THE ALPINE NUTRIENT TRADING PROGRAM SUGAR CREEK WATERSHED, OHIO

Environmental Trading Network Workshop

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Why is the Alpine Case Important?

- It is based on a single NPDES permit and expanding to add other permit holders. There are 3420 public and industrial wastewater treatment NPDES permits in Ohio as of April 2005. There are another 8000 general NPDES permits.
- The value of the externalities to the local community are worth more than the value of the trades.
- The broker is the SWCD. The university is a mediator/facilitator.
- The plan is a partnership between the factory, the local SWCD, and the university with rebates for all partners depending on the amount of phosphorus credits generated.

Alpine Case: An Appendix to a 5 year NPDES Permit

- The nutrient trading plan is part of the permit. The Alpine Cheese Company will reduce it's phosphorus from 220ppm to approximately 3ppm using ATS Engineering consultants. The function of the trading plan from the company's view is:
  - ✓ The president of the company wanted a solution to the problem that would help the local community.
  - ✓ Cost effectiveness. The cost of the last 10ppm is approximately equal to the cost from 220ppm to 10ppm.
  - ✓ Promoting local infrastructure for the dairy industry.
  - ✓ Flexibility for future plan production was desired.

Alpine is a Trading Partnership

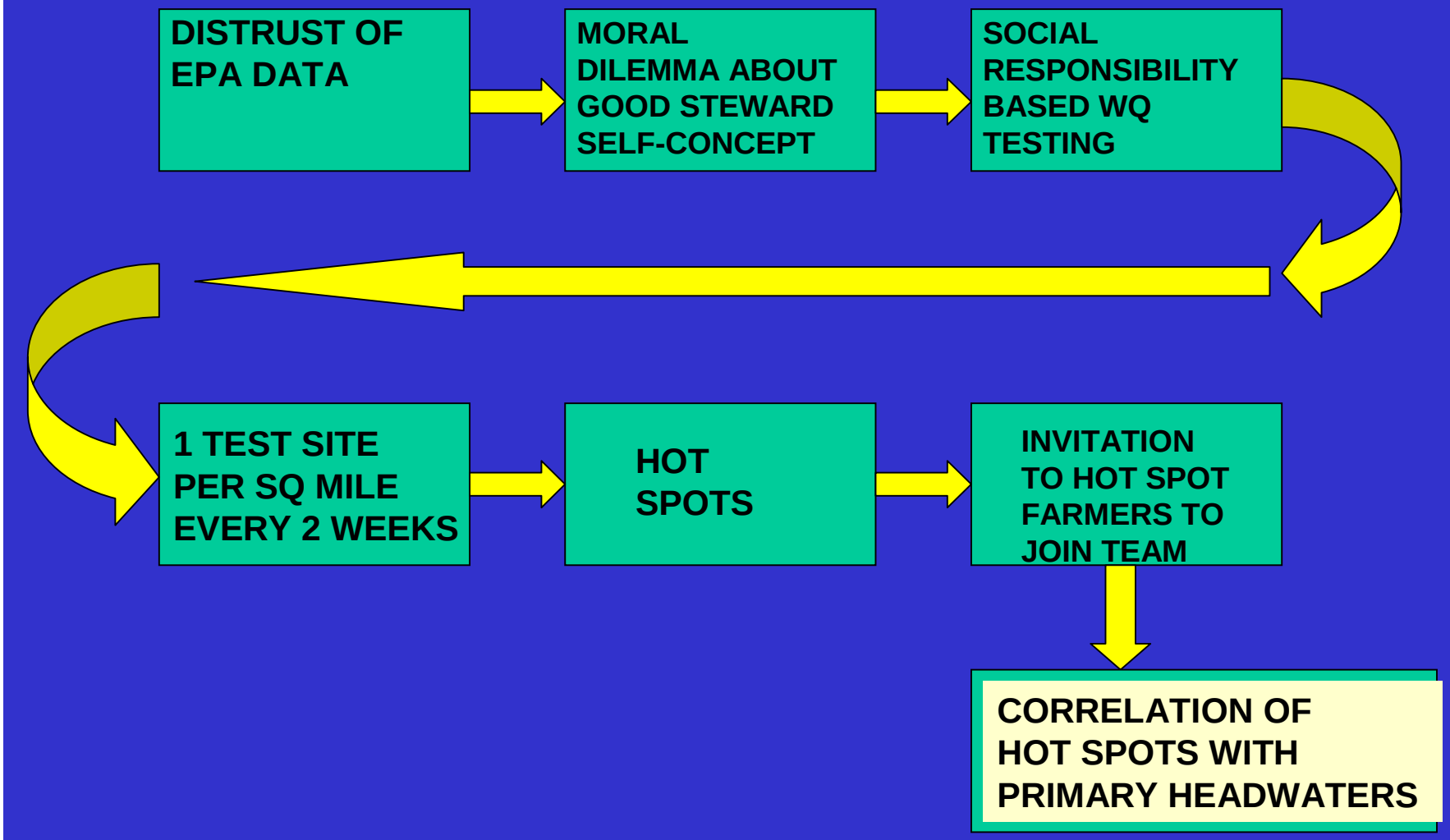
- The sellers and buyer of credit have some contact. The broker knows both the buyer and seller of credit.
- Ecosystem function is valued. Overall sustainability of the farm and BMPs that produce P are compared. $30/#/P farm cap is used. BMPs are selected from off CNMP list.

HOW DO WE MEASURE SUCCESS OF THE PLAN?

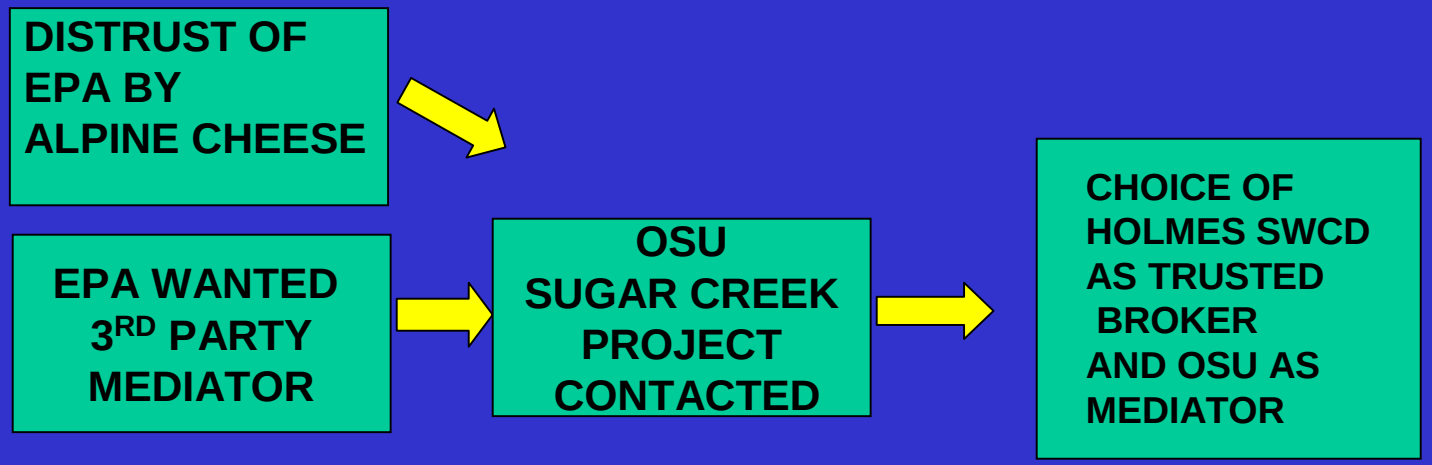
- The degree to which the Sugar Creek water quality is improved.
- The degree to which Alpine Cheese Company meets its 5 year NDPES permit obligation (5500# P of which comes from the plan)
- Cost of the phosphorus per pound over time. (over 5 years, 10 years, etc.)
- The amount of stimulation to the local economy (new jobs and local demand for products)
- The degree to which ecological farming can be accomplished.

ALPINE PLAN : PART OF THE SUGAR CREEK METHOD

HOW THE SUGAR CREEK METHOD EMERGED IN THE UPPER SUGAR CREEK FARMER TEAM



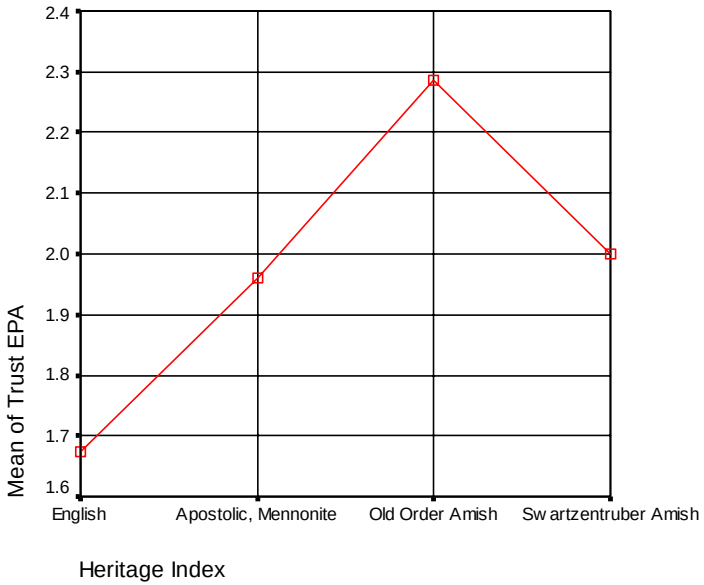
HOW THE ALPINE PLAN EMERGED IN THE MIDDLE FORK OF SUGAR CREEK



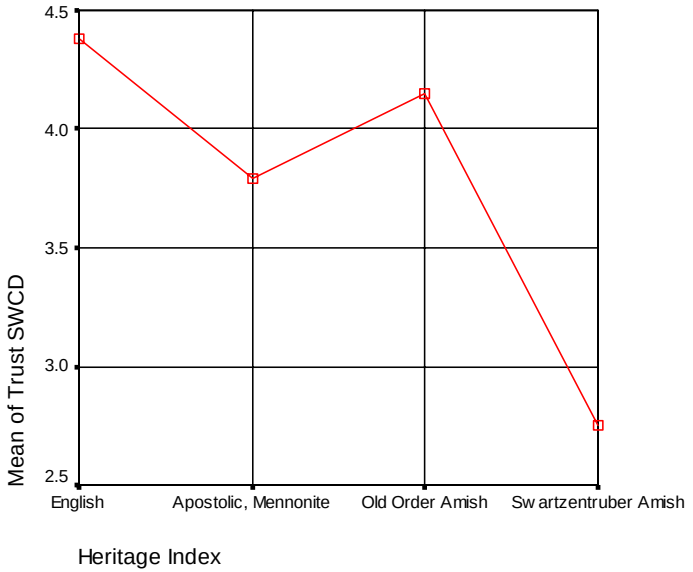
Start date for credit banking: April 2006

Start date for NPDES permit: Jan.1, 2007

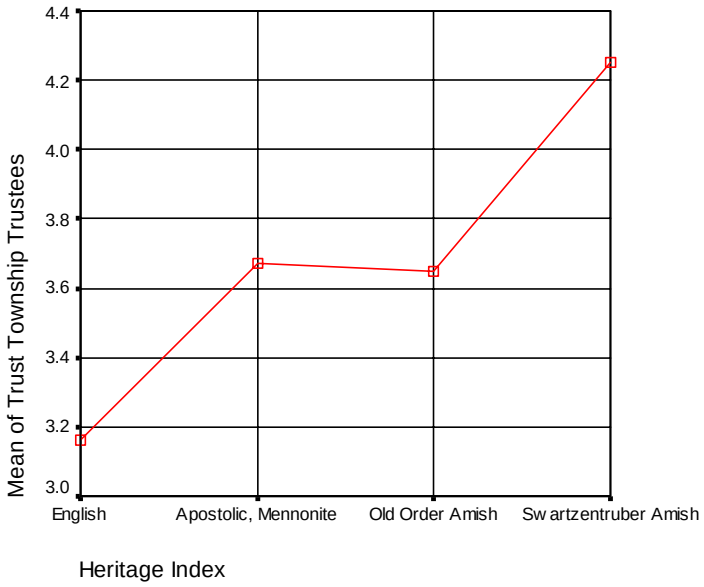
Trust in EPA

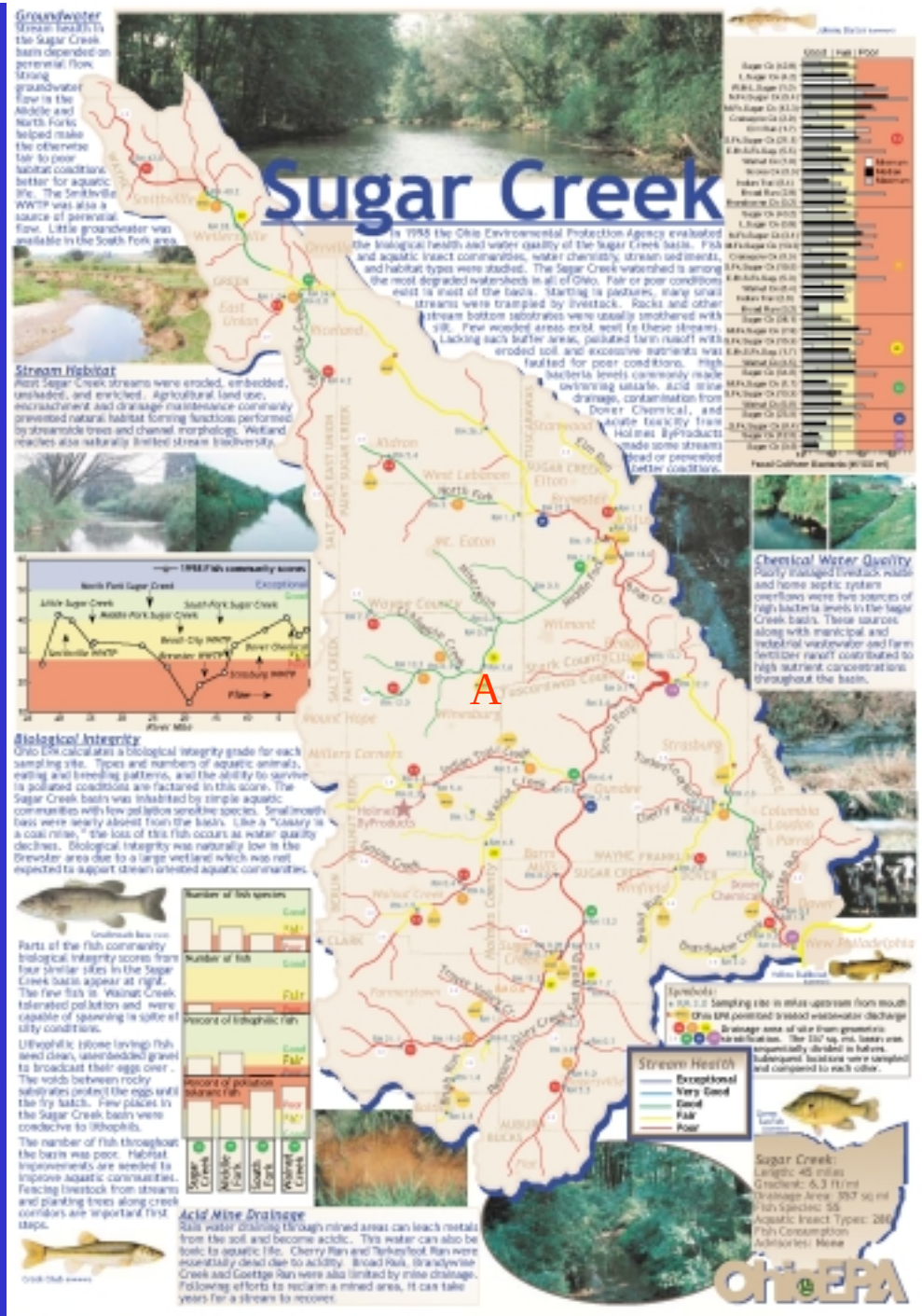


Trust in SWCD



Trust in Township Trustees




Sugar Creek
Groundwater
Stream Habitat
Chemical Water Quality
Biological Integrity
Acid Mine Drainage
Stream Health
Exceptional
Very Good
Good
Fair
Poor
Sugar Creek:
Ohio EPA

Nutrient Trading for Agriculture and Industry

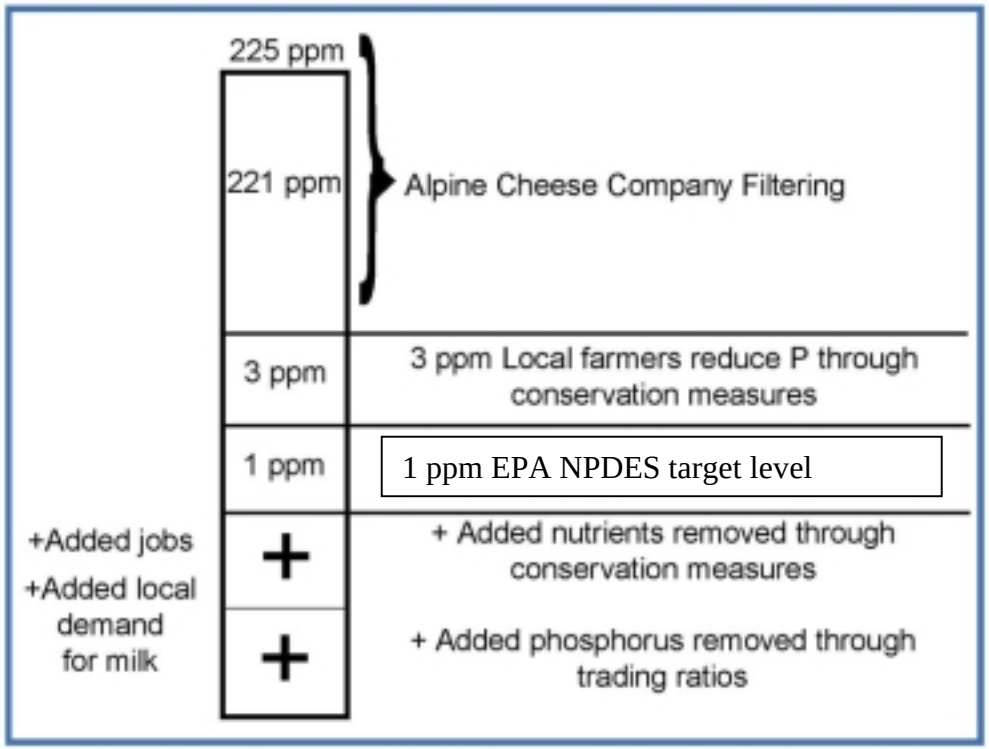
- Creative nutrient trading to promote cleaner water
- Saving pollution remediation costs to industry
- Improving the bottom line for farmers
- Creating local jobs

The Problem:

Alpine Cheese Company had phosphorus levels of 225ppm. The EPA goal for the NPDES 5 year permit was 1ppm. There was a much lower cost associated with filtering the first 221ppm than the last 3ppm. Alpine's NPDES permit was preventing plant expansion. The factory wanted to expand, creating 12 new jobs and local milk demand of 250,000 #/day.

Jarlsberg products
wheel, loaf & lite loaf form.

Alpine Cheese Factory



The Solution:

The factory filtered their phosphorus down to 3ppm and pays the farmers to reduce phosphorus on their farms. A trading ratio favors more phosphorus being removed than if the factory filtered it by itself. Other nutrients being recycled are a plus. Farms save fertilizer costs. Extra incentives are included for the factory, local farmers, the Holmes Soil and Water Conservation District, and OARDC at The Ohio State University.

The community solution includes OARDC partnering with Holmes Soil and Water Conservation District, Holmes County Commissioners, Ohio EPA, Ohio DNR, OSUE and Local Congressional Representatives.

Table 14. TMDLs and Allocations For the Sugar Creek Basin

Subwatershed	Existing Conditions			Percent Reduction	TMDL	TMDL Allocations		
	NPS	PS	Total			Natural	WLA	LA
Dissolved Nitrogen (kg/day)								
E Branch	103	0	103	40%	62	13	0	49
Upper Sugar	426	27.3	453	70%	136	37	27.3	72
Lower Sugar	253	102.6	356	0%	356	35	102.6	218
North Fork	77	36.4	113	70%	34	8	21.2	5
Middle Fork	186	13.6	200	25%	150	22	13.6	114
South Fork	338	40.1	378	30%	265	29	28.5	207
Walnut/Indian Tr	222	30.3	252	30%	176	22	26.0	128
Total Phosphorus (kg/day)								
E Branch	24	0	24	60%	10	4	0	6
Upper Sugar	39	5.6	45	60%	18	3	2.6	12
Lower Sugar	47	33	80	50%	40	6	6.2	28
North Fork	14	5.4	19	50%	10	2	3.6	4
Middle Fork	39	11.2	50	40%	30	5	1.0	24
South Fork	59	24.7	84	60%	34	5	2.7	26
Walnut/Indian Tr	30	12.9	43	60%	17	8	2.3	7
Sediments (metric tons/year)								
E Branch	4798	0	4798	30%	3359	896	0	2463
Upper Sugar	3657	13.3	3670	30%	2569	408	13.3	2148
Lower Sugar	9774	115.2	9889	30%	6922	1270	115.2	5537
North Fork	2040	15.4	2055	30%	1439	356	15.4	1067
Middle Fork	6981	4.9	6985	30%	4890	1305	4.9	3580
South Fork	8690	17.0	8707	30%	6095	1158	17.0	4920
Walnut/Indian Tr	5025	15.2	5040	30%	3528	2047	15.2	1466

Table 15. Phosphorus Summer [A] Loads for Point Source Dischargers in the Sugar Creek Basin

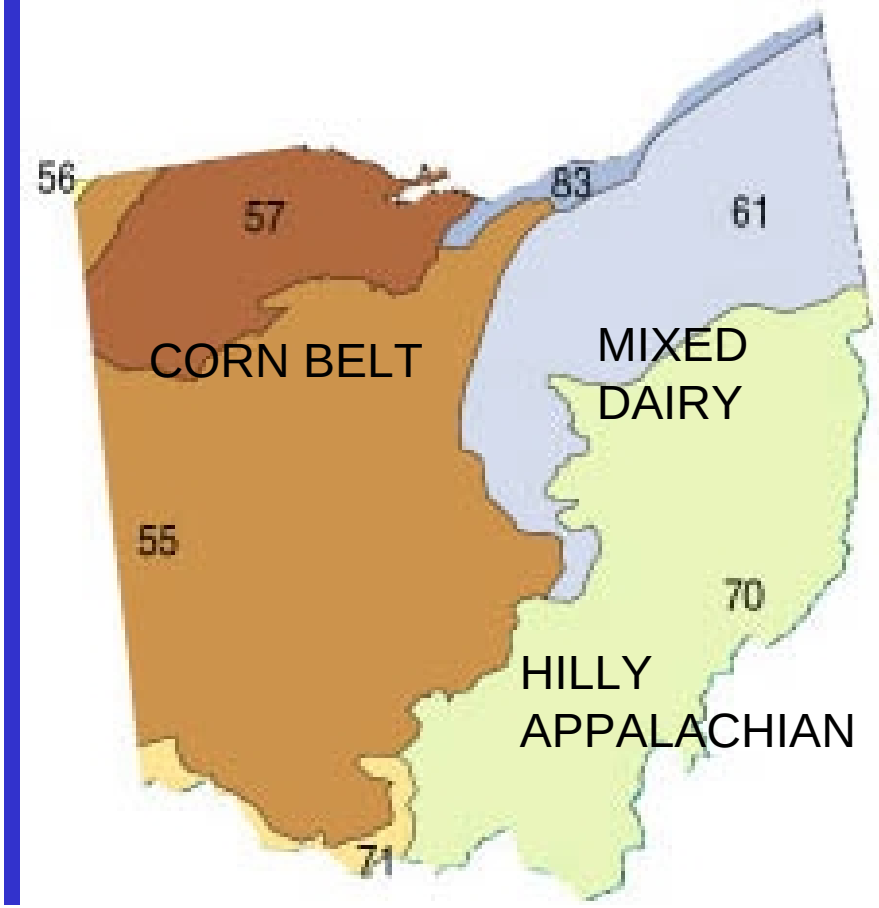
Discharger	Design Flow (MGD)	Existing Flow (MGD)	Existing P Load (kg/day)	P Load* @ 1 mg/l (kg/day)	Subwatershed
Smithville WWTP	0.30	0.3	1.2	1.1	Upper Sugar
Eastwood WWTP	0.2 [B]	0.06	0.7	0.76	Upper Sugar
Harmony Lake WWTP	0.036	0.036	0.41	0.14	Upper Sugar
Gerber Poultry	0.80 [B]	0.16	4.6	3.0	North Fork
Kidron WWTP (proposed)	0.1	None	none	0.38	North Fork
Mt. Hope WWTP	0.022	0.022	0.25	0.08	Middle Fork
Alpine Cheese Co.	0.022	0.022	8.35	0.08	Middle Fork
Brewster WWTP	0.665	0.391	4.28	2.52	Sugar Creek
Brewster Dairy	0.30	0.30	18.6	1.14	Sugar Creek
Beach City WWTP	0.297	0.15	2.8	1.12	Sugar Creek
Baltic Rubber Co.	0.02	0.02	NA	NA	South Fork
Baltic WWTP	0.1	0.1	2.8	0.38	South Fork
Guggisberg Cheese	0.04 [B]	0.014	9.6	0.15	South Fork
Sugarcreek WWTP	0.50	0.5	9.4	1.9	South Fork
American Whey	0.065	0.065	2.88	0.25	South Fork
Walnut Creek WWTP	0.090	0.09	1.0	0.3	Walnut Ck
Holmes By-Products	NA	NA			Indian Trail Ck
Troyer's Trail Bologna	0.005	0.005	0.05	0.02	Indian Trail Ck
Case Farms Inc	0.50	0.50	11.9	1.9	Indian Trail Ck
Strasburg WWTP	0.225	0.225	4.0	1.3	Sugar Creek
Alpine Hills (camp)	NA	NA	0.06	0.02	Sugar Creek
Broad Run Cheese	NA	NA	0.06	0.02	Sugar Creek
Dover Chemical Co.	4.0 [B]	1.45	NA	NA	Sugar Creek

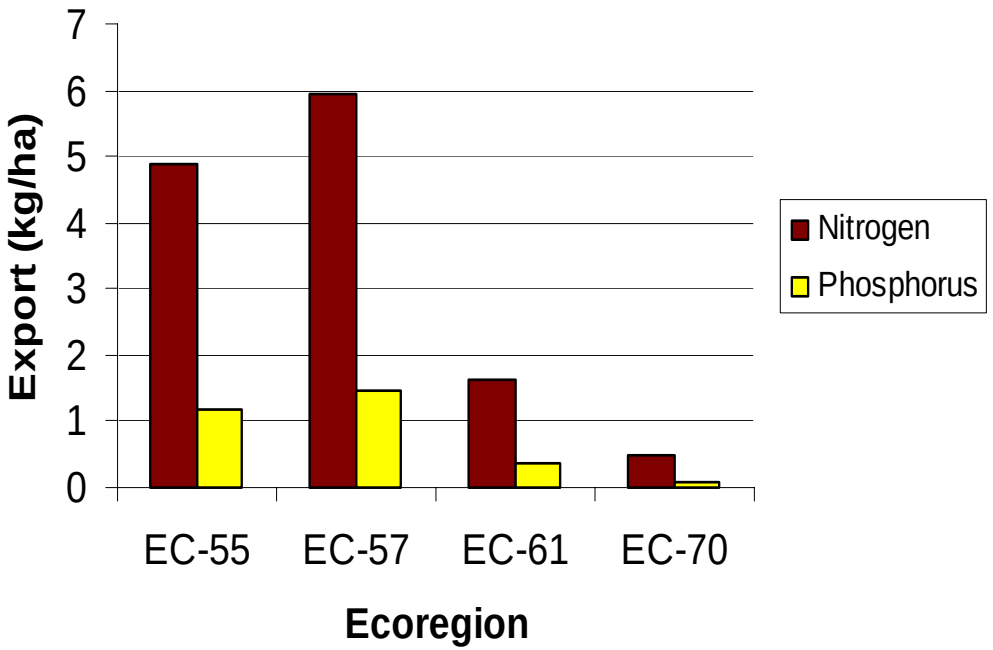
[A] March through November

[B] Proposed expansion flow

* At proposed expansion flow or design flow

NITROGEN AND PHOSPHORUS EXPORT TO STREAMS FROM AGRICULTURE





P Flows on Farms: Calculating nutrient loading…

	Crop	Dairy
Input	lb P/acre/yr	
Fertilizer	20	10
Feed	0	20
Output	–18	–13
Balance	+2	+17

Crop=75-acre cash crop farm growing corn and alfalfa.

Dairy=100-acre dairy farm with 65 dairy holsteins averaging 14,500 lb milk/cow/yr, 5 dry cows, and 35 heifers. Crops were corn for silage and grain, alfalfa, and rye for forage.

SOURCE: Lanyon and Thompson (1996) and Bacon et al. (1990).

A Nutrient Trading Program that Creates Synergy at the Local Level

- 12 new jobs at the local factory
- New milk demand through factory expansion
- One new job at the local SWCD
- More phosphorus and nitrogen removed than if company did it alone
- Rebate to company if additional credits generated
- Long-term approach
- Equality among partners: cheese factory, local SWCD, university (equal credit rebates)

WHY IS THE PLAN GOOD FOR ALPINE CHEESE COMPANY?

- Flexibility in planning.
- Good relationships and trust with milk producers.
- Improves the quality of the milk received and supports the local milk quality
- Good community relations and PR
- Supports the community infrastructure

COST OF THE PLAN(1)

(AMOUNT TO BE PAID BY ALPINE CHEESE COMPANY=$800,000)

- OSU—$300,000 ($60,000/yr for 5 years) for monitoring, research, agency liaison, planning, education.
- Holmes SWCD--$200,000 ($50,000/yr. for 5 years) for conservation measure cost-share and incentives
- Holmes SWCD--$300,000 for staff, brokering, education

COST OF THE PLAN (2)

- Initial Cost for Alpine=$800,000
- Rebate for Alpine (sale of surplus credits if 2X credits are generated)=1/3 X $600,000 (or negotiated amount)=$200,000
- Rebate for Alpine (if N is sold)=?
- Total Cost per #P = $600,000/5500#=$109-1/3 N credits sold

CURRENT STATUS OF CREDITS

- 1 MILK HOUSE WASTE CASE
  - Biofilter finished and collecting 50+ credits/yr.
- 2 CNMPs finished and 2 in progress (CNMP must be finished within 18 months after signing contract)
- 2 Grazing Plans in progress

WHAT'S IN IT FOR THE FARMER?

- Financial Benefit: A premium of $2 per pound of phosphorus reduced per year. If it is a targeted farm, it may also receive an additional $.50 incentive.
- Ecological Benefit: Farmers are interested in passing down the farm in good condition to the next generation. Our program provides a means to make holistic improvements to the farm rather than a shot-gun approach to get credits.
- We promote farmers working with neighboring farmers and increasing social and natural capital.

WHY INTENSIVE WATER QUALITY MONITORING?

- Local effect of raising awareness. Biweekly with 1 site per 2 square miles.
- Each subwatershed has different social and natural conditions
- We are researching headwaters as a key factor in improving water quality through habitat improvement.

WHY THE COUNTY SWCD IS THE BROKER?

- A high level of trust in the watershed
- Has led a team of farmers in the South Fork previously
- Excellent relations between NRCS and SWCD at the county level
- A need to create local level budget funding
- We are planning to have a watershed level trading program to begin in 2007.

Size of the Trading Area

- OEPA welcomed combining the three 11 digit watersheds called Sugar Creek.
- We had prior water quality achievements in the northern part of the greater watershed so were reluctant to risk the whole watershed in the plan so restricted it to the southern half of the watershed.
- Now that the plan appears to be successful, we are expanding it based on requests by additional point source permit holders as well as the farmer groups and SWCDs.

HURDLES WE ENCOUNTERED

Trading Across Subwatersheds

- The Cheese Factory was located in the only subwatershed that was in attainment.
- The adjacent subwatershed called the South Fork, had many Alpine producers and was in non attainment.

WHAT ARE THE HEADWATERS WORTH?

- Soil redeposition approach (headwaters worth less)
- Ounce of prevention is worth a pound of cure? (headwaters worth more)

Ratios

Our ratios are 1:1 for BMPs which reduce milkhouse and feedlot waste (if they directly discharge) and 2:1 (upstream of the factory) to 8:1 for BMP reductions in soil erosion depending on estimated sediment delivery ratio (SDR) to point source (PS) or confluence point.

A 1:1 multiplier is used for point source (PS) into attaining waters (AW) and 1.5:1 into impaired waters (IW).

Draft Ohio rules for trading state 3:1 ratio for PS:NPS

Milk House Waste: Fine as PS Violator or Use Proactive Solution?

- In early discussions EPA wanted milk house waste to be treated as a point source violation because it often discharged directly into ditches and streams.
- This approach, however, would have alienated the entire farming community, so it was proposed to proactively deal with it without fining. OEPA accepted this approach.

BMP'S: Milk House Waste

- Makes cultural sense—no brainer… (cheese factory and dairy farmers)
- High concentration of phosphorus
- Proactive solution
- Leads to comprehensive solution to farm management (CNMP)
- Cost is about $4000 per tank—pumped out onto field or $3000 for sawdust biofilter.

Milk House Waste

MILK HOUSE
WASTE

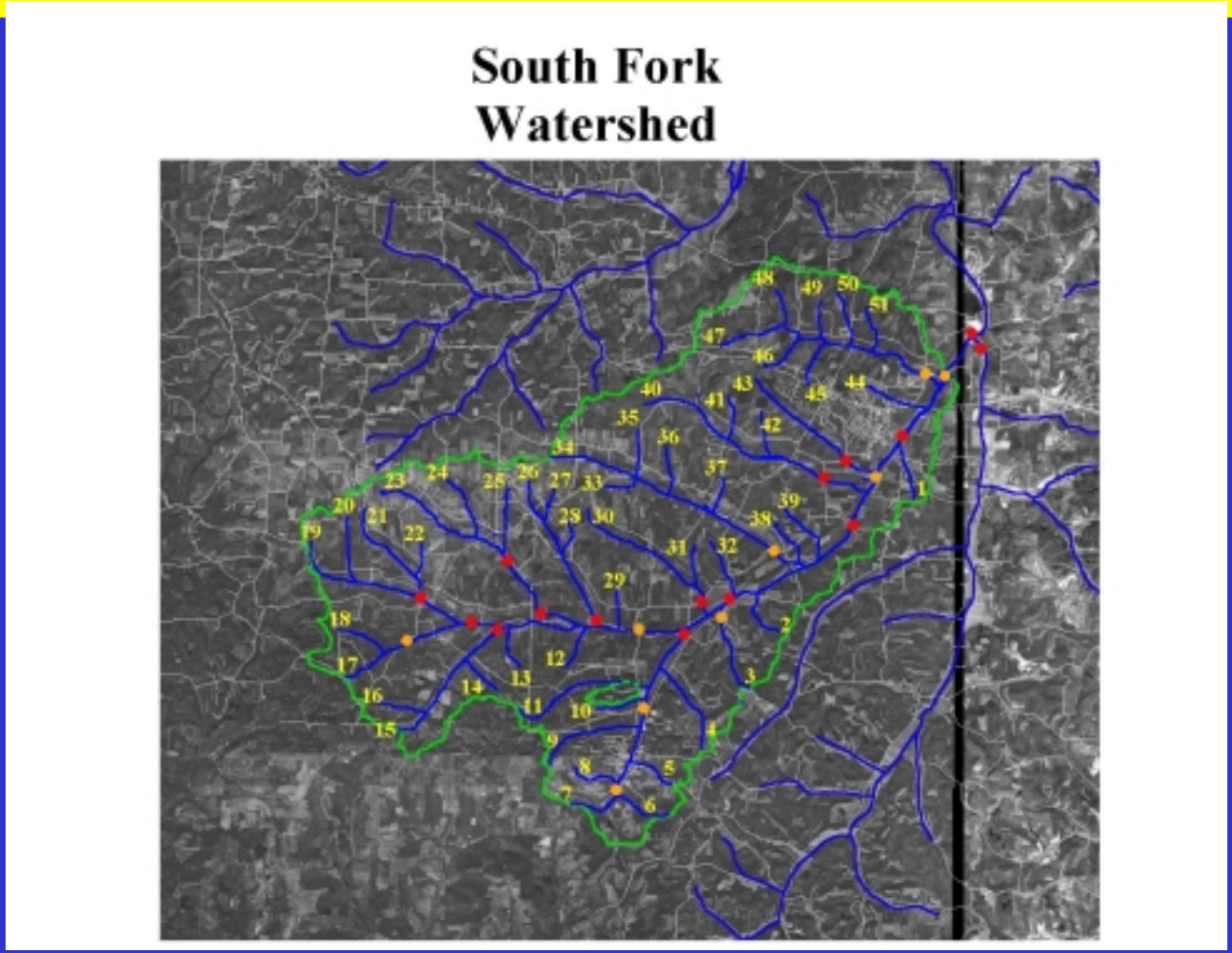

Adobe Acrobat Professional - [DSCN7591.pdf]
File Edit View Document Comments Tools Advanced Window Help
Small Farm Institute's
2006 Family Farm Day
At the Jerry Miller Farm
1 of 1
start

Biofilter Used at the Jerry Miller Farm

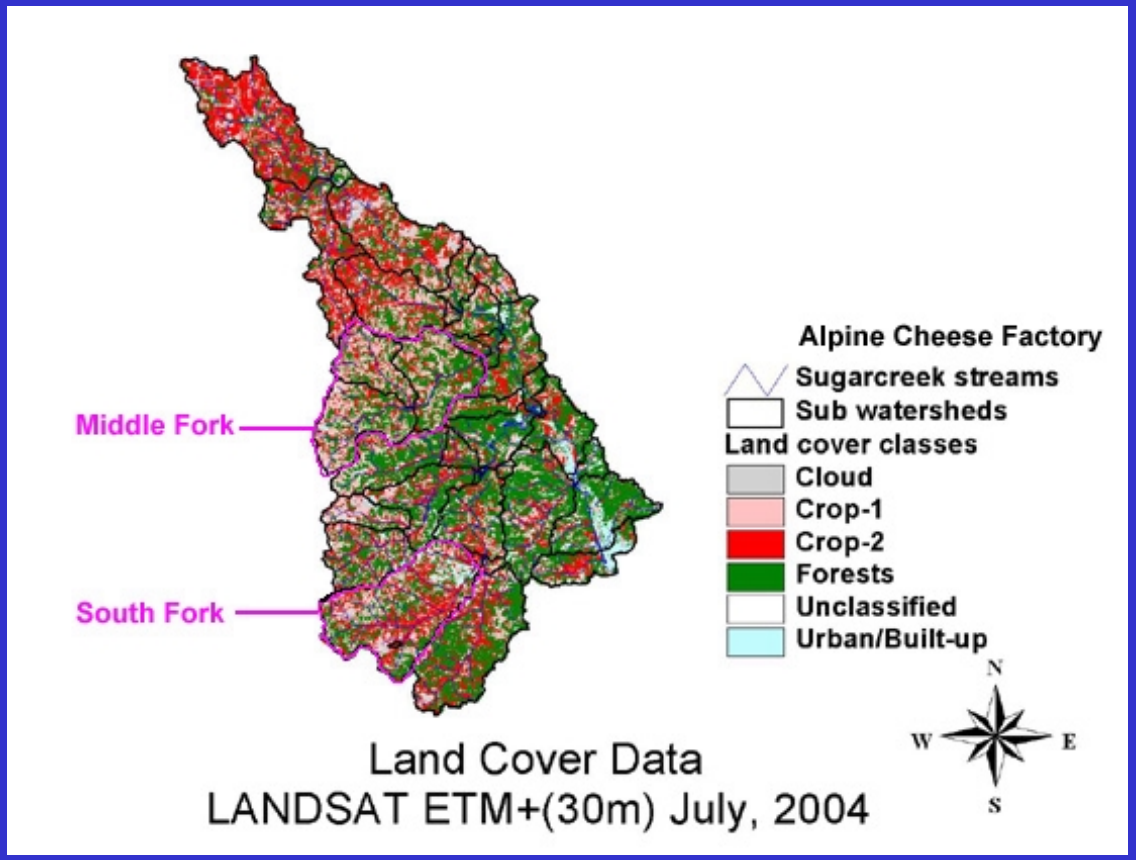
MOU on Site Inspection

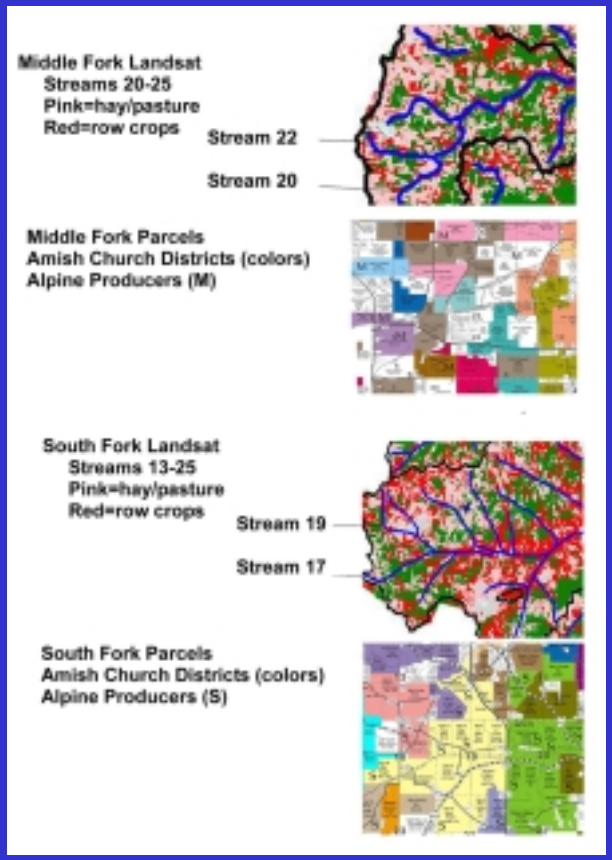
- EPA and Holmes SWCD created an MOU for site selection.
- Ohio DNR had a system in place for spot checking SWCD/NRCS conservation measures.
- Amish farmers trusted SWCD and wanted a low level of outsiders on their farms. This was a “deal breaker” for Alpine Cheese and ATS Engineering, the consulting firm for Alpine Cheese.

SOUTH FORK (AMISH)



Finding Phosphorus Using Land Use Patterns





SOME BMP's Used

- Conservation Tillage (No-till)
- Contour Farming
- Cover Cropping
- Filter Strips
- Cow exclusion from stream (fencing)
- Milk House Waste
- CNMP

Comprehensive Nutrient Management Plans (CNMP)

- Takes 80 hours of work for the technician from the county NRCS (Natural Re sources Conservation Service)
- Must be carried out if manure management is involved
- A holistic plan listing BMPs (Best Management Practices) for the farm sustainability.

Ohio DNR Load Reduction Spreadsheet

Milking Center Wastewater

Please fill in the gray areas below.

Project Information (complete all applicable fields)						
Calculated by:	County		14 Digit HUC			
	Owner / Operator		Stream Segment Name			
Checked by:	Semi-Annual Report Date		River Miles			
	319 Project Name		BMP & Date Installed			
	OEPA Project Number		Latitude		Longitude	

	Estimate	Example
Number of cows	0	80
Avg. cow weight (lbs)	0	1400
Milking System*	1	2
Delivery Ratio	1.00	1.00

*Description of milking system

1. Milk house only
2. Milk house and parlor
3. Milk house, parlor and holding area (holding area scraped and flushed - manure excluded)
4. Milk house, parlor and holding area (holding area scraped and flushed - manure included)

Total wastewater, manure and milk entering the waste treatment handling system

		Example
Total wastewater (gal/day)	0.0	504.0
Phosphorous (lb/year)	0.0	152.7
Nitrogen (lb/year)	0.0	307.2

Source: NRAES-115, Guideline for Milking Center Wastewater

BMP's: Livestock Exclusion

- Makes economic sense because milk premiums go up with lower somatic cell counts.
- Herd health seems to improve as well (mastitis rates are reported to decrease)
- We have a history of successful cases of livestock exclusion in this area.
- Fences can be put up using group labor as the cost-share.
- Cost is about $2.40 per linear foot and yields 3#P/acre excluded.

Cow Crossing and Exclusion Fencing

Milk somatic cell count dropped from 300 before fencing to 75 after.

Decrease in mastitis

Environmental Value-adding

GREENFIELD AMISH ORGANIC FARMS—40 FARMS IN 2006 WITH MANY MORE WAITING TO JOIN.

THANK YOU!!

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