Yahara Wins Executive Committee  
December 13, 2017 Meeting

Agenda Item:  
Yahara Pride Farms Manure Composting Project

Background and Analysis:  
In mid-September, Yahara Pride Farms submitted a grant proposal to Yahara WINS, Dane County and Clean Lakes Alliance, seeking a total of $148,400 in funding to support a two-year manure composting project. A copy of the proposal is included with this recommendation packet. The project builds upon an earlier composting project and focuses on composting “solid” manure or bedding pack. This type of manure typically comprises 20-25% of the total manure generated by a dairy farm.

From a water quality perspective, solid manure composting reduces the volume of manure that needs to be applied, allowing farmers to hold manure during the winter months and target application to times when manure is less susceptible to runoff. In addition, preliminary data shows that much of the phosphorus initially in a soluble form in raw manure is bound to particulates during the composting process, reducing the risk of phosphorus runoff when the composted manure is land applied.

Yahara WINS, Dane County and the Clean Lakes Alliance staff support moving forward with this project as it has the potential to move the needle in terms of how solid manure is managed. Among other things, information generated as part of this project will help farmers better assess composting as a manure management alternative by providing information on the operational, economic and environmental aspects of manure composting.

$50,000 of the amount requested in the grant proposal would be used as a 50% cost share match for the capital cost of a customized compost turner, and $98,400 would be used for project operating expenses ($42,800 for 2018 and $56,600 for 2019). Dane County will fund the 50% cost share for the compost turner if Yahara WINS and Clean Lakes Alliance are able to fund the operational component of the grant request.

The Yahara WINS 2018 budget includes a $21,400 line item to partially fund the 2018 operational costs. The remaining 2018 operational funds can be met by WINS directing unspent funds from the 2017 MOU between WINS and Clean Lakes Alliance to this project. Clean Lakes Alliance supports using unspent MOU funds for this purpose.

The 2018 WINS budget narrative stated that funds would need to be included in the 2019 WINS budget for the composting project. The adopted Clean Lakes Alliance budget includes $100,000 to support renewal of an MOU with Yahara WINS. Clean Lakes Alliance has agreed that $25,000 of the 2018 MOU funds can be carried over to 2019 to cover a portion of the 2019 composting project operating expenses.

Dane County will develop a contract directly with Yahara Pride for cost sharing of the compost turner since they are the sole provider of funds for this purpose. The cleanest approach to address the operational costs is to develop a contract between Yahara WINS and Yahara Pride. Although a portion of the operational costs would be covered using carryover funds from the MOU between Yahara WINS and the Clean Lakes Alliance, developing a three-way contract between Yahara WINS, Yahara Pride and the Clean Lakes Alliance adds an unnecessary level of complication. A draft contract between Yahara WINS and Yahara Pride Farms has been
developed and is attached. The contract is structured as a one-year agreement that can be renewed for an additional one-year term. Structuring the contract in this manner is a prudent approach that is agreeable to Yahara Pride.

**Options and Recommendation**

1. Approve execution of a contract between Yahara WINS and Yahara Pride Farms to provide funding for the 2018, that may be renewed for a one-year term, with execution subject review and approval of the final contract language by Yahara WINS counsel, and subject to Dane County executing a separate contract covering the capital portion of the grant request.

2. Approve execution of a contract between Yahara WINS and Yahara Pride Farms subject to revisions that are identified by the Yahara WINS Executive Committee, with execution subject to review and approval of the final contract language by Yahara WINS counsel, and subject to Dane County executing a separate contract covering the capital portion of the grant request.

3. Request that additional information be collected and brought back to the Executive Committee at a later date for use in making a decision regarding the composting project.

Option 1 is the recommended option. Yahara WINS has sufficient funding capacity to support this project. This is the cleanest approach from a contracting standpoint, even though some of the funds will come from the MOU between Yahara WINS and the Clean Lakes Alliance. Option 1 will allow the project to move forward quickly, providing important information that farmers can use to determine the feasibility of manure composting as a management alternative and water quality improvement practice. If this option is chosen, WINS should also expect to include funds in its 2019 budget to support this project. It should be noted that based on a recent discussion with Yahara Pride, the minimum number of farmers that would participate in this project has been reduced by 2 (from 11 to 9), but compost quantities and related project costs remain unchanged.

Option 2 is similar to option 1 and could be adopted if the Executive Committee identifies changes to the contract language that it believes are necessary to strengthen the contract. This would still allow the project to move forward in a timely manner.

Option 3 could result in significant delays for the project, depending on how long it takes to collect the additional information and to convene a subsequent meeting of Executive Committee. This option should be adopted only if the Executive Committee has significant questions/concerns about the project or the proposed contract language.
2017 Yahara WINS Manure Composting Grant Agreement with The Yahara Pride Farms

This Grant Agreement (the “Agreement”) is made and entered into this __ day of ___________________ 2017, by and between the Yahara Watershed Improvement Network (the “Yahara WINS”) and Yahara Pride Farms (the “Yahara Pride”).

Recitals

a. Yahara WINS is pursuing an approach to address reductions of phosphorus in the Yahara Watershed through an Adaptive Management project.

b. Yahara Pride is a farmer-led, not-for-profit organization working to improve soil and water quality.

c. Yahara Pride has proposed conducting a solid manure composting project. A copy of the proposal is included as Attachment A. Goals of this project include demonstrating the viability of solid manure composting; reducing application of solid manure during winter months and other critical runoff periods; and redistributing manure from fields that are high in phosphorus to fields that are phosphorus deficient.

d. Yahara WINS desires to support the solid manure composting project, with the ultimate goal of reducing phosphorus losses in the Yahara Watershed.

AGREEMENT

Therefore, Yahara WINS and Yahara Pride (collectively the “Parties” and each individually a “Party”) agree as follows:

1. Scope of Work. Yahara Pride shall perform the following services:

   • Engage a total of at least 9 farms to participate in the composting project, two of which will be farms that meet the definition of a Confined Animal Feeding Operation (CAFO).
   • Supply the equipment and personnel to conduct composting operations and spread the finished compost.
   • Conduct all required nutrient analysis associated with the composting project
   • Participate in communication and outreach efforts, including development of communication materials such as fact sheets and newsletters on an “as needed” basis so that information regarding the composting project can be broadly shared throughout the Yahara Watershed.
   • Perform all other services that are explicitly identified or implied in Attachment A.
   • Provide all items specified in Section 5 of this Agreement.
2. **Term of Agreement.** This Agreement covers a one (1) year period beginning January 1, 2018 and ending December 31, 2018. This Agreement can be renewed annually subject to terms and conditions mutually agreed to in writing by the Parties.

3. **Modification of the Agreement.** The terms of this Agreement, including Attachment A, may be modified by written agreement between the Parties.

4. **Funding**
   a. Yahara WINS agrees to make available $42,800 to support 2018 operational costs of the project. This funding level is contingent on Yahara Pride having a minimum of 1,600 cubic yard of windrowed manure being managed under this project in 2018. Yahara WINS reserves the right to proportionately reduce the level of funding available if the quantity of windrowed manure being managed is less than 1,600 cubic yards.

   b. Yahara Pride agrees to return any unused funds to Yahara WINS at the end of the Term of Agreement or in the event that the Yahara Pride is dissolved or no longer has legal standing prior to the end of the Term of Agreement

5. **Deliverables**
   a. Yahara Pride agrees to provide Yahara WINS with an annual report on or before March 15, 2019. The report will include the following:
      - A general description of activities conducted during the previous calendar year.
      - All relevant data related to compost quantity and quality.
      - Number of farms and location of farms participating in the project
      - Estimated change in the phosphorus index (PI) and changes in soil loss on a field by field basis using SNAP-Plus, organized by TMDL stream reach. Both annual and rotational changes in PI shall be reported.
      - Unit cost information for phosphorus reduction, express as $/pound of phosphorus reduction.
      - Unit cost information for the composting operation express as $/cubic yard of finished compost and/or other appropriate metrics.
      - Educational and outreach activities conducted in support of this project.

   b. Yahara Pride agrees to provide Yahara WINS with a brief semi-annual progress report on or before July 31, 2018.

   c. Yahara Pride agrees to attend Yahara WINS meetings and meetings that other funding agencies may jointly hold on an “as needed” basis for the purpose of providing project information updates.

6. **Payment**
   a. Yahara WINS agrees to make payments as follows to the Yahara Pride Farm Conservation Board in consideration of and subject to all of the conditions above: Payments will be made as follows:
      - $9,500 by January 31, 2018 or upon written notification to Yahara WINS that Yahara Pride has received commitments from eleven (11) farms to participate in the project, whichever is later.
      - $9,500 by March 31, 2018
      - $9,500 by June 30, 2018
• $9,500 upon receipt of the 2018 semi-annual progress report
• $4,800 upon receipt of the 2018 annual report

b. Yahara WINS reserves the right to reduce the payment amounts proportionately if the volumes of windrowed compost are less than the minimum volumes specified in Section 4.

7. **Modification of the Agreement.** The terms of this Agreement may be modified if agreed to in writing by Yahara WINS and Yahara Pride.

8. **Notice.** Notices under the Agreement shall be considered complete when transmitted by email or U.S. Postal Service letter as set forth below:

   If to Yahara WINS: Yahara WIN Executive Committee President
   1610 Moorland Road
   Madison, WI 53713
   Email Address: [kathyl@madsewer.org](mailto:kathyl@madsewer.org)

   If to Yahara Pride: Yahara Pride Board Chair
   229 Douglas Drive
   Brooklyn, WI 53521
   Email Address: [jeff.endres@yaharapridefarms.org](mailto:jeff.endres@yaharapridefarms.org)

9. **Complete Agreement.** This agreement constitutes the complete and entire agreement between the parties and supersedes any previous communications, representations, or agreement, whether oral or written, with respect to the subject matter hereof.

   **For the Yahara Pride Farms:**

   __________________________________________  ________________________________
   Jeffrey Endres                          Date
   Chair-Yahara Pride Farms

   **For Yahara WINS:**

   __________________________________________  ________________________________
   Kathleen Lake                          Date
   Yahara WINS Executive Committee President

   __________________________________________  ________________________________
   Jeffrey S. Rau                          Date
   Yahara WINS Executive
Committee Treasurer

Attachment A

Yahara Pride Solid Manure Composting Proposal
The Manure Distribution Project:  
Expanding the Use of Composted Manure on Dairy Farms in the Yahara Watershed

Submitted to Dane County, Yahara WINS and Clean Lakes Alliance

by

Yahara Pride Farms

Background:

Yahara Pride Farms (YPF) is a farmer-led non-profit organization that evaluates and promotes management techniques and technologies that can reduce phosphorus loss to surface waters in the Yahara Watershed. Over the past 5 years, YPF has gained national recognition for its efforts to improve soil health and water quality, through the adoption of many innovative management practices including composting.

Windrow composting (controlled decomposition by piling organic material in rows and turning regularly to aerate) is an ancient and relatively cost-effective method of processing animal manures. Composting can make manure nutrients easier to handle and transport. Although composting does not reduce phosphorus from manure, manure windrows dry down and decrease in volume by approximately 50% through the aerobic oxidation of organic materials. The resulting final product is dryer, easier to spread and has a higher concentration of phosphorus and other plant nutrients. Compost also is a valuable resource with market potential, used by farmers, landscapers, nursery managers, greenhouses, engineers and road-building contractors to improve soil fertility, health and structure.

In 2015, YPF received a USDA Farmer Rancher SARE grant to begin to evaluate the benefits and economic opportunities of windrow composting solid heifer dairy manure. On a dairy farm heifers are typically housed in separate pens where they are fed and cared for until they reach breeding age. This solid manure, or “bedding pack,” (approximately 20-25% of a total farms manure) is managed separately from the liquid manure produced by lactating dairy cows (often stored in concrete tanks and spread in the spring and fall). A convenient way to begin composting is via headland stacking; piling manure on the soil at the edge of a crop field. Often these areas of the field are lower in yield due to tractor compaction.

Heifers that are six months and younger are typically housed in group pens and bedded with corn stalks, straw, wood shavings or sand. These pens are typically cleaned daily or weekly and the bedding pack manure is spread directly (not stored) onto cropland. Manure that is spread in the winter months can result in increased P loads to surface water when the snow melts.

Results from the SARE grant showed promise that composting heifer bedding pack manure, was a feasible practice and provided an alternative for winter-applying solid heifer manure.

Update:
For the last two years, three members of Yahara Pride Farms, with higher concentrations of livestock, have been working with UW Madison on a research project (through grant funding secured by Clean Lakes Alliance via the Lake Michigan Fund) to determine whether composting can lead to reductions in phosphorus runoff loads from dairy manure.

The study evaluated the phosphorus from the heifer bedding pack manure spread to cropland versus composted bedding pack manure.

While phosphorus does not disappear, preliminary results show that phosphorus from composted dairy manure does appear to be held in a less soluble form. The proportion of total phosphorus that was 20% in finished compost (week 12) versus 40% at week one. Additionally, one farm, using gypsum wallboard in their windrow, had only 5% of its total phosphorus as water soluble phosphorus.

In addition, compared to raw manure, compost offers farmers additional flexibility for land application and allows greater precision to target application to fields where P may be low. The final product is drier and easier to manage. During the composting process, manure windrows dry down and decrease in volume by approximately 50% reducing hauling costs. In addition, compared to raw manure, it is less “hot” (containing less nitrogen) and can be spread onto alfalfa fields without damaging the growing plant tissue.

To manage compost windrows effectively, they should be turned weekly. This is accomplished by use of a “compost turner,” a large piece of equipment that straddles the windrow. As the windrow is turned, oxygen is added, and waste gases are allowed to vent, speeding decomposition. For the research project, YPF farmers rented a compost turner owned by a small company that circulates across the state. This meant that scheduling weekly turns for all three farmers was not possible resulting in a less efficient composting process.

In 2017, Jeff Endres, YPF President and co-owner of Berryridge Farms decided that if composting solid manure in the Yahara Watershed was going to advance, farmers needed more reliable access to a compost turner. Jeff decided to contract with a local welding company to build a compost turner that could be made available to farmers within the Yahara watershed. Compared to a traditional turner, this turner is uniquely designed and engineered, allowing for a complete turn in a short amount of time. Its paddles are grooved and designed to aggressively aerate the windrow. The turner was also designed so that it was entirely mobile, it fits on a variety of tractors, is road legal and can easily travel from farm to farm to encourage equipment sharing. The turner was designed by Jeff and others working on the project and he and his family financed the entire project at a cost of $100,000.

**Next steps, 2017-2019:**

The feasibility results from the composting study on these three farms led to the headland stacking and composting solid manure cost share, initiated in 2017. Yahara Pride Farms would like to expand this incentive program to farmers who have to clean out lots with solid manure during critical runoff periods. The primary environmental benefit of composting is to reduce the acreage of winter manure which is highly vulnerable to runoff and to redistribute the manure from fields that are high in P to fields that are P deficient. By having a compost turner available locally, we can offer interested farmers, timely turning of composted windrows, which will encourage additional farms to begin composting manure. We will also test the completed compost material for nutrient value including water soluble phosphorus levels (fraction of P that is most easily lost to the environment).

The goals of this program are to reduce the risk of phosphorus loss by:
• Offering an incentive to farmers for stacking manure and not applying it during this critical runoff period,
• Working with these farms to actively transform solid manure into compost, which reduces soluble phosphorus levels,
• Establishing a composting turning schedule where the solid manure is turned on a routine basis to insure adequate heating for pathogen reduction,
• Work with each of these farms on reloading and spreading manure during a low risk runoff period.
• Evaluate the benefits of using composted manure solids as a source of nutrients for growing crops in the Yahara Watershed.

In addition to the three participating farms, we will target the recruitment of 8 farms in the Yahara Watershed who house animals on a bedded pack. The majority of these farms will be operations that are not permitted because farms with WPDES permits are required to store solid manure during the snowmelt period. However, Yahara Pride Farms will seek two permitted (CAFO) farms to participate in this study to determine the benefits of composting solid manure versus spreading it directly on the field. Based on data collected over the past two years of the composting project, there are benefits to composting for both crop production and water quality protection.

The remaining 6 farms will be non-permitted operations that have normally cleaned out lots and directly spread the manure. Yahara Pride will work with these farms to identify safe stacking and composting sites, and will do all of the turning and compost preparation. The only responsibility the farmer has it to move the manure from the lot and create the initial stack.

**Water Quality Benefits:**

Calculating the predicted reductions in phosphorus loss from headland stacking and composting during critical runoff periods can be accomplished using the SNAP+ program by comparing the risk of a manure application in the winter (surface applied) and in the spring (incorporated). The predicted reductions in phosphorus loss are shown in table 1.

The information contained in Table 1 was generated from a farm that cooperated in the headland-stacking program in 2016. This farm stacked about 500 tons of solid dairy manure on a site approved for stacking. If the manure had been applied to cropland during the critical runoff period, the application would have covered about 50 acres.

As shown in table 1, staking manure during the critical runoff period reduced the estimated average loss of phosphorus by about 2 pounds per acre. Headland stacking showed a greater reduction in the risk of phosphorus loss than any other single practice. It is also important to note that headland stacking of manure during the critical runoff period is the only practices where soluble phosphorus losses are the dominant form of phosphorus reduction.

The predicted reductions in soluble phosphorus from each of the three fields in this study were two pounds per acre.

Manure application rates were the same on each field, the only variable was whether manure was spread during the winter on frozen and/or snow covered ground or during the spring and incorporated within 72 hours. This one operation stacking just 500 tons of manure reduced the predicted risk of phosphorus loss to nearby surface water by 107.3 pounds.
Practices that reduce losses of soluble phosphorus are of particular importance because once phosphorus is in runoff water there is little that can be done to remove it prior to reaching nearby surface water. Most conservation practices are designed to capture and slow water running off of fields so that particulate soil particles fall out of the runoff and remain in the buffers settling basins and wetlands. However, soluble phosphorus is not tied to particles and therefore flows with the water. Keeping soluble phosphorus out of runoff is a critical factor in reducing the overall phosphorus loads to the Madison chain of lakes.

This proposal is targeting 8 additional farms (in addition to the 3 participating farms that are composting now) with an average of 500 tons of manure composted per farm (One, 250 ton windrow in year and two 250 ton windrows in year 2). Using the average application of 10 tons per acre for pack manure this mean that each farm will not be spreading raw manure on about 50 acres. The project will reduce the amount of raw manure applied to 400 acres of cropland. Using the phosphorus reduction estimates generated from the cooperating farm in 2016 of 2 pounds of phosphorus reduced, these means that the project could reduce the risk of phosphorus loss by about 800 pounds in 2018. An analysis of the effects of using compost versus applying bedded pack on an operation with 427 acres of cropland in 2017 showed an estimated reduction of about 350 lb of phosphorus with the compost. This reduction was primarily a result of being able to apply compost at lower runoff risk times to lower runoff risk fields. Using the compost, the producer was able to make spring and summer applications to established alfalfa fields that needed phosphorus and potassium.

Table 1. Change in Phosphorus loss from headland stacking/composting solid dairy manure

<table>
<thead>
<tr>
<th>Acres</th>
<th>Soil Type</th>
<th>Soil Symbol</th>
<th>Slope</th>
<th>Winter Spreading</th>
<th>Headland Stacking</th>
<th>Pounds</th>
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<tbody>
<tr>
<td>13.6</td>
<td>Dodge</td>
<td>Dc2</td>
<td>9%</td>
<td>6</td>
<td>6</td>
<td>2.1</td>
</tr>
<tr>
<td>22.2</td>
<td>Pano</td>
<td>PmC2</td>
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<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>14.6</td>
<td>Dresden</td>
<td>Dc2</td>
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<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>50.4</td>
<td>Total Acres</td>
<td></td>
<td></td>
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<td>2.13</td>
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Farmer Benefits:

Why would farmers be interested in cooperating in this project? First because most farmers understand that spreading pack manure on melting snow is not the best way to utilize the nutrients in the manure. They are stuck in a position of having to clean the lots for animal health, and not having the time or resources to double handle the manure. This project increases the amount of nutrients available for crop production and eliminates the additional cost of doubling handling stacked manure.

This proposal provides farmers with the following benefits:
Farmer is responsible to create the initial stack of manure,
YPF will supply the equipment and personnel to turn the pile until acceptable compost is created,
YPF will supply the equipment and personnel to spread the compost,
YPF will have staff conduct nutrient analysis on the initial and final products,
Composted manure can be applied to hay,
Pathogens in manure are greatly reduced through the composting process,
Compost contains higher concentrations of nutrients and less moisture,
Compost has more flexibility for land applications and/or selling off the farm,
Composted manure can be a source of bedding,
Phosphorus in the manure is in a more stable state than raw manure.

Farmers are looking for ways to improve the handling and the application of solid manure and composting provides many great benefits. Composting also reduces the volume of manure to be handled. The alternative to composting solid manure is constructing an approved stacking pad for storage during the spring and summer months and double handling the product.

Budget Request:

We are seeking $50,000 in capital funds for 2017 to cost share the design and construction of a compost turner, which will be rented to the Yahara Pride Farms organization to demonstrate manure composting as a viable manure handling option with the long-term goal of expanding the number of farms composting manure in the Yahara Watershed (Table 2.) We are seeking an additional $98,400 in 2018-2019 (Total $148,400) to implement the practice in on 8 additional farms, 2 CAFO’s and 6 small to medium sized farms. Farmers will be paid a $5/yard cost share to participate and will be responsible for building the compost piles. Compost will be turned weekly for them by YPF. The recruitment of small and medium farm participants will focus on operations who currently winter spread bed pack manure. Successful adoption of manure composting by these farms will reduce the amount of phosphorus reaching surface waters in the Yahara River watershed. The CAFO participants will focus on adapting manure composting in a large scale animal productions setting. These farms do not normally winter apply manure and will focus on the ability of manure composting to allow more efficient phosphorus distribution across the farms cropland base.

Table 2. Budget Request: 2017-2019
<table>
<thead>
<tr>
<th>Manure Distribution Project: Expanding the use of composted manure on dairy farms in the Yahara watershed</th>
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<tr>
<td><strong>Budget 2017</strong></td>
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<tr>
<td>Cost share, compost turner</td>
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<td><strong>Budget 2018</strong></td>
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<tr>
<td>Farmer cost share, composting manure</td>
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<tr>
<td>Weekly compost turning</td>
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<tr>
<td>Compost sampling and analysis</td>
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<tr>
<td>P reduction planning and outreach</td>
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<tr>
<td>Subtotal, 2018</td>
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<tr>
<td><strong>Budget 2019</strong></td>
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<td>Farmer cost share, composting manure</td>
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<td>Capital budget request, 2017</td>
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<td>Operating, budget request 2018-19</td>
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