



WASHINGTON STATE DEPARTMENT OF
LICENSING

Sunrise Review Report



Soil and Wetland Scientists

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Table of Contents

Executive Summary.....	2
Common Ground.....	3
Hydric Soils.....	3
Soil Scientist Services.....	4
Wetlands Scientist Services.....	5
Typical Activities.....	6
Number of Practitioners.....	6
Requirements to Become a Soil Scientist.....	7
Requirements to Become a Wetlands Scientist.....	8
Those not in Membership Associations.....	9
Soil Scientist Organizations and Background Facts.....	10
Wetland Scientist Organizations and Background Facts.....	14
Related Professions.....	18
Consumer Related Issues.....	19
Regulation in Other States.....	25
Outreach Efforts.....	29
Excerpts from Public Hearings.....	30
Comments from Practitioners, Organizations and Citizens.....	36
Soil Scientist Written Testimony.....	37
Wetland Scientist Written Testimony.....	67
Summary of Written Testimony.....	90
Additional Comments from Other States.....	92
Conclusion.....	94
Recommendations.....	99

Appendices

Commerce and Labor Committee Request for Sunrise Review.....	102
Soil Scientist Applicant Report: Response to RCW 18.118.030 Sunrise Review.....	103
Wetlands Scientist Applicant Report: Response to RCW 18.118.030 Sunrise Review..	121
Hiring a Qualified Wetland Professional.....	139
Definitions of Types of Regulation.....	143
Department of Ecology statement.....	144
Department of Agriculture comments.....	146
Testimony from Public Hearings Burien.....	147
Testimony from Public Hearings Wenatchee.....	148

Executive Summary

The Department of Licensing (DOL) was asked to conduct a sunrise review of soil and wetland scientists on May 31, 2007 by State Representative Conway and State Representative Wood. The request was for DOL to revisit the previous review conducted in 2005. Legislation was proposed following the prior review that constituted a practices act. The current effort in seeking regulation has shifted to consideration of a title act for certification of practitioners as opposed to a full practices act.

In light of the following issues, DOL recommends that the Legislature pursue a title act of voluntary certification of soil and wetland scientists in Washington State. This recommendation is due to:

- Testimony on public harm to both the individual and large scale,
- The potential for long term environmental damage,
- The current lack of recourse for consumers,
- The lack of state standards for entry-level professionals,
- Testimony of the inconsistency in the application and oversight of the work done.

Outreach to the stakeholders was made in several manners. Two public hearings for each discipline were widely publicized, with over 650 practitioners from the two professions notified in advance through electronic mail. Additionally, related professions were contacted and solicited for input. The hearings were conducted in Burien and Wenatchee, with relatively low turnout. There was however a fairly good response in written testimony, which is included in the body of the report.

Membership organizations for each profession were reviewed and analyzed as to their entry requirements, practices, and membership numbers within the state. It was found that about 375 practitioners reside in Washington. The number of non-member practitioners was not available through the Department of Revenue, as the codes given their businesses are “other professionals” which encompass a multitude of occupations.

Public harm, a key factor in sunrise reviews, was problematic to identify. As with most unregulated professions, no agency is responsible to collect and keep records of complaints. There was evidence found of some large scale public harm instances in Cowlitz county septic systems and eastern Washington agricultural wastewater applications. Testimony by practitioners of cases of harm where individual landowners experienced harm due to poor work done by unqualified scientists and complaints received by the Attorney General’s office are provided in the report.

Testimony, both verbal and written, was split on the question of regulation. Wetland comments were, on the whole, slightly more than 50% in favor. Soil debate overall was stronger, with about 75% in favor of regulation. When the pro/con tally was viewed by the occupation of those testifying, it was found that opposition was more likely from related professions than from soil or wetland practitioners. With the concerns expressed during the last legislative session over the proposed practices act and the concerns

provided to DOL, it is clear that those in related professions have concerns about potential affects on the work they customarily do. The intent of the applicant's proposed title act is, in part, an attempt to mitigate some of those concerns. Clarification of this factor, should certification be pursued, would be perhaps beneficial to those with practices concerns.

Two Professions—Common Ground

The directive provided to DOL was to include both the wetland and soil scientist professions in this review process. While each discipline provides a distinct set of services, the overlapping common practice is the identification of *hydric soils*, otherwise known as wetland soils (see definition below). This commonality between the two professions allows for their grouping in the consideration for joint regulatory enactment. The first few sections will deal with the two individually for familiarization purposes. Following that, the report will address the industries in a more uniform manner.

Hydric Soils¹

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

Most soils are aerobic. This is important because plant roots consume oxygen and carbohydrates while releasing carbon dioxide and there must be sufficient air -- especially oxygen -- in the soil to support most forms of soil life. Air normally moves through interconnected pores by forces such as changes in atmospheric pressure, the flushing action of rainwater, and by simple diffusion.

In addition to plant roots, most forms of soil microorganisms need oxygen to survive. This is true of the more well-known soil animals as well, such as ants, earthworms and moles. But soils can often become saturated with water due to rainfall and flooding. Gas diffusion in soil slows (some 10,000 times slower) when soil becomes saturated with water because there are no open passageways for air to travel. When oxygen levels become limited, intense competition arises between soil life forms for the remaining oxygen. When this anaerobic environment continues for long periods during the growing season, quite different biological and chemical reactions begin to dominate, compared with aerobic soils. In hydric soils where saturation with water is prolonged, unique soil properties usually develop that can be recognized in the field.

¹ Definition from *Wikipedia*

Soil Scientist Services

What is a soil scientist?²

A soil scientist studies the upper few meters of the earth's crust in terms of its physical and chemical properties; distribution, genesis and morphology; and biological components. A soil scientist needs a strong background in the physical and biological sciences and mathematics.

What is soil science?

Soil science is the science dealing with soils as a natural resource on the surface of the earth including soil formation, classification, and mapping; physical, chemical, biological, and fertility properties of soils; and these properties in relation to the use and management of the soils.

Soils play multiple roles in the quality of life. Soils are not only the resource for food production, but they are the support for our structures, the medium for waste disposal, they maintain our playgrounds, distribute and store water and nutrients, and support our environment. They support more life beneath their surface than exists above. They facilitate the life cycle of growth, sustenance and decay. They influence the worldwide distribution of plants, animals, and people.

What does a soil scientist do?

Soil scientists work for federal, state and local governments, universities, and the private sector. The job of a soil scientist includes collection of soil data, consultation, investigation, evaluation, interpretation, planning or inspection relating to soil science. This career includes many different assignments and involves making recommendations about many resource areas.

A soil scientist needs good observation skills to be able to analyze and determine the characteristics of different types of soils. Soil types are complex and the geographical areas a soil scientist may survey are varied. Aerial photos or various satellite images are often used to research the areas. Computer skills and geographic information systems help the scientist to analyze the multiple facets of geomorphology, topography, vegetation, and climate to discover the patterns left on the landscape.

² Definition of Soil Scientist occupation used with permission from the US Dept. of Agriculture, Natural Resources Conservation Service. Some elements of the USDA definition which applied to Wetland Scientist are used in that section.

Wetlands Scientist Services

What is a wetland scientist?

A wetland scientist studies primarily the upper meter, more specifically the first 12-24 inches, of the earth's surface in terms of its physical and hydrological properties. A wetland has three criteria that must be present for an undisturbed area to be called a wetland: wetland hydrology (the way water enters, is retained and released by a wetland); wetland vegetation (specific plant life that grows mainly in wetlands); and wetland soils, commonly known as hydric soils. There are many aspects within the title of wetland scientist, some of which include wetland consultants, wetland specialists, wetland biologists, wetland ecologists, and wetland delineators. For the purposes of this report, much of the focus will be on the functions of the delineation of wetlands. A wetland delineator has the task of the identifying and determining the boundary which divides a wetland from a non-wetland, or *upland*. The process of defining these boundaries is called *delineation*.

What is wetland science?

Wetland scientists use their skills and experience in field botany, soil science, hydrology and sampling procedures, as well as the federally and state approved wetland delineation methods, to determine and document where a wetland begins and ends. Delineators usually are private consultants, but a delineator can be anyone with the necessary skills and equipment. The result of a delineator's efforts is a wetland delineation report, which consists of a map of the wetlands and supporting data sheets, written descriptions and photographs.

A wetland delineation is performed when a planned activity will involve placing fill material in a potential wetland area. Common activities that involve placing fill include grading and leveling, the construction of malls, housing development, golf courses and roads. Project planners need to know where the wetlands are and how big they are so they can comply with federal and state laws governing work in wetlands.

What does a wetland scientist do?

A wetland scientist also requires good observation skills to be able to analyze and determine the boundaries separating wetlands and uplands and to properly identify often difficult areas as wetlands. It is a common thought among the public that a wetland would be a pond or a marsh or any landlocked water body. However, these are only the obvious wetlands. More difficult is the determination of seasonal wetlands which may appear quite unlike a wetland during much of the year. However, the three factors of hydrology, plants, and hydric soils provide the evidence to the trained eye that a seemingly apparent upland in a dry period of the year is actually a wetland. Determining the presence of hydric soils is often complex, and the geographical areas in Washington State vary significantly by region. Recall that the determination of hydric soils is a common function practiced by both wetland and soil scientists.

Typical Activities of Soil and Wetland Scientists

Soil and wetlands scientists work in a variety of activities. Either scientist's job may involve:

- Conducting general and detailed soil surveys
- Determining the hydric (wetness) characteristics of the soil
- Delineation of wetland boundaries
- Recommending soil management programs
- Recommending wetland mitigation strategies
- Helping to design hydrologic plans in suburban areas
- Providing site maps and technical reports on wetland delineations
- Monitoring the effects of farm, ranch, or forest activities on soil productivity
- Identifying the location of a wetland by GPS point, or marked on aerial photos/ hand-drawn map
- Giving technical advice used to help plan land management programs
- Acquire and review existing topographic maps, National Wetland Inventory maps, National Cooperative Soil Survey (NCSS) soil surveys
- Predicting the effect of land management options on natural resources
- Design and apply site specific, appropriate technologies necessary to meet project goals
- Preparing reports describing land and soil characteristics
- Advising land managers of capabilities and limitations of soils
- Conducting research in public and private research institutions
- Managing soils for crop production, forest products and erosion control management.
- Evaluating nutrient and water availability to crops
- Managing soils for landscape design, mine reclamation, and site restoration
- Investigating forest soils, wetlands, environmental endangerment, ecological status, and archeological sites
- Assessing application of wastes including non-hazardous process wastes (residue and sludge management)
- Conducting studies on soil stability, moisture retention or drainage, sustainability, and environmental impact
- Regulating the use of land, soil, and water resources by private and public interests (government agencies)

Number of Practitioners

There are many aspects regarding the membership requirements, testing processes and continuing education mandates that exist within the Standards of Practice of the professional organizations for soil and wetland scientist that operate in this state. These elements will be outlined in subsequent sections in detail. Using the organizational

counts, we can estimate the number of practitioners in both professions, providing some idea of the number of those in a potential licensee group.

The Pacific Northwest Chapter of Society of Wetland Scientists (PNSWS) stated that as of August 2007, they have about 240 members in Washington and about 450 members in the region which also encompasses Oregon and Idaho. It's reasonable to assume that some of the members along the borders may find it practical, based on their customer base, to work in Washington, which would increase the number slightly to something greater than 240.

The Soil Science Society of America provided information to the DOL for a 2007 fiscal note that indicates about 134 applicants for license could be expected. This fiscal note took into consideration non-Washington residents from neighboring states which would likely be licensed. The soil scientist applicant report in the appendices of this review indicates they believe as many as 200 qualified soil scientists may live in Washington. If true, this would increase the number by another 66 potential licensees. For our purposes, we'll use the lower number so as to avoid an over count.

Together, these membership organization counts total at least 374, which would constitute the known population. Another consideration is the unknown number of practitioners that choose not to belong to any membership organization which is addressed in the "*Those Not in Membership Organizations*" section below.

Requirements to Become a Soil Scientist

Washington State currently has no set requirements to be a soil scientist. However, many practitioners belong to one or more professional societies which do have membership criteria. These organizational affiliations provide added assurance to prospective employers that the soil scientist has completed an educational curriculum as well as been tested and passed the criteria of the membership organization which also requires a length of experience in field work. While this is useful to prospective employers and practitioners alike, it provides less assurance to consumers or the public in general when problems from errant work occur and no formal means of recourse is available. The membership organizations have some degree of influence over their members and can take disciplinary action up to de-certification, but they have little to no influence in arranging remedial actions for harmed consumers.

The applicant group for soil scientists references the membership qualification criteria for the Soil Science Society of America (SSSA) as a model for determining entry level competence for state certification of soil scientists. The SSSA is a nationally recognized organization that has developed and maintained a highly regarded, professional certification program.

The SSSA exam is offered in two levels, based on experience and training. The first level, Associate Professional Soil Scientist (AAPSS), is primarily for those just

graduating from college. The second level, Certified Professional Soil Scientist (CPSS), requires a second test and a minimum of 5 years field experience.

The qualifications criteria for SSSA membership are:

- Education: A minimum of a Bachelors degree in soil science or a closely allied field of science, meeting the core requirements defined in the application.
- Work Experience: No work experience required for Associate level. For Certified Professional levels, a minimum of 5 years work experience in the field for those holding a Bachelors degree is required. Those holding a PhD or Masters degree are required to have 3 years field experience. All experience must be acquired after the Bachelors degree was received.
- Examinations: Two comprehensive exams are required for membership entry: *The Fundamentals of Soil Science* and *Professional Practice*. The exams are not scored on a curve and are changed regularly. The questions are developed by the Council of Soil Science Examiners (CSSE), which is a panel of about 30 soil scientists from across the nation. The Associate level must pass only the Fundamentals test. Certified Professional level must also pass the Professional Practice exam.
- Cost: Each exam costs \$125 per attempt and they are offered twice yearly.
- Ethics: A code of ethics is maintained and applicants must subscribe to its standards.

Requirements to Become a Wetland Scientist

Washington State currently has no set requirements to be a wetland scientist. Much like the soil scientists, the wetlands profession also has membership organizations to which many practitioners belong. The Society of Wetlands Scientists (SWS) is the national organization which has chapters branching out nationally in regions as well as chapters in Canada, Australia, Asia, Europe, and South America. They also have an International chapter comprised of 450 members from 62 countries not within the other chapters. Washington belongs to the Pacific Northwest Chapter of the Society of Wetland Scientists (PNSWS) along with Oregon and Idaho.

The SWS has developed a widely accepted certification process for its members. The SWS reports that there are not currently any other certification programs for wetland scientists nationally. The organization has, as in the soil scientist's case, some degree of authority over the wetland scientists regarding entry level competency, ethics, standards of practice and the continuation of certification status based on standards of practice, but lacks any real ability to provide relief to harmed consumers or the public.

The wetlands applicant group has referenced the SWS membership standards as a model for certification in Washington State. The SWS certification program provides entrance criteria for two levels of membership, based on education and experience. The Wetland Professional in Training (WPIT) level is designed primarily for those who have finished their educational requirements, but lack the experience needed to apply for the fully credentialed level, the Professional Wetland Scientist (PWS).

The qualifications criteria for SWS membership are:

- Education: Minimum of a Bachelors degree with course distribution of 15 semester hours each in biological and physical sciences and 6 semester hours in quantitative areas. For the PWS level, an additional 15 semester hours in wetland related courses is required.
- Work Experience: None required for the WPIT. To apply for a PWS level, a minimum of 5 years field experience is required that demonstrated the application of current technical knowledge dealing with wetland resources and activities. All work experience must be acquired after receiving the Bachelors degree.
- Exams: No exam required. Competency based on verified educational achievement and, for the PWS level, demonstrated/documented/verified work experience.
- Cost: The SWS has an application fee of \$100 for the WPIT level and \$200 for the PWS level, and a \$35 annual fee thereafter.
- References: Five listed references, three of which must be SWS members, must provide a statement in favor of your application and membership.
- Ethics: A code of ethics is required to be acknowledged and followed.

Those not in Membership Organizations

There are some practitioners in Washington that are not members of an organization for either wetland or soil scientists. These individuals would practice their profession based on educational merit or experience gathered and be required to market their services without benefit of certification status by either a national or state chapter of a professional organization. As both disciplines are highly technical and require advanced education, the likelihood that a professional would forgo the benefit of certification through a professional society is low. However, it is known that some do and rely on their reputation to persuade employers to hire them in the private sector. In the public or governmental sector, practitioners may not be certified, as their scope of duties is decidedly different.

The Department of Revenue (DOR) was contacted regarding practitioners in the private sector in the hope that an NAICS code was available to identify wetland and/or soil

scientists. Upon review of the options, it was determined that most would fall into a catch-all code for “other professionals” and hence the DOR could not isolate them. In the end, although we can’t identify these unknowns, we can conservatively estimate the total population at approximately 134 soil scientists and 240 wetland scientists practicing in Washington.

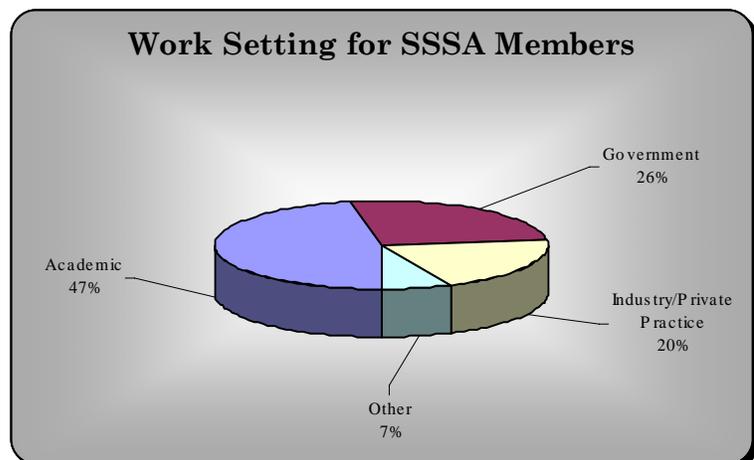
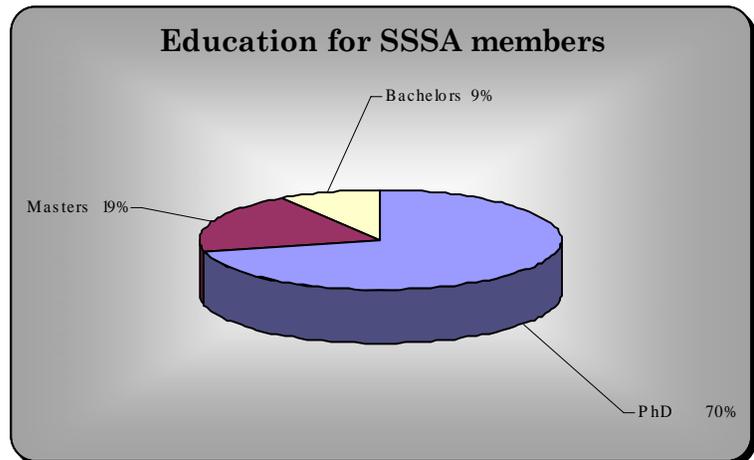
Soil Scientist Organizations and Background Facts

Soil Science Society of America

The Soil Science Society of America (SSSA) is the national leader in the realm of professional soil scientist membership organizations. With over 5,800 members nationally, it is the largest and most influential. The SSSA holds an annual meeting that draws an average of nearly 4,000 members in attendance. The Society was formed in 1936, as an offshoot of the American Society of Agronomists (ASA) which was founded in 1907.

In the summer of 2005, SSSA conducted a survey³ of its members and gathered many important statistics regarding its membership criteria. Some of their findings are reproduced here to provide a view of what makes up the SSSA membership in terms of education, tenure, work environments, and reasons for joining SSSA.

Data was solicited over the internet from 3,291 potential SSSA members who were invited to participate and a total of 1,000 responses were received, representing 30% of the population. From these, a sample of 600 surveys was randomly chosen from which the data was derived.

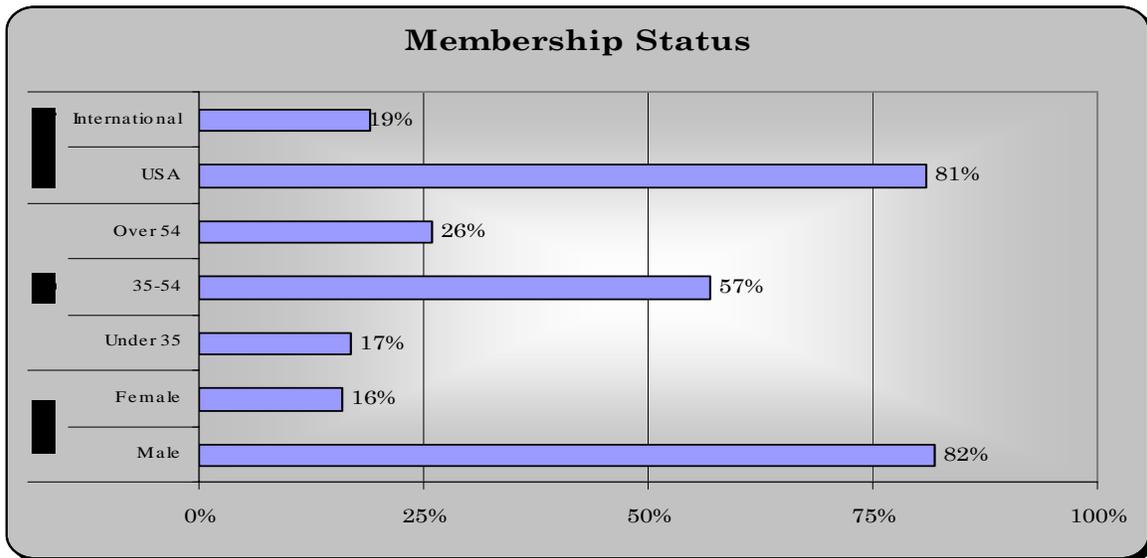


³ Complete survey can be reviewed at https://www.soils.org/pdf/SSSA_SurveyFindings.pdf

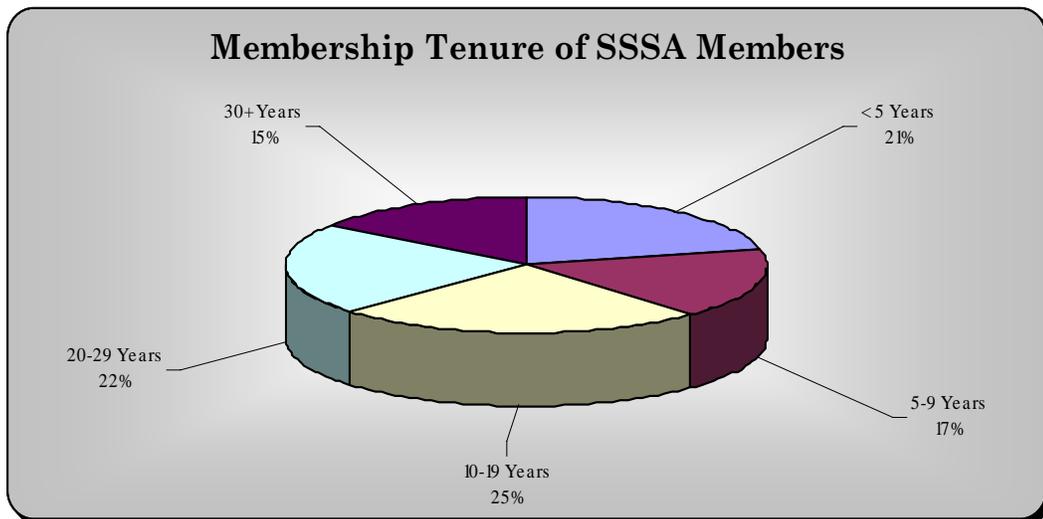
To belong to SSSA, Soil scientists must have at least a Bachelors degree to practice. The chart above indicates most have a PhD. SSSA indicated that this may be an over representation due to the members who were most likely to participate in the survey.

Regarding work location, nearly half of those that responded indicated they work in an academic environment. About a quarter indicate government employment and another quarter work in private practice or industrial employ.

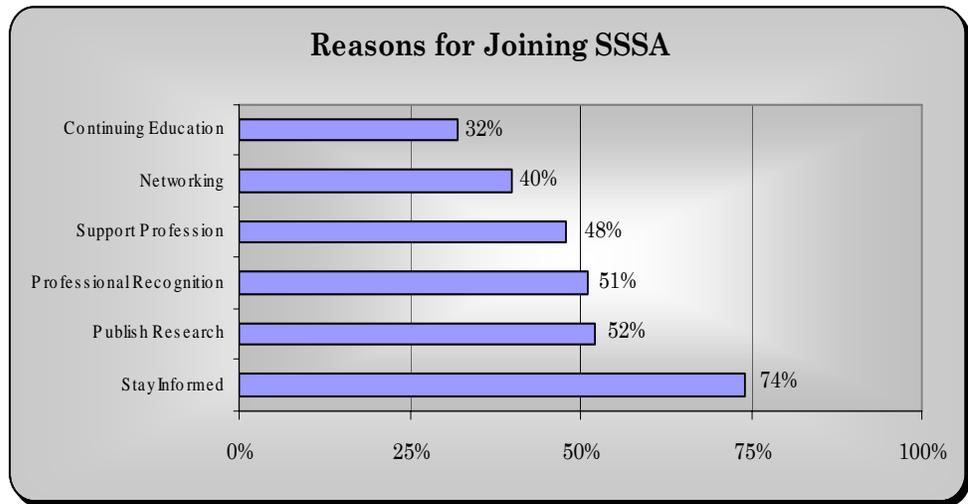
SSSA members are primarily male, with 16% indicating otherwise (2% did not respond). Memberships span the world, but over 80% are US residents. Member ages were categorized in three groups of under 35, 35-54, and over 54.



The average tenure of an SSSA member is 15 years. The distribution by age group shows that there is a good balance of long, middle, and short term members. This would indicate that the organization is successfully recruiting new members and is in a healthy position to continue in the future.



Members were asked for their reasons for joining the SSSA. Most indicated that the society afforded them an opportunity for information to help them stay informed about issues pertaining to



their profession. Over half use the certification through SSSA as a way to gain professional recognition and half use it as a vehicle to publish their research papers. Continuing education and networking, with 32% and 40% responding, were also important reasons for membership.

The SSSA requires that applicants pass both a fundamentals exam as well as a professional practices exam, have 5 years experience (3 with an MS or PhD), provide professional references and adhere to a code of ethics.

The National Society of Consulting Soil Scientists

The National Society of Consulting Soil Scientists (NSCSS) is another national organization with membership limited to private sector companies owned by soil scientists, with 189 member companies as of August 2007. They meet annually in the late winter when the profession is slowest and exchange experiences and insights. Business skills workshops, job referrals, and a group liability insurance option are a few of the benefits. The NSCSS maintains a professional registration program and a Code of Ethics. Their membership criteria mirrors the SSSA.

The United States Consortium of Soil Science Associations

The United States Consortium of Soil Science Associations (USCSSA) is a framework established to promote national communication and coordination between soil science societies and associations. There are currently 48 individual state soil science societies and/or associations. The goal of the USCSSA is for all soil science societies/associations to share information and work together in promoting common goals, objectives, and activities.

A listing of the organizations participating in the USCSSA effort provides a good example of the depth of the soil science profession and its organizational support across the nation:

Professional Soil Classifiers Association of Alabama State Board of Registration for Professional Soil Classifiers - Alabama Alaska/Yukon Society of Professional Soil Scientists Soil Science Society of America Arkansas Association of Professional Soil Classifiers Arkansas State Board for Registration of Professional Soil Classifiers Professional Soil Scientists Association of California Florida Association of Environmental Soil Scientists Soil Science Society of Georgia Idaho Soil Scientists Association Illinois Soil Classifiers Association Indiana Association of Professional Soil Classifiers Indiana Registry of Soil Scientists Board Professional Soil Classifiers of Iowa Kansas Association of Professional Soil Classifiers Kentucky Association of Soil Classifiers Maine Association of Professional Soil Scientists Mid-Atlantic Association of Professional Soil Scientists (DE, MD, DC) Soil Classifiers Association of Michigan Minnesota Association of Professional Soil Scientists Professional Soil Classifiers Association of Mississippi Missouri Association of Professional Soil Scientists National Society of Consulting Soil Scientists Nebraska Society of Professional Soil Scientists	New Hampshire Association of Natural Resource Scientists Society of Soil Scientists of Northern New England (ME, VT, NH) New Jersey Association of Professional Soil Scientists New Mexico Association of Professional Soil Scientists Empire State (New York) Pedologists Soil Science Society of North Carolina North Carolina Board for Licensing Soil Scientists Professional Soil Classifiers Association of North Dakota Association of Ohio Pedologists Professional Soil Scientists Association of Oklahoma Oregon Society of Soil Scientists Pennsylvania Association of Professional Soil Scientists Soil Science Society of South Carolina South Carolina Land Resources Commission Professional Soil Scientists Association of South Dakota Society of Soil Scientists of Southern New England (CT, MA, RI) Soil Scientists Association of Tennessee Professional Soil Scientists Association of Texas Utah Society of Soil Scientists Virginia Association of Professional Soil Scientists Washington Society of Professional Soil Scientists West Virginia Association of Professional Soil Scientists Wisconsin Society of Professional Soil Scientists Association of Women Soil Scientists
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What's so important about soil science?

While the value of soil, relative to wetlands, has been better understood for a longer period of time, many still have difficulties comprehending the value of this thin layer of life from which all other life on earth depends. Consider the campaigns of the forestry industry on the value of “renewable resources” in reference to re-planting harvested forests. While this is certainly a step in the right direction, much of the public believes that as long as we replace the harvested trees with new saplings, all will be well and the forest will be sustained forever. Unaccounted for in this scenario is the depletion of the soil from which the forest survives, for a harvested forest is not allowed to naturally recycle itself and does not as efficiently replenish its soil with the nutrients needed to sustain it. Thus, the renewable resource will be so only as long as the life beneath it remains viable.

Not to be confused with the mineral components associated more with geology and engineering, soil is a living, breathing myriad of organisms that feed all the forms of life we know, either directly or indirectly, which, in turn, will be returned to the soil upon their deaths to become nourishment for others. Thus, when answering the question of soil's importance to the environment and society, the only responsible answer is that it is not *important*; it is *critical*.

Wetland Scientist Organizations and Background Facts

Society of Wetland Scientists

The Society of Wetland Scientists (SWS) is the premier national and international organization for wetland practitioners. They claim an approximate total membership of 3,500 with chapters throughout the nation. The SWS was formed in 1980 by a biologist with the US Army Corps of Engineers. Since then, they have provided a forum for scientists and managers to meet and work together. By 2005, the Society's membership was fairly evenly divided among government employees, academic scientists, and private consultants. A Code of Ethics, Strategic Plan and a set of by-laws and rules are available for review at the national website. Washington belongs to the Pacific Northwest Chapter (PNSWS), which comprises approximately 450 wetland scientists in the tri-state region and about 240 in Washington State.

Certification by the SWS as a Wetland Professional in Training (WPIT) is considered a preliminary step for persons who have completed the educational requirements but do not meet the experience requirements. Professional Wetland Scientist (PWS) certification is awarded to those meeting both educational and experience requirements. Although certification is not a requirement to practice wetland science in Washington, The PNSWS explains its value to Washington wetland scientists as such:

- “Certification is not required by any agency and has no official or legal standing. Certification signifies that your academic and work experience meet the standards expected of a practicing wetland professional and provides acknowledgment to your peers of your adherence to the professional ethics of the Society of Wetland Scientists Professional Certification Program. Certification will aid in acceptance by other disciplines, especially in multi-disciplinary work environments.”

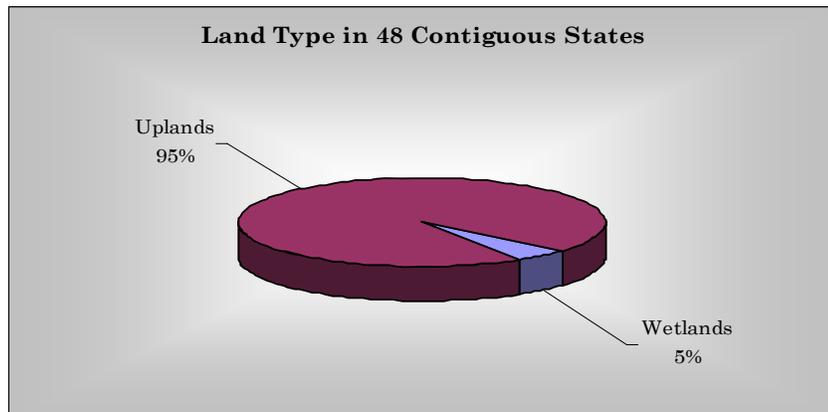
The SWS indicates that they maintain the only complete wetland certification program in the nation, noting that the US Army Corps of Engineers developed a certification pilot program specific to wetland delineation.

The SWS is a relatively new organization compared to their soil science counterpart, the SSSA. Founded in 1980, the SWS is now 27 years old at the time of this writing. Clearly wetlands science is an emerging and important aspect of our environmental and social responsibility. Facts that may be helpful in defining the importance of these two professions are outlined in the next section.

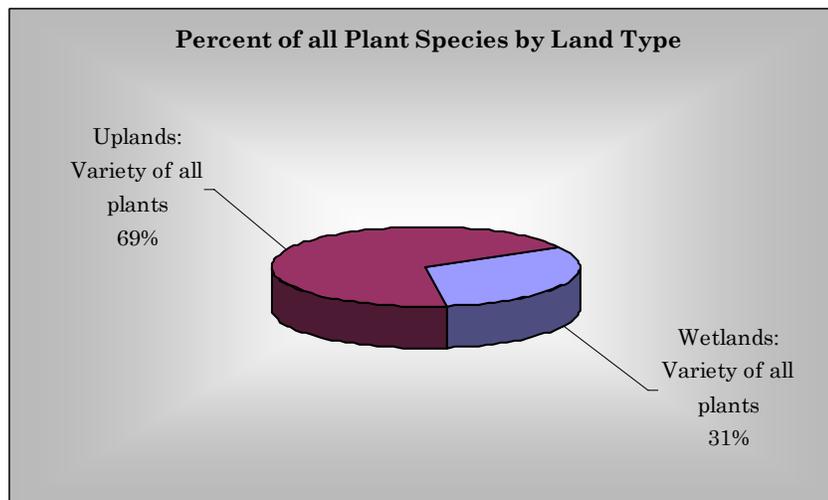
Wetlands science has recently become an important element in the management of our environment. Previous beliefs about wetlands being a nuisance and an obstacle to development resulted in significant losses. More than 220 million acres of wetlands are thought to have existed in the lower 48 states in the 1600s. Since then extensive losses have occurred, and more than half of our original wetlands have been drained and converted to other uses. The mid-1950s to the mid-1970s were a time of major national

wetland loss. Since then the rate of loss has slowed. Presently, it's estimated that the US has approximately 107.7 million acres of remaining wetlands.⁴

Wetlands make up a small percentage of the overall land mass, representing about 5% of the 48 contiguous states. Of those 5% which are wetlands, 95% of are freshwater.



While wetlands represent only 5% of the land, the plant diversity of life found there is remarkable. Over 30% of all plant species are found in wetlands.⁵



Until the very recent years, wetland losses were substantial. According to the T.E. Dahl report of 2006, between the 1780's and mid-1980's a total of 22 states lost more than 50% of their wetlands (listed below). Washington, a relatively new region in the US, has to date lost 31% of its known wetlands according to the Association of Wetland Managers⁶. The time is right to address the importance of appropriate qualifications of wetlands delineators and ensure we have in place the best available policies to properly identify and manage our resources.

⁴ Dahl, T.E. 2006. Status and trends of wetlands in the conterminous United States 1998 to 2004. U.S. Department of the Interior; Fish and Wildlife Service, Washington, D.C. 112 pp

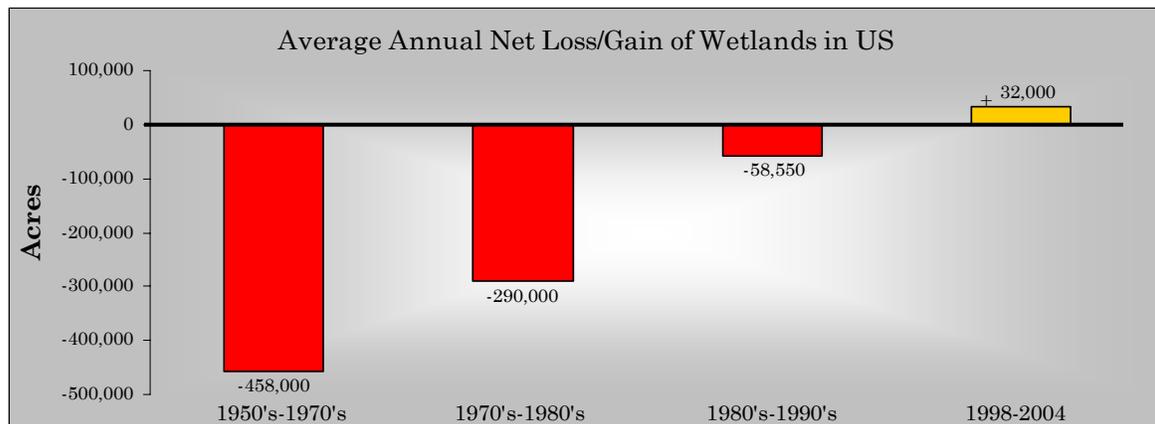
⁵ United States Environmental Protection Agency <http://www.epa.gov/owow/wetlands/pdf/threats.pdf>

⁶ Association of State Wetlands Managers. <http://aswm.org>

The states that have lost at least 50% of their wetlands are:

Alabama 50%	Idaho 56%	Mississippi 59%
Arkansas 72%	Illinois 85%	Missouri 87%
California 91%	Indiana 87%	New York 60%
Colorado 50%	Iowa 89%	Ohio 90%
Connecticut 74%	Kentucky 81%	Oklahoma 67%
Nevada 52%	Maryland 73%	Pennsylvania 56%
Delaware 54%	Michigan 50%	Tennessee 59%
		Texas 52%

Not all the news regarding wetlands is bad. The most recent data indicates that the nation has recognized the importance of wetlands and has taken steps to improve in our maintenance and restoration of them. Much of this has been due to an increase in understanding the value of wetlands and subsequent legislation from the state and federal levels designed to protect it. Up until about 1998, we nationally lost wetlands annually. The chart below provides a look at how our nation's efforts have changed the trend.⁷



As the chart indicates, for the first time in our recorded history, the US has a net annual gain of wetlands which amounts to the beginning of a successful restoration effort of this important resource. It is astounding to consider that just 40 years ago, we were losing over a half million acres of wetland a year while today we are seeing a net annual gain. While the restoration of 32,000 net acres of wetland per year is an astounding turn around for the US, it is important to keep in mind that an estimated 100+ million acres have been lost. To put this in perspective, if the US continued to recover 32,000 acres of wetland per year, it would require over 14 years to recover one (1) year's loss from the 1970's.

⁷ Dahl, T.E. 2006. Status and trends of wetlands in the conterminous United States 1998 to 2004. U.S. Department of the Interior; Fish and Wildlife Service, Washington, D.C. 112 pp

What's so important about wetlands?

As the chart above might suggest, our concern about the importance of wetlands has changed dramatically over several decades. Where a wetland was once considered a mosquito infested soggy plot of land that was unsuitable for farming, development, recreation, or any other human oriented activity, the value of wetlands was not clearly understood until much of it was converted to upland status. This was done by filling or draining the land, mostly for the benefit of human expansion. A detailed explanation of the benefits of wetlands is provided below.

Importance of Wetlands⁸

Wetlands perform an array of ecological functions that we have only recently begun to appreciate. A century ago the president of the American Health Association promoted the idea of a national campaign to eliminate wetlands. Today scientists recognize the environmental benefits that wetlands provide, and they are now alerting us to the importance of preserving rather than eliminating our wetland resources. Wetlands perform vital ecological functions that were barely recognized a few short years ago.

Even now our understanding of the complexities of wetland ecosystems is still developing, and it seems the more that is learned, the more valuable wetlands become. Wetland ecologists have already documented the following environmental benefits of wetlands: water purification, flood protection, shoreline stabilization, groundwater recharge, and stream flow maintenance. Wetlands also provide habitat for fish and wildlife species, including endangered species.

Water Purification

Wetlands protect water quality by trapping sediments and retaining excess nutrients and other pollutants such as heavy metals. These functions are especially important when a wetland is connected to groundwater or surface water sources (such as rivers and lakes) that are in turn used by humans for drinking, swimming, fishing, or other activities.

Flood Protection

Almost any wetland can provide some measure of flood protection by holding the excess runoff after a storm, and then releasing it slowly. The size, shape, location, and soil type of a wetland determine its capacity to reduce local and downstream flooding. While wetlands cannot prevent flooding, they do lower flood peaks by temporarily holding water and by slowing the water's velocity. Wetland soil acts as a sponge, holding much more water than other soil types.

⁸ Joy P. Michaud. At Home with Wetlands: A Landowner's Guide. Washington State Department of Ecology, Ecology Publication #90-31 At Home with Wetlands (five benefits of wetlands cited)

Shoreline Stabilization

Wetlands that occur along the shoreline of lakes or along the banks of rivers and streams help protect the shoreline soils from the erosive forces of waves and currents. The wetland plants act as a buffer zone by dissipating the water's energy and providing stability by binding the soils with their extensive root systems.

Groundwater Recharge and Stream flow Maintenance

Aquifers and groundwater are "recharged," that is, replenished with water by precipitation that seeps into the ground and by surface waters. Those wetlands that are connected to groundwater systems or aquifers are important areas for groundwater exchange. They retain water and so provide time for infiltration to occur.

Fish and Wildlife Habitat

Many species of birds, fish, mammals, reptiles, and amphibians rely on wetland habitat for breeding, foraging, and cover. The special wetland conditions provide unique habitat for species that cannot survive elsewhere. Migratory birds depend on wetlands, and many endangered and threatened animal species require wetlands during part of their life cycle. The high rate of wetlands loss has contributed to their demise.

Economic Benefits

The economic benefits associated with these environmental values of wetlands also can be substantial. If, for example, a community had to build flood control or water treatment systems to replace those functions provided by wetlands, the costs could far outweigh the land purchase price of preserving the natural wetland systems.

Related Professions

During the public hearings as well as through written comments, several related professions have voiced opinions regarding possible legislation for soil and wetland scientist regulation.

In previous legislative action, opposition to soil scientist regulation was heard from related professions who seemed focused on concerns regarding the limitation of practices common to their profession through the licensure of soil scientists. With the current effort, the applicant groups from both soil and wetland scientists have proposed a title act in the effort to mitigate the concerns regarding limitation of practices. An excerpt from the soil scientist website demonstrates their position:

“Hydro-geologists, geologists, engineers, architects, septic system designers, professional wetland scientists, or crop specialists will not have to get a soil scientist license. All state-licensed professionals are exempt from our licensing program. In addition, we exempt many unlicensed professionals that typically apply some aspects of soil science in their

day to day work. We recognize that there are other professionals that use concepts of soil science in their work. We state that and explicitly and implicitly exempt those professionals in the proposed regulation. We are not trying to regulate other professions that we respect and work with daily. We are trying to ensure that the *soil scientists* who work in this state are held to a high standard; we are not trying to carve out a separate set of practices that only we can carry out.”

While there is still opposition to regulation by some of the aforementioned professions, the reasons cited are varied. Rather than practices concerns, there is emphasis on the lack of a perceived need for licensure, a perception that the requested certification status would be ineffective, and a concern that the applicant groups are using the process to “enhance their professional status”. It is perhaps noteworthy that most of those that oppose licensure of soil and wetland scientists are currently licensed in their own profession. Examples of these concerns are found in the Comments from Practitioners, Organizations, and Citizens section.

Many of these related professions perform similar functions as performed by soil and wetland scientists in the realm of their everyday duties. However, they are also generally different in the sense that they are looking at the land in reference to a load bearing capacity, where the applicant groups are most often defining the composition of the land from a natural or environmental stance. Simply put, one looks at what the land can handle, while the other defines its composition and function. Both schools of thought are important and compliment each other, but distinct differences exist.

Consumer/Public Related Issues

When an industry is not regulated, there normally is not a central location which maintains records of complaints or corrective measures taken. Such is the case with the soil and wetland professions. Knowing this, efforts were made to seek out consumer or public concerns through other channels.

Attorney General’s Office

The Washington State Attorney Generals Office, Consumer Protection Division (AG) was contacted and asked if they had any consumer complaint data relative to soil or wetland scientists. Following an electronic review of their database, several instances were identified which are summarized below. It is noteworthy that the AG’s office has no authority to enforce a resolution, but will contact the parties to ask that they resolve the issue. Barring an agreement, the matter would require an action in the courts.

- In September 2007, a consumer in Clallam County complained that they were entitled to a refund from a soil scientist who they’d contracted for a perc test and septic system design. The consumer cancelled the contract and felt the contractor owed them the balance for work not yet completed. As the claimed balance due is approximately \$300, the matter is unlikely to be pursued.

- In May 2006, a land owner contracted a wetlands biologist to determine the wetlands status on their property. The land owner wished to build a home in Mason County. A \$500 initial down payment was made and the wetlands biologist determined that the property had abundant saturated soils and runoff from natural seeps. The biologist informed the land owner that development of the property for residential use would require a costly variance procedure from the Mason County Critical Area regulations. The land owner identified another wetland consultant who had offered to obtain a permit for their home at a much higher fee who had “fixed” a neighboring property which was “worse than” the land owners property in regards to wetlands. The original biologist disagreed with the other biologist’s position and determined he would refund the remaining money from the \$500 deposit. The land owner presumably used the report of the second biologist and sought return of his entire \$500 deposit from the first. Clearly the consumer in this case sought an answer that would allow him to build rather than an objective report on the condition of his land.
- In January 2004, a soil scientist was contacted and asked if he could determine where a septic system should be located on land owned by a consumer in Burlington Washington. The scientist indicated that he could do the work promptly, as it was slow during winter. He requested \$1,000 of the \$1,800 fee up front so he could “fix a broken down vehicle” and said he would bring a contract over on his next visit. The contract was never produced. After several unanswered calls, in late February the work had not been done. A complaint was filed and the scientist contacted. In mid-March, only after notification by the AG’s office, the work was completed. The land owner was held up for three months while the soil scientist failed to do work he promised could be done right away.
- In June 2005, a telephone call was placed to a soils specialty company in Sequim Washington about septic design questions on undeveloped property in Sequim owned by a school teacher in Seattle. She (land owner) advised them that she needed to have a well put in, locate a proper septic site, and planned to have a home moved on the property. She was under the assumption that the inquiry was preliminary to any work, as no contract was discussed, nor any paperwork signed. The business contacted the Clallam County Environmental Health office and designed a plan for a septic system. They then billed the land owner \$934 for the design. When the payment was not made, they sent it to collections. The owner of the business and the land owner never spoke, although she attempted to call a number of times and he was never in. The land owner filed a complaint with the AG’s office in February 2006 and the matter remains unresolved.
- In June 2007, property owners living in Union Washington filed a complaint against a soils company in Sequim (same as above) regarding their rental property in Port Townsend. The renters had cut overflow alarm wires on the septic system to silence it and the neighbors filed a complaint with the local Health Department when sewage spilled onto their property. The land owners learned of this and hired the soils company to assess the problem and develop a solution. They paid the firm \$600. The company claims they completed the work, but failed to supply the report. The contractor hired would not proceed without approval from the Health Department, and the Health Department wouldn’t approve without the

report. It was never produced. The land owners, unable to navigate this problem from their home in Union decided to sell the property “as is” and absorbed the loss.

- Perhaps one of the most compelling examples of a failure in mitigating disputes among practitioners, the public and governmental authorities began in 1998 and continues to be a concern today. Two wetlands consultants, partners in their firm, were on a site in Kirkland with a Department of Ecology (DOE) supervisor, a Kirkland Planning Department official, the potential land buyer, an attorney and a third party soil scientist hired by the buyer. The wetlands consultants had dug holes with a backhoe and were present with the aforementioned to determine wetlands status, as the land had many telltale signs in its vegetation. The wetlands consultants, angered by the positive wetland determinations made, became aggressive to the DOE supervisor, shouting in his face in an attempt to intimidate him. A complaint was filed with the American Registry of Certified Professionals in Agronomy, Crops, and Soils (ARCPACS). The DOE also notified the wetlands consultants of its intent to pursue a complaint. The language in the DOE letter to the consultants outlines the fact that their behavior was seen as intimidation of a state employee and could result in criminal prosecution. An investigation by the ARCPACS ethics board was undertaken which resulted in no determination by the ethics board. Clearly the efforts to control these behaviors by the membership association were ineffective.
- Another incident with the same wetland consultants occurred in Camas Washington in 1998. A field inspection took place with representatives from the Environmental Protection Agency (EPA), the land owners and their legal representatives, and an Army Corps of Engineers (Corps) representative. The wetlands consultants again became confrontational to the EPA and Corps representatives, challenging them openly in front of the land owners and their legal representative. As the wetland determination was contrary to the consultants view, they became verbally confrontational to the point that the EPA employee advised the attorney present that his clients would be removed from the field site by EPA criminal investigators if they continued. The Corps employee stated in her summary that she felt threatened as a federal employee and strongly recommended that all Corps employees take precautions when dealing with these two well-known consultants.
- The two wetlands consultants noted above filed suit against the State of Washington alleging harm to business reputation and loss of business (Cause # 98-2-20219-0SEA), claiming that the DOE supervisor they threatened had defamed them in a telephone conversation with a client of theirs. The suit resulted in a voluntary dismissal in April 1999 when the defendants served their interrogatories. The AAG stated that he “strongly suspected they did not want to disclose the information requested out of a fear that it might damage their reputation further or lead to other problems for them”.
- The DOE advised the two consultants that DOE staff were directed not to conduct business with either of them until they could provide assurance that they would not assault, intimidate, threaten or otherwise harm them.

- No action by the ethic boards of the membership associations to which these consultants belong occurred.

Applicant Reports

Two large scale problems of an environmental nature and another pertaining to the lack of consumer recourse are noted in the soil scientist applicant report. They are reproduced below as evidence of public harm.

- A problem as a result of poor soil science resulted in 20 different documented failures in areas ranging from Ellensburg to Richland to Yakima that affected groundwater on 9 sites, surface water (Yakima and Columbia River) on 3 sites, individual households on 8 sites with various levels of settlements described as follows:
 - simply improving the treatment process;
 - \$12,000 settlement;
 - provision of safe dialysis water;
 - criminal investigation, water treatment and fines;
 - soil treatment;
 - trucking of wastewater;
 - closure of sprayfield;
 - closure of a facility and almost \$1,000,000.00 defense costs;
 - According to Kim Sherwood, P.E. (Ecology), many of these failures are still in cleanup mode after more than ten years of treatment. As a result of those problems and their eventual solution, which involved appropriate application of soil chemistry, soil biochemistry and soil physics, Ecology has a written policy *recommending* use of a professional soil scientist to develop sprayfield application prescriptions.
- Another large scale problem was a result of a Cowlitz County employee, a soil scientist, whose job was to evaluate soils for onsite septic system design. His assessments apparently ignored standards such as required separation to seasonal groundwater and resulted in many inadequately designed systems being installed. As a result, according to a consultant working with the county, over 200 failing systems had been identified as of the previous Sunrise Review report, and more were anticipated to come. The claims value of those failed systems at the time of the original Sunrise Review report was estimated at \$3,000,000.00. Recently updated information from Cowlitz County indicates that \$457,315.38 has been paid out to date.
- The third problem described in the previous Sunrise Review report involved events that occurred during an onsite meeting between staff from the State Department of Ecology (Ecology), Environmental Protection Agency (EPA), Corps of Engineers and a soil scientist wetlands consultant that resulted in a complaint (to the Soil Science Society of America [SSSA] Ethics Board) claiming that the consultant had behaved unprofessionally for a Soil Scientist. The Ethics

Board had no formal response to the complaint, other than saying that the information provided was inconclusive. As a result, Department of Ecology prepared a memorandum for their employees recommending and requiring certain precautions when working around this soil scientist and describing protective ground rules for data collection in the presence of this scientist. Therefore, Ecology was forced to develop protective policies for their employees in regard to one individual soil scientist rather than having the ability to effectively complain about that person's actions to an effective professional board.

Other Testimony

“Clearly the loss of wetlands that provide water quality and hydrologic support functions have the potential to adversely affect human and environmental health, safety, and welfare. We need only look at current and ongoing funding efforts to restore Puget Sound. Part of the problem with the cultural eutrophication of Puget Sound is related to the loss of wetlands and increased nutrient loading directly related to the loss of wetlands that provided nutrient removal functions. With increasing eutrophication can also come increased populations of disease organisms, which can clearly translate to additional cases of various waterborne diseases. Similarly compelling arguments can be made in relation to losses of wetlands that provide flood control and attenuation functions. Again, part of the reason we are trying to recover so many species of federally-listed salmon is directly related to habitat modifications resulting in part from loss of wetlands.”

Scott Luchessa, Certified Ecologist, Ecological Society of America

“Inaccurate representations of wetland type, size, and protection requirements by wetland scientists and other unqualified persons representing themselves as wetland scientists leads to reductions in wetland functions (e.g. water storage, water quality protection, fish and wildlife habitat) and can lead to improper siting of on-site waste disposal systems, and residential and commercial development, that can have negative effects on public health, safety and welfare.”

David S. Parks, Geologist/Wetland Scientist

“The major concerns that triggered Oregon's SB544 centered on significant project delays and cost overruns attributable to incorrect or incomplete consultant work that does not meet state requirements.”

Janet Morlan, Oregon State Wetlands Manager

“One of my clients received an on-site wetland inspection from the county staff, who gave an upland determination over most of the 5-acre commercial property. He told me he then spent \$60,000 on engineering based on that determination. When he applied for a building permit, the same county department told him that he had wetland and couldn't build there. He hired me and I confirmed the existence of wetlands and informed him that his engineered site plan would require substantial changes. He lost the money on the engineering and on the purchase of the property.”

Joseph Leyda, Wetland Scientist

“In making these decisions, I must rely on wetland delineations and mitigation plans prepared by a “professional wetland consultant”. Unfortunately, in contrast with engineers and a host of other professions, I do not know what a “professional wetland consultant” is. I have seen delineations and mitigation plans submitted by Professional Wetland Scientists with doctorates in biology, and I have received the same thing from someone with a brand new Bachelor’s Degree in biology and no experience whatsoever. In the latter circumstance, I am usually obliged to accept the material and then arrange for third party review of that work by another trusted professional to determine if it is indeed adequate.”

Thomas Black, Planning and Building Director for the City of Ferndale

“A septic design was accepted for a house on Swayne Rd north of our home that put the drain field on a very steep unstable slope that slopes so the run-off goes directly into Henderson Inlet. After the drain field was put in we received heavy rain and much of the rock for the drainfield lines washed down slope and was deposited on the beach! Thus, you know where the waste water goes from this septic system. We are asked to pay higher taxes to clean up Henderson Inlet yet the County allows poorly planned development such as this to occur.”

Tom Terry, Forest Soils, PhD

“Thurston County’s Health Department is charged with determinations of soil suitability for septic systems. However, Thurston County does not have a certified soil scientist on its staff. The Board of Health has approved an ill conceived cluster of septic tanks in a soil that is probably too wet and too disturbed to properly receive and transport effluent. Additionally, this wet area is adjacent to a ditch which feeds into a creek that empties on to shellfish beds in Henderson Inlet.”

Pricilla Terry, Citizen, Thurston County

“One example of this was at the Teledyne Wah Chang CERCLA site in Albany, Oregon. Apparently there was a large plume of PCB’s that was mysteriously spreading across the site. The very first borehole I “logged” within a asphalt parking lot revealed a “gleyed” soil near the surface. To most geologists/engineers, this doesn’t mean much, however, to a soil scientist, a gleyed soil indicates extended periods of water saturation likely due to a seasonally high water table. Thus the mystery was solved on how PCB’s were transported across the site via a flowing seasonal high water-table.”

Ken Leary, Professional Soil Scientist, Hydrogeologist/Hydrologist, Hanford

“At the present time, the current unregulated fields of Soils and Wetland Science are not providing consistent services to the consumer for two primary reasons: (1) Practitioners in the field that either do not have the proper educational background and/or experience for the respective field in which they are practicing; (2) Incompetent or unethical practitioners that are providing inferior and/or incomplete products to the consumer.”

Ken Leary, Professional Soil Scientist, Hydrogeologist/Hydrologist, Hanford

Regulation in Other States

Soil Scientists

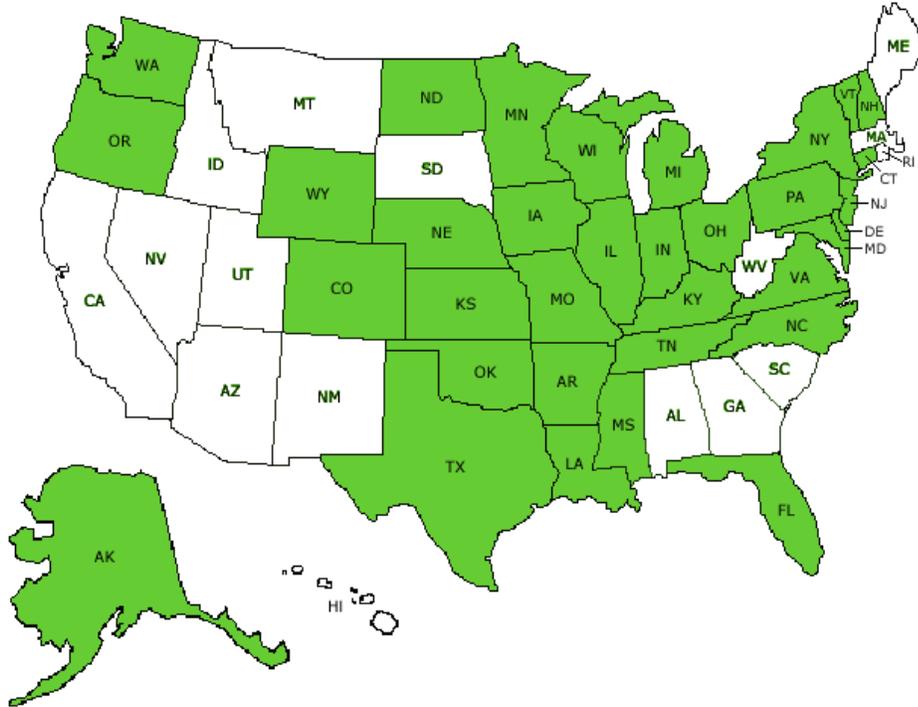
A review of the nation's regulated states indicates that 15 states have some form of regulation for the soils industry, be it licensure, registration or certification, for both soil scientists and soil classifiers. The definitions for scientists vs. classifiers overlap considerably and when compared among the states are nearly synonymous. One state has developed a specialized version of soil scientist which they call a geoscientist. Additionally, 2 states license soil evaluators and one requires soil scientist recognition in order to do wetlands work. A cross-reference grid is available below for detailed comparison purposes. For the purposes of comparison, we'll discuss the 15 states with a form of regulation for soil scientist or soil classifiers, noting that three other states listed separately have some standards of lesser significance (see footnoted comments).

- Of the 15 regulated states, all require a minimum of a Bachelors degree for entry into the program.
- Eight regulate by licensing, 5 have a registration system and 2 have a certification program.
- Seven states have a two-stage process where the practitioner starts out at an in-training level and progresses to the professional level after completing an experience requirement.
- Twelve require two tests, often the first being a fundamentals level and the second being a practical applications level and some have a field exam component.
- Reciprocity is granted in 12 states when equal qualification standards have been previously recognized in another state.
- Only 3 states specifically referenced continuing education as a requirement.
- Required field experience is a mandate in all states for the second, or professional, level where the in-training levels usually don't require any.
- The experience required varies from 1 to 6 years with an average among the 15 states of just over 3 years.
- Seven states have a posted code of ethics and/or standards of practice
- Thirteen states have some number of professional references required.
- The number of practitioners by state varies from 14 in Mississippi to 233 in North Carolina, with a statewide average of 77.

	Licensure	Registration	Certification	Education Bachelors degree	In-Training Option	One Exam (Fundamentals)	Second Exam (Practices)	Reciprocity	Continuing Education	Experience (years)	Code of Ethics	Standards of Practice	References Required	Approximate Number Practitioners
States with regulation programs for soil scientists and soil classifiers														
Alabama Soil Classifiers		✓		✓		✓	✓	✓		2	✓	✓	✓	67
Arkansas Soil Classifiers		✓		✓	✓	✓	✓	✓		2		✓	✓	59
Delaware Soil Scientists	✓			✓		✓	✓			6			✓	20
Georgia Soil Scientists	✓			✓	✓	✓		✓		4			✓	47
Indiana Soil Scientists		✓		✓	✓	✓	✓	✓	✓	3	✓		✓	45
Maine Soil Scientists	✓			✓		✓	✓	✓		3	✓		✓	74
Minnesota Soil Scientists	✓			✓		✓	✓			5			✓	98
Mississippi Soil Classifiers	✓			✓		✓		✓		1			✓	14
New Hampshire Soil Scientists			✓	✓	✓	✓	✓	✓	✓	1		✓	✓	38
North Carolina Soil Scientists	✓			✓	✓	✓		✓		3			✓	223
North Dakota Soil Classifiers		✓		✓	✓	✓	✓			4			✓	30
South Carolina Soil Classifiers		✓		✓	✓	✓	✓	✓		2	✓			35
Texas Geoscientists	✓			✓		✓	✓	✓	✓	5			✓	151
Virginia Soil Scientists			✓	✓		✓	✓	✓		4		✓		136
Wisconsin Soil Scientists	✓			✓		✓	✓	✓		5			✓	125
States without regulation as soil scientists, but have some state program														
Connecticut* Soil Scientists			✓	✓	✓					3	✓		✓	113
Rhode Island Soil Evaluators**	✓			✓	✓	✓	✓		✓	3	✓		✓	28
Massachusetts Soil Evaluators**	✓			✓	✓	✓	✓			3	✓		✓	52
<p>* In order to do wetlands delineation in Connecticut, one must be recognized as a soil scientist by the Society of Soil Scientists of Southern New England (SSSSNE) registry to determine qualification standards.</p> <p>** Soil Evaluators are licensed in Rhode Island and Massachusetts. They are not soil scientists and primarily focus on determining the suitability of proposed sites for on-site subsurface sewage disposal systems. The number of practitioners represents soil scientists residing in these states who belong to SSSSNE</p>														

Wetland Scientists

Wetland regulatory programs are much newer than soil science programs, having become established as early as the 1970's and as recently as 2006. Most states have governmental regulations pertaining to wetlands identification and management. The Association of State Wetlands Managers (ASWM) has reviewed each state's wetland policies and determined that most have some legislation in place to protect wetlands. The map below indicates the shaded states as those with established legislation designed to safeguard wetlands.⁹



While most states have wetlands programs overseen by local, state or federal agencies, only 4 states actively regulate wetlands scientists. These states are Minnesota, New Hampshire, Virginia, and Wisconsin. Following a brief history of each, with a cross reference grid provided below for more detail.

Three of the regulated states use a certification program for their wetland scientists. The fourth, Wisconsin, has developed a “Professional Assurance Program” which is an attempt to work out issues in a pilot phase prior to pursuing a formal certification program. A short summary of the four states programs follows.¹⁰

The U.S. Army Corps of Engineers set up a pilot certification program in the mid 1990's in Seattle, Jacksonville, and Baltimore. Wetland delineators earned their certificate after passing a two-part regional exam that was based on the 1987 corps delineation manual.

⁹ Association of State Wetlands Managers. <http://aswm.org/swp/statemainpage9.htm>

¹⁰ Primarily from *State Wetland Delineator Certification Programs*: Leah Stetson, *Wetland News*, June/July 2007

The Corps program did not advance to the national level and stopped issuing professional certificates in the late 1990's. Partly because the Corps program did not progress beyond the pilot phase and in response to a growing need for correct wetland delineations a few state wetland agencies decided to pursue legislation to state in-state certification programs.

Virginia was the first state to certify wetland scientists. It took stakeholders ten years to establish the program, as the state already had similar programs such as soil scientists. The Virginia Association of Professional Soil Scientists had difficulty funding its certification program. It merged with the new certification program for wetland delineators and the two groups combined the boards and income. The Virginia Association of Wetland Professionals indicates that the program is a success.

New Hampshire modeled its certification program for wetland scientists after the existing Certified Soil Scientist program, which is administered by the state's Joint Board of Licensing and Certification. There was a one year grandfathering period, during which the state acknowledged approximately 200 people as Certified Wetland Scientists.

In Minnesota, builders and developers called for a certification program to improve the quality of wetland delineations for permitting purposes in 2001. A study was conducted by the Board of Water and Soil Resources in partnership with Minnesota Association of Professional Soil Scientists. And the Minnesota Wetland Professionals Association. Funding has not been provided for the program by the state, rather, the University of Minnesota funds the program from course fees for training, one of the requirements of the program. No wetland delineators were grandfathered in and they report no complaints were received.

Wisconsin's Wetland Delineation Professional Assurance Initiative is a pilot program of the state's Department of Natural Resources. The state wetland agency began to pilot this program in 2006 with the goal of enhancing wetland protection as well as the certainty of wetland boundaries for project planning and to save time in state review of those boundaries. By using the term, "assurance" instead of "certification," the Wisconsin DNR hopes to work through any issues during the pilot phase prior to pursuing a legislative process for a formal certification program.

	Licensure	Assurance	Certification	Education Bachelors	In-Training Option	One Exam (Fundamental)	Second Exam (Practices)	Reciprocity	Continuing Education	Experience (years)	Code of Ethics	Standards of Practice	References Required	Approximate Number Practitioners
Minnesota			✓	✓	✓	✓			✓	3	✓		✓	184
New Hampshire			✓		✓	✓	✓		✓	3	✓	✓	✓	209
Virginia			✓	✓		✓		✓		4		✓	✓	67
Wisconsin		✓		✓		*	*			5				6**

* Wisconsin's exams are reviews of both field work and delineation reports by the board.

** The Wisconsin Wetlands Association has a membership count of 66 professionals. The Wisconsin regulatory authority's DNR site lists six (6) delineators who are certified as "Professionally Assured" by the state.

Outreach Efforts

The Department of Licensing made a strong effort to ensure stakeholders were engaged in the review process of soil and wetlands scientists. A summary of the efforts DOL made is listed below:

- Developed a list of approximately 200 soil scientists and related industries professionals and notified them of the study, upcoming hearings, and solicited input and opinion
- Worked with the Society of Wetlands Scientists (SWS) northwest chapter to notify approximately 450 practitioners of the study, upcoming hearings, and solicited input and opinion
- Solicited comments from the 15 states that actively regulate soil scientists and 4 states that regulate wetlands scientists
- Held two public hearings, one on the west side and one on the east side of the state
- Filed notification of the public hearings with the State Register
- Issued a statewide press release regarding the review and asked for input
- Developed an e-flyer for the hearings and distributed it throughout the state
- Posted the testimony from the public hearing on the DOL internet website

Resulting from these efforts, the DOL has received many written comments, telephone call, media inquiries, and other information from stakeholders both in favor and opposed to regulation. In addition to the DOL outreach, the soil scientist applicant group developed a very informative website¹¹ that provides the public with background information, meeting schedules, our hearing postings, and a wealth of additional information on the Sunrise Review of their profession.

The hearings were attended by both soil and wetland scientists representing both pro and con opinions on regulation. Also providing testimony were attorneys representing industry stakeholders as well as practitioners from related professions. Media representatives were in attendance as well. Excerpts from the hearings are included in the *Excerpts for Public Hearings* section and links to the entire texts are listed in the appendices.

Membership organizations from within the soil and wetlands professions as well as related professions were helpful in providing information, testimony and comment during our review of the respective industries. The Soil Science Society of America, Washington Onsite Sewage Association, Architects & Engineers Legislative Council, Washington Society of Professional Soil Scientists, American Council of Engineering Companies of Washington, the National Society of Consulting Soil Scientists, and the Pacific Northwest Chapter of the Society of Wetland Scientists are examples of organizations that have provided input on the subject of regulation. Copies of these documents are

¹¹ Website can be viewed at: <http://www.soilscientistlicensing.com/>

included in the *Comments from Practitioners, Organizations and Citizens* section and the links to public hearing testimony.

Excerpts from Public Hearings

The following are some excerpts from the four hearings held, two in Burien and two in Wenatchee. Minor grammatical changes may be included in the excerpts. The full text is available in the appendices and the testimony is reproduced verbatim.

Soil Scientist Testimony, Burien, Washington, September 11, 2007

"When I first joined the ranks of county environmental inspectors, I was a restaurant inspector. One day my boss came in and said; 'Today you are switching to the onsite program.' My training at college did not include any soils classes or any other training in onsite issues. The training program was to have me ride around with various onsite professionals, both private and governmental, for a number of days and learn from them. The department where I was employed had no particular training program other than this on-the-job training".

Soil Scientist testimony, Burien Hearing

"But some of those concerns are centered around the actual description of the practice of soil science. And when we've seen these proposals in the past, they can include work in slope stability, erosion, surface-water runoff, and decisions for building site locations that clearly run into the practice of engineering and geology. And our concerns are about those scope-of practice issues".

Attorney, Architects & Engineers Legislative Council

"However, I have personal experience in the past working with wetland biologists who do not have such high standards. And things can get into gray areas of opinion, and personal belief structures can be misused as environmental regulation. They intrude. And I've seen it on both sides of the fence where you have people with a strong environmental slant and you have people with a strong development slant. And it's potluck on which one you're going to get, both as a hired expert that a developer pulls onboard on a project or on the agency side. And so I would be in favor, above all others, that agency employees should have some sort of licensing and regulations imposed over them. Too often I've gone for permit, and it's really potluck in a city who your regulator is, who your permitting reviewer is, as to whether you're going to have problems with a project or whether you're not".

Professional Engineer, Burien Hearing

"...one of the most conflicting and difficult interpretation issues rests in hydric soils interpretation, and that means the interpretation of a soil that's developed under wetland conditions. This has enormous problems when you apply this to vast areas of land that are highly valuable if they're non-wetland and almost not valuable at all if they are wetland. So there are very big arguments, inconsistencies between calls that range all the way

from something being called 100 percent wetland to something being called 100 percent not wetland. And the problem being that the range of knowledge and the range of how these sciences are applied is so wide that, even in the specialists, it's hard to get a concurrence.”

Soil and Wetland Scientist, Burien Hearing

“In a very clear example, where a site had 3 feet of permeable soil over hard glacial till -- for those of you that don't know, that basically is concrete. And we did the predevelopment soils assessment. (We) said “if you only have 3 feet of soil that's permeable, and you've got a seasonal water table sitting on top of the till at 3 feet. You need to remove as little of that soil as possible”. And they went in, and they graded it all flat. And some of those homes now have yards that have glacial till below 12 inches of what they call amended so the developer, who basically was given a one-page document that said, "Here is your prescription of how you're going to amend your soils, and had to do with bringing in some compost and tilling it in”. They didn't understand what they were trying to create. They didn't understand the purpose of it. They didn't understand a natural soil profile. And as a result they've got the homeowners are suing. The city is in the process of possibly suing the developer.' The developer's in the process of suing the city. Everybody's arguing over who's responsible and who's paying for it all. And homeowners, whose yards are flooding and their crawl spaces are flooding. So that's a great example of terrible application of soil science for low impact development, and low impact development is all about appropriate application of soil science”.

Soil and Wetland Scientist, Burien Hearing

“And it appears to the ACEC, the American Council of Engineering Companies, that what significantly prompts this is the change in the law with respect to geologists and then both interpretations by the geology board about scope of practice of geologists and the intrusions into that scope of practice by other professionals, licensed or otherwise, and then these critical areas ordinances adopted at the local level. And it's our view that the reason to license, either by title act or registration title act or full licensing, shouldn't be driven by the fact that some agency or organization within state government is behaving inappropriately. It should be driven by considerations of public health and safety. In fact, the consumers of the services are highly sophisticated purchasers. These are not consumers in the sense of people who might go in -- individual patients who go in to see a physician or someone who comes in to have a home designed by an architect. They are sophisticated developers, large engineering firms, large geotechnical firms, large geology firms. They are not consumers in the sense of what we generally think of as consumers. Oh, and might add also, state and local agencies, all of whom are sophisticated purchasers and, we don't think, necessitate the need for licensing under these circumstances. They are capable of discerning whether the person is competent and whether they're -- whether they, the agency, or they, the organization, is hiring a competent individual.”

Attorney, American Council of Engineering Companies of Washington, Burien Hearing

“I do probably 100 jobs a year, and I still don't think I've ever been hired by an engineering firm. My sophisticated customers are (indiscernible) customers, the consumer itself, the person who owns the land and wants to do something with it.”

“I did want to say one other thing in terms of our connection to engineers. I'm hired by engineers certainly, and they make sure that my contract separates their liability from me. They do not want to be responsible for my faults professionally. They hire me because they value my approach to soils, which is very different from theirs. They hire me because I treat soil as a living medium, not as a support medium. That's why they hire me.”
Soil/Wetland Scientist, Burien Hearing

Soil Scientist Testimony, Wenatchee, Washington, October 3rd, 2007

“Soil scientists really understand soil and how it behaves. Other professions typically – from my own experience – I have a degree in geology and at that time we glossed over soil. It wasn't until I became a soil scientist that I really understood how the surface – the soil medium responds to treatment, how it responds to manipulation. What I find at this point is that established licenses, such as engineering and geology, do not recognize soil science classes as curriculum that would meet licensing requirements even though the work that is described by those courses and the work that the soil scientists are commonly doing is described as work that is commonly done by engineers and geologists.”

President, Washington Society of Professional Soil Scientists, Wenatchee Hearing

“Our society – the only thing we can do really to regulate our members is to revoke their membership. There is no real official way we can tell the state to keep that person from working in the state. We can just deny them membership into our society, the national organization, which is the Soil Scientist Society of America, they can also revoke membership. But they also have a certification program and it's a regimented testing structure that their members have to take to be able to pass that certification.”

President, Washington Society of Professional Soil Scientists, Wenatchee Hearing

“I think we are all willing to work with these other professionals; it just seems like sometimes other professionals in related fields are arguing about soils information and they may be going beyond their field of expertise when they should be actually consulting with a soil scientist. The soil is really a thin layer of skin between the atmosphere and the earth crust where all terrestrial plants and animals live and depend upon for their survival. In typical descriptions, the surveys go down to five feet, but the soils actually go down deeper than that.”

Soil Scientist, Wenatchee Hearing

“Would regulation of soil scientists be beneficial to our industry? Clearly yes, it would be. We would benefit – if the experience in Washington State is going to be anything like the other states that have licensed and regulated the practice, we certainly would benefit in two ways. One is that it gives folks an identity for choosing a career that they don't currently have and we would attract more people, more brain power to our profession. Secondly,, looking at these other states, there would be a higher level of professional interaction, a real dynamic where people exchange information because we have more responsibility under that – those circumstances and we rise to the challenge, like we have

done in Georgia and North Carolina. With higher responsibility comes a change in character and it is a good thing for a profession to go through. So I look forward to it and it is clearly to our benefit as a profession to be licensed.”

Soil Scientist, Wenatchee Hearing

“In the 10-plus years since then I have seen this repeated over and over again in public hearings, whether I’m testifying about the critical areas ordinance or wetland functions. When I agree with the folks who are in the audience, I get support and support as a soils professional. When I disagree, I’m told that I’m not qualified to make those comments. And licensing is specifically pointed out time and time again. The point is that folks like (private citizen) can’t afford to go to court the way my larger clients can. In court I get a fair shake. I get recognized by the judge, by the court as a qualified witness. But many other people – individuals who are victimized by the county staff members, by contractors that counties permit at an individual land parcel level suffer because we as a profession are not licensed.”

Soil Scientist, Wenatchee Hearing

“Certainly the consumer is protected by having a (recourse) process available, but our process is really geared to preserving our profession. We want to cull out the bad actors and we want to protect our members by assuring that we know what a high level of professional behavior is and we advance along those lines. Consumer protection is really secondary to that and we are very ineffective because what we do in the perspective of the consumers is we simply release that person into the free market.”

Soil Scientist, Wenatchee Hearing

“When you get to a land treatment system where you are using wastewater and it is not just fresh irrigation water, you want to make sure it’s right. You don’t want that excess running off. In fact, it is basically illegal to have wastewater run off the site. Soil scientists know how to go out there and honestly characterize that soil, measure intake rates, look at the profile, take soil samples, ask for the right kind of tests in the laboratory to understand the fertility and the physics and so forth of what that profile can take from a hydraulic standpoint and know how much water it can hold.”

Certified Agronomist, Wenatchee Hearing

Wetland Scientist Testimony, Burien, Washington, September 11, 2007

“I think it's unfortunate that there is no guideline, no set standard of qualifications to go do what we do because mistakes are made, continually made. And in answer to these six questions -- just saw them today. But would regulation of soil or wetland scientists be beneficiary to the industry? Well, the answer certainly is yes because you could have some standard and education requirements. Next one, would regulation solve -- for wetland scientists be beneficial to the consumer? Of course, the answer is yes because with the right training, education, and experience, you can provide accurate services. And are they consistent with the services provide to the consumers? And the answer is no and a big fat no. They're not consistent; there are differences all over the place because, in my

opinion, they're not standardized in their training and qualifications to go and do what they need to do to learn how to identify wetlands.”

Wetland Scientist, Burien Hearing

“I know for an example of a real estate I was working with in Grays Harbor County who were hiring us to do their wetlands assessments. And he sent his wife to a workshop, a week-long workshop, got a wetland certificate, and now she's delineating wetlands. And her previous training was basically helping him in the real estate business. So she's not a soil scientist, not an ecologist, she doesn't have a degree in botany. She has no training other than a week-long wetland workshop. But she is doing wetland delineations in Grays Harbor County based on a one-week workshop.”

Wetland Scientist, Burien Hearing

“The example of a problem, if a wetland is – if wetland is delineated too large, then obviously somebody loses developable ability for their property. They lose dollars. They lose lots. If it's delineated too small, then the consumer inherits the problem with flooded crawl spaces, flooded driveways, and problems with septic systems. So whether the delineation is too generous or too conservative, the consumer pays the price in eventual problems.”

Wetland Scientist, Burien Hearing

“Self-regulation of soil scientists in a sense is not -- is not happening, even though we do meet yearly. We have a Society of Wetlands Scientists Pacific Northwest chapter. We do talk amongst ourselves, not badmouthing people per se. But what we get together and we talk about our profession. It's not self-regulating because there is no place to issue complaints. And as Ms. Palazzi brought up earlier as far as going to the Society of Wetlands Scientists national chapter professional wetlands certification program, it has no teeth.”

Wetland Scientist, Burien Hearing

“As all of us in the room would agree, the main reason for this discussion is to effectively protect wetlands, which are waters of the state. However, I am not aware of published literature that points to poor wetland delineations as the main cause of wetland loss. The literature does mention a lack of wetland mitigation follow-up, poor wetland mitigation design, the historical conversion of wetlands for agricultural uses, the allowed cumulative loss of small or isolated wetlands, and a lack of enforcement as significant causes of wetland loss in our state. In any profession there will be bad apples, even with state licensing or certification requirements. My question is whether the public, be it a citizen or business groups, are asking for wetlands scientists to be licensed or otherwise regulated by the state. In other words, how big of a problem is this really? Where is the data showing that there is a dire need for state regulation of wetlands scientists? In further consideration of the public, consumers will bear the financial cost of the licensing fees as these will be passed on when wetland delineation and other wetland reports and products are prepared. This greater cost for services will not necessarily guarantee a good product.”

Wetland Scientist, Burien Hearing

“Although it is not a requirement, some wetlands scientists in our state have obtained a certification as a professional wetlands scientist, PWS, or a wetland professional in training from the Society of Wetland Scientists. This PWS certification requires that applicants possess the education, experience, and references desired as a foundation for performing wetland work. State certification or licensing would be duplicating this existing certification program operated by our professional association and would likely lead to its elimination.”

Wetland Scientist, Burien Hearing

“When you're talking about a title act, you then are regulating the individuals who, you know, claim to do work under that title. And, in fact, you can still have individuals out there doing that type of work and don't happen to call themselves wetland scientists, soil scientists, or so forth. And your main effort to protect the public safety and welfare is kind of lost in it.”

Attorney, Architects & Engineers Legislative Council, Burien Hearing

“And I do have one other suggestion. And that is I think basically a lot of people have pointed out that the wetland work we do is essentially adversarial, here we are hired by property owners and we present ourselves to be objective scientists and then our work is reviewed by agencies, local agencies. And what I find the weakest link in this whole system is that the local agency review is really inconsistent. I mean, I think horribly inconsistent is the way I would describe it. And if there is going to be a licensing requirement, I think that key is not so much who is practicing as who is reviewing. The people who are going to make the final decision are the reviewers. And I think we need to concentrate at the state level probably. At the very least there should be something more elaborate, akin to the model ordinance that Ecology has promoted. They've done a great deal to make wetland delineations more consistent throughout the state in consistency of interpretations by using their bully pulpit and using educational practices.”

Wetland Scientist, Burien Hearing

Wetland Scientist Testimony, Wenatchee, Washington, October 3rd, 2007

“All these things contribute to a tilted marketplace for wetland consultants. The fact is that the wetlands do not exist anywhere except where the local agencies say they do. If a certain type of wetland consultant performs delineation and sees no wetlands where others have seen them and if the agency accepts the delineations then the wetlands go away. In the Whatcom county area, building lots start around \$120,000. For a 20-acre subdivision, 80 lots, that means about 9.6 million dollars gross. If there are wetlands all over the property, the lots will disappear with the potential cash. In essence, this type of consultant makes a living by exploiting the inadequacy of regulatory agencies.”

Wetland Scientist, Wenatchee Hearing

“There have been some issues brought up by the soil scientists where they feel that public health and safety has been affected, where they believe if a soil scientist had been

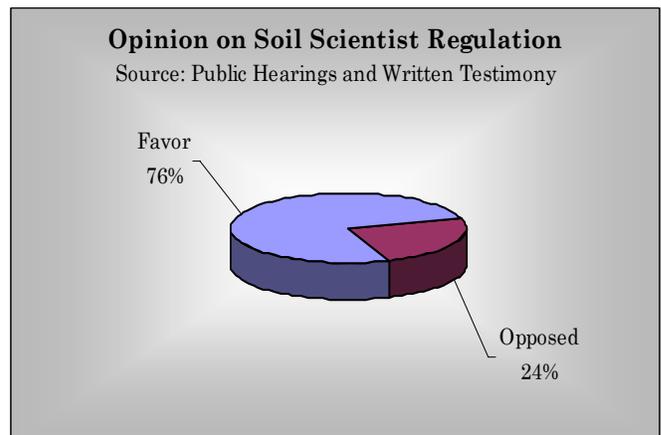
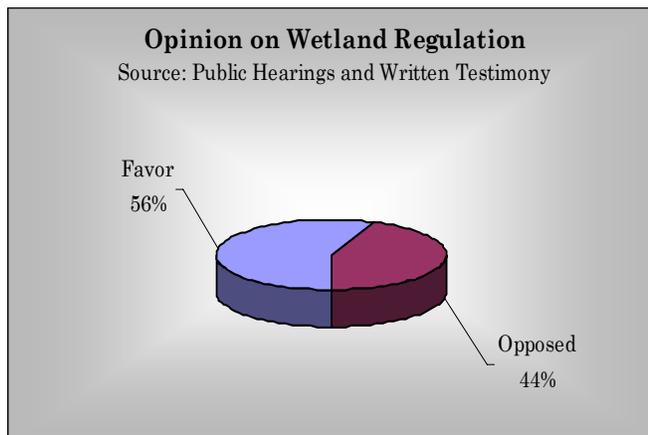
involved, then that would not have occurred. And they give examples of groundwater contamination due to spreading of agricultural wastes and some septic system failures. It seems to us that there are other licensed professionals that this really falls under their venue of what they do. If it is a groundwater contamination issue, then clearly a hydrogeologist should be involved. There may be some chemical nutrient type exchange issues that occur close to the surface and clearly a soil scientist should be retained to assist with that, but, again, we don't see that rising to the need of professional licensing to protect public health and safety whereas once it gets beyond that, to the realm of a hydrogeologist or an engineer it might. And pretty much the same is true for septic system failures, and, of course, the state already licenses sanitarians.”

Professional Engineer, ACEC, AELC Representative, Wenatchee Hearing

Comments from Practitioners, Organizations, and Citizens

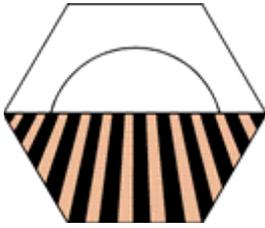
Responses via electronic and standard mail were provided by a number of individuals from the community. Several national membership organizations, practitioners from related professions, state governmental officials from within Washington and other states, and local jurisdictions were represented. In all, 58 individuals or organizations provided testimony, either verbal or written, received which provided a wealth of thoughts on regulation of wetland and/or soil scientists. Copies of the written testimony are shown below.

A quick look at the opinions for both professions in a favor/oppose format indicates that the testimony was more in favor than opposed to regulation. This accounting combines both the public hearings and written testimony received.



When looking at those who favor regulation, most were practitioners in either the wetland or soil science fields, governmental officials, and some from academia. Opposition was more centralized from practitioners in related professions, lobbyists for other professions, engineering firms, geotechnical firms, and some governmental employees who expressed concern over impacts on their livelihoods.

Soil Scientist Written Testimony



SOIL SCIENCE SOCIETY OF AMERICA

677 South Segoe Road • Madison WI 53711 • (608) 273-8095 • Fax (608) 273-2021 •
www.soils.org

October 17, 2006

Mr. Toby Rodgers, President
WA Society of Professional Soil Scientists (WSPSS)

Dear Mr. Rodgers:

The Soil Science Society of America (SSSA) would like to express its support and encourage the State of Washington to pass licensing legislation for Soil Scientists.

SSSA is a 6,000 plus member, scientific society with a 75 year history of leading soil science related issues. SSSA also administers the Certified Professional Soil Scientist / Classifier (CPSS/C) programs with over 1,200 certified soil scientist/classifiers throughout the US and Canada.

The membership of SSSA includes individuals from academia, government and the private sector. Many soil scientists are now entering the private sector in fields predominantly related to environmental protection and urban issues. SSSA is committed to helping these soil scientists through the certification programs and/or licensing programs at the state level. Certification and licensing programs help to establish the profession by following a set of standards. These standards also strive to protect the public interest from substandard performance.

SSSA administers the examination process for the certification programs as well as for other states with licensing programs. There are seven other states that have enacted state licensing, NC, WI, MN, ND, ME, TX and NH. Several other states are considering licensing or a state based certification process while working with SSSA. These partnerships help to minimize costs while maintaining a creditable exam process. SSSA provides valuable national guidance through the exams and certification processes that helps to maintain consistency between state boundaries but soils related issues can

quickly become state specific. That is why it is so important to have state licensing legislation enacted.

State government is charged with protecting the public interests. Soil scientists work with land owners on environmentally related issues that may and in some situations do impact public health, safety and welfare. For example, an on-site septic system that is not sited correctly will not only negatively impact the home owner but also has the potential to contaminate the drinking water in that area endangering public safety and health. This is only one example that could be minimized through proper licensing legislation.

SSSA would like to encourage the State of Washington to pass soil science licensing legislation and where appropriate, is willing to assist in the administration of that process.

Sincerely,

Mary Collins, Ph.D.
President, Soil Science Society of America

From: Heather Hansen [heatherhh@qwestoffice.net]
Sent: Friday, November 09, 2007 6:14 PM
To: Chunn, Bruce (DOL)
Subject: RE: Sunrise Review of Soil and Wetland Scientists



Thank-you for your efforts to gather information regarding our concerns about the effort to license soil scientists.

First and foremost, we do not believe there is a problem that needs to be solves. We are concerned that the proposed language will create more confusion than it resolves.

We understand that it is not the proponent's intent to regulate normal activities performed as a part of agricultural or timber production, however, we are concerned that language will be easy to misinterpret and difficult to enforce.

From HOUSE BILL 1318 "Sec. 3 (6) General scientific work customarily performed by... agronomists, crop scientists, horticulturists, and foresters, providing such work does not include the design and execution of soil science investigations, being in responsible charge of soil science, and the drawing of soil science conclusions and making recommendations in a way that can be shown to negatively impact the public health, safety, or welfare."

The professions named above, as well as producers who may not have specific formal education, draw conclusions about soil fertility and determine methods of working soil to maximize crop production and minimize erosion. Crop advisors, fieldmen, conservation advisors and others investigate soil, draw conclusions and make recommendations on a

daily basis. These and other activities could be construed as “the drawing of soil science conclusions.”

If the proposal is to go forward, it should be limited to urban and suburban areas only. Farm and timber land should be excluded.

Heather Hansen
Washington Friends of Farms & Forests

Subject: soil scientists in WA

Dear Mr Chunn,

As a licensed OSS designer in WA ground water is of primary concern and the main reason we are licensed here. The goal is to select waste water treatment technology based on soil and groundwater conditions at a site so the water table is not compromised. Poor wetland decisions lead to the same end as poor OSS site evaluation: flooding and polluted ground water. While I do not have the time to repeat yesterday's email, I will go out of my way here to repeat the conclusion: soil scientists are a very small contingent, probably less than 100 in private practice here in WA. However, the impact their decisions have on water quality is massive, to say the least. There is no doubt in my mind that the practice of soil science and wetland science need regulation here in the state of WA.

Thank you for your time

Ron Hansen

Licensing or Certification of Soil/Wetlands Scientist in WA State

By

Kevin D. Leary

ARPACs Certified Professional Soil Scientist, Hydrogeologist/Hydrologist

1. **Would regulation of Soil or Wetlands Scientists be beneficial to the industry?**

Regulation of Soil/Wetland Scientist would be beneficial to industry as it would foster quality control of data and interpretation, encourage sharing of data, enhance R & D of each respective field via sharing lessons learned and stimulate formal benchmarking, enhance the respective fields reputations amongst industry and the public, and improve the public's understanding of the respective fields

2. **Would regulation of Soil or Wetlands Scientists be beneficial to the consumer?**

The consumer, in theory, should receive a more consistent, enhanced quality product that should be somewhat standardized and more acceptable to regulatory agencies (and stakeholders) overseeing permits and various clean-up actions resulting in improved protection of human health and the environment.

3. Are Soil or Wetlands Scientists consistent in the services provided to consumers?

At the present time, the current unregulated fields of Soils and Wetland Science are not providing consistent services to the consumer for two primary reasons: (1) Practitioners in the field that either do not have the proper educational background and/or experience for the respective field in which they are practicing; (2) Incompetent or unethical practitioners that are providing inferior and/or incomplete products to the consumer

4. Is self-regulation of Soil or Wetlands Scientists working sufficiently to protect the consumer?

No. See #3 above.

5. What do you see as the least intrusive method to ensure quality performance by Soil or Wetlands Scientists?

Establish a code of ethics; develop a comprehensive examination for Soils and Wetlands Scientist currently not licensed and/or certified by a national recognized board, a state licensing board and/or review board; incorporate a grandfather clause for ARPACs certified Soil Scientist/Wetlands Scientist to be licensed in the state; and allow the consumer an avenue to file written complaints for inferior and/or unethical performance

6. How does the Soil or Wetlands Scientist industry, or membership associations within it, handle complaints?

I am unsure at the present time as I have never received any complaints for my services. However, I would suspect that individual(s) who do receive continual complaints will rapidly lose their respective client base and repeatedly be denied regulatory approval for various permit applications and regulatory document approval.

In addition to answering the questions above, I would also like to submit a few anecdotal stories regarding the need for licensing Soil/Wetlands Scientist. These examples illuminate cases where individuals from other disciplines (e.g., geology and engineering) were overseeing work that required the expertise of a Soil Scientist.

As a consultant for a large firm in Portland, OR, I was hired as a Hydrogeologist but also utilized as a Soil Scientist for land application of industrial and municipal wastes as well as constructed wetlands projects. One of my technician co-workers accused me of not being a real Hydrogeologist since my undergraduate degree was not in geology, but in Soil Science. I asked this individual that of all the multi-state groundwater projects we had in the Western US, how many projects had groundwater wells installed in actual hard-rock (versus unconsolidated material i.e., soil)? Her slow response was "one." I soon found that a Soil Scientist could "log" a borehole in much greater detail and much more accurate in unconsolidated material than a geologist or engineer. This difference in

detail and quality of borehole logging has a huge impact on accurately developing site conceptual models at hazardous waste sites that include a preliminary understanding of subsurface contaminant transport. In general, it is the small contrasting soil textural changes or even subtle changes in the physical or chemical composition in soils (that most soil scientist are trained to detect) that often control the fate, transport, and remediation options of a hazardous waste.

One example of this was at the Teledyne Wah Chang CERCLA site in Albany, Oregon. Apparently there was a large plume of PCB's that was mysteriously spreading across the site. The very first borehole I "logged" within a asphalt parking lot revealed a "gleyed" soil near the surface. To most geologists/engineers, this doesn't mean much, however, to a soil scientist, a gleyed soil indicates extended periods of water saturation likely due to a seasonally high water table. Thus the mystery was solved on how PCB's were transported across the site via a flowing seasonal high water-table.

In another example, there was a RCRA Subtitle D sanitary landfill in Oregon City, OR that had a major problem with large quantities of leachate only generated in the summer. This phenomenon baffled the "firms" geologists, hydrogeologists, and engineers. However, once I (a soil scientist) was consulted, the solution was elementary. The standard "shrink-swell" montmorillonite clay was used as the primary capping material for the landfill. The problem with this design is that when this smectitic clay is dry (like in the summer), it can form large, vertically extensive cracks that will only swell upon hydration. However, this "swelling" hydration effect can take some time to seal-off the cracks and it was during this transitional period that large quantities of leachate were generated from summer rainstorms. Hence, the barrier design had to be modified and the problem was solved.

On final example involves recent work at the Hanford site in Eastern Washington State. As the technical lead for several remediation projects, I managed the characterization and eventual remediation of Hanford's first zone closure project called the U-Zone. One of the waste sites is a former liquid waste disposal area called a "crib." In order to select a remedy, the site first has to be adequately characterized. As part of the characterization process, several shallow boreholes (50 feet or less) were drilled to assess the lateral spread of the contamination. The contractor, consisting of engineers and geologists, used spectra-gamma logging of each respective borehole to characterize the type and lateral spread of the respective contaminants. However, it took a Soil Scientist to point out several problems with this approach including the following:

- ★ Spectra-gamma logging is only useful for detecting uranium and not the other two primary contaminants of concern which are technetium and nitrates
- ★ Conceptually, the uranium will preferentially adsorbed onto the soil matrix if the contaminant wetting front is moving laterally while the technetium and nitrate would theoretically move laterally to the farthest extent of the wetting front. Bottom line is that this approach of characterization completely missed the farthest extent of the lateral spread of other contaminants causing the need for additional boreholes to be drilled. Most engineers and geologist have a limited knowledge of

soil-matrix cation exchange as well as other chemical/physical processes in the soil which affect the fate of most contaminants.

In addition to the problems cited above, the geologist and engineers did not detect the small contrasting soil textural changes in soil stratigraphy which have a huge influence on unsaturated zone contaminant transport and did not measure soil moisture content (while performing a geophysical logging of the borehole) which has a significant influence on contaminant transport unsaturated hydraulic conductivities.

Response from Walt Shields on 8/14/07

Walter J. Shields, Ph.D., C.P.S.S.
Director, Environmental Sciences Practice
Exponent Health and Environmental

- Would regulation of Soil or Wetlands Scientists be beneficial to the industry? YES
 - Would regulation of Soil or Wetlands Scientists be beneficial to the consumer? YES
 - Are Soil or Wetlands Scientists consistent in the services provided to consumers? NO
 - Is self-regulation of Soil or Wetlands Scientists working sufficiently to protect the consumer?
I DON'T KNOW
 - What do you see as the least intrusive method to ensure quality performance by Soil or Wetlands Scientists? LICENSE REQUIREMENT
 - How does the Soil or Wetlands Scientist industry, or membership associations within it, handle complaints? NO PROCEDURE
-

Soil Scientist Public Hearing Written Testimony

My name is Dr. Michelle Miller. I am the Past-President of the Washington Society of Professional Soil Scientists (WSPSS). I have a Ph.D. in soil science and am currently licensed in the state of Washington as a Geologist and Hydrogeologist. I am also a certified Professional Soil Scientist with the nationally recognized association, Soil Science Society of America.

As a professional soil scientist, licensed geologist and one who deals with Engineers on a regular basis, I can share with you that although these disciplines compliment each other well, they are distinct. This extends to not only how one looks at the natural landscape but the specific terminology used in each discipline. As in any situation, in order to clearly communicate amongst ourselves and ultimately to the public a common language is essential. A clear example of this is how particle size in soil is described. Fine sand is defined by the United States Department of Agriculture as greater than 0.10 to 0.25 mm while the Public Roads Association defines fine sand as greater than 0.05 and less than 0.25 mm. Although this difference seems minor, without that commonality, interpretation of laboratory data and soil surveys can be misread and might ultimately result in improper citing of facilities such as septic systems.

This is just one example of the importance of regulating soil scientists that would benefit the industry and the public. Regulating soils scientists can be efficiently performed through active professional organizations that define this profession and have in place a code of ethics and disciplinary process. The Washington Society of Professional Soil Scientists is a society of professional soil scientists organized in 1974, although our profession has been active since the 1800's. WSPSS works for the public good and to safeguard life, health and property. We, as an organization, are concerned with the advancement of soil science as a profession by "...the establishment and observance of high ethical standards of conduct through commitment to ethical conduct, the practice of sound scientific principles, and affiliations . . ." (WSPSS By-Laws) with the Soil Science Society of America (SSSA).

I wanted to thank you for the opportunity to provide written testimony and I support moving forward with a title act for soil scientists.

Michelle Miller, Ph.D., LHG, CPSS, RS

From: Kevin Martin [mailto:kmartin@sandec.com]
Sent: Thursday, September 06, 2007 12:55 PM
To: Chunn, Bruce (DOL)
Subject: RE: soil scientist title, sunrise review hearing

I would strongly suggest that you pursue a practice act or nothing, Virginia has a title act and it accomplishes nothing. In NC we were in the same uphill battle but chose to go for something with some teeth over something without.

Good Luck. Kevin

September 9, 2007

This letter is in support of having a certified soil scientist to perform work that requires in depth knowledge of soils as they relate to development generally, and in the South Sound in particular.

I am a "high rate" taxpayer in the Henderson Inlet Shellfish Protection Area, and I care what happens to the quality of the waters in South Puget Sound. I have just been through a very sad case involving a Thurston County development.

Thurston County's Health Department is charged with determinations of soil suitability for septic systems. However, Thurston County does not have a certified soil scientist on its staff. The Board of Health has approved an ill conceived cluster of septic tanks in a soil that is probably too wet and too disturbed to properly receive and transport effluent. Additionally, this wet area is adjacent to a ditch which feeds into a creek that empties on to shellfish beds in Henderson Inlet.

The county staff couldn't describe a soil profile by standard and accepted USDA soil descriptive methods, and did not have the ability to know whether the soil was derived in place nor disturbed, nor could they explain to the Board of Health why the soils in questions might not be suitable for citing a septic drainfield.

The result was that the County advised the developer to hire his own consultant (not a certified soil scientist), who presented a biased and equally non-qualified opinion as to suitability. His testimony was given more credence because he described himself as an expert, and no one knew what questions to ask him. He merely said that the "soils looked OK to him."

Henderson Inlet is a "Shellfish Protection Area," which means that the State has mandated the County to (a) tax those living on the inlet and its tributaries, presumably so that (b) the County has the funds to work on improving water quality in the Inlet.

However, doing things "right" entails having extensive knowledge of soil/water relations. The staff at Thurston County is not equipped to have this understanding, nor to make a case for or against development entailing septic systems in delicate or critical areas.

For this reason, a very high risk cluster of septic tanks will probably be built in an area that should not receive effluent.

Had the County had a certified soil scientist on its staff, this development and others probably would not go forward, thus reducing the rate of deterioration of the water quality and the shellfish beds.

A certified soil scientist could have (a) understood the nature of the soils on the site as well as the dynamics of the site, and (b) testified in a professional manner as to the suitability of the project.

Thank you for your time.

Priscilla S. Terry
Citizen

December 26, 2006

WOSSA is a 400 plus member organization with a 16 year history of organization, support and work in the Onsite industry in the State of Washington. WOSSA has been active in participation and support of the development and implementation of the Onsite Wastewater Designers Licensing Program with the Department of Licensing in WA.

The membership of WOSSA includes individuals from private sector, various onsite industry segments, academia, government and the manufacturing community. In

particular, our licensed designers under the DOL call out soils as it applies to treatment of wastewater. As soil scientists enter the private sector in fields related to environmental protection and growth management development issues, WOSSA supports this legislative initiative for soil scientists to become recognized and managed through a licensing program at the state level. As with the discussion and questions with the WSPSS representative who participated in our October board meeting, we see the value of licensing and certification programs to establish competency levels, ongoing education requirements and the capability for management of this body by following an agreed set of standards established by the licensing body and the people under their charge.

State government responsibility is to protect the public interests as it regards the environment and standards of professional licensure for certain types of work that come under professionally established practice. Currently, soil scientists work with land owners, developers and others on environmentally related issues that may impact public health, safety and welfare and they may work with other licensed professionals. The need to work under identified and adopted standards of practice and implementation of them through a managed license program on a state level is clear.

The Washington Onsite Sewage Association (WOSSA) would like to indicate its support and encourage the State of Washington to pass state level licensing legislation for Soil Scientists.

Sincerely,

Peter Lombardi
President
Washington Onsite Sewage Association

November 7, 2007

Mr. Bruce Chunn
Management Analyst
Washington State Department of Licensing
Re: DOL Sunrise Review for licensing soil scientists

Dear Mr. Chunn:

Thank you for the opportunity to comment on the proposal to license soil scientists. We sincerely appreciate our collaborative relationship with proponents of this issue and their efforts to address our concerns.

The Washington Forest Protection Association (WFPA) represents private forest landowners who grow and harvest trees on approximately 4.2 million acres in

Washington State. The goal of our Association is to advance sustainable forestry in the state and provide forest products and environmental benefits to the public. .

We understand that it is not the proponent's intent to regulate normal forestry work, and the bill introduced in the 2007 legislative session, HB 1318, included language that exempted work 'customarily' performed by foresters.

However, the language went on to state:

“providing such work does not include the design and execution of soil science investigations, being in responsible charge of soil science, and the drawing of soil science conclusions and making recommendations in a way that can be shown to negatively impact the public health, safety or welfare.”

WFPA's concern about the 2007 proposal is that the rules regulating the licensing and activities of soil scientists will have the effect of increasing the regulatory burden on the practice of commercial forestry on private lands in Washington. To understand this concern it is important to be familiar with both the current regulatory standards under which the forest industry and family forest owners operate and the economic position the forest products industry in Washington currently faces.

First the current regulatory standards: Under the Washington Forest Practices Act (Act) the Forest Practices Board has promulgated and continues to update a comprehensive set of rules for protecting private and public resources while managing state and private forests in Washington. The rules include provisions addressing two of the primary goals of the Act: protection of forest soil productivity and prevention of water quality degradation through sediment pollution. The provisions require that relatively straight forward and intuitive principles of equipment operation and soil erosion protection be used to eliminate or minimize soil compaction and sediment delivery during forestry operations. These principles are implemented by trained foresters, forest engineers and equipment operators. Compliance is monitored on the ground by Department of Natural Resources forest practices foresters with support from Department of Fish and Wildlife area habitat biologists and Department of Ecology field technicians. Forest practices in many regions of the state are also monitored by one or more of the 29 federally recognized tribes in Washington. The effectiveness of the water quality protection rules is monitored through an adaptive management research program with oversight by the Department of Ecology and others.

Nearly every aspect of harvesting a forestry crop is regulated, and there are specific rules pertaining to work around soils which require foresters to draw soil science conclusions. The Forest Practices Rules contains numerous references to soils, soil erosion and soil compaction. The word soil appears over 40 times in the forest road construction and timber harvest sections of the rules. In each of these instances foresters and forest engineers are asked to use their knowledge of soil and its erosion or compaction potential to properly implement Forest Practices Rules. Under the soil scientist licensing language proposed in 2007 any of these relatively mundane interpretations of soil properties could

be construed or interpreted in law to be the practice of “soil science.” For example road construction rules (WAC 222-24-030) require that:

“erodible soil disturbed during road construction and located where it could reasonably be expected to enter the stream network must be seeded with noninvasive plant species”

and that construction

“be accomplished when moisture and soil conditions are not likely to result in excessive erosion and/or soil movement, so as to avoid damage to public resources.”

We are concerned that a future regulator or court finding could determine that these practices are the execution of soil science investigations or the drawing of soil science conclusions. The Forest Practices Rules are designed to protect public resources which are little different than public welfare.

When operation involve streams, a hydraulic permit (HPA) is required alongside a forest practices permit. HPAs often include a requirement for a plan to eliminate or minimize soil erosion or sediment delivery. Again, these plans could be interpreted as preparation of the detailed soil maps that are included in the draft legislation as examples of the work of licensed soil scientists.

The second issue that we hope that the Department understands is relative economic position of the forest products industry in respect to costs of operation. As confirmed in a recent University of Washington study¹², the industry is fundamentally a commodity producer of construction lumber products. Logs grown and harvested by WFPA member companies, family forest owners and others are the raw material entering a commodity stream where prices are controlled by world markets largely independent of any one producer or any regional economy. The high cost of growing and harvesting trees in Washington is well documented in the UW study. Despite its position as a high cost producer, Washington’s industry maintains a slim margin of profitability through extremely efficient milling operations and relative proximity to the very large U.S. lumber market. The industry is working diligently to maintain a competitive position in this difficult economic situation. The growers of timber cannot support the additional overhead cost of more regulation or more expensive implementation of the regulation already in place.

It is clear from our experience with the advent of state licensing of geologists that regulatory agencies tend to defer to, or prefer licensed practitioners for technical analysis

¹² Future of Washington Forests and Forest Industries. Prepared for the Washington Department of Natural Resources as requested by the Washington State Legislature by the College of Forest Resources, University of Washington. July 31, 2007.

in forest practices situations. Although we would not anticipate any immediate response by the forest regulating agencies (DNR, the Forest Practices Board and the Fish and Wildlife Commission) to licensing of soil scientists, over time it is inevitable that the agencies would lean toward requiring more review by licensed professionals, first in higher risk situation and later in more common application of forest practices. This is a logical tendency toward risk avoidance. Requiring landowners to employ outside consultants increases cost.

At the same time, experience shows that the Geologist Licensing Board has a natural tendency to provide rules and guidance for licensed professionals in their charge. Recent work by the Board to develop standardized reporting guidelines for geological reports is an example. These efforts are part of the Board's responsibility to public service but the unintended consequence is an increased regulatory and cost burden when regulatory agencies require the use of those services.

The 2005 Sunrise Review of Soil Scientists did not contain any analysis pertaining to the effects of licensing soil scientists on forest lands. We hope this letter provides some information to support such an analysis. Given the level of rigor in the Forest Practices Rules and forest practices system, we believe it is unnecessary for persons working under or regulated under the Forest Practices Act to be subject to yet another level of regulation. If a new licensed profession of soil scientists is created, there is a high potential that necessary forestry work would fall under another state regulated profession, which would raise the cost of doing business for us, thereby increasing the difficulty of remaining competitive in a global economy. If this new licensing requirement is promulgated, we request specific language that exempts work carried out by persons working under or regulated under the Forest Practices Act.

Please do not hesitate to contact us if you have any questions.

Debora Munquía
Director of Governmental Relations
Washington Forest Protection Association



NATIONAL SOCIETY OF CONSULTING SOIL SCIENTISTS, INC.

PMB #700, 325 Pennsylvania Ave., S.E. Washington, D.C. 20003 (800) 535-7148 www.nscss.org

DATE: 12 January 2007

TO: Washington Society of Professional Soil Scientists (WSPSS)
P.O. Box 881
Newman Lake, WA 99025

FROM: Pierre Bordenave, RPSS #054 and Board Chair of the
National Society of Consulting Soil Scientists (NSCSS)

RE: **AN ACT Relating to licensing of soil scientists...**

The National Society of Consulting Soil Scientists represents Soil Scientist Business Owners throughout the United States and Canada. In the State of Washington, the NSCSS has 5 member business owners. An additional 5 business owners perform consulting services in the State of Washington.

The NSCSS maintains a national registry of professional consulting soil scientists (known as the Registry of Professional Soil Scientists – RPSS), which requires academic credentials, testing, experience, peer review, ethics training, and ongoing education.

NSCSS strongly supports licensing of the practice of soil science in Washington State. While NSCSS supports initiation and improvement of all state registration programs, we are particularly supportive of Washington State's proposal because of its emphasis on professionalism, and a structure that does not restrict interstate commerce.

Cc: Rick Joslyn, NSCSS President
Kari Sever, NSCSS President-Elect
Phil Small, RPSS #06 and NSCSS Secretary

Sent: Sunday, September 09, 2007 9:26 PM

Subject: Soil Scientist Title / Sunrise Review Hearing

I will not be able to attend the upcoming hearings on the need for state licensing or certification of soil and wetland scientists. I would like to provide two examples where the work of unqualified people made on-site decisions or gave testimony in a hearing that resulted in less than desirable outcomes. The county staff does not have qualified soil scientists yet they make decisions that affect water quality and public safety on a routine basis. A septic design was accepted for a house on Swayne Rd north of our home that put the drain field on a very steep unstable slope that slopes so the run-off goes directly into Henderson Inlet. After the drain field was put in we received heavy rain and much of the rock for the drainfield lines washed down slope and was deposited on the beach! Thus, you know where the waste water goes from this septic system. We are asked to pay higher taxes to clean up Henderson Inlet yet the County allows poorly planned development such as this to occur.

We recently listened to the hearing tapes where County staff were presenting their arguments why a large-lot subdivision should not be allowed on a given tract that has drainage that goes into Henderson Inlet. The County personnel were unable to adequately explain the soil horizons observed on the said tract. They also were not able to determine whether the soil was derived in place or was disturbed (most likely by land clearing and road spoil pushed on top of the surface horizons), which is a critical criteria for location of Glendon septic systems. Another unqualified "soils expert" testified for the developer and his only definition of disturbance was what would be caused by plowing, and he said this was too common to consider the soil to be "disturbed." He failed to explain how all the rotten wood got in the surface other than perhaps plowing. No detailed soil profile descriptions were presented by the County or the developer's "expert." And the amount of buried wood was not quantified. Both parties should have used standard Natural Resource Conservation Service protocols for describing the soils. In this case the County staff also were not able to give any reasons why they thought the soil observed was not suitable for the Glendon septic system, except they thought the disturbance criteria would be reason enough why not to allow the system. The developer's "expert," just said the soil was OK from his standpoint and no further questions were asked by the County. The County staff could have discussed the rapid flow rates that would occur through the rotten wood in the disturbed surface; the potential for soil subsidence in the drainfield when rotten wood decomposes; and the lateral flow to the drainage ditch nearby when the septic drainage water hits the glacially compacted subsoil.

South Sound pollution will continue and it will do so at a faster rate as more development will occur in the region, unless we have qualified individuals making these soil assessments and decisions. Therefore, I support the proposal that soil scientists and wetland scientists that perform tasks that affect land development and septic system location and design decisions should be licensed / certified by the state. The criteria for licensing should also be routed for public comment.

Tom Terry, Ph.D. Forest Soils



P.O. Box 24925 SEATTLE, WA 98124
www.seattleasce.org

Mr. Bruce Chunn
Planning and Performance
Department of Licensing
1125 Washington St. SE

October 2, 2007

Olympia, Washington 98507

RE: Sunrise Review of Licensing Soil Scientists and Wetland Scientists

Dear Mr. Chunn:

The American Society of Civil Engineers (ASCE) is a national trade organization representing more than 140,000 members of the civil engineering profession. Locally, the Seattle Section of ASCE represents the civil engineering community for the nine-county region in Northwest Washington. ASCE works closely with other members of the construction design industry to ensure the appropriate regulation of professions with respect to issues of public health and safety.

ASCE is opposed to the certification or licensing of soil and wetland scientists. Sufficient evidence has not been provided by the applicant groups that significant public health and safety issues exist with the unregulated practice of these professions. Additional costs would be incurred by consumers of these services through licensing and examination fees when determinations of public safety on a project are ultimately made by an engineer or architect, professions that are already licensed.

The intent of the Sunrise Act (RCW 18.118.01) is that all individuals should be permitted to enter into a business profession unless there is an overwhelming need for the state to protect the interests of the public by restricting entry. In addition, changes of existing licensed practitioner's scope of practice should benefit the public. Enhancement of professional status alone is not justification for regulation.

Sincerely,

SEATTLE SECTION ASCE


Lawrence A. Costich, PE, Esq.
Legislative Committee Co-Chair

October 1, 2007

I have been an active member of the Washington Society of Professional Soil Scientists (WSPSS) for the last 17 years. I am in favor of the soil scientist title licensing bill (HB 2324) that is sponsored by Representative Hunt and Representative Wood. I would like

to submit this written testimony in support of the bill and for the public hearing on the Soil Scientist profession in Washington that will be held in Wenatchee on October 3.

I do not have any large scale disaster stories to give you concerning bad soil science work that was performed by somebody who was not a soil scientist and did not know what they were doing. In my former job position as a mapping soil scientist for the NRCS for 13.5 years and my current job position as a Water & Soil Resources Technician for the Lincoln County Conservation District for the past 6 years, I have not had the opportunity to observe large scale disasters caused by any soils related work done by non-soils professionals. If I was a private consulting soil scientist, I would probably have some examples for you, but this is not the world that I work in or have ever worked in.

However, I have noted that some citizens and some contractors (in other non-soil scientist professions) that seek soils information often do not pay the proper attention to explicit information given to them by soil scientists on how the soils information should be used along with the limitations of the soils information. For example, in some cases I have gotten the impression that some landowners and contractors only want to believe that the only soils found in a given area are the soils listed for the map units on the soils map for this area, and that they do not want to be bothered with the possibility that there can and will be small areas of contrasting inclusion soils here that can adversely affect the use and management of this area. Because of this possibility, soil scientists routinely recommend that a site specific investigation be completed when any high value projects are going to be built on a piece of property.

When the general public and other professionals do not pay the proper attention to the guidelines on how soils information should be used or to the limitations of this soils information, the distributed soils information can be “abused” by these users and potential threats to the public health, safety and welfare can become a very real issue. Perhaps one of the most important services that soil scientists can provide to the general public and to other professionals is assistance with how the available soils information for a given area should be interpreted and used along with information on the possible consequences that can occur if the soils information is misinterpreted, misused or abused.

I do have some examples of how my knowledge, skills, education, and experience as a professional soil scientist has helped me on small scale soils work that I have done as an employee with the Lincoln County Conservation District.

One example was locating appropriate sites for installing guzzlers, (otherwise known as wildlife watering facilities) in CRP fields for District cooperators. The fiberglass guzzler tank is approximately 6 feet square and 26 inches deep. Good locations for guzzler sites have the following characteristics:

- 0 to 3 % slope
- easy-to-dig silt loam textures with no significant rock fragments, duripan layers, or bedrock within 30” of the soil surface,
- no high water table or significant flooding hazard, and

- preferably are in a somewhat elevated position in a draw bottom that has some protection from the wind.

In nearly all locations where the District installed a guzzler for a cooperator, and especially where the hole for the guzzler was going to be dug by shovel, I took a soil auger and made sure the site fit all the above criteria before the guzzler was installed. Sometimes I had to convince the cooperator or other District staff that the guzzler site should be moved 20 to 100 feet or more from the original site in order to have better site to install the guzzler. My knowledge and experience as soil scientist allowed me to find the subtle micro-sites on the landscape that were most favorable for guzzler location and that were also closest to the location desired by the cooperator.

Locations for several guzzlers in the Harrington area were sited at the insistence of the cooperator and when I was not able to offer my assistance in the field. These sites ended up being poor sites for guzzlers. Several of these sites were located on 8 - 15% slopes, and water was eroding the fill dirt around the outside of the fiberglass tanks after the guzzlers had been installed. I was asked to finish hand digging the bottom portion of the hole for another guzzler in this area, and I had to fight through duripan intergrade horizons (2Bkq horizons) with cemented cicada casts that were very hard to excavate by shovel. If I had been present when the guzzler sites were located, I would have insisted that the sites be shifted to nearby better locations.

In one location in northern Lincoln County, I ended up moving the initial site for a guzzler away from the border of wet depression and onto a nearby hilltop because the soil was too wet, even along the elevated boarder of the wet depression. I have heard that in Spokane County, some guzzlers were installed in soils and locations with a high water table. In the spring following the guzzler installation, the pressure of the high water table floated the fiberglass tank up out of the ground until the tank was floating on water and was jammed up against the bottom of the collecting wings on both sides of the tank. The only way to solve the floating guzzler tank is to completely remove the collecting wings, pump the water out of the tank, and reinstall the guzzler in another location that does not have a high water table. I know how much work is required to install a guzzler, and I can imagine how frustrated a landowner or operator would be if they had to redo all the work required to relocate a guzzler from an unsuitable wet location to more suitable drier location where the guzzler should have been installed in the first place.

Another example includes my time spent working with a fencing crew installing fencing to exclude livestock for riparian projects in Lincoln County. From my past experience, I know what types of vegetation will grow on “very shallow” versus “shallow” range sites as well as what vegetation is typical over similar looking stony loam range sites often found on deep skeletal flood deposits. For fencing, the “very shallow” range sites over basalt bedrock need to be drilled using an air compressor and rock drill, while the shallow and stony loam range sites can have steel fence posts installed without having to use the rock drill. The fencing crew does not have the comparable soils and vegetation knowledge. I could almost always predict what would be needed for each steel fence post site, but the fencing crew often could not predict what was needed for these sites

until after they had first tried to install the fence posts. Because it takes time and effort to pull the air compressor into range ground areas where it is needed, it saves time and money to know in advance where the steel fence posts most likely will need to be drilled into the bedrock.

For one fencing location in obviously wet reed canarygrass sites close to Crab Creek, I made sure that buckets of road gravel were available for compacting the soil around railroad ties for H braces. This was the most feasible method to insure that more solid and sturdy H braces were installed in this silt loam soil that does not have adequate strength by itself to support the railroad ties when wet (most of the year). I told the fencing crew to expect water in the hole before they were finished digging the 3 foot deep holes for the railroad ties, but they were still initially surprised and dismayed to find water in the holes at about 2.5 feet down from the surface.

Correlating the onsite vegetation with soil conditions is one example of where soil scientists commonly work with other related professionals (range conservationists, in this example) to complete the overall job in an appropriate and professional manner. The soil scientist identifies and describes the soils, interprets the use and management for the soil series that are typically found with this vegetation, and also describes the landscape positions where these soils are typically found, while the range conservationist designates what typical range site description best fits the vegetation and what the typical range production is for the site.

I believe that the vast majority of soil scientists are ready and willing to work with other professionals on jobs that require work that is outside of the expertise of the soil scientist. I sometimes wonder how many professionals in other related fields of expertise are providing soils related information on their own to their clients, when they should really be consulting with a professional soil scientist to adequately address issues and concerns that are primarily based on the soil resources!

Soils scientist are the professionals that know the most about the soils in a given area, and are the professionals that should be consulted for questions that revolve and center around the soils resources in that area. Other related professionals that do not also have the additional equivalent soils expertise (geologists and engineers, for example) are not qualified to provide the necessary soils information on issues and concerns that center around the soils resources in a given area!!! Soil scientists with experience in that local area are also one of, if not the most qualified professionals to provide input on where expensive, site specific projects that are primarily installed in the upper 5 feet or so of the soil profile should be located on the various, subtle micro-sites on the landscape for a successful and cost effective project.

Sincerely,

Dean White

Water & Soil Resources Technician, Lincoln County Conservation District

ARCPACS Certified Professional Soil Scientist #22725

Historian, Washington Society of Professional Soil Scientists (WSPSS)

October 4, 2007

RE: Sunrise Review for Licensing Soil Scientists

Dear Mr. Chunn,

Thank you for the opportunity to comment on the Soil Scientist Licensing. I am a licensed Engineering Geologist (#468) with Washington Department of Natural Resources, Forest Practices Division and at present I am the Acting Forest Practices Science Team Lead. I understand that the new soil scientist license is shouldn't affect those of us who are already licensed geologists, etc. in Washington State; however, I have two concerns about the proposed new Sunrise Review.

1) First, I object to the definitions as written, of what geologists do.

From your website:

“REVISED text of the Soil Scientist Licensing legislation, January 31, 2007”.

(12) "Soil science" means the science that:

“b. is distinguished from geology, as defined in RCW 18.220.010, by the fact that the living soil ecosystem, which is the study focus of a soil scientist forms on the surface on the geologist's focus, which is the greater earth's crust. Geology deals with relatively undisturbed materials formed at the earth surface or within the earth's crust by large-scale tectonic or depositional processes. Soil scientists study how the surface of that material changes over time in response to weather, biology and topography on a comparative micro-scale;”

The underlined statement is only partially true. The earth is dynamic and geologists do not simply study relatively undisturbed materials. One of the underlying tenets of geology is that “the present is the key to the past”. Therefore, we study how the earth is continually changing which means that we examine recent surface processes, which in turn include weathering and erosion, as well as mass wasting.

In my field of work engineering geologists and geomorphologists predict landslides in forested basins. In order to do so, we gather information or data on not only recent (last 50 years) land use history, but the geologic history including rock type, geologic structure, topography, slope form, slope angle, geomorphology (landslides and landforms in the vicinity), aspect, hydrology, and soil, to name a few variables. “Soil” includes weathering products and composition, potential for erosion, porosity and permeability, and tendency for compaction and slumping, as well as other factors. Information about climate and weather patterns and how water travels through the soil are also important. Additionally, we are often requested to identify wetlands and channel migration zones. We do this partly by examining soil composition and depth. So we do not just deal with static conditions. We deal with every physical thing that has to do with a site or a region and that includes disturbed materials as well as depositional processes and large-scale

tectonic forces. As we use a holistic approach in terms of time and material, I would rather not have us be relegated by law or any other means, to a static world!!

My suggestion about the wording of that section is to completely take out the sentence about what geologists do and just keep the part about what soil scientists do. It could read something like this:

(12) "Soil science" means the science that:

b. "as defined in RCW 18.220.010, studies the living soil ecosystem. Soil scientists study how that living material changes over time in response to weather, biology and topography on a comparative micro-scale;"

That way, you wouldn't be misrepresenting the work that geologists do and you would be stating what, in fact, soil scientists do.

2) From the Sunrise report: "Geologically Hazardous Areas—A critical areas report for a geologically hazardous area shall be prepared by an engineer or geologist, licensed in the state of Washington, with experience analyzing geologic, hydrologic, and ground water flow systems, and who has experience preparing reports for the relevant type of hazard."

"For the most part, a geologist or engineer would be the qualified profession for preparing geologically hazardous area reports. However, erosion hazard reports are uniquely soil science."

I disagree with this last statement. Soil is important in erosion hazard reports but so are vegetation, hydrology, topography, slope gradient, slope shape. Soil erosion potential is dependent on the type and characteristics of soil present, but also the type of vegetation present, the amount and source of water affecting the site, the topography: if the site is sloping or not, or in a basin, the slope gradient, and the shape of the slope. If you turn a fire hose on soil on a steep convergent slope, the soil is going to move regardless of the type of soil. If an assessment is strictly about soil, then as far as I can tell, it is incomplete.

In my field, a geologist can make erosion hazard assessments without using the Uniform Soil Loss Equation. Perhaps however, the Sunrise Report is referring to a specific type of erosion hazard report with which I am unfamiliar.

Thank you again for the opportunity to comment.

Sincerely,

Venice Goetz
Geologist, LEG #468
Acting Science Team Lead
Forest Practices Division
WA Dept of Natural Resources

Gentry Consulting

Herman R. Gentry, MS
ARCPAC Certified Professional Soil Scientist
ARCPAC Certified Professional Soil Classifier
P.O. Box 1244
Ellensburg, WA 98926

509-968-4100
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Email: herman.gentry@charter.net



Regulation of Soil Scientists

September 2, 2007

I am asking for your support.

I am a retired Soil Scientist that worked 34 years for the Natural Resources Conservation Service. I have a consulting business that has worked throughout Washington State and I feel this is an important effort to ensure protection of the citizens of Washington.

I have attached a newspaper article in regards to public hearing before the Kittitas County commissioners. State Rep. Bill Hinkle attended meeting. I gave testimony in regards to my concerns about ground water contamination. I pointed out soil interpretations did not address problem soils. This included filling in test pits before recorded high water table which occurs when the irrigation water is first turned on. That is why I think it is important that Regulated Soil Scientists should conduct soil evaluations. This will insure that correct interpretations are being made uniformly statewide.

I have been working on a job for a client on the west side that began April 29, 2007. The opposing client has a Nutrient Management Specialist making interpretations on soil properties which should be made by Soil Scientists. His interpretations are contrary to interpretation made by NRCS employees. This has resulted in extra expense for my client. I have completed extensive documentation which included photograph documents of soil conditions, soil descriptions and lengthy report covering existing conditions. The issue has not been resolved at this time. The Nutrient Management Specialist is working outside his field of expertise and it demonstrates the need for Regulated Soil Scientists.

A list of qualified Soil Scientists is needed. I have had clients tell me it is difficult to find qualified Soil Scientists.

A handwritten signature in blue ink that reads "Herman R. Gentry".

Herman R. Gentry, MS, CPSS, CPSC



**Thurston
Conservation District**
Local Solutions to Local Problems
2918 Ferguson St. SW
Building #1, Suite A
Tumwater, WA 98512

Conservation Department • Department of Licensing • Bio-engineering • Soil Analysis • Conservation Education • South Sound GREEN • Nutrient Management

Bruce Chunn
Department of Licensing
PO Box 9030
Olympia, WA 98507-9030
Mail stop 48027

Aug. 14, 2007

Dear Mr. Chunn,

Regarding the licensing of Soil and Wetland professionals:

1 and 2. I feel that licensing Soil and Wetland scientists is probably a good idea. As far as I know, there are no requirements for these positions as this time that give a client any reliable way of determining the qualifications of the individual or company doing evaluations of soil or wetland conditions.

As a certified professional crop consultant, I feel that professional credentials are very helpful to the industry. A client at least has the confidence in his consultant that comes with that recognition by a legitimate certifying agency that he or she has demonstrated proficiency in the field of expertise.

3. Generally, a qualified professional soil or wetland scientist should be familiar with standard practices and methods for whatever service the customer requests. Of course there is a range of possible services that each of these types of scientists might be asked to perform. However a qualified professional should be prepared to provide the level of service requested by the customer.

4. My experience with soil and wetland scientists has been limited to working with professionals that were certified in their fields by an independent certifying agency. For example, my certification, Certified Crop Advisor, is provided by the American Society of Agronomists and requires a minimum of 2 years experience, a degree in an appropriate field of study, passing 2 comprehensive tests and 40 hours of continuing education credits every two years. The American Society of Soil Scientists has a similar certification program. These societies keep track of customer complaints and can remove a member from the certification lists if a member fails to provide services that meet Society standards.

I recommend that the Dept. of Licensing contact the American Society of Soil Scientists directly for more information about their certification standards and review and disciplinary processes.

5. I think the most efficient and least intrusive way to ensure quality performance in the soil and wetland scientific fields would be to accept the certification procedures of the professional organizations and to work with those organizations to insure that inferior performance is reported and appropriate disciplinary actions are taken.

I feel that if licensing is required that professional designation by a recognized professional organization should be adequate to meet licensing requirements. The Department of Licensing should be able to work with the certifying boards of appropriate professional organizations to develop a mutually acceptable memorandum of understanding about appropriate proficiency standards. Probably if a potential licensee who chooses not to be a member of a professional certifying association but can meet the standards developed by the association in consultation with the Dept. of licensing, then that person should be able to become licensed in this state.

I hope my comments are useful to you.

Brian Thompson CCA
Resource Specialist
Thurston Conservation District
bthompson@thurstoned.com

Daniel R. Ufnar, CPSS
SSSA Certified Professional Soil Scientist
1335 Tullis St NE
Olympia, WA 98506
ufnar@hotmail.com

Bruce Chunn
Dept. of Licensing
PO Box 9030
Olympia, WA 98507-9030

Mr. Chunn,

I am a certified soil scientist working as a private consultant conducting soils and wetlands work for public and private landowners in the south sound area of Washington State since 2004. Unfortunately, I was and will be unable to attend the public hearings for soil and wetland scientists seeking licensure, but I would like to offer my support for the legislation in the following written testimony.

I have some specific reasons for my support of legislation, and much of my concern revolves around a subject of importance to both soil and wetland scientists: *the proper identification of hydric soils in wetland determinations*. As a young professional, I am also interested in gaining a level of professional respect amongst my peers and colleagues in other fields as well as maintaining potential opportunities for employment in other parts of the country.

Hydric Soils

There is currently a lack of understanding and application of hydric soil terminology and field identification of hydric soils across a wide spectrum of professionals here in Washington. This includes those in the private consulting business, local jurisdictional staff, state agencies, and federal staff.

As this region continues to grow and expand, new development will be putting more and more pressures on regional wetlands, and their proper identification and interpretation of functions becomes more important. This is especially apparent in marginal or seasonal wetlands that are often difficult to identify and often become contentious between the regulator and the private land owner. This potentially could cost the land owner thousands of dollars in taxes or lost income, or cause detrimental impacts (increased flooding from runoff, increased pollution threats, etc.) to wildlife habitat and other human resources.

Due to the lack of training and limited soil experience of many local jurisdictional staff, state agencies, and private consultants—I feel like some of these cases are not being decided with the best available science. In addition, there have been some cases involving both private consultants and local jurisdictional staff who have actively misapplied, or promoted the misapplication of Hydric Soil Criteria for wetland determinations. Whether this conduct was done intentionally or not out of lack of proper training is not known; however, this does prove to me that there is a need for a State system to regulate these mistakes.

Professional Advancement & Accountability

Another topic that I am personally affected by as a young professional is potential advancement and accountability within my field. I am a master's degree graduate from Washington State University in soil science, and I have also worked in other states that do have state licensure of soil scientists. Although soil and wetland scientists do have national self-regulating professional certification programs, these have little influence on those who wish to not become certified or in cases of unprofessional behavior. It is very difficult to follow through with a complaint (and the client is likely unaware of who even to make the complaint to), and even if the member has their certification suspended or revoked it will have little impact on their professional career as many jurisdictions don't even recognize or require consultants and/or staff to be certified.

In addition, because these programs are national in scope they are not involved or up to date with issues directly concerning our state. And while the certification program is somewhat meaningful amongst our peers—it has, as mentioned, little sway over jurisdictions or other entities in the state. In fact, a fellow soil scientist recently asked me if it was worthwhile to gain certification through our national organization (Soil Science Society of America), and I told him that to be honest, if he wasn't interested in gaining status amongst his peers in the field it would have little to no impact on his day-to-day work. In essence, it becomes a choice of whether you want to spend the money every year to be called "certified" because the certification does not provide a level of protection or oversight for those hiring soil and wetland scientists.

A lack of licensure or some type of regulation may deplete the pool of new professionals in our state, as we could very well lose out on those graduating from soils and wetland programs at our universities (Washington State has a soils department) or those coming in from out of state. As more and more states have regulations regarding soil and wetland scientists it becomes harder for professionals to move from Washington and begin or work for firms or agencies in other states that requires their scientists to be licensed.

A state-wide sanctioned program would regulate those who are conducting work within Washington, hold individuals accountable, and provide a level of safety for both the public and private sectors that is just not in place currently.

Thank you for your time and consideration. Please contact me if you have any questions regarding my testimony

Respectfully,


Daniel Ufnar



Washington Society of Professional Soil Scientists

“A nation that destroys its soil, destroys itself.” Franklin Roosevelt

AN OPEN LETTER FROM THE PRESIDENT OF THE WASHINGTON SOCIETY OF PROFESSIONAL SOIL SCIENTISTS

November 15, 2007

I am writing this letter to officially record the support and desire of the Washington Society of Professional Soil Scientists (WSPSS) to see the successful pursuit of licensure of soil scientists in the State of Washington. This desire for licensure has in fact been brought forward by soil scientists themselves in the interest of better protecting public health, safety, and welfare through effective oversight and regulation of professionals in the field of soil science. WSPSS was organized in 1974 and has the mission to increase the overall knowledge and awareness of soil science and the role of the Soil Scientist in the public and private sectors. Throughout our history, WSPSS has worked to fulfill this mission by demonstrating and promoting sound scientific principles, leadership, and high ethical standards. The membership of WSPSS includes individuals from academia, government and the private sector. A licensing program in our state would allow a set of standards to ensure those that practice soil science are qualified and that they maintain those qualifications.

Unfortunately, examples exist where substandard work under the guise of soil science has directly impacted the public interest with respect to water and habitat quality as well as property ownership and management. Seven other states (NC, WI, MN, ND, ME, TX and NH) have seen the need for regulation and have enacted state licensing. Many more states are in the process or are considering licensing. Although the work of soil scientists has been labeled by other professions as falling within their existing licensing programs, the education and training of soil scientists is regarded as inadequate or unrelated to the existing license. This dichotomy is troubling in that the work soil scientists specialize in appears worthy of state oversight but the professionals most suited for the work cannot seek that oversight for their work.

Soil scientists possess a unique set of skills and qualifications that make their training and experience invaluable in the field of earth science and natural resources. No other profession is *as qualified or motivated* to perform the analysis and reporting that constitutes a thorough soil investigation as it relates to the common definition of soil science. Many soil investigations are contracted out to soil scientists by other professions, owing to the lack of interest or expertise by those professions in performing the job correctly. Although soil information is required by a variety of government entities and regulations in most environmental investigations, it is all too common for professionals outside of soil science to ignore the requirement or to dismiss the information as superfluous. Research and litigation have proven this is not the case when it comes to adequately addressing environmental concerns. As such, soil scientists stand ready to effectively address soil concerns in the state of Washington and we eagerly anticipate the opportunity for complete transparency in the work we perform. We firmly believe a state program for licensure of soil scientists will provide the very best means for protecting the citizens and resources of our great state.

Sincerely,

Toby Rodgers, B.S. Geology, M.S. Soil Science
WSPSS President

Subject: Sunrise Review of Soil and Wetland Scientists

I am chair of the Council of Soil Science Examiners. This group provides national exams for the licensure and certification of professional soil scientists. Soil scientists are uniquely qualified to evaluate land for agricultural, environmental, and development activities. As such, I believe it is a very positive move to provide licensure of soil scientists to ensure that the public is protected through the work of professionals who are verified as having met high standards of ethics and practice. I look forward to the state of Washington joining the ranks of states with licensing programs.

Sincerely,

Dr. Mike Mullen
Associate Dean - Academic Programs
College of Agriculture
N6 Agricultural Science Bldg N
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TO: Bruce Chunn Management Analyst
Washington State Department of Licensing
FROM: Scott McKinnie, President
Far West Agribusiness Association
DATE: November 8, 2007
SUBJECT: Soil Scientist Legislation

I appreciate the opportunity to provide comment to you regarding the Soil Scientist legislation which has been introduced each of the past three Washington State Legislative sessions. Far West believes there is no necessity for such a designation to be advanced.

In reviewing the legislation each time it has been presented, and in speaking to the advocates for the legislation, it is clear to us the confusion this bill will put into the agricultural community. Our industry values highly the quality soil scientists that work within the agricultural industry, both at institutes of higher learning (e.g. Washington State University) and within industry itself. The term soil scientist has a very distinct meaning of us. It refers to professionals who hold doctorate degrees and are recognized for the particular area of agronomic expertise.

The bills I have read allow others to be licensed by the state as a soil scientist who may not necessarily hold the same educational credentials. We believe this is poor policy.

Those who are recognized as soil scientists should have earned their designation via education, not the purchase of a license. Additionally, the bill tossed a wide net over the entirety of the agronomic community, and then created exemptions for specific types of professionals who deal with soil.

Should such legislation reappear in the 2008 session, we will again challenge it's introduction. We believe that the issues associated with those who are promoting can be handled within their own governance. The State of Washington should not be involved.

The United States Consortium of Soil Science Associations is pleased to comment on your recent e-mail suggested questions concerning licensing of Soil and/or Wetland Scientists.

The USCSSA applaud the excellent awareness and work being done in the State of Washington to achieve a licensing program for Soil and/or Wetland Scientists. We certainly support this type of licensing program.

Below is our response to each of the suggested questions you offered:

1 -- Would regulation of Soil and/or Wetlands Scientists be beneficial to the industry?

Regulation of Soil and/or Wetland Scientists would be a positive benefit to the industry. Regulations would require all Soil and/or Wetland Scientists to have technical skills, education, experience and etc to be competent in terms of having the technical skill to do quality work. It will ensure qualified people are in the business of providing good acceptable requested work for the consumer.

A regulation program would greatly assist in keeping all Soil and/or Wetland Scientists informed on the standards of the industry and responsive to the needs of new technology, and new state/federal guidelines/regulations.

Regulations would greatly assist in identifying training needs, problem areas and providing training opportunities for Soil and/or Wetland Scientists. Several states currently conduct technical training sessions such as phases of wetlands, hydric soils, mapping techniques and etc.

Regulation would be a definite beneficial to the industry because we (soil scientists) would have a clear process that would allow us to peer review and ensure through targeted continuing education that professional and ethical work is being carried out in the state.

2 -- Would regulation of Soil and/or Wetlands Scientists be beneficial to the consumer?

Regulation of Soil and/or Wetland Scientists would be of great benefit to consumer. It would provide an opportunity for the customer to have access to technical competent and qualified scientists they chose for technical advice and doing work projects as requested.

A state licensing program would essentially eliminate those individual who claim to be knowledgeable soil and wetland scientists but in reality do not have the required technical training, knowledge or know the standards to perform acceptable quality work.

State licensing of soil and/or wetland scientists will be of great value in preparing state and local ordinances and/or regulations for a variety of issues i.e. identification of wetlands, suitability of sites for septic tank absorption fields, home site evaluations and etc. Requiring a soil and/or wetland scientists who is licensed by the state or an equivalency to be used in the language of appropriate regulations/ordinances where soil and/or wetland scientists are needed to do the work will ensure the work is performed by a person who is qualified. This will be of benefit in providing quality work for the customer and a reference list of scientists for the customer to use in selecting the scientist needed to do the job.

A personal experience of people not technical qualified in making and interpreting soils occurred in Nebraska several years ago when I was a State Soil Scientists for the USDA- Soil Conservation

Service (Now Natural Resource Conservation Service). Several County Commissioners hired poorly qualified people in soils to do work on agriculture land evaluations for use in tax assessment. The soils work was poorly done, the tax assessment not accepted and the county was out an appreciable amount of money. This result ended up with County Commissioners signing agreements with University, State Department of Natural Resources and USDA to pay for State soil scientists working along with Federal soil scientists in making quality and useable soil survey which was successfully used by the County commissioner in the land evaluation process. This system was shortly expanded state wide with encouragement from the State Department of Revenue.

3 -- Are Soil and/or Wetlands Scientists consistent in their services to customers?

Yes and probably no. When Soil and/or Wetland Scientists understand and use the standards of the National Cooperative Soil Survey, it is highly probably the services to customers will be of high quality. Many of the Standards of the National Cooperative Soil Survey is included on the USDA-NRCS web site at <http://soils.usda.gov/>. Soil and/or Wetland Scientists who are members of state licensing/ certification programs, members of Soil Science Society of America - Certification Professional Soil Scientists /Classifier (CPSS) program, and state Soil Societies/Associations are required to meet minimum in terms of education – often the Federal Civil Service requirement for employing soil scientists, knowledge, skills, experience etc. It has been my experience during my over 40 years of hands on soil survey at the local, state and national levels these individuals will in general always be consistent in their mythology on how to do a job and consistent in the way they perform their work.

When Soil and/or Wetland Scientists who do not choose to become members of some type of licensing /certification program often tend to be the kinds of people who like to do work their way- often without the required education, not understanding or using the appropriate standards, questionable technical skills, and low esteem for ethics. These kinds of scientists tend to be the ones who do shoddy work resulting in problems for customers, local and state officials.

Most state that do not have some type of soil certification can cite examples of problems with inconsistent or poor work being done. Several of these kinds of problems are cited in your excellent Sunrise Review report – i.e. hydric soils interpretation; assessment of seasonal water table issues related to septic system design (and wetland issues); Land Application of agricultural vegetable and fruit processing water.

4 – Is there evidence of self-protection within the respective industries and, if so is it working sufficiently to protect the customer:

There is evidence of self-regulations in a few states. Some states such as Arkansas, South Carolina, North Dakota, Georgia, Indiana, Mississippi, Minnesota, and Texas have state soil licensing programs that do provide a level of customer protection. However, most states do not have any type of soil licensing program and the customer does not have a ready list of state licensed soil and/or wetland scientists from which to review for work selection. In these states the individual or business who needs a soil /and/or wetland scientist must use other reference sources to find a quality person. There are several good sources such as a member of the National Society of Consulting Soil Scientists and the Soil Science Society of America Certification Professional Soil Scientists /Classifier (CPSS) program.

The CPSS program is excellent in terms of identifying soil science professionals according to their education and experience. Commonly state law precludes using a certification from a national organization as a tool in local or state regulations, so the public has to be fairly sophisticated to even locate the list of those professionals since it is not provided or directly referenced by the state in any form. Lastly most people do not know these kinds of state soil society/associations and national organizations exist so they are left to their own initiative and luck as to whom they end up getting as soil and/or wetland scientist to help them.

5 -- Is there a working mechanism within the respective industries to handle consumer complaints and, if so, is it working?

States that do have a soils licensing program have a working mechanism within their state to handle customer's complaints. Their state licensing boards can remove soil scientists from being licensed within their state as deemed appropriate as a result of customer complains and performance problems.

A state licensing program strengthens this process. First, only licensed people could do the work specified and second, if a consumer is harmed they file a complaint and if found justified the person loses their license and can't work in soils any longer. Certification follows the same process but they can still work without the certification unless the state adds some statutory language to prevent it.

It is important to understand the difference between licensing and certification. Licensing is a mandatory process while certification is a voluntary process. In short states with a licensing program can put some teeth into what they expect and have a legal recourse to take positive action to correct any potential problems.

We trust these comments will be of value. It is obvious in reviewing some of the background information of your work toward the licensing of soil and/or wetland scientists that a large amount of excellent work has been done in the State of Washington by several people working on this activity. Best wishes in the days ahead. The USCSSA certainly supports you work!

Best Regards,

Jim Culver – Advisory Group – United States Consortium of Soil Science Associations (USCSSA)

-- Retired Soil Scientists – USDA – Natural Resources Conservation Service

611 Jeffery Dr.
Lincoln, NE 68505

Wetland Scientist Written Testimony

November 6, 2007

To Whom It May Concern:

I am writing in support of the effort to formalize and make clearer the standards and certifications necessary to conduct work as a wetland consultant. I understand that this is the first of several opportunities to comment on the proposed legislation.

I have been a land use regulator for several decades, most recently as the Planning and Building Director for the City of Ferndale, Washington. In my capacity as Director and as SEPA Official I often had to make determinations regarding the nature of impacts to wetlands resulting from proposed development, as well as judge whether proposed mitigation measures were appropriate.

In making these decisions, I must rely on wetland delineations and mitigation plans prepared by a “professional wetland consultant”. Unfortunately, in contrast with engineers and a host of other professions, I do not know what a “professional wetland consultant” is. I have seen delineations and mitigation plans submitted by Professional Wetland Scientists with doctorates in biology, and I have received the same thing from someone with a brand new Bachelor’s Degree in biology and no experience whatsoever. In the later circumstance, I am usually obliged to accept the material and then arrange for third party review of that work by another trusted professional to determine if it is indeed adequate.

The problem is the lack of clear standards and requirements for wetland consultants, or any commonly accepted degree of certification for achieving professional status. Rectifying this problem will require initiatives such as the proposed legislation, before a professional standard will be set for the biological community in the same way it has been for engineers, planners, surveyors, etc. The fact is, a push is needed.

Passage of this proposed legislation would assist land use regulators such as myself immensely, in providing a yardstick by which to measure the credibility of the information being provided to us. This will make for quicker decisions and lower costs, as the need for third party review would become greatly decreased.

Thank you for the opportunity to comment on this important proposal. I look forward to providing expanded comment as some point in the review process. Please feel free to contact me if you have any questions about this communication.

Sincerely,

Thomas Black, AICP

October 3, 2007

Mr. Bruce Chunn
Research and Planning Office
Department of Licensing
1125 Washington Street SE
P.O. Box 9030
Mail Stop 48027
Olympia, WA 98507-9030

RE: SOIL AND WETLANDS SCIENTIST PROFESSIONS SUNRISE REVIEW

Dear Mr. Chunn:

I am a Professional Wetland Scientist certified through the Society of Wetland Scientist (SWS) (No. 1115), and have been a consulting wetland scientist for nearly 20 years. I was on the chapter board of the society for many years, and have been active in planning chapter and national meetings for more than a decade. I have been a Professional Wetland Scientist since 1997.

I am opposed to the proposed title act. In my opinion, the state certification process will not provide a net benefit to professional wetland biologists. The title act will cost biologists a significant sum of money on a yearly basis, especially if we are required certification in more than one state. Based on discussions I had at the SWS annual conference last week, Oregon is proposing a similar process.

It is unclear to me how the title act will be beneficial to the industry or the consumer. Because it is just a title act and not a practices act, we would be certified in title only. SWS provides a certification that allows biologist to call themselves Professional Wetland Scientists. This title act is a duplicate of the certification process that SWS already provides.

I do not see how the proposed title act protects the health, safety and welfare of the public through this certification process. While there are instances of biologists doing unethical things on occasion, the title act will not change people's behavior.

I would hope that you reconsider enacting this proposed title act.

Thank you for your time.

Sincerely,

SHANNON & WILSON, INC.



Katie Walter
Professional Wetland Scientist (No. 1115)

Re: Support of certification of wetland delineators in Washington

Dear Mr. Chunn:

I am writing this letter on behalf of the Pacific Northwest Chapter of the Society of Wetland Scientists in support of ongoing efforts to pass a Title Act in Washington that would certify wetland delineators. The PNW Chapter now has 240 active members in Washington. That number is expected to increase as more members renew membership subscriptions that have lapsed.

It is my understanding that the Washington Society of Professional Soil Scientists (WSPSS) in their pursuit for licensing/certification for soil scientists has now sought to add licensing/certification for wetland delineators to a proposed Title Act bill introduced to the Washington State Legislature. Other states, including New Hampshire, Virginia, Wisconsin and Minnesota have adopted certification programs for wetland delineators. These programs are all voluntary and have been adopted to ensure that people practicing wetland delineation meet minimum education, training, and experience requirements. All of these programs have a common goal and that is to provide reasonable assurance that properly qualified people are conducting wetland delineations and accurately identifying wetland boundaries. Such programs are in the public interest as inaccurate wetland delineations can result in the loss of wetlands and the functions and values that they provide.

It is widely recognized that wetlands provide many functions and values that are beneficial to society. These include flood storage and desynchronization, water quality protection, and wildlife habitat. Therefore, loss of wetlands that provide flood storage functions can potentially result in increased flooding, damage to public and private property, and loss of life. Similarly, loss of wetlands that provide water quality protection functions can potentially contribute to degradation of water quality.

For these reasons, the Board of Directors of the PNW Chapter voted in favor of supporting similar voluntary certification of wetland delineators in Washington.

Such a program will help to ensure that properly qualified professionals are clearly identifiable. Certification of wetland delineators will help protect the public health and welfare by more closely regulating the people that practice wetland delineation and ensuring that those holding such certification demonstrate a consistent ability to accurately delineate wetland boundaries and thereby protect the functions of these resources.

Sincerely,

Ralph Garono
President
Pacific Northwest Chapter of the Society of Wetland Scientists

Joseph D. Leyda, M.A., W.P.I.T.
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jdleyda@yahoo.com
(360) 510-2737

September 12, 2007

Bruce Chunn, Management Analyst
Washington State Department of Licensing
P.O. Box 48027
Olympia, WA 98507-9030
bchunn@dol.wa.gov

RE: Wetland Scientist Certification Statement for D.O.L. Sunrise Review

Mr. Chunn:

My name is Joseph D. Leyda, and I am a wetland ecologist. I have a master's degree in biology, and I am certified as a Wetland Professional in Training (W.P.I.T.) by the Society of Wetland Scientists. I will be upgrading to Professional Wetland Scientist imminently. I have worked for seven years as a private consulting ecologist, and have experience in wetland delineation, mitigation, permitting, and policy development for local shorelines and critical areas updates under the Growth Management Act. I am writing this letter to share my personal perspectives on the question of certification in Washington, and I am not representing any client or company.

I am in support of state certification, as well as licensing, for wetland scientists. Certification will create minimum standards for wetland scientists, and licensing will establish professional rules and protocols to maintain those standards. Together, licensing and certification will provide for better quality of work, for accountability of professional behavior, and for a better informed governmental advisory entity. In my opinion, these are the three most important benefits to certifying and licensing wetland scientists in Washington.

Certification and licensing will improve the quality of work done by wetland scientists. An examination requirement will ensure a common knowledge base, and more congruity between professional opinions. Too often one consultant "sees" wetlands and another consultant does not. The result is uneven regulation of the resource and a tilted marketplace for wetland consulting. Better standards will reduce liability and risk to citizens employing wetland scientists.

When a wetland scientist makes an incorrect wetland determination, or provides advice that proves to be grossly inaccurate, other parties may be adversely affected. The other party can be either the public in the case of an agency scientist, or a developer in the case of a consulting scientist. Sometimes that inaccuracy or faulty advice can have damaging consequences, particularly in the case of wetland delineation. A particular wetland delineation can change the value of a property considered for development, because the usable land area is reduced when wetlands and associated buffers predominate. Currently there is no avenue for a party perceiving damages to pursue to correct a truly negligent result.

My concern is not so much to punish those in error as much as it is to create a system that protects against such vagary. For example, one of my clients received an on-site wetland inspection from the county staff, who gave an upland determination over most of the 5-acre commercial property, which was vegetated with mowed pasture grasses. He told me he then spent \$60,000 on engineering based on that determination. Later, when he applied for a building permit, he was told by the same county department that he had wetlands all over the site and couldn't build there. He hired me, and I confirmed the existence of the wetlands, and informed him that his engineered site plan would require substantial changes based on the actual wetland locations. He lost the money on the engineering, but also on the purchase of the property, based on the government's on-site verbal wetland determination.

How can that situation be avoided? I think that we should create a system that not only allows such gross inaccuracies to be aired in a legal setting, but also prevents them from happening in the first place. Certification and licensing will establish protocols and standards to bring continuity to the profession. Land surveyors have standard methods which are required to be used in setting property corners, and if the method is not followed, the corner is not correct. My opinion is that wetland scientists should have similar legal standards, especially for wetland determination. The proposed licensing and certification will provide both professional standards and methods as well as the legal accountability for wetland scientists who behave in a less than ethical manner, and will improve the practice of wetland science in Washington.

The final reason for licensing and certification is to create a state legal entity that can advise the government on wetland science policy. The Advisory Board in the proposed code will be available to consult the legislature or governor as needed. That Advisory Board will be made up of wetland scientists with different professional backgrounds such as research, regulation, and consulting. The diversity will provide a balanced perspective on wetland science issues, and a potential alternative to Department of Ecology wetland science policy recommendations.

In closing, I would like to ask you to recommend to the legislature that professional wetland scientists be not only certified, but also licensed in Washington State. I have included a *Draft Professional Wetland Scientist Certification Act* for your review and distribution. It is a work in progress, and several wetland ecologists and lawyers will be making revisions to this text. I will present revised text for the October 3, 2007 hearing scheduled in Wenatchee. This draft *Act* is similar to the soil scientist's proposed code, and includes the suggested legislative staff edits. It also includes the items from the August 21, 2007 letter to you by wetland scientists Jim Wiggins and Scott Luchessa. My intent is to open a venue for legal discussion of the certification and licensing requirements that will produce a meaningful legislative result, and I invite your reply.

Sincerely,



Joseph D. Leyda, M.A., W.P.I.T.
Biologist



Oregon

Theodore R. Kulongoski, Governor

Department of State Lands

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October 11, 2007

State Land Board

Bruce Chunn
Research and Planning Office
Department of Licensing
P.O. Box 9030
Olympia, WA 98507-9030
Mail Stop 48027

Theodore R. Kulongoski
Governor

Bill Bradbury
Secretary of State

Randall Edwards
State Treasurer

Re: Wetland Scientist Certification

Dear Mr. Chunn:

I participated on a panel last month at the Society of Wetland Scientists chapter meeting in Yakima and learned that you are conducting the analysis for possible state certification of wetland scientists. I thought it may be helpful to you to know about recent legislation in Oregon that directs the State of Oregon to investigate professional wetland scientist certification—the topic of my presentation in Yakima.

The 2007 legislative assembly passed Senate Bill 544 (copy enclosed) as a result of growing frustration on the part of the public and developers with the poor quality of work provided by many wetland consultants. The major concerns that triggered SB 544 centered on significant project delays and cost overruns attributable to incorrect or incomplete consultant work that does not meet state requirements. The state Removal-Fill Law regulates fill and removal of material in waters of the state in order to assure the best uses of the water resources of the state and protect the health, safety and welfare of the people of the state (ORS 196.805). The Department of State Lands (DSL) administers the Removal-Fill Law and, of course, wetland consultants provide much of the information necessary for making our permit decisions.

SB 544 directs DSL to investigate the feasibility of a wetland scientist certification program and come back to the legislature with a recommendation for legislation prior to the 2009 session. Though DSL did not initiate this legislation, we share the concerns raised by the public and worked with the bill sponsors during the legislative session. I have enclosed a copy of DSL's testimony in support of the bill.

We are just beginning our investigation, but I hope this information is helpful to you. Please don't hesitate to contact me if you have any questions. My phone number is 503-986-5236.

Sincerely,

Janet C. Morlan, PWS
Wetlands Program Manager

Enclosures

G:\WWCWetlands\SB 544 Implementation\Letter To Chunn.doc

**Enrolled
Senate Bill 544**

Sponsored by Senators MORSE, AVAKIAN, BEYER, JOHNSON

CHAPTER

AN ACT

Relating to Department of State Lands; and declaring an emergency.

Be It Enacted by the People of the State of Oregon:

SECTION 1. (1) The Department of State Lands shall investigate the feasibility of establishing an Oregon certification program for professional wetland scientists. The study shall include but need not be limited to:

- (a) The feasibility of a certification program for professional wetland scientists;
- (b) The existence and validity of professional wetland scientist certification programs;
- (c) The professional methods and procedures about which a professional wetland scientist should be knowledgeable;
- (d) The scope of an initial examination for certification and any continuing education requirements that should be imposed;
- (e) A recommendation of an appropriate entity to administer the certification program; and
- (f) Recommended fees for certification as necessary to cover the expenses of operating a certification program.

(2) Not later than November 1, 2008, the department shall submit a report of the findings of the study conducted under this section, and shall include recommendations for legislation, to the interim legislative committees on environment and natural resources.

SECTION 2. Section 1 of this 2007 Act is repealed on the date of the convening of the next regular biennial legislative session.

SECTION 3. This 2007 Act being necessary for the immediate preservation of the public peace, health and safety, an emergency is declared to exist, and this 2007 Act takes effect on its passage.



Oregon

Theodore R. Kulongoski, Governor

Department of State Lands
775 Summer Street NE, Suite 100
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(503) 378-3805
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www.oregonstatelands.us.

Testimony of
Kevin Moynahan, Assistant Director
and
Janet Morlan, Wetlands Program Manager
Wetlands and Waterways Conservation Division
Department of State Lands
On A-engrossed Senate Bill 544
Before the House Agriculture and Natural Resources Committee
May 15, 2007

State Land Board

Theodore R. Kulongoski
Governor

Bill Bradbury
Secretary of State

Randall Edwards
State Treasurer

Good afternoon. For the record, I am Kevin Moynahan. With me is Janet Morlan. We are here on behalf of the Department of State Lands to testify in support of A-engrossed Senate Bill 544.

What This Bill Does

- SB 544A directs the Department of State Lands to investigate establishing a certification program for wetland professionals practicing in Oregon.
- The investigation would research how well other programs are working; appropriate education and training requirements; and administration options.
- DSL would report the results of the investigation to the Legislative Assembly by January 2009.

Background/Current Situation

- Currently, there are no education, training or certification requirements for persons providing wetland consulting services in Oregon.
- Typical services include: wetland delineations; development planning; preparing permit applications; and designing & monitoring compensatory mitigation projects.
- To provide these services accurately and effectively requires interdisciplinary coursework and training including botany, soil science, hydrology and ecology.
- Many individuals who provide wetland consulting services in Oregon are highly qualified and professional. These individuals are essential partners in the removal-fill permit program—they educate applicants, handle complicated development projects, and navigate clients through multiple permit requirements.
- Unfortunately, many persons providing wetland services are not well qualified and, as a result, they create problems for their clients and for agency staff.

Why it's a Problem

- Few landowners or businesses know how to locate a highly qualified consultant.
- When they run into problems with their consultant, they're usually very surprised to learn that there are no education or certification requirements.
- A few examples of problems people run into are:
 - Multiple revisions to or rejected wetland delineations
 - Incomplete permit applications and multiple submittals
 - Cost over-runs and project delays, sometimes to the next construction season

These comments are submitted in response to the Washington Department of Licensing's request for comments regarding potential registration for wetland scientists. My academic background is in plant and soil science (M.S. degree) and I have been practicing in the field of wetland science for approximately 20 years.

I currently do not see a need for registration requirements for wetland scientists in the state of WA. Wetlands are currently regulated by the U.S. Army Corps of Engineers at the federal level. Any wetlands on public or private lands that affect Washington state residents are already confirmed, verified, or identified by the Corps' staff; it is not the decision of the wetland scientist outside of the Corps. Wetlands are also regulated at the local level through critical area ordinance regulations, which again are confirmed or verified by the local jurisdiction, not the independent/consultant wetland scientist working for the public or private entity.

Washington is unique in that the state does not issue a permit for filling wetlands. Although the state issues 401 water quality certification in association with a federal 404 wetland fill activity, there is no state permit process absent of the 404 permit process. Ecology has stated wetlands are regulated by the state under RCW 90.48, but again there is no state permit issued. Therefore, it seems regulating/registering individuals whose careers are focused on wetland sciences seems to be an unnecessary requirement.

Wetland scientists perform many activities or may specialize in only one of these activities – e.g., conduct delineations, identify and assess functions, assess impacts, develop methods for restoring or rehabilitating wetlands, etc. Wetland scientists may specialize in a specific field such as wetland botany, hydrology, soils, or wildlife biology. Wetland scientists may also focus their careers in a specific type of wetland in freshwater, estuarine, riparian, or vernal wetlands. The broad field of wetland science offers a wide range of disciplines and therefore can require a wide range of specific skills, training and education. Applying one registration to such a broad field is not a solution to ensure all disciplines of wetland science practice under an assumed threshold of competence. Wetlands occur in the landscape along a continuum of habitat types and wetland science is integrally linked to other fields such as fisheries science, wildlife biology, river geomorphology, etc. Requiring state registration for wetland sciences within the broad range of interrelated sciences the wetland scientist must participate in is not practical.

Registration will not make a significant change in the quality of services provided to the consumers. As previously noted, wetlands are regulated by three levels of government in Washington State and it is the responsibility of those governments to ensure their regulations are administered. Currently the Society of Wetland Scientists offers certification for professional scientist and I know many certified scientists that fall within a wide range of philosophies and approaches to practicing wetland science. State

registration, like SWS certification, will not likely reduce this range of philosophies and practice of wetland science.

Wetland scientists will continue to work within the industry as academics, government regulators, private consultants, environmental advocates, fundraisers, etc. Wetland registration is not needed at this time to provide benefits to the industry or consumers. Three levels of government agencies will continue to regulate wetlands and those agencies will continue to provide training to their wetland scientists, and will expect professional services from their employees. Outside of the government regulatory setting, I would hope that my undergraduate and graduate training in plant and soil science and ecology, along with my years of experience and interaction with scientists of similar background is sufficient to continue my career choice. It is my responsibility to identify to the consumer, wetland regulator, or colleague how wetland science can be held to an expected standard, or when it is being compromised.

Mark Matthies

10-29-07

RE: Sunrise Review for Licensing Wetland Scientists

I was unable to attend the hearing in Burien recently regarding DOL's Sunrise review of licensing for Soil and Wetland Scientists. I wanted to make sure I sent in written comments for your consideration.

My comments are specific to the proposed licensing of wetland scientists and **not** to soil scientists.

In terms of background, I am a licensed geologist, engineering geologist, and hydrogeologist in the State of Washington. I am also a Professional Wetland Scientist certified by the Society of Wetland Scientists. I have twenty years of experience performing wetland science in the State of Washington both as a private consultant and as a state regulator.

1. Would regulation of Wetland Scientists be beneficial to the industry?

Yes. Initially, the cost of a licensing program may be expensive, and the cost of licensing will be either absorbed by the licensee or passed on to the consumer. This expense may not be beneficial to the industry initially, but over the long term, licensing will help raise the standard of practice within the industry which should lead to fewer lawsuits and better overall performance.

One of the main problems today is the practice of wetland science by unqualified persons. Licensing would help to establish minimum qualifications for wetland scientists. Licensing requirements would lead to an increase in the demand for qualified wetland scientists and that would be good for the industry.

2. Would regulation of Wetland Scientists be beneficial to the consumer?

Yes. Initially, the cost of licensing may raise fees for consumers of wetland science. However, licensing will give consumers an opportunity to hold wetland scientists accountable if they experience unprofessional conduct or sub-standard work products.

3. Are Wetland Scientists consistent in the services provided to consumers?

In the area of wetland delineation, I would say there is fairly good consistency in the services provided to consumers due to the requirements of local governments and other state and federal regulations and methods.

In other areas of wetland science such as mitigation planning and wetland restoration, I would say there is poor consistency provided to consumers.

4. Is self-regulation of Wetland Scientists working sufficiently to protect the consumer?

Absolutely not. Currently there is little to no self-regulation of wetland scientists in place to protect consumers. Typically, only certified wetland scientists can be held accountable by de-certification. Otherwise, it is up to local and state governments to disapprove permits on the basis of inaccurate wetland products prepared by wetland scientists.

5. What do you see as the least intrusive method to ensure quality performance by Wetlands Scientists?

Establish minimum education and experience qualifications for receiving a wetland science license. Make licensure of wetland scientists mandatory for all persons performing wetland delineations, wetland inventories, and wetland mitigation and restoration projects.

6. How does the Wetlands Scientists industry, or membership associations within it, handle complaints?

Typically, the wetland industry may refer complaints to local governments when it is noticed that sub-standard work has been performed. Membership

associations, such as the Society of Wetland Scientists has ethics and other subcommittees to review complaints of incompetence and unethical behavior.

7. How does the lack of regulation of wetland scientists endanger the public safety, health and welfare?

Inaccurate representations of wetland type, size, and protection requirements by wetland scientists and other unqualified persons representing themselves as wetland scientists leads to reductions in wetland functions (e.g. water storage, water quality protection, fish and wildlife habitat) and can lead to improper citing of on-site waste disposal systems, and residential and commercial development, that can have negative effects on public health, safety and welfare.

I suggest that because of the interdisciplinary nature of wetland science, regulation of wetland scientists is going to be a challenge. I recommend that the composition of the oversight committee for wetland scientists reflect this interdisciplinary characteristic by having at least one member be a soil scientist, one member be a botanist, and one member be a hydrologist. In addition, other members of the oversight body should have experience in private consulting, academia, and regulation.

Sincerely,



David S. Parks
Geologist/Wetland Scientist
LG, LEG, LHG #533/PWS#1623
Forest Practices Division
Washington Department of Natural Resources

Sent: Monday, November 05, 2007 1:51 PM

Subject: Re: Certification of wetland scientists

With regard to whether or not to certify wetland scientists for services other than delineation, I am not unequivocally opposed, but I see no pressing need for it now. The services I listed in most situations do not have the same legal implications that delineation does. Certification would add another layer of bureaucracy, without an obvious or strongly demonstrated need. If certification is required for non-delineation tasks, the requirements should be kept much broader than for delineation. For example, require simply a college degree in an environmental field, and prior experience on related tasks.

You may find my position unusual, given the fact that I stand to gain financially from a certification requirement, partly because I teach other wetland professionals as well as college students. However, I think my position as stated is the correct path to take.

Paul Adamus, Ph.D.
Assistant Professor
College of Oceanic and Atmospheric Sciences,
and Water Resources Graduate Program,
Oregon State University

Subject: Certification of Wetland Scientists

I testified at the public meeting in Burien about this topic. I noticed this morning that today is the deadline for comments for the sunrise review process.

I would like to reiterate my recommendation that the Professional Wetland Scientist certification not be made the sole basis for any state certification that is being considered. I have a B.Sc. degree in Botany from the University of Washington and a M.S. degree in Plant Pathology from Cornell University and have been a full-time wetland consultant since 1991. Although I am a U.S. Army Corps of Engineers certified wetland delineator and a member of SWS since 1991, I decided not to apply for PWS certification when it was developed because it seemed redundant, expensive and was not a requirement of any of the jurisdictions in which I worked.

I would not currently qualify for PWS certification because I was educated before formal programs in wetland science had been developed. I have more experience and knowledge in wetland science and regulations than the PWS people I have worked with. Originally, people with prior experience rather than being graduates of wetland programs could apply for PWS status but they no longer allow this.

It would be unfair to people such as myself and not in the public interest to discriminate against senior professional wetland specialists such as myself by adopting the un-amended PWS as a state licensing requirement to perform wetland delineations. Maybe I should have been politically motivated to obtain and maintain this certification when it was originally conceived, but I should not be punished retroactively because I chose not to do it.

Thanks for your consideration of these comments.

Felix Mahr, Principal Biologist

Land-Tek Wetland Services
Olympia, WA

Subject: Wetland Scientist Licensing

I would support licensing or some other state-sponsored certification but it is important to understand that ignorance or limited experience and skill are not the only reasons delineations may be inaccurate. Some consultants are ethically challenged so any licensing effort should also include a requirement that professional ethics be taught and adhered to. As it stands now, we often do "field verification" of consultants work when the reported results differ substantially from our understanding of the site characteristics.

Michael N. Paine

Environmental Planning Manager
Department of Planning and Community Development
City of Bellevue

Resource Planning Unlimited, Inc.

Shelly Gilmore • 1406 East F Street • Moscow, ID 83843 • (208) 883-1806 • rpu@turbonet.com

September 4, 2007

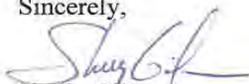
Bruce Chunn
Research and Planning Office
Department of Licensing
PO Box 9030
Olympia, WA 98507-9030

Comments for Public Hearing

I do not believe that the regulation of Wetland Scientists would be beneficial to the industry, be beneficial to the consumer, nor additionally protect the consumer.

The consumer presents a report or study performed by the wetland consultant (scientist) to their respective County and/or Washington Department of Ecology for review and final jurisdictional determination. The consumer would not further benefit from a regulation requiring a wetland consultant to be licensed. The license would not enhance the quality of the wetland consultant's report. Because the final jurisdictional determination is authorized by Ecology in the State of Washington, the additional level of regulation would not change the determination or decision that Ecology would make regarding presence and absence of wetlands, the categorization of wetlands, or wetland mitigation efforts.

Sincerely,



Shelly Gilmore

Resource Planning Unlimited, Inc.

Department of Licensing Wetlands Scientist Public Hearing 9/11/07
Comments by Sarah Blake, Professional Wetland Scientist (PWS) #1377
Blake Environmental LLC 12506 Smokes Road Arlington, WA 98223
northfork@prodigy.net

Before starting my own environmental consulting company with my husband, I worked for nearly 5 years for the Washington State Department of Ecology as a Wetlands Specialist and previous to that worked as a Wetland Biologist for a local jurisdiction in another state.

As all of us in the room would agree, the main reason for this discussion is to effectively protect wetlands, which are “waters of the state”. However, I am not aware of published literature that points to poor wetland delineations as a main cause of wetland loss. The literature does mention the lack of wetland mitigation follow-up, poor wetland mitigation design, the historical conversion of wetlands for agricultural uses, the allowed cumulative loss of small or isolated wetlands and a lack of enforcement as significant causes of wetland loss in our state (*Washington State Wetland Mitigation Evaluation Study Phase 2 Evaluating Success*, Washington State Department of Ecology, February 2002; *Wetlands in Washington State Vol. 1: A Synthesis of the Science*, Washington State Department of Ecology, 2005).

In any profession, there will be “bad apples”, even with state licensing or certification requirements. Is the public, via citizen or business groups, asking for wetland scientists to be licensed or otherwise regulated by the State? In other words, how big of a problem is this really? Where is the data showing that there is a dire need for state regulation of wetland scientists?

In further consideration of the public, consumers will bear the financial cost of the licensing fees, as these will be passed on when wetland delineation or other wetland reports and products are prepared. This greater cost for services will not necessarily guarantee a good product. In addition, further increasing the cost for wetland delineation services may lead people to choose not to hire a consultant, doing work in wetlands without permits and leading to more wetland loss.

Although it is not a requirement, some wetland scientists in our state have obtained certification as a Professional Wetland Scientist (PWS) or a Wetland Professional in Training (WPIT) from the Society of Wetland Scientists (SWS). This PWS certification requires that applicants possess the education, experience and references desired as a foundation for performing wetland work. State certification or licensing would be duplicating this existing certification program operated by our professional association, and would likely lead to its elimination. As I know there are concerns with the administration of this PWS program, the answer lies in hiring competent managers to oversee its maintenance, which is an internal association matter.

Instead of forming a completely new bureaucracy to duplicate what the PWS program is already providing, the solution may lie in making the PWS certification a requirement to operate in the State of Washington, if a wetland consultant or other wetland professional consistently produces inadequate reports. It is my understanding that the existing PWS certification program also offers redress for complaints and possible de-certification when warranted. I am not aware whether or not this avenue has been attempted when or if problems with PWS certified practitioner has occurred. If the PWS certification was a requirement, then this would reduce the number of unqualified wetland practitioners, some of whom may be accountable for submitting inadequate wetland work. However, there are certainly many consultants that are currently operating that produce competent wetland reports and have not chosen to apply and pay dues to the PWS program. Forcing a state licensing requirement for wetland practitioners will eliminate their positive contribution to this field.

It is not clear how proposed state certification or licensing will “ensure consistency and accuracy” in wetland delineation work, as mentioned in the August 1, 2007 Sunrise review letter to DOL. Obtaining a state license does not necessarily mean a particular wetland delineation produced by a wetland practitioner will be accurate and complete. State and local law requires specific methodology and data to be included in a wetland delineation, as laid out in the *Washington State Wetlands Identification and Delineation Manual, March 1997* (Washington State Department of Ecology, 1997). If erroneous, incomplete or incorrect information is included in a wetland delineation report, it is the responsibility of the regulator reviewing a project to point out those inadequacies and require a delineation that complies with the *Manual*. Requiring state certification or licensing of wetland delineators will not erase this fundamental responsibility of local, state and federal regulators. Whether these entities have the staff or prioritize these reviews, is a separate issue that will not be resolved in this discussion.

To answer the questions posed in the meeting notice:

Would regulation of Wetlands Scientists be beneficial to the industry?

No

Would regulation of Wetland Scientists be beneficial to the consumer?

No, as explained in above comments

Are Wetland Scientists working sufficiently to protect the consumer?

Yes

Is self-regulation of Wetlands Scientists working sufficiently to protect the consumer?

Yes. It is the consumer’s responsibility, as when hiring any contractor, to check references, the status of their state business license, and for any reported complaints (under state business license). Also, the Washington State Department of Ecology has published guidance on hiring a qualified wetland professional (*Wetland Mitigation in Washington State – Part 1, Version 1*, Washington State Department of Ecology, 2006)

What do you see as the least intrusive method to ensure quality performance by Wetlands Scientists?

Continue to have the State Department of Ecology provide technical assistance to local jurisdictions and also to the public when a questionable wetland delineation is received. Also, greater support from the U.S. Army Corps of Engineers (Corps) and the Natural Resource Conservation Service (NRCS) in checking wetland delineations and answering questions from the public on wetland issues.

How does the Wetland Scientist industry, or membership associations within it, handle complaints?

See above pertinent comments.

In closing, without specific information to clarify this need, state certification or licensing of wetland scientists would seem to provide questionable benefits to the industry and consumer.

Thank you for considering my comments on this issue.

Subject: Wetland Scientist Certification

I have been involved with environmental jobs that include making wetland science decisions since 1990, seventeen years.

I have reviewed the suggested topics that your office listed as pertinent to the process. Below are my comment(s):

Regulation of Wetland Scientists already exists to some extent through local government jurisdictions. However, local jurisdictions have some difficulty in determining when they are able to regulate or sanction a wetland scientist. Due to the lack of wetland scientists employed within these local jurisdictions some of the "follow through" for protecting the industry, consumer and wetland resource fails. Given that employment of wetland scientists has been on the increase due to adoption of environmental regulations and the Growth Management Act, the procedure to certify wetland scientists must include not only science but some aspects of the regulatory environment at the local level in order to benefit the industry, consumer and resource. If the state were to regulate wetland scientists, it would only be beneficial to the industry and consumer if aspects of local environmental regulations were to be a part of the certification process. Wetland scientists, are not providing quality services to the industry, resource or the consumer if they are not knowledgeable about the science and the regulations that are driving the demand for wetland scientists.

Thank you for opportunity to comment and please keep me informed of your process and decisions.

Patricia Bunting, PWS
Graham-Bunting Associates
Environmental & Land Use Services

Bow, WA

Krista M. Rome, B.S.
Bellingham, WA 98225

September 28, 2007

Re: Wetland Scientist Certification Review

I have been working as a wetland consultant in Bellingham, Washington for approximately 3 years. I have some concerns about the proposed credentialing of wetland scientists in the State of Washington. Although I believe it is important to have minimum standards for practicing wetland scientists, I am not convinced that the pros outweigh the cons in moving from the current voluntary PWS certification program to a state-mandated certification or licensing. My concerns are as follows:

However, if certification were to become a mandatory requirement for practicing wetland scientists, the state would need to require certification of all individuals involved with delineating wetlands, including those conducting third-party reviews and agency staff conducting verifications of wetland boundaries.

- **I have often observed the misapplication of wetland science by agency staff reviewing wetland delineations.** I believed that the state mandated credentialing must be required of all individuals involved with delineating wetlands, including those conducting third-party reviews and agency staff conducting verifications of wetland boundaries.
- **Licensing would not prevent differences of opinion between wetland professionals about the locations of wetland boundaries.** Wetland science and delineation manuals are vague in areas, changeable, and allow too much room for differing interpretations in marginal or difficult situations. Bias and differing interpretations would therefore remain in wetland science. There will continue to be a certain amount of marginally-wetland areas incorrectly identified as uplands and vice versa. It is my opinion that risks to the public resulting from somewhat varying wetland boundaries would therefore not be significantly reduced.
- **Licensing would not prevent wetlands from being “missed” during a site visit.** The 1987 ACOE Wetland Delineation Manual routine-on-site investigation method calls for sampling a site through the practice of walking transects, with the intention of discovering any major wetland areas on-site. It is common that small wetlands will be missed on large or brushy sites, especially during the dry season. As above, this does not result from a lack of education or experience, but rather is a normal part of wetland science.
- **Licensing would not prevent wetland scientists from acting unethically.** On the contrary, holding a license may just as likely give impunity to an unethical scientist. Proving that the behavior of a specific wetland scientist has been unethical versus the aforementioned difference of interpretation would prove costly to the taxpayer and not likely result in a license being revoked, except for in the most extreme cases.

- **Exceptions must be written into the state credentialing requirements to allow for non-licensed individuals to practice wetland science under the supervision of a licensed individual.** I don't see this item in the requirements for certification listed in the August 21, 2007 document provided to you by Jim Wiggins and Scott Luchessa of the PNW SWS Ethics Committee and I want to make sure that this fact is not overlooked. An avenue for gaining experience must be left open so that those individuals lacking 5 years of experience may continue to conduct wetland delineations and perform other wetland work under the supervision of an experienced individual.
- **Who will resolve disputes?** I am concerned about who will be sent to solve a dispute when two certified wetland scientists have drastically differing results on a site, if a complaint is made about one of the scientists to the board. In our profession, you could send 10 wetland scientists out to the same very difficult site and they could come up with 10 different boundaries. I have seen equally qualified, experienced wetland scientists disagree many times. Even the most ethical and experienced wetland scientists likely to be appointed to the review board may have different interpretations. To have the fate of an individual's certificate or license dependent on which board member reviews their "delineation in question" could easily become a nasty political issue.
- **Wetland consultants act as advisors.** Speaking from the perspective of a consultant, I am concerned that licensing does not take into account the advisory nature of those acting as consultants. Consultants are hired with the understanding that other professionals may disagree with their work. It would be very costly to the public if the state were to require licensing of all individuals performing work of an advisory nature.
- **Wetland scientists are required to follow strict standards.** The standards of wetland delineation have been set forth in state and federal manuals, the use of which are required by local, state, and federal agencies. Agencies likewise require the use of specific manuals for designing wetland mitigation plans.

I hope you will consider my concerns as you move forward with your review of the potential need for credentialing of wetland professionals. I appreciate the opportunity to contribute my thoughts.

Sincerely,

Krista M. Rome,
Consulting Ecologist



November 1, 2007

Mr. Bruce Chunn
Management Analyst
Washington State Department of Licensing
P.O. Box 48027
Olympia, Washington

Mr. Chunn:

The purpose of this letter is to encourage the Department of Licensing to consider implementing a professional licensing program for wetland scientists. As professional practitioners in the civil engineering and land surveying fields we are obligated to work with other consultants whose work product we rely upon when making professional decisions. It is in the best interest of the public that the work product presented to us by a wetland scientist be absolutely reliable, consistent and within the guidelines established by the local, state and federal jurisdictions. The existing conditions found on any given site have a significant influence on the decisions we make from an engineering design standpoint. The presence, location, type and extent of wetlands are a paramount concern.

Based on our experience, we feel strongly that it is in the best interest of the public that wetland scientists be subject to a standardized examination process and that wetland scientists be required to obtain a prescribed level of relevant education and experience before being allowed to offer professional services to the public.

It is also in the best interest of the public that wetland consultants be subject to a professional license review board to ensure that the highest standards of practice are upheld, and that a disciplinary procedure be in place to ensure compliance with the appropriate rules, regulations and guidelines.

We would defer to the Society of Wetland Scientist's discretion as to the level of education and experience required and as to the content of the licensing exam.

Thank you for your consideration in this matter,

Darcy Jones
PLS 41302

Jim Wilson
PE, LS 9642

4164 Meridian Street, Suite 200
Bellingham, Washington, 98226

(360) 733-8888 FAX (360) 671-6666

LAND USE PLANNING/CIVIL ENGINEERING/LAND SURVEYING



J. S. Jones and Associates, Inc.

October 22, 2007

Mr. Bruce Chunn
Research and Planning Office
Department of Licensing
1125 Washington St. S.E.
P.O. Box 9030
Olympia, WA 98507-9030

RE: Professional Licensing of Wetland Scientists

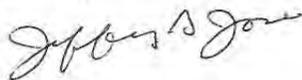
Dear Mr. Chunn:

I am writing in support of professional licensing of wetland scientists. Currently the National Society of Wetland Scientist certification is the only meaningful certification. I have found that wetland scientist with this certification provide consistent quality wetland determination and delineations. Unfortunately, this certification is not required to work as a wetland scientist in Washington State. Consequently, there are a number of poorly qualified and unethical consultants. I routinely am the second or third consultant on projects that had inaccurate determinations and delineations. I have also witnessed the development of sites that I previously determined to be wetland and clearly met the criteria.

I believe professional licensing would be the best way to help the consumer and protect the environment. The state needs to step in and stop real estate agents, civil engineers, and other scientists with limited expertise in wetlands from working as wetland scientists.

I was surprised that engineers oppose professional licensing of soil scientists and wetland work. Ask property owners that have gone through the permit process in Western Washington and they will tell you horror story after horror story of difficulties and costs dealing with wetland issues.

Sincerely,



Jeffery S. Jones
Professional Wetland Scientist, No.1025

cc: Scott Luchessa, Exec. VP, NW Dist. SWS

402 EAST MAIN STREET, SUITE 110
AUBURN, WASHINGTON 98002
253-804-2645 / FAX 253-333-8584

Please accept this testimony in response to proposed licensing of wetland scientists in Washington. It represents my personal position and not necessarily that of my company. For the past 16 years, I have been an environmental consultant in the Seattle area. Much of my practice has focused on wetland-related services for my various clients. Over the course of my career as an environmental scientist which spans more than 22 years to date, I have had the good fortune to work first in academia, the public sector for a natural resource management agency (USDA, Forest Service), and the private sector. Most of my career has been spent in the consulting service industry here in the Seattle area, but I have served clients in both the private and public sector ranging from big to small, public to private, on simple to very complex projects. As a manager and a third party reviewer of other consultants' work for local government agencies here in Washington, I have seen a clear need for licensing of wetland scientists. There is a very wide range of expertise and qualifications within the consulting industry, academia, and natural resource managers. I have personally been involved in cases where wetlands have not been accurately delineated and services have been lost. Some of these have come to my attention as a third party reviewer of code enforcement actions initiated by local government. Others have been clearly documented in both regional and national reports evaluating the trends of wetlands losses as well as critical evaluations of wetland losses resulting from the U.S. Army Corps of Engineers regulatory permitting program under the federal Clean Water Act. In the latter case, the compensatory wetland mitigation program of the Corps has continually been shown to prevent losses of both wetland acreage and function as required by current federal policy (see the National Research Council's 2001 critique at <http://books.nap.edu/openbook.php?isbn=0309074320>). Studies conducted by the Washington State Department of Ecology and King County have found similar results. There are many reasons for this failure, including lack of resources within local, state, and federal agencies for follow up enforcement. However, I maintain that part of the problem is that members in both the private and public sector (i.e., consultants and government agencies) lack the necessary qualifications and experience to identify and delineate wetlands, evaluate functions and values using established methods, prepare compensatory mitigation plans, provide appropriate construction oversight, and conduct post-construction monitoring and make appropriate adaptive management recommendations or corrective actions to ensure there is no net loss of acreage and functions of wetlands as required by local, state, and federal laws.

We know that wetlands provide widely recognized functions, including water quality protection, hydrologic support (e.g., flood control and attenuation), and wildlife habitat. These have been summarized most recently in the Synthesis of the Science published by the Washington State Department of ecology. This document is available online at <http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html>. As indicated in Ecology's synthesis, not all wetlands provide all functions. In addition, wetlands may provide various functions to varying degrees, depending on landscape position, physical and biological structure, and whether there is an "opportunity" to provide a particular function. Clearly the loss of wetlands that provide water quality and hydrologic support functions have the potential to adversely affect human and environmental health, safety, and welfare. We need only look at current and ongoing funding efforts to restore Puget

Sound. Part of the problem with the cultural eutrophication of Puget Sound is related to the loss of wetlands and increased nutrient loading directly related to the loss of wetlands that provided nutrient removal functions. With increasing eutrophication can also come increased populations of disease organisms, which can clearly translate to additional cases of various waterborne diseases. Similarly compelling arguments can be made in relation to losses of wetlands that provide flood control and attenuation functions. Again, part of the reason we are trying to recover so many species of federally-listed salmon is directly related to habitat modifications resulting in part from loss of wetlands. These are but a few examples. There are many more.

Some have suggested that this unnecessarily duplicates the Society of Wetland Scientists Professional Certification Program (PCP). As the current President of the Pacific Northwest Chapter of the Society of Wetland Scientists, I can tell you that this is an unconvincing argument and that this was a consideration before joining the Washington Society of Professional Soil Scientists' efforts to certify both soil and wetland scientists. Though I qualify to be a Professional Wetland Scientist under the current PCP program, to date I have not pursued that certification for several reasons. First, I have seen poor quality work by more than one individual that currently holds PWS certification. Though it is certainly true that many PWS holders are well qualified and do consistently good work, others do not. And if you ask anyone that knows much about the program, you will find out that it is not functioning as intended. In short, at least in the past, the program has done a poor job of policing those that have PWS certificates. While I believe that there have been positive changes to the program that will improve it, there are other short comings. Most notably that there really is not much to lose should a complaint be sustained. In other words, if someone loses their PWS, it really does not matter much because you do not need to be a PWS to practice wetland science. This is one of the major reasons why there is a need for statewide certification.

And finally, perhaps one of the most compelling pieces of evidence is the growing number of states that are requiring certification for wetland delineators and wetland scientists. Previously, I sent you the summary of these programs provided by the Association of State Wetland Managers. It does a good job of summarizing current state programs in Minnesota, Virginia, and New Hampshire. Also I would refer you to the most recent version of the Pacific Northwest Chapter of SWS' newsletter (attached) and the article on page 3 by Janet Morlan. She provides a summary of the recent directive by the Oregon state legislature for the Oregon Department of State Lands to report on the need for certification of wetland scientists.

Thank you for your diligence in investigating the need for licensing wetland scientists. If I can provide any more information to assist you in making an well-supported sunrise review, please do not hesitate to ask.

Sincerely,
Scott Luchessa
Certified Ecologist, M.S. | Senior Manager
Environ International Corporation

Summary of Written Testimony

Soil Scientists

Summarizing the written testimony is best viewed when broken down into organizational and individual practitioner responses. When the organizational or agencies are grouped, those in favor of regulation are clearly affiliated with the soil science profession, while those opposed represented professions or organizations with some competing interests.

Below is a table of organizations and practitioners, page found above, Pro/Con, and key points.

Organization	Page	Position	Key point
Soil Science Society of America	37	Pro	Consistent examinations, public health/safety
Washington Friends of Farms and Forests	38	Con	Farm and timer land should be excluded
Wash. Onsite Sewage Association	44	Pro	Establish competency levels, public health/safety
Wash. Forest Protection Association	45	Con	Increase in burden on forestry on private lands
Natl. Society of Consulting Soil Scientists	49	Pro	Academic credentials, testing, professionalism
American Society of Civil Engineers	51	Con	No evidence of concern for public health/safety
Wash. Society of Professional Soil Scientists	61	Pro	Establishment of qualified practitioners
Council of Soil Science Examiners	62	Pro	Public protection, need for ethics and standards
Far West Agribusiness Association	63	Con	Any bill should require a PhD level education
US Consortium of Soil Science Associations	64	Pro	Services to consumer improve with certification
Practitioners	Page	Position	Key point
Onsite Septic designer	39	Pro	Flooding/polluted ground water
Soil Scientist/Hydro-geologist	39	Pro	Enhancement of professional standards
Certified Professional Soil Scientist	42	Pro	Inconsistent services provided to consumers now
Certified Professional Soil Scientist/Geologist	42	Pro	Improper citing of facilities such as septic systems
Soil Scientist	43	Con	Recommends licensure—not
Citizen	43	Pro	Septic discharge into Puget Sound
Certified Professional Soil Scientist	50	Pro	Poor science in septic design—unqualified “experts”
Certified Professional Soil Scientist	51	Pro	Unqualified practitioners currently
Geologist	55	Con	Disagrees with terminology of 2007 legislation
Soil Scientist (retired)	57	Pro	Unqualified persons working outside their profession
Certified Crop Advisor	58	Pro	Reporting of inferior work with disciplinary action
Certified Professional Soil Scientist	59	Pro	Need for accountability of professionals

Wetland Scientists

Those organizations or agencies providing written testimony were primarily from wetland related organizations and in favor of regulation. Practitioners in wetland science or in affiliated organizations. Those in opposition were split, with half in favor and half not. The reasons provided were varied, ranging from a lack of problems present to reliance on local agency and/or DOE oversight as an adequate form of regulation.

Organization	Page	Position	Key point
Planning and Building Director, Ferndale	67	Pro	Inconsistent experience/competency levels
Pacific NW Chapter, Society of Wetland Scientist	69	Pro	Loss of wetlands/damage to environment
Oregon Department of State Lands	72	Pro	Poor quality work provided by wetland consultants
Environmental Planning Director, Bellevue	80	Pro	Need to correct “ethically challenged” consultants
Resource Planning agency, Idaho	80	Con	County/DOE reviews are sufficient under current law
Practitioners	Page	Position	Key point
Professional Wetland Scientist/Geo-Technical firm	68	Con	Duplication of Society Wetland Scientist program
Wetland Professional in Training	70	Pro	Inconsistent services provided, no recourse available
Wetland Scientist	75	Con	Already three levels of regulation—not needed
Geologist/Wetland Scientist	76	Pro	No self regulation/inaccurate delineations
Oregon State University/Asst Prof	78	Con	Not all opposed—wants delineators only regulated
Wetland Scientist (Army Corps of Engineers cert.)	79	Con	Opposed if SWS standards set criteria
Professional Wetland Scientist	81	Con	Not needed—regulation through DOE in place
Professional Wetland Scientist/Planning Office	83	Pro	Lack of ability to sanction at local level
Wetland Consultant	84	Con	Would not stop differences of opinion/unethical acts
Professional Land Surveyor	86	Pro	Need a review board to ensure high standards
Professional Wetland Scientist	87	Pro	Number of poorly trained/unethical consultants
Certified Ecologist	88	Pro	Lack of standardization of professional standards

A closing note to this section is that the reader should not rely solely on the summary above. These tables are useful only as a recap to the written testimony. Reading the complete text is advised in order to gather the many points made in the detailed written testimony.

Additional Comments from Other States

States with regulatory programs were contacted and asked for comments on how their programs were operating. Some other, non-regulated state's soil and wetland associations were also contacted and solicited for comments as well. Much of the data collected was presented in the previous chapter "*Regulation in Other States*". Some states however provided additional detailed information regarding their regulatory process, which we'll summarize below.

Texas passed legislation in 2001 called the *Geoscience Practice Act*. They found that the relatively small population of soil scientists (approximately 150) would fit well in a licensing act that also incorporated geologists and geophysicists, whom they refer to cumulatively as "Geoscientists". In combining these disciplines, the regulatory authority was able to keep licensing costs down due to the large overall number of practitioners who share the administrative costs.

Texas had specific concerns about a number of areas that suffered due to some work performed by unqualified soil geoscientists. Some of these concerns were:

- *Misidentification of hydric soils in delineating regulated wetlands*
- *Disposal of industrial, municipal, and residential wastes in and on inappropriate soils or in levels excessive to the soil's capacity to handle such wastes*
- *Inappropriate or improper methodology in monitoring movement and quality of shallow groundwater*
- *Placement and design of septic systems in soils that could not handle the loads or properly filter the effluents*
- *Excessive soil erosion in construction projects resulting in off-site damages*
- *Inappropriate methods to remediate salt damage due to discharge of saline waters*

One of the comments in the Texas response created somewhat of an epiphany for this author during the study of soil and wetland sciences. When asked if their regulation had created a reduction in consumer harm, the Texan respondent explained that consumer harm was, in their opinion, an incorrect term. Their response explains it very clearly:

"In our case, the term "consumer harm" may not be most appropriate. A better descriptive term might be "public harm" as, without regulation, the "consumer" paying for the services may be getting exactly what is needed to proceed with projects while the public is paid a disservice by off-site effects of poor geoscience practices. The regulation sought to ensure that only those qualified to make judgments in geosciences could practice, and to establish a framework of ethics to which professionals would adhere, and a mechanism to remove those who practice inappropriately."

The concept of Washington's Sunrise review process is that regulation is driven by, among other things, consumer harm. Thus defining the "harm" caused by bad soil or wetland science in consumer terms becomes less accurate when incorporating all those

that are potentially negatively affected. Thinking in a more global manner, the true damage caused takes on a much bigger audience when one considers the explanation provided the State of Texas.

North Carolina, a regulated state with over 200 licensed soil scientists, provided us on the origins of their soil scientist licensing program. The local membership organization, The Soil Science Society of North Carolina, pursued licensure because many state regulations required soil evaluation, but the scientists who performed these tasks were not licensed or recognized by the state. Thus, geologists and engineers had to sign for certifying any soil work conducted on a project. The requirement for soil work to be signed off by a licensed individual prompted them to push for licensing of soil scientists. In turn, when licensing was enacted the liability for soil work was placed on the soil scientist instead of the geologist or engineer on the project. Licensing for North Carolina has resulted in making the job of regulators easier in assessing the soil works submitted for site assessments. They initially set the licensing fees too low (\$50 application, renewal \$80, exam \$120) and now have problems funding their program. They must go through their legislature to now raise fees to cover administrative costs. North Carolina was careful to define work practices such as hydrogeologic analysis, where the soil scientist may gather data and do analysis, but cannot design systems, as that is considered engineering work.

California, a non-regulated state, has an association called the California Professional Soil Scientists Association (CPSSA). They indicated that most states recognize engineers and geologists so when a registered professional is required, work goes to them by default. Soil scientists on the other hand may be just as qualified by can not do the work for lack of recognition as a registered professional. Thus, regulation of soil scientists is beneficial to the profession. The CPSSA stated that the California Regional Water Boards recognize SSSA and ASA certification as a measure of qualification for soil science competency.

Indiana, a state with soil scientist registration, provided a response from its Natural Resources Commission. Their response addressed the interaction between their Board of Registration for Soil Scientists and the Natural Resources Commission's oversight at the "ultimate authority" regarding administrative law reviews requested by the Board. The Judge responding to our request indicated that in her three year tenure, she had reviewed one such case at the request of the Board.

Some state systems proved to be somewhat obscure. Such was the case in **Mississippi**, where data indicated they had a soil classifier licensing program, and information was very hard to obtain. After speaking with a few related agencies such as their Professional Engineers and Department of Agriculture, we determined that a sub-division of the Department of Agriculture called the Bureau of Plant Industry had oversight of the state's 14 licensed soil classifiers. The lesson learned here was that some small regulatory organizations become hard to locate among large agencies. Making the information more accessible is probably in everyone's best interest.

North Dakota, a regulated state with registration of soil classifiers, passed legislation in 1973. In the early 1970's, North Dakota was undergoing an energy boom and there was speculation that large coal strip mines were going developed. The environmental impacts of these mines were a major concern of the public, especially the reclamation of expended mines. With these concerns, the legislature was convinced to regulate the profession in order to ensure proper soil classification was being completed. They state that very successful reclamation programs have resulted from this effort, which they state is one of the best programs in the nation. Services provided by soil scientists have been improved and expanded into wetland identification, septic site evaluations, and landfill siting. The North Dakota representative encouraged Washington to ensure a multi-disciplinary approach involving all earth science professionals be used in any legislative process to ensure all profession's issues were heard and infringement into other's disciplines was avoided.

Conclusion

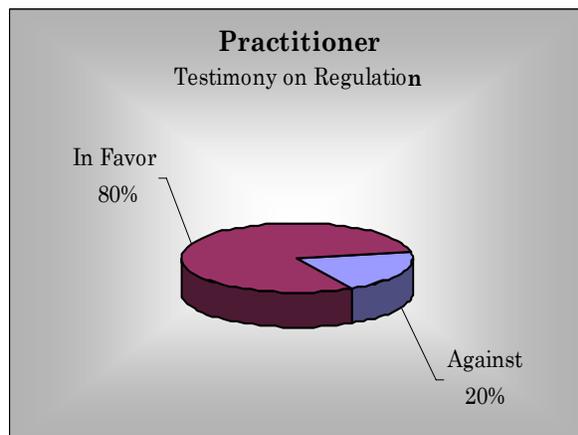
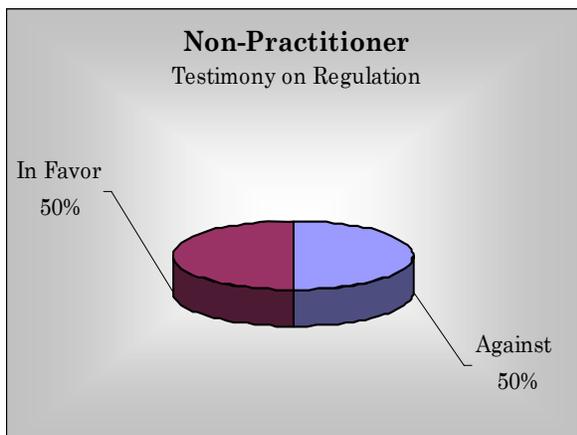
Clearly the consideration of regulation for soil and wetland scientists is not a simple decision. Washington is not the first state to struggle with this determination. When self-regulation has failed, the determining factors used by most states in any regulatory effort normally focus on consumer harm as the impetus for state controlled regulation. As noted by the state of Texas, this factor alone may not be suitable criterion for the determination of regulation, as unchecked or irresponsible work in these professions affects more than just the "consumer". In fact, when bad wetland delineations or bad soil science are applied, by either incompetence or by design, the ramifications are widespread, encompassing the entire community, as well as compounding damaging environmental factors that threaten both plant and animal life. The many factors provided in the previous sections on wetland and soil science practices clearly demonstrate that neither of these disciplines can go unchecked without drastic consequences, the results of which will endure far beyond the lifetimes of those who must now decide if regulation is the right course of action.

The depth and complexity of these professions makes consideration of regulation that much more difficult. Practitioners with entry-level minimum education are college graduates with hard science backgrounds. Most have post graduate degrees. The nature of their work is not easily defined in the limited space of a Sunrise Review. Without having to completely comprehend the technical aspects of these professions, it is perhaps useful to the reader to consider that soils and wetlands are critical factors in the survival of both humans and all that surrounds them. Soil is a thin skin of life which provides the nutrients from which all life on land survives as well as providing nutrients on which all life in our oceans depend. Disrupting this very finite resource irreparably is not just a consumer problem; it becomes an environmental problem affecting the very existence of all that we know. Wetlands have become better understood in recent history as resources that mitigate many problems for both human development and in the maintenance of nature's balance. The importance of proper stewardship of soils and wetlands cannot be underestimated and thus, our determination on regulation takes on a much more critical

importance when we decide how to ensure the management and continued good health of these resources.

Since the 1970's, the importance of proper maintenance of our soils and wetlands has become an imperative objective for government. The passage of laws since then in most states to protect wetlands is a reversal of the previous objective of filling them in or draining them to allow for continued expansion of our communities and industry. That we have come from eliminating about a half million acres of wetland annually then to a small annual net gain presently is evidence of the importance placed on our responsibility to our communities and the environment. Washington has in place certain checks and balances where local and state authorities must "buy off" on development plans, and we have trusted these authorities to ensure our soils and wetlands are protected and maintained in accordance with local and state law. Numerous testimonies by professionals in both disciplines indicate that the local oversight varies greatly in experience and staffing levels. Several practitioners testified to the disturbing reality that the desired outcomes of land owners or developers sometimes affect the way the land is mapped for review by the local authority. In the end, we see apparent inconsistencies in the application of science and interpretation of reports, resulting in questionable outcomes in the areas of adherence to the local and state regulations governing these disciplines.

Opposition to the regulation of both professions has been voiced. When looking at a tally of the pro/con testimonies the charts on page 34 show that the wetlands side indicates just over 50% favor and the soils side is about 75% in favor of regulation. Those charts represent the aggregate totals regardless of who provided the testimony. As seen in the charts below, when viewed as practitioners in soil or wetland science or those who are not, we see different outcomes regarding who is in favor and who opposes regulation. Clearly practitioners in soils or wetlands work tend to be more in favor, while those voicing opposition are more likely to be from different or related professions. This may be due to some concerns about how regulation may shape the nature of the work they may currently be doing.



Some of the concerns voiced by individuals and organizations to any regulation are more specifically addressed in the bulleted items below.

- In the public hearings, an attorney for the American Council of Engineering Companies of Washington (ACEC) indicated that consumers of soil scientist services are generally larger corporate customers and are able to determine the qualifications of the practitioner. While this may be true for large organizations accustomed to hiring such services, several soil scientists present indicated that they rarely worked for the corporate side and that nearly all their customers were private citizens who hired them in small construction related circumstances.
- The attorney for the Architects & Engineers Legislative Council (AELC) stated that their position was that a title act would allow practitioners who were not certified to practice under other titles, which is true. Their concern was that a title act would fall short of the intent of protecting the public. The position of DOL is that certified professionals from which the consumer can choose will provide a pool of practitioners with established credentials which will enhance the likelihood that quality work will be produced in wetland and soil science.
- An engineer representing the ACEC and the AELC voiced concerns that some of the reasons he'd heard for regulation seemed to fall under the responsibility of licensed professions other than soil or wetland scientists. Some examples included septic systems and groundwater contamination. While it is true these examples are customarily attended to by licensed professionals from other occupations, there are a multitude of other customary work details identified that are customarily specific to wetland or soil scientists (see pages 5-6). There was also concern that professional licensing was not required to protect the public health and safety until the work rises to the level of hydro-geologists or engineers. DOL respectfully disagrees because we feel that regulation of wetland and soil scientists would aid in improving the health and safety of the public.
- One forestry organization, The Washington Friends of Farms & Forests, identified concerns that the draft legislation may impede forestry professionals from doing their jobs. The legislation referenced was HB1318 from the 2007 session, which was the previously drafted practices act, which has been disbanded. The DOL recommendation would entail a title act which will not impact other professions, as it is entirely voluntary and does not limit any customary work done by other professionals.
- Another forestry organization, The Washington Forest Protection Association, raised the question of the impact of another level of bureaucracy for the persons working in their industry. Additionally, they are concerned that regulation may require specific work customarily done by persons in the forestry industry to be mandatorily done by regulated soil scientists and thus drive up operational costs, making it more difficult to survive in a global economy. However, the DOL

recommendation is a voluntary program and will not require the forestry industry to seek the services of any certified professionals.

- An engineer representing the American Society of Civil Engineers (ASCE) said that they are opposed to any regulation because there is not sufficient evidence that the public is threatened and that the enhancement of professional status is not justification for regulation. DOL feels that the evidence of public risk is lessened by certification of these professions and believes there is sufficient evidence that poor science in soil or wetland science does indeed threaten the public welfare. DOL agrees that regulation for professional enhancement is not appropriate and further believes that not to be the objective in the recommendation.
- The Far West Agri-Business Association stated that they believed the agricultural business can satisfactorily govern its own practitioners. They additionally indicated that a soil scientist was, to them, qualified only by holding a doctoral degree in that discipline. DOL recommends, among other criteria, a high standard in educational qualification for soil scientist certification, although setting the bar at the doctoral level is not consistent with national standards.
- A Geo-Technical firm, Shannon & Wilson, was concerned that a title act will not change behavior of the wetland practitioners, will bring additional costs to the consumer, and duplicates the Society of Wetlands Scientists (SWS) certification program. DOL acknowledges that certification will not eradicate bad science from the professions. It will however provide more opportunity for consumers to choose qualified practitioners. Certification will have some slight affect on the annual operational cost of practitioners, which is voluntary on the part of both the scientist and the consumer. Regarding duplication of the SWS program, the applicant report does mirror the qualification criteria as well as offer some additional recourse to the consumer that is lacking in SWS oversight. Additionally, the SWS supports certification of wetland scientists in Washington State (see page 69).

As noted in the directive from the Commerce and Labor Committee (appendices), the revised request for regulation consideration is a proposal for a title act, which is not intended to secure work practices for the applicant groups. The applicant groups have indicated that a certification of their occupations would result in a voluntary decision to participate and would not affect the work currently done by related professions. The obvious question, posed by many of those opposed to regulation, is “how would certification ensure that the consumer does not experience the occasional bad science that we presently see?” In short, it would not. There may always be either incompetent or unethical practitioners who will, by ineptness or by design, perform bad work.

One would logically ask the question, “why not full licensure if regulation is warranted?” The answer is multifold, and requires some discussion. Noting that the opposition from related professions was present during the last legislative session and indicates it will be again in opposition, the likelihood of the passage of a practices act is not good. There is

and will continue to be concerns about the customary work that these related professions do not wish to lose which is understandable. In a good faith attempt to make compromise that would benefit some and not damage others, the applicant groups have sought certification through a title act. This is, in the eyes of the Department of Licensing, a reasonable intermediate measure of regulation that would serve to benefit the practitioners who chose to become certified, the consumers who wished to readily identify qualified practitioners and the public by raising the standards for entry into the profession to a predictable level of competency. On the downside, certification would have less enforcement authority than would licensure. The public needs to be aware that the regulatory authority will have some limited ability to mitigate issues with certified practitioners and no authority with non-certified practitioners. However, the consumer will have options available they currently don't have and public safety can only be enhanced.

The next obvious question regarding certification is "why bother?" While outright licensure would require all who wished to practice either science to participate, certification affords both the practitioner and the consumer to choose between state certification or not. Will this eliminate bad practices in soil or wetlands science? Absolutely not, nor would full licensure, nor would doing nothing. Certification would however potentially allow for other advantages, some of which are listed below:

- Consumers, both private and governmental, could choose to hire a state certified practitioner with known minimum qualifications or hire a consultant who is not certified
- Those who became certified would be bound to a code of ethics, providing some assurance to both the consumer and the public that ethical standards would be followed
- Consumers would have a listing of practitioners available through the regulatory authority of practitioners, their location, contact information, disciplinary records, and qualification credentials
- Minimum standards in education, experience, and ongoing education would exist for those who become certified, allowing for some level of expectation of by the consumer and the public of professional qualifications and competency
- Certification would be a voluntary process, where any added costs to the practitioner or consumer are accepted of their own free will
- A advisory board, made up of qualified professionals, would exist to provide oversight for certified practitioners, ensuring ethical standards are maintained
- A method of recourse would exist for the consumer when disputes arise, allowing for mediation and resolution of matters prior to expensive legal actions
- Local and state oversight authorities would have more clear expectations in the qualifications and experience levels of practitioners who were certified

Regarding costs, the DOL completed a fiscal note for soil scientists prior to the last legislative session based on an approximation of 134 licensees. Noting that the wetlands scientists have been incorporated into this review, the pool will grow considerably. Earlier we estimated the known membership counts in Washington to be around 375,

noting that an unknown quantity of both soil and wetland scientists exist who are not members of any organization. Using only 300 as a potential certification group, we find that the costs would be in the \$450 per year range, which by discussions with practitioners is not out of reach.

In the end, we have a group of practitioners who are requesting a voluntary regulatory program that they hope will raise the qualification standards of entry level professionals and provide for continuing education to ensure their certified members are operating with the most current science available. This, in turn, is proposed to better serve the public in providing an option for employers to choose from a pool of standardized professionals. It is notable that the Department of Ecology, the statewide oversight authority for compliance to wetland and soil science regulations, provides consumers advice on how to find a competent wetland scientist (copy in appendices). In this document they state, **“There is no government sanctioned program for certifying someone as a “qualified wetland professional” or “qualified wetland specialist.”** The DOE document goes on to describe various attributes of qualified persons and even suggests that the consumer look to the Society of Wetland Scientists, a private organization, for assistance. Clearly, the consumer is left with few choices in locating competent practitioners.

With the interests of the public in mind, it is reasonable to think this self-imposed regulatory request will produce a win-win scenario where the consumer is afforded an option not previously available and the practitioners who choose to be certified can offer this credential as a symbol of their commitment to improved quality and ethical standards in their profession. Those practitioners who believe certification is unnecessary could simply opt out and rely on their reputation and marketing abilities to continue in the profession. Further, local permitting authorities could accept reports from certified practitioners with a degree of confidence in their competency, where uncertified practitioners reports may bring a higher level of scrutiny.

Recommendations

The Department of Licensing recommends that the Legislature pursue certification of soil and wetland scientists. We justify this recommendation based on several criteria:

- Testimony provided by practitioners of the inconsistencies in the application of science in the field
- Testimony of inconsistency in oversight by local authorities
- The evidence of harm done to on large scales such as:
 - Clark county with hundreds of failed septic systems (Currently exceeding \$4,000,000 in costs)
 - At least 20 large scale ground water contaminations in eastern Washington due to misapplication of agricultural waste water (after as many as 10 years, many are still in clean up mode—cost unknown as yet)
- Testimony provided on smaller scale harm, typically to landowners, where:

- Development is delayed due to incorrect determinations of wetlands until appeals processes and subsequent correct delineations are done
- Development is forbidden based on incorrect initial wetland mapping as uplands where wetlands truly exist
- The lack of an avenue of recourse for disgruntled consumers
- The lack of any state standards of competency, education, and experience for practitioners
- The lack of any state code of ethics for practitioners of soil or wetland science
- The lack of a readily available listing of practitioners and their qualifications for consumers to review
- Incorrect soil and site evaluation of sites for ground absorption sewage treatment and disposal systems has increased the chances for spread of diseases.
- Incorrect soil and site evaluations for prospective building sites costs landowners large sums of money when the site is later determined to be unsuitable for the proposed use or worse yet when a failing system prevents the sale or refinancing of a home or business.
- Incorrect soil and site evaluations cost landowners large sums of money in lost or delayed sales of property.
- Incorrect designation of wetlands due to misidentification of hydric soils deprives landowners of their rights to use their property for its highest and best use. On the other hand, lack of hydric soils identification can result in destruction of bona fide wetlands

The applicant group request is for consideration of certification under a voluntary program. As this would not require mandatory participation, nor would it impede the work of non-certified practitioners or those in related professions, the Department of Licensing feels that certification would create more benefits to the public and sees no detrimental aspects. Full licensure is not recommended due to the lack of overwhelming evidence of widespread public harm, although evidence does exist of errors made that have run into millions of dollars in clean up costs and litigation costs. Another consideration is the potential of long term environmental damage due to poor science. While certification will not eliminate bad work, it will provide minimum qualification standards in the profession for those who participate and will afford the public an option for more informed choices in the selection of soil and wetland practitioners.

Both applicant reports, included in the appendices, outlined the recommended entry level criteria which are modeled after nationally recognized professional organizations. The Department of Licensing agrees with these standards and supports the applicant group outline in regards to:

- Board qualifications, authority, term length
- Education
- Experience
- On-going Education
- Examination standards
- Reciprocity

- Related professions issues¹³
- Grandfathering
- Exemptions to certification
- Prohibited Acts/Unprofessional conduct
- Ethical Standards of Practice

¹³ Some of the professions with concerns involve Geologists, Engineers, Anthropologists, Archeologists, and several Agricultural professions. The recommendation by DOL for voluntary certification will allow for them to continue their normal and customary work while not being affected by the certification of soil or wetland scientist.

APPENDICIES

Commerce and Labor Request for Sunrise Review



Washington State Legislature

May 31, 2007

Director Liz Luce
Department of Licensing
PO Box 9020
Olympia, WA 98507

Dear Director Luce:

On behalf of the House Commerce & Labor Committee, we are requesting that the Department revisit the sunrise review of soil scientists conducted in 2005. We are asking that the report be updated to include wetland scientists, taking into consideration that what is now being proposed is a title protection bill (HB 2324) rather than a practices bill, and provide any additional analysis you find warranted.

The sunrise review should include an opportunity for input from all interested stakeholders. In addition to recommending whether regulation is needed, please include in the report recommendations on the specifics of the proposed regulation.

I appreciate your consideration of this request and look forward to receiving your written report before the start of the legislative session in January, 2008.

Thank you for your attention to this matter.

Sincerely,

Handwritten signature of Steve Conway in black ink.

Steve Conway
State Representative
Chair, Commerce & Labor Committee
Committee

Handwritten signature of Alex Wood in black ink.

Alex Wood
State Representative
Vice-Chair, Commerce & Labor

cc: Barbara Sandahl, Department of Licensing
Bruce Chunn, Department of Licensing
Senator Jeanne Kohl-Welles
Representative Sam Hunt

Soil Scientist Applicant Report



RCW 18.118.030 Sunrise Report for Soil Scientists Licensing August 1, 2007

Explain each of the following factors to the extent requested by the legislative committees of reference:

(1) A definition of the problem and why regulation is necessary:

(a) The nature of the potential harm to the public if the business profession is not regulated, and the extent to which there is a threat to public health and safety;

The nature of the potential harm is related to the fact that most applied soil science is related to either detailed mapping of a local soil based on a certain management need (surface soil erodability, soil quality, soil drainage potential), or is related to using soil as a filter or receiver of solid and liquid waste. If the soil is mapped incorrectly, the management target will fail. If waste material is inadequately treated or purified (by improperly applying natural soil processes), the result is contaminated surface water and drinking water aquifers.

The previous Sunrise Review described three different specific problems with work carried out by soil scientists that had impacts on public health safety and welfare in Washington State:

- Land Application of agricultural wastewater
- Poor soil evaluation that resulted in hundreds of failing septic systems in Cowlitz County
- Unethical conduct related to wetland delineation process and state agency review

The first problem resulted in 20 different documented failures in areas ranging from Ellensburg to Richland to Yakima that affected groundwater on 9 sites, surface water (Yakima and Columbia River) on 3 sites, individual households on 8 sites with various levels of settlements described as follows:

- simply improving the treatment process;
- \$12,000 settlement;
- provision of safe dialysis water;
- criminal investigation, water treatment and fines;
- soil treatment;
- trucking of wastewater;
- closure of sprayfield;
- closure of a facility and almost \$1,000,000.00 defense costs;
- a "large financial settlement".

According to Kim Sherwood, P.E. (Ecology), many of these failures are still in cleanup mode after more than ten years of treatment. Therefore, total costs are as yet unknown. As a result of those

problems and their eventual solution, which involved appropriate application of soil chemistry, soil biochemistry and soil physics, Ecology has a written policy *recommending* use of a professional soil scientist to develop sprayfield application prescriptions. Therefore, Ecology staff recommends use of currently unregulated professionals -- soil scientists -- for this work.

The second problem was a result of a Cowlitz County employee – a soil scientist – whose job was to evaluate soils for onsite septic system design. His assessments apparently ignored standards -- such as required separation to seasonal groundwater tables -- and resulted in many inadequately designed systems being installed. As a result, according to a consultant working with the county, over 200 failing systems had been identified as of the previous Sunrise Review report, and more were anticipated to come. The claims value of those failed systems at the time of the original Sunrise Review report was estimated at \$3,000,000.00. Recently updated information from Cowlitz County indicates that \$457,315.38 has been paid out to date. Please note that we have since verified that the County employee did have a degree in soil science, but was not a member of the state or national professional soil scientist organizations.

Please also note that one might think this problem is solved by recent legislation licensing onsite wastewater system designers; but that is not the case. The licensed designers are required to take Continuing Education courses that ensure they are adequately trained to design and understand the systems they design. And their most basic and ongoing training is in soil science – classes taught by professional soil scientists. Without that training, they would not be as effective at their work, and there would be negative impacts on public health safety and welfare. Therefore, this state-licensing program depends on and requires critical training from currently unregulated professionals -- soil scientists.

The third problem described in the previous Sunrise Review report involved events that occurred during an onsite meeting between staff from the State Department of Ecology (Ecology), Environmental Protection Agency (EPA), Corps of Engineers and a soil scientist wetlands consultant that resulted in a complaint (to the Soil Science Society of America [SSSA] Ethics Board) claiming that the consultant had behaved unprofessionally for a Soil Scientist. The Ethics Board had no formal response to the complaint, other than saying that the information provided was inconclusive. As a result, Department of Ecology prepared a memorandum for their employees recommending and requiring certain precautions when working around this soil scientist and describing protective ground rules for data collection in the presence of this scientist. Therefore, Ecology was forced to develop protective policies for their employees in regard to one individual soil scientist rather than

having the ability to effectively complain about that person's actions to an effective professional board.

In addition to those three examples, we can cite many examples in the field of wetland science where two or even three different delineations on the same site resulted in two or three very different results in terms of a legally defined wetland boundary. In particular, hydric soils interpretations are often carried out incorrectly by both soil scientists and other wetland professionals. These kinds of outcomes tend to result in legal battles and public hearings, often with highly technical, confusing, contradictory and sometimes misleading information provided during testimony. And because there is no professional oversight, in the form of local peer review through an Ethics or Complaint process, there is at least a perception in some cases of there being purposeful deception with no satisfactory process by which to determine or resolve whether a particular site is in fact legally wetland or not.

Finally, it should be noted that professional soil scientists, particularly in the private sector, often are accused of breaking state or local law when they are carrying out their "normal and accustomed" work. Soil scientists are specifically exempt from being required to get a geology license as long as the work they are carrying out falls within the standard activities of their profession. But most local Critical Areas Ordinances (CAOs) are a prototype of the State model CAO, which was drafted by the Washington State Department of Community, Trade and Economic Development (CTED) and made available for general use and adoption by November of 2003.

When drafts of that CTED model ordinance were first made available for review and revision about a year or two earlier, some soil scientists noticed that state-licensed geologists were listed as being the only professionals allowed to write reports for sediment and erosion control plans. The soil scientist community contacted Chris Parsons at CTED at that time, and suggested some alternate language that would also allow certified professional soil scientists to do that work. Ms. Parsons agreed to the change after it was verified that erosion control equations (Revised Universal Soil Loss Equation [RUSLE]) were in fact originally developed and applied most commonly by soil scientists. However, for reasons unknown at this time, the agreed upon change in language was missing from the final draft of the CTED model CAO. As a result, most local CAOs only allow sediment and erosion control reports to come from a state-licensed geologist.

When the soil scientists community contacted CTED (Tim Gates – Chris Parson's successor at CTED) (TimG@CTED.WA.GOV) to find out what happened, CTED agreed that it was a mistake – the missing language should have been included -- and suggested that they could send out an

addendum or errata to correct the original model ordinance language. But since most local CAOs have already been formally adopted, that would have no real effect. Each local jurisdiction would have to be contacted individually and asked to update their CAOs to accommodate soil scientists – an unlikely event. Therefore, soil scientists are unable to carry out their normal and accustomed work in erosion and sediment control due to being inadvertently written out of local CAOs that only accept reports from state-licensed individuals. And there are some concerned that detailed soil mapping – clearly soil science -- could also be challenged under that same rule.

But in a more general sense, in order to fully explain the “nature of potential harm to the public” if soil scientists are not licensed, we must first define “soil science” and those who practice it. We realized during the past few years of legislative effort that few people outside of the profession were aware of what a soil scientist even does. Therefore, we will attempt to provide a definition of the science and examples of what a professional soil scientist might do at work.

We borrow heavily for the following text from <http://en.wikipedia.org> (an online encyclopedia) and other information provided by soil scientists across the nation that are interested and personally invested in our effort to be licensed in Washington State. Whenever possible, we reference the source of the information; but in no case is there any intent to plagiarize or present this material as ours alone. It is a composite of many contributors’ efforts.

Soil science is the study of a complex natural living system composed of:

- soil minerals (sand , silt and clay),
- soil atmosphere (gases),
- soil biota (microbes, insects, animals etc.) and
- plants (micro and macroflora).

This science differs greatly from the study of soil as a load-bearing material – i.e., soil engineering. Soil in its *natural* state is not static; it is living and always changing in response to changes in surface management. A soil scientist thinks of a particular soil as a something comparable to a “species” with unique characteristics requiring skills to classify and identify – comparable to how a zoologist or botanist would think of an animal or plant. But since soil is adapted and used by many different disciplines to accomplish many different things, *the diversity of professions associated with the discipline of soil science is enormous* -- engineers, agronomists, crop scientists, chemists, geologists, geographers, biologists, microbiologists, climatologists, silviculturists, sanitarians, archaeologists, wetland scientists and specialists in regional planning all borrow from soil science. And at times, every one of those groups will need to call on a soil scientist to resolve a more highly

technical argument, or to add a higher level of understanding to a certain natural soil-related problem.

The practice of soil science is basic to defining safe or prudent ways to carry out certain aspects of urban land development, agriculture and forestry. These three major industries have great environmental impacts in Washington State. Disturbed soils and related wind and water erosion have enormous impacts on water quality; badly managed soils result in greater volumes of surface runoff and resultant flooding and related pollution. Particularly with recent listing of several salmonid sub-species as well as terrestrial animals and plants that appear sensitive to soil and habitat disturbance, proper soil management is and will be of paramount importance in Washington State – particularly in the increasing efforts to clean up Puget Sound.

Academically, soil scientists tend to be drawn to one of five areas of specialization:

- Soil Microbiology (job-related fields: biochemistry, hazardous waste management, septic system function, CO2 production related climate change, landscape ecology, earthworm impacts)
- Pedology (job-related fields: soil genesis, soil mapping, geomorphology, soil taxonomy and/or classification, historical assessments of climate change)
- Edaphology (job-related fields: crop science, agriculture, silviculture, horticulture)
- Soil Physics (job-related fields: soil water movement, soil heat transfer and related climate change, stormwater management, septic system drainage function, solute transfer, watershed and wetland studies, irrigation management)
- Soil Chemistry (job-related fields: biochemistry, soil fertility, hazardous waste management, mineralogy, soil chemistry analysis labs, water quality treatment, NO production and related climate change)

Within the past 10-20 years, soil scientists have increasingly been applying their skills as consultants in environmental management – particularly around rapidly urbanizing areas or in areas with extensive agriculture. Therefore, the results of applied soil science have become an increasing concern with resultant increases in impacts on state and locally regulated activities. As a result, at least 18 states currently have some form of soil science regulation written into state law (more on this below).

With almost a century of national and international soil survey efforts behind the profession, soil scientists have developed unique insights into landscape-scale functions that are either the source of a problem or can provide a solution to a problem. These functions fall roughly into six fields of expertise:

- Land-based treatment of wastes ([septic systems](#), [manure](#) management, municipal [biosolids](#), food and fiber processing waste)

- Identification and protection of environmentally critical areas (sensitive and unstable soil surfaces, [wetlands](#), unique soil situations that support valuable [habitat](#), and [ecosystem diversity](#) -- such as bogs),
- Management for optimum land productivity ([silviculture](#), [agronomy](#), [nutrient](#) management, [water](#) management, native vegetation, [grazing](#))
- Management for optimum water quality ([stormwater](#) management, [sediment](#) and [erosion](#) control)
- Remediation and restoration of damaged lands (mine reclamation, wetland mitigation, flood and storm damage, hydrocarbon or heavy metal contamination)
- Sustainability of desired uses ([Soil](#) conservation, wetland management, habitat protection)

There are also other practical applications of soil science in cooperation with other sciences:

- [Age dating](#) (archeology): specifically a knowledge of local pedology is used to date prior activity at a site where soil formation processes and preservative qualities can help with the study of [archaeological sites](#);
- Surface soil impacts on [geological phenomena](#) ([landslides](#); evidence of [earthquake faults](#))
- Altering soils to achieve new uses ([vitrification](#) to contain [radioactive wastes](#); enhancing [soil microbial](#) capabilities in degrading contaminants [[bioremediation](#)]; and [carbon sequestration](#))

Some quotes about the value of soil (borrowed from <http://en.wikipedia.org>)

"We might say that the earth has the spirit of growth; that its flesh is the soil." ~ [Leonardo da Vinci](#)

"We know more about the movement of celestial bodies than about the soil underfoot." ~ [Leonardo da Vinci](#)

"The thin layer of soil covering the earth's surface represents the difference between survival and extinction for most terrestrial life." ~ ***Defining and Assessing Soil Quality*** by ***John W. Doran and Timothy B. Parkin***

"... the Latin name for man, homo, derived from humus, the stuff of life in the soil." ~ ***Dr. Daniel Hillel***

"History is largely a record of human struggle to wrest the land from nature, because man relies for sustenance on the products of the soil. So direct is the relationship between soil erosion, the productivity of the land, and the prosperity of people, that the history of mankind, to a considerable degree at least, may be interpreted in terms of the soil and what has happened to it as the result of human use." ~ ***Hugh H. Bennett and W.C. Lowdermilk, circa 1930s***

“We are able to breathe, drink, and eat in comfort because millions of organisms and hundreds of processes are operating to maintain a livable environment, but we tend to take nature's services for granted because we don't pay money for most of them.” ~ Eugene Odum

“The Nation that destroys its soil destroys itself.” ~ Letter to all State Governors on a Uniform Soil Conservation Law (February 26, 1937) by Franklin Delano Roosevelt

(b) The extent to which consumers need and will benefit from a method of regulation identifying competent practitioners, indicating typical employers, if any, of practitioners in the profession; and

Soil scientists in the **public** sector are typically employed by governmental agencies that manage natural ecosystems (such as forests or wetlands), or highly managed ecosystems (such as agricultural lands or urban areas). As such, these soil scientists typically carry out environmentally sensitive work. In a broad sense – the work is usually related to mapping soil, managing water quantity or water quality, or controlling erosion, but can also include providing third party review of reports or work provided to Cities or Counties (usually related to proposed development). These agencies range from federal (NRCS, USFS, EPA, COE, BLM, NPS, DOE, NWS, USBR¹⁴) to state (Universities, (Ecology, DNR, WDFW, WSP, WSDH¹⁵) to counties and cities (Planning Dept., Health Dept., Stormwater Dept.).

Soil scientists in the **private** sector are typically self-employed or employed by engineering and environmental consulting firms that provide information and assistance to public and/or private sector developers or landowners with environmental problems. Examples of their work would include:

- Wastewater quality management (sewage treatment, stormwater treatment, agricultural runoff or processing water, rain gardens...);
- Wastewater quantity management (stormwater infiltration; rain gardens; erosion control...)
- Hazardous waste management (Superfund sites, Hanford Reservation, hydrocarbon contamination...);
- Land management (Low Impact Development, soil mapping and interpretation; wetlands delineation, mitigation and permitting processes; erosion control plans; stormwater infiltration function, global warming issues ...)
- Water management (irrigation systems, erosion control)
- Soil Mapping or Interpretation (all purpose mapping and classification, septic system siting, archeology, hydric [wetland] soils, shallow water tables...)

¹⁴ NRCS: Natural Resources Conservation Service, formally Soil Conservation Service; USFS: United States Forest Service; EPA: Environmental Protection Agency; COE: Army Corps of Engineers; BLM: Bureau of Land Management; NPS: National Park Service; DOE: Department of Energy; NWS: National Weather Service; USBR: United States Bureau of Reclamation

¹⁵ Ecology: State Dept. of Ecology, DNR; State Dept. of Natural Resources, WDFW; State Dept. of Fish and Wildlife, WSP; Washington State Parks, WSDH; State Dept of Health.

Both public and private soil scientists provide training in hydric soils through workshops sponsored by national organizations as well as federal and state agencies. Soil scientists also train state-licensed septic system designers through the Washington On-Site Sewage Association (WOSSA). For that reason, this licensing/certification effort has the support of WOSSA, the organization responsible for providing the bulk of the designers' CEU training requirements.

As mentioned above, soil scientists have been identified by Ecology staff as the preferred professionals for preparing prescriptions for Land Application of agricultural wastewater due to their understanding of soil chemistry (affecting the soil's ability to trap pollutant cations), soil biochemistry (microbial breakdown of pollutants), and soil physics (rate of saturated versus unsaturated water flow through the soil). This is a wastewater re-use issue that is very common in east-side agricultural settings and has a history of significant failures affecting drinking water aquifers -- public health, safety and welfare -- when mismanaged.

Soil scientists are uniquely trained to properly apply the highly technical and often mis-used hydric (wetland) soils evaluation techniques. These assessments are used to formally (legally) identify and delineate wetlands. This information (wetland boundary) is then recorded on deeds and plats, and has long-lasting economic and legal impacts. Incorrect wetland delineation can have disastrous economic impacts whether the work results in the wetlands being larger or smaller than regulations require. A larger wetland (than is legally correct) means a loss of economic gain from legally developable land; a smaller wetland (than is legally correct) means increased potential for flooding, water in crawl spaces, drainage problems, failing septic systems and loss of wildlife habitat.

As water quality and quantity impacts become a greater and greater impact on our daily lives, having incompetent or unprofessional soil scientists working on projects that affect soil erosion, hydric soils, soil stability, vegetation cover, soil chemistry, etc can only harm the public

(c) The extent of autonomy a practitioner has, as indicated by:

(i) The extent to which the profession calls for independent judgment and the extent of skill or experience required in making the independent judgment; and

(ii) The extent to which practitioners are supervised;

Soil scientists in general and as a profession are typically called upon to make an independent professional call and to use their best professional judgment. Therefore, even when working as a contractor for a licensed engineer/ architect, or when working as a scientist under a comparable supervisor – the soil scientist has been hired for that specific skill and level of expertise unique to their profession. It is in the nature of the soil science profession to be called upon to provide a

third-party opinion on sites with confusing soil characteristics (such as interpretation of indicators of a seasonal water table), or to make a more detailed technical assessment of a problematic natural soil condition (such as evaluating hydric soil indicators).

Engineers are not trained to evaluate a natural soil, but rather consider soil as a load-bearing material. For that reason, in the private sector, soil scientists are usually hired as separate contractors, and are both contracted and insured separately from the engineer. Moreover, having an extensive history as soil mappers of remote areas, most soil scientists are accustomed to working alone and depending only on themselves to carry out physically and mentally strenuous work under difficult working conditions.

(2) The efforts made to address the problem:

(a) Voluntary efforts, if any, by members of the profession to:

(i) Establish a code of ethics; or

(ii) Help resolve disputes between practitioners and consumers; and

The Soil Science Society of America (SSSA) (www.soils.org) is a national professional association (over 5,800 members) that provides not only a way for soil scientists to maintain contact with others in their profession through annual meetings (average annual attendance 3,945), but has developed and maintained a highly regarded, professional certification program (including a professionally created and maintained certification exam¹⁶) with over 1,200 certified professional soil scientists. Through that program, the profession has developed a Code of Ethics, and has an Ethics Review Board intended to review and resolve complaints against their certified members. Unfortunately, their response to previous complaints has not elicited confidence from Washington state agencies.

The National Society of Consulting Soil Scientists (NSCSS) (www.nscss.org/soil.html) is also a national professional soil scientist group, but membership is limited to private sector companies owned by soil scientists (189 member companies). This group is affiliated with the SSSA, but provides private sector soil scientists an opportunity to interact with others in their profession through annual meetings (average annual attendance 100-300). They have developed and maintained a professional registration program (36 registrants) that parallels that of the SSSA (same educational and professional experience requirements). The NSCSS also has an excellent

¹⁶ Although this is not formally proposed in the legislation, we are assuming that this exam can be used in WA state, as it is on other states with licensure. This will save the state thousands of dollars that would otherwise be spent on developing a professional exam.

Code of Ethics and an Ethics Review Board that is used to review and resolve complaints against their registered members. We have no records of their response to complaints against members.

However, the Ethics Review Boards of both organizations only meet periodically, as needed, and they are composed of members from all over the U.S. They have minimal local (Washington state) presence or concerns. Therefore, an ethics complaint must be in writing, and without a potential for face-to-face discourse, or question and response. There are examples from within Washington State of unresolved conflicts that were apparently inadequately addressed by the SSSA Ethics Board. ***A local review board would better serve citizens of Washington State.***

(b) Recourse to and the extent of use of applicable law and whether it could be strengthened to control the problem;

There is no current law that regulates soil science in Washington State. The only control is through the national professional societies. As mentioned above, although the SSSA and NSCSS do have Ethics Boards and excellent certification or registration programs, the main offices and functions for of both groups are located outside of Washington State. SSSA offices are located in Madison, Wisconsin. NSCSS's formal mailing address is Washington D.C. Therefore, these benefits and information networks are not easily available to the Washington consumer – particularly if they are less than competent at use of the internet. Having a state-administered licensing program provides the citizens of Washington with local control over their local issues, and does not force them to depend on a board of out-of state scientists (that they will never meet or talk to in person) to make decisions about the merit of their complaint.

There are WA state licensing programs that address some aspects of traditional soil science – such as interpretation of soils for septic system design (engineering and wastewater system designers programs) and erosion control plans (geology programs). But wastewater system designers are trained by soil scientists; therefore, this professional state licensing program is dependent on a non-licensed professional for critical training. In addition, although erosion control plans are traditional soil science, they are included in the list of professional geology practices along with mass wasting (landslides)¹⁷, therefore, cannot be carried out by soil scientists without challenges.

¹⁷ It should be noted that in many Counties and Cities, “state licensed geologists” are identified in local Critical Areas Ordinances as the professional allowed to prepare reports for “Landslide Hazard Areas”. As a result, soil scientists are not allowed to prepare soil and sediment erosion control plans. And erosion control is traditional soil science – not geology.

Any state-licensed professional (i.e., licensed engineers, architects, surveyors, wastewater system designers, geologists) can choose to oversee and take on liability related to results of hiring a soil scientist. However, more and more, these state-licensed professionals are unwilling to take on that liability when it involves highly technical interpretations that can have disastrous outcomes if carried out incorrectly or unethically.

The state of Tennessee is currently assessing whether to regulate soil scientists simply due to costs of a state-required surety bond for soil scientists evaluating soils for onsite septic systems. (pp 3, 6 in NSCS Summer 2007 newsletter <http://nscss.org/2007%20Newsletter%20Summer.pdf>)

“Recent requirements for soil consultants to carry a surety bond by the Tennessee Department of Environment and Conservation (TDEC) have prompted a push for legislation to be written that would grant consultants licensure. The amount of coverage required for the surety bond is \$30,000.00 which may not be quite enough to cover the consultant in the event that he or she makes an error with regards to mapping.”

(3) The alternatives considered:

(a) Regulation of business employers or practitioners rather than employee practitioners;

Many private sector soil scientists tend to be self-employed (and self-insured), but when working for others, have a wide range of potential employers. There is no practical way to regulate the potential employer group.

(b) Regulation of the program or service rather than the individual practitioners;

As described above, the list of potential soil science services is quite long, and sometimes overlaps into other professionals groups. More important, in order to carry out soil science interpretations, most professionals utilize combined aspects of sub-specialties. For example, a soil scientist working to evaluate a hydric soil would have to be well-versed in soil physics (study of water transfer through soil), soil biochemistry (due to microbial controls of diagnostic soil color patterns), soil chemistry (understanding both Fe and N cycles) and soil taxonomy (classification). This is not a practical alternative.

(c) Registration of all practitioners;

(d) Certification of all practitioners;

As described above, we currently have a national certification program through the SSSA and a registration program through NSCSS. Neither program is intended or able to register or certify all

soil scientist practitioners. It is a voluntary program. However, the state may choose any of these routes – including licensure -- as long as the outcome allows the managing board to evaluate whether the soil scientists can perform adequately both professionally and ethically.

(e) Other alternatives;

I know of none.

(f) Why the use of the alternatives specified in this subsection would not be adequate to protect the public interest; and

I believe this was already covered in the discussion above.

(g) Why licensing would serve to protect the public interest;

Licensure would enable state control of a professional group that is doing more and more work in environmental protection, particularly in relatively new fields or practices that use soils as a treatment or infiltration medium, such as Low Impact Developments (LIDs)

www.metrokc.gov/dnrp/swd/greenbuilding/site/low-impact.asp

Most water quality and quantity problems, and some air quality problems, can be traced back to inappropriate or inadequate soil management in agriculture, forestry or urban-level land development. In response to the need to better define these problems as well as to offer effective solutions, soil scientists are moving into the private sector in ever increasing numbers. In recognition of this fact, soil scientists licensing, certification or registration is now in place in several states with efforts at setting up some form of regulation in at least one or two other states at this time.

Current State Licensing or Other Regulatory Soil Science Programs (as per wikipedia and with a couple of extra states added as a result of other online searches)

http://en.wikipedia.org/wiki/List_of_State_Soil_Science_Licensing_Boards

- [Alabama](#) Board of Registration for Professional Soil Classifiers (soil mapping)
- [Arkansas](#) Board of Registration for Professional Soil Classifiers (soil mapping)
- [Connecticut](http://www.ct.nrcs.usda.gov/Soil_Pages/ss_qualifications.html) (http://www.ct.nrcs.usda.gov/Soil_Pages/ss_qualifications.html) (Connecticut does not have licensing or registration, but does certify soil scientists primarily related to wetlands work)

- [Delaware](#) (uses SSSA certification¹⁸ to license wastewater system designers)
- [Georgia](#) Licensing Board for Professional Soil Scientists
- [Indiana Indiana Registry of Soil Scientists](#)
- [Maine Board Of Certification For Geologists and Soil Scientists](#)
- [Minnesota Board of AELSLAGID](#) (Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design)
- [Mississippi Bureau of Plant Industry](#) Performs functions similar to a state licensing board.
- [New Hampshire Board of Certification for Natural Scientists](#)
- [North Carolina Board for Licensing Soil Scientists](#)
- [North Dakota Board of Registration for Professional Soil Scientists](#)
- [Rhode Island](#) (Uses proof of SSSA certification or training in soil science to license “Soil Evaluators”)
- [South Carolina Soil Classifiers Advisory Council](#) Performs functions similar to a state licensing board.
- [Tennessee](#) (currently evaluating state certification under land surveyors)
- [Texas Board of Professional Geoscientists](#)
- [Virginia Board for Professional Soil Scientists and Wetland Professionals](#)
- [Wisconsin Examining Board of Professional Geologists, Hydrologists and Soil Scientists](#)

(4) The benefit to the public if regulation is granted:

(a) The extent to which the incidence of specific problems present in the unregulated profession can reasonably be expected to be reduced by regulation;

State licensing will accomplish two tasks:

1. It will provide a method for the state to identify and control professionalism and ethics of soil scientists at a local level, and
2. It will provide consumers with a readily available list of competent practitioners (which is currently unavailable).

(b) Whether the public can identify qualified practitioners;

Through the internet, a knowledgeable consumer may be able to find their way to the SSSA and the NSCSS – the two national soil science societies. Of those two websites, NSCSS readily provides a list of members and registration status by region; in the SSSA, a knowledgeable consumer may be able to work their way through the website to get access, and then request the information.

Nevertheless, this information is not readily available on the SSSA website as a list. Neither the NSCSS or SSSA lists comprises a complete listing of practicing professionals, however, as each list is taken from the respective memberships which are in themselves voluntary.

¹⁸ Please note that any references to ARCPACS certification is referring to the old acronym for the certification offered through the SSSA. It stands for American Registry of Certified Professionals in Agronomy, Crop and Soil Science.

(c) The extent to which the public can be confident that qualified practitioners are competent:

If the public uses either a CPSS (certified by SSSA) or RPSS (registered by NSCSS), they can be assured of a certain level of education and experience, but there is little (if any) reliable, unbiased information about competency in any particular specialty field other than what the person claims as their specialty.

If state licensed or certified, the public would have that same information available about regulated individuals. In addition, we could develop local standards that could be used to define what an individual might be allowed to claim as a field of expertise or specialty.

(5) The extent to which regulation might harm the public:

(a) The extent to which regulation will restrict entry into the profession:

(i) Whether the proposed standards are more restrictive than necessary to insure safe and effective performance; and

The soil scientist definition in the proposed legislation (text provided in www.soilscientistlicensing.com) is taken directly from the national standard. A soil scientist gains that title through a certain level of experience and education – the same as what is defined in the legislation. Therefore, as defined -- this regulation would not restrict entry into the field of soil science, but rather, just recognizes the professional standard.

The past-proposed legislation was a Practices Act¹⁹, which the soil scientist community would have preferred. We were more interested in regulating the action than the title of the scientist. However, as mentioned above, there are many other professionals that carry out some aspect of soil science in their work, and many lobbying groups were concerned that their constituents would no longer be able to do that work under a Practices Act. We attempted to solve that by exempting a long list of those professionals from licensure, but to no avail. They were still convinced there would be unintended consequences. Therefore, we restructured the RCW as a Title Act, which only regulates those who want to use the title of "soil scientist".

¹⁹ A Practices Act defines a list of practices that soil scientists customarily carry out, and basically says that to do these things, one must have a state license. A Title Act instead is a state *certification* process, and defines who can *call him/herself* a soil scientist – in this case, an individual with certain education (a degree in soil science) and experience (5 years professional practice). Both Practices and Title Act allow control of the a regulated individual in terms of being responsive to public complaints and assessing whether that person is practicing professionally and ethically.

The only potentially limiting issue with the current proposed legislation is that the state (DOL) has estimated that the regulated group will only include about 130-140 individuals, which makes the fiscal note and costs associated with regulation prohibitively expensive. However, to increase our numbers (which will decrease costs), we are proposing co-licensing with wetland scientists (with the obvious professional connection being hydric soils), and we believe that the state estimated number of potential licensees is somewhat low.

The DOL estimated about 50 soil scientists would come from within the state with the balance coming from surrounding areas. However, based on data we collected from various nearby universities and national professional organizations, we believe there are at least 200 soil scientists within the state that would qualify and be interested in some form of licensure. This data indicates that there are at least a few hundred qualified individuals living in Washington, and comparable numbers in the surrounding states. The issue is rather whether those qualified individuals are interested in being identified as soil scientists when they may have been employed with other titles – environmental technician, sanitarian, etc.

Therefore, if there are too few soil scientists, the program would be prohibitively expensive, which would restrict entry into the profession. For that reason, we are seeking to formally list the in-state individuals to get a better count, and to co-license with wetland scientists to share costs.

(ii) Whether the proposed legislation requires registered, certificated, or licensed practitioners in other jurisdictions who migrate to this state to qualify in the same manner as state applicants for registration, certification, and licensure when the other jurisdiction has substantially equivalent requirements for registration, certification, or licensure as those in this state; and

This is described in the proposed legislation and meets the professional standard for licensing comity. The incoming practitioners would have to meet the same standard as required for licensure/certification in terms of education and experience.

(b) Whether there are similar professions to that of the applicant group which should be included in, or portions of the applicant group which should be excluded from, the proposed legislation;

As described above, we are proposing co-licensure with the wetland scientists. Part of that reasoning is to increase our numbers. But the other part was because that professional group (Society of Wetland Scientists and one lobbying group) was concerned that since soil scientists are the recognized specialists in two out of the three parameters used to legally delineate and classify

wetlands – hydric soils and soil hydrology – then soil scientists would become the professional of choice for carrying out wetland science, eliminating other practitioners regardless of training or expertise. This could occur either by law or by default, if a local jurisdiction chose, through law or policy, to only allow “state-licensed/certified individuals” to delineate or otherwise classify wetlands.

For that reason, we are evaluating whether it might be possible to include the wetland scientists in our proposed Title Act, but as a subspecialty with the professional connection being that we both need to be very well trained and competent in hydric soils interpretation and evaluation. More important, this lack of correct interpretation of hydric soils has been a serious problem in both professional groups for some time. Hydric soil science is a very new, rapidly developing and changing science as well as regulatory environment. Remaining well informed and trained in these changes is a great challenge in both wetland science and soil science.

(6) The maintenance of standards:

(a) Whether effective quality assurance standards exist in the profession, such as legal requirements associated with specific programs that define or enforce standards, or a code of ethics; and

There are no state laws to enforce standards of soil science or a code of ethics – other than a state law defining what will be regulated as a wetland and providing standards for how to legally delineate those wetlands. Nevertheless, there is no enforcement section in that law, and no section that defines who is qualified to carry out the work. Moreover, even with the regulatory guidance, the range of variation between delineations by different practitioners is very wide – a result of low standards in who is defined as being competent to carry out this work, and a result of poorly trained “professionals”.

Therefore, other than the state law regarding wetland definition and delineation standards, the existing “quality assurance” standards or programs for soil science are all voluntary and through national professional organizations – not regulatory programs.

(b) How the proposed legislation will assure quality:

(i) The extent to which a code of ethics, if any, will be adopted; and

(ii) The grounds for suspension or revocation of registration, certification, or licensure;

The details above are described in the proposed legislation and meet or exceed all professional standards.

(7) A description of the group proposed for regulation, including a list of associations, organizations, and other groups representing the practitioners in this state, an estimate of the number of practitioners in each group, and whether the groups represent different levels of practice; and

The description of soil scientists (and soil science), was already provided above in answer to the very first question.

The associations and organizations (national and local) include:

National Groups

Soil Science Society of America (SSSA) (www.soils.org)

About 5800 members; about 1200 certified soil scientists

National Society of Consulting Soil Scientists (NSCSS) (www.nscss.org)

About 208 member companies, about 36 registered soil scientists

Association of Women Soil Scientists (AWSS) (www.womeninsoils.org)

Society of Wetland Scientists (SWS) (www.sws.org)

United States Consortium of Soil Science Societies (www.soilsassociation.org)

Soil and Water Conservation Society (SWCS) (www.swcs.org)

Regional State Groups

Washington Society of Professional Soil Scientists (WSPSS) (www.ieway.com/wspss)

Oregon Soil Science Society (OSSS) (www.oss.peak.org/)

Professional Soil Scientists Association of California (PSSAC) (www.pssac.org)

Idaho Soil Scientists Association (ISSA) (no website)

State Groups

(8) The expected costs of regulation:

(a) The impact registration, certification, or licensure will have on the costs of the services to the public; and

(b) The cost to the state and to the general public of implementing the proposed legislation.

Some of this information must come from the DOL paperwork. Joe Vincent did this work for the last legislative session. Even with the current proposed fiscal note, which is relatively expensive compared to costs of licensure with other programs, the increase in costs to the public – born in the increase in the overhead cost for the consultant – would be minor.

As for costs to the state, that must ultimately come from the DOL fiscal note assessment. Based upon our involvement and structuring of the proposed legislation, we feel the cost of the proposed legislation would be greatly reduced through inclusion and/or modification at the state level of the

accredited and established soil science examination as currently administered by the SSSA Council of Soil Science Examiners (CSSE).

[1987 c 514 § 6.]

Wetlands Scientist Applicant Report

21 August 2007

Bruce Chunn
Planning and Performance
Department of Licensing
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Re: Sunrise Review and Credentialing for Wetland scientists

Dear Mr. Chunn,

Thank you for the opportunity to present you with this information regarding the development of a Sunrise Review for the credentialing of wetland scientists. The State of Washington Growth Management Act requires municipalities to adopt ordinances to protect the functions of environmentally critical areas, including wetlands. Despite the fact that state defines how to define and delineate wetlands, there are currently no standards nor requirements set forth by the State of Washington regarding those who carry out that work of defining and delineating wetlands. Therefore, we request that the State of Washington Department of Licensing set up a program for regulation of wetland scientists as outlined in this review.

We recommend that all persons working within the wetland consulting industry who make wetland determinations (define and classify wetlands) and who delineate wetland boundaries (i.e., wetland delineators²⁰), including wetland consultants, wetland specialists, wetland biologists, wetland ecologists, and wetland scientists (hereafter collectively referred to as wetlands scientists) have the necessary credentials to practice this profession within the State of Washington. The necessary credentials for wetland scientists are listed within this Sunrise Review. We recommend regulation of all practitioners since there is no effective way or effective reason to separate out the sub-specialities listed above.

We believe this is necessary for at least three reasons:

²⁰ “Wetland delineators“ means anyone, regardless of professional title, that makes a determination of wetland presence or absence and may include marking the wetland boundaries on the ground and/or on a drawing or map to be submitted to any regulator (federal, state, or local government agency) for the purposes of including but not limited to protecting the functions of a wetland as required by the Growth Management Act (RCW 36.70A), determining potential development constraints, or conserving wetland resources.

1. To bring and ensure consistency and accuracy in work of wetland scientists. Work products include but are not limited to identification and delineation of wetland boundaries using the methods specified in the Washington State Wetland Identification and Delineation Manual²¹; wetland reconnaissance and delineation reports; identification of wetland functions; consultation with clients regarding the regulations and the permitting and regulatory process; and,
2. Accountability. A body to bring complaints to (i.e., the Department of Licensing).
3. To require all wetland scientists to have a minimum of education and local experience in the wetlands profession.

We are pursuing this legislation because we have personally witnessed and discussed with our fellow wetland scientists, the development community, and regulatory agency staff instances where:

- wetlands were missed during a site review,
- uplands were delineated as wetlands, or
- site conditions were misrepresented either in the field or to regulatory agencies during the permitting process.

These actions have either restricted legal development through delineation inaccuracies or have allowed wetland resources to be developed and their associated valuable functions lost. In addition, clients may incur unnecessary expenses through poor work requiring the work to be redone by others.

We are also requesting that we share this legislation and certification with the soil scientists, such as those members of the Washington Society of Professional Soil Scientists. Soils scientists make up a portion of wetland scientists within the state. Our recommendation to share this legislation with the soil scientists is because one of the commonalities of the two trades is the correct identification of hydric soils²². Hydric soils are one of the three parameters²³ required for an area to be defined and regulated as a wetland. Hydric soils are often misidentified. This knowledge of how to correctly identify hydric soils from both a scientific and regulatory standpoint is critical to the accurate delineation of wetlands. This partnering will also enable us to increase the numbers of regulated scientists within our proposed program and therefore reduce overall costs to the practitioners who choose to become certified.

²¹ While state law requires use of standardized methods for delineating wetlands (i.e., the state manual), the manual or state law do not specify minimum educational background, experience, or requirements for implementation or application of these methods.

²² “Hydric soils” per the Washington State Wetlands Identification and Delineation Manual are soils “that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. (USDA, NRCS 1995, Federal Register, 7/13/94, Vol. 59, No. 133, pp 35680-83).”

²³ The other two parameters usually required to be present for an area to be considered a wetland are hydrophytic vegetation and wetland hydrology.

Below are certain questions within RCW 18.118.030 (in bold) and our responses to those questions.

A definition of the problem and why regulation is necessary:

Currently there are no state standards or criteria to work as a wetland scientist in the State of Washington. Most local (city and county) jurisdictions require a minimum of a Bachelor of Science degree to work as a wetlands practitioner, and some jurisdictions require additional knowledge and/or experience such as 5 years of working locally as a wetland scientist in their jurisdiction. However, these requirements are not sufficient to prepare a wetland scientist to delineate wetlands, write wetland delineation or reconnaissance reports, accurately identify and assess wetland functions, prepare compensatory mitigation plans, or properly assist and instruct the public on the permitting process and regulatory process.

To enable a person to understand the definition of a wetland and to accurately and consistently identify the wetland/upland edge in the field (delineation), a wetland scientist needs to understand and be able to properly identify hydric soils, hydrophytic vegetation, and primary and secondary indicators of wetland hydrology. The better practitioners have certain educational backgrounds, but also have taken the time to continue their education, share information with colleagues and to increase their skills through years of experience.

We are the first to admit that there are some wetlands that are very difficult to identify. All wetlands are identified based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as described in the Corps of Engineers *Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Washington State Wetlands Identification and Delineation Manual, March 1997* (Washington State Department of Ecology 1997). With few exceptions, all three parameters must be present for an area to be considered a jurisdictional wetland under normal circumstances. Exceptions may include problem areas or atypical situations.

We are aware of many instances, and have knowledge of situations where wetlands and uplands have been misidentified. This has led to the loss of the resources wetlands provide, or, has led to regulation of uplands incorrectly identified as wetland. Because wetland scientists have a significant impact on usable land and the economy, we believe that it is very important that the professionals that delineate wetlands and carry out associated permitting and mitigation activities have the education and experience to be consistent with the statutory definition, and an understanding of the ecological and landscape processes that create and affect wetlands.

Furthermore, we have spoken with many local agency planning department staff, engineers, planners, and developers that want a list of qualified wetland consultants to use and trust. These individuals are also seeking accountability of the professionals when the public trust is lost by poor, unethical, or unprofessional work.

We are providing you with a list of practitioners and resources that you can contact and review or discuss their perspective on credentialing for wetland scientists (Appendix A).

The profession of wetland scientists is varied but our concern is mostly with the practitioners that delineate wetlands. This process is the field identification and physical flagging (delineation) of the wetland boundaries. It also includes associated and subsequent work related to permitting and mitigation – very costly processes. There are instances where wetlands have been either intentionally or unintentionally (through lack of knowledge) missed, or, conversely, uplands identified as wetlands. This incorrect identification of a wetland either constitutes a loss of the functions and values wetlands provide or the regulating of an upland as a wetland. Both mistakes, whether intentional or unintentional, create problems for the regulatory agencies and development industry. The regulatory agencies already understaffed and overburdened are unable to efficiently process permit applications or may make decisions based on inaccurate information. This lengthens the time necessary to obtain proper approvals and permits, causes backlog delaying timely approval of properly completed permit applications, and potentially causes economic harm to the community, loss of wetland resources, and in a worst case, property damage and loss of life.

A law to regulate the practitioners will bring consistency in the profession and greater accountability. There are currently no state or federal laws that directly regulate wetland scientists. Essentially, the practitioners of the wetland profession are autonomous. All wetlands work, whether delineating wetlands, or consulting clients on the definition of a wetland and/or the regulatory nature of wetlands, requires independent judgment and skill. Many wetland consultants are unsupervised and do not possess the education and experience required to be wetland delineators or practitioners.

The efforts made to address the problem

There have been efforts to bring consistency and professionalism to the wetlands consulting industry – including a relatively recent professional certification program through the Society of Wetland Scientists – a national organization.

There is currently a certification program that was established by the Society of Wetland Scientists Professional Certification Program (SWS PCP). You may contact the SWS PCP to review their program at the Society of Wetland Scientists web site, www.sws.org. The certification program we are recommending within this Sunrise Review generally follows the SWS PCP certification requirements, but brings regulatory control and consistency to the state rather than to a national organization with different goals and intent.

Nationally, there are 4 states that have a wetland scientist certification program. These are New Hampshire, Virginia, Wisconsin, and Minnesota. Appendix B, an article written by Leah Stetson of the Association of State Wetland Managers, titled *State Wetland Delineator Certification Programs*, provides a good description of credentialing in other states, and provides contacts for additional information.

Another means of addressing the problem is through continuing education. The Pacific Northwest Chapter of the Society of Wetland Scientists (PNW SWS) has held annual meetings since the formation of the chapter. These meetings generally have an attendance between 200 to 400 participants. The meetings have technical sessions, workshops, and fieldtrips for participants to disseminate the best available science on wetland ecology and changes in regulatory programs. Because there are few if any formal wetland scientist education or major programs offered in colleges or universities nationwide, we recommend a continuing education program as part of this regulatory program.

There are short (1-day to 1-week) courses on wetland related topics that are offered by Western Washington University, the University of Washington, and Portland State University. And there are several national companies that offer wetland delineation courses locally such as the Wetland Training Institute (www.wetlandtraining.com) and the Richard Chinn course (www.richardchinn.com). But we do not know of any 2-4-year wetland science major program in any state university or college (inside or outside of WA state).

The PNW SWS is promoting and sponsoring workshops on various topics such as identification of wetland plants, amphibians, and hydric soils. Additional workshops are continually being offered based on membership interest and developing issues.

There is a lack of accountability among wetland scientists, including identification of education and experience requirements or resolving disputes regarding delineations. A mechanism needs to be set up to establish minimum education and experience requirements and resolving disputes. We trust that the Department of Licensing and the proposed certification of wetland scientists will establish this mechanism.

The alternatives considered

The wetlands consulting community believes that if regulation is determined to be necessary, certification is the best form of credentialing to begin regulating the industry to ensure the professionalism of the practitioner and the protection of the consumer. Licensing could be considered in the future.

Alternatives such as the regulation of business employers or the regulation of the program or service are not practical. There are many wetland scientists that work alone in the field and the employers generally are not familiar enough with the requirements and knowledge the wetland scientists have or require. Wetland scientists require specific education and training. It is inappropriate for employers to be regulated unless those employers meet the specific qualifications to be a wetland scientists. Many wetland scientists are “single shingle” businesses. That is, most are small companies with few employees. Some wetland scientists do work with surveying and engineering companies. However surveyors and engineers are very different professions and do not have the education required to be a wetland scientist. We propose that all wetland scientists become certified.

The benefit to the public if regulation is granted

There are currently no credential requirements nor accountability for wetland scientists. The requirement of credentials to practice wetlands work in the state would ensure a baseline of education, training, experience, testing, and accountability. Homeowners, developers, engineers, attorneys, planners, or agencies would then be assured that a wetland scientist would have a minimum of education and experience needed to be accountable. Furthermore, when someone hires a wetlands practitioner, the consumer or reviewing agency will now have assistance from the Washington State Department of Licensing (DOL) in the event that they have questions or concerns regarding the conduct of a specific wetland scientist.

We do not believe that the regulation of wetland scientists will instantly eliminate all incidences of specific problems, such as unprofessional conduct, the misapplication of the definition of a wetland leading to incorrect wetland delineation, or, to misleading statements regarding the regulations and/or regulatory process regarding wetlands. However, this proposed regulation of wetland scientists (i.e., requiring specific educational, experiential, and training requirements) will ensure that all practitioners are at least initially fully qualified to practice. Over time, the less competent or unethical practitioners should be weeded out through the adoption and application of these proposed standards.

Wetland scientist Certification Board

We recommend that a wetland scientist certification board be created. The board would consist of seven members appointed by the director the DOL, who shall advise the director concerning the administration of the law. Of the appointments to this board, all seven shall be currently practicing and qualified (as defined in the regulation) wetland scientists, at least four from the private sector and at least two from the public sector. Board members shall also be from the various geographic regions of the state. A minimum of two from eastern Washington and three from western Washington (the disparity is due to the greater population in western Washington). One representative shall be from southwest Washington, and one from northwest Washington. In the event that representatives cannot be found from these regions and sectors, the director shall make the appointments.

Board's qualifications and terms

Members of the board shall be certified by the state as a wetland scientist. Members of the board shall be appointed for three year terms. Terms must be staggered so that not more than two appointments are scheduled to be made in any calendar year. Members hold office until the expiration of the terms for which they were appointed. The director may remove a board member for just cause. The director may appoint a new member to fill a vacancy on the board for the remainder of the unexpired term. All members are limited to two consecutive terms. Members shall step aside after their second term but if a replacement board member cannot be found, the director may reappointment the board member for a third term or until a replacement is selected. A board member may reapply for a board position after 3 years.

Each board member is entitled to compensation for each day spent conducting official business and to reimbursement for travel expenses in accordance with RCW 43.04.240, 43.04.050, and 43.03.060. Because the licensing board will be established prior the certification start date, the director will establish the criteria for the initial appointments to the certification board.

Director's authority

The director has the following authority in administering the law.

1. To adopt, amend, and rescind rules approved by the board as deemed necessary to carry out the law.
2. To adopt fees as provided in RCW 43.24.086.
3. To administer certification examinations or reviews of applications approved by the board and to adopt or recognize examinations or reviews of applications prepared by other organizations as approved by the board.
4. To adopt standards of professional conduct, practice, and ethics as approved by the board.

Board's authority

The board has the following authority in administering the law.

1. To establish rules, including board organization and assignment of terms, and meeting frequency and timing, for adoption by the director.
2. To establish the minimum qualification for certifying applicants as provided in the law.
3. To approve the method of administration of examinations or reviews of applications required by the law or by rule as established by the director.
4. To approve the content of or recognition of examinations or reviews prepared by other organizations for adoption by the director.
5. To set the time and place of examinations or reviews of applications with the approval of the director.
6. To establish and review standards of professional conduct, practice, and ethics for adoption by the director.

Unprofessional conduct

Regarding unprofessional conduct; in addition to the unprofessional conduct described in RCW 18.235.130, the following conduct, acts, and conditions, constitute unprofessional conduct.

1. Violating the law or the rules adopted within the legislation.
2. Not meeting the qualification for certification set forth in the law.
3. Failure to comply with the assurance of discontinuance entered into with the director.
4. Committing any other act, or failing to act, which act or failure are customarily regarded as being contrary to the accepted professional conduct or standard generally expected of those conducting business as a wetland scientist.

A wetland scientist shall also:

1. Only express opinions on wetland matters for which he or she is knowledgeable or familiar with the facts.

2. Refrain from attempting to injure the reputation of other scientists through the use of false, biased, or otherwise undocumented claims.
3. Accurately and adequately represent the facts and results of research and do not base decisions on theological or religious beliefs, political beliefs, political pressure, and client or supervisor pressure.
4. Reveal any conflicts of interest to their clients or the public that may interfere with full representation of the scientific facts as they can reasonably be interpreted.
5. Avoid the use of certification as a vehicle for personal or private gain.
6. Accurately convey that certification only implies certification of qualifications to conduct work in your specific area of expertise, such as wetland delineations, investigations, reports, mitigation plans, or specific related professional studies.
7. Maintain the confidentiality of information produced for a client, as required by appropriate federal and state laws.
8. Maintain original records of research, methods, results, and analyses for a minimum of three years beyond the termination of the project.
9. Keep informed of advances in the field of expertise of the member, including literature, methods of measurement and analysis, and skills for the interpretation of data.
10. Keep informed of changes in regulations, including local, state, and federal regulations.

Hearing before the director

The procedures governing adjudicative proceedings before agencies under chapter 34.05 RCW govern all hearings before the director or his or her designee. Upon a finding that a certificate holder or applicant has committed unprofessional conduct, the director may issue an order providing for one or any combination of the following:

1. Revocation of the certificate.
2. Suspension of the certificate for a fixed or indefinite term.
3. Restriction or limitation of the practice.
4. Issuance of a civil fine not to exceed five thousand dollars for each violation.
5. Requiring satisfactory completion of a specific program of remedial education or treatment.
6. Monitoring of the practice by a peer approved by the director.
7. Reprimand or censure.
8. Compliance with conditions of probation for a designated period of time.
9. Withholding of a certificate request.
10. Refund of fees billed to and collected from the consumer.
11. Other corrective action.

Investigation of complaints

Any person may submit a written complaint to the department charging a certificate holder or applicant with unprofessional conduct and specifying the grounds for the charge. If the director determines that the complaint merits investigation or if the director has reason to believe, without a formal complaint, that a certificate holder or applicant may have engaged in unprofessional conduct, the director may investigate to determine if there has been unprofessional conduct. A person who files a complaint under this section

in good faith is immune from suit in any civil action related to the filing or contents of the complaint.

Suspension of certificate

The director shall immediately suspend the certificate or practice permit of a person who has been certified pursuant to RCW 74.20A.320 by the department of social and health services as a person who is not in compliance with a child support order. If the person has continued to meet all other requirements for a certificate under this chapter during the suspension, re-issuance of the certificate is automatic upon the board's receipt of a release issued by the department of social and health services stating that the certificate holder is in compliance with the child support order. The procedure in RCW 74.20A.320 is the exclusive administrative remedy for contesting the establishment of noncompliance with a child support order, and suspension of a certificate under this subsection, and satisfies the requirements of RCW 34.05.422.

Civil infractions

The department has the authority to issue civil infractions under chapter 7.80 RCW in the following instances:

1. Conducting, offering to conduct, or represent oneself as a wetland scientist without being certified in accordance with this chapter.
2. Presenting or attempting to use as his or her own the certification of another wetland scientist.
3. Giving any false or forged evidence of any kind to the director or his or her authorized representative in obtaining a certificate.
4. Falsely impersonating any other certificate holder.
5. Attempting to use an expired or revoked certificate.

All fees, fines, and penalties collected or assessed by a court because of a violation of this section must be remitted to the department to be deposited into the wetland scientists account.

Relief by injunction

The director is authorized to apply for relief by injunction without bond, to restrain a person from the commission of any act that is prohibited in the law. In such proceedings, it is not necessary to allege or prove either that an adequate remedy at law does not exist, or that substantial or irreparable damage would result from continued violation. The director, individuals acting on the director's behalf and members of the board are immune from suit in any action, civil or criminal, based on disciplinary proceedings or other official acts performed in the course of their duties in the administration and enforcement of the law.

Grandfather clause

We recommend that a grandfather clause be written into certification requirements. The grandfathering clause is to forego the taking of a state test if it is determined to be required and/or specific educational requirements as determined by the board, to become certified and to give relief to those wetland scientists that may not have the additional

wetlands related course work but do not meet the minimum experience and educational requirements as expressed below.

At the date certification of wetland scientists becomes effective, any person who has been actively engaged in the business of conducting work as a wetland scientist, has at least five years of experience working as a wetland scientist in the State of Washington, or equivalent (as determined by the board), and has a minimum of a Bachelors of Science degree, may apply to the board for initial certification without meeting the certification examination or instruction requirements. Wetland scientists that have a minimum of five years of experience working within the State of Washington and who are Professional Wetland Scientist as certified by the Society of Wetland Scientists Professional Certification Program qualify. Parties requesting to be grandfathered that do not have the above recommended credentials may submit a request to the board for review. This may include Professional Wetland Scientists from adjoining states or have sufficient professional experience in other states and are Professional Wetland Scientists that are certified by the SWS PCP.

We further recommend that any person who receives an initial certification under the grandfather clause, must, upon renewal of his or her certification, provide the board and the DOL with acceptable documentation that the applicant meets the certification renewal requirements as determined by the board and as expressed below.

Reciprocity

Any reciprocity agreements with other jurisdictions shall require applicants from those jurisdictions to meet or exceed the requirements adopted by the State of Washington regarding wetland scientist certification.

Qualifications for Certification

The following requirements for training, experience, and testing shall be required to become a State of Washington certified wetland scientist.

Wetland scientist certification is awarded to those meeting both educational and experience requirements. An application form, to be completed by each applicant, shall be prepared by the board and used in the processing of applications. The following are requirements to be certified as a wetland scientist in the State of Washington.

All applicants must submit information documenting completion of the educational requirements leading to a college or university degree of Bachelor of Science, Bachelor of Arts, or equivalent or higher degree, and should have the following, or equivalent, course work:

- 1) Biological Sciences: Fifteen (15) semester hours in biological sciences including courses such as general biology, botany or zoology; general ecology; plant, animal, aquatic or wetlands ecology; invertebrate zoology; taxonomy; marine science; fisheries biology; plant physiology, plant taxonomy, plant pathology, plant morphology; relevant environmental sciences; and similar courses.

2) Physical Sciences: Fifteen (15) semester hours in courses in soils, chemistry, hydrology, physics, geology, sedimentology, oceanography, coastal processes, environmental engineering, and similar courses.

3) Quantitative Sciences: Six (6) semester hours in courses in math, computer sciences, basic statistics, population dynamics, experimental statistics, and similar courses.

4) Additional Educational Requirements for wetland scientist certification: Fifteen (15) semester hours (or equivalent in short courses or continuing education courses) of wetland-related coursework. Examples of recommended courses, continuing education, and/or training needed to attain additional competency include, but are not limited to, the following:

Wetland Plant Taxonomy ; Advanced Plant Taxonomy; Wetland Hydrology; General Hydrology; Soil Morphology, Classification, and Mapping; Hydric Soil Identification; Wetland Restoration and Creation; Wetland delineation/Evaluation/Classification; Applied Wetland Ecology and Management; Wetland Creation/Mitigation; Wetland Ecology.

Attendance at professional meetings of symposia will not qualify to meet this requirement.

Applicants seeking credit for specialized wetland courses taken outside of the university setting where no official college credit was generated must provide the following information to assist the board for assessing the applicability or the course in meeting the minimum hour requirement for Specialized Wetland Courses:

- Name, date, location and sponsor of the course
- The number of classroom and/or field hours completed
- Provide CEUs if earned

Qualifying experience

In addition to the minimum collegiate courses required, a wetland scientist must meet specific experience and wetlands-related education as outlined below: Professional experience begins following conferral of the FIRST degree at a baccalaureate or higher level. Certification as a wetland scientist requires a minimum of five (5) years of full-time professional experience gained in the State of Washington. Relevant experience must be gained within ten (10) years prior to applying for the wetland scientist certification. Experience must demonstrate the application of current technical knowledge to problems and programs dealing with wetland resources and activities. Relevant experience may be gained while working in the private (e.g., consulting, industry, non-profit), public (e.g., local, state, federal government), and/or academic sectors.

Identification of the professional level of experience will require careful evaluation of each application. Experience is calculated based upon applicant's description and documentation of percentage of time applied to relevant wetlands work. Therefore, it is the applicant's responsibility to fully document for each experience the percentage of time devoted specifically to practitioners wetland activities, providing month/year dates for each period(s) of experience. Full-time work experience is defined as a minimum 75% of daily/weekly/monthly duties devoted specifically to wetland science. Work experience below the 75% threshold will be credited on a pro-rated basis.

Examples of qualifying experience include:

1. Engaging in research that includes field or laboratory observations, analysis of data, and preparation of a publication for recognized journals and/or published reports to private/public clients.
2. Directing a research project with supervisory responsibility over several technicians.
3. Serving as a leader or assistant leader on wetland-related projects requiring independent judgment and action.
4. Teaching a college course or equivalent in wetlands science.
5. Working as a wetland specialist, scientist, or manager in the public (local, state, or federal agency) or private (industry, consultant, developer) sector.
6. Directing a state-wide or district-wide wetlands program, conducting wetland restoration projects, wetland program planning, or conducting wetland delineation or evaluation.

Examples of **non-qualifying** experience include:

1. Teaching below the college level.
2. Carrying out routine responsibilities such as data collections without statistical analysis, professional writing of someone else's work, making routine plant identifications, conducting bioassay or other analytical laboratory determinations not related to wetlands.
3. Providing input to or review of environmental impact statements - unless as a wetland specialist.
4. Working as an undergraduate or graduate research or teaching assistant in a non-wetland related course.
5. Involvement in wetland studies as an administrative function without application of principles and concepts of wetland sciences.

Time spent obtaining advanced academic degrees may apply toward professional experience subject to the following guidelines.

1. Experience credit normally will be given only upon completion of curriculum and research judged by the board as relevant to the wetland scientist within the State of Washington.

2. Up to two (2) years of credit will be allotted for a Master's degree, up to three (3) years of credit for a Ph.D., and up to four (4) years of credit for a Master's and a Ph.D. Credit allowed will be on a case-by-case basis based on relevance to the wetland sciences and research within the State of Washington. The applicant should outline the wetlands relevance of the work leading to the degree(s) to ensure experiential credit is given.
3. When time intervals for education and employment overlap, a detailed explanation must be provided of the relevant portions of each. Experience must be gained within the ten (10) years prior to the date the application is signed.

Each application for wetland scientist certification must include the following:

A curriculum vita or resume documenting name, address, college/university degree(s), a list of relevant college/university courses, and documentation of full-time experience in wetland science.

A list of citations for wetland-related publications, technical reports, oral presentations, and other professional activities.

Names, addresses and phone numbers of three (3) references that are certified wetland scientists must accompany application for certification. Do not list personnel that you supervise.

Copies of all academic transcripts for all degrees conferred or courses taken (photocopies are acceptable).

Applicant must also certify the accuracy of application documents and certify that they agree with the certification Code of Ethics.

Wetland Delineator Qualifications

To be qualified to delineate wetlands in the State of Washington a person must have the following qualifications and experience.

1. The qualifications listed above to become certified.
2. Five years of full time experience delineating wetlands in the Pacific Northwest Region. The PNWR shall be defined by the board.
3. A minimum of 10 wetland delineations must be either peer or agency reviewed.

Assurance that practitioners will maintain competence, i.e., certification renewal

We recommend certificates be issued for a term of five years and expire on the last day of the month the certificate was issued. The DOL will notify the practitioners of the impending lapse of certification. As a condition of renewing a certificate under this chapter, a wetland scientist shall present satisfactory evidence to the board of having completed requirements as prescribed by the board. The board shall set up the standards for reissuance of certification to wetland scientists. We recommend at a minimum that

wetland scientists accumulate a point score that will be determined by the board. The point score shall include the following:

1. Work as a full time wetland scientist in the State of Washington.
2. Attend workshops or complete courses that constitute 40 hours of class time.
3. Attend wetland conferences or symposia that constitute 40 hours.
4. Teach wetland related courses, workshops, or sponsor symposia.
5. Complete research on wetland related topics. Topics may include scientific, applied ecology, or regulatory.
6. Course work, workshops, conferences, symposia, and research do not need to be within the State of Washington but must be wetlands related.
7. Wetland delineators must also maintain their field skills by completing a minimum of 1 wetland delineation per year. The board shall determine the scope of the wetland delineation.

The extent to which regulation might harm the public Restrictive Regulations

In our opinion, the criteria for certification are not so restrictive as to limit entry into the profession. To the contrary, anything less comprehensive would have the potential of sending less qualified applicants out to practice within the state. We understand that wetland scientists will continue to have the option to expand their training and other credentials, but it is also likely that many will not pursue more education or training than the required standards. Therefore, those standards must meet the minimum bar for competency and the additional training must be part of the certification renewal process.

Professional exclusions to the proposed certification

None recommended. This profession is unique and requires the credentials and experience expressed above.

The maintenance of standards

As stated in an earlier section, there is a code of ethics and strict requirements to gain certification, to continue to be certified, to maintain certification, and accountability as a wetland scientist in the State of Washington.

A description of the group proposed for regulation, expected costs of regulation, and cost-impact.

Group Proposed for Regulation

The group of individuals who will be considered for regulation are those who are delineating wetlands, preparing wetland/delineation reconnaissance reports, consulting clients on regulatory matters as they pertain to wetlands or other waters of the State of Washington, or represent themselves as professional wetland scientists, including but not limited to wetland consultants, wetland specialists, wetland biologists, and wetland ecologists. There are currently about 425 members of the Pacific Northwest Chapter of Society of Wetland Scientists registered in the three state area that it encompasses, Washington, Oregon, and Idaho. This does not represent all wetland scientists as many

are not members of the SWS. There are about 240 members of the PNW SWS chapter from Washington State.

We expect to share this legislation and licensing with the soil scientists such as those members of the Washington Society of Professional Soil Scientists. This will enable an increase in numbers to reduce overall costs to the practitioners.

Our recommendation to share this legislation with the soil scientists is because one of the commonality of the two trades and because one of the three criteria to be delineated as a wetland is hydric soil.

Expected costs of regulation

The fiscal notes that have been provided this year, based on a governing format outlined above, estimate the cost of license to be approximately \$450 every two years, with an additional \$200 fee assessed at the time of testing.

Cost impact of regulation to consumers

It can be realistically expected that the fees for wetland scientists will rise slightly following any credentialing or regulation. However, it is our belief that the overall cost to the public and the environment will be reduced by bringing consistency within the profession, and reducing poor work that is required to be redone which adds to the overall cost of a project.

Jim Wiggins MS, PWS
President
ATSI
Program VP, PNW SWS
Co-chair, PNW SWS Ethics Committee
atsi@fidalgo.net

Scott Luchessa MS
Certified Ecologist, Ecological Society of America
Senior Manager
Environ International Corporation
Exec VP PNW SWS
Co-chair, PNW SWS Ethics Committee
sluchessa@environcorp.com

APPENDIX A

Contacts for people and organizations that are willing to be contacted to discuss credentialing of wetland biologists.

Darcy Jones, PLS, AICP
Principal, Jones Engineering
4164 Meridian Street, Suite 200
Bellingham, WA 98226
360-733-8888
darcy@jonesengineers.us

Tom Black, AICP
Planning Department, City of Blaine
344 "H" Street
Blaine, WA 98231
360-332-8311
Black6088@comcast.net

Oliver Grah PWS
Whatcom County Planning and Development Services
Northwest Annex, Suite B
5280 Northwest Drive
Bellingham, WA 98226-9097
Ograh@co.whatcom.wa.us

Bob Thomas
Wetland Assessment and Monitoring
Program Manager
Washington State Department of Transportation
Environmental and Engineering Programs
310 Maple Park Avenue Southeast
PO Box 47331
Olympia, WA 98504-7331
thomsabo@wsdot.wa.gov

Erik Stockdale and Andy McMillan
Department of Ecology
ESTO461@ECY.WA.GOV
ANMC461@ECY.WA.GOV

Society of Wetland Scientists Professional Certification Program (SWS PCP)
Society of Wetland Scientists web site, www.sws.org.
PNW SWS chapter for list of WA State professionals and all chapter members

APPENDIX B

Leah Stetson, ASWM. State Wetland Delineator Certification Programs
www.leah@ASWM.org

Here is a link to the web version. There is a correction that has not had a chance to make to the article, however, and it is that 1.) Wisconsin has not grandfathered any delineators and 2.) rather than a written exam, they are considering field review of delineators' work.

Please credit Association of State Wetland Managers and you may want to add, "Re-printed with permission from Association of State Wetland Managers, Inc. A prior version of this appeared in ASWM's Wetland News, July 2007."

http://www.aswm.org/member/wetlandnews/june07/certification_0607.htm

APPENDIX C

10 July 2007

Re: Support of certification of wetland delineators in Washington

I am writing this letter on behalf of the Pacific Northwest Chapter of the Society of Wetland Scientists in support of ongoing efforts to pass a Title Act in Washington that would certify wetland delineators. The PNW Chapter now has 240 active members in Washington. That number is expected to increase as more members renew membership subscriptions that have lapsed.

It is my understanding that the Washington Society of Professional Soil Scientists (WSPSS) in their pursuit for licensing/certification for soil scientists has now sought to add licensing/certification for wetland delineators to a proposed Title Act bill introduced to the Washington State Legislature. Other states, including New Hampshire, Virginia, Wisconsin and Minnesota have adopted certification programs for wetland delineators. These programs are all voluntary and have been adopted to ensure that people practicing wetland delineation meet minimum education, training, and experience requirements. All of these programs have a common goal and that is to provide reasonable assurance that properly qualified people are conducting wetland delineations and accurately identifying wetland boundaries. Such programs are in the public interest as inaccurate wetland delineations can result in the loss of wetlands and the functions and values that they provide.

It is widely recognized that wetlands provide many functions and values that are beneficial to society. These include flood storage and desynchronization, water quality protection, and wildlife habitat. Therefore, loss of wetlands that provide flood storage functions can potentially result in increased flooding, damage to public and private property, and loss of life. Similarly, loss of wetlands that provide water quality protection functions can potentially contribute to degradation of water quality.

For these reasons, the Board of Directors of the PNW Chapter voted in favor of supporting similar voluntary certification of wetland delineators in Washington. Such a program will help to ensure that properly qualified professionals are clearly identifiable. Certification of wetland delineators will help protect the public health and welfare by more closely regulating the people that practice wetland delineation and ensuring that those holding such certification demonstrate a consistent ability to accurately delineate wetland boundaries and thereby protect the functions of these resources.

Sincerely,

Ralph Garono

President, Pacific Northwest Chapter of the Society of Wetland Scientists

Hiring a Qualified Wetland Professional²⁴

(Department of Ecology Document)

This appendix contains recommendations to help locate and select a professional who is qualified to assist with wetland issues. Wetland professionals are usually hired to identify and delineate wetlands, rate them, assess functions and values, and provide assistance with wetland regulations and permits. They often complete the necessary application forms and studies needed to meet regulations and also provide advice about designing and implementing compensatory mitigation projects that are needed to replace wetlands if they are impacted.

Wetland professionals are generally hired by landowners or developers who want to do something on their property that may affect a wetland. In addition, many local governments hire professionals to provide review as a third party. Some professionals are self-employed; others work for larger environmental or engineering consulting firms.

What is a Qualified Wetland Professional?

There is no government sanctioned program for certifying someone as a “qualified wetland professional” or “qualified wetland specialist.” Generally, the term means a person with professional experience and comprehensive training in wetland issues, including experience performing wetland delineations, assessing wetland functions and values, analyzing wetland impacts, and recommending and designing wetland mitigation projects.

The Society of Wetland Scientists administers a professional certification program for wetland scientists that has two levels of certification: Professional Wetland Scientist (PWS) and Wetland Professional In-Training (WPIT). A person certified as a PWS would be considered a qualified wetlands expert. This program is discussed further in the shaded box at the end of this appendix.

If the person is not a certified PWS, there is no simple means of determining if they are adequately qualified to undertake the tasks listed above. However, the following criteria are indicators of someone who may be qualified to perform the wide range of tasks typically required of a wetland professional:

- At a minimum, a **Bachelor of Science or Bachelor of Arts** or equivalent degree in hydrology, soil science, botany, ecology, resource management, or related field. A graduate degree in one of these fields is usually an indication of more advanced expertise.

²⁴ Wetlands in Washington State Appendix 8-H Volume 2 – Protecting and Managing Wetlands 1 Hiring a Qualified Wetland Professional April 2005

- At least **two years of full-time work experience** as a wetland professional; including delineating wetlands using the state or federal manuals, preparing wetland reports, conducting function assessments, and developing and implementing mitigation plans. Generally, the more years of experience, the greater the expertise.
- **Completion of additional wetland-specific training programs.** This could include a more comprehensive program such as the University of Washington Wetland Science and Management Certificate Program or individual workshops on wetland delineation, function assessment, mitigation design, hydrophytic plant or hydric soil identification, etc.

Keep in mind that most people engaged in professional wetland work have greater expertise in some aspects of the field than others. A person may have in-depth training in plant ecology or soils or hydrology, but few people have all three. A person may have extensive experience in wetland delineation or function assessment and have little experience in designing and implementing mitigation projects. Thus, it is important to be clear what specific tasks need to be completed and make sure the person or firm being hired has the specific expertise needed. Generally, more complex projects require multiple individuals that provide collective expertise to address all aspects of the project.

How to Find a Qualified Wetland Professional

There are a number of ways to find the names of wetland professionals. Finding a qualified one, however, can be difficult since this group of professionals is not required to be certified, licensed, or bonded in the State of Washington. One approach is to look in the Yellow Pages under *Environmental and Ecological Services*. You can also contact the local government planning office and ask for a list of professionals that work in their jurisdiction. Some local governments maintain lists of wetland professionals they consider to be well qualified.

Wetland professionals may also be found by requesting the advice of associations or businesses that commonly encounter wetlands in their work, such as the Building Industry Association and Association of Washington Business. Finally, state and federal resource agencies can be asked for referrals. Be aware, however, that most agencies will not be able to provide recommendations because of questions of fairness.

How to Select a Qualified Wetland Professional

A number of factors should be considered before hiring a wetlands professional. When interviewing professionals, their qualifications should be carefully considered (see above for the minimum recommended). Be sure to ask the following questions before making a selection:

- **Does the professional have training or experience in the use of the 1987 federal or 1997 Washington State wetland delineation manuals?** The selected professional should have the ability to apply the methods for identifying wetlands used by state and

federal agencies. Make sure that the professional can identify wetlands and their boundaries consistent with regulating agencies.

- **Has the professional had additional training or expertise in related fields** such as hydrology, soil science, botany, or ecology?
- **Is the professional familiar with local, state, and federal wetland regulations?**
- **How long has the professional been doing wetlands work?** How much experience do they have delineating wetlands in the field, assessing wetlands functions and values, or working with wetland regulations? Has the person worked in the part of the state where you propose to develop? Ask the professional for examples of previous work similar to the services being requested. Can the professional take you to a successful wetland mitigation project they designed and/or implemented?
- **Does the professional have experience working with regulatory agencies?** Ask the professional to describe their working relationship with the agencies that will be reviewing and/or permitting your project.
- **Does the professional have experience working on a team?** Given the complexity of some projects, it is expected that a wetland professional will team up with others who have experience in related fields such as water quality, wildlife, stormwater management, and hydrogeology. Ask the professional for a list of people with whom they have worked on a team in the past.
- **Who were some of the professional's past clients?** Request referrals and ask clients if they were satisfied with the professional's work. Ask whether there were any problems that occurred during or after the project, how the professional handled those problems, and what they charged for their work. Find out what type of track record the company has with local, state, and federal agencies. Be sure to ask for references that include clients who have had projects reviewed and approved by the regulatory agencies (Corps, Ecology, and local government).
- **Talk with colleagues and other businesses**, such as real estate, land development, homebuilding, etc. that are routinely involved in wetland concerns. Ask them about their experiences and knowledge regarding the professional being considered.
- **If you are considering a consulting firm, find out exactly who will be working on your project.** Will it be the principal professional with the years of experience, or someone with less experience who works for them?
- **Get an estimate of how much the professional will charge.** Compare rates but do not let cost be the sole criterion. Be sure to consider training, experience, and the other factors as well. A good professional who charges more may end up saving money by reducing permit processing delays.

Society of Wetland Scientists Professional Certification Program

The Society of Wetland Scientists keeps a list of those who have qualified for their professional certification program for wetland scientists. The certification program website <http://www.wetlandcert.org> allows you to search by name, city, and/or state.

As explained in the Professional Wetland Scientist program overview:

Certification is not required by any agency and has no official or legal standing. However, certification signifies that the academic and work experience of a Professional Wetland Scientist (PWS) meets the standards expected by his or her peers of a practicing wetland professional and provides acknowledgment to his or her peers of adherence to standards of professional ethics with regard to the conduct and practice of wetland science.

Wetland Professional in Training (WPIT) is considered a preliminary step for persons who meet the requirements for either (but not both) education and experience. Professional Wetland Scientist (PWS) certification is awarded for those meeting both educational and experience requirements.

Minimum degree requirements for WPIT and PWS are the BA or BS degrees, with course distribution of 15 semester hours each in biological and physical sciences and 6 hours in quantitative areas. For certification as a PWS, an additional 15 semester hours in wetland-related courses are required. In addition to comprehensive training in wetland science, a PWS is expected to have professional experience of at least 5 years as a wetland scientist, demonstrating the application of current technical knowledge dealing with wetland resources and activities.

Definitions of Types of Regulation

Licensure:

Licensure has the most rigorous regulatory requirements among the three types of credentials. Licensing is a mandatory process for practitioners and generally stipulates that individuals meet significant education, experience, and examination requirements before being granted licensure. Requirements often require payment of fees and:

- Examinations to assess minimum competencies
- Basic educational requirements
- Codified professional and performance standards

Certification:

Certification is a voluntary process through which a regulatory entity grants recognition to an individual who has met certain prerequisite qualifications. Once these prerequisites are met the individual may use “certified” in their title or professional designation. Requirements may require payment of fees and:

- Demonstration of passage of entry level examinations
- Basic educational requirements
- Minimum experience levels

Registration:

Registration generally has the least burdensome requirements for those wanting to join the profession. Registration programs provide a formal process whereby the practitioner can register by paying a fee and submitting specific information to a regulatory entity such as:

- Name and address of the practitioner
- Location
- Nature and operation of the business
- Activity to be practiced
- Description of services provided



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DEPARTMENT OF ECOLOGY

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DEC 31 2007

DIRECTOR'S OFFICE
DEPARTMENT OF LICENSING

December 28, 2007

Ms. Liz Luce, Director
Department of Licensing
P.O. Box 9020
Olympia, WA 98507

RE: Regulation of Wetland and Soil Scientists

Dear Director ^{Liz}Luce:

Thank you for your letter of December 6, 2007, asking about the Department of Ecology's (Ecology's) position regarding the regulation of wetland and soil scientists. Ecology supports the voluntary state certification of wetland and soil science professionals in the State of Washington under a title act.

I understand that a group of wetland and soil science practitioners have requested a voluntary regulatory program that would:

- Set minimum standards for education and experience, and require ongoing education.
- Provide consumers with a listing of certified practitioners.
- Bind practitioners to a code of ethics.
- Establish an advisory board to provide regulatory oversight.

The credentialing of wetland and soil scientists will help provide consistency and accuracy in the field of wetland delineation and management by requiring practitioners to possess a minimum level of education and experience. It will also help consumers find qualified scientists who meet those minimum standards, and provide them with a venue to address poor or unprofessional work. Under the proposal, public employees would be exempt from the credentialing requirements.

We have reviewed the draft report. Ecology recommends that the final report and associated legislation clearly address the concerns expressed by some geologists, engineers, agronomists, and others regarding potential overlaps and conflicts with related professions.

Liz Luce
December 28, 2007
Page No. 2

We look forward to tracking the issue as it moves through the legislative process.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jay J. Manning", with a stylized flourish at the end.

Jay J. Manning
Director

cc: Tom Clingman
Keith Phillips
Gordon White

From: Wick, Ann (AGR)
Sent: Monday, January 07, 2008 3:23 PM
To: Chunn, Bruce (DOL)
Subject: RE: Soil Scientists & Wetland Scientist sunrise

Bruce,

A quick read over the scope of this proposal does not appear to present any areas that would conflict with the Department of Agriculture's responsibilities for licensing. If any recommendations were to be made in the process of "soil and/or wetland management" for application of any type of pesticide, this would require a Pesticide Consultant's license. We do not license fertilizer or soil amendment applicators.

There might be some misunderstanding regarding the responsibilities of these two certifications with those duties that are preformed by a "crop advisor" but, as long as no recommendations for pesticide applications are made, this should not be a problem. However, I can see some instances where a crop advisor might need soil scientist certification. There are therefore some concerns regarding how regular maintenance of farming and forestry operations might be perceived. Would the services of a certified soil/wetland scientist generally be confined to a professional evaluation when land practices are altered? In other words, farmers wanting to improve soil would not need to enlist a soil scientist but a developer wanting to convert farmland to housing would. In that case, I can see a real advantage to certification.

I do agree that even a voluntary system eventually leads to a "requirement", but you seem to have numerous documentations for the need for this certification. A voluntary certification system as opposed to a mandatory license requirement would appear to give the public some confidence in choosing the right individual for an evaluation without unduly burdening normal farming or forestry procedures.

Ann Wick

Testimony from Public Hearing: Burien

Soil Scientist

http://www.dol.wa.gov/about/reports/Soilscientists_Burien.pdf

Wetland Scientist

http://www.dol.wa.gov/about/reports/Wetlandscientists_Burien.pdf

Testimony Public Hearing: Wenatchee

Soil Scientist

http://www.dol.wa.gov/about/reports/Soilscientists_Wenatchee.pdf

Wetland Scientist

http://www.dol.wa.gov/about/reports/Wetlandscientists_Wenatchee.pdf