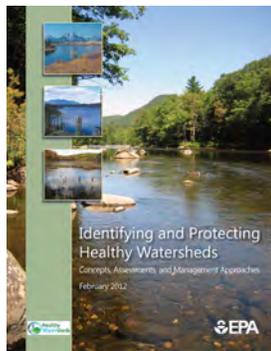


In This Issue

This issue showcases assessments that are currently underway across the country to evaluate one or more of the six healthy watersheds assessment components - landscape condition, habitat, hydrology, geomorphology, water quality, and biological condition. EPA's Healthy Watersheds Initiative is encouraging states to perform integrated assessments of watershed health. These assessments involve holistic evaluations of watershed system characteristics, functions, and processes to obtain a more complete understanding of aquatic ecosystem condition, and allow for the targeting of management actions to protect the health and resilience of watersheds. As the examples featured in this issue demonstrate, involving multiple program partners is critical.

EPA's technical document *Identifying and Protecting Healthy Watersheds* provides many examples of approaches for assessing one or more components of healthy watersheds, as well as integrated assessment options for identifying healthy watersheds. The technical document is available for download at: <http://water.epa.gov/healthywatersheds>



Massachusetts Looks to Develop Statewide Fluvial Geomorphic Assessment

Fluvial geomorphic assessments provide information that helps improve our understanding of natural hydrologic systems. This understanding is essential for protecting and restoring watershed health. Fluvial geomorphic assessments help answer questions about how land use, climate change, and channel manipulation are leading to changes in hydrology, sediment supply, and channel stability and form. They also provide a way to

define equilibrium conditions and better understand the watershed-scale processes at work. Understanding these complex relationships helps aquatic resource professionals manage toward dynamic equilibrium found in natural fluvial systems.



River sinuosity. Photo: USFWS

Numerous groups are currently using different protocols to collect fluvial geomorphic data across Massachusetts. There is currently no single standard method for performing fluvial geomorphic assessments in streams and rivers in Massachusetts. In response to this need, the University of Massachusetts Amherst hosted a one-day fluvial geomorphic assessment workshop in October 2012 to discuss the development of an assessment protocol for the Commonwealth. The workshop goals were to: 1) share assessment methodologies being used; 2) identify management objectives for the Commonwealth; 3) propose an assessment protocol; and 4) establish the next steps for developing and implementing a statewide assessment.

Mike Kline of the Vermont Department of Environmental Conservation spoke at the workshop about work he and his colleagues have done to complete a statewide fluvial geomorphic assessment in Vermont.

The resulting assessments and subsequent planning have provided water quality, habitat, and public safety benefits, as well as important context for prioritizing and implementing protection and restoration projects.

The Commonwealth of Massachusetts has already laid significant groundwork by gathering data and conducting analyses on the health of its aquatic ecosystems. The Sustainable Water Management Initiative (SWMI) Framework was released by the Massachusetts Office of Energy and Environmental Affairs (EEA) with the goal of maintaining healthy rivers and streams and improving degraded water resources over time. As part of the Initiative, staff from EEA collaborated with other state agencies to develop an interactive web-based map that displays the alteration of fluvial fish habitat and groundwater withdrawal levels. The Commonwealth has also developed indicators of stream flow alteration, data on impervious cover, and rigorous fish community assessments. A fluvial geomorphic assessment will complement these and other efforts to understand hydrologic systems in Massachusetts.

All presentations from the Massachusetts Fluvial Geomorphology Workshop are available online: <http://wrrc.umass.edu/fgm-presentations>

Information on Vermont's Stream Geomorphic Assessment Program can be found at: http://www.vtwaterquality.org/rivers/htm/rv_geoassess.htm

Information on SWMI can be found at: <http://www.mass.gov/eea/air-water-climate-change/preserving-water-resources/sustainable-water-management/>

EPA Supports State Healthy Watersheds Assessments

A statewide healthy watersheds assessment characterizes landscape condition, hydrology, geomorphology, habitat, water quality, and biological condition at broad spatial and temporal scales, with the understanding that many variations will exist within individual watersheds and across seasons.

A statewide healthy watersheds assessment is intended to be used as a screening level assessment to:

- Increase our understanding of how landscape structure and watershed processes drive aquatic ecosystem health;

- Prioritize individual watersheds for targeted and more detailed assessments;
- Increase communication among programs resulting in common interests in protection priorities and collaboration opportunities; and
- Maximize use of limited resources by leveraging those resources across state agencies and with other partners to coordinate protection for high priority aquatic ecosystems ultimately leading to statewide healthy watershed protection strategies.



The six healthy watersheds assessment components.

EPA's Healthy Watersheds Initiative is providing states with funding and technical support to complete integrated assessments of watershed health statewide. These assessments are currently underway in Alabama, California, and Wisconsin, as well as in the Clinch Powell Watershed in Tennessee and Virginia. The assessments are being performed using the framework outlined in the Healthy Watersheds technical document (http://water.epa.gov/polwaste/nps/watershed/hw_techdocument.cfm), and are tailored to each state based on available data.

Alabama and Mobile Bay Watershed

Mobile Bay is one of the largest estuaries in the Gulf of Mexico and supports a diverse collection of fish and

Partners: Mobile Bay National Estuary Program, Alabama Department of Environmental Management, Geological Survey of Alabama, Alabama Department of Conservation of Natural Resources, EPA Region 4, others.

wildlife species. The impetus for the Mobile Bay Healthy Watersheds Assessment comes from the understanding that effective conservation of Mobile Bay ecology will benefit from management efforts throughout the entire 45,000 square mile Mobile Bay Watershed. The assessment will help identify high-quality aquatic ecosystems in the watershed for protection and identify opportunities for restoration. In conjunction with the Mobile Bay Watershed Assessment, Alabama is conducting a statewide Healthy Watersheds Assessment.

The Alabama and Mobile Bay Healthy Watersheds Assessments will be conducted in coordination with several ongoing efforts, including an update to the Mobile Bay Comprehensive Conservation and Management Plan by the Mobile Bay National Estuary Program, the implementation of the Water Resource Management Plan of the Alabama Department of Environmental Management (ADEM), the development of a Biological Condition Gradient model for the Mobile Bay estuary, and the identification of strategic habitat units by the US Fish and Wildlife Service, ADEM, and Geological Survey of Alabama. The assessment is currently in the planning phase, with data compilation and a draft assessment methodology nearing completion. The final assessments are expected to be completed this summer.



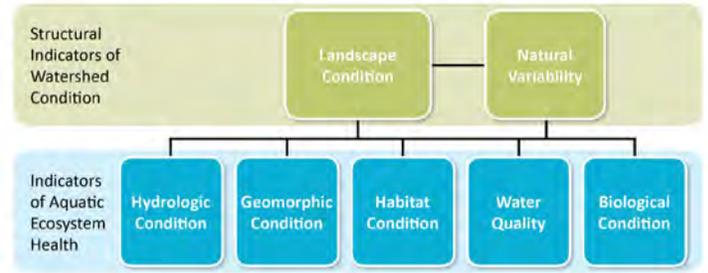
Mobile Bay Watershed.

California

The project partners held a face-to-face meeting in San Francisco in August 2012 to discuss and select indicators of watershed health and watershed vulnerability across the state. At the meeting, the partners decided that the assessment would include both indicators of aquatic ecosystem health and structural indicators of watershed condition. The structural indicators, which come primarily from remote sensing data, are being used to build landscape predictive models that will be calibrated with the indicators of aquatic ecosystem health. These indicators come from high-quality field data collected at discrete monitoring locations representative of California's nine ecoregions. Uncertainty associated with each of the landscape predictive models will be quantified and communicated

Partners: California's Healthy Streams Partnership, California State and Regional Water Boards, Department of Fish and Game, EPA Region 9, others.

to help ensure responsible decision-making and adaptive management of California's freshwater ecosystems.



California healthy watersheds integrated assessment framework.

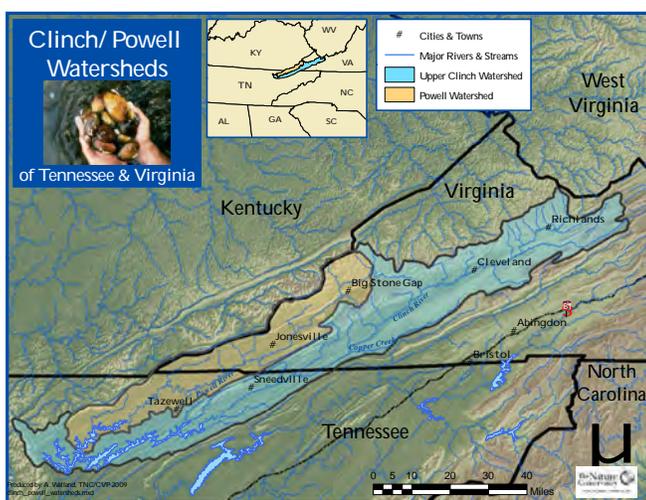
Watershed vulnerability is also being assessed through an evaluation of available climate, land use, and water use change projections. These include measures of hydro-modification potential and projected changes in baseflow, snowpack, surface runoff, and wildfire severity. The adaptive capacity of California's watersheds to deal with these stressors is being considered through measures of groundwater dependency, presence of coldwater fisheries habitat, connectivity of protected areas (e.g., national forests, conservation easements, etc.), and the extent of intact headwater areas.

California intends to use the results of the statewide integrated assessment of watershed health to inform the development of its biocriteria program, as a communication tool on its new Healthy Streams Portal, and to improve protection of aquatic resources through local initiatives that build on the statewide assessment. The final assessment is expected to be completed this spring.

Clinch-Powell Watershed, Tennessee and Virginia

The Clinch-Powell Watershed, historically home to one of the most diverse fish and mussel assemblages in North America, has experienced significant ecological degradation associated with past and present coal mining, agricultural activities, and runoff from developed areas. Nevertheless, the basin still supports the largest number of threatened and endangered aquatic species in North America; and the Clinch and Powell Rivers upstream of Norris Lake are two of the remaining free-flowing sections in the Tennessee River Basin. In addition to strategic restoration of the Clinch-Powell ecosystem, protection of its remaining intact attributes is essential to a comprehensive watershed management program.

The Clinch-Powell Healthy Watersheds Assessment is taking advantage of detailed field monitoring data to evaluate the six attributes of watershed health. Stream flow water chemistry, physical habitat, and aquatic life data (mussel, macroinvertebrates and fish) from multiple locations throughout the watershed are being used to evaluate aquatic ecosystem health within the Clinch-Powell system. The landscape and watershed characteristics that drive physical (hydrologic and geomorphic), chemical, and biological health at these sites will be identified through the use of geospatial and statistical modeling methods to select indicators of watershed health. The results of the analysis will be used to make scientifically supported statements about the health of the Clinch-Powell watershed and its many subwatersheds to help prioritize future resource protection.



Clinch-Powell Watershed.

Wisconsin

The Wisconsin Healthy Watersheds Assessment is being designed to support the state's program needs. It builds on previous work and uses existing data to demonstrate links among aquatic ecosystem components and their landscapes. The outputs of Wisconsin Department of Natural Resources' (DNR) instream flow modeling work will be incorporated into the assessment. Another assessment component includes an experimental approach to using remote sensing data for evaluating stream geomorphic condition and identifying groundwater-dependent ecosystems. The Wisconsin project team held a face-to-face meeting in October 2012 in Madison to discuss the assessment approach and select indicators of watershed health and vulnerability. During the meeting, the group identified

Partners: Wisconsin Department of Natural Resources, The Nature Conservancy, EPA Region 5, others

future partners for collaboration, highlighted existing data and assessments, determined what the existing assessments say about the location of Wisconsin's healthiest watersheds, selected datasets to be used in the assessment, and discussed uses for the healthy watershed assessment outputs. The group identified the following uses for the completed healthy watersheds assessment:

- Identify areas to target for site-specific protection
- Identify outstanding/exceptional resource waters
- Inform DNR and county land and water management plan development
- Use vulnerability information to build public support for protection
- Communicate economic benefits of protecting healthy watersheds to market the importance of environmental programs
- Prevent future impairments in vulnerable waters and help target restoration
- Identify nutrient reduction needs in healthy watersheds as part of statewide nutrient reduction strategy
- Inform in-lieu-fee wetland mitigation
- Prioritize runoff management grants that protect healthy watersheds
- Prioritize watershed monitoring
- Contribute to instream flow assessments

The final assessment is expected to be completed this spring.



The Wisconsin Healthy Watersheds Assessment Project Team. Left-top to right-bottom: Andy Stoltzman (DNR), Andy Somor (Cadmus), Tom Bernthal (DNR), Paul Thomas (EPA), Mike Miller (DNR), Matt Diebel (DNR), Laura Gabanski (EPA), Carroll Schaal (DNR), Corinne Billings (DNR), Nick Miller (TNC), Corey Godfrey (Cadmus), Laura Blake (Cadmus), Stephanie Truitt (Cadmus), Kristi Minahan (DNR).

Chesapeake Bay Program Releases Report on the Role of Natural Landscape Features in the Fate and Transport of Nutrients and Sediment

The Chesapeake Bay Program's Maintain Healthy Watersheds Goal Implementation Team and its Scientific and Technical Advisory Committee sponsored a workshop in March 2012 to consider whether there is a scientific basis for changing how the Chesapeake Bay Program Watershed Model assigns nutrient and sediment loading rates of natural landscape features based on their ecological condition, management status, and landscape position. Workshop participants agreed that there is a scientific basis for adjusting the model's nutrient and sediment processing rates assigned to natural landscape features. Such adjustments would better reflect the influence of landscape feature attributes on actual nutrient and sediment loading rates. Hydrologic retention time and water flow connectivity were recognized as natural landscape feature attributes that have an important effect on nutrient and sediment retention. The workshop participants agreed that a better accounting of the role of intact and healthy watersheds in the landscape should be incorporated into the Chesapeake Bay Program Watershed Model.

Read the full workshop report: http://www.chesapeake.org/pubs/293_2012.pdf

Oregon's Resource Innovation Group Incorporates Climate Change in Watershed Assessment Guidance

Oregon's Resource Innovation Group recently developed a guidebook titled, *Toward a Resilient Watershed: Addressing Climate Change Planning in Watershed Assessments*. The guidebook helps watershed managers understand how future climate scenarios may affect their management decisions and identifies proactive measures for improving the resilience of stream habitat and water quality. This guidebook provides suggestions for ways to include climate change considerations in watershed assessments, emphasizing systems-based approaches and citing EPA's Healthy Watersheds Initiative as an example of such an approach. By incorporating climate change into healthy watershed assessments, results can be used to project potential future conditions and the resulting beneficial or negative consequences of those conditions. As a result, watershed managers and stakeholders can look across the systems and sectors within their watersheds and, based on future projections, make decisions now that will enhance the benefits and reduce the risks.

The guidebook was released in early 2012 and is available at: <http://horticulture.oregonstate.edu/content/toward-resilient-watershed-addressing-climate-change-planning-watershed-assessments>

Join the EPA Healthy Watersheds Online Forum

EPA's Healthy Watersheds Program launched a new online forum called HWI_info in November 2012. This online forum is a place to share and discuss healthy watersheds assessment, protection, and other activities around the nation. To join, visit https://lists.epa.gov/read/all_forums/ and subscribe to HWI_info.

For More Information

For more information or questions about EPA's Healthy Watersheds Initiative, visit www.epa.gov/healthywatersheds or contact Laura Gabanski: Gabanski.Laura@epa.gov

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