

Wisconsin's DRAFT Water Monitoring Strategy 2015 to 2020

Wisconsin's 2015-2020 Water Quality Monitoring Framework Summary

This update to the Wisconsin Water Quality Monitoring Strategy presents DNR's vision to fulfill Wisconsin's Clean Water Act monitoring responsibilities and is integral to our "blueprint" for improving Wisconsin's monitoring, assessment, and reporting activities. This strategy supports our statewide commitment to achieving better water quality through monitoring that is structurally integrated with key assessment and management requirements across all water programs.



Strategy Highlights

- Updates Wisconsin's implementation of *10 Key Elements of a Comprehensive Monitoring and Assessment Strategy* reflecting changes in funding emphasis, monitoring design, staff resources, and connectivity with assessment approach based on new science, data and information, modernized information and technology systems, and reorganized agency structure.
- Adopts a "prescriptive" monitoring approach [Targeted Watershed Assessments (TWA) and Directed Lakes] to address integrated resource assessments by media type.
- Reallocates funding from probabilistic monitoring and local competitive projects to *prescribed monitoring* which provides a strategic statewide perspective to address federal, state and "local" issues. This monitoring will consume nearly 50% of the allocable budget from federal and state sources.
- Much greater emphasis on training, oversight, and follow up on staff procedures to ensure that monitoring study design, equipment, methods and analyses are completed and documented as planned in the database.
- Significantly greater emphasis on linking monitoring, or data collection, with attainment decisions for Clean Water Act 305b/303d reporting and other science-based decisions for management actions.
- Increased focus on effectiveness monitoring, e.g. evaluating progress toward water quality improvement

Wisconsin's Monitoring Program Implementation Recommendations 2015-2020

- **Program Effectiveness Metrics:** Develop and evaluate measures to determine the effectiveness of our program activities and make modifications to improve that effectiveness.
- **Condition Information and Tools:** Develop and implement effective data collection, evaluation, and reporting tools so that we can communicate a consistent message regarding Wisconsin's water quality.
- **Quantitative Performance Tracking:** Develop systems and processes to measure and demonstrate quantitative improvements in and the maintenance of water quality, monitoring and smart collection design to achieve these goals (from Bureau Strategic Plan).
- **Produce and Share Data with Citizens and Partners:** Improve and demonstrate success with intra-agency, inter-agency, and stakeholder coordination of programs and data sharing.
- **Enhanced Quality Assurance and Control Procedures:** Identify, document, and implement accurate monitoring and assessment procedures.
- **Resource Condition Sharing:** Publish the results of monitoring in easily accessible online reports for the public.
- **Timely, Efficient and Science Driven Federal Reporting:** Meet federal reporting needs in designing and monitoring program that specifically addresses federal requirements.
- **Professional, Intuitive Data Systems:** Emphasis on IT system maintenance and upgrades for monitoring and assessment program protocols results (WisCALM) and monitoring strategy (2015-2020) compliance.
- **Resource Inventory, Planning and Management:** Coordinate a statewide framework with high quality, consistent, and scientifically defensible methods to improve the monitoring, assessment, reporting, implementation and most importantly, the condition, of Wisconsin's water. This framework is part of the state's continuous planning process (CPP) Plan.

Wisconsin's DRAFT Water Monitoring Strategy 2015 to 2020

Monitoring Section Strategic Implementation Areas

Staffing Resources:

Creation of the Monitoring Section to centrally coordinate and manage the state's data collection endeavors was a significant step forward. Analyzing proposed work against existing and projected resources now and in the future is a critical implementation step.

Funding:

Strategic funding allocations for monitoring allow the section to work with programs to create scientifically based study designs (developed in cooperation with and to support the needs of critical programs) including Runoff Management, Wastewater, Water Evaluation, Fisheries, Waterways and Wetlands, Drinking Water and Groundwater, and more.

Equipment:

Documenting, managing and planning for current and future equipment needs is a strategic implementation area for the monitoring program. Identification of and management of equipment needs including new acquisitions, maintenance, and strategic planning for future items are high priorities. Exercises to think broadly and strategically will help better allocate resources for costly purchases with upfront considerations.

Training:

Technical and generalized work function training is a strategic implementation area for the coming biennium. Creating core, standardized technical training elements for new employees and ongoing training opportunities for veteran employees is a critical goal. This training strategy, an outgrowth of the monitoring strategy, is a strategic implementation area for the program.

Sampling Procedures, Methods:

Inventory, documentation, and access to written sampling procedures is critical for maintaining a high quality program. This is a high priority strategic area for the monitoring program. Standardized protocols, document storage, easy access, and use of multimedia tools are all part of this implementation area.

Data Analysis Procedures:

Documentation of core knowledge metrics for data management and analysis is fundamental to collectively turning raw data into condition decisions or in answering other management questions. This implementation area will integrate resource specialist expertise with IT professionals and current and emerging tools to ensure that Wisconsin is providing the highest quality information for decisions.

Information Technology Management:

Inventory, analyze and recommend current and future IT needs for programs to help advance infrastructure support funding and maintenance which is critical for a successful Water Quality Program.

Clean Water Act Objectives:

- Establish, review, and revise water quality standards, including use designations and use attainability (Section 303(c)).
- Determine attainment of designated uses and identify impaired waters (Section 305(b), 303(d)).
- Identify causes and sources of water quality impairments (Sections 303(d), 305(b)); and
- Implement water management programs and support evaluation of water management program effectiveness (Sections 303, 305, 314, 319, 402, etc.).

A comprehensive monitoring strategy that meets all of these objectives will enable DNR to answer five general questions:

- 1) What is the overall quality of waters in the state?
- 2) To what extent is water quality changing?
- 3) What are problem areas and areas in need of protection?
- 4) What level of protection is needed?
- 5) How effective are water management programs?

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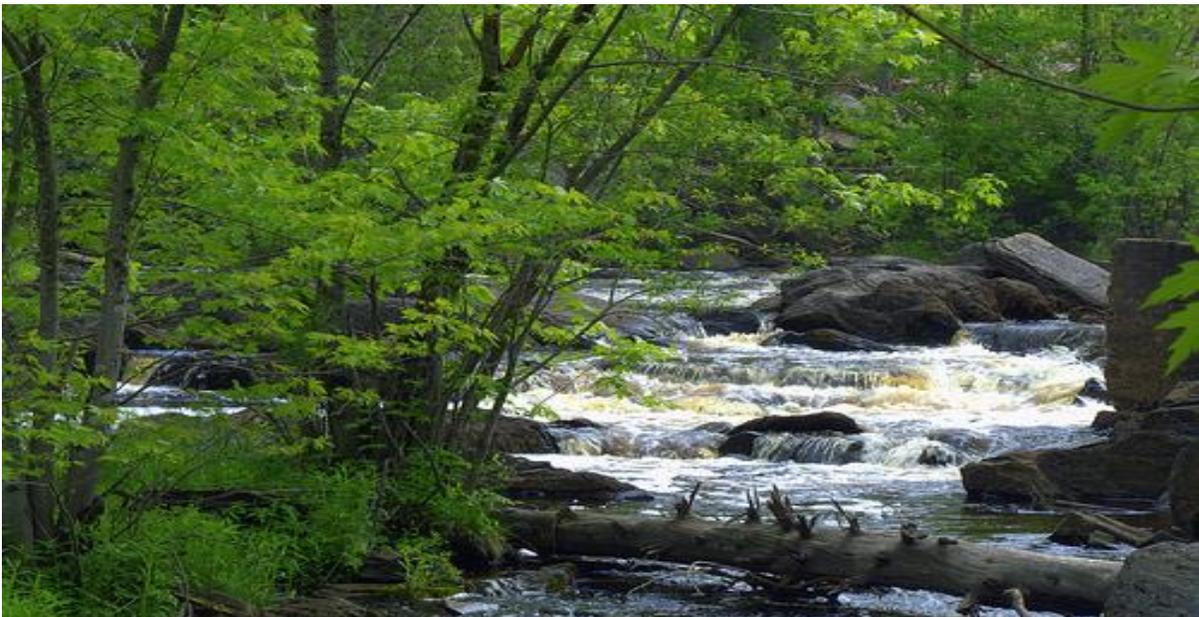
Significant Changes in the 2015 Update

Table 1: Significant Changes in the 2015 Update

Area	2008 Strategy	2015 Strategy Update	Comments
Management and team structure.	Inter-bureau Standing Monitoring Team and subteams created strategy reflecting fisheries, groundwater, and watershed management/ water quality	Water Quality Bureau's new Monitoring Section and statewide Monitoring Success Team (multi-program, ad-hoc team for strategy creation)	Agency redesign reflected in approach to monitoring coordination. Significant work to strategically connect with pertinent programs and staff where value added work was possible.
Address 10 Elements of a successful monitoring strategy	10 Elements discussed and issues identified.	10 Elements addressed up front and in each media (as in 2008); proposed performance goals identified to meet highest level of compliance.	Areas identified for work reflected in rolling list of actions (prioritized) for work planning as resources allow.
Monitoring to fulfill Clean Water Act assessment and management needs.	Acknowledgement of Clean Water Act reporting requirements linked to specific studies.	Specific outputs from study designs are work planned products linked to program goals and objectives and individual staff assignments.	Biennial work plan cycle will reflect "ripe" high priority items or available funding for specific projects. Remaining work will stay in queue and will be reprioritized next work planning cycle.
Emphasis on probabilistic, prescribed and local needs	Primary emphasis for monitoring water resources condition placed on probabilistic study designs and the 'competitive/local needs' project procurement process.	Reallocation of funding from a focus on probabilistic monitoring and local competitive projects to prescriptive or prescribed monitoring, which provides a strategic statewide perspective while addressing federal, state and "local" issues.	Prescriptive monitoring will consume 50% of the allocable budget, probabilistic 15% and local needs 35%. Local needs may be local representations of statewide issues, like confirming natural communities, or compliance monitoring for WPDES issues.
Role of follow up monitoring	Follow up monitoring may not have been strategically represented in the report but over time has become critical for gap filling to make attainment decisions.	Follow up monitoring, linked to probabilistic, targeted or local needs studies, is now a specific type of work identified in strategy and budget under prescriptive monitoring that is purposefully conducted to help meet attainment decisions.	Acknowledging that WI must conduct some form of follow up monitoring to close data gaps for attainment decisions is realistic and transparent. Over time, as the strategy and WisCALM (assessment guidance) are more tightly integrated, the need for follow up monitoring will decline.

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Area	2008 Strategy	2015 Strategy Update	Comments
Use of Natural Communities for streams, rivers and lakes	Natural communities as a concept and as a basis for decision making were in their infancy and therefore were the focus of exploratory research.	Natural communities have now moved from conceptual design, modeled output to tightly integrated into DNR systems and decision making, influencing monitoring protocols, database analysis and report / package creation.	New Designated Use and Biocriteria updates are heavily influencing short and long-term monitoring work. Identification of new parameters and protocols pre-and post- rule promulgation will heavily affect the amount, type and location of monitoring in subsequent biennium.
Tiered approach versus media specific	A tiered approach was used as an organizing principle in the 2008 strategic plan.	The 2015 update uses a media-specific outline, with emphasis on statewide/probabilistic and prescriptive studies.	The term "tier 1, 2, 3" unwittingly conveyed a priority, whereas the use of a media specific approach that incorporates statewide and prescriptive monitoring reduces the relative "weight" or importance of these different studies, while the budget and prioritization of work actions conveys the strategic emphasis.
Quality assurance/ quality control measures.	Protocols, procedures, and quality assurance work was incorporated into each description.	This update emphasizes the creation of a protocol inventory, and professionalization of field procedures, training plans and documentation.	The emphasis shifts to work that reflects advances in study designs which answer questions aligned with federal and state program requirements and goals.
Implementation Planning	Implementation planning for the coming biennium has begun through 2015 work planning. Progress will be tracked and posted online for management and staff to view and update.		



Pine River, Wisconsin. Jim Klosiewski

Section 1 Strategy Overview

Water is Wisconsin's most precious resource. It provides an essential lifeline between wildlife, recreation, public trust resources, agriculture, industry, health and safety, and environmental, urban and rural interests throughout the state. With a growing population of more than 5.5 million (Figure 1) and a precious supply of fresh water, the protection of water for designated and beneficial uses is of paramount importance.

This update to Wisconsin's strategic water monitoring plan identifies current program elements in relation to USEPA recommendations for key elements of a comprehensive strategy. This document presents recommendations for short and long-term actions to evolve DNR's program through the year 2020.

5.726 million (2012)

Wisconsin, Population

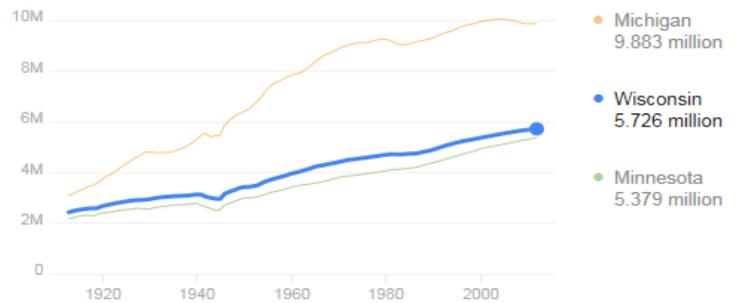


Figure 1 Population from Google Statistics

One of the most significant facets of this update is a shift in funding emphasis from a probabilistic monitoring scheme to greater work on *'prescriptive' monitoring* which will include a Targeted Watershed Assessments (TWA), Directed Lakes, 319 (Non-point) Project Evaluation, and follow up monitoring. These four areas of strategic emphasis directly support a rotating watershed approach to monitoring, assessments, planning and management. A critical leg of this resource management cycle (monitoring) is now redesigned to better reflect DNR/USEPA co-funded pilot watershed studies which were conducted in the East Branch Pecatonica and Yellow River Watersheds. These pilot studies laid the groundwork for creation of a new facet of Wisconsin's integrated monitoring of rivers, streams, lakes, wetlands and more in the strategic plan implementation period.

Section 1.1 Monitoring Strategy Goals and Objectives

This strategic monitoring plan is designed to guide ambient monitoring through 2020 with an updated framework including media-specific studies, protocol inventory, and field procedures that reflect advances in study designs to answer questions aligned with federal and state program requirements and goals. This strategy builds upon the 2008 Water Division Strategic Monitoring Plan, created by the Division Monitoring Team. However, this update focuses primarily on water resources program goals (Clean Water Act and federal and state cross program needs).

The initial portion of the plan identifies key drivers for the strategy update:

- ▶ USEPA's monitoring program evaluation method.
- ▶ Water Quality Bureau's Strategic Plan with specific performance measures driving biennial work planning.
- ▶ Analysis of Wisconsin's programs for Bioassessment/Tiered Aquatic Life Use approach.
- ▶ USEPA's 10 key elements of a comprehensive monitoring strategy.

These requirements set the stage for describing Wisconsin's media-specific monitoring studies, program-specific monitoring needs, and the inventory of work needed to achieve program goals in the next five to ten years. This plan update is geared to form the basis of work plan items in the coming biennium to create a comprehensive (water quality, biology, habitat, hydrology), cross-media (lakes, streams, rivers, wetlands), monitoring plan driven by assessment and management needs, adequately resourced (staffed and funded), and one which highlights collaboration with partners and volunteers.

Section 1.2 Water Quality Bureau Strategic Plan

The Wisconsin DNR is responsible for protecting the state's water resources ([Water Quality Bureau Strategic Plan, 2013-15](#)). The strategy includes the agency's approach to surface water monitoring with multiple goals and objectives including water quality restoration and protection. Appendix B provides a detailed listing of Strategic Plan Objectives, Goals, and Performance Measures that directly relate to monitoring. The Water Quality Bureau operates within the Division of Water and works cooperatively with the Bureaus of Watershed Management, Drinking Water and Groundwater, and Fisheries with the integrating oversight of the Water Management Team.

- This monitoring strategic plan addresses multiple bureau and program needs, with specific emphasis on Clean Water Act related performance measures from the Water Quality Bureau's Strategic Plan.

Water Quality Strategy Vision and Mission

Our vision is a sustainable Wisconsin, made possible by clean water and water availability for wildlife, humans, and a vibrant economy through excellent environmental resource management. Our mission is to protect and enhance our aquatic ecosystems, and to ensure clean, safe water by adhering to state and federal requirements for water quality and environmental protection.

Monitoring in Support of Goals and Performance Measures

Appendix H provides a Water Program and Monitoring Element Integration Chart. This chart is designed to match each of the previously described strategic goals with specific program elements and then cross-references these "needs" with the monitoring strategy elements. The matrix highlights the program's sufficiency. Results have been incorporated into symbolic descriptions found in media monitoring descriptions.

- Lakes, rivers, and streams throughout the state are assessed using representative data collected with standardized biological, chemical, and physical metrics.
- Water quality is supported by an annual monitoring work plans that incorporate baseline (status and trends), problem assessment, evaluation, and response monitoring needs for the agency in a balanced and cost effective manner.



Figure 2: Strategic Linkages

Section 1.3 Characterization of Wisconsin Waters

The water program has initiated an update of the state's surface water quality standards. For the past 10 years, resource professionals have evaluated emerging science and tools applicable to the assessment of flowing waters and lakes, and the agency is now using this information to update its classification and assessment framework.

The goals behind these changes are to more accurately characterize our waterbodies, clearly set expectations for their quality, and use biological metrics to assess whether those expectations have been met. Two key concepts that underpin the proposed shift are U.S. EPA's "Tiered Aquatic Life Uses" and "Biological Condition Gradient". The State of Wisconsin intends to advance this concept for as many water resource types as possible given science, aquatic resources, and staff resources. DNR is addressing these emerging program issues with USEPA in the future.

Proposed concepts for Fish and Aquatic Life Designated Uses are:

Refine waterbodies' classification categories to better represent the diversity of stream, river, and lake types in the state. This entails assigning a "natural community" category to each waterbody which describes its natural character and potential.

- Assign a "Tier" of Excellent, General, Modified, or Limited to each waterbody. The Tier defines the state's expectation of quality for that waterbody. All waters would be assigned to General Tier unless specific procedures are followed to reassign it to a different Tier, which may have different criteria associated with it. More details regarding this design will be available in future technical documents.
- Develop and implement biological criteria (biocriteria) to assess whether a waterbody is meeting its FAL designated use classification and Tier. Different biological metrics will be used a) to assess the water's overall health at the community level, and b) as Phosphorus Response Indicators to assess whether the waterbody is showing a response to ambient phosphorus concentrations. Once developed, biocriteria may be codified or established through guidance.

Figure 3: Drainage Basin



Example of a drainage basin.

*The dashed line is the main
water divide of the
hydrographic basin*

As the department completes development of the above structural changes, it will conduct rulemaking to revise and add to ch. NR102, Wis. Adm. Code. These changes will be presented to the public for comment during the rule development process. They are described further below.

Rivers and Streams - Natural Communities and Biological Assessments

Wisconsin's river and stream Natural Communities were developed through a USGS/WDNR Bureau of Science Services model based on predicted flow and temperatures. Ranges of flow and temperature for flowing waters are associated with specific fish communities; each category has a distinct assemblage.

About the stream model

The model used to generate proposed stream natural communities is based on a variety of base data layers at various scales, and was initially applied to the federal 100k scale NHD (National Hydrography Dataset) hydrography layer. The data was then extrapolated or "conflated" to the 24K scale WDNR hydrography layer (version 5). The model was re-run and published at the 1:24K scale in 2013 and updated in October, 2014 to reflect improvements in data based on improved data inputs.

Biological Criteria for Streams and Rivers

The two primary biological metrics for assessing the overall community health of streams and rivers are the Wisconsin Fish Index of Biological Integrity (FIBI) and the Wisconsin Macroinvertebrate Index of Biological Integrity (MIBI). These metrics, which were developed by WDNR researchers and have been published in peer-reviewed journals, have been in use for several years in Wisconsin. Different IBI calculations are applied depending on the type of stream or river.

WDNR is in the process of determining which metrics will be used as Phosphorus Response Indicators. For flowing waters, these will likely include measures of primary productivity, macroinvertebrates, and dissolved oxygen.

Natural Communities for Flowing Waters

Macroinvertebrate (non-fish)
Coldwater (includes both headwater & main stem)
Cool-Cold Headwater
Cool-Cold Mainstem
Cool-Warm Headwater
Cool-Warm Mainstem
Warm Headwater
Warm Mainstem
River

Figure 4: Natural Communities Flowing Waters

Lakes and Flowages - Natural Communities and Biological Assessments

For lakes, DNR researchers and limnologists identified key variables that define water condition, including aquatic life inhabiting the lakes. Lakes 'natural communities' are based on lake surface area, stratification status, hydrology and watershed size, which are stored in the Register of Waterbodies (ROW) database.

Biological Criteria for lakes

WDNR is in the process of developing biocriteria for lakes. The main biological metric proposed for lakes is a measure of the macrophyte (plant) community. Other metrics, such as phytoplankton or fish, may be developed in the future.

Staff is also determining which metrics will be used as Phosphorus Response Indicators for lakes. Chlorophyll a concentrations are already used in this capacity by the department. Other metrics may include specific plant or algae taxa and dissolved oxygen.

Figure 5: Natural Communities Lakes

Natural Community	Stratification Status	Hydrology
Lakes less than 10 acres		
Small	Variable	Any Hydrology
Lakes 10 acres or greater		
Shallow Seepage	Mixed	Seepage
Shallow Headwater	Mixed	Headwater Drainage
Shallow Lowland	Mixed	Lowland Drainage
Deep Seepage	Stratified	Seepage
Deep Headwater	Stratified	Headwater Drainage
Deep Lowland	Stratified	Lowland Drainage
Other Classifications (any size)		
Spring Ponds(a)	Variable	Spring Hydrology
Two-Story Lakes (b)	Stratified	Any hydrology
Impounded Flowing Waters(c)	Variable	Headwater or Lowland Drainage

Section 1.4 Monitoring Providing Multi-Program Support

The Water Quality Bureau gathers environmental information to assess aquatic environmental health, evaluate environmental problems and to determine success of management actions intended to protect aquatic resources. This Strategy directs efforts to address a variety of management information needs, while providing adequate depth of knowledge to support management decisions in multiple programs. With this Strategy, the WDNR strives to meet the goal of comprehensive coverage of all of the state's waters, while maintaining efficiency necessitated by resource availability. The Figure 6 (below) represents a sampling of programs that require data for answering mandatory questions. The areas highlighted with a red boundary are the primary programs supported by this strategy. All data may be used for ancillary purposes, but the essential questions grounded in performance measures and strategic goals are focused on those areas outlined in red. Also below are the primary program needs required of the Clean Water Act, cross program objectives, and related activities that are affected by and influence monitoring needs.

Blending Program Objectives

One purpose of this strategy is to create a more efficient match between our monitoring programs and our program objectives found in state and Federal legislation related to water. In addition to reviewing and revising water monitoring programs, the WDNR is focusing efforts to meet other water program objectives. Establishing more comprehensive procedures for ensuring statewide consistency in Water Division program areas is also critical. To do this, consistent protocols must be developed and documented.

To meet Clean Water Act objectives, DNR must answer the following questions:

- *What is the overall quality of Wisconsin's surface waters?*
- *To what extent is surface water quality changing over time?*
- *What are the problem areas and areas needing protection?*
- *What level of protection is needed?*
- *How effective are clean water projects and programs?*

Wisconsin's DRAFT Water Monitoring Strategy 2015 to 2020

Clean Water Act Objectives:

- ❖ Establishing, reviewing and revising water quality standards, including use designations, use attainability and criteria.
- ❖ Determine water quality standards attainment and identify impaired waters and causes and sources of water quality impairment.
- ❖ Identifying trends in water quality.
- ❖ Identifying Outstanding or Exceptional Resource Waters.
- ❖ Implementing water quality management programs and evaluating the effectiveness of management actions.

Cross Program Objectives:

- ❖ Develop quantitative management objectives for waters.
- ❖ Identifying areas or hotspots not meeting objectives.
- ❖ Compile data to identify problem causes or sufficient limits.
- ❖ Compile input for developing management recommendations.
- ❖ Analyze responses to management actions.
- ❖ Secure additional funding for execution of decision making and management actions that would “close out” or restore waters to their beneficial uses.

Standards Program Needs:

- Establishing and documenting attainable and designated uses for waterbodies.
- Creating and using bioassessment metrics to understand water condition status for listing impaired waters, ORW/ERW candidates, and Clean Water Act reporting. Bioassessment analyses are needed to modify the state's water quality standards to incorporate biocriteria.
- Integrating new findings and model results, including modeled natural communities based on flow and temperature projections, to identify the biological potential of a stream, river, lake, wetland, spring or recharge area.

Permit Issuance Program Needs:

- Establishing timely permits for effluent limits but in particular phosphorus and sediment in those areas where impaired waters are identified.
- Conducting timely permit processing for decisions based on wetland and shoreline data that is used to identify potential impacts.
- Evaluating the effectiveness of WPDES permits.
- Analyzing and permitting proposals for high capacity well requests while protecting and minimizing impacts to surface and groundwater resources.

Runoff Management – Nonpoint Source Program and Restoration Program Needs:

- Analyzing data for 305 (b) reporting and 303(d) attainment decisions.
- Collecting pollutant and landscape source data for assessments, point and nonpoint source permits, and multiple resource areas to best target management actions through Watershed Planning and/or TMDL Implementation Planning or Nine Key Element Plans.
- Identifying projects for Lakes, Rivers, aquatic invasive species (AIS) or Runoff Management Grant Projects.
- Prepare for and implement large analyses and restorations such as Total Maximum Daily Load (TMDL) analyses, implementation and evaluation.



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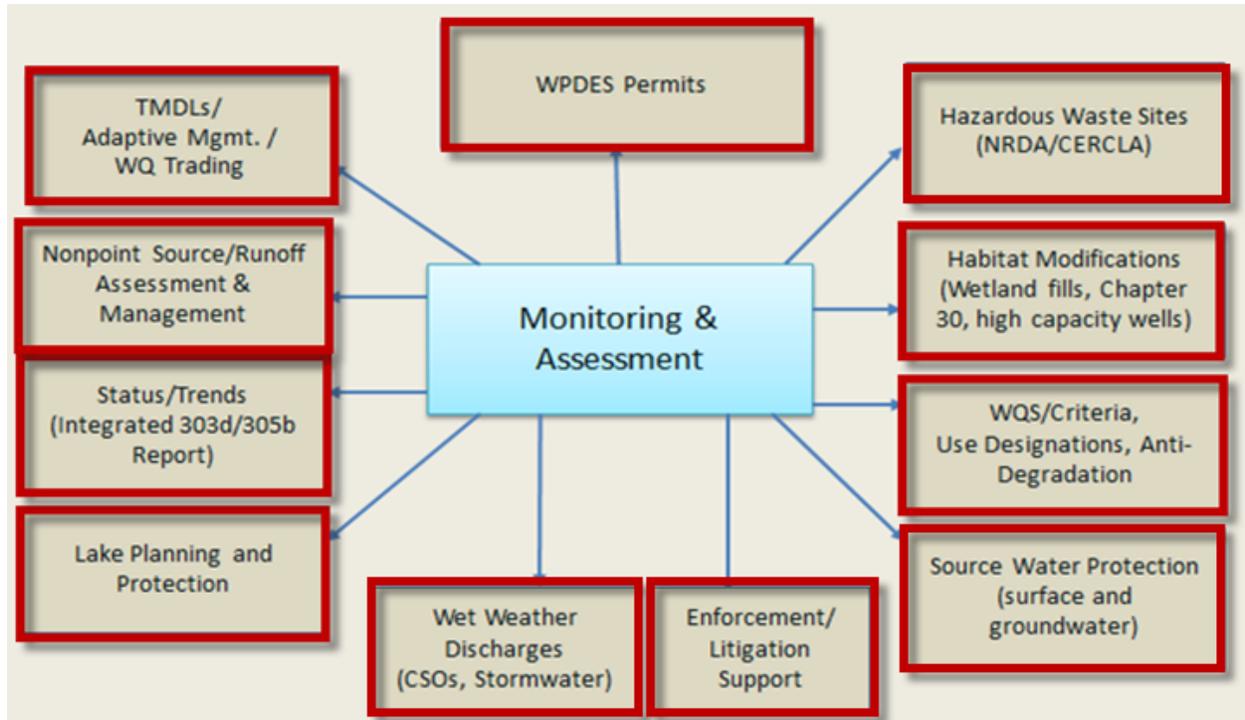


Figure 6: Program Reliance on Monitoring Data

The strategy focuses on **documenting and ensuring that core elements of a comprehensive monitoring strategy are successfully identified for each of the state's resources** (rivers, streams, wetlands, lakes, etc.), that gaps are documented and a plan for closing gaps are articulated. This work must answer questions for a variety of needs.

An overall framework for monitoring is presented in light of the state's strategic plan, changing climate of state service, variety of program need, and changes in resource availability. By documenting the core elements and identifying what we have, we will be able to successfully fill gaps through budget requests, additional position requests, or key work items for existing staff. *The strategy employs a stratified approach to meeting various monitoring objectives as follows:*

"Baseline" – Statewide

- Trends sites (Lakes, Rivers)
- Probabilistic surveys (streams, AIS, NARS (coastal condition and wetlands))
- Reference sites (wadeable streams, macrophytes, large river macroinvertebrates)

"Prescribed" – Statewide and District Collaboration

- Targeted Watershed Assessments
- Directed Lake Assessment (including APM and Critical Habitat)
- 319 (Non-point) Project Evaluation
- Follow-up for Impaired Waters

"Local Needs" - District Initiated

- Cross program support
- Unique stressors, projects

Wisconsin's DRAFT Water Monitoring Strategy 2015 to 2020

Implementation of the strategy is overseen by resource technical teams charged with programmatic direction, evaluation and implementing monitoring plans. Biennial work planning is advocated. Monitoring technical teams (rivers/streams, lakes, wetlands) are charged with meeting the following goals:

- Establish the annual and/or biennial sampling schedule for each resource type to reflect data needs.
- Audit implementation to ensure that sampling designs are being properly executed and documented.
- Assess and evaluate technical needs based on feedback from monitoring of Wisconsin surface waters.

Baseline Monitoring – Statewide

This 2015 strategy update supports continuation of ongoing studies described below.

- ▶ Trends sites (Lakes, Rivers) – Long Term Trend Projects (ongoing)
- ▶ Probabilistic surveys (streams, AIS, NARS (coastal condition and wetlands))
- ▶ Reference sites (wadeable streams, macrophytes, large river macroinvertebrates)

DNR will work to continue collection of ambient water quality data such as dissolved oxygen, pH, temperature, hardness, heavy metals, and pesticides important in understanding the assimilative capacity that is appropriate for specific receiving waters under its Long-Term Trend Rivers and Wadeable Streams Programs. There is an important emphasis on collection of phosphorus and stream base flow data statewide, as the issues of phosphorus permit issuance, site specific permit issuance, and high capacity well permit reviews are conducted. The emphasis on biological data and background information needed to create assessment parameters to support the creation of updated designated uses and biocriteria for the state's water quality standards will precipitate new and additional monitoring requirements in the current and future work plans.

Prescribed Monitoring – Statewide and District Collaboration

Prescribed Monitoring includes directed monitoring activities with common purpose and a suite of standard monitoring procedures. A major goal of this monitoring effort is to coordinate water selection across disciplines (e.g., more integration between streams and lakes, water resources and fisheries) to obtain diverse data sets from the same water body (e.g., water chemistry, physical habitat, and biological data on a single lake). However, the field sites will vary from year to year and will be selected jointly by District and Central Office staff. In some cases Prescribed Monitoring projects may be used for stream, river and/or lake monitoring waterbodies individually for whole watersheds.

For those areas in the state where protection is warranted or pollutant problems are known, such as an impaired water or an existing listed watershed where a TMDL is needed, more intensive sampling will occur to verify the cause, extent, or loading rates of the pollutant or problem. *Prescribed monitoring* is designed to meet statewide data needs through consistent data collection schemes and generalized site selection priorities, however watershed/site selection and monitoring designs are developed by Districts.

Four examples of this type of work include:

- ❖ Targeted Watershed Assessments
- ❖ Directed Lake Assessment (including APM and Critical Habitat)
- ❖ 319 (Non-point) Project Evaluation
- ❖ Follow-up for Impaired Waters

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Targeted Watershed Approach (TWA) will initially include rivers/streams and **Directed Lakes Studies** will focus on lakes, as well as selected additional water types. Monitoring work under this initiative will be synced with related program activities including assessments, planning, and implementation, all of which will be conducted through a rotating HUC framework and will be integrated into staff's daily work activities through work planning.

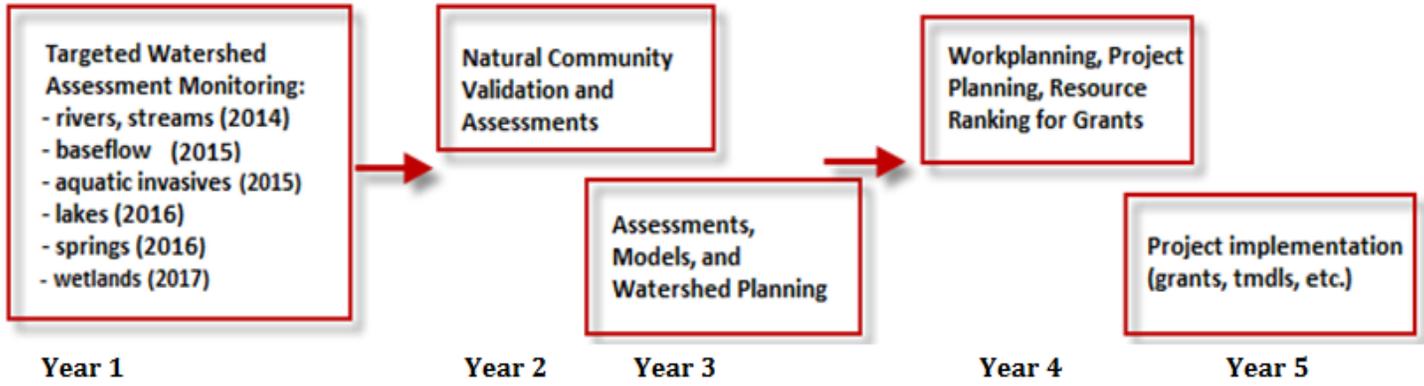


Figure 7: flow of Targeted Watershed Assessments and Directed Lakes Elements

Figures 6 and 7 above illustrate a structured sequence of work elements to monitor, assess, and manage waters within targeted 'hydrologic unit code (HUCs)' units at one or more spatial scales. Both the Targeted Watershed Assessment (streams, rivers) and Directed Lakes study designs are the new foundation for Wisconsin's cross resource integration work. The Water Resources Program will identify high priority watersheds and areas based on water condition, program availability, and partnership readiness. Custom monitoring designs will be created for individual watersheds to reflect the primary purpose of the study. The initial guidance requests that the projects fall within one or more of the following categories:

Figure 8: Types of Targeted Watershed Assessment Projects	
Category	Rationale
Stressor Identification	"Poor" IBI scores where usual stressor may not indicate a problem (TP, TN, TSS, or Qual. Habitat).
Nutrient Impacts	High priority WTs in Nutrient Reduction Strategy or site specific nutrient study
Watershed Planning	Updates to HUC10 level watershed /water quality plans or to assess management actions
Protection	Baseline data on "Healthy but Vulnerable" watersheds in the Healthy Watersheds Assessment
Evaluation/Success	Evaluate the effectiveness of NPS BMPs, one WT in partnership with NRCs NWQI

Directed Lakes Studies

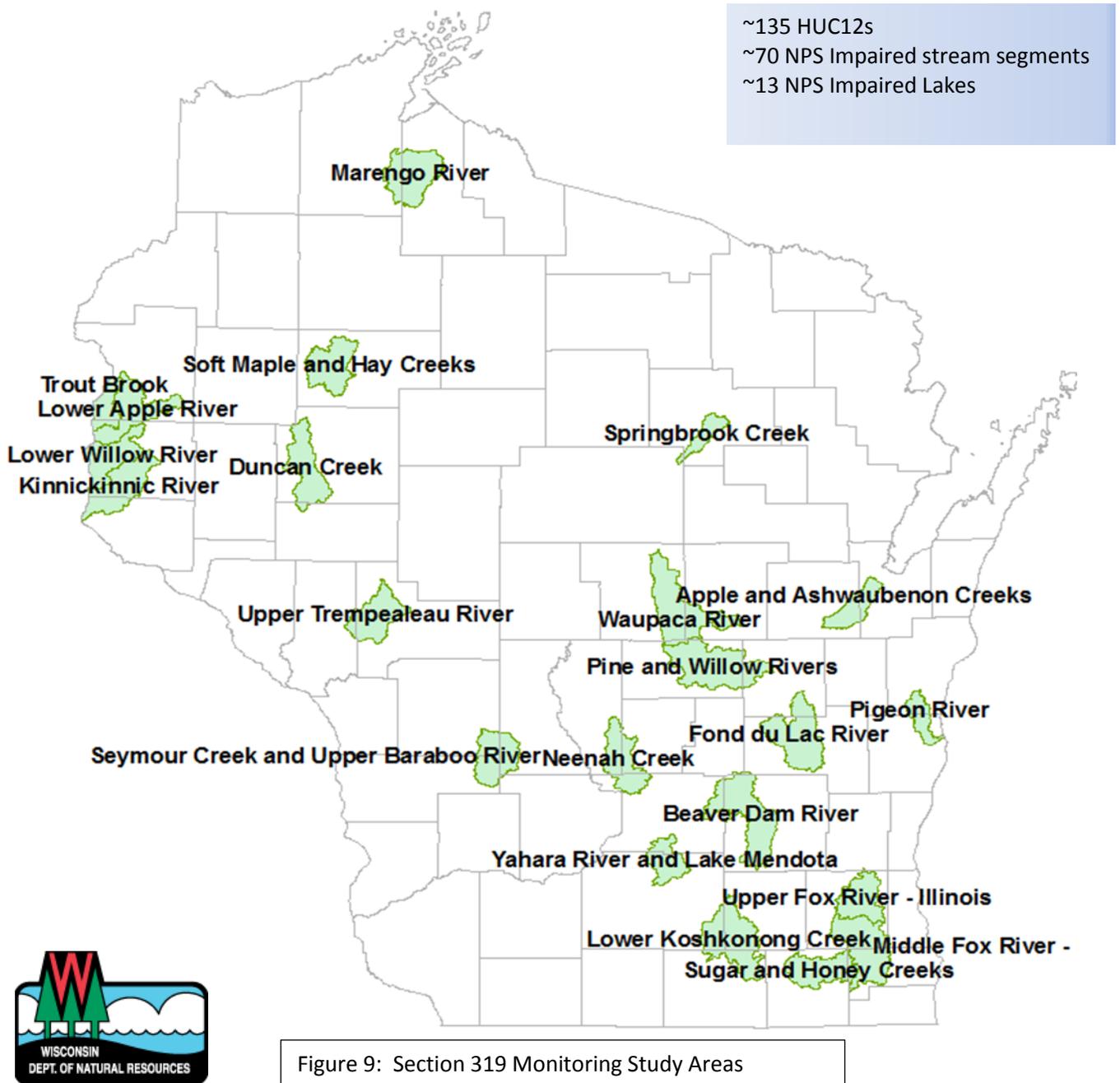
Directed lakes is a new concept that provides a parallel work effort for statewide lakes monitoring and assessment by DNR staff and partners to support assessments and lake management. Directed Lakes involves collecting chemical, physical and biological data; the prescriptive nature of the study helps with coordination of cross-program field surveys. At minimum, each lake survey will include Plant Point Intercept Survey, Shoreland Habitat Survey, and at least one or more 1 water chemistry samples. This study design will be implemented initially in 2015 -16 and will grow over time.



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Section 319/Runoff Management Monitoring Studies

Section 319 monitoring studies are designed to focus on evaluating the effectiveness of best management practices. These studies are similar to the Targeted Watershed Assessment studies, but the network of sampling sites are more concentrated and focused on sites where practices have been implemented. The work on these sites are tied in to the Wisconsin Statewide Nonpoint Source Management Plan, approved by USEPA.



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Follow Up Monitoring

Where indicated, follow-up studies will be conducted on targeted waters to determine the success of management actions. These projects are critical to the delisting of impaired waters, the de-listing of beneficial use impairments (BUIs) in Great Lakes Areas of Concern (AOCs), and in creating success stories which convey positive systematic movement toward clean water in the State of Wisconsin. For example, filling gaps for total phosphorus "assessment packages" that are used in the state's Water Quality Report to Congress can be completed in "intensification areas" in targeted watersheds (the "Tier II element"). This type of matching of gap filling for assessment parameters with baseline monitoring work is fundamental for cost-effective programs. Identifying assessment program needs and "plugging in" capturing those needs in the TWA program is a logical approach to address multiple program goals in a single integrated sampling program. This cross-program integration and cooperative work is fundamental to the program's success.

"Local Needs" - District Initiated

Local needs monitoring are designed to address specific data gaps for closing up open questions related to attainment decisions, permit evaluation or other pressing needs.

This strategy is designed to be a dynamic document, with continuing investment in research to better understand our aquatic resources and timely update of when and how gaps are addressed as documented online and as amendments to the state's Water Quality Monitoring Strategy. This 2015-2020 Monitoring Strategy is formally the 4th Water Program update of previous versions in 2008, 2006, and 2004. This strategy will be advanced as a formal amendment to the state's Areawide Water Quality Management Plan.

Section 2.0 Resource or Media-Based Monitoring Study Descriptions

To help states fulfill federal requirements, USEPA produced *Elements of a State Water Monitoring and Assessment Program (U. S. Environmental Protection Agency, 2003)*, which identifies the 10 basic elements of a state water quality monitoring program. The USEPA document referred to as USEPA "Elements" serves as a tool to determine whether a monitoring program meets the prerequisites of Clean Water Act Section 106 (e)(1). This Strategy outlines Wisconsin's activities in each of the 10 basic USEPA elements.

This document is organized by water type (rivers, streams, etc.) to reflect the agency's monitoring team oriented approach. However, in each of the media sections, USEPA's strategy elements will be addressed to some degree. Each media area will reports the current status of the program relative to Clean Water Act statutory requirements, then activities and plans to protect and restore Wisconsin's water quality, emphasizing those actions that must be taken to have a technically defensible program. Full implementation of our Strategy will take 10 years and will require significant additional resources.

