

# Tar-Pamlico

## Local Watersheds Planning Team

### NEXT MEETING

Wednesday

August 24 , 2005

12:30- 3:00

Braswell Center  
Tarboro

Please RSVP to Christy for lunch, graciously provided by NCEEP at [Christy\\_perrin@ncsu.edu](mailto:Christy_perrin@ncsu.edu) or 919-515-4542

*-The meeting objectives are to discuss existing watershed protection policies/programs and identify areas that the watershed plan may address.*

**\*\*AGRICULTURE  
SUBCOMMITTEE WILL  
NOT MEET\*\***

Directions to Braswell  
Center:

From Raleigh:

US64 East until Exit 485 -  
Tarboro. At stop sign take  
left on Western Blvd. Go  
through 3 stoplights.  
Braswell Center is on the  
right.

From Greenville: NC 43  
until stop sign in Tarboro.  
Right on 258, which will  
turn into Western. Go  
through 3 stoplights.  
Braswell Center is on the  
right.

*Watershed Education for Communities and Local Officials*  
[www.ces.ncsu.edu/depts/agecon/WECO/tar\\_pamlico.htm](http://www.ces.ncsu.edu/depts/agecon/WECO/tar_pamlico.htm)

### **Tar-Pam Team and Ag. Subcommittee Meet Separately**

The **Tar Pamlico Local Watersheds Group** met on May 24 at the Pitt County Emergency Operations Center in Greenville. At this meeting Blue, LWI (BLWI) presented the potential restoration projects they have identified for the four subwatersheds, with details presented on the few projects for each watershed that they felt would provide the most benefits. Then WECO shared the results of the survey that participants completed in March regarding the planning process. The group discussed next steps for the planning process.

The Project Team will provide an overview of existing regulations and programs in the watersheds for the group's discussion at the next meeting to be held in August. A summary of the presentations and discussions from the May 24 meeting are included in this newsletter. The complete

presentations are available on the project website listed above.

The **Agricultural Subcommittee** then met on June 15 in Tarboro to hear a presentation from Dr. Robert Evans, NCSU, and discuss next steps for a demonstration project in the Crisp Creek watershed. The summary from the June 15 meeting is also included in this newsletter.

Contents:  
Pages 1-4 Proposed Water Quality Improvement Projects

Pages 4-5 Next Steps for Watershed Planning Project

Pages 6-8 Summary of Agriculture Subcommittee's June 15 meeting

### **Proposed Water Quality Improvement Projects**

Amber Coleman and Melissa Ruiz, BLWI, briefly explained the improvement project types, presented the scenarios used in the watershed model, and then some proposed targeted projects. The projects highlighted in their presentation are those thought by BLWI to be most feasible and most beneficial if put in the ground--basically some good places to start and to achieve short-term successes.

The projects identified by BLWI are not all encompassing--other projects may be possible that have not yet been identified. All of the projects identified are included in an atlas completed by BLWI, and available from NCEEP in electronic or hard copy.

#### *Improvement Project Types*

The projects identified by BLWI include:

- ▼ Stream restoration
- ▼ Wetland restoration
- ▼ Riparian buffers (woody & herbaceous)
- ▼ Best Management Practices (BMPs)--Stormwater wetland, bioretention, swales

#### *Watershed Pollutant Removal Scenarios by Landowners Type*

BLWI Calculated pollutant removal for three different scenarios in each watershed, to estimate the impacts of

## Proposed Water Quality Improvement Projects continued...

targeting different landowners. The scenarios included:

1. Implement all projects on public lands .
2. Implement all projects with 3 or fewer landowners
3. Implement all projects.

Scenario (3) produced the most substantial water quality improvement while the other two scenarios showed variable but much lesser degrees of improvement. Melissa pointed out that there is no public land in Cow Swamp or Crisp Creek watersheds. The results show that landowner participation will be necessary to make improvements in pollutant removal, and that targeting the projects with fewer landowners may show fair levels of removals, and in most cases targeting all projects will provide significantly greater pollutant removals.

The results of these scenarios are illustrated in the following tables:

Table 1: Green Mill Run Project Pollutant Removal

<b>GMR</b>	<b>Public</b>	<b>≤ 3 owners</b>	<b>All Projects</b>
TSS	0%	7%	14%
P	7%	27%	51%
N	1%	22%	25%

Table 2: Hendricks Creek Project Pollutant Removal

<b>HDK</b>	<b>Public</b>	<b>≤ 3 owners</b>	<b>All Projects</b>
TSS	2%	12%	77%
P	3%	8%	79%
N	5%	12%	37%

Table 3: Cow Swamp Project Pollutant Removal

<b>COW</b>	<b>Public</b>	<b>≤ 3 owners</b>	<b>All Projects</b>
TSS	-	23%	73%
P	-	23%	71%
N	-	19%	55%

Table 4: Crisp Creek Project Pollutant Removal

<b>CSP</b>	<b>Public</b>	<b>≤ 3 owners</b>	<b>All Projects</b>
TSS	-	*	45%
P	-	*	57%
N	-	*	40%

\*Martin County parcel data was not available at time of modeling

## Targeted Proposed Improvement Projects



Amber and Melissa then discussed the watershed improvement projects that BLWI identified in the four watersheds, highlighting a few projects for each watershed that they believed would be most effective.

### *Crisp Creek Proposed Improvement Projects*

These include:

- 24 Riparian Buffer Projects
- 3 Stream Restoration Projects
- 11 Wetland Restoration Projects

The Agricultural Subcommittee will be helping to identify additional projects, beginning with a demonstration project. Two projects highlighted include Project 17, a wetland restoration of up to 88 acres, with 6,450 linear feet of woody buffer proposed. Constraints include some of the area is under the drainage district, and there would be a loss of cropland. Project 5 is a potential wetland restoration of 40 acres chosen for the opportunity to expand on an existing wetland, so there is opportunity to combine with preservation. Loss of cropland is a constraint.

### *Hendricks Creek Proposed Improvement Projects*

These include:

- 7 Riparian buffer projects
- 8 Stream restoration projects
- 3 Wetland Restoration Projects
- 7 BMPs

BLWI highlighted three of these projects. Project 4 is a stream restoration of 3,250 linear feet on Hendrick's creek, upstream from Wilson St. to the confluence of Holly Creek. This stretch is in bad shape and the Town if Tarboro owns much of the land. Constraints include a sewer line and multiple landowners. A participant commented that after storm events the stream backs up in this area.

Project 13 is a stream restoration opportunity with two phases. Phase one would restore 1,340 linear feet near Western Blvd. and Tarboro High School. The land is publicly owned so it may be easy to begin. A participant commented that phase one could be a demonstration project to help convince landowners to participate in phase two. Phase two would be a 1,800 linear feet restoration. Constraints include a sewer line and multiple landowners.

Project 5 is a potential stream restoration of 2,290 linear feet, which would extend a previous NRCS stream restoration project at Western Blvd. Constraints include

existing large trees and stormwater inputs. The restoration would increase the length (the linear feet) of the stream segment as meanders are created, helping with flooding and slowing the flow of stormwater.

### *Green Mill Run Proposed Improvement Projects*

These include:

- 8 Riparian buffer projects
- 2 Wetland restoration/enhancement projects
- 2 stream restoration/channel improvement projects
- 7 BMPs

BLWI highlighted three projects here. Project 1 would stabilize banks, restore a stream segment, (for total of 2,640 linear feet of improvement) and create stormwater wetlands. Project 8 would be 1,800 linear feet of woody riparian buffer restored. The buffers would treat runoff from cropland before it enters the Greenville Country Club stream restoration project. Loss of cropland is a constraint.

Projects 15 & 16 involve 6,950 linear feet of riparian buffer restoration. This area is urbanizing quickly and needs buffers. Participants commented that this parcel is already developing with single family homes, and has been piped since DWQ determined it was not a blue line stream, but a ditch (meaning the Tar-Pam Buffer Rule does not apply). BLWI commented that many other buffer restoration opportunities exist in Green Mill Run, and that the cumulative impact of many of these projects will make a difference.

### **Discussion about buffer restoration...**

This project prompted the group to discuss DWQ jurisdiction in identifying blue line streams. If this is NOT a blue line stream, then local governments can pursue opportunities for BMPs that would not be allowed in a stream. Pitt County is currently seeking DWQ certification so they can identify waters subject to the buffer rules. Pitt County would like to investigate potential partnerships between the County, developers, and EEP.

EEP is trying to get credit for alternate mitigation-- stormwater BMPs. In addition, a new provision in the Tar-Pamlico Nutrient Rules would allow buy-down of nutrients, which will provide funds for stormwater BMPs (the provision has not been enacted yet). A buy-down provision allows developers to pay a mitigation fee for part of the nutrient removal they are required to achieve through the Tar-Pamlico Rules. The Neuse Rules allow this, but the Tar-Pamlico Rules do not, yet.

**Targeted Proposed Improvement Projects** *continued from p. 3...*

*Cow Swamp Proposed Improvement Projects*

These include:

- 21 Riparian buffer projects
- 6 Swale projects
- 3 Stream restoration projects
- 5 Wetland restoration projects

Three projects were highlighted. Project 2 is 3,010 feet of stream restoration and 1,430 linear feet of swales. Project 25 is 1,850 linear feet of stream restoration, and Project 27 is 7 acres of proposed wetland restoration, and 4,640 proposed linear feet of woody riparian buffers. Constraints for all three include the loss of cropland. Potential partnerships with SWCD or NRCS could provide cost-share for loss of cropland.

**Discussion about project implementation**

Rob Breeding provided a hand-out with the various project implementation tasks and estimated times required for each.

Q: When working with landowners, they will ask what will happen if they want to develop in the future? What constraints will they be faced with?

Answer from Jeff Shaffer, EEP: It would be best to know what kind of density would be likely on the property, so restoration projects can be designed to meet city requirements. Ideally the restoration project is completed before development so we are out of the developer's way. If we are doing a stream project, the developer has to adhere to the Tar-Pamlico Rules anyways. Even if the land is currently farmed, when it develops, they will need to maintain the 50 foot buffer.

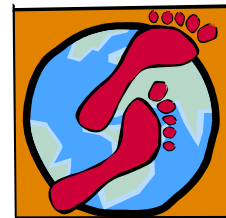
EEP can offer benefits to landowners, particularly since this buffer area is undevelopable anyway. Even if a landowner sells an easement to EEP, they can still use that area for recreation.

Q: Does this plan provide details about the projects being proposed, in case anyone asks?

A: There are some details in the atlas about the sites, but specific details about what is being proposed do not exist yet, since those will be determined when EEP implementation staff look at the site. After looking at a site, an array of options is usually presented to the landowner, and EEP works with the landowner to design a project that they can accept.

Q: Is there information in BLWI's report that indicates why some areas were chosen over others? So that in the future somebody does not spend resources investigating sites that were already determined as unfeasible?

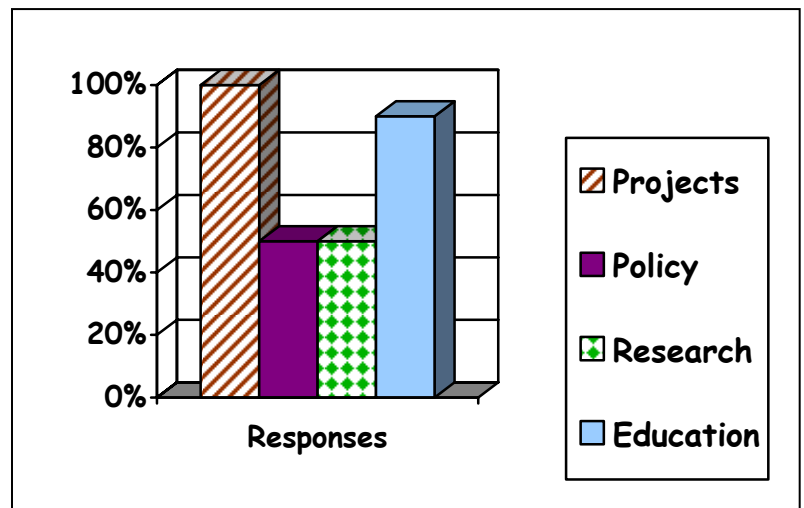
A. Yes, they identify constraints that may prevent areas from being identified as good project sites.



**Next Steps for Watershed Planning Process...**

At the March meeting and afterwards, participants were provided the opportunity to complete a survey to assess their expectations about the watershed planning process. Christy presented an overview of the results and suggested a process for the group to follow for the remainder of the year.

Ten participants completed the survey. When asked what elements are appropriate to include in a watershed plan, all participants answered that on-the-ground projects were appropriate and 90% responded that educational projects were appropriate, while 50% responded that research projects and policy recommendations were appropriate (see Graph 1).



Graph 1: What is appropriate to consider in this watershed plan?

## Next Steps for Watershed Planning Process *continued from p. 4...*

Participants were also asked how the watershed plan could help their goals, what they consider successful outcomes of the planning effort, and what must happen to make it worth their time to help implement the plan. Complete answers are available on the project website. In summary, we heard participants say that they needed assistance with:

- Meeting mandated water quality goals, including Phase II EPA Stormwater requirements and Tar-Pamlico Rules
- Education, particularly regarding the benefits to landowners
- Identifying projects and successfully getting them in the ground (restoration, stormwater retrofits, preservation)

The following next steps were suggested to the group by WECO and EEP for the watershed planning process:

- Continue working with the Agricultural Subcommittee to oversee a demonstration project in the rural area
- Project team to present an overview of existing policies/programs in the watershed to the entire group (including identified restoration projects)
- Engage in a facilitated discussion of perceived adequacy of these in meeting watershed goals
- Develop recommendations to address any identified shortfalls
- Develop action steps for implementing watershed plan

### Discussion:

Participants commented that they all have to abide by the Tar-Pamlico Rules. Some ideas for education were raised, including targeting people signing up for the tobacco buy-out and farmers who may want to develop their property in the near future. An idea for educational content was to show people conservation/ low-impact development in comparison with traditional development.

These are all ideas that can be explored when the group discusses how to address any shortfalls in existing programs in the watershed.

## Tar-Pamlico Local Watershed Team

### May Meeting Participants



Patrick Beggs, WECO; NCSU  
 Gail Bledsoe, NCDFR  
 David Brown, City of Greenville  
 David Cashwell, Town of Tarboro  
 Amber Coleman, BLUE LWI  
 Greg Griffin, Edgecombe SWCD  
 Leland Heath, CWMTF  
 Jennifer Johnson, NCDFR  
 Troy Lewis, Town of Tarboro  
 Chiquita McDowell, Edgecombe SWCD  
 Sam Noble, Town of Tarboro  
 Kathy Paull, NCDWQ  
 Christy Perrin, WECO; NCSU  
 James Rhodes, Pitt County  
 Melissa Ruiz, BLUE LWI  
 Rob Breeding, NCEEP  
 Stephen Smith, Pitt Co. Planning  
 Bill Swartley, NCDFR

## Agricultural Subcommittee: June 15 Meeting Summary

Alternatives for Enhancing Watershed Functions in Agricultural Settings, presented by Robert Evans, Dept. Biological and Agricultural Engineering, NCSU

For a more complete experience of Dr. Evans' presentation, visit the website and view his powerpoint presentation (on Adobe PDF). The following is a summary of Dr. Evans' presentation and the discussion that occurred afterwards.

### *Background of Dr. Evans and agriculture in the coastal plain:*

Dr. Evans is a native North Carolinian from Chowan County, the Pollack Swamp watershed. His own family farm has channels that are tile drained. In the coastal plain natural drainage of stormwater to waterways occurred through swamps, although there are not many natural systems left. Natural stream channels are typically not well defined, with wide stream valleys.

In the early 20<sup>th</sup> century there were 9 million acres of crop land in NC, now there is 4 million acres of crop land. About 5 million acres has reverted to forest, pine plantations, some development.

### *How we got where we are relative to drainage*

Late 1700's: Drainage of land in eastern NC began  
 1909 Drainage District Act of NC: 55 districts chartered  
 1944 Federal Flood Control Act authorized US Army Corps of Engineers flood control projects  
 1954 Watershed Protection and Flood Prevention Act- PL-566 authorized USDA to plan and construct drainage projects (including Conetoe and thus Crisp Creeks)

Dr. Evans showed pictures of routine flooding events from the 40's-70's. Prior to drainage district projects, flooding

occurred regularly, every 2-3 years from storms, not necessarily tropical events. More recently when we think of flooding, it is associate with tropical storms, but this is not the only cause of flooding in this area of the state.

### *Positive and negative consequences of channelization:*

- + Reduced frequency and duration of flooding
- + Increased agricultural productivity
- Altered adjacent wetlands
- Disassociated stream from floodplain
- Reduced opportunity for floodplain storage
- Reduced residence time for treatment
- Increased peak outflow rates (during moderate and smaller events)

*How much drainage is needed for a drainage project?*  
 Drainage requirements depend on the desired land use and the amount of rainfall, saturation, and/or flooding.

### *Drainage Requirements/Protection*

A certain level of flooding impacts has been generally accepted based on cost/benefit analysis of preventing these impacts. It becomes increasingly more expensive to provide drainage for infrequent storms.

#### Crops

- Pasture can be saturated for 2-3 days several times per year
- Field crops can be saturated no more than 24 hours at or above the surface once per year
- Truck and cash crops can be saturated less than 12 hours at or above surface once every 2-5 yrs.

#### Structures/buildings

- Tolerate minor flooding once in 5 years
- Agricultural buildings tolerate structural damage once in 20 years
- Residences tolerate structural damage once in 50+ years

Each drainage project was designed determined by how much protection is needed for the crops being planted. Channels have been sized using a formula to handle a storm based on a certain frequency. For example, a 3-year design means that once every 3 years a storm will occur that would exceed drainage capacity and damage crops.

**Table 5 : Watershed Projects (PL-566) Coastal Plain**

Watershed	Gradient	Ave. Depth	Velocity	Design Cap.
Ahoskie	.0005	6.8	3.0	2-3 yr
Conetoe	.0006	9.2	3.1	2-3
Chicod	.0006	5.4	2.3	3-5
Pollock	.0003	6.8	2.0	2-5
Mosley	.0005	8.2	2.8	3
Jacobs	.0006	6.2	2.3	10
Meadow B.	.001	5.6	2.5	10
Swift	.0005	6.1	2.5	5

**Alternatives for Enhancing Watershed Functions in Agricultural Settings, continued from p. 6**

Most agricultural drainage projects were designed to protect general field crops. This drainage design typically has the capacity to remove about 2 inches of runoff within 24 hours after a storm. Under row crop conditions, 2-inches of runoff results from about a 4 inch rainfall. Thus, most drainage systems can protect crops for up to a 4-inch rainfall which occurs once every two years on average. In other words, minor flooding and crop damage is likely to occur once every two years on average.

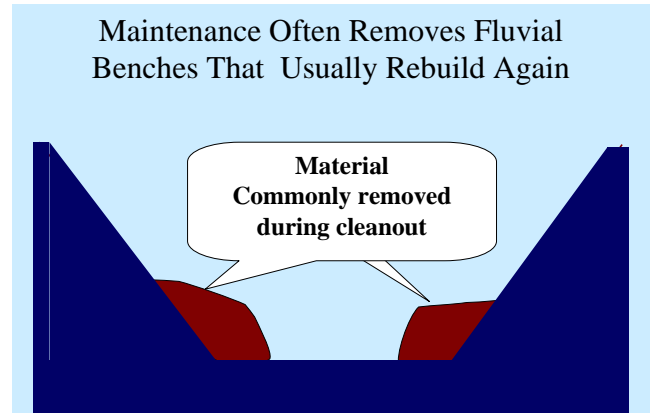
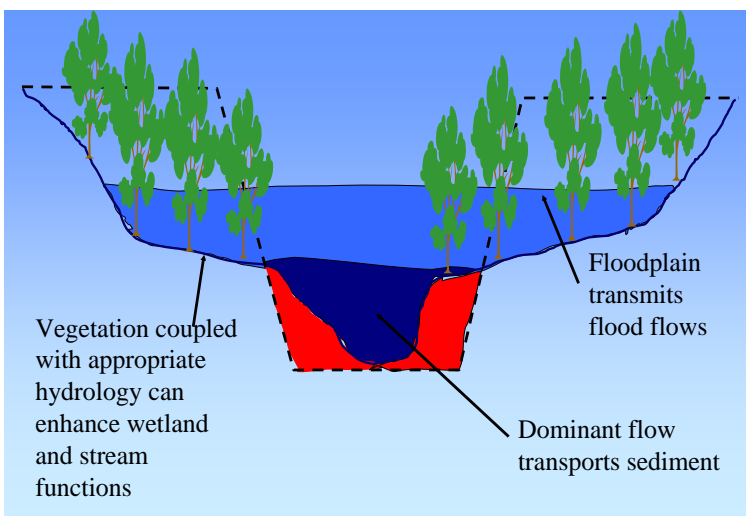
Table 5 on the previous page shows specifications of PL-566 Coastal Plain Projects and their design capacities (NRCS has design specifications for all PL-566 projects).

**Channel Design**

Channel designs in the past usually were trapezoidal due to ease of construction and flow efficiency. Limitations of this design include:

- The formula for creating the channel is valid for infinite slope, and does not consider tailwater or backwater effect
- Low gradient streams (as found in coastal plain) have a tremendous tailwater/backwater effect
- As a result, drainage channels don't have as much capacity as was believed when created
- Trapezoid channel is too wide at base flow
  - Doesn't transport sediment out of the system
  - A stream strives to get to a stable condition if altered (which has a stream and a floodplain, called a 2-stage channel) and continues to build up sediment benches
- Solution has been to remove sediment that builds in the channels every 5 years

This solution has been counter-intuitive for a natural system. It requires constant maintenance and expense to try to prevent the stream channel from functioning how it



will naturally function on its own. The trapezoidal channel was designed for water to get out of the banks (over what is called "bankfull") every 2-3 years. However, in eastern North Carolina, natural channels get out of the banks several times every year.

**Better Ditch Maintenance Strategy**

- Removing a low bench built by sediment will help short term but will not be stable
- Reducing roughness will help but might cause instability problem
- Create a floodplain by establishing a wider bench

**Diagram: Two-stage relationship**

Constructing wider benches takes more land. But maybe we can be paying restitution for the taking of the land. If bench/floodplain is made big enough, wetland plants can then be used in this area, but it must be designed with that in mind, otherwise it will not transmit the flood flows.

Example: Newland Watershed Project is an example of a drainage project that is trying to create a 2-stage relationship between the dominant channel and a floodplain.

*Restoration* as a concept is often perceived as putting a stream back the way it was. The purpose of the kind of restoration we may want to conduct in agricultural lands is to restore a stable system with natural functions. This may look different in different areas.

**Water Management Service District**

In the northeast area, they found the drainage district law was too confining. They developed a service district, instead of drainage district, called the Newland Service District. This new structure has the same taxing authority, but has more flexibility. County Commissioners are the governing body, with assistance from a five member advisory board.

## Participants of June 15 Agriculture Subcommittee meeting

Deborah Amaral, NCEEP  
Patrick Beggs, WECO  
Gail Bledsoe, NCDFR  
Thomas Blue, BLWI  
Rob Breeding, NCEEP  
Mark Brinson, ECU  
Robert Evans, NCSU  
Greg Griffin, Edgecombe  
SWCD  
Rupert Hasty, Edgecombe  
NRCS  
Jennifer Johnson, NCDFR  
Steve Kroeger, NCDWQ  
Chiquita McDowell,  
Edgecombe SWCD  
Kevin Miller, NCEEP  
Kathy Paull, NCDWQ  
Christy Perrin, WECO  
Brian Short, Edgecombe  
NRCS  
Bill Swartley, NCDFR  
Jimmy Worsley,  
Edgecombe Co. Drainage

### Action steps:

- **WECO will work with Mr. Worsley to set up a time this summer when Dr. Evans and EEP can provide a brief presentation about the potential project with the drainage district commission.**
- **EEP will see if there are some ballpark figures for landowners that they can obtain from their property office.**

### Comments and questions following Robert Evans' presentation:

*Question: For a project that seeks to recreate the 2-stage relationship, do you establish a riparian buffer or leave it as is?*

A: We plant trees and other vegetation.

*Q: What happens downstream of a project?*

A: Projects need to be designed for water not to be transmitted downstream any faster than before. Better capabilities exist now to model impacts on downstream landowners.

*Q: What are measures of success for a project like this?*

Comparing to other unrestored streams/channels and looking at the following:

- Comparing flows and peaks
- Comparing flows in the wetland areas themselves
- Coming up with stable plant communities
- Stream functions - microinvertebrates
- Water chemistry – N, P, etc
- sediment transport through the system
- stream temperature

*Q: Does this reduce management of ditches/drainage?*

A: We are collecting data on that now. Theoretically the better design should remove silt. We also need to control upland areas and riparian zones to keep it stable. Floodplain areas should begin to function as wetlands, including wetland plants. These types of projects are relatively new. We would like to try a few demonstration sites to evaluate stability and longevity.

*Comments from participants about how to make this work:*

- There will be an education process involved with all this. This isn't what people think, or how they think about water.
- It is hard to convince people who think a clean mowed buffer and smooth, clean channel bottom are the way to go.
- Drainage districts are a good way to get word out to people.

### Discussion about moving forward in Crisp Creek:

The drainage district board has not yet been presented with the idea of establishing a demo project in the Crisp Creek watershed. In order to work here, the group will need approval from the commission, and the landowners. The group will need to explain how this will be beneficial to the District.

Participants asked questions about EEP's funding and process for project. The timing of a project was discussed- including the desire to have projects completed in a timely manner. EEP explains their process fully to landowners at the beginning, including likely timelines. Whether or not there is any out-of-pocket expense for the landowners depends on the agreements made with EEP, although no cost-sharing is required for an EEP project.

Suggestions from participants about moving forward:

- Participants suggested providing ballpark figures about how much EEP pays for easements early on in the process.
- Consider buying the land outright and setting up demonstration projects on state-owned land, perhaps leasing agricultural lands so they are working lands.
- It will be easier to get permission from a drainage district to try a project in the headwaters of the district
- Consider asking Connell Purvis as a landowner
- The drainage district for Crisp Creek usually meets once a month (3 members)