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Conservation Drainage Priorities: Learning from Stakeholders

Full report available at: wrc.umn.edu/randpe/agandwq/consdrainage

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Water Resources Center
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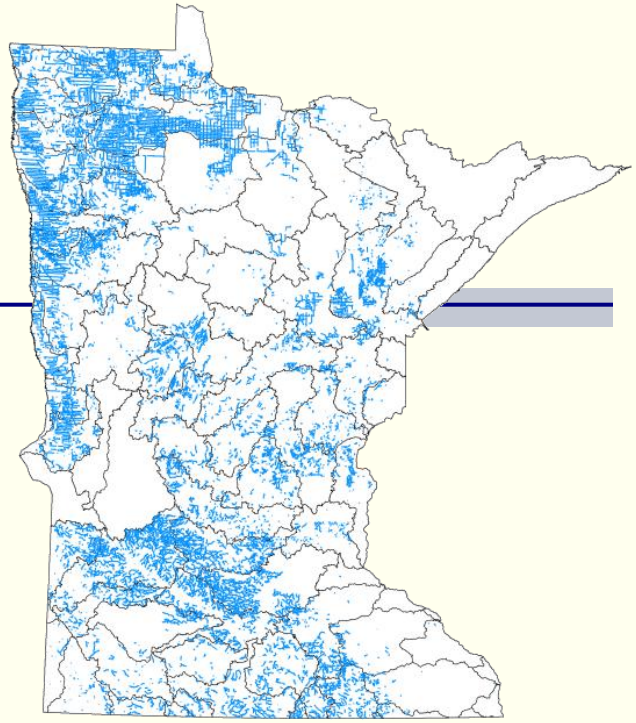
Agricultural Drainage



21,000+ mi surface drainage ditches in MN

Uncounted miles of subsurface drainage tile.

Modifying hydrology

Essential to productive and viable agriculture

➡ High activity across the region

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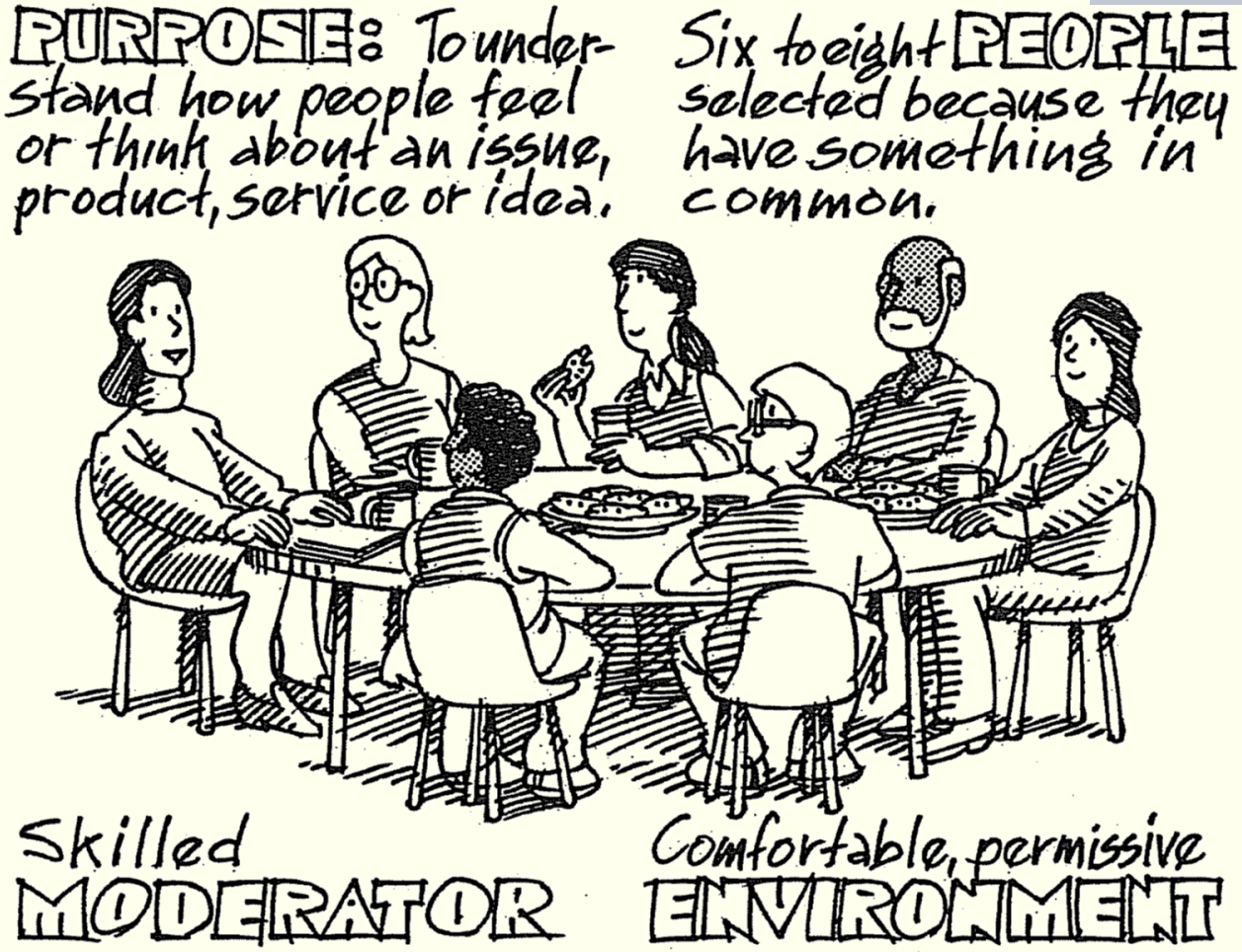
Water Resources Center
University of Minnesota

Drainage Systems Management Education and Stakeholder Feedback Project

- MDA project managed by UM Water Resources Center, with EPA 319 funding
- July 2009 through spring 2011
- **Motivation:** Increase implementation of conservation drainage approaches
- **How:** Learn from local and regional stakeholders

Focus Groups



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From Krueger and Casey. 2000. Focus Groups, 3rd Ed.

Water Resources Center
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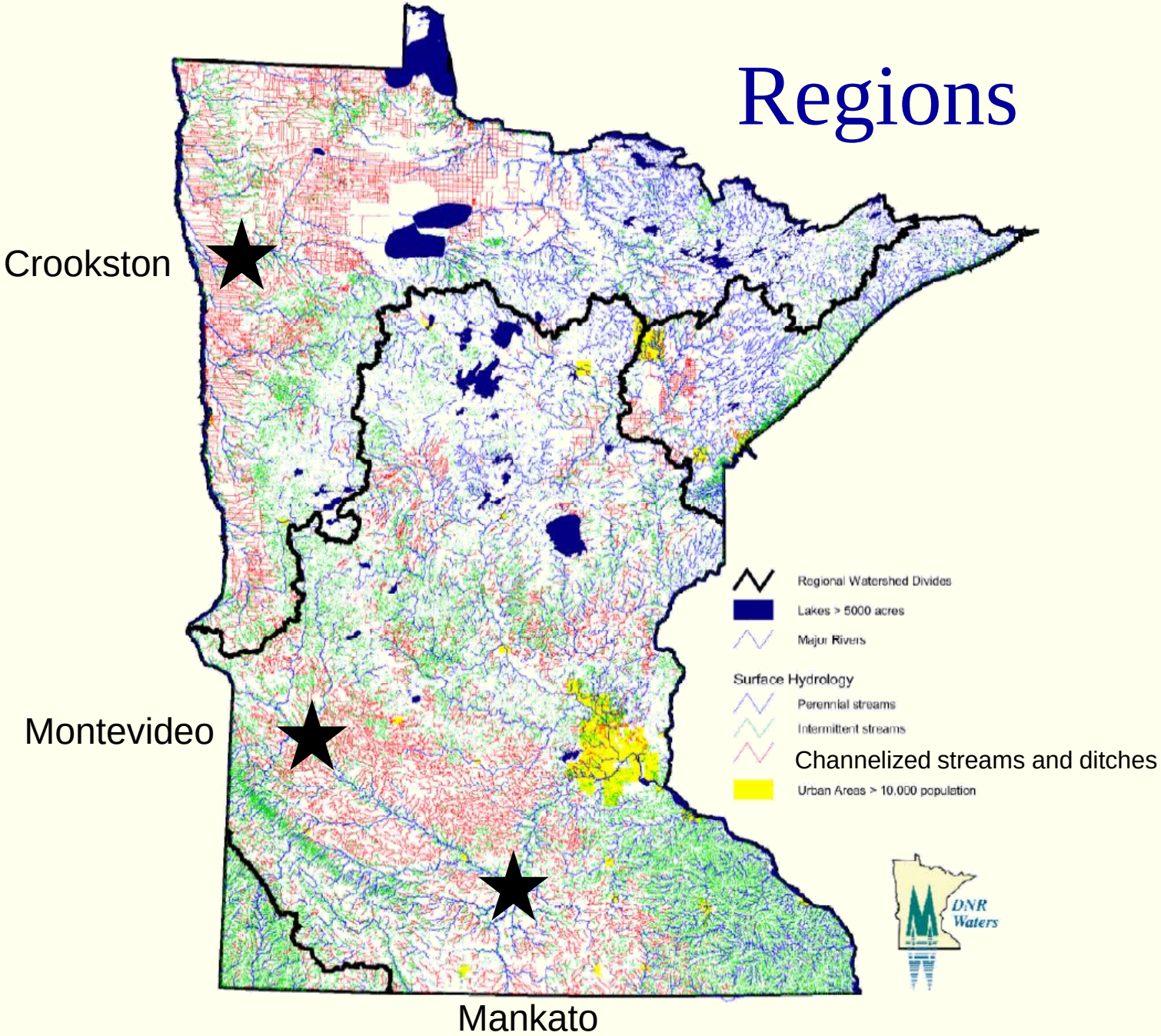
Participants

- Engineers and agency hydrologists
- Farmers and contractors
- Drainage authorities

Regions


Crookston
Montevideo
Mankato
Regional Watershed Divides
Lakes > 5000 acres
Major Rivers
Surface Hydrology
Perennial streams
Intermittent streams
Channelized streams and ditches
Urban Areas > 10,000 population
DNR
Waters

Purpose of focus groups

Gain insights about how drainage professionals around the state think about “conservation drainage”. . .

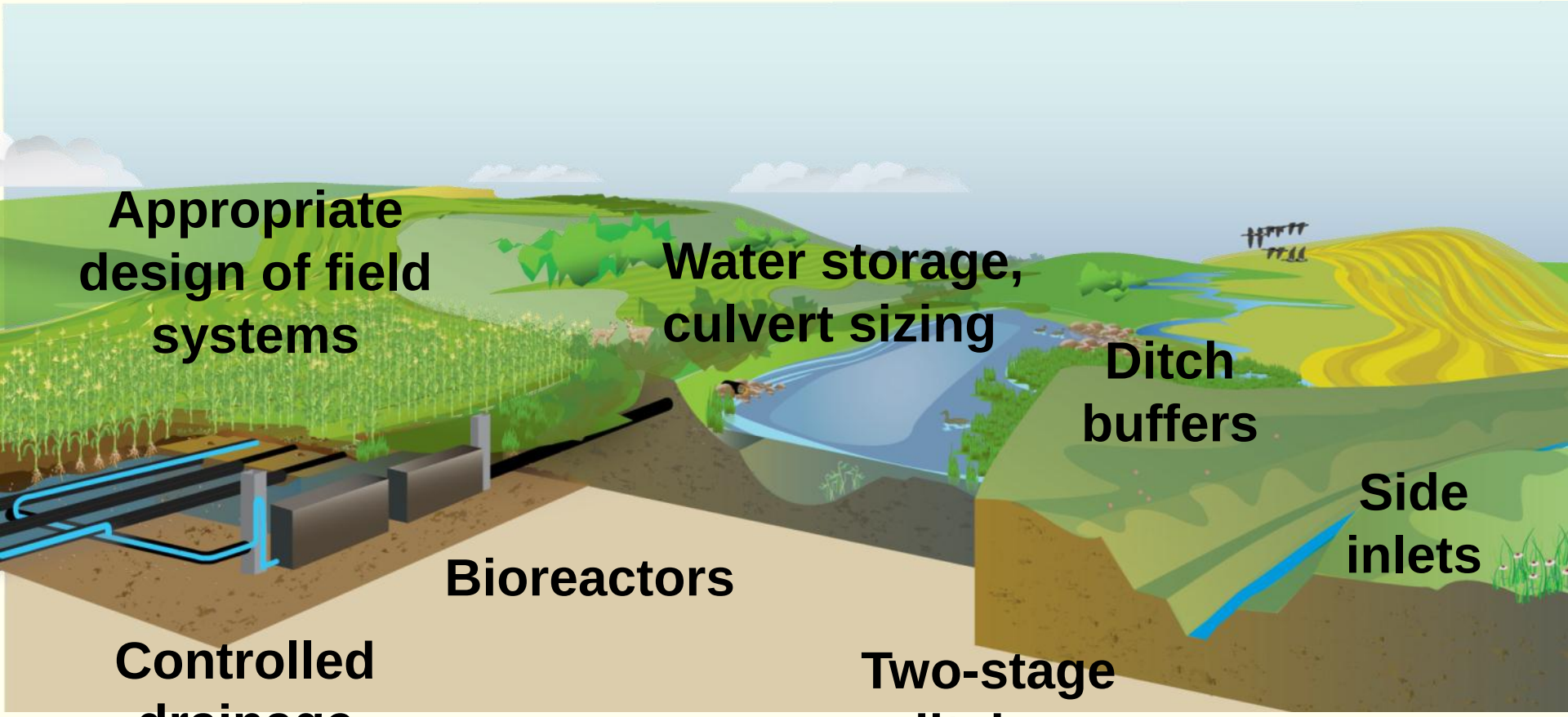
. . . so future outreach and research can be informed by the knowledge and perspectives of the people who actually design, install, and regulate drainage.

What is conservation drainage?

A set of drainage practices and designs intended to support the needs of agricultural production while addressing impacts on water quality and flow.

The act of preventing or mitigating the unwanted effects of artificial drainage.

What is conservation drainage?



What people said:

People are key

"If you want these projects to happen, staff cuts at the local offices are the worst thing you can do." (Drainage authority)

Regarding redetermination: *"Once things have been done successfully, they're going to catch on. . . ." "But it takes a commissioner with guts to do it."* (Drainage authority)

What people said:

Communication is critical

"Given the funding climate, the economic climate we live in, we can't settle for a one-win solution. . . . We need to figure out solutions that provide wins for all the parties involved. And that's going to require communication not just among agencies and farmers." (Drainage authority)

"We all know we have issues. Problem is, we have to figure out how to work together to fix some of these issues. I'm really glad that this discussion is starting." (Drainage authority)

"We fight the perception of the public who has never seen a combine before." (Farmer/contractor)

What people said:

Building positive relationships is essential

"It's the one-on-one approach. It's not the meeting, or the flyer. . . . For a farmer, they want to talk about a project over a cup of coffee, with the understanding that he may not do anything for two, three years." (Drainage authority)

"If we can show that certain techniques are appropriate for certain areas, we can make that decision much better than any authority can make it for us." (Farmer/contractor)

"If there are two families with a long-standing feud, 90% chance it has to do with somebody dumping water on somebody else." (Farmer/contractor)

"All it takes is one person standing in the way to prevent a project, you can put hours and hours into a project, it's often not the dollar amounts, but personal beliefs or family ideas that pose problems in moving projects forward." (Drainage authority)

What people said:

Impacts of agricultural drainage are complex

Drainage increases <u>peak flow</u>
(except tile compared to surface drainage)

- *"Surface drainage would increase the peak flows, but subsurface is actually a longer drainage period. . . compared to surface."*
  (Engineer/agency)

Drainage increases total <u>volume of flow</u>
(maybe)

"County drainage systems were designed to handle a watershed – the amount of water coming down from the sky in that area. That's what my impression has always been. With more seepage tile, that doesn't mean there is more water going to come down from the sky and go down the river." (Farmer/contractor)

"If we can take land that we're growing 120-150 bushels/acre and grow corn up to 200-250 [by tile draining it], we're using a lot more water. In the long-run you're going to have less water coming off land." (Farmer/contractor)

"I think we see trends that more flow exists, more bluff erosion, but I don't know if we have the relationship down very well." (Engineer/agency)

"If the field level of water is this high and its flooding in Fargo, our tiling lines aren't doing anything for that. Water in tile lines aren't even flowing." (Farmer/contractor)

"We have more volume coming out of the whole system than we used to. . . . At some scales, rate control might help, but on a bigger scale, volume may the biggest driver of problems". (Engineer/agency)

What people said:

Impacts of agricultural drainage are complex

Soil filters water

- *"We have thousands and thousands of acres of bioreactors already by having four foot drainage. I really believe it – because of my experience with septic programs. They're telling us we can treat raw sewage with three feet of well-aerated soil. And we basically have four feet with most of our fields."* (Farmer/contractor)
- *"We have enough people closing up their inlets putting in pattern tiling, I feel that is filtering as good as it's going to get."* (Drainage authority)
- *"Everyone's so afraid of tile and everything that's coming out of it -- it's as clean as bottled water."* (Farmer/contractor)
- *"Is there a difference in water quality if tile is not as deep, because water doesn't filter through as much soil?"* (Farmer/contractor)

Ag drainage and nitrogen

- Soil filters nitrogen
- If you manage N applications, loss is not a problem
- If we reduce N loss through tile, where does it go?
- Bioreactors and controlled drainage are viewed primarily as N control methods
- Is the N benefit of controlled drainage enough?
- Are there were simpler ways to denitrify: ditches, lift stations, anywhere water stands

What people said:

Watershed-scale planning is spotty

Engineer/agency groups were most likely to talk in terms of a watershed system.

- *Regarding culvert sizing: "You have to design on a system basis, not on every one individually." "Start at the top of a watershed and work your way down."* (Engineers/agencies)

Drainage is seldom an explicit part of water plans, except buffers and side inlets.

Drainage authorities generally had no long term vision for their drainage systems.

What people said:

"Bureaucracy" can be a barrier

"They're trying to protect their livelihood by not contacting NRCS. They could utilize NRCS for all kinds of good conservation things, but they just don't want to run the risk." (Engineers/agencies)

[Regarding replacing farmed wetlands with a single wetland,] "to me that was the perfect plan; it was exactly what everybody wanted; but it took 5 years to do it. . . . Too many agencies got involved: Army Corps, USFWS, NRCS." (Farmer/contractor)

What people said

About Conservation Drainage Practices and Designs

Don’t prioritize single practices.

Each practice is appropriate in some places and inappropriate in others.

What people said

About Conservation Drainage Practices and Designs

Appropriate sizing of field systems	We do that already
Controlled drainage	Maybe. Is it cost effective and practical? Show a yield benefit. Need guidance for retrofitting.
Bioreactors	Maybe. Is it cost effective and practical? What is the lifespan? Will it be practical on large acreages?
Side inlets	Of course. Widely relevant. Do more.
Ditch buffers	Of course. Widely relevant. Do more. Target and size correctly.
Water storage, culvert sizing	Looks like the win-win solution. Looks like trouble. What is it?
Two-stage ditches	Interesting. Can we afford it?

And don’t forget agronomic practices

Water storage – the confusion

Goal: Wildlife, flood and flow mitigation, water quality.

Time scale: Permanent vs. temporary

Spatial scale: Field-edge vs. massive impoundments

Mechanism: In the soil profile, down-sizing of inlets or culverts (road impoundments), breaking tile to restore wetlands

Land use while storing water: permanent easement, wetland habitat, in-ditch storage, farmable after early-spring flooding, farmable except after large storm, farmable with crops that can tolerate brief inundation

What people said

About Conservation Drainage Practices and Designs

Appropriate sizing of field systems	We do that already
Controlled drainage	Maybe. Need to see evidence of practicality and yield benefit. Need guidance for retrofitting.
Bioreactors	Maybe. Need to see what the lifespan is and if it works on large acres.
Side inlets	Of course. Widely relevant. Do more.
Ditch buffers	Of course. Widely relevant. Do more. Target and size correctly.
Water storage, culvert sizing	What is it? Looks like the win-win solution. Looks like trouble.
Two-stage ditches	Interesting. Can we afford it?

And don’t forget agronomic practices

Summary of barriers

Practicality and cost

Awareness

Lack of data

Policy and institutions

Communication to

- understand goals
  (wq, productivity, flood/flow, habitat)
- build trust

Guidelines for Action

1. Support long-term relationships.
2. Be part of the conversation.
   - Make goals explicit
   - Build shared understanding of hydrology and drainage
   - Communicate within and between stakeholder groups, including the non-farming public
   - Be precise in defining terms and be explicit about assumptions when discussing impacts of drainage.

Guidelines for Action, cont.

3. Clarify the roles and responsibilities of agencies
4. Discuss and clarify who is responsible (landowner or society?)
5. Examine options for water storage on the landscape
6. Promote watershed-scale views of drainage planning and management.

Guidelines for Action, cont.

7. Continue research and demonstrations

8. Address regional differences

What's next for conservation drainage?

Implications for

- Education/Outreach
- Research
- Policy
- Networking/ Information Exchange/ Community Building

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