“Improving Profitability Through Land Stewardship: Lessons from Washtenaw County” 12.11.21

“We should try to be the parents of our future rather than the offspring of our past”-Miguel de Unamuno (1864-1936)

SOLUTIONS IN THE LAND

Innovating a diverse suite of agricultural practices that are both revenue generating and ecologically restorative

Mega Trends

The virtually instantaneous worldwide exchange of information empowers networks to be flexible, nimble and effective. Hierarchies are giving way to networks.

The speed of change continues to accelerate.

Coalescing toward new global stage of human evolution –

Our climate has changed and will continue to change

Rising social awareness of our “leaky” agriculture

What's right with our food system?

Michigan ag statistics

Abundant supply for most people

Contributes $1 trillion to economy

Employs 17% of labor force

13% of GDP

Food, Fiber, Feed, Fuel, Fun, FLOW of ecological services – value = worldwide GDP

Will Urban AG save the Planet?

Community gardens provide the opportunity for community development and outdoor education and cultural celebrations of food.

Community gardens and green roofs **can help filter out** local air pollution, **cool down cities** in the summertime, and retain precipitation — avoiding storm-water runoff into nearby waterways. When designed well, urban gardens **can provide valuable habitats** for wild bees and other pollinators.

"Improving Profitability Through Land Stewardship" Ron Doetch

Urban ag won't feed our cities,

The more realistic hope is that community gardens and urban farms can provide some families with an additional source of healthy, low-cost produce. That's a worthwhile goal in itself, and there's **some evidence** that people who engage in urban farming eat more fruits and vegetables.

The social benefits of urban ag can be large, but not always shared.

Community gardens can increase social bonds and networks among neighbors and the people who participate in farming. While urban farms don't usually provide all that many livable-wage jobs, they can "serve as sites for education, youth development, and skills/workforce training opportunities." Some cities have programs that use urban agriculture to help teach young people about science, environmental stewardship, and healthy eating.

Washtenaw County Parks and Recreation Commission

Facilities Map

10/25/2018

Conservation & Recreation Lands

- County Park
- County Nature Preserve
- County Farmland Conservation Easement *
- Other Recreation Land
- Other Conservation Land *
- Public Access not Available at Present
- WCPARC Partnership Contribution
- Ann Arbor Greenbelt Boundary

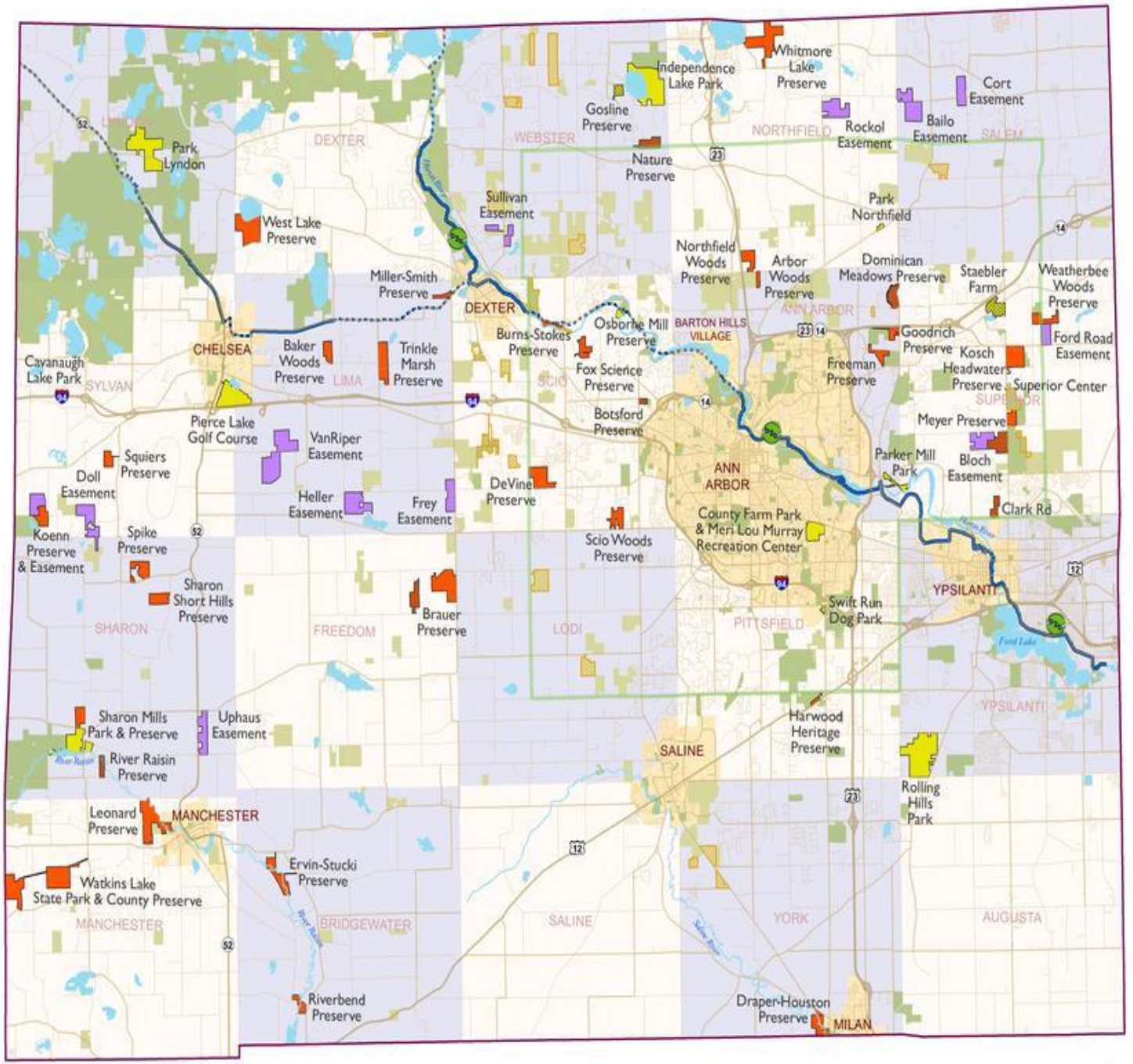
Border-to-Border Trail (B2B)

- Existing Trail Route
- Proposed Trail Route

Other Map Features

- Water Body
- River
- Highway
- Major Road
- Local Road

* = Access by Appointment
* = Property may not be Open to the Public

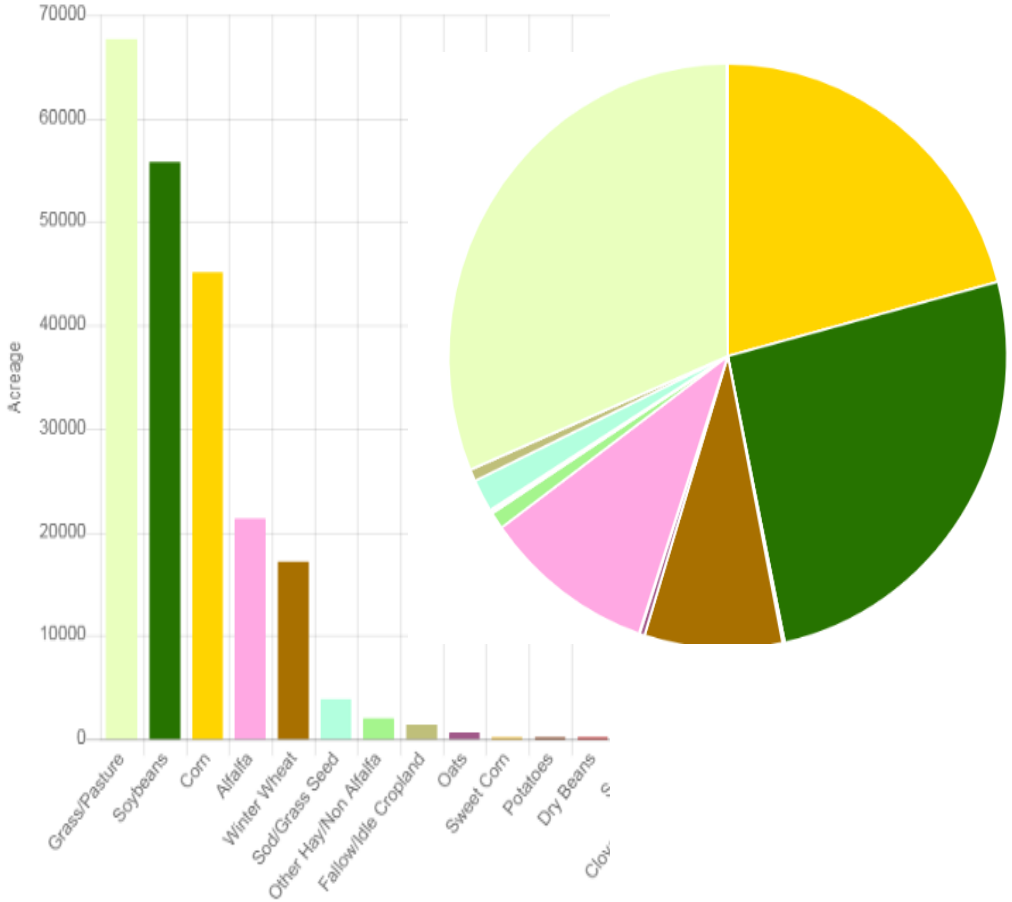


Washtenaw County Parks & Recreation Commission (WCPARC)
washtenaw/parks.org · (734) 971-6337

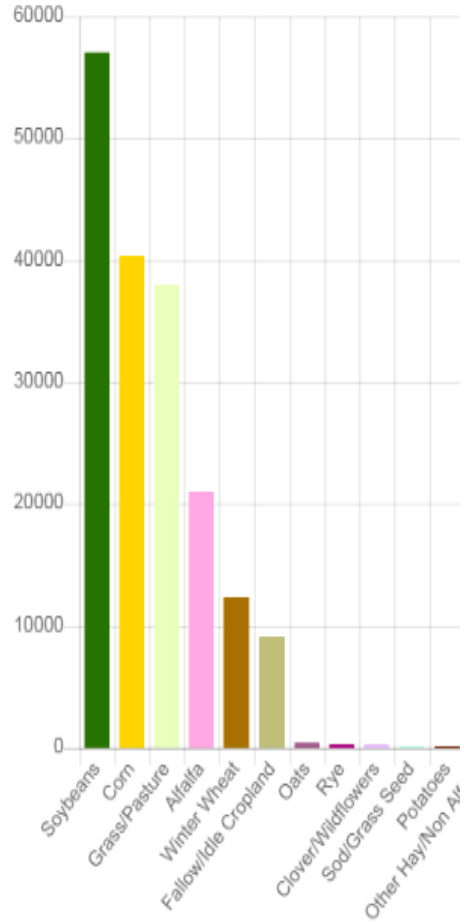
Data Source:
Washtenaw County GIS

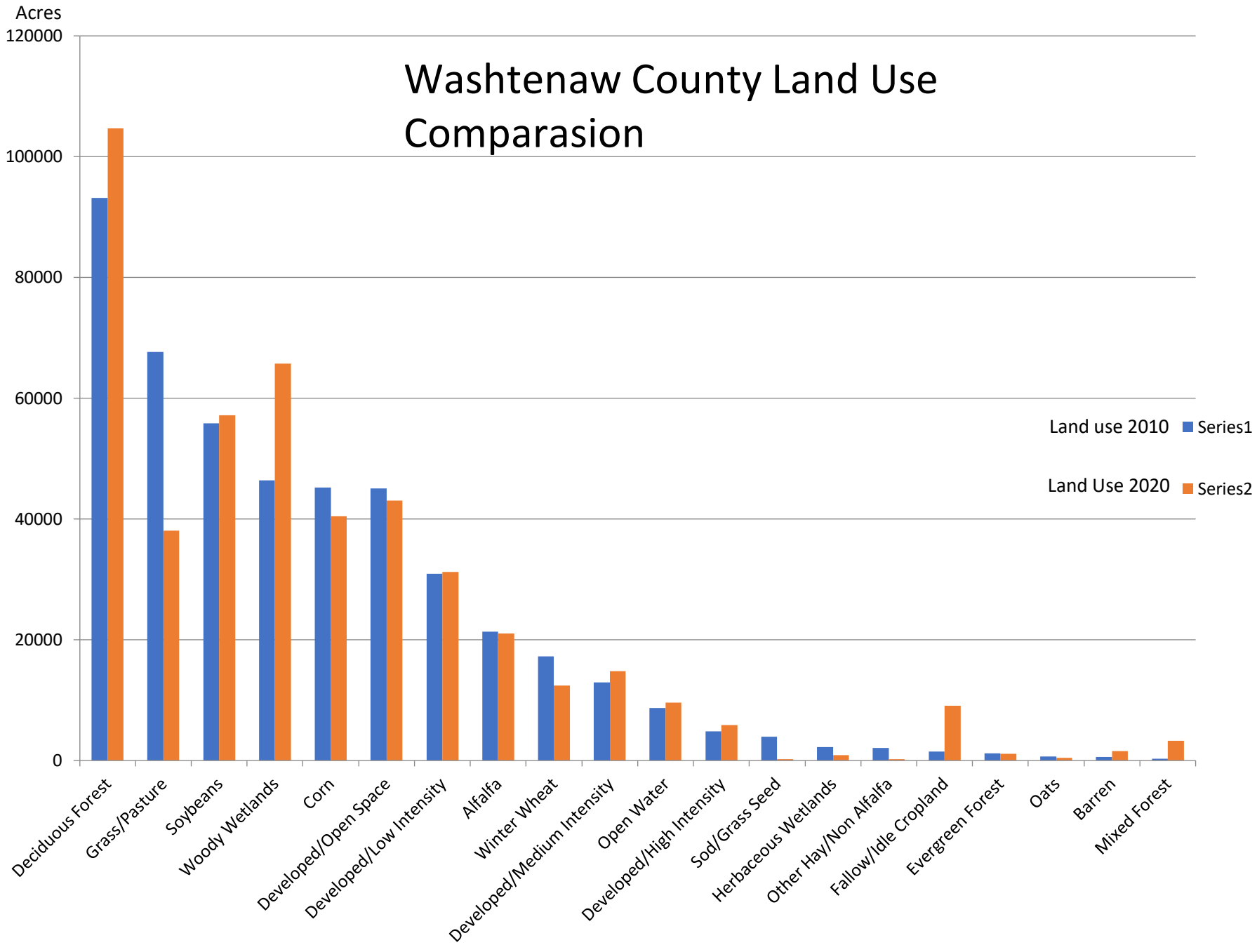
Crop Changes in Washtenaw County, MI over the past 10 years

2010

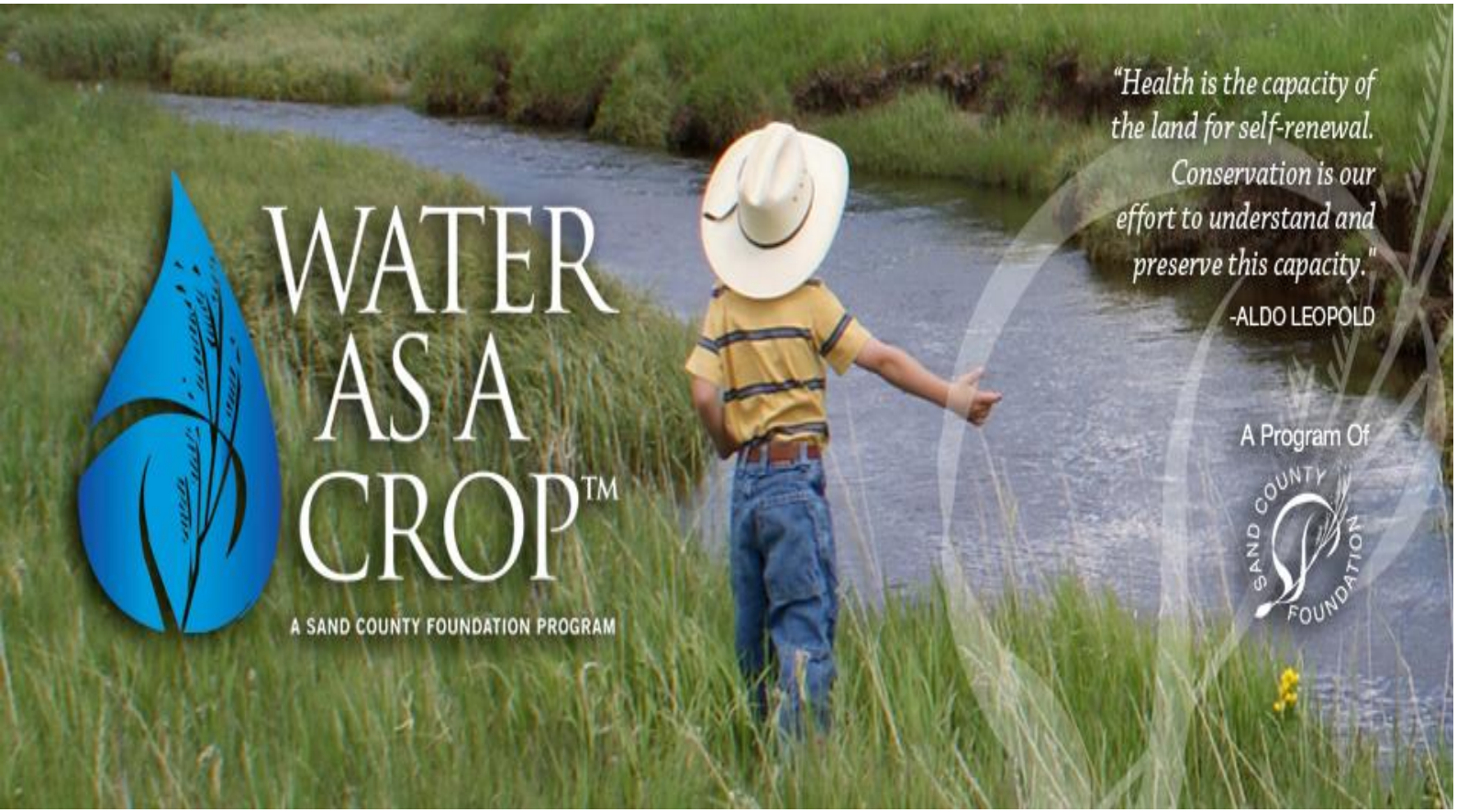


2020




Acres
120000
100000
80000
60000
40000
20000
0
Washtenaw County Land Use Comparasion
Land use 2010
Series1
Land Use 2020
Series2
Deciduous Forest
Grass/Pasture
Soybeans
Woody Wetlands
Corn
Developed/Open Space
Developed/Low Intensity
Alfalfa
Winter Wheat
Developed/Medium Intensity
Open Water
Developed/High Intensity
Sod/Grass Seed
Herbaceous Wetlands
Other Hay/Non Alfalfa
Fallow/Idle Cropland
Evergreen Forest
Oats
Barren
Mixed Forest

Docking Water with Ag



DUPONT PIONEER

MillerCoors

Upstream Flashing
Fresh water source
Water credit offsets
Water trading

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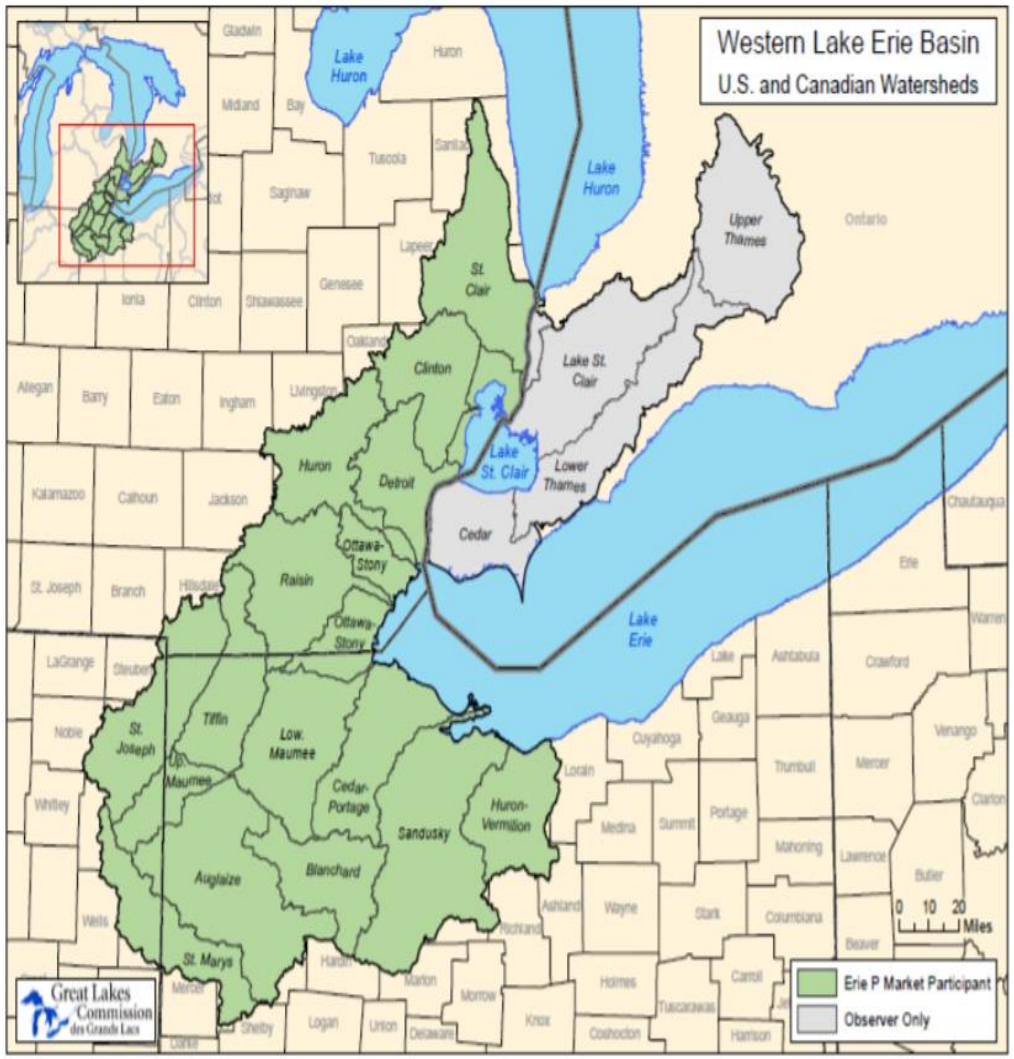
Fresh Water

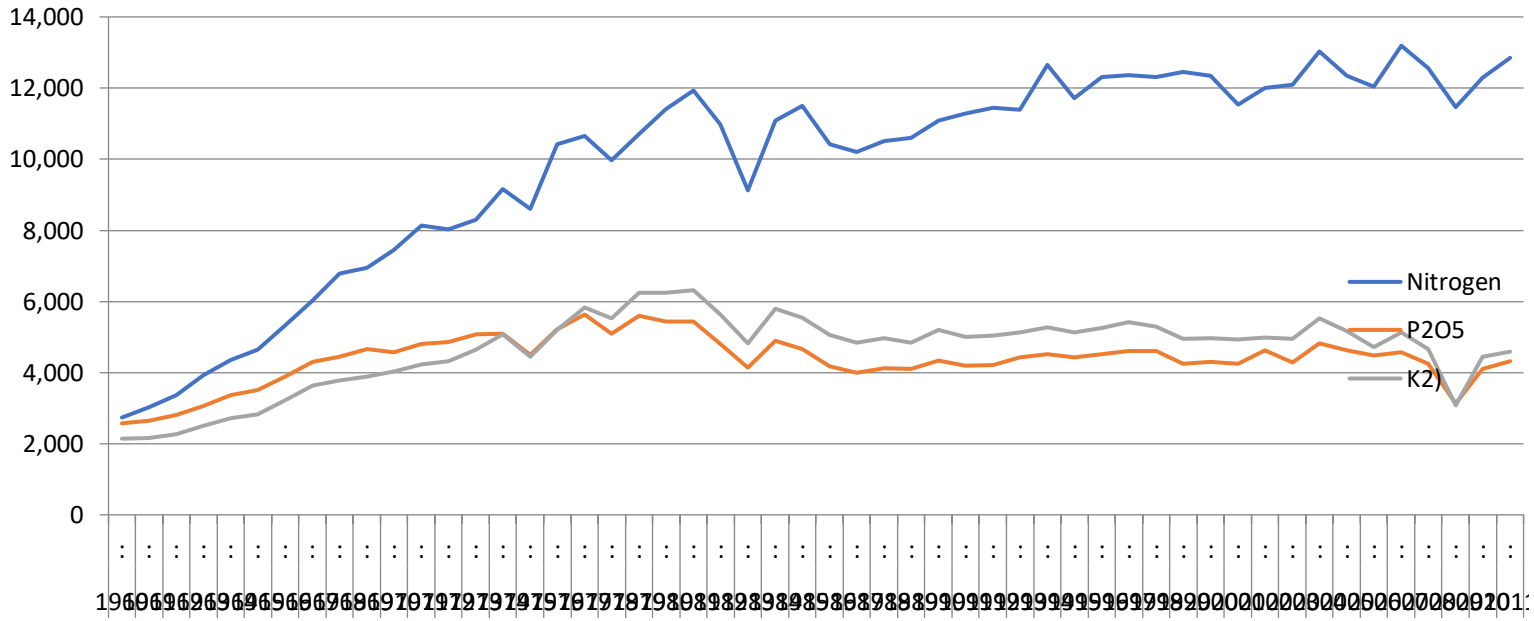
Huron River Watershed



Lake Erie Watershed

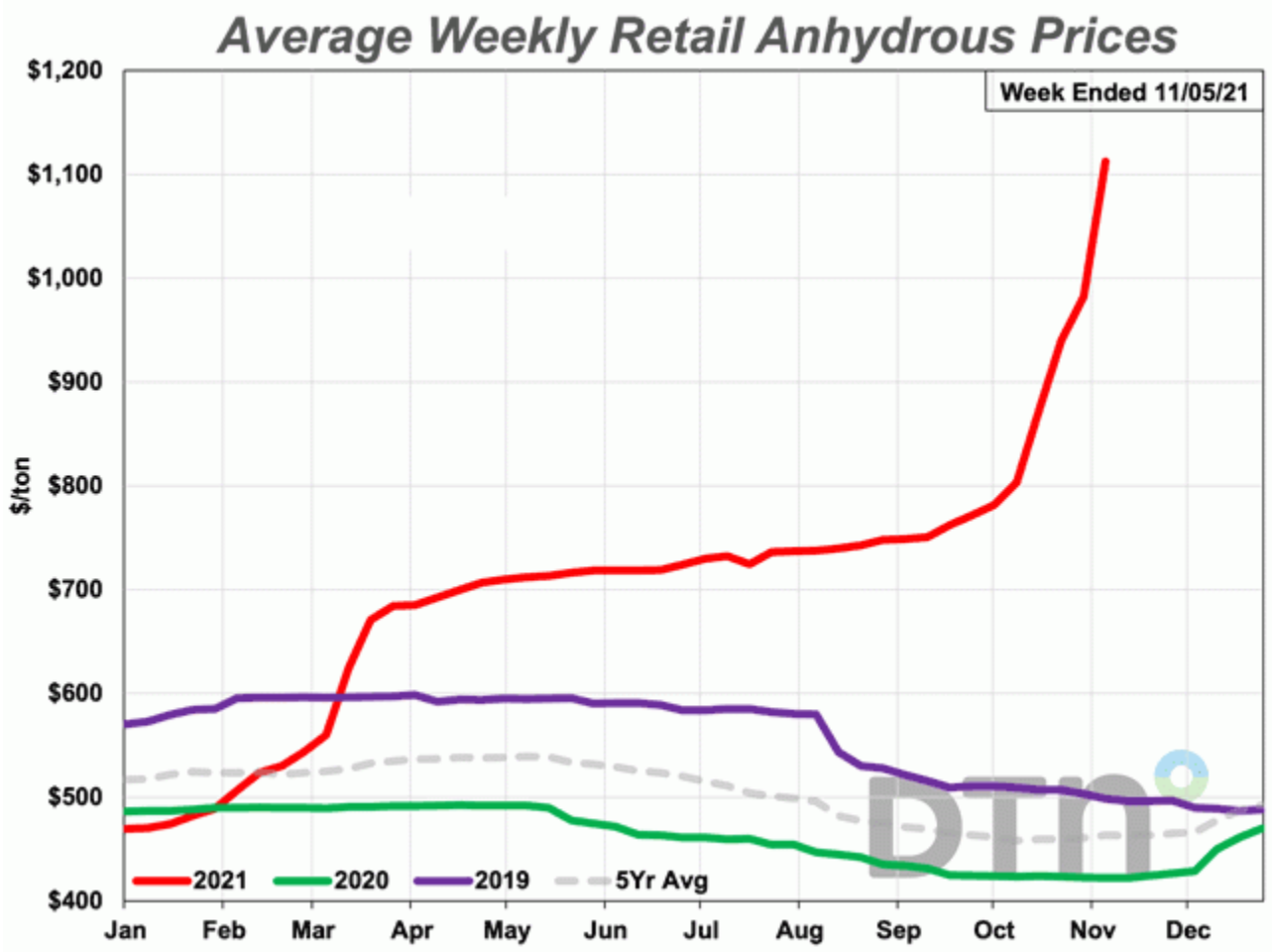
Phosphorous Recycling?

Sustainable solutions: Compost, PSB's



Nitrogen @ $16.8 B
Phosphorous @ $4.16 B
Potash @ $3.8 B

Current Nitrogen Prices



Grow a healthy business while improving water quality

Whole Farms for Clean Water

Get paid to reduce phosphorus runoff into the Huron River and Lake Erie with sustainable and profitable long-term conservation approaches that benefit your whole farm.

Work with our farm consultants to explore flexible and cost-effective conservation techniques. Your farm and field data combined with our watershed-level nutrient and economic modeling will predict measurable reductions in phosphorus loss. A Whole Farm Plan will outline a strategy specific to your farm to maximize your payment, meet your business goals and protect water quality. You choose which techniques are best for you and get paid if and when you implement them.

The Headlines

Dissolved phosphorus from agricultural runoff is the primary driver of Lake Erie's harmful algae outbreaks, and a recent report from the USDA-NRCS shows that 84% of phosphorus applied to agricultural land in the Lake Erie Basin is from commercial fertilizers, and 16% is from manure

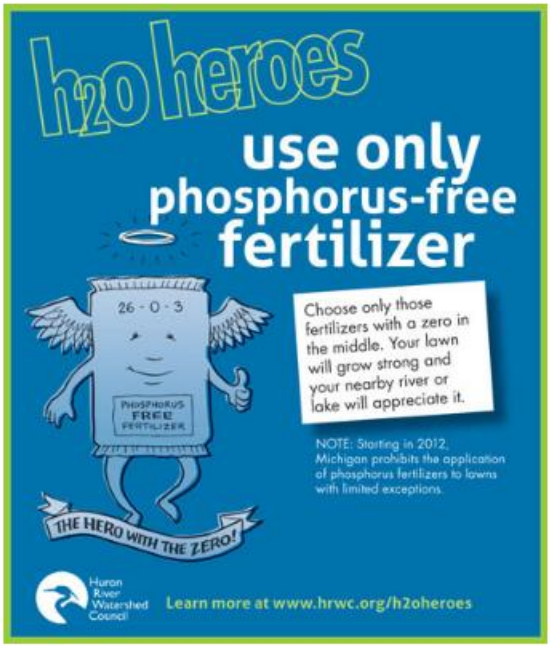
The Reality

Significant reduction in soil erosion in the past 10 years
Variable rate application reduces total phos applied
Technology has treated farming well
Farmer awareness of environmental issues are high
Crop rotations have been expanded
Moldboard plowing is a practice of the past.
Legacy Phosphorous will be around for a long time
Very active Farmland Preservation in Washtenaw County

Phosphorous Reduction

Huron River Watershed Council

REDUCE THE UNNECESSARY APPLICATION OF PHOSPHORUS TO LAWNS, AND REDUCE POLLUTION IN THE RIVER!



Phosphorus is naturally abundant in the soils of southeast Michigan. Water runoff from fertilized residential lawns is the primary source of phosphorus contaminants entering the Huron River. During normal lawn watering or natural rain storms, unnecessary phosphorus washes into the storm drains. These empty into local streams and the Huron River, without filters or treatment. If you own waterfront property, it can wash directly into the adjacent waterbody directly or is carried by eroding soil.

Phosphorus contributes to excessive aquatic plant growth, nuisance algal blooms and decreased oxygen levels in our freshwater lakes, rivers and streams.

Starting in January 2012 a new Michigan Law, Public Act 299 of 2010, took effect. It prohibits

Phosphorous Reduction

Focus on Adaptive Management

Just as there's no "one size fits all" solution, the options for reducing nutrient pollution can change over time. Active monitoring and interpretation of the current conditions on farmlands is crucial to managing nutrient applications and keeping nutrient pollution out of waterways.

Follow the "4Rs" for nutrient stewardship

The 4Rs promote best management practices designed to ensure that the Right fertilizers and manures are applied at the Right rate, at the Right time, and in the Right place. These practices can include avoiding fertilizer and manure application to frozen fields; injecting fertilizer beneath the surface of the soil; and testing soils to know how much fertilizer will be needed for healthy crops.

Fertilizing crops as needed as oppose to "building fertility".


Although corn or soybeans could not be planted on 1.6 million acres of Ohio farmland in 2019 - little to no fertilizer was applied to those fields, the amount of phosphorus entering Lake Erie still was high. (NOAA Great Lakes Environmental Research Laboratory)

"Phosphorus was already in fields, ditches, rivers, and tributaries, and it just moved downstream,"

Greg LaBarge, Ohio State University Extension field specialist

REPORT NUMBER
21-099-0438

COMPLETED DATE
Apr 15, 2021

ACCOUNT
43090

RECEIVED DATE
Apr 9, 2021

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TODAY'S DATE
Apr 15, 2021

IDENTIFICATION
HRWC

Solutions in the Land LLC
Ronald Doetch
20506 Beaverton Rd
Poplar Grove IL 61065

SOIL ANALYSIS REPORT

NEUTRAL AMMONIUM ACETATE (EXCHANGEABLE)

INFO SHEET: 134464

LAB NUMBER *377*	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I.	PHOSPHORUS			POTASSIUM	MAGNESIUM	CALCIUM	SODIUM	pH		CATION EXCHANGE CAPACITY CEC	PERCENT BASE SATURATION (COMPUTED)				
			P_1 (WEAK BRAY) 1:7	P_2 (STRONG BRAY) 1:7	OLSEN BICARBONATE P	K	Mg	Ca	Na	SOIL pH 1:1	BUFFER INDEX		% K	% Mg	% Ca	% H	% Na
		percent RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE	ppm RATE			meq/100g					
77704	Good Farm	3.5 M	59 VH	83 VH		160 H	276 VH	1736 H	10	6.3	6.8	12.7	3.2	18.1	68.3	10.1	0.3
77705	Poor Farm	1.8 L	6 VL	12 L		66 L	210 VH	1319 H	13	7.0		8.6	2.0	20.3	77.0	0.0	0.7

LAB NUMBER *377*	NITRATE-N (FIA) SURFACE ppm	SURFACE lbs/A	SURFACE depth (in)	SUBSOIL 1 ppm	SUBSOIL 1 lbs/A	SUBSOIL 1 depth (in)	SUBSOIL 2 ppm	SUBSOIL 2 lbs/A	SUBSOIL 2 depth (in)	Total lbs/A	SULFUR S ICAP ppm RATE	ZINC Zn DTPA ppm RATE	MANGANESE Mn DTPA ppm RATE	IRON Fe DTPA ppm RATE	COPPER Cu DTPA ppm RATE	BORON B SORB. DTPA ppm RATE	EXCESS LIME RATE	SOLUBLE SALTS 1:1 mmhos/cm RATE
77704	9	16	0-6							16	7 L	2.8 M	12 M	64 VH	1.8 H	0.4 VL	L	0.2 L
77705	9	16	0-6							16	6 VL	0.6 L	6 L	30 VH	0.7 L	0.3 VL	L	0.1 L

REV. 10/17

The above analytical results apply only to the sample(s) submitted. Samples are retained a maximum of 30 days.

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SOIL HEALTH ASSESSMENT

ANALYTICAL LABORATORY FINDINGS

SAMPLE IDENTIFICATION: Good Farm
LABORATORY NUMBER: 37777704

ANALYTE	UNITS	RESULTS	LOW	MEDIUM	OPTIMUM	VERY HIGH
H3A EXTRACTION						
ORTHOPHOSPHATE-P	ppm	19.8				
PHOSPHORUS	ppm	25				
POTASSIUM	ppm	60				
MAGNESIUM	ppm	97				
CALCIUM	ppm	441				
SODIUM	ppm	6				
IRON	ppm	52				
ALUMINUM	ppm	95				
WATER SOLUBLE						
NITRATE-N	ppm	8				
AMMONIACAL-N	ppm	1.3				
ORTHOPHOSPHATE-P	ppm	4.02				
CARBON	ppm	220.9				
TOTAL NITROGEN	ppm	19.6				
1 DAY CO_2C BURST		139.00				
ORGANIC CARBON	ppm	220.9				
ORGANIC NITROGEN	ppm	10.3				
ORGANIC C/N RATIO		21.5				

ADDITIONAL NITROGEN CREDIT IDENTIFIED VIA HANEY TEST: 23

NITROGEN RECOMMENDATIONS MAY INCLUDE ADDITIONAL NITROGEN CREDITS BASED ON PREVIOUS CROPS AND NITROGEN MINERALIZATION RATES.

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SOIL HEALTH CALCULATION

17.1

0 — 25

The **H3A Soil Extractant** was developed by Haney*. This extract is designed to mimic organic acids produced by living plant root systems. These organic acids increase nutrient availability in the root zone.

The **Water Soluble Extract** provides a snapshot of nutrients that are immediately available to the plants.

The **CO_2 Burst** test is very good indicator of soil health. This test measures the amount of CO_2 naturally released from the soil due to the activity of the soil microbes through microbial respiration. This test is very dependent on the amount of carbon that is available to the soil microbes and the form that the carbon is in. As the available carbon increases in your soil the Microbial respiration will increase.

Organic Carbon is the available total water extractable organic carbon from your soil. This pool of carbon is roughly 80 times smaller than the Soil Organic Matter. The organic carbon pool reflects the energy/food source that is driving the soil microbes.

The **Organic Nitrogen** pool is replenished by fresh plant residues, manure, composts, and dying soil microbes.

The Organic C/N ratio is a critical component of the nutrient cycle. A soil C/N ratio above 20 generally indicates that Nitrogen will be tied up and not available to plants. The ideal range for the Organic C/N ratio will be from 8:1 to 15:1.

The **Soil Health Calculation** uses the CO_2 Burst, Organic Carbon, Organic Nitrogen, and the C/N ratio to generate the soil health number. This calculation looks at the balance of soil carbon and nitrogen and their relationship to microbial activity. This number represents the overall health of your system. Soil values will range from 0 to 25. A soil with a value below 7 would be considered low. You want to see this number increase as you make changes and adjustments. Keeping track of this number will allow you to gauge the effects of your management practices over time.

*Modifications to the New Soil Extractant H3A-1: A Multinutrient Extractant
R.L. Haney (a); E.B. Haney (b); L.R. Hossner (c); J.G. Arnold (a)

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IDENTIFICATION
FLORIDA SWEET
ARCADIA
VERNIA942

SOIL HEALTH ASSESSMENT

ANALYTICAL LABORATORY FINDINGS

SAMPLE IDENTIFICATION	F. Sweet 1
LABORATORY NUMBER	38672855

ANALYTE	UNITS	RESULTS	LOW / MEDIUM / OPTIMUM / VERY HIGH
H3A EXTRACTION			
ORTHOPHOSPHATE-P	ppm	36.9	
PHOSPHORUS	ppm	46	
POTASSIUM	ppm	13	
MAGNESIUM	ppm	39	
CALCIUM	ppm	146	
SODIUM	ppm	6	
IRON	ppm	24	
ALUMINUM	ppm	43	
WATER SOLUBLE			
NITRATE-N	ppm	3	
AMMONIACAL-N	ppm	1.1	
ORTHOPHOSPHATE-P	ppm	3.39	
CARBON	ppm	65.2	
TOTAL NITROGEN	ppm	8.1	
1 DAY CO_2C BURST		31.00	
ORGANIC CARBON	ppm	65.2	
ORGANIC NITROGEN	ppm	4.0	
ORGANIC C/N RATIO		16.3	

ADDITIONAL NITROGEN CREDIT IDENTIFIED VIA HANEY TEST: **10**

NITROGEN RECOMMENDATIONS MAY INCLUDE ADDITIONAL NITROGEN CREDITS BASED ON PREVIOUS CROPS AND NITROGEN MINERALIZATION RATES.

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SOIL HEALTH CALCULATION

4.2

0 — 25

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The **Water Soluble Extract** provides a snapshot of nutrients that are immediately available to the plants.

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The **Organic C/N ratio** is a critical component of the nutrient cycle. A soil C/N ratio above 20 generally indicates that Nitrogen will be tied up and not available to plants. The ideal range for the Organic C/N ratio will be from 8:1 to 15:1.

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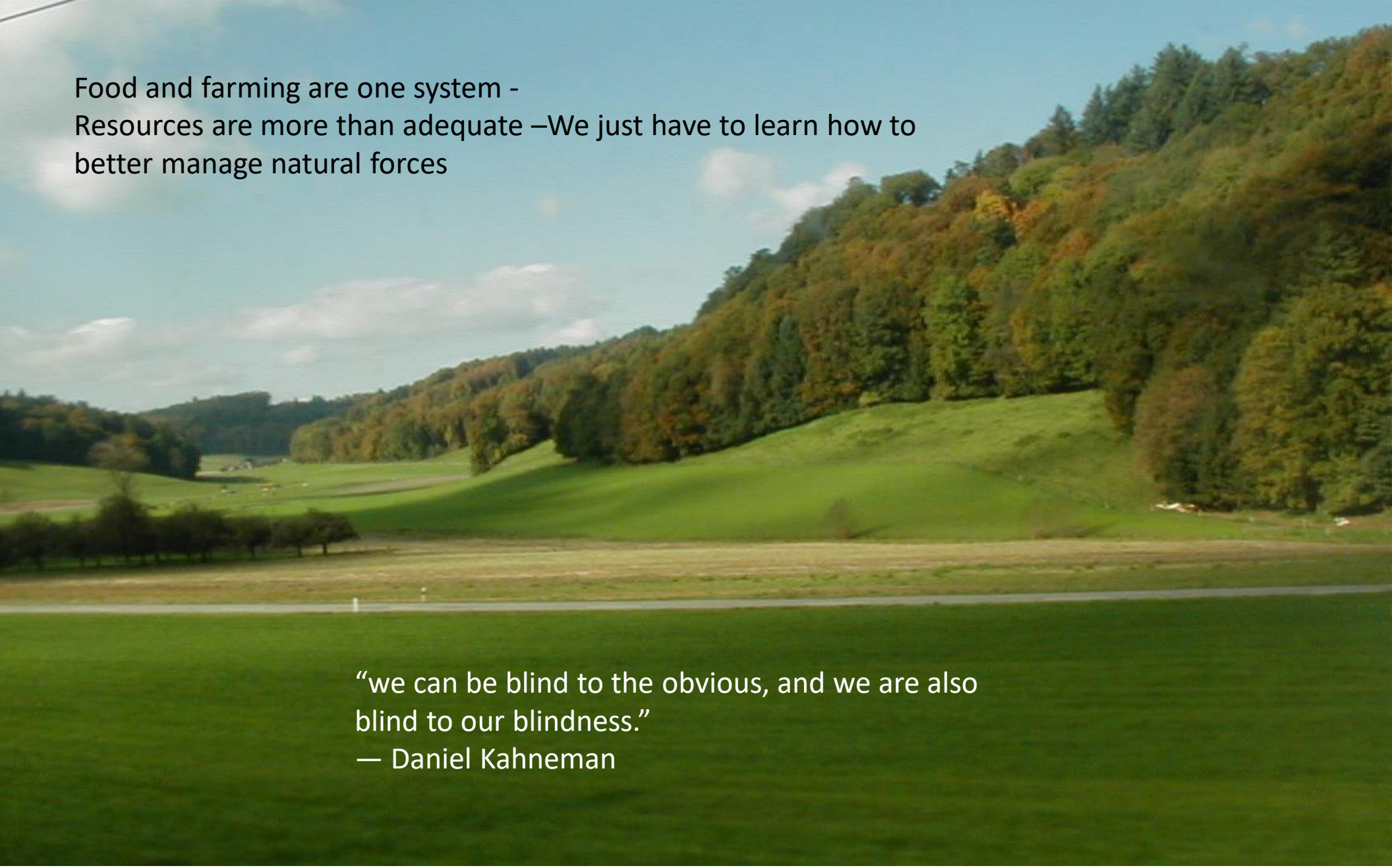
R.L. Haney (a); E.B. Haney (b); L.R. Hossner (c); J.G. Arnold (a)

Implemented Practices for Reducing Phos runoff

Cover Crops – Move the needle on soil organic matter – seed firmers
Extended crop rotation – small grains, hay, seed
Filter strips
Waterways
Strip till
Strip till with deep band placement of phosphorous
No broadcast phosphorous
Reduced tillage
No tillage
Improved soil health



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