

SAND COUNTY FOUNDATION'S APPROACH TO PERFORMANCE-BASED CONSERVATION



APRIL 2025

Using SnapPlus to Calculate Field-Level Nutrient Baselines and Evaluate Conservation Scenarios

Sand County Foundation (SCF) has been implementing performance-based conservation (PBC) since 2014, starting with a project in the Milwaukee River Basin with Winrock International and Delta Institute partners. Since then, we have worked with individual municipalities, private companies holding Wisconsin Pollution Discharge Elimination System (WPDES) permits, watershed groups, and large-scale grants to plan and quantify farm management modifications for water quality improvement. These management changes increase conservation acres adopted across Wisconsin watersheds. We utilize an individual farm modeling method for analysis that is based on field geography and management. This method is more complex and time-consuming than other methods, but allows for more flexibility for management shifts by the farm, and gives the most personalized impact report.

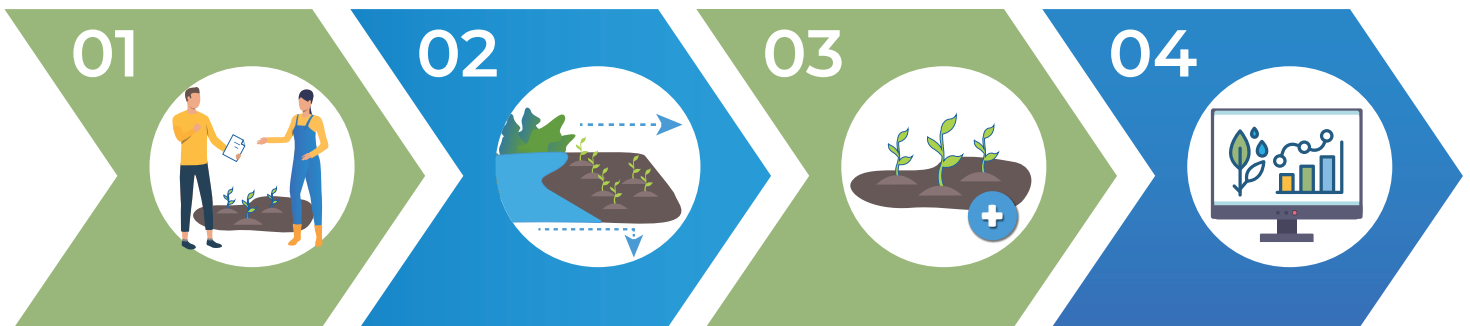
General: Determine a farm's management history to create a typical baseline plan within the project's accepted timeframe. The baseline management is built out to extend through the project assessment period as if the farm consistently maintained this rotation and management system. A second version of the farm plan is built out with the actual management, including the conservation activities implemented. Both the baseline and new management system should be analyzed in SnapPlus to identify and compare the annual phosphorus and sediment losses modeled from each scenario. The difference between the two is the reduction of loss in phosphorus or sediment from the field and farm. Management can be verified through random on-ground checks and farm records. Using a copy of one of the plans to trial practices and model results can be used



to choose the management option that gives the largest impact to water quality.

Baseline: Typically SCF programs allow baseline management to be set from management history within the last 10 years or two crop rotations. Farms often trial new management practices, but may not implement them uniformly on all fields. Occasionally, certain fields have a baseline management that differs from the rest of the fields on the farm. An example is a farm that has ground that is sandy soil so they do limited tillage there but on the majority of the farm the tillage is a higher intensity. The goal is to understand the typical baseline management for the farm and fields.

Data Management: SnapPlus is a great resource in Wisconsin, but file management is critical. Multiple versions with unique file names must be created for the baseline and each tested scenario. There is not an undo button in SnapPlus.



01 Sand County Foundation meets with farmers to gather soil tests, field details, and management history to establish baseline data.

02 Sand County Foundation models soil and nutrient loss from each field under baseline and other conservation scenarios.

03 Farmers implement the best conservation scenarios for their field(s).

04 After verification, farmers receive data to quantify the environmental benefit of the management change.

Metrics: SnapPlus phosphorus and sediment trade reports account for a delivery factor of nutrients and sediment to a waterbody, considering the dominant soil type of each field. These reports are the most widely accepted for water quality permitting compliance.

Determining the Farm Baseline

- Verify that the previous plans provided in SnapPlus were created with accurate information. Often the input data is not verified because SnapPlus is primarily used as a planning tool and not a record-keeping tool.
- Discuss with the farmer or manager what they believe is their “normal management” for crop rotation, tillage, nutrient management, and cover crop use. Are there acres they treat differently? Have they tried any new management changes in the last five years?

- Verify these answers by comparing the farm’s SnapPlus rotations, tillage, and nutrient (fertilizer or manure) use.
- Use the SnapMaps feature in SnapPlus to assess acreage, slope, or soil type disagreements that may occur between the maps in the program and the fields.
- Review the nutrient management plan for selections that do not make sense, like planting green without a cover crop.
- Ensure that each field has an up-to-date soil sample and two years of history beyond the baseline to draw results from the trade reports. Fields with insufficient history or soil data will not be processed.

SnapPlus 20.4 built on 2021-06-03 -

File Import/Export Tools View Help Save Snapshot

Location: C:\SnapPlus2\MySnapPlusData

Farm Soil Tests SnapMaps Fields Nutrients Cropping Records Reports

of 3 Page Wid Find Next

WQ1: P Trade Report

Reported For		Prepared for:
Printed	2025-03-05	
Plan Completion/Update Date	2021-03-23	
SnapPlus Version	20.4 built on 2021-06-03	
C:\SnapPlus2\My SnapPlusData\RL&C		

The P Trade Report estimates the annual pounds of phosphorus (P) in surface runoff from cropland entering surface waters. These P loss calculations are based on a field's soil test P concentration, crops, tillage, nutrient management practices and estimates of average runoff and sheet and rill erosion for the predominant soil type. Losses from concentrated flow channel or gully erosion with a field are not included in these calculations. Field runoff losses are calculated for each year as PTP (lb P/field/yr). Fields are only included if there are at least 2 years of crops before the selected start year. Before using this report as part of a Water Quality Trade activity, phosphorus losses (PTP) must be converted into 'P credits' according to DNR guidance.

For more information go to <http://dnr.wi.gov/> and type keyword: **Water Quality Trading**



Saving the Output Report

- Utilize the phosphorus and sediment trade reports in the reports tab of SnapPlus for the analysis year.
- Save the spreadsheet versions or store them in an online workbook. This is helpful when comparing SnapPlus plan results (e.g., baseline vs. conservation scenarios). Multiple runs and rounding give slightly different outputs in each report.
- Document which SnapPlus version was used to create the report. SnapPlus version updates can affect results. Knowledge of the version used can help justify discrepancies.

Selecting Conservation Scenarios to Result in Phosphorus Reductions

- Change rotations on fields, such as adding wheat or removing high soil loss crops that leave little biomass at harvest like peas or corn silage.
- Shift nutrient management- changing placement, type, or timing of fertilizer or manure.
- Add perennial crops to the rotation.
- Place filter strips on the contour or field edge.
- Reduce tillage or amount of field disturbance.
- Add grazing to the field.

SnapPlus Tips

- Do not worry about changing past years unless they were a trial-type scenario. SnapPlus does use past history to determine the current year's phosphorus and sediment loss amount.
- Using the add/copy/delete tools instead of the rotation wizard often provides more control.
- Do not over estimate manure use beyond what the farm has available.
- Use an agreed-upon typical nutrient management that can be saved under "Nutrient System" for each crop or situation in the baseline plan.
- When a buffer or filter strip is added, SnapPlus will add it to all years of the field's history. Utilize the phosphorus or sediment reductions from the year it was implemented.
- Some management, like complex grazing scenarios, will not be listed in SnapPlus.
- Watch for unexpected impacts from certain management that might come from adding wheat or cover crops.

If you are interested in learning more, or are part of a demonstration network or farmer group and would like to explore conservation options, please contact:

Tricia Verville | (920) 980-1971
tverville@sandcountyfoundation.org



NFWF

syngenta®



Natural Resources
Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

USDA is an equal opportunity provider, employer, and lender.



This project is supported by a public-private partnership between General Mills, NRCS and NFWF and is designed to sustain, restore and protect fish, wildlife and habitat by leveraging funding, building conservation capacity, and focusing partners and resources toward key ecological issues utilizing the leveraged resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the U.S. Government or the National Fish and Wildlife Foundation and its funding sources. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government, or the National Fish and Wildlife Foundation or its funding sources.

Additional funding was provided by Syngenta Crop Protection, LLC, and leveraged with support from Green Lake Sanitary District, Ozaukee County Land and Water Management Department, Tilth Agronomy, and Wisconsin Department of Agriculture Trade and Consumer Protection. Project collaborators include NEWWater, City of Oconomowoc, Dane County Land & Water Resources Department, InDepth Agronomy, Tilth Agronomy Group, and Johnsonville, LLC.



Sand County Foundation inspires and empowers farmers, ranchers, and forestland owners to ethically care for the land to sustain water resources, build healthy soil, and enhance wildlife habitat.

www.sandcountyfoundation.org