SECTION 2: MONITORING AND ASSESSMENT

Introduction

The following sections are to help Tribes and States develop a monitoring and assessment program. First, is a section defining critical elements that characterize a comprehensive monitoring and assessment program. Second, are identified actions and activities to be considered when developing a plan and/or applying for a WPDG. The final section provides additional resource links.

Definition

A monitoring and assessment strategy can be defined as the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, compile, and analyze data on the condition of wetlands on Tribal lands or in a State (adapted from *Elements of a State Water Monitoring and Assessment Program, 2006*). Monitoring is the systematic observation and recording of current and changing conditions, and assessment is using that data to evaluate or appraise wetlands to support planning and decision-making.

Wetlands can be characterized by their extent and functions to determine the overall condition (i.e., health or quality). The wetland's condition can be further analyzed for a site by comparing it to a reference site or Water Quality Standards (WQS). Reference condition is a standard or benchmark of ecological integrity, which is the ability of a system to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization typical of wetlands in the region. In general, the reference site is used to determine the condition of a wetland before the disturbance occurred**.** Comparisons over time between reference and at-risk or degraded systems can help describe biological responses and patterns in wetland health.

EPA typically uses a three-tier framework to monitor and assess the condition of a wetland, including a landscape assessment (Level 1), rapid assessment (Level 2), or intensive site assessment (Level 3). A *Level 1* (landscape assessment) can be completed using GIS data to inventory and assess landscape disturbance indices to assess wetland conditions. A *Level 2* (rapid assessment) can be achieved using relatively simple metrics to assess wetland conditions. A *Level 3* (intensive site assessment) can be used to provide a more thorough and rigorous measure of wetland condition by gathering direct and detailed measurements of biological taxa and/or hydrogeomorphic functions.

Most Tribes and States draw on one or more of these tiers when designing and implementing their wetlands monitoring programs. For example, assessing the extent of wetland gains and losses on Tribal lands or in a State for a specified baseline (e.g., European Settlement, initiation of a regulatory program, or initiation of a monitoring program) is addressed by a Level I (landscape level) measure, often using GIS or other remote sensing methods. Measurement of condition generally requires Level II or III methods, which may be carried out based on a

statistically random sample of all wetlands or specific wetland types, or of wetlands in a priority geographic area or watershed. The evaluation of an individual site in a timely manner as needed to respond to a permit or license application is typically done using a Level II Rapid Assessment Method (RAM), Floristic Quality Assessment (FQA), or similar method that can be carried out in a matter of hours, rather than days. These methods are scientifically based, but also require application of best professional judgment. Definition of the range of normal chemical, physical, or biological conditions requires Level III monitoring for the parameters of concern over a wide geographic area. Level III includes research-derived, multi-metric indices such as the Hydrogeomorphic Approach or Biological Assessments. They are meant to give detailed information regarding how well a wetland is functioning. This information can help in developing numeric limits and may be used for Tribe or State's water quality standards.

Wetland assessment activities at all three levels can be effectively integrated with other surface water monitoring efforts, such as stream or habitat assessments. For example, a probabilistic survey of wetland conditions can be used to help establish Total Maximum Daily Load (TMDL) for riverine TMDL survey areas. Doing so can provide a more integrated understanding of watershed health and a foundation for developing more effective management approaches.

Monitoring and Assessment Program

In general, a well-designed and executed wetland monitoring and assessment program can be a critical tool for Tribes and States to use to better manage and protect their wetland resources. For example, monitoring and assessment can allow Tribes and States to document baseline conditions that identify wetlands extent, condition, and function. Over time, Tribes and States can detect changes and make appropriate decisions to protect their resources.

EPA recommends that Tribes and States identify their program specific monitoring and assessment needs. After the needs are outlined for the program, program goals can be identified. The program goals can be used to determine which phase to enter. For example, if your goal is to determine the extent and location of wetland resources within a specific area, Phase 1 actions and activities are the starting point. If implementation is the focus, then start with Phase 2. If program refinement or decision-making is the focus, start with Phase 3.

EPA recommends that you design and build your program to address your specific needs, which could result in blending some activities from the same or different phases. The phases are as follows (Tables 1 – 3):

Table 1. Phase 1: Monitoring and Assessment Planning Considerations

Actions	Menu of Activities
a. Identify program decisions and long-term environmental outcome(s) that will benefit from a wetland monitoring and assessment program (i.e., develop a wetland monitoring strategy)	• Document program's long-term environmental goals • Identify programs that may use monitoring data (e.g., CWA section 401 certifications, restoration, permitting programs) • Collaborate with water quality programs in a state/tribe • Identify how wetland data can be used to implement watershed planning and integrated into existing water quality monitoring efforts, other critical issues like environmental justice and climate change, and emerging issues related to aquatic resource health and management
b. Define wetland monitoring goals and objectives, which generate data that serve management decision needs	• Coordinate with most relevant partners, for example: federal, state, tribal, and local agencies, universities, regional and national work groups • Examine other sources for monitoring information within the Tribe or State to identify monitoring objectives and goals • Define data needs and uses, including emerging issues
c. Select and integrate multiple designs to meet the full range of decision needs	• Determine classification scheme to group the type, class, and size of wetlands • Develop mapping system to be used as part of the sampling design (including how wetland inventory maps will be updated) • Describe site selection process • List/map universe of wetland resources using the National Wetland Mapping Standard from which sites could be selected if available • Determine which data are already available.
d. Select a core set of indicators to represent wetland condition or a suite of functions	• Identify indicators that are relevant for established monitoring objectives • Confirm indicators are scientifically defensible • Develop/select field method(s) and timing • Add supplemental indicators, including socio-economic indicators, to provide insight on wetland role in overburdened communities.

Table 2. Phase 2: Monitoring, Data Collection, and Assessments Considerations

Actions	Menu of Activities
a. Ensure the scientific validity of monitoring and laboratory activities	• Draft and peer review Quality Management Plan and Quality Assurance Project Plan • Develop Field Operations Manual • Select, prioritize, and peer review candidate site assessment indicators • Review Tribal/State environmental justice policies and data collection requirements • Review Tribal/State climate strategies and data needs at the regional and local level • Train staff in monitoring and assessment techniques
b. Monitor wetland resources as specified in strategy	• Conduct pilot monitoring projects (e.g., small-scale projects to test methods, calibrate, enhance reference network) • Develop a schedule for monitoring wetland resources • Engage or expand involvement in National Wetland Condition Assessment or intensification projects • Partner with other programs (e.g., fish, forest, highways), federal agencies, underserved or overburdened communities, academic institutions, or NGOs
c. Establish reference condition	• Define reference condition (the gradient from unimpaired to impaired) • Define reference standard condition (e.g., Best Attainable Condition, Least Disturbed Condition, Minimally Disturbed Condition, Historical Condition, Best Professional Judgment) • Determine process for measuring reference standard condition (e.g., reference sites, historical data) • Select reference sites using systematic approach
d. Track monitoring data in a system that is accessible, updated on a timely basis, and integrated with other state or tribal water quality data	• Design a data management system that supports program objectives • Administer and update data system so that state or tribal can use it for analysis. Plan for data storage in a location that is accessible to all users • Geo-reference data as it is gathered for reporting • Identify sites to sample repeatedly for a trend network • Integrate with other water quality data systems (e.g., State watershed planning databases)
e. Analyze monitoring data to evaluate wetlands extent and conditions/function or to inform decision-making	• Document data analysis and assessment procedures • Develop assessment method to determine condition thresholds relative to reference standard condition (i.e., departure from reference standard condition) • Establish baseline condition • Analyze changes in wetland extent or condition relative to reference conditions and/or in response to climate change • Assess wetlands status and trends (e.g., annual reporting of no net loss, net gain, or CWA section 305(b) reports for wetlands)

Table 3. Phase 3: Refinement and Wetland Management Decision-Making Considerations

Actions	Menu of Activities
a. Evaluate monitoring program to determine how well it is meeting a Tribe/State's monitoring program objectives	• Develop schedule to evaluate monitoring program • Track program reviews • Ensure assessment method(s) are providing the necessary information • Make changes as necessary to the program • Review other wetland program elements (e.g., restoration, regulation, water quality standards) • Modify other aspects of wetland program as needed based on review of monitoring data • Plan for and consider long term needs – frequency of repeated monitoring, covering of cost, etc.
b. Evaluate the environmental consequences of a federal or state/tribal action or group of actions; modify programs as needed based on M&A data	• Inform state/tribal wetland permit decisions or determinations of "waters of the tribe" or "waters of the state" • Inform CWA section 401 certification decisions on federal licenses or permits • Inform CWA section 401(a)(2) reviews and objections to discharges from neighboring jurisdictions • Modify licensing/permitting or CWA section 401 certification practices as needed based on assessment information • Demonstrate the use of M&A data in decision making (e.g., list and track) including targeting risk reduction strategies in overburdened communities and mitigation of hazards related to climate change • Make data accessible to EPA and the Corps to help inform their determinations of federal jurisdiction
c. Improve the site-specific management of wetland resources	• Incorporate monitoring and analysis into restoration techniques • Establish ecologically meaningful benchmarks for gauging restoration success • Evaluate the performance of compensatory mitigation sites • Evaluate the ecosystem services provided by individual wetlands, consider using screening tools to connect ecosystem services to underserved or overburdened communities • Innovative mapping tool develop and use using the National Wetlands Mapping Standard (e.g., NWI plus and other refinement tools, consider including socio-economic data to reflect underserved or overburdened communities) • Partner with other programs (e.g., fish, forest, highways), federal agencies, academic institutions, underserved/overburdened communities, or NGOs to share information, ideas, technologies
d. Develop geographically defined wetland protection, restoration, and management plans	• Identify and prioritize management areas (e.g., identify vulnerable wetlands, prioritize restoration potential underserved or overburdened communities) • Incorporate wetlands into a comprehensive watershed plan that serves Tribal or State water quality management needs and addresses all waters • Evaluate progress toward meeting wetland objectives identified in other projects/programs (e.g., wildlife action plans, climate action plans, and water and equity strategies) • Inform broader watershed activities (e.g., reducing erosion, providing floodplain storage, reducing nutrient loading, reducing risks to underserved/overburdened communities)

Resource Links

EPA Wetland Monitoring and Assessment Information:

- https://www.epa.gov/wetlands/wetlands-monitoring-and-assessment

APPENDIX A: EPA WEBSITE RESOURCES

EPA Basic Information about Wetland Restoration and Protection:

- https://www.epa.gov/wetlands/basic-information-about-wetland-restoration-and-protection

EPA Core Elements of Effective State and Tribal Wetlands Program document.

- https://www.epa.gov/sites/default/files/2015-10/documents/2009_03_10_wetlands_initiative_cef_full.pdf

EPA National Guidance Water Quality Standards for Wetlands:

- https://www.epa.gov/cwa-404/national-guidance-water-quality-standards-wetlands

EPA Partnering with Land Trusts Fact Sheet:

- https://www.epa.gov/sites/default/files/2021-01/documents/wetlands_protection_partnering_with_land_trusts.pdf

EPA Templates for Developing Wetland Water Quality Standards:

- https://www.epa.gov/wqs-tech/templates-developing-wetland-water-quality-standards

EPA Wetland Monitoring and Assessment Information:

- https://www.epa.gov/wetlands/wetlands-monitoring-and-assessment

EPA Wetlands Program Development Grants:

- https://www.epa.gov/wetlands/wetland-program-development-grants-and-epa-wetlands-grant-coordinators

EPA Wetland Program Development Grants [Tribal] Case Studies:

- https://www.epa.gov/wetlands/wetland-program-development-grants-case-studies

EPA Wetland Program Plans:

- https://www.epa.gov/wetlands/developing-state-or-tribal-wetland-program-plan
- https://www.epa.gov/climate-adaptation/climate-adaptation-plans
- https://www.epa.gov/environmentaljustice/resources-creating-healthy-sustainable-and-equitable-communities

EPA Wetland Restoration Fact Sheet:

- https://www.epa.gov/sites/default/files/2021-01/documents/wetland_restoration.pdf

APPENDIX B: BIBLIOGRAPHIC RESOURCES LINKS

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