Catchment Programs

Getting Changes on the Land that Improve Water Quality

Dennis R. Frame
Director U.W. – Discovery Farms
Professor U.W. - Extension
Discovery Farms:

- Producer led on-farm research and outreach program
- Began with edge-of-field monitoring
- Now studying watershed/catchment scale

- Identifying Problems – need for monitoring
  - Data drives management decisions
- Evaluating all contributing factors
- Building trust and respect
What is the Discovery Farms Program?
Discovery Farms?

Real farms in different geographic areas facing different environmental challenges.

Goal - to identify and reduce the sources of nitrogen, phosphorus, sediment, and other factors that may impair surface and groundwater.

On farms:

✓ 5 to 7 years with monitoring (provide annual data updates to farms and community)
✓ 1 – 2 years for graduation report development
Main Vision

- Our goal is to identify, understand and solve agricultural water quality problems.

- We believe that the only way to solve problems is to engage the people running the land; and

- Involve farmers in identifying the problems as well as the solutions
Location of Discovery Farms Projects

- 1 Beef
- 1 Swine – odor
- 3 Poultry-stacking
- 2 dairy – grazing
- 1 Dairy - grazing/organic
- 6 Dairy - confinement
- 2 Watersheds
...the brains of the operation
Data Collection

- Remote Field Sites
- Two-Way Communications
- Robust Sampling Equipment
- Flumes
- Adjustable Sampling Sequences
- ON-FARM INFORMATION
Monitoring Runoff in the Winter

- Relatively few research studies
- Potentially long duration runoff events (both rain and snowmelt events)
- Runoff during the day and freezing at night
- Multiple site visits
Jersey Valley

- Small catchment
  - Mostly ag
  - Dairy
  - Non-farm land steep
- Lake at base
- Fish kill 2005
- Installed 5 field sites
- Installed 3 stream
- Lake sampling
Identifying Problems

Data drives management decisions
Critical periods

- Our work has identified critical time periods when the risk of runoff is very high:
  - Snowmelt, rain on snow/frozen ground
  - Non-frozen soils that are close to saturation.
## Timing – Critical Runoff Periods

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean-Monthly Runoff</th>
<th>Mean-Monthly Runoff as a Percentage of Annual Runoff</th>
<th>Runoff Frequency</th>
<th>Total Precip</th>
<th>Mean-Monthly Runoff as a Percentage of Total Precip</th>
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</thead>
<tbody>
<tr>
<td>October</td>
<td>0.07</td>
<td>3%</td>
<td>23%</td>
<td>2.32</td>
<td>3%</td>
</tr>
<tr>
<td>November</td>
<td>0.02</td>
<td>&lt;1%</td>
<td>15%</td>
<td>2.22</td>
<td>1%</td>
</tr>
<tr>
<td>December</td>
<td>0.04</td>
<td>1%</td>
<td>35%</td>
<td>1.73</td>
<td>2%</td>
</tr>
<tr>
<td>January</td>
<td>0.10</td>
<td>4%</td>
<td>50%</td>
<td>1.68</td>
<td>6%</td>
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<tr>
<td>February</td>
<td>0.41</td>
<td>16%</td>
<td>58%</td>
<td>1.48</td>
<td>28%</td>
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<tr>
<td>March</td>
<td>0.87</td>
<td>34%</td>
<td>100%</td>
<td>2.22</td>
<td>39%</td>
</tr>
<tr>
<td>April</td>
<td>0.11</td>
<td>4%</td>
<td>54%</td>
<td>3.42</td>
<td>3%</td>
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<tr>
<td>May</td>
<td>0.32</td>
<td>12%</td>
<td>38%</td>
<td>3.70</td>
<td>9%</td>
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<tr>
<td>June</td>
<td>0.48</td>
<td>19%</td>
<td>42%</td>
<td>3.83</td>
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<tr>
<td>July</td>
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<td>3%</td>
<td>42%</td>
<td>3.90</td>
<td>2%</td>
</tr>
<tr>
<td>August</td>
<td>0.07</td>
<td>3%</td>
<td>19%</td>
<td>3.55</td>
<td>2%</td>
</tr>
<tr>
<td>September</td>
<td>&lt;0.01</td>
<td>&lt;1%</td>
<td>19%</td>
<td>2.76</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
P Losses for Entire 2004

A manure management decision can have a big impact to annual nutrient losses
How much rain does it take to produce runoff for a given soil condition?

Example: No-till farm in SW Wisconsin (2003-2008)

Focus on the minimum rainfall needed to produce runoff
Evaluating all contributing factors
Collaboration

- Water quality cannot be improved without everyone being involved and being part of the solution.
- Every acre counts!
- Every source matters!!!
- **Suspended Sediment Loss**

- Average across all farm years of data was **670 lb/ac**
Phosphorus Loss - Summary

![Phosphorus Loss Graph]

- **Non-frozen ground**
- **Frozen ground**
- **Mean**

Total phosphorus yield, in pounds per acre

- SW1, 2005
- SW1, 2006
- SW1, 2007
- SW2, 2006
- SW2, 2007
- SW2, 2008
- Pioneer, 2003
- Pioneer, 2004
- Pioneer, 2005
- Pioneer, 2006
- Pioneer, 2007
- Pioneer, 2008
- SE1, 2006
- SE1, 2007
- SE1, 2008
- NE1, 2005
- NE1, 2006
- NE1, 2007
- NE1, 2008
- NE2, 2005
- NE2, 2006
- NE2, 2007
- NE2, 2008
Collaboration

- Focusing on one portion of the problem causes people to get defensive:
  - Septic systems
  - Barnyards
  - Fields
  - Non-farmed land
  - Point sources
Building Trust and Respect
Stay Focused On Goals

- What are you trying to achieve?
  - Graduate students, published papers
  - Promote programs, practices or regulations
  - Work with farmers to identify what is happening on their farms. If their farm has negative impacts, work with them to identify solutions.
People Must Trust You/Program

- You are sincerely interested in their farm and/or their community.

- You want to help them resolve any environmental issues and remain profitable.

- You respect their farming system and seek to find acceptable alternatives to their current farming practices.
Be Open and Honest

- Participants need to know that you are going to use the data correctly.

- However, you must show all the data and make sure that you can put it into context as it relates to their farming system and geophysical settings.
Producers have to be engaged in the identification of practices that can reduce losses

- Have to fit into farming system
- Have to fit into beliefs and values
Discovery Watersheds

- We are committed to working with the producers, agency personnel and citizens to better understand the issues.

- We are committed to identifying what is currently happening in the watershed.

- We are here to provide unbiased research and outreach in this region.
There is no nation so powerful, as the one that obeys its laws not from principals of fear or reason, but from passion.

Author: Charles De Montesquieu 1689-1755, French Jurist, Political Philosopher
Questions???

WWW.uwdiscoveryfarms.org