



Legislative Water Commission

Barb Huberty, Director

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July 7, 2016

Rm 306 Borlaug Hall, University of Minnesota St Paul Campus

Meeting Minutes

Members Present

Representative Paul Torkelson, Chair
Senator Bev Scalze, Co-chair
Representative David Bly
Representative Matt Dean
Representative Peter Fischer
Representative Clark Johnson
Senator Carrie Ruud
Senator Matt Schmit

Members Absent

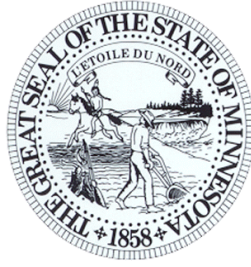
Senator Gary Dahms
Senator Roger Chamberlain
Representative Rod Hamilton
Senator Charles Wiger

The LWC meeting began at 10:03 a.m. on Thursday, July 7, 2016 in Room 306 of Borlaug Hall at the University of Minnesota, St Paul Campus. A quorum was not yet present.

Director Huberty provided an overview of the meeting packet and the day's logistics. She reminded members that the next meeting will be a field trip to the St Peter and Mankato areas on Wed August 17th. Details will be emailed to members and posted on the web site when they become available.

Six presentations were given that provided an overview of U of MN research topics that link agriculture and water quality (presentations posted on the LWC web site), as follows:

1. Dr. Carl Rosen (U of MN Dept. of Soil, Water and Climate) spoke about drainage practices for water quality remediation, including saturated buffers and bioreactors, particularly the current project on the Gorans farm SE of Willmar.
2. Josh Stamper (U of MN Dept. of Soil, Water and Climate) described advances in irrigation management. Funding for his position comes from the MN Dept of Agriculture. He has mapped the locations of all permitted wells using center pivots and their irrigated fields and correlated the information to soil type. From this he is beginning the process of developing soil water characteristic curves for the top 12 soil types (which constitute 85% of irrigated acres). By appropriately "mining" the water in the soil profile, tiling can be avoided.
3. Dr. Don Wyse (U of MN Dept. of Agronomy & Plant Genetics, Green Lands Blue Waters Partnership) described the Forever Green Initiative that aims to develop the next generation of marketable perennial and cover crops that provide high productivity to feed 9 billion people, while maintaining functional diversity and ecosystem services. To develop marketable products, they are partnering with the Pepsico, Patagonia and General Mills companies.



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4. Dr. David Mulla (U of MN, Dept. of Soil, Water and Climate) spoke about precision agriculture and precision conservation initiatives to minimize input applications by accounting for spatial and temporal variability, while maintain productivity. GIS data can be used to direct unmanned aerial vehicles to detect plant health and unmanned ground vehicles to deploy targeted inputs.
 5. Dr. Joe Magner (U of MN, Dept. of Bioproducts and Biosystems Engineering) explained the importance of connecting field scale practices to achieve watershed scale results, particularly within riparian areas. He discussed practices such as riparian buffers with perennial crops or more effective vegetation, using abandoned oxbows to construct bioreactors, and saturated buffers.
 6. Dr. Chuck Clanton (U of MN Dept. of Bioproducts and Biosystems Engineering) described various livestock management practices that protect water quality and further research needs, such as determining the maximum capacity of feedlots based on the amount of manure generated compared to the amount and type of land available for its use (those that buy feed have less land). The #1 limiting factor for manure application is the nutrient credit available for it. Research has shown that 2' to 3' wide buffers are sufficient to manage 90% of manure runoff. He encourage agencies to remain current in their knowledge of agriculture practices (such as MPCA's agreement to allow the use of Rumensin to reduce manure pit foaming).

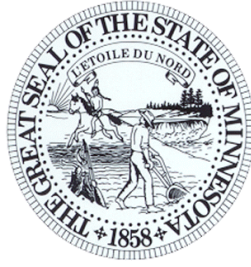
Shortly after the presentations began a quorum was reached, but the meeting was not called to order until after the presentations at 10:53 a.m. Sen. Schmit moved approval of the minutes from the April 26, 2016 meeting. THE MOTION PREVAILED.

A panel discussion between LWC members and the presenters then ensued.

Sen Scalze asked how economics was evaluated in the development of these new ideas. Dr Wyse explained that markets and crops need to be developed in parallel so the risk to producers is reduced and the economic incentive maximized. In the Forever Green model, improved soil health by cover crops is an added bonus.

Rep Johnson wondered what could be done to speed up the research process. Dr Wyse said it is important to consider whether to use existing infrastructure or start new companies and that decision varies based on specific circumstances. Developing perennial crops was catalyzed by the request of farmers in three counties, including the Magnuson farms in Roseau County.

Rep Fischer asked whether the younger generation's desire for more organic products will drive new crops. Dr Wyse agreed and said other factors were also drivers: what food companies are interested in purchasing. As an example, the Patagonia Company wants an organic Kernza™ so that is being developed. Whether there are multiple benefits for the product is also a factor; for instance, Kernza can be grazed, harvested as a grain, and used as a biofuel. Some winter annuals provide 98% weed management, reducing the need for pesticides.



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Rep Torkelson asked what percent of farmers are using irrigation. Josh Stamper replied that there are 700,000 acres permitted for irrigation and he estimates 2% to 5% of farmers irrigate. When asked if irrigation could expand dramatically in MN, Mr Samper replied that MN is the last frontier for irrigation and its expansion depends on the availability of water. Variable Rate Technology and low pressure irrigation systems have the potential to reduce water use by 13% to 25%.

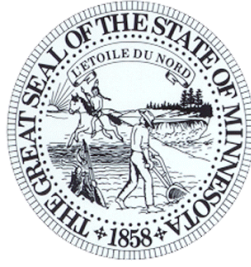
Sen Schmit wondered how many farmers are adopting precision agriculture technology, particularly aerial drones. Dr Mulla said there are many types of precision ag and estimates that about 30% of corn and soybean farmers have adopted 1 or more technologies. It is now embedded in new farm equipment. MN is a leader and home to several big industries that develop precision ag technologies and equipment: AgCo, Land-o-Lakes/Winfield/Geosys, Farmer's Edge, plus many small start-ups. Factors limiting adoption include age (and computer skills), the price of buying and using the technology, and crop prices. As awareness increases, Dr Mulla believes the use of drones will increase and believes they will be an important component of meeting the MN Nutrient Reduction Strategy.

Rep Torkelson said that nutrient management is a goal shared by farmers and environmental groups and that these new technologies are still in development, but are on the horizon. An uncontrollable element is the effect of large rainfall events that drive off nutrients.

Rep Bly mentioned that having livestock on the land can be a benefit for water quality. Dr Clanton agreed that the introduction of deep rooted forage crops, like alfalfa, can increase diversification and break the 2 crop cycle.

Rep Fischer asked about the effects of including research as base funding vs two year grant cycles. Dr Mulla indicated that grants are good for short-term, local scale projects, but base funding is needed to provide economic incentives for statewide scale, long-term projects and to expand short-term projects. An example of an initiative that has lost ground due to non-continuous funding is the creation of an end market for crops to generate cellulosic ethanol fuels; a plant needs to be built or retrofitted to facilitate this. In the 7 Mile Creek Watershed, a group of farmers is experimenting with growing perennial crops for use in animal feed and cellulosic ethanol (the POET plant in IA is the closest). Dr Wyse explained that it takes many cycles of breeding selection to derive economically viable crops; the wheat breeding program started in MN in 1909. In the early days of breeding corn, soybeans, and wheat, there was no commodity group support, only state funding. With the current Forever Green program, the U of MN has not added faculty, only graduate students – who will become the next work force and brain trust. Dr Clanton said that 100% of their base funding is gone; they have changed from researchers to fundraisers, with the odds of getting any particular grant about 10%.

Sen Schmit gave panelists an opportunity to speak about key messages that may have been missed thus far. Panelists expressed appreciation for funding support already received and their desire to do what is best for MN. It was also noted that the people who deal directly with farmers, like SWCDs and Extension, have a high turnover and unsustainable funding model.



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The conversation continued outside as attendees viewed the research plots:

- Dr Wyse explained that in addition to crops grown in these small fields, the U's branch research stations have larger field plots and that more farmers will have contracts for full scale planting this fall.
- A questions was asked about the potential for existing oil processing plants to also process these new crops; that is conceivable and could potentially be funded through the AURI program.
- It is important is that the new crops and their markets be developed simultaneously.
- The U is experimenting with row spacing of Intermediate Wheat Grass (Kernza™) to prevent lodging; as stands age, they become thicker, but the stems become thinner so they aren't as capable of remaining upright. This Kernza™ will be harvested in mid-August by swathing. It can be used for grain, grazing, and biofuels. When mature, its roots grow 20' deep. Five new breeding lines will be released in 2018.
- The U is also trying to improve winter rye as a cover crop, along with winter barley. They are experimenting with a variety of native plants that have high value components for the cosmetic industry (e.g., Aveda and Estee Lauder).
- There is a federal process to insure new crops; Kernza™ is eligible for insurance now.
- The U's biofuels study area is 10 years old; there is less research in that area at this time since the price of natural gas is so low, but earlier investment in those fields demands that they be retained because it is likely that biofuels will become a cost-effective source in the future.
- In their breeding fields, each plant represents a different line (or phenotypr). They are breeding different lines for different uses, such as: grain, biomass production, and grazing.
- They will be sequencing the full genomes for Camelina and Pennycress to speed the breeding program. This is not the same as genetic engineering, which creates genetically modified organisms.
- The Forever Green program is 20 years old; researchers did not start talking publically about it until they had confidence in its potential as a new cropping system. Funding now will support expansion of crop planting more than the research and development activities. At this time it is a \$5M/yr program with funding from the Buffet Foundation, the Mader Foundation, federal funding, as well as state funding.
- Members also viewed the research plots for hazel nuts (used for food and oil) and Silphium (a drought tolerant perennial grain and oilseed).

The meeting adjourned the end of the tour at 12:15 pm.