APPENDIX A. CITIZEN-BASED WATER MONITORING NETWORK PROPOSAL

PLEASE NOTE: Implementing this proposal will require long-term financial and staffing resources that the Department has not yet identified.

During 2006 and 2007 a pilot monitoring effort was carried out to assess the level of commitment needed by the Department, citizens, and partner groups to carry out monitoring as outlined in this proposal. This proposal has been modified from its original version and may be further modified based on findings from the pilot effort. Thus, this document will remain dynamic to allow for appropriate change over time.

Kris Stepenuck
Citizen Monitoring SubTeam Leader
October 23, 2007

DRAFT (Includes edits made up until October 23, 2007)

INTRODUCTION

The Water Division of the Wisconsin Department of Natural Resources (Department) has four key objectives:

- To protect the waters of the state that are held in trust for all the people of Wisconsin through enforcement of the Public Trust Doctrine.
- To fully implement the Clean Water Act in order to achieve the goal of fishable and swimmable waters throughout Wisconsin.
- To protect drinking water and groundwater resources for both human and environmental health.
- To enhance and restore outstanding fisheries in Wisconsin's waters.

Water quality and habitat assessment are high priority activities that the Department undertakes to accomplish these objectives by documenting and monitoring the status and trends of the water resources of the state. The Department gathers environmental information to assess aquatic environmental health, evaluate environmental problems and to determine success of management actions that are intended to protect our aquatic resources. The Water Monitoring Strategy for Wisconsin (Strategy) directs monitoring efforts in a manner that efficiently addresses the wide variety of management information needs, while providing adequate depth of knowledge to support management decisions.

However, accomplishing the assessment and monitoring goals of this Strategy is an enormous task which is hampered by the magnitude of the state's water resources, inadequate numbers of staff and limited financial resources. Engaging citizens to assist the Department with water monitoring is of paramount interest to many. With over 15,000 lakes and 84,000 miles of rivers, the Department cannot monitor every water body and must set limits on the amount of monitoring it is able to do. Interest in having citizens participate in this monitoring effort has been expressed not only by the Department, but also by its many partners. These include educational

institutions, statewide Non-Governmental Organization (NGO) partners (e.g., River Alliance of Wisconsin, Wisconsin Association of Lakes, Wisconsin Wetlands Association), local units of government, community-based water management organizations, and citizens across the state.

It is important to note that the Strategy is a state effort to help ensure waters of the state are healthy and protected. Everyone doing sampling under the Strategy must follow standardized protocols and receive appropriate training. This ensures that Department and other agency staff, citizen monitors, consultants, and others contribute consistent, quality-assured data.

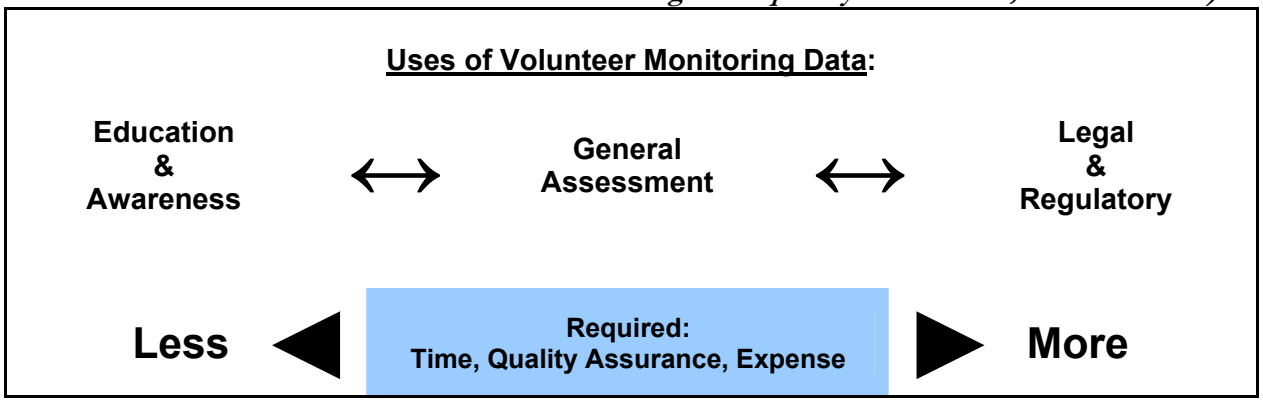
Currently, there are both lake and stream-focused citizen monitoring programs co-sponsored by the Department, but no statewide wetlands, inland or Great Lakes beaches, or groundwater citizen monitoring efforts (though two new pilot monitoring efforts are being implemented in 2007-8 in marshes and ephemeral ponds in certain areas of the state). Citizen monitoring efforts in lakes have proven successful, as demonstrated by the Department's Citizen Lakes Monitoring Network. In that program, more than 1100 citizens monitor over 800 lakes on which they reside, often in connection with local lakes associations. Data from the program are used regularly by the Department for management decisions. However, data generated through the Water Action Volunteers (WAV) program, which supports educational and baseline level citizen monitoring in streams, have not been regularly used to assist with management decisions of the Department. This is due to the dynamic nature of streams and rigorous requirements (including data quality, time of sampling, locations, etc) for monitoring that would be required to make such decisions. This proposal is focused on developing a more rigorous citizen monitoring program for streams, rivers, wetlands, groundwater, and beaches.

The ultimate goals of this proposal are to:

1. Develop a Citizen-based Water Monitoring Network (Network)
2. Educate citizens about the status of Wisconsin's surface and groundwater resources
3. Build a network of informed citizen advocates for management and protection of Wisconsin's water resources
4. Obtain water resource data useful for Department decision-making

There are a broad range of uses for citizen-collected data (Figure 1). As data uses progress from educational to regulatory, time required for monitoring, rigor of monitoring, quality assurance requirements, and expense to implement the program increase. This proposal was designed to provide a range of opportunities for citizen involvement in water monitoring in Wisconsin, and includes details regarding the level of effort associated with these opportunities. Thus, the proposal serves as a template for citizen water monitoring efforts in Wisconsin. However, because there are multiple uses of citizen-generated data, not every opportunity for data use has been defined in the proposal.

Figure 1. Effort Associated with Collecting Volunteer Monitoring Data for Various Uses (based on The Continuum of Volunteer Monitoring developed by Geoff Dates, River Network)



This proposal is an appendix of the Water Monitoring Strategy for Wisconsin (Strategy), and provides linkage with the Strategy to identify numerous activities and parameters for which citizens can safely and accurately monitor. There are three main sections of the proposal:

I. "Core Program Details" provides information about how citizens can monitor water resources in concert with the Strategy, and defines general expectations of the citizen monitors in each of three levels of monitoring. This section also offers examples of how citizen-collected data will be used and managed.
II. "Program Start-Up/Pilot Project" defines the citizen-based monitoring pilot projects and how they will be implemented during 2006 and 2007. It also provides a timeline for implementation of the pilot projects and the suite of parameters citizens will be able to monitor.
III. "Long Term Options" provides information about the types of water resources monitoring citizens can perform once the Network is fully implemented. It provides a generalized timeline for implementation of all aspects of the Network.

I. Core Program Details

In order for citizens to monitor water resources in concert with their own goals as well as with goals of the Strategy, and to allow them to monitor in a way that can provide useful information for the ongoing protection of Wisconsin's waters, they must consider and follow the core aspects of this proposal, as provided in this section.

Levels of Monitoring

Three levels of monitoring have been defined for this Network: Level 1 - Introductory (Educational), Level 2 – Status (one year) and Trends (three or more years), and Level 3 – Special Projects/Sport Fisheries Assessments. Details of these three levels are provided below. Levels 2 and 3 are based on Department monitoring needs. Citizens should be aware that many of the parameters included in those levels are also appropriate to monitor for other data uses when a monitoring plan is made to meet goals of a specific project. So although it may appear that citizens are only able to provide data for which the Department has identified a need, in actuality, the Department will be providing participating citizens with the base knowledge to carry out monitoring with other goals in mind that may also result in data useful to the Department.

LEVEL 1: INTRODUCTORY (EDUCATIONAL)

The introductory level of monitoring is designed to introduce citizens to the basics of monitoring and educate them about the waterbody type they are monitoring and the connection between land use and the resulting effects on water quality. Data generated at this level may be used for generalized screening purposes (e.g., a first assessment of a parameter used alongside other data to see if similar waterbodies are found to have potential water quality problems), but will not necessarily be used for making management decisions. All citizens will be asked to initiate monitoring at this level during their first year of program participation (except under special circumstances in which the citizen has extensive experience conducting water monitoring). For stream monitoring, this level of monitoring is equivalent to the existing Water Action Volunteers Program. For lakes monitoring, this level is equivalent to Secchi depth monitoring in the Citizen Lakes Monitoring Network. For wetlands, inland beaches, and groundwater, this level of monitoring is new for the Department.

Expectations of citizens:

- Attend Training
- Sample on a schedule defined by the Department of Natural Resources (if interested in progressing to higher levels of monitoring; usually once a month during summer)
- Submit data to online database (if interested in progressing to higher levels of monitoring)

Expectations of the Network:

- Provide training and materials (methods, data sheets)

Table 1. Level 1 – Introductory (Educational) Monitoring

Waterbody Type	Parameter		Method
Wadeable/Non-wadeable Streams and Rivers	Biological	Macroinvertebrates	Primarily Order Level Identification
	Chemical	Dissolved Oxygen	Hach Kit
	Physical	Air Temperature	Thermometer
		Flow	Orange Float
		Habitat	Water Action Volunteers (WAV) protocol
		Transparency	Transparency Tube
		Water Temperature	Thermometer
Beaches - Inland and Great Lakes	Physical	Turbidity/Algal Growth	Secchi (Citizen Lakes Monitoring Network (CLMN) protocol)
Lakes	Biological	Invasive Species (Eurasian water milfoil, curly-leaf pondweed, water fleas, rusty crayfish, etc.)	WAV and CLMN protocols
	Physical	Trailer Checks	Clean Boats, Clean Waters Program protocol
		Turbidity / Algal Growth	Secchi (CLMN protocol)
Wetlands		TBD	TBD
Groundwater	Physical	Flow	Orange Float/Staff Gage

LEVEL 2: STATUS (ONE YEAR) AND TRENDS (THREE OR MORE YEARS)

Status and trends level monitoring will offer citizens a more intensive monitoring experience. Citizens will be asked to follow a specific monitoring schedule, including specific times and locations for monitoring. The Department will provide a position description to interested citizens describing the expectations of those who participate in the effort. In addition, the Department, working with partners, will host an orientation session to screen citizens (allowing them to decide if the effort is something they can manage based on their time schedule, interest, local program funding, etc., and allowing the Department to save costs by only training those citizens most likely to carry through on the monitoring effort). Following the orientation session and review of the position description, a formal training session will be provided to citizens who have chosen to attend. Citizens' proficiency at monitoring will be assessed. If citizens follow defined methodology and quality assurance procedures their data will be stored in a Department database and used in the same manner as any Department-collected data for status and trends monitoring defined in the Strategy. For this level of monitoring, Department work planning will not drive citizen participation. Anyone who is trained to follow methods as they are defined and who follows quality assurance and quality control methods while monitoring will be able to submit their data to the Department database.

For status and trends monitoring, unless citizen-monitors are replacing Department staff obligations to sample a specific site, they will generally need to fund that monitoring activity. The Department has a limited monitoring budget. Outside funding will need to be obtained to collect these additional citizen-based monitoring data. Department-sponsored programs for which citizens can solicit funding for monitoring efforts include the Lake and River Management Grants and the Partnership Program.

<u>Status: one-year of monitoring</u>

Water quality conditions or "status" can be evaluated by collecting data over time following prescribed protocol. Department biologists work plan to collect these data as part of their regular monitoring. With training, citizen

monitors can assist with these data collections or augment the monitoring effort by expanding the coverage in the watershed being sampled by the Department. Alternatively, citizen monitors can sample other watersheds of interest. In all cases it is strongly recommended to work with local biologists to develop the monitoring plan so that the data will be useful.

In general, status monitoring will include monitoring at reference site(s), and may include monitoring above and below impoundments, tributaries, outfalls, urban areas, agricultural areas, or other stream reaches that help characterize the stream or watershed of interest. This is frequently accomplished through monthly sampling (and/or event-related sampling), but the specific sampling frequency may be project-specific. This is level of monitoring must be a partnership – citizens working closely with Department resource managers will result in improved monitoring coverage.

Trends: three or more years of monitoring

Water quality trends may be assessed by collecting data over a longer period of time at specific locations, following prescribed protocol. The sample site(s), parameters measured, frequency, and analytical methods must be determined prior to sampling. Department biologists work plan to collect these data as part of their regular monitoring. With training, citizen monitors can assist with these data collections or augment the monitoring effort by expanding the coverage in the state. It is strongly recommended that citizen-monitors work with local biologists to develop the monitoring plan so that the data will be useful and to determine who will do the analysis.

In general, Trend Monitoring is conducted at sites with U.S. Geological Survey (USGS) gage stations or stream discharge data are collected during the sample collections. This is frequently accomplished through monthly sampling, but the specific sampling frequency may be project-specific. Like with status monitoring, this is level of monitoring must be a partnership between citizens and Department resource managers in order for monitoring to result in improved coverage.

Expectations of Citizens:

- Attend orientation and training
    - Citizen monitors skill level will be assessed by the trainers in the proper calibration and use of the required equipment
- Sample on a schedule defined by the Department
- Fund own monitoring efforts
- Fully implement the monitoring plan developed between the Department and the citizen monitor
    - This includes collecting all of the samples following the prescribed methods and frequency and adhering to all of the quality assurance and quality controls (QA/QC) to assure that the data are of the necessary quality to be fully used by resource managers and the public

Expectations of the Network:

- Provide a position description defining explicit expectations of citizens
- Provide interested citizens an orientation session about the Network and its expectations
- Provide training to citizens
- Provide database for storage of citizen-generated data
- Provide general support throughout the monitoring effort, including answering questions about methodology and assisting with site identification
- Provide quality assurance checks throughout the effort (timeframe TBD depending on parameter being monitored and findings of pilot study)
- Provide report to citizen monitors or otherwise demonstrate how data were used for status and trends management decisions

Table 2. Possible Parameters to Include in Level 2 – Status (1 year) & Trends (3 or more years) Monitoring

Waterbody Type	Parameter		Method	Specific Details
Wadeable/Non-wadeable Streams and Rivers	Biological	Bacteria	Collect grab sample; Send samples to lab	Follow required random sampling
		Macroinvertebrates	Family level identification OR Collect sample and ship to lab	May use modified order level identification
	Chemical	Dissolved Oxygen	Meter	Consider time of day; calibrate meter before use; maintain log
		Nutrients	Collect grab sample; Send samples to lab	Follow required random sampling
		pH	Meter	Calibrate each sampling day; maintain log
	Physical	Flow/Water level	Surveyed staff gage	Will need professional assistance to place gages
		Habitat Assessment and Stream Visual Survey	Department method to document existing conditions	Include near-shore survey & photos
		Suspended Sediments	Collect grab sample; Send samples to lab	Follow required random sampling
		Transparency	Transparency tube	
		Water Temperature	Thermistor	May – September, or year-round hourly readings; check equipment regularly; maintain log
Beaches - Inland and Great Lakes		TBD	TBD	
Lakes	Biological	Invasive species (Eurasian water milfoil, water fleas, rusty crayfish, etc.)	Conduct full assessment	CLMN protocols
	Chemical	Dissolved Oxygen	DO meter, Hach/LaMotte kit, or colorimetric kit	CLMN protocols
		Nutrients	Collect grab sample, Send samples to lab	CLMN protocols
	Physical	Shoreline Inspection	Conduct full assessment	CLMN protocols
		Turbidity	Secchi	CLMN protocols
		Water level	TBD	
Wetlands		TBD	TBD	

Groundwater	Physical	Flow	Surveyed staff gage	Will need professional assistance to place gages

LEVEL 3: SPECIAL PROJECTS/SPORT FISHERIES ASSESSMENTS

Special projects are those within the Strategy that do not fit into generalized status and trends monitoring. The Department may have special projects that will be defined annually through the work planning process; these will have a variety of focuses. Other special projects might be identified by partner groups (e.g., UW-Extension, River Alliance of Wisconsin, local rivers' groups, etc.), while others may be defined by independent groups. Thus, the type of citizen involvement will vary widely in this level of monitoring. The following describes level 3 monitoring for the Citizen-based Water Monitoring Network Proposal. A table follows to outline the information provided in the text.

I. Network-sponsored Projects

Network projects are those which are defined by sponsoring agencies/groups of the Citizen-based Water Monitoring Network. These may be Department of Natural Resources-led projects or projects led by sponsoring partner agencies/groups.

Department-defined Projects

Through Department work planning process, Level 3 projects will be available for citizens to participate in on an annual basis. These will vary year to year. For these work plan-defined projects, the Department will provide training to citizens to perform the defined monitoring. Data collected by citizens will be entered into a Department database.

Non-Department-defined Projects

Within the Network there may be other level 3 projects advertised in which citizens may participate. This is due to the fact that the Department works with partners to coordinate its citizen monitoring programs (i.e., University of Wisconsin-Extension, River Alliance of Wisconsin). These partner groups, in cooperation with the Department, may at times have special research projects ongoing that are designed to help build the overall citizen monitoring program. For these projects, unless identified in specific research proposals, the Department will not provide citizens with training (though partner groups may do so) and data may or may not be entered into a Department database. (If data are entered into a Department database, methods followed to obtain data must be the same or equivalent to methods the Department uses. Results of the research projects may be used to augment available monitoring opportunities within the Citizen-based Water Monitoring Network.

Examples: Recent research projects studied various E. coli monitoring techniques for use by citizen monitors and the efficacy of using citizen monitors to identify macroinvertebrates to family level. These were both categorized as level 3 research projects, and were conducted in cooperation with the Department, but not necessarily led by the Department.

II. Non-Network-sponsored Projects

The Department recognizes that there are other entities (e.g., University departments, rivers groups, etc.) that monitor surface waters in ways not identified in the Citizen-based Water Monitoring Network Proposal. These entities may desire their data to be entered into a Department database. This can be done provided these groups can document that methods used to collect the data are the same as or equivalent to methods the Department uses. Specific information about data use and storage follows:

- Available resources may limit what information can be stored in Department databases (i.e., the Department databases may not have ability to store data that are collected by partner groups as these are still under development and require resources to build).
- A Department team (or some form of that team) that has developed this Network proposal

will be charged with determining if methods are acceptable for data to be entered to a Department database.

- The Department's response to results of non-Department-initiated level 3 monitoring will be at the Department's discretion.

Hypothetical example: Friends of Mighty River want to monitor their river to assess fish community structure. They hire a consulting company to electroshock fish in the river and want to provide that data to the Department.

Table 1. Examples of level of support provided to citizens for Level 3 projects.

	Network Projects		**Non-Network Projects**
	Department-defined Projects	*Non-Department defined Projects*	
Funding to citizens to conduct the monitoring	Department may provide (depends on availability of resources)	Partner group may provide	No funding provided through Network
Position description defining explicit expectations of citizens	Department provides	Partner group provides	No position description provided by Department
Orientation session about the Network and its expectations	Department provides	Partner group will decide; may or may not be provided by Partner group	No orientation session provided by Department
Training to citizens	Department provides	Partner group provides	No training provided by Department
Database for storage of citizen-generated data	Department provides (may be individual computer vs. SWIMs for such projects)	Partner group will collect data; Partner group decides how and where data are stored	Data may be entered to Department database if methods can be proven to be equal or equivalent to Department methods
Ongoing support/communication throughout the monitoring effort	Department provides	Partner group provides	No support provided by Department
Quality assurance checks throughout the effort	Project-dependent; Department may or may not provide	Project-dependent; Partner group may or may not provide	No quality assurance check provided by Department
Report to citizen monitors or otherwise demonstrate how data were used for the project	Department provides	Partner group provides	No report provided by Department
Network website advertised as an available monitoring option for citizens	Network provides	Network provides	May be included on Network website

Data Uses for Citizen-Generated Monitoring Data

To realize the efficiencies of enhancing Department programs with citizen-generated data, it is important that these data be evaluated and utilized in the same decision-making capacities as Department-collected data. Citizen monitors will be trained in collecting certain water quality parameters and will meet prescribed quality assurance procedures. All citizen-collected data will be entered into the Surface Water Integrated Monitoring System (SWIMS) database, and representative and acceptable data from all sources (citizen- Levels 2 and 3- and Department generated) will be considered when prioritizing management actions. Level 1 citizen data may be used as an initial screening tool, but may not be utilized exclusively when prioritizing management actions.

Once protocols, stringent quality assurance and quality control measures, and training have been established for this citizen-based water monitoring program (Levels 2 and 3), citizen-collected data have the potential to contribute to the following Clean Water Act Objectives:

- Establish, review and revise water quality standards
- Identify impaired waters
- Evaluate management (protection/restoration) effectiveness

Citizen-generated data can also be used to:

- Provide broader spatial and temporal coverage in river, stream, wetland, lake, groundwater and beach water quality
- Monitor water quality conditions to support TMDL/303(d) listing, 305(b) Reports, and general information on the water quality of Wisconsin waterbodies
- Assess water quality conditions in relation to nonpoint source management projects
- Support decision making by individuals and agencies other than the Department, such as in preparing County Land and Water Resource Plans

Database Management

There are a variety of databases used by the Department to store water monitoring data, many of which are accessible to the public via the internet. However, these systems are not linked to one another and some are not easily accessible. To unify the various database systems and more easily access data from each of them, a project is underway to combine many of these databases as part of the new web accessible Surface Water Integrated Monitoring System (SWIMS), which was initially made available in 2006 and continues to develop. Efforts are underway to coordinate this citizen water monitoring proposal with SWIMS development in order to ensure that data collected by citizens can be input directly to that Department database. The SWIMS database will eventually be available to anyone with web access for searching. As of 2007, registered citizen monitors are able to enter data to it directly for the Clean Boats, Clean Waters program, the Citizen Lakes Monitoring Network, and Level 2 (and some Level 3) stream monitoring program participants. The database will store information about each monitor, the training they have received, and length of time they have monitored. A code will be included with the data that will allow users to sort by class of data (citizen-collected, Department-collected, consultant-collected, etc.). A database manager is needed to provide data quality assurance (QA), report development and support for citizens entering data.

Methods

Generally, except for some of the Level 1 monitoring, citizens and any non-Department monitors whose data are to be used by the Department will be trained to utilize standardized Department or Department-equivalent

protocols for monitoring each of the chosen parameters. These methods are being compiled into an online-accessible Field Procedures Manual and can be grouped into four generalized categories based on the type of activity the citizens will be required to complete (Table 1):

1. Conduct field measurements or analyses
2. Collect samples to be shipped to a certified laboratory for analysis
3. Assist Department staff with field work
4. Maintain and download information from a site with automated monitoring equipment

There are also several parameters for which collection methods are yet to be documented in standard protocol. These will be added as they become available.

Training

Training for this Network will be developed to address each of the parameters included in the program. Initially, a program website (http://watermonitoring.uwex.edu/) will be used to post descriptions for the various levels of monitoring available to citizens. This will include generalized descriptions of the three levels of citizen monitoring as well as project specific descriptions and expectations for citizens for Levels 2 and 3. For Level 2 and 3 Department-led monitoring, an orientation session will be held to orient the potential citizens to the Network in more detail. Training sessions will follow the orientation sessions.

Depending on the number of interested citizens, training sessions may follow the existing Water Action Volunteers (WAV) program model in which one to three centralized Train the Trainer sessions would be held followed by local trainings provided by those who attended the Train the Trainer session. Department staff or other authorized entities (e.g., University instructors, local program coordinators, retired Department staff, other trained trainers, etc.) will conduct annual Train the Trainer sessions. Both the number of Train the Trainer events and local trainings will vary based on program size, but the eventual goal is to have a minimum of one annual local training per Department region. Trainings will be held on a Saturday or on multiple weeknights. Following Train the Trainer events, local trainings would be tailored to train citizens to monitor specific parameters at specific sites identified through Department work planning.

There will be standard components included in the basic training for all three levels of monitoring, and unique components included in training sessions for specific parameters. A matrix of training has been developed for the parameters included in Tables 1-3 to help define levels of training necessary for the Department to accept the data into the SWIMS database for use in management decisions regarding surface waters of the state. Basic training for all three levels of monitoring will include information about:

- water safety
- trespassing laws
- liability
- how to minimize the spread of exotic invasive species when monitoring
- quality assurance and quality control measures
- general understanding of what the data mean
- data recording, entry, reporting and presentation
- how to geolocate monitoring locations
- expected response from the Department to citizen-generated data results

In addition, citizens will be asked to demonstrate their ability to perform monitoring activities for Levels 2 and 3.

Table 4 shows other components of trainings specific to the parameters that may be monitored.

Table 4. Training Matrix

MONITORING PARAMETER		Basic Classification Skills	Boating Safety (if boats used)	CPR	Electrofishing Safety	Equipment Calibration	Equipment Maintenance	Equipment Use	Health Awareness	Sample Collection Technique	Sample Preservation	Sample Shipping Procedures
Biological	**Bacteria**						X	X	X	X	X	X
	Exotics/ Invasive Species	X	X							X		
	Fish Monitoring (Fish Shocking, Fish Index of Biotic Integrity, Fish Catch per Unit Effort)	X	X	X	X		X	X		X		
	Macroinvertebrate Monitoring	X					X	X		X	X	X
	Nuisance Plant Growth											
	cladophora	X						X		X		
	Eurasian water milfoil	X	X							X		
	purple loosestrife	X						X		X		
	toxic algae	X						X	X	X		X
	Vegetation Monitoring / Aquatic Plants	X						X		X		
Chemical	**Chlorophyll a**		X			X	X	X		X	X	X
	Dissolved Oxygen											
	meter		X			X	X	X		X		
	LaMotte/Hach kit		X				X	X		X		
	Nutrients									X	X	X
	pH											
	meter		X			X	X	X		X		
	strips		X					X		X		
Physical	**Flow / Water Level**					X	X	X				
	Habitat Assessment									X		
	Transparency						X	X		X	X	X
	Visual Survey	X										
	Water & Air Temperature (continuous recorder, digital handheld, alcohol)		X			X	X	X				

Quality Assurance/Quality Control

Any non-Department monitors will follow Department protocols if their data are to be used by the Department. Because the citizen monitors will be following Department methodologies, the Department's existing Quality Management Program for monitoring each of the parameters should be able to be followed with only minor adaptations. One such modification is the need for conducting quality assurance sampling to ensure citizen collected data are equivalent to Department-collected data. Therefore a portion of the Quality Assurance plan for the Network will be to define quality assurance and control checks of the samples collected by citizens (such as split samples, annual observation of citizens conducting monitoring, and/or studies to compare methods). An independent quality assurance project plan is being developed for the Citizen-based Water Monitoring Network. The citizen-based monitoring sub-team and Department Administration need to agree upon how this will be carried out. Specifically, side by side events with staff and citizen testing side by side should be conducted and the results entered into SWIMS. Additionally, some test/certification of citizen monitors will be necessary. Whatever quality assurance plans and procedures are needed will be developed as the program is implemented to help ensure its success.

Proposed Program Structure and Staffing Needs

Respecting that funding will be limited to implement this citizen water monitoring initiative, the following staffing structure is recommended: one statewide program coordinator, one statewide program assistant (limited term employee), and five regional coordinators. These positions are explained in more detail below. Other human resources will be necessary for implementing the project as well. First, the program will utilize services of a statewide rivers and beaches database manager, who will be responsible for working with data from both Department staff and citizens. Based on the success that the Water Action Volunteers (WAV) and Citizen Lakes Monitoring Network (CLMN) have had in using local coordinators (who are knowledgeable about local streams, fairly easily accessible to citizens, and able to coordinate local field trainings and quality assurance checks), local coordinators will be sought to help implement the program. These individuals may be paid through their places of employment, may receive grants to fund their work, or may be volunteers. Other essential human resources necessary for this proposal to be implemented successfully include an active citizen network, participation of Department staff, and assistance from other support staff as described below. Because the WAV and CLMN programs are a component of the Network, existing program staff will assist with implementation of portions of this program. Positions listed below that are new are indicated as such.

STAFF

Statewide Citizen-Based Stream Monitoring Program Coordinator (continued position, initiated during stream monitoring Level 2 pilot in 2006-7)

A full-time statewide citizen-based stream monitoring program coordinator will be responsible to, at a minimum:

- Work with Department staff to identify methods and proper QA/QC procedures for each Level 2 parameter monitored in the program described in this proposal (except lakes' program protocols)
- Coordinate efforts of the five regional coordinators (if/once hired)
- Plan and conduct "train the trainer" sessions for the regional coordinators in all methods of the Level 2 stream monitoring program
- Make on-site visits with regional coordinators for in-field training
- Prepare and disseminate program materials to regional coordinators and citizens
- Order, distribute and maintain inventory of equipment for the regions
- Work with database manager to maintain database integrity
- Evaluate and modify the Level 2 stream monitoring program as needed

Statewide Program LTE (new position)

This part-time position has responsibility to:

- Assist statewide program coordinator in development of methods, and training and educational materials for the program.

Regional Coordinators (new positions)
Five full-time regional coordinators will be hired through the Department, UW-Extension (UWEX), River Alliance of Wisconsin and possibly other partners. This builds upon strong relationships between the Department and its partners in implementing citizen water monitoring programs. By working together, the citizen water monitoring network will be most effective in terms of technical, educational and advocacy aspects. Specific locations for the positions have yet to be determined, but it is likely that one position per Department region will exist with the understanding that certain regions have more geographic area to cover and other areas have greater populations to serve. The idea is to do the best with the resources that are available. Staff will be responsible to:

- Recruit citizens from throughout their Department region to be monitors
- Network with local partner groups to help carry out the program
- Provide orientation sessions to explain the scope and expectations of the program
- Plan and carry out training sessions for citizen monitors
- Communicate which sites are to be monitored in a given year (as identified by internal Department workgroups) and assign appropriate monitors to each area
- Coordinate which citizens are monitoring in a given year (see Citizen Network below)
- Working closely with Department staff, work to help ensure that needed monitoring is completed
- Work with the database manager to ensure data are quality assured
- Carry out quality assurance and quality control assessments with citizen monitors
- Check out equipment to citizen monitors
- Maintain equipment used by citizen monitors (general maintenance; citizens will be expected to do this to some extent as well)
- Analyze data as needed (at a minimum by providing a annual template report for citizen monitors; Usually Department staff responsible for specific projects will analyze data for such projects at appropriate times)
- Ensure that local coordinators and citizen monitors are kept up to date about program changes, updates, and happenings.

ADDITIONAL HUMAN RESOURCES

Rivers and Beaches Data Manager (new position)
This full-time position will be based in Madison. The duties of the position include, but are not limited to:

- Serve as a member of the long-term SWIMS database maintenance team
- Update database as necessary
- Facilitate the development of forms and reports necessary to meet the needs of citizens monitoring rivers, streams, beaches, etc.
- Ensure data sheets sync with online database
- Conduct quality assurance checks of the data in the database
- Analyze data for annual reports to local citizen monitoring groups

Local Coordinators
Local Coordinators will work with Regional Coordinators to implement the program on a local basis. These coordinators will not be paid staff through the Citizen-based Water Monitoring Network, instead they will be members of partner groups who are willing to lead a group of citizens in their area in the monitoring effort. They may be paid through their own jobs, through grant stipends, or they may be volunteers.

Citizen Network
Each Department region will have a pool of citizen monitors coordinated locally by the regional and local

coordinators. Local subgroups of citizens within each region may be asked for their assistance on a rotating basis, depending upon where in the region monitoring is required in a given year. Citizen monitors living nearest to waterbodies that require monitoring, or who are willing to travel to defined monitoring sites would be enlisted to monitor that year. Citizens and citizen groups that have their own monitoring goals may also monitor at appropriate sites and times to meet those goals. If appropriate training has been received, defined quality control and assurance procedures have been followed, and proper equipment used, data collected in such efforts will be accepted into the SWIMs database.

Significant time, money and effort will go into planning and carrying out this citizen monitoring program, therefore, citizens participating in levels 2 and 3 will:

- Be able to sign up for the program only at certain times of the year
- Be required to attend an orientation session about the program, which will explain monitoring design, challenges, and expectations
- Be asked to make a minimum of one year commitment to the program
- Be expected to monitor at designated locations and on specified dates to ensure that data that need to be collected will indeed be collected
- Work in teams to allow for cooperation among citizens to monitor on a set timeline and on specific dates while still allowing for 'life to happen'
- Be responsible for covering the cost of equipment that is lost or damaged due to misuse
- Provide their own waders
- Be certified to do the monitoring they are trained to do

In return, citizens will be ensured that they will receive training, necessary equipment (with the exception of waders), and support of the Department in their efforts, and that the data will be utilized for purposes clearly defined prior to collection. Citizens groups will also be able to utilize the training they receive to meet local goals for water quality management.

Department Staff

Although the program will be primarily coordinated through the state, regional, and local coordinators, this citizen monitoring program cannot succeed without the input and connection of Department staff (a combination of water quality and fish biologists). A scoping study will be performed during the summer of 2006 to determine what level of commitment will be required by Department staff to make the program successful. However, for purposes of this proposal, we estimate 10% time commitment on the part of Department biologists towards the program (with more commitment at some times of the year and less at other times), with the following responsibilities:

- Assistance with training sessions
- Determination of monitoring sites and parameters (through the work planning process)
- Participation in quality assurance/quality control assessments
- Assistance with data assessment and presentation
- Downloading thermistor (or other digital equipment) data

In order for this level of participation to become a reality, Department Administration must recognize the need for staff input to the program and must ensure that some job duties are removed from those staff so that they can give the time necessary to make the program successful (i.e., Department Administration must make citizen monitoring participation a priority for specified Department staff).

Support Staff

In addition to the direct project staff, support staff will be necessary to help develop project materials, assist with day to day clerical needs, etc. For purposes of this proposal, these support staff will be considered as a single entity, but in reality, portions of several people's jobs (e.g., graphic artists, web developers, and clerical staff) will be included. They might be employees of a variety of agencies and interest groups, this will vary by project.

Volunteer Stream Monitoring Program (WAV) and Citizen Lake Monitoring Network (CLMN) Staff
There is currently one full-time volunteer stream monitoring (WAV) program staff person, a full time CLMN educator, and a number of part-time limited term employees for the CLMN. The statewide WAV coordinator has taken a lead role in developing this Citizen Water Monitoring Network proposal and will continue to be involved in development of the project as well as continuing to support growth and implementation of WAV monitoring as Level 1 and various Level 3 monitoring projects across the state. The CLMN Educator is also a member of the planning and implementation team for the Network. Other staff will continue to assist with the implementation of CLMN monitoring in their respective areas of the state.

II. Program Start-up/ Pilot Project

This section identifies a general pilot project available for citizen water monitors, and provides details about the pilot project, including scope, location, database and equipment, training, evaluation, timeline, budget, additional implementation issues, and volunteer qualifications. The pilot project is the true start-up mechanism of this proposal to initiate a Citizen-based Water Monitoring Network. The pilot project was initially intended to last for a period of one year, though the project was continued as a pilot for a second year to better answer remaining questions after the first year's work. Results of the pilot effort will help inform the future of the statewide Citizen-based Water Monitoring Network.

The pilot project focus is a Basic Water Quality Suite.

The general goals of the pilot project are to:

1. Assess whether citizens are interested, willing, and successfully able to monitor waters using Department methods and sampling plans.
2. Evaluate the viability of a statewide Citizen-based Water Monitoring Network. This includes all aspects of such an effort including recruiting, training, developing user-friendly and accessible data entry and storage systems, evaluation, and feedback (to citizens, Department staff, and political leaders).
3. Obtain data of sufficient quality that they can be used by the Department.
4. Define methods, quality assurance and control checks, a position description, an orientation session and training for the parameters within the water quality suite.
5. Assess the time commitments of Department staff to assist with the program, including with training, site selection and data analysis.
6. Assess the costs of operating such a program on a statewide scope.

In summary, the goal of the pilot project is to learn if the Department and other organizations can build a successful Citizen-based Water Monitoring Network by starting small and working to create a more comprehensive and larger effort. This basic approach is modeled after the Citizen Lakes Monitoring Network, which started with simple (but useful) Secchi disc monitoring, and has grown into a much more diverse monitoring program. The model is straight forward – start simple, do it well, become established, and then grow it over time.

Basic Water Quality Suite

SCOPE: The Basic Water Quality Suite (Suite) pilot will emphasize stream monitoring. It will provide an opportunity for individuals or groups to collect a basic set of water quality data. The Suite consists of dissolved oxygen, continuous water temperature, pH, and transparency. Other parameters might be added in specific instances where Department staff feel it would be useful. These water quality data will help to determine baseline water quality conditions of a stream, and track trends in that stream. They can fill data gaps, and provide information the Department

would not otherwise have. Additionally, this pilot will help the Department determine the feasibility, expense, and effort required to train and support citizen monitors to do this type of monitoring using methods followed by Department staff. The pilot represents a Level 2 monitoring effort.

LOCATION: Statewide, with effort to locate at least one pilot project in each Department region. Sites will be determined for each project individually by working with Department staff.

DATABASE: Data will be stored in the SWIMS database. Data submittal will be done electronically via the Internet.

EQUIPMENT: Meters will be used to collect dissolved oxygen, water temperature, and pH. A transparency tube will be used to measure transparency. Thermistors will measure continuous water temperature.

TRAINING: All citizen monitors will be trained in the same methods Department staff use to collect these data. Standard protocols will be compiled and distributed to the citizen monitors at regional training events to be held in spring 2006 (April-May). Trainers may include Department, UWEX, and River Alliance staff or others who are knowledgeable about the specific methods being taught. Quality assurance plans and procedures specific to this pilot will be developed and used as part of the training.

EVALUATION: There are a variety of studies that have considered professional vs. citizen-generated data in monitoring. However, it is not often that the methods that are followed between the two groups are identical. Implementing this pilot project offers the Department a unique opportunity to explore the success of this proposed citizen water monitoring network, to characterize the level of commitment necessary to support such an effort, to address problems and concerns, and to adapt the network for best effectiveness.

All citizen monitors will be asked to provide feedback in the form of a post-pilot survey as a primary way to evaluate the effectiveness of the pilot. Surveys will be carefully developed, and all responses will be examined. The Department will generate summary reports based on results obtained in the pilot project. These results will be disseminated to participating citizens, Department Water Division Administration and its Water Monitoring Team which is working to develop the Strategy. Measures of success of the citizen-based water monitoring network may include (but not be limited to):

- Cost savings to the Department (was data obtained for less money by using citizen monitors than it could/would have been by hiring additional staff?)
- Greater understanding and stewardship of water resources within the state of Wisconsin by residents of the state (as measured through learning evaluations and activity of monitors in natural resources activities within their communities)
- Larger area monitored (were more waterbodies monitored than could have been monitored by Department staff alone?)

TIMELINE: Monitoring under this pilot is to be conducted at a minimum frequency of once per month between the months of May and October. All data for this pilot is to be submitted no later than November of the year it is implemented. See Figures 2 and 3.

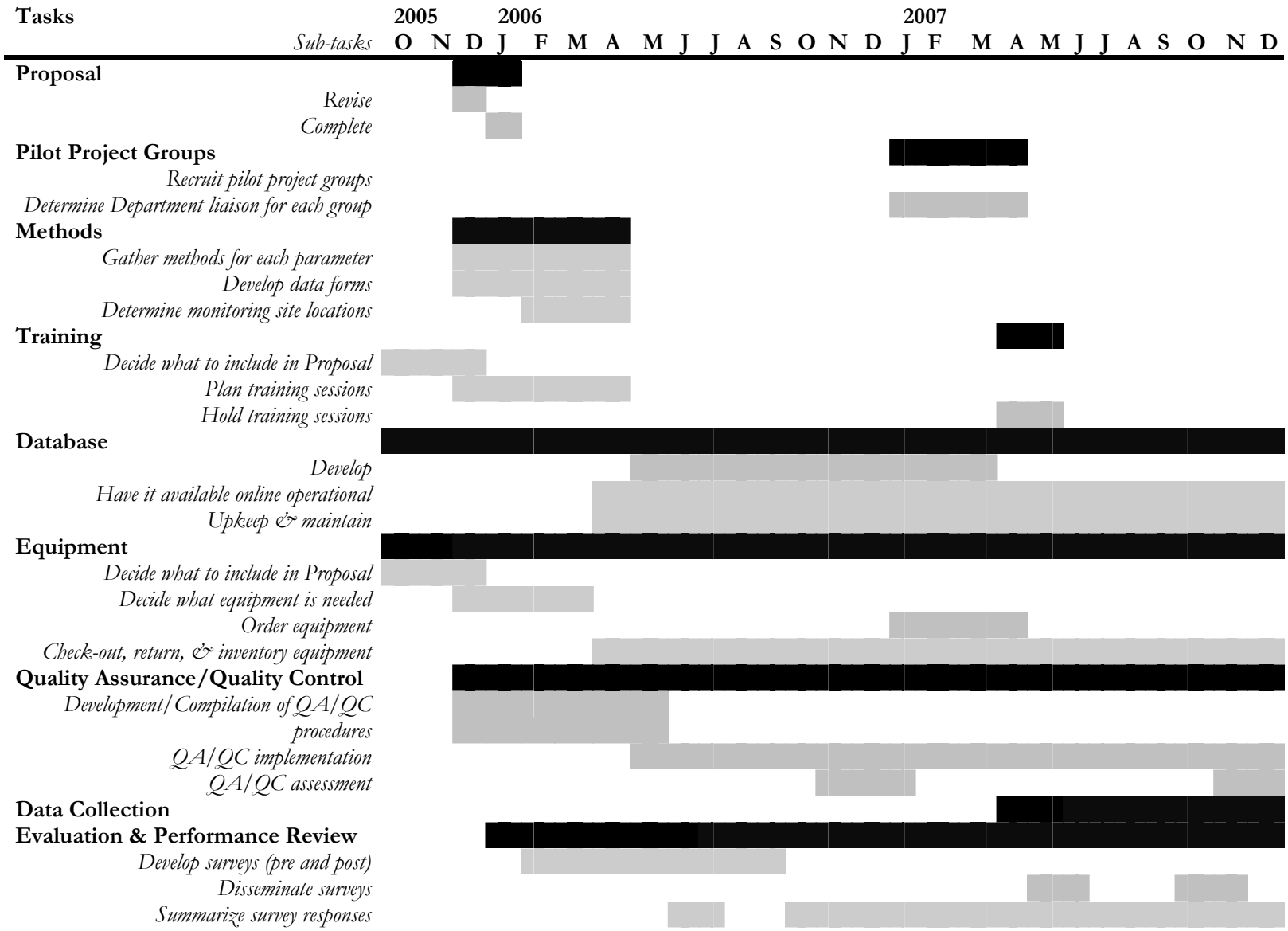
OTHER IMPLEMENTATION ISSUES: Citizens who choose to participate in this pilot in 2006 or 2007 must:

- Attend all training sessions scheduled for the pilot (including an orientation session; most training sessions will be held in evenings or Saturdays). These trainings will have both field and classroom components. The trainings will be held locally to the groups that are participating.
- Collect dissolved oxygen, water temperature, pH, and transparency from Wisconsin streams on a regular basis (following a to-be-arranged sampling schedule) during spring and summer.
- Equipment for the pilot will be provided to participants.

- Report results to the Department in a to-be-determined format.
- Complete a series of surveys about the training and opinions about the monitoring methods, training, support, etc. received during the duration of the pilot.
- Rigorous project review will occur and appropriate changes and recommendations will be made to address concerns and challenges so that a larger scale monitoring effort can occur in the future.

CITIZEN QUALIFICATIONS: Citizens do not need to have a scientific background, as training will be provided. Citizens should have the ability to walk along river/stream banks and enter the water to access a monitoring site.

Figure 2. 2005-2007 Pilot Project Timeline – Department Implementation & Administration

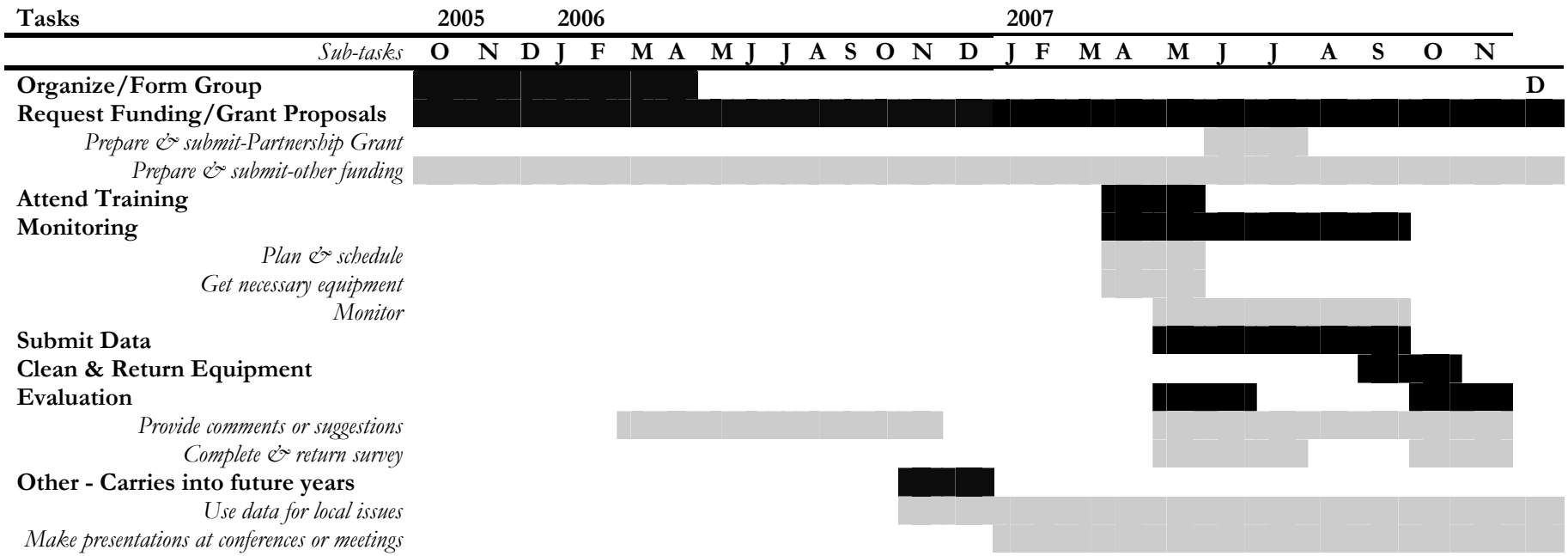


Prepare summary report
Develop performance review criteria
Carry out performance review
Summarize performance review

Website

Develop
Have it available online/operational
Upkeep & maintain

Figure 3. 2005-2007 Pilot Project Timeline – Citizen Monitor Actions



III. Long Term Options

While the Department will initially focus on implementing the pilot projects identified above, over time the Department plans to provide additional opportunities for citizens to participate in water monitoring to fully establish the Network. This section provides the framework for expanding this Citizen-based Water Monitoring Network. Since this is a framework for long-term expansion of citizen-based water monitoring opportunities, few details are provided here. This is done intentionally to provide the flexibility needed to develop future site, project, or parameter-specific monitoring opportunities for citizens. Further, it would be virtually impossible to provide an accurate list of details for future monitoring opportunities since costs, staffing, support, priorities, and data needs would be very difficult to estimate. While the pilot projects are the true start-up mechanisms of the Network, it will be these additional opportunities that will mature it into a full-fledged and fully effective program. The ultimate goal is to fully implement this proposal (or a modified version of it) by 2015.

Table 5 lists the monitoring parameters identified in the Strategy that may be available for citizen monitoring, and includes a description of how citizen monitors will be able to participate. It also includes, when known, the year that the parameter could be available for monitoring within the Network. This variable relies on funding sources available for advancing citizen-based water monitoring, and staff time and interest available to support level 3 monitoring efforts.

Table 5. Range of Citizen Participation Appropriate for Monitoring Parameters Identified in the Strategy

Monitoring Category	Parameter		Range of Participation	Expected Implementation Year
Wadeable/Non-wadeable Streams and Rivers	Biological	Bacteria (i.e., *E. coli*)	Collect sample; ship to lab	2006 (level 3 research)
		Exotics/Invasive Species	Collect sample; ship to the Department. Department staff will voucher or send to the appropriate vouchering entity	TBD
		Fish Catch per Unit Effort (CPE)	Assist Department Staff or Conduct Full Assessment	TBD
		Fish Index of Biotic Integrity (IBI)	Assist Department staff or Conduct Full Assessment	TBD
		Macroinvertebrate Monitoring	Conduct full assessment to modified order or to family level; or ship sample to lab	2006 (level 3 research)
		Nuisance Plant Growth (cladophora)	Collect sample; ship to lab	2005 (level 3 research)
	Chemical	Dissolved Oxygen	Conduct full assessment	2006
		Nutrients	Collect sample; ship to lab	TBD
		pH	Conduct full assessment	2006
	Physical	Flow	Conduct full assessment	TBD
		Habitat Assessment	Assist Department staff or conduct full assessment	TBD
		Transparency	Conduct full assessment	2006
		Watershed/Stream Visual Survey	Conduct full assessment	TBD
		Water & Air Temperature	Conduct full assessment	2006

Beaches - Inland and Great Lakes	Biological	Bacteria (i.e., *E. coli*)	Collect sample; ship to lab	2006 (level 3 research)
		Exotic/Invasive Species	Collect sample; ship to the Department. Department staff will voucher or send to the appropriate vouchering entity	TBD
		Toxic Algae	Collect sample; ship to lab	TBD
	Chemical	Dissolved Oxygen	Conduct full assessment	TBD
		Nutrients	Collect sample; ship to lab	TBD
	Physical	Turbidity/Clarity	Conduct full assessment	TBD
		Water Temperature	Conduct full assessment (grab samples, not continuous)	TBD
		Visual Survey (Perception Rating)	Conduct full assessment	TBD
Wetlands *(Note: Wetlands monitoring within the Department is still under development, so parameters listed are subject to change as program becomes more defined)*	Biological	Anuran survey for marshes, open water areas	Assist Department staff or conduct full assessment	TBD
		Breeding bird survey - Identification of territorial behavior, nest building, young, etc.	Assist Department staff or conduct full assessment	TBD
		Exotic/Invasive Species	Collect sample; ship to the Department. Department staff will voucher or send to the appropriate vouchering entity; Assist Department staff; or Conduct full assessment	TBD
		Invertebrates - In marshes – identification to order	Conduct full assessment	TBD
		Mammal survey - by tracks, sight	Assist Department staff or conduct full assessment	TBD
		Vegetation identification - diversity measured by number of different species	Assist Department staff or conduct full assessment – herbariums will voucher plants	TBD
	Physical	Wetland classification by Eggers and Reed system	Assist Department staff or conduct full assessment	TBD
Groundwater	Physical	Flow in wadable streams	Conduct full assessment	2009
Lakes	Biological	Aquatic Plants	Collect and press samples, Department staff, UW-Stevens Point, and UW-Madison scientists voucher specimens. Citizen maps aquatic plant beds (submergent, emergent, floating) or assesses transects for abundance and composition.	Ongoing

		Other invasive species (not listed in this table; e.g., crayfish, fish, etc.)	Conduct full assessment or assist Department staff, Department will voucher	2006
		Purple Loosestrife	Assist Department staff with identification, biocontrol, chemical and mechanical control. Specimens vouchered by the Department.	Ongoing
		Water Fleas	Conduct full assessment or assist Department staff,	Ongoing
		Zebra Mussels	Identify sample and complete reporting form. Specimens collected and vouchered by Department staff.	Ongoing
	Chemical	Chlorophyll a	Collect sample; filter; ship to lab	Ongoing
		Dissolved Oxygen	Conduct full assessment	Ongoing
		Total Phosphorus	Collect sample; ship to lab	Ongoing
		Transparency / Clarity	Conduct full assessment	Ongoing
		Water Temperature	Conduct full assessment	Ongoing
	Physical	Trailer check	Conduct full assessment or assist Department or UWEX staff	Ongoing
Sport Fisheries Assessments		All aspects of monitoring fish	Assist Department staff or Conduct Full Assessment	TBD
Special Projects		Specific parameters as appropriate at discretion of Department staff and funding	Varies	2006
Management Effectiveness Monitoring		Specific parameters as appropriate at discretion of Department staff and funding	Varies	TBD

Table 6 lists the costs of various monitoring equipment needed to conduct the monitoring parameters identified throughout this proposal. Costs provided will change through the life of this proposal and are provided simply as a scoping tool. Supplier and specific model are subject to change and are used simply to provide estimated costs for implementation.

Table 6. Equipment Costs for Various Monitoring Parameters

Parameter	Item	Supplier	Cost Each
D.O./Conductivity/ Temperature	High Quality Meter	Meter – type TBD	$1250
	Replacement membranes*	Fisher # 13-298-14 YSI No.:5350	$132
	Calibration reagents*	Fisher	$50
	Carrying case	Fisher	$150
Fish Monitoring (all aspects)	No additional costs to utilize citizens		
Habitat	Measuring Tape	Forestry Suppliers #39972	$45

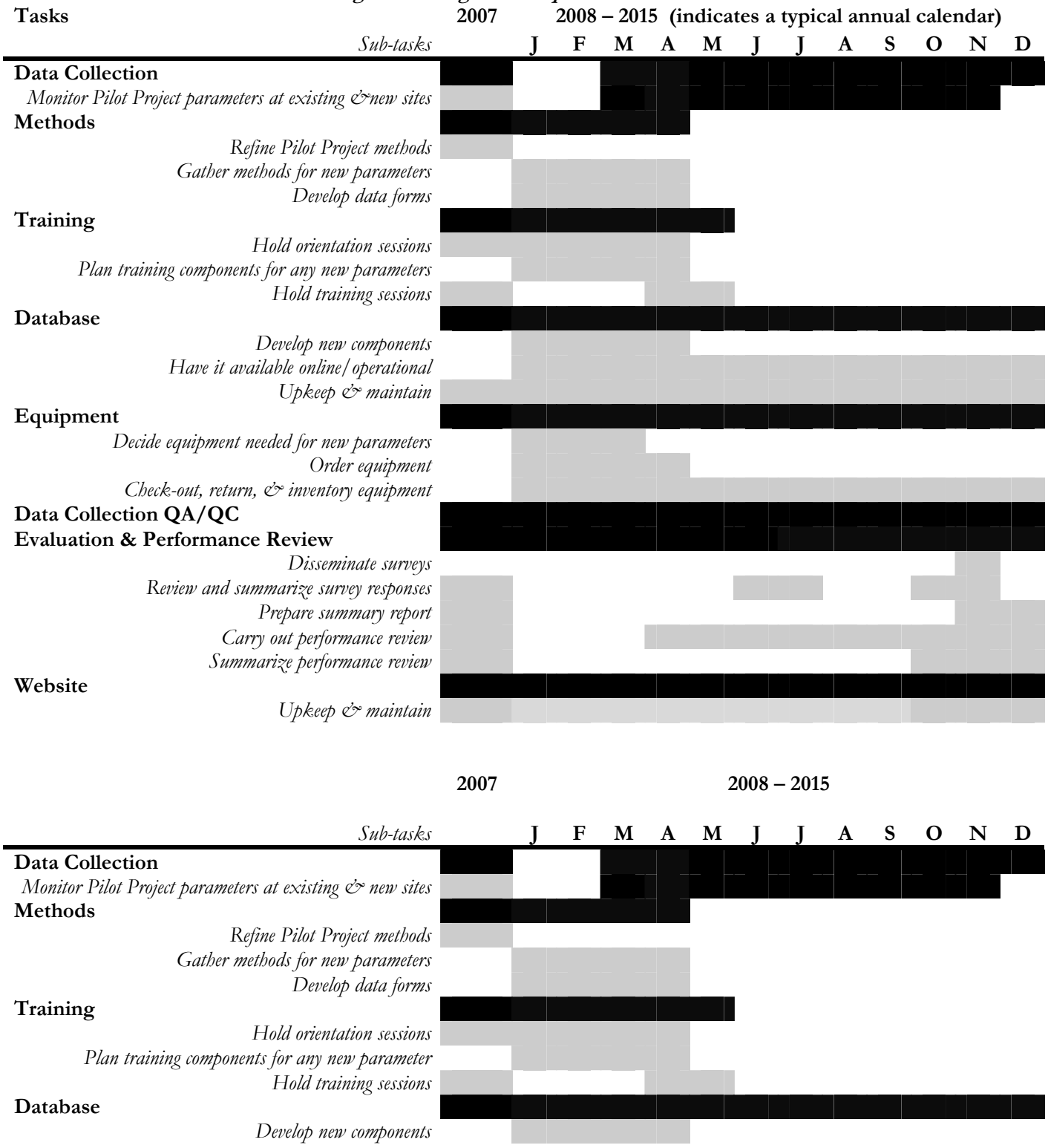
	Flagging Tape	Forestry Suppliers #57905	$1
	Clipboard	Forestry Suppliers #53282	$22
	Meter Sticks	Fisher #S32052	$6
	Waterproof Paper	J. Darling Corp. 208511 (bulk cut;500); 8511 (copier sheets;200)	$50
	Forest Densiometer	Forestry Suppliers #43888	$100
Macroinvertebrates	Aquatic nets	Forestry Suppliers #77921	$122
	Storage jars	3 per site	$10
	Preservative -denatured alcohol	Fisher 200 L steel drum # A407-200	$527
	Microscopes	Partner with groups that have	
pH	High Quality Meter	Meter – type TBD	$600
	Calibration reagents*	Fisher	$25
	Carrying case	Fisher	$30
Rainfall	Use existing gages		
Temperature	Thermistors	DORIC meter made by VAS engineering	$80
Transparency/Clarity	Transparency Tube	Forestry Suppliers # 77107	$35
	Secchi Disc	Aquatic Research / use local rope source	$25
Water flow	High Quality Meter		$1200
	Staff gage		$500
Wetlands	TBD		
All	First aid kit		$30
	Gloves*	Assorted sizes	$6
	Recreational grade GPS unit		$130
	Digital camera and card		$400
General maintenance**	Varies (will include batteries, meters being sent in for calibration, new thermistors over time, etc.)		$100

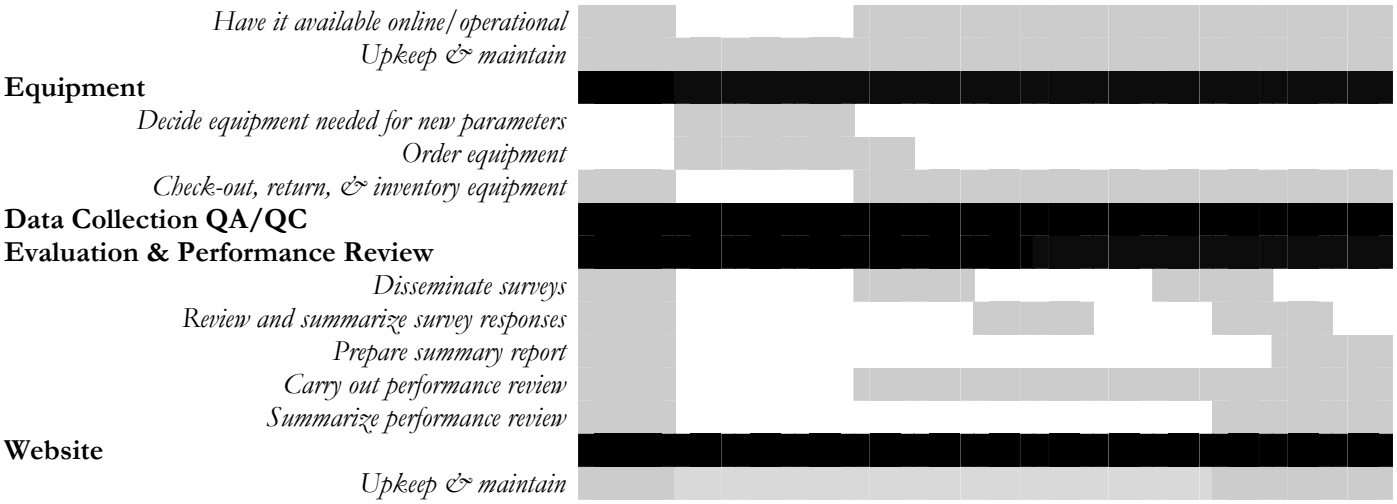
* Part of annual maintenance budget as well.

**General maintenance and * items are those that will be annual costs; others are start up costs

Figure 4 identifies a generic timeline for implementation of the full proposal. Note that recruitment of citizen monitors is not listed in the figure. This was not included since citizens will be able to contact any of the Network staff throughout the year to express interest in participating, but will only be able to be trained during April and May.

Figure 4. Long-term Implementation Plan





Evaluation and Performance Review

All citizen-based monitoring efforts within this proposal will be evaluated and a performance review of the Network will be made. The evaluations will provide an opportunity to explore the success of this proposed Network, to characterize the level of commitment necessary to support such an effort, to address problems and concerns, and to adapt the Network for best effectiveness. Measures of success of the citizen-based water monitoring Network may include (but not be limited to):

- Cost savings to the Department (was data obtained for less money by using citizen monitors than it could/would have been by hiring additional staff?)
- Greater understanding and stewardship of water resources within the state of Wisconsin by residents of the state (as measured through learning evaluations and activity of monitors in natural resources activities within their communities)
- Larger area monitored (were more waterbodies monitored than could have been monitored by Department staff alone?)

SUMMARY

Challenges

A crucial component of Network in regards to the use of citizen-collected data is the response of the Department to citizen findings. Citizens who are volunteering their time to conduct monitoring are going to expect the Department to respond to water quality exceedances that they discover. By endorsing the concept of citizen-based water monitoring and developing methods, training, and quality assurance necessary for data to be accepted into Department databases, the Department is recognizing the value of such data. It is very important to know, however, that the Department's response to citizen collected data may not always be immediate. Work planning is conducted biannually and reflects the Department's attempt to most efficiently match resources with priorities. This process is very important to managing our surface water resources on a statewide basis due to the limited staff and financial resources available. If the concept of developing and expanding citizen-based monitoring is endorsed by Department administration, then a co-commitment dedication of adequate resources to implement an effective program must be made. Citizen-collected data that help address a local issue of imminent and urgent environmental importance may receive a much more rapid response than general water quality data collected in support of more general water monitoring objectives.

Another challenge that needs to be met is that of communication within the Department regarding citizen-based monitoring. A variety of opinions and past experiences with citizen monitors, as well as changing attitudes about citizen monitoring, have influenced the extent to which citizen monitoring data will be utilized by Department staff. Clear communication by administrators to all staff regarding expectations of data use for data obtained by citizens is essential. For this program to be successful, it will be essential that staff understand the value of this partnership with our concerned citizens. A commitment of adequate staff and financial resources for citizen-based monitoring will be a significant factor for developing staff support for and participation in the program.

Yet another challenge is that of funding. The Department must obtain funding to support the Network. This will be needed in order to create staff positions to work with the program, to purchase equipment, plan and carry out trainings, etc.

Other challenges that need to be met for citizens to be able to follow Department methods are to:

- Train citizens to use and maintain the equipment, monitor safely, and enter data and report results
- Update the online database of field procedures
- Support development and enhancement of a citizen-based water monitoring network with well-developed communication and recognition strategies defined

Final Statement

It is the citizen-based water monitoring subcommittee's opinion that citizens will be able to support and significantly augment the Department in its surface and ground water monitoring efforts. Based on the Department's experience with citizen monitoring on lakes and in streams, it is expected that citizen monitors will be capable of collecting valid and accurate information and can provide a cost-effective—though not cost-free—service to the Department. This Network has the potential to tap into a large, underutilized human and financial resource base to assist the Department in accomplishing its monitoring objectives. The educational value of this Network, long term, should yield very powerful benefits by building a strong advocacy base to better protect and manage our critically important surface and groundwater resources.

Citizen-based Water Monitoring Proposal developed by Tom Aartila – NOR, Jeff Bode – FH, Laura Chern – GW, Jim Congdon – SCR, Jennifer Filbert –FH, Frank Fetter – WT, Steve Galarneau –SER, Laura Herman – UW-Extension, Cindy Koperski – WCR, Mike Miller – FH, Kristi Minahan – WT, Scott Provost – NER, Ken Schreiber – WCR, Kris Stepenuck (Sub-Team Leader) – WT, Pat Trochlell – FH, Michelle Washebek – FH, and Mike Wenholz – WT. Input was also received from other Department Water Division Staff and external partners.