Society of Soil Scientists of Southern New England

Spade and Auger

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Inside this issue:

Message from the President

The New Year has arrived and so has the bitter cold winter weather. The days are getting longer and spring will be here soon! The 2004 Board of Directors of SSSSNE remains the same as last year. Jim Turenne volunteered to be Newsletter Editor – please send articles, pictures, meeting notices, suggestions etc. to Jim at:

Now is the time to renew your Society membership and send in Registry update information. Please consider sending in a contribution to the Sautter Fund (for the Windsor monolith at the Smithsonian soils exhibit). The forms are at the end of this issue of *Spade and Auger* and they are due by April 1.

We are still far short of our goal to raise the necessary money to sponsor this monolith. In the last issue of *Spade and Auger* I told you that Missouri was the first state to successfully raise the money. Now California, South Carolina, Florida and Pennsylvania are close to the goal. We also need to have some members volunteer the time and energy to solicit funds from people and organizations outside of SSSSNE. Please contact me if you can help with this effort (see form on back of this publication).

Phone: (860) 688 – 7725 x115
Email: margie.faber@ct.usda.gov

The Annual Meeting in November at JD Cooper's was a great success. The crowd really seemed to enjoy the food, fellowship, Sautter Fund raffle, and the Iceland slide show presentation. Special "Service to the Society" awards were presented to Harvey Luce and Everett Stuart. Our scholarship winners Janet Atoyan (undergraduate, URI), Tim Twohig (graduate, URI), and Sal Mangiafico (graduate, UConn) were present to accept their awards. If you haven't made it to one of these annual meetings recently, try to come this year: it will be our **30th Anniversary** celebration!

Marjorie Faber, President.

Have You Read…?

Living Ice: Understanding Glaciers and Glaciation

By Robert P. Sharp

As you are walking through the landscape while at work, are you thinking about the landforms around you and the processes that lead to their development? Would you like a better understanding of the landforms of southern New England? Have you ever wondered how moraines are formed? Would you like to see a swarm of drumlins?

If you answered yes to any of these questions, you will be fascinated by Living Ice: Understanding Glaciers and Glaciation by Robert P. Sharp. The amazing photographs of glaciers and the features they produce will astonish you. Each photograph is described in detail, with arrows indicating key features. Many of the features of the landscape

Have You Read…? continued

This is a book for both beginners and the more experienced. The story of glaciers unfolds as you learn the basics about how great ice streams are formed. Gradually you are introduced the more complex characteristics of glacier movement and products of glacial erosion, transport and deposition. As new terms are introduced in the text, they are highlighted and defined in the handy glossary. As you are walking through the landscape after reading Living Ice, you will see your surroundings in a new light.

Submitted by Margaret Washburn

Soil Taxonomy Ninth Edition 2003

The 9th edition of Key to Soil Taxonomy is now available. You can download a PDF copy from the following web site: http://soils.usda.gov/technical/classification/tax_keys/ (a copy of the document file is on the SSSSNE SoilCD). A hard copy is available for $34.00 from Pocahonats Press—see web site for ordering information. The ninth edition incorporates all changes approved since the publication of the second edition of *Soil Taxonomy* (1999). The NCSS Staff, along with NCSS Regional Soil Taxonomy Committees (such as ICOMANTH—for Anthropogenic soils), reviewed over 50 proposals that have been submitted since 1998. Four new suborders, 11 great groups, and 87 subgroups have been added in the Ninth Edition.

Changes in the new version include all corrections previously recorded in the on-line errata, re-wording of thickness requirements for Mollic and Umbric Epipedons to simplify the definition (no changes made to the meanings), and other minor changes for Fragipans, Andic Soil Properties, Resistant Minerals, and Weatherable Minerals. Most of the changes to Inceptisols and Entisols are related to the addition of "Gel" Great Groups.

Clarification of Certifications for Soil Scientists

The SSSSNE Board has received some questions recently on the certification and licensing of soil scientists. The following is some information about certified soil scientists and licensing requirements for soil scientists within southern New England.

First and foremost the Society of Soil Scientists of Southern New England does NOT certify or license individuals as soil scientists (although SSSSNE serves as a registry that is used by CT.). To become a "Certified Professional Soil Scientist, Classifier, etc." in the U.S. you must register through ARCPACS (see next article on recent changes to the ARCPAS certification). Some individual states outside of southern New England offer (and in some circumstances, require) certification and registration of soil scientists In Southern New England you need be licensed by each State to conduct soil evaluations for septic systems. Requirements vary with each State as to what you need to be allowed to be a licensed soil evaluator.

In Massachusetts, soil evaluators must be one of the following; Massachusetts Registered Sanitarians, Massachusetts Registered Professional Engineers, Engineers in Training, Massachusetts Registered Land Surveyors, Certified Health Officers, Board of Health Members and Agents, and employees of the Department involved in the administration of Title 5. As of this writing soil scientists are not allowed to be licensed soil evaluators. Individuals must pass a written and field exam, classes are offered to train individuals to conduct soil evaluations for septic systems (visit: http://www.state.ma.us/dep/brp/wwm/t5pubs.htm).

In Rhode Island, a total of nine college credits in soil related courses is the minimum education prerequisite to be eligible to take the RIDEM Class IV-Soil Evaluator exam (a list of the classes allowed and more information is available from: http://www.state.ri.us/dem/programs/benviron/water/permits/isds/index.htm). To become a Class IV Soil Evaluator in RI, individuals must pass a field and written exam.

In Connecticut a person needs to be a licensed professional Engineer or a licensed sanitarian to sign off on septic sys-

Certification (cont)

tem designs. Some engineers and sanitarians use a soil scientist to help evaluate test pits especially in the dry season. Some soil scientists are also used to perform permeability testing.

For wetlands delineations, there are no licensing requirements in Rhode Island or Massachusetts. A soil scientist is required to delineate state wetlands in Connecticut. According to state law, a soil scientist is a person which meets the minimum qualifications for a G.S. 5 soil scientist under the federal rating system. (a degree with a major in soil science or related discipline, 30 semester hours in biological, physical, or earth sciences, including a minimum of 15 hours of soil science OR a combination of education and experience equivalent to the education requirement). A soil scientist does not have to belong to SSSSNE or any other organization to meet this minimum standard, all they need is the appropriate course work.

Did you know…?
A Ground-penetrating radar is being used to explore the "soil" and geology on Mars. The radar, called Marsis, is on the Mars Rover Spirit.

Please Welcome New Members:
Associate Members: Erin MacGregor, Scott Morrison, Daniel Ottenheimer, Basic Member: Hue Quan. Welcome back—Ed Pawlak, and David Lord.

Changes for Certification of Professional Soil Scientists

The Soil Science Society of America (SSSA) will take over responsibility for certification of professional soil scientists (CPSS) in the United States in 2004. The CPSS program had been administered since 1976 by the American Society of Agronomy (ASA) through the ARCPACS program. Under SSSA, the CPSS program will maintain the existing Soil Certifying Board and will issue two certificates: Soil Scientist and Soil Classifier. The ARCPACS program, which is specifically mentioned in legislation certifying or licensing soil scientists in several states, will continue to exist until SSSA identifies a suitable alternative that ensures continuity of professional recognition in all states.

Tom Sims, SSSA President stated "SSSA welcomes the opportunity to provide leadership and support to national efforts to certify and license professional soil scientists. We are committed to providing significant resources to expand our efforts in this area and will work with other state and national soil science organizations to enhance the professional opportunities available to all soil scientists."

Visit: http://www.agronomy.org/certification/soils.html for more information.

Mark Your Calendar

May 21—SSSSNE Spring Hydric Soil Workshop (see article in this edition for information).

Feb. 26—SWSC Winter Meeting see: http://users.chonomedia.com/snec-swcs

Oct. 28-31 Land Trust Alliance Rally—Providence, RI. Visit: www.lta.org/training/rally.htm

Web Sites of Interest

Soil Taxonomy Forum: http://clic.cses.vt.edu/soiltax/soilt.htm

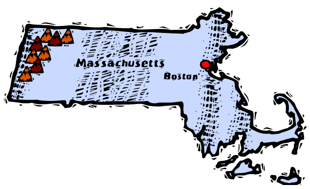
U.S. Consortium of Soil Science Associations: http://soilsassociation.org

Soil, Geology, Environmental, Educational, Map Links: http://nesoil.com/links.html

Soil Survey Program in Massachusetts Undergoes Personnel Changes—by Al Averill

People coming and going is standard operating procedure in soil survey work. Opportunities for personal growth, advancement or simply the search for quality of life have lured folks to and from various localities since those first organized soil surveys.

For the past several years, Massachusetts enjoyed continuity and consistency provided by four veteran field soil scientists; Jim Turenne and Rob Tunstead in Plymouth County, and Al Averill and Astrid Martinez in Franklin County. (As a case in point, all four came to these positions via other parts of the world including New Jersey, New York, Puerto Rico and Rhode Island). Together, they devoted 34 staff years to mapping and classifying soils and providing technical services for western and southeastern Mass. This status quo would be disrupted when three of the four opted for change.



Massachusetts

Astrid, desiring greater opportunity, jumped discipline as well as state by accepting a Soil Conservationist position in the Green Bay area of Wisconsin. Jim left his position as project leader and ground penetrating radar operator to move on to his native Rhode Island where he now serves as Assistant State Soil Scientist. After 22+ years in the field, Al left his project leader job to become a Soil Data Quality Specialist on the Major Land Resource Area staff in Amherst, MA serving the glaciated northeast. These changes occurred over a two week period leaving Rob as the only NRCS field soil scientist in the state.

Of course, change often offers opportunity. Rob was promoted to project leader for Plymouth County and will also assume radar operator duties. The filling of the project leader vacancy in Franklin County brings a new face to the NRCS soils program in Massachusetts, which calls for an introduction.

Tom Cochran, of Plymouth, New Hampshire, worked as an electrician in Maine, New Hampshire, Vermont and North Carolina. Opting for a career change, he earned a BS degree in Environmental Science (Soil & Water Systems) from the Soil Science Dept. at NCSU in 1998. Following his junior year he worked for the NC Cooperative Extension Service in the Soil Science Dept., full time through the summer and part time during his senior year. He followed by earning an MS in Soil Science with a minor in statistics from NCSU in 2000. In Oct. 1999, he accepted a position as a Soil Specialist with the NC Dept. of Environment & Natural Resources where he mapped soils for the Buncombe/Madison survey project and aided the Great Smoky Mountain National Park Survey by ground-truthing the results of a modeling project. He earned ARCPACS certification in 2003 and is licensed to practice soil science in NC.

Tom's NRCS career began in Franklin County this past November. He certainly seems to be keeping with a soil survey tradition in paying his traveling dues. And, with Rob's promotion, the soil surveys for Plymouth and Franklin Counties continue to be led by committed soil science professionals.

Spring Hydric Soil Workshop Being Planned

A Spring workshop is currently being planned for May 21, 2004 located at the Tolland Ct. Agricultural Experiment Station. The workshop will be a fund-raising event with proceeds going to the Ed Sautter fund. The workshop will focus on problem hydric soils and a review of the new Version 3.0 of the New England Field Indicators of Hydric Soils. Plans are to have morning lecture and afternoon field sites looking at disturbed soils and other wetland soils at the experiment station. Plans are to have a second hydric soil workshop in the fall looking at dark till soils and wet Spodosols. A registration form will be sent to members in April. The workshop will be open to the 1st 30 people to respond.

New Soils Course at UNH—by Steve Hundley

The UNH Department of Natural Resources will once again be offering a 4-credit graduate level course in Soil Genesis and Classification (NR704/804). The course will be held every Friday afternoon from 1-5pm starting May 28, 2004, ending July30, 2004. It will be a field-based course, meeting at various locations around the Durham-Portsmouth area. The course will focus on the soil morphology and soil taxonomy of the region along with practical application of interpretive behavior based on the diagnostic features of the predominant taxonomic classes. There will be weekly assignments to complete outside of class and a course project for graduate level students. A request for CEU's has been made to the NH Joint Board for certified professionals wishing to take this course. Prerequisites are: beginning soils; or one year's professional field experience with a soil consulting firm, or instructor permission.

The course will be taught by Steve Hundley, USDA State Soil Scientist with 32 years experience in soil genesis, classification, and interpretation.

This may be a start to getting a soils curriculum back at the UNH campus. If you have any questions regarding this course, contact Steve Hundley at:

steven.hundley@nh.usda.gov

Harvey receiving award at ASA meeting in Denver (article below).

Harvey Luce Receives Award at the ASA Meeting

At the 2003 Tri Societies (ASA, SSSA, CSSA) Annual Meeting in Denver, Colorado, society member and Professor of Soil Science at UCONN Harvey Luce received the Monsanto ARCPACS Service Award. The Service Award is presented in recognition of outstanding leadership and professionalism. Criteria for selection of the successful nominee are based on professional service such as consulting, expert witness, or providing services or products to the agricultural community; scholarly work in providing publications to serve the agricultural practioner; and self-improvement as evidenced by teaching workshops, developing teaching techniques, service in professional activities and organizations, etc. The award is administered by the ARCPACS Program of the American Society of Agronomy and funded by Monsanto through a contribution to the Agronomic Science Foundation" The award was presented at the 2003 Annual Meetings of the Tri Societies (ASA, SSSA, CSSA) in Denver Colorado.

See photo above.

World Congress of Soils

The World Congress of Soil Science will be held July 9-15, 2006 in Philadelphia, PA. This will be the first time in over 40 years that the United States has had an opportunity to host this Congress. The Soil Science Society of America and the US National Committee of Soil Science will jointly sponsor this event. The theme of the Congress is "Frontiers of Soil Science: Technology and the Information Age". The soils exhibit at the Smithsonian Institute will open in 2006 to coincide with the Congress and be showcased for the attendees from around the world. Visit: www.18wcss.org for more information.

A field tour of New England is being planned for the conference.

DEP TECHNICAL ADVISORY REPORT ON IDENTIFYING AND MAPPING OF INLAND WETLANDS ON DISTURBED AREAS (Proposed) submitted by, Thomas W. Pietras

NOTE: The purpose of the article is to help CT-DEP develop a technical advisory bulletin on disturbed wetland soils so that soil scientists and regulators working in these areas will have a uniform standard on which to base their justification for wetlands or non - wetlands in disturbed soils. which are becoming more common across our state.

Human activities have changed the original landscape and altered the natural drainage patterns in many areas of CT. In some cases the original soils were removed through deep excavations or covered over by deep fill. In other cases, there was only shallow excavation or filling. Some landscapes which were formerly associated with prolonged wetness are now much drier. The newly created soil surface within a disturbed area will posses quite different features than those contained in the original soil types. Because of their recent formation these soils will often have little to no diagnostic features that are typically relied upon for wetland identification. The task of identifying and mapping wetlands within disturbed areas is often difficult. This report presents a discussion about several forms of disturbed areas which are common to Connecticut. A list of criteria are presented for the soil scientist to consider in order to determine whether a disturbed area qualifies as a regulated wetland.

Under the Connecticut Inland Wetlands and Watercourses Act, wetlands are defined as land, including submerged land, not regulated pursuant to Sections 22a-28 to 22a-35 (Tidal Wetlands), inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial and floodplain by the National Cooperative Soil Survey, as may be amended from time to time by the Natural Resources Conservation Department of the USDA (CT General Statutes Sections 22a-36 to 22a-45). One should not confuse the meaning of soil types in this definitions. Soil types here, simply means "kinds of soils" (namely poorly drained, very poorly drained, alluvial and floodplain). This definition encompasses soils classified and named at any level of soil taxonomy.

The process of Inland Wetland delineation requires a visual inspection of soil features to determine if a wetland soil type is present. Poorly to very poorly drained soils will typically contain redoximorphic features below the A horizon and a low chroma matrix within 50 cm (20 inches) of the soil surface. With the exception of some problematic natural soil areas (ie. soils formed in reddish Triassic parent material), these diagnostic soil features are typically found on the wetter portions of a landscape. For those soils which have been subject to slight to no disturbance, the process of wetland identification and delineation of the wetland boundary is fairly straight forward for a soil scientist.

Disturbed soils are of widespread occurrence in agricultural, residential and urban areas of Connecticut. Within these areas there is often a mix of original soil types and more recently created soils, commonly referred to as man-made land. Investigations conducted by soil scientists for the purpose of wetland identification often encounter soils which have been effected by artificial drainage, filling, excavation, mixing or a combination of these disturbances. The soil scientist needs to understand how these disturbances affect soils, to what extent they can change the classification of a soil and which factors determine if a soil qualifies as a wetland.

I. ARTIFICIAL DRAINAGE & WETLAND IDENTIFICATION

A. General Discussion

Historically, artificial drainage structures (e.g. clay tile drains, plastic corrugated drainage pipe and ditches) have been widely used to drain many wetlands in Connecticut. Other structures, such as road storm drains, may have a similar effect. Re-routing water courses or large excavations can also result in draining wetlands. Nearly every watershed in the state contains wetland areas whose natural drainage patterns have been altered by various forms of artificial drainage or diversions.

The net result of artificial drainage is generally the creation of a better draining soil. However, the factors which determine how well artificial drainage work are numerous. Factors affecting rates of flow into a subsurface drain include soil permeability, depth of drain, drain openings, drain spacing and drain diameter. The causes of artificial drainage may be temporary or permanent. A tile drain could become clogged or a ditch may become silted in. In these cases the soil would likely revert to its original ground water regime. In other cases, the re-routing of a watercourse may result in permanently draining a wetland.

Often artificially drained wetlands lack the hydrologic and vegetative features typically associated with undisturbed wetlands. Many acres of farmland, residential subdivisions or urban areas contain soils with coloration patterns reflective of poor drainage, but in which the seasonal high ground water table remains several feet below the soil surface due to artificial drainage. The explanation for this phenomenon is that soil mottling and gray matrix coloration patterns may persist for many years in wetland soils following artificial drainage as relics of a prior water regime. The presence of the relic diagnostic soil coloration patterns still identify the soil as a wetland soil type.

According to the National Cooperative Soil Survey guidelines, poorly and very poorly drained soils which have been artificially drained continue to be included with those soils that have aquic moisture regimes. In other words, soils which have coloration patterns of poorly drained or very poorly drained soils are classified to a specific soil types regardless as to whether they have been subject to artificial drainage. In conclusion, artificially drained wetland soil types still qualify as Inland Wetlands.

B. Relevant criteria for wetland identification

The soil scientist needs to carefully examine the soils in areas which may have been subject to artificial drainage. The wetlands mapping would still include any artificially drained, poorly drained and very poorly drained soil types. In their soils/wetlands report the soil scientist should discuss any poorly or very poorly drained soil which has been significantly altered through artificial drainage. The effects of artificial drainage upon surrounding soils may be difficult to interpret during a brief site inspection. To more fully assess the effects of artificial drainage, the soil scientist may wish to revisit the site during a wetter period of the year. Although, artificially drained wetland soils are still considered regulated wetlands, quite often these areas exhibit few if any of the values typically associated with undisturbed wetlands. Any review of these areas by municipal or state regulators should consider the functional values of an artificially drained wetland soil.

II. FILLED SOILS AND WETLAND IDENTIFICATION

A. General Discussion

Filling has been a widespread practice throughout the state. It has been commonly used to built up and level sites for development. The types and depths of materials utilized for filling are highly variable. In general, most fill sites consist of earthen materials removed from a nearby source. Along the coast and near waterways dredge material has been commonly used for fill.

Soils containing fill can still be classified according to criteria established in Soil Taxonomy. When there is less than 50 cm (twenty inches) of fill placed over an original soil profile, the fill is considered as shallow. The presence of a shallow fill does not change the original classification of a soil. Thus, when there is less than 20 inches of fill over an original wetland soil type, then the soil continues to classified by the original wetland soil type.

Fill which is greater than 20 inches does change the classification of a natural soil type. A 20 to 40 inch layer(s) of fill is described as moderately deep fill and over 40 inches of fill is described as deep fill. If the fill is fairly recent, then there has been insufficient time for any recognizable diagnostic soil horizon to be formed and the soil is classified as an Entisol. Entisols mainly include the group of recently formed soils. Wet Entisols possess an aquic moisture regime and qualify as poorly drained or very poorly drained soil types. These soils would be identified as Aquents. Thus, even when there is moderately deep or deep fill an Entisol could still be identified as an Inland Wetland.

B. Relevant criteria for wetland identification

1. In evaluating sites where the original soils have been covered by fill, the soil scientist needs to be knowledgeable on what depth of fill will alter a soil's classification and be aware that even a deep fill area could still qualify as a wetland soil. An original poorly or very poorly drained soil type covered by less than 20 inches of fill is still classified according to the original soil type. A notation could be added to the soil description in the Soil Scientist's report which documents the presence of a shallow fill. Additional information could be provided in a wetlands assessment report which further describes the filled wetland soil, along with the hydrological and ecological features and wetland values.

2. For those areas where there is more than 20 inches of fill atop an original wetland soil, the soil scientist needs to assess the existing plant, soil and hydrologic indicators. A determination should be made of what plants are growing in an area and whether hydrophytic vegetation is the dominant type. Test holes should be dug to determine if a buildup of surface organics or if redoximorphic features have developed in the fill soil material which may be indicative of a poorly or very poorly drained soil. In many cases rhizospheres, or oxidized root zones, and/or red mottles can form within five to ten years in upper portion of a poorly to very poorly drained, fill soil. During the investigation a determination should be made of the depths to saturation and ground water. In some cases standpipes can be placed into the disturbed soils to allow for ground water monitoring, preferably during the late winter or spring. By carefully assessing the existing plant, soil and hydrologic indicators a soil scientist can usually make a reasonable determination as to whether the filled soil possesses an aquic moisture regime, and thus qualifies as a poorly drained or very poorly drained soil.

III. EXCAVATED AREAS AND WETLAND IDENTIFICATION

A. General Discussion

Some landscapes were excavated for a source of fill material. In other areas cuts were made in order to level sites for buildings, recreational facilities and roads. Landscapes where two or more feet of the original soil surface has been excavated are often a challenge for wetland identification. Within excavated areas the newly created soil surface often contains little to no diagnostic features for use in wetland identification. Often, recently excavated landscapes can exhibit the appearance of a well drained site during the dry summer months, and yet be characterized by excessive wetness in the winter and spring. Former sand and gravel pits can often have wide ranges in soil wetness which are dependent on seasonal changes. Areas subject to past excavation are often very challenging for wetland determination and require very careful examination by the soil scientist.

B. Relevant criteria for wetland identification

1. The depth of the excavation needs to be closely observed. Where only a shallow layer of soil has been removed (less than 10 inches), then most of the original B horizon along with the underlying C horizon will remain. There should be enough left of the

diagnostic features in the B and C horizons to classify the soil according to its original soil series. Wetland soil types which have been subject to shallow excavation will continue to be classified as wetland. In some cases, the removal of the upper layers from an original non-wetland soil will result in a newly created soil possessing an aquic moisture regime, and hence qualify as a wetland.

2. In cases where the excavation has removed the original A and most of the B horizons, then the newly created soil would be subject to re-classification as an Entisol (??). Those Entisols which are either posses an aquic moisture regime or are subject to frequent flooding would qualify as wetlands. The subsequently formed soil needs to be carefully assessed to determine if it qualifies as a wetland. The following section provides a list of criteria that should be considered.

LIST OF CRITERIA WHICH SHOULD BE CONSIDERED TO EVALUATE IF A DISTURBED SOIL QUALIFIES AS A WETLAND

The following list provides features which are commonly found in wetlands occurring in disturbed soils. In recently disturbed areas, soil diagnostic features commonly used to determine soil drainage are often absent or only marginally developed. Vegetation and physical signs of wetland hydrology are often the best indicators of a wetland. Studies have determined that a variety of plant, soil and hydrologic indicators can often be utilized for wetland identification in disturbed soils. Some disturbed wetlands will contain many of these features, while others may only contain one or two. These features can also be found in some non-wetland areas. Experience and best professional judgement are often most important tools for wetland identification in disturbed soils. Utilization of the listed criteria for wetland identification is valid for those physically altered soils which have been subject to 20 or more inches of filling or were subject to moderate to deep excavation.

1) Landscape and landform

In general the landscape position or landform will often provide valuable clues which can indicate the likelihood of a wetland. Certain landforms tend to favor the formation of wetlands, such as depressions, floodplains, toe-of-slope, drainage ways and low-lying areas bordering water bodies. The presence of a confining layer, such as hardpan, silty-clay subsoil or bedrock, near the soil surface are also common features of wetlands.

2) Hydrologic features

Permanent or periodic inundation, or soil saturation to the surface, are the main factors of wetland formation. The following hydrologic indicators are often associated with wetlands.

a) Visual observation of inundation. Both seasonal conditions and weather conditions should be considered when observing an area, because surface water can also be present on a non-wetland site.

b) Visual observation of soil saturation. The same considerations apply as in 2 a) above.

c) Water marks. Water marks are found most commonly on woody vegetation. They often occur as stains on bark or other fixed objects. When several water marks are present, the highest usually reflects the maximum extent of recent inundation.

d) Drift lines. This indicator is typically found adjacent to streams or other sources of water flow in wetlands. Evidence consists of deposition of debris in a line on the wetland surface or debris entangled in above ground vegetation or other fixed objects. Drift lines provide an indication of the minimum portion of the area inundated during a flooding event.

e) Water-borne sediment deposits. Plants often have thin layers, coatings or depositions of mineral or organic matter on them after inundation. This evidence may remain for a considerable period. It provides an indication of the minimum level of inundation.

f) Water-stained leaves. Forested wetlands that are inundated earlier in the year will frequently have water-stained leaves on the forest floor. These leaves are generally grayish or blackish in appearance, darkened from being under water for significant periods.

g) Algal mats provide evidence of inundation (ponding or flooding) of some duration.

h) Surface scoured areas. Surface scouring occurs along floodplains where overbank flooding erodes sediments. The absence of leaf litter from the soil surface is also sometimes an indication of surface scouring.

i) Wetland drainage channels. Many wetlands have characteristic meandering or braided drainage patterns that are readily recognized in the field.

j) Oxidized channels (rhizospheres) associated with living roots and rhizomes. Iron oxide concretions (orange or reddish brown in color) form along the channels of living roots and rhizomes as evidence of soil saturation (anaerobic conditions) for a significant period during the growing season.

k) Morphological plant adaptations. Many plants growing in wetlands have developed morphological adaptations in response to inundation or soil saturation. Examples include buttressed tree trunks, multiple trunks, adventitious roots and shallow roots systems.

3) Wetland soil features.

a) Thick dark surface layer. Extended wetness impedes the aerobic decomposition of organic matter and there will be a gradual buildup of organics. Wetlands typically have a black to very dark grayish-brown surface layer. The presence of a black mucky surface is often a positive indicator for wetlands.

b) Redoximorphic features near soil surface. Development of distinctive coloration patterns, such as mottling, iron/manganese stains and gleying, are indicators used to identify poorly and very poorly drained soils. Redoximorphic features are often present even in disturbed wetland soils. Distinct red-brown mottles can be formed within several years in some recently created wetlands. The process of gleying, or the depletion of iron from a soil, typically requires a much longer period. The presence of mottling or iron/manganese stains within 12 inches of the soil surface will usually provide evidence of a poorly drained soil. A gleyed matrix within 20 inches may be an indicator of a wetland in a disturbed area.

4) Vegetative indicators

Vegetative indicator plants are often highly valuable in determining if a disturbed area is a wetland, especially those plants considered as hydrophytes. If obligate and facultative wet plant species (especially in the herbaceous layer) are dominant and upland species are absent, then the area is likely a wetland.

5) Detailed ground water studies

These studies are well-suited for those disturbed soils which are especially difficult to determine whether they qualify as wetlands. Examples of such sites would be where the vegetation has been removed or when there is contradiction among the wetland indicators. In some situations ground water studies may be the most reliable indicator for determining if a disturbed area qualifies as a wetland. Groundwater wells can be established throughout a site. They should be placed in a range of elevations so that the data obtained will be representative of the site as a whole. It is advisable to collect data during the wetter part of the growing season.

The following information serves as a general guide for determining if wetland hydrology is present. An area has wetland hydrology when saturated to the surface or inundated at some point in time during an average rainfall year, as defined below:

1. In soils with low permeability (less than 6 inches/hr) for the upper 20 inch soil layer, the water table is less than 1.5 feet from the surface for one week or more during the growing season.

2) In more permeable soils (greater than 6 inches/hr) for the upper 20 soil layer, the water table is less than 1.0 feet from the surface for one week or more during the growing season.

References Used:

1) Federal Manual for Identifying and Delineating Jurisdictional Wetlands. January 1989.

2) Keys to Soil Taxonomy. 1997. USDA

3) Wetland Indicators, A Guide to Wetland Identification, Delineation, Classification and Mapping. 1999. Ralph Tiner.

Version 5 of the Soil CD now available

Version 5 of the SSSSNE Soil and Environmental Documentation CD is now available. The new version has many new documents including the following; Soil Quality Fact Sheets, Keys to Taxonomy 2003, several lists of plant species that occur in wetlands, the National Forestry Manual and Handbook, and several other documents. In addition all the official soil series mapped in New England and New York are on the CD and linked in a web-type document. Also included is some digital soil data for SE Mass. Visit: http://nesoil.com/ssssne/soilcd.htm

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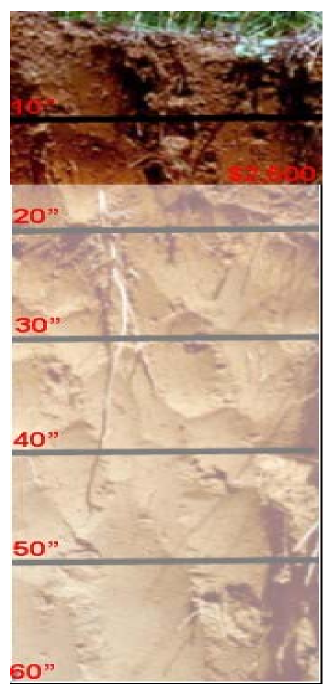
Ed Sautter Fund for the Smithsonian Soil Exhibit

Help build the Windsor Monolith for the Ed Sautter Smithsonian Soil Exhibit. We have barely gotten into the Bw1 horizon. Please donate today, if you would like to chair the Ed Sautter fund or know of individuals or companies we should contact fill out the form below. Visit: http://nesoil.com/ssssne/sautterfund.htm.



Name:____

$_______Contribution to the Ed Sautter Fund (Make checks payable to SSSSNE)

________ I would like to chair or serve on the Sautter Fund.

Here are some people/companies we should ask for contributions:_______________

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Return form to: SSSSNE, PO Box 258, Storrs, CT. 06268