August 27, 2012

Association of State Wetland Managers

Wetland Water Quality Standards for States

By

Jon Kusler, Esq. Ph.D.
jon.kusler@aswm.org

Jeanne Christie, ASWM
jeanne.christie@aswm.org

August 27, 2012

Wetland Water Quality Standards for States

By

Jon A. Kusler, Esq. Ph.D. and Jeanne Christie

Jeanne Christie photo

Association of State Wetland Managers, Inc.
32 Tandberg Trail, Suite 2A
Windham, ME 04062
http://aswm.org

Foreword

The following report has been prepared by the Association of State Wetland Managers as part of a broader project to help states adopt water quality standards for wetland ecosystems. It addresses selected issues with regard to the formulation and adoption of such standards. It provides the states with some examples of draft narrative standards in Appendices A and B.

The materials which follow are based upon:

- A literature search; web search; and legal statutory and regulatory search of the terms "state water quality standards"; "state wetland water quality standards; "state water quality; tribal water quality; "tribal wetland water quality standards" and variety of other relevant terms;
- Examination of existing state and tribal water quality standards for wetlands. We have examined the standards adopted by all of the states and tribes which have approved water quality standards;
- A series of conference calls and Webinars with the states conducted by ASWM in cooperation with many states
- Discussions with state staff concerning the content, strengths, and weaknesses of existing wetland water quality standards.

In preparing the materials in Appendices A and B**,** ASWM staff first prepared an outline of draft standards based upon the sources listed above. States and other interested parties were then asked to review the outline. Draft language for the standards were prepared based upon the outline. Much of this language has been taken from existing state and tribal statutes and regulations.

States and other interested parties have been asked to review the draft language posted on the Internet. Three one day wetland water quality meetings were conducted in the spring of 2012. A session was also included in the joint EPA/ASWM annual coordination meeting in the spring of 2012.

We hope that you will find the report interesting and useful. We welcome any corrections or suggestions.

Thanks.

Jon Kusler
Jeanne Christie

Acknowledgements

The materials which follow are based, in part, upon an earlier study and report concerning state wetland water quality standards prepared by the Association of State Wetland Managers for the Maryland Department of the Environment. The earlier report and the report which follows have been prepared with funding support from the U.S. Environmental Protection Agency, Wetland Division, which is gratefully acknowledged. However, the reports reflect the views of the authors and not necessarily the U.S. Environmental Protection Agency or the Association of State Wetland Managers (ASWM).

Draft state wetland and water quality language is suggested in Appendices A and B. The draft language provides examples for the states wishing to adopt their own narrative wetland water quality guidance or standards.

Limitations

The following document is intended solely for state use and does not represent the U.S. Environmental Protection Agency. The draft language in Appendices A and B is drawn from existing state wetland water quality regulations and revised to reflect comments and suggestions provided to ASWM staff in webinars, workshops, written comments, and discussions concerning state wetland and water quality standards.

Future Revisions

Water quality standards for wetlands is an area of public policy that will continue to evolve as additional states and tribes adopt wetland-specific water quality standards. This report may be expanded and revised as more examples, best practices and references become available. Therefore, the Association of State Wetland Managers retains the discretion to revise and add to this document in the future. States and tribes and other interested parties that would like to provide information and recommendations for improving this document may contact Jon Kusler (jon.kusler@aswm.org) or Jeanne Christie (jeanne.christie@aswm.org).

Table of Contents

PART 1: INTRODUCTION

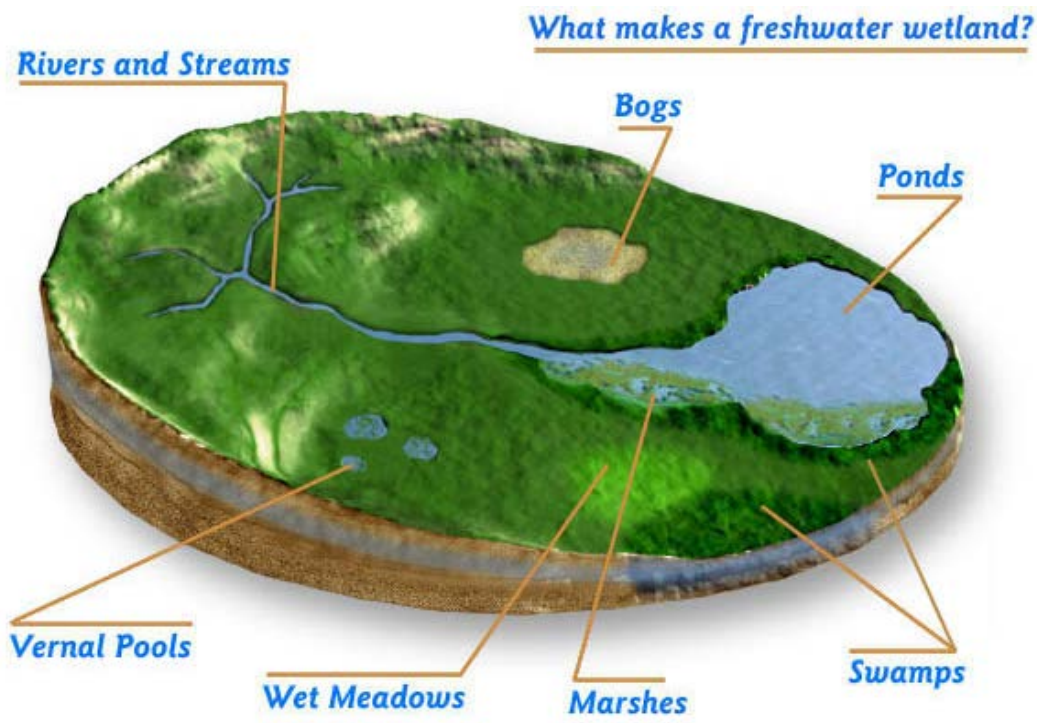
Wetlands

Wetlands are "wet" "lands," which are inundated or saturated by surface or ground waters for at least a portion of the year. They are often located adjacent to rivers, lakes and coastal waters although they are also found in isolated depressions throughout the landscape. For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."[1]

Wetlands have been created by a variety of geologic, hydrologic, and biological processes.[2] For example, glaciers in the northern tier of states (Alaska to Maine) during the last ice age created millions of depressions in the landscape which, once filled with water, became wetlands, lakes and ponds. Rivers and streams have, through hydrologic and geologic processes, created broad floodplain wetlands in states like Louisiana, Mississippi and South Carolina and narrower floodplain wetlands and riparian areas adjacent to creeks and streams throughout the nation. Fluctuating sea levels and sediment deposition have, through geologic time, created coastal and estuarine wetlands, which are particularly extensive in the Gulf of Mexico and lower Atlantic states.

Most wetlands are federally regulated "waters of the U.S." under Sections 404, 401 and 402 of the Clean Water Act and subject to federal and state permitting requirements. States may more broadly regulate wetlands than those regulated at the federal level. Source: River Network CWA

[1]See 40 CFR 232.2.
[2]See National Water Summary on Wetland Resources, *United States Geological Survey Water Supply Paper 2425 (1999).*



Wetlands and the hydrologic cycle. Wetlands collect and store rain and snow. They convey surface runoff and flood waters. They act as both ground water recharge and discharge areas (depending upon the situation). Hydrologic alterations such as filling, grading, and drainage damage and destroy wetlands outright and cause erosion and increase sedimentation, destroying or diminishing wetland functions and their values. Source: Diagram of a Wetland from Rhode Island Office of Water Resources

Wetlands in their natural condition perform a variety of functions of the sort outlined below. As low areas in the landscape, wetlands tend to collect silt and sediment, nutrients, toxic chemical and other pollutants. Their functions and values are often damaged or destroyed by pollution.

Areas of riparian vegetation in arid and semi-arid areas often serve functions similar to those played by riverine wetlands such as pollution control and flood storage and often contain wetlands.[3] Like wetlands, riparian areas and their functions may be damaged by pollution.

[3]See Riparian Areas: Functions and Strategies for Management, National Academies Press (2002); http://www.nap.edu/catalog.php?record_id=10327.

Nonpoint source pollution from surface runoff. Nonpoint source runoff often contains a broad range of pollutants and pollution such as floating debris, wood, sediment, phosphorous, nitrogen, oil, and pesticides. Source: City of Santa Rosa, California, Stormwater Pollution Prevention

Large, direct, point discharges of pollution into wetlands are increasingly rare but wetlands are broadly subject to unregulated nonpoint sources of pollution such as nutrients and pesticides from urban development and agriculture. Source: Statutory Law of water pollution, All About Drinking Water

Riparian buffers are narrow belts of land along streams, lakes, and wetlands that often contain a variety of wetland plants, areas of grass, small to medium-sized shrubs, trees. They provide a transition zone between aquatic and upland areas and protect wetlands and other waters from sediment, phosphorous, nitrogen and other pollution. Source: University of Illinois Extension, Introduction to Riparian Forest Buffers

A Clean Water Act Partnership

The Clean Water Act establishes a federal/state/tribal partnership to "restore and maintain" the chemical, physical, and biological integrity of the Nation's waters (See Section 101 of the Act). To help achieve this goal, Section 303(C)(2)(A) of the Act requires states to adopt water quality standards for "waters of the U.S." No distinctions are made between wetlands and other waters.

The long term goal of the Clean Water Act is to eliminate the "discharge of pollutants into the navigable waters." The interim goal is to achieve "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water."[4] Section 402 of the Act requires EPA to regulate pollution discharges into waters of the U.S. States may be authorized by EPA to issue permits for pollution discharges into such waters. If states fail to do so, the U.S. Environmental Protection Agency (EPA) is authorized to directly regulate "waters of the U.S." Section 303(c)(2)(A) requires states to adopt water quality standards for waters to "protect the public health or welfare" and "enhance the quality of water." Section 305(b) and 303(d) of Clean Water Act and regulations adopted by EPA pursuant to these sections require states to list "impaired" waters. States are to establish Total Maximum Daily Loads (TMDLs) for impaired waters. Impaired waters will be briefly discussed in Appendix C below.

According to EPA, a water quality standard for a water body or class of water bodies consists of four basic elements:[5]

1. designated uses of the waterbody (e.g., recreation, water supply, aquatic life, agriculture),
2. water quality criteria to protect designated uses (e.g., numeric pollutant concentrations and narrative requirements),
3. an antidegradation policy to maintain and protect existing uses and high quality waters, and
4. general policies addressing implementation issues (e.g., low flows, variances, mixing zones).

States must not only adopt water quality standards for "waters of the U.S." but must assess waters and review and revise water quality standards (Clean Water Act Section (303) (c)).[6]

[4]See 33 U.S.C. Section 1251(a) et seq.; Title 40 CFR 131.1 et. seq.
[5]See Designated Uses, EPA http://www.epa.gov/waterscience/standards/about/uses.htm.

Clean Water Act regulations apply to "waters of the U.S." which include surface waters such as coastal/estuarine waters, lakes and ponds, rivers and streams and most wetlands. However, not all surface waters are considered "waters of the U.S." For example, due to Supreme Court decisions,[7] certain isolated wetlands are not considered "waters of the U.S." States have the ability to regulate "waters of the state," which may be defined more broadly than those under federal jurisdiction.

The Clean Water Act provides further guidance for states in developing water quality standards (for all waters, not just wetlands). In establishing water quality standards, states are to determine appropriate uses taking into consideration the use and value of a water body for public water supply, fish, and wildlife, recreational purposes and agricultural, industrial, and navigational purposes.[8]

The goal of this report is to help states adopt water quality standards for wetlands to protect and restore the "chemical, physical, and biological integrity of the Nation's waters." Clean Water Act, Section 101.

The Clean Water Act provides that in designating uses for a water body, states are to examine the suitability of the water body for uses based on the physical, chemical, and biological characteristics of the water body, its geographical setting and scenic qualities and economic considerations.[9] The characteristics necessary to support an use are to be identified so that water bodies having those characteristics can be grouped together as supporting particular uses such as "aquatic life."

Section 304(a) of the Clean Water Act directs EPA to provide guidance to states and tribes in adopting water quality standards.[10] This guidance includes both numeric and narrative standards. Section 304(a)(1) of the Clean Water Act requires EPA to develop water quality criteria "accurately reflecting the latest scientific knowledge…." Water quality criteria are based on science alone although designated uses may also take into account economics. These criteria are based on data and scientific judgments on pollutant concentrations and environmental or human health effects.

---

[6]The following paragraphs are derived, in part, from EPA's Wetlands and Water Quality Standards website: See http://water.epa.gov/scitech/swguidance/standards/imp.cfm.

[7]See *Solid Waste Agency of Northern Cook Cty.* v. *Army Corps of Engineers,* 531 U. S. 159 (2001); Rapanos v. United States, 547 U.S. 715 (2006).

[8]See Designated Uses, EPA http://www.epa.gov/waterscience/standards/about/uses.htm. See more specifically 40 CFR § 230.3(s); 33 CFR § 328.3(a).

[9]Id.[1]

[10] In establishing criteria, states should: "(1) Establish numerical values based on: (i) 304(a) Guidance; or (ii) 304(a) Guidance modified to reflect site-specific conditions; or (iii) Other scientifically defensible methods; (2) Establish narrative criteria or criteria based upon biomonitoring methods where numerical criteria cannot be established or to supplement numerical criteria." http://www.gpo.gov/fdsys/pkg/CFR-1999-title40-vol14/xml/CFR-1999-title40-vol14-sec131-11.xml.

EPA regulations set forth a variety of requirements for state water quality standards[11] which apply to waters including but not limited to wetlands.

In 1990 EPA developed a guidance document for the states: National Guidance: Water Quality Standards for Wetlands, which was included as Appendix D of the Water Quality Standard Handbook: Second Edition, August 1994.[12]

EPA Guidance for State Wetland Water Quality Standards

EPA in the 1990 guidance recommended that states, in preparing their own wetland water quality standards, include 5 elements:[13]

- Include wetlands in the definition of "state waters"
- Designate uses for all wetlands
- Adopt aesthetic narrative criteria (the "*free froms*") and appropriate numeric criteria for wetlands
- Adopt narrative biological criteria for wetlands
- Apply the state's antidegradation policy and implementation methods to wetlands.

EPA has also published wetland/water quality guidance on establishment of nutrient water quality criteria for wetlands.[14]

Any state wishing to draft its own water quality standards for wetlands needs to begin its effort by examining the guidance pertaining to State Water Quality Standards for wetlands and the guidance pertaining to nutrient criteria. The EPA guidelines contain much helpful material and are flexible and leave considerable discretion to the states and tribes in developing their own guidance and regulations, as long as basic requirements are met. However, states and tribes may go beyond this guidance[15] and many states have done so with regard to regulatory goals, definition of wetland, regulated activities, designated uses, criteria for designated uses and other regulatory provisions as suggested in Appendices A and B below.

Fifteen states have adopted some sort of water quality standards specifically for wetlands although the specifics differ greatly: Wisconsin, Minnesota, Colorado, California, Nebraska, North Carolina, Ohio, Hawaii, Iowa, Florida, Wyoming, Maine, Massachusetts, Tennessee, and Washington State. See more detailed discussion of these programs in an earlier report: Jon

[11]See generally Id. See also http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=2bb83ac1e2da2db51d52ad985a694506&rgn=div8&. According to EPA water quality criteria are to specify the amount of various pollutants that may be present in waters and still achieve designated uses. All state water quality permits must have effluent limitations at least as stringent as needed to maintain established beneficial uses and to attain the quality of water designated by states for their waters.
[12]See National Guidance Water Quality Standards for Wetlands, EPA http://water.epa.gov/lawsregs/guidance/wetlands/quality.cfm.
[13]See ibi http://www.epa.gov/owow/wetlands/regs/quality.html.
[14]See Criteria Development Guidance: Wetlands, EPA http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/wetlands/es.cfm.
[15]See Section 510 of the Clean Water Act (33 U.S.C. 1370) http://www.epa.gov/npdes/pubs/cwatxt.txt.

Kusler, State Water Quality Standards for Wetlands.[16] This earlier report was used as a starting point in preparing the present report, which reflects not only existing programs but the literature search, workshops and webinars. See Appendix C for more discussion of the EPA regulations and guidance with special relevance to altered wetlands.

States may adopt more stringent pollution control and hydrologic alteration regulations required by EPA, the Army Corps of Engineers and other federal agencies. See CWA Section 510.

To help the states, EPA has developed quantitative water quality criteria for a wide variety of pollutants that include recommended maximum concentrations of pollutants in surface waters. These criteria have been developed nationally based upon laboratory and other data to protect most aquatic species most of the time.

EPA's quantitative, numeric standards pertain to aquatic life and human health.[17] See the websites listed below for greater detail. EPA's compilation of national recommended, quantitative water quality criteria for specific substances is presented as a summary table available on the Internet. These criteria include recommended water quality criteria for the protection of aquatic life and human health in surface water for approximately 150 pollutants. These criteria are published pursuant to Section 304(a) of the Clean Water Act and provide guidance for states and tribes to use in adopting water quality standards. See generally National Recommended Water Quality Criteria Table: http://www.epa.gov/waterscience/criteria/wqctable/2004-table-fs.htm

EPA criteria for "aquatic life" and "human health" include the following criteria:

Aquatic Life. In its aquatic life criteria, EPA establishes pollutant limits to protect surface water for specific types of aquatic life.[18] Limits are based upon physical, chemical and biological factors. Biological criteria[19] are based on the numbers and kinds of organisms present and describe the biological condition of aquatic communities inhabiting surface waters in good condition. Nutrient criteria,[20] one example of chemical criteria, pertain primarily to phosphorous and nitrogen and prevent over-enrichment of surface waters and resulting threats to aquatic life.

[16]State Water Quality Standards for Wetlands, ASWM http://aswm.org/pdf_lib/state_water_quality_standards_for_wetlands_061410.pdf.
[17]See below. See more generally: Designated Uses, EPA http://www.epa.gov/waterscience/standards/about/uses.htm, http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm.
[18]See Aquatic Life Criteria, EPA http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/index.cfm; http://www.epa.gov/waterscience/criteria/.
[19]Ibid.
[20]See Water Quality Criteria, EPA http://www.epa.gov/waterscience/criteria/; http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/memo2007.cfm.

Human Health. In its human health criteria, EPA includes technical information and guidance for surface water protection from specific pollutants through water ingestion and aquatic organism ingestion exposure pathways.[21] Criteria for microbial organisms[22] are used to protect the public from exposure to harmful levels of pathogens in surface waters. Recreational criteria[23] protect people who are in direct or secondary physical contact with coastal recreational waters from exposure to pathogens.

Stormwater contains a wide variety of pollutants which impair the functions and values of wetlands such as sediment, phosphorous, nitrogen, salt, oils, and pesticides. Source: Town of Niskayuna. Stormwater Management Program.

Algae bloom in Kesterson National Wildlife Refuge. Many wetlands are vulnerable to even small quantities of pesticides, herbicides and other toxic chemicals in the environment. *Source: Kesterson National Wildlife Refuge.* In Kesterson National Wildlife Refuge selenium was concentrated in agricultural runoff killing migratory birds. Studies of the area found that high levels of Selenium were causing developmental deformities in both embryos and chicks of the majority of the birds nesting at Kesterson. The deformities were present in up to 65% of the birds and consisted of missing eyes and feet, protruding brains, and deformed beaks, legs and wings. Estimates suggested that several thousand birds had been poisoned. In addition, in 1983 there was a massive fish kill followed by high numbers of still births in the mosquito fish population, which happened to be the only fish that could "survive" the seleniferious conditions. Source: Selenium Case Study

[21]See Human Health Criteria, EPA http://water.epa.gov/scitech/swguidance/standards/criteria/health/.
[22]See Microbial (Pathogen), EPA http://water.epa.gov/scitech/swguidance/standards/criteria/health/microbial/index.cfm.
[23]See Recreational Water Quality Criteria, EPA http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/index.cfm.

Box 1: Hydrologic Alterations and Water Quality

Type of Modification	Impact of Modification On Water Quality
Fill	• Increased sediment in water while fill is taking place; increased sediment later from erosion • Increased toxic materials from fill in some instances (e.g., fill as part of solid waste disposal) • Possible destruction of wetland removing or reducing all pollution control functions
Drainage	• Increased sediment, nutrients while drainage is taking place • Reduce flows during dry periods, concentration of pollutants • Possible destruction of wetland removing or reducing all pollution control functions • Increased concentrations of pesticides, nutrients, toxic chemicals during low flows • Release of climate change gases (carbon dioxide, methane)
Excavation, dredging	• Increased sediment in water while excavation, dredging is taking place • Release of dredge spoil • Release of toxic materials (e.g., acid runoff from mining) • Removal of wetland vegetation, decreased pollution control function, increased water temperatures • Removal of wetland soil, decreased nutrient absorption capacity
Modification of wetland configuration	• Destruction of wetland flood storage and conveyance with resulting increased peak flows and water velocities (riverine wetlands), increased erosion, increased sediment
Flooding	• Health and safety threats from flood waters polluting wells; stormwater • Destruction of wetland vegetation, reducing pollution prevention and control functions • Release (in some instance) of nutrients • Possible positive impacts by diluting polluted waters

Box 2 Definitions

"Buffer" Buffer means an upland and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses.

"Compensatory mitigation" for wetland losses means the restoration (re-establishment or rehabilitation), establishment (creation), and/or in certain circumstances preservation of aquatic resources. Compensatory mitigation is for the purposes of off-setting unavoidable adverse impacts, which remain after all appropriate and practicable avoidance and minimization has been achieved.

"Designated use" is a classification describing the level of protection from perturbation that the wetland is afforded by the water quality standard.

"Functions" mean the ability of wetlands to produce goods or services of value to society such as providing wildlife habitat, flood storage, and recreational opportunities. These functions depend upon the hydrologic, chemical and biological process, which take place within wetlands.

"Hydrology" means the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere, particularly at the lands surface.

"Hydrologic alterations" are human changes in hydrology caused by fills, channelization, ground water pumping, tree cutting, and other activities. Such changes include but are not limited to increased and decreased flows, changes in surface and ground water elevations, changes in wave heights, changes in water velocity, and changes in the size and configuration of water bodies. Such changes include but are not limited to changes in rivers and streams which are often referred to as hydrologic modifications.

"Isolated wetlands" are wetlands not ordinarily connected by surface waters to other state surface waters.

"**Outstanding Natural Resource Wetlands**" (ONRW) ONRW are wetlands of exceptional ecological, recreational, flood storage or conveyance, erosion control, pollution prevention or control, or other function or value.

"**Pollutant**" as defined in Clean Water Act Sec. 502(6) means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. States may define pollutant even more broadly and can regulate an even broader range of activities which impact wetlands and other waters.

"Pollution" is the human-induced alteration of the chemical, physical, biological, hydrologic and radiological integrity of waters including wetlands.

"Regulated activities" include all activities causing or contributing to destruction of wetlands and associated buffer areas including but not limited to point and nonpoint pollution discharges, dredging, draining, filling, other hydrologic alterations, destruction of vegetation, bulk heading, mining, and drilling."

"**Total Maximum Daily Loads (TMDLs)**" is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards.

"**Value**" is the social significance or worth of functions including but not limited to monetary worth.

"**Waters of the state**" are defined for the purpose of this report to include all seasonal or permanent, perennial, intermittent and ephemeral rivers, streams, lakes, reservoirs, and wetlands including isolated wetlands which are not man-made retention ponds used for the treatment of municipal, agricultural or industrial waste; and all other bodies of surface water, either public or private which are wholly or partially within the boundaries of the state of ….(State name)"

"Wetland water quality and hydrologic alteration permit" is a permit issued by a pollution control, water resources, wetland, fish and wildlife, or other regulatory agency authorizing specific regulated activities with the goal of protecting wetland water quality and preventing hydrologic alterations which would damage or destroy wetland functions.

"**Wetlands**" are defined for the purpose of this report as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas and include isolated wetlands."

PART 2. POLLUTION SOURCES AND IMPACTS

Wetland functions and values are threatened by both point and nonpoint pollution. Major activities creating pollution and stressing wetlands in rural areas include agriculture, mining, road construction, water projects, and recreational development. Activities stressing wetlands in urban areas include industrial discharges, municipal sewerage systems, stormwater systems, roads, and urban development generally. EPA recently developed field observation guidance to assess the impact of stressors on the nation's wetland resources.[24] Some major types of pollution which threaten wetlands and their functions and values include the following types:

Types of Pollutants and Pollution[25]

Sediment. Sediment is a problem in both rural and urban waters for fish, amphibians, reptiles, and other wetland animals and plants. High sediment loadings from agriculture, urbanization, commercial development, stormwater runoff and other sources may quickly fill wetlands, destroying all functions. Sediment is a particular problem for depressional wetlands which, if filled with sediment, are not periodically flushed as are riverine wetlands and to a lesser extent lacustrine and estuarine wetlands.

A variety of factors affect rates of sediment deposition and the affect of deposition on wildlife such as the size distribution of sediment particles, velocity and turbulence of the water, density and type of vegetation and other factors.

Water pollution destroys or damages wetland functions and values, particularly habitat.

High sediment loadings may be a mixed blessing where coastal and estuarine wetlands are quickly inundated by sea level rise. Sediment can help wetlands keep pace with sea level rise but also threaten fish and shellfish.

Pesticides and Herbicides. The bioaccumulation and biomagnifications of pesticides is a problem for rural and urban wetlands. Agricultural use of pesticides is a particular problem for rural wetlands in the prairie states where the small size of the wetlands, the short distance between the wetlands and the use of pesticides in near proximity to wetlands allows them to enter the wetlands through a variety of direct and indirect routes. Pesticides and herbicides are a problem not only in lethal quantities but where they hinder reproduction and the health of wetland species.

Toxic Chemicals. Toxic chemicals such as mercury and lead affect a broad range of wetland fauna. They limit human consumption of fish, waterfowl and other wildlife. They also limit water contact in recreational use of wetlands. Some pollutants, like selenium, may be naturally occurring. But even these may become deadly through reduced flows of rivers and streams, evaporation and resulting bio-accumulation. The problems with accumulation of selenium in

[24]In 2011 EPA, in cooperation with the states, commenced a National Wetland Condition Assessment (NWCA) and produced a field manual to guide the assessment. See: U.S. Environmental Protection Agency. 2011. National Wetland Condition Assessment: Field Operations Manual. EPA-843-R-10-001.
[25]This list is not intended to be comprehensive but to provide examples.

agricultural runoff water at Kesterson National Wildlife Refuge in California and resulting wildlife deaths are well known.[26]

Nutrients. Many wetlands are subject to excessive nutrients (phosphorous, nitrogen) from agricultural runoff, lawn fertilizers, septic tanks, stormwater, and in some instances point discharges of effluents. Excessive phosphorous and nitrogen result in algae blooms, low oxygen levels which kill fish and amphibians, and rapid in-filling of wetlands by organic matter. Nutrients may be washed from a range of nonpoint sources into creeks, streams, and ditches which lead to wetlands.

Evaluating the health effects of a dry-cleaning chemical. The presence of tetrachloroethylne (PCE or PERC) in the environment has been linked to cancer and other health effects. Source The National Academies, Environmental Studies & Toxicology.

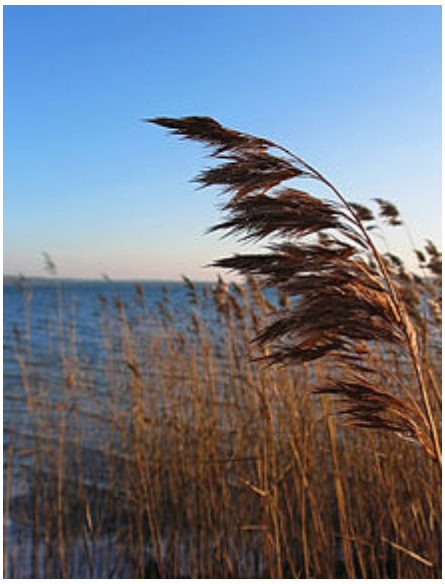
Carbon and Organic Matter. High levels of dissolved carbon and organic matter in wetlands and low levels of oxygen will kill many types of wetland fauna such as fish and shellfish, which require relatively high levels of dissolved oxygen. Organic matter may be directly discharged into wetlands (e.g., sewage treatment plants) or carried into wetlands by surface runoff.

Road Salt. Road salt is an increasing problem for wetland wildlife and to a lesser extent wetland flora, particularly for isolated or partially isolated, smaller, freshwater wetlands next to roads in the northern states. It is estimated that between 10 and 20 million tons of road salt are spread on highways each year. There is high variability in the response of animals and plants to elevated salt levels with some fauna and flora highly sensitive and others not.

Road salt is a common pollutant in the northern states. Source: Wisconsin Sea Grant Program.

[26]See, e.g., Kesterson National Wildlife Refuge, CA Water Impact Network http://www.c-win.org/kesterson-national-wildlife-refuge.html.

Water Temperature. Many types of wetland amphibians and fish are threatened by increased water temperatures directly or indirectly caused by hydrologic modifications (e.g., dams, wetland water extractions) low flows, the cutting of stream bank vegetation, and the use of water for cooling (e.g., nuclear reactors).



Phragmites is a common invasive species. Source: University of Wisconsin's Sea Grant Institute, Wisconsin's Water Library

Invasive Species. Although not ordinarily thought of as pollution, invasive flora and fauna destroy native plants and animals and may have a severe impact on rare and endangered species.

Surface Water Flow Diversions and Ground Water Pumping. Surface and ground water extractions are an increasing problem for wetland water quality particularly in the semi-arid West during low flow portions of the year. During low flows, toxic pollutants, nutrients, sediment and other pollutants may be concentrated in wetlands.

Water Quality and Wetland Functions

Water pollution impacts a broad range of wetland functions and values:

Wildlife Habitat. Wildlife habitat is a well known wetland function. Habitat is affected by a wide variety of pollutants such as mercury, lead and cadmium and other types of pollution such as excessive nitrogen or phosphorus. Wetlands provide habitat for thousands of species of wildlife including many game species such as deer, bear and moose. Wetland wildlife broadly affected by pollutants and pollution includes amphibians, reptiles, mammals, insectivores, birds, reptiles and shellfish. Pollution will not only kill many types of wildlife but reduce resiliency and increase juvenile mortality rates. Pollution can also destroy spawning grounds and food chain support.

Box 3: Wetland Goods and Services

The following list of wetland goods and services has been drawn from statutes, ordinances, regulations, and the literature. Wetlands goods and services are also sometimes referred to as wetland "functions," "functional values," and values.

Provide flood storage. Many wetlands temporarily store flood waters and reduce flood heights and velocities for downstream lands.

Provide flood conveyance. Many wetlands act as flood conveyance areas, reducing flood heights and velocities at upstream, adjacent, and downstream lands.

Reduce wave damage. Some vegetated wetlands (e.g., mangroves) reduce the force of waves and resulting wave and erosion damage to back lying properties and structures.

Reduce excessive erosion. Many vegetated wetland areas help moderate erosion by reducing water velocities, binding soil and contributing to the vertical and lateral stability of stream channels (i.e., associated with dynamic equilibrium)**.**

Reduce sediment loadings in lakes, reservoirs, streams, estuaries, coastal systems. Many wetlands reduce the sediment flowing into lakes, streams, and estuaries by intercepting and trapping sediment.

Provide groundwater recharge. Some wetlands provide groundwater recharge although most are discharge areas much of the year.

Provide groundwater discharge. Some wetlands help maintain the base flow of streams and help to reduce ground water levels (which would otherwise flood basements) by providing groundwater discharge.

Produce natural crops. Many floodplains and wetlands produce cranberry, blueberry, saltmarsh hay, aquaculture, wild rice, forestry, and other natural crops.

Prevent and treat pollution:

1. **Prevent pollution from entering water body.** Virtually all types of vegetated wetlands intercept sediments, nutrients, debris, chemicals, etc. from upland sources before they reach down gradient rivers, streams, lakes, estuaries, oceans, and ground waters.
2. **Treat (remove) pollution in water body.** Wetlands located in lakes, streams, estuaries, depressions, and at other locations may remove pollutants from waters.

Provide habitat for fish and shellfish.* Wetlands adjacent to lakes, streams, estuaries, and oceans can provide food chain support, spawning areas, rearing areas, and shelter for fish. Many estuarine wetlands provide shellfish habitat.

Provide habitat for amphibians, reptiles, mammals, and insect species.* Many wetlands provide habitat for a broad range of mammals, reptiles, amphibians, and birds and corridors for migration or movement.

Provide habitat for song birds and other nongame birds.* A broad range of wetlands provide habitat for nongame birds important for ecotourism.

Provide habitat for waterfowl.* Many depression, river fringe, lake fringe, coastal and estuarine fringe wetlands, provide food supply, nesting, water etc. for waterfowl.

Provide habitat for rare, endangered and threatened species.* Virtually all types of wetlands provide food chain support, feeding, nesting, and substrates for endangered and threatened animals and plants.

Maintain carbon stores, sequester carbon, reduce climate change. Many wetlands and floodplains store carbon in carbon-rich wetland soils and trees and vegetation, reducing climate change. Some continue to sequester carbon from the atmosphere.

Provide micro-climate modification. Wetlands and floodplains, particularly those near cities, may reduce temperatures and reduce air pollution levels.

Provide recreational opportunities and scenic beauty. Many wetlands provide canoeing, wildlife viewing and other water -based recreational opportunities. Many wetlands have aesthetic value. Scenic beauty when viewed from a car, a path, a structure, or a boat may enhance real estate values, provide recreation, and provide the basis for ecotourism.

Provide historical, archaeological, heritage, cultural opportunities. Some wetlands and floodplains such as the confluence of the Missouri and Mississippi Rivers (Lewis and Clark Expedition) have historical value; others have archaeological value (shell middens, burial sites).

Provide educational and interpretive opportunities. Many wetlands they contain provide education and research opportunities for schools and universities (K-graduate schools) and government agencies

Provide scientific research opportunities. Schools, universities, resource agencies, a not-for-profit organizations carry out many types of scientific research in wetlands, floodplains, and riparian areas.

*These functions/values can be listed separately or together as "habitat" value. They have been listed separately here because they require somewhat different sorts of assessments.

Wetlands provide habitat for many threatened or endangered plant and animal species. However, they are also threatened by many pesticides, herbicides and other toxic chemicals in the environment. See, for example: Missouri Hellbender. Proposed by Fish and Wildlife Service for listing as an endangered species. Source: Missouri Sierra Club

Fish and Shellfish. Wetlands provide habitat and food chain support for many species of fish and shellfish. Toxic chemicals such as mercury and pesticides such as DDT kill fish and shellfish or make them inedible. Fish and shellfish are also seriously impacted by excessive nutrient levels, sediment, BOD levels and increases in water temperatures.

Threatened or Endangered Plant and Animal Species. Wetlands provide habitat for an estimated 35-55% of the threatened or endangered plant and animal species. Many are threatened by toxic pollutants, pesticides and herbicides, excessive nutrients, increased water temperatures, and excessive sediment.

Recreation. Some wetlands provide recreational opportunities, which are impeded or prevented by poor water quality. These include water contact sports such as swimming (deeper wetlands). They also include uses involving human consumption of wetland plants or animals such as fishing. Uses involving human consumption are particularly sensitive to viruses, bacteria, and toxic chemicals. The aesthetic qualities of water are also important to recreational uses such as canoeing, kayaking, and bird watching which are impacted by color, turbidity, and sediment levels.

Pollution Control and Remediation. Wetlands act as buffers for other waters by intercepting pollution which would otherwise enter lakes, rivers streams and coastal and estuarine waters. They also remove some pollutants in situ such as nitrogen, debris, sediment and phosphorous. However, there are limits to the ability of wetlands to intercept or remove pollutants. State and federal regulations prohibit the use of natural wetlands for waste disposal although constructed wetlands may be used for waste treatment in some circumstances. Fills and sediment whether naturally occurring or man-made may quickly destroy a wetland and all of its functions and values. Drainage may have similar impacts although more reversible. Removal of wetland and riparian vegetation may reduce water pollution prevention and remediation capabilities.

Wave Attenuation. Some wetlands, particularly wetlands adjacent to major rivers, lakes, or coastal/estuarine areas reduce wave heights and erosion and flood damages. Fills, sedimentation and removal of vegetation may decrease the wave attenuation capacities of wetlands.

Flood Storage and Conveyance. Many wetlands temporarily store and/or convey flood waters reducing downstream, adjacent, upstream flood heights and velocities. These include many isolated and partially isolated wetlands. Fills and sediment from man-made or natural sources destroy flood storage and conveyance capacity. The filling of natural detention areas also increases flooding. It also reduces detention time and the quality of stormwater discharges.

Erosion and Sediment Control. Wetlands adjacent to rivers and streams reduce stream bank and, in some instances, stream bed erosion. Wetlands in upland areas reduce sheet erosion and sediment loading from a broad range of rural (agricultural, forestry) and urban sources. Fills, drainage, and vegetation removal destroy or limit erosion and sediment control functions.

Natural Crops (e.g, cranberries, blueberries, salt marsh hay). Wetlands produce a variety of natural crops which may be destroyed or reduced by excessive sediment and nutrients and other pollutants or pollution. Because natural crops are consumed by people, their use is limited by even low levels of toxic chemicals, viruses, bacteria and pesticides.

Forestry. A wide variety of trees grow in wetlands such as Atlantic White Cedar, Bald Cypress, and Water Tupelo. Trees are quite tolerant to some but not all pollutants. However, fills, drainage, and flooding can destroy forested wetlands.

Research and Education. Wetlands provide researchers, students, and educators with a broad range of research and educational opportunities. However, pollution may destroy the research and education functions of wetlands. Researchers, students and educators often avoid polluted wetlands in their research and teaching.

As will be discussed in greater depth below, wetland water quality standards can prevent many types of pollution and water quality related hydrologic alterations. See Box 1. This, in turn, can prevent the destruction of wetland functions and values.

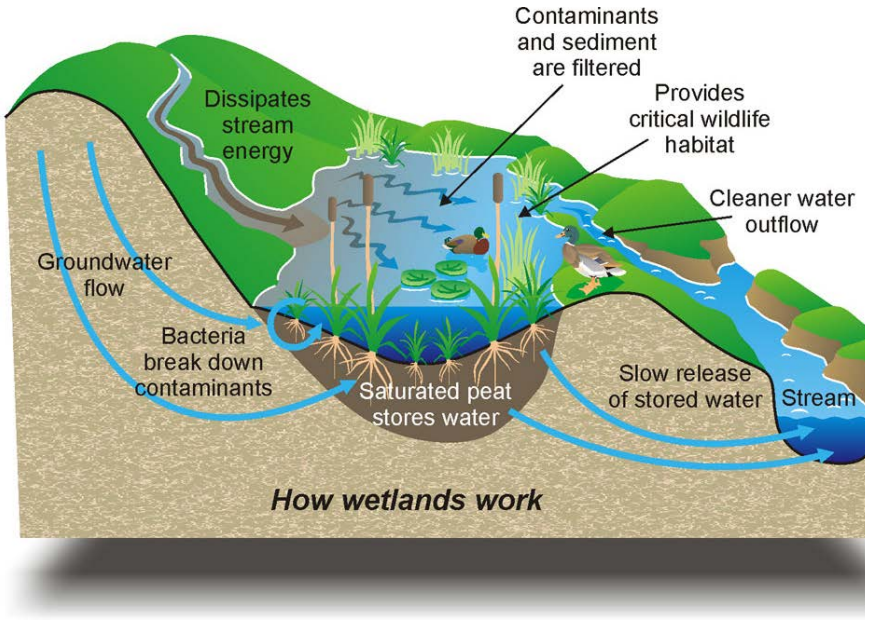
Box 4
Characteristics Important to the Capacity of Wetlands to Produce Goods and Services

- Type of wetland.
- Water quality.
- Overall hydrologic and geologic setting including climate, rainfall, topographic form, geology, soils.
- Fluvial processes and geomorphology: the erosion and depositional processes which determine the vertical and lateral position of the water body relative to the floodplain.
- Overall ecological setting including adjacent upland and deep water habitats.
- Onsite hydrologic and hydraulic characteristics including fluctuations in water levels, hydroperiod.
- Water quality, water chemistry (e.g., Ph), nutrients.
- Flora (vegetation): types, diversity of types, condition.
- Fauna (animals): types, diversity of types, condition.
- Persistence, longevity of the wetland and wetland features (i.e., will a wetland be here in 10 years?)
- "Connectivity" with other wetlands, waters, upland habitat.
- Size and shape (e.g., edge ratio).
- Existing uses and alterations and restoration potential.
- Presence or absence of buffers.
- Presence or absence of active management measures. (e.g., exotic weed control, water level control, fencing of cattle, etc.)

Bog turtles are endemic to wetlands where groundwater discharge or recharge is occurring such as springs and seeps. Source: The New York Times Blog. See also Species Profile, Bog Turtle, U.S. Fish and Wildlife Service

Wetlands hold back stormwater during flood events. Source: City of Lincoln, Rain to Recreation

Wetlands reduce the depth of storm surges and reduce the height and force of waves from hurricanes, inland storms, and tsunamis. Mangroves are particularly effective in reducing waves and erosion because of the density of their branches, leaves and roots. Source: National Park Service



Wetlands provide water quality protection and filtering of pollutants. Source: Natural Resources Canada.

Recreational canoeing in marsh. Recreation is one of many uses of wetlands disturbed or destroyed by water pollution. Source: EPA Wetlands Division

Class identifying plants. Wetlands are broadly used by teachers at all levels for educational and research purposes. Source: EPA Wetlands Division

PART 3. BENEFITS OF WETLAND WATER QUALITY STANDARDS TO THE STATES

Why should a state or tribe adopt water quality standards for wetlands? Some important reasons are listed below:

- Wetland water quality standards can help states achieve not only the protection of wetland water quality but the Clean Water Act goals and similar state and tribal goals to more broadly "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." (Section 101 of the Act).
- Water quality standards can aid a state in reviewing federal permits pursuant to Section 401 of the Clean Water Act.
- Water quality standards can form the basis for quantified water quality-based effluent limitations in NPDES permits.[27]
- Water quality standards can assist the state in preparing Clean Water Act Section 305(b) and 303(d) reports including information concerning the ambient condition of wetlands, wetlands needing management attention, and remedial measures for wetlands subject to pollution.
- EPA has interpreted the Clean Water Act to require states to adopt wetland water quality standards.[28]
- Wetland specific water quality standards can provide greater certainty to landowners in the use of their wetlands and regulators in processing regulatory permits.
- Water quality standards can be used as benchmarks to help a state determine how it is doing in protecting and restoring wetlands and meeting a no-net-loss goal.
- Wetland water quality standards adopted as part of state pollution controls or as water regulations can provide at least partial protection for wetlands in states which have not adopted independent wetland regulatory statutes. State water quality standards for wetlands may be more politically acceptable than broader wetland regulations.
- Water quality standards can provide another layer of protection for wetlands in states which have also adopted separate wetland regulatory statutes.

Water quality standards for wetlands can simultaneously strengthen state pollution controls and state wetland protection efforts.

[27] See National Guidance Water Quality Standards for Wetlands, EPA http://www.epa.gov/owow/wetlands/regs/quality.html#2.0.

[28] EPA guidance provides that "Water quality standards for wetlands are necessary to ensure that the provisions of the Clean Water Act (CWA) applied to other surface waters are also applied to wetlands." http://www.epa.gov/owow/wetlands/regs/quality.html#2.0.

- Wetland water quality standards can help states integrate wetland protection and restoration with broader water planning and regulation including watershed management by establishing goals for such broader efforts and implementation mechanisms including establishment of TMDLs.

PART 4. HOW WETLANDS ARE SIMILAR TO AND DIFFERENT FROM OTHER WATERS; WHAT THIS MEANS TO STATE WATER QUALITY STANDARDS FOR WETLANDS

Wetlands are similar to other waters and application of traditional water quality standards to wetlands makes sense in some contexts. For example water quality standards make sense prohibiting toxic discharges into wetlands as well as more traditional waters. But, wetlands are also quite different from other waters and these differences need to be reflected in wetland water quality standards. We will briefly discuss both shared characteristics and differences:

Shared Characteristics Between Wetlands and Other Waters

How are wetlands similar to other waters?

Wetlands share many features with other waters (lakes, ponds, rivers, streams, estuarine and coastal waters). Both wetlands and other waters:

- Are saturated from precipitation, high ground water, or tides much of the time,
- Support a range of flora and fauna adapted to inundated or saturated conditions,
- Are characterized, in part, by saturated soils,
- Provide a broad range of services to society based upon this saturation including but not limited to fisheries, habitat for rare and endangered species, water supply, recreation, aesthetics, etc.
- Are subject to a broad range of chemical, physical, and biological pollutants and forms of pollution which threaten the flora and fauna and many wetland services to society,
- Are, in most instances, considered "waters of the U.S." by the federal government and waters of the state by most states,
- Are subject to public trust and navigable servitude doctrines (in some instances), and
- Affect, through runoff and ground water flow, the quality and quantity of other waters.

Differences Between Wetlands and More Traditional Waters

Wetlands share many characteristics with more traditional waters but, as suggested above, are also different in important ways, which need to be reflected in the establishment of water quality criteria for wetlands**.**

Differences in Sensitivity to Small Changes in Precipitation and Ground Water Levels. Small changes in wetland water levels affect the depth, flora and fauna, nutrient levels, functions and values, and other characteristics of wetlands. As is the case for intermittent streams, this is particularly true for playas, vernal pools, and wet meadows, which are dry for a portion of the year. Natural changes in water levels typically occur on seasonal and longer term basis in response to seasonal variations in precipitation, (rain fall, snow, hail and sleet). However, man-made changes in hydrology are increasingly important in determining wetland characteristics.

Even small changes in water levels often damage or destroy wetlands. Source: Public domain image.

Other waters (lakes, streams, coastal waters) are also responsive to changes in precipitation but the differences are not so great and they typically continue to be recognizable as waters even when seasonal or longer term variations in precipitation and runoff occur. In contrast, a seasonal or long term change in hydrology will often temporarily render a wetland dry or diminished in size. Such a change may also destroy a wetland if the change is permanent (e.g., drainage).

Because of the sensitivity of wetlands to small changes in hydrology, water quality standards for wetlands often need to address both water quality and water quantity. Preservation of the natural hydrologic regime is essential to protection of wetland functions and values. Sensitivity to small changes also makes it difficult to develop and enforce precise numeric water quality standards for wetlands.

Differences in Hydrology, Soils, Vegetation Within Individual Wetlands.

Water depth and sometimes water velocity often vary considerably within a specific wetland and vary by time of year. With differences in depth come differences in wetland flora and fauna and wetland soils. For example, outer shallow areas of a freshwater wetland are often dry a portion of the year and are at this time characterized by vegetation adapted for both wetland and upland conditions. Inner, deeper areas may be continuously wet and are characterized by aquatic or wetland plants and animals. These differences are also reflected in water quality including nutrient levels, sediment levels, and biological oxygen demand. These differences are, in turn, reflected in differences in wetland functions and values.

The functions and values and other characteristics of other waters such as rivers, streams, lakes, and estuarine areas vary depending upon location within a water body and the water depth, velocity, and resident times. Nevertheless, differences from one area to another within a water body are often particularly great in wetlands. This complicates the development of numeric water quality standards for wetlands and favors narrative water quality criteria.

Hydrologic alterations such as fills, drainage, grading, dikes and dams often cause pollution. They also more broadly destroy wetland functions and values.

Differences in Threats. Both wetlands and other waters are threatened by pollution (point and nonpoint source) such as toxic chemicals, bacteria, nutrients, and sediment. But, wetlands are also threatened by a broad range of additional activities which impact wetland hydrologic regime and affect their ability to provide functions and values. These threats include filling and draining for agriculture; forestry, subdivision, commercial development, flooding, vegetation removal, and road building. Sediment is also a particular problem for wetlands, particularly for smaller depressional wetlands, which act as sediment sinks.

Ditching and grading often alter hydrology and simultaneously cause pollution. Tennessee uses §401 certification to protect wetlands. Source: Jerry Greer Photography

Water quality standards must be responsive to these additional threats (particularly those from filling and draining) if the standards are to "restore and maintain the physical, biological, and chemical integrity" of wetland waters and the goods and services they provide. See Box 3.

Drainage of wetlands releases pollutants from wetland soils and increases the concentration of pollutants in runoff, particularly during periods of low stream flows and limited precipitation. Source: School of Geosciences, Edinburgh

Fills in wetlands destroy natural flood storage and conveyance and all other wetland functions and values. Fills also commonly cause water pollution. Source: Fish and Wildlife Service

Flooding of wetlands. Dams, dikes and levees often flood wetlands. Long term flooding destroys wetland vegetation, destroys or diminishes wildlife habitat, interferes with animal migration and prevents natural succession of plant species. Dams and levees also often destroy the connection of wetlands to lakes, streams, and estuaries: Source: The Seattle Times

Crushing drain tiles. Lakes, streams, and estuaries often recover once chemical and nutrient pollution is stopped. However, active restoration such as crushing drain tiles is needed to address wetland drainage and fills and restore wetland hydrology. Source: Land and Water

Differences in Reversibility of Impacts, Restoration Techniques, Cost of Restoration. Many pollution impacts to traditional waters such as impacts from toxic pollutants and nutrients may be, over time, partially or totally reversed when pollution is stopped. In contrast, the impacts of drainage or fills on wetlands are often not reversed when fill or, in some instances, drainage activities are stopped. Active restoration is needed. For drained wetlands, hydrology must be restored. For filled wetlands, fills need to be removed. Both are typically expensive and time-consuming.

Differences in reversibility mean that regulation of hydrologic alterations must take place as well as regulation of water quality if wetland functions are to be protected and/or restored. This is particularly true for regulation of fills and drainage. The concept of a total maximum daily load (TMDL) makes no ecological sense for a pollutant or pollution which will permanently destroy a wetland.

Differences in Relationship to Other Waters. Wetlands have a unique relationship to other waters. They may be damaged or destroyed by pollution like other waters. However, wetlands also intercept pollutants and act as pollution buffers for lakes, streams, and estuarine waters. They help reduce the sediment loadings and pollution from natural and man-made sources such river erosion and flooding, agriculture, forestry, road building, and commercial, residential and industrial development. Wetlands are often restored or created to temporarily store and purify storm waters. Increasingly, wetlands are also constructed to provide "tertiary" treatment of liquid wastes by removing nitrogen and phosphorus. EPA's Water Quality Standards for Wetlands National Guidance states:

> "Created wastewater treatment wetlands which are designed, built and operated solely as wastewater treatment systems are generally not considered to be waters of the U.S. Water quality standards which apply to natural wetlands generally do not apply to such created wastewater treatment wetlands. There are, however, many created wetlands which are designed, built and operated to provide, in addition to wastewater treatment, functions and values similar to those provided by natural wetlands. Under certain circumstances such created multiple use wetlands may be considered waters of the U.S. and as such would require water quality standards. This determination must be made on a case-by-case basis, and may consider factors such as the size and degree of isolation of the created wetlands and other appropriate factors."

Water quality designated uses and criteria for such uses need, in some instances, to balance the water quality needs of wetlands with the water quality needs of downstream waters. However, dual roles also need to be approached with care because pollution and sediment control functions of wetlands to protect other waters may also result in the destruction or impairment of wetlands and their functions and values. In addition, use of a natural wetland for treatment of pollution is prohibited by the Clean Water Act.

Wetlands are similar to but also different from other waters. Wetland water quality standards need to reflect these differences.

The dual role of wetlands as waters needing protection and waters which protect other waters creates a challenge for establishment of water quality standards and the application of antidegradation policies on a case by case basis. Are wetlands, in a given instance, to be used as receiving waters to a greater or lesser extent for protection of other waters from pollution, sediment, and other impacts? Or, are they to be given a high degree of protection like other waters and consistent with their many functions? There may be acceptable pollution levels (sediment or nutrients) in stormwater or other discharges to wetlands but loadings must be limited. Standards need also to differentiate natural and constructed wetlands where the latter are intended for pollution treatment (and may not be considered "waters of the U.S.")

Water quality standards for wetlands need to incorporate criteria and procedures which allow the state wetland and water quality regulatory agency to make informed decisions concerning this dual role. Criteria and procedures need to apply a "no net loss standard" for wetland functions, values, and acreage. Impact reduction and compensation (restoration, creation) need to be required for residual impacts.

Differences in Functions/ Values/ Services. The functions/values of wetlands are similar in some respects and different in others to the functions/values of more traditional waters. For example, both wetlands and waters provide habitat for many types of birds, fish, reptiles, and amphibians. They are both important for water supply for agriculture, residential, commercial and industrial uses although often less so wetlands. They are both dependent upon water quality and hydrology for functions and services. Therefore, establishment of "designated uses" consistent with protection and restoration of high quality waters make sense for both wetlands and traditional waters.

However, there are also differences. Most wetlands are not prime swimming areas due to shallow depths and rooted or floating vegetation. Many are not prime canoeing or boating waters for the same reasons. Many of the smaller and drier wetlands (e.g., vernal pools) are not good for fishing areas although they may provide food chain support for fisheries.

Wetland water quality standards need to reflect the unique biological functions and values of wetlands such as their role as habitat for rare and endangered plant and animal species. Rare and endangered species habitat is likely to be particularly sensitive to changes in nutrient levels, toxicity and water temperatures.

Differences in Numbers of Water Bodies. Water bodies or segments of water bodies such as lakes, streams and coastal waters may number in thousands or tens of thousands in a state. In contrast, wetlands may number in the hundreds of thousands or millions.

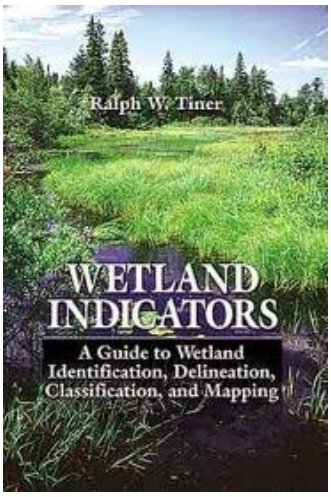
This makes it economically impossible for a state to develop wetland-specific water quality standards for each individual wetland in a state since the costs of assessment, standard-setting, monitoring, and enforcement would be prohibitively high.

This favors the development of broadly applicable narrative criteria for whole classes of wetlands although it may be possible for a state to develop individual wetland-specific narrative or numeric criteria for a small number of "problem" wetlands.

Differences in Management Needs. Wetlands are characterized by a variety of special management needs in contrast with more traditional waters. Some of these are described below:

Application of "Compensation" Requirements. State and federal wetland protection regulatory programs typically require that permit applicants first avoid impacts, next reduce impacts, and then require "mitigation" or "compensation" for residual impacts applying a no-net-loss standard. In contrast, water pollution control programs require impact reduction and application of best pollution control technology but do not typically incorporate a no-net-loss standard or require compensation.

Need for Delineation or Maps. Waters in lakes, ponds, rivers, streams and the ocean are often regulated without mapping because they can be described with relative certainty in regulations and their boundaries can be quite readily identified in the field by landowners and regulatory agencies through a combination of air photos, remote sensing, and field observations of water all or most of the year. Wetlands are more difficult to identify and to delineate without maps, particularly isolated wetlands and other wetlands which are dry a portion of the year. This means it is highly desirable to combine regulations with a wetland mapping and/or delineation program.



Wetland delineation by Dr. Ralph Tiner, U.S. Fish and Wildlife Service. Dr. Tiner has also published a book on wetland indicators for delineation and mapping.

Need to Involve Local Governments. The role of local governments is another difference. Local governments in many states such as Massachusetts and Connecticut play a major role in regulating wetlands through zoning, subdivision controls, building codes, sanitary codes, and locally adopted wetland regulations.[29] In contrast, point source pollution control is typically a state or federal function although local governments play significant roles in controlling nonpoint source pollution through building set backs from streams, stormwater regulations, tree cutting regulations and erosion controls. Comprehensive water quality regulations for wetlands need to reflect the important roles local governments can play, particularly in watershed approaches and the control of nonpoint pollution.

Implications of Similarities and Differences

What these similarities and differences mean to state adoption of wetland and water quality standards:

- **Despite the differences between wetlands and other waters, water quality regulations make good sense for both wetland and traditional waters.** The functions and values of both types of waters may be diminished or destroyed by pollution. As described above, EPA regulations and guidelines require states to adopt water quality standards for wetlands along with other waters.[30] However, a state should do so not only because it is required to do so but because such regulations could help protect and restore the unique features of wetlands, provide more specific guidance for state pollution control staff and landowners in 401 water quality certification, and help coordinate wetland-related permitting activities in a state. States could adopt wetland-specific water quality regulations pursuant to existing pollution control statutes as has been done in Nebraska and Tennessee.[31]

- **Wetlands share many characteristics with other waters but are also different in important ways which need to be reflected in the establishment of water quality criteria for wetlands.** For example, if a state wishes to protect wetlands, it must regulate the full range of threats to wetlands such hydrologic alterations including drainage and fills. Differences between wetlands and other waters need to be taken into account in establishing water quality standards for wetlands and in the processing of individual regulatory permits. For examples of water quality regulations which regulate not only pollution but other threats to wetlands such as hydrologic alterations see Wisconsin, Minnesota, Ohio, and North Carolina regulations. See Appendix D below for internet addresses for state wetland and water quality programs and regulations.

---

[29]See The Wetlands Protection Act, Massachusetts General Laws http://www.mass.gov/dep/water/laws/ch131s40.pdf.

[30]See National Guidance Water Quality Standards for Wetlands, EPA http://www.epa.gov/owow/wetlands/regs/quality.html.

[31]See Nebraska Administrative Code T117Ch.7, Water Quality Standards for Wetlands http://www.deq.state.ne.us/RuleAndR.nsf/23e5e39594c064ee852564ae004fa010/9f07eae313ae56d686256888005bc61e/$FILE/WQS07.pdf. Tennessee Aquatic Resource Alteration Permit. See http://www.tn.gov/environment/permits/arap.shtml; http://www.tn.gov/environment/wpc/forms/cn1091guide.pdf; http://fwf.ag.utk.edu/mgray/wfs560/TN_WetlandRegProgram.pdf.

- **Water quality standards need to balance the needs of wetlands with the needs of downstream waters.** Water quality standards need to reflect the dual roles of wetlands as waters in their own right as well as roles in protecting other waters from pollution. Watershed approaches to wetland protection and management are therefore desirable including integrated assessments, integrated goal setting, and integrated regulations (wetland protection, flood loss reduction, stormwater management) and mitigation requirements for impacts to wetlands. However, dual roles also need to be approached with care because allowing pollution of wetlands to protect other waters may also result in destruction or impairment of wetlands and their functions and values and use of wetlands or other waters to treat pollution is prohibited by the Clean Water Act.

- **Wetland water quality designated uses and regulatory criteria to protect such uses need to reflect the full range of unique services and functions provided by wetlands if they are to fully "restore and maintain" waters of the U.S.** For example, designated uses and regulatory criteria need to protect not only habitat but flood storage, flood conveyance, wave attenuation, erosion control and ground water recharge functions.[32] See, for example, the wetland water quality standards of North Carolina, Wisconsin, Minnesota, and Ohio, which list such broader services and functions as designated "uses" and establish protection criteria for them. See Appendix D below.

- **Criteria for protecting wetland designated uses need to reflect hydrology since hydrology determines wetland functions and, ultimately, values.** Wetland regulations need to require assessment of hydrology, particularly whenever a proposed activity may significantly change hydrology.

- **Designated uses and criteria for protecting such uses need to reflect the large number of individual wetlands in many states.** This favors adoption of narrative water quality criteria and procedures for wetlands as a whole or classes of wetlands rather than water quality standards for individual wetlands although there should be flexibility in procedures so that the state could adopt wetland-specific water quality standards for particular wetlands when important wetland resources are threatened. Adoption of TMDLs may also be appropriate in some cases for individual wetlands threatened by pollutants.

- **A general wetland antidegradation policy is needed with a "no net loss" standard for exceptions.** A general antidegradation policy with implementing procedures makes sense for both wetlands and other waters to achieve the Clean Water Act goal to "restore and maintain." Such a policy should, we believe, include a "no net loss" of condition, functions, values, and acreage. All of the states with wetland water quality standards have adopted antidegradation policies although the specifics differ. Limited and carefully proscribed exceptions in the application of this policy are also needed, particularly for activities

[32]See, e.g., EPA Wetlands and 401 Certification: Opportunities and Guidelines for States and Eligible Indian Tribes (1989) p. 6 http://yosemite.epa.gov/water/owrccatalog.nsf/9da204a4b4406ef885256ae0007a79c7/cd15cd29df94e01d85256d83004fd959!OpenDocument. This provides, in part that "Clearly, the integrity of waters of the U.S. cannot be protected by an exclusive focus on wastewater effluents in open waters…A State's authority under Section 401 includes consideration of a broad range of chemical, physical, and biological impacts. The State's responsibility includes acting upon the recognition that wetlands are critical components of healthy, functioning aquatic systems."

involving some measure of pollution or impairment of wetlands (e.g., agriculture). This may degrade wetlands though the wetlands subject to such a designated use may serve to improve waters as a whole. At a minimum, destruction or serious impairment of a natural wetland should not be allowed.[33] States should require compensatory mitigation where some measure of degradation is allowed. See, for example, the wetland and water quality standards of Minnesota, Wisconsin, Ohio and North Carolina and the general wetland water quality guidance of Washington State. See Appendix D.

- **Water quality designated uses and criteria for protecting such uses need to reflect the sensitivity of wetlands to small changes in hydrology and the cumulative impact of land and water use activities upon wetlands.** This favors protection and management of wetlands within watershed planning and management contexts. It requires the assessment of hydrology and the reflection of hydrology in wetland planning and management. Cumulative impacts should be explicitly addressed.

- **There is the potential for more fully utilizing the "outstanding natural resource wetlands" designation as part of an antidegradation policy to better protect rare wetland types or wetlands with special functions and values.**

- **Functions and values of wetlands reflect not only the biological condition of wetlands but the ability of wetlands to provide goods and services (functions and values), and the social significance of these services.** Measurement of wetland condition relative to undisturbed wetlands can help develop and apply water quality standards to individual wetlands or classes of wetlands. Nevertheless, condition only partially reflects wetland goods and services and other factors which need to be considered in determining beneficial uses and criteria for protecting beneficial uses in the public interest. See the regulations of Wisconsin, Minnesota, North Carolina, and Ohio which address a range of goods and services including "values."

[33]See 40 CFR 131.10 which provides, in part: "In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States."

PART 5: STATE WETLAND WATER QUALITY PROGRAMS

Part 5 provides an overview of existing wetland water quality programs. Part 5 is not intended as the final word on such programs. Additional information should be considered (and is contemplated) in other portions of this report when a state is developing wetland water quality standards.

> Many states could adopt water quality standards for wetlands without adopting new legislation based upon their existing pollution control, water resource, and natural resource statutes.

According to the Environmental Law Institute (ELI), all states now directly or indirectly have the authority to regulate wetlands because wetlands are explicitly or implicitly included within the definition of state waters although the term wetland may not be used.[34] Fifteen states have adopted some sort of "wetland-specific water quality standards specifically for wetlands although the specifics differ greatly."[35] These standards include water quality criteria, designated uses, and/or antidegradation policies specific to wetland resources. The states include California, Hawaii, Colorado, Iowa, Wisconsin, Minnesota, Florida, Massachusetts, Maine, Ohio, North Carolina, Wyoming, Nebraska, Tennessee and Washington State. Washington State has not adopted wetland water quality standards per se but has prepared guidance for applying broader water quality standards to wetlands.[36] According to ELI, 37 states have not adopted water quality criteria, anti-degradation policies, or designated that are wetland-specific.[37] The states may, by default, apply water quality standards from other surface water to wetlands.

State water quality standards for wetlands are quite varied although many follow Wisconsin's regulations to a greater or lesser extent. Wisconsin was the first state to adopt water quality standards and regulations for wetlands and its regulatory language has been broadly adopted by other states.

---

[34]For a useful overall summary of state water quality standards for wetlands see Figure 2-E on page 15, Environmental Law Institute, State Wetland Protection: Status, Trends, and Model Approaches (2008) and http://www.elistore.org/Data/products/d18__06.pdf. It is to be noted that the Environmental Law Institute study lists two fewer states as having wetland water quality standards for wetlands than the present study because a less restrictive concept of "standard" was applied. See also Jon Kusler, State Water Quality Standards for Wetlands, ASWM (2010) http://aswm.org/pdf_lib/state_water_quality_standards_for_wetlands_061410.pdf.

[35]See Figure 3-A, 3-B, Environmental Law Institute, State Wetland Protection: Status, Trends, and Model Approaches (2008). Of these, nine describe water quality criteria narratively. See also Environmental Law Institute, State Wetland Protection: Status, Trends, and Model Approaches (2008) http://www.elistore.org/Data/products/d18__06.pdf. See also Jon Kusler, State Water Quality Standards for Wetlands (2010).

[36]See Washington State Water Quality Guidelines for Wetlands http://www.ecy.wa.gov/pubs/9606.pdf.

[37]See Environmental Law Institute, State Wetland Protection: Status, Trends, and Model Approaches (2008), page 38, http://www.elistore.org/Data/products/d18__06.pdf.

Overview of State Provisions

State water quality standards for wetlands in most of the 15 states with wetland-specific regulations parallel the content of more comprehensive wetland regulatory statutes and administrative code regulations in some respects. For example, both wetland/water quality regulations and broader wetland protection statutes contain similar overall elements including the following.

- Identification of enabling statute or statutes
- Finding of facts
- Statement of goals and objectives
- Definition of state waters to include wetlands or separate definition of wetlands
- Description of regulated activities
- Antidegradation policy (or the equivalent thereof)
- Statement of allowed uses, prohibited, or conditional uses (non water quality regulations) or "designated" uses (water quality regulations)
- Statement of regulatory standards for uses (non water quality wetland regulations) or regulatory criteria for designated uses (water quality regulations)
- Procedures for seeking permits
- Monitoring and enforcement requirements
- Penalties

However, there are also differences in the wetland and nonwetland regulations. Most wetland regulations not part of water quality regulations are "stand alone" regulations. In contrast most wetland water quality regulations are contained in more extensive pollution control regulations. See Appendix A for an example.

Another difference is that water quality regulations contain an antidegradation standard. Broader wetland regulations do not but often contain an analogous "no net loss" of function and value standard.

As one would expect, wetland water quality standards are to a greater extent couched in "water quality" terms and concepts such as "beneficial uses," "criteria" for beneficial uses, and "antidegradation" policy. Also, as one would also expect, there is an emphasis upon water pollution.

Some of the key elements of wetland/ water quality regulations or guidance more specifically include the following. These examples are drawn from existing state wetland water quality standard regulations:

Enabling statutes. Most states with wetland water quality regulations like Tennessee and Nebraska, reference their state water quality statutes as the basis for such regulations. Other states list state dredge and fill, wetland protection, and other statutes. See discussion in Part 6.

Goals. Most states in their statutes, regulations, or guidance establish broad pollution control goals for the protection and restoration of waters which include but are not limited to wetlands. For example see Maine Rev. Statutes, (Tit. 38:464) which provides, in part:

> "The Legislature declares that it is the State's objective to restore and maintain the chemical, physical and biological integrity of the State's waters and to preserve certain pristine state waters. The Legislature further declares that in order to achieve this objective the State's goals are stated below:
>
> A. That the discharge of pollutants into the waters of the State be eliminated where appropriate;
>
> B. That no pollutants be discharged into any waters of the State without first being given the degree of treatment necessary to allow those waters to attain their classification; and
>
> C. That water quality be sufficient to provide for the protection and propagation of fish, shellfish and wildlife and provide for recreation in and on the water."

See also Minnesota's comprehensive goals and statement of beneficial uses:

> Minnesota Administrative Rules 1a. Definitions.7050.0186 Wetland Standards and Mitigation.
>
> Subpart 1. Policy and wetland beneficial uses. It is the policy of the state to protect wetlands and prevent significant adverse impacts on wetland beneficial uses caused by chemical, physical, biological, or radiological changes. The quality of wetlands shall be maintained to permit the propagation and maintenance of a healthy community of aquatic and terrestrial species indigenous to wetlands, preserve wildlife habitat, and support biological diversity of the landscape. In addition, these waters shall be suitable for boating and other forms of aquatic recreation as specified in part 7050.0222, subpart 6; general industrial use as specified in part 7050.0223, subpart 5; irrigation, use by wildlife and livestock, erosion control, groundwater recharge, low flow augmentation, stormwater retention, and stream sedimentation as specified in part 7050.0224, subpart 4; and aesthetic enjoyment as specified in part 7050.0225, subpart 2.

Definition of wetlands. Most states[38] define wetlands consistent with the U.S. Army Corps of Engineers Section 404 wetland definition.[39] See, for example, Minnesota. However some states such as Iowa have adopted a more restricted regulatory definition which explicitly requires all three parameters (vegetation, soils, and hydrology) to be present. In contrast, others are more inclusive such as Wisconsin which allows identification of areas based upon vegetation and soil. Hawaii defines wetlands in several ways (e.g., "coastal wetlands," "low wetlands" and "elevated wetlands") for the purpose of regulations.

Classification of wetlands. Several states classify wetlands for water quality purposes. For example, both Hawaii and Nebraska establish two categories of wetlands. Hawaii does this by adopting two separate wetland definitions based upon elevation of the wetlands. Nebraska also divides wetlands into two categories: isolated and not isolated. Some states such as Wyoming make distinctions between wetlands which are adjacent to other waters and those which are not. Wetlands assume the classification of adjacent waters. See also Massachusetts. Most states distinguish special resource waters from other waters in their general water quality regulations. Some classes of wetlands may be identified as a special category of protected waters. See, for example, Wisconsin.[40]

In some states, the water regulatory agency is authorized to classify wetlands on a wetland by wetland basis as permit applications are submitted to the agency. For example, Ohio authorizes the regulatory agency to place wetlands into one of four categories with varying degrees of protection on a permit by permit basis. Ohio Administrative Code provides, in part: (3745-1-54 Wetland antidegradation).

> (2)(a) Each wetland shall be assigned a category by Ohio EPA for the purposes of reviews of projects pursuant to this rule.
>
> (i) A category will be assigned based on the wetland's relative functions and values, sensitivity to disturbance, rarity, and potential to be adequately compensated for by wetland mitigation.
>
> (ii) In assigning a wetland category, the director will consider the results of an appropriate wetland evaluation method(s) acceptable to the director, and other information necessary in order to fully assess the wetland's functions and values.

Some states like Wyoming and Massachusetts place wetlands into broad protection categories shared with other waters.

---

[38]See Appendix D for references.

[39]See 40 CFR 232.2. The Corps of Engineers Section 404 regulatory definition is: "Wetlands" means those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

[40]See Wisconsin Administrative Code. NR 103.04 Wetland Water Quality Standards.

Regulated activities. States typically rely upon broader water quality regulations to define regulated activities. However, this may substantially limit the scope of regulatory powers where a water quality statute is quite narrow. For example, Wyoming wetland and water quality regulations focus only on pollution. However, most states such as North Carolina regulate not only pollution but draining and filling wetlands.

Beneficial ("designated") uses. Most states, like Wisconsin, briefly list beneficial uses such as "water supplies, propagation of fish and other aquatic life and wild and domestic animals, preservation of natural flora and fauna, domestic and recreational uses, and agriculture, commercial and industrial uses." See also Minnesota in the discussion of goals above. Washington State in its guidance for application of water quality standards to wetlands provides more detailed discussion of individual categories of beneficial uses. Wisconsin lists functions as "functional values or uses."[41]

Wisconsin provides:

> "(1) To protect, preserve, restore and enhance the quality of waters in wetlands and other waters of the state influenced by wetlands, the following water quality related functional values or uses of wetlands, within the range of natural variation of the affected wetland, shall be protected:
>
> (a) Storm and flood water storage and retention and the moderation of water level fluctuation extremes;
>
> (b) Hydrologic functions including the maintenance of dry season streamflow, the discharge of groundwater to a wetland, the recharge of groundwater from a wetland to another area and the flow of groundwater through a wetland;
>
> (c) Filtration or storage of sediments, nutrients or toxic substances that would otherwise adversely impact the quality of other waters of the state;
>
> (d) Shoreline protection against erosion through the dissipation of wave energy and water velocity and anchoring of sediments;
>
> (e) Habitat for aquatic organisms in the food web including, but not limited to fish, crustaceans, mollusks, insects, annelids, planktonic organisms and the plants and animals upon which these aquatic organisms feed and depend upon for their needs in all life stages;
>
> (f) Habitat for resident and transient wildlife species, including mammals, birds, reptiles and amphibians for breeding, resting, nesting, escape cover, travel corridors and food; and
>
> (g) Recreational, cultural, educational, scientific and natural scenic beauty values and uses.

[41]See Wisconsin Administrative Code. NR 103.03 Wetland Water Quality Standards.

Criteria for protecting beneficial uses, implementing the antidegradation policy. State wetland water quality regulations typically list wetland functions and values which are to be protected and also set forth criteria and procedures for protecting those functions. See, for example, Wisconsin, North Carolina, Ohio, and Nebraska regulations. Wisconsin calls for "the conditions necessary to protect water quality related functions and values of wetlands including sediment and pollutant attenuation, storm and flood water retention, hydrologic cycle maintenance, shoreline protection against erosion, biological diversity and production and human uses such as recreation." Ohio and Maine establish no-net-loss of function and values goals. Ohio provides in its antidegradation policy:

> 3745-1-54 Wetland antidegradation "Wetland designated uses shall be maintained and protected such that degradation of surface waters through direct, indirect, or cumulative impacts does not result in the net loss of wetland acreage or functions…."

Wyoming provides (DNV-WAT-1 Section 12) that:

> Point or nonpoint sources of pollution shall not cause the destruction, damage, or impairment of naturally occurring wetlands except when mitigated through an authorized wetlands mitigation process.

Assessment procedures. A number of states such as Connecticut, New Hampshire, Wisconsin, Oregon, Washington and Minnesota have developed rapid wetland assessment procedures to provide a preliminary evaluation of wetland functions and, in some cases, values. These procedures are not water-quality specific. Most have been based to a lesser or greater extent upon a federal wetland assessment technique (WET) developed by federal agencies in the 1980s, which is now outdated but contains useful features. Water quality functions are assessed by these procedures along with other functions. However, WET and the assessment techniques based upon WET are quite subjective. Rapid assessment procedures have been quite broadly used by the states to provide a preliminary evaluation of activities impacting wetlands but do not provide a quantitative assessment of functions and values. A number of states such as Oregon and Washington have developed more sophisticated evaluation methods based upon the "Hydrogeomorphic" assessment model[42] developed by the Army Corps of Engineers in the mid 1990s. Many states have also developed or are developing "Indices of Biological Integrity." See discussion below.

Use of Indices of Biological Integrity (IBI). At least nineteen states are developing or have developed "Indices of Biological Integrity"[43] for wetlands. These efforts generally build upon or are part of broader state efforts to develop indices of biological integrity for rivers, streams, lakes, and estuarine waters. Ohio[44] has quite extensively used these indices in its wetland regulatory program including the development and use of a wetland classification system

---

[42]See D. Smith et. Al. An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Function Indices, U.S. Army Corps of Engineers (1995), http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde9.pdf.

[43] See generally, An Introduction to the Index of Biotic Integrity, EPA

[44]See Wetland Ecology Group Reports, Ohio EPA, http://www.epa.gov/bioiweb1/html/ibi_history.html; http://www.epa.state.oh.us/dsw/wetlands/WetlandEcologySection_reports.aspx.

reflecting, in part, water quality. IBI efforts involve information gathering at selected "reference" sites, representing a disturbance gradient. IBIs may be used by states to help establish and administer water quality standards for wetlands although they do not qualify as a designated use in and of themselves.

Establishment of reference wetlands. The states establishing wetland IBIs (see above) have all identified "reference" wetlands. Pennsylvania, Washington and California have developed more comprehensive wetland "reference" systems. These involve the identification of a relatively large number of reference wetlands throughout a state representing different types of wetlands and different degrees of disturbance. Reference sites are being monitored over time to serve a variety of objectives including but not limited to development of IBIs. Like the IBIs, reference systems may be used over time to help develop water quality regulations for wetlands.

Mitigation requirements. All states with water quality standards for wetlands establish some sort of mitigation requirements for activities in wetlands. This distinguishes traditional water quality standards and wetland regulations because traditional water quality standards do not require compensation and wetland regulations do. See, for example, Wisconsin, Minnesota, North Carolina, and Ohio. Such standards typically call for avoidance, impact minimization, and compensation. A number of states establish by regulation "mitigation" ratios including numeric criteria for mitigation. See, for example, the Ohio mitigation rule which, as part of its antidegradation policy contains a table of mitigation ratios (Ohio Administrative Code, Section 3745-1-54) and a number of empirical formulas for calculating mitigation ratios. The Washington Administrative Code 173-201A-300 Antidegradation policy provides for restoration:

> (3) Habitat restoration. Both temporary harm and permanent loss of existing uses may be allowed by the department where determined necessary to secure greater ecological benefits through major habitat restoration projects designed to return the natural physical structure and associated uses to a water body where the structure has been altered through human action.

Administrative requirements (e.g., permit application content, procedures). All states establish procedures for applying for permits including information gathering requirements. Some, like Florida, establish monitoring requirements for mitigation. Florida's dredge and fill regulations provide, in part,[45] that a mitigation plan contain a "monitoring plan" …for monitoring the success of creation or enhancement project.

[45]See Florida Department of Environmental Protection Dredge and Fill Activities http://www.dep.state.fl.us/legal/web_update/rules/surfacewater/62-312.pdf. Note that monitoring requirements are contained in dredge and fill permitting regulations and not water quality requirements per se.

PART 6: DEVELOPING A STATE WETLAND WATER QUALITY PROGRAM

A state wishing to develop a wetland water quality program will need to address a variety of issues. Some of the more important include these:

Does Your State Need New Legislation?

Some states adopting wetland water quality standards to date have done so based upon existing pollution control statutes such as Nebraska and Tennessee. (See footnote 31, supra.) However, state legislatures in Ohio, North Carolina and Wisconsin adopted new statutes to create wetland water quality programs. So, new legislation is a possibility in some states.

New legislation is attractive because it allows a state to specifically shape its wetland water quality program to state needs. And a clear legislative intent can help a regulatory agency develop regulations and guidance and implement a wetland water quality program.

A state can best document the gaps in wetland and water quality protection as a first step in developing water quality standards for wetlands.

However legislatures in recent years have become particularly reluctant to fund new programs. The political acceptability of a new wetland water quality regulatory statute is also questionable in some states. Instead, a state may best build upon existing water quality, wetland protection, hydrologic alteration, dredge and fill and other programs as described below.

A state should examine its statutes carefully to determine whether existing programs and enabling statutes are broad enough to form the basis for wetland water quality regulations. A state may cite more than one statutory basis for wetland water quality regulations. See discussion below. Lack of enabling authority should not be a legal stumbling block to most states, depending upon the content of their statutes and the pollution control regulations. However, this will vary from state to state and the nature of the proposed regulations. Some states may need additional legislation.

What Programs Could Provide The Basis for State Wetland Water Quality Regulations?

Most states with wetland water quality programs have built their programs upon existing water quality (e.g. Nebraska, Tennessee, Washington), water resource (e.g., Maine, Florida), shoreland zoning (Wisconsin, Minnesota) or wetland (e.g., Massachusetts) regulatory programs or some combination of these programs. Although other programs may be important in a specific state most states could best start building a wetland water quality program upon their existing state water quality program.

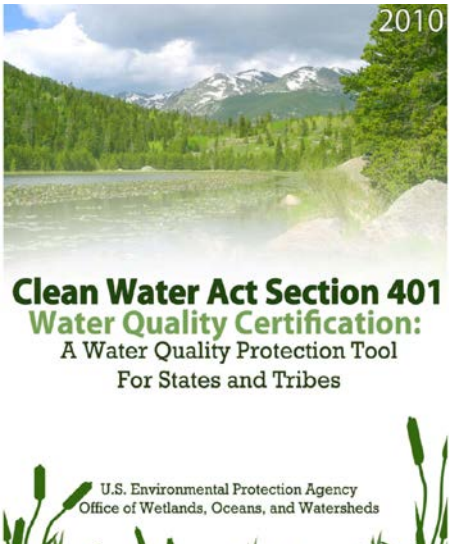
Examples of programs which could provide the basis for future wetland water quality programs include the following.

1. State point source pollution control programs. As indicated above, states may find it most productive to build a wetland water quality program upon existing state water quality statutes and regulations. All but five states have adopted broad point source pollution control programs. EPA reviews and approves state point source pollution control programs under Section 402 of the Clean Water Act (NPDES Program) and state water quality standards under section 303(c) of the Clean Water Act. The NPDES Program utilizes water quality standards in establishing permit limits and setting pretreatment and performance standards for point source discharges. Federal pollution control Section 402 programs apply only to "waters of the U.S." which include many, but not all, wetlands. State pollution control programs may exceed the scope of Section 402 in terms of both geographical coverage and subject matter content.

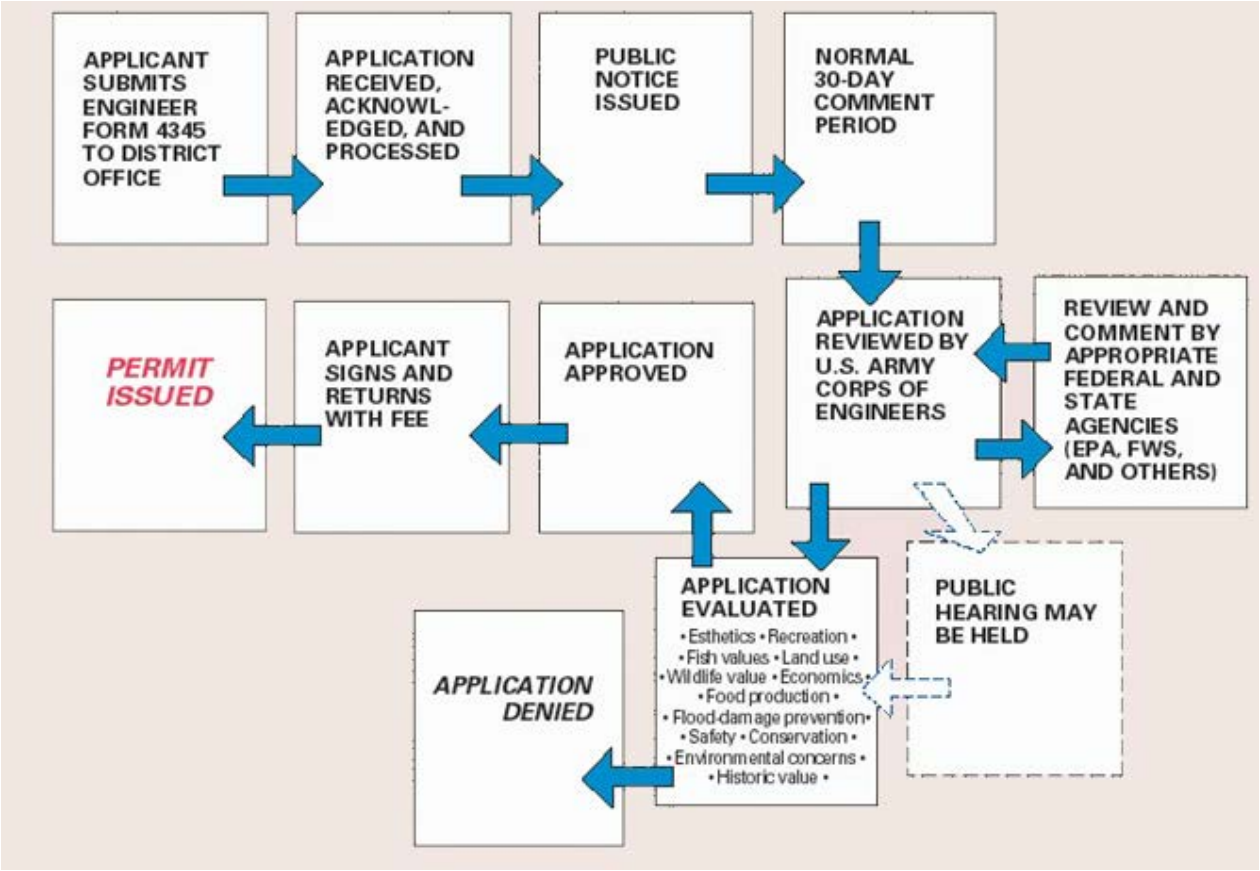
Many of these broad state pollution control statutes could serve to "enable" state adoption and implementation of more specific wetland water quality standards or guidance of the sort described in Appendices A and B. A state wetland/water quality program could build upon not only enabling legislation but existing pollution control permitting procedures, assessment and evaluation models, penalty provisions and other features of pollution programs.

2. State Clean Water Act Section 401 Water Quality Certification Programs. All states provide Clean Water Act Section 401 water quality certifications for federally permitted activities such as federal Section 404 permits administered by the Army Corps of Engineers and EPA. In most states this certification is provided by the state water pollution control agency but is often undertaken jointly with other state agencies.

A state wishing to adopt wetland specific water quality standards might do so, in part, by expanding their Section 401 regulations. However, Section 401 does not create any new state pollution control or aquatic ecosystem protection powers. Section 401 water quality certification requirements also only apply to federally licensed projects such as projects subject to federal Section 404 regulations, and this limits their scope. Their scope is further limited by the application of Section 401 certifications only to federally regulated waters.



Source: U.S. Environmental Protection Agency, Water Quality and 401 Certification



Overview of a typical U.S. Army Corps of Engineers review process for Section 404 dredge-and-fill permit request. Source Environmental Law Institute.

3. State wetland statutes. A state might, depending upon the precise statutory language of the statute establishing the wetland regulatory program, adopt wetland water quality regulations pursuant to a combination of existing state wetland protection and state water quality statutes. At least fifteen states have adopted wetland protection statutes such as Wisconsin, Minnesota, New York, and Massachusetts. Although not primarily designed to protect water quality, such state wetland statutes often list water quality protection as one goal. A state could adopt wetland water quality regulations, in part, pursuant to these state wetland regulatory statutes. These programs typically require a wetland permit for most activities impacting wetlands.

4. State dredge and fill statutes. Legislatures in a number of states such as Massachusetts, New Hampshire, Florida and Michigan have adopted state "dredge and fill" statutes which establish state water programs resembling or paralleling the federal Clean Water Act Section 404 program. These statutes could also provide the statutory basis wholly or in part for adoption of water quality standards for wetlands.

5. Other water related programs. Many states have adopted a variety of other water-related programs which could serve at least as a partial basis for wetland water quality regulations. These include "coastal zone" regulatory programs (e.g., California, Rhode Island), "shoreline" regulatory programs (e.g., Washington), "shoreland zoning" (e.g., Wisconsin, Minnesota, Maine), "stormwater management"(e.g. Florida), "sediment and erosion control" (e.g., Maryland),"submerged lands" (e.g. Florida), "floodplain management" (e.g., Massachusetts), water supply (e.g., Massachusetts) or other coastal, lake, or river regulations with water quality objectives (among other objectives). At a minimum, many of these programs could be important cooperating partners for a wetland and water quality program.

Does a State Need to Regulate Water-Quality Related Hydrologic Alterations as Well Traditional Sources of Pollution?

As suggested in Part 4 above, hydrologic alterations as well as traditional types of pollution must be regulated if water quality standards are to protect wetlands. A state may best build upon pollution concerns but should not limit the scope of regulations to traditional pollutants and pollution.

Point source pollution control programs have, as one would expect, focused upon pollution. These programs have not ordinarily regulated fills and drainage or have done so minimally. They have established minimum water quality standards for various pollutants and various waters throughout a state and some of these do make sense for wetlands as well (e.g., toxics, sediment). They typically require impact reduction for issuance of permits and require site by site best management practices. But, they have not regulated or only partially regulated water quality-related hydrologic alterations Nor have they required compensation (restoration, creation, enhancement, preservation) for residual impacts as have wetland regulatory and dredge and fill programs. And, these are important omissions. We recommend, therefore, that states issue combined water quality and hydrologic alteration permits as suggested in Appendices A and B.

Some state wetland and water quality programs already involve a combination of regulations for both water quality and hydrologic alterations such as state storm water regulatory efforts. They set both water quality and physical alteration standards such as peak rate attenuation and recharge and removal of total suspended solids.

Appendices A and B of this report set forth several draft narrative options to help states better regulate water quality-related hydrologic alterations. They could do this by integrating hydrologic alteration provisions into pollution control regulations as suggested in Appendix A below, or, alternatively, by adopting a single, more integrated wetland water quality/ hydrologic alteration amendment as suggested in Appendix B.

Do States Need to Protect Riparian as Well As Wetland Areas?

Areas of riparian vegetation often serve functions similar to those played by wetlands such as pollution control and flood storage.[46] Like wetlands, the functions of riparian areas may be damaged by fills and drainage and a broad range of pollutants such as toxic chemicals, nutrients, and sediment. Regulations are needed to protect and restore riparian areas. For example, California regulates both wetlands and riparian areas as part of it its water quality protection program. The draft regulations contained in Appendices A and B could be amended to address riparian areas as well as wetlands.

Oregon, Ohio was awarded $204000 in state funds to help create this wetland buffer. Much of the funding was for land acquisition costs. Source: Center for Respect of Life and Environment

Should a State Adopt Wetland and Water Quality Regulations as Statutes, Administrative Regulations, or Guidance?

Some of the strengths and weaknesses of incorporating wetland water quality standards into administrative regulations, guidance, or statutes, include the following:

Statutes. Statutes are legislative acts formally adopted by a state legislature or Congress. Statutes have the force of law. Wisconsin and Ohio legislatures have adopted wetland and water quality regulatory statutes. However states often find adoption of pollution control or other statutes more difficult politically than adoption of administrative regulations or guidance.

Administrative regulations. Most states adopting wetland water quality policies have adopted such policies as administrative regulations. Typically such regulations are adopted by a water resource or pollution control agency. Administrative regulations, like statutes, have the force of law. The draft regulations set forth in Appendices A and B are primarily intended for adoption by a state regulatory agency as administrative regulations.

Guidance. Agencies often issue less formal guidance to address a variety of less important issues or technical issues such as best management practice manuals, wetland evaluation technique manuals, and permit forms and guidance. Washington State has issued rather extensive guidance concerning wetland water quality designated uses and criteria. Guidance is the least difficult to adopt of the three alternatives but lacks the force of law.

[46]See Riparian Areas: Functions and Strategies for Management; National Academies Press (2002), http://www.nap.edu/catalog.php?record_id=10327.

Given strengths and weaknesses of these three approaches, states may best adopt wetland water quality regulations as administrative regulations with some requirements (e.g. permit guidance) issued as guidance.

What Steps Can a State Take to Develop a Wetland/Water Quality Program?

Given the existing framework of state and federal regulations, what could states do to fill the gaps and better protect wetland water quality and water quality related hydrologic regimes? States have the inherent power to adopt regulations which exceed EPA (water quality) and U.S. Army Corps of Engineers (hydrologic alteration) standards. What steps could a state follow?

States should first assess and document the gaps in their wetland protection and restoration efforts and the consequences of failure to protect water quality and hydrologic integrity. Long term solutions require the support of all branches the state government, including the administrative, legislative and judicial branches. Public support must, ultimately, underpin efforts at all levels. To do this a state can best document and articulate:

What is at risk?
Why is it important?
What will it take to fix it?

States could productively begin by evaluating their current ability to answer these three questions. State agencies have a responsibility to the public to protect the state's natural resources and to spend monetary resources wisely. In many cases, it will be apparent that more information is needed to support formulation and implementation of state programs. There are any number of ways states can develop public and government support for such programs. Based on steps taken by states in the past, here are some suggestions.

1) Ask field staff to take pictures and document and describe activities that destroy and degrade wetlands. These may be wetland not protected by state or federal law and/or actions not regulated by state or federal law.

2) Structure the state's monitoring and assessment activities to quantify acres and/or functions and ecosystem services that are being lost. What wetland losses are occurring in the state? How much is due to point sources of pollution? Nonpoint sources? Water quality-related hydrologic alterations? Other? What functions are being lost? What does this mean to the values of wetlands and other waters?

Having identified gaps in protection, a state is then in the position to develop a plan for filling the gaps. The state should consider tailoring the state's existing monitoring and assessment activities to support better protection. Do functions of specific wetland types need to be documented? What is a logical strategy for developing future, strengthened wetland standards? Does the information needed already exist or should additional monitoring or studies be conducted?

An analysis should be made of existing state authorities. Sometimes authorities exist in state law that has not been fully utilized. States should assess what new authorities (if any) are needed to fill the gaps.

All of this needs to be supported by an outreach and communication strategy to ensure state government and the public (including the regulated community) understand the purpose, importance, and benefits of more comprehensive and coordinated protection.

A plan for more comprehensive protection may include both regulatory and nonregulatory components. See discussion below. For example many states have joined with the U. S. Department of Agriculture to use the Conservation Reserve Enhancement Program (CREP) to support voluntary installation of buffers along streams and rivers.

.

Increasingly water quality problems are linked to water quantity (e.g., flooding) problems and other issues of concern in the state. An early step might be to form an advisory group consisting of experts from pollution control, flooding, stormwater, transportation, forestry, fish and wildlife, natural hazard and other agencies to help with development and implementation of a strategic plan.

States can next prepare draft regulations. In preparing draft regulations, we suggest that a state examine the regulations of other states. We suggest, particularly, the regulations of Wisconsin, Minnesota, Ohio, and North Carolina. We also suggest that a state consider EPA's 1990 recommendations for state wetland water quality regulations. We suggest a state consider the draft regulations in Appendices A and B of this report.

In structuring regulations states need to anticipate and plan for EPA approval of their water quality standards for wetlands at a future date. Under Section 303 of the Clean Water Act EPA is required to review and approve water quality standards, but not permitting regulations. The state regulations should be structured so that it is possible for only the 'standards' portion of the state's program to be forwarded to EPA for review and approval.

States could insert such regulations into existing water quality regulations as has been done in most states with water quality standards for wetlands to date such as Tennessee. Or, they could be adopted as "stand alone" regulations. The insert approach has the advantage of simplicity. However it may also provide less protection than a free-standing program.

States without wetland-specific water quality regulations could adopt such regulations in stages. As a first stage or step, a state could, through administrative regulations, adopt state wetland water quality standards to be implemented through one or more existing permitting programs. States wishing to implement water quality standards through existing permitting statutes may look to the state's 402-related program, state 401 program, state wetland program (if one exists), state coastal zone, dredge and fill, stormwater and other permitting programs as sources of regulatory authority**.** No new permitting authority of the sort suggested in Appendix A would be created with such an approach. A state wishing to follow this path would first need to determine whether existing state permitting authorities are broad enough to implement wetland water quality standards. In most states the state pollution control statute

creating a Clean Water Act Section 402-related pollution control program would apparently be broad enough to implement wetland water quality standards for point sources of pollution. However, state Section 402 -related programs typically regulate only limited nonpoint sources of pollution and states may further lack existing enabling authority to regulate hydrologic alterations.

The adoption of wetland water quality standards first as administrative regulations or guidance and then adoption of a permitting authority later on may be politically more palatable than adoption of wetland water quality standards and a new permitting authority all at once. However, there may also be questions concerning the adequacy of the scope of existing permitting authority to authorize implementation of wetland water quality standards and the application of various criteria such as sequencing requirements.

None of the states with water quality regulations for wetlands have taken such a staged approach to date but such an approach may be politically acceptable where a more comprehensive approach would not.

A state wishing to take a staged approach could, as a second stage, adopt a "permitting" program for water quality-related activities in wetlands. Such a permitting program is suggested in the draft models contained in Appendices A and B. See Section 9 of Appendix A. State adoption of a wetland-specific water permitting program could be used to create a water quality related wetland protection program of the sort adopted in Wisconsin, Minnesota, Ohio, and North Carolina. Statutory adoption of such a permitting program could resolve any ambiguities with regard to the adequacy of existing pollution control statutes to authorize regulations addressing non point source pollution, isolated wetlands, and hydrologic alterations.

States with existing wetland-specific water quality regulations should also evaluate the effectiveness of their regulations and amend regulations as needed. States with existing regulations could, for example, amend their regulations to include some or all of the provisions contained in the draft regulations set forth in Appendices A and B. Some states such as Wisconsin have amended their regulations to more specifically address particular sources of pollution such phosphorus loadings from forestry activities. See generally Wisconsin Forest Management Guidelines. http://dnr.wi.gov/topic/ForestManagement/documents/guidelines/appendixD.pdf

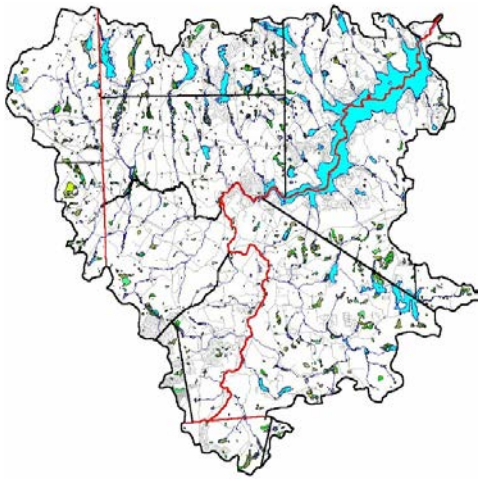
Wetland restoration is increasingly common at all levels of government. This is a US Fish and Wildlife Service wetland restoration project. Source: Gary Sewell / Herald Democrat Herald

Does a State Need to Supplement Wetland Water Quality Regulations With Nonregulatory Approaches?

Experience to date with wetland water quality programs suggests that wetland-specific water quality regulations can play an important role in protecting wetland functions and may create the conditions favorable to restoration of wetlands. But, nonregulatory approaches are also needed. Some additional important nonregulatory components of a state wetland and water quality program may (depending upon state budgets, preferences, etc.) include the following:

States need to supplement wetland water quality standards with nonregulatory wetland protection and restoration such as wetland mapping and delineation efforts, wetland restoration, wetland education and establishment of wetland reference systems.

Map wetland and riparian areas. Wetlands and riparian areas are in some instances difficult for landowners and regulatory agencies to identify. This is particularly true for wet meadows, forested wetlands, playa wetlands, vernal pools riparian areas and other wetlands which are dry a portion of each year. Many states are working with the National Wetland Inventory or undertaking their own mapping or map updating efforts to develop and digitize wetland maps, including in some instances specialized mapping including mapping of riparian areas. For example, Massachusetts has developed maps for vernal pool wetlands. Other states are mapping or otherwise identifying potential wetland restoration sites. Many states such as Wisconsin are inputting data to Geoinformation Systems to facilitate tracking of permits, provide analysis of wetland functions and values, and identify restoration sites. Maryland and Michigan have identified wetlands of special importance. Maryland has also cooperatively undertaken a general characterization of wetland functions with the US Fish and Wildlife Service for the Nanticoke watershed.



Because of their sensitivity to small changes in precipitation and runoff, wetlands are best managed on a watershed basis. This multiobjective map shows wetlands on a watershed basis. Source: Lake Wallenpaupack Watershed Management District, Maps

Restore wetlands, riparian areas, streams. Wetland water quality regulations will not by themselves restore filled or drained wetlands although stopping pollution will help restore some functions. Wetland water quality regulations need to be combined with active removal of fill and restoration of hydrology. Many states such as Wisconsin and Minnesota have established wetland restoration efforts in cooperation with federal agencies (USDA, NOAA, US Fish and Wildlife Service) and not-for-profit organizations. In addition, most mitigation banks involve some measure of wetland restoration. Wetland restoration is also in some instances a component of TMDLs. See, for example, Wisconsin's TMDL and watershed planning for the Fox River watershed with wetlands restoration as one component in efforts to improve the water quality of the watershed as a whole.

Develop cooperative wetland monitoring programs. Wetland monitoring can help a state develop and revise wetland water quality criteria including the development, over time, of numeric as well as improved narrative wetland water quality criteria. Monitoring can also help a regulatory agency track regulatory permits, determine the effectives of mitigation, and help determine net losses and gains of wetland and related resources.

As part of its monitoring efforts states may best document the water quality component of "nonpollutant" activities on wetlands (e.g., the water quality impacts of fills, drainage). Over time, this component may be quantified and serve as basis for state adoption of more wetland-specific water quality standards for nonpollutant activities, for "listing" wetlands, and for preparing TMDLs or applying watershed plans and management approaches. A state may best develop a monitoring program with the help of other state agencies, federal agencies, local governments and private organizations (e.g. the Nature Conservancy). See Massachusetts for a monitoring program used for regulatory enforcement. See Minnesota for an example of a state-wide wetland monitoring program with many elements.

Develop indices of biological diversity and state wetland reference systems. Many states such as Maine, Massachusetts, and Montana are cooperatively developing with EPA indices of biological diversity (IBIs) for wetlands as well as lakes and streams. IBIs can help states characterize the relative condition of specific wetland resources and establish regulatory goals and standards including, in some instances, numeric criteria for toxic chemicals, nutrients, sediments and other pollutants. However, development of IBIs for wetlands is proving difficult because of the complexity and dynamic nature of wetland systems and the high level of human impacts on many wetland systems.

New York has mapped wetlands 12.4 acres and larger in size. Here wetlands are shown on wetland maps for the Cayuga Lake Watershed. Source: Cayuga Watershed

Work with Not-for-Profit Organizations. State wetland programs have found it increasingly useful to work with private not for profit organizations such as The Nature Conservancy, the Land Trust Alliance, National Audubon Society, and the Wisconsin Wetland Association. Members can help monitor regulatory compliance and report violations to the wetland water quality agency. They can comment on permit applications and appear at hearings. They can also provide broader assistance such as support adoption of regulations politically. The can raise money for protection efforts, acquire sensitive wetlands, develop boardwalks, carry out research, and carry out educational efforts (brochures, manuals, training sessions).

Work with Local Governments; Plan Watersheds Cooperatively on a Watershed Basis. States are finding that local governments can play an increasingly important water quality protection role, particularly for nonpoint sources of pollution. Local governments are undertaking watershed and comprehensive land use planning, regulating floodplains and wetlands, establishing stream buffers and setbacks, and regulating stormwater discharges. Water quality designated uses and standards for wetlands need to reflect the sensitivity of wetlands to small changes in hydrology and the cumulative impact of land and water use activities upon wetlands. This favors protection and management of wetlands within cooperative local/state/federal watershed planning and management contexts.

PART 7. FUTURE DIRECTIONS

What are productive future directions for state wetland water quality programs? What steps could states take to develop wetland water quality regulations? How could EPA help the states?

State Actions

What actions could/should states take?

- **Document the gaps in regulations and the need for strengthened regulations.** A state may best document what is being lost by failure to address wetland pollution. To do this, a state could develop case studies of both damaged and protected wetland ecosystems as is being done by Montana**.**

- **Invest in monitoring to set baseline data and to inform performance goals for the wetland resource.**

- **Build upon existing water quality, wetland, dredge and fill and other existing state regulatory authorities and programs.** As discussed in Part 6 above, a state can often best build upon existing wetland and water quality programs in developing and implementing a wetland water quality program.

- **Use the regulatory efforts of other states as models.** States with wetland water quality regulations have found it useful to borrow from others states with established programs like Wisconsin, Minnesota, North Carolina and Ohio.

- **Tailor regulatory proposals to state needs.** Copying from other states (and from the draft regulations in Appendices A and B below) can be useful as a starting point in establishing a state wetland and water quality regulatory program but proposals need to be tailored to state needs and preferences. For example, stream protection, stream buffers and riparian corridor protection are particularly important in the West and need to be more fully addressed in western states regulations.

- **Develop wetland water quality "programs" not just regulations.** As discussed in Part 6 above, states need to combine regulatory and non regulatory approaches such as combination of regulatory, monitoring, mapping and restoration efforts.

- **Identify high value wetlands and waters.** States can protect high value wetlands such as wetlands providing habitat for rare and endangered species by identifying classes of high value wetlands and preparing actual lists of such wetlands. See, for example, suggested classes of wetlands in Appendix B below.

- **Identify potential wetland restoration sites.** A state can use lists or maps of potential restoration sites to guide mitigation. It can use lists or maps to identify impaired wetlands and to target TMDLs. It can use lists to target restoration by federal agencies such as USDA. Identification of potential sites can often best be

cooperatively undertaken with other state agencies, federal agencies, and not-for-profit organizations.

- **Cooperate with local governments and nonprofit wetland organizations such as the Land Trust Alliance, Nature Conservancy, Wisconsin Wetland Association and the New York Wetland Forum.** As discussed in Part 6 above, local governments can carry out watershed planning and comprehensive land use planning with wetland protection and restoration as one component. They can adopt wetland, floodplain and riparian protection ordinances. They can incorporate wetlands into greenways. They can plan wetlands on public lands and undertake management activities such as constructing boardwalks.

  Similarly, nonprofits can help states monitor regulatory permits and report violations. They can help states restore wetlands and riparian areas. They can help states identify wetland restoration sites. They can help states undertake public education and training.

- **Undertake joint research with state, federal, local agencies, nonprofits, academic institutions.** Examples of needed research include these areas:

  1. **Investigate the effectiveness of impact reduction and compensation measures including use of creation and restoration.** States with partners need to monitor restoration and creation projects including mitigation banks. How are they working? Are goals being met? Is offsite restoration and creation working better than onsite? Is out of kind replacement working better than in kind?

  2. **Track permits.** States should monitor and track regulatory permits and undertake enforcement actions with federal and state agencies, and local governments. They can then, over time, revise wetland water quality standards based upon this monitoring.

  3. **Continue to develop indices of biological integrity (IBI).** As discussed in Part 6 above, many states have underway efforts to develop IBIs for wetlands. States have found it difficult to develop indices of biological diversity for wetlands because of the complexity and dynamic nature of wetlands. Never the less, IBIs can provide improved and more quantitative standards for wetlands and should continue to be developed.

In California the Southern California Coastal Water Research Project (SCCWRP) Authority is establishing a statewide system of wetland restoration sites. Source: Southern California Coastal Water Research Project, Wetlands

4. **Develop state wetland "reference" systems.** Washington, Pennsylvania, and California have developed state wide or regional (Washington) wetland reference systems consistent with the "reference condition" concept. This involves the identification of representative examples of wetlands with varying levels of disturbance, the inventory of the characteristics of these wetlands, and the monitoring of these wetlands over time (important since the condition of reference locations may change over time and should be periodically re-evaluated in their ability to exemplify stated performance goals of a given category of wetland). Reference systems may then help a state develop indices of biological integrity, wetland evaluation procedures, and water quality standards for wetlands. It is unlikely that minimally disturbed wetlands will always exist for all categories of wetlands.

- **Seek from EPA assistance on unanswered questions such as the listing of impaired wetlands and use of TMDLs.** A state may best develop a list of unanswered wetland/water quality questions and submit the list to EPA. Answers would help the state evaluate the need for additional actions.

EPA

What could EPA do to better support state development and implementation of wetland and water quality standards?

- **Provide continued financial support for the states.** EPA needs to continue to financially support development of state wetland regulatory programs including wetland water quality programs. Funds need to be available for not only development but implementation of programs.

- **Revise and update the wetland and water quality program 1990 guidance.** (1990). Such an update could focus on a number of more specific types of needed guidance. These include the following items:

    - **Guidance concerning the incorporation of water quality-related hydrologic alteration into state wetland and water quality permitting.**
    - **Guidance concerning listing impaired wetlands and the use of wetland TMDLs.**
    - **Guidance concerning state utilization of use attainability analyses in wetland/water quality contexts.**
    - **Guidance concerning wetland and stream/riparian evaluation procedures including rapid evaluation procedures for water quality-related issues.**
    - **Guidance concerning use of "wetland condition" in wetland water quality permitting.** How is condition to be determined? How is relative "naturalness" to be considered in evaluating a wetland water quality permit? Is the ability of a wetland to produce goods and

services to be evaluated in addition to the relative condition? If a state determines a wetland is in a poor water quality condition is restoration potential to be considered? Or, is a seriously impact wetland to be written off? Given special attention? For example, seriously compromised wetlands in urban areas may, nonetheless, have important flood storage, flood conveyance, erosion control and wave attenuation functions. Altered wetlands may also have significant water quality functions.

- **Work with states, federal agencies, local governments, nonprofits and others to identify and prioritize wetland restoration sites.**

- **Support the states technically and financially in adopting protection measures for buffers and riparian areas[47] which play water quality protection and restoration roles similar to those for wetlands. For example, the Chesapeake Bay states are broadly protecting and restoring riparian buffers to reduce sediment, nitrogen, phosphorous, and other forms of pollution entering the Bay.**

- **Bring local governments more fully into the picture.** Support local government watershed planning and comprehensive land use planning with water quality protection as one goal.

- **Include wetland water quality sessions in EPA-sponsored wetland workshops and conferences** (e.g. SWS, ASWM).

- **Cooperatively undertake and fund with other federal, state and local agencies, not for profits, and academic institutions wetland-related research.** See research topics for states listed above. Other priority research needs include:

    1. **Develop water quality numeric criteria for various types of pollution, various types of wetlands, and various types of wetland flora and fauna.**
    2. **Investigate with states the use of the 2011 National Wetland Assessment data and study conclusions in state wetland programs including the use of NWA data for 303(d) assessments and development of wetland water quality standards.**
    3. **Continue to support the development of state wetland "reference" condition systems of the sort developed in Washington state and Pennsylvania. Such systems should also involve comparisons between assessment of "condition" and "function" and what each has to offer wetland/water quality standard-setting and permitting.**
    4. **Continue to support state development of wetland Indices of Biological Integrity.** EPA could prepare and distribute a state and tribal guidance manual concerning the use of IBIs in state wetland water quality regulatory programs.

[47] See Effectiveness of Buffers for Managing Nitrogen, EPA http://www.epa.gov/ada/eco/pdfs/riparian_buffer.pdf.

APPENDIX A. DRAFT WETLAND AND WATER QUALITY/ REGULATIONS/GUIDANCE

Introduction: Use of Draft Regulations/Guidance Contained in Appendices A and B

We hope that you will find the following draft wetland and water quality regulations contained in Appendices A and B useful. Please note:

- The drafts are intended as a starting point for states interested in developing their own water quality standards. The drafts will need to be modified and supplemented to meet state needs and preferences.

- The drafts do not necessarily represent EPA policy or the policy of any individual state. The drafts do not represent a legal opinion on any issue.

- The regulatory language included in both drafts have been extracted, with limited modifications, from existing state water quality and hydrologic alteration regulations for wetlands.

- We have carefully considered EPA's Water Quality Standards for Wetlands National Guidance issued in 1990 in preparing the draft materials and have prepared the draft standards provided below with the goal of meeting or exceeding EPA recommendations. Nevertheless the draft materials which follow address a variety of issues not addressed by the 1990 guidance.

- The drafts are for use by states in two principal ways:

(1) Appendix A is intended for use by states as providing regulatory "elements" which could be inserted, where appropriate, into existing, broader state water quality regulations. See Box 5 for an outline of these provisions and the discussion below. A state with existing water quality regulations but without water quality regulations specific to wetlands could amend their broader regulations as suggested below to more specifically protect wetlands and wetland functions from pollution and to protect wetlands from water quality-related hydrologic alterations. To do this, various draft regulation provisions such as definitions for state waters, definition of regulated activities, and definition of "wetland" could be inserted into appropriate sections of broader regulations. Some states such as Tennessee and many tribes have already incorporated wetland protection provisions into their water quality regulations such as the Fond Du Lack Band of Lake Superior Chippewa or the Confederated Tribes of the Umatilla.

(2) Appendix B is intended for use by states as a single consolidated "wetland water quality" regulatory amendment incorporating the regulatory provisions suggested in Appendix A above and with some additional provisions. (See Box 6 and draft provisions contained in Appendix B below). This second more consolidated option could be adopted by states as a quasi "stand alone" state wetland water quality regulation. It would be "quasi" stand alone because it would not replace state point or nonpoint source pollution controls.

The draft regulatory provisions suggested in Appendix A and B both use the same definition of wetland and regulated activities. Both adopt the same anti degradation policy. Both apply the same overall mitigation policy. The major differences between A and B include consolidation of provisions in B and the addition of a number of provisions in B.

Draft: Appendix A. Suggested State Wetland Water Quality Regulatory Elements for Insertion Into Broader Regulations

The Appendix A draft regulations which are intended for insertion are outlined in Box 5. They are also briefly summarized as follows.

Box 5
Outline Draft Wetland Water Quality Elements for Insertion Into Broader Regulations

1. Statutory authority; application of regulation
2. Definition of state waters to include wetlands
3. Findings of fact
4. Explicit definition for wetlands
5. Broad definition of "regulated activities"
6. Antidegradation policy for wetlands
    - 6.1 General antidegradation policy
    - 6.2 Tiered protection
    - 6.3 Existing uses
    - 6.4 Outstanding natural resource wetlands
    - 6.5 Cumulative Impacts
    - 6.6 Buffers
7. Wetland designated uses including designated functions
    - 7.1 Designated uses
8. Criteria for protection of designated uses
    - 8.1 Toxic substances
    - 8.2 "Free froms"
    - 8.3 Narrative biological criteria for wetlands
    - 8.4 Protecting the water regime

9. Implementation of Antidegradation Policy: Sequencing and Compensation
    9.1 Mitigation
    9.2 Sequencing
        9.21 Avoid
        9.22 Minimize
        9.23 Mitigate
        9.24 Practical alternatives
    9.3 Compensation
        9.21 Location and type
        9.22 Timing
        9.23 Compensation ratios
        9.24 Use of mitigation banks
        9.25 Wetlands and watershed planning
10. Permit Requirements
    10.1 Permits required
        10.11 An individual wetland water quality/hydrologic alteration permit
        10.12 A wetland water quality hydrologic alteration general permit
        10.13 Water quality certification
        10.14 Other permits required
11. Fees
12. Evaluation, monitoring, reporting requirements
13. Penalties

Summary of Appendix A Provisions

- State regulated waters are broadly defined to include wetlands.
- An explicit definition of wetland is suggested (U.S. Army Corps of Engineers definition suggested with an additional reference to isolated wetlands.)
- Regulated uses are broadly defined to explicitly include drainage and fills.
- A detailed and stringent antidegradation policy is provided (no net loss of condition, function, value, acreage) with more specific regulation of existing uses, tiered regulations, and regulations for special natural resource wetlands.
- Designated uses are briefly identified with a list of designated functions as well.
- A variety of criteria are provided for protecting designated uses and implementing the antidegradation policy. A number of different types of permits are required.
- Sequencing is required (avoidance, minimization, and compensation) and mitigation (restoration, creation) of unavoidable losses.
- Fees are required and penalties are specified for violations of regulations.

EPA Guidance

As discussed in Part 1, above, the EPA in 1990 issued a National Guidance to help states develop water quality standards for wetlands. In addition, under its "Enhancing State and Tribal Wetlands Programs Initiative" EPA has developed a more recent "Core Elements Framework" which articulates an activities menu for developing wetland water quality standards.[48] These documents contain a variety of recommendations but no draft regulatory language. In the 1990 guidance, EPA recommended that states in adopting water quality standards for wetlands include five elements.[49] We have attempted to meet or exceed EPA's recommendations for implementation of the five elements:

States need to work with EPA in developing state wetland water quality standards. They can do this by submitting draft standards to EPA early-on and by designating the portions of their water quality standards they wish to have approved by EPA.

- EPA recommendation: **Include wetlands in the definition of "state waters.** We have done this. See the broad suggested definition of state waters below.

- EPA recommendation: **Designate uses for all wetlands**. We have done this. See broad and detailed antidegradation policy below.

- EPA recommendation: **Adopt aesthetic narrative criteria (the "free froms") and appropriate numeric criteria for wetlands**. We have partially done this. We have adopted narrative "free froms" and a broad range of other narrative criteria and we have cross-referenced and adopted by reference EPA's numeric criteria. See below. However, development of numeric criteria was beyond the scope of this project and only Nebraska has adopted numeric criteria specifically for wetlands. These are limited in scope.

- EPA recommendation: **Adopt narrative biological criteria for wetlands**. We have done this. We suggest a variety of biological criteria. See below.

- EPA recommendation: **Apply the State's antidegradation policy and implementation methods to wetlands**. We suggest a stringent wetland antidegradation policy (no-net-loss of condition, function, value, and acreage) which exceeds a state's typical antidegradation policy and a variety of implementation methods including sequencing requirements (impact avoidance, reduction and compensation) and compensation requirements (restoration, creation).

[48]See Water Quality Standards for Wetlands, EPA http://water.epa.gov/grants_funding/wetlands/quality.cfm; Core Elements of an Effective State and Tribal Wetlands Program Framework, http://water.epa.gov/grants_funding/wetlands/cefintro.cfm.
[49]See National Guidance Water Quality Standards for Wetlands, EPA http://www.epa.gov/owow/wetlands/regs/quality.html.

Draft Textual and Commentary Language for Appendix A: Suggested State Wetland Water Quality Regulatory Elements for Insertion Into Broader Regulations

Section 1. Statutory Authority; Application of Regulations. A state should cite state statutory pollution control, wetland, coastal zone management, dredge and fill or other statutes which "enable" the regulations which follow. The primary enabling statute will in most states be the state comprehensive pollution control statute. However, other statutes may also help provide the statutory basis for wetland water quality regulations. See discussion in Part 6 above.

Sections 5, 6, 7 and 8 below comprise state water quality standards for EPA approval purposes (CWA 303(c)).

A state may wish to clarify interrelationships between programs if wetland water quality regulations are based upon more than one enabling statute. For example, a state may also wish to clarify which penalty provisions are to apply if several enabling statutes with different penalties are utilized. The sequencing of permits is also an issue. For example, a state basing regulations upon both water quality and wetland statutes may wish to specify that any permit applicant must seek a water quality permit before seeing a wetland permit or vice versa.

A state should review existing EPA and state numeric water quality criteria and adopt them to the extent they are applicable to wetlands. Numeric criteria for wetlands can be informed by those that are in place for adjacent surface waters; however, some may not apply, or require modification in order to apply, such as standards for dissolved oxygen or pH.

A state could also cite Clean Water Act Section 401 as providing, in part, state authority to certify federal permits.

We suggest:

> *"**Statutory authority; application of regulations.** The wetland water quality regulations which follow are adopted pursuant to (State statutory section or sections)… to preserve, protect, restore, and maintain the chemical, physical, and biological integrity of the wetlands and waters of (State name)……The regulations which follow shall apply to all regulated wetland areas and activities as defined by sections….. below.*
>
> ***Adoption by reference.** The regulations which follow also adopt by reference state and EPA numeric regulatory water quality standards and any duly adopted amendments including the following:…… (state needs to insert state and federal citations).*
>
> ***Certification of federal permits.** The regulations which follow have been adopted, in part, to facilitate the (agency name)….. review of federal activities consistent with the requirements of section 1341 of the federal water pollution control act, 33 U.S.C.1251, et. seq., including but not limited to all activities which require a federal license or permit which may result in any discharge to waters of the state.*

Section 2. Definition of State Waters to Include Wetlands. The definition of state waters for state water quality programs should be sufficiently broad to include wetlands. For clarity purposes, we recommend that wetlands be specifically referenced in the definition of state waters even if a state has adopted a broad definition of state waters which could be interpreted to include wetlands. EPA's National Guidance suggests such an explicit definition of state waters to include wetlands.

We suggest:

> ***"Waters of the State"*** *are defined to include all seasonal or permanent, perennial, intermittent and ephemeral rivers, streams, lakes, reservoirs, and wetlands including isolated wetlands which are not man-made retention ponds used for the treatment of municipal, agricultural or industrial waste; and all other bodies of surface water, either public or private which are wholly or partially within the boundaries of the state of ….(State name)"*

Other Definitions. We have set forth individually three definitions—"state waters," "wetlands" and "regulated activities—which are of particular significance for regulatory purposes. However, Box 2 sets forth a much broader list of definitions which a state may wish to include in its regulations.

Section 3. Findings of Fact. Finding of facts are self-explanatory. Findings of fact can help educate the public and landowners with regard to the need for the regulations and can help set goals for the regulatory agency in implementing the regulations.

We suggest:

> ***"Findings of fact****. Wetlands of State (State name)….. are indispensable and fragile natural resources which serve multiple functions for protection of public water supply and groundwater, pollution prevention and control, wildlife habitat, endangered plant and animal species habitat, storage and passage of flood waters, storm damage prevention and erosion control, recreation, and scientific study. They prevent pollutants from entering lakes, rivers, and streams. They also remove pollutants from these and other water bodies. However, wetlands are also degraded and destroyed by a broad range of pollutants such as toxic chemicals, nutrients, sediments, and fills. A considerable acreage and many of the functions and values of the wetland resources in…..(state name) has been destroyed or damaged. Water quality standards are needed to protect and restore wetland resource and their functions.*

Section 4. Explicit Definition for "Wetlands". Most states have adopted the U.S. Army Corps of Engineers definition of wetland although some states have adopted a slightly more stringent definition such as Wisconsin. Adopting the Corps of Engineers definition provides consistency between state/tribal and federal regulations.

We suggest:

> ***"Wetlands"*** *are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

Section 5. Broad Definition of "Regulated Activities". To protect wetland condition, functions, values, and acreage, a state or tribe needs to define regulated activities to include a broad range of threats to wetlands including threats from fills and drainage. It is to be noted that the broad definition of regulated activities we suggest below goes beyond the EPA definition. See, Wisconsin, Minnesota, Ohio, and North Carolina for broad definition of regulated activities.

We suggest:

> ***"Regulated activities"*** *include all activities causing or contributing to destruction of wetlands and associated buffer areas including but not limited to point and nonpoint pollution discharges, dredging, draining, filling, other hydrologic alterations, destruction of vegetation, bulk heading, mining, and drilling".*

Section 6. Antidegradation Policy for Wetlands. The Clean Water Act requires states to adopt antidegradation water quality policies for protecting existing uses, keeping healthy waters healthy and giving strict protection to outstanding waters. EPA's National Guidance suggests an antidegradation regulatory element. We believe that state or tribe should adopt a broad antidegradation policy for wetlands. See, for examples, Ohio, North Carolina, Wisconsin, and Minnesota.

We suggest:

> ***6.1 General antidegradation policy.*** *"It is the policy of ….(State name) to protect and maintain wetlands from both individual and cumulative impacts so there will be no net loss of wetland condition, function, value, or acreage. Water quality and quantity in wetlands shall be maintained within the range of variation of environmental processes that provide no net loss level of condition, functions, values, and acreage unless otherwise specified and approved by the ……..(State regulatory agency)*

Tiered protection. EPA's National Guidance suggests an explicit "tiered" wetland protection element. Consistent with EPA, we suggest three tiers. However, some states in their pollution control regulations have included another protection category for high quality waters (sometimes referred to as tier 2 ½) in addition to Outstanding Natural Resource Waters. Adding another protection level is an option states should consider.

We suggest for three-tiered protection:

> ***6.2 Tiered protection.*** *It is the policy of ….(state) to apply several levels of protection to wetlands as generally described below:*
>
> *(i) Tier I applies to all wetlands and all sources of pollution. It requires the protection and maintenance of all existing and designated wetland uses and functions.*
>
> *(ii) Tier II is used to ensure that wetlands of a higher quality than the criteria adopted in these regulations are not degraded unless such lowering of water quality is necessary, in the overriding public interest, and in compliance with the policies and procedures of these regulations and state administrative procedure policies and regulations pursuant to….(citation to state administrative procedure act or citation to other applicable state or federal antidegradation procedures).*
>
> *(iii) Tier III prevents the degradation of wetlands listed in these regulations as "Outstanding Natural Resource Wetlands".*

EPA's National Guidance suggests an "existing use" element.

To comply with this, we suggest:

> ***6.3 Existing uses.*** *It is the purpose of these regulations to fully protect existing uses of all wetlands. Existing uses are those actually attained in a wetland on or after November 28, 1975.*

EPA's National Guidance also suggests an outstanding natural resource wetland element.

We suggest:

> ***6.4 Outstanding natural resource wetlands*** *comprise a special and unique resource and include the following categories of wetlands. Because of their special and unique qualities, it is particularly important that the physical, chemical, hydrologic and biological conditions of these waters be maintained. Degradation of these classes of wetlands is prohibited:*
>
> (Note, a state needs to list here the classes of outstanding natural resource wetlands. See more discussion and examples in Appendix B.)
>
> ***6.5 Cumulative Impacts.*** *Wetland condition, designated uses and functions shall be maintained and protected such that degradation of waters through direct, indirect, or cumulative impacts or regulated activities does not result in the net loss of wetland condition, function, value, or acreage. The (State agency name)…. may permit a proposed regulated activity within a wetland or wetland buffer area only if the permit applicant can demonstrate that such activity will not have an unacceptable adverse impact either individually or in combination with other activities.*

Buffers. Many local governments[50] and some states such as New York (100 foot), Maine (250 feet), and Rhode Island (100 feet) have adopted regulations establishing wetland buffer requirements. Scientific studies assessing the size of buffers needed to remove nitrogen, phosphorous, sediments and other forms of pollution have concluded that needs vary. Buffer needs for various forms of wildlife may exceed 500 feet.[51] We suggest a minimum, buffer of 100 feet for water quality and wildlife purposes. See below. Alternatively, wetland water quality regulations could establish a variable buffer of 50-300 depending upon a characterization of the wetland functions and values at the site of a regulated activity.

States need to protect riparian buffers as well as wetlands, particularly in the semi-arid West where riparian areas often serve water quality protection, habitat, flood storage, and other functions similar to those for wetlands.

> ***6.6 Buffers.*** *Regulated activities shall maintain a 100 foot buffer area measured horizontally from the edge of a wetland in the direction of the upland unless otherwise approved by the ……..(State agency) consistent with the goals and standards of these regulations.*

Section 7. Wetland Designated Uses Including Designated Functions. A state needs to list designated (beneficial) uses for wetlands. EPA's 1990 National Guidance suggests such a wetland designated use element. Most states with wetland water quality standards have adopted quite simple designated use lists. A number of states list wetland "functions" as designated uses such as Wisconsin, and North Carolina. A state may need to modify the following list of suggested designated uses to meet state or wetland-specific needs influenced by factors such as climate and wetland position on the landscape.

We suggest:

> ***7.1*** *"**Designated uses.** It is the policy of the (State name)……. to protect, maintain and restore the designated and existing uses of wetlands and other waters of the State influenced by wetlands. Designated uses more specifically include: general habitat; swimming and other body contact sports; fishing; aquatic life support; and rare and endangered species habitat. To protect designated uses it is necessary to protect the condition and the following functions, values, and acreages of wetlands and wetland buffer areas including:*
>
> *(1) **Pollution control and prevention functions** including **the filtration** or storage of sediments, nutrients, toxic substances, or other pollutants that would otherwise adversely impact the quality of other waters of the State.*[52]

[50]See the Environmental Law Institute, Planner's Guide to Wetland Buffers for Local Governments, Washington, D.C. (2008) and footnote 47 above.
[51]Id.
[52]States have considerable flexibility in identifying designated uses. However, the Water Quality Standards Regulation (40 CFR 131.10(a)) states that, "(i)n no case shall a State adopt waste transport or waste assimilation as a designated use for any 'waters of the U.S."

(2) ***Flood water storage and retention functions*** *including the retention and the moderation of extreme water level fluctuations;*

(3) ***Hydrologic functions*** *including water temperature maintenance, groundwater discharge that contributes to maintain dry weather stream flow and, at other locations or times, groundwater recharge that replenishes the groundwater system;*

(4) ***Shoreline protection against erosion functions*** *through the dissipation of water energy and water velocity and stabilization of sediments;*

(5) ***Habitat functions for*** *the propagation of wetland-dependent* ***aquatic organisms*** *including, but not limited to fish, crustaceans, mollusks, insects, annelids, planktonic organisms and the plants and animals upon which these aquatic organisms feed and depend upon for their needs in all life stages; and*

(6) ***Habitat functions for*** *the propagation of* ***wetland-dependent wildlife*** *species, including mammals, birds, reptiles and amphibians for breeding, nesting, cover, travel corridors and food.*

(7) ***Recreational, cultural, educational, scientific and natural scenic beauty functions and values****.*

Designation of a use does not imply a license to degrade water quality. In water bodies with several uses, the level of quality necessary to support the most sensitive designated and existing uses must be maintained."

Section 8. Criteria for Protection of Designated Uses. States need to adopt broad regulatory criteria and procedures to protect designated uses and to implement the antidegradation policy. See Wisconsin, Minnesota, North Carolina, and Ohio for examples.

8.1 Toxic substances. *Toxic substances shall not be discharged into wetlands or waters leading to wetlands which, alone or in combination with other substances in concentrations that result in acute or chronic toxicity to aquatic life or other wetland dependent species.*

"Free froms." State water quality statutes and regulations typically list "free froms" as general narrative standards applying to all waters (not just wetlands.). Nevertheless, a State may desire to incorporate a list of wetland specific list of "free froms" in state water quality regulations to clarify their application. EPA's 1990 National Guidance suggests such a "free froms" element.

We suggest:

8.2 "Free froms." *All activities in wetlands shall be subject to the following general standards:*

- *Liquids, fill or other solids or gas may not be present in amounts which may cause significant adverse impacts to wetlands;*
- *Floating or submerged debris, oil or other material may not be present in amounts which may interfere with public rights or interest or which may cause significant adverse impacts to wetlands;*
- *Materials producing color, odor, taste or unsightliness may not be present in amounts which may cause significant adverse impacts to wetlands; and*
- *Concentrations or combinations of substances which are toxic or harmful to human, animal or plant life may not be present in amounts which individually or cumulatively may cause significant adverse impacts to wetlands."*

Narrative biological criteria for wetlands. EPA recommends in its National Guidance that states should adopt "narrative biological criteria for wetlands". The general narrative antidegradation standards set forth above (e.g., "no net loss") provide a good deal of biological protection. A state may also wish to include additional narrative biological standards to protect wetland flora and fauna as suggested in Section 8.3 and Appendix B below.

We suggest:

> ***8.3 Narrative biological criteria for wetlands.*** *Any regulated activity proposed to be located in a wetland or wetland buffer area or flowing into a wetland or buffer area shall maintain the water quality and other wetland features necessary to support wetland habitat and populations of wetland flora and fauna including but not limited to:*
>
> - *Protecting the water quality needed for food supplies for fish and wildlife,*
> - *Protecting reproductive and nursery areas,*
> - *Preventing conditions conducive to the establishment or proliferation of nuisance organisms, and*
> - *Protecting dispersal corridors.*
>
> *Because wildlife utilizing wetlands rely on aquatic biota in many cases for food and habitat, general criteria and toxic criteria for the protection of aquatic life shall also apply for the protection of wetland wildlife pursuant to….(Statutory or regulatory citations.)"*
>
> ***8.4 Protecting the water regime.*** *Hydrological conditions necessary to support the physical, chemical and biological characteristics of wetlands shall be protected to prevent adverse impacts on wetland condition, functions, values and acreage including but not limited to pollution control and prevention functions, flood storage and retention, hydrologic functions, shoreline protection against erosion; habitat for aquatic organisms and wetland-dependent wildlife, and recreational, cultural, educational, scientific and natural scenic beauty: This includes maintaining:*

- *The chemical, nutrient and dissolved oxygen regimes of wetlands;*
- *The quantity of water necessary to maintain fish and wildlife during low flow periods of the year;*
- *Natural variations in water levels or elevations needed for fish and wildlife, including those resulting from ground water recharge and discharge;*
- *The pH of the wetland;*
- *Water temperature variations;*
- *Water currents, erosion or sedimentation patterns; and*
- *The movement of aquatic fauna.*

Section 9. Implementation of Antidegradation Policy: Sequencing and Compensation. Section 404 of the Clean Water Act and the regulations the Corps of Engineers and EPA have adopted to implement the Act require "sequencing" in the evaluation of wetland permits including avoidance, impact reduction and compensation. This is also required by some states wetland/water quality programs. However, state water pollution control regulations do not require "sequencing" although avoidance and impact reduction may be required. Failure to require compensation (wetland restoration, creation) is a limitation of water quality programs in the implementation of a state's antidegradation policy and the protection and restoration of wetlands.

Wisconsin, Minnesota and other states with sequencing requirements find that "avoidance" substantially reduces the number of permit applications submitted to a regulatory agency. Similarly, impact reduction requirements reduce the impact of permit applications. Compensation requirements for wetland losses which cannot be avoided or minimized result in onsite or offsite restoration or creation for most mid-sized and large projects.

We suggest:

> ***9.1 Mitigation.*** *Regulated activities shall not cause the destruction, damage, or impairment of wetlands and their condition, functions, values, and acreage except when in compliance with these regulations and mitigated through an authorized wetlands mitigation process as set forth in these regulations below. When considering the adequacy of proposed mitigation, the…(agency name) shall consider the condition, ecological functions, wetland value, the acreage of the wetland, and other relevant factors."*
>
> ***9.2 Sequencing. Antidegradation implementation.***
> *Permit applicants for a wetland regulated activity shall apply the following sequence to reduce impacts to wetland condition, function, acreage and values:*
>
> > ***9.21 Avoid*** *the impact altogether by not taking a certain action or parts of an action;*
> > ***9.22 Minimize*** *the impact by limiting the magnitude of the action and its implementation, and by taking affirmative action's to rectify the impact*

and reduce or eliminate the impact over time including the use of best management practices.

***9.23 Mitigate** the unavoidable impact to functions and values of a wetland by compensation. Compensatory mitigation shall be accomplished in the following descending order of priority of replacement:*

(1) restoration of a former wetland that has been so completely altered it now represents a non-wetland area; and

(2) creation of a wetland in an area that has historically been upland.

***9.24 Practical alternatives.** A regulated activity pursuant to these regulations shall not be permitted if there is a practicable alternative to the proposed activity which would have less adverse impact on the recipient ecosystem, so long as the alternative does not have other more significant adverse environmental consequences. Activities which are not water dependent are presumed to have practicable alternatives, unless the applicant clearly demonstrates otherwise.*

***9.3 Compensation.** Impact compensation measures for the unavoidable impact to wetland condition, functions and values shall be consistent with the following:*

***9.31 Location and type.** If compensatory mitigation is accomplished by restoration or creation, the replacement wetland shall ordinarily be of the same type and at a minimum in the same watershed as the impacted wetland. A watershed approach (see below) shall be favored in determining location and type. However, onsite mitigation shall be required for local loss of wetland functions such as flood storage, flood conveyance, water pollution control and erosion control where loss of function may cause nuisances or otherwise threaten lands or waters. If the wetland impacted borders on an impaired water, mitigation such all be on the same tributary to such water if feasible. If the wetland impacted is located within a FEMA designated 100 year floodplain, mitigation shall be within the same floodplain.*

***9.32 Timing.** Compensatory mitigation shall be completed before or concurrent with the actual physical alteration of the wetland affected by the proposed project to the extent prudent and feasible.*

***9.33 Compensation ratios.** The (regulatory agency)….shall require compensation for unavoidable project impacts caused by regulated activities at a minimum ratio of……to account for both the temporal loss of functions during development of a mitigation site and account for the potential risk of failure. The required ratio applicable at a particular site shall be determined by the…… (regulatory agency) taking into*

consideration wetland functions and values, the location of the proposed mitigation, the type of compensation proposed, the scientific difficulty and experience to date in restoring, creating or enhancing this wetland type, the permanency of the proposed compensation, and expertise and experience of the project applicant. This ratio shall be,……..(specify) at a minimum, to provide no net loss of wetland or wetland buffer area function, value, use, and acreage.

9.34 Use of mitigation banks. *The (regulatory agency)…..may allow the project applicant for a regulated activity to compensate unavoidable wetland losses through the use of a mitigation bank approved by (regulatory agency name….). Use of a mitigation bank may be allowed only if it will secure greater ecological benefits and achieve or exceed compensation ratios as provided in the preceding paragraphs.*

9.35 Wetlands and watershed planning. *Watershed approaches will be encouraged in the implementation of these regulations. Watershed approaches are approaches which support the sustainability or improvement of aquatic resources in a watershed. Such approaches involve consideration of watershed needs and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic functions and services caused by activities authorized by…(regulatory agency name)." Restoration priorities shall include restoration of degraded wetlands identified from assessments, wetlands adjacent to impaired waters, and where restoration is feasible based upon land ownership, cost and other relevant factors.*

Section 10. Permit Requirements

This section of draft regulations begins with a description of permits required to implement the proposed regulations. As discussed in Part 6, some states may use existing water quality, wetland protection, dredge and fill or other water resource permitting programs to implement water quality standards for wetlands on an interim or longer term basis. Alternatively, it, instead, a state wishes to adopt a new permitting program, we suggest three types of permits including "individual wetland water quality and hydrologic alteration permits" "general wetland water quality and hydrologic alteration permits," and wetland water quality and hydrologic alteration certifications. All states with existing wetland water quality programs require permits as an enforcement mechanism. All states have also adopted Section 401 water quality certification requirements. A number of states such as Pennsylvania and New Jersey have adopted state wetland general permits similar to the general permits issued by the Army Corps of Engineers in the Section 404 program. This is particularly the case for states with their own "dredge and fill" programs. However, most states have not issued such permits and issuance of general permits should be considered a state option.

States typically have detailed permitting requirements under state water quality statutes and regulations for point sources of pollution. The Clean Water Act Section 402 authorizes EPA to issue permits if a state fails to adopt and administer point source water quality regulations meeting EPA standards. All of the permits issued by a state regulatory agency pursuant to state wetland water quality regulations of the sort proposed here would need to comply with requirements of state point and nonpoint source regulations including any state or EPA applicable anti-degradation review procedures. This will include but not be limited to NPDES permitted discharges into wetlands.

It is to be noted that we use the term "wetland water quality/hydrologic alteration permit" to broadly describe both a state individual and a state general permit for a regulated activity in a wetland. In implementing this section, a state may want to establish administratively a multiagency review procedure involving both pollution and natural resource (water, fish and wildlife) agencies.

With such a multiagency review procedure, a pollution control agency could carry out a preliminary analysis for any permit application to characterize the permit for evaluation purposes. If the water quality implications of a proposed permit are primary, the principal evaluation would be from a water quality perspective and would be carried out by the pollution control agency. Similarly if the habitat or hydrologic alteration perspective were primary, the principal evaluation would be from habitat or hydrologic perspectives and the principal evaluation would be by a water or fish and wildlife agency. Either way, a wetland water quality/hydrologic alteration permit would need to be issued.

> ***10.1 Permits required.*** *Persons proposing a regulated activity in a wetland or wetland buffer area shall require one or more types of wetland permits from….(regulatory agency name) pursuant to these regulations. Types of permits required may include an (1) individual wetland water quality/hydrologic alteration permit; a general wetland water quality and hydrologic alteration permit, and (3) a wetland water quality and hydrologic alteration certification.*
>
> > ***10.11 An individual wetland water quality/ hydrologic alteration permit*** is *required from the (agency name)……for any regulated activity to be located in wetlands or in wetland buffer areas extending 100 feet inland from the boundary of a wetland if such as activity will result in loss of more than 1/10 acre of wetland and/or buffer area. The (agency name)….shall apply the standards contained in these regulations in evaluating an application for a proposed permit.*
> >
> > ***10.12 A wetland water quality hydrologic alteration general permit*** *is required from the (agency name)…. for any person undertaking a regulated activity for which a general permit is required by these regulations. Any person proposing to conduct an activity regulated by a general permit shall comply with any conditions and best management practices required by the general permit and shall notify the state (regulatory agency….) of his or her intent to conduct the regulated*

activity. The state (regulatory agency) may, within 30 days of receipt of the permit notification require an individual permit if the proposed activity may have significant environmental impact.

The following activities shall be subject to general permits:

(A state will need to flesh this out if they wish to authorize state general permits. A number of states such as Pennsylvania and New Jersey have authorized general permits.)

10.13 Water quality certification. A wetland water quality/hydrologic alteration **certification** is required from the (agency name)…. for any federal agency undertaking a federally licensed or permitted activity resulting in an discharge to navigable waters and requiring certification under 33 U.S.C. 1341 (Clean Water Act 401) unless the (agency name)…. waives its right to certify under 33 U.S.C. 1341(a). The (agency name)….shall apply the standards and criteria contained in these regulations in evaluating a proposed certification. Any conditions contained in a water quality certification becomes conditions of the federal permit or license.

Other permits required. Depending upon state laws and preferences, a variety of other state, local, and federal permits may be required for a proposed wetland regulated activity. These include but are not limited to floodplain management, coastal zone management, shoreland zoning, dredge and fill, stormwater management, sediment control and local zoning and subdivision control permits. A state may, at the minimum, want to cross reference these other permits to provide the basis for multiagency review. A state may also make one sort of permit contingent upon successful acquisition of another. For example, a permit applicant seeking an individual wetland water quality permit may be required to first obtain a coastal zone regulatory permit (e.g., California).

We suggest for other permits required the following.

10.14 Other permits required. *The applicant for an individual wetland and water quality/hydrologic alteration permit shall first obtain a permit from ….(name of state regulatory agency) pursuant to (…..statutory citation).*

Section 11. Fees. Permit application fees will likely be set in a broader pollution control statute and these will need to be cross-referenced. However, a special fee may also be specified for physical alteration (hydrologic alterations) activities in wetlands because of the cost of evaluation of modifications and mitigation plans. Regulations may specify a minimum fee to process an individual permit or water quality certification with a sliding scale of fees beyond the minimum based on acreage of affected wetland, gross value of project or other measure. In some states wetland regulatory programs do not charge fees for use of a "general permit" except when preliminary examination of a permit application indicates that an individual permit is needed.

We suggest:

> *"A minimum fee for a wetland permit or water quality certification shall be……. or 1% of the gross value of the project."*

Section 12. Evaluation, Monitoring, Reporting Requirements. These provisions allow the regulatory agency to decide what evaluation procedures are necessary in general and for a specific permit application.

We suggest:

> *"Evaluations of wetlands to implement these regulations shall be based on procedures approved by the (state agency)…. . The (state agency)….. may approve wetland evaluation procedures on a case by case or broader basis that have been demonstrated to produce verifiable and repeatable results and that have acceptance in the scientific community. Copies of approved methods or guidance may be obtained by submitting a written request to…(agency name, address, e-mail address)."*

Section 13. Penalties. All state water pollution control statutes set forth penalties for violation of regulations including fines, injunctive relief, and jail sentences. State water quality standards for wetlands need to cross reference the civil or criminal penalties contained in such broader pollution control regulations. Alternatively, a state may establish by statute separate civil and/or criminal penalties for violation of wetland water quality/hydrologic modification standards.

We suggest:

> *Any person or corporation who violates any provision of these regulations shall be liable for a fine of up to ….(e.g., $ 5,000) as provided by (statutory citation)…. with each violation considered a separate offense. They may also be imprisoned for up to…….(e.g., 6 months) as provided by (statutory citation)…..*

APPENDIX B: STAND ALONE DRAFT REGULATIONS

Appendix B has been prepared for a state wishing to adopt more detailed water quality regulations for wetlands than provided by the draft materials in Appendix A. The draft materials contained in Appendix B are also intended for use by a state without wetland regulations wishing to adopt more or less "stand alone" wetland water quality/ hydrologic alterations regulations.

Supplementary materials incorporated in the Appendix B and set forth below include the following. See Box 6 to see where the supplementary materials could be included in broader draft regulations.

- Addition of a regulatory goals section
- Addition of more definitions
- Addition of more detailed biologically-oriented criteria for individual designated uses
- Addition of more detailed information submission requirements for individual permit applications
- Addition of a list of possible classes outstanding natural resource waters

For the reader interested in existing wetlands water quality legislation from the various states we refer you to the individual state webpages listed in Appendix D below and to the appendices of another report which extracts materials from individual state web pages. See Jon Kusler, Wetlands and Water Quality Standards developed for the Maryland Department of the Environment. http://aswm.org/pdf_lib/state_water_quality_standards_for_wetlands_061410.pdf

To avoid repetition in the materials in Appendices B we do not repeat draft regulatory elements provided in Appendix A or the definitions set forth in Box 2. Instead, we cross-reference materials in Appendix A and definitions.

Box 6
Draft Wetland Water Quality Regulations for Possible "Stand Alone" Use

The following provisions (in capital letters below) have been added to the draft regulatory provisions (in lower case letters below and) set forth in Appendix A above.

1. Statutory authority.
2. Definition of state waters to include wetlands
3. Finding of fact.
4. REGULATORY GOALS. Addition of a new regulatory goals section.
5. DEFINITIONS. Addition of some definitions.
6. ANTIDEGRADATION POLICY FOR WETLANDS. Addition of a listing of possible classes of outstanding natural resource wetlands.
7. Wetland designated uses
8. CRITERIA TO PROTECT DESIGNATED USES. Addition of more specific criteria for biologically-oriented and recreationally-oriented designated uses. See 7.4.
    - 8.1 Prohibit toxic substances
    - 8.2 "Free froms"
    - 8.3 Narrative biological criteria for wetlands
    - 8.4 MORE SPECIFIC CRITERIA FOR BIOLOGICALLY-ORIENTED AND RECREATIONALLY-ORIENTED DESIGNATED USES
    - 8.5 Protect the water regime
9. IMPLEMENTATION OF CRITERIA. Addition of more specific criteria and procedures.
    - 9.1 GENERAL INFORMATION TO BE PROVIDED BY PERMIT APPLICANT FOR AN INDIVIDUAL PERMIT
    - 9.2 ENVIRONMENTAL IMPACT STATEMENT
    - 9.3 PROVIDE BUFFERS SEE "PROVIDE BUFFERS"
    - 9.4 PROTECT ADJACENT AREAS FROM POLLUTION
    - 9.5-SPECIAL SCRUTINY FOR ACTIVITIES WITH POSSIBLE SIGNIFICANT IMPACT UPON WETLANDS
10. Implementation of antidegradation policy
    - 10.1 Interpretation of the federal antidegradation policy
    - 10.2 Sequencing
    - 10.3 Compensation
11. Permit requirements
12. Fees
13. Evaluation, monitoring, reporting requirements
14. Penalties

Why a "Stand Alone" Option?

Why have we provided states with a "stand alone" draft regulatory option?

We realize that there benefits of inserting wetland water quality protection elements into existing state water quality regulations rather than adopting a single more integrated wetland and water quality regulation. Insertion of elements can reduce the length of such combined regulations. It may also reduce duplication.

On the other hand, there are disadvantages with insertion of wetland provisions into broader regulations. As discussed in Part 4 above, wetlands are quite different from other waters in a number of significant respects including the major threats to wetlands such as fills and drainage. These threats have not traditionally been regulated by water quality programs. These differences need to be reflected in the regulatory policies and procedures. The stand alone option places greater emphasis upon hydrologic alterations. Wetland regulatory programs also typically require "sequencing" and mitigation (restoration, creation) for residual impacts and water quality programs do not. The stand alone option we propose would require sequencing and mitigation.

Keeping all of the wetland water quality regulatory provisions in a state program in one place may make them easier to understand and help a state form a coherent wetland/water quality program. Piecemeal insertion of wetland water quality provisions into various sections of state water quality regulations which are already likely to be complex may come at the expense of even greater complexity.

Finally, we have provided a separate, "stand alone" option in Appendix B because we thought that the draft elements might, with limited modifications, be used by local governments interested in preparing their own stand alone wetland protection/water quality ordinance. These common elements include: goals; definition of regulated waters, wetlands, and activities; permitting requirements; standards and procedures for permits; sequencing requirements; compensation requirements; fees and; penalties.

Text of Draft State Wetland Water Quality Stand Alone Regulations

The draft elements set forth in Appendix B below are identical in most cases with the elements set forth in Appendix A with two exceptions: (1) they contain some additional provisions and (2) they have been have been assembled into what could become a "stand alone" set of wetland and water quality regulations. See Box 6 for an outline of draft provisions including some suggested additional provisions. See also Box 2 for definitions.

We propose that Sections 5, 6, 7 and 8 comprise state wetland water quality standards for EPA approval purposes (CWA 303(c)); other sections do not.

Section 1. Statutory Authority

See Appendix A draft language and commentary on **"Statutory Authority"** above which remains the same.

Section 2. Definition of State Waters to Include Wetlands

See Appendix A draft language and commentary on **"Definition of State Waters to Include Wetlands above"** which remains the same.

Section 3. Findings of Fact

See Appendix A draft language and commentary on **"Finding of Fact"** above which remains the same.

Section 4. Regulatory Goals

A **"Regulatory Goals"** section was not contained in the Appendix A draft regulations and commentary and has been added as suggested below. A more detailed statement of regulatory goals of the sort set forth here can help the public understand the need for regulations and can help the regulatory agency implement regulations.

We suggest an additional provision setting forth regulatory goals in greater detail:

> ***"Regulatory goals.*** *It is the policy of the State of (State name)….to protect and maintain existing wetlands and prevent adverse impacts on wetland functions and beneficial uses caused by chemical, physical, hydrologic, biological, or radiological changes in the wetland environment. The quality and quantity of wetlands shall be maintained to permit the propagation and maintenance of a healthy community of aquatic and terrestrial species indigenous to wetlands, preserve wildlife habitat, and support biological diversity of the landscape. Activities not requiring a wetland location shall where practical be located at upland sites. To achieve these goals it is necessary to regulate direct and indirect discharge of polluting discharges into wetlands including filling and drainage of wetland systems."*

Section 5. Definitions

The "definitions" for the draft regulations in Appendix B are identical with those set forth in Box 2. For the purposes of brevity we do not repeat them but suggest a state wishing to adopt definitions include the ones from Box 2 as appropriate.

Section 6. Antidegradation Policy for Wetlands

See Appendix A draft language and commentary on "**Antidegradation Policy for Wetlands**" above which remains the same subject to the additional recommendation that a state list classes of outstanding wetlands here as provided below. The antidegradation policy includes general

antidegradation policy, tiered protection, existing uses, outstanding natural resource wetlands, no cumulative impactss, and buffers. Designation of classes of wetlands as outstanding natural resource wetlands (ONRW) can be a powerful tool in helping to protect wetlands. We list the following classes of wetlands as examples. A state will need to decide which of these or others may be appropriate. This list has been derived the EPA water quality web site, from the lists of outstanding waters in Wisconsin's water quality standards, and from the lists of outstanding wetlands from several other states. We suggest for inclusion in a state list as many of the following or others as a state believes appropriate:

- *Wetlands wholly or partially contained in parks at all levels of government; wildlife management areas and refuges and, federal and state estuarine sanctuaries.*

- *Wetlands adjacent to or within other Outstanding Natural Resource Waters (e.g., lakes, estuaries shellfish beds, etc.).*

- *Wetlands adjacent to state and federal designated wild and scenic rivers, designated state riverways and state designated scenic urban waterway.*

- *Wetlands in state and federal designated wilderness areas.*

- *Wetlands in designated or dedicated state natural areas.*

- *Wetland habitat used by state or federally designated threatened or endangered species,*

- *Wetlands in state and federal fish and wildlife refuges and fish and wildlife management areas;*

- *Critically imperiled or imperiled wetland communities.*

- *Priority wetlands identified under the Emergency Wetlands Resources Act of 1986 through Statewide Outdoor Recreation Plans (SORP) and Wetland Priority Conservation Plans;*

- *Wetland sites within joint venture project areas under the North American Waterfowl Management Plan;*

- *Wetlands sites under the Ramsar (Iran) Treaty on Wetlands of International Importance;*

- *Wetland biosphere reserve sites identified as part of the "Man and the Biosphere" Program sponsored by the United Nations;*

- *Wetland natural heritage areas and other similar designations established by the State or private organizations (e.g., Nature Conservancy);*

- *Priority wetlands identified as part of comprehensive planning efforts conducted at the local, State, Regional or Federal levels of government; e.g., Advance Identification (ADID) program under Section 404 and Special Area Management Plans (SAMPs) under the 1980 Coastal Zone Management Act.*

- *Wetlands contained in cold water communities including all trout streams and their tributaries;*

- *Wetlands subject to flooding. The freshwater wetland area is inundated with floodwater during a 100-year flood event based on flood insurance maps produced by the Federal Emergency Management Agency or other site-specific information.*

- *Calcareous fens.*

- *Bogs*

- *Freshwater wetland area is located within 25 feet of a river, stream or brook.*

- *Wild rice waters.*

Section 7. Wetland Designated Uses

See **"Designated Uses"** draft language and commentary in Appendix A above remains the same. See also sections below which provide greater detail for biological designated uses.

Section 8. Criteria To Protect Designated Uses

8.1 Prohibit Toxic substances.

See **"Toxic substances"** draft language and commentary in Appendix A above.

8.2 "Free Froms"

See **Free Froms** in draft language and commentary in Appendix A above.

8.3 Narrative biological criteria for wetlands.

See **Narrative biological criteria for wetlands** in Appendix A above.

8.4 More specific criteria for biologically-oriented and recreationally-oriented designated uses.

The following three subsections establish more specific biologically-oriented and recreationally-oriented standards for the protection of wetland designated uses than those contained in Appendix A. A state may also wish to add additional nonbiologically-oriented designated uses such as agriculture.

We suggest for biologically-oriented and recreational designated uses:

> *"Activities impacting designated uses shall comply with the following more specific standards for designated uses:"*
>
> ***Designated use: swimming, boating, canoeing, kayaking, other recreational uses.*** *The water quality of wetlands subject to this designated use shall be protected so that conditions shall not occur that will have a significant adverse impact on the ability of the wetlands to be used for water contact sports and recreational purposes. The water contact sports and recreational use numeric criteria developed and adopted by the United States Environmental Protection Agency pursuant to Sections…. of the U.S. Code shall also be applied to designated uses.*
>
> ***Designated use: aquatic life support; fishing and shell fishing.*** *Wetlands subject to this designated use provide, or could provide, habitat capable of supporting aquatic biota on a regular or periodic basis. Aquatic biota are life forms which require water to fulfill basic life functions such as reproduction, growth, and development. Examples of aquatic biota include, but are not limited to, fish, macroinvertebrates, amphibians, and hydrophytic vegetation.*
>
> *For this beneficial use, the biological integrity of wetlands shall be maintained and protected. Any regulated activity causing water pollution or other activity subject to these regulations which would degrade the biological integrity of wetlands and degrade aquatic life support functions is a violation of these standards. The biological numeric water quality criteria developed and adopted by the United States Environmental Protection Agency pursuant to Sections…. of the US Code shall also be applied to these designated uses.*
>
> ***Designated use: habitat for rare and endangered species.***
> *Wetlands subject to this designated use provide, or could provide, habitat capable of supporting rare or endangered species on a regular or periodic basis. Any human activity causing water pollution which would destroy of damage any identified rare or endangered species is prohibited.*
>
> *The following list of flora and fauna shall be considered by (department name) to be threatened or endangered: (state should list species or adopt them by reference from an official list)……..*

8.5 Protect the Water Regime

See **Protect the Water Regime** draft language and commentary in Appendix A above.

Section 9. Implementation of Criteria in Permitting

A state will need to flesh out the information and procedural requirements listed here for each type of wetland and water quality permit authorized by regulations including individual permits, water quality certifications, general permits, and any other permits). Many states now require use of joint permit processing forms and procedures.

We suggest, for example, that the following sorts of information be required for an individual permit:

> ***9.1 General information to be provided by permit applicant for an individual permit.*** *An applicant for an individual permit (State should specify type of permit or certification)…shall provide to the (wetland and regulatory agency name)…. the following information:*
>
> > *Contact information*
> > *Map of the wetland*
> > *Project site plan,*
> > *Names and addresses of adjacent property owners*
> > *Why a wetland location needed*
> > *Copy of the Clean Water Act Permit Application (If one is required)*
> > *Description any proposed best management practices associated with the project*
> > *Functions, values and acreage of the existing wetland and proposed altered wetland,*
> > *Measures to reduce impacts*
> > *Measures to compensate for impacts*
> > *Supplementary information that the …..(state agency name) determines is necessary to review the permit application.*
>
> **9.2 Environmental impact statement.** Many states already require permit applicants for a variety of regulated programs (e.g., coastal zone management, dredge and fill) to prepare environmental impact statements under certain circumstances and a wetland water quality/hydrologic alteration permit may already be subject to such requirements. Nevertheless it may be desirable for a state to explicitly authorize the regulatory agency to require the preparation of a wetland environmental impact statement for a proposed individually permitted wetland activity.

We suggest:

> ***Environmental impact statement.*** *The (regulatory agency name)…. may require that a permit applicant prepare an environmental impact statement, determining the impact of a proposed permit including impact reduction and mitigation measures on wetland condition, functions, values, and acreage and the relationship between short term uses of the wetland and the maintenance of long term water quality and productivity".*

9.3 Provide Buffers. See **"Provide Buffers"** draft language and commentary in Appendix A above.

9.4 Protect Adjacent Areas From Pollution.

In some instances activities carried out in wetlands threaten the quality of water on adjacent lands. The following narrative standards can help prevent this:

We suggest

"Activities proposed to be located in a wetland or wetland buffer area shall not cause pollution of adjacent lands and waters. Such pollution may include but is not limited to:

- *Location of domestic waste disposal systems including septic tanks and soil absorption fields in wetland areas with resulting pollution runoff.*
- *Release of sediments, nutrients, and other pollutants onto adjacent lands or waters by dredging or draining wetlands or excavating or otherwise disturbing natural topsoil.*
- *Erosion and sedimentation due to placement of fill in wetlands.*
- *Unauthorized application of pesticides, herbicides, or algaecides.*
- *Other activities including but not limited to wetland hydrologic alterations which cause pollution of adjacent lands or waters."*

9.5. Special Scrutiny for Activities With Possible Significant Impact Upon Wetlands

This draft section provides a higher level of scrutiny for activities with potential significant impact on wetlands. Often these activities have separate permitting requirements (e.g., permits for stormwater discharges) and such permitting requirements should be referenced here or below (state will need to provide references). The regulatory agency will ordinarily require a permit applicant for an activity subject to this section to provide an assessment of existing and anticipated wetland condition, functions, values, and acreage. The regulatory agency will in many circumstances require an environmental impact statement and a mitigation plan. The agency may hold one or more public hearings.

We suggest:

> ***Special Scrutiny for Activities With Potentially Significant Impact Upon Wetlands.*** *The (regulatory agency name)…. shall evaluate with particular care any proposed activity with a high potential irreversible impact on wetlands such as but not limited to the following.*
>
> ***Solid waste disposal.*** *Solid waste disposal sites often involve the discharge of quantities of fill and pollutants into wetlands and associated waters.*

Mining. *Sand and gravel mining and placer mining sites often destroy or damage wetlands by the fills and dredging accompanying mining and the release of sediments and toxic chemicals.*

Storm water management facilities. *Storm water management systems often involve discharge of polluted waters into naturally occurring, restored wetlands, or created wetlands. Such discharges of sediment- rich water into a wetland may quickly fill the wetland.*

Major highways, bridges, culverts. *Major highway projects often result in many individual discharges into restored and natural wetlands and the large scale modification of natural hydrology.*

Feed lot operations. *Feed lot operations may discharge large quantities of nutrient and sediment rich waters into wetlands and other waters.*

Major water projects. *Water projects such as dikes, dams, levees, sea walls, and groins, often involve large and multiple impacts upon wetland and related water resource systems including the placement of fill in wetlands, drainage, and other modifications of natural hydrology.*

> *The permit applicant for an individual water quality/hydrologic alteration permit and/or water quality certification for such an activity will ordinarily be required to prepare an environmental impact statement for such an activity depending upon the size of the activity, the severity and types of impacts and the characteristics of the wetlands and other impacted waters. . A permit applicant will need to assess the impact of the proposed activity upon existing and anticipated wetland condition, functions, values, and acreage. The applicant will need to prepare an impact reduction and compensation plan.*

Section 10. Implementation of Antidegradation Policy

10.1 Implementation of the Antidegradation Policy

The draft regulations contained in Appendix A provide a variety of narrative standards to implement the state wetland antidegradation policy and protect designated uses. See draft language and commentary in Appendix A above. EPA's 1990 Water Quality Standards for Wetlands National Guidance provides the following interpretation of the federal antidegradation policy:[53]

> "Since a literal interpretation of the antidegradation policy could result in preventing the issuance of any wetland fill permit under Section 404 of the Clean Water Act, and it is logical to assume that Congress intended some such permits to be granted within the

[53]See EPA 1990 National Guidance, Water Quality Standards for Wetlands, p. 21 http://water.epa.gov/scitech/swguidance/standards/upload/2006_12_01_standards_wetlandsguidance.pdf.

> framework of the Act, EPA interprets 40 CFR 131.12(a)(l) of the antidegradation policy to be satisfied with regard to fills in wetlands if the discharge did not result in "significant degradation" to the aquatic ecosystem as defined under Section 230.10(c) of the Section 404(b)(l) guidelines. If any wetlands were found to have better water quality than "fishable/ swimmable", the State would be allowed to lower water quality to the no significant degradation level as long as the requirements of Section 131.12(a)(2) were followed. As for the ONRW provision of antidegradation (131.12(a)(3)), there is no difference in the way it applies to wetlands and other waterbodies."

EPA further provides[54] that "the Section 404(b)(1) Guidelines state that the following effects contribute to significant degradation, either individually or collectively:

> ...significant adverse effects on (1) human health or welfare, including effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites (e.g., wetlands); (2) on the life stages of aquatic life and other wildlife dependant on aquatic ecosystems, including the transfer, concentration or spread of pollutants or their byproducts beyond the site through biological, physical, or chemical process; (3) on ecosystem diversity, productivity and stability, including loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water or reduce wave energy; or (4) on recreational, aesthetic, and economic values.

EPA provides that "(t)hese Guidelines may be used by States to determine "significant degradation" for wetland fills. Of course, the States are free to adopt stricter requirements for wetland fills in their own antidegradation policies, just as they may adopt any other requirements more stringent than Federal law requires."[55]

We have suggested (above) that states exceed these general recommendations by requiring no net loss of wetland functions, values, and acreage.

10.2. Sequencing

See **"Sequencing"** discussion and draft language in Appendix A above.

10.3 Compensation

See **"Compensation"** discussion and draft language in Appendix A above.

Section 11. Permit Requirements

See Appendix A draft language and commentary on **Permit Requirements** above which remains the same.

[54]Id. p 20.
[55]Id.

Section 12. Fees

See **"Fees"** discussion and draft language in Appendix A above.

Section 13. Evaluation, Monitoring, Reporting Requirements

See **"Evaluation, Monitoring**" discussion and draft language in Appendix A above.

Section 14. Penalties

See **"Penalties"** discussion and draft language in Appendix A above.

APPENDIX C: ALTERED WETLANDS

Many wetlands and their functions and values have been altered by toxic chemicals, sediment, drainage, fills, and other activities. Some of these alterations are "self healing". Once the impacting activity is ceased, natural restoration of fish and wildlife occurs. However, this only takes place for some types of pollution and related hydrological alterations. It does not occur for fills and drainage.

Appendix C briefly examines three sets of Clean Water Act requirements particularly relevant to altered wetlands:

--Does a state need to undertake "use attainability analysis?"

-- Should a state "list" "impaired" wetlands?

--Should a state prepare wetland-related TMDLs?

Altered wetlands pose particularly difficult challenges to development and implementation of state wetland water quality programs. Many have limited habitat value, particularly those in urban areas. Yet, they may have significant water quality protection, flood storage, flood conveyance, and erosion control functions. Regulatory efforts need to consider not only the existing condition of altered wetlands but restoration potential.

Does a State Need to Undertake a Wetland "Use Attainability Analysis"?

Under section 131.10j of the EPA Water Quality Standard Regulation states are to conduct a "Use Attainability Analysis" whenever:

1. The state designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act, or
2. The state wishes to remove a designated uses that is specified in 101(a)(2) of the Act or adopt subcategories specified in 101(a)(2) that require less stringent criteria.

More specifically, the Clean Water Act requires states to conduct "use attainability analysis" for any water body with designated uses that do not include the "fishable/swimmable" goal of uses identified in the section 101(a)(2) of the Clean Water Act.[56] EPA regulations provide that a: "Use Attainability Analysis (UAA) is a structured scientific assessment of the factors affecting the attainment of uses specified in Section 101(a)(2) of the Clean Water Act (the so called "fishable/swimmable" uses). The factors to be considered in such an analysis include the physical, chemical, biological, and economic use removal criteria described in EPA' s water quality standards regulation (40 CFR 131.10(g)(1)-(6)). Under 40 CFR 131.10(g**)** states may remove a designated use which is not an existing use, as defined in § 131.3, or establish sub-categories of a use if the State can demonstrate that attaining the designated use is not feasible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or

[56]See Designated Uses, EPA http://www.epa.gov/waterscience/standards/about/uses.htm /.

2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact."

Water bodies subject to a use attainability analyses must be reexamined every three years to determine if new information has become available that would warrant a revision of the standard. If new information indicates that fishable/swimmable uses can be attained, such uses must be designated. For steps in carrying out a suitability analysis, see http://www.epa.gov/waterscience/standards/handbook/images/figure2_2.pdf. See also more broadly http://www.epa.gov/waterscience/standards/handbook.

To date, states have rarely used the attainability analysis procedure for wetlands. This will likely continue to be true if states adopt wetland water quality designations exceeding the "swimmable/fishable" goals like those set forth in Appendices A and B. On the other hand, an applicant for a wetland water quality regulatory permit may trigger a use attainability analysis by claiming that it is unfeasible for specific altered wetlands to meet designated uses due to conditions set forth in 4 and 5 above ("Dams, diversions" or "Physical conditions").
EPA could assist states address altered wetlands by providing more specific guidance concerning the application of use attainability analysis procedures in wetland contexts although providing widely applicable guidance may be difficult because of the diversity of wetland types.

Restoration of impaired waters here dam removal is expensive and time consuming. Source: Maryland Department of Natural Resources

Should A State List "Impaired" Wetlands?

Section 305(b) and 303(d) of Clean Water Act and regulations adopted by EPA pursuant to these sections require states to list "impaired" waters. States are then required to establish Total Maximum Daily Loads (TMDLs) for impaired waters. No distinction is made between impaired wetlands and other waters. "Impaired" waters are waters that are too

polluted or otherwise degraded to meet the water quality standards set by states, territories, or tribes. The law requires that these jurisdictions establish priority rankings for impaired waters.

In making an impairment determination, states need to consider the various components of a water quality standard (i.e., designated use, criteria (narrative or numeric), and antidegradation. A listing could be based on not meeting any one of these components. For example, even if there are no numeric criteria, a wetland could be listed based on not meeting either a designated use or a narrative criteria.

A Total Maximum Daily Load, or TMDL, is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards.

It is to be noted, that EPA does not presently require that states *list* wetlands or adopt TMDLs for wetlands impaired by non pollutants such as flow alterations: See http://www.epa.gov/watertrain/cwa/cwa26.htm which provides, in part:

> Current EPA regulations call for 303(d) lists to include only waters impaired by "pollutants," not those impaired by other types of "pollution" (including altered flow and/or channel modification). If it is certain that a waterbody's impairment is not caused by a "pollutant" but is due to another type of "pollution" such as flow, the waterbody does not need to be on the 303(d) list. If, however, biological monitoring indicates there is impairment of aquatic life uses, but it is not clear whether a pollutant is at least one of the reasons, the water should be on the 303(d) list, and further analysis to identify the causes are needed. Waters impaired by "non-pollutant pollution" should be identified in 305(b) reports."

However, states in their integrated assessment report could put impaired wetlands into "category 4c" which would provide a way to track and call attention to the status of wetlands in a state even if a TMDL isn't required and could help identify wetlands for other management/mitigation efforts.

Special precautions are needed to protect rare and endangered species in restoration efforts. Source: Giacomini Wetland Restoration Project, National Park Service

To date states have not broadly identified impaired wetlands because of limited budgets and the large number of wetlands in a state (often hundreds of thousands or millions) although some states such as do list wetlands as impaired and some have prepared TMDLs for wetlands such as Kansas and Iowa. The requirement that states must prepare TMDLs for "listed" wetlands has apparently also discouraged states from listing wetlands. Another impediment is uncertainty about how water quality standards apply to wetlands.

Although states have not undertaken broad and detailed inventories looking for impaired wetlands, number such as Minnesota and California have identified specific impaired wetlands.

Given their budgetary limitations, it is unlikely that states will broadly investigate and "list" impaired wetlands in the near future. Nevertheless states may be able to undertake selected and focused inventories of impaired wetlands such as wetlands impaired by toxic discharges. States could then adopt TMDLs for these wetlands on a priority basis. EPA could help states develop "lists" by providing guidance concerning state listing of wetlands. For example, EPA could suggest priorities for listing such as wetlands subject to toxic discharges.

Active wetland restoration. such as revegetation is often necessary or advisable in cleared or excavated wetland areas where non-native or invasive species are believed to be capable of rapidly establishing and precluding establishment of native plant species. Source: Source: Giacomini Wetland Restoration Project, National Park Service

Should a State Prepare Wetland TMDLs?

As discussed above, Section 305(b) and 303(d) of Clean Water Act and regulations adopted by EPA pursuant to these sections require states to establish Total Maximum Daily Loads (TMDLs) for impaired waters. No distinction is made between impaired wetlands and other waters.

TMDLs for wetlands make sense in some ongoing discharge contexts. For example, maximum daily loads can be calculated for discharge of toxics, bacteria, nutrients, salt, temperature changes and some other pollutants into wetlands. TMDLs to reduce such discharges could be implemented through point or a combination of point and nonpoint source pollution controls for such pollutants. TMDL could also be used to prohibit future fills. In such situations, wetlands can and should be treated like other waters. But, the concept of maximum sustainable daily loads make little sense for new discharges of fill which will, over time, destroy a wetland. And, removal of existing fill is expensive. Stopping existing pollution or setting water quality standards for existing pollution can restore more traditional waters but once fill is discharged into a wetland or a wetland is drained it is not ordinarily restored by natural processes.

As indicated above, several states such as Minnesota and California have evaluated a portion of their wetlands to determine which may be "impaired" and have adopted TMDLs for a small number wetlands. See brief description of the Los Angeles TMDL for discharges of trash into wetlands below.

Looking to the future, it is not likely that states will prepare TMDLs for large numbers of wetlands because of the difficulty and costs in establishing numeric standards for total maximum daily loads for wetlands. In addition, it is not clear under what circumstances wetlands must be listed as "impaired". Because of this, a combination of multi-objective, watershed planning and regulations is more promising in most circumstances to address the full range of sources of wetland impairment in a specific context rather than "listing" of individual wetlands and adoption of a TMDL for each pollutant.

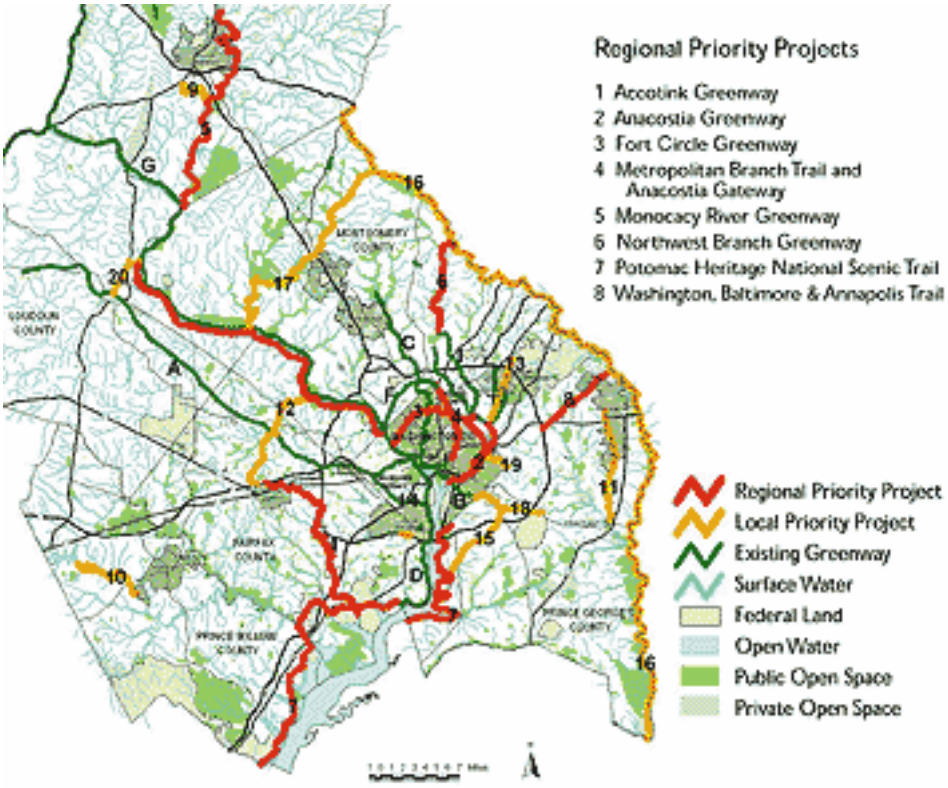
Cooperative state/local watershed planning and plan implementation efforts could "go directly to the solution" of wetland impairments including drainage and fills. The legality of directly addressing pollutants, fills, and drainage through watershed planning approaches rather than going through the TMDL process remains to be seen but it appears likely such an approach would be upheld given the practical problems states face with listing and TMDL requirements and the broad discretion courts have given states in adopting TMDLs to date.

One advantage of listing wetlands and developing wetland TMDLs is that the listing/TMDL can used as a planning/regulatory **tool to address not only point sources of pollution but nonpoint sources of pollution or combined point and nonpoint sources. For example Los Angeles County created a TMDL for trash discharges into wetlands and rivers/streams. See also, for example, the proposed TMDL for the Chesapeake.** http://edocket.access.gpo.gov/2009/pdf/E9-22410.pdf Development of a TMDL may also help a state obtain Clean Water Act Section 310 funding from EPA.

A state may use constructed and restored wetlands as part of watershed planning to help reduce nutrient, sediment, and toxic chemical pollution of not only wetlands but of rivers, streams and other water bodies and help achieve broader goals for those water bodies. Restoration can also be used to restore impaired wetland functions. However, use of restored wetlands for pollution control may in many instances result in long term degradation of wetlands and should be approached with care.[57]

Looking to the future, EPA could help states by providing more guidance concerning the definition of wetland impairments and state options for addressing impairments. It could provide more guidance the listing of wetlands and development of TMDLs in wetland regulatory contexts including options for addressing wetland impacts without formal listing.

[57]See note 50 supra. See, for example, 40 CFR 131.10 which provides, in part: "In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States."



Many cities and metropolitan areas like the Metropolitan Washington, D.C. have created greenways and trails to simultaneously achieve flood damage reduction, water quality protection, recreation, and protection of habitat. Source: Federal Highway Administration

APPENDIX D: SELECTED WEBSITES AND BIBLIOGRAPHY

General References

EPA, Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, (1985), http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/upload/85guidelines.pdf

EPA, National Guidance Water Quality Standards for Wetlands (1990) http://www.epa.gov/wetlands/regs/quality.html

EPA, National Guidance, Wetlands and Nonpoint Source Control Programs (1990) http://www.epa.gov/wetlands/guidance/wlnps.html

EPA, Strategy for Water Quality Standards and Criteria, Setting Priorities to Strengthen the Foundation for Protecting and Restoring the Nation's Waters (2003), http://water.epa.gov/scitech/swguidance/standards/strategy/upload/2003_08_28_standards_strategy_final.pdf

EPA, Wetlands and 401 Certification: Opportunities and Guidelines for States and Eligible Indian Tribes (1989) http://yosemite.epa.gov/water/owrcCatalog.nsf/065ca07e299b464685256ce50075c11a/cd15cd29df94e01d85256d83004fd959!OpenDocument

Overview of State Programs

Association of State Wetland Manager Summary of State Wetland Programs http://www.aswm.org/state-summaries

ELI publication: State Wetland Protection, Status, Trends, Model Approaches http://www.elistore.org/reports_detail.asp?ID=11279&topic=Wetlands

ELI Study of State Wetland Programs, State Profiles http://www.eli.org/Program_Areas/state_wetlands.cfm

Stetson, L., Wetland Assessment Measuring the Quality of the Nation's Wetlands http://www.aswm.org/pdf_lib/wetland_assessment_0208.pdf

State Statutes and Regulations

California Dredge/Fill (401) and Wetlands Program http://www.waterboards.ca.gov/water_issues/programs/cwa401/index.shtml

California Water Quality Standards, Water Resources Board and Regional Water Control Boards http://www.waterboards.ca.gov/plans_policies/#plans

Colorado Code of Regulations Subtitles: Colorado Administrative Code 5 CCR 1002-31
Colorado Basic Standards and Methodologies for Surface Water

31.27 Statement of Basis, Specific Statutory Authority, and Purpose; March, 1993 Hearing on Wetlands Classifications and Standards

Colorado Water Quality Standards
http://www.cdphe.state.co.us/regulations/wqccregs/

Florida Water Quality Standards
http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf

Florida Wetland Resource Permitting
http://www.dep.state.fl.us/water/wetlands/erp/rules/guide.htm

Iowa Water Quality Standards for Wetlands. Iowa Administrative Code, 567-61.2 (455B)
http://water.epa.gov/scitech/swguidance/standards/upload/ia-wqs-section2.pdf

Maine, Chapter 310 Wetlands and Waterbodies Protection
http://www.aswm.org/pdf_lib/096c310-1.pdf

Maryland Department of the Environment Water Quality Standards
http://www.mde.state.md.us/programs/Water/TMDL/Water%20Quality%20Standards/Pages/programs/waterprograms/tmdl/wqstandards/index.aspx

Massachusetts Surface Water Quality Standards, 314 CMR 4:00
http://www.mass.gov/dep/service/regulations/314cmr04.pdf

Minnesota Administrative Code, Wetland Water Quality Standards
https://www.revisor.leg.state.mn.us/rules/?id=7050.0186

Nebraska Administrative Code, Title 117-Nebraska Department of Environmental Quality, Chapter 7, Water Quality Standards for Wetlands
http://www.deq.state.ne.us/RuleAndR.nsf/23e5e39594c064ee852564ae004fa010/9f07eae313ae56d686256888005bc61e/$FILE/WQScont.pdf

North Carolina Wetland Water Quality Standards (See more specifically NCAC 02B.0231)
http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environment%20and%20natural%20resources/chapter%2002%20-%20environmental%20management/subchapter%20b/subchapter%20b%20rules.html

Ohio Administrative Code Ann.3745-1-54 Wetland Antidegradation
http://codes.ohio.gov/oac/3745-1-54

Washington State Water Quality Guidelines for Wetlands
http://www.ecy.wa.gov/pubs/9606.pdf

Wisconsin Administrative Code, Chapter NR 103, Water Quality Standards for Wetlands
http://www.legis.state.wi.us/rsb/code/nr/nr103.pdf

Wyoming Water Quality Standards
http://deq.state.wy.us/wqd/watershed/surfacestandards/index.asp

Wyoming Water Quality Rules and Regulations
http://soswy.state.wy.us/Rules/RULES/6547.pdf