

# Curriculum Outline

## Purpose

This outline aims to clarify particular topics included in presentations, offer additional background information for points of interest and offer information as to a subject’s relative importance.

The left column incorporates the presentation content, with any notes expressed in the right column.

### Presentation Content

### Notes

Watershed information – Minnesota River

***This section is optional and may not be applicable to certain areas of Minnesota (northern and south-eastern regions). Information regarding these areas can be organized, upon request.***

Extent

*The Minnesota River is most of central Minnesota, with 28 counties with around 90 percent of the land being used for agriculture – agriculture has an impact.*

Nutrient Impairments  
Phosphorous  
Nitrogen

*Concentrations increase moving closer to the Mississippi River, with TMDL and drinking standards not being met in much of the basin.*

Health/Environmental Issues

*Phosphorous and nitrogen both eutrophication in fresh and salt waters, respectively, as well as health problems.*

Extended Impacts

*MN River comprises ~1% of MS River, along with much of the nitrates contributing to the “dead zone”.*

Management  
Current Work

*This slide stresses the importance of self-adoption of conservation and the many available options for farmers to do so, with participation levels throughout Minnesota.*

Improvement Opportunities

*We are an option among others; we will fit for some, but not everyone.*

BMP CHALLENGE Introduction

***This section quickly gives an overview of the BMP CHALLENGE purpose and motivation, including some project details.***

Rationale

Environmental Need

*This slide recaps the environmental issues from the previous section. When time is limited, this could be used alone.*

Reducing Uncertainty

*BMP CHALLENGE asks farmers to ‘bet’ their fields. Over-applications, tillage and GMOs reduce risks, but cost more. We hope to help make the risk safer.*

Details

Components

*Funding is provided by USDA-NRCS, and programs are available throughout 13 states, with potential for WQT.*

Partners

*We work with a variety of people in many different groups, to better accommodate the farmer interests, including producer advisors.*

Goals

*Goals include major water quality reductions with phosphorous and nitrogen, while making this program available to many farmers in Minnesota (and elsewhere).*

**BMP CHALLENGE Mechanics**

***BMP CHALLENGE can seem complicated and esoteric. This section works to clarify important topics and explain methods and calculations with relatively few slides.***

Eligibility

*Farmers must meet EQIP regulations (see ELIGIBILITY), grow corn (grain or silage), work with a crop advisor and not apply fall N or tillage.*

Applications

*Applying is simple, go online, print out form (or email data and send signed copy). We only require general farmer information and basic farm history (soil tests, previous crops, etc., with Nutrient BMP CHALLENGE).*

Check-strips	<p><i>Check-strips are the basis for all comparisons and calculations. They receive conventional tillage practices or nutrient levels.</i></p>
General	<p><i>Farmers work with their crop advisor and fill-out the worksheet, providing the location, size and check-strip application or tillage information.</i></p>
Crop Advisors	<p><i>Crop advisors must help farmers find representative samples in their fields, through photos or testing. GPS coordinate or landmarks should mark the site, with equal sized adjacent BMP CHALLENGE rate strips found (for harvesting).</i></p>
Variations	<p><i>Farmers using contour strips should use the provided advice for check-strip application (not likely an issue for much of Minnesota).</i></p>
Yield Assessment	<p><i>Farmers work with their crop advisor to harvest their check-strip and adjacent BMP strips, using preferred means of weighing or monitoring. Any comparisons of BMP strips with the rest of the field should be noted prior to harvest. Harvests should be adjusted for moisture.</i></p>
Net Returns	<p><i>Farmer and crop advisor can work through the net returns worksheet, which provides all the steps for calculating check-strip area, (bushels/tons)/acre and net gain or loss. With net gain, farmers would contribute 1/3 of their savings (no more than \$6/acre). With net loss, farmers receive a payment compensating all loss, after savings.</i></p>
Examples	<p><i>Examples are provided, showing net gain and net loss calculations with Nutrient BMP CHALLENGE. For tillage, custom rates are used to generalize operation costs, see TILLAGE CUSTOM RATES.</i></p>

## Water Quality Trading 101

### Overview

#### Terms

***Water quality trading is a very complicated subject to discuss, with limited information already available. We want to help farmers understand this as an option for them in the future, without confusing them and making trading seem too complicated. Right now, trading rules are still being written and issues being organized. Specific questions can be referred to James Klang, PE, or Mark Kieser, see CONTACTS.***

*Explain what WQT is alongside what can be traded, what produces credits and of what the market consists.*

#### Schemes

*There are 3 main trading schemes, as shown, though farmers usually trade with a point-source. Waste water treatment plants would include non-point sources with potential trading opportunities. Credits are handled in difference manners for each type.*

#### Locations

*Trading programs are currently in six states, this presentation highlights Minnesota and Michigan cases.*

### Examples

#### Michigan

*Michigan had buyers from paper mills and WWTPs, who purchased credits from public, farm and private groups. BMPs were implemented in a range of categories, with nutrient management as one option among many. BMP CHALLENGE only deals with nutrient and tillage BMPs, but encourages farmer participation in other conservation strategies.*

*Michigan examples show that long-term costs of BMP implementation often decrease substantially.*

#### Minnesota

*In Minnesota, work was done with a Rahr malting location. BMPs included spring cover crops and stream bank stabilization work. Outcomes were*

*obvious and clearly beneficially to habitats and water quality.*

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Next Step  
Rule Forming

*Minnesota is working to establish clear and well-placed rules regarding environmental credit trading, with a two-year timeframe. BMP CHALLENGE is involved in this process, to help ensure rules that are beneficially, including testing schemes.*

Agriculture Involvement

*Agriculture could potentially gain extra income, as well as the credit for being a substantial force in stewardship and conservation efforts.*

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**BMP CHALLENGE Experience**

***Dave Legvold put together some information regarding his involvement with BMP CHALLENGE around Northfield, MN in 2006. Legvold and his farmers participated in Reduced Tillage BMP CHALLENGE. While they had significant reductions in yield and negative net returns, much could be attributed to new equipment, poor weed management and environmental variables. This presentation provides good information for watershed and conservation groups. Legvold works for the Cannon River Watershed Partnership in Northfield, MN.***

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Agriculture Management  
Problems

*Legvold relates many of the problems with ag management to an imbalanced approach of incentives, education and regulation. There may be incentives in most cases, but there is often little educational opportunities and even less regulation available.*

Total Resource Management

*Legvold uses 'total resource management' to describe working with all aspects of a farm system. This system works to connect a farm with opportunities and funding then use them to implement BMPs and decrease inputs.*

Manure	<p><i>Manure applications should work with university recommendations for nitrogen and phosphorous, meeting these needs through frequent manure and soil tests for proper nutrient crediting. See MANURE.</i></p>
Erosion	<p><i>BMP CHALLENGE requires a minimum of 30 percent residual cover to be 'conservation tillage'. Seemingly small changes in tillage, among others, can cause large reductions in inputs.</i></p>
Problem Solving	<p><i>Changes can be made to the system to provide incentives based out of the farm itself (through reductions). BMP CHALLENGE and other groups help to provide learning opportunities. Once farmers feel comfortable with modifications, they can be a stronger voice in self-enforcement of regulations.</i></p>
Experiences	<p><i>Legvold shared how BMP CHALLENGE and a new piece of equipment worked with his group.</i></p>
Education	<p><i>Brian Brandt spoke at a field day near Northfield, talking about the program and its mechanics.</i></p>
Innovation	<p><i>Legvold and another participant used new equipment, Soil WARRIOR, to incorporate liquid hog manure and provide tillage and seeding at the same time.</i></p>
	<p><i>The Soil WARRIOR had a higher custom rate than traditional tillage schemes. This can be attributed to initial purchasing costs and the newness of the product.</i></p>
Adoption	<p><i>Legvold was able to get 4 participants, but many more learned about the processes and may adopt on their own.</i></p>
Results	<p><i>BMP CHALLENGE covers the cost of any losses, so it is the test period and reductions that can be focused on by farmers.</i></p>