Watershed Based Approach to Water Quality Compliance

Exploring a Municipal-Agricultural Partnership in Wisconsin

SAND COUNTY FOUNDATION

The Wisconsin Department of Natural Resources (DNR) allows point-source phosphorus (P) dischargers the opportunity to utilize adaptive management or nutrient trading options to obtain Wisconsin Pollutant Discharge Elimination System (WPDES) permit compliance as an alternative to expensive utility infrastructure upgrade requirements. To date, 45 permittees are using these options, often investing in streambank stabilization or retiring one or two farm fields from production. Few incentivize conservation practices on annual cropland, due to the complexity in documenting P reductions dispersed across multiple farms.

With a 2018 Fund for Lake Michigan (FLM) grant, Sand County Foundation (SCF) piloted a novel Performance-Based Conservation (PBC) approach with the Village of Grafton wastewater utility department, located in Ozaukee County, focusing on bridging urban and rural communities and sharing outcomes with local and state agency representatives. The objective of the PBC pilot was to incentivize the adoption of agricultural conservation practices to farmers upstream of the utility's discharge point to reduce P loading to the Milwaukee River. As a result, the Village of Grafton pursued a Wisconsin DNR adaptive management plan to meet their waste water treatment plant water quality permit needs.

This document is meant to serve as a primer for other regulated facilities interested in pursuing an adaptive management approach for permit compliance. We incorporate lessons learned during our pilot pro ject with the Village of Grafton. The process laid out focuses on building trust between stakeholders and creating a culture of commitment to the goals and objectives of the entire watershed community. A PBC incentive system, customized to fit local conditions (landscape and economic) and farmer networks in existing watershed-based projects, can accelerate nutrient management adoption and leverage non-federal conservation funding for farmers.

Original support for the work on which this publication is based came from the Walton Family Foundation

Part 1 Identify Nutrient of Concern, Project Area and Compliance Strategy Option

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 and scale of concern, will lead to a better focused and defined project scope for more efficient coordination and greater opportunity for success. Beginning a project with a clear understanding of the scale of activities necessary to achieve compliance is a critical step to attaining the nutrient reduction goal.

In the Village of Grafton case, the primary constituent of concern was phosphorus (P) related to their wastewater treatment plant water quality permit, with Total Suspended Solids (TSS) as a second concern under both the wastewater plant permit and the City's MS4 (municipal separate storm sewer system) permit. P is an essential crop nutrient 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 and negatively impact water quality. From an agricultural perspective, TSS is primarily soil in the context of non-point source pollution. When crops are not protecting the exposed soil, erosion and nutrient run-off losses are often elevated during rainfall or snowmelt events.

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.

Once the nutrient(s) of concern are defined for the project, the next step is to identify the potential nutrient sources located throughout the contributing watershed boundaries. 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.

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

- Soil and geologic landscape surveys
- Current and past land use, land cover, and land management maps, including aerial imagery
- Existing water quality and monitoring data
- Total Maximum Daily Load (TMDL) reports or other watershed level assessments
- Wisconsin's Nutrient Reduction Strategy and Implementation Progress Report (WDNR,2013; 2020)

This information can be obtained both online and by contacting local or state government offices. Conservation implementation will be best achieved through collaborative efforts with city, township, county, and state personnel, as well as local agricultural or conservation outreach groups such as Department of Agriculture, Trade and Consumer Protection (DATCP, 2021) producer-led groups. This initial opportunity to reach out and engage relevant organizations, departments, and agencies early in the data reconnaissance process can streamline and improve project efficiency.

Resources

WDNR. 2013. Wisconsin's Nutrient Reduction Strategy: A Framework for Nutrient Reduction and Management. Madison, WI. Retrieved from: https://dnr.wisconsin.gov/topic/SurfaceWater/NutrientStrategy.html

WDNR. 2020. Wisconsin's Nutrient Reduction Strategy Implementation Progress Report 2017-2019. Madison, WI. Retrieved from: https://dnr.wisconsin.gov/topic/SurfaceWater/NutrientStrategy.html

WDNR. 2021. Adaptive Management. https://dnr.wisconsin.gov/topic/Wastewater/AdaptiveManagement.html

WDNR. 2021. Wisconsin's Water Quality Trading. https://dnr.wisconsin.gov/topic/Wastewater/WaterQualityTrading.html

Familiarity with the watershed's TMDL process and associated report input information can be extremely helpful to the process and understanding the watershed's priorities. A properly developed TMDL will have regulatory information related to point and non-point source pollution identified to the sub-watershed level, which is key for targeting potential agricultural areas for impactful implementation.

Information from the Village of Grafton's TMDL was used to determine the extent of conservation that would be needed to meet the initial permit compliance needs. This was followed up with a landscape analysis including SnapPlus modeling the agricultural activities in the watershed to develop options. Sand County Foundation (SCF) staff worked with Ozaukee County, local USDA Natural Resource Conservation Service (NRCS), and Agronomy Services staff, as well as local farmers, to build baseline models of the existing agricultural management in the watershed. By modifying the baseline management in the models, conservation plan design options were compared to identify a pathway toward achieving sediment and P reduction goals for Village of Grafton permit compliance.

Based on the information gathered from the resources listed above, it was determined that the Village of Grafton would need to direct efforts to its immediate watershed as well as the watershed directly upstream to have the capacity to meet its compliance needs. Further analysis into the options available, the Village of Grafton selected adaptive management as their watershed-based approach to compliance. Compared to the WDNR water quality trading options, adaptive management allows a longer time period (15-years in Grafton's approved plan) to generate compliance offsets and to lower the instream P concentration to water quality standards at the receiving water body (the Milwaukee River at Grafton's compliance point).

Part 2 Develop the Watershed Plan

Once the nutrient(s) of concern have been identified, the geographic scope of the project has been defined, and the best compliance option has been determined, the next step is to develop the plan to achieve the reductions needed to meet overall compliance goals. This includes developing an outreach strategy and schedule for implementation that meets interim goals for the compliance strategy. Since the plan will need to be approved by the appropriate regulatory agencies, it is advised that they are engaged in the project from the start.

For many communities, targeting nutrient load reductions is based on the local water utility or municipal MS4 permit load reduction requirements. Working with the appropriate staff (i.e., wastewater plant engineer or city engineer) will be critical in developing a plan to adequately meet compliance needs. This involves understanding any plant or system upgrades that are being planned and if there is any potential for future permit change (i.e., increase in effluent loads due to population or industry increases, large municipal infrastructure changes that may increase impervious surface) over the project timeframe. Comparing the current permit requirements to the capacity for infrastructure or plant upgrades is a good starting point to determining what level of upgrades versus out of service area offsets are needed to meet permit needs. Then factoring in future expectations can allow information from the data reconnaissance to be used in conjunction with any future needs to create the most cost-effective plan to achieve permit compliance.

Once the target load reduction is confirmed, agricultural conservation management options to achieve those goals should be identified. In general, management options that can be implemented to reduce losses in-field, edge-of-field, and in-stream need to be analyzed to determine the most cost-effective approaches to meeting reduction goals. It is critical to work with local farmers, agronomists and conservation staff in your area of operation (identified in Part 1) to determine what management options have the best chance of adoption in conjunction with the cost effect reductions analysis.

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

A key step to identifying feasible management options is to estimate the load reductions from each potential farm conservation scenario. A conversation with WDNR and local partners should occur at the start of the plan development to determine what metric will be used to analyze the compliance offsets. Staying on top of this conversation throughout the planning process is important to make sure that proper crediting occurs.

In the early phases of building the Village of Grafton's adaptive management plan, it was understood that quantification of P loss for most field agricultural management schemes should be done using the Soil Nutrient Application Planner (SnapPlus) computer software program developed and maintained at the University of Wisconsin-Madison. This program includes the WI Phosphorus Index (PI) and the WDNR backed Phosphorus Trade Pounds (PTP) calculations, the latter being developed specifically for use in water quality permit compliance scenarios. The Village of Grafton agreed to use a Pay-for-Performance approach, or Performance-Based-Conservation (PBC), to meeting their compliance. PBC is based on paying the farms based on a per pound of P loss reduction rate rather than the commonly used Pay-for-Practice approach, which is based on a

flat fee for an acre of practice metric. Since no two farm fields are identical, the effectiveness of a conservation practice varies based on the design (if it is a structural practice), landscape characteristics, and farm management. Therefore, PBC seems to be a more cost-effective method for a municipality to gaining their P loss reductions for compliancy. This was proven true in the first year of the Village of Grafton's pilot. Since a Pay-for-Practice approach is more common, to introduce the compliance offset concept to the watershed it was used for the first year. However, performance was also modeled and results indicated that when compared to the baseline modeled P loss, 33% of the farms actually yielded no P loss reduction for compliance offsets with the conservation practices implemented in the plan. Moving forward in their compliance schedule, the Village of Grafton continues to use the more efficient PBC process in their WDNR approved adaptive management plan.

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 Wisconsin Land and Water Directory or the list of NRCS Wisconsin Local Service Centers. 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

If Pay-for-Practice is the approach used, there will need to be an inventory of the different practice options with a cost structure for each. Structural practices have the advantage of results over time, but with the possible disadvantage of higher upfront and long-term maintenance costs. Annual practices have the advantage of general low cost but the disadvantage of annual management, maintenance, and operation costs to retain consistent compliance results. It is also important to note that annual practices like cover crops have a tendency to move from field-to-field each year based on the commodity crop that they are following.

PBC has the advantage of a payment based on a known quantity of P needed based on pounds reduced and a corresponding budgeting. The potential budgeting disadvantage to this is the initial staff time needed to model scenarios and work with the farmers to set an annual plan for meeting P loss reduction on each farm involved. The advantage of a longer-term project for PBC is that as the staff and farmers get more experience with the process and the relative effectiveness of options on their fields, this time/cost factor will be reduced. Farmer relations, agricultural conservation expertise, and modelling experience are staff skillsets that may be costly to obtain and retain over time. Maintaining staff consistency is important for developing a trusted relationship with farmers within the watershed. It is best to have the same person interacting each year with the farmer to collect operation data. For example, one of the Village of Grafton farmer collaborators has specifically asked who they will be interacting with year after year. They want to have a lasting relationship with their project collaborators.

Timeline issues are primarily related to trying to go too big too fast. When possible, it is best to work with the regulatory agency to set a realistic reduction schedule to meet the compliance goal. In general, a relationship "buildup" phase is not possible once a permit holder has entered into a water quality trading compliance option. This is primarily because trading is designed with a straight offset. Timelines for adaptive management are more conducive to allowing for the buildup phase since they are predicated on a receiving waterbody change and not so much on direct offsets. It is recommended that permit holders entering a water quality trading option should spend a few years building an offset network of farmers or other non-point source entities that can provide tradable pounds of the constituent of concern.

A valuable resource to reference throughout your plan development is 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). Both references provide a step by step outline with guidance of the plan development process and should serve as go-to publications.

Resources:

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

USDA-NRCS. 2021. Local Service Centers. https://www.nrcs.usda.gov/wps/portal/nrcs/main/wi/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

Wisconsin Land & Water Conservation Association. 2021.Wisconsin Land + Water Directory. https://wisconsinlandwater.org/files/pdf/WILandWaterDirectory.pdf

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:

- County Land and Water Conservation Departments
- Local NRCS offices
- Farmer-led or other watershed groups
- Other agricultural stakeholders (agronomists, ag retailers, etc.)

These groups can help connect farmers located throughout the watershed project area to the implementation plan development for potential conservation system 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.

Aside from the Village of Grafton, another example of a successful urban-agricultural partnership is the 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 go 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.

Similarly, the DATCP sponsored producer-led Milwaukee River Clean Farm Families (CFF) group was active in the watershed area that was critical to achieving agricultural offsets for the Village of Grafton's adaptive management goals. CFF was engaged from the start to ensure that there was a connection between the municipal and agricultural communities. CFF was involved in the adaptive management plan development and included Village of Grafton staff in their field days and meetings. This relationship facilitated an understanding of how the municipal and agricultural partners could work together to effectively achieve each other's goals and objectives. CFF, local agronomists, and Ozaukee Land and Water Conservation Department staff assisted SCF in compiling the farm management information necessary for modeling baseline conditions in SnapPlus.

Recruiting farmers and gathering farm management data for baseline modeling requires time and a coordinated effort. It is imperative that this build-up phase is not rushed in order to ensure project viability. Furthermore, as farm management data is collected, consider that depending on who drafted the farmer's conservation plans, the level of detail in farm management data will vary from year to year and plan to plan. This lack of consistency can create time-consuming obstacles for quantifying baselines. The CFF groups willingness to try new approaches and listen to new ideas was critical to getting the Village of Grafton's permit compliance work moving forward.

Success of any water quality improvement program is dependent upon the availability of willing landowners to implement a conservation practice or adjust their nutrient management. The ability to meet compliance goals will hinge on having full commitment from diligent and engaged collaborators; therefore, it is imperative that communication is frequent between all partners and progress be tracked throughout the project duration to adequately evaluate and modify methods for high impact.

Resources:

DATCP. 2021. Producer-Led Watershed Protection Grants. Madison, Wi. Retrieved from https://datcp.wi.gov/Pages/Programs_Services/ProducerLedProjects.aspx

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 the local water quality and watershed health can 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 water quality permit holder in some way or another. 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 a larger community would need to discuss more background information on watershed connectivity, drinking water resources, water quality benefits of the plan, and how it relates to being the most cost effective way of keeping their water bills down.

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
- URGENT: Describe the sense of urgency or issue a call to action

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 agronomist or engaged farmers, local political figures, water utility staff, or businesses who are struggling with the effects of the water quality impairment.

Sample Core Message

We all want and need to have clean water, but our water treatment plant faces expensive upgrades if we don't do something to improve water quality in our watershed before it gets to the treatment plant. To address this, our city is going to work with and provide funds to our local farmers for farm conservation management activities that aim to reduce soil and nutrients from entering our waterways. This work with farmers can also help to ease flooding problems. If we do not create this type of partnership with our farmer neighbors now, we will all face more expensive solutions down the road.

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 time to develop an up-front 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:

With the Public	- Website - Blog - Social media - Reports	- Events - Conferences - Speeches - News coverage
With NGOs	- Newsletters - Magazine articles - Email updates	- Action alerts - Annual reports - Presentations
With the Media	- Events - Press releases - Press statements - Op-eds	- Letters to the Editor - Media tours - Press conferences - Phone briefings
With Public Officials	- Letters - Phone calls - In-district visits	- Congressional office visits - Restoration site visits

Part 5 Getting Credit

If the primary objective for initiating the watershed project is to achieve permit or regulatory compliance, then there are additional steps to take and information to document. Communication with WDNR and local partners will be a key component to ensure that the project adheres to program protocols. At the beginning of the project it is important to establish baseline conditions for all farms that may be involved in providing compliance offsets.

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.

For the Village of Grafton this phase included some obstacles. Of the nine farms that were engaged in offset discussions, half had existing data that needed to be vetted and augmented in order to establish a proper baseline for future offset quantification. This required extra staff time and effort to document baseline data that would meet regulatory requirements. There should be continual discussions with regulatory staff to create a better understanding of what is necessary for verification, since requirements may vary. For example, for some structural practices it may be necessary to submit engineering designs and as-builts.

When initiating the project and considering 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 modelling and monitoring will be a critical piece for meeting compliance requirements. It is strongly encouraged to talk to a representative with WDNR to ensure that the watershed project follows the state protocol. Modelling and monitoring can be complex activities, without clear procedural guidance, disputes in data can come up and jeopardize the success of the project.

The Village of Grafton submitted a monitoring plan as part of the adaptive management plan. Nutrient offset quantification from implemented agricultural activities will be done primarily using the Phosphorus Trade Pounds (PTP) output in the SnapPlus model. The PTP is an output in SnapPlus that was developed by WDNR in conjunction with the University of Wisconsin-Madison and is the accepted model for water quality permit compliance offsets calculations in Wisconsin. SnapPlus training hosted by the university and Wisconsin DATCP staff is frequently offered across Wisconsin.

Detailed recordkeeping and data management are invaluable for properly tracking SnapPlus generated offset credits and compliance progress. Even if progress reports are not required, it is important for tracking success and adaption to methodologies that led to success. Meeting notes with attendees should be kept and logs of any official project phone calls should be documented as well. All data sources that come from lab analysis should be formatted and displayed according to regulatory agency guidelines and be accompanied by any related lab equipment accuracy tests and state lab license information.

Resources:

University of Wisconsin. 2020. SnapPlus Training Manual. Madison, WI. Retrieved from https://snapplus.wisc.edu/

www.sandcountyfoundation.org