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Thank you for allowing me to visit with you this morning. I am honored to have this opportunity to share a few thoughts and meet with some old friends. Thirty-two years ago I was just starting my career mapping soils in Pendleton County, WV, and never in my wildest dreams did I imagine I would someday be speaking to this audience as the NRCS Deputy Chief for Soil Survey and Resource Assessment.

I would like to start my remarks by going back to a speech made by Dr. Maurice Mausbach, retired Deputy Chief for Soil Survey & Resource Assessment given at the Soil Water Conservation Society Conference in San Diego, CA in 1998. The occasion was the marking of the 100th year of the Soil Survey.

Dr. Mausbach made ten observations and I will give you my impression or scorecard for each on how I think we've done or where we are going.

1. Soil survey is entering an era in which field mapping, as we have known it, is nearing completion. In the new soil survey, we need to allow for the continuous updating of information on a physiographic basis. Thus, soil scientists must fully implement the MLRA concept for soil survey. The concept will need continuous adjustments to meet the changes in technology, science, and customer needs.

I'm happy to report that we are fully implementing the MLRA concept for soil survey. Dr. Mausbach was here to see the establishment of the 18 MLRA Regions and over the past few years we have moved to reorganize from over 250 project offices to under 150 project offices. Gone are the 1-person offices so we are creating greater critical mass to address soil survey needs for the long-term.

2. Because of electronic access to soil survey data and the increased needs of users of the information, we must develop statistical means of estimating the reliability of soil survey maps and associated attribute properties. Soil mapping activities have been based on a landscape model of the interrelationship of soils to landscape position. The composition of soils in map units has largely been determined through use of some form of transect. We need to continue to improve methods for collecting these data and move to a statistically based approach.

More efforts are needed here but, recently we were able to secure a Geo-Statistician, Dr. Sky Wells, at the National Soil Survey Center to focus on Geo-statistical needs and research.

3. We must continue to maintain, enhance, and expand relationships with NCSS partners and customers, enhancing existing partnerships, expanding to new partners (being more inclusive), marketing our products and activities, and gathering input from internal as well as external customers as to needs. We need to continue to reach

out to the private sector soil scientists and members of the National Society of Consulting Soil Scientists. We must involve them in the development of standards for soil survey and assure the availability of these standards for their work. It is absolutely crucial to our existence that we reach out to people in other disciplines within and outside soil science, such as soil biologists, soil chemists, soil physicists, ecological scientists, foresters, range conservationists, and agronomists, to address environmental issues.

We have made efforts to expand relationships and three I will mention are:

1. The National Geospatial Development Center is now the North American node for the Bill & Melinda Gates Foundation Global Soil mapping effort. This project will be an asset because as we learn more about our global soil resources we will improve our understanding of global climate change, food production capacity and several other areas.
2. The National Cooperative Soil Survey Advisory Group was established to inform the Soil Survey Program by providing quarterly input to the Director and staff.
3. We plan to expand our cadre of discipline specialists at the National Soil Survey Center to help build better standards and improve our ability to address environmental issues.

4. We need to expand the scope and science of soil taxonomy. Up until now, we have concentrated on grouping soils for the use of soil scientists in mapping soils and to assist in the interpretation of the soil maps. The latter will be the focus in the future. In the United States we have more than 19,000 recognized soil series, and it becomes a difficult task to develop interpretative standards, such as soil health, for each of these soils for the many different land uses. The hydric class of soils is an example of a recent classification to aid in the identification of wetlands. We also need methods of grouping soils that perform similarly for use by modelers to predict outcomes on a regional or national basis. The modelers simply cannot deal with 19,000 individual sets of soil properties when running national analyses.

We now have more than 20,000 soil series with additions like aqueous and gypsum soils but the good news is we are establishing 1400 Benchmark Soils which will greatly improve our ability to develop interpretations.

5. We are now able to address the dynamic properties of soils as they are impacted by human-use and management. Throughout this century, soil survey has concentrated on mapping and characterizing the static properties of soils. In the next century we need to address the effects of human use and management on soil properties and the health of the soils. Addressing these effects includes, but is not limited to, use of soil properties and knowledge of soil genesis in developing nutrient management strategies, developing nutrient loading capacities by kind of soil, monitoring contaminants, adapting soil surveys for site specific management, and interpreting yield monitoring data.

A new Soil Change Guide and led by Drs. Arlene Tugel, Sky Wells and Jeffery Herrick was just completed in a joint effort between our federal and University partners. This

guide will help us improve our ability to plan within the capability of the soil because we will know what soil properties are affected by the human time scale and those that are not affected.

7. We need to continue and enhance innovating efforts to make our products/information/data easier to use via Internet access, CD-ROM technology, training methods, or other methods. We need a seamless SSURGO product so that users will be able to join counties from different states and not be able to draw state lines based on inconsistencies in our product. In addition, we need to provide our clients all of the technical tools needed to fully analyze and use the information that meets their needs.

Web soil survey has been very successful. We are approaching 5 million users with about 5000 hits per day. Improvements are in the works to make the product more intuitive and easier to use.

8. We need to continue to perfect geospatial techniques for analyzing and using soil survey information. I dream of a virtual geospatial system where, in real time, we model the movement of rainfall through a watershed by using digital soil surveys linked with soil property data and overlaid on digital elevation data. When developed, these models will be powerful tools for predicting the movement of chemicals in the watershed.

We've made some advances in our use of geospatial products and tools. We are using LIDAR and IFSAR to establish terrain features and using tools such as 3-D mapper and SoLIM. All of this shows promise, but is expensive and so we are piloting our efforts to find the right fit within our budgetary constraints.

9. Soil survey is based on the study of how soils formed. We need to continue our studies of soil formation to address global change issues both nationally and globally. By studying the effects of past climate changes on soil properties, we can predict how soils change. Through these studies we can make predictions of the capacity of soils to sequester carbon based on land use and management practices.

We are testing a new carbon test kit in the field. When available we'll be able to measure sequestered soil carbon. If this proves out, there will be opportunities to marry this with our onsite National Resources Inventory Program and provide better estimates of soil carbon gains and losses over time.

10. We must fully institutionalize technical soil services. These services are tied directly to the mission statement "Helping People Understand Soils." They are especially critical in our effort to serve our Field Office Staff and provide them with the technical tools and training needed for them to perform their jobs. Technical soil services activities are an important part of an outreach, marketing, and educational program. Education and outreach are important as we promote the value of the soil resource to the general public. We need to concentrate on K-12 grade levels as well as the general

public. As we help others use our product, we are also building a dedicated customer base.

This is an area where we have made great strides. We have modified our funding formula to support technical soil services in every state and states have responded very favorably. As we near the completion of the initial soil survey we need to continue to expand technical soil services to ensure good land use decisions are being made.

So I think Dr. Mausbach would be proud of our Soil Survey accomplishments and where we are going in the future. Let me briefly speak to the future as it applies to Soils and our Nation.

We are in a new Administration and this is always an exciting time. In one recent speech given at the National Academy of Sciences on April 27th President Obama said he wanted to put the emphasis back on science and quoted FDR when he said “basic scientific research is scientific capital.” Research takes time, money and the pay off may be decades away. We know this because we are in the second 100-year cycle of soils research. We still don’t know what we don’t know but we know there’s more to be done and that is exciting.

Soils information is our foundation for good land use planning. That will never change and never be replaced with technology, only enhanced by it. We recently completed a cropland study of the Upper Mississippi River Basin on the environmental effects of conservation practices and it’s now in peer review. The study was built on the framework of the National Resources Inventory and farmer based interviews about their farm management techniques. How much fertilizer and chemicals they were using. How often they tilled the fields. The results from the models show significant reductions in the delivery of sediment, nutrients and chemicals downstream due to conservation. This was possible because we had soils information at every NRI site where model inputs were made.

The Farm Bill programs for conservation are bigger than ever, easily topping 2 billion dollars per year. Congress and OMB expect the agency to report on the effect of all the conservation dollars being delivered and we intend to use reports like the Upper Mississippi River Basin to answer their questions. This is one reason we need good soils information.

In closing, there is one other observation the President made in his April speech and I think it is appropriate to share with this audience. In 1968, Astronaut Bill Anders aboard Apollo 8 took the first ever photo of the earth coming up over the moon’s horizon now known as “Earthrise.” Anders later said this moment changed him forever and further stated “We came all this way to explore the moon and the most important thing is, we discovered the earth.” We’ve been discovering this Earth for over 100 years. What you are doing is very important and I want you to know you have my full support.

Thank you.