The Chippewa 10% Project: Perennials and Soil Health at Scale to Achieve Water Quality Goals in and Beyond an Agricultural Watershed

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Introduction

The 8 digit Chippewa River Watershed (CRW) drains 1.3 million acres of mixed natural & managed ecosystems. Corn and soybeans dominate throughout the watershed, especially in the south. In the eastern and northern sections, grazing livestock and longer crop rotations are common.



Why 10%? Chippewa River Watershed Project (CRWP) compared land-use in sub-basins with in-stream water quality. Correlations indicated a 10% increase in perennial cover would meet water quality goals.



What If' Scenarios for modeling changes from corn =Nitrogen, MIRG= management intensive rotational grazing; LCC 1 or 2 is good corn land, 3 needs conservation and 4+ is less good;)

Ecosystem Service Output Coefficients Comparing Systems on LCC β from APSIM								
Eco- Service	Corn /Soy	CSW HHH (Org)	Warm seaso BG	Cont graze	Basio rot graze	MIRG	MOB graze	
Animal Units/Ac/Yr			1.2	1.2	1.2	1.78	2.5	
Erosion MT/ac/yr	2.42	0.13	0	0	0	0.01	0.02	
NO3-N Leach Kg/ha/yr	16.7	9.49	12.46	17.14	6.48	2.80	3.07	
Runoff	36.7	29.81	10.5	5.24	4.62	5.75	6.29	

Load Reductions from HSPF--see right. (TMDL=total maximum daily load reduction TP=total phosphorous, TN= total nitrogen). RESPEC consulting firm, June 2015

APSM Results--see left. (C = corn, S= soybeans, W=wheat, H=hay, BG=basic grazing, MOB is high density grazing)

Hydro	logic	Simulat	ion Program	FORT				
		Usii	ng C10 Scenar	rios				
(% change in load from baseli								
Focal		Scen	Scen C (1-4)	Scen				
area		B	Living Cover	low/h				
			(3.7% of	(14% (
			CRW)	CRW)				
East	TN	-4.1	-32.3	-1.1/-4				
Branch	TSS		-22.6	-2.0/-				
Middle	TN	-0.8	-16.2	-0.4/-				
Main	TSS		-18.4	-1.7/-3				
Shakopee	TN	-6.0	-28.8	-1.5/-6				
	TSS		-19.7	-2.1/-4				
CRW	TN	-2.9	-18.4	-0.8/-				
	Р		-16.5					
	TSS		-16.1	-1.5/-3				

Goals

≻Meet water quality goals for 12 and 8 digit Chippewa River watersheds Enhance existing grasslands and achieve 5,380 more acres of grass in Minnesota Prairie Plan local corridor Engage farmers/landowners to transition 10% of fields from annual row crops to Continuous Living Cover (CLC) in profitable ways

Monitoring Streams and Fields:



18 Years of water quality monitoring by Chippewa River Watershed Project led them to: •Identify sub-basins that had 34% perennials and met water quality standards—The watershed as a whole had 25% leading to goal of 10% more

•Select 3 focal areas chosen (see map on upper right) •Assemble data showing that diversity of cover moderates runoff after extreme rainfalls in this landscape

> Data from farmer networks:

•Biannual Haney soil tests for soil health connected to the Soil Health and Cover Crops Farmer Network •3 tile line monitors installed



Predicting Improvements

≻Identified 110,000 acres of ecologically sensitive and marginal row crops with GIS

Agricultural Research Service developed ecosystem services coefficients for dominate and organic farming systems, crop and soybean fields (Land Capability Classes (LCC), N rotations, perennials, and continuous and rotational grazing

systems on: up to 195 soils in Land Capability Classes (LCC) 1-2, 3 and 4+, and historic and future climate, using the Agricultural Production Systems Simulator model (APSIM)

'RAN (HSPF)

D TMDL Load Reductions (av %) / vs % decreased -44 %/56% 4.3 1.8 -3.5 **-49**%/41% -4.6 -76%/29% 3.5 -3.2 -54%/33%

► HSPF model + APSIM results: With 4% more continuous living cover, make progress toward reductions of N and 100% of P and 30% of the total maximum daily load needed in the watershed

Louisiana State University Agricultural Center Estimated \$4.3 million greater profits annually from adopting continuous living cover on 110,000 acres (using 10-yr average prices).

>Involve the community—hunters, anglers, bird watchers, lake shore owners, canoeists and others to support land stewardship through the BioBlitz, shifting narratives and working for supportive policies

>Ask recreational landowners and affinity groups to support managing public and private lands with conservation grazing

≻Work with Green Lands Blue Waters: Watershed Initiative and Forage Working Group

>Enlist researchers and modelers to include CLC scenarios and develop an ecosystem services payment pilot

> Engage Natural Resources **Conservation Service and state** agencies about CLC

Engaging Farmers

≻Through 300+ 1-1 conversations elicit values about stewardship & community, obstacles, options and build relationships

>Farm profits from new practice or enterprise from:

- Markets for regionally produced grass fed beef
- Conservation incentives-federal and state
- Reduced costs from improved soil health

Discovery and innovation is supported through 4 farmer networks on: rotational grazing, soil health and cover crops, and women non-operating landowners— 12,600 acres in changed management

Simon Lake Challenge is Community Conservation with farmers and landowners using invasive species removal and rotational grazing on a large landscape

Healthy, resilient soil is the source of a farm's wealth and the link to the farm family's stewardship values and landscape health

Advancing Systemic Change



BioBlitz 24 hr observation in Simon Lake area July 2015

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Plan











We have learned

≻It is important to go beyond outreach to farmers to engagement with farmers. ► Farmers respond to individual conversations about values. Climate change impacts are reduced with diverse rotations. Policy can drive resource depletion or stewardship-it matters and a well-informed public matters. ≻The public discussion about

continuous living cover is advancing.

≻ Farmer leaders speak publicly about stewardship and economics, shifting what is viewed as possible

