

Newsletter

In This Issue—

Technical Soil Services— Directions and Activities	1
Web Soil Survey and Soil Data Viewer on Display in Seattle	4
Publication of NCCPI User Guide	5
World Reference Base for Soil Resources Workshop To Be Held at ASA This Year	6
Soil Survey Helps To Expedite Delivery of BMP Project at Lake Tahoe	6

Editor's Note

Issues of this newsletter are available on the World Wide Web (<http://soils.usda.gov/>). Under Quick Access, click on NCCS, 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@lin.usda.gov.



Technical Soil Services— Directions and Activities

By Chris Smith, Ph.D., National Leader for
Technical Soil Services, NRCS, Washington, D.C.

The Soil Survey Program in NRCS and NCCS is rapidly approaching a crossroads. After over a hundred years of an almost single-minded goal of providing soil surveys of all the private lands in the U.S., we can see the fruition of our labors. The mapping of Federal lands is becoming a tangible reality as well. Some people may be tempted to think that the job of the Soil Survey Program is done, that we can disappear into the dust by attrition or move into other disciplines. In times of lean budgets, there are always those looking for additional funds for "their" programs.

I would like to propose that we look upon our soil survey product not as the goal we have always seen it to be. Times change, and needs change. Rather than the goal, the soil survey product needs to be viewed as a solid foundation for the next generation of soils information. There is a great deal of work to do. Some has begun already. Many soil surveys are "old." Their map unit design is in places too broad, ill defined, or incomplete, databases are unpopulated or not validated, and interpretations need to be expanded because of new uses, issues, laws, and questions. The "join" issue remains.

Work on improving existing soil surveys has been termed "update." An update may take on many forms, including validation of data, revision of the maps, addition of new data and new interpretations, realignment of old

polygons to improved imagery, and addition of detail where use pressures dictate.

We have begun to think of soil scientists in the agency as either soil mappers or resource soil scientists (RSS). I would like to suggest that there is a fuzzy boundary between the two stereotypes. For soil scientists conducting initial and update activities, there might not be enough time to validate selected soil properties because of the pressure to meet goals. Ideally, the RSS can spend more time transecting, taking notes, collecting data or samples, and "fleshing in" the information so that the "science-based" approach is strengthened. I am pleased to have seen instances in which field soil scientists have made estimates of properties from guides that were based on research findings somewhere in the dim past and the estimates are quite accurate. I have also seen instances in which the estimates were off and the effects rippled through the interpretation system. The estimate of water permeability is a good example. We need to measure, as variable as the values can be, to be able to stand firmly behind our pronouncements.

Soil is, in part, a living skin of the earth, a fragile thin veneer, an environmental membrane. Nature usually changes it slowly, while humans change it rapidly and often not for the better. We have treated soil as a static object in our soil survey work. It is clearly not. In recent years, the concepts of soil quality, sustainability, and fragility have become subjects for scientific definition and discussion and issues for action. Population increases, and prime farmlands are paved. The

curves will cross in our children's lifetimes.

The demand for ethanol is dramatically increasing the need for farmland. About 9 billion gallons per year are currently produced, and 32 billion gallons per year are called for by 2022. Breaking out CRP HEL lands seems inevitable, and nutrient and pesticide loading across the landscape will put more pressure on surface waters. Conservation planning needs can only increase. Science-based, field-specific inventories of resources, including soils, help to put "walk the talk" in the agency mission.

I tell some that part of my job is to "meddle in the affairs of others." I have formed working relationships with staff within the Conservation Engineering Division, Ecological Sciences, Conservation Planning, Farmland Protection, and Strategic Planning as well as being a representative to the Business Tools Council for the SSRA deputy area.

Last March, a team (CASPeR) was assembled to answer Dana York's question about how field office conservation planners can get to the field more often. I was on that team. The basic problem is the programmatic needs that keep the planner tied to the computer. A report of the team made over 50 recommendations. One of these concerns the use of specialist teams that include Resource Soil Scientists. I have suggested that the field office personnel consider these teams to be part of the extended field office staff. In some areas this arrangement is already in place. The work on teams is not the only work that the RSS performs, but the job of a conservation planner has become so complex that a person who is a conservation generalist cannot properly deal with the nuances of many of the issues today. Such a generalist

commonly does not see some of the more subtle features that a trained soil scientist can see.

Resource inventories for conservation planning must be done in the field. For soils, a RSS can observe the characteristics in a field and use his or her experience to determine if the soil is in good health or has been degraded. The RSS can then back up the hypothesis with measurements (which are stored in NASIS and thus improve the dataset and interpretations), and there is no reason why the RSS cannot assess the conditions in the field within his or her expertise and make recommendations to the planner as to the best practices to address the concerns.

The plan must use the data for the soil in the producer's field. The dominant soil in a field mapped as a complex must be determined. It is possible, especially in small fields, that the dominant condition is a minor component. If we are to keep the work of NRCS science based, an experienced eye must assist in the planning process.

Another issue regarding RSS assistance to the planning process involves the charge of CTA time during resource inventory. This is an issue because the programmatic contract has not yet been developed or signed. TA can only be earned after contract signing. To maximize the use of program dollars and minimize the use of scarce CTA funds, I suggested that only cursory field examinations be made during the initial stages of planning that are sufficient to determine the resource concerns. Then, after program enrollment, a more detailed inventory and documentation process can take place and time can be charged to the appropriate program. Some members of the CASPeR group agreed that this approach was

workable, while others did not yet see how this could be done. This idea needs further testing.

Technical Soil Services (TSS) within NRCS is focused on maximizing the use of soil survey information among the greatest number of customers possible. TSS works to expand the knowledge of nontraditional users of soils (urban planners, landscape architects, Realtors, and developers) and to increase the use of soils information by traditional users. We are working to increase the demand for our product. Even current users of soils data and interpretations and properties at times do not use these products properly. Therefore, a strong educational and advisory role is important. When customer types and their topics of interest are identified, the need for new interpretations or delivery mechanisms becomes evident. TSS must work with as many NRCS disciplines and external entities as possible and at every level in the agency to ensure that soils issues are properly addressed.

At the national level, aside from involvement with the CASPeR Team, I am on the National Conservation Practice Standard Subcommittee (as is Ed Griffin in Fort Worth). In conjunction with that, Conservation Practice Physical Effects need to be reviewed to ensure that effects on soils are noted where appropriate. One way of creating demand for the services of a RSS is to ensure that soils issues are addressed within every applicable conservation practice. This is a job for every soil scientist doing RSS type of work. States create state versions of the national standards, and a soil scientist is or should be on the Tech Guide Committee and should review these standards. If soils concerns are not addressed in the state standard, there is

an excellent chance that they will be missed in the national standard version. Ed Griffin, Terry Aho at the West National Technical Center, Leander Brown at the East National Technical Center, or I should be notified so we can address the omission. Also, our Regional Resource Soil Scientists have been doing an excellent job of training other agency staff in the use of Soil Data Viewer.

The agency's current Strategic Plan nicely focuses on soil quality. The agency measures erosion reductions. In spite of significant reductions in erosion, USGS still reports high N and P loading in many surface waters. CEAP data from modeling agrees with this observation. We need to do more in the arena of nutrient management. We resource soil scientists need to have our knowledge refreshed on nutrient-soil dynamics if we are to provide effective assistance in soil sampling and in understanding test results. Do not leave this to only the engineers and planners or water-quality specialists. Work with them to add our expertise in how various soils respond to nutrients and their carrying capacity. It is probable that the hydrologic function of the nation's cropland has been significantly altered through reductions in infiltration caused by the destruction of soil structure and the formation of pans through compaction. Obviously, the best way to keep nutrients and pesticides out of waterways is to keep the water in the field. This said, it is understood that there is no free lunch and the increase in infiltration brings its own set of issues.

I see a potentially large workload for resource soil scientists in soil survey update efforts and in the collection of dynamic soil property data. Where the term "update" means populating new data elements or validating existing data, much of the data collection can be

couched under the concept or DSP, which, in turn, may be couched within ESD efforts. Where soil survey crews are conducting fieldwork to refine polygon boundaries or create new map units, there will probably be little time to collect more data via time-consuming transects or plots. This is where the RSS can augment the soil survey effort.

By collecting a DSP database, eventually we will be able to document the effects of conservation practices and even indicate the degree of improvement or decline as a function of a practice or management system. This issue includes the topic of carbon sequestration. We need to develop a comprehensive protocol to assess the sustainability of our soil resource. It is literally a national security issue.

Web Soil Survey is a huge success. There are over 4,500 visits per day presently, and the increase in use continues in a linear fashion with no signs of plateauing. Even though the site is the envy of other natural resource agencies and NRCS divisions, it is still confusing to some users. Also, the information accessed may not meet the user's needs. I have found that helping people walk through the site at least once is met with much appreciation. Also, more work needs to be done to bring WSS to the point where it can provide the other types of information that our hard copy products provided.

In order to strengthen the role and need for the RSS, we must educate the line officers and top leadership in the value of our participation in field to national planning and in external customer assistance. A one-page flier aimed at heightening awareness of the functions and activities of the RSS has been created. In states where resource soil scientists are actively assisting NRCS activities, we have become our

best advertisement. In other states, for various reasons, there is work to be done.

In order to tell our story to management and leadership, a modified version of the RSS Reporting System of Russ Kelsea (my predecessor) is being programmed into NASIS. The hope is that the reportable items can then be linked to TCAS through IDEA to provide a more robust sorting of progress and kind of work performed. State soil scientists will be the ones to show the state conservationists what work is being done and where if need be.

A major effort is underway to produce a Technical Soil Services Handbook. The intent is to enumerate all of the major topics addressed by resource soil scientists at any level of the agency. It is not intended to repeat information that can be found at other sites or in other sources but, rather, to reference to those resources. The handbook will be electronic and thus will facilitate URL references. The input of BLM and the Forest Service on the TSS that they provide will be included in the handbook, which will thus be an interdepartmental effort. A draft is planned for the end of the fiscal year.

A TSS NEDC course is being revised. We may not be able to pilot it this year, but it should align well with the handbook.

The major efforts in TSS are advertising, educating, inserting soils concerns and information in agency technical documents, influencing field office operations, reporting progress, training, and documenting TSS procedures via the handbook. The RSS should also enhance soil survey activities with soil measurements to validate and add to the database and should be leaders in the collection of dynamic soil property data. ■



Jim Fortner and Brad Duncan at the Ag Expo in Seattle.

Web Soil Survey and Soil Data Viewer on Display in Seattle

By Jim R. Fortner, Soil Scientist, NRCS, National Soil Survey Center, Lincoln, Nebraska.

The National Alliance of Independent Crop Consultants met in Seattle, Washington, for their annual national convention January

23-25, 2008. Jim Fortner, Soil Scientist, NSSC, and Brad Duncan, Assistant State Soil Scientist, Spokane, Washington, demonstrated the Web Soil Survey (WSS) and Soil Data Viewer (SDV) as part of the Ag Expo.

About 450 consultants, researchers, and industry representatives attended the convention. Many of the attendees stopped by the booth for a

demonstration. At least half of these were aware of WSS and use it on a regular basis. Jim and Brad were able to answer questions users had and helped them work through the application. Attendees who had not seen the application were excited to find that it exists and saw that it could be a real benefit to them in their work. Some suggestions for enhancement of WSS were gathered. ■

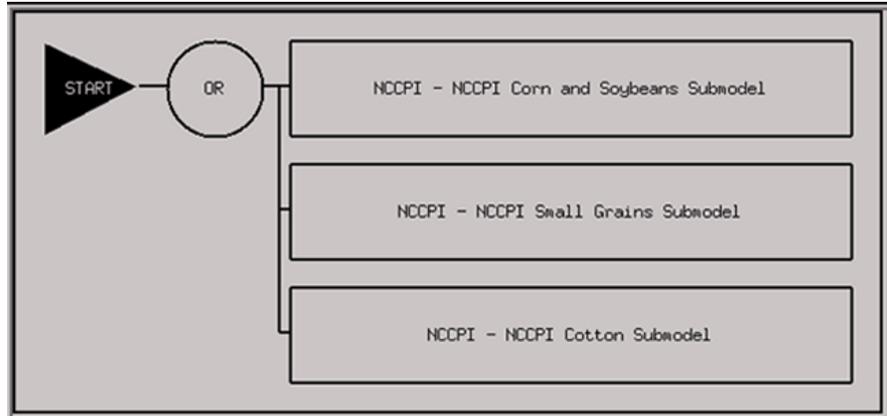
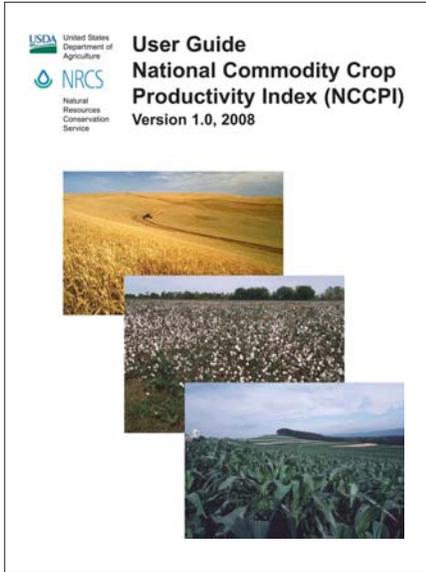


Figure 1.—The main model of NCCPI. The “OR” operator indicates that the highest of the ratings calculated by the three main submodels is reported as the NCCPI for the map unit component.

Publication of NCCPI User Guide

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

Members at the National Soil Survey Staff in Lincoln, Nebraska, have prepared *User Guide, National Commodity Productivity Index (NCCPI)* for publication. This publication examines the productivity of soils for corn and soybeans, for small grains, and for cotton, which “represent three major divisions of commodity crops, in terms of climatic, landscape, and soil adaptation” (figs. 1 and 2). The following paragraphs, from the Preface, identify the criteria used in the guide:

The user guide for NCCPI, version 1.0, arrays soils according to their inherent capacity to produce dryland (nonirrigated) commodity crops. Most of the NCCPI criteria relate directly to the ability of soils, landscapes, and climates to foster crop

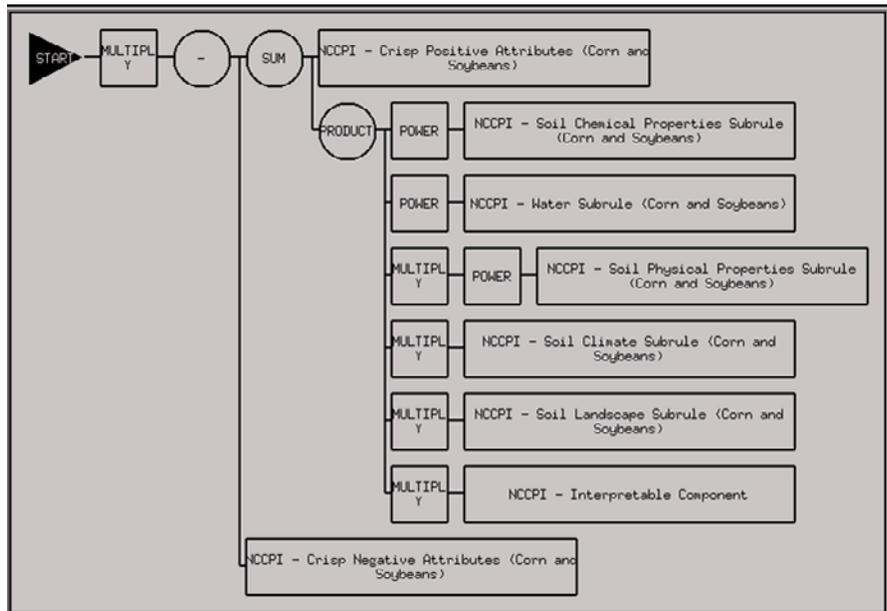


Figure 2.—The corn and soybeans submodel.

productivity. A few criteria relate to factors that can limit use of the land (e.g., surface boulders). All criteria used in the index affect crop culture and production and are referred to as factors affecting inherent productivity. The rating indices

can be obtained through a computer program in NASIS.

Inherent productivity is considered nearly invariant over time. Temporary fluctuations in productivity caused by good or bad management and year-to-year variations in weather are

not addressed. More permanent changes in soil properties that cause significant changes in productivity can affect the NCCPI index when current NASIS information is used. Extreme erosion, compaction, land leveling, and salinization are examples that could cause such changes.

Paper copies of the guide will be published this summer. Also, the guide is available on the Internet (<http://soils.usda.gov/technical/>). On the Web site, it is listed under "Other References." ■

World Reference Base for Soil Resources Workshop To Be Held at ASA This Year

By Craig Ditzler, National Leader for Soil Survey Standards, NRCS, National Soil Survey Center, Lincoln, Nebraska.

Soil Scientists in the U.S. are familiar with Soil Taxonomy as our system for classifying soils. There are several other soil classification systems in use around the world. One of these is the "World Reference Base for Soil Resources" (WRB). For soil scientists interested in learning more about WRB, a half-day workshop will be held on Sunday, October 5, 2008, as part of this year's ASA meeting in Houston, Texas. Registration information is available at the conference Web site (<https://www.acsmeetings.org/>).

The WRB is currently the official scheme of the International Union of Soil Scientists for international classification, correlation, and communication for soil scientists. This workshop will provide a basic understanding of the development and

principles used in the WRB. A brief history of the development of the system will be included along with examples of its current use in several countries. The speakers will discuss the basic principles, the architecture, and the rules of classification. The 32 Reference Soil Groups comprising the first hierarchical level of classification will be introduced, and the second level (qualifier level) will be explained. Benchmark soils from the U.S. will be used as examples for correlation of WRB with U.S. Soil Taxonomy. The target audience includes university teachers who are willing to include the WRB in the curriculum, professionals who wish to be able to communicate with international soil scientists not familiar with Soil Taxonomy, and all interested students. Participants will receive teaching material on a CD, which they can use for reference or in their own teaching activity. Copies of "World Reference Base for Soil Resources" (2006) will be available.

For information about the workshop, contact one of the following:

Peter Schad, Technische Universität München, Germany, schad@wzw.tum.de

Erika Micheli, Szent Istvan University, Hungary, Micheli.Erika@mkk.szie.hu

Soil Survey Helps To Expedite Delivery of BMP Project at Lake Tahoe

By William Loftis, Soil Scientist, USDA, Natural Resources Conservation Service, South Lake Tahoe, California.

Lake Tahoe, considered to be one of the most beautiful lakes in the United States, is having some beauty issues. Over the years, population growth and development on the erosion-prone landscape

surrounding the lake have caused runoff that has contributed fine sediment and unwanted nutrients to the lake. The once clear and pristine Lake Tahoe is currently losing clarity at a rate of about a foot a year (fig. 1).



Figure 1.—Lake Tahoe, situated along the California-Nevada State line, continues to lose its world-famous clarity. This loss of clarity is largely attributed to a combination of fine sediment and soluble reactive phosphorus contributed from areas of the urban development.

In an attempt to ameliorate the problem and stem the degradation, the Tahoe Regional Planning Agency passed an ordinance in 1992 requiring all property owners to infiltrate storm water originating on their property. This requirement meant that about 30,000 single-family residential properties would need to be retrofitted with Best Management Practices (BMPs). BMPs that homeowners are expected to implement include infiltration structures and land treatment for erosion control. The deadline for all properties to be in compliance with the ordinance is October of 2008. For several years, the Natural Resources Conservation Service (NRCS), the Tahoe Resource Conservation District (fig. 2), and the Nevada Tahoe Conservation District have been providing conservation assistance one property owner at a



Figure 2.—Molly Pulsifer of the Tahoe Resource Conservation District measures impervious areas to develop a BMP retrofit plan to assist Lake Tahoe homeowners.

time. This approach has resulted in assistance to owners of about 1,500 properties annually and about 600 completed projects per field season.

With about 19,000 single-family residences still in need of assistance and the deadline for compliance rapidly approaching, soil scientists from USDA, Natural Resources Conservation Service (NRCS), in California contributed their expertise to a multidisciplinary team of conservationists and engineers. As an expert in the field of soils and soil survey mapping, the local NRCS soil scientist was able to utilize the recently published *Soil Survey of the Tahoe Basin Area, California and Nevada* (2007). This document, rich in soils information, has proven to be an extremely valuable tool in the team’s planning efforts. By using the very extensive and detailed soil survey data, the team established an evaluation process that envisioned a triage approach to parcel analysis. This analysis provided a breakdown of soil

limitations that guided project managers in determining how to allocate their limited staffing resources more effectively. The final result was an area-wide or community approach to the application of technical assistance. Project managers could now make decisions that improved the quality of BMP retrofit plans and expedited the project. This planning approach resulted in properties being divided into five categories, which are shown in figure 3 and are described as follows:

- On 29 percent of the properties, the soils are so rapidly permeable that designs are generally not necessary. Because of the nontechnical nature of the BMPs, the owners of these properties are simply provided a do-it-yourself packet.
- On 11 percent of the properties, the soils are so slowly permeable that infiltration BMPs are not practical because of economic and/or technical constraints. These properties required large ground-disturbing excavations and were set aside. They show potential for a regional storm-water treatment approach.
- On 9 percent of the properties, the soils have a seasonal high water table, which is so high that other ordinances prevent the installation of infiltration BMPs. These properties have been set aside and show potential for a regional storm-water treatment approach.
- On 7 percent of the properties, the soils are rocky or are shallow to bedrock. These properties are difficult to excavate and unfortunately require a site visit to determine their suitability for infiltration systems.
- On 44 percent of the properties, the soils did not exhibit any limiting factors. These properties became the focus of staff time and resources. They are expected to involve significant staff

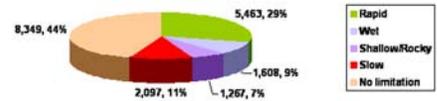


Figure 3.—Lake Tahoe Basin analysis of residential parcels with NoBMP retrofit plan, by GIS analysis category.

involvement for BMP design because these are the properties where the staff can get the most for its time.

The number of properties requiring significant staff time was reduced by 56 percent (the total of the properties described in the first four bullets). On 29 percent of the properties, the problems were so simple that all the staff had to do was to provide the property owners a do-it-yourself packet, and on 27 percent of the properties, the problems were so difficult that the property owners were asked to wait for a new approach to be worked out.

The soil survey data in correlation with GIS portrayals of problem areas and areas of opportunity (fig. 4) enabled NRCS and partners to focus their efforts on appropriate areas, increasing the number of BMP retrofit plans that could be done in a year and minimizing the collateral damage to the environment that could result from wholesale excavations for infiltration systems in marginal locations.

The field office has not only increased their efficiency by empowering a significant percentage of homeowners to accomplish the task with minimal staff effort, but also has improved the services to the rest of the landowners. Furthermore, landowners who are situated on sites with severe soil limitations are given a temporary reprieve from the implementation date until new technology or regional storm-water treatment resources become available.

Limiting Factors for Infiltration BMPs in the South Tahoe Area

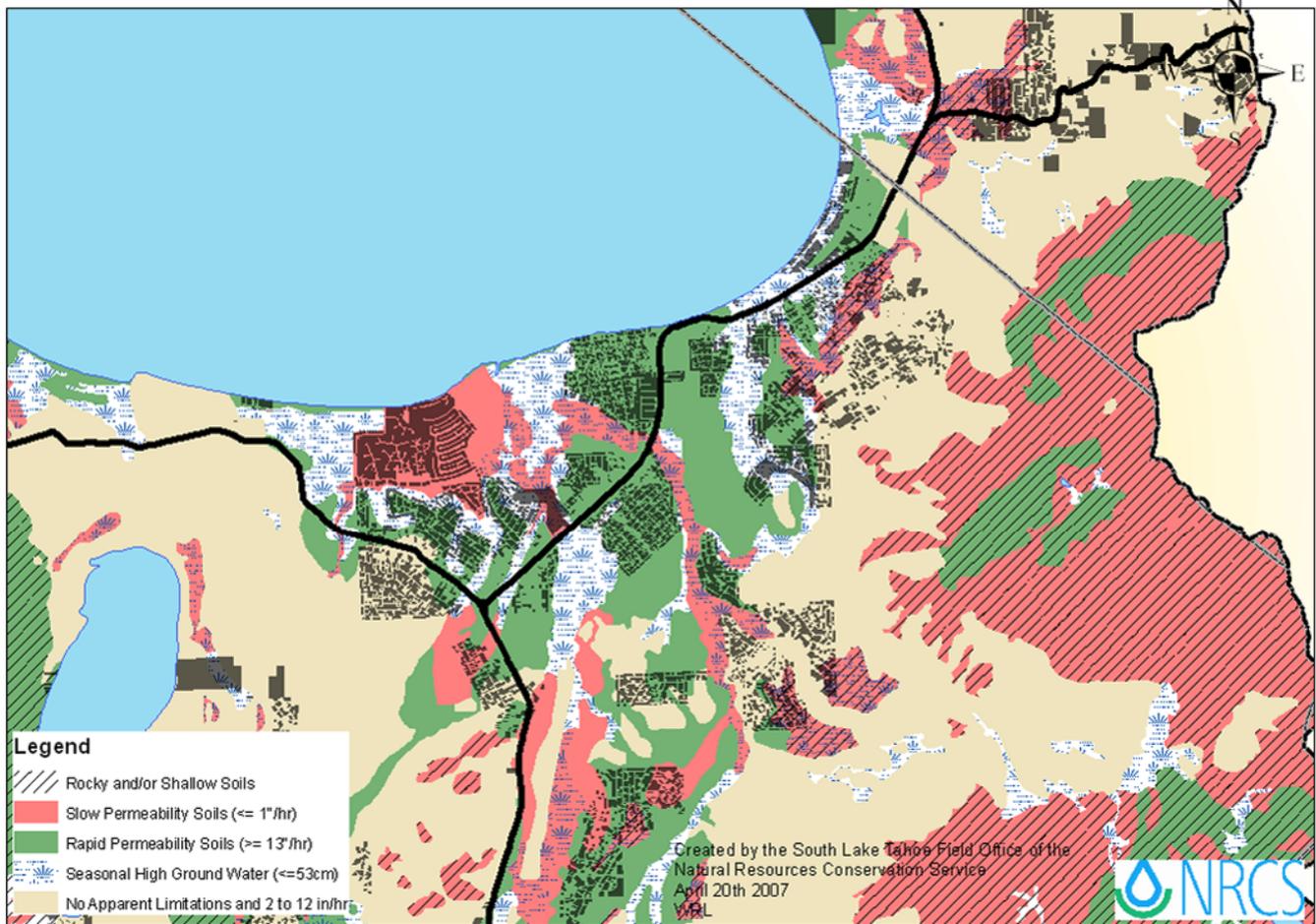


Figure 4.—A map illustrating the application of GIS analysis to residential areas in the South Lake Tahoe, California, area.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.