



# Watershed Approaches to Meet Permit Compliance

## A Primer in Municipal-Agriculture Partnerships



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## Part 1

# Identify Nutrient of Concern and Project Area

Prior to beginning a watershed nutrient reduction project, it is critical to first identify the priority issue or nutrient to be addressed. Characterizing the problem, specifically the nutrient of concern, will lead to a more focused and defined project scope for more efficient coordination and opportunity for success.

In Iowa, the primary nutrients of concern for water quality are nitrogen and phosphorus; however, the scale and potential impairment may vary regionally. Nitrogen and phosphorus are essential crop nutrients applied to farmland as manure, mineral fertilizers, and bioproducts. If nutrients are

applied at rates in excess of what can be taken up from the soil by the crop or if the nutrient sources are not incorporated, or mixed, into the soil prior to a rainfall event, they can run-off the fields or leach through the soil, and negatively impact surface and ground water quality.

Once the nutrient of concern is defined for the project, the next step is to identify the potential nutrient sources located throughout the watershed boundary. The watershed boundary includes the area of land that

contributes runoff to the lake, river or stream of concern. Identifying potential non-point nutrient sources within the watershed boundary will help determine which regions within the watershed are best to target implementation efforts to define the project area.

*When initiating a potential nutrient trading project that engages the upstream agricultural community, a phone call to the local conservation planner can streamline the project scoping process and pave the way toward reaching water quality goals.*

To identify the nutrient(s) of concern and potential project area, start by gathering the following reports and digital data:

- Soil and geologic characteristic landscape surveys
- Current and past land use, land cover, and land management maps or aerial imagery
- Existing water quality and monitoring data
- Iowa's Nutrient Reduction Strategy and supporting documents (IDALS, IDNR and ISU, 2013)

This information can be obtained both online and by contacting local or state government offices. Implementation efforts will be best achieved through collaborative efforts with city and county personnel. Therefore, this initial opportunity to reach out and engage relevant departments and agencies early in the data reconnaissance process can streamline and improve project efficiency. Staff within city or county planning, environmental or conservation offices will likely have knowledge, information and reports to share that would otherwise be difficult to access.

Resources available through state agencies including Iowa Department of Natural Resources (IDNR), Iowa Department of Agriculture and Land Stewardship (IDALS) and various federal agencies (e.g., Environmental Protection Agency, US Fish and Wildlife Service, US Department of Agriculture) will also provide valuable comprehensive water quality reports and summaries. Reviewing and understanding the past and current information will be a critical for defining project goals, refining objectives, setting measurable targets, and identifying performance indicators.

**Key output:** *Identify causes and sources that need to be addressed and the load reductions this project hopes to achieve.*

### Resources

Iowa Department of Agriculture and Land Stewardship (IDALS), Iowa Department of Natural Resources (IDNR), and Iowa State University (ISU). 2013. *Nutrient Reduction Strategy: A Science and Technology-based Framework to Assess and Reduce Nutrients to Iowa Waters and the Gulf of Mexico*. Retrieved from <http://www.nutrientstrategy.iastate.edu/documents>

IDALS. 2020. *Soil Conservation and Water Quality*. Retrieved from <https://iowaagriculture.gov/dscwq>

IDNR. 2020. *Source Water Protection*. Retrieved from <https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Source-Water-Protection>



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## Part 2

# Develop the Watershed Plan

Once the nutrients of concern have been identified and the geographic scope of the project refined, the next key step is to quantify the nutrient load reduction that is necessary to meet watershed goals. This also includes identifying the agricultural management practices that can reasonably achieve these targets.

For many communities, targeting nutrient load reduction is based on the local water utility permit for either drinking water standards or wastewater effluent load. Working with the wastewater engineer to understand the reduction requirements that are necessary to maintain permit compliance will be the most efficient approach to estimating the target nutrient load reduction. Comparing the numbers cited in the permit to current plant treatment capacity can provide an initial starting point for determining whether it is feasible to execute infrastructure upgrades or could those same nutrient reductions be fiscally achieved by implementing farm conservation practices from agricultural sources. For many scenarios across Iowa, the efforts will require significant nitrogen reductions.

Once the target load reduction is confirmed, agricultural conservation management practices to achieve those goals should be identified. In general, management practices are implemented to reduce losses in-field, edge-of-field, or in-stream. It will be important to work with local conservation planners to better understand which practices are most likely to be adopted by farmers within the targeted project area identified in Part 1.

A key step to identifying feasible management practices is to estimate the load reduction from each practice. A conversation with IDNR should occur at the start of the plan development to ensure that nutrient credit offsets

from farm conservation practice implementation conform with state guidelines. IDNR approved the Nutrient Tracking Tool (NTT), a free, online, user-friendly tool that quantitatively estimates nitrogen, phosphorus and sediment loss from crop and pasture lands, for use in calculating the nutrient reductions for water quality trading. The tool can be used to estimate environmental improvement opportunities on farms based on implementing various conservation practices, using site-specific condition and on-farm management practices.

The *Whole Farm Conservation Best Practices Manual* is a science-based framework to support the conservation planning process and should be referenced as a starting-point for identifying feasible conservation practice options (CLG, 2020). When scoping potential conservation practices, it is important to remember the timing involved for successful implementation. For example, cover crops are seeded annually and have a narrow planting window when they are following a corn or soybean crop harvested in late fall. Unless the farmer has equipment to inter-seed or aerial apply the seed prior to cash crop harvest, the seeding window for successful establishment is very narrow adding an adoption challenge. Other practices such as buffer strips or grassed waterways may have more flexibility with timing, but must align with farm management operations. Weather and market fluctuations can also affect the adoption of specific practices, or farmer's willingness to take land out of production. Constructed practices like filter strips provide a guaranteed pollutant reduction annually, but are less appealing to farmers as they typically require the loss of productive land. Annual practices that work into the farming system, such as reduced tillage, extended rotations, or 4R nutrient management are more appealing to farmers, but are also

### Resources:

Conservation Districts of Iowa (CDI). 2018. *Soil and Water Conservation District Partnership Pictorial Directory*. Retrieved from <http://cdiowa.org/wp-content/uploads/2018/11/Pictorial-Directory1.pdf>

Conservation Learning Group (CLG). 2020. *Whole Farm Conservation Best Practices Manual*. Ames: Iowa State University Extension and Outreach, CLG105. <https://store.extension.iastate.edu/product/15823>

IDALS. 2020. *Division of Soil Conservation's Financial and Reports Management System (FARMS)*. Retrieved from <https://idals-farms.iowa.gov/index.php/districtMap>

IDNR. 2009. *Watershed Management Action Plan Guidebook*. Retrieved from <https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Watershed-Improvement/Watershed-Planning/Management-Plans>

USDA-NRCS. 2020 Iowa Local Service Centers. Retrieved from <https://www.nrcs.usda.gov/wps/portal/nrcs/ia/contact/local/>

USEPA. 2008. *Handbook for Developing Watershed Plans to Restore and Protect our Waters*. Washington, DC: Office of Water, Nonpoint Source Control Branch, EPA 841-B-08-002, Retrieved from <https://www.epa.gov/nps/handbook-developing-watershed-plans-restore-and-protect-our-waters>

USEPA. 2013. *A QUICK GUIDE to Developing Watershed Plans to Restore and Protect our Waters*. Washington, DC: Office of Wetland, Oceans, and Watershed- Nonpoint Source Control Branch, EPA 841-R-13-003, Retrieved from <https://www.epa.gov/nps/resources-watershed-planning>

subject to possible annual implementation fluctuations and corresponding load reductions. These practices would require annual verification to ensure consistency.

It is suggested that the implementation budget is split to dedicate a specific percentage towards installing constructed practices, and the remainder towards annual conservation practices. This approach encourages farmers to transition towards a conservation mindset, establishes partnerships, and provides a short-term boost in nutrient reduction, while also building a watershed based, water-quality network that will continue to pay off over time.

Planning out the implementation of conservation practices will reflect on the overall project budget. Some of the constructed practices require more expense upfront versus the maintenance costs associated with annual practices. To better gauge the project budget, the cost for implementation and maintenance of each practice could be refined by working with the local soil and water conservation district or local Natural Resources Conservation Service (NRCS) office. Local contacts are available online through the IDALS Division of Soil Conservation's Financial and Reports Management System (FARMS) interactive map (IDALS, 2020), Conservation Districts of Iowa's Pictorial Directory (CDI, 2018), or a list of Iowa NRCS Service Centers (USDA-NRCS, 2020).

The overall project budget should consider:

- Cost of each management practice over the life span, including materials and annual maintenance
- Staff time associated with practice design, technical assistance to the farmer or landowner, construction or installation (if applicable) oversight, and verification
- Staff time and analytical costs of water quality monitoring or soil sampling

Two valuable resources that will be important references throughout your plan development include the IA DNR's Watershed Management Action Plan Guidebook (IDNR, 2009) and the US EPA Handbook for Developing Watershed Plans to Restore and Protect our Waters (USEPA, 2008). A condensed, Quick Guide, version of the US EPA Handbook is also available (USEPA, 2013). All three references provide a step by step outline with guidance of the plan development process and should serve as go-to publications.

**Key output:** *Identify target load reductions, feasible conservation practices and project costs.*



## Part 3

# Develop and Engage Partnerships

Project partners are a critical piece for successfully implementing a watershed plan. Partnerships will vary between watersheds and true engagement depends on the project leader's ability to understand the interest of each group and effectively explain how those can be met through the project. Potential partners can be divided into several groups including:

- Local Soil and Water Conservation Districts (SWCD)
- Local NRCS offices
- Farmer-led watershed groups and
- Other agricultural stakeholders (i.e., agronomists, nutrient management planners, agricultural retailers)

These groups can help connect farmers located throughout the watershed project area to the implementation plan development for potential conservation practice adoption. It is possible to connect individually and work one-on-one with any farmer, but working with at least one of these entities is encouraged to establish a long-term partnership that can facilitate outreach to a diverse and committed farmer network. These groups already work with farmers through a trusted community and their established relationships can make it easier to connect more effectively. Additionally, they may provide insight on which individuals are easiest to work with or have recommendations for navigating certain personalities. While this may sound trivial, conflicting personalities and fragile relationships are one of the leading causes behind project failure. Ultimately the key is to find farmers that are leaders in the watershed and can serve as champions for both project and conservation implementation.

An example of a successful urban-agricultural partnership is Wisconsin's [Yahara Watershed Improvement Network](#) (Yahara WINS). Yahara WINS, led by the Madison Metropolitan Sewerage District (MMSD), began in 2012 in response to more restrictive water quality standards (MMSD, 2020). Yahara WINS includes many government agencies and non-governmental organization (NGO) stakeholders, and coordinates multiple memorandum of understandings (MOU) with local water quality permits. Yahara WINS approached the Yahara Pride Farms (YPF) farmer group about being a partner and helping provide nutrient load reductions. Both MMSD

and YPF were cautious about the relationship but through clear goal setting, outlining the benefits to both parties and slow trust building the partnership has blossomed. YPF receives annual funding to hire a dedicated soil conservationist to research and explore new techniques and to host an annual stakeholder and partner meeting. The relationships established through the network goes a long way towards maintaining a strong connection and successful program.

YPF agreed to the partnership because the urban-agriculture framework provides

- access to long term and flexible funding,
- complimentary watershed planning and monitoring services, and
- an opportunity for farmers to play a leadership role in the watershed's water quality.

MMSD and other municipal partners benefit from the partnership by receiving nutrient and sediment load reductions generated by the farmers.

Beyond serving solely a basic transactional role, success was achieved because the municipality provided a formal structure or team that communicated the regional issues and enabled the farmers to understand that they could play a big role to advancing the solution.

A smaller scale example can be found in the city of Griswold, Iowa. Griswold developed a source water protection project and team to reduce the risk of nitrate contaminates from entering their drinking water supply. After identifying agriculture as the main nitrate source, the team mapped out vulnerable regions surrounding the municipal wells. They decided to focus on planting cover crops and set a goal to plant cover crops over 75% of the targeted region. Griswold has seen a decline in groundwater nitrate levels and staff anticipates larger decreases in the future after consecutive years of cover cropping.

**Key output:** *identify key partners and begin to develop relationships*

### Resources:

Madison Metropolitan Sewerage District (MMSD). 2020. *Yahara WINS*. Madison, Wisconsin. Retrieved from: <https://www.madsewer.org/Programs-Initiatives/Yahara-WINS>



# Part 4 Public Engagement

Once fruitful relationships have been established between local conservation groups and farmers, and the watershed plan is developed, it will be important to communicate these efforts to the general public. Effectively communicating the scope, purpose and benefit of the work, and the impact on local water quality and watershed health will encourage community support and may open doors for future partnership opportunities.

There are several key points to consider as part of your communication planning:

## 1. Who is your audience?

The first rule of outreach is to know your audience. Targeting a specific audience allows you to tailor an effective message. In general, your audience will likely be customers serviced by the utility department and the people who live in the municipality. Telling the story of watershed work and explaining its local environmental and economic relevance is critical to getting the public engaged.

Prior to any public engagement opportunity, it is important to consider who will be in attendance. Proactive planning can improve the interaction and discussion during the meeting. For example, a meeting with local businesses may require more background information on permitting requirements or their nutrient load contribution, whereas a meeting with residents of the larger community would need to discuss more background information on watershed connectivity, drinking water sources, water quality, nutrient sources, and community benefits.

## 2. What is the message?

Once the audience has been identified, define your core message. While the message may shift slightly to make it relevant to different audiences, it is important to develop and deliver a consistent fundamental message. This “values-based” core message will be used for all audiences and will include the following elements:

- **VALUES:** Give your audience a reason to care by appealing to their values and concerns
- **THREAT:** Describe the threat to the watershed and/or city and its citizens

- **SOLUTION:** Offer your watershed partnership as a solution
- **URGENCY:** Describe the sense of urgency or issue a call to action

### Sample Core Message

*We all want and need to have clean water in our city, but our water treatment plant faces expensive upgrades if we don't do something to improve water quality in our community before it gets to the treatment plant. To address this, our city is going to provide funds to local farmers for farm conservation practices that aim to keep fertilizer and manure on the farm instead of in our waterways. This work with farmers can also help ease flooding problems. If we don't create this type of partnership with our farmers now, we will all face more expensive solutions down the road.*

A list of three or four concise talking points is a valuable resource for all who might be asked to deliver the message or who may be at a meeting when a candid discussion occurs. This is an effective way to ensure the message remains consistent across staff and partners.

Another important piece to consider during message development is who will be the best person to deliver the message. Strong messengers are essential to effective communication; however, having different messaging styles can be a method to better engage different audiences. Compelling messengers could include water utility staff, or businesses who are struggling with the effects of the water quality impairment.

## 3. What is the story?

People respond when they relate personally to a shared story. Strong, compelling stories make a message more effective and make abstract concepts more concrete and salient. It is worth the up-front time to develop a powerful story that will capture the audience's attention and make them feel compelled to see change. Real life success stories underscore that these problems and issues are solvable, and can help instill good morale and momentum in the work.

## 4. How do I handle challenges or opposition?

Even the most rehearsed and planned speaker at a public engagement event will inevitably be faced with a difficult or potentially controversial



question. When answering questions or criticisms, the goal should always be to return back to the original message through the ABC's of message discipline:

- **Acknowledge** the question or issue
- **Bridge** with a common fact or talking point back to the core message
- **Communicate** the core message

Although the situation may be unexpected, it is important that the response is never defensive. An appropriate way to address a difficult question would be to respond back with a clarifying question that requires the person who asked the question to provide background or elaborate on why they are concerned or mentioning the issue. Finding a connection that everyone can relate to regardless of their view will help to guide a discussion back to the issue. Water sees no boundaries; it is a shared resource within the watershed. Once it is impaired, the entire community is impacted in some way whether it be through recreational use, drinking water, or economic value.

### 5. How do you get your message out?

In addition to in-person meetings and gatherings, message delivery through other channels should also be explored. Depending on the demographics of the watershed or the audience to reach, there are a number of options:

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|------------------------|----------------|-----------------|
| <b>With the Public</b> | - Website      | - Events        |
|                        | - Blog         | - Conferences   |
|                        | - Social media | - Speeches      |
|                        | - Reports      | - News coverage |

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| <b>With NGOs</b> | - Newsletters       | - Action alerts  |
|                  | - Magazine articles | - Annual reports |
|                  | - Email updates     | - Presentations  |

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|-----------------------|--------------------|-------------------------|
| <b>With the Media</b> | - Events           | - Letters to the Editor |
|                       | - Press releases   | - Media tours           |
|                       | - Press statements | - Press conferences     |
|                       | - Op-eds           | - Phone briefings       |

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| <b>With Public Officials</b> | - Letters            | - Congressional office visits |
|                              | - Phone calls        | - Restoration site visits     |
|                              | - In-district visits |                               |

**Key outputs:** develop core message, identify target audiences and effective ways to reach them.



## Part 5

# Getting Credit

If the primary objective for initiating the watershed project was to achieve permit or regulatory compliance, then there are additional steps to take and information to document. Communication with IDNR will be a key component to ensuring the project adheres to program protocols. At the beginning of the project it is critical to establish a baseline and to develop a common understanding of the requirements for permit compliance with the appropriate regulating agency or agencies. Record keeping to track the methodology used at each step of the project is critical.

Documenting existing land management practices with time-stamped photos at the beginning of an implementation project should occur for verification to ensure that appropriate credit is achieved for every action implemented. The key is to be able to show change over time and share a successful story of nutrient reduction. Planning out how partner and farmer interactions will be tracked or how practice adoption will be recorded should be determined at the start of a project so that future progress could be measured and properly accounted. If goals are met after ten years of progress, the story can only be shared if it is properly documented.

When initiating the project and considering critical factors for regulatory compliance, certain aspects will need to be agreed upon between the project partners and the appropriate stakeholder groups. These project management aspects may include:

- Project timeline, including implementation and verification
- Project scale and boundaries
- Nutrient reduction levels
- Nutrient reduction models and compliance monitoring

Nutrient reduction modeling and compliance monitoring will be a critical piece for compliance credits. It is strongly encouraged to talk to a

representative with IDNR to ensure that the watershed project follows the state protocol. The modeling tool supported by IDNR for nutrient reduction benefits from farm conservation implementation is NTT; reach out to IDNR to better understand how NTT should be used to select conservation practice options. A contractor who is familiar with the watershed and has experience working with NTT should be hired to work closely with local conservation staff to run the NTT assessment, guide data collection, and evaluate nutrient reduction loads. There are assumptions that must be input into the model; therefore, the consultant should work with staff who could provide background watershed characteristic data for more accurate estimates. There are NTT training opportunities and documentation available online (Saleh, 2018); staff should familiarize themselves with the model to better understand necessary inputs and how the outputs are generated. Detailed record keeping of all underlying assumptions and background information used in the model will facilitate proper crediting.

Progress reports may be required by the IDNR or local conservation office. Regardless of the scheduled arrangement it is important to keep track of all progress and methodology throughout the project. The process of project set-up should be well documented and phone calls should be logged. Any coordinated meetings should be summarized with a list of attendees and affiliation, agenda, action items, and key discussion results. Basic data analysis, such as nutrient concentrations or loads, dissolved oxygen, biologic indicators, should be conducted regularly to keep track of project progress and to identify any potential equipment issues or flag any atypical data.

**Key output:** *establish baseline conditions for your project area and develop common understanding of requirements with regulating agency(s).*

### Resources:

Saleh, A. 2018. *Nutrient Tracking Tool (NTT) User Manual*. Stephenville, TX: TIAER Modeling Team at Tarleton State University. <https://ntt.tiaer.tarleton.edu/welcomes/new?locale=en>



