National Cooperative Soil Survey Newsletter

November 2004
Issue 29

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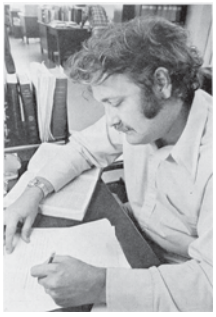
Editor's Note

Issues of this newsletter are available on the World Wide Web (http://soils.usda.gov/). Under Quick Access, click on NCSS, then on Newsletters, and then on the desired issue number.

You are invited to submit stories for this newsletter to Stanley Anderson, National Soil Survey Center, Lincoln, Nebraska. Phone—402-437-5357; FAX—402-437-5336; email—stan.anderson@nssc.nrcs.usda.gov.



2005 National Cooperative Soil Survey Conference Planned for Corpus Christi, Texas, in May 2005

By Maxine J. Levin, Soil Scientist, Soil Survey Division, Natural Resources Conservation Service, Washington, DC.

The 2005 National Cooperative Soil Survey Conference is planned for May 21-26, 2005, in Corpus Christi, Texas, at the Omni Corpus Christi Hotel, Marina Tower, 707 N. Shoreline Boulevard, Corpus Christi, Texas 78401. The Natural Resources Conservation Service, Soil Survey Staff, Temple, Texas, and the Agricultural Experiment Station, Texas A&M University, College Station, Texas, are co-hosts of this conference. Rates will be $76 for single and $86 for double under the government rate block of reserved rooms. Call 1-800 THE-OMNI for reservations by Tuesday, May 3, 2005. Emergency cancellations are by noon, day of arrival. A small registration fee ($100-125) is planned to cover field trips, receptions, and refreshments. The theme of the conference will be *Planning the New Soil Survey—Technology, Standards and Electronic Delivery.*

The agenda is still being drafted and will be available soon on the Internet (http://soils.usda.gov/partnerships/ncss/conferences/index.html).

NCSS intends to highlight two optional field tours for the conference: King Ranch, Saturday May 21, 2005 (afternoon, half day), and Padre Island National Seashore, Sunday, May 22, 2005 (full day). The official conference will commence with a reception Sunday evening, May 22, and continue through Wednesday evening, May 25, with workshops, speakers and committee meetings. There will be seven committees (three standing committees and four in-house committees), which will begin deliberations by email and teleconference in January 2005 and will give final reports at the conference. Any NCSS cooperators or interested parties are welcome to review the charges of the committees and to comment on the reports.

Standing Committees

Research Agenda Standing Committee

Co-Chairs:

David Hammer, National Leader Investigations, NRCS, NSSC (david.hammer@usda.gov)
Nancy Cavallaro, CSREES, Soils (ncavallaro@csrees.usda.gov)

NCSS Standards Standing Committee

Co-Chairs:

Craig Ditzler, NRCS, NSSC (craig.ditzler@usda.gov)
Duane Lammers, USFS (DuaneL@NRCSNHQ.USDA.gov)
Colin Voigt, BLM (colin_voigt@blm.gov)

New Technology Standing Committee

Co-Chairs:

Pete Biggam, NPS (pete_biggam@nps.gov)
Jon Hempel, NGDC, NRCS (jon_hempel@usda.gov)

In-Conference Committees

Committee 1: WEB Soil Survey—Promoting Partnerships

This committee should consider issues concerning WEB Soil Survey standards, product delivery, marketing strategies, public access to expertise, product timeliness, and education on product use with an emphasis on promoting partnerships.

Co-Chairs:

Dennis Lytle, NRCS, Washington , DC (dennis.lytle@usda.gov)
A university cooperator interested in electronic delivery

Committee 2: Ecological Principles in Soil Survey

This committee should review classical references and university curricula for ecological principles and associations with soil and natural resource inventories. The committee should investigate new interpretations and management recommendations associated with state and transition models, ecological frameworks, ecological site inventories, and ecological land use inventories and discuss how they may be incorporated into soil survey.

Co-Chairs:

Curtis Talbot, NRCS, NSSC (curtis.talbot@usda.gov)
Randy Davis, USFS, Washington, DC (rdavis03@fs.fed.us)

Committee 3: Recruitment and Retention of Soil Scientists in Soil Survey

This committee is to concern itself with recruitment and retention of soil scientists in soil survey and soil resource management.

Co-Chairs:

Gary Steinhardt, Purdue University, IN (gsteinhardt@purdue.edu)
Denise Decker, USDA-NRCS, Human Resources, Washington, DC (denise.decker@usda.gov)
Roy Vick, NRCS, North Carolina (roy.vick@nc.usda.gov)

Committee 4: Water Movement and Water Table Monitoring in Soil Survey

This committee will explore and discuss how soil survey should address water movement and water tables for regional updates of soil surveys and database representation.

Co-Chairs:

Henry Lin, Pennsylvania State University (henrylin@psu.edu)
Cathy Seybold, NRCS (cathy.seybold@usda.gov) ■

Estimating Latitude and Longitude From Legal Descriptions

By Thomas G. Reinsch, Soil Scientist, Soil Survey Laboratory, National Soil Survey Center, Natural Resources Conservation Service, Lincoln, Nebraska.

Point legal descriptions are commonly recorded in series profile descriptions. The georeference (latitude and longitude) can be estimated if the cadastral or public land survey system is used in the point legal description and if the georeference of the section center is known and distances from the center or corners are recorded.

The section center can be derived from a geospatial layer through use of GIS software. The shape files are available from various agency and public sources. The centroid also can be calculated by software available on the Internet (http://www.geocities.com/jeremiahobrien/trs2ll.html). There are two dlls available for download. TRS2LL is used to convert township/range/section to latitude/longitude. LL2TRS is used to convert latitude/longitude to township/range/section. The dlls can be used in the following States: Arkansas, Arizona, California, Colorado, Idaho, Kansas, Montana, North Dakota, Nebraska, New Mexico, Nevada, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming.

After the center of the section is derived, the georeference of the legal description is calculated by transforming the distance using polyconic inverse ellipsoidal equations in Snyder, John P., *Map Projections—A Working Manual*, 1987, U.S. Geological Survey Professional Paper 1395, Polyconic projections, pp. 128-131; Appendix A: Numerical examples, pp. 304-306.

The results of this approach depend on an accurate centroid (some sections have more than one polygon) and a square shape. The results can be used to validate entered georeferences or to derive georeferences where none exist.

Example (NAD27 horizontal datum)

Point legal description: 440 feet N. and 520 feet W. of the center of sec. 34, T. 90 N., R. 2 E., fifth principal meridian.

Section center (in decimal degrees, NAD27): Latitude: 42.5649; Longitude: -90.7122

We need to calculate the new georeference located 440 feet N. and 520 feet W. of the center.

Given:	Clarke 1866 ellipsoid:	$a = 6{,}378{,}206.4$ m
		$e^2 = 0.00676866$
	Origin:	$\ddot{o}_0 = 42.5649^o$ N. lat.
		$\ddot{e}_0 = 90.7122^o$ W. long.
	Point:	$x = 520$ ft or 158.5 m
		$y = 440$ ft or 134.1 m

M is the distance along the meridian from the Equator to latitude ö.

$$M= a[(1 - e^2/4 - 3e^4/64 -5e^6/256 - \ldots) ö - (3e^2/8+3e^4/32+45e^6/1024 + \ldots) \sin 2ö + (15e^4/256 + 45e^6/1024 + \ldots) \sin 4ö - (35e^6/3072 +\ldots) \sin 6ö + ...] \quad (3–21)$$

First calculate M_o. $ö_0$ is converted to radians by multiplying $ö_0$ by ð/180°.

$$M_o = 6378206.4 (9.983 \times 10^{-1} ö - 2.543 \times 10^{-3} \sin 2ö + 2.698 \times 10^{-6} \sin 4ö - 3.533 \times 10^{-9} \sin 6ö)$$
$$= 4714170.8 \text{ m}$$

$$A = (M_o + y)/a = (4714170.7 + 134.1)/6,378,206.4 = 0.73913$$
$$B = x^2/a^2 + A^2 = 158.5^2/6,378,206.4^2 + 0.73913^2 = 0.54631$$

Assuming an initial value of $ö_0$= 0.73913 radian, the following calculations are made in radians from equations (18–20), (3–21), (18–17), and (18–21):

$$C = (1 - e^2 \sin^2 ö_n)^{1/2} \tan ö_n \quad (18–20)$$

$$C = (1 - 0.00676866 \sin^2 0.73913)^{1/2} \tan 0.73913 = 0.910089$$

$$M_n = 4690172.95 \text{ m}$$

$$M' = 1 - e^2/4 - 3e^4/64 - 5e^6/256 - \ldots -2 (3e^2/8 + 3e^4/32 + 45e^6/1024 +\ldots) \cos 2ö + 4 (15e^4/256 + 45e^6/1024 + \ldots) \cos 4ö - 6(35e^6/ 3072 + \ldots) \cos 6ö + \ldots . \quad (18–17)$$

$$M_n' = 9.983 \times 10^{-1} - 2 \times 2.543 \times 10^{-3} \times \cos (2 \times 0.73913) + 4 \times 2.698 \times 10^{-6} \times \cos (4 \times 0.73913) - 6 \times 3.533 \times 10^{-9} \times \cos (6 \times 0.73913)$$
$$= 0.997825$$

$$M_a = M_n/a = 4690172.95/6,378,206.4 = 0.735344$$

$$ö_{n+1} = ö_n - [A(CM_a + 1) - M_a - 1/2(M_a^2 + B)C]/[e^2 \sin 2 ö_n (M_a^2 + B - 2AM_a)/ 4C + (A - M_a) (CM_n' - 2/\sin 2 ö_n) - M_n'] \quad (18–21)$$

$$ö_{n+1} = \mathbf{0.73913} - [0.73913 \times (0.910089 \times 0.735344 + 1) - 0.735344 - 1/2(0.735344^2 + 0.54631) \times 0.910089]/ [0.00676866^2 \sin (2 \times \mathbf{0.73913}) \times (0.735344^2 + 0.54631 - 2 \times 0.73913 \times 0.735344)/(4 \times 0.910089) + (0.73913 - 0.735344) \times (0.910089 \times 0.9977825 - 2/\sin (2 \times \mathbf{0.73913})) - 0.9977825]$$
$$= 0.74289 \text{ radian}$$

With substitution of 0.74289 in place of 0.73913 in equations (18–20), (3–21), (18–17), and (18–21), for $ö_n$, a new $ö_{n+1}$ of 0.7429187 is obtained. Using this in place of the previous value results in a third $ö_{n+1}$ of 0.7429187, which is unchanged by recalculation to seven decimals. Thus,

$$= 0.7429187 \times 180°/ð = 42.56611° = 42° \text{ N. } 33' \ 58'' \text{ lat.}$$

From equation (18–22), using the finally calculated C of 0.9170326,

$$ë = [\arcsin (xC/a)]/\sin ö) + ë_0 \quad (18–22)$$
$$ë = ([\arcsin (-158.5 \times 0.9170326/6,378,206.4)] \times 180°/ð)/\sin (0.7429187) + (-90.7122°) = -90.71412° = 90° \text{ W. } 42' \ 51'' \text{ long.}$$

A distance that is measured from a corner is recalculated on the basis of the assumption that the center is 0.5 mile east or west and 0.5 mile north or south of the corner.

To determine the georeference for NAD83 datum, use a = 6,378,137, e^2 = 0.00669438, and corresponding section centroids in NAD83.

A Microsoft Access database with polygon center points and a calculation module is available on request (thomas.reinsch@nssc.nrcs.usda.gov). ■

Language Matters

By Stanley P. Anderson, Editor, NRCS, National Soil Survey Center, Lincoln, Nebraska.

In the last issue of this newsletter, I asked for explanations of the origin of the term "thunderbook." Following are the responses I received.

An email message from Dr. Hari Eswaran to Dr. Richard Arnold:

> I tried searching the web but did not have much success. The best I came with is, " If someone steals your thunder, then they take credit that properly belongs to you." The expression was coined by the playwright and critic John Dennis (1657-1734). He discovered that the sound of thunder could be mimicked by rattling a sheet of tin. This he used for dramatic effect in one of his own plays. The play itself was not well received but the idea of the tin was widely copied. Dennis was very annoyed and is alleged to have said: "See how the rascals use me! They will not let my play run, yet they steal my thunder!"
>
> So, I presume that a "thunder book" is a book where you note down all those great ideas for future use. Stan Anderson asked this question in his newsletter and I thought I will see if someone had a better answer.

Dr. Richard Arnold responding to Dr. Hari Eswaran:

> I remember talking to Tommie Calhoun about "rules of thumb" and he said they called them in the west, a thunderbook. I think I remember also talking to Tommie Holder, who had worked and mapped in Montana and I thought he knew about thunderbooks. I guess I liked the sound of the phrase because it implied that there was a noise and it would get your attention. I used to refer to a set of ideas, like the relation of pH vs BS for different parent materials, as "rules of thumb," those guidelines that helped you see relationships and make intelligent estimates or guesses about properties of interest. Maybe Mike Golden knows about them, or Bill Puckett from his time in Oklahoma. Or one of the guys from the western states that you know.

Tommy Calhoun ("Tommie" Calhoun to Dr. Arnold) responding to an email from me:

> Great minds think ...
>
> I was just thinking about you yesterday, that I needed to drop you a note just to stay in touch. You beat me to it.
>
> Thunderbook...actually I don't know where the name got started, but the day I started work for SCS (June 27, 1971 in Roswell, NM) my supervisor, Max Hodson, told me I needed to start my thunderbook. It was a place, as Dick Arnold said, to file away supplementary information that we collected in workshops, from each other, from school or wherever, that helped us describe soils and interpret how their physical characteristics would respond to management (how to interpret them). This was all information in addition to the official soils memos that were issued (back in those days we didn't yet have a National Soil Survey Handbook, just a set of memos).
>
> I always thought the name thunderbook was an abstraction of what Hari discussed. I thought that thunder was referring to knowledge or information..."your thunder."
>
> TommY

From Robert Wilson, USDA, NRCS, Higley, Arizona:

> I believe the term Thunder Book comes from the military. While I was in basic training in 1966, we were issued a copy of a small book of military knowledge called a Thunder Book. It contained information that a trainee was required to know, like the effective range of the M-14 and M-16, the correct way to position unit insignia, etc. Every time I got to a new unit, I was issued a Thunder Book about the unit, its history and mission to include basic load, types of vehicles, and so on. This changed from unit to unit depending on mission posture, for instance light infantry, mechanized infantry, or airborne infantry, combat engineer or heavy engineer support and so on.
>
> Since I saw it in 1966, it could be much older than that. No doubt some returning veteran saw this as a good idea and began the practice in the USDA.
>
> Hope this helps. ■

Dr. Warren Lynn Retires

By Judy Kisch, Program Administrative Assistant, NRCS, National Soil Survey Center, Lincoln, Nebraska.

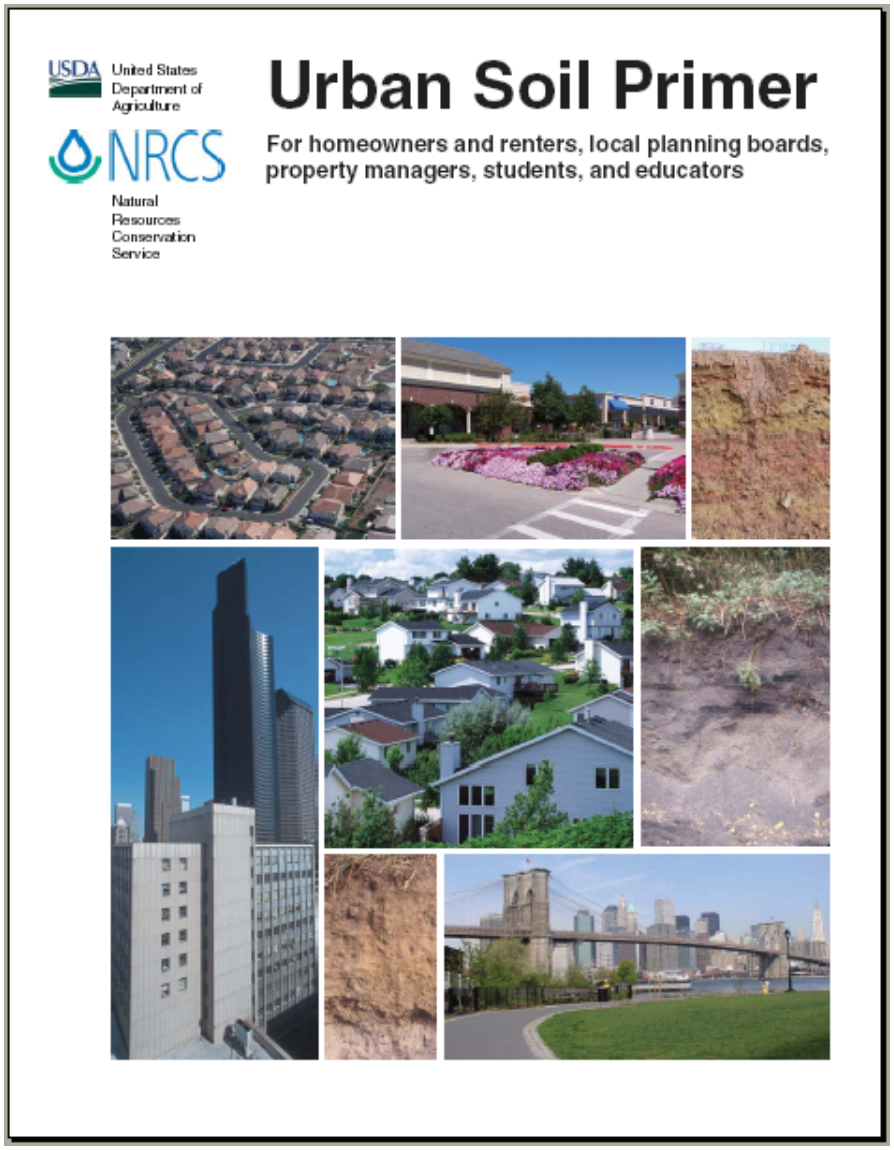
Warren C. Lynn, research soil scientist at the National Soil Survey Center, retired effective September 30, 2004, after 41 years of Federal service.

Warren was born in Satanta, Kansas, on December 4, 1935. He attended Kansas State University, where he received his Bachelor (1957) and Master of Science (1958) degrees. He earned his Ph.D. in 1964 from the University of California at Davis.

Warren began his career with the Soil Conservation Service on September 5, 1963, when he joined the staff of the Lincoln Soil Survey Laboratory as a soil scientist. He remained in Lincoln and was promoted to research soil scientist in the new consolidated National Soil Survey Laboratory in 1975. His principal professional activities have been mineralogy analyses procedures and interpretation, characterization, and classification of Histosols, morphology and genesis of Vertisols, soil characterization sampling, teaching Soil Laboratory classes, learning the pedology of soils, and photography of soils and landscapes. He is known for his excellent quality stereo-pair profiles and panoramic landscape photos.

Warren is a member of the Soil Science Society of America and the Clay Minerals Society. He has signed up as an Earth Team Volunteer with NRCS and plans to participate in the World Soils Congress in Philadelphia in 2006.

Warren is married to the former Arlene Richardson. They have two sons, one daughter, and nine grandchildren. ■



Urban Soil Primer To Be Published

By Stanley P. Anderson, Editor, NRCS, National Soil Survey Center, Lincoln, Nebraska.

A work entitled *Urban Soil Primer* will be sent to the Government Printing Office early in 2005. A low-resolution PDF version of this publication will be posted on the Web, and a medium-resolution PDF version will be published on CD. The first paragraph of the Preface indicates the purpose of this publication :

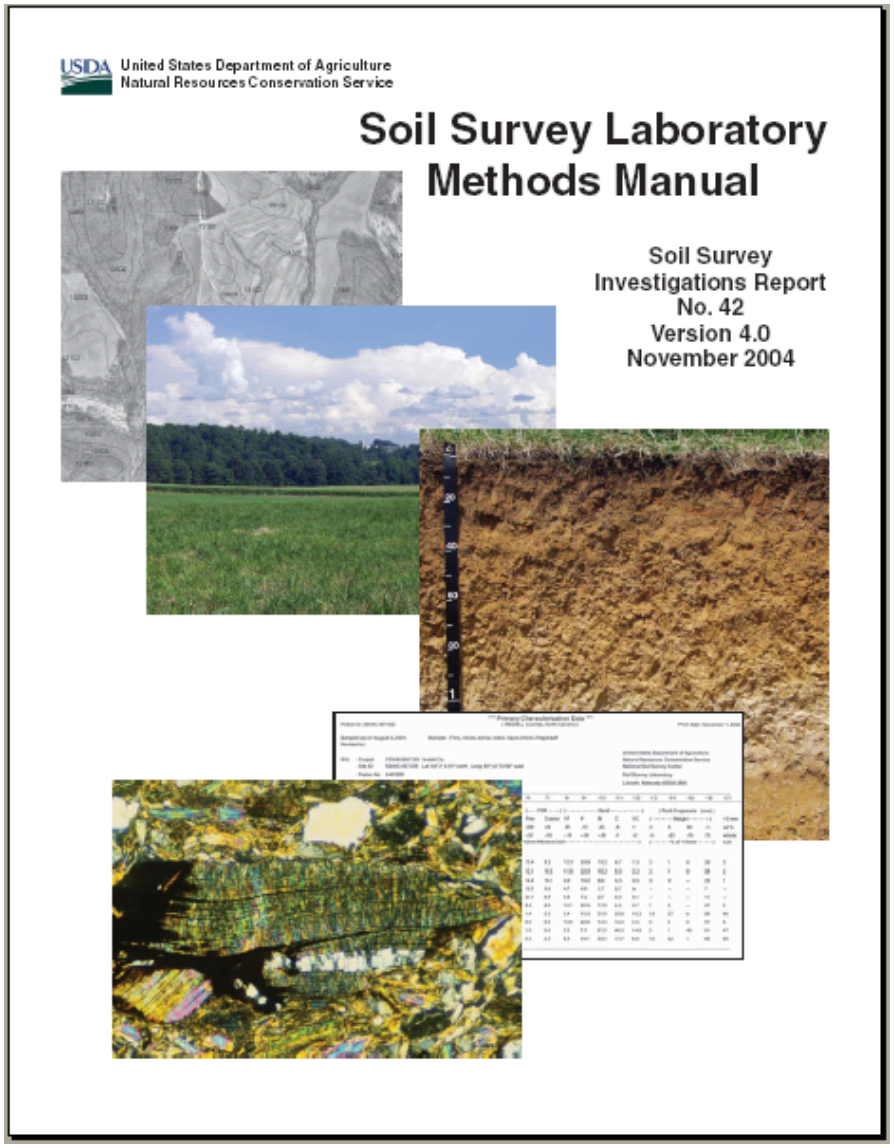
> The *Urban Soil Primer* is intended to give planning officials and people who live

in urban areas an introduction to soils. It provides information important in planning and managing land resources in a manner that helps to prevent or mitigate problems associated with sedimentation, contamination, runoff, and structural failure. In nontechnical language, this publication describes the basic processes and functions common to all soils. Much of the complexity of soil science is simplified, and many sensitive issues are discussed only in passing. ■

Version 4.0 of *The Soil Survey Methods Manual* To Be Published Soon

By Stanley P. Anderson, Editor, NRCS, National Soil Survey Center, Lincoln, Nebraska.

Version 4.0 of the *Soil Survey Methods Manual* (Soil Survey Investigations Report No. 42) is in press. Printed copies should be distributed within the next 4 months. An electronic version of this manual will be posted on the Internet. Also, a CD version of the publication is planned. ■



What do you call Santa's helpers?

Subordinate clauses.