Yahara Pride Farms 2020 Phosphorus Preliminary Report

Yahara Pride Farms Board of Directors

January 28, 2021

Introduction

On behalf of Yahara Pride Farms, we would like to commend and thank all farmers who worked with the Yahara Pride Watershed program, together with Yahara Pride Farms and Yahara WINS, to implement practices that reduce the potential for phosphorus loss to the streams and rivers that contribute water to the Yahara Lakes. The farmers in this area continue to be supportive of Yahara Pride Farms and continue to seek alternative farming systems and conservation practices that reduce phosphorus and sediment loss. The 2020 final report conveys how dedicated every farmer is to keeping soil and nutrients on their fields and out of our water.

Thanks also to the businesses and organizations who provide support (both financial and in-kind) to Yahara Pride Farms. It takes people and money to offer this cost-share program, as well as the certification, outreach, and education events, and we would not be able to do it without the generous support. This farmer-led watershed approach has become a model for others around the state because we have been able to offer programs and events based on your support. Thank you for being an important part of the Yahara Pride Farms program.

Programs offered in 2020

Each year the Yahara Pride Farms board of directors reviews the cost-share program and discusses whether they should add or remove conservation practices. This decision is based on the level of success of past practices (pounds of phosphorus removed), the potential for new practices to reduce phosphorus loss and the level of funding available to the program. The 2019 cost-share program offered seven cost-share programs plus payment for multiple practices on a field, had five new farms participate in the cost-share program and for the first time offered two payments for the cover crop program:

- Over-wintering cover crops, 100 acres maximum at $50 per acre, and
- Nonover-wintering cover crops, 50 acres maximum at $30 per acre.

The 2020 cost-share program continued the cost-share programs and added two new practices. Below is a list of the cost-share programs offered to farmers in 2020:

	Practice	Maximum acres	Payment per acre
1	Over-wintering cover crop	100	$50
2	Non-over-wintering cover crop	50	$30
3	Low disturbance manure injection	100	$20
4	Strip Tillage	100	$15
5	Low disturbance deep tillage + cover crop	50	$55
6	Headland stacking manure	500 yards	$8/yard
7	Composting and stacking manure	500 yards	$8/yard
8	Deferred fall killing of alfalfa	50	$30
9	Adding grass to alfalfa seedings	50	$25
10	Stacking multiple practices	100	$25

Each and every year brings challenges to famers due to weather conditions. Fortunately, the fall and early winter of 2020 presented good to excellent field conditions, with only about 7 inches of rainfall. Conversely, the fall of 2019 had about 16 inches of rainfall delaying harvest and preventing practice implementation. The reduction in rainfall provided vast opportunities for farmers to plant cover crops, harvest bedding, apply manure and conduct strip tillage and

fields within the Yahara Watershed. As we begin to gather information on the number of acres planted or managed with conservation systems, we are impressed at the number of acres that were managed using conservation farming systems.

This preliminary report provides an estimate of the number of farms acres involved in each of the cost-share practices. The Wisconsin Phosphorus Index (P Index) is a model that estimates the pounds of phosphorus prevented from reaching the nearest waterbody. The nearest waterbody would, in most cases, be streams and rivers. These estimates can then be used (with the appropriate delivery factors) to estimate the pounds of phosphorus prevented from entering the Madison Chain of Lakes. The information gathered at this point indicated that **56 farms participated** in the cost-share program (dramatically increased compared to the 38 farms in 2019). This increase of 18 new farms may be because of the excellent weather conditions and/or the increased interest in the Yahara Pride Farms cost-share program.

1. Strip Tillage:

Strip tillage is a conservation system that offers an alternative to no-till, full-till and minimum tillage. It combines the soil drying and warming benefits of conventional tillage with the soil-protecting advantages of no-till by disturbing only the portion of the soil that is to contain the seed row (similar to zone tillage). Each row that has been strip-tilled is usually about eight to ten inches wide. The system still allows for some rainfall contact with the soil that could cause erosion, however, the amount of potential erosion on a strip-tilled field is lower than the amount of erosion on an intensively tilled field. Compared to intensive tillage, strip tillage saves considerable time, fuel, and money. Another benefit is that strip tillage conserves more soil moisture compared to intensive tillage systems. However, compared to no-till, strip tillage may, in some cases reduce soil moisture and increase the potential for soil loss.

Switching from no-till to strip-till may increase the potential for particulate phosphorus loss while having minimal impact on soluble phosphorus losses (depending on manure applications). Considering that strip tillage normally replaces more aggressive tillage (chisel plowing, cultivation, etc.), it seems reasonable that most of the advantage to changing to this tillage system will be in the reduction of soil loss. To increase the use of strip tillage in the Yahara Watershed there needs to be more equipment readily available for rent or more custom strip tillage available to farmers in this region.

Strip-tillage is performed with a special piece of equipment. YPF's original strip-till program assisted with the rental of a strip-till machine to determine if this farming system fit into a farms overall farming system and management. The YPF's board approved a payment of $15/acre for up to 100 acres for farmers wanting to experiment with strip tillage (maximum payment of $1,500 per farm).

The signup for the 2020 strip tillage program includes:

- **3,710 acres, compared to 821 acres in 2019**
- **7 farms compared to 3 farms in 2019**
- **Potential cost share of $ 10,500 compared to $4,500 in 2019.**

2. Low Disturbance Manure Injection:

The northern portion of the Yahara Watershed is an area with high concentrations of livestock and, therefore, a great deal of manure. Manure is either incorporated into the soil using a number of different tillage implements (chisel plow, disk, or field cultivator) or it is applied to

the soil's surface and not incorporated. Surface applications of manure have been shown to increase nitrogen and phosphorus runoff to rivers and streams, while injection/incorporation places manure below the surface where it doesn't interact with runoff water during storms. However, on steep slopes injection/incorporation of manure can make the soil more susceptible to erosion.

For many livestock operations in the Yahara Watershed, manure incorporation is a standard practice. Traditional incorporation methods move a great deal of soil and increase the potential for soil erosion. Field evaluations conducted by the Yahara Pride Certification Program during the spring of 2013 and 2014 identified reducing soil erosion as a high priority. Since much of the tillage was conducted to incorporate manure, a system of incorporating manure with minimal soil disturbance needed to be implemented in the watershed. Minimum disturbance equipment also works well with no-till farming systems and allows farmers to experiment with new methods of preserving nitrogen, phosphorus, and potassium to save on fertilizer costs. In addition to the economic benefits, improved manure utilization benefits the environment by ensuring efficient nutrient use and improving soil and water quality.

Participants in the cost-share program were either farmers who had purchased LDMI equipment, or hired a custom operator who had LDMI equipment. **The signup for the 2020 LDMI program includes:**

- **3,677 acres, compared to 2,620 acres in 2019**
- **24 farms, compared to 19 farms in 2019**
- **Potential cost-share of $ 39,230 compared to $14,000 in 2019.**
    - There was additional manure applied using this equipment, but some of that land was out of the Yahara Watershed.

3. **Low Disturbance Deep Tillage and Cover Crop:**

The low disturbance deep tillage and cover crop program was offered again in 2020. The program offered cost-share assistance to farmers willing to implement deep tillage practices that were also low disturbance followed by planting of a cover crop. The goal was to reduce the potential for aggressive deep tillage conducted within the watershed, which would increase the potential for soil erosion. **The signup for the 2020 LDDT+CC program includes:**

- **1,303 acres, compared to 550 acres in 2019**
- **17 farms, compared to 9 farms in 2019**
- **Potential cost share of $ 41,250 compared to $19,525 in 2019.**

4. **Cover Crop Assistance Program:**

Cover crops are grasses, legumes, small grains, or other crops grown between regular grain crop production periods for the purpose of protecting and improving the soil. The most common cover crops are fall-seeded cereals, such as rye, barley or wheat, and fall-seeded annual ryegrass. Late summer-seeded spring oats or spring barley is sometimes used if winterkill is preferred to avoid spring termination by tillage or herbicide. One of the two major reasons for growing winter cover crops is to reduce soil erosion. In the Yahara Watershed a significant amount of the tillable acres has sufficient slope to be at risk for erosion if not adequately protected. Eroding soil particles not only fill in wetlands and streams, but they also carry particulate bound phosphorus to surface water.

Based on the data collected by the Yahara Pride Farms over the years of this cost-share program, the use of cover crops is most effective when targeted to specific fields and farming systems. Cover crops have a high potential to reduce phosphorus loss on fields being harvested as corn silage with manure incorporated in the late summer or fall. Research has shown that fields with winter cover incorporated in the spring have 55% less water runoff and 50% less soil loss annually than do fields with no winter cover. More recent studies show soil losses from corn or soybeans no-tilled into a vigorous growth of rye or wheat to be 90-95% less than soil losses from corn and soybeans conventionally tilled.

The Yahara Pride Farms board of directors made a decision to change the cover crop program in 2019. The board decided to increase the incentive for planting cover crops that over-winter and, therefore, start growing and providing cover in the spring of the year. The 2019 cover crop program was divided into two payments:

- $60 per acre for over-wintering crops with a maximum of 50 acres ($3,000)
- $40 per acre for non-wintering crops with a maximum of 50 acres ($2,000)

In 2020 the incentives for the cover crop program were revised:

- $50 per acre for over-wintering crops with a maximum of 100 acres ($5,000)
- $30 per acre for non-wintering crops with a maximum of 50 acres ($1,500)

The signup for the 2020 cover crop program includes:

A. Over-Wintering Cover Crops:
   a. **5,622 acres, compared to 2,943 acres in 2019**
   b. **47 farms, compared to 33 farms in 2019**
   c. **Potential cost share of $ 153,006 compared to $ 72,780.**

B. **Non-Over-Wintering Cover Crops:**
   a. **1,877 acres, compared to 1,386 acres in 2019**
   b. **20 farms, compared to 13 farms in 2019**
   c. **Potential cost share of $ 20,685 compared to $ 20,040.**

5. Headland Stacking Manure

Based on data collected at the Discovery Farms and the U.W. Platteville Pioneer Farm, winter runoff events that occur as a combination of increased temperatures and rainfall, along with frozen soils and deep snow cover, produces a high potential for surface runoff from fields. Livestock producers who make manure applications to cropland during this high-risk period need to understand that spreading manure during snowmelt does have an extremely high risk of runoff. Studies from farms cooperating in the Discovery Farm Program indicate that manure applied to snow covered and/or frozen soils during conditions of snowmelt or rain on frozen soils **can contribute the majority of the annual nutrient losses. One inappropriately timed manure application can generate large losses of phosphorus to surface waters.**

Yahara Pride Farms decided to provide an incentive to farmers who sometimes have to clean out lots with solid manure during this critical runoff period. The goals of this program were to reduce the risk of manure run off by:

- Offering an incentive to farmers for stacking, reloading, and spreading manure during a low-risk runoff period.
- The incentive payment is offered to help offset the cost of double handling manure.

The signup for the 2020 Headland Stacking of Manure program includes:

- **3,765 yards, compared to 7,600 yards in 2019**
- **10 farms, compared to 15 farms in 2019**
- **Potential cost share of $ 25,200 compared to $30,400 in 2019.**

6. Composting Stacked Manure:

Another practice that Yahara Pride Farms has been actively researching is composting bedded pack manure. The goal is to enhance the quality of the manure that is headland stacked in the winter and provide a fertilizer that has a reduced risk of phosphorus loss to waters of the state. Research by the UW Soils Department shows that composting dairy manure reduces the amount of dissolved phosphorus and reduces the risk of phosphorus movement. Yahara Pride Farms has been extremely active researching methods to improve the nutrient concentration of composted manure and has made significant investments in the development of a composting program.

Composting bedded pack manure is an excellent way to reduce the risk of dissolved phosphorus loss to waters of the state. Almost all dairy operations have some level of bedded pack manure coming from dry cows, heifers, and calves, so finding an alternative to spreading during critical runoff periods could make a significant reduction in the level of phosphorus loss.

The signup for the 2020 Composting of Manure program includes:

- **7,917 yards, compared to 5,125 yards in 2019**
- **9 farms, compared to 7 farms in 2019**
- **Potential cost share of $ 19,536 compared to $ 9,900 in 2019.**

7. Deferred killing of alfalfa:

When a stand of alfalfa reaches its conclusion there are a few ways to terminate the crop including tillage and/or spraying with herbicide. Spraying with herbicide allows the farm to plant into the killed stand maintaining the root structure and not disturbing the soil. This significantly decreases the soil erosion and reduces the potential for soil particles to reach streams and lakes. However, the decision of when to terminate the crop can play a big role in the potential for soil erosion.

Yahara Pride Farms decided to offer an incentive payment to farms that were willing to terminate alfalfa fields in the spring instead of spraying the fields in the fall of the year. Delaying the spraying of alfalfa reduces the risk of soil erosion and reduces the potential of phosphorus loss. In 2020, Yahara Pride Farms offered a cost share payment of $30 per acre with a 50-acre maximum to farms willing to delay the spraying of alfalfa until spring. **The signup for the 2020 delayed spraying of alfalfa program includes:**

- **5,947 acres, of which all are new**
- **23 farms elected to participate in this new program**
- **Potential cost share of $ 26,700.**

8. Seeding grass with alfalfa:

Alfalfa is a tap rooted crop which has less soil holding capacity than grasses which have fibrous roots. Tap rooted crops grow down into the soil and have branches which grow out to collect water and nutrients. These roots can go deep into the soil and can harvest water

much deeper in the soil structure than fibrous rooted crops. However, there is much less rooting material near the soil surface to hold soil particles in place. This means that fields seeded only to alfalfa often have fewer roots per square foot and as a field nears the end of its productive life, the number of plants per square foot decreases.

In 2020, the Yahara Pride Farms board of directors decided to offer an incentive payment that would encourage farms to plant grasses with their alfalfa seedings. Planting both alfalfa and grass provides a mix of tap rooted crops and fibrous rooted crops and provide an excellent root mass for holding soil in place. In 2020, Yahara Pride Farms offered a cost share payment of $25 per acre with a 50-acre maximum to farms willing to add grasses into their alfalfa seedings.

The signup for the 2020 seeding of grass into alfalfa program includes:

- **96 acres, of which all are new**
- **3 farms elected to participate in this new program**
- **Potential cost share of $ 2,400**

9. Multiple Practices on a Field:

For the past number of years Yahara Pride Farms has offered a payment to farms that apply more than one conservation practice on their fields. For example, applying manure with low disturbance application equipment and then planting a cover crop on the field. If you run each of these conservation practices through the SNAP Plus program each practice provides a reduction in the risk of phosphorus loss. However, it has been determined that when applying two or more conservation practices the reductions can exceed the total of each practice individually. The multiple practice incentive payment is designed to encourage farmers to consider using more than one conservation practice on high-risk fields.

The signup for the 2020 multiple practices program includes:

- **1,807 acres, compared to 1,195 acres in 2019**
- **6 farms, compared to 4 farms in 2019**
- **Potential cost share of $ 14,825 compared to $ 10,000 in 2019.**

Conclusion:

The 2020 Yahara Pride Cost Share Program engaged more farmers than ever, in one or more of the ten cost share programs. It is important to note that the field conditions were excellent in the fall of 2019 and that farmers were able to implement many practices. At the time of the development of this preliminary report it appears that the number of farms participating in the program was significantly higher than at any other time (56 compared to 40). However, staff still needs to visit several farms and gather their updated nutrient management plans.

The final report will provide more information on the total number of farms and acres for each of the cost share programs. It will also contain predicted reductions in phosphorus loss by farmers adopting one or more of these practices. The report will contain information on both the total reduction for the entire watershed and the reductions for each of the six stream reaches that Yahara Pride Farms is working with farmers on adoption of conservation systems.