittee but considered important to corn yield is soil temperature. This factor has been added to their list. The following represents soil factors identified by this subcommittee:

A. Water-supplying capacity of the soil, as influenced by:

1. The [illegible] capacity of the soil, as influenced by:

a. Soil texture of the surface and subsurface horizons

b. Organic matter content of the surface and subsoil horizons
c. Clay mineralogy of the surface and subsurface horizons
d. Effective rooting depth, as influenced by:
   (1) Bedrock
   (2) Fragipan horizons, other genetic horizons of high bulk density, and management induced compacted zones
   (3) pH profile in subsurface horizons
   (4) Aluminum and manganese ion activity in subsurface horizons
   (5) Soil fertility profile in subsurface horizons
   (6) Soil drainage characteristics. watertable hydrology, and flooding frequency.

2. Soil water recharge potential, as influenced by:

   a. Soil infiltration rate, as influenced by:
      (1) Soil texture of the surface horizon
      (2) Macro and micro soil structure of the surface horizon
      (3) Organic matter content of thk surface horizon
      (4) Clsy mineralogy of surface horizon
      (5) Salinity, alkalinity and carbonate status

   b. Soil percolation rate, as influenced by:
      (1) Soil infiltration rate
      (2) Soil texture profile of the subsurface horizons
      (3) Macro and micro soil structure profile of the subsurface horizons
      (4) Management induced compacted zones
      (5) Fragipan horizons and other genetic horizons of high bulk density
      (6) Clay mineralogy of the subsurface horizons
      (7) Salinity, alkalinity and carbonate status

   c. Slope and landscape position

   d. Subirrigation potential, as influenced by:

      soil drainage and watertable hydrology

3. Soil water discharge potential, as influenced by:

   Soil water evaportranspiration rate, as influenced by:
   (1) Soil texture profile of the subsurface horizons
   (2) Soil structure profile of the subsurface horizons
   (3) Management induced compaction zones
   (4) Fragipans and other genetic horizons of high bulk density
   (5) Surface soil organic matter and plant residue content
   (6) Salinity, alkalinity and carbonate status

B. Soil chemistry, fertility, and mineralogy of subsurface horizons.

These considered separately in addition to their consideration under (a) above becasue they are normally outside of fertility management consideration and recent evidence suggests subsurface chemistry pertinent to crop yield responses.

C. Soil temperature, as influenced by:

1. Moisture content of surface and subsurface horizons
2. Soil texture of surface and subsurface horizons
3. Soil color of surfsce
4. Bulk density of surface and subsurface.

The subcommittee did not attempt to scale soil factors to arrive at a numerical rating for different soils where previous yield responses were available. It was felt that arbitrary scaling of soil factors would be inappropriate in view of the probable interactions and insufficient evidence to support scaled indexes. Before soil properties can be quantified as to their respective inpact on yield responses, research is needed to determine proportionality coefficients and interactions. Little data of this nature is currently available in this region.

Charge 2: Explore the utilization of a sequential testing scheme to deduce soil factors responsible for yield differntials on contrasting soils.

C. T. Hallmark. Chairman	D. Eagleston
L. P. Wilding	John Meetze

As a consequence of a presentation entitled "Sequential Testing" by Mr. Frank Moorman, International Institute of Tropical Agriculture at the National Cooperative Soil Survey Work Planning Conference in Orlando, Florida, 1977, it was deemed appropriate to explore "the state of the art" of this approach and report its utility as a potential tool in developing index values for soil potentials. The following statement represents this subcommittee report:

"The use of sequential testing to deduce or quantify soil factors affecting plant growth and yield differentials has not been discussed in the literature. However, F. R. Hoorman, W. J. Veldkamp and J. C. Ballaux of the International Institute of Tropical Agriculture, Ibadan, Nigeria, have been using a sequential testing design since 1972 to evaluate the growth of rice. maize, soybeans, and cowpeas on contrasting soil within a toposequence from well-drained to poorly drained conditions. In this regard, sequential testing has been used to model soil water table depths and yields as well as to test crop varieties as a function of soil moisture. A sequential testing design, as viewed from the work of Moorman and co-workers. appears promising in evaluating soil yield differences.

Basically, there are three sets of factors which govern crop yield: (a) previous and present management practices, (b) climate, and (c) the physical, chemical and mineralogical properties of the soils. Sequential testing involves a small area (circa 1 to 5 Ha) within which are two or more soils which strongly contrast in one or more properties. Since the test area is small, management practices and climate may be considered constant within each year leaving the soil properties as the only variables in a soil yield study. I" contrast, common sampling schemes for modeling soil yield often include areas under different management and/or from different climatic influence. Soil physical, chemical, and mineralogical properties of the soils can be examined on the transect through the contrasting soils and their intergrades along with yield data. Data secured from a sequential testing design can be analyzed by standard statistical methods with a simple and multiple regression analysis being the most likely. If a sequential test is repeated over time in the same field, variables in management and fluctuations in climate can be observed and evaluated.

> Basically there are few requirements for the sequential design. There must be strongly contrasting soils in at least one soil property. The transition between the contrasting soils should not be too abrupt since samples from the intergrade area between the contrasting soils are desired. Design of the sampling points should allow sampling from one contrasting soil to the other and of all intergrade soils in between; therefore, it Is imperative that a detailed soil map be available and all soil properties of interest along the sampling points be quantified.
>
> The major disadvantage of the technique is that adjacent contrasting soils only differ in a limited number of properties, i.e., if one were interested in the influence of depth and degree of the argillic horizon and depth to bedrock on yield, it would be difficult to find adjacent contrasting soils to give all the desired interactions"

At present sequential testing has not been tried as a method of evaluating soil yield in the Southern Region. It is suggested, however, that efforts be made to test this design in the region to elucidate the potential of the technique in regard to soil yield predictions.

Charge 3: Develop procedure for predicting and testing yield potentials for common field crops on same or very similar soils in wide geographic range.

C. A. McGrew, Chairman	L. Ratliff
E. R. Blakley	W. Sabbe

This charge was not addressed by this subcommittee because of Carl McGrew's extended illness. It was deemed inadvisable to assign a new subcommittee chairman because of the time and nature of the charge.

Recommendations:

1. Factors identified in this report be transmitted for consideration by disciplines or research groups engaged in crop or woodland yield prediction activities.
2. Encourage cooperators end allied expertise conducting soil fertility, crop variety or other crop response research to utilize sequential testing models so soil factors responsible for yield differentials can be further identified and quantified.
3. Committee be inactivated:
   a. Activities of committee on fringe area of major responsibilities and interests within the group
   b. Charges not likely realized under current committee structure or committee mechanism; and
   c. This committee has been active over a number of years with no reel progress towards quantifying soil factors responsible for crop

yields; and

d. Work of this committee might better be accomplished by a task force of those state and federal representatives with major responsibilities in this area.

Committee Members:

G. J. Buntley	D. E. Lewis, Jr.
J. H. Steigler	John Meetze
C. P. Hallmark	G. W. Thomas
Wayne Sabbe	E. Eagleston
E. R. Blakley	L. Ratliff
J. Soileau	L. P. Wilding

Southern Regional Soil Survey
Technical Work-Planning Conference

Jeykll Island, Georgia

March 13-17, 1978

Committee VII - Remote Sensing

Chairman - David E. Pettry

Vice-Chairman - Carter Steers

Charges to Committee

1. Inventory activities of working groups on the applications of remote sensing to soil survey and land use in the region.
2. Investigate and evaluate multispectral radar imagery with reference to earth observation studies applicable to soil survey and land use maps.
3. Determine the feasibility of using topographic and multispectral scanner overlay to delineate soil resource areas.

Committee Report

Charge 1

Numerous groups in the South are engaged in various phases of remote sensing activities. Many of these efforts are in the research and development stage, and primarily directed to land use inventories and planning. Such activities are underway at several universities and colleges, planning and development agencies, highway departments, federal, state, and local government agencies. However, functional efforts most related to soil surveys and interpretative data appear to be conducted by NASA; SCS, U.S. Forest Service, TVA, U.S. Fish and Wildlife Service and universities.

A summary of major efforts in the southern region most directly related to soil surveys are as follows.

SCS Activities in Remote Sensing

State	Activities
Alabama -	Cooperating with the Alabama Development Office, providing soil and flood data to be digitized and compiled with landuse data from LANDSAT data analysis. Studies are part of the Alabama Resource Information System (ARIS)
Florida -	A cooperative study was made with NASA to evaluate remote sensing imagery and data processing relative to soil survey application. Two sites in Volusia County were selected for their contrasting soils and vegetation. One site was evaluated using color III prints and transparencies, conventional black-and-white prints, multispectral scanner, and thermal scanner. The second site was evaluated using color IR prints and transparencies, black-and-white prints, LANDSAT and SKYLAB imagery. The correlation between image signature boundaries and soil boundaries was greater with color IR photography. Generally , color IR transparencies were of more value than prints. However, color IR photography was not of equal value to all Soil Scientist. Frequently soil boundaries were not reflected on the photographic imagery, "or are all image signature boundaries indicative of soil boundaries. The study indicated time savings using color IR prints as hase maps in the field may be small. However, monetary

savings over the course of a soil sruvey may be substantial. The quality of soil surveys could bc increased due to better correlation between image signatures and soil boundaries via remote sensing imagery .

Arkansas - Reviewed USGA LUDA program; landuse map has been published.

Georgia - Cooperating with the Georgia Department of Natural Resources to develop a LANDSAT program to cover the whole state under a modified level III land cover project. Plan to use LANDSAT digital data for water management and river basin analysis.

Kentucky - Ground cover data within the Kentucky River Basin will be collected using ERTS digital data, and will be Included in the River Basins Comprehensive Report. The data is to be analyzed to provide 10 land use classifications. Color photography is being tested as an aid to soil surveys in locating soil boundaries for two counties in the Daniel Boone National Forest. The soil scientists feel the color photographs are superior to color infrared imagery for soil boundary location.

Louisiana - Soil scientists used color IR photographs in the soil survey of Morehouse Parish, which has about one-half the area comprised of flat bottomlands. Mapping production increased from about 31 acres per hour to 50, with more accurate line placement when the color IR imagery was used. Color IR photographs are being used to aid mapping or is being ordered for Richland, East Carroll and Franklin Parishes.

Color IR photography is proving to be a valuable tool in mapping marshlands. Salt Marsh, brackish Marsh, and Fresh Water Marsh areas are readily delineated by signature on Color IR. It was also very helpful in the Delta Prairie areas near New Orleans in separating organic soils from mineral soils. Definite signatures are evident for alluvial, thin organic and thick organic soil areas.

Mississippi - Soil scientists have provided NASA cell coded soil data to be used with NASA's land cover digital data. Washington county was used by NASA as a pilot county to depict cropland patterns and potentials.

Color IR transparencies (9 x 9 inch) were used to supplement conventional black and white prints in the soil survey of tidal marshes in Hancock County. Large areas of Bohicket soils, which were almost imperceptible on black and white photographs, were clearly depicted on color JR transparencies. Napping accuracy and speed were improved via use of the IR imagery to supplement conventional photographs.

North Carolina - A land use map has been completed for the Mideast RC & D Project via photo interpretation of aerial photographs at a scale of 1:76,000. Land use information was digitized by center point of 40-acre cells and stored by resource area river basin, and sub-basin. Nine land use classifications were coded and a 1:500,000 scale map was published. The five-county area was thoroughly field checked.

Soil scientists are evaluating color photographs for field boundary identification in four counties.

Oklahoma - Plan to utilize LANDSAT data for the location of the erosion sites.

South Carolina - Limited involvement with remote sensing presently.

Tennessee - Intensely used remote sensing for watershed and river basin planning in cooperation with U. Tennessee, Tullahoma Branch, and TVA. Land use was mapped in the Obion Forked Deer area using a densitomer and LANDSAT imagery.

Staellite imagery is used with aerial over-flights for mapping land use; water pollution of rivers, streams or lakes; conservation practices and flood plains.

Soil scientists cooperated in evaluating the the use of color infrared photographs to delineate soils in the Obion Forked Deer Region. It was concluded that soils could not be separated entirely by by photo interpretation. The upland and terrace soils could not be differentiated. Color infrared photographs are being used as an additional tool for mapping, but not as a base map for soil survey.

Texas - Cooperated with the Texas Natural Resource Agency in providing land use data for serveral counties. A cooperative study with the Agricultural Research Service evaluated various types of aerial photography for use in soil surveys. Three areas of contrasting soil types were mapped using color IR and conventional color aerial photographs. Use for color IR and color photographs resulted in increased mapping rate and accuracy compared to conventional black and white Photographs.

Coopcrated with Texas A & !.I University to study the relationship between the existing soil survey of Brazos County, Texas (Published 1958), and photo interpretations made from color, color IR, and new conventional black and white imagery at various scales. The study employed operational techniques to determine any advantages resulting from advanced imagery and it was not designed to identify soil taxonomic units in the laboratory via imagery interpretation. Study indicated many significant soil areas can be identified in the laboratory on modern imagery. The soil taxonomic and mapping units could then be identified and described hy minimal field checking. An operational procedure of this nature could speed the soil surveys by 10 to 20 percent based on the Hidalgo County study. Texas plans a study in Brewster County in which satellite data will be tested for locating map unit boundaries.

Virginia - Black and white IR imagery is used as an aid in mapping rugged, mountaineous areas. Cooperated with agencies in digitizing soil survey dntn in the metropolitian Richmond area.

Color IR photographs were used to delineate soils on the outer barrier islands of the Eastern Shore of Virginia. Vegetative types were closely related to soil types and were readily delineated via IR imagery.

Summary of U.S. Forest Service Activities in Remote Sensing

1. High altitude black and white photo quadrangles are used, orthophotos in hilly terrain and uncontrolled in flat coastal areas. The imagery is 1:24,000 and corers the same area as 7.5 minute USGS topo sheets. Utilized regular photographs on double weight paper, oslid prints, cronoflex positives, half tone and continuous tone. The photographs are good for displaying soil maps for large areas with minimum sheets for coverage. The imagery does not appear to have special advantages for interpreting soil features.

2. Imagery from multispectral scanner and color and B/W IR at various scales have been used for special projects, and appear to have limited value.

3. Standard color photography has gained wide acceptance for use in the Forest Service for stand mapping, land use planning and soil mapping. The imagery is conducive for interpretation of land form, land use and discrimination between pine and hardwood.

Summary of U.S. Fish and Wildlife Service Activities in Remote Sensing

The U.S. Fish & Wildlife Service, office of Biological Services has inagurated the National Wetland Inventory Project to provide an inventory of all the Wetlands of the United States. The Inventory will make extensive use of remote sensing data to create a data base, in both map and computer form, in which wetlands data will be collected, interpreted, stored and reproduced.

The Inventory will be primarily accomplished via aerial photographic techniques. Photography preference in order is color infrared, color, black and white infrared, and black and white film emulsion types. Wetlands are delineated via photo interpretation directly on the photo by use of a 6 X stereoscope, and transferred to a 1:24,000 USGS quad with a zoom transfer scope. The final map is published at 1:100,000 on a USGS quad-base. In areas of particular complexity, 1:24,000 scale maps are produced. The maps are digitized and placed in a computerized data bank to provide easy information retrieval and update capability.

Summary of Tennessee Valley Authority Activities in Remote Sensing

The Division of Forestry, Fisheries, and Wildlife Development of the Tennessee Valley Authority in cooperation with SCS has inagurated a demonstration project involving the computerization of soil survey data for the 201-county TVA power service area in portions of several states. The project will be a national demonstration of development and use of computerized soil information and the data will be applicable to the National Land Inventory and Monitoring Program.

Charge 2

The application of radar imagery to soil surveys and land use appears to be in the research and development stage. Knowledge is relatively limited concerning the applications and limitations of Side-looking Airborne Radar (SLAR) to soil surveys and natural resource classification.

A side-looking airborne radar system generates images that record the reflective properties of the terrain at microwave wavelengths of one to 30 centimeters. The images, retained on photographic film, resemble aerial photos but have fundamental differences. Unlike aerial photos made by the light of the sun, the radar antenna is the terrain's source of illumination and the resultant image depends on its reflected energy. The detail on the radar image depends on the wavelength and polarization of the incident signal and by the geometrical and electrical properties of each reflecting surface on the terrain. In contrast to conventional circular-scan radar systems which have poorly defined images, the side-looking radar antenna obtains finer angular resolution and detail.

Microwave (radar) sensors have the capability to penetrate cloud cover and possibly vegetation cover. They can function during the day and night and active microwage radar sensors can measure distance. Potentially, microwave imaging radar may be capable of measuring soil moisture.

NASA has a 5 year technical plan to develop an active microwave dual frequency, dual, polarization imaging radar for vegetation classification and soil moisture measurement. Such developments should complement LANDSAT data.

Change 3

Topographic and multispectral scanner data have become widely used as a composite part of the natural resource data base. Terrain analysis within the limits of order IV soil surveys are being implemented in tidal marsh areas and broad geomorphic surfaces. There appears to be a serious lack of verification of such landscape classifications and the reliability remains untested. Such data may be overemphasized once it is computerized. There is an inherent fallacy of over extending data bases obtained via remote sensing beyond their reliability.

Much activity has centered on digitization and automatic data processing of existing soil surveys as an integral part of data bases for interpretative groupings and land use planning. Efforts have extended beyond this level to classify landscapes via remote sensing data into broad classes where soil data are lacking. There appears to be much promise in utilizing such technology to obtain baseline data of remote, inaccessible areas. The advantages of temporal coverage are pronounced for vegetative analysis and land use. Detection and monitoring of accelerated soil erosion may be assisted by these technologies. However, the availability of such data and the economics have not been established.

It is recognized there needs to be refinements of wavelengths, improvement of resolution and quality control of such data and applications, but it appears to offer significant benefits to natural resource analysis.

Committee Discussions

Concern was expressed for coordination of efforts in remote sensing and data processing to ensure maximum usability and avoid costly duplication. Clear, definitive operational guidelines concerning the use of remote sensing data in the cooperative soil survey appear to be lacking. Individual states and agencies have initiated separate efforts to evaluate the use of remote sensing imagery, primarily color IR, to aid in soil surveys. Much of the testing has used imagery'not designed or acquired for soil surveys and it lacks proper control. Lack of clear communication seems to exist relative to the types of imagery available, format, cost and how to acquire it, The diverse activity in all the southern states in testing and using remote sensing imagery in some manner attests to the increased awareness of its applicaton as a tool to aid soil surveys.

Numerous problems exist relative to map scales, coordinate systems, cell size and shape, supporting ground truth and associated software for computer processing. There appear to be problems with data aquisition and transfer both within and between states and different agencies.

No acceptable system appears to exist to permit objective evaluation of the reliability of different systems and in comparison to soil surveys. Accuracy levels for landscape and feature identification have not been established. Documentation of imagery evaluation tests often has not been written and distributed to others.

Concern exists relative to the functional use of the national soil survey data base by individual states and/or agencies and compatability of integrating with other systems. Numerous agencies, governmental units and organizations are developing natural resource data banks and interpretating remote sensing data, including soil surveys. Such activities demonstrate the need for coordination of efforts and development of processing systems.

Recent legislation, including the U.S. Conservation Act (1977), which requires yearly reports on the status of natural resources may provide impetus to increased use of remote sensing data and technology.

COMMITTEE RECOMMENDATIONS

1. Closer coordination needs to be developed in the cooperative soil survey relative to the format, mapscales, software-data transformations to avoid costly duplication and ensure maximum use.

2. Reliability standards and verification methods need to be developed to evaluate systems of natural resource classification concerning soil surveys.

3. Standardization of ground truth technology needs to be developed for uniform application and acceptance. A standard data form is suggested,

4. That appeals be directed to administrative levels of the cooperative soil survey for strong guidance and leadership in remote sensing at state, regional and national levels. Assignment of responsibilities should be emphasized.

5. The committee should be continued to keep the Conference appraised of developments in remote sensing relative to soil survey with the following responsibilities:

   A. Plan and sponsor a symposium of remote sensing techniques with emphasis on field procedures and practical evaluations.

   B. Gather data on all remote sensing activities relevant to soil surveys within the region and publish findings as a part of the Soil Survey Work Planning Conference. The information should be directed in a practical context to field personnel.

   C. Assimilate data on remote sensng available in each state of the region including cost, size, format, scale, related ground truth, and procedures on obtaining data.

To expedite actions and maintain continuity, it is urged the new committee be established immediately and include some present members.

COMMITTEE MEMBERSHIP

H. F. Huckel
R. E. Horton
Pete Avers
W. F. Miller
B. T. Birdwell
R. H. Griffin
W. hf. Koos
Joe Kleiss
Blake Parker
Joe Downs
Glenn Kelly
R. A. McCreery
C. M. Thompson

D. E. Pettry - Chairman

C. A. Steers - Vice Chairman

APPENDIX

SOUTHERN REGIONAL SOIL SURVEY TECHNICAL WORK-PLANNING CONFERENCE

PURPOSE. POLICIES AND PROCEDURES

1966

I. Purpose of Conference.

The purpose of the Southern Regional Soil Survey Technical Work-Planning Conference is to bring together Southern States representatives of the National Cooperative Soil Survey for discussion of technical and scientific developments. Through the actions of committees and conference discussions, experience is summarized and clarified for the benefit of all; new areas are explored; procedures are proposed; and ideas are exchanged and disseminated. The Conference also functions as a clearing house for recommendations and proposals-received from individual members and State conferences for transmittal to the National Cooperative Soil Survey Technical Work-Planning Conference.

II. Membership.

A. Voting Membership.

Voting members of the Conference are the following:

The state soil scientist, or his representative, of each of the 13 States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia) and Puerto Rico.

The experiment station or university soil survey leader, or his representative, of each of the 13 States and Puerto Rico.

The principal soil correlator of the Southern States, or his representative.

One representative of the Soil Survey Laboratory serving the region.

One representative of the Cartographic Unit, SCS. serving the region.

One representative of the Forest Service regional office.

One representative of the Southern Forest Environment Research Counc 1.

(Other organizations designated by the Conference),

B. Non-Voting Membership.

Special invitations may be given to a number of other individuals to participate in specific conferences. Any soil scientist or other technical specialist of any State or Federal agency or private enterprise whose participation would be helpful for particular objectives or projects of the Conference may be invited to attend. These extra participants do not vote on issues of Conference policy and procedure.

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS
USDA-SCS-FORT WORTH, TEX 1971

III. Officers.

A. Chairman and Vice-Chairman.

A chairman and vice-chairman of the Conference are elected to serve for two-year terms. Elections are held during the biennial business meeting. Election of officers follows the selection of a place for the next meeting, because officers must be from the State where that meeting is to be held. Officers rotate among agencies. That is, the chairman-elect must be of a different agency than the past chairman. Similarly, the vice-chairman must be of a different agency than the chairman.

Responsibilities of the chairman include the following (specific tasks may be delegated to the vice-chairman):

1. Planning and management of the biennial Conference.
2. Function as a member of the Steering Committee.
3. Issue announcements and invitations to the Conference.
4. Write the program and have copies prepared and distributed to the membership. Provide a recording secretary to take and prepare minutes of the business meetings of the Conference for inclusion in the proceedings of the Conference.
5. Make necessary arrangements for: food and lodging accommodations for Conference members; special food functions; meeting rooms (including committee rooms); and local transport on official functions.
6. Obtain official clearance for the Conference from SCS and Experiment Station officials, and other organizations as required.
7. Assemble and distribute the Proceedings of the Conference.
8. Provide for appropriate publicity for the Conference.
9. Preside at the business meeting of the Conference.
10. Maintain Conference mailing list, clear membership with appropriate administration, and turn it over to incoming chairman.

Responsibilities of the vice-chairman include the following:

1. Function as a member of the Steering Committee.
2. Act for the chairman in the chairman's absence or disability.
3. Perform duties as assigned by the chairman.

B. Steering Committee.

A steering committee assists in the planning and management of the biennial meetings, including the formulation of committee memberships and selection of committee chairmen and vice-chairmen, organizing the program of the Conference, and selecting presiding chairmen for the various sessions. The Steering Committee consists of the following members, or their designated representatives:

The Conference chairman (Chairman)
The Conference vice-chairman
Principal Soil Correlator, Southern Region
The Conference past chairman and/or vice-chairman

1. Regular Meetings.

At least one meeting is held at each regional work-planning conference. Additional meetings may be scheduled at other times or places if the need arises.

2. Communications.

Most of the Committee's communications will be in writing. Copies of all correspondence between members of the Steering Committee shall be sent to each member of the Committee.

3. Participants.

The Steering Committee makes recommendations to the Conference for extra and special participants in specific regional conferences.

4. Committee Charges.

The Steering Committee is responsible for the formulation and transmittal to Committee chairmen of charges to committees.

5. Conference Policies.

The Steering Committee is responsible for the formulation and statements of Conference policy. Final approval of such statements is by vote of the Conference.

6. Liaison.

The Steering Committee is responsible for maintaining liaison between the regional conference and (a) the Southern Regional Soil Survey Work Group, (b) the Southern experiment station directors, (c) the Southern state conservationists, (d) the national and state offices of the Soil Conservation Service, (e) regional and national offices of the Forest Service, (f) Southern Forest Environment Research Council, and (g) other cooperating and participating agencies.

C. Advisors.

Advisors to the Conference are the SCS State Conservationist and the Experiment Station Director from the state where the Conference is held. In addition other advisors may be selected by the Steering Committee or the Conference.

D. Committee Chairmen and Vice-Chairmen.

Each Conference committee has a chairman and vice-chairman which are selected by the Steering Committee.

IV. Meetings.

A. Time of Meetings.

The Conference convenes every two years, in even-numbered years. Time of year to be determined by the Conference.

B. Place of Meetings.

The Conference may be held at any suitable location. During the biennial business meeting, invitations from the various states are considered, discussed, and voted upon. A simple majority vote decides the location of the meeting places. Meeting sites should be determined two meetings in advance (eg. 1966 Conference should select place for 1968 and 1970 meetings, and then 1968 Conference select place for 1972, etc.)

C. Separate State and Federal Meetings.

Time is to be provided on the Conference program for separate state and federal meetings if requested by the Conference and scheduled by the Steering Committee.

V. Committees.

A. Most of the technical work of the Conference is accomplished by duly constituted committees.

B. Each committee has a chairman and vice-chairman. A secretary, or recorder, may be selected by the chairman. Committee chairmen and vice-chairmen are selected by the Steering Committee. It is the intent, where possible, for the vice-chairmen to succeed the chairmen at the succeeding conference.

C. The kinds of committees, officers of the committees, and their members, are determined by the Steering Committee. In selecting committee members, the Steering Committee considers expressions of interest filed by the Conference members, but at the same time provides for efficient continuity of work, and considers the technical proficiency of the members of the conference.

D. Each committee shall make a verbal report at the designated time at each biennial Conference. Accepted committee reports shall be written and duplicated by the Committee Chairman as per instructions from the Steering Committee.

Note: Chairmen of Committees are responsible for submittal of committee reports promptly to the Chairman of the Conference. The Conference Chairman is responsible for distribution of committee reports to Conference members snd others.

E. Much of the work of committees will, of necessity, be conducted by correspondence between the times of biennial conferences. Committee chairmen are charged with responsibility for initiating and carrying forward this work. They shall provide their committee members with the charges as directed by the Steering Committee, and whatever additional instructions they deem necessary for their committees to function properly. Chairmen should initiate committee work at the earliest possible date.

VI. Representation at the National Technical Work-Planning Conference.

At least one state and one federal voting member will represent this conference at the National Technical Work-Planning Conference. Selections are to be made subject to approval of the appropriate administrators. Representatives will report back to this conference, as well as to their respective state or federal group.

VII. Amendments.

Any part of this statement of purposes, policy, and procedures may be amended at any time by simple majority vote of the Conference voting membership.

Adopted by Southern Regional Soil Survey Technical Work-Planning Conference at Lexington, Kentucky on 9 June 1966.

AHB.

(d) Amendments To The National Soil Classification System In Categories Above The Series. The national soil classification system is dynamic and as new knowledge is gained and soils are examined and described in new places, amendments to the system are required to accommodate the new information. Soil Taxonomy expresses in print knowledge of the system and understanding of soil science up to the time it was published.

(1) Kinds of Amendments. The kinds of amendments that may be expected are as follows:

- Addition of taxa.
- Deletion of taxa.
- Changes in definitions of taxa.
- Changes in definitions of diagnostic criteria.
- Additions of diagnostic criteria.
- Clarification of the text not related to any of the above.

(2) Origin of Suggestions for Amendments. Suggestions for amendments to the soil classification system may originate from any individual or group participating in the National Cooperative Soil Survey or from outside the United States. Others must obtain a sponsor from within the National Cooperative Soil Survey.

(3) Supporting Evidence for Amendments. The amount and kind of evidence required to accompany recommendations for amendments to the soil classification system varies, depending on the nature of the proposed changes. For example, a description of a proposed soil series with interpretations and laboratory data is acceptable evidence to support a new class in the family category.

Definitions of some taxa may need to be revised to provide more suitable groupings For these, as a minimum, the supporting evidence must describe the impact of each proposed change on definitions of all taxa that will be affected.

(4) Amendments That Originate Within the National Cooperative Soil Survey (NCSS).

(i) Regional Soil Taxonomy Committees. Four Soil Taxonomy committees, one for each of the group of states seved by a technical service center consider proposed amendments to the soil classification system. Members are:

- The principal soil correlator, serving as chairman.

- Six additional members, three from state agencies and three from federal agencies.

- Members from federal and state agencies are selected by the federal and state members respectively of the Regional Work Planning Conference of the National Cooperative Soil Survey.

- Members serve three-year terms except for the initial period, one state and one federal member retiring each year.

- Additional soil scientists, depending on the nature of the recommended changes and the expertise needed may be asked to consult with the committee at the discretion of the chairman.

(ii) National Ad Hoc Work Groups. Such work groups are appointed by the Assistant Administrator for Soil Survey as needed. These ad hoc work groups review reports from regional soil taxonomy committees and recommend additional study or implementation of proposed amendments. Membership includes representatives of state and federal agencies, and may include international representatives. They are composed of:

- A chairman, usually a member of the Washington office Soil Survey staff,

- Additional members depending upon the nature of the recommended changes and the expertise needed.

(iii) Procedures For Amendments--~ Categories.

(A) Soil Series. Soil series is the most common taxonomic reference for naming soil mapping units in the United States. Changes in the classification of soil series are made through the correlation process. When about 800 ha (2,000 acres) of a unique new kind of soil are recognized, using descriptions obtained for at least 10 pedons, necessary laboratory data obtained, and interpretations developed, 8 new series can be proposed and established as outlined in Section 301.1(c)(5).

(B) Adding New Families. Proposals to classify soils in families that previously lacked any soil series but are listed in the soil classification system, are submitted to the principal soil correlator for concurrence. When the added series meets the requirements given in (A) above, the soil series description is reviewed in the normal manner. Proposals to add new family criteria and new families to the system of soil classification follow the procedure for changes in the system outlined in Sections 301.1(d)(4)(iii)(D), 301.1(d)(4)(iv), and 301.1(d)(5).

(C) Dropping Families. Families are not dropped automatically from the approved list maintained by the Director, Soil Survey Classification and Correlation Division, because no soil series is listed in the family. Some variants, taxadjuncts, and unnamed (at the series level) soils may be classified in these families. A soil family is dropped by the Director, Soil Survey Classification and Correlation, upon recommendation of the principal soil correlator from the list of soil families of the USA only after it is determined that the family does not represent a significant [less than 800 ha (2,000 acres)] area of soils.

(D) Implied Subgroups & Families. The classification of some soils at the subgroup level was not provided in the soil classification system because of limited knowledge or small extent. These soils can be classified in a great group, but by definition are excluded from all recognized subgroups. For example, some soils, such as Grossarenic Hapludults, are excluded from the typic and other subgroup definitions of the great group. They are excluded because they have not bee" located and studied, but are "implied" because there is reasonable assumption that they occur. The following procedure is used for soils that are outside the range of any defined subgroup, but meet all the requirements for recognition as a new soil series:

- Determine if an existing subgroup can be modified to accommodate the new series without changing the intent or value for reasonable grouping of Similar soils. If this cannot be done the":

--Define a new subgroup and provide documentation as to why it is needed.

301.1(d)(4)(iv)

--The proposal and supporting documentation, including the series description is sent to the Director, Soil Survey Classification and Correlation Division (DC&C). The DC&C reviews the proposal, determines if additional action is necessary and notifies the proposing individual within 30 days.

Families other than those listed in Soil Series of the United States, Puerto Rico and the Virgin Islands will be recognized when at least one series in the family has been approved in the correlation process.

(iv) Procedures for Amendments--Higher Categories. For proposed amendments that originate within the National Cooperative Soil Survey the steps are as follows:

(A) Proposals that originate within a state either from SCS staff or from cooperators are submitted to the state soil scientist. The state soil scientist reviews and comments on the proposal and supporting evidence and forwards all to the principal soil correlator (PSC) within one month of the receipt of the proposal.

(B) The PSC examines the proposal and the supporting evidence, requests additional evidence from the originating state if necessary, and within two months of the receipt of the proposal, submits the proposal to all members of the soil taxonomy committee of the Regional Work Planning Conference, NCSS.

(C) The soil taxonomy committee may choose t" set up work groups to study proposals and to submit their recommendations to the committee, to seek advice from individuals with special knowledge of the subject matter of the proposal, or submit it to one or more of the other regional soil taxonomy committees for their consideration. Approval of the proposal requires a favorable vote by the majority of the committee (4 of the 7 members) serving the area where the original proposal was made. Minority reports may be submitted by dissenting members. If the proposal is disapproved, the originator of the proposal is notified of that action. If approved, the proposal and supporting evidence are submitted to the other three regional soil taxonomy committees through their chairmen and to the DC&C.

(D) The reports of the remaining three committees which must be approved by the majority of their members, are returned to the originating committee which prepares a consolidated report and forwards it to the DC&C.

(E) The DC&C evaluates the consolidated report and submits recommendations to the Assistant Administrator for Soil Survey.

(F) The Assistant Administrator for Soil Survey my:

- Approve the proposal, or

- Refer it to an ad hoc committee for additional study. The report of the ad hoc committee is returned to the four regional soil taxonomy committees for additional comments. The comments from the four committees are returned to the DC&C who, after consultation with the ad hoc committee, recommends to the Assistant Administrator for Soil Survey whether the proposal should be approved or rejected.

(G) If approved by the Assistant Administrator for Soil Survey, an edited copy is prepared and submitted to the Administrator, SCS, for signature.

(H) Proposals that originate outside the area of responsibility of the state or technical service center are sent to the DC&C who, within two months submits the proposal to a national ad hoc work group or an appropriate soil taxonomy committee for approval. If approved by the majority of the work group or committee, the proposal is forwarded to all the soil taxonomy committees. Procedures given in Section 301.1(d)(4)(iv)(D) through (G) are subsequently followed.

(5) Amendments That Originate Outside The United States.

(i) Implied Subgroups & Families. Procedure is the same as that for amendments that originate within the National Cooperative Soil Survey. See Section 301.1(d)(4)(iii)(D).

(ii) Subgroups and Higher Categories & Diagnostic Properties.

(A) All such proposals for amendments are submitted to the Assistant Administrator for Soil Survey, Soil Conservation Service, U. S. Department of Agriculture, Washington, D. C. 20250, who refers the proposal to the Director, Soil Survey Classification and Correlation Division.

(B) The Director. Soil Survey Classification and Correlation Division (DC&C), evaluates the proposals and refers them to an appropriately constituted international work group and to those regional soil taxonomy committees affected by the recommendations for consideration. This work group submits its report to the DC&C. The regional committees affected by the proposals submit their comments to the DC&C.

(C) The DC&C prepares a consolidated report. If responses of all reviewers are favorable, the report is submitted to the Assistant Administrator for Soil Survey.

(D) If the consolidated report is controversial, the Assistant Administrator for Soil Survey constitutes an ad hoc work group. See Section 301.1(d)(4)(ii). The group makes recommendations for approval or disapproval.

(6) Notification of Amendments.

(i) Decisions on proposed amendments will be sent by the Director, Soil Survey Classification and Correlation Division, to the originators and reviewers of the proposed amendments as soon as the review procedure is completed.

(ii) Amendments are issued to the soil classification system in National Soils Handbook notices at least once each year.

(iii) Amendments are filed in Part II, Section 301.1 of the National Soils Handbook of the Soil Conservation Service. Amendments can be transferred to working copies of Soil Taxonomy by individual soil scientists.

(iv) Each amendment will be printed on a separate sheet so that it can be properly filed. Exceptions are changes which involve only correction of spelling or punctuation, several of which can be printed on a single sheet.

(v) Copies of the amendments will be sent to all soil scientists of the NCSS, and to other interested soil scientists. They will also be sent to domestic and some international journals of soil science, and to libraries known to hold copies of Soil Taxonomy.

NATIONAL COOPERATIVE SOIL SURVEY

Southern Regional Conference Proceedings

Jackson, Mississippi
April 6-8, 1976

Slusher

PROCEEDINGS
OF SOUTHERN REGIONAL TECHNICAL WORK - PLANNING CONFERENCE OF THE COOPERATIVE SOIL SURVEY

Jackson, Mississippi

April 6-8, 1976

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

National Cooperative Soil Survey
Southern Regional Technical Work-Planning Conference
April 6-8, 1976
Jackson, Mississippi

Contents

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 610, Jackson, Mississippi 39205

April 20, 1976

RE: 1976 Southern Regional Technical Work-Planning Conference of the National Cooperative Soil Survey

TO: Recipients of Proceedings

The conference convened at 9:00 a.m. Tuesday, April 6, 1976, at the Holiday Inn, Jackson, Mississippi.

The program committee extends their thanks to the speakers who addressed the opening session.

Committee chairmen and members are commended for the reports they developed and for the conduct of the workshop sessions during the conference.

Dr. Perkins of the University of Georgia was selected for the position of chairman for the 1978 conference. Mr. M. E. Shaffer, State Soil Scientist of Georgia, will serve as conference vice-chairman.

The conference adjourned at 12:00 noon, April 8, 1976.

R. C. Carter
R. C. Carter
Chairman

D. E. Pettry
D. E. Pettry
Vice-chairman

AGENDA

1976 Southern Regional Technical Work-Planning Conference
of the Cooperative Soil Survey

Holiday Inn Medical Center
2375 North State Street
Jackson, Mississippi

Monday, April 5
4:00-7:00 p.m. Registration

Tuesday. April 6

8:00-9:00 a.m.	Registration
9:00-9:10	Introductory Remarks
9:10-9:25	Welcome - Mr. Doug Shanks, city Commissioner Jackson, Mississippi
9:25-9:45	Soil Surveys in Mississippi Mr. W. L. Heard State Conservationist Soil Conservation Service Jackson, Mississippi
9:45-10:05	Experiment Station Role in Soil Surveys Dr. Walter K. Porter, Jr. Associate Director Miss. Agricultural & Forestry Experiment Station Mississippi State University
10:05-10:25	Recess
10:25-10:40	Use of Soil Surveys in the Cooperative Extension Service Dr. K. L. Anderson, Leader Extension Agronomy Department Missiesippi State University
10:40-11:00	Interpretative Maps Prepared from MIADS Data Dr. R. H. Griffin National Aeronautics and Space Administration Bay St. Louis, Mississippi
11:00-11:30	Soil Surveys for Land-Use Planning Mr. Volney J. Cissna, Jr., Special Projects Officer Southern Mississippi Planning and Development District Gulfport, Mississippi

11:30-12:00	**National Soil Survey Program** Mr. R. I. Dideriksen, Director Land Inventory and Monitoring Division Soil Conservation Service Washington, D. C.			
12:00-1:00	Lunch			
	Discussion Group 1	Discussion Group 2	Discussion GGroup 3	Discussion 4
1:00-2:30	Corn.1	2	3	4
2:30-2:50	Recess			
2:50-4:20	5	6	7	
4:20-5:00	2	3	4	1
5:30-6:30	Social Hour Holiday Inn			
6:45	Banquet: Holiday Inn Speaker: Dr. Louis N. Wise Vice President Agriculture, Forestry and Vetinary Medicine, Mississippi State University			

Wednesday, April 7

	Discussion Group 1	Discussion Group 2	Discussion Group 3	Discussion Group 4
8:00-8:40	corn.2	3	4	1
8:40-10:00	3	4	6	7
10:00-10:30	Recess			
10:30-12:00	4	5	1	2
12:00-1:00	Lunch			
1:00-2:30	6	7	5	3
2:30-3:00	Recess			
3:00-4:30	7	1	2	5
4:30-5:00	-			6

Committee on Soil Taxonomy Meeting will be scheduled by the Chairman

Thursday. April 8

8:30-10:00	Committee Reports (l-6)
10:00-10:20	Recess
10:20-10:50	Committee Report 7 and Soil Taxonomy

Thursday continued

10:50-11:20	National Soil Survey Laboratory Dr. Warren Lynn National Soil Survey Laboratory Lincoln, Nebraska
11:20-11:30	Comments Dr. D. M. Gossett Directors' Representative - Southern Soil Research Committee University of Tenneasee
11:30-11:40	Comments Mr. Joe D. Nichols Head, Soil Correlation Unit, STSC Fort Worth, Texas
11:40-12:00	Business Session
12:00	Adjournment

Participants at the
Southern Regional Technical Work-Planning
Conference of the National Cooperative Soil Survey

April 6-8, 1976-Jackson, Mississippi

Southern Regional Soil Survey Work
Group Representatives

Alabama :	B. F. Hajek	Auburn University
	D. E. Lewis, Jr.	SCS-USDA
	L. Ratliff	SCS-USDA
Arkansas:	E. M. Rutledge	University of Arkansas
	C. A. McGrew	SCS-USDA
Florida:	R. E. Caldwell	University of Florida
	V. Carlisle	University of Florida
	R. W. Johnson	SCS-USDA
Georgia:	H. F. Perkins	University of Georgia
	M. E. Shaffer	XX-USDA
Kentucky:	H. H. Bailey	University of Kentucky
	J. Newton	SCS-USDA
Louisiana:	B. J. Miller	Louisiana State University
	B. A. Touchet	SCS-USDA
Mississippi:	D. E. Pettry	Miss, State University-Vice Chairman
	R. C. Carter	SCS-USDA - Chairman
North Carolina:	S. W. Buol	North Carolina State University
	H. F. Byrd	SCS-USDA
Oklahoma:	F. Gray	Oklahoma State University
	B. T. Birdwell	SCS-USDA
Puerto Rico:		
South Carolina:	B. R. Smith	Clemson University
	D. Hallbick	SCS-USDA
Tennessee:	M. E. Springer	University of Tennessee
	R. P. Sims	SCS-USDA
Texas:		
	C. Thompson	SCS-USDA

Virginia: W. J. Edmonds Virginia Polytechnic Institute and State University

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D. M. Gossett, University of Tennessee, Director's Representative to the Southern Regional Research Committee

R. I. Dideriksen, USDA-SCS, Washington Office Advisor to the Conference

Joe Nichols, Principal Soil Correlator, South Region, USDA-SCS TSC, Fort Worth, Texas

D, G. Aydelott, USDA-Forest Service, Atlanta, Georgia

Z. Lund, USDA-AR?, Auburn, Alabama

General Session Speakers

Mr. W. L. Heard, State Conservationist, USDA-SCS, Jackson, Mississippi

Mr. Doug Shanks, City Commissioner, Jackson, Mississippi

Dr. Walter K. Porter, Jr., Associate Director, Miss. Agricultural and Forestry Experiment Station, Miss. State University, Mississippi

Dr. K. L. Anderson, Leader, Extension Agronomy Department, Miss. State University, Mississippi

Dr. R. H. Griffin, National Aeronautics and Space Administration, Bay St. Louis, Mississippi

Mr. Volney J. Cissna, Jr., Special Projects Officer, Southern Mississippi Planning and Development District, Gulfport, Mississippi

Mr. R. I. Dideriksen, Director, Land Inventory and Monitoring Division, USDA-SCS, Washington, D. C.

Work - Planning Conference Attendees

Allen, B. L. - Department of Agronomy, Texas Technological College, P. O. Box 4169, Lubbock, Texas 79409

Aydelott, G. - Soil Scientist, U. S. Forest Service, 1720 Peachtree Road, NW, Atlanta, GA 30309

Bailey, H. H. - Professor, Agronomy Department, University of Kentucky, Lexington, KY 40506

Birdwell, 11. T. - State Soil Scientist, Soil Conservation Service, Agricultural Ctr. Bldg., Farm Rd. & Brumley Street, Stillwater, OK 74074

Bramlett, G. L. - Soil Correlator, Soil Conservation Service, Box 832, Athens, GA 30601

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Burt, J. - Sanitary Engineer, Soil Conservation Service, Box 610, Jackson, MS 39205

Byrd, H. J. - State Soil Scientist, Soil Conservation Service, Box 27307, Raleigh, NC 27611

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Gossett, H. M. - University of Tennessee, Knoxville, Tennessee 37916

Gray, F. - Professor of Soil Science, Department of Agronomy, Oklahoma State University, Stillwater, OK 74074

Hajek, B. F. - Associate Professor, Agronomy and Soils Department, Auburn University, 21% Funchess Hall, Auburn, AL 36830

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Koos, W. M. - Soil Correlator, Soil Conservation Service, Box 610, Jackson, MS 39205

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Lewis, [illegible]. E. Jr. - Assistant State Soil Scientist, Soil Conservation Service, Box 311, Auburn, AL 36830

Lund, Z. - Agronomy and Soils Department, Auburn University, 230 Fur chess Hall, Auburn, AL 36830

Lynn, W. - Soil. Scientist, National Soils Survey Laboratory, NTSC, Federal Building, U.S. Courthouse, Room 345, Lincoln, NB 68508

McElroy, C. - Civil Engineer, Soil Conservation Service, Box 6.567, Fort Worth, TX 76115

Miller, B. - Agronomy Department, Louisiana State University, Baton Rouge, LA 70803

Miller, W. F. - School of Forestry, Mississippi State University, P. O. Drawer FD, State College, MS 39762

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Perkins, H. F. - Professor of Agronomy, Agronomy Department, University of Georgia, Athens, GA 30601

Pettry, D. E., - State Soil Survey Leader, Department of Agronomy and Soils, Mississippi State University, P. O. Box 5248 State College, MS 39762

Ratliff, L. - Assistant State Soil Scientist, Soil Conservation Service, Box 311, Auburn, AL, 36830

Rehner, R. - Assistant State Soil Scientist, Federal Building, 355 E. Hancock Avenue, Box 832, Athens, GA 30601

Rutledge, E. M. - Agronomy Department, University of Arkansas, Fayetteville, AR 72701

Shaffer, M. E. - State Soil. Scientist, Soil Conservation Service, Box 832, Athens, GA 30601

Sims, R. P. - State Soil Scientist, Soil Conservation Service, 561 U.S. Courthouse, Nashville, TN 37203

Smith, B. R. - Agronomy and Soils Department, Clemson University, Clemson, SC 29632

Soileau, J. - Land Use Specialist, Soils and Fertilizer Branch, Tennessee Valley Authority, Muscle Shoals, AL 35660

Springer, M.E. - Department of Agronomy, University of Tennessee, Box 1071, Knoxville, TN 37901

Steers, C. A. - Cartographic Unit, Soil Conservation Service, Box 6567, Fort Worth, TX 76115

Thompson, C. M. - State Soil Scientist, Soil Conservation Service, Box 648, Temple, TX 76501

Touchet, B. A. - Assistant Principal Soil Correlator, Soil Conservation Service, Box 6567, Fort Worth, TX 76115

General Session I

April 6, 1976 - 9:00 a.m. - 12:00 noon

R. C. Carter, State Soil Scientist, welcomed the group to Jackson and introduced the speakers for the morning session.

Douglas Shanks, City Commissioner, welcomed the conference members to Jackson.

W. L. Heard, State Conservationist, reviewed the soil survey program in Mississippi. He discussed survey progress and the increased use of Boil survey information.

Dr. Walter K. Porter, Jr. illustrated the Boil resource areas of Mississippi and pointed out the role of the Experiment Station in the Cooperative Soil Survey. He stressed that an understanding of soils is basic to agricultural research. He commented that current agronomic research is becoming increasingly complex and often requires inter-disciplinary efforts to solve pertinent problems. Dr. Porter extended the group best wishes for a productive end worthwhile conference.

Dr. Kelton L. Anderson spoke of the cooperative nature of the soil survey program in Mississippi and the role of the Extension Service. He pointed out the importance of introducing published soil survey reports to the public end the need to educate local officials on the uses of Boil reports. Dr. Anderson noted that efforts to educate the younger members of society on soils and uses of soil information will return dividends in the future.

Dr. R. A. Griffin gave a slide presentation on soil interpretative maps. He used coded soil information that had been prepared for MIADS maps for Washington County, Mississippi. He used this information for computer input for a number of kinds of maps that were produced at USA.

Mr. Volney Cissna, Jr. discussed the use of soils information by planners. He stressed the need to speed up the soil survey program for land use planning.

Mr. Ray Dideriksen reviewed the soil survey organization at the National level. He gave the survey production and progress on soil survey publications. Principal activities of each division were outlined.

General Session II

April 8, 1976 - 8:00 a.m. - 12:00 noon

The meeting was called to order by D. E. Pettry.

Final reports of each committee were presented by the chairman of each committee. All reports were accepted. The chairman thanked each committee for their efforts. He requested 150 copies of each committee report by May 10, 1976.

Mr. Joe Nichols stated the committee on Soil Taxonomy was organized and ready. They will handle recommendations by correspondence and meetings. The following new members were elected by the conference:

1976 - B. A. Touchet - replaces D. F. Slusher

1977 - Hobby Birdwell - replaces W. W. Fuchs

1978 - Richard Guthrie

1978 - E. M. Rutledge

Dr. Gossett commented on the activities of this conference and the work of the committees. He serves as liaison between the directors and this work group. It is possible to have a regional research project as a part of this group. If we will present a proposal, he will help develop the project and present to the directors.

Dr. Warren Lynn reviewed the objectives and facilities of the National Soil Survey Laboratory. He serves as liaison from the laboratory to the Southern states. A list of 43 projects have been proposed for the next 5 years.

Mr. Joe Nichols discussed the accomplishments of this conference. He listed the new personnel at the Soil Correlation Unit.

BUSINESS ITEMS CALLED FOR:

Invitations to host the 1978 conference were recieved from Georgia and Oklahoma. The group voted to hold the next conference in Georgia.

The preparation of an article on Southern Soils and Crop Production in Crops and Soils was discussed. Dr. Stan Buol recommended a small group of 2 or 3 be requested to prepare this article. The conference chairman and vice-chairman will contact these people.

Dr. John Soileau expressed appreciation for participation in the conference.

Dr. Lund of the ARS commented on areas of research and the relation to the soil survey program.

Dr. Ben Hajek presented a special award to Dr. DeMent for his assistance on study of soils with pllnthite.

MEETING ADJOURNED

SOUTHERN REGIONAL SOIL SURVEY WORK PLANNING CONFERENCE
JACKSON, MISSISSIPPI
April 5-8, 1976
Chairman - J. F. Brasfield
Vice Chairman - D. F. Slusher

Committee 1 - Histosols and Soils of Tidal Areas

Charg es to Committee:

1. Review the report of the National Committee on Organic Soils. Identify problems in applying the recommendations to soils in the Southern Region and prepare recommendations for solving any problems found to exist.

2. Review the guides for soil survey interpretations as applied to soils of tidal areas other than Histosols and recommend any needed changes or additions.

COMMITTEE REPORT:

The committee reviewed the report of the National Committee on Organic Soils and offers the following comments:

1. We will restrict our comments to organic soils and soils of tidal areas. The national committee went beyond the title "Classification of Organic Soils and the Interpretations" and included associated mineral soils. It appears that the guide includes all mineral soils and not just mineral soils in tidal areas. We feel the guide for preparation of management suitability groupings should delete the part concerning associated mineral soils, or it should be split into two guides, one for Histosols and one for mineral soils in tidal areas for easier use and comparison. With our capability system, there is a question of whether we need the "management suitability groupings for mineral soils". If we are going to use the soil potential concept, perhaps the mineral soils not in tidal areas should be evaluated by the Committee on Soil Potential Ratings.

2. We feel that a positive rating system that is alluded to on page 5, 2nd paragraph of the national committee report is much more desirable. A scale of 0 to 100 with 100 having the highest potential and 0 the lowest would allow comparisons between soils and would serve as a numerical potential ranking. See attachment 1 of "Soils shown according to potential for improved pastures" as an example.

3. In using a positive rating system mentioned above, there needs to be flexibility in the assignment of positive points. Some factors might be of minor importance or not applicable in a survey area. Rather than assign points to factors in a national or regional guide, it might be better just to list the factors that are considered important in arriving at a rating. The term "management suitability" is not the best; we are not rating management but the soil's potential response to management inputs. A better title would be "Guide for the Preparation of Soil Potential Groupings for Mechanized Agriculture for Organic Soils".

4. On page 12 of the National Committee Report, the "Development Difficulty Rating for Areas of Organic Soils" should be based on a site investigation, since some of the physical features used to determine the rating such as vegetative cover, surface roughness, establishment of adequate water control, and in some cases coarse fragments are not part of the criteria for series or mapping unit separations. Where appropriate, these physical features could be discussed in the mapping unit.

5. On page 6 of the National Committee Report, assumption No. 1, we have these comments:

   Subsidence in drained conditions is dependent on depth of drainage. Stephens, 1955 and 1956, worked this out for Florida and Indiana. Formulas are presented on page 295 of Buol, Hole, and McCracken's book. Soil Genesis and Classification. Also, if underlying mineral material is of suitable texture and drainage outflow is available for that mineral surface, the mineral material in some instances may be as good soil as the Histosols. Therefore, shallow organics should be rated not only on depth but also on what is underneath.

6. Page 7 of the National Committee Guide, the thickness of organic soil materials and underlying materials should be considered together. Also, in the underlying materials, sandy may be better than clayey materials due to the restricted permeability of many clayey soil materials. Since most organic soils have some mineral content after complete subsidence, a surface high in organic matter would probably he left. Some sandy soils that have a surface layer high in organic matter are very productive. Also, whether the underlying rock is permeable or impermeable should be considered. Some limestone that underlies Histosols is highly permeable and contains pores or holes that allow root penetration and will give support to a plant.

7. On page 7, rooting depth of some plants can he limited by aluminum toxicity. This factor needs to be included. This factor could be combined with the reaction factor on page 9 and the reaction with depth evaluated. The reaction groupings indicate a penalty factor

pf 0 for pH 7. For Typic Sulfihemists such as the Handsboro soils that have pH readings more than 7.0 in natural conditions and that become highly acid when drained, we suggest the heading be changed to REACTION FOR ORGANIC SOILS WITHOUT SULFIDIC MATE-RTALS.

8. 0" page 10 of the National Committee Guide under coarse wood fragments, we believe that a depth function needs to be put with the coarse wood fragments. If we have more than 25% wood but only to a depth of 20-30 inches, our clearing operation can take care of it at a reasonable cost. If that wood is from the surface to a depth of 6 to 8 feet, it is an impossible situation because of subsidence. We would suggest the following:

Thickness of woody layer from surface to a depth of:	% of wood
1 to 3 ft.	1-10%
4 to 5 ft.	1-10%
6 ft.	1-10%
1 to 3 ft.	10-25%
4 ft.	10-25%
5 ft.	10-25%
6 ft.	10-25%
1 ft.	> 25
2 ft.	> 25
3 ft.	> 25
4 ft.	> 25
5 ft.	> 75
6 ft.	> 25

Appropriate positive points can be assigned to the above combinations to meet the needs of a particular survey.

9. On page 9 of the National Committee Guide under tidal storm flood control, it is felt that if a soil has only marginal tidal storm flood control that its potential for use is more limited than indicated by the penalty factor of 45.

10. On page 7 of the National Committee Guide for underlying materials, we believe that permeability classes need to he added to the rating factor. There is a marked difference in water relations in soils with clay at 20 inches versus sand at the same depth. The permeability classes as indicated on page 15 of the National Committee Guide for sapric, hemic, and fibric materials may not serve a useful purpose since the rates are so wide. In Florida, sapric materials do not have restrictive permeability with the exception of those containing clastic materials. Where the water table has been lowered by water control structures, the sapric materials will absorb water from heavy rainfall about as fast as it falls. This could be due to soil structure and the low silt content of the soils in Florida. Limnic materials, relatively scarce in the South, would be less permeable than most other organic mate-

rial. Permeability rates for soils in North Carolina approximate those in the National Committee Guide. Suggest that wc use the available lab data on permeability of organic soils and the estimated permeability as shown on the SCS-SOILS-5 for each individual series.

11. On page 11 of the National Committee Guide regarding thickness of organic materials, we offer this comment: Certainly if mineral texture is okay and drainage is available, the land is not lost if it becomes a mineral soil. Until recently, burning off the organic material was the best way to handle organics in Tidewater, North Carolina because less input of fertilizer, herbicide, and lime was needed on the mineral than on the organic soils. This may be the exception rather than the rule. We certainly want to retain as much of the profile of the highly productive Histosols in the Everglades section of Florida as possible, since most of these deep Histosols overlie hard limestone.

12. On page 11 of the National Committee Guide regarding rooting depth, we offer this comment: Acid conditions limit roots just as effectively as lithic contacts and the expense of getting lime deeply incorporated is prohibited if not physically impossible.

13. On page 12 of the National Committee Report concerning development difficulty rating for areas of organic soils, establishment of adequate water control criteria are missing. The following is suggested. Slight = Adequate water control established. Moderate = Minor canals (not navigable) required or tile drains needed with nearby outfall. Severe = Major canals to navigable water required, as well as a system of pumps; or permeability of the soils is low or very low.

14. On page 16 of the National Committee Guide under coarse fragments, we make this observation. Coarse fragments arc a less severe limitation on pastures where higher water levels can be maintained and machine operation is not as frequent as on cultivated areas. As noted earlier, both volume and thickness need to be considered.

15. In the South, we have insufficient site data to evaluate the interpretive guides for forestry.

In regard to Charge 2, we offer these comments:

1. Soils of the tidal areas are flooded each day with sea water. For all of the uses rated on the SCS-SOILS-5 form, these soils have severe limitations from flooding with sea water except for wetland wildlife, but most important are the value of these soils for their

environmental services when left in their natural state. Quoting from the book Environmental Quality by Design: South Florida by Albert Veri and William Jenna, Jr. and Dorothy Bermamaschi, a summary of environmental services rendered by soils and are as follows:

"1. Storage and dispersal of flood waters.

2. Filtration of runoff improves near-shore water quality.

3. Protection of upland by buffering water surge and wave energy.

4. Stabilization of shore line.

5. Land building by trapping of sediments and other materials and by accumulation of mangrove roots; marl deposition occurs in coastal marsh.

6. Habitat and food for many marine species, including sport and commercial fish.

7. Wildlife habitat, especially for waterfowl and wading birds."

In addition to the above, tidal marsh-estuaries have great economic value to highly urbanized regions in waste treatment. Gosselink, Odum, and Pope 1973 in a paper titled "The Value of the Tidal Marsh" (Work Paper No. 3. 'Gainesville: University of Florida, Urban and Regional Development Center) estimated that an acre of marsh-estuary is doing about $14,000 worth of work per year at a daily loading of 19.4 lb. ROD, assuming the cost of artificial tertiary treatment is at least $2/lb. BOD. Using an income capitalization calculation, an acre of estuary that is able to handle (this) waste loading is worth $280,000. This value represents a large "overload" of work that has serious pollution side-effects, and if continued or increased could result in a system breakdown. If the BOD load can he reduced, these estuaries would function better as tertiary treatment plants and be more valuable overall.

Whether these values are completely accurate or not, it is readily apparent that the tidal marsh areas have enormous value. Based on the above, we believe that these soils should not be considered for cropland production, and that any use of these soils should leave them in their natural state. We should continue to study these soils so that we can better understand their properties and predict their behavior.

SUMMARY AND CONCLUSIONS:

The Committee in the Committee Report has responded to the charges. The National Committee on Classification of Organic Soils and Interpretations did a good job of putting together a lot of material and developing guides. We feel the guides can be improved by concentrating on organic soils only and refining them along the lines of a positive potential concept. Some of the suggestions outlined in the committee report and further enumerated in the recommendations would improve the guides for use in the Southern Region,

The soils of tidal areas have enormous environmental value to man. These soils should continue to be studied so that we can better understand some of their unique properties and can better point out some of the environmental degradations that can be expected from misuse. Any use of these soils should leave the soils and the vegetation essentially in its natural state.

The Chairman is appreciative of the help and contributions of individual committee members to the report. The committee extends a thank you to all the discussion groups for their helpful suggestions.

RECOMMENDATIONS:

1. That in the guide for preparation of management suitability groupings, that the part concerning associated mineral soils be deleted. (See number 1 in the body of our Committee Report.)

2. That consideration be given to just listing the-factors considered important in arriving at a rating without showing the points or allow a positive rating system with flexibility in assignment of positive points. It is suggested that in developing soil potentials, inputs from individuals with local expertise affecting land use be utilized.

3. That the "Development Difficulty Kating for Areas of Organic Soils" not be used to rate individual soil series as to their development difficulty for publication in soil surveys; however, that it be developed and utilized as a guide for onsite investigation. This would not preclude discussing these features in the mapping unit description in a soil survey manuscript.

4. That the thickness of organic soil materials and underlying materials be considered together. (See numbers 5 and 6 in the body of our Committee Report.)

5. That consideration be given to the effect of aluminum toxicity on rooting depth, and that the heading "REACTION" be changed to "REACTION FOR ORGANIC SOILS WITHOUT SULFIDIC MATERIALS". (See

number 7 in the body of our Committee Report.)

6. That a depth and thickness function be put with coarse fragments in their evaluation. (See number 8 in the body of our Committee Report.)

7. That the factor for marginal tidal storm flood control be given rather low points in a positive rating system.

8. That permeability classes be added as part of the evaluation criteria for underlying materials. (See number 10 in the body of our Committee Report.)

9. That water control criteria for slight, moderate, and severe under development difficulty rating, for areas of organic soils he added as suggested in number 13 in the body of our Committee Report.

10. That we not have a general guide for rating soils of tidal areas for cropland.

11. That we show the estimated properties of soils of tidal areas on SCS-SOILS-5 and rate them according to their limitations. (See discussion in the body of our Committee Report in regard to Charge 2.)

12. That on Histosols we accumulate more woodland site and productivity data for forestry for use in developing an interpretive guide applicable to the Southern Region.

13. Recommend that this committee be continued to help organize and evaluate material relative to interpretations of Histosols and soils of tidal areas.

Committee Members:

J. F. Brasfield, Chairman
D. F. Slusher, Vice Chairman
W. L. Cockerham
E. Gamble
C. L. Girdner
D. Hallbick
R. E. Horton
H. F. Huckle
W. M. Koos
L. Ratliff
Luis Rivera

Attachments: 1. Soils shown according to potential for improved pastures.

NOTE : It is suggested that anyone attending the Committee 3. discussions bring with them a copy of the report of the "Committee on Classification of Organic Soils and Interpretations National Soil Survey Conference, Orlando, Florida, Jan. 27-31, 3975".

SOILS SHOWN ACCORDING TO POTENTIAL FOR IMPROVED PASTURES

MAP SYMBOL	SOIL NAME	POTENTIAL (RANKING)		% OF CNTY.	REFER TO PAGE
De	Delray fs	Very High	(90)	1.8	83
Dm	Delray mfs	Very High	(90)	.9	85
Df	Delray fs, high	Very High	(90)	2.9	84
Dh	Delray fs, mod. shal., high	Very High	(90)	.9	85
Mb	Manatee fs	Very High	(90)	.5	104
MC	Manatee Ifs	Very High	(90)	.1	105
Rh	Rutlege fs, high	High	(80)	.2	117
Rf	Rutlege fs	High	(80)	1.7	116
Rm	Rutlege mfs	High	(80)	.4	118
Ok	Okeechobee m	High	(80)	1.0	107
Tc	Terra Ceia m	High	(80)	.4	125
Ik	Iberia ml	High	(80)	.1	89
Ib	Iberia cl, overflow	High	(80)	3.0	88
OrB	Orlando fs, 0-S% slopes	High	(75)	.2	109
OrC	Orlando fs, 5-8% slopes	High	(75)	.1	110
Bp	Brighton p	High	(75)	.1	79
Br	Brighton p, shal. var.	High	(75)	.1	80
Bt	Brighton, Istokpoga, and Okeechobee soils	High	(75)	1.6	81
IO	Brighton p, deep	High	(75)	.3	92
IP	Brighton p, mod. deep	High	(75)	.1	93
Rh	Rutlege fs, high	High	(75)	.2	117
Rp	Rutlege and Pompano soils, ponded	High	(75)	.6	120
Md	Manatee-Delray complex, overflow	High	(75)	2.8	106
IS	Istokpoga p, shal. var.	High	(70)	.1	94
On	Ona fs	High	(70)	.3	103
Sa	St. Johns fs	High	(70)	2.3	121
Pn	Pompano fs	High	(70)	3.1	114
PO	Pompano fs, mod. shal.	High	(70)	.4	115
Wa	Wabasso fs	Medium	(65)	.5	126

MAP SYMBOL	SOIL NAME	POTENTIAL (RANKING)		% OF CNTY	REFER TO PAGE
Ff	Felda fs	Medium	(65)	.9	87
Lo	Leon s	Medium	(60)	1.4	102
LfA	Leon fs, 0-2% slopes	Medium	(60)	15.9	100
LfB	Leon fs, 2-5% slopes	Medium	(60)	.1	101
Ph	Plummer fs, high	Medium	(60)	2.1	112
Pf	Plummer fs	Medium	(60)	.9	111
Im	Immokalee fs	Medium	(60)	3.3	90
In	Immokalee s	Medium	(60)	1.4	91
BnB	Blanton fs, low, 0-5% slopes	Medium	(60)	9.4	76
BnC	Blanton fs, low, 5-8% slopes	Medium	(60)	.2	77
Ch	Charlotte fs	Medium	(60)	.a	82
SW	Swamp	Medium	(60)	11.7	124
LaB	Lakeland fs, 0-5% slopes	Medium	(55)	4.2	95
LaC	Lakeland fs, 5-S% slopes	Medium	(55)	.6	96
BfB	Blanton fs, high, 0-5% slopes	Low	(50)	6.1	73
BfC	Blanton fs, high, 5-8% slopes	Low	(50)	1.2	74
PmB	Pomello fs, 0-5% slopes	Low	(50)	4.1	113
LaD	Lakeland fs, 8-12% slopes	Low	(50)	0.1	97
BfD	Blanton fs, high, 8-12% slopes	Low	(45)	.2	75
Sn	Sandy alluvial land	Low	(45)	2.2	123
M B	Lakewood s, 0-5% slopes	Very Low	(35)	1.5	98
SfB	St. Lucie fs, 0-5% slopes	very Low	(35)	3.0	122
M C	Lakewood s, 5-8% slopes	Very Low	(35)	.1	99
Bo	Borrow pits	Not rated		.3	78
Ma	Made land	Not rated		1.0	103

Very High	85-100	RANKING FOR THIS TABLE ONLY
High	70-85	
Medium	55-70	
Low	40-55	
Very Low	< 40	

Improved Pastures

Soil Property	Positive Points (0-5)	Weighting Factor (1-5)	Product
1. Available Water Capacity in Upper 80"			
More than 10 inches	5	5	25
7 to 10 inches	4	5	20
4 to 7 inches	3	5	15
< 4 inches	1	5	5
2. Average Organic Matter Content in the upper 1'2 inches			
More than 2.5 percent	5	5	25
1.5 to 2.5 percent	4	5	20
0.8 to 1.5 percent	2	5	10
0.8 percent or less	1	5	5
3. Wetness (Depth to Seasonally High Water Table)			
15 to 30 inches	5	4	20
0 to 15 inches	3	5	15
More than 30 inches	2	5	10
+24-0 inches (standing water above the surface for periods of 30 days or more and/or frequent flooding by stream overflow of long or very long duration.)	0	5	0
4. Natural Fertility			
High (Mollisols and Histosols with pH > 4.5)	5	4	20
Moderate (All Alfisols and Histosols with pH < 4.5)	3	5	15
Low (All other soils except St. Lucie & Lakewood)	2	5	10
Very Low (St. Lucie & Lakewood)	1	5	5
5. Slope			
0 to 8 percent	5	2	10
8 to 15 percent	1	5	5
> 15 percent	0	5	0

SOUTHERN REGIONAL TECHNICAL SOIL SURVEY WORE-PLANNING CONFERENCE

Jackson, Mississippi, April 5-8, 1976

Chairman - H.H. Bailey; Vice-Chairman - James A. DeMent

committee: II - Waste Disposal on Land

Charges to the Committee:

1. Review Advisory Soils-14 and

   a. Identify conditions where soil survey personnel can make suitable predictions of soil behavior for waste disposal on the land versus conditions where assistance from other disciplines is required.

   b. Determine the adequacy of the soil properties and attributes evaluated in the guide for the predictions made.

In Charge 1, test Advisory Soils-14 to determine if the guides will allow suitable predictions through the use of soil interpretations given on SCS-Soils-S. The study might include the physical, chemical, and biological aspects of the factors involved.

Report on Charge 1

Combining Charge 1 a and b the committee and conference participants felt that the following items can be identified by soil survey personnel, and that they are important in making predictions (see Tables 1 and 2 in Advisory Soils-14) for disposal of biodegradable liquid and solid wastes that lack toxic quantities of heavy metals:

Depth to seasonal water table
Soil drainage class (Note: some say omit this)
Depth to bedrock or other impermeable layer
Runoff
Slope
Stoniness class
Rockiness class
Salinity
Soil texture
pH

Items which will require assistance from other sources:

Permeability of most restrictive layer
Infiltration rate(s)
Available water capacity
Exchangeable cations
Clay mineralogy
Al, Fe, and $CaCO_3$ contents (concerns P "pick-up")
Salt content

Note: It was suggested that three tables might be required for liquid disposal and three for solid disposal. Namely:

- one for "site" properties
- one for "filtering ability and limitations", to include exchangeable cations; clay mineralogy; Al, Fe, and CaC03 contents
- one for "application rate limitations" where consideration is given to rates of loading

General Comments on Charge 1

1. Values for the tables (Advisory Soils-14) should be continually reviewed and up-dated based on available research.

2. Tables (in Advisory Soils-14) should clearly indicate the levels of liquid application (loading) that are to be considered when using the tables, i.e., (a) equate to normal irrigation principles and procedures, or (b) light loading or unsaturated flow, or (c) heavy loading or saturated flow.

3. Considerations must recognize seasonal variations of rainfall, temperature, vegetative cover or bare soil, and water balance.

4. Infiltration rate varies within a given soil depending on past use and management, vegetative cover and other variables. Runoff rates may effectively substitute for this property.

5. Evaluation of rock, etc. below approximately 2 m should be referred to other disciplines, when needed.

2. Determine if additional waste management uses, other than those listed under Sanitary Facilities, can be added to the SCS-Soils-5 and if current Estimated Soil Properties on the SCS-Soils-5 are adequate to accomodate current and possible additional uses.

In Charge 2 determine if the estimated soil properties given on SCS-Soils-5 are adequate to accomodate the current guides (Advisory Soils-14) or if additional soils information such as climatic regime, mineralogy, etc. are needed. Will the guide apply equally well to soils of arid as well as humid regions for a given waste disposal practice? Have we overlooked mineralogy or is it implied in the present list of items affecting use? Are there other soil properties we need to consider?

Report on Charge 2

The committee and the conference participants felt that two additional uses should be added to SCS-Soils-5. namely: (a) use of the soil for disposal of liquid waste, and (b) solid wastes. These two items could be included under "Regional Interpretation" until such time Soils-5 is revised.

The Estimated Soil Properties section should be revised to include any new items accepted from Charge 1, of this report, if computer generated interpretations are to be utilized. Otherwise, hand processing can be used with data from various unlisted sources, such as official series descriptions, benchmark soil data and research reports.

Recommend that the committee be continued.

Conference accepted the report as shown above.

Committee Members:

E.R. Blakley	W.F. Hatfield
J.R. Brasfield	Z. Lund
John Burt	Gary Margheim
R.B. Daniels	R. Rehner
T.R. Gerald	K.B. Tan
Fenton Gray	B.A. Touchet

H.H. Bailey, Chairman
James A. DeMent, Vice Chairman

1976 Southern Regional Soil Survey
Technical Work Planning Conference

April 5-8, 1976

committee III - Soil Potential Ratings

Chairman - Allen L. Newman
Vice-Chairman - R. Miller

Charges

A. Review the policy and procedure guide developed by the Washington Soil Survey Interpretation Staff. Recommend charges if needed.

B. Propose a procedure for arraying soils for practical application of ratings, including:

1. How to array classes

2. Names for classes

3. Definitions of classes

C. Propose criteria for ranking soils on the basis of potential for specific uses.

D. Identify kinds of uses and different kinds of criteria needed for the array.

E. Propose a procedure for testing the ratings.

Committee Report

Charge A

The policy guide for potentials, National Soils Handbook-404, has been reviewed by the states and comments sent to the Washington Office. There were many comments and this section will likely be rewritten. The committee should review the next draft of this section of the NSH.

Charge B

1. We propose the soil classes be arrayed according to their potential from best to worst.

2. The names would be the three-class system of high, medium, and low with the local option of very high, high, medium, low, and very low. These names will distinguish potentials from limitation classes, slight, moderate, and severe; and suitability classes of good, fair, and poor.

3. Definitions of classes

These are given in examples in the appendices.

3.1 Some raters prefer a simple system that does not require as much information on the part of the rater. Such a system rates all soil characteristics on an equal basis.

Most raters prefer a more comprehensive rating system. An example would be the extra cost to build a house on a soil for each derogatory characteristic, such as $600.00 extra for a rigid slab on a high shrink-swell soil, or $400.00 extra to dig for utility lines on a soil 34 inches to bedrock, or add another $500.00 if the soil is wet and drain lines are needed. If the soil has two or three derogatory characteristics it has lower potential than only one, except perhaps flooding. The dollar figure should perhaps be disguised as an index. After the point system is developed, all the soils in the area being rated can be arrayed from best to poorest in order. Groups can be determined by equal arraying.

3.2 The soils can be arrayed by using a positive or negative numbering system. The Harris County, Texas system is the so-called negative system where the highest numbers have the lowest potential. The Seminole County, Florida system is the positive system where the best soils have the highest numerical rating. The majority of the members like the positive system. See the appendices.

Charge C

We propose the criteria listed under the limitations ratings in the guide for engineering interpretations of soils be used to rate potentials with additions locally needed. The proposed criteria for ranking soils on the basis of potential for specific use should be done by a committee of soil scientists and local individuals with expertise in land use.

Charge D

We could develop potentials for all of the kinds of uses we now rate for limitations on the SCS-Soils-5 form. The criteria or soil characteristics used for the limitations ratings should also work for potentials if given the proper weighting. The advantage of this system is the possibility that a retrieval form similar to SCS-Soils-6 could be developed to give weighting6 so that potentials could be obtained from computer data storage.

Potentials will also be needed at the local level for other uses. We need to remain flexible in the system we use so that local people can have a say in using the system they feel best suits their situation.

Charge E

The ratings can be tested by being used by those who need the information. It seems we need to stick to the soil characteristics for the phases of soil series that we use in mapping. We need to interpret for the taxonomic unit in tables. The planner could then use these data to develop potentials for the mapping unit based on the kind, amount, and size of contrasting inclusions, size and shape of delineations, and associated units as well. as other variables. If we don't go this way a 10-acre delineation of Ruston sandy loam, 2 to 5 percent slopes, might have a different potential than a 50-acre delineation. This would complicate tables. We believe a two-step procedure of rating by taxonomic units and planning for specific tracts of land has proven good in the past.

Summary, Conclusions, and Recommendations

This committee discussed soil potentials, possible classes and definitions. We believe that soil potential provides for a positive approach or perspective in planning. Limitation points to the problem, whereas potential suggests solutions. We need both limitation ratings and potential ratings.

We believe that we must rate the potential of a soil based on its characteristics, at least until potentials are tested for a period of time. The spatial soil characteristics should be left to the planner for the time being.

costs to overcome limitation and cont. limitation

A procedure for predicting the potentials of soils and including costs involved in making them suitable for a certain use is still in the future. An index could be developed.

Potentials can probably be developed for resource areas or smaller units, but would be very difficult to develop nationally.

List of Committee Members

Chairman - Allen L. Newman
Vice-Chairman - R. Miller

Members

F. G. Calhoun
B. L. Carlile
J. R. Farson
W. W. Fuchs
R. W. Johnson
J. T. Hood
R. Leonard
Charles McElroy
W. F. Miller
Joe Nichols
W. B. Parker
Jack Perkins
David Slusher
J. Soileau

Comments made at the Southern Regional Soil Survey Work Planning Conference, April 5-8, 1976:

A. Several of the comments indicate a concern of state and regional coordination.

B. Several of the comments indicated just as much concern over keeping potential ratings open to the local user having expertise in land use.

C. Statistics should be considered in testing systems.

D. Sane discussion of terminology -- potential vs. suitability vs. capability.

Recommendations

A. Continue the Committee.

B. Change or add charges as follows:

1. Review National Soils Handbook-404.

2. Test the ratings in some areas where they have been developed and are in use.

3. Identify organizations and/or discipline specialists that should be involved in developing potential ratings.

4. Propose a format for publication to include a listing of procedural guidelines, laws, rules, regulations, and contributing sources.

Seminole County, Florida

Soil Potential

Each soil is rated as to its potential for 14 selected land uses. For the purpose of this supplement, "Soil Potential" is defined as the ability of the soil to produce, yield, or support a given structure or activity expressed in economic, social, or environmental units of value. The criteria used for rating soil potential includes the relative difficulty or cost of overcoming soil limitations, the continuing limitations after practices in general use in overcoming the limitations are installed, and the suitability of the soil relative to other soils in Seminole County.

In Seminole County, a five-class system of soil potentials is used. They are defined as follows:

Very High Potential - Soil limitations are minor or are relatively easy to overcome; performance for the intended use is excellent. Soils rated as very high potential are the best in the county for the particular use.

High Potential - Some soil limitations exist, but practices necessary to overcome limitations are available at reasonable cost; performance for the intended use is good.

Medium Potential - Soil limitations exist that can be overcome with recommended practices, but limitations are mostly of a continuing nature requiring practices that have to be maintained, or the practices are more difficult or costly than average; performance for the intended use ranges from fair to good.

Low Potential - Serious soil limitations exist that are difficult to overcome and the practices necessary to overcome the limitations are relatively costly compared to those required for soils with higher potential; necessary practices may involve environmental values and considerations; performance for the intended use is poor or unreliable.

Very Low Potential - Very serious soil limitations exist that are most difficult to overcome; initial cost of the practices and maintenance cost are very high compared to those for soils with high potential; environmental values are usually depreciated; performance for the intended use is inadequate or below acceptable standards.

Appendix 2

Soils Shown According to Their Potential for Selected Land Uses

In tables 1 through 14, the soils are arrayed according to their potential for the specific land use. Soils are grouped and arrayed from very high to very low potential. The numerical rankings were determined by assigning positive points to those soil properties that affect a particular use, multiplying each point by a weighting factor, and then summing the products. The weighting factor is a variable number or device used to maneuver or weight the properties so that a soil with all favorable properties will have a numerical ranking of 100. Properties considered favorable were assigned a point value of 5, those less favorable a point value of 4, 3, 2, or 1, and those considered most unfavorable a value of 0. For example, in local roads and streets, the following properties were used: soil strength, shrink-swell potential, flooding or standing water, wetness, and slope. A soil such as Lakeland fine sand, 0 to 5 percent slopes, that has good strength (5 positive points x weighting factor of 5 = 25 points), low shrink-swell potential (5 positive points x weighting factor of 5 = 25 points), not subject to flooding (5 positive points x weighting factor of 4 = 20 points), not wet (5 positive points x weighting factor of 4 = 20 points), and gentle slopes (5 positive points x weighting factor of 2 = 10 points) has a numerical ranking or point value of 100, the highest potential numerical ranking. The highest point totals were assigned to those properties that would have the most affect on the particular land use. In local roads and streets, soil strength and shrink-swell potential were considered of most importance, flooding and wetness of slightly less importance, and slope of least importance. Theoretically, a soil could have a potential as low as 0 or as high as 100, but for all the land uses considered, most soils in Seminole County came out with a numerical ranking of more than 0. For some land uses, there were some soils that had a numerical ranking of 100, and for some land uses, there were not any soils that had a numerical ranking as high as 100.

The percent of the county that each soil comprises is also shown in the tables. This will enable users to quickly calculate the extent of the soils with the best potential for a particular use.

The last column in the table refers you to the page that has the properties and interpretations for a particular soil.

SOILS SHOWN ACCORDING TO POTENTIAL FOR SEPTIC TANK ABSORPTION FIELDS

MAP SYMBOL	SOIL NAME	POTENTIAL	(RANKING)	% OF CNTY.	REFER TO PAGE
LdB	Lakewood s, 0-5% slopes	Very High	(100)	1.5	98
LaB	Lakeland fs, 0-5% slopes	Very High	(100)	4.2	95
BfB	Blanton fs, 0-5% slopes	Very High	(100)	6.2	73
SfB	St. Lucie fs, 0-5% slopes	Very High	(100)	3.0	122
LdC	Lakewood s, 5-8% slopes	Very High	(100)	0.1	99
LaC	Lakeland fs, 5-8% slopes	Very High	(100)	0.6	95
BfC	Blanton fs, 5-8% slopes	Very High	(100)	1.2	74
LaD	Lakeland fs, 8-12% slopes	Very High	(96)	0.1	97
BfD	Blanton fs, 8-12% slopes	Very High	(96)	0.2	75
OrB	Orlando fs, 0-5% slopes	High	(81)	0.2	109
BnB	Blanton fs, low, 0-5% slopes	High	(81)	9.4	76
PmB	Pomello fs, 0-5% slopes	High	(81)	4.1	113
OrC	Orlando f's, 5-8% slopes	High	(81)	0.1	110
BnC	Blanton fs, low, 5-8% slopes	High	(81)	0.2	77
Ph	Plummer fs, high	Medium	(75)	2.1	112
Rh	Rutlege fs, high	Medium	(65)	0.2	117
Lo	Leon s	Medium	(66)	1.4	102
LfA	Leon fs, 0-2% slopes	Medium	(66)	15.9	100
LfB	Leon fs, 2-5% slopes	Medium	(65)	0.1	101
On	Ona fs	Medium	(66)	0.3	108
Im	Immokalee fs	Medium	(66)	3.3	90
In	Immokalee s	Medium	(66)	1.4	91
Sa	St. Johns fs	Medium	(66)	2.3	121
Wa	Wabasso fs	Medium	(66)	0.5	125
Df	Delray fs, high	LOW	(50)	1.8	84
Dh	Delray fs, mod. shal., high	LOW	(50)	0.9	85
De	Delray fs	LOW	(50)	1.8	83
Dm	Delray mfs	LOW	(50)	0.9	86
Pf	Plummer fs	LOW	(50)	0.9	111
Rf	Rutlege fs	LOW	(50)	1.7	115
Rm	Rutlege mfs	LOW	(50)	0.4	118
Rn	Rutlege, Plummer, and St. Johns soils	LOW	(50)	0.8	119
Rp	Rutlege and Pompano soils, ponded	Low	(50)	0.6	120

Appendix 4

MAP SYMBOL	SOIL NAME	POTENTIAL (RANKING)		% OF CNTY.	REFER TO PAGE
Ch	Charlotte fs	LOW	(50)	0.8	82
Ff	Felda fs	LOW	(50)	0.9	87
Pn	Pompano fs	LOW	(50)	3.1	114
PO	Pompano fs, mod. shallow	Low	(50)	0.4	115
Sn	Sandy alluvial land	Very Low-Medium	(25-70)	2.2	123
BP	Brighton p	Very Low	(35)	0.1	79
Br	Brighton p, shallow variant	Very Low	(35)	0.1	80
Bt	Brighton, Istokpoga, and Okeechobec soils	Very Low	(35)	1.6	81
IO	Istokpoga p, deep	Very Low	(35)	0.3	92
IP	Istokpoga p, mod. deep	Very Low	(35)	0.1	93
IS	Istokpoga p, shallow variant	Very Low	(35)	0.1	94
Ok	Okeechobee m	Very Low	(35)	1.0	107
TC	Terra Ceia m	Very Low	(35)	0.4	125
SW	Swamp	Very Low	(25-35)	11.7	124
Mb	Manatee fs	Very Low	(25)	0.5	104
MC	Manatee Ifs	Very Low	(25)	0.1	105
Md	Manatee-Delray complex, overflow	Very Low	(25)	2.8	106
Ik	Iberia ml	Very Low	(25)	0.1	89
Ib	Iberia cl, overflow	Very Low	(25)	3.0	88
Bo	Borrow Pits	Not rated		0.2	78
Ma	Made land	Not rated		1.0	103

Very High	95-100	RANKING FOR THIS TABLE ONLY
High	80-95	
Medium	60-80	
Low	40-60	
Very Low	< 40	

SOILS SHOWN ACCORDING TO POTENTIAL FOR SANITARY LANDFILL
(TRENCH TYPE)

MAP SYMBOL	SOIL NAME	POTENTIAL (RANKING)		% OF CNTY.	REFER TO PAGE
BfB	Blanton fs, high, 0-5% slopes	Very High	(90)	6.1	73
LaB	Lakeland fs, 0-5% slopes	Very High	(90)	4.2	95
LdB	Lakewood s, 0-5% slopes	Very High	(90)	1.5	98
BfC	Blanton fs, high, 5-8% slopes	High	(85)	1.2	74
LaC	Lakeland fs, 5-8% slopes	High	(85)	0.6	96
LdC	Lakewood s, 508% slopes	High	(85)	0.1	99
BfD	Blanton fs, high, R-l?% slopes	High	(80)	0.2	75
LaD	Lakeland fs, 8-12% slopes	High	(80)	0.1	97
BnB	Blanton fs, low, 0-5% slopes	High	(70)	9.4	76
BnC	Blanton fs, low, 5-8% slopes	High	(65)	0.2	77
SfB	St. Lucie fs, O-S% slopes	High	(65)	3.1	122
Wa	Wabasso fs	Medium	(60)	0.5	126
Ph	Plummer fs, high	Medium	(60)	2.1	112
OrB	Orlando fs, 0-5% slopes	Medium	(45)	0.2	109
PmB	Pomello fs, 0-5% slopes	Medium	(45)	4.1	113
OrC	Orlando fs, 5-8% slopes	LOW	(40)	0.1	110
MC	Manatee 1s	LOW	(40)	0.1	105
Ib	Iberia cl, overflow	LOW	(40)	3.1	88
Ik	Iberia ml	LOW	(40)	0.1	89
Ff	Felda fs	Low	(35)	0.9	87
Im	Immokalee fs	Low	(35)	3.3	90
In	Immokalee s	Low	(35)	1.4	91
LO	Leon s	LOW	(35)	1.4	102
LfA	Leon fs, 0-2% slopes	LOW	(35)	15.9	100
LfB	Lfs, 2-5% slopes	LOW	(35)	0.1	101
On	Ona fs	LOW	(35)	0.3	108
Rh	Rutlege fs, high	LOW	(35)	0.2	117
Mb	Manatee fs	LOW	(35)	0.5	104
Md	Manatee-Delray complex, overflow	Low	(35)	2.8	105
Pf	Plummer fs	LOW	(35)	0.9	111

Appendix 6

A. Septic Tank Absorption Fields

Soil Property	Positive Points (0-5)	Weighting Factor (1-5)	Product
1. Flooding or standing water above the surface for periods of 2 weeks or more.			
None or rare	5	5	25
Common	0	5	0
2. Wetness (water table)			
Below 60 inches	5	5	25
36 to 60 inches	4	5	20
15 to 36 inches	2	3	6
0 to 15 inches	0	3	0
3. Permeability (of least permeable layer in upper 72 inches)			
>2.5 inches per hour	5	5	25
0.8-2.5 inches per hour	4	4	16
0.2-0.8 inches per hour	2	1	2
<0.2 inches per hour	0	1	0
4. Slope			
0-8 percent	5	2	10
8-15 percent	3	2	6
8-15 percent (with soil material within 72 inches that has permeability of less than 2.5 inches per hour)	2	1	2
>15 percent	1	1	1
>15 percent (with soil material within 72 inches that has permeability of less than 2.5 inches per hour)	0	1	0
5. Subsidence			
None	5	3	15
Subsides (usually about 1 inch per year on the average)	0	3	0

B. Sanitary Landfill (Trench Type)

Soil Property	Positive Points (0-5)	Weighting Factor (1-6)	Product
1. Wetness (depth to water table)			
Below 72 inches	5	6	30
30 to 72 inches	4	5	20
15 to 30 inches	2	5	10
0 to 15 inches	0	5	0
2. Flooding or standing water above the surface for periods of 2 weeks or more.			
None or rare	5	5	2.5
Common	0	5	0
3. Permeability (below a depth of 60 inches)			
Less than 2.5 in/hr or 2.5 to 5 in/hr with texture of sandy loam or finer	5	5	25
More than 2.5 in/hr and texture of loamy fine sand or coarser	0	5	0
4. Soil texture (surface layer or upper 10 inches)			
Sandy loam, sandy clay loam	5	2	10
Loamy sands, clay loam, mucky loam	5	1	5
Muck, peat, sands	0	1	0
5. Slope			
0-5 percent	5	2	10
5-8 percent	5	1	5
8-15 percent	0	1	0

Appendix 8.

HARRIS COUNTY, TEXAS

A SYSTEM FOR RATING SOILS FOR POTENTIAL SITES FOR RESIDENTIAL HOUSING WITH PUBLIC SEWER SYSTEMS AND INCLUDING SHOPPING CENTERS AND SMALL BUSINESSES

The method of determining the relative potential for residential housing sites is a four-part system. Rate a soil (or soil phase) for each part. Sum the four parts. Determine the potential for sites from the following guides:

Sum of Ratings of Four Sub-Systems

0-15	Very High
16-30	High
31-38	Moderate
39-100	Low
100-176	Very Low

A. Dwellings Without Basements, Industrial Buildings Less Than 3-Stories

	Rating
1. Flooding	50
2. Seasonal Water Table	
Below 30 inches	0
20 to 30 inches	2
Above 20 inches	6
3. Shrink-Swell Potential	
Low	0
Moderate	2
High below 15 inches	3
High above 15 inches	6
4. Soil Drainage Class (Wetness)	
Moderately well drained or better	0
Somewhat poorly drained	2
Poorly drained or worse	6
5. Soil Strength	
<51% Passing #200; CL with P.I. <15	0
ML; CL with P.I. of 15 or more	1
CH, MH, OL, OH	4

Sum of Ratings for A Sub-System

0-1 Very High; 2-10 High; 11-13 Moderate; 14-30 Low; 31-72 Very Low

B. Local Roads and Streets

	Rating
1. Flooding	50
2. Shrink-Swell Potential	
Low	0
Moderate	2
High below 15 inches	3
High above 15 inches	6
3. Soil Drainage Class	
Moderately well drained or better	0
Somewhat poorly drained	2
Poorly drained or worse	6

Sum of Ratings for B Sub-System

0-1 Very High; 2-7 High; 8-10 Moderate; 11-20 Low; 21-62 Very Low

C. Corrosivity of Uncoated Steel

Low	0
Moderate	1
High	4

Sum of Ratings for C Sub-System

0- High; 1- Moderate; 4-Low

D. Shallow Excavations

1. Soil Drainage Class	
Well drained	0
Moderately wall drained	3
Somewhat poorly drained or worse	6
2. Seasonal Water Table	
Below 60 inches	0
30-60 inches	3
Above 30 inches	6
3. Flooding	20

	Rating
4. Texture to Excavated Depth	
fsl, sl, 1, sil, sicl, scl	0
si, cl, sc, gravelly types	2
c, sic, fs, lfs	6

Sum of Ratings for D Sub-System

0-10 Very High; 11-14 High; 15-17 Moderate; 18-30 Lou; 31 or more Very Low

POTENTIAL FOR RESIDENTIAL HOUSING SITES

Soil	Overall Site Sum	Overall Site Rating	Potential For Dwellings Sum	Potential For Dwellings Rating	Potential For Streets Sum	Potential For Streets Rating	Potential For Not Corroding Uncoated Steel Sum	Potential For Not Corroding Uncoated Steel Rating	Potential For Excavations Sum	Potential For Excavations Rating	Soil	Overall Sites Rated From Best Site To Poorest Site Sum	Overall Sites Rated From Best Site To Poorest Site Rating
Addicks	35	Moderate	13	Moderate	6	Moderate	4	Low	12	High	Kenney	6	Very High
Aldine	38	Moderate	11	Moderate	5	Moderate	4	Low	18	Low	Segno	10	Very High
Aris	47	Low	16	Low	9	Low	4	Low	18	Low	Hockley	12	Very High
Atasco	33	Moderate	8	High	6	Moderate	4	Low	15	Moderate	Boy	19	High
Beaumont	56	Low	22	Low	12	Low	4	Low	18	Low	Bissonnet	22	High
Bernard	44	Low	14	Low	8	Low	4	Low	18	Low	Wockley	27	High
Bissonnet	22	High	5	High	2	High	1	Moderate	14	High	Atasco	33	Moderate
Boy	19	High	2	High	2	High	0	High	15	Moderate	Katy	33	Moderate
Clodine	39	Low	15	Low	8	Low	4	Low	12	High	Addicks	35	Moderate
Edna	56	Low	22	Low	12	Low	4	Low	18	Low	Aldine	38	Moderate
Gessner	155	Very Low	63	Very Low	56	Very Low	4	Low	32	Very Low	Clodine	39	Low
Harris	176	Very Low	72	Very Low	62	Very Low	4	Low	38	Very Low	Bernard	44	Low
Hatliff	141	Very Low	56	Very Low	50	Very Low	0	High	35	Very Low	Aris	47	Low
Hockley	12	Very High	3	High	2	High	1	Moderate	6	Very High	Lake Charles	48	Low
Ijam	56	Low	22	Low	12	Low	4	Low	18	Low	Vamont	48	Low
Kaman	176	Very Low	72	Very Low	62	Very Low	4	Low	38	Very Low	Beaumont	56	Low
Katy	33	Moderate	11	Moderate	4	High	4	Low	14	High	Edna	56	Low
Kenney	6	Very High	0	Very High	0	Very High	0	High	6	Very High	Ijam	56	Low
Lake Charles	48	Low	18	Low	8	Low	4	Low	18	Low	Midland	56	Low
Midland	56	Low	22	Low	12	Low	4	Low	18	Low	Voss	139	Very Low
Nahatche	153	Very Low	61	Very Low	54	Very Low	4	Low	34	Very Low	Hatliff	141	Very Low
Ozan	155	Very Low	63	Very Low	56	Very Low	4	Low	32	Very Low	Nahatche	153	Very Low
Segno	10	Very High	1	Very High	0	Very High	1	Moderate	8	Very High	Gessner	155	Very Low
Vamont	48	Low	18	Low	8	Low	4	Low	18	Low	Ozan	155	Very Low
Voss	139	Very Low	52	Very Low	52	Very Low	0	High	35	Very Low	Harris	176	Very Low
Wockley	27	High	9	High	2	High	4	Low	12	High	Kaman	176	Very Low

Appendix 11

Potential for Urbanization

The potential of a soil is the ability of that soil to produce, yield, or support a given structure, or activity at a cost expressed in economic, social, or environmental units of value.

The soils of Harris County have been rated in Table W for their potential for urbanization. The elements considered are: (1) dwellings without basements, but with public sewer systems, (2) streets, (3) excavations in which to place utilities, and (4) uncoated steel pipe. Shopping centers and small businesses were also considered in the rating potential.

The soils that have the highest potential for urbanization are those on which streets and structural foundations can be placed and not deteriorate because of adverse soil factors. In general, these same soils are easy to dig in, easy to grow plants in, and present a well drained, nonflooding landscape that is pleasing to the eye.

The factors to consider in rating a soil's potential for each element of urbanization are: (1) flooding, (2) water table, (3) wetness, (4) shrink-swell potential, (5) soil strength, (6) soil texture, and (7) corrosivity to uncoated steel.

Soils that flood have a very low potential for urbanization because of the difficulty and expense involved in control of flood waters. In most cases, the watershed includes an area much larger than any single land developer has control over.

Soils that are wet or have a high water table have a medium to low potential for urbanization. Drainage systems can be installed to reduce wetness and lower the water table, but because of the flat landscapes in Harris County, good drainage outlets are frequently several miles distant from the area being developed.

Soils with a high shrink-swell potential or low soil strength have a medium potential for urbanization. These factors can be partially overcome by increasing the strength of the structures. In Harris County these soils often have additional factors, such as wetness, clay texture, and high corrosivity to uncoated steel, that further lowers their potential for urbanization.

Clay soils are difficult to excavate and move or manipulate. This adds additional cost to development and maintenance.

Soils that are highly corrosive to uncoated steel pipes generally have other factors that lower their potential. The corrosive effect of the soil on uncoated pipes can be partially overcome by using protective coatings, or by attaching anodes to the metal, or by using more resistant metals or materials such as plastics or concrete.

TABLE W.--POTENTIAL FOR URBANIZATION

Soil and Symbol	Elements of Urbanization: Dwellings	Streets	Excavations	Uncoated Steel Pipe	Potential for Urbanization	Major Problems to Overcome
Addicks Ad, Ak 1/	Medium	Medium	High	Low	Medium	Wetness
Aldine Am, An 1/	Medium	Medium	Low	Low	Medium	Wetness, shrink-swell
Aris Ap, Ar 1/, As 1/	Low	Low	Low	Low	Low	Wetness, shrink-swell
Atasco At	High	Medium	Medium	Low	Medium	Shrink-swell, wetness
Beaumont Ba, Bc	Low	Low	Low	Low	Low	Shrink-swell, wetness
Bernard Bd, Be 1/, Bg 1/	Low	Low	Low	Low	Low	Shrink-swell, wetness
Bissonnet Bn	High	High	High	Medium	High	wetness
Boy Bo	High	High	Medium	High	High	Wetness
Clodine Cd, Ce 1/	Low	Low	High	Low	Low	Wetness
Edna Ed	Low	Low	Low	Low	Low	Shrink-swell, wetness
Gessner Ga, Gs, Gu 1/	Very Low	Very Low	Very Low	Low	very Low	Flooding
Harris Hr	Very Low	Very Low	Very Low	Low	very Low	Flooding, shrink-swell
Hatliff Hf	Very Low	Very Low	Very Low	High	very Low	Flooding
Hockley HoA, HoB	High	High	Very High	Medium	Very High	None
Ijam Is	Low	Low	Low	Low	Low	Wetness, shrink-swell
Kaman Ka	Very Low	Very Low	Very Low	Low	Very Low	Flooding, shrink-swell
Katy Kf	Medium	High	High	Low	Medium	Wetness

See footnotes at end of table.

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TABLE W.--POTENTIAL FOR URBANIZATION

Soil and Symbol	Elements of Urbanization				Potential for Urbanization	Major Problems to Overcome
	Dwellings	Streets	Excavations	Uncoated Steel Pipe		
Kenney Kn, Ku 1/	Very High	Very High	Very High	High	Very High	None
Lake Charles LcA, LcB, La 1/	Low	Low	Low	Low	Low	Shrink-swell, wetness
Midland Md, Mn 1/	Low	Low	Low	Low	Low	Shrink-swell, wetness
Nahatche Na	Very Low	Very Low	Very Low	Low	Very Low	Flooding
Ozan Oa	Very Low	Very Low	Very Low	Low	Very Low	Flooding
Segno SeA, SeB	Very High	Very High	Very High	Medium	Very High	None
Vamont VaA, VaB, Vn 1/	Low	Low	Low	Low	Low	Shrink-swell, wetness
Voss Vo, Vs	Very Low	Very Low	Very Low	High	Very Low	Flooding
Wockley Wo, Wy 1/	High	High	High	Low	High	Wetness

1/ This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

In Table M, the limitation of a soil for building site development may be based on the rating of a single factor. For example, a soil having a high shrink-swell potential is rated as having a severe limitation because of a single factor. In Table W, Potential for Urbanization, the rating factors are cumulative, that is, a wet soil that shrinks and swells greatly, and is highly corrosive to metals is rated lower than a soil that is only wet. Further, the ratings of elements of urbanization, that is, dwellings, streets, excavations, and uncoated steel pipe, are also cumulative to arrive at the overall potential of the soil for urbanization.

The potential of soils for urbanization is divided into five classes: very high, high, medium, low, and very low. Definitions are:

Very High - Soils with very few factors that are likely to cause problems during construction or after development. The factors can be easily and economically corrected.

High - Soils with a few factors that will cause problems during construction or after development. The factor5 can be economically overcome.

Medium - Soils with several factors that will cause problems during construction or after development. Sane factors can be easily overcome, but one or more factors will be difficult or expensive to overcome.

Low - Soils with several factors that will cause problems, both during construction and after development. Factors can only be overcome with difficulty and very expensive measures.

Very Low - Soils that flood, and most have other factors as well that are very difficult to overcome. These soils are best suited for uses other than urbanization.

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service

1976 Southern Regional Technical Work
Planning Conference of the Cooperative Soil Survey

Jackson, Mississippi

April 5-8, 1976

Report of Committee No. 4 - Kinds of Soil Maps
Chairman - F. Ted Miller
Vice Chairman - E. M. Rutledge

Charges to Committee:

1. Review the report of the National Committee on kinds of soil surveys.

2. Determine if the kinds of mapping units for soil surveys are applicable as kinds of map units for all kinds of soil maps.

3. Review conventions for naming mapping units for soil surveys, and recommend the form of names to use for generalized soil maps and schematic soil maps,

4. Recommend standards for minimum size delineations for generalized and schematic soil maps.

Committee Report

1. Review of the report of the National Committee on kinds of soil surveys.

   Committee members are in general agreement with the report. All agreed that much thought and effort has been put into this subject. Most of the recommendations and ideas contained in the report have been accepted' and incorporated into the Revised Soil Survey Manual.

   This committee is of the opinion that there is considerable confusion in the term "kinds of soil survey and soil maps," as the term is used in the report. The term "kinds of soil surveys" has been used to define soil survey maps, generalized soil maps, and schematic soil maps, to distinguish the five orders of soil survey, and also to identify Detailed, Reconnaissance, and Exploratory surveys. Although all soil survey, no matter what the purpose or method, results in a soil map, care must be exercised in distinguishing between "kinds of soil survey" and "kinds of soil maps." Soil surveys should be defined as the five levels (orders) and these levels used to explain soil surveys based on the criteria outlined in Table 1 and the writeup entitled "Kinds of Soil Surveys." The basis of distinguishing the three "Kinds of Soil Maps" is well done although the term Generalized Soil Map should be extended to include maps developed from more general materials, as well as those made from pre-existing soil survey maps. Many existing generalized soil maps were not made by cabining preexisting soil survey maps. This is especially true of many state maps.

Although this committee is in agreement vith the terms used to identify the three kinds of soil maps, we would modify these terms somewhat when they are used to title soil maps. Soil Survey Map and Schematic Soil Map would remain as titled but Generalized Soil Map would be General Soil Map. The term General Soil Map would be more readily accepted as it is in general usage by personnel outside the service as well as in service.

2. Determine if the kinds of mapping units for soil surveys are applicable as kinds of map units for all kinds of soil maps.

All committee members agree that the kinds of mapping units defined for soil survey maps are also applicable to generalized soil maps and schematic soil maps. Consociations, soil complexes, soil associations, and undifferentiated groups have been used in the pest and should continue to be used in the future.

This committee strongly supports the retention of Undifferentiated Groups as a kind of mapping unit. This kind of mapping unit is essential if we are going to design soil surveys that provide interpretations for applied objectives without creating detail that is not useful. Soil maps are made to be used. As discussed in Committee 7's report of the National Work Planning Conference, combining two very steep phases of two otherwise dissimilar soil series may in no way affect the usefulness of the map for the purposes of the soil survey. In designing soil surveys , our objective is to prepare the kind of map at the desired scale and detail needed to fulfill the desired use. Undifferentiated Groups as a kind of mapping unit can help us fulfill this objective.

3. Review conventions for naming mapping units for soil surveys, and recommend the form of names to use for generalized soil maps and schematic soil maps.

A summary of comments from committee members responding to this charge indicate some differences in attitudes regarding nomenclature used to identify map units of soil survey maps, generalized soil maps, and schematic soil maps. All agree, however, that the mapping unit name cannot be completely connotative and that we expect or instruct the users to read the mapping unit descriptions to find out the nature of the units. We must, however, strive to give the average map user a greater awareness than he has now of the complexity that does exist between the different kinds of soil maps and map units. Regretably, there is a tendency among users of maps, soil or otherwise, to consider any delineated area on a map as uniform, especially if it has a single symbol and is identified with a single name. All too frequently the accompanying description is not read carefully.

Since the five orders of soil surveys contained in the National Committee report and the revised Soil Survey Manual reflect specific levels of confidence, it follows that the three kinds of soil maps (soil survey map, generalized soil map, schematic soil map) also reflect specific levels of confidence. Users of soil maps must have knowledge of the confidence level for making interpretations. Some have suggested that this could be accomplished by a footnote on the map unit legend reflecting the predictability of each soil map unit (85%, 60%, 40%, etc.). If on the other hand, confidence level was reflected in the name of the map unit, the problem would not be as great. It seems, therefore, highly desirable to have unique names for map units to identify soil survey maps from generalized soil maps and from schematic soil maps.

The Montgomery County, Mississippi published soil survey which was issued in December, 19'75 adequately illustrates the problem. The Smithdale-Providence association, hilly (SpE) occurs as a mapping unit on the detailed soil survey map, while the Smithdale-Providence association (5) is included in the general soil map. In this instance, it would be very easy for a user to mistake a soil survey map from a general soil map. It is both confusing and misleading to users of our soil surveys. This type of problem is not unique to Montgomery County as it exists in most all soil survey publications.

The benefit of unique names for map units on general soil maps and schematic soil maps would be two-fold. First, it would eliminate considerable misuse of soil surveys and general soil maps by users. Secondly, it would force everyone concerned to give more attention to the kind of unit he is illustrating, describing, and correlating.

Seemingly, it would be preferable to restrict the usage of the terms consociation, associations, and complexes to name mapping units strictly for the legends of soil survey maps. Although the same kinds of mapping units defined for soil survey maps are also applicable to generalized soil maps and schematic soil maps, they should be modified to distinguish them from mapping units of soil surveys. This can be done by adding the word "group" to the taxonomic reference terms used to identify the essential components of the unit. Examples are:

Consociations
  Udorthents group

Complexes and Associations
  Smithdale-Providence group
  Udalfs - Udorthents group

Undifferentiated groups
  Smithdale and Providence group

The term "areas" has also been suggested. It was used in naming soil map units of the Soil Association Máp of the United States contained in the 1938 Yearbook of Agriculture. However, since all delineated bodies on a soil map consist of areas, this term is not favored.

Schematic soil map legends should also readilý identify the kinds of soil map unit. Although this committee has no specific recommendation,, names could include such terms as community, sequent, block, zone, belt, province, domain, territory, residence, body, division, or other connotative terms to connote a soil map unit of a schematic soil map.

4. Recommend standards for minimum size delineations for generalized and schematic soil maps.

Scale of maps and minimum size delineations is well defined. Although a review of a number of generalized soil maps contained in published soil surveys indicates larger minimum size delineations then suggested in Table 2, the guidelines are adequate. The size of the minimum delineation must relate to map scale. The use to be made of the map must determine the map scale.

Minimum size delineations and scale of maps used in Table 2 should also pertain to general soil maps and schematic soil maps.

Recommendations

1. Use the term General Soil Map, not Generalized Soil Map in soil survey publications and to title maps.

2. Redefine the definition of General Soil Maps as follows:

   General Soil Maps are those that have been made by combining the delineations of preexisting soil survey maps to form larger areas, or by a combination of generalizing preexisting available soil survey maps end the use of field investigations to support work in portions of the area where soil survey maps are limited.

3 . Drop all references to Detailed, Reconnaissance, and Exploratory surveys. The five orders adequately define levels of soil surveys. Groupings within these five orders serve no useful purpose.

4. Retain the use of undifferentiated groups as a kind of mapping unit applicable to all orders of soil survey and kinds of soil maps.

5. Recommend that National Committee search for a better term than "consociation" for use in identifying simple taxa units.

6. Use unique names for soil map units of general soil maps to distinguish them from soil mapping units of soil survey maps.

7. Recommend the committee be continued. A major charge is to continue to review, evaluate and test all proposals relative to naming of mapping units.

Committee Members:

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Discussion

Committee and discussion group members are in general agreement with recommendations contained in this report. Considerable discussion by the individual discussion groups evolved around the advisability of having unique names for soil map units of general soil maps. Although there was unanimous agreement among the groups that unique names are needed, there was no agreement as to the term to "se. The committee suggested the word "group." Several other terms were discussed by members of the discussion group. The terms group and area received most attention with considerable preference shown to the term "area."

Some members of the work group favored retention of the name associations on general soil maps and the "se of other terms on the soil survey map.

TABLE 2
GUIDE TO MAP SCALES AND MINIMUM SIZE DELINEATIONS

Map Scale		Inches Per Mile	Minimum Size Delineation[1] acres	hectares
1:500		126.7	0.0025	0.001
1:2,000		31.7	0.040	0.016
1:5,000		12.7	0.25	0.10
1:7,920		8.00	0.62	0.25
1:10,000		6.34	1.00	0.41
1:12,000		5.28	1.43	0.57
1:15,840		4.00	2.5	1.0
1:20,000		3.17	4.0	1.6
1:24,000	(7½')	2.64	5.7	2.3
1:31,680		2.00	10.0	4.1
1:62,500	(15')	1.01	39	15.8
1:63,360		1.00	40	16.2
1:100,000		0.63	100	40.5
1:125,000		0.51	156	63
1:250,000		i-1.25	623	252
1:300,000		0.21	a97	363
1:500,000		0.127	2.500	1,000
1:750,000		0.084	5.600	2.270
1:1,000,000		0.063	10,000	4,000
1:5,000,000		0.013	249,000	101.000
1:7,500,000		0.0084	560.000	227,000
1:15,000,000		0.0042	2,240,000	907,000
1:30,000,000		0.0021	9,000,000	3,650,000
1:88,000,000		0.0007	77,000,000	31,200,000

[1]The "minimum sire delineation" is taken as a ¼x¼ inch square are. (1116 sq. in.). Cartographically, this is about the smallest area in which . symbol can be printed readily. Smaller areas can be delineated. and the symbol lined in from outside. but such very small delineations drastically reduce map legibility.

TABLE 3
DIFFERENTIA FOR IDENTIFYING ORDERS OF SOIL SURVEYS 1/

Orders of Soil Survey	Kinds of 2/ Map Units	Kinds of Components	Field Procedures 3/	Appropriate Scales for Field Mapping and Published Maps	Minimum 4/ Size Delineation
1st Order	Mainly consociations and some complexes	Phases of soil series	The soils in each delineation are identified by transecting and traversing. Soil boundaries are observed throughout their length. Air photo used to aid boundary delineation.	<1:12,000 5/	<1.5 acres
2nd Order	Consociations, associations and complexes	Phases of soil series	The soils in each delineation are identified by transecting and traversing. Soil boundaries are plotted by observation and interpretation of remotely sensed data. Boundaries are verified at closely spaced intervals.	1:12,000 to 1:31,680	1.5 acres to 10 acres
3rd Order	Associations and some consociations and complexes	Phases of soil series and soil families	The soils in each delineation are identified by transecting, traversing and some observations. Boundaries are plotted by observation and interpretation by remotely sensed data and verified with some observations.	1:24,000 to 1:250,000	6 acres to 640 acres
4th Order	Associations with some consociations	Phases of soil families and subgroups	The soils of delineations representative of each map unit are identified and their patterns and composition determined by transecting. Subsequent delineations are mapped by some traversing, by some observation, and by interpretation of remotely sensed data verified by occasional observations. Boundaries are plotted by air photo interpretations.	1:100,000 to 1:300,000	100 acres to 1,000 acres
5th Order	Associations	Phases of subgroups, great groups, suborders and orders	The soils, their patterns, and their compositions for each map unit are identified through mapping selected areas (15 to 25 sq. miles) with 1st or 2nd order surveys, or alternatively, by transecting. Subsequently, mapping is by widely spaced observations, or by interpretation of remotely sensed data with occasional verification by observation or traversing.	1:250, to 1:1,000,000	640 acres to 10,000 acres

1/ Soil surveys of all Orders require maintenance of a soil handbook (legend, mapping unit descriptions, taxonomic unit descriptions, field notes, interpretations) and review by correlation procedures of the National Cooperative Soil Survey. Work plans for many survey areas list more than 1 order; the part to which each is applicable is delineated on a small scale map of the survey area.

2/ Undifferentiated groups may be used in any order with possible exception of 1st Order.

3/ Field procedures used with meanings defined in preceding text.

4/ This is about the minimum size delineation for readable soil maps (i.e., 1/4 x 1/4 area)--see Table 4. In practice the minimum size delineations are generally larger than the minimum shown.

5/ 1st Order soil surveys are made for purposes that require appraisal of the soil resources of areas as small as experimental plots and building sites. Mapping scale could conceivably be as large as 1:1.

• 5. ***Smithdale-Providence association***

Mainly gently sloping to hilly, well drained and moderately well drained, loamy soils; some have a fragipan; on uplands

This association is on uplands that are dissected by intermittent streams in narrow valleys and by many short drainageways. It has long, winding, narrow ridgetops and sloping to very steep side slopes.

This association makes up about 41 percent of the county. Smithdale soils make up about 40 percent of the association, and Providence soils about 26 percent. Loring, Sweatman, and Tippah soils, which are on hills, and Collins, Gillsburg, and Iuka soils, which are in narrow valleys, make up most of the rest.

Smithdale soils are on side slopes, and they are well drained. The surface layer is sandy loam, about 11 inches thick, that is dark grayish brown in the upper 4 inches and brown in the lower 7 inches. The next layer is yellowish-red, friable sandy clay loam to a depth of about 38 inches, yellowish-red sandy loam to a depth of 52 inches, and red sandy loam to a depth of 80 inches.

Providence soils occupy mainly ridgetops and moderate side slopes, and they are moderately well drained. The surface layer is dark yellowish-brown silt loam about 4 inches thick. The next layer is about 25 inches thick. The upper 8 inches of this layer is yellowish-red, friable silty clay loam, the next 8 inches is strong-brown, 'friable silty clay loam, and the lower 9 inches is strong-brown, friable silt loam. Below this, and extending to a depth of about 57 inches, is a firm, compact and brittle fragipan. The fragipan is dark yellowish brown and has light brownish-gray mottles. It is silt loam in the upper part and loam in the lower part. The underlying material, to a depth of about 65 inches, is yellowish-brown sandy loam that has light-gray mottles.

About 70 percent of this association is wooded. The narrow bottoms and less sloping areas are used for crops and pasture. Selected sites within the association are suitable for the development of industrial, commercial, or residential areas, but the steep slopes in most of this association are a severe limitation to these uses. Fishing, hiking, and horseback riding are suitable recreational uses. This association is suited to openland and woodland wildlife.

Smithdale-Providence association, hilly (SpE).-This association is on rough, hilly uplands. It consists of well drained Smithdale soils and moderately well drained Providence soils. The Smithdale soils are mainly on the steeper side slopes that are broken by many short drainageways. The Providence soils are mainly on the narrow ridgetops and, in some places, are on the upper parts of the side slopes. Slopes are 8 to 35 percent. The composition of this association is more variable than that of most other mapping units in the county, but mapping was controlled well enough for the expected use of the soils.

Smithdale soils make up about 59 percent of this association, Providence soils about 18 percent, and included soils the remaining 23 percent.

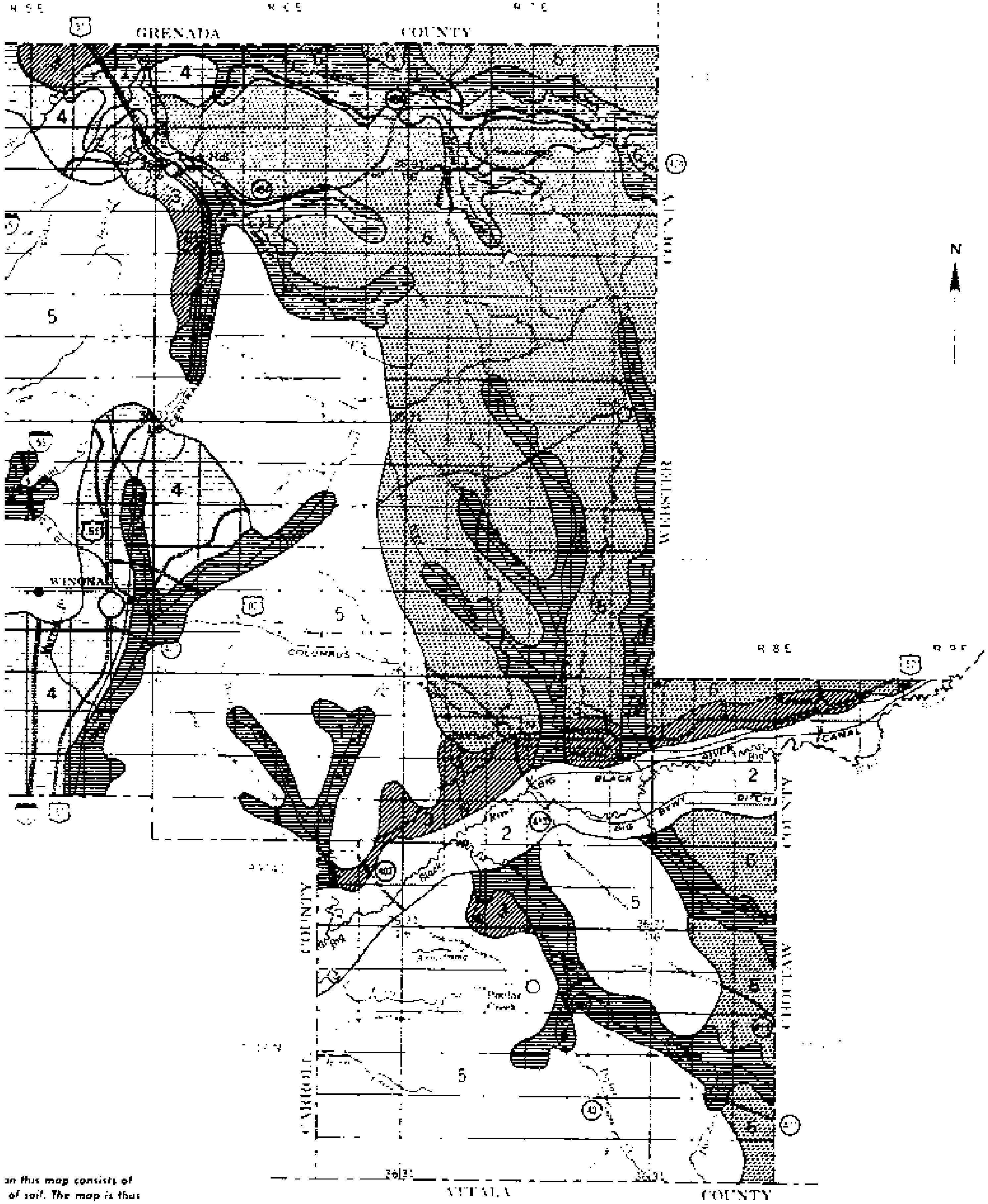
One of the Smithdale soils has the profile described as representative of the Smithdale series.

The Providence soils have a surface layer of silt loam, about 6 inches thick, that is dark grayish brown in the upper '2 inches and is brown in the lower 4 inches. The next layer, reaching to a depth of 27 inches, is strong-brown silty clay loam in the upper part and strong-brown silt loam in the lower part. Below this layer is a fragipan about 25 inches thick. The fragipan is dark yellowish-brown silt loam in the upper part and dark-brown loam in the lower part. It contains common light brownish-gray mottles throughout. It is underlain by yellowish-red sandy loam that extends to a depth of about 73 inches.

Included in mapping were areas of Sweatman soils, Tippah soils, loamy soils that have a sandy surface layer 20 to 40 inches thick, and Iuka soils in narrow drainageways. Also included were a few areas of eroded soils.

Runoff is rapid, and the hazard of erosion is very severe. Available water capacity is medium in the Smithdale soils and medium to high in the Providence soils. Permeability is moderate in the Smithdale soils and moderately slow in the Providence soils. Reaction is strongly acid or very strongly acid in the Smithdale and Providence soils.

Almost all of the acreage of this association is wooded. The soils are better suited to pines and hardwoods than to other plants. They are poorly suited to crops and pasture plants because of slope and the very severe hazard of erosion. (Capability unit VIIe-2; Smithdale soil in woodland group 301; Providence soil in woodland group 3o7)



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

GENERAL SOIL MAP

MONTGOMERY COUNTY, MISSISSIPPI

Scale 1:190,080

0 1 2 3 4 Miles

SOIL ASSOCIATIONS *

1 — Gillsburg-Collins-Arkabutla association: Nearly level, somewhat poorly drained and moderately well drained, loamy soils, on flood plains

2 — Chenneby-Arkabutla-Gillsburg association: Nearly level, somewhat poorly drained loamy soils, on flood plains

3 — Grenada-Calloway association: Nearly level and gently sloping, moderately well drained and somewhat poorly drained, loamy soils that have a fragipan; on uplands

4 — Providence-Loring association: Gently sloping and sloping, moderately well drained, loamy soils that have a fragipan; on uplands

5 — Smithdale-Providence association: Mainly gently sloping to hilly, well drained and moderately well drained, loamy soils; some have a fragipan; on uplands

6 — Smithdale-Sweatman-Providence association: Mainly hilly, well drained and moderately well drained, loamy soils; some are loamy throughout, some have a clayey subsoil, and some have a fragipan; on uplands

*Unless otherwise stated, the terms for texture used in the descriptive heading of the associations apply to the surface layer of the major soils.

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25

...on this map consists of
...of soil. The map is thus
...lanning rather than a basis

(31)


R. 1 E. | R. 2 E.
(Joins sheet 29)
(Joins sheet 32)
N
Scale 1:20 000
Gb
SrE3
PrC
SoE
Cm
Hayasha
Creek
Branch
32

1976 Southern Regional Soil Survey
Technical Work Planning Conference

April 5-8, 1976

Committee V - Improving Soil Survey Field Procedures

Chairman - Richard L. Guthrie
Vice-Chairman - Arville B. Touchet

Charges

1. Make a survey of training needs for soil survey personnel in soil-vegetative relationships and in the relationship between soil, geomorphology and geology.

2. Study and identify physiographic regions that lend themselves to broadly defined mapping units.

3. Identify conditions under which assistance from technical and non-technical aids would benefit soil survey work.

4. Explore techniques for improved note-taking during the soil survey.

Committee Report

Charge 1

The survey of training needs in the relationship between soil-plant and soil, geomorphology and geology indicates an apparent weakness among most soil scientists. University courses, the soil science institute, and soil correlation workshops were listed as sources of this kind of training. Less than half of the soil scientists in the units responding to the survey have attended the soil science institute or a soil correlation workshop. Most soil scientists don't take college courses which teach either soil-plant or soil, geomorphology and geology relationships, unless they go beyond the B.S. degree.

All the responses indicated a need for additional training in soil-vegetative relationships and soil, geomorphology and geology relationships. Strengthening college curricula was the most often mentioned idea to improve training. This proposal certainly has merit, but may not reach soil scientists who are already working. Some soil scientists should be encouraged to return to college.

Training by state program specialists and by knowledgeable soil scientists may be to" often overlooked. Most committee members suggested that training in soil-vegetative relationships could be provided by plant science specialists on the job or in workshops.

Most responses suggested that soil, geomorphology and geology training should be given by someone trained in geomorphology. SCS employee development units have the capability and facilities for arranging this kind of training.

Summary

A survey was made of training needs in soil-vegetative and in soil, geomorphology and geology relationships. The survey shows that most soil scientists have not had adequate training in these areas. Improving college curricula, training in soil-vegetative relationships by plant science specialists, and training in soil, geomorphology and geology relationships by trained geomorphologists were listed as methods of providing additional training.

Recommendations

1. Encourage potential soil scientists to study ecology and geomorphology if these courses are available.

2. Encourage student summer trainees that are likely to return to take courses in ecology and geology.

3 Party leaders and plant specialists should strive to give more "n-the-job training in soil-vegetative and soil, geomorphology and geology relationships.

4. SCS-EDU should continue the Basic Soil Survey and Soil Correlation courses for the beginning soil scientists and for the advanced soil scientist. These courses are to he held in Port Worth where models are set up for geology, geomorphology, ecology and soil survey training.

5. States should develop short courses in cooperation with the universities, if necessary, to strengthen the soil scientists concepts of geomorphology and ecology.

6. Encourage high-potential soil scientists to return to college to do graduate work.

Charge 2

Several physiographic areas in the South appear to he best suited for broadly defined mapping units. Some of the areas, listed by state, are:

Alabama - Southern Piedmont, Southern Coastal Plain
Arkansas - Ouachita Mountains, Arkansas Valleys and Ridges
Georgia - Blue Ridge, Atlantic Coast Flatwoods
Kentucky - Cumberland Plateaus and Mountains
Tennessee - Cumberland Mountains, Blue Ridge, Southern Appalachian Ridges and Valleys

Guidelines were suggested for determining what factors should be considered in designing mapping units for broadly defined units. Present and projected land use were mentioned hy all those responding to this charge. Landscapes, geology, geomorphology, topography, and complexity of soils were factors mentioned by some of the respondents. A consensus of the committee is that land use projcctions should be the major factor in determining what kinds of mapping units arc needed in a particular survey.

Summary

Several physiographic regions in the South were identified as areas that lend themselves to broadly defined mapping units. Factors to consider in designing mapping units were discussed and land use, both present and future, was listed most frequently.

Recommendations

1. The use of broadly defined mapping units should be encouraged in regions where projected land use lends itself to broadly defined unit-c:. Areas of intensive use should be mapped using narrowly defined units.

2. More training in the design of broadly defined mapping units and more training in the mapping of broadly defined units should be provided for soil scientists involved in these areas. Requests for assistance from FSC or State Staff should be encouraged in these areas.

Charge 3

Some duties related to soil survey could be performed by technical or non-technical aids. Technical aids might be required for some jobs, but most could be performed by non-technical aids. Training would be necessary for both kinds of aids.

As SCS state offices now have the responsibility for map compilation of published surveys, soil survey field time must inevitably be reduced unless other parsons can be utilized to compile maps. In survey areas where photobase map sheets are available early in the survey, aids can be utilized to transfer penciled soil boundaries from field sheets and ink them on overlays. This allows the soil scientist to forego inking and allows the maps to be compiled concurrent with mapping if quality control through correlation procedures is adequate. This procedure requires close supervision by a soil scientist and demands that he accurately place soil boundaries on the field sheet.

Other jobs can be handled by aids, either in the field or in the office. In the field, an aid could operate equipment, to open soil pits or install groundwater wells, for example. He could assist in running transects, taking notes, and in collecting water table and percolation data. In the office, an aid could make color checks, measure map acreages, file, and prepare progress maps and time and progress summaries.

Summary

Map compilation appears to be the activity which could benefit most.

Part time aids, district, or state aids could be used for field and office activities if available when needed.

Charge 4

Committee members were asked to explore techniques of note-taking, including use of mark sense forms for coding mapping unit and series. descriptions. Most soil scientists agree that more field notes are needed, but techniques to improve the quantity and quality of field notes have not really been developed. Most of the committee members believe that mark sense forms are too formal and too complex for recording field notes.

Tape recorders have been used by some soil scientists for recording notes. Responses from those who have wed recorders indicate that they were pleased with the improvement in note-taking. Recorders may be difficult to use in some situations and some soil scientists may not feel comfortable using them, but they offer an easy way to record many notes. Notes can be recorded verbally in the field and transcribed in the office.

Summary

Techniques for improved note-taking were explored. The "se of recorders was suggested as a new idea. The use of coding systems was not generally accepted by this committee as a technique for note-taking. Poor note-taking may be due either to a lack of motivation or due to uncertainty about what kinds of notes are needed.

Recommendations

1. Guidelines containing specific examples of kinds of field notes, such as narratives on delineations, landscape relationships, sketches and simple block diagrams should be provided to field soil. scientists.

2. Continue to explore techniques in note-taking with strong emphasis on the use of tape recorders and mark sense forms.

General Recommendations

Continue Committee 5 and charge it with (1) developing specific guidelines in the southeast for designing broadly defined mapping units, (2) training soil scientists in mapping broadly defined units, (3) continuing to explore for better note-taking techniques, (4) looking some more at remote sensing, (5) exploring possibilities of group field trips on special projects, and (6) developing better guidelines for photo interpretation.

Committee Members:
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Report to: Southern Regional Technical Soil Survey Planning Conference - Jackson, Mississippi, April 6-8, 1976

Committee VI: Soil Yield Potentials

Charges to Committee:

1. Evaluate procedures now in use for making and coordinating ratings of crop yield potentials for soil series which have a wide range of occurrence. Also, include the site correlation range data system and the system for rating soils for wood crop production.

2. Develop a procedure for predicting and testing the reliability of predictions of yield potential for common field crops such as corn for the same kind of soil over a wide geographic range.

Committee Report

Discussion of Charge 1:

Opinions vary within the committee but generally the following concerns seem to be foremost in present procedures. Gathering yield data from on-going farms leaves us behind the new developments in varieties, manaqement practices and fertilizers. This would point to using more weight on research plots and annual reports from research stations.

Concern is expressed that Series is not the level of taxonomy which should be considered for yield data. Here opinion varies from those who favor going to Families on one hand to those who point out that soil moisture is probably the single most important factor in yield and the need to incorporate slope and erosion (phase) characteristics. Position on the slope is of significant importance to this concept. Soil depth to both physical and chemical (Al toxic) restricting layers are important to soil yield potential evaluations.

The committee had little comment on the range index, probably reflecting experience in this area. Weight of native vegetation from properly managed sites would probably furnish the most accessible and reliable data for deriving a prediction equation.

Woodland, site index seems fairly satisfactory but perhaps some attention could be given to expressions of cords, cubic volume or board feet. Also, concern is expressed about predictions for the new genetic superior trees. As to the evaluation per site, there is a qreat deal of concern about the moisture parameters as affected by such factors as aspect and slope position, i.e., non-taxonomic criteria.

Discussion of Charge 2:

Ideas for developing a procedure for predicting and testing the reliability of predictions of yield potentials were rather limited. Expressions of average bu/ac or similar values are desirable since they are easily converted to economic values by bankers, tax assessors and other investors.

Because all possible uses of the soil must be considered in both the taxonomic classification and the establishment of map units, the development of a technical classification using criteria of specific importance to specific crop yield potential may have some merit. This is presently done for woodland, wildlife, septic fields and most other interpretive purposes.

Testing predictions with crops is a difficult task and because of changes in varieties, insect control and year to year weather variability, absolute comparisons are nearly impossible.

Three suggestions are made in this regard:

1. Reduce, for comparison purposes, yields from well identified sites to an index. For example, select a given soil and each year assign the yield on that soil a value of 100. Arrange yields from other soils each year as a ratio or percent of that index site yield. Thus, if the index site yields 40 bu of soybeans/ac in 1975 and site B yields 50 bu of soybeanslac in 1975, site B has an index of 125. Likewise, for example, with site C yielding 30 bu soybeans/ac would index as 75. If in 1976, the index yielded 30 bu/ac; site B 40 bu and site C 20 bu, the index would reflect 100 for the index site, 133 for site B and 67 for site C.

2. Since moisture during the growing season has been identified by numerous studies to be a big variable, a probability of yield rather than an average yield could maybe be developed. For example, this would say that 2 years in 10 the yield may project as 40 bu/ac; 5 years in 10 average 30 bu/ac; 2 years in 10 yield equals 20 bu/ac and 1 year in 10 total failure. This may help convey to money lenders the real risks involved in farming.

3. Develop groupings of map units based on specific management criteria for agronomic management interpretations (see Appendix I).

Summary and Conclusions

No conclusions or recommendations are unanimous within the committee. It appears that the majority favor paying more attention to slope and thickness of root zone criteria in evaluating yield potentials than is possible by using only the taxonomic criteria of either Series or Family. Thus, greater attention to phase criteria is needed in making yield potential ratings for crops and woodland. Rangeland discussion has not been possible by this qroup.

A couple ideas have to be advanced for discussion about using an index method to test the yield potential predictions and the use of probability of potential yield rather than average potential yield. No testing of these proposals has been possible.

Recommendations

1. Continue reporting potential yields on absolute quantities, i.e., bu/ac, site index, etc.

2. Use units such as cords, cubic volume or board feet, in addition to site index in woodland interpretations.

3. Concentrate yield data predictions on soil phases rather than taxonomic units because of root depth, erosion, soil moisture, slope, surface texture, variations permitted within taxonomic units. Report yield data in Soil Survey Reports by mapping units,

4. Continue this committee with at least one charge to test suggestions made with regard to present charge No. 2.

List of Committee Members:

B. R. Smith
D. E. Pettry
C. A. McGrew
B. J. Birdwell
L. A. Quandt
D. E. Lewis
C. Powers
W. B. Parker
G. Aydelott
C. M. Thompson
Ferris Allgood
M. E. Shaffer, Vice Chairman
S. W. Buol, Chairman

Appendix I:

The following table is taken from the article, "Soil Fertility Capability Classification: A Technical Soil Classification for Fertility Management," by S. W. Buol, P. A, Sanchez, R. B. Cate, Jr., and M. A. Granger. pp. '126-141, "Management of the Soils in Tropical America," ed. by E. Bornenisza and A. Alverado. Published on behalf of the University Consortium on Soils of the Tropics by the Soil Science Department, North Carolina State University, Raleigh, North Carolina 27607.

(Although this system is developed only to aid in the interpretation of soil management with respect to soil fertility and soil test, it may provide some basis for grouping soil map units for yield predictions.)

Fertility-Capability Classification[1/].

TYPE: Texture is average of plowed layer or 20 cm depth, *8") whatever is shallower.

S = Sandy topsoils: loamy sands and sands (USDA).
L = Loamy topsoils: < 35% clay but not loamy sand or sand.
C = Clayey Topsoils: < 35% clay.
0 = Organic soil: > 30% 0.11. to a depth of 50 cm or more.

SUBSTRATA TYPE: Used if textural change or hard root restricting layer is encountered within 50 cm (20").

S = Sandy subsoil: texture as in type.
L = Loamy subsoil: texture as in type.
C = Clayey subsoil: texture as in type.
R = Rock or other hard root restricting layer.

CONDITION MODIFIERS: In plowed layer or 20 cm (8"), whichever is shallower unless otherwise specified (*).

*g = (Gley): Mottles $\leq$ 2 chroma within 60 cm of surface and below all A horizons or saturated with H_2O for > 60 days in most years.

*d = (Dry): Ustic or xeric environment; dry > 60 consecutive days per year within 20-60 cm depth.

e = (low CEC): < 4 meq/100 soil by Σ bases + unbuffered Al.
< 7 meq/100 soil by Σ cations at pH 7.
< 10 meq/100 soil by Σ cations + Al + H at pH 8.2.

*a = (Al toxic): > 60% Al saturation of CEC by (bases and unbuffered Al) within 50 cm.
> 67% Al saturation of CEC by (cations at pH 7) within 50 cm.
> 86% Al saturation of CEC by (cations at pH 8.2) within 50 cm.
or pH < 5.0 in 1:1 H_2O except in organic soils.

*h = (acid): 10-60% Al saturation of CEC by (Σ bases and unbuffered Al) within'50 cm.
or pH in 1:1 H_2O between 5.0 and 6.0

i = (Fe-P Fixation): % free Fe_2O_3/% clay > 0.2 or hues redder than 5 YR and granular structure.

[1/]Proposed Feb., 1974.

(continued)

x = (X-ray amorphous): pH > 10 in 1 N NaF or positive to field NaF test or other indirect evidences of allophane dominance in clay fractions.

v = (Vertisol): Very sticky plastic clay > 35% clay and > 50% of 2:1 expanding clays; COLE > 0.09. Severe topsoil shrinking and swelling.

*k = (K deficient): < 10% weatherable minerals in silt and sand fraction within 50 cm or exch. K <0.20 meq/100 g or K < 2% of Σ of bases, if Σ of bases < 10 meq/100 g.

*b = (Basic Reaction): Free $CaCO_3$ within 50 cm (fitting with HCl) or pH > 7.3.

*s = (Salinity): > 4 mmhos/cm of saturated extract at 25°C within 1 meter.

*n = (Natric): > 15% Na saturation of CEC within 50 cm.

*c = (Cat clay): pH in 1:1 H_2O is < 3.5 after drying, Jarosite mottles with hues 2.5Y or yellower and chromas 6 or more within 60 cm.

SOUTHERN REGIONAL SOIL SURVEY WORK PLANNING CONFERENCE
JACKSON, MISSISSIPPI
April 5-8, 1976
Chairman - Bobby T. Birdwell
Vice Chairman - Joe A. Elder

Committee VII - Major Land Resource Areas

Charges to Committee:

1. Review Soils Memorandum-49 and USDA Agriculture Handbook 296, Land Resource Regions and Major Land Resource Areas of the United States.

2. Test the adequacy of the concept of land resource regions and land resource areas.

3. Prepare a revised map and descriptive legend for the southern states' portion of the "Land Resource Regions and Major Land Resource Areas" map if changes are recommended.

Committee Report:

Charge 1. - Review of Memorandum and Handbook

Soils Memorandum SCS-49 merely transmitted the map "Land Resource Regions and Major Land Resource Areas of the United States (48 Coterminous States)," 1963, and suggested how it might be used.

USDA Agriculture Handbook 296, Land Resource Regions and Major Land Resource Areas of the United States should be updated. In the text soils are referred to as great soil groups of the modified 1938 yearbook classification, and should be revised to reflect classes in soil taxonomy. The dominant physical characteristics of each of the major land resource areas should be described under the following headings and in the order listed:

1. General Description
2. Soils
3. Climate
4. Water
5. Use

Two attached descriptions illustrate what we believe should be contained under each of these headings.

Charge 2. - Test the adequacy of the concept of land resource regions and land resource areas.

The concepts of both of these broad levels of generalization seem adequate to the needs for which they are intended.

Charge 3. - Prepare a revised map and descriptive legend for the southern states' portion of the "Land Resource Regions and Major Land Resource Areas" map if changes are recommended.

The committee believes the existing map should be revised to reflect current knowledge of the relationship between soils and landscapes. Furthermore, the committee believes a map showing the major land resource areas of the south should have a photographic base which illustrates the spatial relationships of soils. We, therefore, obtained a mosaic of Band-5 ERTZ imagery for use as a photo base. The mosaic provides a synoptic view of the whole region which lets us observe the full extent of each area.

Band-5 imagery records electromagnetic energy in the 0.6-0.7 micrometer region of the spectrum. The spectal energy coming from various earth features, including soils and vegetation, exhibits unique tonal "signatures" on the image. Similar vegetative, climatic, geologic and topographic environments have unique signatures and are easily identified as "photomorphic" areas on the image.

Each member of the committee delineated on an ERTZ mosaic of Band-5 imagery the major land resource areas he believed should be shown on a revised regional map. Most of the delineations corresponded closely to the tonal signatures on the imagery.

Believing that there is a very close correlation between image signatures and major land resource areas, we decided to visually analyze the imagery and delineate what we choose to call "photomorphic areas" on the mosaic of Band-5 imagery. Photomorphic areas as used here simply refer to areas that, in the opinion of the image analyst, have the same tonal signatures. No other source material was consulted nor was there an attempt to "match" an existing map of the south region. The analyst simply delineated those areas that he could "see".

Recommendations:

1. The USDA Agriculture Handbook 296 should be updated, both text and map, to refer to soil in terms of classes of soil taxonomy and to increase the accuracy of the map by using satellite imagery.

2. The committee realizes that ERTZ imagery cannot by itself be used to generate a map of the major land resources of the south region. It does believe, however, that satellite imagery can be a very useful tool in updating such a map and that it has immediate practical use.

   We recommended that the states objectively test the photomorphic areas that are shown on the map using higher-resolution, larger scale imagery, existing maps and other source materials, ground truth and personal experience and observation, and report their findings to the committee chairman.

3. If, after testing, the photomorphic areas are reasonable or can be modified to represent major land resource areas, they must be named or renamed as needed. We chose not to try to name the units, preferring rather that those who test them supply the name and map symbol.

4. A period of not to exceed one year should be allowed for testing and finalizing the map and text before any attempt is made to publish it.

5. Time should be allocated to this committee for it to meet, discuss its charges, and pursue a course of action that will help accomplish its task. Committee action can be best achieved in committee meetings.

6. The committee should be continued and given the responsibility of coordinating all ongoing activities and efforts to revise and publish the handbook.

Committee Membership:

Glenn Bramlett
J. F. Brasfield
J. R. Coover
Erling Gamble
R. L. Googins

W. M. Koos
Lester Loftin
C. A. McGrew
B. J. Wagner

Bobby T. Birdwell, Chairman

Joe A. Elder, Vice Chairman

NASHVILLE BASIN
TENNESSEE

Any No. Square Miles

General Description:

The Nashville Basin is an interior lowland encircled by the Highland Rim. It consists of two segments -- the outer and inner parts. The outer part, underlain almost entirely by phosphatic limestone, is deeply dissected and consists of steep slopes between narrow rolling ridgetops and narrow valley floors. The inner part, underlain by clayey limestone, is smoother than the outer part and its average elevation is lower. The surface, except for a few isolated and narrow ridges, is undulating to rolling. There are extensive smooth areas of "Glady Land" or areas that have numerous outcrops of limestone. In numerous places throughout the Basin the land surface is deeply pitted by limestone pinks and outcrops of limestone rock can be seen nearly everywhere. The common elevation of the Basin ranges between 600 and 800 feet above sea level, but isolated hills rise to elevations of 900 to 1300 feet.

Soils:

Most of the soils in the Basin formed from limestone-phosphatic limestone in the outer part and clayey limestone in the inner. Few of them are more than 6 feet deep over rock. Generally, the depth to rock is between 1 and 4 feet and some soils occur mostly as small patches among outcrops of limestone. Generally the soils are medium acid and strongly acid and become less acid with depth. They are predominantly well drained and have subsoils rich in clay. More than one-half of the soils are high in phosphorous. The main soils on the uplands in the outer part of the Basin are Hapludalfs (Mimosa, Hampshire and Stiversville) and Hapludults (Dellrose). On the footslopes and terraces are Hapludalfs (Armour). In the inner part of the Basin the main soils on the uplands are Hapludalfs (Talbott, Colbert, and Bradyville), Rendolls (Gladeville) and Hapludolls (Barfield). There are small isolated bodies of Paleudalfs (Lomond and Cumberland) which formed in old alluvium. Soils on the bottomlands are mainly Hapludolls (Arrington, Lynnville, and Egam) and Haplaquolls (Godwin and Roellen).

Climate:

The average annual precipitation is about 50 inches, which normally provides adequate moisture for farming and enough water for other needs. Even short dry spells are rather serious in the Basin because of the rather shallow soil depth and limited capacity for available water storage. Precipitation is greatest during the period January 1 to April 30, and about one inch of this falls as snow. Least precipitation is during the period August 1 to November 30 because of the greater frequency of high pressure systems. The average annual temperature is 58° to 60° F., and it varies little throughout the Basin. Average date of the last freeze in spring is April 12 and average date of first freeze in fall is October 21, giving an average growing season of 192 days. The ground freezes to a depth of 2 to 4 inches two to five times during the average winter season and commonly remains frozen for 2 to 7 days.

Water:

The moderately high rainfall generally provides adequate moisture for crops and pasture, but occasional short summer droughts reduce yields. Irrigation of crops is rare in the Basin. Permanent streams and lakes occupy 120 square miles. The Cumberland River has dams for flood control, power production, navigation, and recreation. Numerous large areas lack surface water because it flows into underground channels in the cavernous limestone; here, farm ponds and deep wells provide water for home and livestock use. In many places water lines from metropolitan areas extend far into the countryside.

Use:

The densely populated Nashville Basin is mostly in small and medium size farms. Urban expansion, particularly around Nashville, has used a large acreage for residential development and small estate-type farms. About 15 percent is in forest consisting mostly of large rocky areas commonly called "Glady Land" which are in cedar or a mixture of cedar and deciduous brushy growth. Hay, pasture, and feed grains for beef and dairy cattle are the principal crops. Small acreages of tobacco, cotton, and soybeans are grown.

GRAND PRAIRIE
TEXAS AND OKLAHOMA

Any No. Square Miles

General Description:

The area is mostly a gently rolling to hilly dissected limestone plateau, with the low rugged Arbuckle Mountains in the northern part. Stream valleys are shallow and narrow in the upper reaches but broader and deeper near the eastern edge of the area. Broad areas in central Texas are gently sloping but steep slopes border the valleys of larger streams, along the sideslopes of flat-topped plateaus and in most of the Arbuckle Mountains. Relief is mainly in tens of feet, but the large valleys are 100 feet or more below the adjacent uplands. Elevation is mainly 500 to 1300 feet, but ranges from 1300 to 1500 feet on some of the high peaks in the southwestern parts and in the Arbuckle Mountains.

Soils:

The soils are mostly alkaline, well and moderately well drained, very shallow to deep. Some are stony or gravelly. They are moderately fine and fine textured soils and have montmorillonitic, mixed or carbonatic mineralogy. Moderately deep to deep Pellusterts (San Saba, Branyon and Slide.11 series) and Chromusterts (Crawford and Sanger series) are on nearly level to gently sloping uplands, upland valleys and ancient stream terraces. Shallow to moderately deep Calciustolls (Purves, Bolar and Denton series) are on the smooth gently sloping uplands. Very shallow to shallow, mostly stony or gravelly Haplustolls (Aledo and Eckrant series), Calciustolls (Tarrant, Purves and Doss series) and Argiustolls (Speck and Tarpley series) are on the gently rolling to hilly limestone ridges and plateaus. Shallow, gravelly or stony Ustochrepts (Brackett series) and Calciustolls (Real series) are on the steeper-sideslopes of the plateaus Deep, well drained Haplustolls (Krum series), Argiustolls (Blanket series) and Calciustolls (Venus and Lewisville series) are on outwash in the valleys and along stream terraces. Deep, well drained Haplustolls (Frio, Bosque and Gowen series) are in the flood plains. In the north part of the area deep Argiustolls (Durant and Newtonia series) are on the smooth uplands. Shallow, stony Haplustolls (Kiti series) and Rock outcrop occupies the Arbuckle Mountains in the north part of the area.

Climate:

The average annual precipitation is 28 to 40 inches and is most abundant in spring and fall months. More than half of the precipitation falls during the frost-free period. Summer moisture deficit (June-August) ranges from about 5 inches in the north part to about 10 inches in the south part of the area. Annual P-E index - 42 to 64. Average annual temperature - 63° to 70° F. Average freeze-free period - 200 to 260 days.

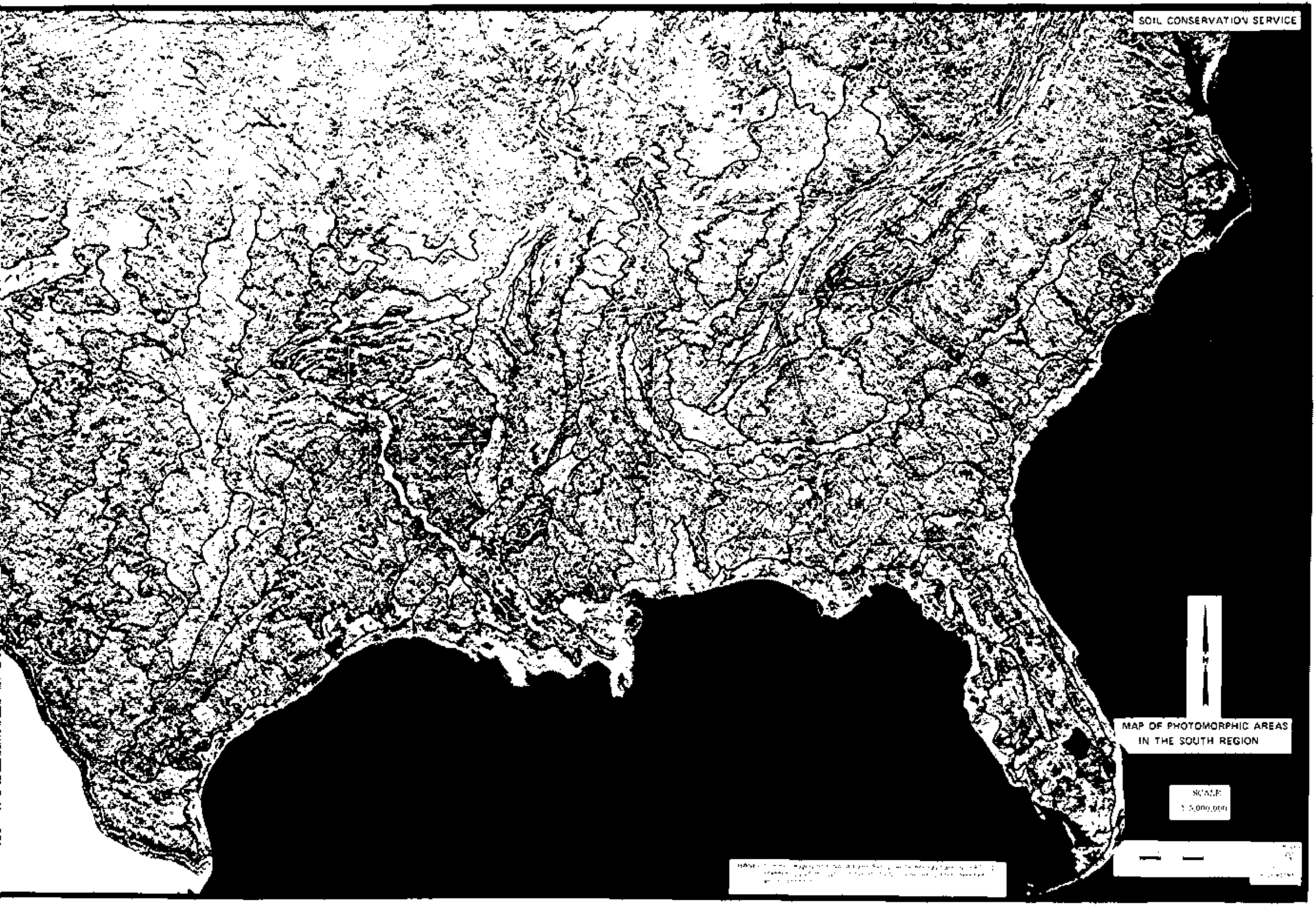
Water:

The moderate but somewhat erratic rainfall supplies the moisture for crops, pasture and range. The large rivers flow the year round and there are several large lakes and flood detention reservoirs in the area. These are potential sources of water for irrigation but are little used at the present. Deep ground water is abundant and there are many springs and wells throughout the area.

Land Use:

Most of the area is in farms and ranches. Urban development is expanding in the central and southern parts of the area. More than 40 percent of the area is in native rangeland consisting of mid and short grasses, bunch grasses, mesquite, scrub oak and juniper. Live oak motts are common in the central and southern parts of the area. About 15 percent of the area is in improved pastures. Beef cattle are the principal livestock, but dairy cattle and sheep are important in the central and southern parts. Deer and wild turkey hunting leases are an important income source in the southern part.

The deeper soils of gently sloping uplands and in valleys and bottomlands are in cropland. The cropland areas make up about 23 percent of the area. Oats, wheat, grain sorghum, forage sorghum, cotton, corn and hay are the principal crops. Native pecan orchards are common along the flood plains.


SOIL CONSERVATION SERVICE
MAP OF PHOTOMORPHIC AREAS
IN THE SOUTH REGION
SCALE

NATIONAL COOPERATIVE SOIL SURVEY

Southern Regional Conference Proceedings

Mobile, Alabama
March 1 I-15, 1974

United States Department of Agriculture–Soil Conservation Service and the
Alabama Agricultural Experiment Station
Auburn, Alabama [illegible]

June 26, 1974

RE: 1974 Southern Regional Technical Work-Planning Conference of the National Cooperative Soil Survey

TO: Recipients of Proceedings

The conference convened at 8:00 a.m. Tuesday, March 12, 1974 at the Admiral Semmes Hotel, Mobile, Alabama.

The program committee extends thanks to the following speakers invited to address the conference:

- Mayor [illegible], City of Mobile
- W. B. Lingle, State Conservationist, SCS, Auburn, Alabama
- Dr. R. D. Rouse, Dean and Director, School of Agriculture and Alabama Agricultural Experiment Station, Auburn University, Auburn, Alabama
- Dr. C. S. Hoveland, Professor, Agronomy & Soils Department, Auburn University
- Dr. Warren McCord, Alabama Cooperative Extension Service, Auburn, Alabama
- Dr. John E. McClelland, Director, Soil Survey Operations, Washington, D. C.

In addition, we extend our appreciation to [illegible], Party Leader; Earl Norton, District Conservationist; and Charles [illegible], Soil Scientist, Mobile, for organizing the field trip and other local arrangements.

Committee chairmen and members are to be commended for the reports they developed and for the conduct of the workshop sessions during the conference.

Mr. R. C. Carter, State Soil Scientist, USDA-SCS, Jackson, Mississippi was selected for the position of chairman for the 1976 conference. Dr. H. B. Vanderford, Professor, Department of Agronomy, Mississippi State University will serve as conference vice-chairman.

The conference adjourned at 12:00 noon, Friday, March 15, 1974.

B. F. Hajek
Chairman

E. A. Perry
Vice-Chairman

National Cooperative Soil Survey
Southern Regional Technical Work-Planning Conference
March 11-15, 1974
Mobile, Alabama

Contents

1974 Southern Regional Technical Work Planning Conference

Of

The National Cooperative Soil Survey

March 11-15, 1974

Admiral Semmes Hotel - Mobile, Alabama

AGENDA

Monday, March 11

3:00 - 6:00 p.m. ----- REGISTRATION -------- Mezzanine-Admiral Semmes Hotel

Tuesday, March 13

8:00 - 9:00 a.m. ----- REGISTRATION -------- Mezzanine-Admiral Semmes Hotel

General Session - Ballroom "A"

9:00 - 9:10 a.m. -- Welcome & Introductory Remarks -- B. F. Hajek, Chairman

9:10 - 9:25 a.m. ---- Welcome to Mobile ---- Representative, City of Mobile

9:25 - 9:40 a.m. ------- Welcome ----- W. B. Lingle, State Conservationist
SCS, Auburn, Alabama

9:45 -10:05 a.m. ----- Dr. R. D. Rouse, Dean and Director
School of Agriculture and Alabama Agricultural
Experiment Station - Auburn University, Auburn, Alabama

10:05 -10:30 a.m. --- BREAK ---

10:30 -11:00 a.m. -- Utilizing our Plant Resources for Food - C. S. Hoveland
Professor, Agronomy & Soils
Auburn University

11:00 -11:30 a.m. -- Land Use Making Decisions -------------- Warren McCord
[illegible] of Soils Information Specialist, Community
and Regional Development
Ala. Cooperative Extension Service
Auburn, Alabama

11:[illegible] [illegible] on Soil Survey ------- John E. McClelland
Director, Soil Survey Operations
Washington, D. C.

12:[illegible] --- LUNCH ---

1:[illegible] --- Presentation of Committee Reports by Committee Chairmen.
[illegible] from Committees I through IV. 20 minutes each.

2:[illegible] --- BREAK ---

Tuesday Afternoon Session (Cont'd)

3:00 - 4:20 p.m. -- Report from Committee V through Ad Hoc. 20 minutes each.

4:20 - 4:30 p.m. -- Announcements and Procedure for Wednesday's Work Group Sessions

4:30 p.m. ———— Adjourn

6:00 - 7:00 p.m. -- Social Hour -- Mezzanine

7:15 p.m. --------- Banquet -- Ballroom "B"

Wednesday, March 13

8:00 - 12:00 -- Work Group Sessions - Committee reports I through IV will be discussed.

12:00 - 1:15 p.m. -- LUNCH --

1:15 - 5:00 p.m. -- Work Group Sessions - Committee reports V through Ad Hoc discussed.

Thursday, March 14

8:00 - 11:00 a.m. -- Committees I through Ad Hoc meet to finalize committee reports for submission to conference.

Those participating in field trip will meet in lobby at 12:45 to board bus for tour.

1:00 - 6:00 p.m. -- Field Trip

Friday, March 15 - General Session - Ballroom "A"

8:00 - 9:30 a.m. -- Presentation of Committee Reports I through VI. (15 minutes each)

9:30 - 10:00 a.m. -- BREAK --

10:00 - 10:30 a.m. -- Presentation of Committee Reports VII and Ad Hoc. (15 minutes each)

10:30 - 12:00 -- General Business Session

12:00 noon -- Conference Adjourns

Participants at the Southern Regional Technical Work-Planning Conference of the National Cooperative Soil Survey

March 12-15, 1974-Mobile, Alabama

Southern Regional Soil Survey Work Group Representatives

Alabama:	B. F. Hajek E. A. Perry	Auburn University-Chairman SCS - USDA - Vice Chairman
Arkansas:	E. M. Rutledge C. A. McCrew	University of Arkansas SCS - USDA
Florida:	F. G. Calhoun R. W. Johnson	University of Florida SCS - USDA
Georgia:	H. F. Perkins M. E. Shaffer	University of Georgia SCS - USDA
Kentucky:	H. H. Bailey R. E. Daniell	University of Kentucky SCS - USDA
Louisiana:	R. Miller D. F. Slusher	Louisiana State University SCS - USDA
Mississippi:	H. B. Vanderford R. C. Carter	Mississippi State University SCS - USDA
North Carolina:	S. W. Buol H. J. Byrd	North Carolina State University SCS - USDA
Oklahoma:	F. Gray W. W. Fuchs	Oklahoma State University SCS - USDA
Puerto Rico:		University of Puerto Rico SCS - USDA
South Carolina:	R. B. Smith R. D. Wells	Clemson University SCS - USDA
Tennessee:	M. E. Springer J. A. Elder	University of Tennessee SCS - USDA
Texas:	C. L. Godfrey A. L. Newman	Texas A & M University SCS - USDA
Virginia:	D. E. Pettry D. Hallbick	Virginia Polytechnic Institute and State University SCS - USDA

B. H. Gossett, University of Tennessee, Director's Representative to the Southern Regional Research Committee

J. E. McClelland, USDA-SCS, Washington Office advisor to the Conference

J. R. Coover, Principal Soil Correlator, South Region, USDA-SCS TSC, Fort Worth, Texas

D. C. Aydelott, USDA-Forest Service, Atlanta, Georgia

R. A. Leonard - USDA - ARS, Watkinsville, Georgia

General Session Speakers

Mr. W. B. Lingle, State Conservationist, USDA-SCS, Auburn, Alabama

Dr. R. D. Rouse, Dean and Director School of Agriculture and Alabama Agricultural Experiment Station, Auburn University, Auburn, Alabama

Dr. C. S. Hoveland, Professor, Agronomy & Soils Dept. Auburn University, Auburn, Alabama

Dr. H. McCord, Specialist, Community and Regional Development, Ala. Cooperative Extension Service, Auburn, Alabama.

Mr. G. Greenough, Mayor, City of Mobile, Mobile, Alabama

Dr. J. E. McClelland, USDA - SCS Washington, D.C.

Local Arrangements and Field Trip Committee

H. G. Mattox, USDA-SCS, Mobile, Alabama

E. C. Norton, USDA-SCS, Mobile, Alabama

Charles Owens, USDA-SCS, Mobile, Alabama

W. B. Tucker, USDA-SCS, Grove Hill, Alabama

R. A. Hoyum, Auburn Univeristy, Auburn, Alabama

Work - Planning Conference Committee Members

Allen, B. L. - Department of Agronomy, Texas Technological College, P. O. Box 4169, Lubbock, Texas 79409. Member - Committee VII

Bailey, H. H. - Professor, Agronomy Department, University of Kentucky Lexington, Kentucky 40506. Member - Committee II & Ad Hoc Committee

Brasfield, J. F. - Assistant State Soil Scientist, Soil Conservation Service, Federal Building, P. O. Box 1208, Gainesville, Florida 32601. Member - Committee I

Bentley, G. J. - Department of Agronomy, University of Tennessee, P. O. Box 1071, Knoxville, Tennessee 37901. Member - Committee VII

Carlisle, V. W. - Associate Professor of Soils and Associate Soil Chemist, 2169 McCarty Hall, University of Florida, Gainesville, Florida 32601. Vice-Chairman - Committee V

Cockerham, W. L. - Soil Correlator, Soil Conservation Service, P. O. Box 1630, Alexandria, Louisiana 71301. Chairman - Committee V

Daniels, K. B. - Department of Soil Science, North Carolina State University, P. O. Box 5907, Raleigh, North Carolina. 27607. Chairman - Committee IV

DeMent, J. A. - Soil Scientist, Soil Conservation Service, P. O. Box 11222, Fort Worth, Texas 76110. Chairman - Committee III

Ellerbe, Clarence E l . Columbia, South Carolina

Green, T. W. Soil Scientist. U.S. Forest Service, Atlanta, Ga., Committee I

Gerald, T. R. - Soil Conservation Service, 901 Sumter Street, Columbia, South Carolina 29701. Member - Committee VI

Gilbert, F. L. - Soil Conservation Service, P. O. Box 311, Auburn, Alabama 36830. Member - Committees II & " I

Hood, J. T. - Agronomy & Soils Department, Auburn University, 232 Funchess Hall, Auburn, Alabama 36830. Member - Ad Hoc Committee

Holzhey, C. S. - Room 333. Soils Building, Agriculture Research Center West, Beltsville, Maryland 20705. Member - Committee V

Horton, R. E. - Soil Specialist, Soil Conservation Service, P. O. Box 27307, Raleigh, North Carolina 27611. Member - Committee VI

Hawley, John H. - Soil Conservation Service, Lubbock, Texas

Huckle, Horace, F. Soil Correlator, SCS, Gainesville, Florida

Koos, W. M. - Soil Correlator, Soil Conservation Service, P. O. Box 610, Jackson, Mississippi 39205. Member - Committee IV

Lewis, D. E. - Assistant State Soil Scientist, SCS, P. O. Box 311. Auburn, Alabama 36830

Lund, Z. - Agronomy & Soils Department, Auburn University, 230 Funchess Hall, Auburn, Alabama 36830. Member - Committee I

Miller, W. F. - School of Forestry, Mississippi State University, P. O. Drawer FD, State College, Mississippi 39762. Member - Committee VI

Newton, John H. Soil Correlator, 333 Waller Avenue, Lexington, KY 40504

Nichols, J. D. - Soil Scientist, Soil Conservation Service, P. O. Box 11222, Fort Worth, Texas 76110. Chairman - Committee VII

Nance, Earl C. SCS, Stillwater, Oklahoma Committee I

Soileau, J. - Land Use Specialist, Soils and Fertilizer Research Branch, TVA, Muscle Shoals, Alabama 35660. Member - Committee I

Steers, C. A. - Cartographic Unit, Soil Conservation Service, P. O. Box 11222, Fort Worth, Texas 76110. Chairman - Committee VI

Sopher, Dr. Charles D. Ass.t Prof. Dept. of Soil Science, North Carolina State University, P. O. Box 5907 Raleigh, North Carolina 27607 Committee VII

General Session I

March 12, 1974 - 8:00 a.m. - 12:00 noon

Dr. Ben Hajek

Dr. Hajek welcomed the group to Mobile and introduced the other speakers whose presentations are summarized in the following paragraphs.

William B. Lingle, State Conservationist

Mr. Lingle expressed his appreciation to the soil scientists for their contribution to the total conservation effort and noted the increasing popularity of the soil survey among many leaders in agricultural fields.

Mayor Gary Greenough

Mayor Greenough gave an impressive welcome to the group in speaking of the growing importance of technology in planning. He emphasized that "all. decisions are based on information," that information comes from many different sources, that people with decision making responsibilities are busy and haven't tine to make in depth interpretations of data, and that, therefore, a good format for the information provided is at least as important as the information itself.

Dean R. D. Rouse

Dean Rouse welcomed the group to Alabama and gave a summary of the diverse nature of the soils, landscapes, and agriculture in the state.

Dr. C. S. Hoveland - "Utilizing our Plant Resource for Food"

Dr. Hoveland gave a well prepared and pertinent slide presentation. In it, he discussed the amounts of different kinds of land in Alabama, emphasized the large amount of land suitable for growing forage, discussed warm season grasses, cool season grasses, and pointed out the differences in the two kinds of grasses as they convert to pounds of beef per acre. Dr. Hoveland discussed the difference between "what we know and what we grow" in reference to growing forages, soybeans, nut and fruit crops, and grain crops.

Dr. Warren McCord - "Land Use Making Decisions Impact of Soils Information"

Dr. McCord reviewed past and present legislative proposals and legislative actions affecting land use.

Dr. John E. McClelland - "Developments in Soil Survey"

Washington Staffing

Dr. McClelland brought the group up to date on the staffing of the Washington soil. survey office. He pointed out there are now 1,343 soil scientists in SCS with 94 percent of these being on the state staffs (state office and field).

Funding

Dr. McClelland outlined non-SCS contributions to the soil survey in FY '74 as follows:

State and Counties	$2,954,600
Private	81,000
Other Federal	812,701
Non-reimbursahle	2,798,512
	$6,646,813
SCS FY '74	$25,026,000

Mapping Status

As of July 1, 1973, about 47,000,000 acres were mapped. This is an accumulated total of 1,197,605,000 acres of 52% of U. S. and Caribbean land area. (This includes 337,516,000 acres exploratory.)

Publication Status

The status of the soil survey publication as of 6/30/73 was as follows:

Published	675	313,000,000 acres
In the GPO (90 went in FY 73)	171	90,000,000 acres
Mapping completed	377	196,000,000
Incompleted soil surveys		642,000,000

Dr. McClelland pointed out that 80 soil surveys were completed and 90 went to the GPO in FY '73.

Soil Taxonomy

The galley has been reviewed. It is hoped to have it published before the end of the year.

Other Publications

The soil survey manual is in the 3rd draft. A National Policy Guide and a National Soils Handbook is being prepared.

Arrangements for Making Changes in the Soil Taxonomy

Dr. McClelland briefly outlined these procedures. The Principal Soil Correlators will serve as chairmen, there will be three Agriculture. Experiment Station Representatives, and three federal (SCS) representatives. Review procedures will soon be sent out for comments.

General Session II

Minutes

Friday Morning
March 15, 1974

Meeting called to order by Ben Hajek.

Final reports of each Committee were presented. by the chairman of each Committee. All reports accepted. Ben Hajek express thanks to Committees for their efforts. Requested 150 copies of each committee report by June 1, 1974.

Break

Meeting called to order by Ben Hajek.

Business items called for.

(1) Report on status of Southern Regional Soil Nap. (Stan Buol) Notion made to reprint map by Stan Buol-Dement second. Motion carried.. SCS agreed to pay cost.

(2) Moye Rutledge reported on progress of Soil Science Society of America Committee on efforts to adopt a particle size scale that would be standard for engineers, soil scientists, geologists, etc.

(3) Steve Holzhey (SCS) informed the group of an up-coming runoff and infiltration study to be conducted in the near future by ARS.

(4) Dr. Jack Perkins (Univ. of Ga.) member of Southern Soil Region Research Committee pointed out the need for the continuation of the colleges Participation Committee and the need for a working place in thr Southern Regional Work Planning Conference. Several conference members express ideas concerning items needing attention at future meetings.

(5) Call for remarks by Forest Service - representatives not present.

(6) Jack McClelland invited to make closing remarks.

(7) R. C. Carter (Miss.) extended an Invitation to hold the next workplanning conference in Jackson, Miss. Motion made, second and carried.

(8) Jim Cower invited to make closing remarks. Coover ask to renominate present Taxonomy Amendment Committee. Due to two vacancies two new members were necdcd. E. A. Perry took chair for Ben Hajek; Hajek appointed to Taxonomy Admendment Committee to represent Colleges. Wes Fuchs appointed to represent SCS.

MEETING ADJOURNED

SOUTHERN REGIONAL
TECHNICAL WORK-PLANNING CONFERENCE
OF THE COOPERATIVE SOIL SURVEY

Mobile, Alabama
March 11-15, 1974

Chairman: Westal W. Fuchs
Vice-chairman: Robert W. Johnson

COMMITTEE I
WASTEWATER RECLAMATION AND DISPOSAL BY LAND SPREADING

CHARGES TO THE COMMITTEE

1. Develop soil suitability guides for treatment of municipal sewage wastewater by land spreading for taxonomic soil groups. 1/

COMMITTEE REPORT

After this charge was developed, a national interim guide, Advisory Soils-14, was released for rating soils for disposal of waste. The Committee reviewed this guide in light of the charges, and especially related to the following questions:

1. What changes or additions would improve the guide?

2. How can this guide be better related to taxonomic soil groups?

3. What short range testing can be done prior to our report, and what are the long range investigation needs?

4. Other recommendations related to the charge given this committee?

Suggested changes or additions to interim guide:

1. Waste should be defined in the first paragraph to avoid confusion with the kind of waste put into a sanitary landfill. This can be done by wording to exclude junk, garbage and trash.

1/ See letter from Homer A. Taff to B. F. Hajek and E. A. Perry (attach 1) and the Committee XI report to the Southern Regional Soil Survey Work-Planning Conference, May 1972.

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2. LOW application rates and high application rates were a point of much discussion. Application rates where the minimum water is used for the maximum production is a common irrigation principle. Many committee members felt that any water application beyond this point "as a high rate system. In most disposal, the object is to reclaim the maximum water, with or without marketable production, using the same principles of soil and crop filtration, biological activity and uptake or immobilization of minerals. All recognized, however, this should not be confused with hydraulic loading or Rapid Infiltration systems "here the soil is used only as an entrance medium for disposal by underground recharge.

3. Further study by the committee indicates the items affecting use are essentially the same for irrigating soils and growing plants regardless of maximizing production or maximizing water reclamation. For these reasons, we recommend table 1 in Advisory Soils-14, as well as the text explaining the table, omit reference to low rate. It should reflect its use for reclaiming wastewater by irrigation where the soil acts as a filter, in addition to supporting plant growth.

4. We recommend that a separate table be developed for rating soils for reclaiming wastewater where the soil does not act as a filter, but supports plant growth which serves as the filter. This system is commonly called overland runoff or overland flow.

5. Infiltration rate, though quite important, is not presently expressed to serve at arriving at a limitation rating. The application intake rate would be most valuable, however this is not available for most soils of the Southern Region. We recommend infiltration rate be deleted from table 1.

6. Ratings soils for "flooding only during non-growing season" will require more than pedological data, and may involve a design using winter or summer crops as appropriate. We recommend table 1 be changed to read "severe - soils subject to flooding".

7. Temporary vs permanent installation seems to relate more to design than to soil limitation for reclaiming wastewater. We recommend both be deleted from table 1 and retain available water capacity as "slight >7.8 inches, moderate 3 to 7.8 inches, and severe <3 inches".

8. The committee recommends three additional items affecting use be added to table 1.

	Slight	Moderate	Severe
a. Depth to water table	>60"	30-60"	<30"
b. Depth to bedrock	>60"	40-60"	<40"
c. Slope	<5%	5-12%	>12%

In addition, change flooding to "moderate-none, severe-subject to flooding."

9. The items affecting use for irrigation with soil as a filter, table 1 of Advisory Soils-14, are essentially the same as for solid wastes, table 2. For this reason, we suggest the tables 3e combined.

How can the guide be better related to taxonomic soil groups?

Most of the items affecting use are directly related to soil families. To relate best to taxonomy, the use of cognate groups would be most helpful in developing a guide. After the significant items affecting use are determined, a second or additional guide can be developed related to taxonomy, as well as the lowest possible level such as phases of series.

What short range testing can be done, and what are the long range investigation needs?

1. Short range testing could be done on a few benchmark soils using the criteria of the national guide. Judgments by those who know the properties of the selected soils may lead to refinements of the guide.

2. For the most part, problems encountered in disposal by land spreading do not lend themselves to short range testing. An investigation of on-going systems with these national criteria, or with revised criteria, would help identify the desirable soil parameters and taxonomic soil groups most effective for waste disposal.

3. Long range investigations should be concentrated on irrigating to maximize water reclamation through the use of both soil and plants as a filter. This area has the greatest lack of predicted response, and because of growth pressure is receiving the most attention as a disposal method.

4. Disposal sites on extensive soils should be monitored, and data used to develop and refine the guide for high application rates. Groupings should be made of soils with similar behavior.

Other recommendations

1. The present guide does not consider the effect of moisture surplus areas as compared to moisture deficient areas and the relationship with other items affecting use, such as available water capacity, permeability and runoff. We recommend new guides be prepared by major moisture regimes, such as udic, ustic, aridic.

2. Limitation ratings are not enough; we need to highlight the problems that can be overcome by design, and show the potential after treatment or installation.

3. Locate by mapping procedures those soils on broad landscapes where waste disposal by land spreading might best be suited. Place a high priority on mapping these soil areas in close proximity to the municipalities where land spreading may be needed.

4. Many states have specific laws in effect prescribing various criteria relating to liquid and solid waste disposal. These laws are not similar in each state, and regardless of a uniform soil interpretative guide, the specific state regulations must be considered. It might be useful to summarize existing laws and regulations for incorporating into a soil interpretative guide for the Southern Region.

SUMMARY AND CONCLUSIONS

Soil suitability guides for treatment of municipal sewage waste by land spreading were reviewed. Several suggestions were made, including omitting the reference to low rate systems and adding additional items affecting use as criteria. Recommendations were made to develop guides for overland runoff and to develop guides by major moisture regimes to reflect differences caused by moisture surplus areas vs moisture deficient areas. Interim guide, Advisory Soils-14, is not presently related to taxonomic soil groups, but could be revised so that soil families and cognate groups would serve as criteria.

RECOMMENDATIONS

1. Omit reference to low rate system end define in text and table for maximizing water reclamation by irrigation with the soil as a filter.

2. Develop a guide for rating soils for maximizing water reclamation by irrigating with plants as a filter.

3. Modify present table 1 by omitting infiltration, temporary and permanent installation, and by adding depth to water table, depth to bedrock and slope.

4. Combine tables for liquids and solids.

5. Develop guides for moisture deficient areas as well es moisture surplus areas.

6. The Committee be continued,

Committee Members:

R. Berdanier
J. F. Brasfield
S. W. Buol
B. L. Carlile
Westal W. Fuchs (Chairman)
Robert W. Johnson (Vice Chairman)
z. Lund
A. Overman
D. E. Pettry
J. M. Soileau

Consultants:
Jack Adair
L. J. Bartelli

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. Box 11222, Fort Worth, Texas 76110

attach 1

October 25, 1972

Dr. Ben F. Hajek
Department of Agronomy and Soils
Auburn University
Auburn, Alabama 36830

Mr. E. A. Perry
State Soil Scientist
Soil Conservation Service
Auburn, Alabama 36830

Some of the states have been experiencing an increased interest in the use of Soil for tertiary treatment Of municipal sewage. Cities are concerned about the high cost of removing all pollutants through plant treatment. They are looking to land spreading for a cheaper way out. The state conservationists are requesting help in developing suitable guides to rate the soil's suitability and load capacity. Through the use of multidiscipline contributions from the Land Grant Colleges and Soil Conservation Service, I hope that we could prepare a regional handbook that provides guides for site selection, efficient use of plants, water-spreading design criteria, and environmental planning.

Would you form a committee in the South Regional Cooperative Soil Survey Work Planning Group to develop the necessary guides for the prediction of soil behavior in this unique use? Dr. Bartelli and Jack Adair from the RTSC staff will work with you and your committee.

Homer A. Taff
Homer A. Taff
Acting Director, South RTSC

cc:
William B. Lingle
L. E. Ensminger
Lindo J. Bartelli
Jack Adair

SOUTHERN REGIONAL
TECHNICAL WORK-PLANNING CONFERENCE
Mobile, Alabama
March 11-15, 1974

Chairman - James R. Coover
Vice-Chairman - Joe Elder

COMMITTEE II - SOIL PHASES

CHARGES TO THE COMMITTEE

1. Propose criteria for the phase as a subdivision of categories in the classification system. Although the phase is not a category of the system, the handling of phases should be related to the correlation process. 1/

2. Make recommendations for ranges in phase characteristics for different use interpretations. Consider ranges in texture, slope, flooding, wetness, mapping intensity, and other significant characteristics.

COMMITTEE REPORT

Definition of a Soil Phase

The committee reviewed the definition of a soil phase given in the 3rd draft of the revision of the Soil Survey Manual. It was difficult for the members to accept that a soil phase is a subdivision of a class of the taxonomic classification system, whereas attributes which are not soil properties may be used as differentiating criteria for phases.

1/ See 1973 National Work Planning conference Report and Topics and Questions.

A majority of the members recommended that the soil phase be defined as a class, not part of the taxonomic soil classification system, used as a device for grouping and naming soils to serve the specific purpose of individual soil surveys. It does not seem appropriate to define a class in what is essentially a technical grouping in terms of the natural classification system. In addition, the majority of the members could not accept soil phases as subdivisions of a class of the taxonomic soil classification system and then have phases differentiated on the basis of attributes which are not soil properties.

Differentiating Criteria for Phases

The committee members accepted the following statements from the 3rd draft:

> "Any attribute of the soil, or any combination of attributes, may be used as differentiating criteria for phases. Their selection is governed by the purpose they serve. They need not be soil properties, but must be associated with the areas of soil as mapped.
>
> "Any limiting value or range of a phase criterion may be used to define phases."

Qualified Units

The committee members were in agreement that qualified units are not needed. The definition of a soil phase should be broadened to include the concept of qualified units.

Phases for Surface Layer Texture

The following proposal is given on page 35 of the 3rd revision of the draft of the Soil Survey Manual:

"Textural terms used in phase names follow:"

Textural Classes	Intermediate Textural Groups	Broad Textural Groups
Coarse sand Medium sand Fine sand Very fine sand Loamy coarse sand Loamy medium sand Loamy fine sand Loamy very fine sand,	Coarse-textured	Sands (sandy)
Coarse sandy loam Medium sandy loam Fine sandy loam	Moderately coarse-textured	Loams (loamy)
Very fine sandy loam Loam Silt loam Silt	Medium-textured'	----- Silts (silty)
Clay loam Sandy clay loam Silty clay loam	Moderately fine-textured	
Sandy clay Silty clay Clay	Fine-textured	Clays (clayey)

The reaction to this proposal was mixed. Those who would be affected slightly or not at all were in agreement or noncommittal. The other members were not in agreement. They presented several good arguments against the proposal. These arguments are rather well summarized in the statement of one of the members representing an experiment station who commented "I question the validity of attempting to classify soil texture into so many categories. During the past year we have analyzed hundreds of samples through our laboratory analysis and found that they were more frequently misclassified texturally than not. This was especially true for sand classes where sand classes were included in the textural classification."

The members do not want to require strict agreement between soil texture classes and surface layer texture phases. There should be additional phase names available such as "sand," "loamy sand," and "sandy loam" which are defined as undifferentiated with respect to whether the sand particle size is coarse, medium, fine, or very fine.

The committee members had no objections to use of the term "mucky" as a phase criterion to differentiate a soil that has a surface layer so rich in organic matter that its physical properties approach those of muck though it is a mineral soil layer. They did not agree that "mucky loam" be defined as a soil textural class.

Phases of Eroded Soils

A majority of the members favored some kind of phase for use in areas which are gullied to the extent that the area no longer fits into class 3 erosion of the Manual. In addition, the areas have a significant part which is of a recognized soil series. Such areas are soil complexes, which need to be phased to differentiate them from other areas. The phase names, "gullied," and "severely gullied" were suggested by one member for conditions fitting parts of the present classes 3 and 4.

Thickness Phases and Depth Phases

The members could not foresee any use of these phases in normal operations. Their use, if at all, would probably be limited to very detailed soil surveys such as those of experimental fields.

Naming Eroded Soil Phases

During the conference, the committee had a full discussion on naming eroded soils. There was general agreement that many people are misled by the use of eroded phase names. In most survey areas, only a few of the soils which have been truncated have the word eroded in the name. These are the soils that have been changed to the extent that there is a significant difference in use, behavior, or management. Other soils may have been truncated even more but now have characteristics which class them in a different series. The committee was in general agreement that each mapping unit should have a unique name. Preferably, the name should be used everywhere the soil occurs. Also, the name should be as short as possible. Thus, if the surface soil textural class already sets a unit apart, the name severely eroded is merely descriptive of the genetic process.

SUMMARY AND CONCLUSIONS

The concept and definition of a soil phase were studied. The differentiating criteria for soil phases given in the 3rd draft of the revision of the Soil Survey Manual were reviewed, together with the concept of qualified units. The members consider the draft to be excellent for the most part, but had questions on the concept of qualified units and the sections on phases for surface layer texture and eroded soils. The committee concluded that a new concept and definition of a soil phase is needed, that qualified units are not needed, and that the proposed sections of the Manual on textural phases and eroded soils need revision.

RECOMMENDATIONS

1. Define a soil phase as -a class or technical grouping of soils used to serve the specific purpose of individual soil surveys. Names of soil phases may be made up in part of names from the taxonomic soil classification system, but a soil phase is not a class of the system.

2. Drop the concept of qualified units. A new concept and definition of a soil phase will include the conditions proposed to be handled as qualified units.

b

3. Provide a category of names for phases of surface layer texture which will be undifferentiated with respect to specific soil textural class. In many survey areas it is neither desirable or possible to be specific as to the exact soil texture class of the surface layer of mapping units. Those soils which behave the same should be grouped together in one surface layer texture phase, regardless of specific soil texture class of the surface layers.

4. Provide an additional class for grouping eroded soils into phases. The class is needed for naming of soil complexes consisting of areas of soil series in a complex pattern with soils or non-soil areas in deep, usually steep sided, gullies. If there is soil in the gullies, it is usually classified at a category higher than the soil series.

5. Discontinue the use of the word "eroded" in naming mapping units if a unique name can be devised using a more specific term.

6. Recommend the committee be continued.

Committee Members

H. H. Bailey
G. L. Bramiett
J. R. Coover (Chairman)
R. E. Daniel1
Joe Elder (Vice-Chairman)
J. W. Frie
F. L. Gilbert
R. L. Googins
D. E. Lewis
G. S. McKee
Blake Parker
H. F. Perkins

SOUTHERN REGIONAL TECHNICAL WORK PLANNING CONFERENCE
Mobile, Alabama, March 11-15, 1974

COMMITTEE III - AUTOMATIC DATA PROCESSING

Chairman: James A. DeMent
Vice Chairman: E. Moye Rutledge

I. CHARGES

1. Prepare summary reports on:

   A. Pedon data storage (reference Montana State University thesis)
   B. Modular writing
   C. Interpretation data recall (SCS-SOILS-5)
   D. Table preparation for interim and special reports
   E. ATS system and progress of work at Ames, Iowa
   F. MIADS

Committee recommendations appear at the end of discussions on each charge.

Charge 1A - Pedon Data Storage (reference Montana State University thesis)

The Montana State University thesis has reference to a work entitled "Automatic Retrieval and Analysis of Soil Characterization Data," by Gordon Decker, December 1972, at Montana State University. Certain aspects of Dr. Decker's work will be discussed in conjunction with the pedon coding system developed for the National Cooperative Soil Survey because:

1. The two systems are compatible in many respects.

2. The Soil Data Storage and Retrieval Unit at Hyattsville has copies of Decker's program for conversion to the National Cooperative Soil Survey system.

3. The national system was released in March 1573 for nationwide testing.

The committee tested the national pedon data system by incoding various data. The system appears to be operational, although questions arose concerning certain phases of coding (See Attachment No. 1). The questions were submitted to the SCS Washington office for clarification.

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Dr. Decker, subsequent to his thesis work, has developed mark sense cards for encoding morphological data. These can be encoded in the field, fed into a mark sense reading machine, and automatically punched. Mark sensing requires a numeric entry. The committee feels that numeric coding has the disadvantages of (1) the added step of converting alphabetized material to numerals and (2) possibility of errors in making conversions. However, the cards are overprinted with an alpha notation to simplify field entry. In addition, a program is underway to simplify computer entry from a numeric to an alphabetic system. In spite of possible disadvantages, the committee feels that mark sensing has merit in that field personnel can contribute by testing and learning the system and by spreading the work load for program entry.

The committee discussed the matter of what data is to be stored in the national file. It is realized that a screening process must be developed. Only pedons with reasonable, complete, and accurate morphological descriptions should be coded. In addition, all pedons should be classified to the family level, with or without a designated series name. Pedon data should not be excluded because of limited area1 extent. Pedons that cannot be classified at the family level should not be entered into the system. Field-determined data should be stored only after careful review and primarily where laboratory data are lacking,

Recommendations to Charge 1A

(1) Guidelines be developed at the national level for the kinds of pedon data that are adequate for storage.

(2) Consideration be given to the development and use of mark sense cards for encoding morphological data in the field.

Charge 1B - Modular Writing

Modular writing stems from a prewritten, edited model, either in text or in tabular form. Authors adapt this material to their survey area by changing key words without altering sentence structure or table format. The prewritten material lends itself to computer storage and retrieval.

Modular writing for soil survey manuscripts has been in use in the south for about three years. Except for a pilot study discussed in Charge ID, magnetic typewriter tapes instead of computers are used for storage. Prewritten material has undergone considerable testing and is currently being revised.

Studies indicate that about 60 to 70 percent of the space occupied in the average soil survey manuscript lends itself to modular writing. Table 1 (Attachment 2) shows a time and cost analysis for Mayes County, Oklahoma (70 percent automated) and Drew County, Arkansas (60 percent automated) against that of three average counties, nonautomated. A large part of the savings in costs and time are due to less review time in the State office and TSC office (Activities II-4 and III-1, and III-2 in Table 1). The lessened review time is largely due to modular writing. Even more time would be saved if series descriptions could be stored for recall in manuscript form. The STSC Correlation Unit is working on this.

Recommendations to Charge 1B

(1) Continued emphasis be given to the preparation and editing of soil survey materials adaptable to modular writing.

(2) Develop a series description format that is adaptable to both the standard and manuscript description format.

Charge 1C - Interpretation Data Recall (SCS SOILS-5)

To the nearest 100, the following figures reflect the status of forms-5 in the computer storage for the southern states as of January 1974:

No. of series 1800
Series in storage 700 (39%)

This storage figure compares favorably with the national average. One problem in storing is the rigid syntax program that causes additional review time for minor errors in entry. A program is needed to allow machine corrections on items of this nature.

As of January, 1974, data interpretation recall has provided interpretation tables for use in manuscript preparation of the following survey areas:

Lee County, Arkansas
Monroe County, Arkansas
Clay County, Mississippi
Jasper County, Mississippi

Presently interpretation data recall is in two forms:

(1) Single sheet (SCS SOILS-5) which is designed to accompany the standard series description and includes all phases of the series.

(2) Tabular form, providing interpretations by map units within a survey area.

The tabular form (item 2, above) for map unit interpretations is ordered from computer storage by using an SCS SOILS-~, developed in Washington an presently undergoing tests. Attachment number 3 illustrates the nature of printouts obtained. For series interpretations in storage, the program is considered operational although improvements are needed. For example, symbol Tl under the Leeper series in Attachment 3 is for the Tuscumbia-Leeper association and should have appeared as TL. The machine must be programmed to print upper case under these conditions. The symbol Le under the Leeper series is correct because it is for the Leeper series in a single-taxa unit.

Many users of the soil survey see need for a third form which would print interpretations for individual map units in single sheet format. All interpretations could then be presented, in simple form, for a specific map unit. Individual sheets would be for interim use during the survey. These sheets could easily be updated without requiring tabular printouts of all map units in the area. They could also be used for the preparation of interim reports, as discussed in Charge 1D.

Recommendations to Charge 1C

(1) Development of a program for recall of interpretation data for a specific map unit in single sheet format.

(2) Develop a program that will allow the Ames computer to correct minor syntax errors.

Charge 1D - Table Preparation for Interim and Special Reports

Through the use of SCS SOILS-~, all tables for interim and special reports can be computer printed. With refinements, these can be provided in camera-ready form, which would lessen printing costs considerably. Following are some examples of refinements needed:

(1) Presently, information concerning miscellaneous land types cannot be stored on a one-time basis for use in a specific soil survey. Consequently these map units are omitted from table printouts and must be entered by hand.

(2) There is lack of uniformity among states in land use entries. For example, some states fail to enter information for Potential Native Plant Communities; other show only woody plants, etc. In survey areas involving series from more than one state, there is a lack of uniformity within tables.

(3) Potential yields are inconsistent among states. Unrealistic values appear when series are arrayed on yield potential for a survey involving series from more than one state. These must be hand corrected, resulting in lost time and less accurate values. A program is needed to compare and properly array yield potentials.

As mentioned in Charge 1C, many users of the soil survey are using single sheets of Form 5 printouts to compile the interpretive material for interim and special reports. Each sheet, however, contains interpretations for all phases of the series, whereas only one phase may occur in the area. Serious errors could occur if the wrong information is chosen from the Form 5. For such users, a single sheet printout by map units would be desirable.

Recommendations to Charge 1D

(1) Provisions be made at the Washington level for a one-time entry in the computer of information on miscellaneous land to facilitate camera-ready printouts.

(2) A program be initiated in the office of the Principal Correlator, STSC, to array yield values among southern soils.

(3) Single sheet printouts of interpretations as recommended in Charge 1C.

Charge 1E - ATS System and Progress of Work at Ames, Iowa

The south has worked with Ames only in the storage and retrieval of interpretation data and has no plans at present for an Administrative Terminal System (ATS) program at Ames.

In June, 1972, approval for a pilot study was granted the STSC for automating parts of the soil survey manuscripts of Drew County, Arkansas and Mayes County, Oklahoma. Facilities involved an ATS system with terminals in the Soil Correlation Unit, STSC, connected to an IBM 360, Model 50 computer located at the University of Texas in Dallas. The system had facilities for storing, retrieving, and text editing of soil survey material. Table 1 (Attachment 2) is a summary of an analysis of this project. Respectively, Mayes County and Drew County were 70 and 60 percent automated. A savings of 10 months State and TSC time in soil survey manuscript preparations was experienced (Activity IV, Table 1) in addition to savings of:

(1) Mayes County - $6412 State and $289 STSC.

(2) Drew County - $5863 State and $289 STSC.

The analysis further indicated:

(1) Interim reports can be furnished within 1 month after the final correlation of a survey area.

(2) One terminal operator can store data and prepare automated sections for about 35 manuscripts per year.

(3) Major reduction in time below the level of' State office for manuscript preparation.

(4) Improvement in quality of manuscripts.

The pilot project was favorably received and the STSC has requested permanent installation of 2 terminals. Instead of ATS, however, these would involve a Time Sharing Option (TSO) system or a similar system determined to be less costly. Capabilities are similar to those of ATS in that the system will perform text and table storage, recall, and editing functions. Terminal connections would be to an IHM 360, Model 65 computer at the New Orleans Computer Center if TSO is used.

Recommendations to Charge 1E

(1) Study means to fully utilize all capabilities of the TSO or similar systems, if installed.

Charge 1F - MIADS (Map Information and Display System)

This is a system whereby interpretive maps are generated from a detailed soil survey by computer translation of the dominant soil in unit cells. The result is printed on unlined paper for graphic display. The size of unit cells is determined by the degree of detail needed for anticipated uses of the survey.

In the south, information has been stored for more than 60 counties or areas, representing nearly 30 million acres. Over 600 interpretive maps have been generated. Studies of the results have been presented by Nichols and Bartelli in 1972 in the proceedings of the 27th annual meeting, Soil Conservation Society of America, and by Nichols at the 1974 American Society of Agronomy meetings at Las Vegas.

The committee recognizes a possible misuse of MIADS in that users might infer as much detail from MIADS as from detailed maps from which it was generated. This could be overcome by stating on the MIADS map the reliability of the information at the scale published.

Where detailed soil surveys are available, uniform procedures are applied in MIADS. This committee is informed, however, that River Basin and Watershed personnel are interested in MIADS for general planning. In some instances detailed maps are not available. A study is needed to determine if a sampling system can be devised that will provide MIADS information for broad resource planning in unmapped areas.

Recommendations to Charge 1F

(1) Investigate the feasibility of sampling techniques for MIADS where detailed surveys are not available.

(2) Consideration be given to indicating a level of confidence on computer generated maps.

II SUMMARY

A. The southern States have applied computer technology in the following areas:

Computer Facility	Program
Washington	Pedon data file series classification file.
STSC (IBM 1130)	MIADS
AMES	Storage of interpretations data; updating interpretations; table printouts of interpretation data.
Univer. of Texas at Dallas (ATS)	Preparation of special reports; storage.of pre-written material for modular writing.

B. The committee believes that use of the above facilities, including TSO with the New Orleans Computer Center or a comparable system, will allow expansion into the following areas:

1. Manuscript preparation of text for published soil surveys (TSO).
2. Camera-ready tables for manuscript preparation (Ames).
3. Soil Survey handbook preparation for survey areas, updated periodically (TSO).
4. Preparation of final correlation documents (TSO or STSC?).
5. Storage, retrieval, and updating of series descriptions (TSO).
6. Soil survey research, particularly on the morphology and behavior of soils (Ames and Pedon Data file, Washington).
7. Provide data at a moment's notice for technical guides and special reports during the course of a survey (TSO and Ames).

III. It is recommended that the committee be continued. An updated summary of computer activities could be a part of the study but the committee suggests that the primary function should be a study of new applications of computer technology to soil survey operations. Item IIB, above, could be a starting point.

COMMITTEE MEMBERSHIP: Chairman: James A. DeMent
Vice-Chairman: E. Moye Rutledge
Members: F. G. Calhoun, Carl A. McGrew
B. J. Miller, Charles M. Thompson.

UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
College of Agriculture and Home Economics
Agricultural Experiment Station
February 12. 1974

Department of Agronomy
575-2355

Fayetteville, Arkansas

FEB 15 1974

COMMITTEE III
ATTACHMENT
No. 1

Dr. James A. DeMent
Chairman, Committee III, 1974 SRSSW/PCont.
USDA, SCS
P.O. Box 11222
Fort Worth. TX 76110

Dear Jim:

I am enclosing our comments (Calhoun, Miller, and Rutledge) on "Pedon Coding System for the National Cooperative Soil Survey", USDA, SCS, March 1973. As I stated, our approach was to test the system by incoding various data and observations. I was unsure of the correct form for writing up our comments so I wrote them up as if they were to be transmitted to the author for consideration in revising the system.

We have discussed the matter of which data is to be stored and agree that all valid data should be stored. (This matter is not related to the completeness of the data-descriptions or laboratory data). As you know I have been concerned that data may be rejected because it is not considered representative of the taxonomic unit for which it was sampled to represent. 1 think we should talk this over at Mobile before we make a statement on the matter.

I am looking forward to our meeting at Mobile.

Best regards.

Moye

E. Moye Rutledge
Associate Professor

EMR/tt

Enclosure

cc: F. G. Calhoun
R. J. Miller

USDA SCS FORT WORTH, TEX. 1974

(CONT'D)

ATTACHMENT # 1
(CONT'D)

Comments on "Pedon Coding System for the National Cooperative Soil Survey", USDA, SCS, March 1973.

1. **General:** The system seems to be essentially complete and in generally good shape. The following comments are offered for consideration.

2. p. 18 & 19. Items 2-6. Do we need both PIPS codes and soil survey sample numbers (SSN)? W. M. Johnson's memorandum of January 4, 1974 directs converting from SSSN to FIPS. Therefore, it appears ve may no longer need two separate items.

3. p. 23. Item 26. Slope. Should length of slope be included? Perhaps should consider reporting slope to 1/10%. The problem is with slopes between 0 and 1%. The only present choices are 0 and 1 which are quite different.
   Shouldn't "none" be added as a type of microrelief? Also, perhaps "Karst" should also be added. Should there be or is there some place in the system to indicate that the pedon had been land leveled or smoothed?

4. p. 29 & 30. Item 15C. Parent Material or Underlying Material. Origin or Source of Accumulation or Deposits. Consider adding cherty calcite and cherty dolomite rather than just cherty limestone. Perhaps also a provision for high carbon shales and underclays.

5. p. 31. Item 19. Water Table. Is there a place for long term water table observations?

6. p. 33. Item 22. Permeability class. Estimates of measurements and measured values should be clearly marked here as with other items throughout the system. Perhaps change this heading to "permeability class, estimated".

7. p. 37. Item 31. Soil Laboratory Methods. Should consider "Other" or perhaps "other, contact source laboratory" under all procedures. It is assumed that the moisture statements in this section refer to the moisture state of the sample at the time of analysis. There should be some place to report the moisture basis on which the data were calculated or expressed (oven dry, air dry, other). It is also possible that different analysis for the same pedon may be reported on differing moisture bases.

8. p. 45 6 46. Items 54 & 56. Horizon Number and Horizon Limits (and related items Nos. 105, 153, and 204). It appears we are getting locked in on a one to one correspondence between the number of horizons and the number of samples. Often horizons are subsampled. For example consider a B3t which is described between, 48 and 72 inches, but is ampled 48-56", 56-64", and 64-72". This evidently could be handled as a B31t, B32t, and

(CONT'D)

ATTACH #1
(CONT'D)

B33t and the description repeated three times. but it seems there should be a better way. The reverse problem occurs with highway samples which often include more than one horizon. To use the upper horizon as the reference horizon in this case is less than satisfactory. More flexability is needed in this matter.

9. p. 45, Item 55. Horizon Designation. It does not appear the field is designed to accept Apl, Ap2 or Bxl, Bx2 etc. Where the lower case letter follows the capitol letter no field remains for an abric number. It is possible "Bx" could be entered Into the capitol letter field, but this would to present retrival problems.

10. p. 47, Item 57. Soil Colors. Does the sum of the matrix colors always equal 100% or does the sum of the mottle plus matrix colors equal 100%?
When chroma goes to zero there is no hue (N). How is this entered. Perhaps entering zero chroma will take care of this?
Is It necessary to code the hue? Could not the hues be entered directly?

11. p. 57, Item 61. Lamellae, Bands, or Pockets. If "eluvial tonguing" is not thick enough to qualify for "tonguing" should it be entered here?

12. p. 64, Item 66. Soil Pores. It seems this needs a more specific statement to indicate that all the smaller pores can not (normally) be observed under field conditions. Perhaps state that pores larger than a certain size are being considered. Also it seems that total porosity, code "TP" under "kind", is a laboratory measurement and should not be included in this section.

13. p. 65. Item 67. Cutans. The system seems to be unduly cumbersome for entering both moist and dry colors. This was especially encountered with Cutans, skeletans. Some workers feel that the difference between moist and dry skeletan colors gives an indication of thickness. In order to enter the color in the second moisture state it appears that kind, abundance, distinctness, location, and structure unit would all have to be repeated.
One description was encountered which gave the color of a coating (cutan) on Fe-Mn concretions. This apparently can not be entered.
The statement under "structure unit" (67c) needs to be clarified.

14. p. 67 6 68. Item 68. Nodules. Although the color of concretions are often given in descriptions, no provision is made for this entry.

(CONT'D)

ATTACH. #1 (CONT'D)

15. p. 70. Item 69. Coarse Fragments. Sandstone and shale are listed as possible kinds of coarse fragments, but siltstones are omitted. Siltstones are listed under "parent material or underlying material". Suggest siltstone be included here.
    Although it is counter to standard procedure, there may be cases where one would like to indicate that the observation was made and no coarse fragments were present. If "00" were entered under abundance what would be the output?'

16. p. 81. Item 108. Miscellaneous Particle Size. Considering the other fractions listed (2-.2μ, <.2μ, and <.08μ) should not the .2-.08μ fraction be listed?

17. p. 82. Item 109. Quantitative Determination of Coarse Fragments. Item 109a, "Kind (Size)" is confusing. It seems to mix size and reporting basis.

18. p. 97. Item 156a. Mineralogical Data, Fraction. Suggest additional silt fractions as follow: medium, .02-.005; fine, .005-.002; and medium and fine, .02-.002. This would be consistent with the present handling of the clay fractions. Many mineralogists use the 5μ break. Also there should be freedom to add specific other fractions. Pedologists sometimes use the size fractions of geologists and these data would be of value.

19. p. 98. Item 156b. Mineralogical Data, Method. More flexability is needed. Perhaps add "unspecified". Also "Total Analysis" needs explaining. I assume it means wet chemistry and not x-ray flouresence.. If so, x-ray flouresence should be added to the methods code.

20. p. 100-103. No. 156c. Mineralogical Data, Kind of Material. Should Codes IN1, IN2, and IN4 use the term "montmorillonite" or "smectite"?
    Pyrolusite (Code MG1) is composed of MnO_2 and therefore should not be listed under "Magnesium Oxide Class".
    Suggest adding codes for elements, especially Ca, K, and Zr.

Frank. G. Calhoun
Bob J. Miller
E. Moye Rutledge

February 1974

End of attach #1

Committee III

ATTACHMENT # 2

Table 1. Time and Cost Analysis

Activity	Average for recent 3 counties (2 from Oklahoma; 1 from Arkansas)		Cost for Mayes County, Oklahoma (70% automated)			Cost for Drew County, Arkansas (60% automated)		
	Professional (hrs) (7.63/hr)	Clerk (hrs) (3.15/hr)	Professional (7.63/hr)	Clerk (3.15/hr)	Computer (11.50/hr)	Professional (7.63/hr)	Clerk (3.15/hr)	Computer (11.50/hr)
I. Non-automated sections (nonrecurring) (General soil map, etc.) (30%)	400	170	400	170		500	170	
II. Automated sections								
1. Interpretations								
a. 'abler and accompaning text	520	350	-	-				
b. Computer Input - tables	r-	-	-		9	-		8
text			8		8	8		8
2. Modular writing			8		8	(not used)		not used)
3. Adjustments (fitting AOP material to county			24		52	24		37
4. Reviews - state office	350	110	50		8	50		8
5. computer printout					I			1
6. Total hrs per activity	1270	630	490	170	78	582	217	62
7. Cost per activity	$9,690	$1,985	$3,739	5535	$989	54,417	$683	$712
. . Total Cost	$11,675		5,263			$5.812		
8. Savings from computer use			$6,412			$5,863		

III. RTSC Review Time	Professional (10.21/hr)	Clerk (3.15/hr)	Professional (10.21/hr)	Clerk (3.15/hr)	Professional (7.63/hr)	Clerk (3.15/hr)
1. Technical Review	32	.1	10		10	
2. Technical Edit	12	1	6		6	
3. Total hrs per activity	' 4 4	2	16	1	16	1
4. Total Cost per activity	5449	$6	$163	$3	$163	.$3
a. Total Cost	$455		$166		$166	
5. Savings fmm computer use			$289		$289	
IV. Time span from final correlation to release In Washington	12 months		2 months		2 months	

Committee II ATTACHMENT #3

ATTACHMENT NO. 3

Clay County, Mississippi

SANITARY FACILITIES

Soil and map symbols	Septic tank absorption fields	Sewage lagoons	Sanitary landfill (trench)	Sanitary landfill (area)	Daily cover for landfill
Belden: Be	Severe Floods Wet	Severe Floods Wet	Severe Floods Wet	Severe Floods Wet	Fair Too clayey
Bigbee: Bg	Severe Floods	Severe Floods Seepage	Severe Seepage Floods	Severe Seepage Floods	Fair Too sandy
Binnsville: BnB	Severe Depth to rock Percs slowly	Severe Depth to rock	Severe Depth to rock Too clayey	Severe Depth to rock	Poor Too clayey Depth to rock
Brooksville: BrA	Severe Percs slowly Wet	Slight	Severe Too clayey Wet	Severe Wet	Poor Too clayey Wet
BrB	Severe Percs slowly Wet	Moderate Slope	Severe Too clayey Wet	Severe Wet	Poor Too clayey Wet
Cahaba: CaA	Slight	Severe Seepage	Severe Seepage Floods	Severe Seepage Floods	Good
Chalk: CoD	Severe Depth to rock	Severe Depth to rock	Severe Depth to rock	Moderate Slope	Poor Thin layer
Griffith: Gr	Severe Floods Percs slowly Wet	Slight	Severe Floods Too clayey Wet	Severe Floods Wet	Poor Too clayey Wet
Kipling: KpA	Severe Percs slowly	Slight	Severe Too clayey	Moderate Wet	Poor Too clayey
KpB2, KpC2	Severe Percs slowly	Moderate Slope	Severe Too clayey	Moderate Wet	Poor Too clayey
Leeper: Le, Tl	Severe Percs slowly Wet Floods	Slight	Severe Too clayey Floods Wet	Severe Floods Wet	Poor Too clayey Wet
Longview: LoA	Severe Percs slowly Wet	Slight	Severe Wet	Moderate Wet	Good
LoB	Severe Percs slowly Wet	Moderate Slope	Severe Wet	Moderate Wet	Good

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
OF THE COOPERATIVE SOIL SURVEY

Mobile, Alabama

March 11-15, 1974

Committee IV - Soil Wetness

R. B. Daniels, Chairman
B. J. Birdwell, Vice Chairman

Charges:

1. Recommend definitions of soil wetness and relate to taxonomic groups of soils (soil moisture regimes as used in Taxonomy).

2. Coordinate wetness classes in engineering guide tables with mapping intensity and taxonomic unit.

COMMITTEE REPORT

For charge 1, the committee will confine itself to the saturated moisture regime of soils and definitions of wetness classes. The aquic moisture regime as now defined probably needs some minor changes to help remove some of the ambiguous points. The aquic moisture regime "implies a reducing regime that is virtually free of dissolved oxygen because the soil is saturated by [ground] water [or by water of the capillary fringe]". Brackets are added for emphasis only. The term ground water may cause some difficulty because many hydrologists would not consider the zone of saturation in some soils as ground water.

The soil moisture in the capillary fringe is under very low tension and there probably is no sharp break between the oxidation reduction state of the water and soil in the capillary fringe and in the zone of saturation, below the water table. However, a major problem is measuring how high the capillary fringe may rise in a given soil. The water table can be measured easily and with reasonable reproducibility by using a variety of simple tools. The capillary fringe may extend from possibly 10 cm to a meter or more above the water table. Its thickness depends upon whether the soil is wetting or drying and it cannot be measured easily in the field. Therefore, it seems unreasonable to include the capillary fringe as part of the definition of a saturated zone even though it is a factor in soil development. This is also at variance with accepted definitions of saturated zones as used by hydrologists and ground water geologists who consider the point of zero water tension as the saturated zone. Any depth limitations placed on the zone of saturation should refer to the water table, the point of zero tension, not to the top of the capillary fringe.

The Aquic moisture regime as now defined implies that a saturated zone of unknown thickness underlies the water table, and that the water is relatively free to fluctuate through this zone. There are conditions where the zone of free water saturation is confined to the upper 1 or 1 1/4 meters and the underlying layers are not saturated. Calhoun, Foley and Grenada soils in Louisiana are examples of soils that are saturated in the upper but not in the lower solum. This condition is believed to be fairly common in the sloping areas of the Coastal Plains and Mountains (Nutter, 1973) although the soils involved probably are Udic rather than Aquic.

Many soils in Louisiana occur on landscapes and under rainfall patterns that would suggest they have high water tables. The morphology of these soils, Crowley, Beautmont, Sharkey, for example, also indicates an aquic moisture regime. But, these soils can have water standing on them or go through prolonged periods (1 to 2 months) of high rainfall and low evapotransporation without becoming saturated by free water. The A or Ap horizon may become somewhat liquid but the underlying B horizons will absorb water, and water will not stand in a bore hole if the upper horizon is sealed. By following Taxonomy, these soils will not qualify as aquic because water will not stand in a bore hole. Yet, other features such as the topography, rainfall, and soil morphology are such that placement in the Aquic moisture regime is appropriate.

Saturation by free water only in the upper meter or the upper few centimeters should be reflected in the engineering and other uses of these soils. But, there is now no mechanism for separating these soils from those where the saturated zone is continuous for several meters and the water table is free to fluctuate. The proposed subdivisions of the aquic moisture regime should alleviate this problem.

Eight wetness classes based on water table levels and duration are proposed primarily for interpretations dealing with tillage trafficability and other engineering uses of soils. The wetness classes are closely related to use of soils for plant growth but soil oxygen is considered to be more of a factor than wetness per se. Three of the classes cannot be adequately defined because data are conflicting. The following table illustrates how soils in these wetness classes under non-managed conditions would be rated for engineering uses according to the current guide.

Wetness Class	Soil	Septic Tank	Sewage Lagoons	Shallow Excavations	Dwellings	Sanitary Landfill
Continuously wet	Barbary	Severe	Severe	Severe	Severe	Severe
Extremely wet	Dare	Severe	Severe	Severe	Severe	Severe
Very wet	Portsmouth	Severe	Severe	Severe	Severe	Severe
Wet - Liberaquic	Rains	Severe	Severe	Severe	Severe	Severe
Epiaquic	Calhoun	Severe	Slight	Severe	Severe	Severe
Moderately wet - Liberaquic	Lynchburg					
Epiaquic	Calloway	Severe	Severe	Severe	Severe	Severe
Slightly wet	Goldsboro	Severe	Severe	Severe	Moderate	Severe
Moist	Norfolk	Slight	N.D.	N.D.	N.D.	N.D.
Slightly moist	Orangeburg					

Most of the wet, soils under non-managed conditions are rated severe for the selected uses. Yet, changes in land use are the rule and soils probably should be rated according to their potential uses with water management as well as under non-managed conditions.

RECOMMENDATIONS

1. The definition of the aquic moisture regime be modified to read as follows:

   "The aquic moisture regime implies a reducing regime at the surface and one or more subjacent horizons that can be produced by water saturation from the capillary fringe, from water under zero tension, or by limited exchange of oxygen. Water may or may not stand in an unlined bore hole. A soil may be water saturated and still be oxidized, but the reducing regime dominates the genetic processes."

   The above definition retains the sense of the original but it eliminates the difficulty caused by the term ground water, and it recognizes that soils may be saturated without having free water stand in a bore hole.

2. The aquic moisture regime should be subdivided into three parts to accomodate the differences in saturated regimes. These subdivisions are:

   2.1 Peneaquic (pene meaning almost). Saturation is confined to the upper 30 cm, or water will not flow into a bore hole below 30 cm unless a loamy aquifer is intersected.

   2.2 Epiaquic (epi meaning upper). Saturation is confined to the upper 1.25 m of the soil by a restricting layer. The water table is free to fluctuate above 1.25 m. The horizons below 1.25 m are not saturated, or water will not run into a bore hole from this depth. A water table may be encountered below 2 m. The unsaturated zone separates the upper saturated horizons from any underlying water table.

   2.3 Liberaquic (liber means free). Saturation is possible throughout the soil. The water table is free to fluctuate through several meters. Temporary perching by fragipan or plinthite horizons may occur, but the zones of saturation eventually join.

3. The following wetness classes are proposed largely for engineering interpretations, not for plant response groupings.

3.1 Continuously wet. Soils receive moisture from other sources in addition to direct precipitation on the land surface, i.e., runoff, river or sound levels, or periodic tidal flooding control the water levels. Water stands above the surface or the soil is saturated within 25 cm of the surface for more than 10 months a year[1]. Water table fluctuations below the surface are slight when compared to other classes. Major reclamation projects are needed to adequately drain the continuously wet areas for use because many occur at or very near sea level. This class includes some undrained Histosols, all Hydraquents and possibly some soils with Umbric epipedons.

3.2 Extremely wet. Water stands above the mineral surface for approximately 10 months a year (Gallup, 1955). Precipitation that falls on the land surface is the dominant source of water, very little water is added from other sources. A combination of very slowly permeable mineral soils or sediments, flat topography, long distance to drainage heads, and high rainfall, allow water to accumulate. This class includes many Histosols that occur on interstream divides and Pocosins, and some soils with Umbric Epipedons.

3.3 Very wet. Saturated within 50 cm of the surface for 6 to 10 months a year. The water table fluctuates through a greater range than in soils in the continuously wet or extremely wet classes. Simple to complex drainage practices are needed for most crops. Includes most soils with Umbric Epipedons and the wet end of the sandy Spodsols, and some typic subgroups of Aquults, Aquepts, Aquents, Aquods, etc.

3.4 Wet. Not defined - corresponds to old grouping of poorly drained soils.

3.5 Moderately wet. Not defined - corresponds to old grouping of somewhat poorly-drained soils.

3.6 Slightly wet. Not defined - corresponds to old grouping of moderately well-drained soils.

3.7 Moist. Not saturated in the upper meter. May be saturated between 1 and 2 meters for only short periods or for several months. Soils are Typic subgroups of Udic moisture regimes.

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1. A tidal salt marsh along the Atlantic Coast may be flooded twice a day and water table fluctuations are nil in all areas but those next to a tidal creek (Gardner, 1973). However, some fluctuation will occur in areas that are fed by runoff or underground seepage.

3.8 Slightly Moist. Never saturated within the upper 2 meters. Soils are Typic subgroups.

4. Soil interpretations for engineering uses be provided for wet soils in a natural or nonmanaged and in a managed environment.

The following table shows the rating of some soils in selected wetness classes for two uses in the nonmanaged and managed conditions when water management includes water table control:

USE - Septic Tanks H_2O Table Control

	SOILS									
	Pantego		Portsmouth		Rains		Calhoun 1/		Goldsboro	
	Natural	Managed	Natural	Managed	Natural	Managed	Natural	Managed	Natural	Managed
>183 cm	Severe	Slight	Severe	Slight	Severe	Slight	Severe	Slight	Severe	Slight
122-183 cm		Moderate		Moderate		Moderate		Severe		Moderate
<122 cm		Severe		Severe		Severe		Severe		Severe

USE - Dwellings (without basements) H_2O Table Control

	SOILS									
	Pantego		Portsmouth		Rains		Calhoun 2/		Goldsboro	
	Natural	Managed	Natural	Managed	Natural	Managed	Natural	Managed	Natural	Managed
>76 cm	Severe	Slight	Severe	Slight	Severe	Slight	Severe	Slight	Moderate	Slight
>50 cm		Moderate		Moderate		Moderate		Moderate		N/A
>50 cm		Severe		Severe		Severe		Severe		N/A

1/ Slow permeability is the determining factor.

2/ Surface drainage essential. H_2O table very difficult to lower below about 20".

Recommendations for Additional Work

Criteria other than depth and duration of water tables probably are needed to subdivide soils in the wet, moderately wet, and slightly wet classes. We suggest that this committee try to establish the range of water table fluctuation in these classes and to propose subdivisions based upon fluctuation. Considerable water table data are available to help establish the ranges.

The members of the committee recognize that water table data cannot be obtained for all soils, but some estimate is needed. We recommend that the committee test the validity of placing soils in the wet, moderately wet, and slightly wet group by using only the high and the low stand of the water table, or in the Peneaquic soils the duration of saturation, from available data. Dr. Fanning has suggested this as a possible means of extending our detailed data into unknown areas. It has the advantage of being easily and quickly obtained during normal survey operations, and the idea should be tested. Wetness classes based on criteria useful for plant response should be developed.

Committee Members

L. E. Aull	W.M. Koos	D. F. Slusher
E. R. Blakley	J. H. Newton	K. H. Tan
R. E. Caldwell	J. R. Moore	

Literature Cited

Gallup, L. E. 1955. Some interrelationships of drainage, water table, and soil on the Hoffman Forest in Eastern N. C. Unpublished Masters Thesis, North Carolina State University.

Gardner, L. R. 1973. The effect of hydrologic factors on the Pore water chemistry of intertidal marsh sediments. Southeastern Geology. 15:17-28.

Nutter, W. L. 1973. The role of soil water in the hydrologic behavior of upland basins. In Field Soil Water Regime, R. R. Bruce, Editor, SSSA Special Publication Series No. 5, Chapter 10:181-193.

SOUTHERN REGIONAL TECHNICAL SOIL SURVEY WORK-PLANNING CONFERENCE

Mobile, Alabama, March 12-15, 1974

Chairman, Warren L. Cockerham, Vice-Chairman, Victor W. Carlisle

Committee V - Histosols and Hydraquents

Charge to Committee:

Review the report of the National Task Force on Organic Soils and make recommendations which apply to the Southern Region. The following problems should be covered.

A. Suitability grouping of Histosols and Hydraquents

B. Interpretive guides for use and management

C. Classification

COMMITTEE REPORT

A. Suitability grouping of Histosols and Hydraquentsr

The committee reviewed the National Task Force on Organic Soils' report on suitability grouping of Histosols. The proposed system designed for Histosols will require major revision if it is to accommodate Hydraquents. The committee suggests that the land capability classification as outlined in Soils Memorandum SCS-22 be used for developing interpretations for Hydraquents. Consequently, Hydraquents should be dropped from committee charge.

The committee members all felt that some modification of the suitability grouping system for Histosols is needed.

<u>Introduction:</u> (Explanation of system and assumptions). An introduction to the suitability group system that clearly describes the system and explains how it is used is needed. The introduction should explain clearly what the suitability system is designed to reflect. It should make clear distinctions between soil potential, soil suitability and soil limitation. The relationships of suitability groups, development difficulty, and guide sheets by crops should be explained.

Each section in the Task Force's report including the following should be explained:

1. Organic soil suitability groupings for agriculture
2. Organic soil subgroups
3. Development difficulty rating

4. Guide sheets for crop suitability ratings
5. Penalty factors used in determining suitability groups and development difficulty ratings

Factors that affect productivity, adapted crops, management difficulty, productive life span of organic materials, and productivity of the underlying material after the organic materials have subsided are criteria for the suitability group classes. Some of the factors or limitations such as pergellic soil temperature cannot be controlled while others such as water control can beaccomplished in some areas. Additional work is needed to overcome the difficulties encountered in devising a single rating system based on such diverse factors that affect soil use.

As a supplement to single suitability group rating, consideration should be given to developing separate ratings for major elements to be considered by agricultural land use decision makers. For example, individual ratings could be developed for the following elements:

1. Productivity
2. Management difficulty
3. Productive life span
4. Productivity of material under the organic material
5. Development cost

Penalty factors could be developed for each of the above elements. (Some penalty factors would apply to more than one group). Each element could be evaluated and appropriate penalty points assigned. The sum of the penalty factors for the four elements would then determine the suitability group. The developer would then need to consider each element individually before arriving at a land use decision.

The following examples illustrate how the above system would work. As indicated below, undrained and reclaimed soils should be rated separately,

Soil	Penalty Points and Limiting Factors After Reclamation				Development Difficulty	Suitability Group
	Productivity	Mgt. Diffi- culty	Life Span of Organic Material (if drained)	Product. of Underlying Materials		
Kenner	0	0	0	0	NA	1
Allemands	0	0	40 OM <36"	lo-clayey	NA	4
Pahckee	0	0	20 OM 36-52"	40-rock'	NA	5

Soil	Penalty Points and Limiting Factors Before Reclamation: Productivity	Mgt. Difficulty	Life Span of organic Material (if drained	Product. of Underlying Materials	Development Difficulty	Suitability Group
Kenner	1/ 55 water control	0	0	0	65 extreme flooding	4
Allemands	1/1/5 55 water control	0	40 OM <36"	lo-clayey	65 extreme flooding 10 clayey subsoil	7
Pahokee	1/ 55 water control	0	20 OM 36-52"	40-rock	35 freq. flooding 50 rock	7

1/ Overcome by reclamation.

The assumptions as listed appear to apply to both "Suitability Grouping for Agriculture" and 'Development Difficulty" ratings. Some of those listed actually apply to both but some apply only to suitability for agriculture.

The committee feels that separate assumptions should be developed for "Suitability Groupings" and 'Development Difficulty" ratings.

Penaltv Factors.. One committee member objects to penalty factor system that can result in negative values. For example, a soil with a 120 penalty point has a numerical rating of -20. This could be eliminated by assigning weights to suitability factor.

Soils that are subject to flooding by tidal storms key to groups 4, 5, b or 7. All of these soils are poorly suited to most agriculture uses in their present state. They all require extensive reclamation (sea walls and/or diking and pumping) that is generally beyond the means of private capital. Also they will subside to below sea level after drainage. The magnitude of problems of reclamation, lack of agricultural potential in the unclaimed state and their common coastal environment suggest that all of these soils should be in the same suitability group.

Adding a penalty factor of 95 for flooding by storm tides would place all unprotected coastal Histosols in group 7.

Soil acidity and aluminum toxicity is a serious problem in the management of some organic soils. Also the potential for acidity and aluminum toxicity must be given consideration when planning reclamation. The rooting depths of cultivated crops is limited to the depths that sufficient Lime is incorporated into the soil.

Acidity and aluminum toxicity should be added to the suitability penalty factors.

The committee concluded that all of the penalty factors and their relative weights do not apply uniformly across very broad geographic areas. Therefore, penalty factors should be adjusted to local land resource regions.

Suitability Group Definitions. The seven suitability groups as now defined needs some refinements. For example, some highly productive soils key to groups 3, 4, or 5. Also, some of these have few limitations that restrict the present production of crops or the range of suitable crops. An example is the Pahokee series, a Lithic Medisaprist which keys to group 5. In Florida this is a highly productive soil with few limitations that affect present crop production or management. The limitations (penalty factors), thickness of organic material and nature of the underlying material affect the "productive life" (36 to 50 years) of the soil. In view of this, the statement, "Large scale reclamation is not feasible.", should be dropped from the definition of Group 5. Adding "...very severe limitations restrict the productive life of the soil" to the group definition would accommodate these soils.

A majority of the committee members feel that the number of suitability groups should be reduced from 7 to about 4 or 5.

Development Difficulty. Some additional work is needed on the 'Physical Features Used to Determine Development Difficulty Rating". Development difficulty factors should be developed for tidal storm flooding. Soils in a coastal environment that require protection from storm sea tides are generally much more difficult to develop than soils at higher elevations that require water control or protection from runoff. After coastal soils are protected from storm tides, they also must have protection from "excess water and flooding."

The feature "Underlying Materials", presumably intended for soils that are to be tile drained, does not apply well to soils that will be drained by an open ditch system. In Louisiana, the most important feature of the underlying material is its ability to support the weight of the levee and its suitability for levee material. The problems involved in building a dike on semifluid clay using semifluid clay as a construction material are tremendous. This should be reflected in the development difficulty rating.

RECOMMENDATIONS

1. Use land capability system as outlined in Soils Memorandum SCS-22 for developing interpretations for Hydraquents.

2. Add an introduction to the Task Force report that explains the suitability system including specific objectives.

3. Revise statements on assumptions as follows:

   (1) Suitability ratings for drained conditions assumes continued subsidence rates of 3/4 inch to 2 inches annually; hence for continuous use the thicker organic materials are the most suitable if the underlying material is unsuitable for agriculture. The system reflects the suitability of the organic materials and the suitability of the underlying materials that are within 51 inches of the surface.

   (2) The organic suitability grouping is an interpretive classification designed to assess the limitation of individual organic soils for production of crops. Factors that affect productivity of the organic materials, productivity of the underlying material, adapted crops, management difficulty and productive life span of the organic materials are used in determining the suitability groups. Development difficulty ratings arc used to access the degree of difficulty of reclaiming undeveloped soils.

   (3) No change.

   (4) The soils within a suitability class are similar with respect to the degree of soil limitation but not necessarily similar with respect to the kind of limitation. The soil suitability subgroup provides information on the kind of limitation or hazard and the group indicates the intensity of the limitation. Organic soils in suitability group 1 have the least severe soil limitation and group 7 have the most severe.

   (5) No change.

   (6) No change.

   (7) No change.

4. The suitability group definitions should be modified in the following manner:*

*No modifications are proposed for groups 1 and 6.

Group 2 (70-80) -- Organic soils in group 2 have few limitations which restricts their use in a minor way. The limitations may be soil temperature, coarse fragments, wood layers, salinity, slope, etc.

Group 3 (55-65) -- Organic soils in this group have moderately severe limitations that restrict the production of crops or that require special management practices or moderately severe limitations that limit the productive life of the organic soil.

Group 4 (40-50) -- Organic soils in this group have limitations which severely restrict the production of crops or that require special development and management practices or severe limitations that limit the productive life of the soil.

Group 5 (25-35) -- Organic soils of this group have severe limitations that severely restrict the production of perennial forage and other adapted crops or very severe limitations that limit the productive life of the soil.

Group 7 (less than 10) -- Organic soils of this group have no potential for agriculture or are subject to flooding by storm tides and require massive diking or other large scale engineering installations.

5. Add the following penalty factors to the physical features used to determine suitability groupings:

Factor	Penalty Factor
TIDAL STORM FLOOD CONTROL	
Adequate	0
Marginal	45
None	90
ACIDITY/ALUMINUM TOXICITY (potential if undrained)	
Low (< 2 tons lime/ac.)	0
Medium (2-5 tons lime/ac.)	10
High (> 5 tons lime/ac.)	20

6. Revise physical features that are used to determine development difficulty ratings as follows:

Vegetation Cover	Excess Ground Water and Flooding With Runoff
No change	Change in factor heading

Surface Roughness	Tidal Storm 1/ Flooding
No change	0-None 100-Extreme

7. The National Task Force on Organic Soils revise definition development difficulty groups.

B. Interpretive guides for use and management:

The interpretive guides for use and management need additional testing to determine their applicability to the soils in the southern region. The use of existing guides where applicable are preferable to the introduction of new guides.

Engineering Interpretations for Organic soils. We agree with the National Task Force recommendation that a single form (SCS-SOILS-5) be used for both organic soils and mineral soils. We also agree with the suggested modifications of form SCS-SOILS-5 under "Estimated Soil Properties."

Wildlife Interpretations. Further study is needed. Guidelines for making wildlife interpretations should be developed and tested.

Woodland Interpretations. Additional studies are needed to determine usefulness of the productivity classes and the use potential concepts in the southern region.

RECOMMENDATIONS

1. The committee recommends that the Rational Task Force on Organic soils continue its work on developing interpretive guides for use and management of organic soils.

2. The committee recommends that these guides be tested to determine their applicability to the soils in the southern region.

1/ Add.

C. Classification:

The recommendation for changes in the classification were reviewed by each member of the committee.

Proposal III 10 would be strengthened by defining hemic materials explicitly. As it is now defined, one must first determine what is sapric and what is fibric.

One committee member is opposed to changing the base of the control section in Histosols to 160 cm. He points out that if this change is initiated, current series concepts will have to be re-evaluated and most of the mapping will be outdated.

RECOMMENDATIONS

1. Define hemic materials as follows:

   A hemic material is one that has an unrubbed fiber content of more than 1/6 and less than 2/5 by volume and a pyrophosphate index of 4.

2. Adopt all changes in taxonomy recommended by the National Task Force on Organic Soils.

3. That committee be continued.

COMMITTEE MEMBERSHIP

Chairman: W. L. Cockerham, Vice Chairman: V. W. Carlisle

Members: H. J. Byrd
R. C. Carter
E. Gamble
C. S. Holzhey
R. Miller
M. E. Shaffer
R. D. Wells

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
Mobile, Alabama, March 12-15, 1974

COMMITTEE VI - SOIL MAPS AND SOIL SURVEYS

Chairman: C. A. Steers
Vice Chairman: C. L.-Godfrey

CHARGES

1. Recommend guides for base map selection.

2. Recommend guides for map scales relative to the intended use of the survey, pattern and complexity of soils and other factors.

3. Review the progress report of the National Task Force for Guidelines for Reconnaissance Soil Surveys and make recommendations for consideration by the Southern Region.

COMMITTEE REPORT

Base Map Selection

There has been numerous information suggested for use as base map of progressive soil surveys. The review draft of Soil Taxonomy has discussed aerial photos, aerial mosaics, photo maps, orthophoto maps, photo base maps, reference maps, and index maps as being used for soil base maps. Comments from committee members were confined to aerial photo, photo base maps from high altitude photography, aerial mosaics and orthophoto maps. Most new survey areas have common problems in selection of suitable base maps such as limited photographic coverage, low initial financing and immediate need of survey field sheets. In some counties such factors as extreme relief. short flying season due to vegetation and wide variations in intensity of use add to the problems in selecting good base maps.

Members reported a marked improvement in base maps within the last few years with the initiation of high altitude contracting for the specific purpose of soil survey base maps along with more detailed planning prior to initiation of the soil survey. Reports on orthophoto maps for soil survey base maps have been very good.

Guides for Map Scales

The selection of map scale is dependent on different factors or combinations of factors. The following factors have been rated as relevant to map scale by this committee: Intended use of survey,

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objective of survey, significant size of management unit, complexity and pattern of soils, potential uses of the survey, landscape and landforms, and geology. Scale cannot be determined by a study of any one factor but should be determined only after an analysis of all such factors. Evaluation of these factors is best made as a cooperative effort between potential user and cooperating agency. Consideration of map scale is not only important for field work and publication but has become of primary concern as users reproduce published maps. Enlargement limits are felt to be necessary to retain the accuracy and relevance of the original survey.

National Task Force Guidelines for Reconnaissance Soil Survey

The guidelines set forth by the national task force have helped greatly to clarify many of the terms and concepts in soil survey, especially those in reconnaissance soil survey. It was difficult for some members to completely accept the new names suggested for levels of survey. However, it was most evident that no criticisms were reported on objectives used to distinguish between different types of soil survey. The task force' recommendations for five orders seem reasonable after a complete analysis of the four objective attributes of survey, namely (1) Kinds of mapping units, (2) Kinds of taxonomic units, (3) Kinds and intensity of field procedures, (4) Map scale and minimum sizes of delineation. As several committeemen have brought out, minimum-sired delineations is not just a mechanical process of delineating the smallest sized soil areas due to map scale but also implies that all such areas have been delineated accurately and consistently. There seems to be misunderstanding among soil scientists and much inconsistency for handling minimum size delineations from field work to publication.

SUMMARY AND CONCLUSIONS

Base maps for soil survey were investigated with respect to aerial photography presently available for soil survey. Guidelines for the selection of proper map scales have been reviewed with respect to filling the projected survey needs. The National Task Guidelines for Reconnaissance Soil Survey have been analyzed with great interest and we heartily endorse the general concept outlined in their progress report.

Base map comments were mainly restricted to order 1, 2, and 3 order surveys. The committeemen reported that much improvement has been made with common use of photo base maps from high altitude photographs contracted for the purpose of soil survey.

It is also the general feeling that some freedom of choice be given for the selection of base maps and kind of base maps should not be rigidly controlled except for quality of publication. The committeemen feel a greater use of orthophoto prints with or without the superimposed topographic maps would increase quality of surveys. As the comments reveal soil survey is now getting good base maps in general and many of the recent complaints about sub-quality base maps are not justified.

Our recent soil surveys seem to be made at a significant scale and to serve their original objectives very well. However, with the great expanded need of high intensity surveys, whether it be irrigation or specialized crop production for agricultural use, urban sprawl, recreational planning, fertilizer and species selection for timber production, we have a great problem in providing maps at a scale to satisfy the need of users. It has become an accepted fact that one soil survey or one scale for maps will not provide all users with information needed in their planning procedures. Any soil survey till need to be supplemented and many will need to be reinvestigated to provide specific users with soil information. This brings into focus the financial aspect and the planning priority of each survey area. The committee feels map scale is a decision to be made at local and state level with the counsel of the cartographic units. This decision can be made by states with full knowledge of survey objectives, expected users, soil complexities and patterns, environmental factors, and financial restraints. This committee also has reservation as to unlimited scale for enlargements of published soil surveys.

The Progress Report of the National Task Force for Guidelines for Reconnaissance Soil Surveys should certainly be considered by the Southern States. It does much to clarify vague concepts that many people once had. However, minority reports stating, "I prefer to continue using the three types of surveys we are now using. These names give the average person a meaning for each kind of survey better than order 1, 2, etc."; and "It seems to me that the five orders of soil survey are defined too wide," do not reflect the thinking of some very good soil scientists. Committeemen feel the task force could improve their guidelines by giving specific examples of survey areas as being optimum for each order of soil survey. Also, relevant comments were made as to practical methods for handling two or more orders of soil surveys within one survey area. These comments deal primarily with scale of maps and how, when, and where the boundaries of two different survey orders are to be made within the survey area. These questions can be easily answered and should be referred back to the task force.

RECOMMENDATIONS

1. It is recommended as a part of the survey work plan, justification for base map selection be included as well as the decision making criteria for scale selection of soil survey area. Freedom

should be given those who select base map and proper scales for mapping, however, criteria for making these decisions should be known to those who assist in the soil survey program. Survey areas to be mapped using two or more survey orders would differentiate precisely which survey will be mapped in specific locations. The work plan should further define scale difference if required. Scale criteria should reflect management units for the predominant users and minimum size of soil delineations that can and will be shown accurately and consistently.

2. A much greater effort be given to acquire orthophoto maps for soil survey bases. These seem to be especially useful for extreme relief or areas of limited accessibility. Orthophoto maps seem to be of greatest value in orders 2 and 3 due to scale factors.

It is also recommended on a trial basis that color photography be acquired for a few counties along with the high altitude photography for base maps. This color photography would be used to supplement the base map photo information.

3. It is recommended the 1:20,000 and 15,840 scales be continued as optimum scales for our publication program. We also recommend field work and map compilation for publication be done at the same scale. It Seem logical that these scales be the prime scale for order 1 and order 2 survey.

4. Some soil maps are being enlarged to scales that match community planning scales. In places the enlargement is three or four times as large as the mapping scale. It is recommended that enlargements of soil survey maps more than two times the original be discouraged, in order to protect the intent of the original mapping.

5. The Southern States endorse the concept of the National Task Force Progress Report with the following suggestions:

a. Minimum size delineation discussed on page 5 of Task Force Progress Report be qualified by the statement, "Minimum size of soil area delineated cannot be smaller than the largest area of an inclusion for a contrasting soil."

b. Minimum sized delineation for long narrow areas be no smaller than 1/8 inch wide by 1 inch long.

c. Table 1 (attachment 1) be revised as follows for head of last column:

"Minimum size delineation due to cartographic limitation."

d. The orders of soil survey should continue to include as a part of the name, the descriptive terms detailed and reconnaissance.

Committee Members:
D. G. Aydelott
J. W. Frie
T. R. Gerald
F. L. Gilbert
C. L. Godfrey
W. L. Hatfield
R. E. Horton
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W. F. Miller
E. C. Nance
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C. A. Steers
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H. B. Vanderford

Attachment

TABLE 1

Attachment I

CRITERIA FOR IDENTIFYING KINDS OF SOIL SURVEYS

Order of Soil Survey1/	Kinds of Mapping Units	Kinds of Taxonomic Units	Intensity of Field Procedures for Quality Control	Appropriate Scales for Published Soil Maps	Minimum Size Delineation2/
1st	Consociations, or complexes	Phases of soil series	Soils in each delineation are identified by field examination.	1:7,920 to 1:31,680	1/2 acre to 10 acres
2nd	Narrowly defined associations	Phases of soil series	Soils are identified I" each delineation by a systematic procedure of traversing, or by transecting that provides a valid statistical sample.	1:20,000 to 1:63,560	5 acres to 40 acres
3rd	Consociations & associations	Broad phases of soil series and phases of soil families	Soils are identified in representative delineations by a systematic procedure of traversing or by transecting that provides a valid statistical sample. Projection made by traverse and field observations.	1:31,620 to 1:250,000	40 acres to 640 acres
4th	Broadly defined associations	Phases of soil families Phases of subgroups Phases of great groups	Representative delineations are transected and information projected by photo interpretation and verified by broadly spaced observations.	1:125,000 to 1:500,000	640 acres to 10,000 acres
5th	Very broadly defined associations	Phases of great groups, suborders or orders	1st or 2nd order soil surveys are made on selected areas (15 to 25 sq. mi.) to identify soils and establish soil patterns on natural landscapes. Projections are made with reliance on broad landscape interpretation and verification of soils at strategically located points.	1:500,000 to 1:1,000,000	10,000 acres

1/ Soil surveys of all Orders require maintainance of a soil handbook (legend, mapping unit descriptions, taxonomic unit descriptions, field notes, interpretations) and review by appropriate correlation procedures of the National Cooperative Soil Survey. Work plans for many survey areas list more than one order; the part to which each is applicable is delineated o" a small scale map of the survey area.

2/ This is the minimum size delineation imposed by limitations of the map scale. I" practice tile minimum size delineation specified for a map unit for 2nd order soil surveys is generally larger than the minimum shown.

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TABLE 2

APPROPRIATE USES FOR DIFFERENT ORDERS OF SOIL SURVEYS

Orders	Intensity of Planning for Land Use or Management
1st	Intensive planning such as predicting specific uses and treatment of discrete tracts of land for most cropland but not for site selection for structures. Soil series interpretations are valid for areas larger than specified minimum size.
2nd	Operational planning for rangeland, woodland, some cropland tracts; not for site selection for structures. Interpretations limited to overall behavior of soil series occurring together in areas larger than specified minimum size.
3rd	General planning--applicable to county or multi-[1/] county planning districts, areas of extensive use such as some rangelands. forested lands and arid lands. Interpretations valid total extent of a map unit; not designed for interpretations for tracts of management size.
4th	Broad planning--applicable to multicounty plan-[1/] ning, large RC&D and RCOG, statewide planning and large state planning districts.
5th	Very broad planning--regional planning, statewide[1/] planning.

[1/] 3rd, 4th, and 5th Order soil surveys aid in locating potential areas for 1st and 2nd Order soil surveys.

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
Mobile, Alabama, March 12-15. 1974

COMMITTEE VII - SOIL SUITABILITY POTENTIALS

Chairman: Joe D. Nichols
Vice-Chairman: Fenton Gray

CHARGES

Investigate the use of a single numerical rating system for engineering and other uses that would rate all soils. Consider the example proposed by the National Task Force on Organic Soils. (Report presented at the 1973 National Work Planning Conference.)

COMMITTEE REPORT

A rating sheet, potential for corn production, was prepared and circulated. Comments from committee members were used to revise the rating sheet. The revised rating sheet is attached to this report as Appendix I.

The goal of the committee was to prepare a type of soil interpretation using a numerical system. Most interpretations used in the programs of the National Cooperative Soil Survey have used equal weighting of soil characteristics related to the problem. Ideally, the kind of information to use in developing a guide is the inherent edaphic characteristics of the soil. Many of these parameters, such as the moisture supplying capacity of a soil under a given climate, are not well understood.

An improvement in precision of predictability is possible by using an unequal weighting system of soil characteristics. This method has limitations because a change in one factor can influence the effect of another factor. A sliding scale of values is needed in such cases. This committee effort used mainly the unequal rating system but applied the sliding scale system for one soil characteristic.

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SUMMARY AND CONCLUSIONS

A rating sheet for potentials for corn production was developed. This effort needs testing against more kinds of soil. It offers three systems of rating: (1) a numerical system from 1 to 100, (2) an arraying into eight groups, ten groupings could have been used, and (3) an adjective rating for eight groups.

RECOMMENDATIONS

Work should continue within states, with coordination by the technical service center, on development of potential systems for agricultural and nonagricultural interpretations. The input of specialists other than soil scientists will be necessary for the development of successful systems. Considerable time inputs will be required for a usable product.

The committee should be continued to keep conference members aware of progress and needed inputs.

Committee Members:
- B. L. Allen
- F. Bell
- G. J. Buntley
- Fenton Gray
- A. L. Newman
- J. D. Nichols
- C. Powers
- D. F. Slusher
- C. D. Sopher
- L. H. Rivera

Attachment:

APPENDIX I

A SYSTEM FOR RATING SOILS FOR POTENTIAL CORN PRODUCTION

The method of determining the relative potential for corn production is a three-part system. Rate a soil phase for each part. Sum the three parts and subtract the total from 100. Determine the potential for corn production from the guide below. The ratings from 1 to 100 or 1 to 10 may be used. For a ranking for yields only, use the A. SOIL CHARACTERISTIC SUBSYSTEM.

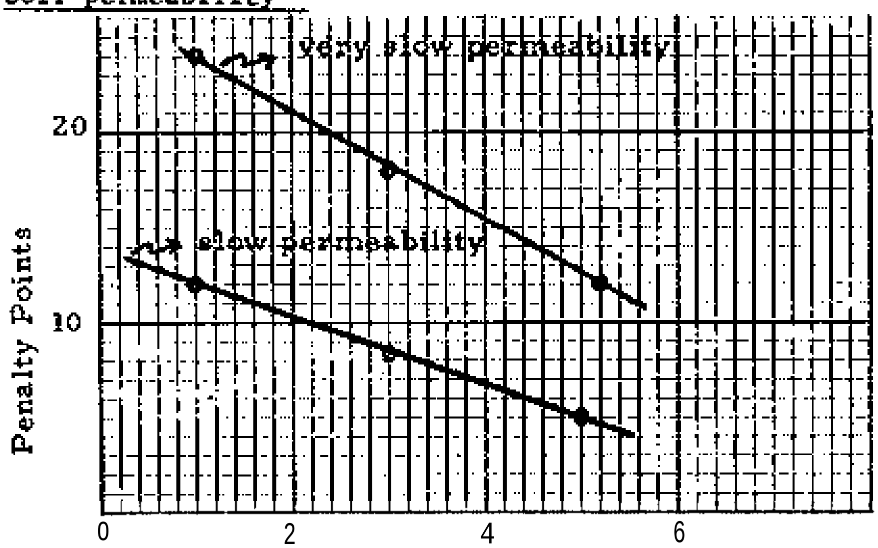
100 Minus Sum of Ratings of Subsystem	Potential for Corn Production
91-100	1
81-90	2
71-80	3
61-70	4
51-60	5
41-50	6
31-40	7
21-30	8
11-20	9
0-10	10

A.' SOIL CHARACTERISTIC SUBSYSTEM	Penalty Points	Weighting Factor	Product
1. Available water capacity in upper 40 inches			
More than 5 inches	0		
4 to 5 inches	1	3	
2 to 4 inches	3	3	
Less than 2 inches	5	3	
2. Coarse fragments in the upper 10 inches			
Less than 2 percent	0		
2 to 15 percent	1	3	
15 to 35 percent	3	3	
More than 35 percent	5	3	
3. Depth to restrictive layer			
3.1. Depth to bedrock, hardpan, or petrocalcic horizon			
More than 40 inches	0		
20 to 40 inches	1	5	
10 to 20 inches	5	5	
Less than 10 inches	12	5	
3.2. Depth to fragipan			
More than 40 inches	0		
30 to 40 inches	1	3	
20 to 30 inches	2	3	

	Penalty Points	Weighting Factor	Product
4. Exchange capacity of upper 20 inches (per 100 grams of soil)			
More than 7 m.e.	0		
3 to 7 m.e.	1	1	
1 to 3 m.e.	3	1	
Less than 1 m.e.	5	1	
5. Mineral reserves as weatherable minerals in the 0.2-2 mm fraction of the control section			
More than 20 percent	0		
10 to 20 percent	1	1	
Less than 10 percent	2	1	
6. Organic matter content in the upper 10 inches			
More than 1 percent	0		
0.5 to 1 percent	1	2	
Less than 0.5 percent	2	2	
7. Soil loss			
Less then 3 tons average per year	0		
3 to 6 tons average per year	1	5	
6 to 10 tons average per year	3	5	
More than 10 tons average per year	5	5	
8. Soil moisture regime 1/			
Udic - less than 2 inches average growing season moisture deficit	0		
Udic - 2 to 4 inches average growing season moisture deficit	1	10	
Udic - 4 to 6 inches average growing season moisture deficit	2	10	
Udic ustic soil moisture regime	5	10	
Typic ustic soil moisture regime	7	10	
Aridic ustic soil moisture regime	9	10	

1/ Not to be used if the land is irrigated.

9. Soil permeability[2/]



		Penalty Points	Weighting Factor	Product
10.	Soil reaction at 20-inch depth or 6 inches into a Bt horizon beginning within 20-inch depth.			
	5.6 to 7.3	0		
	4.5 to 5.6	1	1	
	Less than 4.5	2	1	
	7.3 to a.4	1	2	
	8.4 to 9.0	5	2	
	More than 9.1	9	2	
11.	Soluble salts			
	Less than 2 mmhos/cm conductivity	0		
	2 to 4 mmhos/cm conductivity	2	5	
	4 to 8 mmhos/cm conductivity	8	5	
	8 to 16 mmhos/cm conductivity	12	5	
12.	Soil slope			
	A	0		
	B	1	5	
	C		5	
	D	2	5	
	E	6	5	
	F	10	5	

2/ Use permeability for soils not penalized for having a wetness factor, Do not use both permeability and wetness factors.

	Penalty Factors	Weighting Factor	Product
13. **Flooding**			
None	0		
Moderate hazards, yield reduced less than 10 percent	1	10	
Severe, yields reduced 10 to 30 percent	2	10	
Very severe, yields reduced 30 to 50 percent	4	10	
Extremely severe, yields reduced more than 50 percent	6	10	
14. Wetness - Continuing problems of excess water[1/]			
Little or no continuing limitations, yields not restricted	0		
Slight limitations, yields slightly limited	1	10	
Moderate limitations, yields moderately limited	2	10	
Severe limitations, yields severely limited	4	10	
Very severe limitations, yields very severely limited	6	10	

B. DEVELOPMENT DIFFICULTY SUBSYSTEM

	Penalty Factors	Weighting Factor	Product
1. **Irrigation**			
1.1. Leaching soluble salts	1	5	
1.2. Land leveling			
1.21. Minor amount	1	5	
1.22. Moderate amount	2	5	
1.23. Major amount	3	5	
2. **Drainage**			
2.1. Surface	1	5	
2.2. Tile	2	5	
3. Terrace System	1	2	
4. Forest - Stump clearing, root plowing, and smoothing	1	5	

1/ Rate for problems before drainage for an undrained phase and after drainage for a drained phase.

	Penalty Points	Weighting Factor	Product
5. stones - clearing			
Classes of stoniness			
0	0	5	
1	2	5	
2	4	5	
3	5	5	
4	6	5	
5	8	5	
6. Gullies			
None	0		
Common	1	5	
Many	3	5	
C. MAINTENANCE SUBSYSTEM			
1. Irrigation			
1.1. Water cost - supplemental	1	1	
1.2. Water cost - total			
Low cost	2	1	
Medium cost	3	1	
High cost	4	1	
2. Drainage			
2.1. Surface	1	1	
2.2. Tile	1	1	
3. Terrace System	1	1	
4. Fertilization			
Low amount	0		
Medium amount	1	1	
High amount	2	1	
5. Lime Requirement			
None required	0	0	
Application required	1	1	

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE

OF THE

COOPERATIVE SOIL SURMY

MOBILE, ALABAMA

MARCH 12-15, 1974

REPORT OF

Au Hoc COMMITTEE

PROFESSIONAL SOIL CLASSIFYING

CHAIRMAN - C. L. GODFREY, TEXAS (AGRICULTURAL EXPERIMENT STATION)

VICE-CHAIRMAN - R. W. JOHNSON, FLORIDA (SCS)

A. Southern Regional Technical Work-Planning Conference of the Cooperative Soil Survey
Mobile, Alabama
March 12-15, 1974

Chairman - C. L. Godfrey
Vice-Chairman - R. W. Johnson

B. AD HOC Committee - Professional Soil Classifying

C. 1. Inform the conference about the establishment of the profession of soil classifying.

2. Make recommendations pertaining to Uniform Certification requirements for the Southern Region.

D. Committee Report

In preparation for this report and for a report presented at a special meeting at the Soil Science Society of America meetings, November 11-16, 1973. in Las Vegas, Nevada, a questionnaire was mailed in June 1973 to the committee, to others in the Southern Region and to selected individuals in other states known to have interest and experience relative to organized effort on certifying soil classifiers. The main body of a certification bill passed in North Dakota was included for evaluation (Appendix 1). This report summarizes the results from the questionnaire, from the reports and discussion at the meeting in Las Vegas, and the information compiled since the Las Vegas meeting.

Results of the Questionnaire

Response was prompt and candid. Much thought was obviously given in answering the questions and to the other comments which we received:

- An expression of positive interest in a state and national organization of professional soil classifiers and a related law came from nearly every respondent. However, some, especially from the universities, pointed out that in interviewing their co-workers expressions of disfavor with the idea of an organization or a law were encountered. A movement away from traditional relationships among disciplines and tradltional free-of-charge public service is apparently feared, along with misgivings about getting involved with legal constraints in the practice of soil science. Some also questioned whether or not their state is at this time professionally or politically ready for such action. But everybody seems eager to learn and to Participate In coordinated consideration of a soil classifiers organization and related state laws. Most thought the North Dakota bill a reasonably good model. Virginia and Florida pointed out because of laws already in effect they need to use the name "soil scientists" not "soil classifiers".

- Some action has been taken in the Southern Region toward organizing and passage of legislation. Tennessee introduced a bill which was later withdrawn. South Carolina is organizing and has a bill which passed one House. Passage is expected. Alabama is in the process of organizing and plans to draft a bill. Louisiana and Florida are making efforts toward organizing. Arkansas, Georgia, Kentucky, Mississippi, North Carolina, Oklahoma, Texas and Virginia had no definite action to report when the questionnaire was answered.

- Among other states more definite action is under way. Maine and North Uakota have passed bills. Nebraska introduced a bill but it did not clear their Agriculture and Recreation Committee . California, Idaho, Minnesota and Wisconsin are working toward introducing bills. Wisconsin has a functioning organization, 'Wisconsin Society of Professional Soil Scientists". (See Appendix 2).

- The study revealed that the number and affiliation of those "for" and those "against" a state organization and a related law varies greatly from state to state. Soil and Water Conservation Districts, County Commissioners, City Governarnts, Councils of Government, Planning Commissions, State Health Departments, State Forestry Boards, Water Resources Groups, certain legislators, Soil Conservation Service, Soil Science Society of America, Soil Conservation Society of America, were listed as likely to endorse or supply leadership for promoting an organization or a bill. Geologists, civil engineers, agriculturists and soil scientists at universities and experiment stations, realtors and developers were listed as groups containing individuals likely to voice opposition to an organization, but especially likely to oppose passage of a certification law.

- The questionnaire resulted in a number of additional questions or a repeat of questions similar to those on the questionnaire:

(1) What is the purpose of a soil classifiers law and a related state and national organization?

(2) How might a state and national soil classififer organization relate to ASA, SSSA, SCSA?

(3) How do you go about mustering support for an organization and for a law? What are the necessary steps to take? In what order?

(4) Has anybody prepared a model proposal for a state organization and a statement of need for a state law related to citizen welfare and interests rather than

needs of soil scientists?

(5) What are the salient features of the North Dakota and Maine laws? Did the sponsors get what they wanted? What major problems had to be resolved to effect passage?

(6) How uniform do the state organizations and state laws need to be in order to carry on related professional activities on an interstate basis?

(7) Why is an exemption clause needed in a bill? Should this clause be uniform among states?

(8) Who would develop written examinations given by State Board of Examiners? Who would pay expenses of the Board? What should the filing and registration fees be for applicants?

(9) What are some suitable name alternatives for the organization, the bill and the ones certified uner the bill? Some do not like "Soil Classifiers" or cannot use it. "Soil Scientists" with something in parenthesis about "classification", "mapping", and "interpretations" has been suggested.

(10) Subsequent to certification and registration, would a "Soil Classifier" be professionally liable for his decisions and recommendations?

(11) Should other disciplines which might oppose a "Soil Classifier Act" in a state be asked if they would support a bill which would include certification of their group? (Maine's bill includes both soil scientists and geologists, for instance).

(12) What specific recommendations, if any, should the Ad Hoc Committee make to the conference at Mobile?

Answers to the questions are covered for the most part in the following section of this report. (see page 3A for other questions).

HIGHLIGHTS OF SPECIAL SSSA MEETING, LAS VEGAS

Division S-5, (Soil Genesis, Morphology and Classification) held a special meeting on certification of soil classifiers Wednesday evening, November 14th, from 7:30 p.m. to about 10:30 p.m. It was well attended and few left before it was over. Discussion was lively. Dr. A. R. Bertrand, President, SSSA, Dr. Phil Low. Immediate Past President, SSSA, and Dr. Sterling Olsen, also a Past-President, SSSA, attended the entire session.

- John McClelland, SCS Staff. Washington, D. C., presided. He pointed out soil scientists have a problem at times in establishing their credentials--as an expert witness in court, for instance. Soil scientists, in SCS especially, need a

(continued on page 4)

ADDENDUM

Questions raised in Committee discussions at Mobile

(1). What length of time of what experience should be required for certification? A precedence of 4 years of soil classifying has been set in the bills already passed. Some feel this is too long; that 2 years should be adequate. Each state will have to work this out in relation to its own convictions, but having uniformity among states would be desirable.

(2). Experience in soil classifying of what vintage is acceptable in certification7 A starting date should be given in the law but the approving board will have to decide on the acceptibility of the quality of the experience.

(3). What qualifications in soil classifying must be met by state boards certifying soil classifiers? The board should meet qualification standards higher than the people they certify.

(4). Is it feasible to work toward state certification laws without a state organization of soil classifiers? Many think not, however, South Carolina's bill, modeled after Idaho's bill, is being sponsored by the South Carolina Land Resources Conservation Conission. Sponsorship by such an already established state board has the advantage of providing legal advice and counsel from the state staff at no cost. It also provides endorsement by an already accepted state organization and does not cause a new board to be created. A new board might on some points be competative with long-standing boards in the state.

(5). Can a soil classifier be fully certified in two or more states at the same time? The certifying board in each state acts on the qualification of an applicant in relation to the laws of that state but conditions of reciprocal certification should be stated in the law.

(6). How could uniform national standards of soil certification be established? A national organization, such as the Soil Science Society of America, could suggest these, or state organizations of soil classifiers could form a national committee from among themselves or join together in a national organization unifying organization in which they feel a strong professional bond with their fellow scientists. He indicated that he felt a state organization of soil classifiers and an associated state certification law would help to fulfill these needs. This would give the 1250 soil scientists in the USDA, SCS, who classify, map and interpret soils in the field, a professional status comparable to lawyers, doctors. nurses, engineers and other registered professionals. Only about 15% of these SCS men are now members of SSSA. And interest in membership seems to be on the decline even though SCS administrators encourage membership. Some additional 200-300 staff metiers from agricultural experiment stations and forest services also participate to varying degrees in the soil survey. Many of these people are active metiers in SSSA.

- A. R. Bertrand, Phil Low and Sterling Olsen commented on the interest of SSSA in maintaining close affiliation with the soil survey group and that SSSA will make a full study in 1974 on kinds of memberships to offer soil surveyors and related professionals, possibilities for publishing a soil survey journal (Soil Survey Horizons, for instance) and on affiliation of state organizations of certified soil classifiers with SSSA. Response from the floor indicated that some in the soil survey group do not want any sort of associate membership in SSSA but instead want to maintain full membership with the efforts toward change applied to making the field soil scientist more visible in the programs of SSSA and toward providing a publication with articles of major interest to field men in soil survey. That SSSA should be the national affiliate organization for soil classifier organizations seemed agreed, however, the Soil Conservation Society of America was also mentioned. (See Appendix 3).

- J. B. Fehrenbacher, Program Chairman, Division S-5, pointed out how general interest in the soil classifier organization and related laws prompted the special meeting on the subject at Las Vegas.

- Hollis Omodt, gave a report on how passage of a state law on certification of soil classifiers was effected in North Dakota. His main points follow:

  (1) Regin in a state with a well prepared organization of soil classifiers to decide on standards, exclusions, and professionals to be covered by certification and legal registration. The organization in turn initiates action toward a state law.

  (2) Obtain well-known public sponsors. Influential leaders from organizations are better than endorsement by the

organizations per se. In obtaining support of a powerful organization, the organization's enemies as well as its friends are recruited.

(3) Be sure the law defines both the profession and the practices.

(4) A state organization is needed to organize and support the bill. but the organization is not mentioned in the bill. The National Cooperative Soil Survey is not a good reference since 'it has no formal organization. North Dakota's bill merely states that the standards used were "accepted principles and methods".

(5) Carefully develop exclusion clauses. Be sure, for instance that the law does not impringe on rights of soil testing civil engineers. Exclude them by a proper statement. Other groups need to be considered too, for inclusion or exclusion.

(6) Be prepared to spend $35/hour or more in attorney's fees to test the legality and workability of the law. Total cost can amount to around $1000 or more. The law must stress needs of the public, not needs of soil scientists. Having a good model bill to follow can save much money. Fees may amount to much less than $1000 with a model in hand.

(7) Seek out respected sponsors in the Houses of government.

(8) Use top professionals and citizen leaders in committee hearings.

(9) Understand thoroughly the legislative procedure in your state.

- G. B. Lee discussed experiences in forming the Wisconsin Society of Professional Soil Scientists, (See Appendix 3).

(1) He pointed out that Wisconsin is not especially happy with "Soil Scientists" in the name since the organization was set up to promote professional and social communication and other interest among practical pedologists.

(2) Self-employed and retired soil scientists benefit from a state organization and a related law.

(3) The organization can be especially helpful to soils professionals by sponsoring seminars and holding field days.

(4) An organization can provide identity for the non-agricultural group interested In soil survey information such as engineers, urban planners, wildlife specialists, etc. These people rarely are members of ASA and SSSA.

- Curtis L. Godfrey summarized the status of interest in certification of soil classifiers in the Southern Region. (See this report: Results of the Questionnaire).

E. Summary and Conclusions

(1) There is interest in a state and national organization of professional soil classifiers and in related state laws providing for certification and registration of such professionals. However, the extent of interest and feeling of need varies greatly among the states. Some individuals and organizations dealing with soils oppose organizing or a law. Louisiana, Florida and perhaps others have polled the interest among their soil scientists.

(2) Wisconsin has had a state organization since 1972 which can serve as a model for other states.

(3) North Dakota and Maine have passed laws. (See Appendix 1 and 4). These laws, especially the North Dakota law, are being used as models. Several other states are working toward an organization and a state law.

(4) Tennessee and South Carolina have had the most activity relative to a state law in the Southern Region. Some other Southern States are initiating action toward state organization.

(5) Developing a state organization seems to be the first step toward certification. Work toward a law must stem from this base, but the subsequent law must be predicated on need for a service to the public.

(6) Soil classifiers include professionals with limited interest in ASA, SSSA programs and publications. During 1974, SSSA plans to thoroughly investigate ways and means of better serving the group. Affiliate or other types of membership alternatives will also be considered.

F. Reccomendations

(1) That interested leaders explain the need and funcation of a state association of soil classifiers to soil scientists and others in each state. (See Appendix 2, 4 p. 8, 5 & 6).

(2) That a state association be organized where need and interest justify along the lines of the Wisconsin model or others procured by state leaders.

(3) That state associations consider promotion of state laws, using as guidelines comments and suggestions in this report and the attached laws from North Dakota and Maine.

(4) That soil survey leaders and/or state associations cooperate with the Soil Science Society of America in developing a model for affiliation of soil classifiers with SSSA at the National level. Other alternatives may also be considered.

(5) That the 1974 Southern Regional Technical Work Planning Conference endorse the concept of organization of soil classifiers and the passage of state certification and registration laws for soil classifiers as means of promoting and encouraging the highest levels of professional competence and ethical conduct and to achieve the maximum benefits of soil classification in planning for various uses of land. However, adopting this recommendation by the conference does not imply that every state in the Southern Region necessarily endorses this concept but that a majority of states do endorse the principle and will act accordingly.

(6) That the report of this AD HOC Committee be accepted and that the committee, having now served its function, be dissolved. However, it is recomended that the Steering Committee set up a small committee of about 4 members to serve as a source of information relative to organizations and legal acts pertaining to soil classifiers and further that membership of this new committee be selected from personnel in the Southern Region having the most pertinent experience dealing with soil classifier organizations and state laws related to soil classifiers.

G. List of Committee Metiers

C. L. Godfrey, Chairman
R. W. Johnson, Vice-Chairman

H. H. Bailey	M. E. Shaffer
R. C. Carter	D. F. Slusher
F. Gray	M. E. Springer
J. T. Hood	H. B. Vanderford
D. E. Pettry	R. D. Wells

H. Appendix (These items were attached only to report distributed at Mobile)

1. North Dakota's Bill
2. Wisconsin's State Organization
3. Information from Dr. A. R. Bertrand, President SSSA
4. Maine's Bill
5. Response by Hollis Omodt to special questions raised by Bob Johnson and Curtis Godfrey
6. Information sent to the state SSSA in North Carolina

NATIONAL COOPERATIVE SOIL SURVEY

Southern Regional Conference Proceedings

Virginia Polytechnic institute and State University
Blacksburg, Virginia
May 2-4, 1972

south 72

PROCEEDINGS OF
SOUTHERN REGIONAL
TECHNICAL WORK-PLANNING CONFERENCE
OF THE
COOPERATIVE SOIL SURVEY

U. S. DEPARTMENT OF AGRICULTURE

VIRGINIA POLYTECHNIC, INSTITUTE & STATE UNIVERSITY,

BLACKSBURG, VIRGINIA

MAY 2 - 4, 1972

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service - State Office, P. 0. Box 10026
Richmond, Virginia 23240

August 7, 1972

Re: 1972 Southern Regional Soil Survey Work-Planning Conference

To: Recipients of Proceedings

The conference convened at 8:00 a.m., Tuesday, May 2, at the Donaldson Brown Center, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

The executive committee extends their appreciation and thanks to those speakers invited to address the conference. We welcomed the participation of Dr. J. E. Martin, Dean of Agriculture at VPI& SU. Dr. W. J. Hargis, Director, Virginia Institute of Marine Science, discussed Wetlands Research - New Horizons. Dr. J. Cairns, Director, Center for Environmental Studies, VPI& SU, made a fine presentation on Environmental Research. Mr. W. M. Johnson, Deputy Administrator for Soil Survey, discussed Developments in the National Soil Survey Program. Mr. D. N. Grimwood, State Conservationist for SCS in Virginia, was unable to be with us because of a late conflict in schedules.

The committee chairmen and members are to be commended for their hard work in developing their committee reports.

Dr. B. F. Hajek, Department of Agronomy, Auburn University, suceeds to the position of chairman for the 1974 conference. Mr. E. A. Perry, State Soil Scientist, Soil Conservation Service, Auburn, Alabama, moves up to the position of vice-chairman.

The conference adjourned at 11:30 a.m., Thursday, May 4, 1972.

R. L. Googins (s)
R. L. Googins
Chairman
1972 Executive Committee

National Cooperative Soil Survey
Southern Regional Technical Work-Planning Conference
May 2-4, 1972
Blacksburg, Virginia

Contents

Agenda
1972 Southern Regional Technical Work-Planning Conference
of the Cooperative Soil Survey

Virginia Polytechnic Institute and State University
Blacksburg, Virginia
Meeting at Donaldson Brown Center for Continuing Education

Monday, May 1

4:00 - 7:00 p.m.	Registration, Donaldson Brown Center

Tuesday, May 2

8:00 - 9:00 a.m.	Registration, Donaldson Brown Center
9:00 - 9:15	Welcome - Dr. J. E. Martin Dean of Agriculture Virginia Polytechnic Institute and State University
9:15 - 9:30	Welcome - Mr. D. Grimwood State Conservationist, SCS Richmond, Virginia
9:30 - 10:15	Wetlands Research-New Horizons Dr. W. J. Hargis, Jr. Director Virginia Institute of Marine Science
10:15 - 11:00	Environmental Research Or. J. Cairns, Director Center for Environmental Studies Virginia Polytechnic Institute and State University
11:00 - 11:45	Developments in the National Soil Survey Program Mr. William M. Johnson Deputy Administrator for Soil Survey, SCS Washington, D. C.
11:45 - 12:00	Announcements
12:00 - 1:00 p.m.	Lunch
1:00 - 2:00	Report of Committee I Criteria for Family and Series Chairman: W. W. Fuchs, Texas
2:00 - 3:00	Report of Committee II Application of the New Classification System Chairman: H. T. Otsuki, Oklahoma
3:00 - 3:15	Recess

3:15 - 4:15	<u>Report of Committee III</u> Soil Interpretations at the Higher Categories of the New Classification System Chairman: M. E. Springer, Tennessee
4:15 - 5:15	<u>Report of Committee IV</u> Application and Interpretation of Soil Surveys Chairman: L. E. Aull, North Carolina
Wednesday, May 3 8:00 - 9:00 a.m.	<u>Report of Committee V</u> Handling Soil Survey Data Chairman: G. R. Craddock, South Carolina
9:00 - 10:00	<u>Report of Committee VI</u> Soil Moisture and Temperature Chairman: R. B. Daniels, North Carolina
10:00 - 10:15	Recess
10:15 - 11:15	<u>Report of Committee VII</u> Regional Genesis and Characterization Projects Chairman: B. F. Hajek, Alabama
11:15 - 12:15	<u>Report of Committee VIII</u> Classification and Utilization of Fresh and Salt Water Marshes Chairman: D. F. Slusher, Louisiana
12:15 - 1:15 p.m.	Lunch
1:15 - 2:15	<u>Report of Committee IX</u> Soil Survey for Forestry Uses Chairman: T. W. Green, Georgia
2:15 - 3:15	<u>Report of Committee X</u> Educational Resources Chairman: D. D. Neher, Texas
3:15 - 3:30	R e c e s s
3:30 - 4:30	<u>Report of Committee XI</u> Environmental Soil Science Chairman: S. W. Buol, North Carolina
6:00 - 7:00	Social Hour University Club
7:15	Banquet: Donaldson Brown Continuing Education Center Speaker: R. E. Blaser University Professor of Agronomy Virginia Polytechnic Institute and State University

Thursday, Hay 4

8:00 - 9:00 a.m.	Report of Committee XII Changes in the Classification System Chairman: L. J. Bartelli, Texas
9:00 - 10:00	Report of Ad Hoc Committee on Workshop Chairman: H. B. Vanderford, Mississippi
10:00 - 10:15	Recess
10:15 - 12:00	Business Meeting
12:00 - 1:00 p.m.	Lunch
1:00 - 2:00	Business Meeting
2:00	ADJOURNMENT

Conference Rooms A and B will be available for meetings throughout the Conference. Chairmen may desire to schedule committee meetings prior to presentation of the reports.

SOUTHERN REGIONAL TECHNICAL SOIL SURVEY WORK.-PLANNING CONFERENCE
Program Number: 7205-0204-0112
Dates: Hay z-4, 1972
DONALDSON BROWN CENTER FOR CONTINUING EDUCATION

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Easiness Meeting
Southern Regional Technical Work-Planning Conference
Virginia Polytechnic Institute & State University
Blacksburg, Virginia

R. L. Googins, presiding

The chairman opened the business meeting by reading an invitation for the 1974 conference to be held in Alabama. A copy of the invitation is included at the back of these proceedings. It was moved and seconded that the invitation be accepted. The motion was approved,

A question regarding the final form and due date of the committee reports was raised from the floor. June 1, 1972, was approved by the conference as a due date for final committee reports to be in Richmond, Virginia, for assembling. Dr. Stan Buol agreed to the elimination of 31 pages of abstract material from the committee report of Committee IX. Extra copies of the abstracts can be obtained by writing directly to Dr. Buol.

Dr. D.E. Pettry introduced Dr. P. H. Massie to the conference. Dr. Massie expressed appreciation for the work of the conference and mentioned the soil survey program in Virginia. He also discussed the recent decision of the Southern Land Grant University directors to veto the proposal for a specific workshop in Hawaii. The proposal was made at a time when money is a critical factor in every college and university. Dr. Massie suggested that the proposal, even though refused at this time, would lay the groundwork for a future request.

Dr. L. J. Bartelli briefly discussed the future operation of the national committees. Future national conferences will include suggested work group topics rather than committee reports per se. Such topics might include such topics as interpretations, classification, research, etc. Members of the Washington SCS staff will act as chairmen of the work groups. Reyional conferences will suggest questions to the national committees from conference proceedings. Dr. Bartelli pointed out that the new officers should consider attending the next Charleston meeting.

Dr. Caldwell made a motion that Curtis Godfrey be the conference representative to the National Work-Planning Conference in 1973. No other nominations being received, the motion was seconded and approved, Dr. Bartelli noted that it was precedent to select the new chairman (Ben Hajek) to also attend the national conference. He also suggested that Dr. M. Rutledge attend the national conference as he is the chairman of the Soil Science Society particle size committee.

Dr. Godfrey noted the overall attendance at this conference. A question was raised concerning the size of the organization and voting rights. It was suggested that the by-laws be reviewed prior to the next session. Dr. Bartelli noted that the function of the conference is basically planning. He doubted that SCS would approve attendance if the function were other than planning.

W. Frank Miller requested that more time for committee meetings be allowed at the conference.

Dr. Bartelli noted that the soil training school at Knoxville would be an annual affair and that participants would be sought.

The meeting adjourned at 11:30 a.m., May 4, 1972.

1972 SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
OF THE COOPERATIVE SOIL SURVEY

VIRGINIA POLYTECHNIC INSTITUTE AND STATS UNIVERSITY
BLACKSBURG, VIRGINIA
HAY 2, 3, 4, 1972

Committee I - Criteria for family and series

chairman : W.W. Fuchs

Vice Chairman: C. A. Steers

Charges to Committee:

1. Evaluate the usefulness of soil families in use in the southern region and

   (a) Recommend abolishment of unnecessary families

   (b) Recommend establishment of other needed families

2. Test the usefulness and uniformity of using silt content as series criteria. Some series are recognized on the basis of (+) or (-) 30 percent silt; others on the basis of (+) or (-) 18 percent silt. Evaluate the significance of these criteria.

   Reference source for Charge #1 is recommendation 2 of the committee on soil family criteria, 1971 National Technical Work-Planning Conference of the Cooperative Soil Survey, Charleston, South Carolina.

Committee Report:

Both charges relate to the usefulness of interpretative criteria. In order to make recommendations for the abolishment or establishment of families, or suggesting series criteria, we evaluated what our present system has produced, The prime source for this evaluation was the series interpretation sheets developed from available data and considerable multiple judgment.

We selected clayey and loamy Udults, loamy Ustalfs end Ustolls, and clayey Aqualfs for our study. These cognate groups were selected to teat the significance of silt content as series criteria, and to test the usefulness of families where concern had been expressed.

Five major areas were evaluated as to usefulness of existing families and series.

1. Silt content as series criteria

Silt content as a means of differentiating soils within families was proposed as a result of a field study in November 1964. [Classification of Soils in the Gulf Coastal Plain of the Southern States; South Regional Technical Service Center) November 1964.] This study indicated a definite clustering of low silt soils along the Atlantic Coastal Plain, and a definite clustering of higher silt soils in both loamy and clayey families of Udults in the Gulf Coastal Plain. The text of the report indicated definite low norms and high norms for silt content; however, the classification of about 70 selected series attached to the report suggested specific breaks of 15 percent silt for coarse-loamy, 20 percent silt for fine-loamy, and 30 percent silt for clayey families. The field study of June 1965 [Classification of Soils in the Gulf Coast Flatwoods of Southern States; South Regional Technical Service Center; June 1965] indicated high silt soils had 30 to 50 meq CEC per 100 g. of clay, and suggested 20 percent silt as the break in coarse-loamy and fine-loamy families, 30 percent silt for soils in clayey families, and 15 percent silt for soils in arenic subgroups. The classification table attached to that report supported the text, except clayey, kaolinitic soils had a breakpoint of 20 percent silt rather than 30 percent as given for mixed mineralogy.

Our evaluation of using silt content as differentiae was in Paleudults and Hapludults. Series interpretation sheets were available for 107 of 131 series studied. Silt content is used in differentiae of 67 of the 131 series and sand content is used for 15 series.

The suggested breakpoints of 20 percent silt for loamy soils and 30 percent for clayey soils appear to have served as a guide. Deviation from these breakpoints occur in most family groupings, and about 30 percent of the series are not specific as to silt and/or sand content. About 75 percent of the series which are not specific as to silt content are Hapludults and not in the coastal plain. Silt content as differantia was confined primarily to thermic soils, with only two mesic soils restricting silt content, and three mesic soils restricting sand content.

Our evaluation of the usefulness of using silt content as differentia is that it serves primarily in keeping soils along the Atlantic Coastal Plain separate from soils along the Gulf Coastal Plain. We found no significant difference in biologic or engineering behavior between high silt and low silt soils. Crop yields, especially corn, tended to be higher in some low silt soils. This may be attributed to factors other than silt content, such as moisture stress days during critical stages of the plant. We found no significant difference in woodland site index, Unified classification, plasticity index, or liquid limit between high silt and low silt soils. Even available water capacity., which should relate well to silt content [Available Water Holding Capacity of Alluvial Soil8 in Louisiana; reprinted from Soil Science Society of America Proceedings, Vol. 23, No, 1, Jan.-Feb. 1959, Pages 1-3, Zane F. Land] was not detectably different on the interpretation sheets, Low silt soils in the Coarse-loamy and clayey families had a lower percent passing the 200 sieve.

Silt content is not used as series differantia in the loamy Ustolls or Ustalfs. In analyzing the behavior from the soil interpretation sheets, we could not detect any significant difference in soils normally of high silt content, The available water capacity of soils higher in silt, such as Teller, Zaneis, Venus. Bippus, Bosque, and Gageby, are very similar to other series known to be lower in Silt,

2. Moisture and temperature

Moisture is used at the subgroup and higher levels in taxonomy, Temperature is used at the family and higher levels. Moisture and temperature have seldom been used for series differantia.

Soil moisture and soil temperature are Cyclic, and at present cannot be determined from one soil description or laboratory sample. The moisture state or soil temperature, however, are within the series control section, and as much a part of the composition (morphology) a8 those characteristics that we have one-shot procedures for measurement.

Studies within the past year, as well as in this evaluation, indicate a good correlation by families for most engineering interpretations. The "biologic" interpretation (yields and suitabilities for crops, trees, range plants, and wildlife) were less precise.

Research ha8 shown that the woodland site index decreases by at least 10 feet when the warm season precipitation drops below 30 inches per year. This lack Of precipitation needs to be related to the moisture control section. and become series differentia when significant. Many of our present interpretation sheets reflect different woodland site indexes for warm season rainfall (+) or (-) 30 inches,

Our evaluation of crop yields reflect8 considerable variation within closely similar and parallel families, but good correlation for those series having type location in the same general area. Some evidence indicate8 this difference may be related to period8 of stress during critical periods of the plant, such a8 during bloom or dough stage, rather than overall moisture state within the control section. Reduced yields are not common for all crops because some crops are more tolerant of stress,

Crop adaptability is related to soil temperature and even though the family sorts the major breaks, significant breaks occur with temperature regimes. Citrus is restricted to the hyperthermic soils, but does not grow profitably in the cooler portions. Sugar cane and winter vegetables are restricted to hyperthermic soils and the warmer few degrees of thermic soils. Cotton grows well in hyperthermic and most thermic soils through about 62°.

3. Mineralogy

Some concern has been expressed that mixed mineralogy families were too broad and new families were needed, This problem was poised with both the fine-loamy family high in montmorillonite on one hand, and grading toward siliceous on the other, as well as the clayey family grading to both montmorillonitic or to kaolinitic.

We failed to detect any clustering of interpretations to support another family.

4. Soil depth and shape

a. Past convention, as well as present use, have solum thickness (± 1 meter) as series criteria, Where solumn thickness is not terminated by a contact such as a lithic or paralithic, the correlation with usefulness is not as good as was supposed. Many series studied fail to show significant differences based on solum thickness.

b. The series control section appears to be necessary to maintain uniformity in series differentia. The series control section is somewhat arbitrary and is not related to the effective rooting depth or engineering behavior in many instances.

c. The nature of the contact (lithic, ruptic-lithic, or paralithic) in moderately deep or deep soils, has a greater effect on engineering behavior than on biological behavior.

d. Within the series evaluated, we did not see a need for soil shape as family criteria8 however, our review did not evaluate sloping families, There was some indication that level and sloping families in Aquic groat groups only touched on the problems of soil shape, and the need for soil shape was a6 evident in some other great groups. The wet edge and dry edge effect on soil morphology also influences soil behavior. Many series differentiated by color, consistence, or degradation of horizons are the product of the soil shape (not necessarily slope) and behavior is similar for soils with similar shapes.

5. Use of families in mapping and interpretation

   The western states have used families for naming of map units in reconnaissance surveys. The monograph for Southern Mississippi Valley Alluvium is using the common family name for naming of map units. The criteria used for families were chosen mainly to reflect engineering and plant relations behavior as influenced within the control section, Since soils within subgroups having similar behavior properties are grouped within families, interpretations of units using the common family names for reconnaissance surveys should be as accurate, if not more accurate than conventional methods.

   The committee feels the family and phase of family level is sufficient for generalized soil maps used for broad based planning over wide areas, as well as for mapping for most range and forestry uses, Mapping at the series and phase level is needed where detailed interpretations are used for more intensive use of the land.

   With interpretations correlated at the family level, the common family name will provide a better prediction of behavior than using a variant of a series. Soils thought of as variants differ significantly in behavior from the series by which named; therefore, many will also differ in some behavior response from the family as a whole; however, most predictions of behavior will be within family limits.

Summary and Conclusions

1. Silt content has been used extensively in the Coastal Plain to separate Udults within loamy and clayey families. Guidelines, suggested in 1964 and 1965, have been generally followed. No significant difference in behavior can be detected from present interpretation sheets that is directly related to the silt content, but the differentiae serves to separate soils in the Atlantic Coastal Plain from unlike soils in the Gulf Coastal Plain. A significant difference in corn yields was noted by Dr. Sopher in North Carolina between fine-silty and fine-loamy families. These test data suggest there should be a difference within a family also.

2. Soil moisture and soil temperature are used as differentiae within the higher categories, but have seldom been used for series differsntiae. Significant differences of biologic response in both adaptation and yields are related to moisture and temperature differences within families. Soil moisture and soil temeprature cannot be determined by a one-shot measurement or observation as most characteristics chosen for series differentiae.

3. Mixed mineralogy families have similar behavior response, with no evidence to support another mineralogy class between either montmorillonitic, kaolinitic, or siliceous.

4. Behavior correlation with solum thickness is much better where the solum thickness coincides with a lithic or paralithic contact. The nature of the contact has a greater effect on engineering behavior than on biological behavior, Soil shape should be evaluated as a possible need as family criteria in other great groups.

5. The common family name can be used effectively for naming map units for reconnaissance surveys and generalized soil maps. Naming mapping units at the family level will relate to behavior as well or better than naming as variants of series in most instances.

Specific recommendations

1. We recommend no abolishment or establishment of families,

2. Further study and evaluation of soil shape as family criteria in non-Aquic great groups.

3. Silt content be used as a covarying property for series differentiae within families and that norms of silt content be given rather than specific breakpoints. Interpretation sheets be reevaluated to incorporate known response related to silt content.

4. Criteria used in higher categories be used as series differentiae within families where significant difference in response is evidenced and where the prcperty can be determined within the normal errors of observation. Constant or cyclic (repetitive) properties within the control section may be used as series differentiae.

5. Guidelines be developed for series differentiae within families, but avoid hard and fast series criteria. Suggested series differentiae guidelines include solum thickness, nature of non-soil contact, (lithic, paralithic) soil temperature and soil moisture fluctuations during growing season. Differentiae should evolve from normal distribution patterns of soil properties in landscapes rather than using predetermined breakpoints.

6. Relate name of mapping unit to taxonomy at the level needed such as phase of family, common family name, or series name for reconnaissance surveys.

7. Name mapping units with the common family name in lieu of series variants.

8. The committee be continued. Its charge should include implementing numbers 2 and 5 above.

Committee Membership:

Members;

R. E. Caldwell	J. W. Frie
R. E. Horton	W. E. Keenan
J. R. Moore	N. B. Pfeiffer
J. D. Rourke	C. M. Thompson

Westal h'. Fuchs, Chairman — C. A. Steers, Vice Chairman

Notes cm discussion of the report by the Conference:

Vanderford: Did the committee recommend combining any series?

Fuchs: NO

Bartelli: The committee compared information contained on interpretation sheets, They did not compare research data, Should research data be compared? We may want to tie to controlled observations rather than using guide sheets. The guide sheets do not always reflect actual data. The soil classification may be a step and a half ahead of the present interpretation sheets,

Carter: The committee compared all kinds of classification units. It may have been better to compare like or similar units.

Bartelli: The guides have not considered silt content.

Buol: Research data from North Carolina on specific profiles show a difference in yield based on silt content,

Bartelli: Suggest we amend the report to reflect that the report is based on present series interpretation sheets, but interpretation sheets should be based on research data.

Pfeiffer: There were few series reviewed in the fine textured Aqualfs. Three were montmorillonitic mineralogy, and three were mixed mineralogy. These did not show the differences one would expect,

Bartelli: The lack of differences could be because the soils have the same mineralogy, or the behavior was arrived at by estimates and not based on data.

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Fuchs: The first generation interpretation sheets are not always the best. Some were taken from MLRA tables, As we accumulate information, we see where improvement is needed.

Gray: Are you proposing to name families? If so, how are they to be named? Is the committee going to tell us how we name families?

Fuchs: By common family name (common series). The taxonomic family name is too complicated.

Carter: The Southern Mississippi Valley Alluvium Soils Monograph is being prepared using common family names.

DeMent: There is a problem in making interpretations at the family level. For example, soils in the same family occur in McCurtain County, Oklahoma, with corn yields of 35 to 40 bushels, while the soils in North Carolina, have corn yields of 100 bushels,

Item 5 recommends we use soil temperature and soil moisture, but they still come out in the same family, We cannot say the same thing about the soils in Oklahoma and North Carolina.

Fuchs: Phases of families should be used where needed without a predetermined breakpoint being defined.

DeMent: Recommend where series have different behavior and the soils are in the same family, we need some provision for phasing families.

Bartelli: We can split at any level in taxonomy, Phases can be used when needed.

DeMent: Maybe some do not realize that phases can be used at any level.

Byrd: The common family name idea would be Ruston family, but the Ruston series may be absent. This may be a problem with a map having local application.

Slusher: Where reconnaissance units are made up of only one-soil families, the family name might be OK. Why not use the series name of the series that are there?

Carter: We are having problems with our universe. It depends on whether we are dealing with general soil maps for counties or multi-counties. Where we have named series in a small area, we would use series names. Where the universe is larger, we could use family names.

Steers: If we cannot classify below the family level, x6 would use the family name.

McKee: If the soil is outside the range of the series, it would be better to use the family name than to use 6 variant.

Googins: What are your suggestions for covarying properties?

Fuchs: Silt content alone is not all important, There should be other properties. We should talk about a clustering of behavior rather than a specific breakpoint.

Bartellir (Comment on naming of mapping units, item 6, page 6.)

There are area6 where we do not know the series. We would name the soils to the family level. Examples of this would be a survey in Nevade that was completed, using family names.

Soil taxonomy is a tool in devising a legend. We are not dropping series. If we know and have time, we will use series. If not, we may use a higher level. We are trying to keep mapping and naming within the framework of soil taxonomy.

Gray: Cited an example of naming by series that is not too acceptabler The Houston Black is the family name for Udic Pellusterts, fine montmorillonitic, thermic family. In Oklahoma, the dominant soil is San Saba. The family name then, doe6 not tell the story.

Bartelli: This is a communication problem. We need a scientific name. We have one but it is too long. We need a common name for the family.

Perry: Hoved the committee report be accepted with the recommended changes,

Byrd: Second.

Approved.

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Appendix 1

The significance of silt content as differentia in loamy and clayey Udults was evaluated from series descriptions and available interpretation sheets. The Unified Classification, 200 sieve size, liquid limit, plascity index. and available water capacity given below are from the family control section. Corn yields and woodland suitability class are given for the least restrictive phase. At the end of each group, the average is shown for the range in the control section except Unified. which is shown as the dominate class.

Coarse-loamy, siliceous, high silt

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
Benndale	20	85	2	ML	55-65	20-35	0-6	.12-.18	Typic Paleudults
McLaurin	20	80	263	SM, SC	38-45	20-30	5-10	.12-.14	Typic Paleudults
Harleston	20	90	2	SM, SC	35-50	20-35	6-10	.13-.16	Aquic Paleudults
Blountville	20	90	2	ML, CL	60-75	25-40	8-12	.15-.18	Fragiaquic Paleudults
Stough	20	80	2	ML, CL	60-75	25-40	8-10	.10-.13	Fragiaquic Paleudults
Brewton	20	60	2	SM	36-45	15-30	0-10	.08-.12	Fragiaquic Paleudults
Escambia	20	100	2	ML	60-70	20-30	0-10	.10-.14	Plinthaquic Paleudults
Poarch	20	90	2	ML	60-70	M-30	0-10	.10-.20	Plinthic Paleudults
Latonia	20	60	3	SM	30-40			.10-.15	Typic Hapludults
Bassfield	20	75	2	SM	30-40			.10-.15	Typic Hapludults
Average	20	81	2.1	sn, ML	46-57	19-26	3-8	.11-.15	

Coarse-loamy, siliceous, low silt

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
Brogden	20	70	2	sn, SC	25-40	10-20	5-10	.10-.14	Typic Paleudults
Foreston	20	65	2	SM	18-35	10-25	0-4	.09-.12	Aquic Palaudults
Olanta	20	100	2	SM, SC	15-30	-		.10-.14	Humic Hapludults
*Rumford	20								Humic Hapludults
Average	20	78	2	SW, SC	19-35	10-22	3-7	.10-.13	

*Interpretation sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
			Coarse-loamy, siliceous - undesignated						
Basin		75	2	SM, ML	45-65	20-35	5-8	.12-.20	Fragiaquic Paleudults (high)
'Pine Flat	(10-40)								Rhodic Paleudults
*Sequatchie									Humic Hapludults
			Fine-loamy, siliceous. high silt						
Addiclou	20	65	3	SC, CL	45-65	20-35	4-20	.14-.16	Typic Paleudults
Smithdale	15	55	2&3	SC. CL	40-55	18-40	8-10	.15-.17	Typic Paleudults
*Quitman	20								Aquic Paleudults
Bowie	20	70	3	SC, CL	40-55	20-40	12-20	.15-.20	Fragic Paleudults
Saucier	20	80	3	CL, ML	60-70	25-34	8-12	.16-.19	Plinthaquic Paleudults
Baxterville	30	80	3	ML, CL	60-75	15-30	10-13	.15-.20	Plinthic Paleudults
Malbis	20	100	3	ML, CL	55-62	26-31	5-9	.12-.20	Plinthic Paleudults
Lucedale	20	80	2	SC, CL	40-65	25-40	8-15	.14-.18	Rhodic Paleudults
Cahaba	20	90	2	sn, SC	40-55	25-35	8-10	.12-.15	Typic Hapludults
Pirum	20	50	3	CL, ML	50-65	20-30	4-10	.15-.17	Typic Hapludults
*Whitwell	20								Aquic Hapludults
Average	22.2	74.4	2.6	SC. CL	48-63	21-35	7-13	.14-.18	
			Fine-loamy, siliceous, low silt						
*Orangeburg	20								Typic Paleudults
Norfolk	30	110	2	SC	30-48	30-48	20-35	.12-.15	Typic Paleudults
Goldsboro	30	125	2	SC, CL	25-60	16-35	3-17	.12-.15	Aquic Paleudults
Carnegie	20	70	2	SC	40-50	26-32	13-22	.10-.14	Fragic Paleudults
Cowarts	15	70	2	SM, SC	30-40	20-30	5-8	.10-.14	Fragic Paleudults
Dothan	20	80	2	sn, SC	30-40	20-30	5-8	.10-.14	Plinthic Paleudults
Red Bay	20	80	2	SC	25-35	25-35	8-10	.10-.12	Rhodic Paleudults
Durham	30	90	3	sn, SC	44-49	33-53	15-21	.12-.14	Typic Hapludults

(Continued on sheet #3)

*Interpretation sheets not available.

Series	Break Point	Yields Corn bu	wood site class	Unified	200	LL	PI	AWC	Subgroup
(Fine-loamy, siliceous, low silt, continued from sheet 2)									
Kalmia	20	110	2	SC	30-50	28-29	9-10	.15-.20	Typic Hapludults
Maxton	20	110	2	SC	30-50	20-50	8-20	.15-.20	Typic Hapludults
Granville	30	90	3	sn, SC	36-49	25-40	9-15	.12-.14	Typic Hapludults
*Johns	20								Aquic Rapludults
Average	23	93.5	2.2	SC, sn	32-47	24-38	10-17	.12-.15	
Fine-loamy, siliceous, low sand									
Claiborne (Mesic)	20	80	3	CL. MH	55-85	33-w	8-12	.13-.19	Typic Paleudults
Minvale	20	70	3	CL	SO-70	20-30	5-12	.12-.18	Typic Paleudults
Average	20	75	3	CL, MH	52-82	26-35	7-12	.12-.18	
Fine-loamy, siliceous, high sand									
Nolichucky (Mesic)	20	90	3	CL	60-80	30-35	10-w	.16-.20	Typic Paleudults
Allen	20	75	3	CL	65-80	24-35	8-15	.14-.18	Typic Paleudults
*Etowah	15								Typic Paleudults
*Holston	15								Typic Paleudults
Vaucluse	45	40	3	sn, SC	25-50	10-20	0-10	.08-.12	Fragic Paleudults
Average	23	68	3	CL, SC	50-70	21-30	6-12	.12-.17	

*Interpretation sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
			Fine-loamy, siliceous, undesignated						
Kullit	-	50	2	SC, CL	40-60	20-30	5-15	.12-.16	Aquic Paleudults
Ardilla	-	75	2	SM, SC	36-45	18-22	5-8	.10-.12	Fragiaquic Paleudults
Tifton	-	90	3	SW, SC	30-45	22-36	7-20	.10-.15	Plinthic Paleudulta
Hartsells	-	90	4	CL	40-55	30-35	10-15	.15-.18	Typic Hapludults
Linker	-	50	4	CL	40-60	25-35	11-20	.16-.19	Typic Iiapludults
*Kempsville	-								Typic Hapludults
Humphreys	-	70	2	CL, ML,	30-65	20-38	6-15	.10-.16	Humic Haplndults
Average	-	71	2.8	CL, SC	36-55	22-33	7-15	.12-.16	
			Fine-loamy-micaceous & mixed-low silt						
Grover (Mesic, Mica)	30	90	3	SC, CL	36-65	35-70	15-35	.12-.14	Typic Iiapludults
Evard (mesic)	20		2	SM, CL	30-60	25-40	7-15	.11-.17	Typic Hapludults
Tate (Mesic)	30	105	2	ML, CL	67-91	0-41	0-12	.17-.19	Typic Hapludults
Average	26	97	2.3	CL, SC	44-75	30-50	7-20	.13-.16	
			Fine-loamy, mixed, undesignated						
Edneyville (Mesic)		90	2	ML, SM	35-55	8-40	7-20	.14-.16	Typic Hapludults
Sherwood		55	3	CL	65-85	35-50	13-25	.18-.22	Typic Haplndults
Wickham		95	3	SC, CL	35-55	28-30	8-10	.13-.15	Typic Hapludults
Alta Vista		90	2	SC, CL	28-70	20-45	5-6	.12-.14	Aquic Hapludults
Statler		100	2	CL, ML	60-80	15-30	5-12	.17-.20	Humic Hapludults
Average		86	2.5	CL, SC	44-69	21-39	7-14	.15-.17	

● Interpratatfon sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
				Clayey, kaolinitic, low sand					
Dunmore (Mesic)	20	70	3	MH. CL	75-95	55-70	24-38	.10-.16	Typic Paleudults
Dewey	20	75	3	CL, MH	70-90	30-60	12-26	.11-.15	Typic Paleudults
*Fullerton	20								Typic Paleudults
Decatur	20	100	3	CL. MH	75-80	45-55	12-20	.13-.18	Rhodic Paleudults
Davidson	40	95	3	a. ML	65-98	32-60	11-35	.12-.14	Rhcdic Paleudults
Average	24	85	3	CL, MH	71-91	40-64	15-29	.11-.16	
				Clayey kaolinitic high sand					
Henderson	20		3	CL, MH	45-70	30-53	18-26	.10-.14	Typic Paleudults
Waynesboro	20	85	3	CL, MH	51-75	35-55	10-30	.14-.16	Typic Paleadults
Alcoa (Oxidic)	20	80	3	CL, MH	65-75	50-55	20-26	.14-.18	Rhodic Paleudults
Average	20	82	3	CL, MH	53-73	38-54	16-27	.12-.16	
				Clayey, kaolinitic, high silt					
Anniston	35	85	3	CL, ML	80-90	30-40	8-15	.15-.17	Rhodic Paleudults
Georgeville	30	80	3	CL, MH	75-96	45-70	20-30	.13-.18	Typic Hapludults
Herndon	30	80	3	MH	85-98	50-60	20-30	.15-.25	Typic Hapludults
Average	32	82	3	CL, MH	80-95	42-57	16-25	.14-.20	

* Intemmtatim sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
				Clayey, kaolinitic, low silt					
Faceville	30	85	3	CL, ML	50-70	29-37	12-18	.10-.13	Typic Paleudults
Marlboro	20	90	3	CL, CH	50-70	25-45	11-25	.14-.18	Typic Paleudults
Duplin	30	110	2	CL, CH	53-62	24-54	13-39	.13-.15	Aquic Paleudults
Persanti	30	90	2	CL, CH	65-90	41-60	15-30	.12-.15	Aquic Paleudults
Sunsweet	30		3&2	SC, CL	40-55	26-43	19-26	.10-.13	Plinthic Paleudults
Greenville	20	80	3	CL, SC	45-65	30-40	11-25	.12-.15	Rhodic Paleudults
Appling	30	90	3	MH	55-75	60-74	25-28	.12-.14	Typic Hapludults
Cecil	30	95	3	ML, CL	55-95	40-80	16-37	.13-.15	Typic Hapludults
Mayodan	30	90	3	MH	70-90	70-80	30-37	.12-.14	Typic Hapludults
Average	26	61	2.6	CL, CH	54-77	28-57	17-29	.12-.15	

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
				Clayey. kaolinitic-undesignated					
Esto		45	3	CL, SC	45-65	35-50	15-35	.10-.15	Typic Paleudults
Freemanville		85	3	CL, SC	45-60	30-45	10-25	.12-.16	Plinthic Paleudults
*Varina									Plinthic Paleudults
Hulett		60	3	MH	70-80	45-60	20-25	.12-.16	Typic Hapludults
Madison		90	3	MH, CH	66-76	57-24	27-31	.12-.14	Typic Hapludults
Pacolet		55	3	MH	50-70	50-60	10-25	.12-.16	Typic Hapludults
Wedowee		60	3	SC, CL	40-70	35	15	.10-.14	Typic Hapludults
Average		69	3	CL, MH	53-70	42-45	16-23	.11-.15	

*Interpretation sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
			Clayey, mixed, undesignated						
Shubuta		60	3&4	CL	60-75	30-40	12-20	.14-.17	Typic Paleudults
*Caroline									Typic Paleudults
Tiak		50	3	CL, CH	90-98	40-60	15-30	.14-.18	Aquic Paleudults
Sequoia (Mesic)		55	3	MH, CL	90-100	43-74	20-40	.15-.18	Typic Hapludults
*Howell									Typic Hapludults
Albertville		75	3	CH	72-95	50-55	18-25	.09-.13	Typic Hapludults
Carnasaw		35	3	CL, CH	70-80	40-65	15-35	.14-.18	Typic Hapludults
Enders		25	4	MH, CH	85-100	65-80	35-45	.17-.20	Typic Hapludults
Kirvin		50	3	CH, MH	50-75	40-60	11-25	.10-.15	Typic Hapludults
Townley		55	4	CL, CH	70-90	30-50	12-25	.12-.18	Typic Hapludults
*Cullen									Typic Hapludults
*Hayesville									Typic Hapludults
Beason		55	3	CL	85-95	30-40	10-20	.17-.20	Aquic Hapludults
Creedmoor		75	3	CH, MH	75-88	61-79	32-49	.13-.15	Aquic Hapludults
Helena		75	3	CH	56-76	50-69	25-40	.13-.15	Aquic Hapludults
Sacul		45	3	MH, CH	80-95	60-70	20-32	.15-.20	Aquic Hapludults
*Vinita									Aquic Hapludults
Wolftever		70	3	CL, MH	90-95	40-55	10-20	.15-.20	Aquic Hapludults
*Lignum									Aquic Hapludults
*Clifton (Mesic)									Humic Hapludults
Average		55	3.2	CL, CH	75-89	44-61	18-30	.13-.17	

*Interpretation sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
				Clayey, mixed-high silt					
McQueen	30	90	3	MH	85-95	50-60	20-30	.14-.18	Typic Hapludults
Sweatman	30	55	3	MH	90-95	50-60	15-30	.16-.20	Typic Hapludults
*Tatum	30								Typic Hapludults
*Nason	30								Typic Hapludults
*Craven	30								Aquic Hapludults
Angie	30	55	2	CL, CH	80-90	30-52	15-30	.18-.20	Aquic Paleudults
Average	30	66	2.6	CL, MH	85-93	43-57	17-30	.16-.19	
				Clayey, mixed-low silt					
Gritney	30	45	3	SC, CL	45-65	41-55	15-35	.10-.15	Typic Hapludults
Vance	30	75	3	MH, CH	69-81	61-80	24-44	.12-.14	Typic Hapludults
*Dogue	30								Aquic Hapludults
Luverne	30	60	3	MH	70-80	60-70	15-20	.14-.17	Typic Hapludults
Average	30	66	3	MH, CL	61-75	55-68	18-33	.12-.15	
				Arenic-loamy-low silt					
Wagram	20	60	3	SC	31-50	21-30	10-12	.13-.15	Arenic Paleudults
Fuquay	20	90	3	SM, SC	30-40			.13-.15	Arenic Plinthaquic Paleudults
Stilson	20	75	3	SM, SC	25-50	26-29	0-10	.09-.12	Arenic Plinthaquic Paleudults
Leefield	20	65	3	SM, SC	50-60	22-35	7-16	.10-.13	Arenic Plinthaquic Paleudults
Kenansville	50 (hi sand	70	3	SM, SC	20-25	0-30	0-10	.10-.14	Arenic Hapludults
Average	20	76	3	SM, SC	27-35	17-31	4-12	.11-.14	

*Interpretation sheets not available.

Series	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Subgroup
				Arenic-loamy-undesignated					
*Ocilla									Aquic Arenic Paleudults
Lucy		70	3	SC. SM	35-45	20-35	8-16	.12-.14	Arenic Paleudults
Trep		40	3	SC	45-50	20-30	11-15	.10-.15	Arenic Paleudults
Rosalie		45	3	SC, CL	36-55	20-40	11-20	.10-.15	Arenic Paleudults
Tenaha			3	SC, CL	30-35	25-35	11-16	.15-.20	Arenic Hapludults
Average		51	3	SC, CL	36-46	21-35	10-14	.12-.16	
				Arenic-clayey					
Wicksburg		70	3	CL	SO-70	30-40	10-20	.12-.15	Arenic Paleudults
*Conroe (low silt)	20								Arenic Plinthic Paleudults

* Inttrprctatim sheets not available.

AVERAGES

Number of Series Evaluated	Break Point	Yields Corn bu	Wood Site Class	Unified	200	LL	PI	AWC	Family	No. of Available Interp. Sheets
10	> 20	81	2.1	SM, ML	46-57	19-26	3-8	.11-.15	CL, ail-high silt	10
4	< 20	70	2	SM, SC	19.35	10-22	3-7	.10-.13	CL, silt-low silt	3
3		75	2	SM, ML	45-65	20-35	5-a	.12-.20	CL, silt-not designated	1
2	< 20	75	3	CL, MH	52-82	26-35	7-12	.12-.18	FL, sil-low sand	2
5	> 23	68	3	CL, SC	50-70	21-30	6-12	.12-.17	FL. sil-high sand	3
11	> 22.2	74.4	2.6	SC, CL	48-63	21-35	7-13	.14-.18	FL, sil-high silt	9
12	< 23	93.5	2.2	SC, SM	32-47	24-38	10-17	.12-.15	FL, silt-la silt	10
3	< 26	97	2.3	CL	44-75	20-50	7-20	.13-.16	FL. mixed-low silt	3
7		71	2.8	Cl, SC	36-55	22-33	7-15	.12-.16	FL, sil-undesignated	6
5		86	2.5	CL,	44-69	21-39	7-14	.15-.17	FL, mixed-undesignated	5
7		69	3	CL, MH	53-70	42-45	16-23	.11-.15	C, kao., undesignated	6
20		55	3.2	CL, MH, CH	75-69	44-61	18-30	.13-.17	C, mixed, undesignated	13
5	< 24	85	3	CL, MH	71-91	40-64	15-19	.11-.16	C, kao.-low sand	4
3	> 20	82	3	CL, MH	53-73	38-54	16-27	.12-.16	C, kao.-high sand	3
3	> 32	62	3	CL, MH	80-95	42-57	16-25	.14-.20	C, kao.-high silt	3
9	< 28	81	2.6	CL. CH	54-77	28-57	17-29	.12-.15	C, kao.-low silt	9
6	> 30	66	2.6	CL, MH	85-93	43-57	17-30	.16-.19	C, mixed-high silt	3
4	< 30	66	3	MH, CL	61-75	55-66	18-33	.12-.15	C, mixed-low silt	3
' 5	< 20	76	3	SM, SC	27-45	17-31	4-12	.11-.14	Arenic-loamy-low silt	5
5		51	3	SC, CL	36-46	21-35	10-14	.12-.16	Arenic-loamy-undesignated	5
2		70	3	CL	50-70	30-40	10-12	.12-.15	Arenic clayey	1
131										107

CLASSIFICATION	SERIES	SILT	A	B	AVAIL. H_2O to 40"	ADAPTED CROPS	NATIVE VEG.	PE INDEX	RAINFALL (RANGE)	AIR TEMP. (EST.)	LL (UPPER B)	PI (UPPER B)
HAPLUSTALFS												
Typic Haplustalfs, fine-lo&y, mixed,	Menard	<30%	fsl	scl 25-35	6.5	Gr. sorg., peanuts	Hid-grass	38-48	22-30	67° F.	30-40	12-22
thermic	Rochelle	<30%	fsl	scl 28-35	3.0-32	Gr. sorg., small g.	Mid-grass	32-46	20-30	67° F.	20-30	10-20
Aquic Haplustalfa, fine-loamy, mixed, hyperthermic	Dslfina	< Not evaluated -										
	Lozano	Not evaluated -										
	Lyford	(30%	scl	SC1 25-35	7.2	Cotton, gr. sorg., winter veg.	Mid-grass	30-36	24-28	72° F.	30-40	15-25
fine-loamy, mixed, thermic	Vashtf	Not evaluated -										
Arenic Haplustalfs, loamy, mixed,	Dougherty	<30%	lfs	18-35	4.0	Sorg., small gr., peanuts	Mid-tall	44-64	26-40	62" F.	20-35	5-15
thermic	Stidham	<30%	lfs	scl 18-30	4.0	Small gr., peanuts	Mid-tall	44-64	26-40	62" F.	20-35	5-15
Aridic Haplustalfs, fine-loamy, mixed, hyperthermic	Brennan											
	Duval	<30%	fsl	scl 18-30	4.8	grain sorg.	Mid-grass	26-36	20-26	72° F.	20-35	7-15
Udic Iiaplustalfs, f ine-loamy, mixed, thermic	*Cisco	<30%	If.9	scl 20-35	7.2		Tall & Mid-grass	38-52	28-33	64° F.	30-40	11-25
	Cohb	<30%	fsl	scl 20-30	4.2 to 30		Mid-& Short	23-48	20-28	63° F.	25-36	12-20
	Grandfield	<30%	fsl	fsl-scl 18-30	5.2	Cotton, gr. sorg.	Mid & tall	28-44	19-28	62° F.	20-35	5-15
	May	<30%	fsl	scl 20-35	6.0	Gr. sorg., peanuts	Mid & tall	40-64	26-40	66° F.	30-40	15-25
Ultic Haplustalfs, fine-loamy, mixed, thermic	Konawa	<30%	lfs	scl 18-35	4.9		Mid & tall	44-64	26-40	62° F.	20-35	5-15
	Stephenville											

*siliceous family

CLASSIFICATION	SERIES	SILT	A	B	AVAIL. H_2O to 40"	ADAPTED CROPS	NATIVE VEG.	PE INDEX	RAINFALL (RANGE)	AIR TEMP. (EST.)	LL (UPPER B)	PI (UPPER B)
ARGIUSTOLLS												
Typic Argiustolls - fine-loamy. mixed. hyperthermic	Runge	<30%	fsl	scl	6.4	cotton, gr. sorg., flax. corn	mesquite, hackberry, spiny cat-claw	30-44	24-35	72° F.	22-36	8-18
	Tela	<30%	scl	scl	6.6	Non-avail.	mesquite, huisache	19-31	19-25	72° F.	27-35	12-25
Pachic - fine-loamy, mixed, hyperthermic	Cuero	not updated -										
	Ramedero	<30%	loam	SC1	6.6	gr. sorg.	mesquite, huisache	20-30	18-24	72° F.		
fine-loamy, mixed, thermic	Altus	<30% ?	fsl	SC1	5.0	cotton, alfalfa, gr. sorg.	Tall grass prairie	34-44	22-28	64° F.	20-35	5-15
	Tipton	>30%	loam	cl	6.2	cotton, alfalfa, gr. sorg.	Mid & tall grass	32-44	21-29	61° F.	35-50	10-25
	Farnum		Not evaluated									
	Milan		Not evaluated									
Udic - fine-loamy, mixed, hyperthemic	Willacy	<30%	fsl	scl, fsl, 18-30	6.4	cotton, gr. sorg., citrus	mesquite, wh. br.	22-34	20-28	72° F.	23-30	7-18
fine-loamy, mixed, thermic	Chickasha	<30%	loam	scl 18-30	8.0	cotton, gr. sorg.	Tall grass	50-64	25-37	63° F.	22-35	6-15
	Klump	Not evaluated -										
	Nacon	Not evaluated -										
	Shellabarger	>30%	fsl	scl 18-27	5.2	wheat, sorg.	Tall grass	37-52	22-32	59° F.	25-40	11-25
	Teller	>30%	fsl	scl 18-30	5.80	gr. sorg., cotton, peanuts	Tall grass	44-64	29-39	62° F.	<40	0-20
	Zaneis	>30%?	fsl	cl 20-35	6.0	wheat, sorg., cotton	Tall grass	44-64	26-40	62° F.	24-49	8-25

CLASSIFICATION	SERIES	SILT	A	B	AVAIL. H_2O to 40"	ADAPTED CROPS	NATIVE VEG.	PE INDEX	RAINFALL (RANGE)	AIR TEMP. (EST.)	LL (UPPER B)	PI (UPPER B)
CALCIUSTOLLS												
Typic Calciustolls, fine-loamy, carbonatic, thermic	**Bolar**	> 30%	Cl	Cl	5.4	v. sorg., oats, cotton	Mid-grass	44-64	28-40	66° F.	30-45	15-30
fine-loamy, mixed, **hyperthermic**	Hidalgo	< 30%	scl	scl 20-35		cotton. veg. citrus	Mid-grass	28	26	72°	-	
	Sarenosa	< 30%	fsl	scl 18-30	7.2	Cotton, gr. sorg., flax.	Mid-grass	28-44	24-34	72°	34	20
fine-loamy, mixed, **thermic**	**Clark Engle Venus**	- > 30%	- loam	loam 18-30	7.2	small gr., cotton	Uid-grass	44-64	28-40	66°	20-40	5-18
Aridic Calciustolls- fine-loamv. mixed. **thermic**	**Mansic**		Not evaluated									
	Mansker		Not evaluated									
	Portales		Not evaluated									--
HAPLUSTOLLS												
Aridic Haplustolls - fine-loamy, mixed, thermic	**Paloduro**	< 30%	cl	cl 18-35	6.4	gr. sorg., cotton, wheat	Short-grass	24-34	Y-24	62°	20-35	8-20
	Zita	< 30%	loam	cl 25-35	7.2	wheat, gr. sorg.	Short-grass	25-34	17-22	62°	30-42	20-25
Cumulic Haplustolls- coarse-loamy, mixed, hyperthermic	**Odem**	< 18%	fsl	fsl 10-18	5.6	gr. sorg., cotton	Mid-grass	31-44	23-35	72°	5-19	NP-5
fine-loamy, mind, **hyperthermic**	**Sinton**	< 30%	loam	loam 20-35	7.2	cotton, gr. sorg.	Short & mid-grass	34-44	26-33	72°	30-40	18-25
fine-loamy, mixed, **thermic**	**Bippus**	730%	cl	cl 20-35	7.2	cotton, wheat, gr. sorg.	Shot-t 6 Mid- grass	22-36	16-26	62°	20-40	4-20
	Bosque	>30%	loam	cl 22-35	6.6	sorg., small gr., pecans	Tall grass	44-64	28-35	66°	30-40	10-25
	Gageby	>30%	loam	cl	7.2							

CLASSIFICATION	SERIES	SILT	A	B	AVAIL. H_2O to 40"	ADAPTED CROPS	NATIVE VEG.	PE INDEX	RAINFALL (RANGE)	AIR TEMP. (EST.)	LL (UPPER B)	PI (UPPER B)
PALEUSTOLLS												
Typic Paleustolls - fine-loamy, mixed, thermic	Bukreek	<30%	loam	scl	5.9	cotton, gr. sorg., wheat	Hid & Short grasses	32-38	21-25	62° F.	30-40	15-25
Aridic Paleustolls, fine-loamy, mixed, hyperthermic	Caid	∠30%	scl	Cl 27-35	5.2	gr. sorg.	Mid & Short grass	26-36	21-26	72° F.	25-35	10-20
thermic	Acuff	∠30%	loam	scl 25-35	6.8	cotton. gr. sorg., wheat	Short	22-34	17-21	62° F.	30-45	15-25
Udic Paleustolla - fine-loamy, mixed, thermic	Motley	<30%	loam	scl 25-35	6.0	cotton, gr. sorg.	Mid & Short	32-44	21-28	66°F.	30-40	15-25

This information was evaluated from series descriptions and soil interpretation sheets for the loamy Ustalfs and Ustolls. The liquid limit and plasticity index are given for the upper part of the B horizon or the upper part of the control section. Available water capacity is calculated for the upper 40 inches of the soil, when soils were at least 40 inches *thick;* otherwise, the figures are for the whole soil.

SOUTHERA' REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
OF THE COOPERATIVE SOIL SURVEY

Blacksburg, Virginia

May 2 - 4, 1972

Chairman: H. T. Otsuki Vice Chairman: C. L. Godfrey

Committee II - Application of the New Classification System

I. Charges to the Committee:

(1) Test the control section depth of Paleudults and evaluate its significance, and make recommendations for changes if needed.

(2) Evaluate the use of taxadjuncts in the southern region with respect to:

A'. Uniform application.
B. Taxadjuncts vs variants.
C. Usefulness of established taxadjuncts with regard to interpretations.

II. Committee Report:

A letter was sent to each member of the committee requesting comments and suggestions on the two charges.

(1) Charge 1.

The present definition for the control section depth of Paleudults is as follows: The control section for particle-size class modifiers is the upper 50 cm of the argillic horizon. The control section for series differentiae within a family is from 25 cm to 2 meters. This presents some conflict for the gross-arenic subgroups.

Most of the members of the committee did not think it was advisable to change the control section depth of Paleudults.

One member of the committee suggested that the control section depth of Paleudults be changed by adding the following statement: "In grossarenic subgroups, if the sandy epipedon is 1.5 meters or thicker, particle-size modifiers or substitutes are applied from the top of the argillic horizon to 2 meters. (If the sandy epipedon is less than 1.5 meters thick, then 'the upper 50 cm of the argillic horizon applies.)".

One member of the committee suggested that the control section depth of Paleudults be changed to a 10 to 30 or 40-inch depth.

(2) charge 2.

A. The Committee all agreed that taxadjuncts have been used in accordance with the instructions in Soils Memorandum - 66.

Some members indicated that in some instances the soil series description should be revised to allow a wider range in color, texture, reaction or thickness of horizons to accommodate these kinds of taxadjuncts.

B. The Committee all agreed that taxadjuncts and variants have been used in accordance with the instructions in Soils Memorandum - 66 and had no suggested changes.

Taxadjuncts were used for minor differences from the taxa. They are enough like the soils of the defined series in morphology, composition, and behavior so that little or nothing would be gained by adding a new series. No limit is placed on the extent of the taxadjunct.

Variants were used for major differences from the taxa. They are enough different from the soils of the, defined series in morphology, composition and behavior that a new series is needed, but the extent of the variant is less than 2000 acres.

C. All members of the committee agreed that taxadjuncts have no significant differences in interpretations from the series they were correlated.

(3) Classification of Taxadjuncts.

Though not covered specifically in charges, some members of of the committee feel that in published soil survey manuscripts, the classification of the taxadjunct should be shown rather than the classification of the series from which it was named. All members of the committee do not feel that this is necessary.

III. Committee Recommendations

(1) Charge 1.

The Committee recommends that no changes be made in the definition of the control section depth of Paleudults.

(2) Charge 2.

A. The Committee recommends no change in the present definition of a taxadjunct as described in Soils Memorandum - 66.

B. The Committee recommends that no change be made in the present definition of a variant as described in Soils Memorandum - 66.

C. The Committee recommends no change in the present use of taxadjuncts with regard to interpretations.

(3) Classification of Taxadjuncts.

The Committee recommends no change in the present classification of taxadjuncts. The Committee feels that the taxadjunct is enough like the series from which it is named that it would not add anything by changing the classification.

(4) The Committee recommends it be continued.

Commit t ee Members

H. T. Otsuki - Chairman - OK

C. L. Godfrey-- Vice Chairman - TX

R. I. Barnhisel - KY

0. R. Carter - AK

W. L. Cockerham - LA

A. L. Newman - TX

w. M. Koos - Mississippi

c. L. Brsmlett - Georgia

R. C. Carter - MS

J. A. Elder - TN

J. H. Newton - KY

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING
CONFERENCE OF THE COOPERATIVE SOIL SURVEY
Blacksburg, Virginia
Way 2, 3, 4, 1972

Committee III soil interpretation at the higher categories of the new classification system

Chairman: M.E. Springer

Vice chairman: T.U. Yager

Charges:

1. Make a concentrated effort to ferret out examples of small scale maps end legend6 at the county, state and regional levels. 1/

2. Consider the interpretative decision6 that can be made from soil map6 and legend6 of various scale and detail. 1/

3. Charge6 1 and 2 6hould be considered using the recommended activities for the regional committee6 listed on pages 207 and 208 of the National Technical Work-Planning Conference of the Cooperative Soil Survey, Charleston, South Carolina.

On page6 207 and 208 of the 1971 Proceeding6 of the National Technical Work-Planning Conference each regional committee was asked to:

1. Continue the development and evaluation of small-scale soil maps, legends, and interpretative tables.

2. Concentrate their effort6 on the general soil map6 included in the published soil survey, Resource Conservation and Development plans, River Basin studies, etc.

3. Recommend way6 of enhancing the intarprrtive potential of the general soil up included in the published soil survey, RC&D plane, etc.

1/ Reference source - Conclusion6 and recommendations of the Southern Region61 Technical Work-Planning Conference, Baton Rouge, Loui siana.

I" February 1972 the chairman arbitrarily divided the region into nine parts - one for each member - and asked for maps and comments from each part. Response was excellent and nearly all mambere sent reports.

A sample of the maps are listed along with fragments of comments by individual committee members.

The unpublished colored general soil map of the Southern Mississippi Valley, scale 1:1,250,000, was prepared by USDA, Soil Conservation Service and the Agricultural Experiment Stations of Arkansas, Louisiana, and Mississippi. "The legend is arranged in alphabetical sequence of order, suborder, great group, and the series family name." "The map unite are mostly associations of soil families." Each unit name is preceded by a letter - number symbol, e.g. M-3. It is followed by a one sentence description of the soils and their position.

Some comments about the map are: "A general soil map of this type and scale is a" excellent tool as long as it is used within its limitations. It is a" excellent source of basic resource information for broad generalized planning; i.e. planning for county or multi-county wide solid waste disposal systems determining the need and general location of food processing plants, planning for resource conservation and development project measures, etc.

The main problem with a map of this type is that some people attempt to use it without fully realizing its limitations. This is not a weakness of the map per se.

I feel that the interpretative maps based on the higher categories of our present classification system will play a greater role as a basis for planning and development of our natural resources in the future ".

A comment from someone not on the committee may be paraphrased "No value for individual management decisions. May be dangerous if misused for such purposes".

Joe Nichols' response to his difficult charge is so thorough that it is reproduced as an amendment to the report. He raises some points which certainly need further attention. He comments on a general soil map of the county, a general map of an RC&D area, computer generalized soil ueer mape, and the Southern Regional Soil Map. The difference, by states. in degree of detail on the regional map is pointed out and the possibility of removing some detail and publishing on a scale of 1:5,000,000 is mentioned.

Loftin sent general soil maps of the Capital RC&D project (Scale 1:500,000) and Ascension Parish (Scale 1:126,720) Louisiana. The regional map uses two categories, the lowest of which is soil associations named for one to 3 of the main series in the association. The parish map has one category (soil associations named for the dominant series). In both cases the names are followed with a brief listing of the nature and distribution of soils in the delineation.

From Florida we received three small scale maps and legends.

"The two county general soils maps represent two approaches used in Florida on county general soil map legends. Highlands County is an example using a Statewide legend. After this was tried, it was decided that each county general soil map and legend should stand on its own. As a result, the format used on the Lake County General Soils Map is now being used. YOU will note that the red lines are used in Lake County to distinguish the soil boundaries from the black lines which are used for roads and other features. This seems to be quite effective. The general soils map of the West Florida RC&D Project is included as an example of a regional map. We feel that the scale and the detail for this type of map is about right. Consideration might be given to a slightly larger scale, possibly 1:500,000. The interpretation tables are examples of how we are interpreting the general soils maps. The categories for which the map are interpreted must be kept general as shown in the table. I do think it would be more useful if each of the associations was interpreted as to its use potential. For example, Association No. 1 might be rated as having low potential for general farming. Other rating categories might be 'moderate potential' and 'high potential'.

The General Soils Map of the State of Florida, which is also enclosed, has a scale of about 1:1,000,000. I feel the scale of State General Soils Maps could be enlarged to about 1:750,000 and still be a manageable size. We generally consider this map as having too much detail to be an effective planning tool. Even at a larger scale, much of the detail should be removed to be useable."

Texas sent general soil maps of counties. Also, a General Soil Map of Texas Coastal Basins is under preparation. It is a two category map in which the lowest unit is soil association. Scale is 1:500,000 and descriptions are brief.

Georgia sent general soil maps of counties at scales of 1:63,360 and 1:126,720 and mentioned that scale should be adapted to complexity of soil and anticipated uses of the map. Their general soil map is on a scale of 1:1,000,000 but they conceded that 1:750,000 or 1:500,000 might be better for potential areas of farming or other state oriented uses.

Oklahoma sent a state map, regional map, and county maps. The state map on a very small scale has been very popular as an educational tool and for reaeatch and program training. Their regional map has ten units Of soil associations. It is used for land and water resource planning, regional planning and educational purposes. They consider the general soil maps of the county soil survey as not being very useful. They are optimistic about the computer generalized soil user maps as prepared by Otsuki.

T.U. Ysger sent two maps from outside the region and comment6 on their merits in the attached quotation.

"1. 'Land Use in the Southwestern United States from Gemini and Apollo Imagery, ' 1:1,000,000 by Norman J.W. Thrower assisted by Robert H. Mullens II and Leslie W. Serger; Cartography by Carolyn Crowford and Keith J. Walton, University of California, Los Angeles. Map supplement No. 12, Annals of the Association of America" Geographers, Volume 60, No. 1 March 1970, J. Fraser Hart, Editor; Norman J.W. Thrower, MGS Supplement Editor. We only have one copy of the map in this office. They are for sale from Central Office of the AAC, 1146 16th Street NW, Washington, D.C. 20036 for $3.00 each.

Ten kinds of land use are shown. Some areas were uninterpretable because of cloud cover. Field investigation was made to check preliminary interpretations.

This kind of photo coverage is a good base map for large areas. I believe one interpreting the map would have to have considerable knowledge of the area or it would require a lot of field investigation. The interpretation of similar color texture patterns may vary from one section to another when considerin large areas. I suggest the Committee review various maps prepared from satellite photographs.

2. General Soil Map-East Central Vermont RC&D Project-Vermont. A copy of this map is attached. The map scale is 1:335,000. This matches other kinds of maps in the report; however, it in not a standard scale commonly used hy other makers of maps. The map is limited in use to this report. The scale should have been either 1:500,000 or 1:250,000.

Interpretations are made for the two or three major soils in each association. Three classes of soil limitations are shown for septic tank filter fields, small buildings with basements, industrial buildinga-no basements, streets and parking areas, extensive camp and play areas, sanitary landfill, and farming. It states planning specific sites is best carried out with the use of detailed soil surveys and land use planning, at the community or town level is also an important use for the detailed soil survey.

The detail shown on the map appears to be about right. A few small contrasting area8 (unit 1) are shown. I saw no reference in the report as to how the map was prepared. This should be mentioned and any reference to existing county or other general soils maps listed.

The question that should be askedis, 'What kinds of interpretations are appropriate for a small-scale map of this kind?' To me, septic tank filter appears too limited. Farming, on the other hand, is too all inclusive. Developments, including small buildings, industrial buildings, and streets and parking areas might well be grouped under item, 'community development.' Farming might be subdivided into cultivated agriculture and grassland or woodland agriculture.

In developing small-scale soil maps or any scale soil map for maximum usage, we must use a scale which matches the scale of the other maps. Other maps refer to topographic maps, geology maps. etc. The scale should be one that will be compatible within the area of study as well as adjoining areas. This was brought out by one of the users at the Knoxville Training School in October 1971. Scales of 1:1,000,000; 1:250,000; 1:100,000; 1:50,000; 1:10,000; etc. are preferred to such scales as 1:506,880; 1:126,720; 1:31,680; 1:20,000; 1:15,840; etc. In reviewing maps printed by the USDA, SCS, the scale appears to be determined more or less by what will fit on a page.

The Committee should concentrate on getting maps on scales which will meet the needs of the most users."

Summary end conclusions

It is now apparent that the implications in the title for this committee and the charges to the committed are separate problems which must be attacked in different ways. There are sane rather definite interpretations that may be made for Aqualfs, and even more for Fragiequalfs. These are taxonomic units which if situated in pure areas would not be influenced by associated soils and inclusions. This committee did not pursue such predictions.

When soil series belonging in these higher categories are delineated on a general soil map, any predictions are diluted by the scale of the map , the minimum size of area, and the purity or probability within a delineation. The greater the contrast among the included and associated soils, the greater their impact on the accuracy of predictions. This is true when the general map is based on detailed information. When a map is prepared by reconnaisance methods, further inaccuracies are introduced.

The committee has several suggestions; In preparing a general soil map. careful consideration should be given to the type of interpretations that are to be made. The objective of the map, what interpretations can be made, and more important what interpretations cannot be made should be decided before the map is prepared. Furthermore these potentialities and limitations should be clearly spelled out for all users.

After these objectives are set up, then one can select the scale of map,, minimum size of delineation, and balance between the two that are most desirable for the objective.

Size of map should be designed to meet the objective. but in addition scale should be compatible with other maps in the area. For example, scales of 1:1,000,000; 1:250,000; 1:100,000; 1:10,000 are preferable to odd scales.

Overall ratings are hazardous, except for general planning, but are helped if clearly accompanied by purity or probability statements. Accuracy of prediction will be greater on a map prepared from detailed information than from a reconnaisance.

Ratings should differ on general and detailed maps.

On general maps, potentials for general faming, community development, etc. may be superior to limitations.

Although the general soil maps in the county surveys have some limitations and are sometimes misused, general soils maps for regions of a state or for an entire state are popular and serve many general purposes, especially if interpretations take into account the handicaps of the scale and the variability within each delineation.

Computer produced single purpose user maps should be pursued. Where detailed soil surveys are available, these user maps may be far more useful than general soil maps. Grids should be selected with users in mind, and delineations on the original map must be smaller than the grids. Spatial arrangement should be considered along with grids.

A new committee should be appointed to

1. Coordinate size of delineation with scale of general map.

2. Develop guideline for preparing computer generalized soil user maps.

Members of Committee III

M.E. Springer, chairman, Tennessee
T.U. Yager, vice chairman, Fort Worth, Texas

W.E. Bright, Mississippi
V.R. Catlett, Arkansas
F. Gray, Oklahoma
K.W. Johnson, Florida
L.L. Lofton, Louisiana
M. Milford, Texas
Joe Nichols, Fort Worth
R.M. Smith, Virginia

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, South Regional Technical Service Center
P. O. Box 11222, Fort Worth, Texas 76110

SUBJECT: SOILS - Committee III, Southern Regional Technical Work-Planning Conference of the Cooperative Soil Survey

DATE: March 20, 1972

TO: M. E. Springer
Chairman SRTWPC Committee III
University of Tennessee
Department of Plant and Soil Science
P. O. Box 1071
Knoxville, Tennessee 37901

Before beginning the committee assignment, let me emphasize some concepts I believe we need.

1. We need to tell our users the level of generalization of general soil maps. We can do this by using the concepts of the minimum size decision-making area. A sample statement for general soils map is "The minimum size soil delineatim m this general soils map is 4 square miles. The map is for us4 by planners that use 4 square miles or more as a minimum size decision-making unit,

2. Ye also owe our users an idea of the purity, or probability of prediction, of general soil areas. Attachment II. page 149, to the National Committee on Soil Interpretations is a good example. The "experts" need to give an overall rating, but each component soil should also he rated separately. The purity or probability concept should also be in the narrative description of each soil area.

Assignment

I was asked to review examples of a general map from North Carolina and the Regional map.

I. General Soil Map - Wake County, North Carolina, from published soil survey issued November 1970.

   A. Map Scale and Detail - The minimum size delineatim is about 8 to 10 square miles. According to our present ideas of minimum size units, this map could have been published at about 12750,000. A reference to minimum six4 areas that can be shown on maps of different scales is on page 146 of the Proceeding8 of the 1971 National Technical Work-Planning Conference. I believe more detail should have been put m the map. I think 4 inches to the mile was the correct map scale, but their minimum size unit should have been about 1 square mile. The 1 square mile minimum would have made the map more useful for general planning.

B. Grouping of Soil* into Mapping Units - The first soil ● esociation of Creedmore and White Store groups ● imilar soils. The elope range of gently sloping to hilly is too broad. A elope phase would have allowed better interpretative capabilities and seemingly would have contributed to a more usable minimum size delineation.

Other associations have too wide a slope range for good inter pretations. We need to consider the uses of a map in design of the map units.

C. Interpretations - The allowable interpretations of the maps are handicapped by the minimum size delineations and the design of the mapping units. (These two are interrelated.)

The interpretations in the manuscript am suitable for the present maps. It is the map that does not meet the potential usefulness. General ratings are made on the unite which is good, but we are given no interpretations for each component or purity of prediction. This information is in the manuscript, but can we expect the general map user to ferret out the information? Also, I prefer using terms such as "Residences with on-site sewage disposal" instead of giving severe limitations for septic tanks. In other words, use different rating terms for general maps than for detailed soils maps.

II. General Soils Map of the North Central Piedmont Resource Conservation and Development Area (Attachment I)

A. Map Scala and Detail.- I am assuming that this map is designed for a broad look et this ● ix county area. It would be for very broad planning or preliminary planning. General map* of &out 1:250,000 or 1:125,000 are needed for further general planning. The scale is about 10 miles to the inch or 1:613,656 scale, which seems a rather odd scale. The minimum size delineation is about 4- or 5-square miles. The minimum size delineation fits the map scale. A scale of 1:500,000 would have been preferable and the map could have been published on the same sir paper. We need to pay more attention to map scales.

B. Grouping of Soil8 into Rapping Unit8 - This is a difficult job at this scale map, and the use of the map ● hould be considered in designing the map unite, The grouping of soils and elopes seem good in this case. They may be very good. The legend would have improved readability if it had a 2- or S-level legend.

C. Interpretations - No interpretations are given in the RC&D project plan. This map can be interpreted to an advantage for users who are planning with 4 square miles as a minimum size treatment unit.

plan. This map can be interpreted to an advantage for users who are planning with 4 square miles as a minimum size treatment unit.

III. Regional Soil Map - The map reviewed was the Southern Regional Soils Map, May 1968 copy, cartographic number 4-R-26,513.

A. Map Scale and Detail - The first idea on looking at the map is that different parts of the map show different minimum size delineations. Florida shows about 60 square miles, Oklahoma about 250 square miles, and Louisiana about 600 square miles. However, I may not have a final copy of the map. The scale of the map I have is 1:2,500,000.

The detail on the Florida map seems acceptable at this scale. Perhaps some of the other areas could have more detail. A map with different intensities on different parts of the map though would be hard to interpret. Another answer--perhaps a preferable one is to remove some of the detail from a few states and publish the map at 1:5,000,000.

B. Grouping of Soils into Happing Units - Again this is closely tied to the minimum size delineation. The larger the delineations, the more unlike soils must be grouped, the lower the purity, and the lower the predictability of predictions. Graat groups seep: to be a good mapping unit level for this scale map.

C. Interpretations - Some interpretations can be made. Kinds and relative amounts of crops to be grown can be given along with the principle use of the soil. It is difficult to make uniform non-agricultural interpretations. We could say that Aqualfs have limitations for residences and transportation facilities. Argiudolls, though, could contain soils that range from moderate to severe for these uses.

IV. Computer Generalized Soil User Map - I am sending you two copies of a soil user (soil interpretative map) printed from a computer on a high speed printer. The maps are qualitative visual display maps. The system is called MIADS (Map Information Assembly and Display System). The paps are usually printed at 1/2 inch per mile. These am at 1/4 inch per mile for easy handling. The system uses the following procedure.

A. A grid of a selected size for the unit cell is placed over the soils map. In this case, the cell size was 160 acma and the map was the detailed soil survey of Oklahoma County, Oklahoma. Any size cell From 40 to 640 acres or mom can be used.

B. The dominant soil mapping unit from the detailed survey was coded on the grid sheet. The generalization is by dominant soil for the grid. Happing units am not grouped.

C. The information is card punched and etond in the computer. A soils map is printed. Only one copy is made for the person making the interpretations. The soils map is too detailed for most users. Information is given to users in interpretative maps, or, as we prefer to call them, "user maps." User sups can be made for any interpretation that oan be made for soils.

D. The system is not foreseen as a system for publishing maps. It is a quick way of furnishing maps for use; hence, the term, "user map."

E. The 40, 80, or 160 acres cell user maps fill a gap in soils maps. For some newer uses, such as Regional Council of Governments, RCCD Areas, and Multi-county Planning Arms, they fill a slot between cur old general maps and detailed maps.

Some advantages of the system are low cost and speed. Oklahoma County was coded in 32 hours. The interpretative maps were run from tbe high speed printer at $15 for each intarpretatim. Cartographic scale correction and adding an overlay far roads, streams, etc., added $3 par shoot. We got six copies of maps of each interpretation for $33, or $5.50 each. Any new interpretative map can be printed in minutes. A plastic overlay of roads and streets could be used for quick reference. The maps could be put out in color for slight, moderate, and severe limitations by the 3-R process at a higher cost. Another advantage is that the interpretations are made from the mapping unite from the detailed survey. Any combination of mapping units for general maps combines soils that could be better interpreted separately for certain uses. The generalization on the user wps comes from the generalization to S-level ratings. The interpretative map is the main goal of most users. Overlaying several interpretations or multiple printing can give ratings for combinations of interpretations.

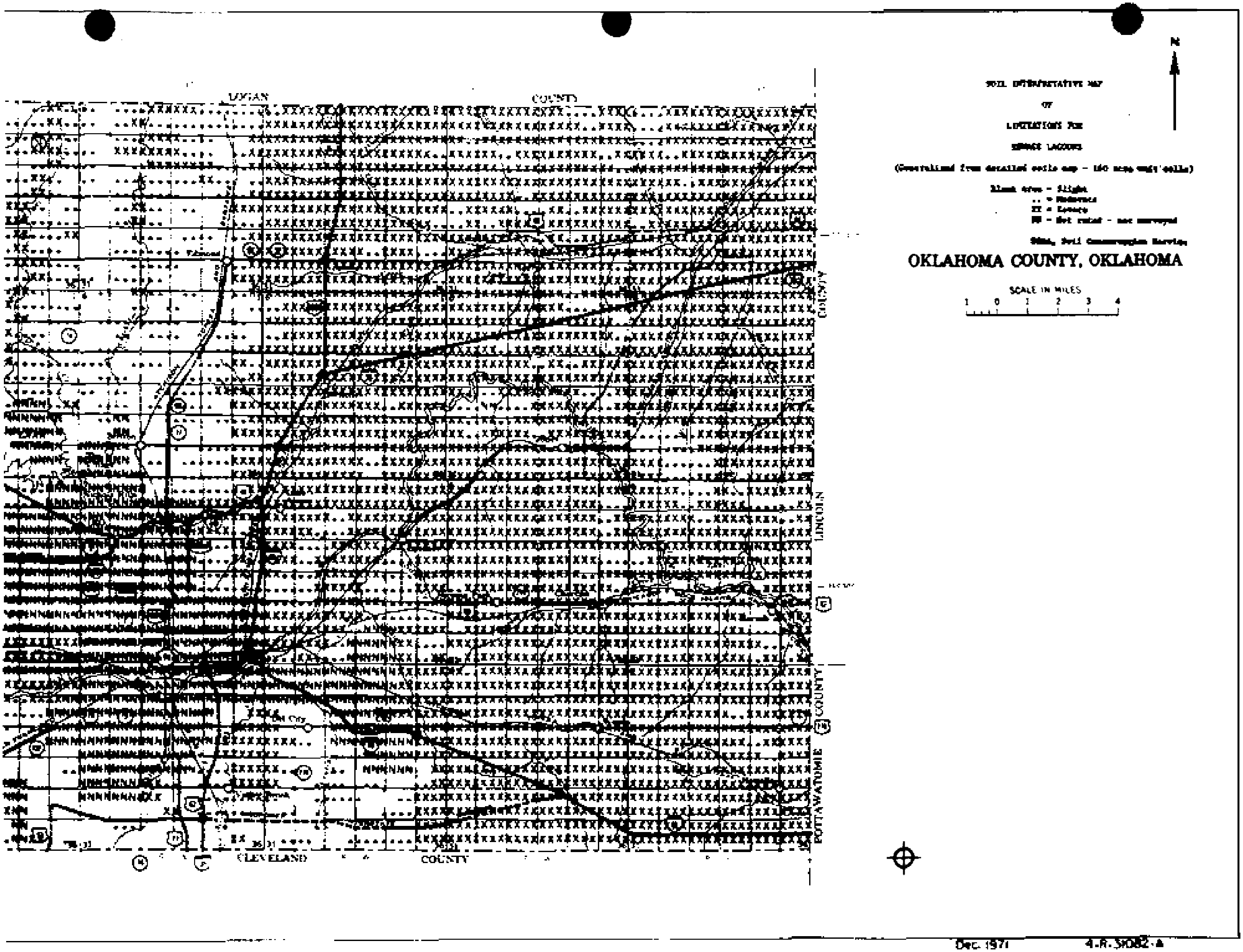
Good soils information must be put into the computer. If a very general soils map ooded and printed at 1/2 inch equals 1 mile scale, the user might think he had more detail than he really has. A disadvantage to some is that there are no lines between the separate unite or ratings. A pattern is printed though, and for visual display, this can be an advantage. This will not handicap land-use planners as their visual display maps for population, etc., are printed in this manner.

Joe W. Nichols

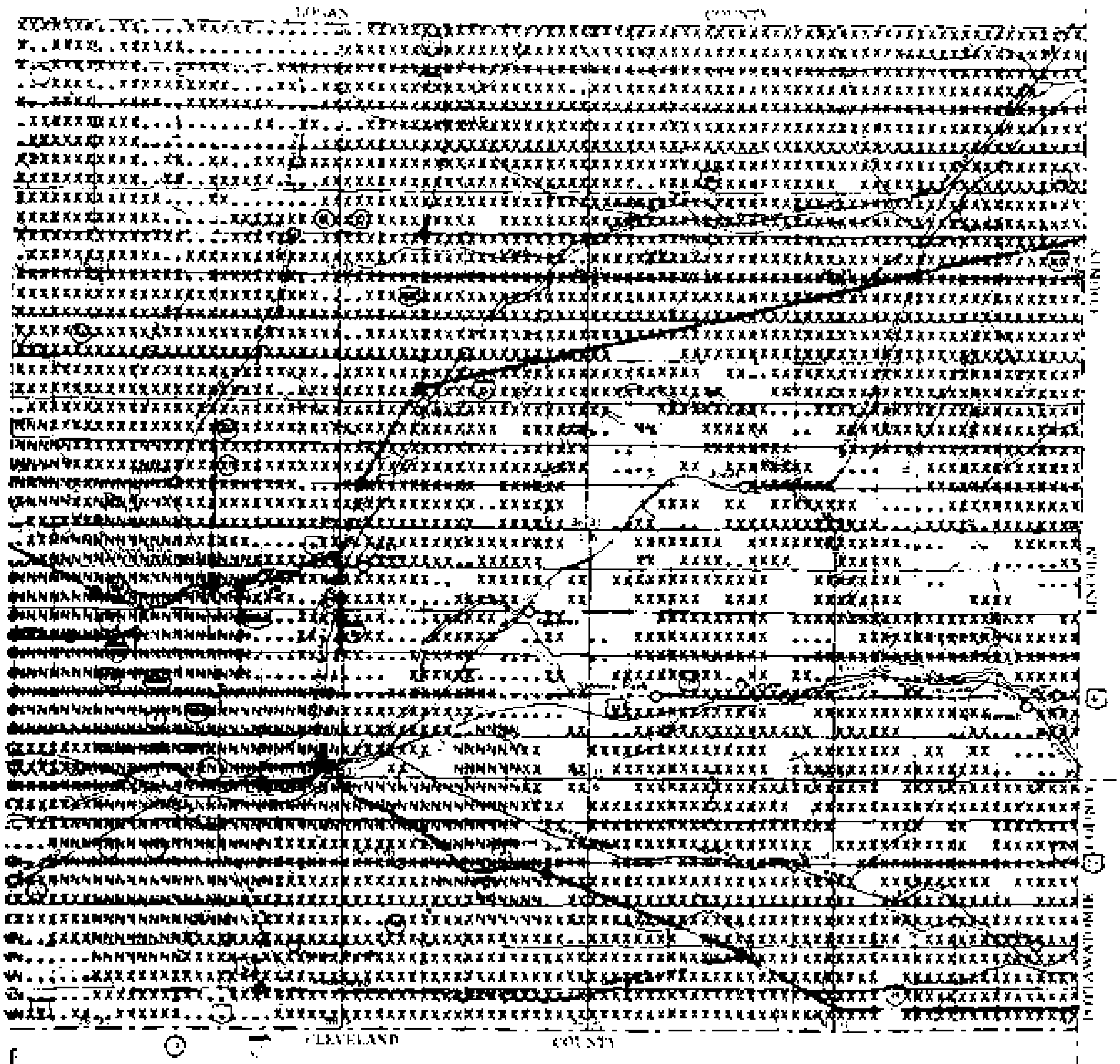
Joe D. Nichols
Assistant Principal Soil Correlator
for Interpretations

Attachments

cc:
G. R. Craddock - v/attachments



Dec. 1971 4-R-31082-A



SOIL INTERPRETATIVE MAP

OF

LIMITATIONS FOR

LIGHT INDUSTRY

(Generalized from detailed soils map - 160 acre unit cells)

Blank area = Slight
.. = Moderate
XX = Severe
NN = Not rated - not surveyed

USDA, Soil Conservation Service

OKLAHOMA COUNTY, OKLAHOMA

SCALE IN MILES

Dec. 1971 4-R-31082-A

SOUTHERN REGIONAL TECHNICAL SOIL SURVEY WORK-PLANNING CONFERENCE

Blacksburg, Virginia, May 2-4, 1972

Chairman, Louis E. Aull, Vice-Chairman, Carl A. McGrew

Committee IV - Application and Interpretation of Soil Surveys

Charges to Committee:

1. Test the criteria in use for sanitary landfill and make needed recommendations,

2. Evaluate the kinds of interpretations presently being made for soils overlying cavernous limestone, Seek ways to improve interpretations for such soils.

3" Review the recommendations to the regional committees by Committee V at the National Technical Work-Planning Conference at Charleston, South Carolina. The Chairman and Vice-Chairman should request action on any or all of items E 4 a-f,

4, Review and comment on the proposed outline of Handbook for Soil Survey interpretations in Appendix 1 of the Committee V report to the National Technical Work-Planning Conference at Charleston, South Carolina.

COMMITTEE REPORT

Charge 1. - Test the criteria in use for sanitary landfill and make needed recommendations.

Criteria in use for sanitary landfills in the southern region generally conform to Soils Memo SSC-45 (Rev. 2) issued November 1971. Complete testing of these criteria has not been accomplished but the current interest in solid waste disposal should enable us to evaluate the criteria adequately in the very near future. The committee does not recommend any changes in the criteria currently being used for area type sanitary landfills (Guide sheet 8 or Table 8) or in the soil suitability classes for cover material for area type sanitary landfills (Table 9). It is recommended however, that these criteria be critically reviewed in each state so that revisions and modifications may be recommended, if needed, at future conferences,

The criteria for trench type sanitary landfills (Table 7 of Memo SSC-45) includes those soil properties that are significant in using soils for this purpose. There are no recommended changes,

Charge 2.

Available literature and guides were reviewed in search of information within the realm of this change, with emphasis on sewage and solid waste disposal systems.

Specific guideline statements for making soil interpretations for waste disposal systems are in the text of the Guide for Interpreting Engineering Uses of Soils, unedited revised draft, February 1971, and its edited version, published November 1971, The statements were compared with tabular items and degrees of limitation shown on guide sheets 3, 4, 7 and 8 of the November Guide....

The committee also reviewed current guides for use of soils for dwellings and small industrial buildings, local roads and streets, and pond reservoir areas, No improvements were suggested for these guides. One correspondent suggested that the maximum dimensions of the ponds to which the interpretations apply need to be stated in the guidelines,

The response of the committee is the basis for the suggested revision of guide sheets, and the committee recommendations.

Committee recommendations:

(1) The committee recommends that soil interpretation guide sheets 3, 4, 7. and 8 of rhe Guide for Interpreting Engineering Uses of Soils. November 1971, as tentatively revised (exhibits 1, 2, 3, 4), to be tested in the South Region (SCS).

Charge 3.

The committee concerned itself primarily with certain engineering properties that appear to present major problems in soil interpretations. These properties are highly significant in use of soils but interpretations have been too general or too poorly defined to be of value to users of soil surveys.

1. Permeability: This has been used extensively in some states as an indication of percolation rates for the benefit of sanitation personnel of the Health Department. It is also used in evaluation for sewage lagoons and sanitary landfills. Permeability classes should be correlated as closely as practical with these user interpretations. The term permeability should always be defined and any correlation between permeability percolation rates, and hydraulic conductivity should be noted,

2, Corrosion: In view of limited data on corrosivity of steel and concrete in different kinds of soils it is suggested that only two classes of corrosion potential be placed in rating tables. Research on major soil subgroups and families should be encouraged so that criteria for corrosivity may be improved.

3. Allowable soil pressure (load supporting capacity): Variations in this soil property create problems in developing quanitative estimates of the load supporting capacity of soils, Evaluation of this property should include quanitative estimates of loads being imposed upon the soil by residences and light industries. It is believed that sufficient data is available on A and B horizons of soils to rate them according to their limitations in supporting light loads,

4. Subsidence: It is suggested that a simple narrative statement be used to express the subsidence potential of soils. This statement to include an estimate of the degree of subsidence indicated and the properties of the soil affecting subsidence-

5. Landslides: Interpretations on soil susceptibility to slippage are pertinent to highway engineers and to all urban users of soils. Emphasis on obtaining data on susceptibility of soils to landslides should be stressed in each state and documented by soil scientists, It is not believed that sufficient data are available at this time to interpret soils in terms of slippage potential,

Charge 4. Comments and Report on Handbook for Soil Survey Interpretations

References in this report are to First Approximation - Handbook for Soil Survey Interpretations:

Part 1 - Introduction

Chapter 1 - Philosophy and Principles Involved in Soil Survey Interpretations

The preference would be that some recognized persons currently engaged in survey work - someone who could give it a more valid interpretation related to agronomic potential usage as well as non-agricultural uses would develop this chapter,

Chapter 2 - The use of remote sensing techniques has the potential of revolutionizing our task of inventorying and monitoring land and water resources, with small scale maps.

Although it cannot provide all types of information needed, remote sensor imagery can be used advantageously in the detection and characterization of many land, water and related phenomena including:

1. Land use

2. Identification of major agricultural crops

3. Locating major soil boundaries

4. Locating sediment producing areas in:

   a. Rural areas

   b. Urban areas .

5. Detecting water pollution

The technology of remote sensing is here: We in the soil survey particularly need to recognize its usefulness and application to our work.

Part II - Farming Interpretations

Chapter 3 - Soil Survey Interpretations for Cropland

The three color systems of interpretation for intensive cropping use by planners sounds like a very worthwhile suggestion. Continue capability explanations and add a discussion for soil loss prediction equation:,

Chapter 4 - Soil Survey Interpretations for Pasture and Range

This seems to be needed and has been developed,

Chapter 5 - Soil Survey Interpretations for Woodland

The format used in woodland progress reports should be used as introduction and then use revised Soils Memo 19 and 26.

Chapter 6 - Soil Survey Interpretation for Wildlife

Soils Memo 74 provides the necessary elements for this purpose. Some consideration might be given to developing a section dealing with wetlands, channelization, and wildlife,

Part III - Nonfarming Interpretations

Chapter 7 - Soil Survey Interpretations for Recreation

This chapter could be a great help to Recreation and Parks students of college departments training professional people for this field. This chapter needs to bring to the attention of those working in this area very forcefully the need for having a basic knowledge of the principles of soil science, survey interpretations and its value in this type of planning,

Chapter 8 - Soil Survey Interpretations for Town and Country Planning

A color interpretation would be useful here,

Chapter 9 - Soil Survey Interpretations for Engineering Uses

The new revision of these interpretations need to be evaluated,

Chapter 10 - Soil Survey Interpretation6 for Tax Assessment

This chapter should discuss the present systems in use and present methods and suggestions for developing a system in any area where soil survey information is available.

Part IV - Coordination of Soil Survey Interpretations, Their Use in Legislation and Limitations

Chapter 11 - Coordination of Soil Survey Interpretations

The use of computers would seem to be especially useful.

Chapter 12 - Legislative Uses of Soil Survey Interpretations

Very timely and much needed. Georgia and other states are very much involved in planning long range uses of the areas on our major river systems. Legislators need a source of accurate basic information.

Chapter 13 - Interpretive Techniques for Special Objectives

This chapter might include techniques to communicate the information to various clientele. This should be included with Chapter 8 and should be written so that it is easily understood by laymen and not limited to professionals,

Chapter 14 - Interpretive and Cartographic Limitations

There may be no limitations except cost. This chapter should discuss scale and other limitations involved in interpretations.

SUMMARY AND CONCLUSIONS

Application and interpretations of soil surveys are the fruits of the soil survey effort. It is essential to continually review and revise interpretive soils material so that they may reflect advancements in other phases of soil science. With an increasing clientele in the use of soil survey interpretations every effort should be made to refine each specific interpretation for each soil. Concentrated efforts should be exerted toward the interpretation of those soil properties that have the most significant effect on use of the land.

Simplification of interpretive soils information is essential if maximum use is to be obtained. It is also necessary that every effort be made to coordinate soil survey interpretations with others that are dealing with the land. As rapidly as possible all interpretations should be supported by irrefutable data supporting the ratings made for each soil property. The cooperation of research workers, at all levels, and of soil engineers, should be actively solicited in the development of interpretive tables for soils. The acceptance of soil survey interpretation depends, to a large extent, on the inputs of those dealing with soils in every phase of land use.

SPECIFIC RECOMMENDATIONS

It is recommended that this committee be continued with the following changes made in the committee charges:

1. The committee on Application and Interpretation of Soil Surveys to be assigned specific soil properties to concentrate on. Suggestions are:

   a) A continuous evaluation of sanitary landfills in each state.

   b) Specific recommendations on the rating of soils for the following properties.

      Landslides or slippage
      Load supporting capacity
      Subsidence

2. Investigate ADP analyses of engineering test data to determine central values (computerized values) for appropriate engineering properties.

COMMITTEE MEMBERSHIP

Chairman: L. E. Aull, Vice Chairman: C. A, McGrew

Members: W. B. Anderson	R. P. Sims
F. F. Bell	R. L. Carter
J. F. Brasfield	R. C. Deen
L. H. Burgess	R. L. Googins
B. T. Birdwell	M. E. Shaffer

Consultants: H, C. Dean, F. T. Ritchfe, J. A. Phillips

Guide Sheet 3.--Soil limitation ratings for septic tank absorption fields

Item affecting use	Degree of soil limitation		
	Slight	Moderate	Severe
Permeability class[1/]	Rapid[2/], moderately rapid, and upper end of moderate	Lower end of moderate	Moderately slow[3/], slow, and very slow
Hydraulic conductivity rate (Uhland core method)	More than 1 in./hr[2/]	1-0.6 in./hr	Less than 0.6 in./hr
Percolation rate (Auger hole method)	Faster than 45 min/in.[2/]	45-60 min/in.	Slower than 60 min/in.
Depth to water table	More than 72 in.	48-72 in.	Less than 48 in.
Flooding	None	Rare	Occasional or frequent
Slope	0-8 pct	8-15 pct	More than 15 pct
Depth to hard rock,[4/] bedrock, (not creviced, fractured, or cavernous) or other impervious materials	More than 72 in.	48-72 in.	Less than 48 in.
Depth to creviced, fractured, or cavernous bedrock[5/]	More than 72 in.	48-72 in.[2/]	Less than 48 in.
Stoniness class[6/]	0 and 1	2	3, 4, and 5
Rockiness class[6/]	0	1	2, 3, 4, and 5

1/ Class limits are the same as those suggested by the Work-Planning Conference of the National Cooperative Soil Survey. The limitation ratings should be related to the permeability of soil layers at and below depth of the tile line.

2/ Indicate by footnote where pollution is a hazard to water supplies.

3/ In arid or semiarid areas, soils with moderately slow permeability may have a limitation rating of moderate.

4/ Based on the assumption that tile is at a depth of 2 feet.

5/ Rate severe in all areas of karst topography.

6/ For class definitions see Soil Survey Manual, pp. 216-223.

Guide Sheet 4.--Soil limitation ratings for sewage lagoons

Item affecting use	Degree of soil limitation		
	Slight	Moderate	Severe
Depth to water table (seasonal or year-round)	More than 60 in.	40-60 in.1/	Less than1/ 40 in.
Permeability	Less than 0.6 in./hr2/	0.6-2.0 in./hr.2/	More than 2.0 in./hr
Depth to bedrock (not creviced, fractured, or cavernous)	More than 60 in.	40-60 in.	Less than 40 in.
Depth to creviced, fractured, or cavernous bedrock3/	More than 72 in.	48-72 in.	Less than 48 in.
Slope	Less than 2 pct	2-7 pct	More than 7 pct
Coarse fragments, less than 10 inches in diameter: percent, by volume	Less than 20 pct	20-50 pct	More than 50 pct
Percent of surface area covered by coarse fragments more than 10 in. in diameter	Less than 3 pct	3-15 pct	More than 15 pct
Organic matter	Less than 2 pct	2-15 pct	More than 15 pct
Flooding4/	None	None	Soils subject to flooding
Soil groups (Unified)5/ (rated for use mainly as floor of lagoon)	GC, SC, CL, and and CH	GM, ML, SM, and MH	GP, GW, SW, SP, OL, OH, and PT

1/ If the floor of the lagoon is nearly impermeable material at least 2 feet thick, disregard depth to watertable.

2/ If bedrock is creviced, fractured, or cavernous, and soil is less than 72 inches thick, increase rating one class.

3/ Rate severe in all areas of karst topography.

4/ Disregard flooding if it is not likely to enter or damge the lagoon, (low velocity and the depth less than about 5 feet.)

5/ For interpretations for material for embankments see "Embankments, dikes, and levees."

Exhibit 3

Guide Sheer 7.--Soil limitation ratings for trench-type sanitary landfills[1/]

tem affecting use	Degree of soil limitation		
	Slight[2/]	Moderate[2/]	Severe
Depth to seasonal high water table	Not class determining if more than 72 in.		Less the" 72 in.
Soil drainage class	Excessively drained, somewhat excessively drained, well drained, and some[3/] moderately well drained	Somewhat poorly drained and some[3/] moderately well drained	Poorly drained and very poorly drained
Flooding	None	Rare	Occasional or frequent
Permeability[4/]	Less than 2.0 in/hr	Less than 2.0 in/hr	More than 2.0 in/hr
Slope	o-15 pct	15-25 pct	More than 25 pct
Soil texture[5/] (dominant to a depth of 60 I".)	Sandy loam. loam silt loam, sandy clay loam	Silty clay loam[6/] clay loam. sandy clay, loamy sand	Silty clay, clay muck, peat. gravel, sand
Depth to bedrock[7/]	More than 72 in.	More than 72 in.	Less than 72 in.
Hard rippable	More than 60 in.	Less than 60 in.	Less than 60 in.
Stoniness class[8/]	0 and 1	2	3, 4, and 5
Rockiness class[8/]	0	0	1, 2, 3, 4, and 5

1/ Based on soil depth (5-6 feet) commonly investigated in making soil surveys.

2/ If probability is high that the soil material to a depth of 10-15 feet will not alter a rating of slight or moderate, indicate this by an appropriate footnote, as Probably slight to a depth of 12 feet," or "Probably moderate to a depth of 12 feet."

3/ Soil drainage classes do not correlate exactly with depth to seasonal water table. The overlap of moderately well drained soils into two limitation classes allows some of the wetter moderately well drained soils (mostly in the Northeast to be given a limitation rating of moderate.

4/ Reflects ability of soil to retard movement of leachate from the landfills; may not reflect a limitation in arid and semiarid areas.

5/ Reflects ease of digging and moving (workability) and trafficability in the immediate area of the trench "here there may not be surfaced roads.

6/ Soils high in expansive clays may need to be given a limitation rating of severe.

7/ If probability is high that the soil is underlain with creviced, fractured, or cavernous bedrock in "I "ear the bottom of the proposed trench and there is a hazard of pollution of underground water, indicate by appropriate footnote, such as "Creviced limestone bedrock probable within excavated depth."

8/ For class definitions see Soil Survey Manual, pp. 216-223.

Exhibit 4

Guide Sheet 8.--Soil limitation ratings for area-type sanitary landfills

Item affecting use	Degree of soil limitation		
	Slight	Moderate	Severe
Depth to seasonal[1/] water table	ore than 60 in.	40-60 in.	Less than 40 in.
Soil drainage[1/] class	xcessively drained, somewhat excessively drained, well drained, and moderately well drained	Somewhat poorly drained	Poorly drained and very poorly drained
Flooding	one	Rare	Occasional or frequent
Permeability[2/]	ot class determining if less than 2 in./hr		More than 2 in./hr
Slope	-8 pct	8-15 pct	More than 15 pct
Depth to creviced, fractured, or cavernous bedrock	ore than 72 in.	48-72 in. and permeability is slower than 0.6 in./hr	Less than 48 in.

1/ Reflects influence of wetness on operation of equipment.

2/ Reflects ability of the soil to retard movement of leachate from landfills; may not reflect a limitation in arid and semiarid areas.

SOUTHERN REGIONAL SOIL SURVEY WORK-PLANNING CONFERENCE

May 2, 3, 4, 1972 - Blacksburg, Virginia

committee v — Handling Soil Survey Data

Chairman: G. R. Craddock
Vice Chairman: H.H. Bailey

Members:

R. L. Blevins	C. S. McKee
K. Brown	J. Melton
C. W. Crockett	J. D. Nichols
R. F. Deaver	E. M. Rutledge
H. A. Fribourg	

charges

1. Evaluate coding system for pedon data and suggest practical uses of ADP in handling soil survey data.

2. Consider methods of assembling and evaluating data that will go into ADP and,

(a) make specific recommendations for standardization of ADP in southern region

(b) consider a change in Pedon data collection procedures so laboratory data can be recorded where complete soil descriptions of properly classified soils are on file.

The "Coding system for Pedon Data for the National Cooperative Soil Survey" and attachment C -"Comments on Pedon Data Subsystem for Soil Survey" (prepared by D. W. Swanson) were distributed in January to committee members for study and hopefully trial'use. Also, each committeeman was asked to respond to the charges set forth by the executive committee.

Responses from committee members indicate there has been insufficient time to fully digest the material and insufficient time to accumulate much experience in printouts of soil user or interpretative maps and other kinds of information since this material became available. The Fort Worth office has tested several soil user (soil interpretative) maps at cell sizes of 40 and 160 acres of Oklahoma City, Oklahoma. There is an apparent need for more pilot studies of soil user maps of the suitability, limitation or potential nature.

A report of ADP activities by the Fort Worth office was presented by Dr. L. J. Bartelli. Examples of user maps of Oklahoma City, Oklahoma were made available. Discussion included use of ADP in correlation activities and the need for rapid means of getting soil survey information to users.

In order to give uniformity within the Southern Region for ADP, it is recommended that the Coding System for Pedon Data for the Rational Cooperative Soil Survey be modified to accomodate changes suggested in "Comments on Pedon Data Subsystem for Soil Survey" and be used as the standard for recording pedon data in the Southern Region. Perhaps some consideration should be given to incorporation of routine soil test information in the future.

Some committee members reacted favorably to the proposal "that laboratory data can be recorded in data banks provided that complete soil descriptions are on file and soil have been properly classified." It is recognized that in many cases complete physical and chemical characterization data will not be available and that partial data may be only available.

Although it was not a part of the charge of the committee to evaluate the use of ADP for parts of soil survey manuscripts, this procedure is being tested in the South Region. Early indications are that engineering tables and other tables can be printed out from ADP data that are available on the standard Soil series description.

This committee also encourages that special care be given toward accurately recording all information in soil descriptions especially in the physical and chemical properties section.

It is recommended:

1. That "the Coding System for Pedon Data for the National Cooperative Soil Survey" and modifications called for in attachment C - Comments on Pedon Data Subsystem for Soil Survey be accepted as the standard system for recording soil data in the Southern Region.

2. That ADP programs developed for the National. Cooperative Soil Survey be made available to cooperative agencies for data processing in order to avoid duplication of time and effort in developing programs and to provide for uniformity within the regions.

3. That further study be given to kinds of user maps that can be generated from ADP which can be used in land use planning.

4. That laboratory data be accepted for soils Pedon Data provided that acceptable descriptions are on file and soils have been properly classified.

5. It is recommended that this committee be continued. Charges should be specific, since experience with use of ADP is somewhat limited.

The report was accepted.

SOUTHERN REGIONAL TECHNICAL WORK-PLANKING CONFERENCE
Blacksburg, Virginia, May 2-4, 1972

COMMITTEE VI SOIL MOISTURE AND TEMPERATURE

Chairman, R. B. Daniels
Vice-Chairman, R. E. Daniel1

CHARGES

1. Review and evaluate the collection and generalization of 2-year water table data in the southern region.

2. Update the 1965 soil temperature map and present the revised copy at the Blacksburg, Virginia meeting of the Southern Regional Soil Survey Work-Planning Conference.

COMMITTEE REPORT

Water-Table Data

Water table measurements over a Z-year period from 23 sites in South Carolina are summarized in Table 1 of the appendix. Measurements have been completed at 47 sites in North Carolina but generalization by a computer program developed by L. A. Nelson is incomplete. A list of soils on which water table data are available are given in the report of this committee dated 5/6/70. Additional series with one or more years water table data are listed in appendix Table 2.

This committee recommends that water table data from Mississippi, Oklahoma, Alabama. South Carolina, Tennessee, North Carolina and other areas be published as soon as possible. The information can gather dust in the files and be of little use to anyone, but once published, it can then be used to help others make decisions. If the story is interesting enough to warrant publication in a national journal, then this should be the vehicle for putting the information in print. However. the limited space available in most journals will permit only generalizations of data. To be of maximum use. the pedon description should be given along with the raw data in the table or a graph for each site. In many areas such as South Carolina, this would involve several pages so the main source for publication would be either a State Experiment Station Bulletin or Circular, or something like the Soil Survey Investigation Reports. Possibly a regional publication would be advisable.

Although considerable water table information is being collected we feel that the job is only partly finished. This information must be interpreted for its influence on soil genesis and land use. In an area as large as the southeast, it would be unusual for the same interpretations to be applied uniformly to all soils. For example, in much of the Atlantic and Gulf Coastal Plain wc have a flushing or percolating type of water regime in soils on broad flats (see A. A. Rode. 1965, Water Regimes of Soils and Their Types. From Pothvovedenie, April, 1965, p. l-23. Translated and published in English as OTS 60-21134). In a flushing type of saturated water regime, the rainfall in excess of that stored in the solum or upper C horizon moves into deeper layers. Here it becomes part of the ground water. During periods when additions to the ground water from rainfall moving through the soil exceeds the movement of water out of the aquifer, the water table may rise to various levels within the solum. The water table drops as additions of water become less than the loss through aquifer leakage and transpiration. The net movement of a water molecule in a flushing type of saturated water regime is through the soil into the ground water and then down and out of the soil-sediment system. The implications for movement of sewage effluent, pesticides, and other water soluble molecules should be apparent. Transit times are unknown, but from measurements in North Carolina it may take a water molecule as long as 100 years to move from the soil system through the aquifer into the stream system (Daniels, Gamble, and Holzhey, unpublished manuscript).

A modification of the flushing type of saturated moisture regime that occurs in rolling country such as the Piedmont is unsaturated downslope flow of water. Nutter. from Georgia, outlined the details in an article presented in the Field Soil Moisture Symposium given in New York City during the ASA meetings in August of 1971. This type of water movement is believed to be important in many dissected areas of the upper Coastal Plain and in the Piedmont and Mountains. Water enters the soil at the top of the hill or at eny place on the slope. A discontinuity in vertical permeability occurs somewhere near the base of the solum so horizontal downslope movement of water occurs. I" most areas this is unsaturated flow of water, but near the base of the slope it may become saturated flow. Nutter believes that very little water moves below this vertical discontinuity in permeability. Therefore, water-soluble molecules can be transported by this mechanism from one part of the landscape to another.

In contrast to the flushing or percolating type of saturated water regime is the non-flushing or non-percolating regime that may occur in some soils in our region. Wells set in soils in northeastern Oklahoma suggest that the solum may be saturated during some winter months, but the lower layers may have little if any water moving into them (Oral communication, J. Nichols). There is some evidence of this type of water regime occuring in certain clayey soils in the Red River Valley and some of the Glossaqualfs near Ville Platt, Louisiana (Oral communication, Dave Slusher). Little is known about this type of saturated water regime in our area, but if little or no water moves down through some of these soils it is obvious that a soil-water table at 10 inches does not have the same interpretation in a soil with a flushing regime as it does in a non-flushing regime.

The presence of non-flushing saturated moisture regime has not been verified in the southeast, but there are strong hints that it may occur. It is also probable that both types may be found in the same landscape. Thus a careful look at data available from Oklahoma should be made to determine whether or not a non-flushing saturated regime does exist. If this type of moisture regime can be verified, then we need to know what areas it occurs in. Caution should be exercised, however, so that an intermittent flushing regime produced by low or limited rainfall is not confused with a non-flushing regime produced by soil or sediment properties. We must also be careful that a downslope flushing saturated regime similar to the non-saturated flow described in Nutter is not confused with a non-flushing regime.

Soil Temperature

A map showing the soil temperature lines in the southeast region is attached (Figure 1). The lines on the map are wide in areas such as Florida, Texas, Oklahoma and parts of Tennessee. North Carolina and Virginia. The wide line is an attempt to show areas where no sharp altitude break occurs and the change from one temperature zone to another is diffuse. Some Florida data will illustrate. Two loamy, siliceous, Arenic Plinthaquic Paleudults in Alachua County were located about 0.3 miles apart. Pedon No. 2 was about 20 feet lower than No. 1. Over a two year period, 1970-1971, the temperature8 were 72.5^{o} at No. 1 and 68.9^{o} at No. 2.

A table showing the relationship between air temperature and 20-inch soil temperature at 12 stations in Kentucky for a period of 4 years (Table 3) is attached. It shows that the mean difference is 1.7°F (0.95%). From other measurements, the thermic-hyperthermic line goes through Alachua County, but apparently it is a zone, not a line. Parts of North Carolina and South Carolina have fairly sharp boundaries between the mesic and thermic zone. This boundary runs near the toe of the Blue Ridge front where abrupt changes in altitude take place.

The validity of the soil temperature boundaries varies considerably from area to area within the southeastern states (Table 4). The mesic-thermic boundary across Virginia and the northern part of North Carolina crosses the Piedmont where there is little change in altitude and a broad zone of change should be recognized. The boundary in southern North Carolina and South Carolina and Georgia closely follows the Blue Ridge front where abrupt changes in altitude and physiographic province occur. The boundary in Tennessee is sharp in places, the Highland Rim and Smokey Mountaina, for example, but in the Great Valley and the northern part of the state it crosses a single physiographic province and should be recognized as occuring over a wide transitional zone.

Measurements of soil temperatures in northern Arkansas end N. E. Oklahoma indicate that the Ozark Highlends are thermic, but the soils are very similar to those in Southern Missouri in the same physiographic province and the temperatures are within 1 to 2 degrees of being mesic. Rather than establish several splinter series it was decided to recognize the Ozark Highlands in Arkansas end Oklahoma as taxadjuncts of the mesic series in Missouri. The line is drawn at the contact between the Boston Mountains and the Ozark Highlands (Oral communication, L. J. Bartelli).

TABLE 4

Information Used to Draw Soil-Temperature Boundaries

Isothermic-Isohyperthermic

Puerto Rico	Soil Temperature

Thermic-Hyperthermic

Florida	Soil Temperature
Texas	Air Temperature

Mesic-Thermic

Virginia	Air Temperature
North Carolina	Air Temperature
South Carolina	Soil Temperature
Georgia	Air Temperature
Tennessee	Soil Temperature and air temperature
Kentucky	Soil Temperature
Oklahoma	Physiographic bias and air temperature
Arkansas	Physiographic bias, see text
Texas	Air Temperature

The mesic-thermic boundary in northwest Texas and western Oklahoma is a broad zone that crosses the high plains. Air temperatures change about one degree across a county so the zone may be two or three counties wide.

Several interesting relations exist between the soil temperature boundaries and cultivated and native vegetation. The cotton belt closely follows the mesic-thermic boundaries in most areas with the exception of northeast Virginia (Fig. 2). The citrus belt in Florida also closely parallels the boundary, but in south Texas the citrus belt is far removed from the thermic-hyperthermic boundary. We are not implying that soil temperatures are the controlling factors, but there may be considerable interaction with other factors.

Native vegetation of various kinds also closely parallels these temperature lines in some areas and not at all in other ways (Table 5 appendix). The mesic-thermic boundary in North and South Carolina illustrates these relations. Loblolly pine end sugarberry reproduce in the thermic but not in the mesic zone, whereas Eastern White Pine and Pitch Pine reproduce in the mesic area. We suggest that the attached tables outlining some of the relations between native vegetation and soil temperature be used as possible, not absolute guides. In areas, however, the vegetation may be helpful in deciding what temperature zone area should be placed. In areas such as Virginia, the understory may not live as long as the major tree species and therefore it may be a fairly sensitive indicator of soil temperature.

SUMMARY AND CONCLUSIONS

Water table levels available in various states in the southeast should be published so the information will be available to everyone concerned with this type of information. While more data are needed, there may be little value in collecting additional data for the same series in adjacent states.

We suggest the possibility of a non-flushing saturated moisture regime occurring in some soils. New work in areas where this may occur should be designed to either verify or refute the existence of this type of saturated water regime.

The complications of non-saturated downslope movement of water described by Nutter may have considerable bearing on soil use in large areas of the southeast. Water regime studies conducted in the Piedmont or mountains should try to characterize and evaluate this type of water movement.

Soil temperature boundaries between areas may be sharp or diffuse. Where the boundaries are sharp, then recognition of different series across the boundary is justified even though this boundary cuts across a county. Where the boundary is diffuse, we recommend that series change on county lines.

A strong relation exists in areas between native vegetation and soil temperature boundaries. Indicator plants probably can be used by soil scientists in helping make decisions in areas where soil temperatures are not known. But each area probably should develop the plants that are the best for their conditions.

RECOMMENDATIONS

Available water table data should be published within the next two or three years, either in one publication or several.

New water table studies should be designed to verify or negate the idea that non-flushing saturated water regimes exist in the southeast. In rolling country the studies should test the ideas of Nutter thst considerable downslope movement of water occurs in the unsaturated state.

Considerable emphasis should be placed on characterizing the non-saturated water regimes of soils in the southeast. This is in the realm of soil physics and the committee should be reorganized with this thought in mind.

We recommend that the interrelations between soil temperature and naturally reproducing vegetation be studied in detail in the field by a team of soil scientists and plant ecologists.

This committee should be continued.

COMMITTEE MEMBERSHIP

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TABLE 1

Water Table Measurements of Some Undrained Coastal Plain Soils in South Carolina Sept. 1969 - Sept. 1971

Soil Series	Number of Days Water Table Was Less Than 40"		30"		20"		10"	
	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year	1st Year	2nd Year
Charleston	234	167	147	45	25	0	6	0
Chipley	177	183	76	109	5	20	0	6
Craven	240	347	196	232	149	137	66	34
Dunbar	234	231	167	209	130	169	35	107
Eulonia	279	280	198	222	60	96	0	0
Foreston	76	231	30	200	6	52	0	3
Lenoir	96	126	80	78	58	54	28	20
Leon	264	182	241	43	30	18	5	0
Lumbee	351	339	296	254	254	244	139	151
Lynchburg	180	335	133	216	72	169	0	36
McColl	85	309	74	263	45	187	12	160
Meggett	266	365	245	342	216	303	185	220
Okeetee	361	365	316	353	189	266	117	184
Olanta	245	265	140	205	18	66	0	7
Rains	145	240	133	214	106	187	46	95
Rains	291	336	261	273	109	198	0	86
Rembert	136	273	99	198	81	175	67	135
Ridgeland	226	204	115	75	4	16	0	0
Seabrook	213	94	72	24	16	0	3	0
Seewee	274	365	223	355	144	169	22	73
Wadmalaw	365	270	255	230	186	135	164	122
Wahee	132	144	120	118	93	17	31	0
Yonges	353	365	256	192	166	177	136	97

TABLE 2

Water Table Data Available in Addition to That Listed in Committee VI Report Dated S/6/70

North Carolina:	
Aquod	
Typic Haplaquod	Murville
Ultic Haplaquod	Mascattee
Humod	
Entic Haplohumod	Rimini
Aquept	
Typic Humaquept	Rutledge
Psamments	
Aquic Quartzipsamment	Pactolus
Florida :	
Aquods	
Arenic Haplaquods	Immokalee, ona
Aeric Haplaquods	Myakka
Entic Haplaquods	Myakka, thin solum variant
Alf ic Haplaquods	Wabasso
Alfic Arenic Haplaquods	Oldsmar
Humods	
Arenic Haplohumods	Pomello
Psamments	
Aquic Quartzipsamments	Adamsville
Typic Quartzipsamments	Tavares
Haplaquodic Quartzipsamment	Tavares, brown layer variant
Aquents	
Spodic Psammaquents	Basinger
Aqualfs	
Arenic Ochraqualfs	Felda
Arenic Ochraqualfs	Pinellas

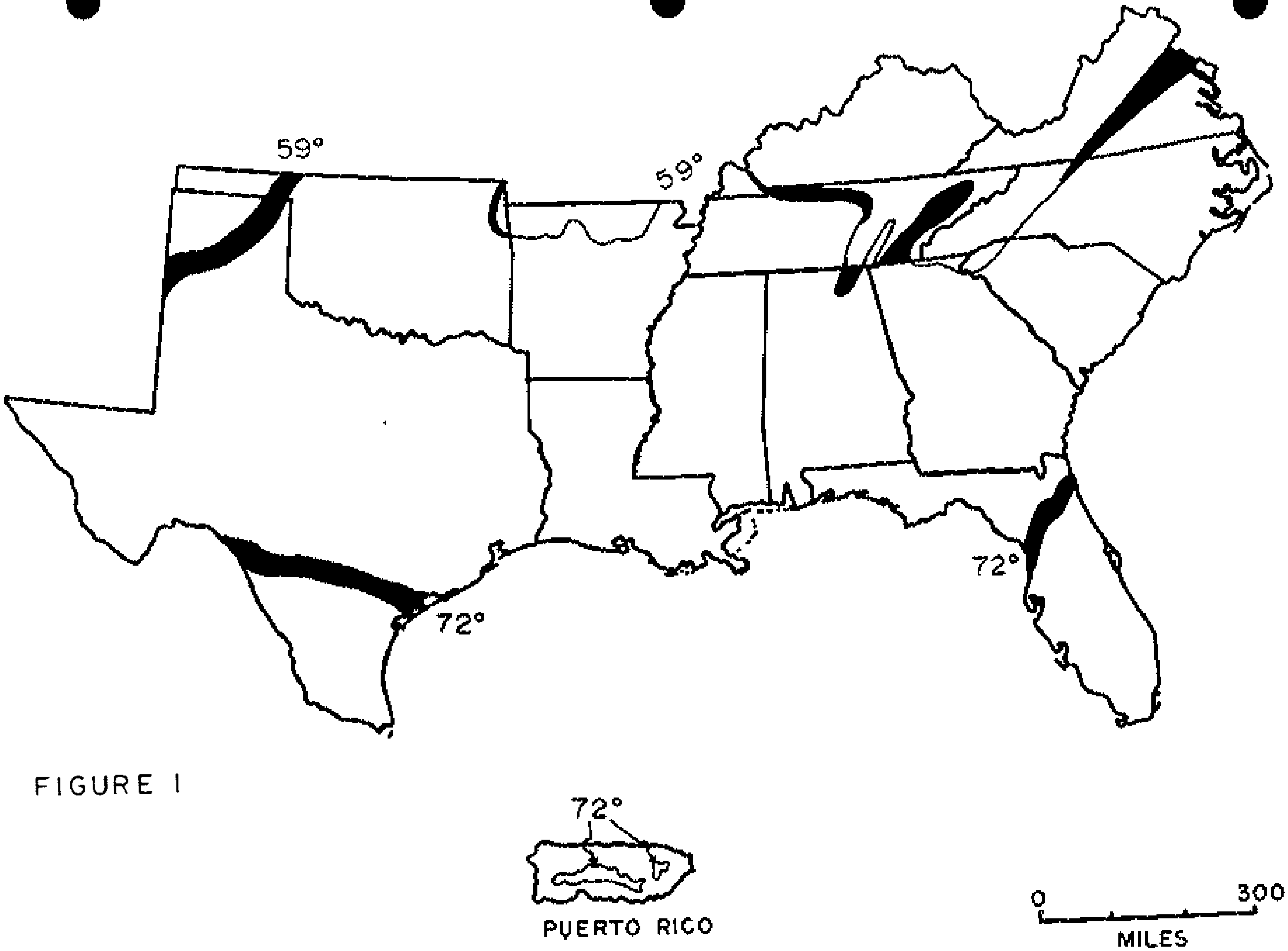

FIGURE I

TABLE 3
AVERAGE SOIL AND AIR TEMPERATURE IN KENTUCKY
1968-1971

Station		1967	1968	1969	1970	1971	$\overline{Ts}$	$\overline{Ta}$	DIFF. ($\overline{Ts}$-$\overline{Ta}$)
BARDSTOWN	Ts		58.2	57.6	58.8	59.7	58.6		2.9
	Ta		55.6	54.1	56.5	56.7		55.7	
BEREA	Ts		56.9	57.4	59.4	62.0	58.9		2.0
	Ta		56.3	55.7	57.5	57.9		56.9	
CAMPBELLSVILLE	Ts		56.5	57.0	58.1	59.0	57.7		1.0
	Ta		55.9	56.0	57.1	57.6		56.7	
FLEMINGSBURG	Ts		54.7	54.3	55.5	55.7	55.1		1.2
	Ta		53.2	53.3	54.6	54.6		53.9	
LEXINGTON	Ts	55.4	56.1	56.4	57.4	57.7	56.6		1.9
	Ta	54.5	54.1	54.6	54.6	55.6		54.7	
GLASGOW	Ts		57.0	57.7	58.5	58.9	58.0		1.8
	Ta		55.8	55.6	56.5	57.0		56.2	
GREENVILLE	Ts		58.2	58.8	59.2	m	58.7		2.2
	Ta		56.1	56.1	57.2	m		56.5	
HENDERSON	Ts		58.1	58.2	58.8	59.1	58.6		1.9
	Ta		56.1	56.1	56.9	57.5		56.7	
IRVINGTON	Ts		56.4	54.9	55.5	56.1	55.7		.2
	Ta		55.5	54.9	55.8	55.8		55.5	
HAYFIELD	Ts		59.3	61.1	60.5	m	60.3		2.6
	Ta		58.1	57.4	57.5	58.1		57.7	
PRINCETON	Ts		58.2	58.8	58.9	59.5	58.9		1.5
	Ta		56.8	57.0	57.5	58.2		57.4	
WILLIAMSTOWN	Ts		55.8	55.7	55.4	55.4	55.6		1.0
	Ta		54.1	54.0	55.0	55.1		54.6	

Mean difference = 1.7°F (0.95°C)

Ts = Average annual soil temperature at 20" below soil surface.
Ta = Average annual air temperature.

$\overline{Ts}$ = Mean annual soil temperature at 20" below soil surface for 4 years.
$\overline{Ta}$ = Mean annual air temperature for 4 years.
(Lexington station record is for 5 years)

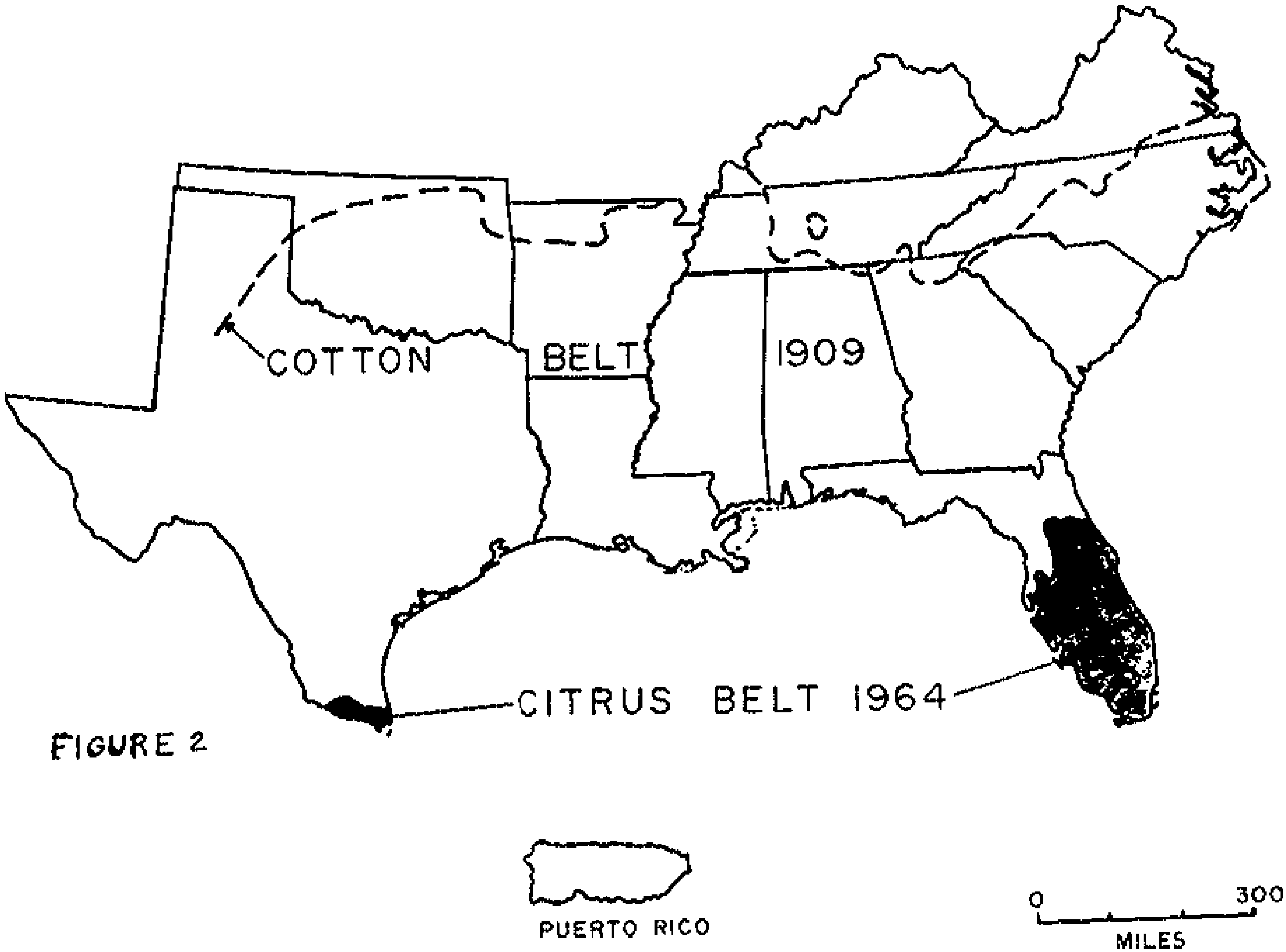

FIGURE 2

TABLE 5

PLANTS THAT MAY BE HELPFUL IN ESTABLISHING SOIL TEMPERATURE BOUNDARIES

COMMON NAME	SCIENTIFIC NAME	ALA.	ARK.	GA.	KY.	[illegible]	N.C.	S.C.	[illegible]	TENN.	TEX.	VA.	OKLA.
TREES Mesic 47-59°													
Table-Mountain Pine	Pious pungens				X			X	X				
Eastern White Pine	Pious strobus				X			X	X	X		X	
Pitch Pine	Pinus rigida				X	X		X	X	X			
Eastern Hemlock	Tsuga canadensis	X			X	X		X	X	X			
Sugar Maple	Acer saccharinum					X							
Yellow Buckeye	Aesculus octandra				X			X	X				
Ohio Buckeye	Aesculus glabra					X							
Yellow Birch	Betula alleghaniensis				X			X	X	X			
Sweet Birch	Betula lenta	X			X	X		X	X	X			
Hackberry*	Celtis occidentalis		X										
Butternut	Juglans cinerea				X								
Sweet Gum*	Liquidambar styraciflua				X			X	X				
Swamp White Oak*	Quercus bicolor					X							
Chestnut Oak	Quercus prims					X							
Black Locust	Robina pseudoacacia							X	X				
Peach leaf Willow	Salix amygdaloides											X	X

COMMON NAME	SCIENTIFIC NAME	ALA.	ARK.	FLA.	GA.	KY.	LA.	MISS.	N.C.	S.C.	TENN.	TEX.	VA.	OKLA.
Thermic 59-72°														
Ashe Juniper	Juniperus ashei											X		
Southern Redcedar*	Juniperus silicicola		X											
spruce Pine	Pinus glabra		X											
Loblolly Pine*	Pinus taeda					X			X	X			X	
Boxelder	Accer negundo			X										
River Birch	Betula nigra			X										
Hackberry*	Celtis occidentalis			X										
Sugarberry	Celtis laevigata					X			X	X				
Green Ash	Fraxinus pennsylvanica			X										
American Hotly	Ilex opaca		X											
Sweetgum*	Liquidambar styraciflua					X			X	X			X	
Red Mulberry	Morus rubra											X		
Ogeechee Tupelo	Nyssa ogeche			X										
Eastern Hophornbeam	Ostrya virginiana			X										
American Sycamore	Platanus occidentalis											X		
Eastern Cottonwood	Populus deltoides					X			X	X		X		
Black Cherry	Prunus serotina											X		
Southern Red Oak*	Quercus falcata		X								X			
Overcap Oak	Quercus lyrata			X					X	X	X			
Black Jack Oak	Quercus mirilsndica											X		
Chinkapin Oak	Quercus muehlenbergii											X		
Swamp Chestnut Oak	Quercus michauxii		X	X			X		X	X	X			
Water Oak	Quercus nigra		X			X	X		X	X	X			
Willow Oak	Quercus phellos					X			X	X	X			
Shumard Oak	Quercus shumardii			X						X	X			
Post Oak	Quercus stellata										X			

COMMON NAME	SCIENTIFIC NAME	ALA.	ARK.	FLA.	GA.	KY.	LA.	NC.	SC.	TENN.	TEX.	VA.	OKLA.
Hyperthermic 72°													
Sandpine	Pinus clausa			X									
Southern Redcedar*	Juniperus silicola			X									
Loblolly Pine*	Pinus taeda			X									
Southern Red Oak*	Quercus falcata			X									
Cabbage Palmetto	Sabal palmetto			X									

* Occurs in more than one temperate zone.

COMMON NAME	SCIENTIFIC NAME	ALA.	ARK.	FLA.	GA.	KY.	LA.	NC.	SC.	TENN.	TEX.	VA.	OKLA.
Thermic													
Pecan	Carya illinoensis				X					X	X		
Flowering Dogwood	Cornus florida				X								
Honeylocust	Gleditsia triacanthos										X		
Black Walnut	Juglans nigra										X		
Hyperthermic													
Flowering Dogwood*	Cornus florida				X								

Trees from Fowells, H.A. 1965. Silvics of forest trees of the United States, Agricultural Handbook 271, U. S. Forest Service, and Little, E. L. 1971. Atlas of the United States trees. Vol. 1. Conifers and Important Hardwoods. U.S. Forest Service. Mis. Pub. No. 1146.

COMMON NAME	SCIENTIFIC NAME	ARK.	FLA.	GA.	KY.	N.C.	OKLA.	S.C.	TENN.	TEX.	VA.
UNDERSTORY PLANTS											
Mesic											
Striped Maple	Acer pennsylvanicum			X		X		X	X		
Mountain Maple	Acer specatum			X		X		X	X		
Elder	Aralia				X	X		X	X		X
Jack-In-The-Pulpit	Arisaema				X	X		X	X		X
Sweet Fern	Comptonia				X	X		X	X		X
Pagoda Dogwood	Cornus alterniflora			X	X	X		X	X		
Beaked Hazelnut	Corylus cornuta			X	X	X		X	X		
Hay-Scented Fern	Dennstaedtia				X	X		X	X		X
Dwarf Bush Honeysuckle	Diervilla lonicera				X	X		X	X		X
Atlantic Leatherwood	Dirca palustris			X	X	X		X	X		X
Aromatic Wintergreen	Gaultheria				X	X		X	X		X
Mountain Laurel	Kalmia latifolia				X				X		
American Fly Honeysuckle	Lonicera canadensis			X		X		X	X		
Club Moss	Lycopodium				X	X		X	X		X
Wiggers	Maianthemum				X	X		X	X		X
Partridge Berry	Mitchella				X	X		X	X		X
Wood Sorrel	Oxalis				X	X		X	X		X
Brake or Bracken	Pteridium				X	X		X	X	X	X
Dwarf Chinkapin Oak	Quercus prinoides				X						
Red Rasberry	Rubus idaeus				X				X		
Blackberry	R. Occidentalis*				X						
Blackberry	R. canadensis*				X						
Scarlet Elder	Sambucus pubens				X						
American Elder	S. canadensis				X						

COMMON NAME	SCIENTIFIC NAME	ARK.	FLA.	GA.	KY.	N.C.	OKLA.	S.C.	TENN.	TEX.	VA.
Canada Yew, Ground Hemlock	Taxus canadensis			X	X	X		X	X		
Highbush Blueberry	Vaccinium corymbasum				X	X		X	X		X
Lowbush Blueberry	V. ungustifolium*				X	X		X	X		X
Witch Hobble	Virburnum alnifolium			X		X		X	X		
Thermic											
Red Buckeye	Aesculus pavia		X						X	X	
Painted Buckeye	Aesculus sylvatica	X	X		X	X		X			
Devils Walkingstick	Aralia spinosa*	X	X		X	X		X		X	
Pawpaw	Asimina triloba*	X	X		X	X		X			
Chittamwood	Bumelia lanuginosa										X
French Mulberry	Callicarpa americana								X	X	
American Hornbeam	Carpinus caroliniana*	X	X	X	X	X	X	X	X	X	
Common Buttonbush	Cephalanthus occidentalis		X			X		X			
Redbud	Cercis canadensis*									X	
Pepperbush	Clethra alnifolia*		X	X		X		X	X		
Swamp Dogwood or Roughleaf Dogwood	Cornus drummondii	X	X	X		X	X	X	X	X	
Flowering Dogwood	C. florida*		X							X	
Stiffcornel Dogwood	C. sticta	X	X		X	X		X			
Hawthorn	Cretaegus spp.*	X	X	X		X	X	X	X	X	
Swamp-Privet	Forestiera acuminata	X	X	X		X	X	X	X	X	
Witch-Hazel	Hamamelis virginiana*		X							X	
Possomhaw	Ilex decidus									X	
Gallberry	I. globra		X	X		X		X	X		
American Holly	I. opaca		X							X	
Yapon	I. vomitoria								X	X	
Red Mulberry	Morus rubra		X							X	

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COMMON NAME	SCIENTIFIC NAME	ARK.	FLA.	GA.	KY.	N.C.	OKLA	S.C.	TENN	TEX.	VA.
Waxmyrtle, southern bayberry	Nyrica cerifera		x	x		X		x	x	X	
Planertree	Planers aguatica		X			X		X			
Shining sumac	Rhus copallina*								X		
Smooth sumac	R. glabra*									X	
Dwarf Palmetto	Sabal minor		X								
Coastal Plain Willow	Salix caroliniana	x	x		x	x		X			
Creenbrier	Smilax spp.*									X	
Snowbell	Styrax americana	x	x		x	x		X			
Carolina Basswood	Tilia		X								
Poison Ivy	Toxicodendron									x	
Arrowwood	Viburnum dentatum	X	X		X	X		X			
Possumhew	V. nudum	X	X		X	X		X			
Rusty Blackhaw	V. rufidulum									X	
Hyperthermic											
Rosemary	Ceratiola ericoides		X								
Scrub Palmetto	Sabal etonia		X								
saw Palmetto	Serenoa repends		X								
Chapmanoak	Quercus chapmanii		X								
Turkey Oak	Q. laevis		X								
Scrub Oak	Q. myrtifolia		X								
Live Oak	Q. virginiana		X								
Sand Live Oak	Q. virginiana var. maritima		X								

Understory from Fowells, A. A., 1963. Silvics of Forest Trees of the United States, Agricultural Handbook, 271, U. S. Forest Service

COMMON NAME	SCIENTIFIC NAME	FLA.	GA.	N.C.	S.C.	S. TEX.	TEX.	VA.	W. OKLA.
GRASSES									
Thermic									
Big Blue Stem	Andropogon gerardi	X							X
Sand Bluestem	A. hallii						X		X
Creeping Bluestem	Stolonifer*	X							
Splitbeard Bluestem	ternarius*	X							
Oldfield Threeawn	Aristida oligantha	X			X				X
Switch cane	Arundinaria tecta	X							
Sand Lovegrass	Eragrostis trichodes						X		X
Carolina Jointtail	Manisuris cylindrica*		X	X	X	X			X
Cutover Muhly	Muhlenbergia expansa	X							
Lindheimer Muhly	M. lindheimeri						X		
Seep Muhly	M. reverchoni					X	X		X
Switchgrass	Panicum virgatum	X	X	X	X		X		X
Texas Bluegrass	Poa arachnifera						X		X
Curtis Dropseed*	Sporobolus curtissii	X							
Broadleaf Uniola	Uniola latifolia	X					X		

*Can extend slightly into hyperthermic area.

WEEDS									
Thermic									
Common Arrowhead	Sagittaria latifolia					X			
Japanese brome, chess	Bromus japonicus	X							
Field Sandbur, Burgrass	Cenchrus incertus		X	X	X			X	

COMMON NAME	SCIENTIFIC NAME	FLA.	GA.	N.C.	S.C.	S. TEX.	TEX.	VA	W. OKLA.
Purple Nutsedge. coco-grass	Cyperus rotundus		x	x	x			X	
Mauseear chickweed	Cerastium bulgatum					X			
Spatterdock	Nuphar luteum					X			
Woolly Croton	Croton capitatus	X				X			
Flowering Spurge	Euphorbia corollata					X			
Velvetleaf, piemarker, butterprint	Abutilon theophrasti					X			
Field Bindweed	Convolvulus arvensis					X			
Jimsonweed	Datura stramonium					X			
Common Yarrov	Achillea millefolium					X			
Giant Ragweed	Ambrosia trifida*	X							
Prickly lettuce	Lacruca serriola	X							
Dandelion	Taraxacum officinale					X			

Grasses from Leithead, Ii. L., Yarlett, L. L. and Shiflet, T.N. 1971. 100 Native Forage Grasses in 11 Southern States, USDA. SCS, Agricultural Handbook. No. 389. Weeds from :Agricultural Handbook No. 366. Selected Weeds of the United States. ARS, USDA.

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE

May 1972 - Blacksburg, Virginia

Committee VII: Regional genesis and characterization projects

Chairman: B. F. Hajek

Vice Chairman: J. A. DeMent

Charges to Committee:

1. Compile a current list of benchmark soils and submit a list for approval.

2. Outline a plan of operation that, if followed, will complete the task and make benchmark soil data available in a form which can be referenced.

3. Review regional investigation needs.

Committee Report:

A list of benchmark soils was obtained from each state. These were obtained by request of this committee, which suggested that procedures recommended in the proceedings of the last national and regional work-planning conferences be considered in series selection. An inventory of available data was also requested; however, response to the data inventory request was not complete.

A total of 211 series were submitted. Most great groups in the south region were represented; however, some multi-series families are represented by more than one series. A suggested list of benchmark soils is given in Appendix I.

The committee members responding to charge 2 recommended that specific assignments of analytical and compilation tasks will be needed before any procedures for publication can be started. If assignments are made the task will be difficult if each series must be published separately.

Recommendations:

1. We recommend that each state start and maintain a benchmark data file on each benchmark soil listed for the state and assist other states by supplying data they obtain on benchmark soils. Copies of this data would be supplied on request. When available, ADP could supplement and in some cases replace these files.

2. When sufficient data has been accumulated the committee recommends publishing as groups of benchmark soils. Grouping at the suborder level would significantly reduce the number of publications needed (about 25).

3. We recommend that the committee be continued and address itself to charges 2 and 3 and recommendation 2.

Committee Members:

L. Desselle	C. L. Girdner
V. E. Nash	J. F. Mills
V. W. Carlisle	C. I. Rich
H. J. Byrd	B. J. Wagner
R. C. Glenn	B. L. Allen

APPENDIX I
BENCHMARK SOILS

Alabama

Decatur	- Rhodic Paleudults, clayey, kaolinitic, thennic
Red Hay	- Rhodic Paleudults, fine-loamy, siliceous, thermic
Sumter	- Rendollic Eutrochrepts, fine-silty, carbonatic, thermic
Troup	- Grossarenic Paleudults, loamy, siliceous, thermic
Hartsells	- Typic Hapludults, fine-loamy, siliceous, thermic
Houston	- Typic Chromuderts, very-fine, montmorillonitic, thermic

Arkansas

Amagon	- Typic Ochraqualfs, fine-silty, mixed, thermic
Amy	- Typic Ochraquults, fine-silty, siliceous, thermic
Foley	- Albic Glossic Natraqualfs, finr-.silty, mixed, thermic
Lafe	- Glossic Natrudalfs, fine-silty, mixed, thermic
Stuttgart	- Typic Natrudalfs, fine, montmorillonitic, thermic

Florida

Lakeland	- Typic Quartzipsamments, thermic, coated
Leon	- Aeric Haplaquods, sandy, siliceous, thermic
Terra Cria	- Typic Medisaprists, euic, hyperthermic
Pampano	- Typic Psammaquents, siliceous, hyperthermic
Astatula	- Typic Quartzipsamments, siliceous, hyperthermic, uncoated
Perrine	- Typic Haplaquents, coarse-silty, carbonatic, hyperthermic
Lynn Haven	- Typic Haplaquods, sandy, siliceous, thermic

Georgia

Stilson	- Arenic Plinthic Paleudults, loamy, siliceous, thermic
Tifton	- Plinthic Paleudults, fine-loamy, siliceous, thermic
Gwinnett	- Typic Rhodudults, clayey, kaolinitic, thermic

Louisiana

Calhoun	- Typic Glossaqualfs, fine-silty, mixed, thermic
Commerce	- Aeric Fluvaquents, fine-silty, mixed, nonacid, thermic
Crowley	- Typic Albaqualfs, fine, montmorillonitic, thermic
Moreland	- Vertic Hapludolls, fine, mixed, thermic
Ruston	- Typic paleudults, fine-loamy, siliceous, thermic
Sharkey	- Vertic Haplaquepts, very-fine, montmorillonitic, nonacid, thermic
Kenner	- Fluvaquentic Medisaprists, euic, thermic

Mississippi

Bude		Glossaquic Fragiudalfs, fine-silty, mixed, thermic
Memphis		Typic Hapludalfs, fine-silty, mixed, thermic
McLaurin	-	Typic Paleudults, coarse-loamy, siliceous, thermic
Savannah	-	Typic Fragiudults, fine-loamy, siliceous, thermic
Grenada		Glossic Fragiudalfs, fine-silty, mixed, thermic
Mantachie	-	AericFluvaquents, fine-loamy, siliceous, acid, thermic
Providence	-	Typic Fragiudalfs, fine-silty, mixed, thermic
Kipling		Veric Hapludalfs, fine, montmorillonitic, thermic
Susquehanna	-	Vertic Paleudalfs, fine, montmorillonitic, thermic

North Carolina

Aycock	-	Typic Paleudults, fine-silty, siliceous, thermic
Cecil	-	Typic Hapludults, clayey , kaolinitic, thermic
Craven	-	Aquic Hapludults, clayey, mixed, thermic
Fannin	-	TypicHapludults, fine-loamy , micaceous, mesic
Wagram	-	Arenic Paleudults, loamy, siliceous, thermic
Porters	-	Humic Hapludults, fine-loamy, mixed, mesic
Ponzer	-	Terric Medisapris ts,loamy, mixed, dysic, thermic
White Store	-	Vertic Hapludalfs, fine, mixed, thermic

Oklahoma

Bethany	-	Pachic Paleustolls, fine, mixed, thermic
Dennis	-	Aquic Paleudolls, fine, mixed, thermic
Dougherty	-	Arenic Haplustalfs, loamy, mixed, thermic
Durant	-	Vertic Argiustolls, fine, montmorillonitic, thermic
Eufaula	-	Psammentic Paleustalfs, sandy, siliceous, thermic
Foard	-	Typic Natrustolls, fine, montmorillonitic, themmic
Nobscott	-	Arenic Paleustalfs, loamy, mixed, thermic
Parsons	-	Mollic Albaqualfs, fine, mixed, thennic
Renfrow	-	Udertic Paleustolls, fine, mixed, thermic
Stephenville	-	Ultic Haplustalfs, fine-loamy, siliceous, thermic
St. Paul	-	Pachic Argiustolls, fine-silty, mixed, thermic
Vanoss	-	Udic Argiustolls, fine-silty, mixed, thermic
Yahola	-	Typic Ustifluvents, coarse-loamy, mixed (calcareous), thermic

Puerto Rico

Bayamon	-	Tropeptic Eutrorthox, clayey, mixed, isohyperthermic
Candelero	-	Aeric Tropaqualfs, fine-loamy, mixed, isohyperthermic
Coloso	-	Aeric Tropic Fluvaquents, fine, mixed, nonacid, isohyperthermic
Coto	-	Tropeptic Haplorthox, clayey, kaolinitic, isohyperthermic
Fraternidad	-	Udic Chromusterts, very-fine, montmorillonitic, isohyperthermic

Puerto Rico (continued)

Humatas	Typic Tropohumults, clayey, kaolinitic, isohyperthermic
Nipe	Typic Acrorthox, clayey, oxidic, isohyperthermic
Pandura	Typic Eutropepts, loamy, mixed, isohyperthermic, shallow
Vega Alta -	Plinthic Tropudults, clayey, mixed, isohyperthermic

South Carolina

Conagree -	Typic Udifluvents, fine-loamy, mixed, nonacid, thermic
Iredell -	Typic Hapludalfs, fine, montmorillonitic, thermic
Lynchburg -	Aeric Paleaquults, fine-loamy, siliceous, thermic
Rains	Typic Paleaquults, fine-loamy, siliceous, thermic
Yonges	Typic Albaqualfs, fine-loamy, mixed, thermic

Tennessee

Bodine	Typic Paleudults, loamy-skeletal, siliceous, thermic
Cumberland -	Rhodic Paleudalfs, fine, nixed, thermic
Dellrose -	Humic Hapludults, fine-loamy, mixed, thermic
Dickson	Glossic Fragiudults, fine-silty, siliceous, thermic
Fullerton -	Typic Palcudults, clayey, kaolinitic, thermic
Talbott	Typic Hapludalfs, fine, mixed, thermic
Staser	Cumulic Hapludolls, fine-loamy, mixed, thermic

Texas (Revised March 1972)

Abilene	Pachic Argiustolls, fine, mixed, thermic
Amarillo -	Aridic Paleustalfs, fine-loamy, mixed, thermic
Austin	Typic Haplustolls, fine-silty, carbonatic, thermic (calciustolls)
Bowie	Fragic Paleudults, fine-loamy, siliceous, thermic
Brackett -	Typic Ustochrepts, loamy-carbonatic, thermic, shallow
Bryarly	Vertic Hapludalfs, fine, montmorillonitic, thermic
Castell	Ultic Paleustalfs, fine, mixed, thermic
Crockett -	Udertic Paleustalfs, fine, montmorillonitic, thermic
Denton	Vertic Calciustolls, fine, mixed, thermic
Duval	Aridic Haplustalfs, fine-loamy, mixed, hyperthermic
Elrose	Typic Paleudalfs. fine-loamy, siliceous, thermic
Hodgins	Ustollic Camborthids, fine-carbonatic, thermic
Houston Black -	Udic Pellusterts, fine, montmorillonitic, thermic
Kirvin	Typic Hapludults, clayey, mixed, thermic
Lake Charles -	Typic Pelluderts, fine, montmorillonitic, thermic
Lufkin	Vertic Albaqualfs, fine, montmorillonitic, thermic
Miles	Udic Paleustalfs, fine-loamy, mixed, thermic
Montell	Entic Pellusterts, fine, montmorillonitic, hyperthermic
Morey	Typic Argiaquolls, fine-silty, mixed, thermic
Norwood -	Typic Udifluvents, fine-silty, mixed, (calcareous), thermic
Olton	Aridic Paleustolls, fine, mixed, thermic

Texas (continued)

Pullman - Torrertic Paleustolls, fine, mixed, thermic
Reagan - Ustollic Calciorthids, fine-silty, mixed, thermic
Sarita - Grossarenic Paleustalfs, loamy, mixed, hyperthermic
Sorter - Typic Orchraqualfs, coarse-loamy, siliceous, thermic
Triomas - Ustalfic Haplargids, fine-loamy, mixed, thermic
Uvalde - Aridic Calciustolls, fine-silty, mixed, hyperthermic
Vernon - Typic Ustochrepts, fine, mixed, thermic
Victoria - Typic Pellusterts, fine, montmorillonitic, hyperthermic
Windthorst - Udic Paleustalfs, fine, mixed, thermic

Virginia (NE States)

Carbo - Typic Hapludalfs (Vertic), fine, mixed, mesic
Frederick - Typic Paleudults (Hapludults), clayey, kaolinitic, mesic
Tatum - Typic Hapludults, clayey, mixed, thermic

Kentucky (NE States)

Crider - Typic Paleudalfs, fine-silty, mixed, mesic
Dunning - Fluvaquentic Haplaquolls, fine, mixed, mesic
Eden - Typic Hapludalfs, fine, mixed, mesic
Jefferson - Typic Hapludults, fine-loamy, siliceous, mesic
Lawrence - Aquic Fragiudalfs, fine-silty, mixed, mesic
Lowell - Typic Hapludalfs, fine, mixed, mesic
Maury - Typic Paleudults, clayey, mixed, mesic
Melvin - Typic Fluvaquents, fine-silty, mixed, nonacid, mesic
Nolin - Dystpic Fluventic Eutrochrepts, fine-silty, mixed, mesic
Shelocta - Typic Hapludults, fine-loamy, mixed, mesic
Tilsit - Typic Fragiudults, fine-silty, mixed, mesic
Whitely - Typic Hapludults, fine-silty, mixed, mesic
Zanesville - Typic Fragiudalfs, fine-silty, mixed, mesic

Southern Regional Technical Work-Planning Conference
of the
Cooperative Soil Survey
Blacksburg, Virginia
May 2-4, 1972

REPORT OF COMMITTEE VIII

-Classification and Utilization of
Fresh and Salt Water Marshes-

David F. Slusher, Chairman
Victor W. Carlisle, Vice-Chairman

CHARGES:

1. Investigate and evaluate current criteria used for classification of both fresh and salt water marshes.

   (a) Determine effectiveness of these classifications for making predictions or interpretations.

2. Make recommendations concerning the optimum classification level for mapping marshes.

3. Make recommendations concerning the optimum level of intensity of mapping marshes.

REPORT OF COMMITTEE VIII

Charge one was to investigate and evaluate current criteria used for classification of both fresh and salt water marshes and to determine the effectiveness of these classifications for making predictions or interpretations.

It was felt that soil taxonomic units should be the basis for mapping marshes and charge one, with considerable elaboration, was divided into three parts as follows:

1. Examine criteria for classification of Histosols, Hydraquents, and Sulphaquents as now given in Soil Taxonomy. Locate inconsistencies and seek to clarify vague statements that might lead to misinterpretations. Investigate and evaluate the present criteria and prepare proposals for modification, addition or deletion of criteria needed to improve the system:

   In Histosols it is very difficult to standardize observed unrubbed fiber with unrubbed material retained on a sieve. In some cases, as in Florida, part of the retained material is not recognizable when in the soil mass. In other cases, some of the fibers recognizable in the undisturbed mass are destroyed before thay can be retained on the sieve. It might be well to state that unrubbed fiber is the fiber recognizable in undisturbed soils. Then rubbed fiber content could continue to be tied tightly to a retained fiber technique. The one property is related to the undisturbed soil morphology and the other, or the two together, relate to the degree of organic decomposition. The main problem with this approach is that there would be no quantitative procedure for actually measuring the unrubbed fiber.

Recommendation 1: That unrubbed fiber not be definitive for fibric, hemic, and sapric soil material but it should be estimated and recorded in soil descriptions.

Another conceptual question revolves around the organic volume. One concept, subscribed to by many, considers the organic volume as the volume fraction which can be calculated from the weight fraction based on relative densities of organic and mineral fractions. The other concept considers the organic fraction as a framework encompassing the whole soil. By this view, the mineral material simply fills spaces within the organic structure. By the first concept, the fiber percent would be based on the organic volume fraction, which would be less than the whole soil volume, By the second concept, the fiber percent is based on the whole soil volume and the mineral content is of no concern. In the one case, the organic matter content must be known and calculations are required. In the other case, the definition is treated as if the words "organic volume!' were not even there. We need a uniform convention in this area.

Recommendation 2: That fiber content of organic soil materials be measured or estimated as the percent of the whole soil volume rather than the organic volume.

Fiber percentages by definition exclude living fibers. Yet, we suspect it is more common to base them on roots plus fibers than to sort living from dead. This nay be particularly true where there is a mat of roots in the upper tier.

We cannot expect to change definitions at this time, but we can suggest clarification through advisories or other vehicles, and can recommend favored approaches.

In the opinion of one of the members, the greatest present problem with the classification of Histosols is the lack of standardized laboratory methodology. Field tests need to be verified by laboratory procedures designed in such a manner that the various results are not in conflict. Bulk density, sodium pyrophosphate, unrubbed and rubbed techniques presently used are not satisfactory because results are frequently conflicting.

It was suggested that investigation of two additional techniques for collecting data be used in the classification of Histosols. These are use of the thfrmobalance (loss of weight upon controlled heating) and application of ultrasonic techniques, perhaps in combination with various chemical treatments. Loss of water upon heating should reflect the stage of decomposition. There is reason to believe that ultrasonic procedures could be devised which would serve as standardized tests to referee the rubbed field tests in a similar manner as the glass electrode pH determination referees the various colormetric field techniques for determining soil reaction.

A question is raised relative to the Great Group Sulfihemists. (a) How much of the soil volume must contain 0.75% sulphur in order to qualify; (b) How much of the total S must be sulfides and how much elemental S, organic compounds, etc.; (c) What lab procedures are used for these determinations? Does the H_2O_2 oxidation procedure for estimation of sulfides (Handbook of Soil Survey Investigations - Field Procedures) approximate the biological oxidation that occurs in drained soils and give the same degree of acidity? Many workers feel it does not and is not suitable for estimation of sulphidic soil material.

There is some question regarding "Clastic" families. There are very fen Histosols in the country, if any, that fall in clastic families. Soils have been observed in the South that seemingly should fall into a clastic family, but do not meet the definition. We would pose the following questions: (a) Hhat is the basis for the 55% mineral matter? (b) Could this be lowered to 40%? About the 40% ash level seems to be the level where the field soil scientist feels a clear change in mineral content. At the present time, the range for clastic material is very narrow, i.e. 55% to 70% nsh if the mineral fraction is primarily clay; 40% ash would provide a broader slot for clastic families. It is suggested that the following definition of clastic families be investigated: "More than 40 percent mineral matter (total ash after ignition) as a weighted average of the organic materials within the subsurface and bottom tiers or a layer containing 40% or more mineral 15 cm (6") or more thick within the sub-surface tier. In some states, ash percentages between 40 percent and 70 percent are associated with Fluventic and Terric subgroups and the feeling is that clastic families are not needed.

The application of the sodium pyrophosphate extract color is still confusing, As we interpret the definition of Ilemic materials, the sodium pyrophosphate extract color is only used to eliminate either sapric or fibric material, therefore written, a reader is lead to believe that hemic material must have sodium pyrophosphate extract colors of 5/1, Gil, 6/2 or 7/3. As wc interpret the definition, this is not the case. We would therefore, suggest that item 2 of the definition of hemic material (p 4-3) be eliminated or an addition statement be added stating: "hemic materials are not limited to extract colors of 5/1, 6/1, G/2 or 7/3." This statement should also be added to Figure 24, page 4-6.

Experience has shown a need for subgroups of the Hydra-quents and Hydric Fluvaquents. Criteria and proposed definitions follow:

Proposed Definition of Subgroups of Hydraquents

Typic Hydraquents are the Hydraquents that

a. (alternative 1) have no horizon or combination of adjacent subhorizons 75 cm or more thick with an upper boundary between 20 cm to 1 meter of mineral soil surface that has an n-value of less than 1.

a. (alternative 2) have no horizon or combination of adjacent subhorizons 75 cm or more thick with an n-value of less than 1 with an upper boundary within 1 meter of the mineral soil surface.

Haplic (Fluvaquentic?) Hydraquents. Hydraquents like the Typic except for a.

Typic Hydraquents. The central concept of the Typic subgroup of Hydraquents is set on soils that are semifluid in all dominant layers within 1 meter of the mineral surface. If drained, the upper horizons dry irreversibly and wide cracks develop that will not close when soil is rewet. The underlying horizons will remain semifluid after drainage. The presence or absence of a histic epipedon or a buried Histosol is not considered particularly important compared to the effects of the semifluid lower horizons after drainage. The Typic subgroup is extensive in the deltaic coastal areas near the mouth of the Ilississippi River.

Haplic (Fluvaquentic?) Hydraquents are like the Typic except that they have thick lower horizons with low n-values. The lower horizons have been subject to wetting and drying in an earlier cycle of soil development and thus have consolidated reducing the maximum water content to less than 100 percent. Later periods of sedimentation deposited semifluid material over the consolidated layers. When drained, the upper semifluid horizon will consolidate and the soil will have low n-values throughout. These soils are not extensive in the U. S. They are considered intergrades to Haplaquents (Fluvaquents).

Proposed addition to Definition of Typic Fluvaquents

h. have no horizon 75 cm or more thick with an upper boundary within 1 meter of mineral soil surface that has n-value of more than 0.7.

Hydric Fluvaquents. Fluvaquents like Typic except for h.

Hydric Fluvaquents are like the Typic except that they are underlain with thick layers that have an n-value of more than 0.7. These are primarily clayey soils in tidal marshes and swamps that have been artificially drained. The soil material was deposited under water and prior to drainage, they were never air dry. When drained, the upper horizons dried irreversibly and wide cracks developed that do not close when soil is rewet. The underlying layers contain more than 100 percent water and remain semifluid to a depth of 1 meter or more.

Recommendation 3: That all the proposed revisions to Soil Taxonomy as well as Recommendations 1 and 2 be referred to Committee XIII (Changes in the classification system) for consideration.

2. Determine the effectiveness of the classification system for making interpretations. What are the significant characteristics to be recorded on interpretation sheets? Is a separate interpretation sheet needed for organic soils? If so, develop a format. In many cases the classification of the soil changes when the soil is drained. In these cases, the predictions may be for an entirely different series. How far should we go in making predictions about behavior for series A if drainage makes it series B? Comparisons should be made between interpretations at all levels in the classification system for Histosols, Hydraquents, and Sulphaquents. Do succeedingly lower categories produce the same or more refined interpretations?

The general reaction of the Committee is that the classification system is effective for making interpretations and that the soil interpretation sheets now being used are adequate, with minor revisions.

Recommendation 4: That total subsidence potential should be noted on the interpretation sheets for Histosols. Also. the n-values for use with mineral soils should be provided where appropriate.

It is pointed out that for the most part succeedingly lower categories of Histosols in general, do not produce more refined interpretations; however, more refined interpretations can be made and included on the interpretation sheets or in supplemental interpretive material.

In judging how far to go in predicting the properties of taxonomic unit B, formed from drained unit A, it is the general feeling to go as far as data will allow. Much of the usefulness of identifying sulfidic material is in recognizing the degree of potential acidity, should the soil be drained. The same is true for subsidence. The most public interest in our information at present probably is in the prediction of the behavior of series B.

The Soil Survey of Portions of Jefferson, Orleans, and St. Bernard Parishes, Louisiana, illustrates a considerable effort toward an organized presentation of vastly different soils. The mapping unit descriptions cover the soil conditions as they occurred at the time of mapping as well as a paragraph on how they would be expected to behave if drained.

In table 5, Engineering and Other Selected Use Interpretations, the soils are arrayed by groups and then by individual soils, in order of decreasing suitability for urban developments (page 100 and 107). The reason for this is that rating criteria did not provide important distinctions between soils. Ratings are also made for the "as is" condition as well as the conditions that would exist if the area were drained. (Appendix A)

In that report, only total subsidence potential, fire hazard, and presence of logs and stumps were significant factors considered unique to Histosols or Hydraquents and included as additional columns in table 4, Estimated Physical and Chemical Soil Properties (at that time there wasn't enough confidence in E-value to use it).

Recommendation 5: That coordinated series interpretation sheets show ratings for "when drained" conditions if drainage changes the series classification. This would distinguish between interpretations for drained phases of a series and interpretations for a different taxonomic unit that is the result of drainage.

3. Review "Criteria for rating soils for subsidence potential", (page 145, Proceedings of National Technical Work-Planning Conference of the Cooperative soil survey 1971) and make suggestions for improvement. Criteria for rating initial subsidence potential should also be considered.

In general, the Committee felt that the criteria for rating soils for subsidence potential as outlined in the 1971 Proceedings of the National Technical Work-Planning Conference was adequate; however, not a great deal of field experience or studies were available to substantiate it's effectiveness. It was noted, however, that the initial subsidence potential depends primarily upon how far the water table is lowered and the degree of drainage already accomplished at time of mapping. In addition, drained phases of thick Histosols still may have "initial" subsidence potential if the water table is lowered still further by deepening the ditches. It is suggested that we report estimated total subsidence potential upon drainage.

It was further suggested that we might want to consider development of some simple field kits for estimating volume change on drainage. This approach could range from collection of bulk samples and weighing on a simple inexpensive balance to the collection and draining of cores and weighings on milk (or other) scales. The closer to the field, the better in estimating initial subsidence of relatively undisturbed cores, and close cooperation between field and research personnel would be imperative.

There would be merit in relating subsidence to organic matter content of defined sections rather than just to thickness of organic materials. There should be some difference in total subsidence potential between organic layers with low mineral content and ones with high mineral content. Again, more precise classes may require many more measurements, including field determinations closely standardized by the laboratories. This is well within reach using available equipment. Variations of the field ignition technique, 19.5 of the new handbook of Soil Survey Investigations Field Procedures, could be used if closely standardized and monitored by the more accurate measurements "sing furnaces.

It is the feeling of the Committee that initial subsidence studies be encouraged wherever the opportunity presents itself, with special note as to the kind of soil materials present. This would assist in substantiating present estimates. Subsidence monitoring under various types of land use and management systems should also be encouraged, which will add to our over-all knowledge and interpretive expertise of soils with high shrinkage potential, Perhaps a work planning conference committee could undertake the assembly of all existing data on initial subsidence and continued subsidence in organic soils.

Charge two was to make recommendations concerning the optimum classification level for mapping marshes.

1. The categorical level of soil classification favored is the great group or subgroup though this decision is perhaps best made in each survey area on its own merits.

2. Soil series are used chiefly in naming map units through phases reflecting salinity, logs, soil acidity and drainage to phase the soil "nits being mapped in Louisiana. Elsewhere, seemingly, soil series provide adequate separation of soil areas. Organic soils in marshes seemingly need to reflect thickness of organic horizons.

Charge three was to make recommendations concerning the optimum level of intensity of mapping marshes.

The optimum intensity of mapping marsh lands should be determined independently for each survey area. Each survey should be designed to meet the present and expected land "se planning. Detailed surveys are needed where marsh lands are being developed for urban uses, as in the New Orleans area. Reconnaissance surveys are sufficient for range and wildlife.

Practical consideration must be given to several factors to determine frequency of observations. These include the following:

1. Planning needs for present and expected land uses
2. Accessibility and trafficability
3. Available transportation and equipment
4. Uniformity of area. Some marshes are extremely broad and uniform. In fact uniform delineations of 5,000 acres or more are not uncommon.
5. cost of survey. The cost of each survey should be weighed against its potential utility. In some marsh areas, one observation par 20 acres will not yield a significantly more precise or usable survey than one observation par 640 acres.

One survey area in each Louisiana, Alabama, South Carolina and Florida were studied to determine the accessibility of the center point of each quarter section CNI sample plot in the marshes. The distance from the nearest road to the canter point of each plot that must be traveled by boat and by foot were determined. The average distances were as follows:

State	Distance by boat (mi.)	Distance by foot (mi.)
Alabama	0.6	0.1
Florida	3.2 (air boat)	
South Carolina	1.5	0.2
Louisiana	4.2	0.2

The results of this study are that the average distance that must be traveled by boat to got within 0.1 to 0.2 miles of randomly selected points ranges from about 1/2 mile to over 4 miles. The extreme distance traveled by boat in this study ranged from 0 to 10 miles.

As a result, serious consideration should be given to making random field observations near boat trafficways rather than straight-line transects on foot across marshes.

Field mapping techniques and frequency of observation presently being used to identify and determine composition of marsh mapping units are as follows:

1. Transportation being used includes conventional boats, air boats, swamp or marsh buggies and amphihious tractors ("Trackster").

2. Sampling equipment includes spades, posthole diggers, bucket augers, mud augers and specially designed sampling devices.

3. Observation intervals vary between states and within states between survey areas. They vary from one observation per 20 acres to one observation per 640 acres depending on the intensity of the survey and the uniformity of the area. In some survey areas, observations are made along straight-line transects traveled by foot and others that are made at random adjacent to boat trafficways.

Acceptable alternatives to the previously discussed methods of defining mapping units are not presently available. Additional work is needed to improve photography and photo interpretation. Also, remote sensing has a high potential for improving marsh surveys.

Recommendation 6: That the intensity of mapping for each survey area be determined at the time work plans are formulated by considering the expected land use, soil patterns, equipment limitations, imagery and costs.

Recommendation 7: That the Committee be continued to work on charge one and that the name of the committee be changed to emphasize classification of soils in marshes.

Members of Committee VIII:

David F. Slusher, Chairman - Louisiana
V. W. Carlisle, Vice-Chairman - Florida

B. L. Allen - Texas
H. J. Byrd - North Carolina
J. Colom-Aviles - Puerto Rico
C. L. Coultas - Florida
J. h. DeMent - Texas
S. C. Holzhey - Washington, D. C.
R. W. Johnson - Florida
S. A. Lytle - Louisiana
E. A. Perry - Alabama
K. A. Tan - Georgia
R. D. Wells - South Carolina

Discussion:

Daniels - What field clues are used to help draw boundaries on maps?

Slusher - The marsh does have a landscape that can be interpreted by skilled observers. Vegetation, drainage pattern. kinds and distribution of open water bodies are also used. In places the transect data is relied upon to a large extent.

Bartelli - We need to think about potential for development of soils rather than just limitations for use.

APPENDIX A

Sample mapping unit description from the Soil Survey of Portions of Jefferson, Orleans, and St. Bernard Parishes

Lafitte muck (12). -- This is a very poorly drained thick organic soil at low elevations. The surface layer is very dark brown to black organic material 50 to 100 inches thick which is underlain by semifluid gray clay (table 3M). The vegetation is salt tolerant marsh grasses. Included in the mapping are small areas that have thin strata of clay in the upper 51 inches.

The water level is several inches above the soil surface most of the year (fig. 7). Permeability is rapid in the organic layers. Surface runoff is very slow or none. Available water capacity is high. Salt content is low to medium.

This soil will not readily support human foot traffic. Many nutria and muskrat trails in the surface mat of live roots make walking difficult. Layers of buried wood, stumps and logs are present in a few areas. It is poorly suited to common uses other than wildlife. The soil is suited to wetland wildlife, and is unsuited to openland and woodland wildlife.

If protected and drained:

The soil will consolidate and shrink with a resulting loss in elevation of 2 or 3 feet within a year after drainage. The organic layers may catch fire and burn when dry (figure 8). Continued subsidence at a slow rate over a long period will occur until all organic material above the water table has been oxidized. Acidity will increase after drainage. Salt content may inhibit certain ornamental plants for a few years, but eventually the salt will be removed by leaching from rainwater. Drainage ditches and levees arc difficult to construct because of the semifluid nature of the organic layers. Levees constructed from the organic materials shrink and wide cracks form. The capacity of ditches is gradually reduced because of the continual subsidence of the organic layers. Flooding may occur if pumps or levees fail. The organic materials will subside after drainage and the underlying semifluid layers are inadequate Support for most foundations, therefore, piling are generally needed. It is suited to openland and wetland wildlife, and unsuited to woodland wildlife.

Excerpt from the Soil Survey of Portions of Jefferson, Orleans and St. Bernard Parishes that precedes Table 5.

For some uses soils are rated under subheadings of Protected or Unprotected in table 5. Ratings given under Protected assume flood protection and drainage, by pumps if necessary, has been or will be installed. The limitations and factors affecting use are those that will still be encountered after protection. Ratings under Unprotected are for use of the soil without drainage improvements. Soils with levees and drainage at the time of the soil survey are rated only as protected, however, no evaluation of the adequacy of the drainage is implied.

Soil Group and Description - Soils in the survey area are placed in six broad groups (A-F) in table 5 according to several soil characteristics that affect their use and management for most urban purposes. Factors considered in grouping soils are: (1) dominant layers (organic or mineral), (2) texture of mineral layers, (3) consistency of mineral layers (consolidated or semifluid), (4) thickness of organic layers, and (5) presence or absence of buried logs and stumps. The groupings show in a general way the kind and degree of limitations for most urban uses. Also listed are dominant limiting factors or degree of limitation for most urban uses. Groups are listed in order of increasing degree of limitations. For example, for most urban uses, soils in Group A have fewer or less severe limitations than soils in Group B and soils in Group B have fewer or less limitations than Group C, etc. A soil with severe limitations in Group A is generally less costly to develop and is a more desirable site for most urban uses than a soil with severe limitations i" Group B or Group C.

The individual soils within each group are listed in order of increasing degree of limitations for most urban uses.

Table 5. Engineering and Other Selected Use Interpretations
(Protected--protected by levees with pumpoff drainage if needed,
Unprotected--subject to flooding.)

ASSOCIATION	SOIL NAME AND MAP SYMBOL	DEGREE OF LIMITATION AND CHIEF LIMITING FACTORS: HOMESITES AND LIGHT INDUSTRY (with community sewage systems)	LANDSCAPING, GARDENING AND LAWNS	PICNIC AREAS AND PLAYGROUNDS	STREETS AND ROADS	SOIL FACTORS AFFECTING: DRAINAGE	UTILITY POLES	TOPSOIL	SUITABILITY AS A SOURCE: HIGHWAY SUBGRADE MATERIAL	HIGHWAY SUBBASE MATERIAL	RESIDENTIAL FILL MATERIAL
	-Commerce silt loam	Protected: MODERATE - moderate wetness	Protected: SLIGHT - moderate wetness	Protected: MODERATE - moderate wetness, fair to good trafficability	Protected: MODERATE - fair traffic supporting capacity, moderate wetness	No significant factor	No significant factor	ood	air	Poor to not suit-able	od
	-Commerce silty clay loam	Protected: MODERATE - moderate shrink-swell potential surface layers, moderate wetness	Protected: MODERATE - moderate wetness, somewhat difficult to work	Protected: MODERATE - moderate wetness, fair trafficability	Protected: MODERATE - fair traffic supporting capacity, moderate wetness	No significant factor	lo significant factor	air to ood	air	Poor to not suit-able	ir to good
with consoli- or loamy layers at typically higher the area. potential, igh shrink- al, most signs for one buildings do	-Vacherie complex, gently undulating	Protected: MODERATE - very high shrink-swell potential subsoil, medium bearing strength	rotected: SLIGHT - moderate wetness	Protected: MODERATE - moderate wetness	Protected: MODERATE - fair traffic supporting capacity, moderate wetness, very high shrink-swell subsoil	No significant factor	Medium bearing strength	-18" good 8"+ poor	-18" fair, 8"+ poor	0-18" poo 18"+ not suitable	18" good, "+ poor
lling. Moderat ree of limita- urban uses e.	-Sharkey silty clay loam	Protected: SEVERE - very high shrink-swell potential, severe wetness, medium bearing strength	rotected: SEVERE - somewhat difficult to work, cracking when dry, severe wetness	Protected: SEVERE - severe wetness, fairly poor trafficability, cracking when dry	Protected: SEVERE - poor traffic supporting capacity, seve wetness, very high shrink-swell potential	No significant factor	Medium bearing strength	oor	oor	Not suit-able	or
	-Sharkey clay	Protected: SEVERE - very high shrink-swell potential, severe wetness, medium bearing strength	otected: SEVERE - severe wetness, difficult to work, cracking when dry	Protected: SEVERE - severe wetness, poor trafficability, cracking when dry	Protected: SEVERE - poor traffic supporting capacity, severe wetness, very high shrink-swell potential	No significant factor	Medium bearing strength	'oor	oor	Not suit-able	or
with thin e layers and that are under- lidated clayey h subsidence y high shrink- al and low gth. Most signs for one or	15--Gentilly muck	Protected: SEVERE - very high shrink-swell potential, medium subsidence potential, severe wetness, low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, medium subsidence potential, difficult to work, medium salinity, nutrient deficiency for some plants Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poo trafficability Unprotected: VERY SEVERE - flooding	Protected: SEVERE - poor traffic supporting capacity, very high shrink-swell potenti severe wetness, organic layers not suitable subgrade material Unprotected: VERY SEVERE - flooding	Medium subsidence potential, poor to fair side slope stability during initial construction of ditches	Low bearing strength, medium subsidence potential, high water table	ot uitable	ot uitable	Not suitable	t itable
ldings require e degree of most urban linage.	19--Allemands peat, firm substratum	Protected: SEVERE - high subsidence potential, severe wetness, moderate to severe fire hazard, very high shrink-swell potential, low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, medium salinity, high subsidence potential, nutrient deficiency for some plants Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poo trafficability Unprotected: VERY SEVERE - flooding	Protected: SEVERE - poor traffic supporting capacity, seve wetness, organic surface layers not suitable subgrade material Unprotected: VERY SEVERE - flooding	High subsidence potential, moderate to severe fire hazard, poor to fair stability of side slopes during initial construction of ditches	High subsidence potential, low bearing strength, high water table	ot uitable	-40" not uitable; 0"+ very oor to ot uitable	Not suitable	t itable

Table 5. Engineering and Other Selected Use Interpretations (continued)
(Protected--protected by levees with pumpoff drainage if needed.
Unprotected--subject to flooding.)

DESCRIPTION	SOIL NAME AND MAP SYMBOL	DEGREE OF LIMITATION AND CHIEF LIMITING FACTORS:				SOIL FACTORS AFFECTING:			ITABILITY	A SOURCE OF:	
		HOMESITES AND LIGHT INDUSTRY (with community sewage systems)	LANDSCAPING, GARDENING AND LAWNS	PICNIC AREAS AND PLAYGROUNDS	STREETS AND ROADS	DRAINAGE	UTILITY POLES	TOPSOIL	HIGHWAY SUBGRADE MATERIAL	HIGHWAY SUBBASE MATERIAL	RESIDENTIAL FILL MATERIAL
	3--Sharkey clay, miry subsoi variant	Protected: SEVERE - very high shrink-swell potential, severe wetness, low bearing strength	Protected: SEVERE - difficult to work, severe wetness, cracking when dry	Protected: SEVERE - severe wetness, poor trafficability, cracking when dry	Protected: SEVERE - poor traffic supporting capacity, severe wetness, very high shrink-swell potential	Logs and stumps, somewhat poor side slope stability during initial construction of ditches	Low to medium bearing strength, high water table	oor	Poor	ot uitable	Poor
ith clayey or urface layers 0 to 40 inches clayey or	9--Ijam clay, miry substratum	Protected: SEVERE - high shrink-swell potential, severe wetness, low bearing strength	Protected: SEVERE - severe wetness, difficult to work, cracking when dry	Protected: SEVERE - severe wetness, poor trafficability, cracking when dry	Protected: SEVERE - poor traffic supporting capacity, severe wetness, high shrink-swell potential	Logs and stumps, poor side slope stability during initial construction of ditches	Low bearing strength, high water table	-40" poor, 0"+ not uitable	0-40" poor, 40"+ not suitable	ot uitable	0-40" poor, 40"+ not suitable
ubsidence to slight fi ring strength . Foundation or two story re piling. of limitation uses after	0--Haplaquents, clayey	Protected: SEVERE - medium subsidence potential, low bearing strength, very high shrink-swell potential	Protected: SEVERE - severe wetness, difficult to work, medium subsidence	Protected: SEVERE - severe wetness, large cracks present when moist	rotected: SEVERE - poor traffic supporting capacity, very high shrink-swell potential severe wetness	Poor side slope stability during initial construction of ditches, logs and stumps	Low bearing strength, high water table	oor		ot uitable	Poor
	8--Hydraquents	Protected: SEVERE - very high shrink-swell potential, medium subsidence potential, sever wetness, low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, difficult to work, medium subsidence, cracking when dry Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poor trafficability, cracking when dry Unprotected: VERY SEVERE - flooding	rotected: SEVERE - poor traffic supporting capacity, very high shrink-swell potential severe wetness, organic layers nprotected: VERY SEVERE - flooding	Medium subsidence potential, logs, stumps, poor side slope stability during initial construction of ditches	Low bearing strength, medium subsidence potential, high water table	ot uitable	Poor to not suitable	ot uitable	Not suiteb'e
	4--Barbary soils	Protected: SEVERE - very high shrink-swell potential, medium subsidence potential, sever wetness, slight fire hazard low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, medium subsidence potential difficult to work, nutrient deficiency for some plants Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poor trafficability Unprotected: VERY SEVERE - flooding	rotected: SEVERE - poor traffic supporting capacity, very high shrink-swell potential organic layers not suitable subgrade material nprotected: VERY SEVERE - flooding	Medium subsidence potential, logs and stumps, poor stability of side slopes during initial construction of ditches	Medium subsidence potential, low bearing strength, high water table	ot uitable	Poor to not suitable	ot uitable	Not suitable
ith 15 to 50 ic material clayey layers	1--Allemands muck, drained	Protected: SEVERE - high subsidence potential, severe wetness, severe fire hazard, very high shrink-swell potential of mineral layers, low bearing strength	Protected: SEVERE - severe wetness, high subsidence potential, nutrient deficiency for some plants	Protected: SEVERE - severe wetness, poor trafficability	rotected: Severe - poor traffic supporting capacity, severe wetness, organic surface layers not suitable subgrade material	High subsidence potential, severe fire hazard	High subsidence potential, low bearing strength, high water table	ot suitable	0-41" not suitable; 41"+ very poor to not suitable	ot suitable	Not suitable
rate to ard, very hig tential, ength. ons for most r drainage.	!--Allemands peat	Protected: SEVERE - high subsidence potential, very high shrink swell potential of mineral layers, severe wetness, moderate to severe fire hazard, low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, high subsidence potential, nutrient deficiency for some plants Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poor trafficability Unprotected: VERY SEVERE - flooding	rotected: SEVERE - poor traffic supporting capacity, severe wetness, organic surface layers not suitable subgrade material	High subsidence potential, moderate to severe fire hazard, poor stability of side slopes during initial construction of ditches	High subsidence potential, low bearing strength, high water table	Not suitable	Not suitable	Not suitable	Not suitable

Table 5. Engineering and Other Selected Use Interpretations (continued)
(Protected--protected by levees with pumpoff drainage if needed.
Unprotected--subject to flooding.)

DESCRIPTION	SOIL NAME AND MAP SYMBOL	DEGREE OF LIMITATION AND CHIEF LIMITING FACTORS: HOMESITES AND LIGHT INDUSTRY (with community sewage system)	LANDSCAPING, GARDENING AND LAWNS	PICNIC AREAS AND PLAYGROUNDS	STREETS AND ROADS	SOIL FACT[ORS] AFFECTING: DRAINAGE	UTILITY POLES	S[U]ITABILITY AS SOURCE OF: TOPSOIL	HIGHWAY SUBGRADE MATERIAL	[HI]GHWAY [SU]BBASE [MA]TERIAL	RESIDENTIAL FILL MATERIAL
with 5 to 12 ceous organic semifluid	1--Kenner soils, drained	Protected: VERY SEVERE - very high subsidence potential, severe fire hazard, low bearing strength	Protected: SEVERE - very high subsidence potential, severe wetness, nutrient deficiency for some plants	Protected: SEVERE - severe wetness, poor trafficability	Protected: SEVERE - poor traffic supporting capacity, severe wetness, organic layers not suitable subgrade material	Very high subsidence potential, severe fire hazard	w bearing strength, very high bsidence potential, high ter table	ot uitable	Not suitable	ot uitable	Not suitable
sidence vere fire earing streng signs for one buildings g. Very seve or most urban sinage.	8--Kenner muck	Protected: VERY SEVERE - very high subsidence potential, severe wetness, severe fire hazard, low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - very high subsidence potential, severe wetness Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poor trafficability Unprotected: VERY SEVERE - flooding	Protected: SEVERE - poor traffic supporting capacity, severe wetness, organic layers not suitable subgrade material Unprotected: VERY SEVERE - flooding	Very high subsidence potential, severe fire hazard, poor side slope stability during initial construction of ditches	ow bearing strength, very high bsidence potential, high ater table	Not suitable	Not suitable	ot uitable	Not suitable
	7--Lafitte muck	Protected: VERY SEVERE - very high subsidence potential, severe fire hazard, severe wetness, low bearing strength Unprotected: VERY SEVERE - flooding	Protected: SEVERE - medium salinity, very high subsidence potential, severe wetness, nutrient deficiency for some plants Unprotected: VERY SEVERE - flooding	Protected: SEVERE - severe wetness, poor trafficability Unprotected: VERY SEVERE - flooding	Protected: VERY SEVERE - poor traffic supporting capacity, severe wetness, organic layers not suitable subgrade material Unprotected: VERY SEVERE - flooding	Very high subsidence potential, severe fire hazard, poor side slope stability during initial construction of ditches	ow bearing strength, very hig ubsidence potential, wetness, igh water table	Not suitable	Not suitable	ot uitable	Not suitable
with 5 to 12 organic t have layers ps and wood r semifluid s. sidence vere fire earing od fragments, ps result in sidence. signs for one buildings g. Severe or imitations fo es after	9--Maurepas muck, loggy	Protected: VERY SEVERE - very high subsidence potential, low bearing strength, severe wetness Unprotected: VERY SEVERE - flooding	Protected: SEVERE - very high subsidence potential, nutrient deficiency for some plants, severe wetness Unprotected: VERY SEVERE - flooding	Protected: SEVERE - poor trafficability, severe wetness Unprotected: VERY SEVERE - flooding	Protected: VERY SEVERE - poor traffic supporting capacity, severe wetness, organic layers not suitable subgrade material Unprotected: VERY SEVERE - flooding	Very high subsidence potential, severe fire hazard, logs and stumps, poor side slope stability during initial construction of ditches	ow bearing strength, very hig ubsidence potential, high ater table	Not suitable	Not suitable	lot suitable	Not suitable

SOUTHERN REGIONAL TECHNICAL WORK PLANNING CONFERENCE

Blacksburg, Virginia
May 2, 3. 4, 1972

Chairman: T. W. Green
Vice Chairman: W. Frank Miller

Committee IX. Soil Surveys for Forestry Use

Committee Charges:

1. Make recommendations regarding the optimum level of soil survey intensity in forested areas and,

   make recommendations regarding the appropriate classification level for surveys.

2. Suggest a" outline for format and content of mapping unit descriptions of soils in forested areas.

Report of Committee IX
Soil Surveys for Forestry Use

Charge l-Optimum Level of Soil Survey Intensity in Forested Areas

Committee IX agreed that the principles of soil survey on forested lands are no different than for other land uses and that no single level of intensity could be recommended. The general feeling of the committee was that mapping intensity will be variable but based primarily on (1) complexity of landscape units and soil patterns; (2) anticipated level or degree of use; (3) type of use--productivity predictions, assessment of land potential for multiple use; (4) smallest area significant to the resource manager. In addition to these variables, also to be considered is the concept that soil surveys should be considered as a" integral part of management costs, and therefore, the survey intensity will be somewhat dependent upon the anticipated value of the crop.

With respect to complexity of landscape units, each physiographic area has unique landscape patterns which must be recognized and identified for resource managers. For example, a flood plain three chains in width is a" important management unit and should be separated from side-slope to ridge-top "nits. The flood plain is generally a high quality bottomland hardwood site. The management criteria are different: the flood plain unit would be the mapping process, probably be of a medium intensity, while the side-slope or ridge-top units could be designated as low intensity "nits. species composition, use and management of these three areas are entirely different.

It is also obvious that the higher the anticipated level or degree of "se of a landscape unit, the greater should be the intensity. Recreational sites, impoundment areas, and other areas of special interest should receive the highest intensity of soil survey. In summary, the optimum level of soil survey intensity can be determined only after a study of the survey area and the needs of the resource manager.

Charge 1-A

Appropriate Level of Categorical Detail for Surveys in Forested Areas

The appropriate level of categorical detail of soil surveys is closely interrelated with the survey intensity; however, the ultimate survey objective for forested areas, as with any other areas, is to identify units significant for resource "se and management. The level at which units become significant may be at the series level, but in practice the level is generally at associations and complexes. Ideally, there should be one level in the classification system where maximum predictability could be found concerning resource "se and management criteria. This level should include a number of different soils that respond in the same way to kinds of use and types of management. In addition to the morphological aspects, external characteristics such as aspect, slope position, and elevation should be considered, primarily because the individual taxon cannot supply sufficient information concerning land use potential.

Since it is stated in a Comprehensive Classification that "the families are differentiated within a sub-group primarily on the basis of properties important to the growth of plants," phases of the soil family would, theoretically, be acceptable as the classification and mapping level for forested lands. However, the system still has some apparent weaknesses if this is put into practice. As an example, examination of the Humic Hapludults, fine loamy, mixed, mesic, within which are found the Porters and l'usquitee series, indicates that the two series arc actually very different soils from a resource and management standpoint. One is "shallow" and generally found on convex slopes, and the other "deep" and found in cove or concave slope positions. Species composition, productivity potential and management alternatives for the two series are completely different. It is recognized that in mapping we could phase these into two units, but the fact remains that here are two major soils of different potential in the same family. In the Piedmont there are ten different series in the clayey, kaolinitic, thermic family of the Typic Hapludults. If there are management differences between these soils should not they be identified and appropriate map units designed to keep them separate? If, however, the uses of these soils are similar, considerable time and money should be saved by mapping at the family level. Also in the Piedmont it is becoming more and more evident that there is little difference in the use and management of the clayey, kaolinitic, thermic family of the Rhodic Paleudults.

Based on these observations, it is questionable that there is a single appropriate categorical level of mapping units for surveys on forested lands if the objective of the surveys is to provide information for planning resource use and management. The classification system should and will eventually give us a needed level for mapping forested areas.

Charge 2

Suggest an Outline for Format and Content of Mapping Unit Descriptions of Soils in Forested Areas

A concensus of opinions of the committee members reflected a need for a format designed for a resource manager. All agreed on the general categories that need to be covered. The sequence, however, varied.

Based on the majority opinion, Committee IX submits the following format for consideration:

Unit Name and Symbol

The title of this section could vary. Most users are familiar with the name "Mapping Unit", The term "Landscape Unit" is gaining favor within the Forest Service. The name should not restrict the size of the unit to insignificant subdivisions.

General Description

Several titles were suggested as heading for this section. "Setting" was the most popular. The word "Environment" was also suggested.

This section would be a combination of two subjects 1) a brief description of the setting and 2) a brief description of the dominant soil type or phase. In describing the setting, emphasis would be on land forms, aspect, elevation and other observable physical features affecting use and management, The soil description would be very brief, but limitations such as depth to bedrock would be highlighted.

Vegetative Habitat

This section would identify dominant and/or indicator species in both the understory and overstory. Emphasis would be on recognizing those plant communities that naturally live and grow best on the particular site.

Inclusions

Here the inclusions would be identified and located on the landscape.

Classification

The majority felt that the dominant soil types should be classified at least at the family level. There was, however, some feeling that the classification should be omitted, and the Committee Chairman was of this opinion.

Remarks

Note any limiting site factors which might influence useage--such as erosion potential in relation to logging road layout.

No attempt was made to add management implications as a part of this format. Expansion to include interpretations poses no problem, but if this is added, it must be remembered that forested lands are used for other than timber production, so interpretation would have to be developed for all potential resource uses.

In Appendix I is illustrated a system that is gaining favor with the resource managers in the U.S. Forest Service. This is not a recommended format, but is presented as information.

Summary and Conclusions

The Committee feels that mapping intensity will vary with complexity of landscape units and soil patterns, anticipated level or degree of land "se, and the type of land "se.

The appropriate level of categorical detail for surveys of forest land is closely related to the survey intensity and therefore, the need for categorical detail will vary under the same conditions as the survey intensity.

A format designed to serve the needs of a resource manager is presented for consideration.

/ / /

Recommendations

1. The Committee recommends that no standardization of mapping intensities and levels of categoricaly detail can or should be attempted for the various levels and types of forest land uses.

2. The Committee recommends that it be continued and proceed to further work to make soil survey information more readily utilizable by resource managers. Specifically,

   a. Investigate the need for different or special kinds of interpretations for forestry uses based on different levels of mapping intensities.

   b. Investigate current trends in site preparation methods by physiographic regions and landscape units with a view toward developing more precise interpretations.

Committee Membership

Chairman: T. W. Green - Georgia
Vice Chairman: W. F. Miller - Mississippi

James R. Coover - Texas
M. E. Schaeffer - Georgia
D. Moehring - Texas
J. T. May - Georgia
K. Watterson - Texas
P. E. Avers - Florida
G. Aydelott - Georgia
W. K. Goddard - Arkansas
G. E. Smith - South Carolina
N. E. Linnartz - Louisiana
H. C. Dean - Arkansas

GWINNETT SANDY LOAM, 6 TO 10 PERCENT SLOPES, -423 C-2

These soils of the broad ridges and upper slopes retain adequate moisture for plant growth except during prolonged dry seasons. They typically have about 4 inches of dusky red sandy loam over three or more feet of dark red clay. Some old erosion scars remain.

Within compartment 769 this unit accounts for about 150 acres. Individual areas are longer than wide and average about 25 acres in size.

Interpretive Soils Data

Timber:	Forest Type	Productivity Class
	31	052
	32	031
	53	083

-Harvesting Precaution -- Moderate - Plan road system and skidding methods prior to harvesting operations.

-Regeneration Precautions -- Moderate - Expose no more than 60 percent of surface soil. No soil disturbance allowed within 50 feet of gully heads or within 25 feet from the side.

-Access Road -- Poor - Erosive clay. Give special attention to shaping and water bars. Cantion! Avoid operations during prolonged wet periods due to erosion and compaction hazards,

Engineering: Estimate unified - 7-36" CL below 36” broken rock and soil material. Depth to bedrock is 5 to 8 feet.
- Volume change - Medium; pH - 5.5

Wildlife: Plantings -- Good site, responds well to proper fertilization. Locate on the more level areas.

Watershed: Hydrologic cond. class. -- Fair - Potential erodibility- Severe. (SCS Group-B)

Recreation: Fair - Avoid erosion scars. Detailed surveys are necessary prior to action plans.

REMARKS

Critically eroded areas are identified on the maps with a red "E". They occur as small isolated areas each less than an acre in size. Stabilization with grasses and/or legumes is needed.

Within this unit are areas of 2 to 6 percent slopes, which are not significant from a management standpoint.

with grasses and/or legumes is needed.

1972 Southern Regional Technical Work-Planning
Conference of the Cooperative Soil Survey

May 2, 3, 4, 1972 - Blacksburg, Virginia

Committee X - Educational Resources

Charge to Committee: To investigate and develop procedures for acquiring inventory reproductions of visual aids not presently inventoried and recommend methods by which these visual aids might be financed.

Committee Report: Correspondence with members of the assigned committee brought little help on the charge. Most all agreed that many faculty members have good teaching aids that they use but that very few probably represent a complete unit. No one seemed to know of a way to discover what various individuals might have. Probably no successful method will evolve.

More recent conversation with Charlie Welch has probably brought to light our problem. No one wants to make a detailed descriptive list of the kind and quality of aids that he has. I don't blame anyone for this. It would take a lot of extra time that no one has. Charlie Welch suggests that we decide what we want specific slides, transparencies, etc. on. This makes good sense. We should have thought of this two years ago. It seems logical that if we, or someone, will "simply" outline a unit to be illustrated and in turn let others know what, specifically, is wanted we might get results. You will recall that this is very much the way the Marbut Memorial Slide Set was put together.

Slides cost more than line illustrations on a sheet of paper. It might be that tables, graphs, schematic drawns, etc. might be cheaply put on smooth paper in black and white. Purchasers could use these for purposes of making duplicate copies, transparencies, or slides or order the transparencies or slides prepared. Certainly some things, such as pictures, would have to be on a film strip or slide.

It will take time and dedicated effort but it seems that the only way to go now is decide upon topics. The next step will be to decide upon the points to be illustrated, the kind of illustration to be used, etc. This step would be followed with a call for the specific picture, schematic, or whatever. A script would have to be pretty well developed at about this point.

Up to this point expenditures would possibly be small but when duplicating starts costs go up fast. A source of support might be possible. Would the SCSA be interested? Perhaps some aggressive student club such as an agronomy club would be interested in such a project as a money raising program. Perhaps it would be too big for a student group. Yet these have both been suggested in the correspondence received. I would not rule them out.

The American Society of Agronomy is, at present, working on units for educational purposes. I do not know at the moment what units are being developed. We certainly do not want to duplicate their efforts.

The Soil Conservation Service has recently released a unit titled "Consider The Soil First." It has a very nice narrative guide to be used with a slide set or film strip. A cassette recording of the narrative is also available. As I see it this unit is suitable even in junior high level classes. In my opinion, this unit is very well done and could be a guide to additional new units. Perhaps there are others being developed now that we don't know about.

In summary we can say that:

1. Needs for educational materials exist.
2. The needs must be identified as units.
3. Each unit needs an outline.
4. Ideas for visual aids must be spelled out.
5. A call for specific slides, schematics, etc. will likely locate many.
6. Some materials will have to be original.
7. Materials will have to be assembled, organized and a script written.
8. Aggressive interested leadership will be necessary.
9. The SCSA or some aggressive, well organized Agronomy Club or some such equivalent might be interested in one or more of the units as a money raising project.
10. Suggestions as to units to prepare and how they might be financed are invited from anyone.
11. A source of funds will be necessary if units are to be assembled such that they will be available for sale to interested individuals, groups or institutions.

Recommendations: A meeting of the committee during its attendence at Blacksbury, Virginia, proposes that:

1. The committee be continued.
2. That the committee present at the meeting at Mobil in 1974:

    a. Information on methodology

b. Samples of visuals and what can be done.
c. Present a unit that has been prepared.

Chairman:	David D. Neher
Vice-Chairman:	G. J. Buntley
Members:	E. R. Blakley
	E. L. Nance
	H. F. Perkins
	H. B. Vanderford
	W. B. Parker
	J. H. Robinson
	C. C. Welsh
Consultants:	Curtis L. Godfrey
	Fenton Gray
	Carl Gray
	H. F. Perkins

SOUTHERN REGIONAL SOIL SURVEY WORK-PLANNING CONFERENCE

MAY 2-4, 1972, BLACKSBURG, VIRGINIA

Report of

COMMITTEE XI: ENVIRONMENTAL SOIL SCIENCE

Chairman: S. W. Buol   Vice Chairman: J. M. Soileau

Charges to Committee

1. Survey the research involving environmental quality at each institution within the region and summarize those activities that are related to Pedology.

2. Review and summarize studies being made by CSRS regional work groups.

3. Review and evaluate soil properties that influence soil behavior in organic waste breakdown. Preliminary guidelines for rating soil behavior may be attempted.

With respect to Charge I, the Committee used the CRIS retrieval system and obtained a print-out of all projects relating to soils, environment and pollution in the Southern Region Agricultural Experiment Stations. From these the Committee abstracted projects of specific interest to the workshop and distributed 31 pages of project abstracts at the conference.

The Committee also assembled and distributed 49 references dealing with waste decomposition, pesticide decomposition and fertilizer N and P movement as related to specific **soil properties.**

With respect to Charge 2, the Committee secured and reproduced the Annual Report of the S-82 Regional Work Group entitled "Fertilizers and Organic Wastes Applied to Soils in Relation to Environmental Quality" for those present at the Work-Planning Conference.

With respect to Charge 3, the Committee developed preliminary guidelines for rating soils for organic waste disposal (Table 1).

Summary:

Whereas there is a great deal of research oriented toward environmental soil science in the southern region, most of the projects have only recently been initiated. Thus, only limited data is available, Also, perhaps because of the nature of working with somewhat specific items, septic waste, poultry waste, DDT, etc., the projects often are rather specific in nature and deal only in a general way with soil properties.

The Committee's attempt to relate decompositon and filtration rates (Table I) is at best primitive. However, the Committee feels that we should work toward the development of guidelines wherein we can provide interpretations of soil series as receptors for waste as we now do for many other uses.

Recommendations:

1. The Committee be continued with the evaluation of soils for land spreading of organic waste as a major change.

2. The Committee should also consider pesticide, herbicide and insecticide decomposition problems related to soil properties.

3. Soil Scientists need to contact waste researchers and work with them to determine the soil environment parameters important to their problems and provide areal extrapolation of their results.

4. Soil Scientists should attempt to raise their visability in the area of Ecology.

Committee Members:

L. J. Bartelli	George Holmgren
Bobby Birdwell	R. Leonard
A. G. Caldwell	D. E. Pettry
R. B. Daniels	L. H. Rivera
L. H. Hileman	E. M. Rutledge
E. L. Hill	John Cady (visitor)

Notes on Discussion at Time of Presentation:

Bacteria, fungi, etc. are present in all soils. Populations and rates of activity change greatly when energy is applied in the form of water. (Cady).

Denitrification may occur in well aerated soils if great amounts of organic matter are applied (Godfrey).

Build-up of heavy metals and the transfer of pathogens to food stuffs are also considerations in waste disposal (Bartelli).

TABLE 1

PRELIMINARY GUIDELINES FOR RATING SOILS FOR ORGANIC WASTE DISPOSAL:

Soil Property	Organic Waste Disposal Rate: Decomposition	Organic Waste Disposal Rate: Filtration
Solum thickness		
Shallow	NA[1/]	Low[2/]
Deep	NA	High[2/]
Soil Temperature		
Cold	Low	NA[1/]
Warm	High	NA
Drainage (aeration)		
Excessive	High	Low
Well-M. Well	High	High
S. Poorly-Poorly	Low	Low (small capacity)
pH		
6.5-7.5	High	NA
<6.5 and >7.5	Less by degree[3/]	NA
Family Texture (well aerated)		
Sandy Skeletal	High	Low
Loamy	Mod.	Mod.
Clayey	Mod.	High
Family Texture ("aqu" suborder)		
Sandy-Skeletal	Mod.	Low
Loamy	Mod-Low	Low
Clayey	Low	Low
O.M. Content (comparable drainage)		
High	High	Slow
Low	Low	Fast
Mineralogy		
High CEC	NA	High (cations)
Low CEC	NA	Low (cations)
High Iron	NA	High (P)
Low Iron	NA	Low (P)

Footnotes:

1/ Not Applicable

2/ As regards particulate matter

3/ The more the pH valve ranges trom the neutral range, the slower the microbial activity.

Southern Regional Technical Work-Planning Conference
Blacksburg, Virginia
May 2, 3, 4, 1972

Chairman: Lindo J. Bartelli

Committee XII - Changes in the Classification System

Soils Memorandum-57 (Rev. 1) outlines procedures for making changes in Soil Taxonomy. Procedures are developed for adding, dropping, or redefining taxa in the four upper categories of Soil Taxonomy. Adding, dropping, or redefining soil series and families is to be done through the correlation process.

Four regional and one national committee are to consider proposals for changes.

I. Composition of South Region Committee

Principal soil correlator will serve as chairman.

Members	Term Expires	Agency
Craddock, S. C.	1973	(Exp. Sta.)
Godfrey, Texas	1974	(Exp. Sta.)
Springer, Tenn.	1974	(Exp. Sta.)
Byrd, N. C.	1973	(SCS)
Slusher, La.	1974	(SCS)
Otsuki, Okla.	1974	(SCS)

II. Composition of National Committee

A. Principal soil correlator

B. Exp. Station representative - three-year term

III. State Committee

No proposal for state committee is included in Soils Memorandum-57. However, states may establish some clearance procedures for proposals originating within the states.

The regional committee will consider proposals for change from any source. The regional committee does recommend that states adopt a procedure that allows for channeling proposals either through the state soil scientist or state soil survey leader. These people should have some knowledge of the proposals originating in their states.

IV. Procedures of the Regional Committee

1. Proposals are submitted to the principal soil correlator who serves as chairman.

2. Proposals must be accompanied by supporting documents. These documents should include both morphological and compositional data of selected pedons. Statements justifying the proposed changes are encouraged.

3. Copies of proposal and supporting documents will be circulated to committee members. Members will either approve or disapprove proposal. A tie vote is considered as a rejection. Disapproved proposal may be resubmitted if additional supporting data warrants such action.

4. Approved proposals will be submitted to the national committee for final action. When the national committee approves a proposal for change, SCS will issue an announcement of the change.

5. The regional committee will meet during each Southern Regional Soil Survey Work-Planning Conference and on a special basis when called by the chairman, Much of the work will be done by correspondence.

V. Committee report:

The committee held its first meeting during this workshop. It reviewed the recommendations presented by Committee VIII, Classification and Utilization of Fresh and Salt Water Marshes, on Proposed Definitions of Subgroups of Hydraquents. The proposed definitions are as follows:

<u>Typic Hydraquents</u> are the Hydraquents that

a. (alternative 1) have no horizon or combination of adjacent subhorizons 75 cm or more thick with an upper boundary between

20 cm to 1 meter of mineral soil surface that has an n-value of less than 1: , or

a. (alternative 2) have no horizon or combination of adjacent subhorizons 75 cm or more thick with an n-value of less than 1 with an upper boundary within 1 meter of the mineral soil surface.

Haplaquentic quents. Hydraquents like the Typic except for a.

Typic Hydraquents. The central concept of the Typic subgroup of Hydraquents is set on soils that are semifluid in all dominant layers within 1 meter of the mineral surface. If drained, the upper horizons dry irreversibly and wide cracks develop that will not close when soil is rewet. The underlying horizons will remain semifluid after drainage. The presence or absence of a histic epipedon or a buried Histosol is not considered particularly important compared to the effects of the semifluid lower horizons after drainage. The Typic subgroup is extensive in the deltaic coastal areas near the mouth of the Mississippi River.

Haplaquentic Hydraquents are like the Typic except that they have thick lower horizons with low n-values. The lower horizons have been subject to wetting and drying in an earlier cycle of soil development and thus have consolidated reducing the maximum water content to less than 100 percent. Later periods of sedimentation deposited semifluid material over the consolidated layers. When drained, the upper semifluid horizon will consolidate and the soil will have low c-values throughout. These soils are not extensive in the U. S. They are considered intergrades to Haplaquents.

Proposed Addition to Definition of Typic Fluvaquents

h. have no horizon 75 cm or more thick with an upper boundary within 1 meter of mineral soil surface that has an n-value of more than 0. 7.

Hydric Fluvaquents. Fluvaquents like Typic except for h.

Hydric Fluvaquents are like the Typic except that they are underlain with thick layers that have an n-value of more than 0.7. These are primarily clayey soils in tidal marshes and swamps that have been artifically drained. The soil material was deposited under water and prior to drainage, they were never air dry. When drained, the upper horizons dried irreversibly and wide cracks developed that do not close when soil is rewet. The underlying layers contain more than 100 percent water and remain semifluid to a depth of 1 meter or more.

The committee reacted favorably to this proposal and has moved to submit the proposal to the National committee pending additional data from Committee VIII. Committee VIII will be requested to furnish a detailed description of a pedon for an example of each new subgroup.

VI. The committee will hold its next regular meeting during the next workshop of the Southern Regional Technical Work-Planning Conference. Any additional work will be handled through correspondence.

VII. Members present:

H. J. Byrd, N. C.
G. R. Craddock, S. C.
C. L. Godfrey, Texas
H. T. Otsuki, Oklahoma
D. F. Slusher, Louisiana
M. E. Springer, Tennessee
L. J. Bartelli, Texas, Chairman

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS

ENVIRONMENTAL RESEARCH

By

John Calms, Jr.*

Department of Biology

and

Center For Environmental Studies

and

Randal M. Robertson*

Research Division

Virginia Polytechnic Institute and State University

Blacksburg, Virginia

Southern Soil Survey Conference

May 2, 1972

Many of the difficulties involving environmental research and problem solving are primarily due to the explosion of interest in the field during the past few years. All sorts of people have decided to jump on the "environmental bandwagon". Currently anyone who is interested in or concerned with the environment even though he or she may not have had any formal training or practical experience feels qualified to be classified as an ecologist. This is somewhat comparable to anyone who has traveled on an airline calling himself a pilot or anyone who has passed a course in first aid calling himself a physician. Words such as ecotacticg, ecocatastrophe, ecofreak and others abound in the literature both popular and scientific. The proliferation of terminology is more humorous than distressing. However, many of us who have been

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* Co-authors

engaged in environmental research and problem solving for a number of years are deeply disturbed by the hoard of opportunistic "instant ecologists" who as consultants, reviewers of grants, teachers, and legislative advisors dispense ecological nonsense to nondiscriminating persons. In recent years a number of ecological Paul Revere8 have ridden throughout the country spreading the alarm and stirring public attention mightily. There is evidence all around us that alarms needed to be sounded; however, so many of the alarms sounded by ecofaddists were so obviously unfounded that doubts have begun to appear concerning the validity of almost any proposition with any ecological or environmental overtone. Furthermore, many of the new breed of environmentalists do not feel the responsibility to provide a solution after they have sounded the alarm. When they do, the solutions are often so hastily and superficially developed as to be extremely vulnerable to any sort of meaningful analysis. If environmental or ecological research and problem solving is to be generally accepted it must meet the demands and needs of planners. An example is given of the nature of this demand in a quotation from a presentation by David A. Aggerholm, Environmental Planner in the Institute for Water Resources, U.S. Army Corps of Engineers, at a seminar sponsored by the Environmental Resources Center of the Georgia Institute of Technology. "In responding to the manpower problem, the Corps is engaged in a stepped-up recruiting program for environmental specialists at all levels of the organization. Also, increased amounts of training are being contemplated.

Growing use is being made of outside consultants, but I should mention that we have had very mixed results in this regard, especially in the use of ecologists. We are finding in some cases that unless an ecologist can state with certainty that something will happen, he doesn't want to say anything. Now the nature of planning is that it deals with uncertainty in that we're planning for the future. So this attitude is totally inconsistent with planning and, no matter how much research we do, we'll never know with absolute certainty what is going to happen. So as I said, we have had a few problems in trying to use ecologists to help us on impact assessment."

However, despite the opportunism, alarmism, and other undesirable activities just described, there seems to be little doubt that we are faced with some serious problems. An organization called the Club of Rome, working through a research team from Massachusetts Institute of Technology, has thrown a number or recent economic and population trends into a computer and come up with the prediction that the world may reach its limits of growth before another 100 years have passed. From then on it would be all downhill as the impoverished multitudes try to feed and clothe themselves with disappearing natural resources.

At the same time an environmental backlash has developed. Recently Senator Lowe1 Weicker of Connecticut told the Sierra Club that "common-sense Americans don't want zero growth; don't want closed factories; don't accept no technology; don't buy no jobs; don't want brownouts... Just as they don't want to be bombed back to the

Stone Age, they don't want to be **environmentalized** back there either."

Statements of this sort are unfortunate because once we recognize a problem we should be considering alternative solutions not setting up straw men in black hats to denounce. In order to work, a solution must first be understood and accepted by a majority of citizens. We cannot preserve natural areas accessible only to the middle class and the wealthy while ignoring the environment of the urban poor. Nor can we relocate the urban millions in rural communes even if they were willing to go. With the world's present population density and distribution anyone with humanistic convictions must recognize that we are locked into a life support system that is both ecological and industrial. We cannot go back to an earlier life style without first reducing population size or sacrificing millions of people. But we **can** optimize our use of civilization's life support system and improve the quality of our lives by abandoning the old fashioned conservationist attitude of merely responding to ecological threats and begin to manage our ecosystem to maintain both use and quality.

Many environmentalists shun words like management because they believe that to manage means to industrialize. But management merely means developing practices which will enable us to achieve certain goals - the nature of the goals is up to **us!**

In order to adequately manage the environment while at the same time minimizing environmental **crises, avoiding** irreparable damage to the environment, and making full use of it in many ways including both recreational and industrial use we must develop capabilities

to the environment, and making full use of it in many ways including

in two significantareas: **1)** environmental monitoring and **2)** environmental quality control techniques. We intend to discuss two aspects of these needs, both as research needs and as an organizational problem.

Research Needs

Environmental monitoring makes mandatory the rapid expansion of information in five area* (from Cairns, **1970):**

1. Prediction systems, not only to predict catastrophe but also to predict the consequences of various types **and** intensities of environmental use,

2. Simulation techniques - the use of scale models to approximate various alternative uses of the environment so that consequences of all possible combinations and intensities of use can be estimated in the planning states and the optimal **benefical** combination of uses can be made.

3. Rapid biological information systems, both "in-stream" and **"in-plant"** which **will** permit environmental quality control to be maintained and **will** provide an early warning of impending environmental problems.

4. Aquaculture techniques that will enable biologists to restore degraded **and** damaged areas to a condition that will permit fuller beneficial use than is now possible and will enable biologists to make fuller use of an ares where non-biological considerations have decreed that the natural environment must be altered drastically.

5. The identification of both the life support functions of our environment and the requirements of the environmental components essential to the maintenance of these functions. All of the above should be as quantitative as possible1

However, the full benefits of this research information will not be realized unless we also develop environmental control techniques which **optimize** the use of this information. (Cairns, in press) This means developing capability for regional management in quality control as is illustrated in a rather simplistic way in Figure 1.

Note that in Figure 1 there are two types of information being generated: (1) in-plant monitoring systems (represented by the squares) which provide information about the quality of the waste materials which will soon enter the receiving system and (2) the in-stream monitoring systems (represented by the triangles in the rivers and reservoirs) which provide information about the biological condition of the receiving system. These should be linked together in a network so that the information is fed back to a central control area (which is also indicated on Fig. 1). A seventeen state network covering the Ohio River drainage basin has already been devaloped by the Ohio River Sanitation Commission (ORSANCO) which accumulates certain types of chemical-physical information on a computer in Cincinnati, Ohio. Biological information is not part of this data gathering system but could be incorporated in the future. Management systems of this kind are absolutely essential if response to environmental crises is to be swift and effective. The adversary system of the courts delays response for months and even years and since no quality control system within an industry could be expected to work well under these circumstances. It is hardly likely that a quality control system in a natural ecosystem would work well either under these circumstances. Perfection of methodology in this area should be a prime research goal.

Organizational Problems

Although this discussion will be directed primarily toward organizational problems of organizing interdisciplinary programs in colleges and universities it will apply equally well to any institution which is organized primarily along disciplinary lines. Putting together a multi-disciplinary* group to work on an inter-disciplinary problem at a university is much more difficult than it might appear at first sight. Universities are generally organized by discipline. The chemists work in a Chemistry Department; the bio-ligists in a Biology Department. The reward system - promotions, pay raises, tenure - operates through the department head. National recognition is also - to a first approximation at least - geared to intra-disciplinary achievement. The difficulty of organizing a closely knit and effective research team where each member is in a different chain of command needs no elaboration, especially where each participant also considers himself an independent scholar in the strict academic tradition.

Some kind of cement is needed to hold the group together. Lacking this cement, there is a strong centrifugal force tending to thrust each participant back into his departmental niche. Then you may have the embarassing predicament of the university administration trying to make a set of independent workers look to the sponsor like a coherent multi-disciplinary team,

To get at some of these problems, or at least to raise them in a realistic context, let us now consider the different kinds of research efforts relating to the environment which may involve multi-disciplinary teams at universities.

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*As a matter of definition, let us call the research problem "interdisciplinary" when its solution calls on the talents of several academic disciplines; and let us call the group of people working together to solve the problem a "multi-disciplinary" research team.

First, there is the area of policy research OK policy **analysis. In** policy analysis, an effort is msde to lay out all the facts in a given situation and to analyze alternative approaches in such a way that planners and decision-makers at the political OK top management level (in the case of industry) can make better decisions. A most important part of any such analysis, incidentally, is a careful statement of what is <u>not</u> known so that decision-makers can better evaluate the risks of each alternative.

Policy analysis is an area where university research people can undoubtedly make major contributions. However, it is not likely, except in a very broad theoretical sense, to become a major campus activity. Such studies should be focused closer to the centers of power, for example, at the **state** capitol OK at corporated head-quarters. The possibility of establishing an Institute for Policy Analysis at **state** OK regional levels should be considered very seriously. A small central staff at such an institute would be able to bring together university scientists to participate in the kind of analytical studies needed both by the legislature and executive side of our state government.

Generally, what holds the multi-disciplinary team together in policy analysis is their common interest in public service.

Let us turn now to what one may call "problem-focused" research. Such **research is** directed toward finding new OK **improved** solutions to specific problems. **For** example, what will be the total impact of a new road through e given wilderness area or of a dam in a valley containing agricultural land? Or, how can we minimize the harmful

to specific problems. For example, what will be the total impact of

effects of agricultural chemical run-off into our streams? Attacking such problems in depth requires the participation of scientists from many fields working in close collaboration. Social, economic, biological, and physical factors must be explored. Often what impedes progress is lack of basic understanding of some factors. This means that basic research must be intensified. Sometimes baseline data are lacking and a regional inventory must be developed.

Problem-focused research differs from policy analysis in its search for relevant new information about the problem, which in turn may lead to new solutions and alternatives. You might say that its aim is to give the policy analysts new things to say, new alternatives to analyze, or, best of all, to eliminate their problem altogether.

Money talks and organization helps, but we believe that the cement for a multi-disciplinary research team working on a stated practical problem must be the problem itself. The sociologist and the biologist are tied together by their mutual interest, for example, in what the proposed dam will do to that region affected.

Much interdisciplinary research, however, is not directed toward a particular practical problem but toward solving a scientific problem which cannot be attacked within a single discipline. For example, there are the biome studies of the International Biological Program, largely financed by the National Science Foundation. Here the effort is to understand a natural biome such as the great plains grasslands as a total system. Such a model should enable us to predict the effect of changing some element in the natural system. For such work you need entomologists, botanists, soil scientists, meteorologists, wildlife specialists, and many others - not to mention computer scientists.

Again, money talks and organization helps, but the real cement is spiritual, a common interest and goal shared by all the research workers. Enthusiasm for the common purpose - solving the problem - transcends the disciplinary bondage under which each scientist lives when in his departmental home.

Paradoxically, much research normally considered disciplinary: is in fact interdisciplinary. Cloud physics, for example, a sub-discipline of meteorology, has brought physicists, physical chemists, and meteorologists together in seeking to penetrate the mysteries in that field. Curiosity about observed phenoma - the problem - was the cement here in every multi-disciplinary collabroation.

The Federal government has tried many experiments in organizing interdisciplinary research at universities. Many have failed; others have been moderately successful.

One of the more successful has been the ARPA-IDL program, where the Advanced Research Projects Agency of the Department of Defense diliberately created about a dozen Interdisciplinary Laboratories of Material Science about fifteen years ago. Each laboratory brought together chemists, physicists, metallurgists, and others involved with materials needed for defense use. In each case a building was provided (or made available) so that all participants would come to do their research. Thus, the special cement here, in addition to the money and organization, was the building. Everyone was placed in physical proximity under one roof. Actually, the impact of the physical proximity was not as great as had been hoped. Solid state physicists continued to do their thing under the new roof, Of course, they got acquainted with some metallurgists, whom they might not otherwise have met in the normal course of campus routine. and some valuable collaborative ventures have indeed developed.

The problem - improved defense materials - did not exert a strong enough pull. Now shifted to NSF, the program will drop what little defense emphasis it had; and, I fear, the cement will be even thinner.

I would like to mention another Federal program which is heavily oriented toward interdisciplinary research, the RANN (Research Applied to National Needs) program of NSF. As one of the architects of the predecessor program, to which we gave the unprepossessing title of "IRPOS" (Interdisciplinary Research Relevant to Problems of Society), I can assure you that NSF recognizes the problems of organizing multidisciplinary teams. It is very hard to convince them that a good administrative front means real faculty coherence. Their Division of Environmental Systems and Resources in the Research Applications Directorate is headed by a fine young ecologist. Phillip L. Johnson. His Division should be a tower of strength in support of the kind of work that interests us here today. However, they will only invest their money where they can see real coherence among the faculty participants. The cement has to be community of interest in the problem or "national need" toward which the research is directed.

Faced with pressures to intensify interdisciplinary research as a public service and with increased interest among students and faculty in problem-oriented environmental research, the university administration must seek ways to get around the difficulties inherent in interdisciplinary research programs. One rather drastic method is to establish an institute outside of the normal academic structure with some full-time staff members including a director, as well as participating faculty assigned part time from regular departments. In its most extreme form this arrangement approximates management of an industrial-type laboratory by a university. More compatible with the normal academic structure is a center which serves primarily to stimulate and encourage collaborative programs. Such a center may take the initiative in organizing multi-disciplinary teams and obtaining research support, but must depend primarily on voluntary collaboration. The reward system remains departmentally structured, even though the center director is consulted about raises, promotions, and tenure. Our Center for Environmental Sciences at Virginia Tech is a successful example of this latter form of organization.

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
P. O. Box 311, Auburn, Alabama 36830

SUBJECT: SOILS - 1974 Meeting - Southern Regional Technical Work Planning Conference

Date: April 25, 1972

TO: Richard L. Googins, Chairman
1972 Southern Regional Work Planning Conference of the Cooperative Soil Survey
P. O. Box 10026
Richmond, Virginia 23240

We extend a cordial invitation to the Southern Regional Technical Work Planning Conference of the Cooperative Soil Survey to hold the 1974 meeting in Alabama.

We would be most pleased to host the 1974 conference in the historic port city of Mobile.

Mobile, readily accessible by highway and plane travel, offers excellent accommodations, a variety of entertainment, and an opportunity to observe a rapidly expanding growth area.

A progressive soil survey is underway in Mobile County using high altitude photography with a combination of detailed and reconnaissance mapping. We hope to include a field trip to study and observe a variety of soils and landscapes as a part of the conference activities.

We trust the Conference will accept our invitation to host the 1974 meeting in Alabama.

/s/ W. B. Lingle

W. B. Lingle
State Conservationist
Soil Conservation Service

/s/ E. V. Smith

E. V. Smith
Director
Alabama Agricultural Experiment Station

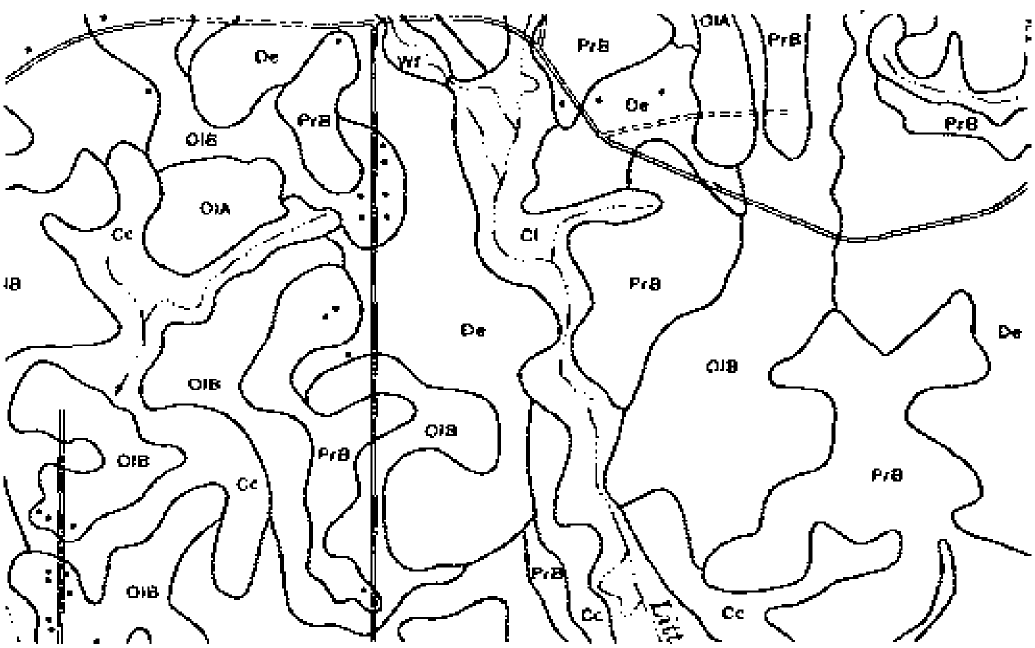
NATIONAL COOPERATIVE SOIL SURVEY

Southern Regional Conference Proceedings

Baton Rouge, Louisiana
May 5-7, 1970

Proceedings of

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE OF THE COOPERATIVE SOIL SURVEY



LOUISIANA STATE UNIVERSITY
BATON ROUGE, LOUISIANA
MAY 5 - 7, 1970

AGENDA

1970 Southern Regional Technical Work-Planning Conference
of the Cooperative Soil Survey

Louisiana State University, Baton Rouge, Louisiana

Meeting at Pleasant Hall, L. S. U. Campus

Monday, May 4th

4:oo to 8:00 PM — Registration, Pleasant Hall Lobby

Tuesday, May 5th

8:00 to 9:00 AM — Registration, Pleasant Hall Lobby

S. A. Lytle presiding. Room 148 Pleasant Hall

9:05 to 9:20 AM — Welcome - Dr. Doyle Chambers, Director
La. Agricultural Exp. Station
Louisiana State University

9:20 to 9:35 AM — Welcome - Mr. J. B. Earle
State Conservationist
Soil Conservation Service
Alexandria, Louisiana

9:35 to 10:20 AM — New Developments in World Agriculture

Dr. J. Norman Efferson
Vice-Chancellor and Dean
College of Agriculture
Louisiana State University

10:20 to 10:35 AM — RECESS

10:35 to 10:50 AM — Is Agriculture Polluting the Environment?

Dr. W. H. Willis, Head
Department of Agronomy
Louisiana State University

Tuesday, May 5th (Continued)

10:50 to 11:25 AM	New Methods in Soil Map Manuscript Compilation	
		Dr. Harold L. Dean, Head Cartographic Unit Soil Conservation Service Fort Worth, Texas
11:25 to 12:00 PM	Evaluation of the Transect Method of Soil Survey in the Woodlands	
		Mr. George E. Smith Woodland Conservationist Soil Conservation Service Columbia, South Carolina
12:00 to 1:30 PM	LUNCH	
1:30 to 1:40 PM	Announcements	
1:40 to 2:00 PM	Soil Survey in the '70's	
		William M. Johnson Ass't. to Deputy Administrator of Soil Survey Washington, D. C.
2:00 to 3:00 PM	Report of Committee I	
	Criteria for Family and Series; Chairman, W. W. Fuchs, Texas	
3:00 to 3:15 PM	RECESS	
3:15 to 4:15 PM	Report of Committee II	
	Application of the New Classification system; Chairmen, H. T. Otsuki, Oklahoma	
4:15 to 5:15 PM	Report of Committee III	
	Soil Interpretations at the Higher Categories of the New Classification System; Chairman, C. L. Godfrey, Texas	

Wednesday, May 6th..........Conference Room 148, Pleasant Hall, LSU

8:00 to 8:15 AM	Announcements
8:15 to 9:15 AM	Report of Committee IV Application and Interpretation of Soil surveys; Chairman, Keith K. Young, Fort Worth, Texas
9:15 to 10:15 AM	Report of Committee V Handling Soil Survey Data; Chairman, G. R. Crsddock, S. C.
10:15 to 10:30 AM	RECESS
10:30 to 11:30 AM	Report of Committee VI Soil Moisture and Temperature; Chairman, R. B. Daniels, N. C.
11:30 to 1:00 PM	LUNCH
1:00 to 2:00 PM	Report of Committee VII Miscellaneous Land Types and Soil Materials; Chairman, R. C. Carter, Mississippi
2:00 to 3:00 PM	Report of Committee VIII Realistic Estimates of Soil Survey Laboratory Work Load; Chairman, B. F. Hajek, Alabama
3:00 to 3:15 PM	RECESS
3:15 to 4:15 PM	Report of Committee IX Soil Survey Procedures; Chairman, M. E. Springer. Tennessee

Wednesday, May 6th (Continued)

4:15 to 5:15 PM	Report of Committee X	
	Soil Surveys for Forestry Uses; Chairman, C. M. Ellerbe, S. C.	

Thursday, Hay 7th...........Room 148 Pleasant Ball, LSU

8:00 to 9:00 AM	Report of Committee XI R Regional Projects Committee; Chairman, D. D. Neher, Texas
9:oo to 1o:oo AM	Report of Committee XII Southern Regional Map Project; Chairman, S. W. Buol, N. C.
lo:oo to 10:20 AM	RECESS
10:20 to 10:45 AM	Report of Committee XIII Regional committee for reviewing changes in the comprehensive soil classification system; Chairman, L. J. Bartelli
10:45 to 12:oo PM	Business meeting
12:oo PM	ADJOURNMENT

Chairman, S. A. Lytle, LSU

Vice-Chairman, Lester L. Lofton
Soil Conservation Service
(replacing D. F. Slusher who
is now on foreign assignment)

REGISTRATION - 1970 CONFERENCE

NAME	ORGANIZATION
Allen, B. L.	Texas Tech.
Avers, Peter E.	USPS - Fla.
Aydelott, D. Gray	USFS - Ga.
Bailey, Harry H.	Univ. of Ky.
Bartelli, Lindo J.	SCS - Texas
Beinroth, Friedrich H.	Puerto Rico Exp. Sta.
Bremlett, Glenn L.	SCS - Ga.
Brasfield, James F.	SCS - Fla.
Breinig, Clarence B.	SCS - Tenn.
Brupbacher. Robert H.	L. S. U. - La.
Buntley, George J.	Univ. of Tenn.
Buol, Stanley W.	N. C. State Univ.
Burgess, Leland H.	SCS - Ala.
Byrd, Hubert J.	SCS - N. C.
Caldwell, A. George	L. S. U. - La.
Carter, Oliver R.	SCS - Ark.
Carter, R. C.	SCS - Miss.
Cockerham, Warren L.	SCS - La.
Cook, Doyle	Univ. of Ky.
Craddock, Garnet R.	Clemson Univ. - S. C.
Daniels, Raymond B.	SCS - N. C. State Univ.
Daniell, Robert E.	SCS - Ky.
Dean, Hartzell C.	SCS - Ark.
Dean, Harold L.	SCS - Texas
DeMent, James A.	SCS - Texas
Elder, Joe A.	SCS - Tenn.
Ellerbe, Clarence M.	SCS - S. C.
Fuchs, Westal W.	SCS - Texas
Godfrey, Curtis L.	Texas A & M Univ.
Gray, Fenton	Okla. State Univ.
Green, T. W.	USFS - Ga.
Hajek, Benjamin F.	Auburn Univ. - Ala.
Hill, Elmer L.	SCS - Okla.
Jackson, Wesley C.	SCS - Tenn.
Johnson, William M.	SCS - Washington, D. C.
Keenan, Walter E.	Agri. Exp. Sta. - Miss.
Koch, Charles J.	SCS - Va.
Koos, W. M.	SCS - Miss.
Lewis, Olin C.	SCS - Fla.
Lofton, Lester L.	SCS - La.

NAME	ORGANIZATION
Lytle, S. A.	L. S. U. - La.
Matthews, Dayton	SCS - La.
McElroy, Charles H.	SCS - Texas
Moore, James R.	SCS - Fla.
Newman, Allen L.	SCS - Texas
Newton, John H.	SCS - Ky.
Nugent, A. L.	L. S. U. - Lo.
Otsuki, Henry T.	SCS - Okla.
Parker, W. B.	SCS - Miss.
Perkins, H. F.	Univ. of Ga.
Perry, Ernest A.	SCS - Ala.
Pettry, David E.	V. P. I. - Va.
Pfeiffer, Norman B.	SCS - Va.
Ritchie, Frank T.	SCS - Ga.
Rivera, Luis H.	SCS - Puerto Rico
Rutledge, E. Moye	Univ. of Ark.
Sheffer, Morris E.	SCS - Ga.
Smith, George E. Jr.	SCS - S. C.
Soileau, John A.	TVA - Ala.
Springer, M. E.	Univ. of Tenn.
Wells, Robert D.	SCS - S. C.
Willis, W. H.	L. S. U. - La.
Vanderford, Harvey B.	Miss. State Univ.
Van Der Voet, Dirk	SCS - Washington, D. C.
Young, Keith K.	SCS - Texas

Business Meeting

Southern Regional Soil Survey Work Planning Conference
LSU Campus, Baton Rouge, May 7, 1970
Professor S. A. Lytle, presiding

In response to the call for suggestions for the site of the next meeting, Dr. David Pettry invited the group to V.P.I. and moved that the Conference meet at Blacksburg, Va. in 1972. Motion seconded and carried.

Curtis Godfrey presented a proposal prepared by Dr. Frank Miller for a Tropical Soils Tour in Costa Rica. Such a tour would include visits to science centers and research institutes in the area. About 15 members of the group were interested in such a tour; 5 members were not in favor. cost estimate was $700 to $800 per person. Dr. DeMent enumerated that Costa Rica soils would differ in part from the soils visited on the Puerto Rico tour in that the area was a high rainfall area and many soils were derived from volcanic ash. In response to the question: Who would prepare sites and serve as a nucleus to show the soils? Dr. Godfrey stated that probably more emphasis on this tour would be placed on forests rather than soils. He suggested that Dr. Vanderford be the chairman in charge of tour arrangements if the tour materializes.

In response to the question: Is there a need for additional committees, particularly, a committee on pollution? Dr. Bartelli commented, "What are the questions and answers on pollutants as they are related to taxonomic units in reference to filter capacity, heat dissipation, etc.? A committee could assemble and circulate ideas."

The motion was made and seconded that a committee on pollution be considered by the steering committee. Some discussion ensued - the possibility of broadening the committee to include the ecological concept was mentioned by Mr. Ritchie. Dr. Ray Daniels stated there was a need to draw on the expertise of researchers in mineralogy and in the pollutant fields. Dr. Bartelli stated that, we as a group, are not researchers on pollution; however, our job is to apply data already developed. We need to solicit the participation of our research co-workers.

Dr. Max Springer mentioned one charge that the steering committee might consider - to assemble and evaluate concrete examples of changes in publications or procedures which either save time or money, or make the soil survey more effective. This was made as a formal motion. Motion carried.

Dr. Bartelli reported for Committee XIII - the Regional Committee for reviewing changes in the comprehensive soil classification system. He stated that the committee consisted of: Dr. L. J. Bartelli, chairman, with committee members C. L. Godfrey, G. R. Craddock and M. E. Springer from the Experiment Stations and D. F. Slusher, Henry Otsuki, and H. J. Byrd from the Soil Conservation Service. This committee would become active as soon as the publication of the classification system has been completed. A statement of operation procedures will be set-up at that time.

As matters of information Dr. Bartelli commented that plans are underway for reducing the backlog of soil surveys for publication; the updating of soil series and interpretation sheets are in good shape; S.C.S. is now in the process of putting interpretation data into the computer; there will be a pilot program for advanced training in soil science at Knoxville, Tennessee with emphasis on geomorphology - this program will be under the leadership of Dr. Ray Daniels with twenty-three students attending.

The chairman asked for comments on a new approach to the make-up of committees and suggested that it might be an improvement if the committee reports were to be preliminary rather than final drafts. The chairman also suggested that better response may be obtained if members are given a choice in selecting the committees of their major interests.

Dr. Ray Daniels said that he liked the format used at this Conference with each chairman bringing enough copies of a rough draft of his committee report for the entire group.

Dr. Bailey said that he would like to see that each committee be given a short period at the beginning of the Conference for individual committee meetings.

Dr. Bartelli said that the committees are too large.

Dr. Croddock suggested that the steering committee might consider the selection of chairman and vice-chairman and two members for each committee to serve as a core committee to give continuity.

Professor Lytle read the rules of the Conference with regard to the organization of the 1972 Conference which provides that the Chairman will be Mr. Charles J. Kock, S.C.S., and the Vice-chairman will be Dr. David E. Pettry, Experiment Station Representative.

Dr. Bartelli suggested that all members advise the Chairman of the Work-Planning Conference of active workers at the Experiment Stations and elsewhere and keep the roster up-to-date.

Dr. Pettry will represent the Southern Region at the National Soil Survey Conference January 25-28, and at the Southern Soil Research Committee Meeting.

Dr. Ray Daniels discussed the need for encouraging soil scientists to continue educational training. He suggested that the Conference go on record as approving a policy for urging good, qualified soil scientists to enter into graduate school programs.

Dr. Bertelli asked if it ware possible for the universities to design a” educational program to fit the individual needs. It was the concensus of Experiment Station workers that almost every university could design programs to fit students.

Professor Lytle asked if the Federal Government had a policy which would make it more attractive for the soil scientists to continue their education.

Mr. Bill Johnson stated that there was a policy which allowed leave for federal employees to take graduate work and to make it as easy as possible, within limits. Part salary could be paid if the student worked part-time.

Dr. Max Springer suggested that possibly more education may not solve the problem of some individuals. The value of a” education to a” individual is the measure of what a man learns.

Mr. Bill Johnson commented that the formal professional degrees now offered by many colleges would not help advance a worker very much.

Dr. Ray Daniels made a motion that the Southern Regional Technical Work-Planning Conference go on record to encourage and support graduate programs for soil survey studies. The motion passed.

Mr. Ernest Perry extended a” invitation to the Conference to hold the 1974 meeting in Alabama at Mobile.

The meeting adjourned at 12 o'clock noon, May 7, 1970.

WELCOME TO LOUISIANA

by

J. B. Earle, State Conservationist, SCS

Regional Cooperative Work Planning Conference for Soil Scientists
Baton Rouge, Louisiana
May 5, 1970

We welcome you to Louisiana and hope you enjoy your visit. YOU may like to have a little background about Louisiana and our work.

The State of Louisiana is located in the south Gulf Coast region of the United States. It is one of the thirteen states carved out of the famous 15 million dollar Louisiana Purchase. Our forefathers paid about 4 cents per acre for this Purchase. Louisiana was admitted to the Union in 1812.

The State flower is the magnolia, the cypress is the State tree, and the pelican is the State bird.

Louisiana's 31,054,720 acres of land and water are geographically divided north and south. The southern portion is nearly flat and made up of prairies, marshes and bottomlands. The northern part is mostly rolling hill country and river bottomland. Elevation varies from 9 feet below sea level in the south, to 535 feet above sea level in the extreme north.

Louisiana has a" interesting and colorful history. The State, or portions of the State, has been under French, Spanish, English, and United States government control. But "one have influenced the State's customs, laws, and cultures like the French. It is the only state that uses the political sub-division of parishes rather than counties. The French language is still spoken freely and fluently in South Louisiana.

The settling of Louisiana started in the 16th century when French, Spanish, and other early sattlers worked their way up the Mississippi and Red Rivers and bayous that empty into the Gulf. The first land settled was on the banks of these waterways. This land was high and well-drained and made excellent locations for homes and farmsteads.

The climate is considered good for growing crops and raising live-stock. The average winter temperature is 51 degrees, and summer is 83 degrees. Annual rainfall ranges from 65 Inches in the southern portion of the State to about 46 inches in the extreme northwest. The State's average rainfall is 58 inches.

Louisiana is blessed with an abundance of natural resources. No other state has such a plentiful supply of fresh water. There are six major rivers running through the State. The great Mississippi is one of these. There are several hundred natural and man-made lakes that help make Louisiana the envy of many water-scarce states. Louisiana alluvial soils are among the most fertile and productive in the Nation. Over 18 crops are grown on the five major land resource areas. Cotton, soybeans, rice, and sugarcane are the major crops grown. Timber is another major resource in Louisiana. The State is one of the largest producers of pine and hardwood in the South. Louisiana is second in livestock numbers in the South. The State ranks second in the Nation in its value of minerals produced. Minerals are produced in 62 of the 64 parishes.

Louisiana is known as a "sportman's paradise." It is one of the major flyways for migratory waterfowl. The four million acres of marshland and over two million acres of water areas help make Louisiana one of the most choice hunting and fishing spots in the Nation.

Louisiana is famous for its crawfish. This freshwater miniature lobster is a delicacy sought after **not** only by **Louisianaians** but **by** out-of-steters as well. And they are fun to catch as well as to eat.

Louisiana is the leading fur-bearing state. Its marshes and low-land coastal areas make ideal habitat for muskrat, nutria, mink, and other fur bearing animals,

The population of Louisiana is about three and one-half million. One-third of the working people earn their living from businesses that produce, process, and sell products of the land and water. Nearly 300,000 people earn about **$1,319,000,000** annually as a result of Louisiana agriculture.

There are 31 soil and water conservation districts in Louisiana. Since the first district was organized in 1938, a great change has taken place in the conservation needs of the State. Up until the middle **1950's,** the number one problem was erosion. This was brought about by **row** cropping the hill areas. gut due to cotton farming shift-ing to river bottoms, and the planting of trees and grass, this erosion problem is greatly reduced.

Soil and water conservation needs are now geared to management, proper use, and development of our soil, water, plant and animal resources for the benefit of every man, woman, and child. We are actively concerned with conservation problems on non-farm as well as farm land.

Our Conservation Needs Inventory land area is **28,596,268** acres. Of this, federal land amounts to 970.247 acres, urban and built-up areas **1,063,808** acres, and small water areas 499,986 acres.

Inventory acres are 26,062,227. This is used as follows:

Cropland - 5,123,409 acres

Pasture and range - 2,837,642 acres

Forest - 14,925,595 acres

Other - 3,175,581 acres

A few soil survey highlights for Louisiana are as follows:

At the present, the SCS in Louisiana has a staff of 23 soil scientists. The U. S. Forest Service has one employed to map their lands in this state. The Louisiana Agricultural Experiment Station furnishes one full time field ma" and also the help of S. A. Lytle and George Caldwell here at the University.

8,977,482 acres have bee" mapped in Louisiana under the new mapping standards. Six survey areas (parishes) have been published in recent years. Field work has been completed on four additional parishes and they are now in the process of being published.

General soil maps have been completed on all parishes in the state. We are now in the process of revising these maps and adding a selected use interpretation table to the back of the maps. There has been a tremendous demand for these maps.

We are now in the process of updating the soil maps and correlation of the soils on five branch experiment stations in Louisiana.

We have also just started a cooperative ground water study with the Louisiana Agricultural Experiment Station on the wet soils of the stations. The SCS is setting the piezometers and the station personnel are recording the water levels. This study is for the purpose of gaining reliable data on water tables on various wet soils so proper classification and use interpretations can be made.

We have just completed mapping 50,000 acres in the vicinity of New Orleans for the Regional Planning Commission on a cost-sharing basis. We anticipate participating in a great deal more cost-sharing work in the future.

We have one 4-perish RC&D project in operations. We have another 5-parish RC&D project approved for planning. We have two more applications submitted for RC&D projects. One of these is for ten parishes and one is for one parish. Marion Monk, NACD Past-president, is chairman of the steering committee for the ten-parish application.

There are over 52,000 individual landowners cooperating with the soil and water conservation districts in Louisiana.

The soil and water conservation district law has recently been amended to include all towns and cities in Louisiana in soil and water conservation districts.

We are glad to have you visit us and we know we'll benefit from your ideas and suggestions. We hope your visit here will be enjoyable and helpful to you.

NEW METHODS IN SOIL MAP MANUSCRIPT COMPILATION 1/

Plans have been made to accelerate the publication of soil surveys and to publish the backlog of completed soil surveys within the next five years.

Status

As of July 1, 1969, there were 375 surveys in the backlog, and when adding the surveys that are completed in the next five years, we find we have a total of 700 surveys. It is necessary to have some 40 surveys as a backlog for efficient cartographic and editorial operations, which means then that we need to publish 660 surveys during the next five years and continue to publish approximately 65 surveys per yeas thereafter. This projection is based on the assumption that we will get about the same funds in 1975 as we are currently getting for publication purposes.

To accomplish the above objective, the following has been developed:

FY 1970	50	surveys
N 1971	60	surveys
N 1972	120	surveys
FY 1973	200	surveys
N 1974	230	surveys
Total	660	

To accomplish this schedule cartographic-wise, a substantial amount of manuscript compilation work must be done in the states by the soil scientists in accordance with Soils Memorandum 70. The plans are for the states to compile 12 surveys in 1970, 100 surveys in 1971, 100 surveys in 1972, and 130 in 1973.

We feel sure that with the excellent cooperation of everyone concerned the present plans will be met within the time limits established.

It is hoped that Cartographic will gradually take over the map manuscript compilation through the use of advanced mapping systems which will include the use of digitizing and other automatic equipment.

High Altitude Photography

To accomplish the proposed acceleration of the publication of soil surveys, a much faster, less costly procedure than the use of mosaicked photographic bases that have been used since 1956 must be developed. The Cartographic Division in Hyattsville has experimented for a number of years with the use of aerial photographs taken at a much higher altitude than the photography previously used by the U. S. Department of Agriculture. The objective of the experimentation is to obtain high quality, small scale

1/ Presented by H. L. Dean, Head, Cartographic Unit, SCS, Fort Worth, Texas, at Southern Regional Technical Work-Planning Conference, May 1970, Baton Rouge, Louisiana photography from which photo atlas sheets may be produced directly from the central portion of an individual aerial photograph thus eliminating the need for mosaicking.

It has become practical to fly at heights that produce small scale photography of the quality needed and reproduce high quality photographic atlas sheets due to the recent improvements in aircraft, cameras, lenses, and film. To obtain special high altitude aerial photography for soil surveys to be published at scales of 1:15,840, 1:20,000, 1:24,000, and 1:31,680, they must be flown at altitudes of 17,500 to 37,500 feet above the ground level, using a precision mapping camera with a 6" lens. A million dollar jet airplane is required to reach the higher range of altitudes and to keep cost down it is necessary to consider the size of the projects, the number of projects, the relative location of the projects to one another, the weather and atmospheric conditions to be expected during the flying season. The Soil Conservation Service has found that aerial photographs flown when the vegetation is dormant are much more usable than those flown at other times of the year. Because of this the cost may be somewhat higher than the cost of photos flown at other times of the year. However, it is important that the Soil Conservation Service use photographs that meet their needs rather than trying to use photographs that were flown primarily for other purposes.

There has been a limited number of aerial photography companies capable of doing the high altitude flying, but now more companies are becoming interested and are getting into the field of high altitude flying.

Last week a contract was let for flying of areas in Minnesota, Kansas, Iowa, and Nebraska, at a scale of 1:50,000 at a cost of $2.95 per square mile. Previous contracts were let for $3.50 par square mile. The flying of large blocks relatively close together along with the bidding competition of several flying companies will certainly help keep the cost more reasonable.

The use of high alitutde aerial photography is currently restricted to those areas where the difference in elevation does not exceed 300 feet within a radius of two miles from any point. This is necessary to keep the distortion at a minimum due to the displacement of features along the four edges of the photo atlas sheets. Attached is a map of the United States showing in general the areas that may be suitable for high altitude flying for soil survey publications under present criteria. Where half of the area falls within these limitations, it is practical to fly the rougher areas at high altitude and prepare mosaics from this photography. Such mosaics would require fewer prints than are now needed from conventional photography and the quality would be higher because they will be produced directly from the aerial negatives of fewer photographs.

While the original intention was to use high altitude photographs for the soil survey publication program, we are now finding that the high altitude photographs are of much value for other disciplines in the Service. The photo atlas sheets are very useful in farm and ranch planning because each atlas sheet covers a much larger area than the conventional photo used in the past. For example. to produce atlas sheets at a scale of 31,680 (2" = 1 mile) the airplane flies at 37,500 feet above the ground and the scale is about 1:75,000 or 0.84" = 1 mile. The gross area covered by each atlas sheet exceeds 100 square miles. To produce atlas sheets at a scale of 1:24,000 (2.64" = 1 mile) the plane flies at 27,500 feet above the terrain and the aerial negative scale is 1:55,000 (or 1.15" = 1 mile). The area covered here is approximately 60 square miles.

Atlas sheets produced at a scale of 1:20,000, 3.16" = 1 mile, the flying height is 22,500 feat and the negative scale 1:45,000 (or 1.40" = 1 mile). Each atlas sheet at this scale covers 40 square miles.

Atlas sheets produced at 1:15,840 (4" = 1 mile) - the flying altitude is about 17,500 feet with the aerial photo negative scale at 1:35,000 (1.81" = 1 mile) and each photograph covers 22 square miles.

It is important that we use high altitude photographs to the vary maximum since they do have a wide application in many disciplines and operations, the photographic image is of superior quality and the total cost of obtaining the atlas sheets is reduced considerably over the cost of using mosaics as we have in the past.

State Conservationists' Responsibilities

The State Conservationists are now responsible for providing map manuscripts on base maps furnished by the Cartographic Division; however, the State Conservationist and the Washington Cartographic Division will review and evaluate the field sheets jointly and are to agree on the procedures for making maps on an individual case basis. This is in accordance with the procedure established by the Service in Soils Memorandum 70 dated October 20, 1969.

It appears now that approximately 70% of the counties published will have atlas sheets made from high altitude photography and 30% will have atlas sheets prepared from mosaics.

Normally, the Cartographic Division at Hyattsville, Maryland, or Spartanburg, South Carolina, will furnish halftone film positives of the photo atlas sheets at the publication scale either directly from high altitude aerial surveys or from aerial photo mosaics in rougher areas. These will be furnished to the states through their field cartographic unit. If the survey is on the three-year proposed publication schedule, these materials will be furnished from NCSS funds at the Washington level. If the survey is on a later schedule and the state wishes to expedite the publication of the survey maps, then the funds for the materials furnished must be provided by the state office.

The soil surveys fall into two general categories regarding cartographic work: (1) When the field sheets are the same scale as the planned publication, the soil survey can be traced and compiled directly from the field sheets onto the photo atlas sheets by use of a light table or light box, using the film positive directly over the original field sheets (not reproductions); (2) If the soil survey has been mapped on field sheets at a scale different from that of the publication, ratioed film positives of the original field sheets at the approximate publication scale will be prepared by the field cartographic unit servicing the area. The ratioed film positive of the field sheets will then be used to transfer and compile the soil map manuscript on the halftone film positive of the atlas sheet using a light table or light box.

The cartographers in the field cartographic units will ink the following on the halftone film positives of the atlas sheets. The neat line which limits the map area, the principal roads and railroads (not abandoned railroads), the double-line drainage, large dams and reservoirs, county, state, and reservation boundaries as well as the state plane coordinate ticks and values. This assistance is to help the soil scientist in the state in orienting the field sheets to the atlas sheets. However, the state office through the soil scientist is responsible for checking the location of all these features and will make necessary adjustments to produce an accurate map. The state may add other cultural features not shown by the cartographer.

Each state conservationist is responsible for providing soil survey manuscripts which are scientifically accurate, complete, and consistent and are to conform to SCS technical guidelines. It is suggested that when the map manuscript compilation work is started in a state, the state soil scientist or his assistant along with one or more survey party leaders should be sent to the Cartographic Unit for training. Make arrangements with the RTSC and the Cartographic Unit that serves the state.

The soil scientist will compile the correlated soil lines and symbols from the original field sheets or from the ratioed film positive of the original field sheets. In doing this, there will be some distortion and scale difference, which can be compensated for by shifting and registering the photo from the field sheets to the atlas sheets. Most soil scientists have had some experience in making this kind of adjustment. The inking of soil lines and symbols is to be neat and legible. No letter or number or symbol is acceptable if it might be mistaken for some other letter, number, or symbol. It is important that the soil designation be properly placed within the boundary so it is clear and easily read. Avoid placing soil symbols in dark areas if at all possible. The soil scientist will also draft on the film positives drainage, pipelines, power lines, road names and numbers, etc.

A color check of the soil map manuscript will be made so that the maps will be clear and accurate. Cartographic Division will send most of these surveys directly to the finish drafting contractor without any further check and, in some instances where the compilation is exceptionally neat, the maps may be published directly without going to the drafting contractor.

When the compilation work of a county is completed by the soil scientist he will send the film positives to the Cartographic Unit serving the area, and they will prepare a lettering layout overlay that will accompany the completed job to the Hyattsville Cartographic Unit.

General

The Washington Cartographic Division is now preparing a guide for soil scientists to use in compiling soil surveys on photobase sheets, and it is hoped that this guide will be completed and sent to the states by the latter part of this month. This guide will be very valuable to the personnel working on the map compilation phases of the program.

Four counties in our 11 state area have been completed (Montgomery, Jones, Hardeman, and Starr Counties, Texas) and the work looks real good. Counties now being worked on are Cherokee-Gilmore-Pickens, Georgia; Marshall and Oktibbeha, Mississippi; Erath, Texas; and Pontotoc, Oklahoma.

Attached is a printed sheet marked "experimental" which shows the layout of the sheet and material included on the borders.

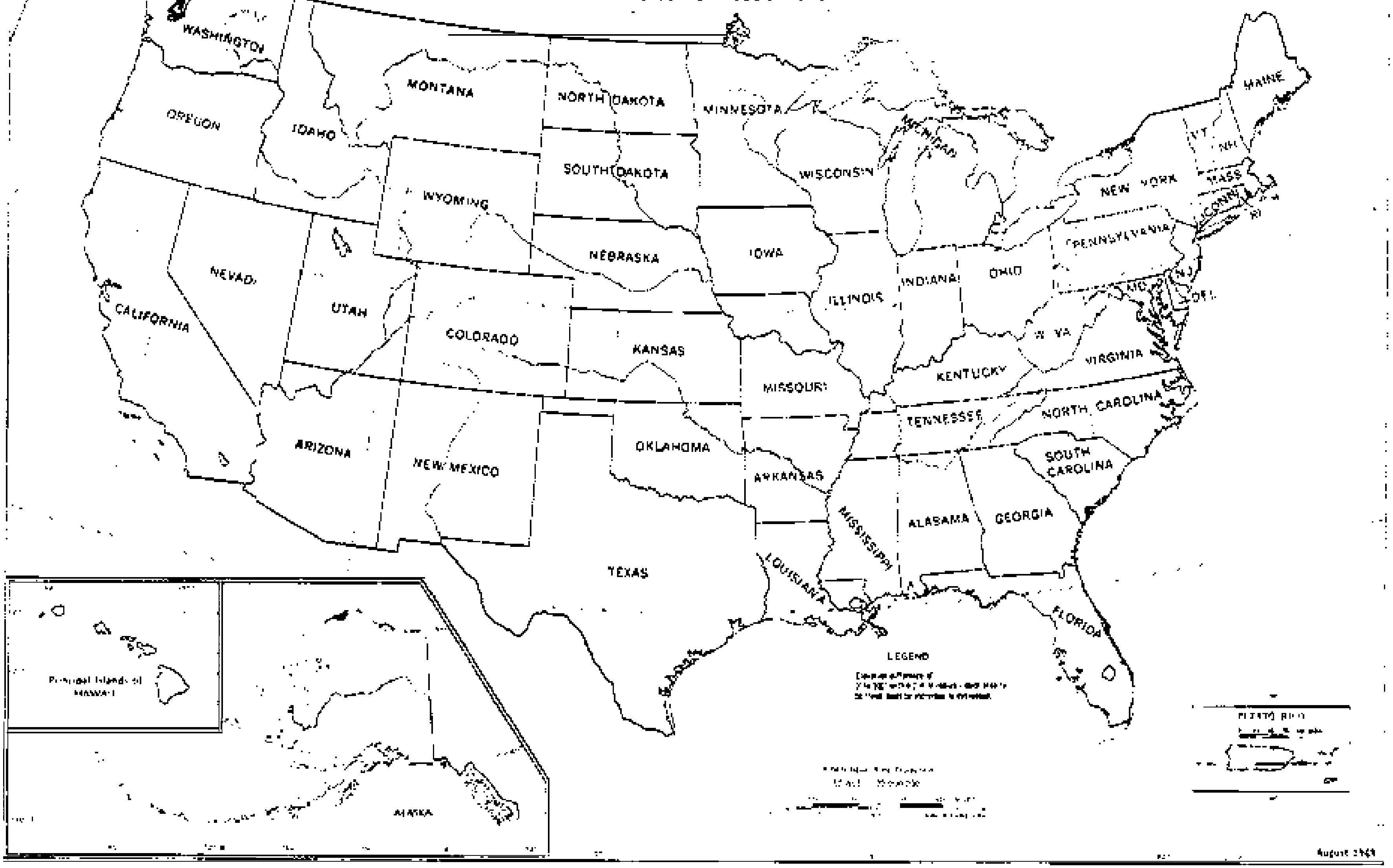
Think you will also be interested in some of the completed work we have received so we want to pass out a few completed film positives and blueline prints for your review.

Questions

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

GENERAL GUIDE TO AREAS THAT MAY BE SUITABLE FOR HIGH ALTITUDE FLYING FOR SOIL SURVEY PUBLICATIONS



EVALUATION OF THE TRANSECT METHOD OF SOIL SURVEY IN WOODLANDS 1/

INTKODUCTION:

SLIDE # 1 To achieve maximum use or productivity the forester or resource manager requires accurate information including descriptions of soils and site conditions.

At the 1959 Forestry Symposium at Louisiana State University, Coile (4) was highly critical of soil surveys made by the Soil Conservation Service. He stated the range of properties allowable for the modal soil type was too broad;

SLIDE # 2 that the 42-inch soil anger used then was too short for making soil surveys over much of the South. Constructive criticism has merit; it results in progress. Concepts of soils have changed; the 42" anger has been replaced and deeper borings are being made.

Research in soil-site classification also has its share of difficulties. Many attempts have been made to correlate soil-site characters with height growth. Recently Broadfoot (2) showed that equations developed by multiple regression for Southern hardwoods did not predict site index with sufficient precision for investment planning.

Obviously considerable improvement is needed in soil classification, in soil survey, in interpretations and in research. Achievements within recent years have been highly commendable; yet progress involves change in concepts and procedures, difficult to achieve in some instances.

The current soil classification system dictated many welcomed improvements. How can soil survey be further improved?

1/ Illustrated slide talk by George E. Smith, Jr., Woodland Conservationist, SCS, Columbia, S. C. presented at Southern Regional Technical Work Planning Conference of the Cooperative Soil Survey, L.S.U., Baton Rouge, La., May 5-7, 1970.

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Listen carefully to a few brief extracts from the Soil Survey Manual (1):

Carolina-bay; Darlington report

SLIDE # 3 Soil mapping is a technical art. Some well-trained men, even men well above the average in competence in soil classification, lack the ability to plot soil boundaries accurately. Above all the successful soil mapper is accurate. He maintains uniform standards of accuracy in his work, in open country and through the bush. He realizes that soil maps without accurate boundaries - guessed at rather than determined- are poor soil maps, regardless of the classification. The damage from using a poor soil map may be very serious,

Pee Dee Swamp

SLIDE # 4 Soil boundaries are located on the mappers route and are sketched ac-- curately on the base. Foot traverses need to be near enough together for accurate plotting between locations. In detailed basic soil surveys, even with traverses at around 800 to 1000 feet, some side traverses are needed to locate boundaries and to identify soils. Although soil boundaries are not actually traversed, they must be plotted from observations made throughout their course in detailed soil mapping.

Only the most experienced mappers can estimate distances accurately beyond 1/8 mile, or 660, even under the best conditions. Most mappers need checks on estimates beyond 300 feet in detailed mapping. Variations in land forms introduce many illusions of distance.

In reconnaissance soil mapping, the boundaries are not necessarily observed throughout their course. They are plotted where the lines of traverse cross them; but between these points of observation, many

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boundaries are sketched from the appearance of patterns on aerial photographs and the general appearance of the landscape. Exceptional skill is required in the interpretation of external features. The sketching of boundaries is a continual check on soil classification.

SLIDE # 5 Sandhills

When the pattern of soils becomes too complex for accurate mapping and symbolization, the soil mapping legend needs to be re-examined with the view of using soil complexes as mapping units. No boundaries should be placed on the detailed soil map unless that can be sketched accurately.

(End Extracts)(Explain sandhills problem-small areas intermingled - 30 pts difference in site index)

SLIDE # 5A (2nd Sandhills - close up of variation)

No issue is taken with these statements. But do they not rule out entirely detailed soil surveys of many areas?

SLIDE # 6 Witherspoon Island vs cropland mapping

Why do some resource managers disregard, or even dispute, soil surveys? Many explanations can be enumerated. Perhaps a basic issue is that soil surveys and soil maps sometimes do not meet quality standards.

Have soil scientists become "over-oriented" to detailed soil mapping?

Do procedures and standards permit accurate and economical detailed soil mapping of some areas? Can reconnaissance or medium intensity surveys provide sufficient information and interpretations to meet the requirements of the user? Which has precedence, theoretical or practical aspects of soil classification and mapping?

The number of soil scientists in South Carolina is not sufficient to provide detailed soil mapping for all requests received. One recent request involved 150,000 acres of woodland, a small portion of the total holdings of a forest industry. Priorities and work loads permitted a survey on only 3000 acres. High quality detailed soil surveys simply are not and will not be available on many areas in the foreseeable future using current procedures.

Soil Survey by Transects:

Johnson (5) reported transect methods provide quick and easy ways of estimating the composition of soil mapping units. Koos (6) considers transect as the most practical and efficient method of surveying wooded areas in Mississippi; mapping by transect has continued since 1964. Cockerman (3) indicated the transect method is statistically sound; that good quality soil maps result from this method.

Jasper county sheet - Woodland areas

SLIDE #7 The transect method is being used on 170,000 acres of Atlantic Coast Flatwoods in South Carolina. The area is heavily wooded, wet and with few roads. Slope is about l-foot per mile towards the coast-line. Drainage-ways are ill-defined or nearly non-existant. Frequently ground-vegetation is dense and areas are difficult to traverse. It is almost impossible to maintain orientation required to make detailed soil surveys.

Site problems are not limited to soil scientists. Other professionals including foresters, geologists, engineers and surveyors experience these same difficulties. Foresters use transects to map forest types and cruise timber; ecologists use transects to sample vegetation

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populations; engineers use transects when determining elevations to prepare contour maps or profiles; geologists use transects to make geological sketches; surveyors use bearings and distances to maintain orientation.

The validity of transects then is well established. Why not utilize transects to orient soil scientists? Are soil maps and interpretations, using the transect method, adequate? The transect soil survey study in South Carolina is quite interesting.

Procedures:

Contrasting areas to be mapped by detailed survey and transect

SLIDE # 8 (a) Selection of areas: On a base map of the county, large wooded areas were delineated for transect survey; other areas used intensively were delineated for detailed soil surveys.

(b) Locations of transects: Tentative transect lines were located generally to cross major drainage-ways as nearly at right angles as practical. Transect lines were located on aerial photographs using base points or lines readily identifiable on the ground.

(c) Intervals between transects: Spacing of transects varied generally from one to two miles apart. In selected areas however, intervals as small as ¼ mile were used.

(d) Intervals between points along the transect: sampling points were spaced uniformally along each transect; fixed intervals ranged from 100 feet on some transects to 750 feet on other transects. Generally intervals ranged from 200 to 500 feet, but were consistant for transects within a specific area being mapped.

(e) Lengths of transects: The majority of transects were one to 4 miles in length. Occasionally shorter transects were established for verification of other transect data, or where outer boundaries of mapping areas restricted transect lenghts.

(f) Field mapping legend: Since slope and erosion were insignificant the field mapping legend was an open legend based on soil series and type.

pH determination

SLIDE #9 (g) Data recorded: Written records were kept for each boring. Included were many soil descriptions, pH determinations, and pertinent field notes. Field notes and records were filed for analyses and evaluations later.

(h) Analyses of point data: For each transect, soils were listed, in order of occurrence, on an individual worksheet. Tentative apparent soil associations, were noted for each transect. Then comparison of data for all transects within the area permitted final association determinations.

Tentative statistical analyses consisted of determination of soils composition by transects, then by associations. Standard deviations and standard error of mean were computed. Final statistical analyses will be computed upon completion of the field survey.

Sample sheets are available.

(i) Progress of field survey: Currently more than 100,000 acres have been mapped; 29 soil associations have been described and complete interpretations for woodland are being prepared. During initiation of the trial survey, considerable reservation and doubt as to success of the transect method was expressed by the soil scientists. This experience has changed their unfavorable attitudes.

COMPARISON OF TRANSECT AND DETAILED SOIL SURVEYS:

SLIDE # 10 A detailed soil survey and a transect soil survey were completed on a tract owned by Kimberly Clark Cooporation. Examination of the two surveys reveal numerous variations.

This slide shows only two of the transects with sample points and soil names.

Table 1 (attached) compares woodland suitability for each transect point of transect A34 as determined by both the detailed and transect surveys. Identical suitability ratings occur in only 5 of the 21 points. Discrepancies are evident in 16 sample points or 76% of the total.

SLIDE # 11 This slide shows the woodland suitability group map prepared from the detailed soil survey. It is inconceivable, to those familiar with this tract, that the soil scientist "observed the soil boundaries throughout their extents", a requirement of this type of survey.

Man-days required for the detailed survey exceeded man days used for the transect survey by 50% in spite of the necessity of retracing the transect survey a second time to determine pH of each sample point (this was erooneously omitted during the initial transect) and in spite of the time used to record soil descriptions.

SLIDE # 12 This slide shows the soil associations prepared from the transect survey. Association boundaries were located by extending lines from points of intersection with transect lines. Use of stereoscope and photo interpretations were utilized advantageously.

Another comparison (black & white)

SLIDE # 13 INTERPRETATIONS OF TRANSECT SOIL SURVEY FOR WOODLANDS:

A sample description of a soil association is attached (See Exhibit A) Interpretations needed for woodcrop production include species suitability, site index (one measure of productivity) for the important species, management problems related to soil characteristics, species suitable for planting, and ordination into woodland suitability groups.

SLIDE # 14 Fawn

Additional interpretations will be required for multiple-use, or "shared" land-use, including wildlife, recreation, watershed protection and maintenance,

SLIDE # 15 and grazing potentials. All interpretations can be related to the individual soil series, type, and phase as required.

Therefore, with adequate narrative descriptions of the soils within the association and appropriate interpretations, as described, the requirements of the resource manager can be adequately and more accurately accommodated.

SUMMARY

SLIDE # 16 The concept of detailed soil survey in extensive heavily wooded areas frequently is impractical. Acceptable quality cannot be maintained due primarily to inability of soil scientist to orient himself continually, and to observe the soil boundaries throughout their extent. Transect soil surveys properly planned, adequately sampled and statistically analyzed can be accomplished at reduced costs, with reduced physical hardship, and improved quality.

SLIDE # 17 Transect soil surveys document soils and vegetative information at oriented points which is available for future reference or use as may be required.

Additional evaluations are needed to improve techniques and procedures to enhance the quality of transect surveys.

LITERATURE CITED AND REFERENCES

(1) 1951 - ARS Soil Survey Manual - USM Misc. Pub. 274 Revised.

(2) 1969 - Broadfoot, W. M. - Problems in Relating Soil to Site Index For Southern Hardwoods. Forest Science, Vol. 15, No. 4, Dec.

(3) 1970 - Cockerman, Warren L. (Unpublished; official correspondence, File Designation: SOILS - Meetings and Conferences - Southern Regional Work Planning Conference, 11 March 1970)

(4) 1960 - Coile, T. S. - Summary of soil-site evaluations. Southern Forest Soils, 8th Annual Forestry Symposium, 1959, Louisiana State Univ. Press, Baton Rouge, La.

(5) 1961 - Johnson, William M. - Transect methods for determination of the composition of soil mapping units. Soil Survey Field Letter, U. S. D. A. - Soil Conservation Service, June.

(6) 1969 - Koos, W. 14. - (Unpublished; official correspondence, File Designation: SOILS - Guides for Making Transects, 5 December 1969).

EXHIBIT A

MEGGET-OKEETEE ASSOCIATION (224). This mapping unit consists of nearly level soils on broad heavily wooded lowlands. Changes in elevation are slight and most drainage ways are poorly defined,

The Meggett soils are poorly drained, and makes up about 50 percent of the mapping unit. They normally occupy the lowest elevations in the immediate vicinity. The description and range of characteristice for the Meggett series are representative for the Meggett soils in this mapping unit.

The Okeetee soils are somewhat poorly drained and make up about 25 percent of the mapping unit, They are on low ridges adjoining the Meggett soils. The description and range of characteristics for the Okeetee series are representative for the Okeetee soils in this mapping unit. Bayboro, Bladen, Coxville, Lenoir, Dunbar, and Pooler soils make up the remaining 25 percent of the association.

Nearly all of this mapping unit is in woodland. The dominant forest type is mixed pine and hardwoods. The higher elevations are dominately in pine and the lower elevations are dominately in hardwoods. To use these soils for cultivation or pasture would require intensive drainage systems. If drained, these soils are suited to corn, soybeans, small grain, and pasture grasses.

Meggett-Capability Unit IIIw-2; Woodland Group 1w9

Okeetee-Capability Unit IIIw-6; Woodland Group 1w8

TABLE I

COMPARISON OF SOILS ORDINATION BY TRANSECT ACID DETAILED MAPPING PROCEDURES

Transect Point	Correlated Soil Name (Transect)	Woodland Suitability Group (Transect)	Woodland Suitability Group(Detailed)
1	Wando	3s2	4s2
2	Wando	382	4s2
3	Coxville	2w9	1w9
4	Rutlege	2w3	3s2
5	Wando	3s2	3s2
6	Albany	3w2	3dl
7	0 keetee	1w8	301
8	Meggett	1w9	1w9
9	Wando	3s2	301
10	Okeetee	1w8	301
11	Meggett	1w9	1w9
12	Santee	1w9	1w9
13	Santee	1w9	1w9
14	Okeetee	1w8	2w9
15	Meggett	1w9	2w9
16	Meggett	1w9	2w9
17	Okeetee	1w9	2w9
18	Stono	1w9	2w9
19	Santee	1w9	2w9
20	Santee	1w9	2w9
21	Santee	1w9	2w9

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE, COLUMBIA, SOUTH CAROLINA
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RUSTON-EUSTIS ASSOC.

TRANSECT		No. Obs.	Ruston No. Obs	%	$\bar{x}$	dev x	x^2	Eustis No. Obs.	%	$\bar{x}$
6BB-147	3	10	2	20*	34	-14	196	2	20	25
5BB-106	A	19	0	0	34	-34	1156	4	22	25
5BB-108	a	15	6	39	34	3 5	25	4	27	25
5BB-108	D	11	3	27	34	- 7	49	4	36	25
5BB-108	E	18	9	50	34	+16	256	5	28	25
5BB-108&174	F	27	8	30	34	- 4	16	8	30	25
5BB-108	G	15	8	53	34	+19	361	4	27	25
5BB-174	A	14	8	57	34	+23	529	2	14	25
5BB-174	3	18	6	33	34	- 1	1	3	17	25

Sx^2 2588

$\bar{x} = 24.6$

Standard deviation (s)

$s = \sqrt{Sx^2/n-1}$ mean $= \bar{x} = 34.3$

Where:

x = deviation from mean* - (x)

n = number of sampling units

s = sum

Standard Error (of mean)

$$S\bar{x} = \sqrt{\frac{S^2}{n}} = \frac{S}{\sqrt{n}}$$

Estimate of standard deviation:

$$s = (r_h - r_e)/C$$

where: r=range

C = 3,4,5,6 for 10,25,100,500 samples

$$s = \sqrt{\frac{2588}{8}}$$

$$s = \sqrt{323.5}$$

$s = 18.2$

$$s\bar{x} = \frac{18.2}{\sqrt{9}}$$

$= 6.1$

$s = 57/3$

$= 19$

* a sampling unit

SOIL SURVEY IN THE 1970'S*

The objectives of the National Cooperative Soil Survey are to identify and map the soils of the United States, to determine and explain the characteristics of the different kinds of soils, and to interpret them for alternative uses. This information is made available to people for use in farming, ranching, forestry, recreation, highway planning of residential, industrial, and commercial developments; for locating areas of potential hazards from floods, landslides, and severe erosion. All of these uses can help in protecting soil and water resources and in improving the quality of the environment.

Cur ultimate long-range goal is to complete by AD 2000 a well-disigned soil survey of 2.2 million acres of land.

As of June 30, 1969, detailed soil maps that meet current standards for all potential users had been prepared on about 750 million acres and reconnaissance soil maps on about another 25 million acres. During fiscal year 1969, 43 soil surveys, covering about 19 million acres, were published. Manuscripts for 42 others, covering 22 million acres, were sent forward for printing. In fiscal year 1970, we sent 40 surveys to the Government Printing Office.

Seventy years ago, even 40 years ago, the principal challenge to the Soil Survey was to provide the kind and detail of soils information needed for the improvement of farming. During the first several decades of its existence, techniques were developed which made soil surveys a major source of precise, accurate, and reliable facts about soils as a medium for plant

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*Written by William M. Johnson, Assistant Deputy Administrator for Soil Survey, Soil Conservation Service, for presentation at the Southern Regional Technical Work-Planning Conference of the National Cooperative Soil Survey, Baton Rouge, Louisiana, Hay 5, 1970.

growth. soil surveys are really the only vehicle for extending research and experience on a given kind of soil from one place to another. Perhaps most important of all is the means by which a soil scientist can communicate to other people about soil behavior. Since the late 1920's or 1930's engineers, architects, sanitarians, builders, and developers have also learned that the soil scientist has something of importance to say to them. The physical, chemical, mineralogical, and biological characteristics of soils determine the stability of soils, the reate of water runoff, and the kind and amount of sediment that will be produced. So they determine the pollution potential of different kinds of soils and the suitability of different kinds of soils for a variety of uses other than farming and ranching.

In a world troubled by rapidly increasing population end deteriorating quality of environment, soil surveys will have an important role in finding solutions to urgent problems. Although we have had trouble with excessive crop production in this country, the time is coming when we may need all of our productive potential in order to feed properly all Americans. Overgrown and blighted cities are unsuitable for even larger populations and other places must be found for people to live. We have come to realize that we need several hundred new cities in America, some close to existing centers of population, but most in parts of the country where cities do not now exist. Of course, one docs not start new towns and cities without support -- that is, employment for the people who will live in the new cities. Also, one cannot build a new city in a vacuum. Cities depend on the surrounding countryside for raw materials, power supplies, labor supplies. recreation, and consumers. In turn, cities provide markets, transport, communications, financial institutions, educational facilities, libraries, museums, and other cultural needs. Tow" and country are interrelated and must be in harmony for the success of both. During the 1970's, we shall have a chance to plan and build new communities (town and country developments) with clean air and water, with parks and nature areas nearby, with good schools and libraries and museums, and with transport and parking and space enough for everyone to have a decent life, The planning and building await only human impetus, because the methods are known.

Planning new communities requires the knowledge and skills of many disciplines. Soil surveys rightly interpreted provide a large part of the data needed to evaluate alternative uses; to locate residential, commercial, and industrial areas; to develop design criteria for roads and buildings; to predict yields of crops; and to estimate hydrological changes that will accompany urbanization. But the planning requires the knowledge and imagination of many specialists: soil scientists, geologists, architects, engineers, sanitarians, economists, educators, biologists, lawyers, cultural anthropologists, and specialists in recreation, transportation, and communication. The Soil Survey is one of the best devices around which to organize the studies that lead to a coordinated town and country plan. One important challenge to the Soil Survey is to anticipate the needs of regional and community planners so as to have soil maps, descriptions, and interpretations ready before the planning process begins. Our best skills and imagination are needed to recognize where new and different interpretations will be helpful.

We would be naive to suppose that anyone is going to give us a blank check to proceed at our own accelerated pace, urgent though the need may be.

The Soil Survey, like other state and federal organizations, will find increasingly vigorous competition for public support and public dollars. The challenge we face is to provide more and better products with fewer dollars. In other words, we must become more efficient. In a period of inflation, this may seem to be an impossible task, but fortunately, it is also a period of rapidly improving technology, and we have many opportunities to make innovative changes in our procedures.

Some of you have already worked on improved base maps that are now appearing in many parts of the country: Orthographic maps, for example, make field work faster, easier, and more accurate; atlas sheets of the same size and format as used in published soil surveys are substituting for the traditional individual aerial photographs, thus reducing the number of map joins and improving accuracy of the survey. Preliminary experiments are underway in the use of computers to store data on soil behavior as related to soil classes and then to rearrange and print out these data in classification charts and interpretive tables ready for use in soil handbooks and published soil surveys. We hear a lot about the potential of remote sensing, even to the extreme view that the soil survey will be replaced by aircraft and cameras. It seems unlikely to me that soil surveyors will become obsolete in our lifetime. In fact, if remote sensing does become a practical reality for identifying and mapping of soils, even in part, it will be because of the efforts of soil surveyors on the ground. We are working closely with remote sensing project leaders, and many of you are working with some of these projects to determine just what applicability the new techniques have to our work. Innovations in automated map making happen almost every week. Cur Cartographic Units now have digitizers and ccmputers which convert geographic detail into numerical records on magnetic tape and which can quickly calculate areas of individual delineations. Display and plotting equipment driven by these magnetic tapes can be used to edit the soil map, warp it to fit a rectified base map, and produce press-ready negatives for printing the soil map. Some of this new equipment is already on order, and we are merely waiting for final improvements in some additional machinery before going to essentially completely automated map manuscript compilation and map finishing procedures. These procedures will give us more accurate published maps at lower cost with fewer workers.

During recent years, the rate of publication of completed soil surveys has lagged behind the rate of mapping for several reasons. Among the principal reasons is the growing and insistent demand for immediate soil information to serve as a basis for local decisions on urban development. On July 1, 1969, mapping had been completed on about 375 surveys that were not yet published, and the backlog has continued to grow.. Now, though, we have plans and support for an accelerated publication program that should enable us to reach a balance between the rates of mapping and publication by the end of fiscal year 1975. To do this requires extra money and extra effort, and it will require active cooperation by everyone in the National Cooperative Soil Survey. We have shifted more and more responsibility for soil surveys to individual states. Recently, we have asked you people to take responsibility for the map manuscript compilation for the next three or four years in order to accelerate this work without adding large numbers of workers to the personnel rolls of the Cartographic Division. We have asked you also to review existing text manuscripts using a new checklist for reviewers and to upgrade the scientific and technical quality of those manuscripts, This will save a good deal of time and money in the formal editing of manuscripts (and will result in better publications). We are experimenting with cold-type composition and offset lithography for text publications. These procedures, along with more automation of the cartographic process, will help us to accelerate the rate of publication. The plan calls for the following schedule:

Fiscal	Year	1971	-	60	publications
"	"	1972	-	120	"
"	"	1973	-	140	"
"	"	1974	-	130	"
"	"	1975	-	130	"

In 1976 and succeeding years, we estimate a stable average of about 80 publications a year until the job is done.

The task we face in the 1970's is formidable, but the National Cooperative Soil Survey has always been equal to its challenges, and I have no doubt that we shall continue to be. At the same time that we are accelerating publication, we must meet increasing demands for soil maps and interpretations immediately. We shall need our best talents for devising more efficient procedures. We shall need imaginative soil scientists to work with planners and developers in designing soil surveys for new purposes and for interpreting and reinterpreting soil surveys for town and country planning, for improvement of environmental quality, for control of pollution, for solid waste disposal, and for all the other purposes that will be required of us. The 1970's will be an enormously more exciting time than the 1960's. I am sure that you look forward to the new challenges as much as I do.

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING
CONFERENCE OF THE COOPERATIVE SOIL SURVEY
Baton Rouge, Louisiana
May 5-7, 1970

Report of the Committee on Criteria for Family and Series.

I. Charge

Evaluate the significance of the following criteria for differentiating series within families; color, particle size distribution (amount and degree of gradation,) permeability, soil structure, consistence, rooting depth, solum thickness, wetness (including depth to water table and moisture regime), and presence of concretions (Fe, Mn, $CaCO_3$).

II. Committee actions

A. Assignments were made to committee members in January 1970. Subcommittee chairmen were designated and the nine features in the charge were assigned to four subcommittees. Members were asked to comment on the features assigned to their subcommittee. A short questionnaire relating to the significance of the specific feature to Genesis, Interpretation, and Mapping accompanied the assignment.

B. The four subcommittee chairmen consolidated the comments from members and this report is a summary of the full committee expressed within the outline of the questionnaire.

III. Committee results

A. Genesis

1. The relationship between the features and time, degree of weathering, change in weathering cycles, parent materials, or topography.

Soil color is an indirect measure of other more important characteristics and thus a complex function of a variety of environmental and pedogenetic factors. It is possible to account for the color of one specific pedon, but a formula to predict soil color appears to be difficult to establish.

In relating color to soil genesis, broad generalizations are usually best. For example, red colors are associated with unhydrated iron oxides, convex surfaces, good drainage, and aeration. Yellow colors are associated with higher manganese and aluminum, good to fair drainage on smoother landscapes. Gray colors are associated with level topography, poor drainage and aeration, high manganese and aluminum. There are, of course, many exceptions to these generalizations.

The gray colors can be a reflection of a change in the weathering cycle where Fe is **removed** under gleying or reduced conditions and is not available for oxidation when better drainage is achieved under a later weathering cycle. Red colors below the calcic horizon in some Ustalfs and Ustolls reflect a thick argillic horizon formed under a prior climate and later engulfed with carbonate during a later weathering cycle.

The particle size distribution has a correlation with the degree of weathering and the nature of the parent materials. The higher levels of classification separate the more significant factors above the series level. The <u>high silt</u> vs <u>low silt</u> separation within a family relates primarily to parent material. The horizontal distribution within the control section relates more to degree of weathering or changes in the weathering cycle.

Permeability, soil structure, and consistence are indirectly related to genesis. These features were influenced most by the degree of the weathering cycle and the nature of the parent material.

Rooting depth results from restrictions within the solum due to fragipans, natric horizons, clay pans, and plinthite concentrations; or lack of restrictions below the solum in material that will support plant roots. Most soils with rooting depth restrictions within the solum are relatively old soils, are moderately to strongly weathered, and usually occur on level to sloping topography. Rooting depth below the solum is normally confined to younger geomorphic surfaces such as terrace deposits with little or no consolidation.

Solum thickness is usually related to the age of the geomorphic surface and the degree of weathering. Some evidence of change in the weathering cycle is present in soils with thick sola but is usually not present in soils with thin sole. Where bedrock such as sandstone underlies the sola and is considered to be the parent material, the soils have relatively thin sola even though the degree of weathering in the sola may indicate old soils. Topography is related to solum thickness in that it has influenced geologic erosion and accumulations. Soils on steeper slopes usually have thinner sols.

Wetness is frequently associated with topography. The degree of weathering as it influences the formation of pans and other pedogenetic restrictions tends to cause perched water table.

The presence of concretions appears to be most related to degree of weathering and in some instances reflects a change in the weathering cycle. Some concretions, such as hard nodular caliche and ironstone reflect a combination of age (time), degree of weathering, and a change in the cycle of weathering.

2. Testing and field study are needed to determine significance to genesis.

Soil color and its relationship to genesis may be better established with computer facilities to determine the significance of color to:

(a) geomorphic surfaces and/or age

(b) topography and/or moisture regime

(c) mineralogy and/or parent material

(d) dominate influences affecting hue, value, and chroma

(e) statistical distribution of' color groups in different taxonomic Levels of the system

Solum thickness testing and field study would be profitable in the Glossaqualfs and Paleustalfs. These Alfisols have thick sola and are presumed to be older than other Alfisols.

The Glossaqualfs are very strongly acid, have magnesium and sodium as dominant cations in the lower part of the solum, and low exchangeable calcium. Are these being recharged at these depths by the cations being released through the breakdown of primary clay minerals, or through recharge from ground water? Many Alfisols are considered to be young soils with high base saturation due to the low degree of leaching. These soils appear thoroughly leached.

Many of the Paleustalfs have thick reddish argillic horizons extending for several feet which appear to be recharged with calcium carbonate. The carbonate accumulation masks out the evidence of an argillic horizon usually within a meter depth. What are the genetic inferences of these observations.

Depth to water table and moisture regimes and seasonal variations in water tables need to be tested as to their significance to genesis.

B. Interpretations

1. The relationship of the feature to soil behavior and plant response.

Color is probably one of the weakest soil characteristics in terms of detailed correlation with plant growth and soil behavior. Broad generalizations are that gray soils are colder in the spring with slow early growth. Red soils are related to better drainage, more friable, and have greater bearing strength.

Particle-size distribution, permeability, soil structure, consistence, rooting depth, solum thickness, and wetness have a direct influence on plant response and soil behavior. Most of these significant features are recognized at a higher level of classification and are not used normally to differentiate series.

The presence of concretions has little effect on soil behavior and plant response, unless the volume is great enough to reduce plant roots, water movement, act as a void decreasing available water capacity, or serve as coarse fragments to improve the engineering properties of the soil.

2. Additional investigations are needed to determine significance to interpretations.

The color of some soils with impeded internal drainage is without the characteristic low chroma mottles. Puerto Rico suggests that yellowish red horizons (5YR and 7.5YR 5/6) of this category should be investigated.

The fine sand content vs seedling growth and survival appears to be correlated in Texas. Further investigation within the Psamments and the Arenic and Grossarenic subgroups is recommended.

The shape of sand and silt particles is believed to account for greater compaction in certain Ustolls in Oklahoma. Further investigation with soils of Planosolic characteristics is recommended.

Soil wetness regimes need additional study related to soil behavior and plant response, with particular emphasis on the timing of the seasonal water tables.

C. Mapping

1. This feature is used in field mapping in the following manner:

Color has been extensively used in field mapping. The Soil Survey Manual states that "soil color is one of the most obvious and easily determined characteristics."

Texture has been estimated by the "feel-method" and also is one of the old standbys in field mapping.

Permeability, soil structure and consistence are normally observed during field mapping and related to pedogenetic processes that are assumed to have occurred. These are normally accessory features to help the soil in a higher category of classification.

Rooting depth and solum thickness are features commonly observed in field mapping. They are diagnostic at a higher level of classification,

Wetness is used in field mapping primarily by inference from gray colors and topographic position.

Presence of concretion has been used extensively in mapping. Concretions are usually quite obvious and are an easily determined characteristic.

2. Accessory features help predict where the primary feature is most apt to occur. Accessory features are valuable in making separations in mapping.

Color predictions are enhanced by observation of the convexity, concavity, and slope gradients provided the geomorphic situation, type of parent materials, degree of weathering, and water regime are taken into account.

particle-size distribution can be best predicted by relating to similar parent materials and landscape positions.

Rooting depth and solum thickness accessory features are landscape position, geomorphic surface, and natural or native vegetation.

3. Statistical accuracy of mapping using this feature as differentia.

Investigations dealing with statistical accuracy of criteria used for mapping are limited.

Field tests are needed to predict the statistical accuracy of most of the nine factors for representative soils in each of the major orders.

IV. Committee recommendations

A. The features used at the higher categorical levels of the classification system be evaluated for use at lower levels, especially as needed in differentiating series.

B. Further field investigation be done to test statistical validity of features being, used and considered for use as series criteria.

C. Testing and field studies be considered and initiated on the needs outlined under IIIA2, B2, and C3 of this report.

D. That investigations be initiated or broadened for the use of other features as series criteria, including but not limited to the following:

1. Absorption capacity
2. Degradation of the argillic horizon
3. Nature and kinds of bisequem profiles
4. Nature and kinds of fragipans
5. Organic matter levels and organic complexes
6. Timeliness of temporary water tables
7. Timeliness of seasonal and annual rainfall
8. Calcium deficiencies
9. Ratio of aluminum to basis (toxicity)
10. Nature of horizon boundaries, including piping and chimneys.

E. The committee recommends it be continued.

W. W. Fuchs, Chairman - Tex.
C. A. Steers, Vice-Chairman - Ala.
O. R. Carter - Ark.
R. E. Caldwell - Fla.
B. L. Allen - Tex.
Fenton Gray - Okla.
Frank F. Bell - Tenn.
F. H. Beinroth - P. R.
R. 1. Barnhisel - Ky.
R. J. McCracken - N.C.
W. M. Koos - Miss.

R. C. Carter - Miss.
C. J. Koch - Va.
R. G. Glenn - Miss.
G. I,. Bramlett - Ga.
C. I. Rich - Va.
M. E. Bloodworth - Tex.
T. W. Green - Ga.
E. L. Hill - Okla.
T. C. Mathews - Fla.
J. R. Runkles - Tex.
Kenneth Watterston - Tex.

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
OF THE COOPERATIVE SOIL SURVEY

Baton Rouge, Louisiana

May 5 - 7, 1970

Report of Committee 11 - Application
of the New Classificational System

I. Charges to the Committee:

(1) Evaluate the soil classificational unit (pedon) in relation to depth and other dimensions.

(2) Clarify the definition and the use of buried horizons in the application of the new classification system.

II. Committee Action:

A questionnaire was sent to each member of the committee requesting comments and suggestions on the two charges.

(1) Charge 1.

The present definition for the lateral dimensions of 8 pedon is as follows: "A pedon is a three-dimensional hody of soil with lateral dimensions large enough to permit the study of horizon shape and relations. Its area ranges from something like 1 to 10 square meters, depending on the nature of the variability of the horizons. Where horizons are intermittent or cyclic, and recur at linear intervals of 2 to 7 meters, the pedon includes one-half of the cycle. Where the cycle is less than two meters, or all horizons are continuous and of uniform thickness, the pedon has an area of approximately one square meter. If horizons are cyclic, recur at intervals greater than 7 meters, the pedon reverts to the 1 meter size, end more than one soil will usually be represented in each cycle."

The Committee all agreed that the lateral dimensions of a pedon was satisfactory and had no comments or suggested changes.

The present definition for the lower limits of a pedon is: "Its lower limit is the vague and somewhat arbitrary limit between soil and 'not-soil'."

The comments from members of the committee were quite variable, ranging from no change in the definition to specific lower limits of 1 meter, 2 meters, and 3 meters.

(2) Charge 2.

The present definition of a buried soil horizon is, "A buried soil horizon is defined as a buried genetic horizon or horizons. Horizons of another solum may or may not have formed in the overlying material, which may be similar to, or different from, the assumed parent material of the buried soil."

Most of the members of the committee did not feel qualified to comment on this charge. The main problem is the confusion and conflict in interpreting buried B horizons.

At the present time buried histic epipedons are diagnostic at the subgroup level in Haplaquents, Haplaquolls, and Tropaquepts, if they occur within 20 inches of the surface, and buried argillic horizons are diagnostic at the subgroup level in Haplargids if they occur within 20 inches of the surface. Other buried horizons are recognized at the series level.

(3) Control section For Soil Series.

In addition to the two charges, the Committee considered the control section for soils series as defined on Page 45 of the March, 1967 Supplement to Soil Classification System (amended April, 1969). Cryic soils were not considered since none occurs in the Southern Region.

III. Committee Recommendations:

(1) Charge 1.

The Committee recommends that no changes be made in the definition of the lateral dimensions or lower limits of a pedon. That soil and "not-soil" is well described and defined on Page 1 of "Soil Classification, A Comprehensive System" dated August, 1960 and should be used as a guide to determine the lower limits of a pedon.

(2) Charge 2.

The Committee recommends no change in the present definition of a buried soil horizon. That to avoid confusion and conflict a buried B horizon should only be recognized when there is a buried A immediately above the buried B horizon.

(3) Control Section For Soil, Series.

The Committee recommends that for the control section of grossarenic subgroups that item (3) under "All other mineral soils" on Page 45 of the March, 1967 Supplement to Soil Classification System bc changed to read: "the bottom of the named diagnostic horizons and any subjacent Cca horizon if the thickness of both the named diagnostic horizons and the regolith exceeds 40 inches (about one meter), but not below a depth of 80 inches (about 2 meters), except for grossarenic subgroups, not below a depth of 120 inches (about 3 meters)."

(4) The Committee recommends it be continued.

Committee Members

H. T. Otsuki, Chairman - Okla.
R. G. Leighty, Vice-Chairman - Fla.
L. E. Hull - N. C.
O. R. Carter - Ark.
J. M. Soileau - Ala.
E. A. Perry - Ala.
L. H. Rivera - P. R.
R. C. Carter - Miss.
C. R. Carter - Texas
Joel Giddens - Ga.
R. I. Barnhisel - Ky.
N. E. Linnartz - La.
E. N. Miller, Jr. - S.C.

April 17, 1970

Southern Regional Technical Work-Planning Conference
of the
Cooperative Soil Survey
Louisiana State University
Baton Rouge, Louisiana
May 5-7, 1970

S.A.Lytle, Chairman
D.F. Slusher, Vice-Chairman
replaced by L.L. Lofton

REPORT OF COMMITTEE III

-Soil Interpretation at the Higher Categories of the New Classification System-

Curtis L. Godfrey, Chairman
M.E. Shaffer, Vice-Chairman

CHARGES:

1. Refine and test some of the items (guides and criteria) set forth in the Rational Committee Report. (See report of Committee II)

2. Develop small-scale maps and legends of counties, states, and regions, using the new classification system with special emphasis on good interpretive legends.

3. Review the possibility of using more than one categorical level in preparing a legend for a state or regional small-scale map. For example, would it be advisable to use phases of associations of families, subgroups, and great groups as components in a state legend where the complexity of the soils is quite variable in a state?

REPORT OF COMMITTEE III

-Soil Interpretations at the Higher Categories of the New Classification System-

The members of Committee III were asked by the Chairman to respond to charges. Highlights of the comments recieved along with all or parts of the more detailed responses follow. (This report did not have advanced review by the Committee.)

CHARGE 1. Test of Guides and Criteria in the Counterpart National Committee Report, Charleston, S.C., Jan. 27-30, 1969.

The consensus is that the scales, the naming of map units, and other guidelines as prepared by the national committee are satisfactory but not all agreed. Summary comments follow; others are in the attachments.

a. We should be careful about the kinds of interpretations made at various levels of generalization. At high level categorical groupings the level of generalization is so great that we can deal only with certain interpretations, i.e. avoid ratings for septic tanks but give ratings for residential development.

b. Only up to date base maps should be used for general soil maps lest the interpretative value be altered or lost.

c. "Over interpretation" of small scale maps is the problem. Interpretation tables must reflect the nature of delineations and why different interpretations are needed and are valid at the scale and detail employed. The smallest scale map may be used only for showing general relationships. Larger scale "small scale" maps may be used for certain planning but the users must be warned of limitations of the map since even detailed maps do not take the place of on-site investigations.

d. Every effort on the map should be made with the user in mind and interpretations should be made so that users can identify with the information. As many users as practical should be served. Interpretations should not be notes to the authors.

e. All factors used in interpretations should be defined and those merely estimated should be pointed out.

CHARGE 2. Examples of Small-scale Maps and Legends.

(See attachments 1,2,&3)

CHARGE 3. Possibilities for More than One Category Levels in Legends for State and Regional Small-scale Maps.

In general, the committee favors using more than one level in order to portray the soils of an area. Here are some of the comments:

a. Such an approach seems necessary where soils are complex. The users of the information must be considered. Information that should be shown may not be included in the differentia at the higher categories-such as the nature of deep underlying rock or high amounts of soluble aluminum.

b. There is a need but having such differences on the same map could be confusing to users. Perhaps area maps within states should be considered, in relation to interpretations demanded by the public.

c. Emphasis and consideration should be given to statistically testing class groups *in* higher categories by data processing procedures. 'This is likely a job for a committee in itself or a special two-year job for this one.

The Chairman recommends that Committee III be continued.

Members of Committee III:

C.L. Godfrey, Chariman - Texas
M.E. Shaffer, Vice-Chairman - Georgia

L. H Burgess - Ala.
H.L. Dean - F?. Worth
F.J. Dries - Okla.
J.A. Elder - Tenn.
C.L. Hunt - N.C.
O.C. Lewis - Fla.
T.C. Mathews - Fla.
J.B. Dixon - Texas
R.L. Blevins - Ky.
L.L. Lofton - La.
E.N. Miller, Jr. - S.C.
A:L: Newman - Texas
W.B. Parker - Miss.
M.H. Milford - Texas
D.E. Pettry - Va.
C.T. Haan - Ky.

Other contributors:
Stan Buol - N.C.
Keith Young - Ft. Worth
James DeMent - Ft. Worth

TO: Curtis L. Godfrey, Chairman
Committee III, Southern Regional
Technical Work Planning Conference

FROM: Joe A. Elder

SUBJECT: Soil Interpretations at the Higher Categories of the Soil Classification System.

I have reviewed the material which you sent to Committee III. The subject is a rather difficult one for me because my thinking is not quite clear on exactly what is needed in regard to small-scale maps and how the information should be presented.

In reviewing the literature on small-scale or general soil maps, I noticed this statement which I reread a few times: "The question is not primarily what 'we' like but what the bulk of our users find easiest to use. He finds the symbols on the map and then from these goes to the legend and the interpretations." This statement, I believe, is a good one and I suggest that it be kept in mind when Committee recommendations are made. It is easy, and even convenient at times, to lose sight of the user. My thoughts on this subject are listed below by kinds of maps.

1. County Maps

a. County maps have the largest number of users among the small-scale maps. Too, they have the most interpretive value.

b. Even though the units on these maps are most commonly associations of soil series, I suggest that the name or title of each unit be given in descriptive terms which users can understand. Titles consisting of the dominant soil series names do not convey information which can easily be understood by most users. Good descriptive titles are, in many cases, difficult to compose, but this would be a weak reason for not using them. We need to put as much infonnation as possible on the face of the map. There is much blank space on most maps.

c. A scale of 1:125,000 seems best for Tennessee. A region-wide uniform scale might be desirable.

d. Exhibit 1 is one way interpretations can be presented for county maps.

e. There is a real problem in rating a unit in terms of slight, moderate, or severe limitations on a general map. For example, if an area is estimated to have 55 percent slight limitations, 10 percent moderate limitations, and 35 percent severe limitations, what would be the single rating for such an area? Perhaps the Committee can come up with some ideas on this. I understand that California rates an area severe if as much as 30 percent of it has severe limitations. Most users want one rating. Most do not seem to prefer the breakdown in percentages.

2. State Maps

a. There is a real need for small (one-page) state maps. In Tennessee, many of those who request these maps are in elementary school or high school.

b. Although the units we delineate may be associations of subgroups or of families, we still need a descriptive title for each unit on the map. The family or subgroup name can follow the descriptive title. Series names need to be placed somewhere near the subgroup name. Many people are familiar with the series name. Some people would be disappointed with a state map without series names.

c. Interpretations should be in general terms pointing out the potential of the area and some of the limiting soil features that affect use.

d. As much information as possible should be on the front of the map. There is ordinarily enough space beside the map for generous descriptive titles.

e. Number of units on map should not exceed 10. Groupings will need to be made to reduce the number to this figure.

f. Map should be in color.

I have made a stab at designing a legend. See Exhibit 3.

3. Regional Maps

a. I believe that we can use the same general criteria for regional maps as we do for state maps. We may need to use associations of great groups instead of subgroups.

b. I suspect that regional maps have a small number of users and that few regional maps are needed.

4. National Maps

a. I would assume that only one national map is needed, except for revisions of it.

b. Phases of associations of great groups are the most logical units. To broaden the uses, descriptive titles should be used.

Exhibit #1 County map of larger scale

LIMITATIONS OF SOIL AREAS FOR STATED USE

Soil Area	Main Soil Series	Degree of Limitation	Septic Tank Drainage Fields % of Area	Housing with Central Sewage % of Area	Picnic Areas and Campsites % of Area	Streets and Roads % of Area	Agriculture % of Area
1. Red clay soils on rolling hills	Decatur	Slight	10	65	60	10	60
	Waynesboro	Moderate	20	10	20	70	15
	Lindside	Severe	70	25	20	30	25
	Minor series are Melvin and Talbott	Summary rating	Severe	Slight	Slight	Moderate	Slight

County Maps To be put on face of map

1. Gravely Hills and Ridges: Soils are 10 to 15 feet deep to limestone rock; they have good drainage and permeability except the narrow strips of first bottoms are often flooded and have high water tables during winter and spring; soils are yellow or red clays containing chert gravel; slopes range from 15 to 35 percent. The main soil problems are steep slopes, low fertility, and drainage in the small bottomlands. Bodine-Baxter-Lobelville soil associations.
2.
3.

Exhibit #3 State Maps Face of map

Cherokee Highlands: Steep, wooded ridges make up about three-fourths of the area and narrow rolling valleys between the ridges the rest. Soils on the ridges are loamy, stony and 10 to 25 inches deep to sandstone rock. Soils in the valley are more than 50 inches to rock, permeable, and loamy, but are poor in fertility. Land suitable for cultivation is in small fields in the valleys. Numerous streams furnish clear, cool water to all parts of the area. Camping and picnicking sites are abundant, and good homesites are plentiful in the valleys. Highways require deep cuts in hard sandstone. The area has potential for recreation, forestry, and limited farming.

1. Typic Hapludults - Typic Dystrochrepts (Hartsells-Muskingum)
2. Typic Paleudults - Humic Hapudults (Jefferson-State)
3:

Description of these units can be on back of map, if they need to be described.

Attachment #2

United States Department of Agriculture
Soil Conservation Service
P.O. Box 610, Jackson, Mississippi 39205

March 2, 1970

Dr. Curtis L. Godfrey
Dept. Soil and Crop Science
Texas A&M University
College Station, Texas 77843

Dear Dr. Godfrey:

SUBJECT: Committee III, SRTWPC - Soil Interpretations at the Higher Categories of the New Classification System

Attached are a general soil map and interpretations from one of our RC&D projects for your use and consideration. We have not developed any small-scale maps at the higher categories of the new classification system for our use as such. However, I think it would be possible to use subgroup and/or great group as components in developing the map and legend for use of broad planning. For example, in this map we could possibly make separations at the order level for Entisols and Vertisols showing soils that are subject to flooding and soils with high shrink swell potential. We could also possibly use subgroups and great groups in some of the associations listed.

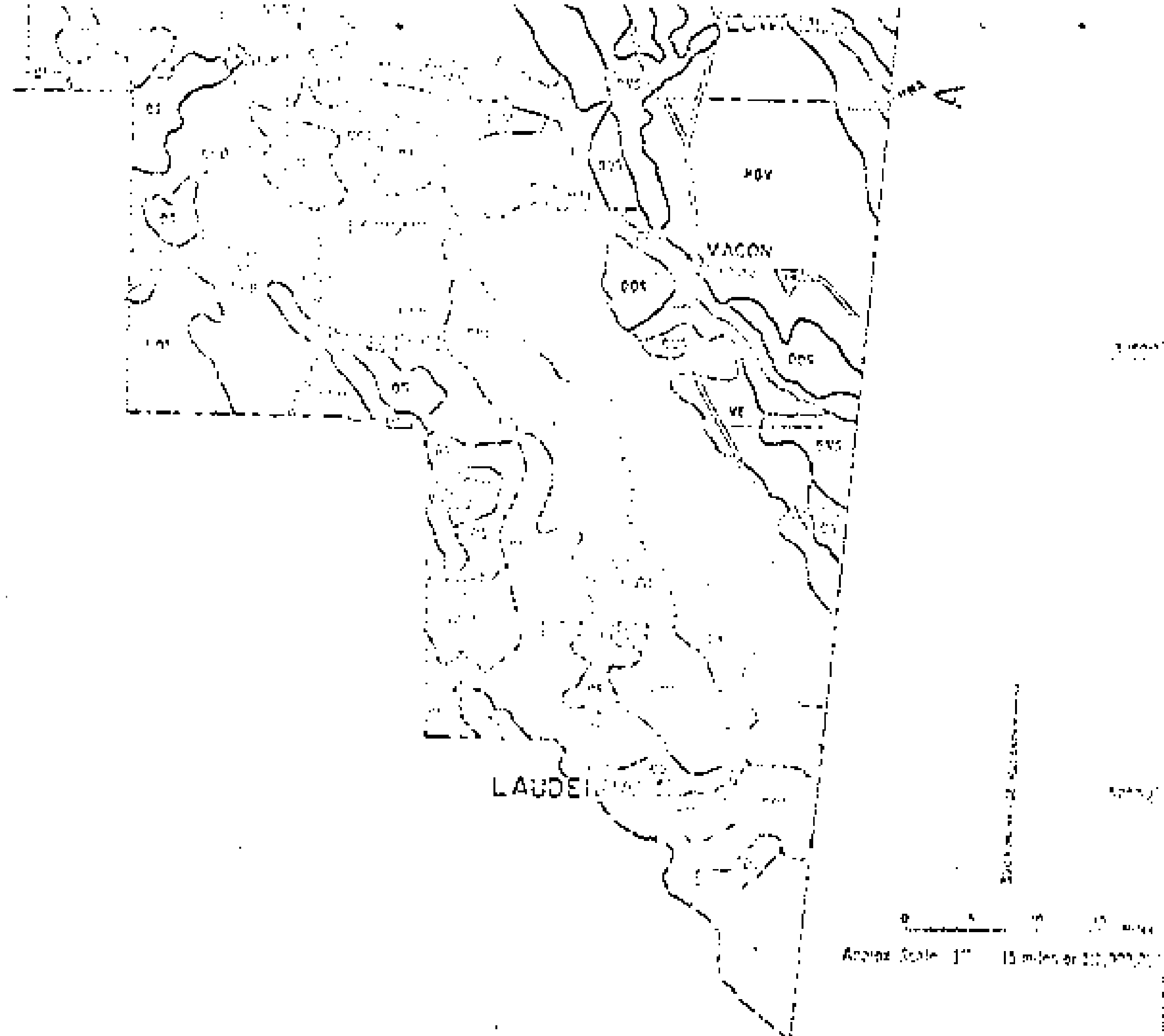
Most of our maps are for local use. Interpretations are being developed at the series or family level. I think most of the soils in our area are too complex and variable to make any accurate predictions at the subgroup or great group level, and we would probably have to use a combination of phases of associations or families with subgroups and great groups to develop a useable map.

I have not reworked the table to fit the charge outlined in your memorandum, but I hope my comments might be helpful in your summarizing this report for our meeting at Baton Rouge.

Sincerely,

W.B. Parker
Assistant State Soil Scientist

Attachments (2)



PORTION OF

Figure 2

GENERAL SOIL MAP

NORTHEAST MISSISSIPPI

RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
JACKSON, MISSISSIPPI

CLASSIFICATION AND SUITABILITY OF SOIL ASSOCIATIONS FOR DIFFERENT USES
NORTHEAST MISSISSIPPI RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

Map Symbol	Soil Association and Percent of Project Area	Percent of Association 1/	Percent Slope	Parent Material	Drainage 2/
SQM	Savannah-Quitman-Mashulaville 4%				
	Savannah	30	0-7	Loamy coastal plain	Moderately well
	Quitman	25	0-3	Loamy coastal plain	Somewhat poorly
	Mashulaville	20	o-2		Poorly

Texture Subsoil	Depth 3/	Reaction 4/	Erosion Hazard	Residences: Community Services 5/	Residences: Individual Services 6/	Commercial 7/
Loam	20-24" to fragipan	Strongly acid	Slight	Good 8/	Fair	Good
Loam	18-22" to fragipan	Strongly acid	Slight	Good	Fair	Good
Loam	16-20" to fragipan	Strongly acid,	Slight	Fair	Poor	Fair

Agriculture: Cropland	Agriculture: Pasture	Agriculture: Woodland	Major Limitation
Good	Good	Good	Fragipan
Fair	Good	Good	Fragipan
Poor	Good	Good	Fragipan, high water table

The remaining percentage consists of inclusions of other soils.
Drainage refers to conditions of drainage that existed during the development of the soil.
Depth refers to the depth that roots will easily penetrate to absorb water and nutrients.
Reaction refers to the degree of acidity or alkalinity of a soil.
Community services refers to such items as: Community water and sewage systems, streets, etc.
Individual services refers mainly to suitability for septic tank absorption fields.
Commercial refers mainly to suitability for shopping centers, parking lots and light industry
Underlined rating is the rating for the association.

Attachment #3

GENERAL SOIL MAP - TEXAS
(In press - for release in 1970)

LEGEND

Explanation: To promote public understanding of the soil resources of Texas is the objective. Popular and scientific language are both used to facilitate communication among a broad spectrum of users.

Main headings make a very general statement about the soils of a land resource area followed by a list of soil orders (i.e., Vertisols) predominant in the area. Orders are the highest or most general categories of scientific soil classification. Land resource areas are geographically-associated extensive units of land similiar in a genera! way as to soils, climate, natural vegetation and physioyraphy. Each area is designated by a name commonly used within the state (see inset map).

Below each main heading a terse description and a list of Great Groups (i.e., Pelluderts) of soils are given for the one or more related soil associations which follow. The associations are the units delineated on the map. They have hyphenated names made up from names of two or three soil series of major extent within the delineation. Soils very similiar as to kind, arrangement and thickness of natural layers or horizions are known as a soil series, A geographic name local to their otcurence is usually used in identyfying them. (i.e., Beaumont). Soil series in each association are in turn keyed to the appropriate Great Group, a category of scientific soil classification more definitive and at a level lower than the Order. Other soil series not named in an association occur in the area delineated and are included in the total acreage shown.

Symbols within delineations on the map relate to soil associations described and classified in the legend. Association symbols consist of consecutive numbers followed by a capitol letter representing the Order of the first-named soil in the association, 1-V (Vertisols) through 73-E (Entisols). Since the symbol "A" is used for Alfisols, "D" is used for Aridisols. For the two types of Rockland, the symbol "T" is used.

Attachment #3 cont.

GENERAL SOIL MAP - TEXAS

LEVEL SOILS OF THE COAST PRAIRIE AND MARSH
VERTISOLS, MOLLISOLS, ALFISOLS, ENTISOLS, INCEPTISOLS

Map Symbols for Soil Associations		Approx. Acreage
	Somewhat poorly and moderately well drained cracking clayey soils, and mostly poorly drained soils with loamy surface layers and cracking clayey subsoils:	
	Pelluderts[a*], *Albaqualfs*[b], *Argiaquolls*[c], *Pellusterts*[d], *Ochraqualfs*[e], *Argiustolls*[f].	
1-V	Lake Charles[a*]-Edna[b]-Bernard[c]	3,800,000
2-V	Victoria[d]-Orelia[e]-Clareville[f]	1,550,000
3-V	Beaumont[a]-Morey[c]-Crowley[b]	1,000,000
	Saline clayey and loamy soils of marshes and sandy soils of beaches:	
	Haplaquolls[a], *Haplaquepts*[b], *Udipsamments*[c]	
4-M	Harris[a]-Veston[b]-Galveston[c]	800,000
	Cracking clayey soils and friable loamy soils of the Brazos and Colorado River flood plains:	
	Hapludolls[a], *Udifluvents*[b], *Haplustolls*[c]	
5-M	Miller[c]-Norwood[b]- Pledger".	800,000
6-M	Moreland[a]-Pledger[a]-Norwood[b]	600,000
	Soils with loamy surface layers and mottled clayey or mottled to gray loamy subsoils:	
	Paleudalfs[a], *Ochraqualfs*[b]	
7-A	Katy[a]-Hockley[a]-Clodine[b].	1,450,000
	TOTAL	10,000,000

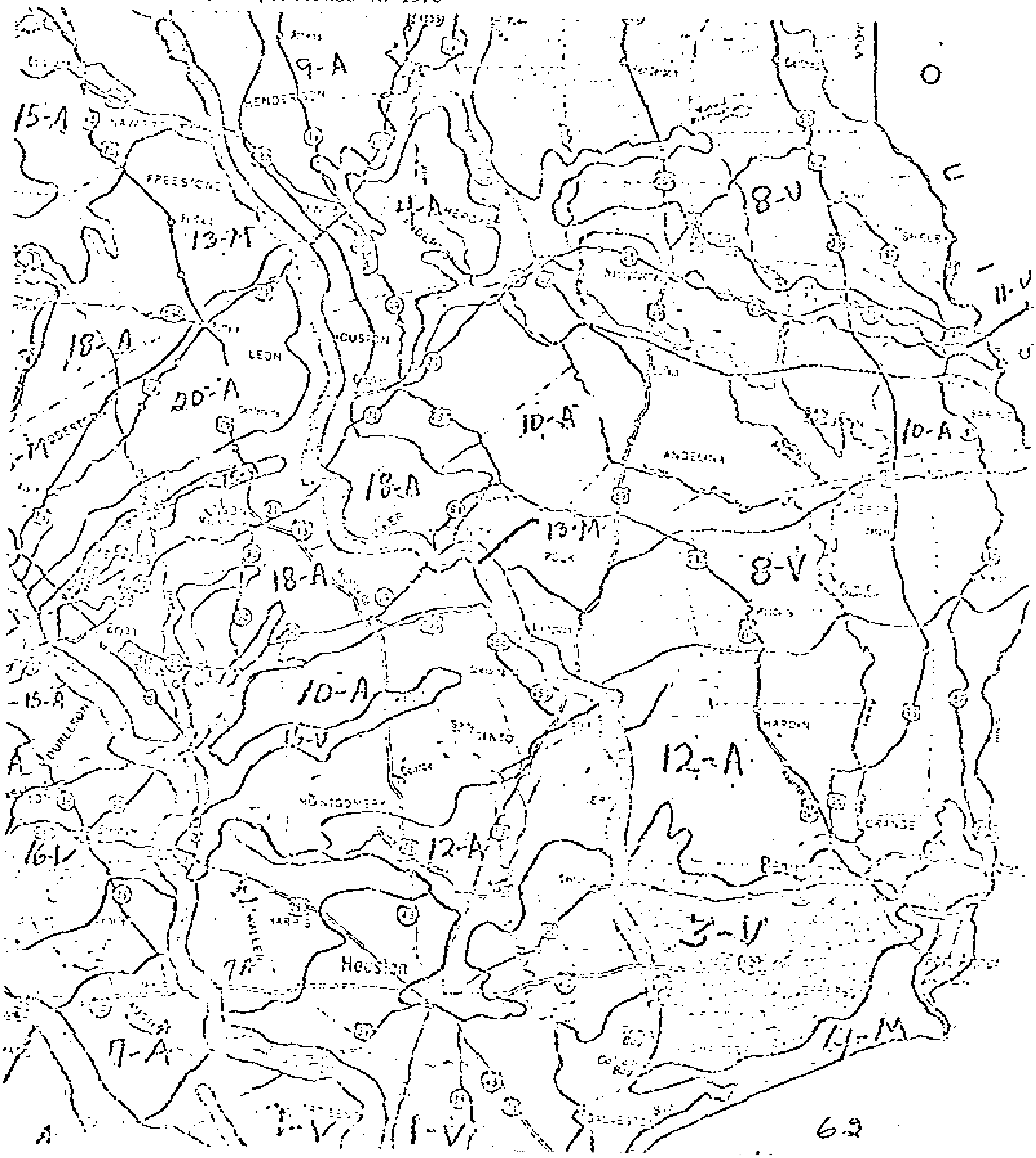
6 /

*The classification at the *Great Group* level of soil series in each soil association is indicated by the matching small letters.

A PORTION OF THE GENERAL SOIL MAP - Texas (rough draft)

Scale: 1:1,500,000 1" = appox. 25 mi.

To be published in 1970



CONCLUSIONS AND RECOMMENDATIONS

1. Limited response to the charges by committee members likely reflects our lack of experience, information, prepared examples of maps and legends, etc., rather than lack of interest - all of us in soil survey make and use small scale maps to one degree or another.

2. Caution in using general soil maps for interpretation was obviously emphasized by those responding.

3. Meeting decision making needs of a broad spectrum of specific users of soil maps and soil interpretations that will stand the test of time was the goal stressed. How to do this we are not sure.

4. Information and experience is accumulating rapidly in the states and on a regional basis. We will be much more knowledgeable within a few years.

5. It is recommended that this committee be continued with the same or similiar charges and that the subsequent chairman make a more concerted effort to ferret out examples of small scale maps and legends at the county, state and regional levels.,

6. It is further recommended that the subsequent committee consider what interpretative decisions can be made from soil maps and legends of various scale and detail.

7. The report was accepted by the conference.

SOUTHERN REGIONAL WORK-PLANNING CONFERENCE
Louisiana State University
Baton Rouge, Louisiana
May 5-7, 1970

REPORT OF COMMITTEE IV - Application and Interpretation of Soil Surveys

I Charges of the Committee:

1. Assemble and circulate instructions and rating criteria for the preparation of soil survey interpretation sheets.

2. Test procedures by preparing soil survey interpretation sheets for each series with responsibility in the Region.

II Committee actions on Charge 1:

In December 1968 a concensus was taken of state soil scientists in the South Region (SCS) to determine which kinds of soil survey interpretations should be made and coordinated. Assignments were made to committee members to assemble or develop guides for making these interpretations. These guides were reviewed by soil scientists and other specialists throughout the South Region and within the Southern Regional Technical Service Center. A soil survey interpretation work sheet was developed and printed. The guides and work sheets were assembled and sent to committee members July 1, 1969 for review, testing, and comment.

III Committee actions on Charge 2:

A procedure was initiated in the South Region (SCS) whereby series interpretations are developed, reviewed, and coordinated among surrounding states and adjoining regions. The procedure is essentially the same as that used to review series descriptions.

Using this procedure, each of the states in the South Region (SCS) has tested the work sheets and guides by preparing soil survey interpretations for series having type locations in their state. Good progress has been made to date. Six states have completed interpretations on more than 75 percent of their series, three states are nearly half through, and three states have less than 40 percent completed.

Many good comments were received from committee members in each of the states. These comments were compiled in the form of a nine-page questionnaire and returned to get committee action on all comments. The response of the committee is the basis for revision of the interpretation work sheet, the guides, and the committee recommendations.

IV Committee recommendations:

A. The soil survey interpretation work sheets for series have been tested for over one year and revised several times. The committee recommends

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE
USDA-SCS-FORT WORTH, TEX. 1970

that the work sheet , *revised* 4/70 (exhibit 1), be accepted for use in the Southern Region and considered by the Washington Office as a national form.

B. The committee recommends that the guides for making soil survey interpretations (exhibit 2) be accepted for use in the Southern Region and considered by the Washington Office in developing national guides.

C. The committee recommends to the Washington Office the following changes in the guides appearing in Soils Memorandums-45 and 69:

(1) Corrosivity--uncoated steel and concrete,

Change the format of the guides to tables similar to the ones in exhibit 3.

Change conductivity in corrosivity-steel, recommended by Grossman and Orvedall, as follows: low, 0.1 to 0.3; moderate, 0.3 to 0.8; high, 0.8 to 4.0; very high, 4.0+.

Change pH in corrosivity--concrete for the moderate limitation as follows: sandy and organic soils with pH 5.5-6.5.

(2) Septic tank filter fields

Revise percolation rate classes as follows: slight, faster than 45 min/in; moderate, 45 to 60 min/in; severe, slower than 60 min/in.

Revise depth to seasonal high water table as follows: slight, over 6 feet; moderate, 3 to 6 feet; severe, less than 3 feet.

Revise slopes as follows: slight, 0 to 8%; moderate, 8 to 15%; severe, 15+%.

(3) sewage lagoons

Change one of the SW's in the severe column to GW.

(4) Camp areas, picnic areas, playgrounds, paths and trails

Allow loamy sand surface layers to be a slight limitation if underlain within 20 inches by finer textured materials.

Allow sand other than loose sand to be a moderate limitation for paths and trails--similar to picnic areas and camp areas.

Revise stoniness classes in camp areas and paths and trails as follows: slight, classes 0, 1, 2; moderate, class 3; severe, classes 4, and 5.

D. The committee recommends it be continued. Some of the activities suggested are:

(1) Study and recommend criteria for making pasture interpretations.

(2) Develop guides to estimate and coordinate crop yields.

(3) Develop and test guides for sanitary landfill.

(4) Application of automatic data processing procedures to soil survey manuscripts.

(5) Continue to develop and test the guides for classifying soils into capability subclasses.

(6) Develop a technical handbook for soil survey interpretations that contains all guides used in soil survey interpretations in the Southern Region.

E. The committee recommends that specialists in plant science and engineering be invited to the membership of this committee.

V. Conference action

The conference accepted the committee report.

Members:
Keith K. Young, Chairman, Tex.
L. E. Aull, Vice-Chairman, N. C.
D. Gray Aydelott, Ga.
F. F. Bell, Tenn.
L. H. Burgess, Ala.
G. R. Craddock, S. C.
R. E. Daniell, Ky.
R. C. Deen, Ky.
J. A. Elder, Tenn.
L. L. Loftin, La.
C. A. McGrew, Ark.
G. S. McKee, Tex.
J. R. Moore, Fla.
E. C. Nance, Okla.
D. D. Neher, Tex.
W. B. Parker, Miss.
D. E. Pettry, Va.
Luis H. Rivera, P. R.
M. E. Shaffer, Ga.
R. M. Smith, Va.

Consultants present at conference:
C. H. McElroy, Civil Engineer, SRTSC, SCS, Fort Worth, Texas
Ray Smith, Jr., Biologist, SCS, Alexandria, Louisiana

EXHIBIT 1

Soil Survey Interpretations Worksheet for Soil Series

EXPLANATION OF FORMAT AND CONTENT OF

SOIL SURVEY INTERPRETATIONS WORK SHEET

(4-N-27413, REV. 4-70)

1. Place series name in upper left-hand corner on line above heading.

2. Place MLRA number of the type location of the series in the upper right-hand corner.

3. Place initials of author or authors and date on which the interpretation sheets were prepared or revised in upper right-hand corner below the MLRA number.

4. Give narrative description of the series in a nontechnical language. This narrative should be about the same as the first several paragraphs on series in published soil surveys.

   a. Give in a brief lead sentence, two or three features that help the reader identify the series.

   b. Describe the general nature of the major horizons.

   c. You may want to mention the kind of material from which the soil developed.

   d. Tell the shape of the soil surface, the position of the soils on the landscape and the range of slope.

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

5. If the physical and chemical properties are based on test data, footnote "Estimated Physical and Chemical Properties" to that effect. You may want to give the number of profiles tested in this footnote.

6. The estimated properties should be given for the major soil horizons, Give ranges in these properties.

7. Many states have data available on liquid limit and plasticity index. Ranges in these values should be given when available.

8. Define the flood hazard in terms of frequency, duration, and time of year.

9. Specify depth to rock and the kind of rock (hard or rippable). Hard rock is defined 8s that which requires drilling and blasting for its economical removal.

10. Give the latest coordinated hydrologic group letter (A, B, C, or D).

11. Define wetness in terms of depth and duration of water table and time of year if known.

12. Some states may want to add wind erosion group in this block.

SUITABILITY OF SOIL AS RESOURCE MATERIAL

13. Rate whole soil for these uses.

DEGREE OF LIMITATIONS AND MAJOR SOIL USES AFFECTING SELECTED USE

?I+. Space is provided in each use so phases of series can be rated separately. Rate only the class determining phases for the particular use.

15. Use latest guides for making the ratings. Specify the guide used by footnote, e.g., Soils Memorandum-69, Regional Guides 1363, Soils Memorandum-45, etc.

CAPABILITY, SOIL-LOSS FACTORS, AND POTENTIAL YIELDS

16. List only those phase:; which are class determining.

17. List the latest coordinated K and T values on sloping soils.

18. Give the potential yields of cultivated crops, pasture, or hay crops that are commonly grown on the soil. Potential yields approximate those obtained by good commercial farmers at the level of management which tends to produce the highest economic returns per acre. Show range of yield in round numbers and in the increments as follows:

Crop	Increment	Range in Yield
Corn	5 bu	30 - 110
Soybeans	5 bu	10 - 50
Wheat or Oats	5 bu	10 - 90
Grain Sorghum	5 bu or 250 lbs	500 - 7,500
Cotton	50 lbs lint	350 - 750
Peanuts	200 lbs	500 - 3,000
Tobacco	100 lbs	1,500 - 3,000
Rice	5 bu	
Pasture	$\frac{1}{2}$ AUM	
Hay Crops	0.2 tons or 400 lbs	

WILDLIFE SUITABILITY

19. Rate only those phases that are class determining.

WOODLAND SUITABILITY

20. Rate only those phases that determine ordination. If all phases of a particular series have the same woodland suitability, write "All" in the column headed "Phases Of Series."

RANGE

21. Give site name and kinds and amounts of vegetation under potential (or climax) cover.

OTHER

22. Space is provided for making interpretations for those uses that are important within a state or between several states. Potential yields for horticultural crops or other specialty crops and pasture groups are examples.

U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

General Soil Profile (inches)	Classification			% of Material Passing Sieve No.				LL	PI	Permea-bility in/hr.	Avail. Water Cap. in/in.	Soil Reac-tion	Shrink Swell Poten tial
	USDA Texture	Unified	AASHO	#4	#10	#40	#200						

Flood hazard: Depth to rock:

Wetness: Hydrologic group:

SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

Topsoil	
Sand	
Gravel	
Roadfill	

DEGREE	LIMITATIONS AND MAJOR SOIL FEATURES AFFECTING SELECTED USE
Pond reservoir areas	
Pond embankments	
Excavated ponds	
Corrosivity - Uncoated steel	
Corrosivity - Concrete	
Foundations for low buildings	
Septic tank filter fields	
Sewage lagoons	
Roads	
Light industries	

Playgrounds	
Paths and Trails	

CAPABILITY, SOIL LOSS FACTORS, AND POTENTIAL YIELDS--(High Level Management)

Phases of Series	Capability	Soil Loss K	Soil Loss T				

WILDLIFE SUITABILITY

Phases of Series	Potential for Habitat Elements: Grain and seed crops	Grasses, legumes	Wild herbaceous plants	Hardwood trees and shrubs	Low conifer. plants	Wetland food and cover	Shallow water devel.	Potential as Habitat For--: Openland Wildlife	Woodland Wildlife	Wetland Wildlife

WOODLAND SUITABILITY

Phases of Series	Ord.	Potential Productivity: Important Trees	Site Index	Important Understory Veg. (Med. canopy)	lbs/ac	Woodland Management Problems: Erosion Hazard	Equip. Limit.	Seedling Mortality	Trees to Plant

Proposed
REV. 4-70

10½ X 14 WORK SHEET 12-68 4 M-27413 2 OF 2
8 X 10½ WORK SHEET 12-68 4 M-27413-A 2 OF 2

EXHIBIT 2

Guides for Making Soil Survey Interpretations

Committee IV, Application and Interpretation of Soil Surveys

1970 Southern Regional Technical Soil

Survey Work-Planning Conference

May 6, 1970

DRAFT
3/28/69

DEFINITIONS OF SOIL LIMITATIONS

None to Slight	Soils have properties favorable for the rated use. Limitations are so minor that they can be easily overcome. Good performance and low maintenance can be expected from these soils.
Moderate	Soils have properties moderately favorable for the rated use. Limitations can be overcome or modified with planning, design, or special maintenance.
Severe	Soils have one or more properties unfavorable for the rated use. Limitations are difficult and costly to modify or overcome, requiring major soil reclamation, special design, or intense maintenance.

For some uses an additional breakdown of the Severe rating may be warranted:

Very Severe	Soils have one or more properties so unfavorable for a particular use that overcoming the limitations is most difficult and costly. Reclamation is extreme, requiring the soil material be removed, replaced, or completely modified.

SUITABILITY AS A SOURCE FOR TOPSOIL

Definition: Topsoil is the soil material used to cover or resurface an area where vegetation is to be established and maintained.

Properties: Properties considered are those that affect the productivity and workability of the soil material and the amount of suitable material available. Soil texture and presence of toxic materials gives an indication of the productivity of the soil material. An indication of workability as for seedbed preparation is given by texture and coarse fragments. For clayey soils, mineralogy is also considered. Thickness of suitable material, amount of coarse fragments, and wetness affect the availability and ease of excavation of the soil material. Ease of reclamation after excavation is also a factor.

Properties Affecting Use	Suitability of Soil		
	Good	Fair	Poor
Texture	fsl, vfsl, 1, sil, scl, sl	si, cl, sicl, sc; c and sic where 1:1 clay is dominant	s, ls; c and sic where 2:1 clay is dominant
Soluble salts--Conductivity of saturation extract (mmhos/cm)	Less than 4	4 - 8	More than 8
Exchangeable sodium (%)	Less than 5	5 - 15	More than 15
Calcium carbonate equivalent (%)	Less than 15	15 - 30	More than 30
Sulfur (%)	Less than 1.0 not class determining		More than 1.0
Thickness of suitable material (ft.)	More than 3	1 to 3	Less than 1
Fragments coarser than very coarse sand (%)	Less than 3	3 to 10	More than 10
Wetness	Excessive to well drained	Moderately well drained and somewhat poorly drained	Poorly drained, very poorly drained
Material below excavated depth	Easy to reclaim	Somewhat difficult to reclaim	Difficult or impossible to reclaim

SUITABILITY AS PROBABLE SOURCE OF SAND AND GRAVEL

Definition: Ratings are based on the probability that soils contain deposits of sand coarser than No. 200 sieve (.074 mm) or gravel coarser than No. 4 sieve (4.76 mm). The ratings do not indicate quality of deposits except generally in term of grain size. The materials are commonly used for filters, drains, aggregate for concrete, or granular subbase, depending on quality. Roadfill (subgrade) is rated separately elsewhere.

Properties: The property considered is sieve size of soil material within the soil and to a predictable depth below the soil. Estimates of probability of sand or gravel are based on studies of the upper 4 to 6 feet of soil. Reliable predictions can be made to 80 inches on many soils and to greater depths on some soils. Amount of overburden, gradation, nature of fines, and soundness of the aggregate are factors that influence the suitability of the sand and gravel but these features must be determined by on-site exploration and testing. Material no thicker than 2 feet is considered an improbable source.

	Probable Source	Improbable Source
Sand	Contains more than 2 feet of material coarser than loamy very fine sand	All Others
Gravel	Contains more than 2 feet of material dominantly coarser than the No. 4 sieve (about 5 mm)	All Others

SUITABILITY OF SOIL AS SOURCE OF ROADFILL (SUBGRADE)

Definition: Roadfill. or subgrade is the soil material on which a subbase is laid and the pavement is built. Suitability ratings are based on the performance of the soil material as subgrade when excavated and compacted or compacted and used in place. Proper compaction and drainage of the subgrade material are assumed.

Properties: Properties that affect suitability for roadfill are (1) those that affect the stability and traffic supporting capacity of the subgrade and (2) those that affect the ease of excavation of the borrow material. The AASHO and Unified Classification, and the shrink-swell potential give an indication of the traffic supporting capacity. Thickness of the borrow material, wetness and stones or rocks influence the ease of excavation as a borrow material.

Properties Affecting Use	Suitability of Soil		
	Good	Fair	Poor
Traffic Supporting Capacity 1/ Unified Classification	GW,SW,GP,GM SP,GC, SM,SC	ML,CL	OL,MH,CH, OH, Pt3/
AASHO Group Index	0 - 4	4 - 8	Mare than 8
Shrink-swell potential	Very low, low	Moderate	High, very high
COLE	Less than .035	.035- .06	More than .06
PVC	Less than 2	2 - 4	More than 4
Plasticity Index	Less than 15	15 - 30	More than 30
wetness 2/	Excessive to well drained	Moderately well to somewhat poorly drained	Poorly and very poorly drained
Thickness of suitable material	More than 5 feet	2 - 5 feet	Less than 2 fee
Stoniness Class 2/ (Percentage of loose stones over 10" diameter on surface)	0,1,2 (Less than 3%)	3 (3 to 15%)	4,5 (More than 15%)
Rockiness Class 2/ (Percentage of fixed rock exposed at surface)	0,1 (Less than 10%)	2 (10 - 25%)	3,4,5 (More than 25%)

1/ In areas subject to frost action, CL and the silt loam part of ML are rated severe, SM is rated moderate. If exchangeable sodium percentage exceeds 15, rate severe.

2/ Classes defined in Soil Survey Manual - USDA Handbook 18, 1951.

3/ Very poor or unsuitable.

SOIL LIMITATIONS FOR POND RESERVOIR AREAS

Definition: Pond reservoirs are areas behind a dam or embankment where water is collected and stored for use. The floor of the reservoir area is normally undisturbed except where soil material may be borrowed for embankment Construction. Construction material for embankments, however, is rated separately and is not a consideration for pond reservoir areas.

Soil Properties: Properties affecting pond reservoir areas are those that affect seepage rate; namely, soil permeability and depth to fractured or permeable bedrock or other permeable material.

Properties Affecting Use	Degree of Soil Limitation		
	None to Slight	Moderate	Severe
Permeability class (in./hr.)	Very slow, slow (< .20)	Moderately slow, moderate 1/ (.20 - 2.b)	Moderately rapid through very rapid (>2.0)
Depth to unsuitable material such as bedrock or gravel	More than 6'	3 to 6'	Less than 3'

1/ Calcareous soils with moderate permeability may be severe.

SOIL LIMITATIONS FOR POND EMBANKMENTS

Definition: Pond embankments are raised structures of soil material constructed across drainageways in order to impound water. These embankments are generally less than 20 feet high, are constructed of "homogeneous" soil material and compacted to medium density. Embankments having core and shell type construction are not rated in this guide. Embankment foundation, reservoir area and slope are assumed to be suitable for pond construction.

Soil Properties: Soil properties are considered that affect the embankment and the availability of borrow material. The soil engineering properties affecting pond embankments are implied from median soils in the Unified Soil Groups. Properties for soils with border or dual Unified Groups must be interpolated. The best soils have good slope stability, low permeability, slight compressibility under load, and good resistance to piping and erosion. The best borrow material is free of stones or rocks and thick enough for easy excavation.

Properties Affecting Use	Degree of Soil Limitation											
	Slight		Moderate			Severe						
Unified Soil Group	GC,SC	CL	GM,SM	ML	CH	GW,GP	SW	SP	MH	OL 1/	OH 1/	Pt 1/
Slope Stability 2/	good	good	fair	fair	fair	good	fair	poor	fair	poor	poor	poor
Permeability (compacted)	low	low	med.-low	med.-low	low	high	high	high	low	med.-low	med.-low	high
Compressibility (compacted)	slight	med.	slight	med.	high	slight	slight	slight	high	high	high	high
Resistance to piping and erosion	good	good-fair	poor	poor	good	good	fair?	fair-poor	good-poor	good-poor	good-poor	poor
Thickness of borrow material	5 feet		2-5 feet			2 feet						
Stoniness Class (Percent of loose stones on surface over 10" in diameter)	0,1 (<.1%)		2 (.1-3%)			3, ,5 (>3%)						
Rockiness Class (Percent of fixed rock exposed at surface)	0 (<2%)		1 (2-10%)			2,3,4,5 (>10%)						

1/ Very severe.
2/ Slope stability is the resistance of the embankment to failure by sliding when impounding water.

SOIL LIMITATIONS FOR EXCAVATED PONDS
(Aquifer Fed)

Definition: An excavated pond is a body of water created by excavating a pit or dugout. Excavated ponds may be divided into two types: those fed by ground water aquifers and those fed by surface runoff. Rated here are those fed by aquifers. Excluded are ponds fed by runoff and also embankment-type ponds where the depth of water impounded against the embankment exceeds three feet. The assumption is made that the pond is properly designed, located, and constructed, and that water is of good quality.

Soil Properties: Properties affecting aquifer-fed ponds are the existence of a permanent water table, permeability of the aquifer, and properties that interfer with excavation--stoniness and rockiness.

Properties Affecting Use	Degree of Limitation		
	Slight	Moderate	Severe
Depth to permanent dry season water table (ft.)	< 2	2 - 6	> 6
Permeability of ground water aquifer	Very rapid, rapid, mod. rapid, and upper end of moderate	Lower end of moderate	Moderately slow, slow, very Slow
Hydraulic conductivity (in/hr)	More than 1.0	0.63 to 1.0	Less than 0.6
Stoniness class 1/ (Percent of loose stones over 10" diameter on surface)	0, 1, 2 (Less than 3%)	3 (3 to 15%)	4, 5 (More than 15%)
Rockiness class 1/ (Percent of fixed rock exposed at surface)	0, 1 (Less than 10%)	2 (10 to 25%)	3, 4, 5 (More than 25%)

1/ Classes defined in Soil Survey Manual, USDA Handbook 18, 1951.

SOIL LIMITATIONS FOR DWELLINGS

Definition! Ratings are for undisturbed soils that are used to support foundation footings of houses or other low buildings no higher than three stories. Footings are assumed to be one foot wide at a minimum depth of one foot.

Soil Properties: The properties affecting the foundation support are those that affect bearing capacity and settlement under load and those that affect excavation and construction cost. The properties affecting bearing strength and settlement of the natural soil are wetness, flooding, density, plasticity, texture, and shrink-swell behavior. Texture and plasticity (Atterburg limits) are inferred from the Unified Soil Group. Density is inferred from the moist soil consistence. Properties influencing the ease and amount of excavation are wetness, slope, depth to bedrock, stoniness, and rockiness.

Properties Affecting Use	Degree of Soil Limitation		
	None to Slight	Moderate	Severe
wetness	Excessively and well drained soils not subject to ponding or seepage. Moderately well drained soils without ponding. Seasonal water table below 4 ft.	Well & moderately well drained soils subject to rare ponding or seepage. Somewhat poorly drained soils not subject to ponding. Seasonal water table between 2 and 4 ft.	Somewhat poorly drained soils subject to ponding. All poorly & very poorly drained soils. Seasonal water table above 2 i-t.
Flooding	None	None	Subject to flooding.
Shrink-swell Potential	Very low, low	Moderate	High, very high
COLE	Less than .035	.035 - .06	More than .06
PVC	Less than 2	2 - 4	More than 4
Plasticity Index	Less than 15	15 - 30	More than 30
Slope and depth to bedrock	0 - 6% with bedrock deeper than 20"	6 - 15% with bedrock deeper than 40"	0-6% with bedrock within 20", or; 6- 15% with bedrock within 40", or; Over 15% slope
Stoniness class 3/	0, 1, 2	3	4, 5
Rockiness class 3/	0, 1	2	3, 4, 5

1/ Very severe.
2/ Firm or very firm consistence may approximate medium relative densities; friable or very friable may approximate soft relative densities.
3/ Classes defined in Soil Survey Manual, USDA Handbook 18, 1951.

SOIL LIMITATIONS FOR ROADS

Definition: These are trafficways exclusive of highways that consist of (1) the underlying local soil material (either cut or fill) called the subgrade; (2) the base material of gravel, crushed rock, or lime- or soil cement-stabilized soil called the subbase; and (3) the actual road surface or pavement, either flexible or rigid. Roads usually are constructed with thicker or higher quality subbase than streets and generally are designed with a more gradual grade. The requirements for subgrade and excavation, however, are similar.

Soil Properties: Properties that affect design and construction of roads and streets are (1) those that affect the traffic supporting capacity and stability of the subgrade, and (2) those that affect the ease of excavation and amount of cut and fill. The AASHO and Unified Classification, and the shrink-swell potential give an indication of the traffic supporting capacity. Wetness and flooding affect stability. Slope, depth of hardrock, stoniness, rockiness and wetness affect the ease of excavation and the amount of cut and fill to reach an even grade.

Properties Affecting Use	Degree of Soil Limitation		
	None to Slight	Moderate	Severe
Traffic Supporting Capacity 1/ Unified Soil Group AASHO Group Index	 GW, SW, GP, GM SP, GC, SM, SC 0 - 4	 ML, CL 4 - 8	 OL, MH, CH, OH, Pt 3/ More than 8
Shrink-swell Potential COLE PVC Plasticity Index	Very low, low Less than .035 Less than 2 Less than 15	Moderate .035 to .06 2 to 5 15 to 30	High, very high More than .06 More than 4 More than 30
Depth to seasonal high water table	Water table below 4 feet	Water table 2 - 4 feet	Water table within 2 feet
Flood Hazard	Less often than once in 20 years	Once in 5 to 20 years	More often than once in 5 years
Slope and Depth to Bedrock 4/	0-6% with bedrock deeper than 3'	6-15% with bedrock deeper than 6'	0-6% with bedrock within 3' 6-15% with bedrock within 6' More than 15% slope
Stoniness Class 2/ (Percentage of loose stones on surface over 10" in diameter)	0,1,2 (Less than 3%)	3 (3 to 15%)	4,5 (More than 15%)
Rockiness Class 2/ (Percentage of fixed rock exposed at surface)	0,1 (Less than 10%)	2 (10 to 25%)	3,4,5 (More than 25%)

1/ In areas subject to frost action, SM is rated Moderate, CL and the silt and silt loam part of ML are rated Severe.
2/ Classes defined in soil Survey Manual, USDA Handbook 18, 1951.
3/ Very severe.
4/ If bedrock is soft (rippable) rate one class better.

6/5/69

SOIL LIMITATIONS FOR LIGHT INDUSTRY

Definition: Ratings are for undisturbed soil that is used to support foundations for light industrial buildings. Emphasis is on foundations, ease of excavation for underground utilities, and corrosion potential of uncoated steel pipe. The undisturbed soil is rated for spread footing foundations for buildings less than three stories high or foundation loads not in excess of that weight.

Soil properties: Properties affecting bearing strengthand settlement under load are wetness, flooding, texture, plasticity, density, and shrink-swell behavior. Texture and plasticity (Atterburg limits) are inferred from the Unified Soil Group. Density is inferred from the mist soil consistence. 1/ Properties affecting excavation are wetness, flooding, slope, and depth to bedrock. Properties affecting corrosion of buried uncoated steel pipe are wetness, texture, total acidity, and electrical resistivity.

Properties Affecting Use	Degree of Limitation		
	None to Slight	Moderate	Severe
Wetness	Excessively and well drained soils not subject to ponding or seepage. Seasonal water table below 40 inches.	Well and moderately well drained soils subject to rare ponding or seepage. Somewhat poorly drained soils not subject to ponding. Seasonal water table between 15 and 40 inches	Somewhat poorly drained soils subject to ponding. A 1 poorly and very poorly drained soils. Seasonal water table less than 15 inches.
Flooding	None	None	Subject to flooding
Shrink-swell Potential	Very low, low	Moderate	High, very high
COLE	Less than .035	.035 - .06	More than .06
PVC	Less than 2	2 - 4	More than 4
Plasticity Index	Less than 15	15 - 30	More than 30
Slope and Depth to Bedrock	0 - 4% with bedrock deeper than 20 inches.	4 - 8% with bedrock deeper than 40 inches.	0-4% with bedrock within 20 inches, or; 4-8% with bedrock within 40 inches, or; over 8% slope
Stoniness 2/	Classes 0, 1	Class 2	Classes 3, 4, 5
Rockiness 2/	Class 0	Class 1	Classes 2, 3, 4, 5
Corrosivity-Uncoated Steel	Very low to moderate	Very high and High	Not class determining

1/ Evaluation is based on relative densities; firm or very firm soil consistence may approximate medium relative densities, friable or very friable consistence may approximate soft relative densities.

2/ classes of rockiness and stoniness are as defined in Soil Survey Manual, USDA Handbook 18, August 1951.

WOODLAND SUITABILITY

This table includes some evaluations of the soil series for woodland use and management. In the first column, "Phases of Series," the slope, texture, erosion, and other phases of the series should be shown if there are significant differences in potential productivity (site index class), management problems, or species suitability.

In the second column, "Ordination," show the ordination of the series of phase into the appropriate woodland suitability class and subclass, as explained on pages 8, 11, and 12 of Soils Memorandum SCS-26 (Rev. 2) dated September 7, 1967. The following table should be used to determine the suitability class.

Indicator Forest Type or Species	Suitability Class 1	2	3	4	5
	Range of Site Index				
Cottonwood	106+	105-96	95-86	85-76	-76
Yellow-poplar	106+	105-96	95-86	85-76	-76
Sweetgum	96+	95-86	85-76	75-66	-66
Nuttall oak	96+	95-86	85-76	75-66	-66
Water oak	96+	95-86	85-76	75-66	-66
Loblolly pine (natural)	96+	95-86	85-76	75-66	-66
Loblolly pine (planted)	76+	75-66	65-56	55-46	-46
Slash pine (natural)	96+	95-86	85-76	75-66	-66
Slash pine (planted)	76+	75-66	65-56	55-46	-46
E. white pine	96+	95-86	85-76	75-66	-66
Virginia pine	86+	85-76	75-66	65-56	-56
Shortleaf pine	86+	85-76	75-66	65-56	-56
Longleaf pine	86+	85-76	75-66	65-56	-56
Upland oaks	86+	85-76	75-66	65-56	-56
Water tupelo	86+	85-76	75-66	65-56	-56
Redcedar	66+	65-56	55-46	45-36	-36

In the above table, site index is the average height of dominant trees at age 30 for cottonwood, at age 25 for planted loblolly and slash pine, and at age 50 for all other species or types.

Priority in designating the subclass shall be in the following order:

- x (stoniness or rockiness)
- w (excessive wetness)
- t (toxic substances)
- d (restricted rooting depth)
- c (clay in upper profile)
- s (sandy soils)
- f (fragmental or skeletal)
- r (relief or slope steepness)
- o (slight or no limitations)

In the third column, "Important Trees," list only the forest types or tree species (usually one to three) which were used to indicate the suitability class. Other adapted species may be listed in the narrative of the standard series description under "Use and Vegetation."

In the fourth column, "Site Index Class," show the site index, rounded off to the nearest lo-foot interval, opposite the appropriate tree species or forest type in the previous column.

In the fifth and sixth columns, give the potential productivity of 4 to 6 understory species for a medium canopy class (36-55% canopy). Productivity is expressed in pounds air dry vegetation per acre. Where data are not available and acceptable estimates cannot be made, an alternance is to list the species in order of their productivity and show the total average annual production as one figure.

In the next three columns, "Erosion Hazard," "Equipment Limitations," and "Seedling Mortality, rate the series or phase of series as slight, moderate, or severe, using guidelines attached.

In the next column, "Trees to Plant," list one or more well-adapted tree species for which suitable planting or seeding methods have been developed.

GUIDE TO POTENTIAL EROSION HAZARD OF SOILS IN WOODLAND USE

Surface Texture	Effective Rooting Depth	Slope Percent 1/	Rating
Sandy (s, ls, lfs) and Clayey (c, sc, sic)	More than 20 inches	0 - 15	Slight
		15 - 45	Moderate
		45+	Severe
	Less than 20 inches	0 - 10	Slight
		10 - 25	Moderate
		25+	Severe
Loamy (sl, fsl, vfsl, sil, l, scl, sicl)	More than 20 inches	0 - 15	Slight
		15 - 25	Moderate
		25+	Severe
	Less than 20 inches	0 - 10	Slight
		10 - 15	Moderate
			Severe
Skeletal		0 - 25	Slight
		25+	Moderate

1/ Slope ranges are approximate and may be adjusted by survey areas.

Soil-Woodland Committee
Fort Worth, Texas
10/3/66

GUIDE TO
EQUIPMENT LIMITATION RATINGS
OF SOILS FOR WOODLAND USES

Soil Texture Classes: Family	Soil Texture Classes: Surface	Slope Percent 1/	Wetness 2/	Class of Rockiness, or Stoniness 3/	Rating
Sandy (includes all psamments and sandy families)	Sandy (w/ less than 10 percent silt and clay) (s)	0 - 10	A or B	-	Moderate
			C		Severe
		10 - 25	-		Moderate
		25+	-		Severe
Loamy (includes loamy, fine loamy, coarse loamy, fine silty and coarse silty families)	Sandy or Loamy (ls, sl, fsl, scl, cl, l, sil, vfsl, sicl, si)	0 -15	A	0, 1	Slight
				2	Moderate
				3, 4	Severe
			B	0, 1, 2	Moderate
				3, 4	Severe
			C	all classes	Severe
		15 - 45	-	0, 1, 2	Moderate
				3, 4	Severe
		45+	-	all classes	Severe
Clayey (includes fine, very fine, and clayey families)	Loamy (scl, sl, l, sil; si)	0-15	A	0, 1	Slight
				2	Moderate
				3, 4	Severe
			B	0, 1, 2	Moderate
				3, 4	Severe
			C	all classes	Severe
		15 -45	-	0, 1, 2	Moderate
				3, 4	Severe
		45+	-	all classes	Severe
	Clayey (cl, sicl, sic, sc, c)	0 - 15	A or B	0, 1, 2	Moderate
				3, 4	Severe
			C	all classes	Severe
		15+	-	all classes	Severe

1/ Slope ranges are approximate. Ranges may be adjusted by soil survey areas.
2/ A = seasonally high water table or free water not above 15 inches more than two months per year.
B = seasonally high water table or free water above 15 inches two to six months per year (also most aquic subgroups).
C = seasonally high water table or free water above 15 inches more than six months pear year (also most aqu suborders).
3/ Refer to Soil Survey Manual, page 222.

10/3/65
Soil-Woodland Committee
RTSC, Fort Worth, Texas

GUIDE TO
SEEDLING MORTALITY OF SOILS FOR WOODLAND USE

Growing Season Rainfall	Wetness 1/	Surface Soil Texture 2/	Effective Rooting Depth	Rating
+ 30"	A	Sandy	20"+	Moderate
			10-20"	Moderate 3/
		Loamy	20"+	Slight 4/
			10-20"	Moderate 3/
			-10"	Severe
		Clayey	20"+	Moderate 3/
			10-20"	Severe
			-10"	Severe
	B	Sandy	20"+	Moderate
			10-20"	Moderate
		Loamy	20"+	Moderate
			10-20"	Moderate
			-10"	Severe
		Clayey	20"+	Moderate
			10-20"	Severe
			-10"	Severe
	C	All		Severe
25-30"	A	Sandy	20"+	Severe
			10-20"	Severe
			-10"	Severe
		Loamy	20"+	Slight 4/
			10-20"	Moderate 3/
			-10"	Severe
		Clayey	20"+	Moderate 3/
			10-20"	Severe
			-10"	Severe
	B	Sandy	20"+	Moderate
			10-20"	Moderate
			-10"	Severe
		Loamy	20"+	Moderate
			10-20"	Moderate
			-10"	Severe
		Clayey	20"+	Moderate
			10-20"	Severe
			-10"	Severe
	C	All		Severe

1/ A'= Water is above surface less than one month per year, and soils are well drained to somewhat poorly drained.
B = Water is above surface one to six months per year, or soils are poorly drained (includes most aquic subgroups).
C.= Water is above surface more than six months per year, or soils are very poorly drained (includes most aqu suborders).

2/ Refer to Soil Survey Manual, page 213.

3/ Severe on south aapecte.

4/ Moderate on south aepecte.

Soil-Woodland Committee
Fort Worth, Tex.
10/3/66

WILDLIFE SUITABILITY

The suitability of soils for producing openland, woodland, and wetland wildlife can be rated by evaluating the suitability of the soils for producing the habitat required by these kinds of wildlife.

The ratings refer only to the suitability of the soil and do not take into account the present use of the soil, or the distribution of wildlife and human populations. The suitability of individual sites has to be determined by on-site inspection.

The three general kinds of wildlife are defined as follows:

Openland Wildlife. Openland wildlife is birds and mammals that normally frequent cropland, pastures, and areas overgrown with grasses, herbs, and shrubby growth. Examples of this kind of wildlife are quail, cottontail rabbits, meadowlarks, and lark sparrows.

Woodland Wildlife. Woodland wildlife is birds and mammals that normally frequent wooded areas of hardwood trees and shrubs, conniferous trees and shrubs, or a misture of these plants. Examples of woodland wildlife are deer, turkey, squirrel, and grouse.

Wetland Wildlife. Wetland wildlife is birds and mammals that normally frequent wet areas such as ponds, streams, ditches, marshes, and swamps. Examples of this kind of wildlife are ducks, geese, rails, shorebirds, and snipe.

Soil properties that affect the growth of wildlife habitat are: (1) thickness of soil useful to crops, (2) surface texture, (3) available water capacity to a 40-inch depth, (4) wetness, (5) surface stoniness or rockiness, (6) flood hazard, and (7) slope.

MAKING THE RATING'S

Ratings are made in two steps. First, the soils are rated in terms of suitability for producing habitat elements. Next, various combinations of habitat elements are evaluated for their suitability to produce openland, woodland, and wetland wildlife.

step 1. Rate the soils for producing each of the wildlife habitat elements given in tables 1 through 7.

step 2. Determine the suitability rating for each of the kinds of wildlife by averaging the ratings of the following combinations of the habitat elements:

a. Openland wildlife
 Grain and seed crops (Table 1)
 Grasses and legumes (Table 2)
 Wild herbaceous plants (Table 3)

b. Woodland wildlife
Hardwood trees and shrubs (Table 4)

c. Wetland wildlife
Wetland food and cover plants (Table 6)
Shallow water development (Table 7)

TABLE 1 RATING CRITERIA FOR GRAIN AND SEED CROPS

Definition: Grain and Seed Crops refer to grain- or seed-producing annuals planted to produce food for wildlife. Examples are corn, sorghums, millets, soybeans, wheat, oats, sunflowers, etc.

Well Suited: Soil conditions suitable for repeated annual planting, individually, in combination, or in rotation of any or all climatically adapted species, without intervening sod crops for soil protection and maintenance.

Suited: Soil conditions suitable for the planting, individually, in combination, or in rotation, of any or all climatically adapted species but requiring a rotation with sod crops up to 66% of the time for soil protection and maintenance.

Poorly Suited: Soil conditions suitable for the planting, individually, or in combination, of any or all climatically adapted species but requiring a rotation with sod crops more than 66% of the time for soil protection and maintenance.

Unsuited: Under prevailing soil conditions, grain and seed crops cannot be grown or it is not feasible to plant them.

Soil Properties	Well Suited	Suited	Poorly Suited	Unsuited
Thickness of soil (useful to crops)	40" +	20 - 40"	10 - 20"	less than 10"
Surface texture	clay loam - fine sandy loam - very fine sandy loam - silt loam - sandy clay loam - loam - silty clay loam - sandy loam - loamy sand - loamy fine sand	clay - silty clay - sandy clay - fine sand	sand	coarse sands - organic deposits
Available water capacity to 40 inch depth	4"+	3 - 4"	2 - 3"	less than 2.0"
Soil drainage class 1/	well drained moderately well drained	somewhat poorly drained somewhat excessively drained	poorly drained excessively drained	very poorly drained
Surface stoniness and/or rockiness	none to slight →	none to slight →	stony	very stony extremely stony
Flood hazard	none to slight	ocassional	frequent	very frequent
Slope range (percent)	0 - 5	5 - 15	15 - 25	25 +

1/ In application on specific sites that have artificial drainage installed the ratings may be adjusted to the degree of drainage achieved.

4/10/69

TABLE 2 RATING CRITERIA FOR GRASSES AND LEGUMES

Grasses and Legumes refer to domestic grasses and legumes that will be established by planting and which furnish food and cover for wildlife. The grasses include species as bahia, ryegrass, fescue, and panicgrasses. Legumes include species as clovers, annual lespedezas, and bush lespedezas.

Well Suited: Soil conditions suitable for planting of a wide variety of climatically adapted species; and the maintenance of adequate stands for wildlife cover for at least 10 years Without renovation, liming or fertilization.

Suited: Soil conditions suitable for planting of 8 wide variety of climatically adapted species; but the maintenance of adequate stands for wildlife cover for at least 10 years requires renovation , liming or fertilization and can be done without difficulty.

Poorly Suited: Soil conditions suitable for a very limited number of species , generally not more than one or two; but where natural vigor of stands my be high without renovation, liming or fertilization.

Unsuited: Soil conditions that have severe limitations as to suitability for a variety of species and for vigor of growth; producing very sparse stands: and where renovation, liming, and fertilization are impossible or impracticable to apply.

Soil Properties	Well Suited	Suited	Poorly Suited	Unsuited
Thickness of soil (useful to crops)	20" +		10 - 20"	less than 10"
Surface texture	sandy clay loam, clay loam, loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silty clay loam	clay, silty clay, sandy clay, fine sand	sands, heavy clay	coarse sands, organic deposits
Available water capacity to 40 inch depth	3 - 4"	2 - 3"	less than 2.0"	- - - - - - - -
Soil Drainage Class	well drained moderately well drained	somewhat poorly drained poorly drained somewhat excessively drained	very poorly drained excessively drained	very wet marsh areas
Surface stoniness and/or rockiness	none to slight	stony	very stony	extremely stony
Flood hazard	none to slight - occasional	frequent	very frequent	continuous
Slope range (percent)	0- 15	15 - 25	25 - 35	35 +

4/70

TABLE 3 RATING CRITERIA FOR WILD HERBACEOUS PLANTS

Wild Herbaceous Plants refers to perennial grasses, forbs, and weeds that provide food and cover for wildlife. Examples of these are beggarweed, perennial lespedezas, wild bean, and pokeberry.

Well Suited: Soil conditions suitable for the establishment and vigorous growth of a wide variety of uncultivated species.

Suited: Soil conditions which limit the variety of species that can be established but on which growth of only a few species my be vigorous.

Poorly Suited: Soil conditions suitable for the establishment of very few species; and vigor of growth limited.

Unsuited: Soil conditions where variety of adapted species is so restricted, stands so sparse, and vigor so poor, as to be of insignificant value to wildlife.

Soil Properties	Well Suited	Suited	Poorly Suited	Unsuited
Thickness of soil (useful to crops)	20" +	10 - 20"	less than 10"	- - - - - - - -
Surface texture	sandy clay loam, clay loam, loamy sand, loamy fine sand, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silty clay loam	clay, silty clay, sandy clay	medium sands	coarse sands, organic deposits
Available water capacity to 40 inch depth	3" +	2 - 3"	less than 2.0"	- - - - - - - -
Soil drainage class	well drained moderately well drained somewhat poorly drained	poorly drained somewhat excessively drained	very poorly drained, excessively drained	very wet marsh areas
Surface stoniness and/or rockiness	← none to slight - stony - very stony →		← extremely stony →	
Flood hazard	none to occasional	frequent	very frequent	continuous

4/10/69

TABLE 4 RATING CRITERIA FOR HARDWOOD TREES AND SHRUBS

Hardwood Trees and Shrubs refer to non-coniferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, or foliage (browse) used extensively as food by wildlife. These plants commonly become established through natural processes, but may be planted. They include species as oak, beech, cherry, dogwood, viburnum, maple, grape, honeysuckle, greenbrier, and eleagnus.

Well Suited: Soil conditions suitable for the vigorous growth and dependable food production from a wide variety of climatically adapted species.

Suited: Soil conditions suitable for most climatically adapted species but dependability of food production somewhat limited.

Poorly Suited: Soil conditions suitable to few species of importance to wildlife for food production and such production undependable.

Unsuited: Soil conditions under which very few or no species of importance to wildlife will grow and where growth is so sparse as to be of little significance to wildlife.

Soil Properties	Well Suited	Suited	Poorly Suited	Unsuited
Thickness of soil (useful to crops)	20" +	10 - 20"	less than 10"	- - - - - - - -
Surface texture	sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silty clay loam, sandy clay loam, clay loam, clay		loamy sand, loamy fine sand, medium and fine sands	coarse sands organic deposits
Soil drainage class	somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, very poorly drained		excessively drained	very wet marsh areas
Surface stoniness and/or rockiness	none to slight, stony, very stony	extremely stony	- - - - - - - - - -	- - - - - - - -

TABLE 5 RATING CRITERIA FOR LOW GROWING CONIFEROUS WOODY PLANTS

Low growing coniferous woody plants are cone-bearing trees and shrubs that are used mainly as cover but may furnish food in the form of browse, seeds, or fruit-like cones. They become established through natural processes or may be planted. Included are pines, junipers, cedars, and ornamentals. The best soils are those that produce slow growing plants With branches low to the ground. Good pine sites would be poorly suited for low growing coniferous woody plants.

Well Suited: Soil conditions suitable for a variety of climatically adapted species but on which growth rate is retarded; canopy closure delayed.

Suited: Soil conditions suitable for a limited number of species; growth rate slow to moderate.

Poorly Suited: Soil conditions suitable for most or all climatically adapted species; growth rate high and canopy rapid.

Unsuited: Soil conditions suitable for few or no species; stands so sparse as to be insignificant to wildlife

Soil properties	Well Suited	Suited	Poorly Suited	unsuited
Thickness of soil (useful to crops)	less than 10"	10 - 20"	20" +	- - - - - - - - -
Soil drainage class	excessively drained very poorly drained	somewhat excessively drained poorly drained	well drained moderately well drained somewhat poorly drained	very dry beach areas, very wet marsh areas
Surface stoniness	extremely stony	very stony	none to slight stony	- - - - - - - - -
Flood hazard	very frequent	frequent	none to slight occasional	continuous

TABLE 6 RATING CRITERIA FOR WETLAND FOOD AND COVER PLANTS

Wetland Food and Cover Plants are annual and perennial wild herbaceous plants that grow on moist to wet sites (they do not include submersed or floating aquatics). These plants furnish food or cover mostly for wetland wildlife. Some examples are smartweed, wild millet, spikerush and other rushes, sedges, burreed, tearthumb, and aneilema.

Well Suited: Soil conditions suitable for the growth of a wide variety of climatically adapted wetland species, particularly food producing annual plants.

Suited: Soil conditions suitable for a wide variety of wetland species, particularly perennials.

Poorly Suited: Soil conditions that tend to produce dominant stands of a few vigorous perennial wetland species, generally of low food production value.

Unsuited: Soil conditions under which wetland plants do not grow naturally or are so sparse as to be of no significance to wildlife. Plants my be introduced but will not persist.

Soil Properties	Well Suited	Suited	Poorly Suited	Unsuited
Soil texture	sl, fsl, vfsl, 1, sicl, scl, Cl, C	ls, lfs, peat, muck	sands	---
Soil wetness	Soils with water table within 20 inches of the surface and often above the surface most of the time. (Most poorly and very poorly drained soils in humid areas.)	Soils with water table within 20 inches of the surface for extended periods but less than half the time. (Most somewhat poorly drained soils in humid areas.)	Soils with water tables within 23 inches of the surface for short periods. (Most moderately well drained soils in humid areas.)	Soils with water tables below 5 feet most of the time.
Surface stoniness	← none to slight, stony, very stony →		← extremely stony →	
Slope range (%)	0 - 3	0 - 3	3 - 8 1/	3 - 15+ 2/

1/ Slopes above 3 percent refer only to somewhat poorly and poorly drained soils; moderately well drained soils above 3 percent would be unsuited.

2/ Extensive seeps that grow wetland plants my be found on steeper slopes but are not here considered valuable.

TABLE 7 RATING CRITERIA FOR SHALLOW WATER DEVELOPMENTS

Shallow Water Developments are those where low dikes and water control structures are established to create habitat principally for waterfowl. They my be &signed whereby they cm be drained, planted, and flooded or they may be used as permanent impoundments to grow submersed aquatics. Both freshwater and brackish water situations are included. The assumption is made that water is available for flooding the field.

Well Suited: Soil conditions under which there me few or no limitations in the construction of shallow water areas and control or maintenance of desired water levels.

Suited: Soil conditions under which there are moderate limitations in construction, choice of measures, or some difficulties in water level control.

Poorly Suited: Soil conditions that severely limit choice of measures, present serious construction problems or major difficulties in water level control.

Unsuited: Soil conditions under which shallow water developments are impossible or not feasible.

Soil Properties	Well Suited	Suited	Poorly Suited	Unsuited
Depth to bedrock 1/	40" +	20 - 40"	10 - 20"	less than 10"
Surface stoniness	none to slight, stony	very stony	extremely stony	rubble
Flood hazard	none to slight	occasional	frequent	very frequent
Slope range (percent)	0 - 1	1 - 2	2 - 3	3 +
Soil permeability	slow, very slow	moderately slow, moderate	moderately rapid	rapid, very rapid

1/ Depth to bedrock ranges are estimated for dominant conditions--on-site evaluation is necessary for specific depth information.

RANGE

In the first column list only those phases of the series that cause different range sites. For example, show both a loamy sand phase and a sandy loam phase if each has a different range site. If both phases are in the same range site, do not list the phases or write "all phases."

In the second column list the range site name.

In the next space, list the approximate climax (potential) plants and their percentage by weight of the total annual yield for the community. If the community composition is complex, list the 4-6 major species and lump the other species into "other" groups.

Show the total annual yield as air-dry weight in pounds-per-acre for the plant community. Since yields fluctuate with growing conditions from year to year and season to season, total yields should be given as 8 range for dry years and for moist years.

EXHIBIT 3

Recommended Changes in Format

SOIL LIMITATIONS FOR CORROSIVITY--UNCOATED STEEL

Definition: Uncoated steel pipe when buried in the soil will deteriorate as a result of an electrochemical process converting iron into its ions. Soil moisture forms solutions with the salts in the soil and becomes an electrolyte. The electrolyte carries current from an area of positive charge (anode area) to an area of negative charge (cathode area) and then through the metal to complete the circuit. The metal in the anode area becomes corroded through the loss of metal ions to the electrolyte.

Properties: Any soil properties influencing the soil solution or the oxidation-reduction reactions taking place in the soil will influence the operation of the corrosion cell. The major properties are fluctuating moisture content, and electrical conductivity of the soil solution. Soil drainage and texture gives an indication of soil moisture fluctuations. Total acidity, resistivity at field capacity and conductivity of the saturation extract give an indication of the electrical conductivity of the soil solution.

Properties Affecting Use	Degree of Limitation 1/				
	Very Low (Noncorrosive)	Low (Slightly Corrosive	Moderate (Mod. Corrosive)	High (Severely Corrosive)	Very High (Very Sev. Corrosive:)
Drainage class and texture	Excessive to somewhat excessively drained, coarse textured soils	Well drained, coarse to med. textured soils; or, Mod. well drained, coarse textured soils; or, Somewhat poorly drained, coarse textured soils	Well drained, mod. fine textured soils; or, Mod. well drained, coarse and med. textured soils; or, Somewhat poorly drained, mod. coarse textured soils; or, Very poorly drained soils with stable high water table	Well drained, fine textured soils; or, Mod. well drained, fix and mod. fine textured soils; or, somewhat poorly drained, med. and mod. fine textured soils; or, Poorly drained, coarse to mod. fine textured soils	Somewhat poorly drained, fine textured soils; or, Poorly drained, fine textured soils
Total acidity (meg./100g soil)	Below 4.0	4.0 to 8.0	8.0 to 12.0	12.0 to 16.0	More than 16.0
Resistivity at field capacity (Ohm/cm)	Moore than 10,000	5,000 to 10,000	2,000 to 5,000	1,000 to 2,000	Below 1,000
Conductivity (mmhos/cm at 25°C.)	Below 0.1	0.1 to 0.3	0.3 to 0.8	0.8 to 4.0	4.0+

1/ Based on data provided in the Publication "Underground Corrosion," table 99, p 167, Circular 579, USDC, National Bureau of Standards. When only three classes are needed, combine very low with low, and very high with high.

SOIL LIMITATIONS FOR CORROSIVITY--CONCRETE

Definition: Concrete placed in soil materials may deteriorate to varying degrees. Deterioration is caused by a chemical reaction between a base (the concrete) and a weak acid (the soil solution). Special cements and methods of manufacturing may be used to reduce rate of deterioration in soils of high corrosivity.

Properties: The rate of deterioration depends on (1) soil texture and acidity, (2) the amount of sodium or magnesium sulfate present in the soil singly or in combination, and (3) amount of sodium chloride in the soil. The presence of NaCl is one of the factors evaluated not because of its corrosivity of cement but because it is used to identify the presence of sea water. Sea water contains sulfates which is one of the principal corrosive agents.

Properties Affecting Use	Degree of Limitation 1/		
	Low	Moderate	High
Texture and reaction	Sandy and organic soils with pH >6.5 or Med.- and fine-textured soils with pH >6.0	Sandy and organic soils with pH 5.5 -6.5 or Med.- and fine-textured soils with pH 5.0 to 6.0	Sandy and organic soils with pH 5. or less or Med.- and fine-textured soils with pH 5.0 or less
Na and/or Mg sulfate (parts per million)	Less than 1,000	1,000 to 7,000	More than 7,000
NaCl (parts per million)	Less than 2,000	2,000 to 10,000	More than 10,000

1/ Based on data in National Engineering Handbook, Section 16, Chapter 5, table 5.2.

U. S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, FORT WORTH, TEXAS

COMMITTEE V HANDLING SOIL SURVEY DATA
AT THE SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE
Baton Rouge, Louisiana
1970

At the National Soil Survey Technical Work Planning Conference at Charleston, South Carolina, January 27-30, 1969 the National Committee on Handling Soil Survey Data recommended that regional committees be established to deal with soil survey data. As a result this committee was formulated. No specific charges were given.

A. This committee endorses the recommendations of the National Committee that work on the coding system be pushed forward as vigorously as possible and that the effort to have a uniform and complete data accumulation system be continued.

B. Work is proceeding at the National level in developing various programs. The Soil Classification (SC) file has been implemented. Work is proceeding on the Pedon Data (PD) code and Series Description (SD). In addition, planning has gone into possible Soil Interpretation (SI) files, and Cartographic Soil Data (CSD) file. This committee favors these efforts and highly recommends that the Soil Interpretation files be developed to cover all practical soil usage including yield potential for crops and forestry engineering aspects and recreational usage.

C. The possibility of extending Automatic Data Processing into the relationship between soil type, soil test and fertilizer recommendations for specific crops presents a challenge.

Some states use ADP for making fertilizer recommendations. Such a system if implemented might work better as a numerical rating system where arbitrary values are used in place of pounds, bushels. etc. Perhaps within the region several groups of states can mutually work together.

D. Automatic Data Processing appears to have a good potential in making interpretative maps for various purposes. Thie area needs to be throughly investigated as interpretative maps for specific purposes would prove valuable for all kinds of planning purposes.

E. It is recommended that this committee become a permanent committee of the Conference for the purpose of:

1. determining what kinds of ADP files are needed; particularly, the kinds of interpretationa needed.
2. reviewing codes and programs to be used in ADP and recommend revisions in existing systems where appropriate,
3. studying the feasibility of ADP in making interpretative maps.
4. Chairman of committees of this Conference that deal with data collection and ADP uses should be members of this committee.

G. R. Craddock, Chairman
H. H. Bailey, Vice-Chairman
R. W. Pearson
D. A. Brown
J. F. Brasfield
J. T. May
H. F. Perkins
H. J. Byrd
W. F. Miller
W. L. Cockerham

S. W. Buol
E. L. Hill
T. H. Silker
G. J. Buntley
C. M. Thompson
C. L. Godfrey
H. C. Porter
J. A. DeMent
R. C. Deen

This report was accepted by the Conference. Discussion of the report yielded these pertinent comments.

1. Some governing groups are beginning to use ADP data for planning purposes, for example, New Orleans and the Virgin Islands. A need exists to communicate among members information about ADP systems in use,
2. The projected use of ADP seems to indicate a need for providing current ADP information to the members of this conference,
3. Experienced ADP expertise is needed in the deliberations of thie committee. It was suggested that the composition of this committee include such persona in the future.
4. The Conference emphasized that ADP language developed at the various institutions should be compatible with the equipment throughout tha region if free interchangeability of information is to be realized.
5. Attention is called to Soil Survey Technical Notes 1970 "A Report on the Use of Automatic Data Processing in the Soil Survey."

Southern Regional Technical Soil Survey

Work-Planning Conference

Baton Rouge, Louisiana
May 5-7, 1970
(Revised - 5/6/70)

Report of Committee 6 -- Soil Moisture and Temperature

Committee Objectives:

1. To initiate water-table studies to serve as a basis for the formulation of descriptive classes in each state. Review and comment on descriptive scheme proposed by the Northeast Committee.
2. Make recommendations on the topics to include the organization of a publication on evaluation of the soil-moisture regimes that would serve a function similar to SCS-T.P. 144- "Soil Temperature Regimes - Their Characteristics and Predictability."
3. Test and evaluate methods of soil moisture measurements; select methods to be used to attain uniform evaluation of soil moisture regime.
4. Initiate, where possible, further observations of soil temperature.

This committee urges each state to initiate a two year water-table study on critical soils. Methods of installing wells and collecting data have been sent to each committee member. The soils used in the study should be really extensive and emphasis should be placed on soils with periodic high water tables. Once the on-site data are collected, they can he generalized by a computer program developed by Dr. Nelson at N. C. State. A list of soils with some water-table data is attached. It is proposed that a function of this committee be to maintain a list of soils with water-table data because there is little need for duplicating data on the same series across adjacent state lines.

Considerable doubt exists as to the validity of depth duration curves as a means of describing water-table regimes. The accompanying graph (Fig. 1) illustrates some of the difficulties. In Fig. 1, there is too much overlap of contrasting soils. The graph is based on generalized bi-monthly data from 9 Udults and 2 Aquults. It is possible that data generalized on a weekly basis may make a more meaningful separation, but experience in North Carolina suggests otherwise. Apparent ly, the difficulty is that several factors other than water-table height are involved. Eh-pH conditions in the soil water and abundance of iron oxides are suspected as being the undetermined link between water table depth and soil color (low chroma mottling) upon which taxanomic placement is presently dependent.

Some of the topics to be included in a publication on soil-moisture regimes should be:

(1) Relations between soil morphology, especially color, and water-table levels.

1a Effect of dissolved oxygen and Eh/pH relations.

1b Effect of micro topography - short periods of saturation by runoff may effect morphology more than average water level.

1c Effect of deep summer or fall water table on development of Aquults and Aqualfs.

1d Effect of shallow winter water table on development of Udults, Udalfs.

(2) Relations between landscapes and water tables.

2.1 Effect of stratigraphy - Permeable vs impermeable underlying formations.

2.2 Effect of landscape dissection on water-table depth and duration.

2.3 Relations between water-table depth and soil properties.

2.31 Physical - clay content of B, A2 horizon thickness, B horizon morphology.

2.32 Chemical and mineralogical properties - Al saturation, clay mineral kinds and amounts.

(3) Soil moisture regimes above the water table.

3.1 Yearly changes in moisture content by depth

3.11 Forested Udults, Aquults, Aquods, Aqualfs and Udalfs, and their cultivated counterparts.

(4) Soil moisture regimes from West-Texas or Oklahoma to the Atlantic Ocean and its relation to climatic factors.

(5) Methods.

5.1 Wells, equipment and measuring frequency used in water-table studies.

5.2 Equipment, its limitations and validity of measurement for studying soil moisture regimes above the water table.

Objective 3 (above) probably can be dropped. Taylor, *et al.* (1) have adequately discussed the theoretical basis for measuring soil water and the experimental evaluation of methods for measuring soil water.

We encourage more soil temperature checks especially in areas "ear temperature family breaks. Eventual preparation of a resource map of isotemps for southern region and also seasonal relations between soil types.

Recommendations:

1. This committee should be continued.
2. Major emphasis for the next 2 to 4 years should be placed on collection and generalization of 2-year water-table data throughout the Southeast.
3. Recommend that a symposium on field-soil-moisture regimes be held by SSSA in 1971. It is further recommended that the symposium be published as a separate volume.
4. The committee should update the 1965 soil-temperature map and present the revised copy at the next Southern Region Work-Planning Conference,

Committee Members:

R. B. Daniels, Chairman	P. A. Avers	F. H. Beinroth
S. W. Buol, Vice-Chairman	H. B. Vanderford	C. M. Ellerbe
C. A. McGrew	R. L. Carter	C. B. Breinig
J. F. Brasfield	H. A. Friboorg	A. L. Newman
R. E. Caldwell	W. R. Elder	M. H. Milford
G. L. Bramlett	F. J. Dries	N. B. Pfeiffer
E. V. Huffman	Elmo Bauman	R. B. Grossman

Water Table Data Available (1 year or more)

North Carolina

Aquads	
Typic Haplaquod	Lynn Have"?
Aeric Haplaquod	Leon
Aquults	
Typic Fragiaquult	Mashulaville N.S.D. fine loamy
Typic Paleaquult	Rains N.S.D. coarse loamy
Aeric Paleaquult	Lynchburg N.S.D. coarse loamy

---

[1] Taylor, S. A., Evans, D. D. and Kemper, W. D. 1961. Evaluating Soil Water. Bulletin 426, Agric. Exp. Sta. Utah State Univ. 67 p.

Typic Umbraquult	N.S.D. clayey
Udults	
Typic Hapludults	Rumford
	Kalmia
Aquic Hapludults	Johns
Typic Paleudults	Norfolk
	Faceville
Aquic Paleudult	Goldsboro
Plinthic Paleudult	Dothan
	Varina

Tennessee

Udalfs	
Ultic Hapludalf	Armour
Udults	
Aquic Hapludult	Beason
Typic Fragiudult	Captina (thermic taxadjunct)
Aqueptic Fragiudult	Taft (?)
Ochrepts	
Aquic Fluventic Euthrocrept	Linside (thermic taxadjunct)

South Carolina (series)

Charleston	Yonges	McColl	Coxville	Olanta
Leon	Dunbar	Rembert	Lynchburg	Lenoir
Seabrook	Seewee	Goldsboro	Barth	Craven
Ridgeland	Chipley			Wahee
Wadmalaw				Rains
Meggett				
Okeetee				

Oklahoma (series)

Summit	Dennis
Choteau	Lula
Parsons	Craig

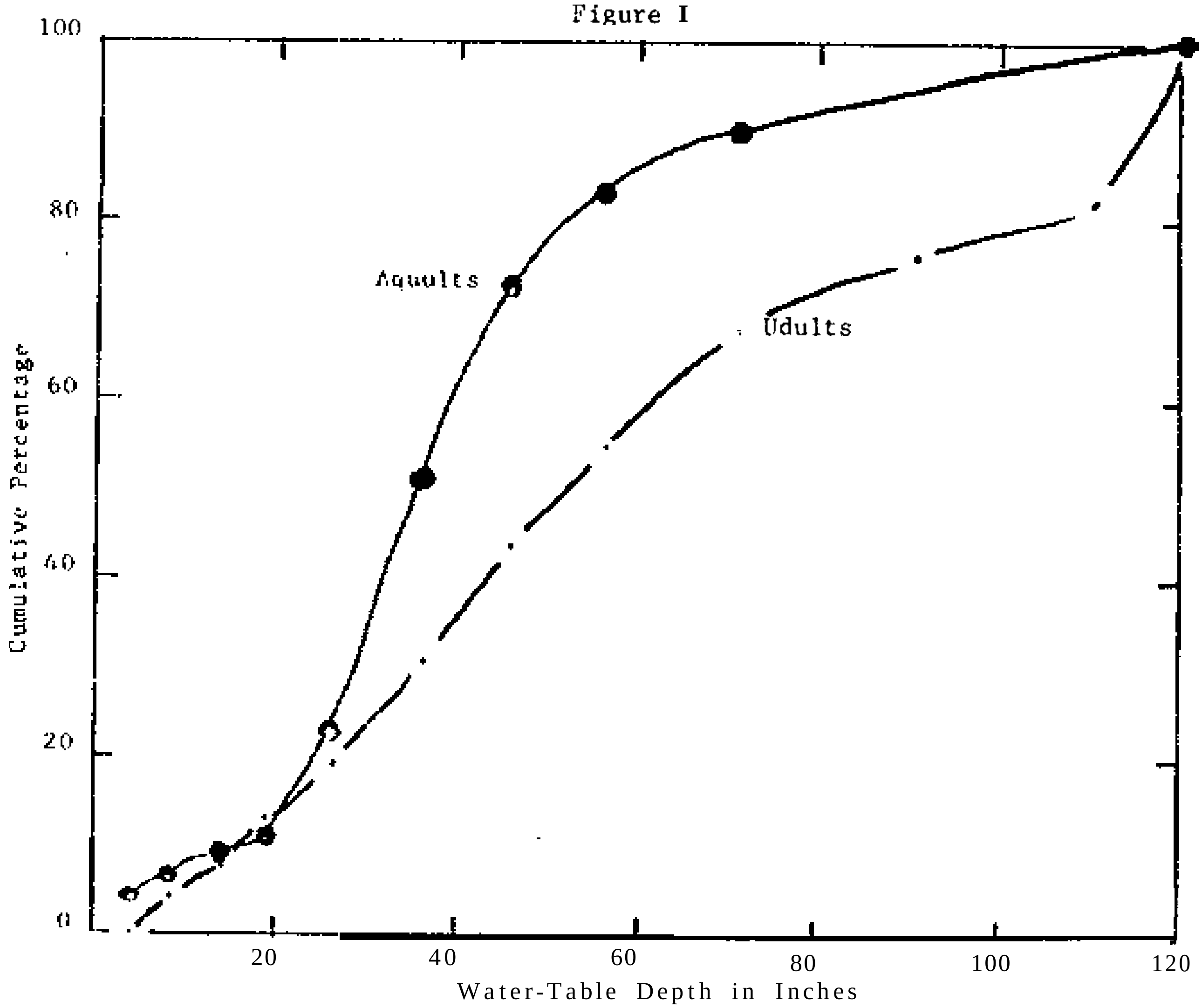
Puerto Rico (series)

Aguirre - Udic Pellusterts
Guanica - Udic Pellusterts

Mississippi

Plinthic Fragiaquults	Atmore
Plinthicaquic Fragiudults	Basin
Typic Fragiudults	Biloxi?
Aquic Paleudults	Harleston

Figure I


100
80
60
40
20
0
Cumulative Percentage
Aquults
Udults
20
40
60
80
100
120
Water-Table Depth in Inches

Southern Regional Technical Work-Planning Conference
of the
Cooperative Soil Survey
Baton Rouge, Louisiana
May 5-7, 1970

Committee VII - Miscellaneous Land Types and Soil Material

The committee was assigned the following charges:

1. Review the report of the 1964 Southern Regional committee "Made or Shaped Soils; Classification and Nomenclature."

2. Evaluate the classification and nomenclature used in that report.

3. Suggest changes necessary for defining and classifying altered or shaped soils and soil materials.

4. Suggest classes and criteria for use within the suborder Arents.

Charges 1 and 2 are combined since they are related. The committee report in 1964 was one of the earlier reports concerning made or shaped soils. Subsequent regional and national work planning conferences have reported in more detail on the 1964 committee's recommendations. We have definitions for land altered by urban development; recommendations for use of phases for soils altered by leveling and deep plowing, and made roll has been defined more precisely as made land or other units within the classification system.

The attached inventory of miscellaneous land types has been used in correlations in the South Region. This list covers a period for publications issued in 1965 to recent correlations.

The committee members did not present any recent data for classification of soils classified as Arents. One state has scheduled a trip in 1970 to study disturbed and altered soils and will prepare recommendations.

We recommend adoption of the following recommendations made by committee No. 8 - "Criteria for Classification and Nomenclature of Made Soils and Definition of Topsoil Used to Resurface Cuts and Fills," at the conference at Charleston, South Carolina in 1969:

1. Definition of topsoil.

2. Definition of made land.

3. We agree to reject the term "made soil" due to possible confusion in the use of the term.

4. Adoption of the "Cut and fill land" miscellaneous land type as defined.

5. Agree with recommendations for nomenclature for heterogenous soil materials. Where possible, these units should be classified at some level in the classification system.

6. Adopt recommendations for use of shaped soil phases of soil texonomic units. We recommend use of levelled or smoothed phases. Many soils occur on steeper slopes and smoothed phases are more appropriate for these.

7. Agree with criteria and recommendations for nomenclature for the Aren ts.

We need to eliminate many of the land types used in the South Region and are opposed to introduction of additional miscellaneous land types since they restrict interpretations. If the soil can be used as a medium for the growth of plants or engineering behavior predictions, these soils should be classified. More effort and study is needed to determine classes and criteria for the Arents. We recommend more use be made of classification units using nomenclature in categories above the series level.

The Committee. recommends it be discontinued.

Committee Members

R. C. Carter, Chairman
N.B. Pfeiffer, Vice-Chairman
B. F. Hajek
J. R. Moore
F. T. Ritchle, Jr.
J. H. Newton
R. L. Blevins
A. B. Elam
A. G. Caldwell
H. B. Vanderford
H. J. Byrd
J. A. Phillips
Fenton Gray
R. D. Well8
G. E. Smith
H. C. Dean
J. R. Runkles
D. M. Moehring

February 20, 1970

Miscellaneous Land Types*
South Region

ALLUVIAL LAND

- Alluvial land, cobbly
- Alluvial land, wet
- Broken alluvial lend
- Clayey alluvial land
- Clayey saline alluvial land
- Cobbiy alluvial land
- Gravelly alluvial land
- Local alluvial land
- Local alluvial lend, moderately wet
- Local alluvial land, phosphatic
- Loamy alluvial land
- Mixed alluvial land
- Mixed alluvial land, saline
- Mixed alluvial land, wet
- Saline alluvial land
- Sandy alluvial land
- Wet alluvial land

BADLAND

BORROW AREA

BLOWN-OUT LAND

BREAKS

COASTAL BEACHES

COASTAL LAND

STONY COLLUVIAL LAND

DUNE LAND

- Active dunes
- Coastal dunes
- Sand dunes, Lincoln material
- Coastal dune land and beaches

ERODED CLAYEY LAND

ERODED LOAMY LAND

FILLED LAND, SANDY

FILLED LAND, SILTY

GRADED LAND, SILTY MATERIALS

GRANITE COBBLY LAND

GRAVELLY LAND
- Hilly gravelly land

GULLIED LAND
- Gullied land, acid
- Gullied land, alkaline
- Gullied land, sandy
- Gullied land, silty
- Severely gullied land

GYPSUM LAND

GYPSUM OUTCROP

LEVEES AND BORROW PITS

LEVELED CLAYEY LAND

LEVELED MARLY LAND

LEVELED ROCKY LAND

LIMESTONE COBBLY LAND

MADE LAND
- Made land, Gila soil materials
- Made land, sanitary fill

MARSH
- Salt water marsh
- Tidal marsh
- Tidal marsh, firm, muck and peats
- Tidal marsh, fresh
- Tidal marsh, salty
- Tidal marsh, soft

MINE DUMPS

MINED LAND, RECLAIMED

OIL-WASTE LAND

PITS
- Borrow pits
- Gravel pits
- Mines and pits
- Mine pits and dumps
- Mines, pits and dumps
- Pits and quarries
- Sand pits

QUARRY

ROCK LAND
- Igneous rock land
- Limestone rock land
- Stony rock land
- Volcanic rock land

ROCK OUTCROP
- Granite outcrop

ROUGH BROKEN LAND
- Clayey broken land
- Gravelly broken land
- Rough broken and stony land
- Rough broken land, clayey
- Rough broken land, gypsiferous
- Rough broken land, loamy
- Sandy broken land
- Stony rough land

SALINE LAND

SANDY AND CLAYEY LAND

SANDY AND GRAVELLY LAND

SETTLING BASINS

SLICKENS

SMELTER - WASTE LAND

SMOOTHED LAND
- Smoothed land, Memphis soil materials
- Smoothed sandy land
- Smoothed silty land

SPOIL BANKS

STONY LAND
- Stony steep land

STRIP MINES

SWAMP
- Fresh water swamp
- Tidal swamp

TERRACE ESCARPMENTS

TIDAL FLATS

URBAN LAND

Southern Regional Technical Work--Planning
Conference Of The Cooperative Soil Survey

Baton Rouge, Louisiana

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Committee VIII - Rcslistic Estimates of Soil Survey Laboratory Workload

Charges: (1) Review plans for investigation and for laboratory work.
(2) Suggest priorities for this work.

<u>Committee Report</u>

A questionnaire was sent to all members of this committee, requesting information relating to charges (1) and (2). Twelve members, representing seven states and Puerto Rico, responded.

This report is based on information provided by respondents.

No increase in requests for determinations from the SCS laboratories was indicated. The Proceedings of the 1968 conference reported a need of about 700 determinations per year. The current and proposed need appears about the same or somewhat less. Most of the data required can be designated as routine characterization to aid placement of soils in proper classification categories.

In addition to the routine characterization data needed to facilitate the soil survey program the following needs were suggested for work especially on benchmark soils:

(1) Laboratory investigations which will provide data needed to establish more central concepts and allowable ranges for soil series and higher categories.

(2) Participation in investigations designed to establish interrelationships of plant growth, productivity and engineering uses with taxonomic defination.

(3) Investigate the effects of soil forming factors on soil characteristics (soil genesis studies).

(4) Study the relation of soil organic matter and soil microorganisms to soil genesis.

(5) Investigation of field soil moisture regimes and related soil characteristics.

(6) Determine soil characteristics needed to predict pollutant behavior in soils.

(7) Quantitative mineralogy and amorphous material in soils.

The following statement about benchmark soils is proposed for review and comment.

Definition of benchmark soils:

The kind of information needed on soils are their morphology and genesis; their chemical and physical properties, including engineering properties; and the interpretation of the soils for various engineering, agricultural, and recreational uses. We do not have the resources to study each soil in this detail. Benchmark soils enable us to study a relatively small number of soils and project this information to a large number of similar soils.

Benchmark soils, therefore, are those soils on which we decide to concentrate our efforts in field investigation, laboratory characterization, and interpretation, They should represent a large geographic area and the data should be capable of applying to similar soils. Publication of benchmark soil data in the form of soil monographs could be a longtime objective and probably should be authored by the State with responsibility for the series.

A large amount of data is already collected on some benchmark soils. These soils need to be retained as benchmark soils if they meet the criteria. Any additional data that is needed should be collected.

Procedure for selecting benchmark soils:

Each State should select the soils they want as benchmark soils and their list should be reviewed and approved by Regional Technical Work-Planning Committee.

The soil classification system should be used to select benchmark soils:

1. Taxa should be selected that represent a large geographic area. Multiseries families generally represent large geographic areas. The fine--loamy, mixed, thermic family of Typic Paleudults, for example contains soils representing one of the most extensive areas in the South.

2. Generally only one series should be selected from each multiseries family. The series that is used to name multiseries families (marked with an X on the classification print out) is a likely candidate for a benchmark soil.

3. Taxa should be selected from which data can be projected. Data from soils in Typic subgroups, for example, can be projected to more soils than data from soils in Vertic subgroups.

4. The number of benchmark soils should be kept small enough to concentrate on the key soils, in order to get the data within a reasonable time.

The chairman of this committee recommends that this committee be continued and that benchmark soils and soil monograph activities be included. Vice-chairmen could be designated for each activity.

Committee Members

B. F. Hajek - Chairman	J. A. DeMent - Vice-Chairman
C. A. Steers	J. W. Frie
R. W. Pearson	M. E. Springer
E. M. Rutledge	W. W. Fuchs
D. A. Brown	J. F. Mills
V. W. Carlisle	J. B. Dixon
R. L. Carter	C. R. Carter
A. G. Caldwell	C. J. Koch
R. C. Glenn	C. I. Rich
J. B. Watts	L. J. Bartelli
R. E. Horton	R. B. Grossman
H. H. Bailey	R. B. Daniels
F. H. Beinroth	C. D. Sopher

Discussion:

Johnson - Regarding needs for laboratory work, the need is there but facilities are limited thus we rust consider priorities. We encourage Experiment Station participation in soil characterization investigation.

Hajek - Response to the questionnaire showed that some states now are assuming the entire characterization work load while others do essentially no characterization in support of the soil survey program.

Johnson - Suggested adding item (6) to item (2).

Hajek - We considered this but decided that the soil parameters need defination before relating to taxonomic units.

Johnson - Two items were omitted, one the role of soil microorganisms in soil genesis and second, the role of organic matter.

Hajek - These will be added,

Buol - In connection with benchmark soils. could consideration be given to setting aside areas designated as benchmark sites that will remain undisturbed. This has been done but not in the South. (Several individuals agreed with Dr. Buol)

Godfrey - Early studies on benchmark soils should be evaluated by this committee to determine if the concepts for the series are still valid.

COMMITTEE IX - SOIL SURVEY PROCEDURES
SOUTHERN REGIONAL TECHNICAL WORK PLANNING
CONFERENCE OF THE COOPERATIVE SOIL SURVEY
MAY, 1970

The charges to the committee were

(1) Evaluate statements on procedures of the National Committee XIII, January, 1969
(2) Recommend any improvements in the procedures.

The chairman mailed a questionnaire to all committee members. Nine responded before the summary was prepared.

Results are summarized directly on the attached questionnaire and quotations are listed for questions 5, 6, 17, 18 and 19.

Thorough study of the results will give some trends.

QUESTIONS FOR COMMITTEE IX - SOIL SURVEY PROCEDURES

Refer directly to the National report on Soil Survey Procedures (Committee 13).

1. Your name is ________________________________.

For other questions, circle yes or no for your answer or write comments.

2. Should objective 3 be enlarged to include -

(a) one-county supplements to published surveys? Yes 7 No 2

(b) supplements covering a general soil area (5 to 10 counties) which would give interpretations on individual soils of each county in that area? Yes 9 No

If answer is yes, should there be a supplement for -

(1) capability classification?	Yes 5 No 1
(2) yield estimates?	Yes 6 No 1
(3) management guides?	Yrs 6 No 1
(4) engineering interpretations?	Yes 7 No
(5) other? (list)	Yes 5 No
Recreation	4
Wildlife	2
Woodland	5

3. Do you favor additional fund input for soil survey publications? Yes 8 No

4. Do you think that "survey staffs in the states "should" contribute addition inputs toward soil map construction and manuscript preparation? Yes 6 NO 2

If answer is yes, what should be sacrificed to get these inputs?

Acres mapped 6
____

5. What other criteria would you add to those listed for placing surveys in Priority A?

See list 5

6. What criteria would you delete from the list for placing surveys in Priority A?

See list 6

7. Have surveys in your state bean placed in Priority A and Priority B? Yes 2 No 5

8. Have you used any **high altitude aerial** photographs in your soil survey program?
Yes 3 No 4 Two have plans

If answer is **yes**, in what kind of a survey were they used? ______________

Were they satisfactory?
Yes 2 No Unknown 1

9. Have you found any field sheets with an excessive number of mapping units?
Yes 6 No 1

Were field soil scientists asked to transfer the soil survey to new base maps?
Yes 4 No 2

Were field soil scientists asked to modify soil boundaries to reduce excessive detail?
Yes 6 No

10. Do you agree that field soil scientists should produce field sheets that can be used directly by cartographic for map compilation?
Yes 6 No 1

11. Of the surveys now being made (with which you are familiar) what % can be used directly by cartographic for map compilation? ________%
80-100% 2 50% - 2 30% - 1 None - 1

12. In your state, who is editor for the soil surveys as they are forwarded to cartographic? Asst. State Soil Scientist 4 Others 3

13. Whw do you think should be the editor in the state? ______________

14. Of the surveys underway in your state, what % are multicounty areas?
________% 0-25 3 25-50 1 50-75 1 75-100 1

15. In your state what % of effort is contributed by the Experiment Station and University personnel?
Map compilation ________% None 3 5-10% 1 r/o% 1
Report writing ________% None 3 5-10% 1 >10% 1

16. Would you like to see this effort increased? Yes 5 No 1

17. To expedite publication what changes do you suggest in preparation of field sheets and compilation of maps?
See quotations under 17

18. To hasten the writing and editing of soil surveys without drastic reduction in their usefulness what changes in length do you suggest for each section? Check one for each.

	Keep as now	Reduce and transfer material to another publication	Eliminate and transfer material to other publication
How survey was made	6		1
General nature of county	6	1	
Climate	5	1	1
General soil description	7		
Description of the soils	7		
Capability groups of soils	3	2	3
Management by capability units	1	4	2
Estimated yields	3	3	1
Engineering properties	3	3	1
Factors affecting engineering work	3	3	1
Uses of the soils for woodland	2	4	1
Management of the soils for wildlife	2	4	1
Formation snd classification of the soils	5	1	2
Laboratory data on soils	6		1

19. Your most urgent recommendation is -

See list 19

5. Need for surveys for cooperating and other agencies.

Low intensity surveys in woodland areas. Surveys started and completed in short time should take priority over the older surveys.

6.

Status of cartographic work toward completion of manuscript soil maps.

17. "Publish interpretation sheets covering several counties and publish maps separately for each county."

"Current procedures should expedite publications. Experience should improve this."

"Prepared mosaics for parallel use with aerial photos in field."

"States could employ a draftsman to compile maps for publication. Require better control of mapping legends. Use higher quality base maps."

Two workers suggested that we speed up high altitude photography so we can transfer and map on the atlas sheet size.

"The state should produce 'press-ready' film positives so that map finishing process can beeliminated.

(1) mapper transfers lines to film positives after final correlation.

('2) the state should be held responsible for applying the map symbols neatly, either by hand or by cartographic means . . . ."

"Use draftsman capacity soil scientist, one only for the state. This should be his primary duty."

18.

Two people like the reports now being prepared.
Two liked some of the changes in the Lake County. Tennessee survey.
One worker proposed county naps and a publication for the area.

19. "Reduce publication to a description of the soils. States should publish interpretative data."

"Obtain high altitude photography for all surveys now in 3-year schedule. Also make specific arrangements for printing as soon as report is edited. Too much time in GPO before printing."

"Adapt the publication to ADP procedures."

One worker suggested an ad hoc committee report back as information is available.

Specialists should have responsibility for making interpretations for soils which can be published for a multicounty or state basis to reduce burden in county surveys. Examples are recent releases on woodland interpretations and soil erosion.

"....The annotated check-lists being used by the reviewers has already had the impact of drastically reducing some sections of the report. We should proceed cautiously before we further reduce the content...."

"Secure more funds to speed up mapping and publication."

Objective 3 of the Committee 13 report was "Improve the quality of soil survey and special reports issued prior to the distribution of the published soil survey." All nine responders agreed that the objective should be enlarged to include supplements covering a general soil area (5 to 10 counties) which would give interpretations on individual soils of each county in that area. For one county supplements the vote was 7 yes and 2 no. A majority listed capability classification, yield estimates, management guides, engineering interpretations as topics that should be included in a supplement. Recreation, wildlife and woodland were added to the list.

Additional fund input for soil survey publications was favored by all 8 who answered. Six of eight thought that survey staffs in the states should do more on map construction and manuscript preparation. Six people volunteered with regret that mapped acreage should be sacrificed.

A few changes in criteria for priorities of surveys are listed. Two states have placed surveys in Priority A or B. Five have not,

Three states have used high altitude aerial photographs and two have already decided that they are satisfactory. Two states have plans for trying them.

Excessive detail is still a problem in some counties, but something is being done about it.

Of seven responses, only one did not agree that soil scientists should produce field sheets ready for compilation.

Surveys that can be used directly for compilation of maps ranged from 0 to 100% in different states.

In the states, the Assistant State Soil Scientist is the most common editor. A few argued that a specially trained soil scientist might be used.

In only three states are more than a fourth of surveys on multi-county areas.

University personnel contribute less than 10% of map compilation and report writing in all but two states. Except for one of these states, everyone wants this effort increased.

Unedited suggestions for expediting publication are listed under 17. Preparation of maps more nearly ready for publication appears in several places.

There is strong sentiment for keeping the outline for certain sections of the published survey as it is now. However, on the other sections there are many people who would like to reduce the length and put extra material in another publication.

Capability groups, management, estimated yeilds, engineering properties and use of soils for woodland and wildlife are the sections most often listed for reduction. A few people would remove all of some sections. In several cases university personnel were mentioned along with these interpretations.

Unedited urgent recommendations are listed under 19. Notice that high altitude photographs, better maps at the state level, concise reports and multi-county interpretations appear in a number of places.

We recommend that Committee IX be discontinued. An ad hoc committee to evaluate any innovations listed here or others (e.g. infrared) and pass the information to conference members would be worthwhile.

Members of Committee IX

0. C. Lewis, Vice-Chairman
E. A. Perry
E. Moye Rutledge
Joel Giddens
R. E. Daniel1
A. B. Elan
R. R. Covell
W. E. Keenan
H. L. Dean
E. C. Nance
T. C. Peele
E. C. Sease
H. C. Dean
J. F. Mill.8
D. M. Moehring
H. C. Porter
L. J. Bartelli
M. E. Springer, Chairman
J. A. Phillips

Notes on Discussion

Multi-county surveys were discussed in detail. They have merit if planned ahead otherwise the advantages are offset by problems.

Johnson in discussing soil surveys suggested that the pay-off is not in soil descriptions and maps, but in soil maps with interpretations. Putting material in another publication is no solution. It will be no cheaper and will be less effective. Up-dated supplements can be published as needed.

Bartelli pointed out that not everyone is happy with the way capability units are used in the reports.

Johnson suggested that their use may vary with area. Where emphasis is on specialty crops or non-farm uses, capability units may not be needed. In other areas they definitely help.

Young proposed that in some cases, information about management could be discussed with the mapping unit.

Johnson pointed out that high altitude photographs are not applicable every where, but are being used wherever possible. Delay in publication is now lack of carefully written and edited manuscripts, rather than printing.

Since so many people have suggested that state people should help with manuscript preparation, especially with yields and interpretations, Springer asked how it could be done.

The report was accepted with suggestions.

SOUTHERN REGIONAL TECHNICAL WORK-PLANNING CONFERENCE

Baton Rouge, Louisiana

May 5, 6, 7, 1970

Report of Committee X
Soil Surveys For Forestry Uses

This report is the result of committee participation through correspondence.

The Committee had the following charge:

Develop and evaluate procedures for making and using soil surveys in forested areas.

Of the seven responses made to the charge, Arkansas, Mississippi, Louisiana, and South Carolina reported their satisfaction in using the transect method of making soil surveys in forested areas. Two states have not used this method but have made medium intensity surveys. Tennessee has not mapped soil associations and questioned their usefulness in planning the management of forested areas. Florida believes that medium intensity surveys should be made of soils on moderate slopes. On steeper slopes or rocky soils, soil associations could be used.

Forest Service reported making a Soil-Site Study for a part of Osceola National Forest, The project involved installing approximately 248 1/000-acre plots on a one-mile grid. The soil characteristics were described in detail, site index was measured and the vegetation cover was inventoried. An analysis of the plots revealed that four soil conditions were common on the forest. A reconnaissance soil survey was then made of the area. Four soil conditions were separated using vegetative clues as a guide,

In South Carolina the transect method is being used to map about 170,000 acres of flatwoods near the mouth of Savannah River, The area is almost entirely wooded, wet and has few roads. Slope is one foot per mile toward the ocean, Drainageways are ill defined or nearly non-existent, Vegetation is dense making the area difficult to traverse. It is almost impossible to stay oriented when making detailed surveys.

Following is a summary of the procedure being used:

(1) The transect method makes use of soil investigations along straight lines at right angles to the major drainage channels, each transect being one to four miles in length, transects being spaced one to two miles apart. Some tentative delineation lines are drawn by photo interpretation before transects are run.

(2) Borings are made at fixed intervals of 200 to 500 feet along transects, the goal being about one boring per 50 acres of soils mapped. Written records are kept of each boring, including many soil descriptions.

(3) Analyses are made of the transect data; soil delineations are made in the office after these analyses; then the delineations are checked in the field.

(4) Soil samples by horizons are collected at a number of borings and the samples sent to Clemson for laboratory enalyaea, including particle size dietrlbution analyses, pH, some mineralogical determinations, and available calcium, magnesium, phosphorous, end potassium.

(5) The transect method is used in selected ereea of the flatwoods, these areas being delineated on county maps. The remainder of the county is being surveyed by conventional detailed soil survey methods.

(6) Mapping unite are all soil associations (29 of them in the 100,000 acres mapped to date), A total of 64 transects have been run and 1,292 observations have been made.

During March 23-25, 1970 a review of the survey was made by William M. Johnson, Assistant Deputy Administrator for Soil Survey, Dr. L. J. Bartelli, Principal Soil Correlator, Olaf Olson, Forest Service representative on this review, A. T. Chalk, State Conservationiet, the State Soil Scientist and Soil Correlator.

Mr. Johnson'6 conclusions (in part) reached after the review are the following:

(1) --I do agree that this kind of survey can be adequate for the interpretations needed in the foreseeable future.

(2) Documentation of the observations made in the field is very good. I would suppose that the volume of field notes might be reduced as more experience is gained.

(3) Although the review party spent quite a lot of time in the field, it was not possible to get a clear picture of the quality and adequacy of the mapping done to date, This was because:

(a) It was impossible to get into the wetter areas or even to get acroaa drainagewaya in order to examine a wider range of soils, and

(b) Because written documentation of needed interpretations were not all available.

(4) There is a need to evaluate carefully the mapping done to date, and to aaaeaa it in terms of accuracy, detail, consistency, and the degree to which the necessary interpretations can be derived from it. --

(5) --we would urge that more use be made of airphoto interpretations, both for locating the surveyor on the field sheet and for locating soil boundaries.

(6) --closer attention to soil-vegetation relationships would be helpful in designing mapping units and in locating soil boundaries in the field.

Dr. Bartelli expressed the opinion that the transect method is suitable and desirable in heavily forested areas.

Mr. Olson was also in agreement with other members of the review party. He emphasised especially the importance of early decisions on the detailed objectives of these surveys. He also commented forcefully on the value of studying soil-vegetation relationships to aid in mapping and in interpretations, and on the usefulness of stereoscopy in mapping wooded country,

The Committee recommends that it be continued and have the same charge.

Committee Members:

C. M. Ellerbe, Chairman-S. C.
T. W. Green, Vice-Chairman-Cs.
John Soileau-T.V.A.
H. C. Dean-Ark.
R. G. Leighty-Fla.
J. T. May-Ga.
P. A. Avers-KY.
Id. L. Cockerham-La.
N. E. Linnartz-La.
W. M. Koos-Miss.
W. F. Miller-Miss.

C. L. Hunt-N, C.
T. H. Silker-Okla.
G. E. Smith-S. C.
C. B. Breinig-Penn.
G. W. Thomas-Ky.
Kenneth Hatterston-Tex.
D. Gray Aydelott-Ga.
L. J. Bartelli-Tex.
D. F. Sluscher-La.
S. A. Lyttle-La.
E. V. Huffman-Ky.

Report of Committee XI - Regional Projects Committee. Committeemen were:

D. D. Neher, Chairman - Texas
G. J. Buntley, Vice-Chairman - Tenn.
H. C. Dean - Ark.
F. T. Ritchie, Jr. - Ga.
H. F. Perkins - Ga.
M. E. Bloodworth - Texas
D. F. Slusher - La.
W. E. Keenan - Miss.
K. K. Young - Texas
R. J. McCracken - N. C.
V. W. Carlisle - Fls.
H. T. Otsuki - Okla.
Elmo Baumann - Okla.
T. C. Peele - S. C.
C. M. Thompson - Texas
B. L. Allen - Texas
J. H. Elder - Va.
F. H. Beinroth - P. R.

The charge to this committee was:

(1) Consider the feasibility of developing regional projects such as:
(a) aids in teaching soil genesis, morphology, and classification.
(b) aids in the interpretation of soil characteristics.

(2) Prepare examples of projects and laboratory exercises for use in soils education. Consider all education levels.

(3) Consider the feasibility of publication of educational materials on a regional basis.

Each committeeman was sent ten copies of a questionnaire which they in turn were asked to send out with a covering letter to their friends in soils. The plan was to discover what was being used in the teaching of soils. Twenty-five (25) questionnaires were returned.

A very wide range of materials is being used. Some indicated a very small use of aids noting that they did not know where to find them. Others were using a very wide selection of materials. Many indicated the use of personally prepared slides, over-lays, mimeographed handouts, etc. as well as commercially available materials. Most all of the leading soils teachers use field studies extensively. Many also use a variety of monoliths such as the micromonolith, the two inch core monolith, as well as the big six inch monolith. Dr. O. W. Birdwell of Kansas State University Agronomy Department at Manhattan, Kansas, has a working exchange of monoliths going with some other states.

As a result of the questionnaire, it was discovered that the American Society of Agronomy has a committee, S-V, which is considering slide sets under such proposed titles as: (1) Macromorphology, (2) Micromorphology, (3) Soil Morphology,(s) Earth Science Curriculum, (5) Soil and Suburbia, (6) Soil Maps, (7) Clay Mineralogy, (8) How a Soil Survey is Made. If you are interested in helping develop any of the above sets or would like to know what the progress is to date, write Dr. Don Franzmeier, Department of Agronomy, Purdue University, Lafayette, Indiana 47907 or Dr. H. D. Foth, Department of Soil Fertility and Management, Michigan State University, East Lansing, Michigan 48823. These proposed slide sets cover a wide range Of understanding starting with Junior High with something like No. 4 above and going on up into advanced soils studies.

The major concern just now, it seems, is the number of teachers who are using almost nothing in the way of aids. Maybe some do not need them but others have indicated that they would like to know what is available and where they could get them.

To date this committee has found only part of the materials available. It is desired that if any of you who read this report know of any group, person, or organization who has prepared materials for sale which would aid in teaching any level of soils would send the details to David D. Neher, School of Agriculture, Texas A&I University, Kingsville, Texas 78363 it would be appreciated.

If additional work is desired on this committee, please let the chairman of this committee know. It seems that a lot has already been done once one finds all of the resource materials. A lot has been left out of this listing for lack of knowledge of it. A lot is in private files waiting for someone to organize the materials and prepare scripts. Please let us know what you want. Any suggestions will be helpful and appreciated.

As a personal note I must admit that I learned a lot in serving as chairman of Committee XI during the past year. I am sorry I have not gotten more done. If you would desire, I will continue to serve as your chairman for another year if another year is desired. If a different chairman is desired, this is also okay with me. I appreciate all of the cooperation that all of you have given me.

The following is a part of what is being used to teach soils. It is the hope of this committee that these will be helpful to many either as aids or as ideas for preparing aids.

Respectfully submitted by
David D. Neher, Chairman, Committee XI
School of Agriculture
Texas A&I University
Kingsville, Texas 78363

DDN:vyd

Enclosures

Sources and Kinds of Prepared Materials that May Aid in Teaching All Academic Levels of Soils

Reference*	Catalog Number	Description	Approx. Price
1	'OW1200	Conservation of Natural Resources. Misuse and ways of rehabilitation and conservation. Set of seven color filmstrips.	$42.00
1	'OW1300	Soil Conservation. Soil defined: forma- =, use, misuse, and improvement. Set of eight black and white filmstrips.	$24.00
1	45W6500	Soil Formation Collection. Illustrates soil formation. Contains 36 specimens of parent rocks and minerals from which soils form. (shipping weight 7 lbs.)	$16.50
1	45W6550	Soil Types Collection. 20 specimens representing different types of soils.	$29.00
1	71W2000	Set of six filmstrips: The Minerals, Identification of Minerals, The Rocks, Igneous Rocks, Sedimentary Rocks, Metamorphic Rocks. Total of 379 frames all in color with teaching guide.	$40.00
1	71W2100	Geomorphology. Set of six filmstrips: Weathering and Erosion, Streams and Rivers, Glaciers, Mountain Building, Volcanism, Lakes and Oceans. Total of 365 frames all in color with teaching guide.	$40.00
1	71W2400	Using Natural Resources. Six filmstrips. Water I, Water II, Soils I, Soils II, Mineral Resources, Metals and Non-Metals, Petroleum and Coal. Total of 389 frames in color with teaching guide.	$40.00
1		A wide variety of rocks and minerals can be bought from this source. Various sized pieces are available. Specimens are available in most any desired quantit	
2	139-l	Soils Manual for Land Judging. 58 page illustrated manual. Judging card included. Covers procedures for locating sites and evaluating the profile.	$1.00
2	.47-1	Experiments In Soil Science. 259 page illustrated manual. Over 50 experiments ranging from simple to complex. Many use household materials while others use standard laboratory equipment.	$4.00

*Refer to the list of references which follow this section.

Refer-ence	Catalog Number	Description	Approx. Price
2	47-2	Overhead transparency set for 1117-l above. 17 plates plus 16 overlays.	$1.95
2	62-1	Introduction to Irrigation. 34-frame color filmstrip with illustrated scrip Shows methods of computing water needs for irrigation. Nso shows typical methods of irrigation.	$7.50
2	.90-1	Land Measurement. Overhead trans-parencies. 14 plates and 6 overlays plus a Q-page guide. Deals with the "rectangular survey" system as well as the determination of areas of irregularly shaped fields.	$1.95
2	.91-1	Watershed Management. 56-frame color filmstrip with taped narrator and script.	$7.50
2		Much of the material in this source is designed for Junior High and High School comprehension. Many subjects outside of soils are covered.	
3		This catalog lists a wide variety of the books, kits, tools and equipment, from the very simple to the complex, which is helpful in studying soils either in the field or in the labora-tory or lecture room.	
3	1512P	Aerial Photo Interpretation Guide. Especially for forestry and conserva-tion fields. Two overlays.	$2.50
3	)T1716P-:G5	Rock Cycle. Overhead transparencies. Illustrates igneous, metamorphic, and sedimentary rocks and their formation.	$2.95
3	)T1717P-:G6	Geologic Time. Overhead transparencie From Cambrian to present. North American.	$2.95
3	)T232P-:S712	Soil Profile, Colored 8" X 10" aperture, overlay transparencies.	$4.00
3	'T232P-:S713	Soil Types. Colored 8" X 10" aperture! overlay transparencies.	$4.00
3	'T232P-.S717	Springs. Colored 8" X 10" aperture, overlay transparencies.	$4.00

Reference	Catalog Number	Description	Approx. Price
3	OT232P-ES718	Ground Water. Colored 8" X 10" aperture overlay transparencies.	$4.00
3	OT232P-ES719	Artesian Water. Colored 8" X 10" aperture, overlay transparencies.	$4.00
3	OT232P-ES720	Swamp Filling. Colored 8" X 10" apertur overlay transparencies.	$4.00
3	OT232P-ES721	Alluvial Fan. Colored 8" X 10" aperture overlay transparencies.	$4.00
3	OT232P-ES722	Limestone Solution. Colored 8" X 10" aperture, overlay transparencies.	$4.00
3	01252P thru 01258P	Conserving our Natural Resources. Set o seven filmstrips in color, each with 45 frames: What is Conservation?, Saving Our Soil, Enough Water for Everyone, Improving Our Grasslands, Using Our Forest Wisely, Giving Our [illegible] Chance, and Using Our Minerals Wisely.	$42.00
3	0207P thru 0214P	Soil Conservation. Set of 8 black and white filmstrips with 60 frames per filmstrip: How Long Will it Last, [illegible] Life and the Soil, Water and the Soil, Animal Life and the Soil, Minerals in the Soil, How Man Has Used the Soil, How Man Conserves the Soil.	$24.00
3	076P-680	Irrigation - Lifeblood of the West (USDA) Black and white filmstrip of 56 frames.	$3.00
3	]151P	More Benefits from Manure. Black and white filmstrip 60 frames.	$1.89
3	]1225P-712	Soil Structure. Black and white filmstrip of 69 frames.	$1.95
3	]1219P-713	Soil Texture. Black and white filmstrip of 85 frames.	$2.30
3	]1614P-708	Soil Color. Color filmstrip of 47 frames	$3.40
3	)787P-703	Collecting and Preparing Soil Samples for Testing. Script on black and white filmstrip of 34 frames.	$1.25
3	)1625P-0463	Using the pH Meter in Testing Soils for Acidity.	$1.35

Reference	Catalog Number	Description	Approx. Price
3	J2645P	Watershed Protection. 38 color slides with narration included. Tells how local people working together can solve soil and water management problems. Produced in cooperation with USDA Soil Conservatio Service.	$19.50
3	D200P	Innoculation of Legumes. 10 color slides with teachers manual.	$3.95
3	F299P	Soil Color Charts. Prepared in coopera- tion with U. S. Soil Conservation Service	$25.00
3	R8P	Land Judging by Ed Robertson [illegible] A&M University, 144 pages heavily illustrated.	$2.50
4		Marbut Memorial Slides. 83 color slides with guide. Slides of soil profiles and landscapes illustrating soil classifi- cation according to both the 1938 and the Seventh Approximation systems.	$28.00
4		Soils Laboratorv Exercise Source Book by H. S. Jacobs and Robert M. Reed.	?
4		Glossary of Soil Science Terms. Reprint. PP. 330-351 S.S.S.A.P. Vol. 29.	$0.25
5		A small selection of easily understood movies in the area of soils and related sciences are listed and available on loan usually through the state land grant college Extension Service or Information Center. The U.S.D.A. Catalog tells where	
6		Spark Plugs. A color 35 min. movie which deals with trace element needs of plants.	
6		Out of the Earth. A color movie which deals with the mining of phosphate and potash minerals for the fertilizer indust	
9		Material directed toward the teaching of soil development and classification. Has some study questions, outline material, definitions and laboratory exercises. Designed for students who have background in soil science or related sciences.	?
9		Dr. Bidwell has indicated to me an interest in exchanging soil monoliths. You must contact him for details.	?

Reference	Description	Approx. Price
10	4 variety of agronomy clubs or some equivalent prepare slides, monoliths, records, overhead projections, etc. We need to find these clubs and discover what they offer. Their preparations probably vary from Junior High School level materials to high quality university level materials.	?
12	Soils and water section of High School conservation course.	?
13	Soil Classification, A Comprehensive System, 7th Approximation. August 1960. (This 265 page publication is under revision and should become available in 1971). Supplements to this publication make approximately an additional 200 pages and are available from the Soil Conservation Service, U.S.D.A., Washington, D. C. 20250 at no additional cost.	$2.25
13	Soil Survev Manual, U.S.D.A. Handbook No. 18. A supplement replaces pages 173-188.	$3.50
14	Barbara Learns About Soil and Water. Slides.	?
15	Resource Conservation Glossarv. 52 pages. A wide variety of terms used in the study of plant, soil, and water problems. Many authorities were used in order to arrive at a standard definition of the many terms. January-February 1970, Vol. 25, No. 1.	$5.00

References

1. Ward's Natural Science Establishment, Inc., P. O. Box 1712, Rochester, New York 14603

2. Vocational Educational Productions, California State Polytechnic College, San Luis Obispo, California 93401

3. Nasco, Fort Atkinson, Wisconsin 53538

4. American Society of Agronomy, 677 S. Segoe Road, Madison, Wisconsin 53711

5. Films of the U. S. Department of Agriculture. Agriculture Handbook No. 14, 1968. U. S. Govt. Printing Office, Washington, D. C. 20241. Price: $.40 (a revised edition may be available)

6. International Minerals and Chemicals Corporation, P. O. Box 4250, Fort Worth, Texas 76106

7. Many private industries produce movies, filmstrips or slides which are available on loan or small fees. A list of these is needed.

8. Your County Agent. He will generally have a catalog of available visual aids supplied by the state land grant college or university.

9. Bidwell, O. W. 1970. Development and Classification of Soils. Kansas State University, Department of Agronomy, Manhattan, Kansas.

10. Agronomy clubs over the U. S. Addresses, nature and quality of materials vary, prices unknown. We need to discover these clubs and make their services known to those needing them.

11. Your State Soil Conservation Service office will often have helpful materials. Most any Soil Conservation Service man can help you or tell you who to contact.

12. Jack Ensminger, Coordinator of Conservation Education, 720 Parkway Drive, Natchitoches, Louisiana 71457.

13. Superintendent of Documents, U. S. Govt. Printing Office, Washington, D. C.

14. State Soil Conservation Service Office, Box 1630, Alexandria, Louisiana 71301

15. Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021.

16. Slides Illustrating the Soil Classification System prepared by Wm. M. Johnson of the S.C.S., U.S.D.A., Portland, Oregon. These are out of print now. You might borrow a set and script from a friend and get them duplicated.

Addendum to Report of Committee XI

The original report of Committee XI was prepared prior to the Baton Rouge Conference. The material in this addendum to the report came out of the conference discussions of that report as additions to, rather than changes in, the original report.

In general, the reaction of the Conference to the committee's report was favorable, resulting in the recommendation that the work of the committee be continued.

It was brought out during the discussion that many individuals have unreproduced visuals of all kinds that are not inventoried by a survey of this type. If some arrangement could be made whereby inventory reproductions of these visuals could be f inanced in some way other than out-of-the-pocket of the individual offering the visuals, a much larger number of visuals would end up in the hands of the regional committee. The Conference recommended that the Steering Committee consider adding the charge to this committee of investigating the feasibility of such an arrangement.

The discussion of aids for soils teaching evolved into discussions of the shortage of soils majors in our Universities and the subject of student recruitment. These discussions resulted in a conference recommendation that the Steering Committee consider the desirability of establishing a new committee to examine the possibilities of establishing, under the sponsorship of the Conference Group, a program for the recruitment of soils majors in the Southeast Region.

NORTH CAROLINA STATE UNIVERSITY AT RALEIGH

SCHOOL OF AGRICULTURE AND LIFE SCIENCES

Department of Soil Science
Box 5907 Zip 27607
Phone (919) 755-2655

May 19, 1970

COMMITTEE XII - SOUTHERN REGIONAL MAP PROJECT

The project, started two years ago to produce a soils map of the southern region at a scale of 1:2,500,000 and a bulletin to narrate the map has progressed to the point where the map and legend are nearly complete. The map, utilizing associations of Great Groups in the comprehensive classification system has been edited by most states and a colored draft was presented at the meeting. Teams of authors have agreed to provide manuscripts for assembling the bulletin. First drafts of some sections have been submitted and these will be assembled and circulated in the next few months.

Preliminary estimates from private printers in Ft. Worth, Texas indicate that each copy will cost about $1.90. It is anticipated that a final draft can be assembled by about January, 1971.

Respectfully submitted,

Stanley W. Buol

S. W. Buol, Chairman

SWB: kc