WATERSHED MANAGEMENT PLAN GUIDANCE

For the Information below please note:

- ➢ An arrow indicates a required element for a WMP.
- ▪ The bullet underneath is additional helpful information/guidance.

INTRODUCE WATERSHED

Introduce and describe the watershed, the group that developed the plan, and the process of how the plan was developed.

➢ Define the mission, vision, or purpose statement that the group came up with for the watershed.

- ▪ It's helpful if the following information is also included: a description of partners and stakeholder groups and how they were involved in the planning process, a description of outreach efforts that were used to enhance public understanding of the project and encourage public participation, and a description of how the planning and any TMDL activities are integrated and how the community was involved (or not) in the TMDL development.

NOTE: If a TMDL has been developed for the watershed, the WMP must be designed to achieve the reduction in pollutant load called for in the NPS TMDL. If a TMDL is developed after the WMP is finished, the plan will need to be amended to be consistent with the load allocations in the TMDL.

- Include a map(s) of the watershed clearly showing watershed boundaries, streams, lakes, towns, county boundaries, roads and other features. Show the location of the watershed within the larger river basin. Identify watersheds using the hydrologic unit code (HUC) as well as geographic name.

- Give a detailed description of the watershed, which may include the following:

  - Physical Setting of the watershed, with a brief description of the present geology and geologic history (examples: was the area glaciated or not, annual rainfall and climate.)

  - Natural History: Description of the native vegetation, current vegetation, and anything interesting or unique about the flora and fauna.

  - Endangered Species: List species that could occur in the area. Describe the habitat the species prefer.

  - Soils: Using the soil survey, describe or list the predominant soil types, and note characteristics of soils that can affect water quality, such as highly erodible, hydric, poor for septic systems, etc.

  - Topography: General nature of the topography; prevalence of steep slopes, valleys, floodplains, etc. and where they are located.

  - Hydrology: Major stream systems; how streams have been modified through drainage or channelization; presence of dams, reservoirs, drinking water sources; whether aquifers are vulnerable; what is known about wetlands in the watershed.

  - Land use: including historical and current land use, areas slated for development, unique recreational resources, and other important features.

  - Land ownership: If there are significant tracts of land in public or managed ownership, such as state forest, national forest, land trust, parks, military holdings, etc., they should be shown on a map. The owners should be involved in the planning process, if possible.

IDENTIFY PROBLEMS AND CAUSES

Identify stakeholder Concerns and potential problems and causes in the watershed

What are the problems in the watershed and how do you know they are problems?

- List the stakeholders' concerns about the watershed that were gathered from the public meetings

- List and briefly summarize information/data gathered to establish 'baseline' or 'benchmark' conditions in the watershed. Reference the studies and reports the group found. *Possible sources:*

  - Existing quality-assured water chemistry or biological monitoring data. State the source of the data and summarize the data and how the group interpreted it.

  - Data collected for the development of this plan (if there is not enough water quality data to support a decision, the group will need to develop and carry out a monitoring program). Summarize the data and how the group interpreted it. Include the raw data in an appendix.

  - Land inventory findings

  - Stream visual survey results

  - Volunteer monitoring data

  - LARE diagnostic studies

  - IDEM 305(b) Water Quality Report and 303(d) List of Impaired Waterbodies. If impairments are listed in the 305(b) report or there are streams or lakes listed on the 303(d) list, note the State water quality standards that have been exceeded. Include any numeric criteria that need to be used later in formulating goals.

  - NPDES discharge data

  - Watershed Restoration Action Strategies

- Identify problems in the watershed based on the information gathered. For help in interpreting data, consult with State, Federal, or other agency technical personnel (IDEM, IDNR, USFWS, USGS, etc.).

What is causing the problems? "Causes" may include specific pollutants, changes in land use, hydrologic changes, and other factors.

- Identify known or probable causes of water quality impairments and threats using data and information gathered by the group. Tie concerns, benchmarks, problems, and causes together so there is a clear thought process throughout the plan. Use tables, bulleted lists, or any other format that makes it easy to see these relationships.

  - *Example:* There is a public concern that children might get sick from swimming in the creek. The data shows high levels of *E. coli* in the creek during low flow and even higher amounts during high flow. High concentrations of *E. coli* are verified as a problem in this creek because concentrations regularly exceed State water quality standards of 235 cfu/100ml. Pathogens (*E. coli*) are the cause of the water quality problem.

IDENTIFY SOURCES

Identify the sources of the problems that need to be controlled to achieve the load reductions estimated later in this plan.

- Identify specific sources for *each pollutant or condition* that will need to be controlled to achieve the load reductions estimated and the goals in the plan. Explain why you believe these to be the sources. Document the evidence for each source. Conclusions must be clearly supported by data. A 'source' may be:

  - An activity without a specific location, like car washing or dog walking. Identify the geographic areas where the activity happens.

  - Associated with a material or structure, such as impervious surfaces or copper roofs. These can also be identified/mapped in a general way.

  - Actions associated with a business or enterprise, such as construction or livestock production. Also, specific actions by a sub-set of operators, such as poor sediment control in subdivisions or inappropriate manure handling by turkey producers. You might not be able to map this easily, but you could identify the land uses where these activities are likely to occur.

Identify all areas of the watershed (specific subwatersheds, land uses, or other defined areas such as "all subdivisions without storm water control") where each source exists.

Describe the sources in detail. State, for example, the number of cattle feedlots in each subwatershed needing upgrading, the number of acres of cropland needing conservation tillage, or the number of linear miles of eroded streambank needing remediation. Include enough information to explain the magnitude of the source (i.e., # of cattle per facility).

Example: Based on the data and information obtained, sources of *E. coli* in the watershed include X# failing septic systems in X subwatersheds, X# cattle in the stream at X farms in X subwatershed, Y farms with poor manure management, X# combined sewer overflows in X urban area, and storm water runoff from the X urban area.

IDENTIFY CRITICAL AREAS

Identify areas in the watershed where the sources are causing the greatest damage and treatment measures will have the greatest effect, and any target areas the group wants to address.

- Estimate existing *loads* for pollutants to assist with prioritization. Concentrations alone may be misleading. Load = concentration x flow (volume/time). In order to calculate a load you need flow data for the sample location. Calculating the load at the mouth of each tributary can highlight where practices need to be installed. For help with determining load calculations, contact the Watershed Assessment and Planning Branch.

- Identify critical or target areas where measures will be needed to implement the plan. Rank the critical areas, either by the problem they represent or by their location, in the order the group plans to address them. Summarize the thought process used for targeting and prioritization.

  - Show these areas on a map. Areas selected should be feasible for the group to address. Think about where you can successfully address the problem, the willingness of landowners to participate, and where the most impact on a problem can be accomplished.

  - *Example*: Critical areas have been identified to be X failing septic systems in X subwatershed because the *E. coli* loads in X creek are the highest found in the watershed during low flow. Other critical areas include X farms where the cattle have access to the stream (controlling this source will also help reduce sediment and nutrients in the stream), and Y farms with poor manure management practices.

SET GOALS & SELECT INDICATORS

Set water quality improvement or protection goals. Select indicators that can be used to determine whether loading reductions are being achieved.

- Develop realistic water quality improvement or protection goals that describe what will be addressed, where it will be addressed, what the targets are, and how long it will take. Where State water quality standards exist for a pollutant, the goal should be, at a minimum, to meet the water quality standards. Refer back to the concerns, benchmarks, problems, sources, and critical areas. Goals should incorporate the following elements:

- A problem, pollutant or condition
- The present pollutant load, baseline level, or benchmark value for the problem
- The target (desired future) load, level, or value
- When the group expects that target to be met

Goals are just that – goals. There are many variables (weather, land use, people, etc.) that can enter into the implementation process to delay attainment of the goals. Through monitoring and evaluation of the plan, you can determine whether progress is being made or the plan needs to be revised to fit new information/conditions in the watershed.

➢ For each goal, determine what parameters (indicators) or criteria can be measured to determine whether pollutant load reductions are being achieved and substantial progress is being made towards attaining water quality standards, and if not, criteria for determining whether the plan needs to be revised or whether an existing NPS TMDL needs to be revised. You will need to develop a plan for monitoring these indicators (see "Monitor Effectiveness").

- Select water quality indicators where appropriate (i.e., pollutant concentrations or loads in the water column, sediments or groundwater). Where applicable, select indicators that will show change in the aquatic ecosystem, such as benthic macroinvertebrate indices, fish community indices, or habitat evaluations. You may be able to use a single indicator to track progress for more than one goal.
- For indicators other than water quality (such as rate of tillage adoption, miles of riparian forest, or indicators of behavior change) describe the measuring methods used and how these indicators relate to reaching the goal(s) in the plan.
- It might be helpful to create a table in the text or appendix listing the goals in order of importance to the group. Include the present level or condition, target level or condition, target date, and the indicator(s) to be used for measuring progress.

➢ Be sure there is a clearly understandable train of thought from problems, causes and sources, to critical areas, goals, and indicators.

- *Example:* The goal is that all waters in X watershed will meet the *E. coli* water quality standards for recreational waters (235 cfu/100 ml) by 2015. *E. coli* will be monitored to track progress toward meeting this goal.

CHOOSE MEASURES/BMPS TO APPLY

Describe what needs to be implemented to achieve the goals and estimated load reductions in the plan, a schedule for implementing the measures, interim measurable milestones, and an estimate of the amount of technical and financial assistance needed.

- Work with State, Federal, local, or private specialists as needed to determine BMPs or measures that need to be implemented to achieve the load reductions required to reach the goals. Include a discussion of how and why these measures were selected.

  - A "measure" may be a practice, program, or process. Measures could include developing local ordinances, installing BMPs, establishing an outreach program, or any other organized change to improve water quality. Measures must be feasible and acceptable to the community and not cause undue economic distress. Measures should be connected to the appropriate goals. There may be overlap between measures & goals; for example, reducing sediment from crop fields will also reduce phosphorous and pesticide loads.

  - Show on a map where measures will be applied: by sub-watershed, as point locations, or whatever is clearest. For BMPs recommended in the plan, identify standards and specifications that apply and which agency maintains those standards. Describe the potential impacts of the measures, both positive and negative. Include economic, social and environmental impacts when possible. Economic impacts should include short-term and long-term and local and regional impacts on the economy such as landowner profits, cost-savings from reduced downstream treatment, increased tourism, impact on land values, etc. Where possible, describe effectiveness (for example, "a properly designed filter strip x feet wide can trap x% of sediment in overland flow.").

- Describe how the stakeholders were involved in selecting, designing, and implementing the NPS management measures. Discuss what information/education techniques will be used to enhance public understanding and encourage continued participation in implementing the chosen NPS management measures.

- Using methods appropriate to your situation, estimate pollutant load reductions for the management measures identified.

  - Identify the BMPs/measures for which a load calculation makes sense. Load reductions (sediment and nutrient) from agricultural and urban practices such as grassed waterways, buffers, streambank stabilization, conservation cover, etc. can usually be calculated. Education and outreach, new ordinances, and changes in habitat or biological composition are not feasible for load calculation.

- Determine a reasonable method such as the Region 5 Model, RUSLE2, SWAT, etc., to calculate the estimated pollutant load change due to implementing measures. For each calculation, state the method used and the assumptions made. For help with determining load reduction calculations, contact Watershed Assessment and Planning Branch.

➢ Describe the planned order of implementation, the time requirements for implementing the plan, and who is responsible for carrying out tasks.

➢ Estimate financial and technical assistance needed to implement the plan.

- Include sources for cost figures, and describe the reasoning behind the estimates. Indicate what agencies, programs, or organizations you will go to for implementation technical assistance such as NRCS, IDNR, or the county Health Department. Identify funding sources that will be asked to provide financial assistance, such as foundations, USDA programs, State revolving funds, or Section 319 grants.

- Discuss operation and maintenance responsibility for installed practices.

➢ Describe interim measurable milestones for determining whether NPS management measures or other control actions are being implemented. EPA interprets "interim measurable milestones" as practices installed, people contacted, etc., not as changes in water quality. Set dates when progress on each goal will be reported.

- Acknowledge which problems will take longer than 3-5 years to address, and briefly discuss how they will be handled, i.e. through longer-range projects, follow-up monitoring, deferring to another agency, etc.

- Describe any permits, easements, agreements with landowners or other legal actions that have to happen in order to make the plan work. In your schedule, take into account the time needed to apply for permits, especially for wetland or floodplain work.

- Create an 'action register' (table) that lists **for each goal** what tasks will be performed, when they will be complete, who is responsible for doing it, how and when the milestones will be measured, and what resources (money & technical assistance) are needed.

MONITOR EFFECTIVENESS

Describe how indicators will be monitored to evaluate the effectiveness of implementation.

- Refer back to the indicators chosen to track progress for each goal (see "Set Goals & Select Indicators"), and develop a monitoring plan to track these indicators to evaluate the effectiveness of the implementation efforts over time.

  - Determine how each indicator can be measured, who will be responsible, what equipment is needed, sample locations and sample frequency, when monitoring is to begin and end, who will evaluate the results, and how they will be reported to the group.

  - Describe how water quality will be monitored. Monitoring for other goals may include spot-checking, landowner participation, adoption of practices, or other measurements.

  - If required, develop a QAPP for monitoring.

  - The load reduction calculations that you did should be linked to the monitoring plan, so actual loads can be calculated as the project progresses.

  - Describe when the watershed plan will be re-evaluated, who will do it, and who is responsible for revisions or adaptations to the plan.

  - Celebrate accomplishments!

ACRONYMS

BMP	Best Management Practice
EPA	Environmental Protection Agency
HUC	Hydrologic Unit Code
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
QAPP	Quality Assurance Project Plan
RUSLE2	Revised Universal Soil Loss Equation
SWAT	Soil and Water Assessment Tool
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
WMP	Watershed Management Plan

ADDITIONAL GUIDANCE

The following information and guidance may be found on the web sites listed below or by contacting the Watershed Assessment and Planning Branch.

Indiana Watershed Planning Guide – http://www.in.gov/idem/nps/3464.htm

Watershed Restoration Action Strategies – http://www.in.gov/idem/nps/2964.htm

Region 5 Model – http://www.in.gov/idem/nps/2575.htm

TMDL Program information – http://www.in.gov/idem/nps/2347.htm