



Extension FactSheet

Agriculture and Natural Resources, 2120 Fyffe Rd., Columbus, OH 43210-1084

Water Quality Impairments Solved through Watershed Planning

Jerry Iles

Agent, Watershed Management, South Centers
Ohio State University Extension

Dana Oleskiewicz

Agent, Watershed Management, North District Office
Ohio State University Extension

Introduction

Community-based watershed planning is the combined effort of the people in a community to protect their water resource through effective land management decisions (see OSU Extension factsheet WS-1-00, *Community-Based Watershed Management*). The objective is to prioritize issues and develop comprehensive solutions. The water quality and ecological integrity of the watershed are measured and then watershed management goals are set, implemented, and evaluated.

A major purpose of watershed planning is to solve water quality impairments. Many groups start with a technical steering committee of stakeholders that leads the watershed planning effort. Based on *A Guide to Developing Local Watershed Action Plans in Ohio* (Ohio Environmental Protection Agency), a Watershed Action Plan documents the water quality conditions, critical areas, and watershed protection activities. This factsheet summarizes the steps needed to deal with water quality impairments using watershed planning.

Decide on Watershed Boundaries

The success of watershed planning efforts can be influenced by the size and scope of the watershed project. In the article “Crafting Better Watershed Plans” (*The Practice of Watershed Protection*, pp. 162-170), scale was considered the critical factor in preparing effective watershed plans. “When watershed plans were conducted on too large a scale (50 or more square miles) the focus of the plan became too fuzzy. The critical link between individual land use decisions or restoration projects and the watershed plan was broken.”

The decision on how much of the watershed to protect or restore is also directly related to where the group’s interest falls within the larger watershed. If upstream tributaries and land-use practices influence the area of interest for a group, then the group may wish to expand their scale to include upstream reaches. For example, if sediment is a concern and the pollution source is upstream, the group may decide to address the problem themselves or partner with an upstream watershed protection group.

Every watershed requires locally relevant planning based on local topography, current land-use trends such as sprawl, and historic land use. In general, watershed plans that address water quality issues from a relatively small scale (approximately 50 square miles) appear to be more effective than large-scale watershed plans.

Gather Existing Watershed Information

The development of a watershed inventory can be a daunting task at first glance. A comprehensive account of the watershed may address a multitude of concepts from community assets to land-use patterns and water quality parameters. A good starting point is for the watershed group to identify base-line water quality conditions and sources of pollution.

Some watersheds will have more readily available data than others. Below is a list of items typically included in nearly all watershed inventories. This list can be used as an initial outline, with additional sections being added as needed.

- ❑ Delineation of watershed and sub-watershed boundaries.
- ❑ Areas of good water quality and impaired streams.
- ❑ Adverse impacts listed in the *305b Water Resource Inventory of Ohio* (located at www.epa.state.oh.us/dsw/document_index/305b.html).
- ❑ Water chemistry based on sampling of parameters that are relevant to identified or suspected impairments, such as dissolved oxygen (DO), pH, turbidity, fecal coliform, nutrients, metals, temperature, acidity, alkalinity, etc.
- ❑ Biological data based on current and past sampling (see *A Guide to Developing Local Watershed Action Plans in Ohio*, p.15 for a more in-depth description), such as:
 1. Index of Biological Integrity (IBI) - measures fish species population and diversity, “The index is a number that reflects total native species composition, indicator species composition, pollutant intolerant and tolerant species composition, and fish condition.”

2. Invertebrate Community Index (ICI) - “an index of the macroinvertebrate communities living in a stream or river.”
- ❑ Aquatic Life Use Designations such as Exceptional Warm Water Habitat (EWH), Warm Water Habitat (WWH), Modified Warm Water Habitat (MWH), and Limited Resource Water (LRW) as presented in OEPA’s Integrated Water Quality Monitoring and Assessment Report (visit www.epa.state.oh.us/dsw).
 - ❑ Physical characteristics (morphology) of the watershed, such as the areas that are channelized versus areas that contain good sinuosity and in-stream habitat.
 - ❑ Hydrologic characteristics (seasonal flow regimes, etc.). For example, if the stream is a source of drinking water or irrigation flows could be affected by these activities.
 - ❑ Historic and current land-use trends.

The watershed group can characterize the watershed using information from the inventory components listed above and other relevant information. Most important is to identify those streams that stand out as impaired and in need of restoration, as well as those that contain excellent biology and morphology that may require a protection strategy.

The water quality impairments, written as problem statements, to be addressed are documented in the plan based in part on the watershed inventory. For further information, contact OEPA Division of Surface Water at www.epa.state.oh.us/dsw.

Determine the Solutions

After the watershed has been defined and the water quality impairment identified, the next step is to outline the solutions and set goals and objectives. First, the watershed group should be familiar with all the strategies for restoration and protection that are available to deal with each of the problems. These solutions are then assessed based on the current situation and predicted effectiveness. Some problems may require a combination of measures.

Goals describe the actual result that the watershed protection activities are designed to accomplish. Objectives are the “how to” in achieving these goals and must include specific strategies.

For example, a goal might be to reduce sediment loading to a stream. The objective would be the adoption of Best Management Practices (BMPs) by watershed landowners, such as no-till farming or streamside vegetation buffers. The objective should list the change that needs to occur, the person(s) or entity responsible for making sure that it happens, and a timeline for

completion. Objectives should also address the way in which the change will be facilitated.

Goal statements should also include indicators of success. Indicators of success are measurable outcomes that reflect changes in water quality. For example, if the desired goal is to reduce sediment, a measurable outcome would be a decrease in the Total Suspended Solids (TSS) from 300mg/l to an average of 100mg/l taken from 50 samples over a 3 year period. By developing measurable outcomes, the group can effectively evaluate the effectiveness of watershed planning decisions and the results of protection efforts.

The following will need to be taken into consideration by the group when writing goals and objectives and in prioritizing the activities: 1) whether to address one source of pollution or multiple sources at the same time, 2) whether to prioritize efforts based on (a) easier and less expensive answers, (b) common problems, or (c) those of greater human and ecological risk, 3) what form of Best Management Practices (BMPs) or pollution controls will be employed, 4) where are the critical areas, and 5) how will success be measured.

Make it happen!

To solve water quality impairments, putting the plan into action is the most important step. A Watershed Action Plan requires that the above be written into a document and, more importantly, that stakeholders perform the stated activities. In addition to the inventory, problem statements, goals, and objectives, the plan should include any items that will assist in its successful completion.

For example, an activity timeline will keep the group focused and provide for stakeholder accountability. If fundraising is needed, a plan should be developed with attention to potential funding sources, grantseeking due dates, when the money is needed, and the tasks necessary to obtain funds. Finally, a public outreach campaign and project evaluation should be part of the watershed planning process.

You can find more information about these activities at the Ohio Watershed Network website (ohiowatersheds.osu.edu).

Bibliography

A Guide to Developing Local Watershed Action Plans in Ohio. 1997. Ohio Environmental Protection Agency, Division of Surface Water.

The Practice of Watershed Protection, Thomas Schueler and Heather K. Holland. 2000. Center for Watershed Protection, Article 29, pp.162 – 170.

Community-Based Watershed Management. Joe Bonnell and Anne Baird. WS-1-00. Ohio State University Extension.

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