BIG HOLLOW LAKE WATERSHED MANAGEMENT PLAN

Public Meeting

Big Hollow – Hickory Shelter House
30 June 2021

Introductions: Project Partners

PROJECT SPONSOR AND PARTNERS

NRCS
NATURAL RESOURCES CONSERVATION SERVICE

IOWA DEPARTMENT OF AGRICULTURE & LAND STEWARDSHIP

DES MOINES COUNTY SOIL & WATER CONSERVATION DISTRICT

DES MOINES COUNTY CONSERVATION

DNR
IOWA DEPARTMENT OF NATURAL RESOURCES

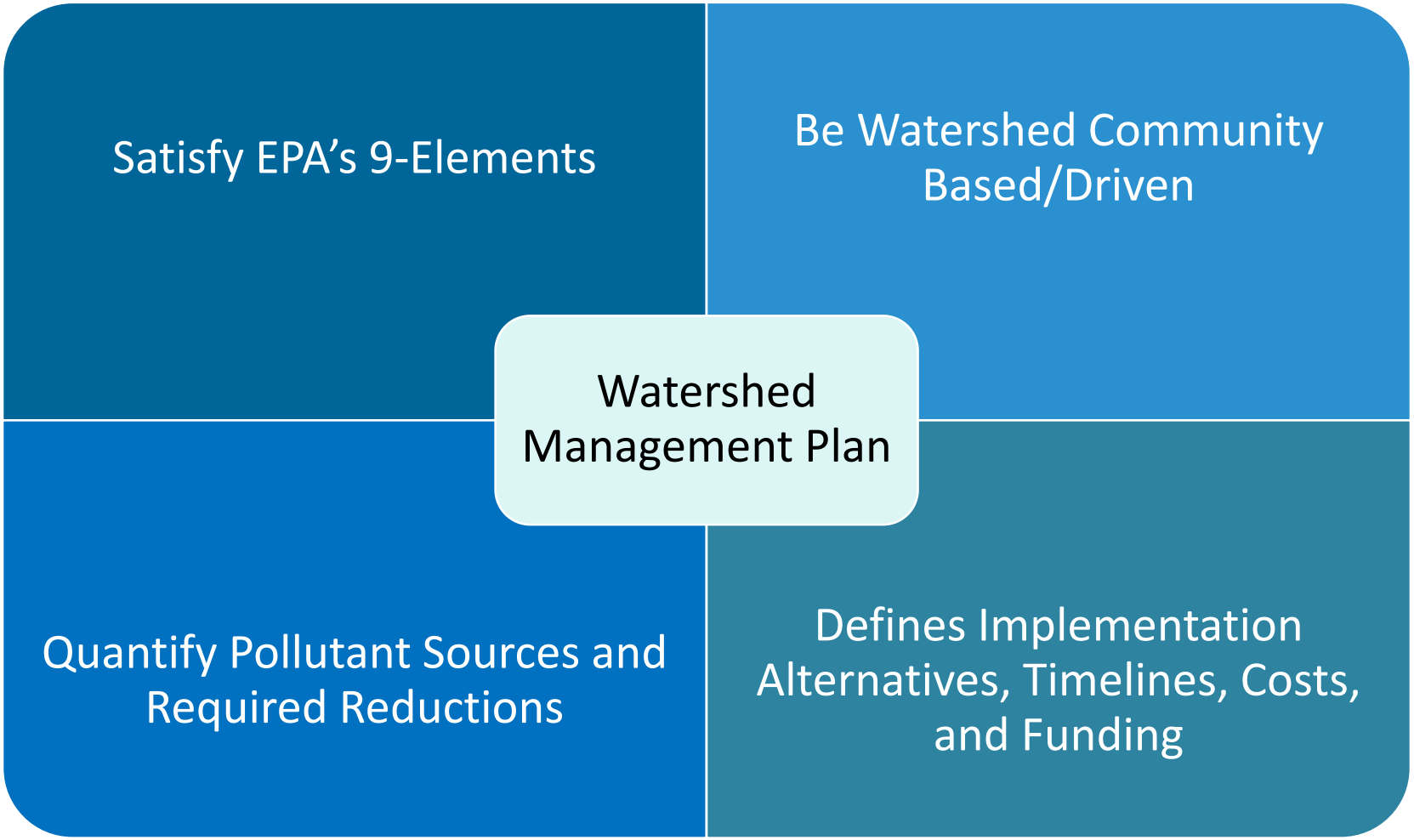
Meeting Agenda

- Introductions
- Lake / Project History (Chris Lee)
- IDALS/NRCS/SWCD (Tyler Shipley)
- DNR Fisheries (Chad Dolan)
- Watershed Plan (FYRA Engineering)
- Q&A
- Informal discussion(s)

Watershed Plan Agenda

- Purpose and Goals
- Watershed/Lake Characteristics
- Pollutant Source Assessment
- Improvement Alternatives/Strategies
- Public/Stakeholder Feedback
- Next Steps

Purpose/Goals



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Watershed Plan Agenda

- Purpose and Goals
- **Watershed/Lake Characteristics**
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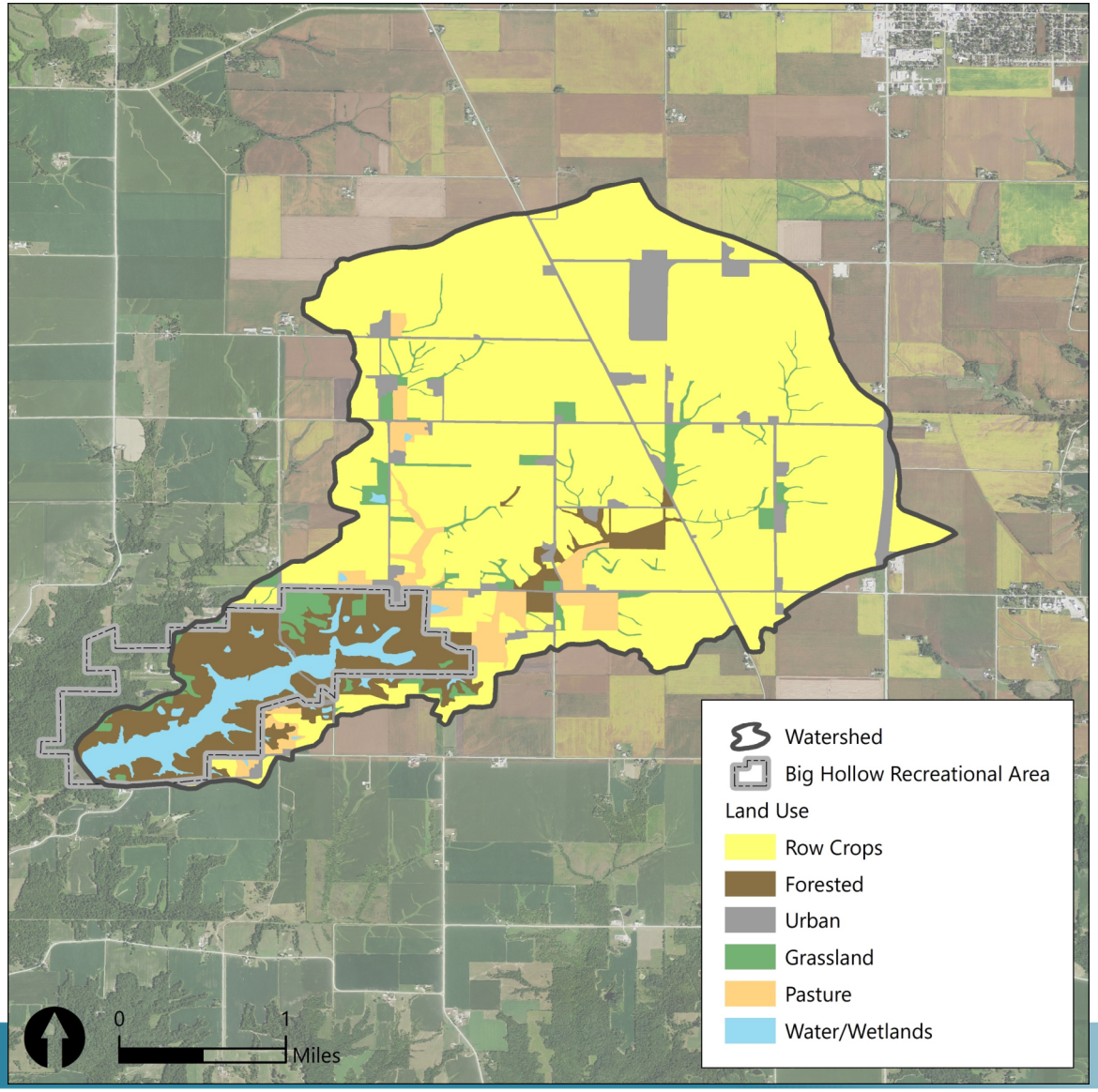
Watershed Characteristics



Land Use	Area (acres)	Percentage (%)
Row Crop	3,193	69%
Forested	532	12%
Urban	323	7%
Grassland	187	4%
Pasture	183	4%
Water/Wetland	183	4%
Total	**4,604**	**100%**

Watershed = 4,604 acres

Lake = 154 acres

Ratio = 30:1

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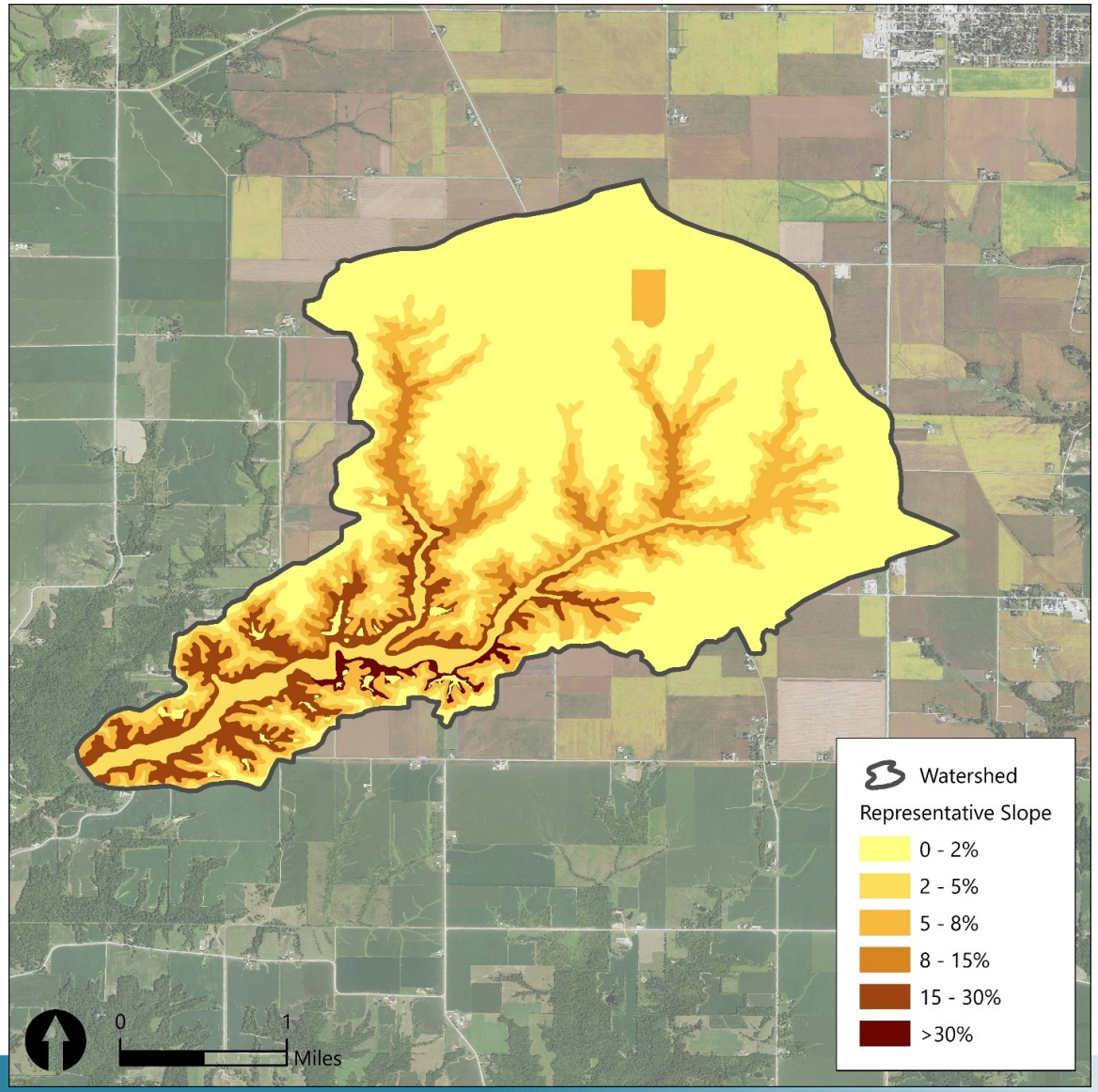
Topography / Terrain



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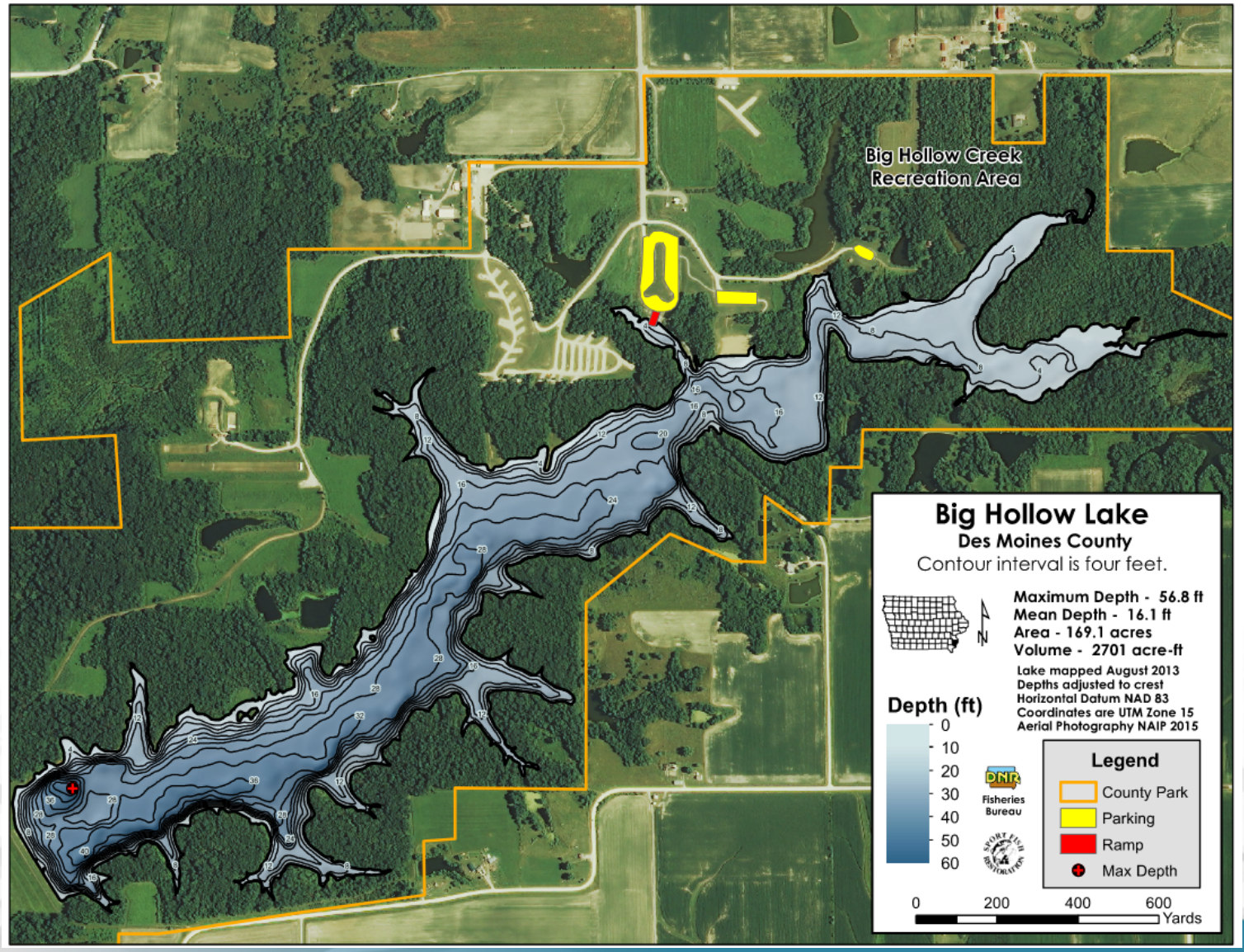
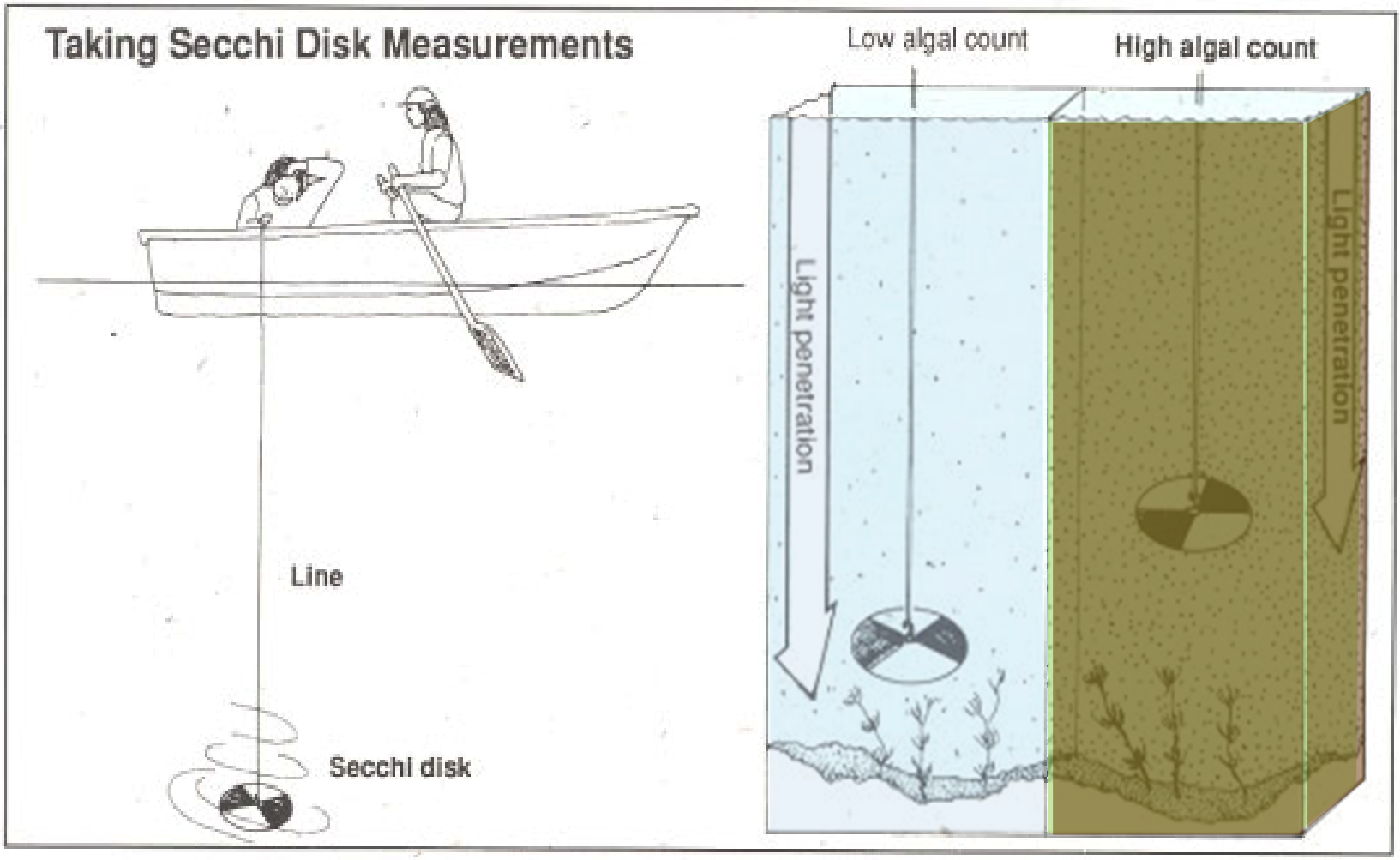
Existing Bathymetry (Depth)



Water Quality ~ Water Clarity



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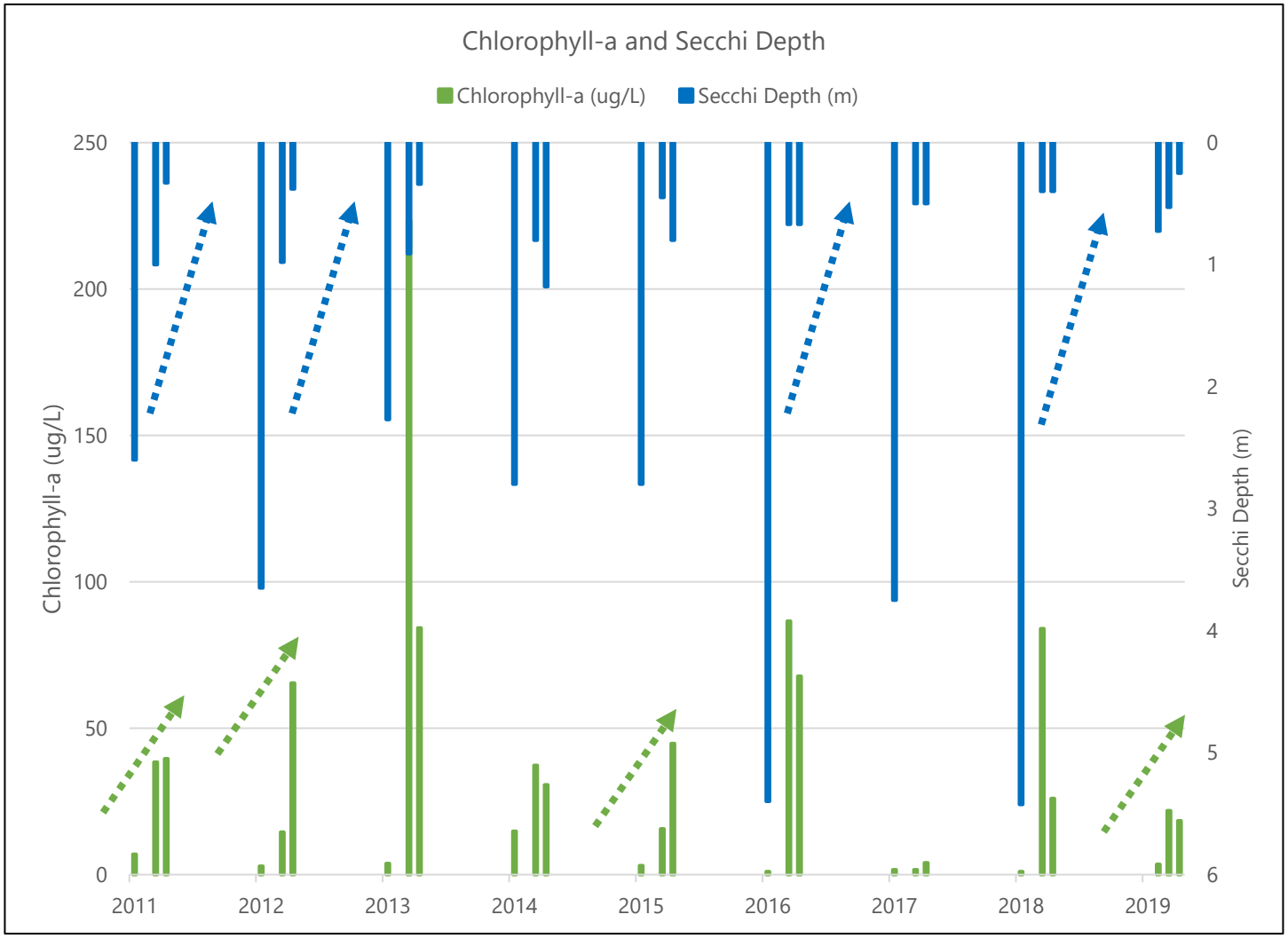

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Official “Impairment” Status

Impairment	Designated Uses
Algal growth/ Chlorophyll a	Primary Contact Recreation
pH	Primary Contact Recreation Aquatic Life

Trophic State = Productivity

“Too Much of a Good Thing”

High TSI Values = Poor WQ

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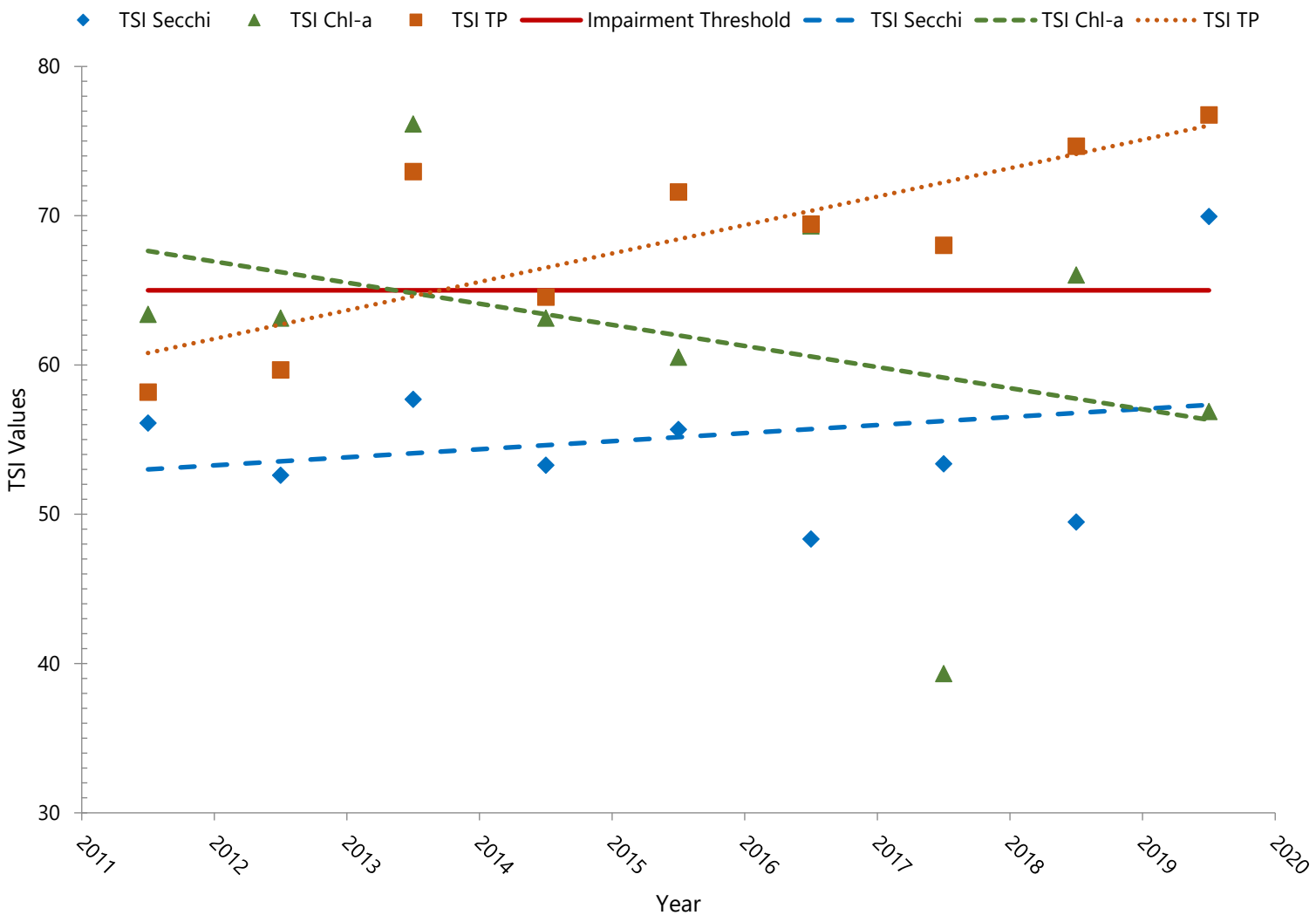
Water Quality Trends



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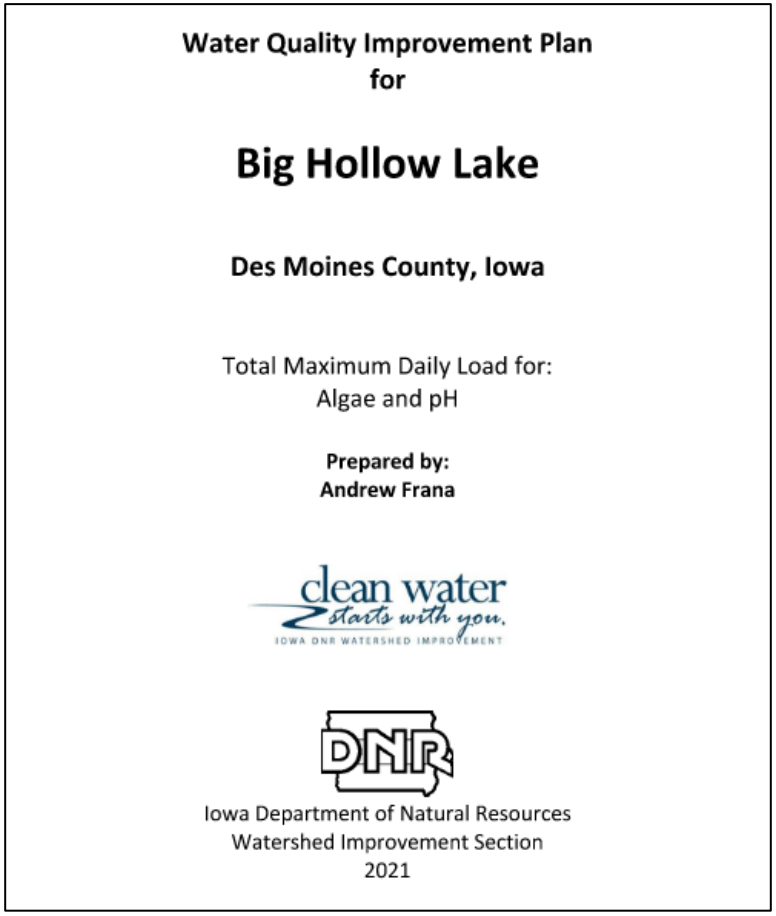
Total Maximum Daily Load

IOWA DNR / US EPA

- Determines "cause"
  - Total Phosphorus (TP)
- Estimates loads
- Develops "target"

TMDL Summary	
Existing TP Load:	6759.9 lbs/yr
Target TP Load:	2628.5 lbs/yr
Required Reduction	**4,391 lbs/yr (61%)**



Water Quality Improvement Plan
for

Big Hollow Lake

Des Moines County, Iowa

Total Maximum Daily Load for:
Algae and pH

Prepared by:
Andrew Frana

clean water starts with you.
IOWA DNR WATERSHED IMPROVEMENT

DNR

Iowa Department of Natural Resources
Watershed Improvement Section
2021

https://www.iowadnr.gov/Portals/idnr/uploads/water/watershed/tmdl/BHL_WQIP_final.pdf

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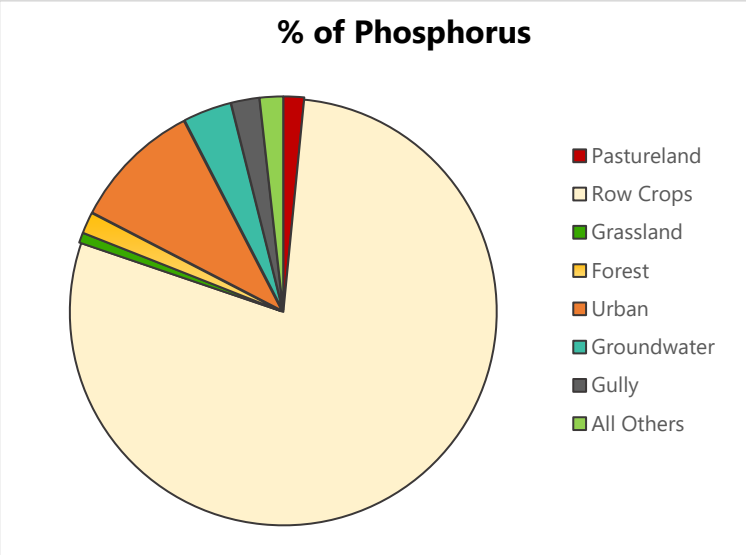
Phosphorus Load Allocation



Source	Descriptions	TP Load (lb/yr)	Percent (%)
Pastureland	Seasonally grazed grasslands	105.3	2%
Row Crops	Sheet and rill erosion from corn and soybeans dominated agriculture	5,308.1	79%
Grassland	Ungrazed grassland, alfalfa/hay	51.7	1%
Forest	Forested park grounds surrounding lake	108.2	2%
Urban	Urban areas, roads, and farmsteads	663.0	10%
Groundwater	Agricultural tile discharge, natural groundwater flow	248.1	4%
Streambank	Streambank erosion into channel	11.6	0%
Gully	Gully formation and incision	144.3	2%
All Others	Wildlife, atmospheric deposition, septics	119.6	2%
Total		**6,759.9**	**100%**

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Watershed Plan Agenda

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- **Improvement Alternatives/Strategies**
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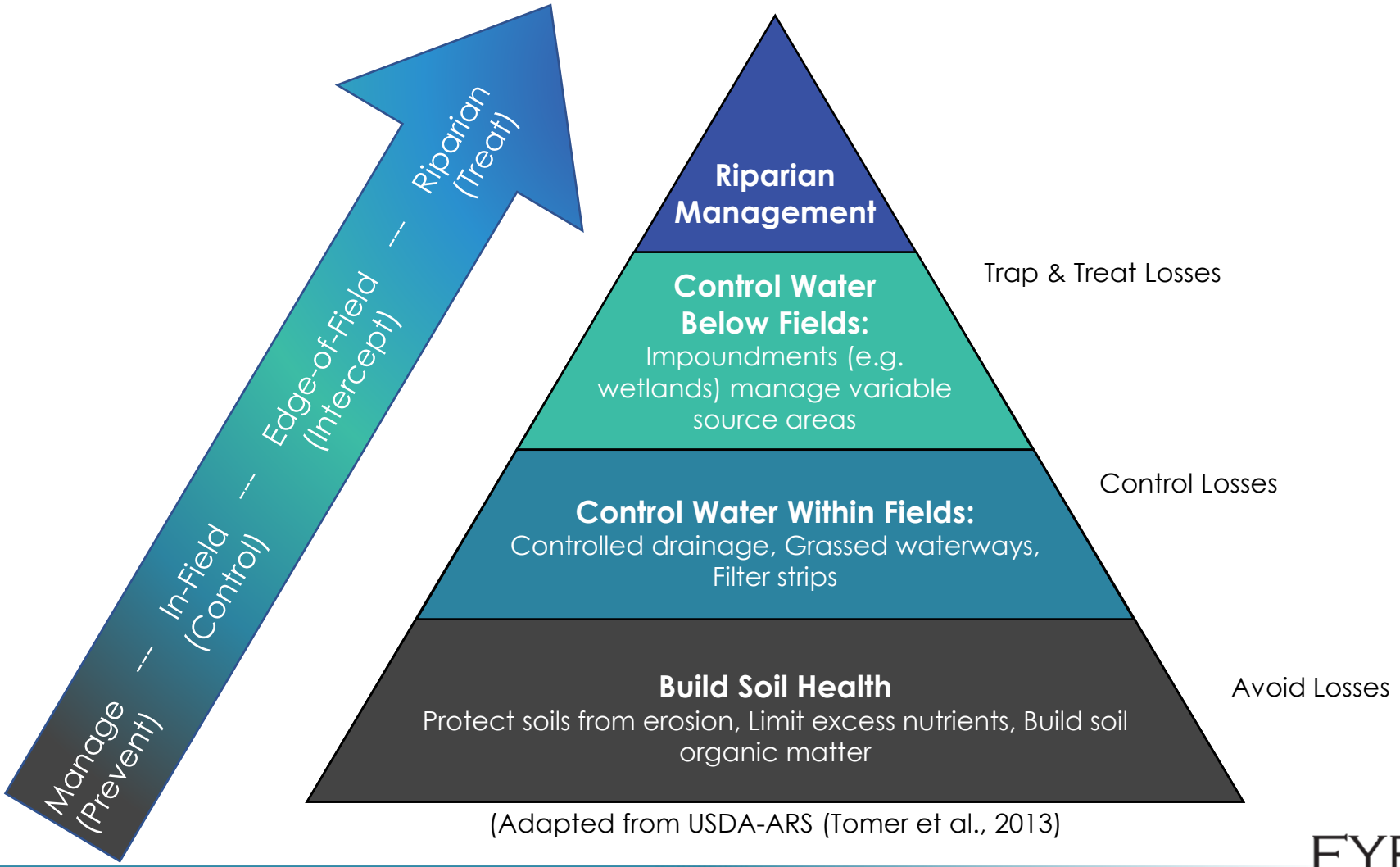
Watershed Improvement

CONSERVATION "PYRAMID"



(Adapted from USDA-ARS (Tomer et al., 2013)

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Management Strategies

AG CONSERVATION PRACTICES

Cover Crops

Buffers

Sediment Basins

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Management Strategies

AG CONSERVATION PRACTICES

Terraces

Grassed Waterways

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Management Strategies

AG CONSERVATION PRACTICES

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Implementation Planning/Modeling

SIMULATE LOADS & REDUCTIONS

1

	Upland Pollutant loads (lbs/ac)			
Subbasin	Sediment (lbs/ac)	P (lbs/ac)	N (lbs/ac)	E.coli (MPN/ac)
1	715.05	2.06	10.10	-
2	618.02	1.75	9.36	-
3	1,366.26	1.73	8.54	-
4	923.93	1.34	7.61	-
5	774.45	1.34	7.80	-
6	811.14	0.94	4.87	-
7	270.47	0.41	2.12	-

2

Watershed treatement potential (ac)							
Contoured Buffer Strips	Grassed WW	Nutrient Reduction Wetlands	Ponds	Terraces	WASCOBs	Cover Crops (all available cropland)	Riparian Buffers
14.23	229.17	662.56	523.67	79.47	33.44	523.12	-
11.44	355.73	721.41	257.23	77.18	48.87	640.06	-
27.17	156.48	2.69	166.69	136.88	31.28	389.07	-
43.58	230.78	662.15	364.53	291.19	181.71	907.25	-
7.69	40.68	1,111.59	173.35	107.98	225.54	591.75	-
13.77	-	-	0.26	127.96	-	220.11	-
-	-	-	-	-	-	42.63	-
117.87	1,012.83	3,160.40	1,485.73	820.67	520.84	3,313.99	-

3

Best Management Practice	Removal Efficiency (%)	
	Sediment	Phosphorus
Contoured Buffer Strips	95%	90%
Grassed WW	75%	75%
Nutrient Reduction Wetlands	87%	69%
Ponds (Sediment Control Basin)	75%	85%
Terraces	85%	77%
WASCOBs	80%	85%
Cover Crops	70%	29%
Riparian Buffers/Filter Strips	86%	65%

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Implementation Planning/Modeling

QUANTIFY LOAD REDUCTIONS

4

	Adoption Rates by Practice by Subbasin							
Subbasin	Contoured Buffer Strips	Grassed WW	Nutrient Reduction Wetlands	Ponds	Terraces	WASCOBs	Cover Crops	Riparian Buffers
1	50%	85%	0%	50%	75%	80%	50%	0%
2	50%	85%	0%	50%	75%	80%	50%	0%
3	50%	85%	0%	50%	75%	80%	50%	0%
4	50%	85%	0%	50%	75%	80%	50%	0%
5	50%	85%	0%	50%	75%	80%	50%	0%
6	50%	85%	0%	50%	75%	80%	50%	0%
7	50%	85%	0%	50%	75%	80%	50%	0%

EXAMPLE ONLY!

5

	Acres Treated (ac)						
Subbasins	Contoured Buffer Strips	Grassed WW	Nutrient Reduction Wetlands	Ponds	Terraces	WASCOBs	Cover Crops (all available cropland)
1	7.12	194.79	-	261.84	59.60	26.75	261.56
2	5.72	302.37	-	128.62	57.88	39.10	320.03
3	13.58	133.01	-	83.34	102.66	25.03	194.54
4	21.79	196.16	-	182.26	218.39	145.37	453.63
5	3.84	34.58	-	86.67	80.99	180.43	295.88
6	6.88	-	-	0.13	95.97	-	110.05
7	-	-	-	-	-	-	21.32
Total	**58.93**	**860.91**	**-**	**742.86**	**615.50**	**416.67**	**1,657.00**

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Implementation Planning/Modeling

MEETING LOAD REDUCTION GOALS

6

	Reduction by Practice by Subbasin (lbs)								
Subbasins	Contoured Buffer Strips	Grassed WW	Nutrient Reduction Wetlands	Ponds	Terraces	WASCOBs	Cover Crops	Riparian Buffers	Total Load Removed from ACPF practices
1	13.17	300.42	-	430.74	94.37	46.76	155.98	-	**1,041.44**
2	9.00	396.71	-	180.00	77.97	58.13	162.35	-	**884.17**
3	21.12	172.35	-	115.19	136.58	36.75	97.47	-	**579.47**
4	26.32	197.49	-	195.73	225.73	165.86	176.59	-	**987.73**
5	4.62	34.65	-	92.66	83.33	204.94	114.66	-	**534.87**
6	5.85	-	-	0.10	69.78	-	30.14	-	**105.86**
7	-	-	-	-	-	-	2.54	-	**2.54**
Total	**80.09**	**1,101.63**	**-**	**1,014.42**	**687.76**	**512.45**	**739.73**	**-**	**4,136.08**

Meet TMDL Target

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Implementation Planning/Modeling

DEVELOP COSTS AND TIMELINE

7

Practice	Total Acres Treated	Estimated Payment Rate ($/acre treated)	Estimated Total Project Cost	Estimated TP Reduction (lbs/yr)	Estimated Sediment Reduction (tons/yr)
Contoured Buffer Strips	58.93	$ 40.00	$ 2,357.31	80.09	13.27
Grassed WW	1,012.83	$ 80.00	$ 81,026.60	1,296.03	236.88
Nutrient Reduction Wetlands	-	$ 520.00	$ -	-	-
Ponds	742.86	$ 520.00	$ 386,289.17	1,077.82	57.77
Terraces	615.50	$ 1,222.60	$ 752,510.51	687.76	178.82
WASCOBs	520.84	$ 1,700.00	$ 885,428.58	640.56	87.88
Cover Crops	1,259.41	$ 50.00	$ 62,970.70	555.81	91.68

EXAMPLE ONLY

8

Lay out phased plan (5-year and 20-year) for BMP adoption and WQ goals

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Watershed Plan (Completion)

EPA'S 9 ELEMENTS

☑	a	Identify causes and sources of pollution
☑	b	Estimate load reductions expected
☑	c	Describe management measures and targeted critical areas
☐	d	Estimate technical and financial assistance needed
☐	e	Develop information and education plan component
☐	f	Develop a project schedule
☐	g	Describe interim, measurable milestones
☑	h	Identify indicators to measure progress
☑	i	Develop a monitoring component

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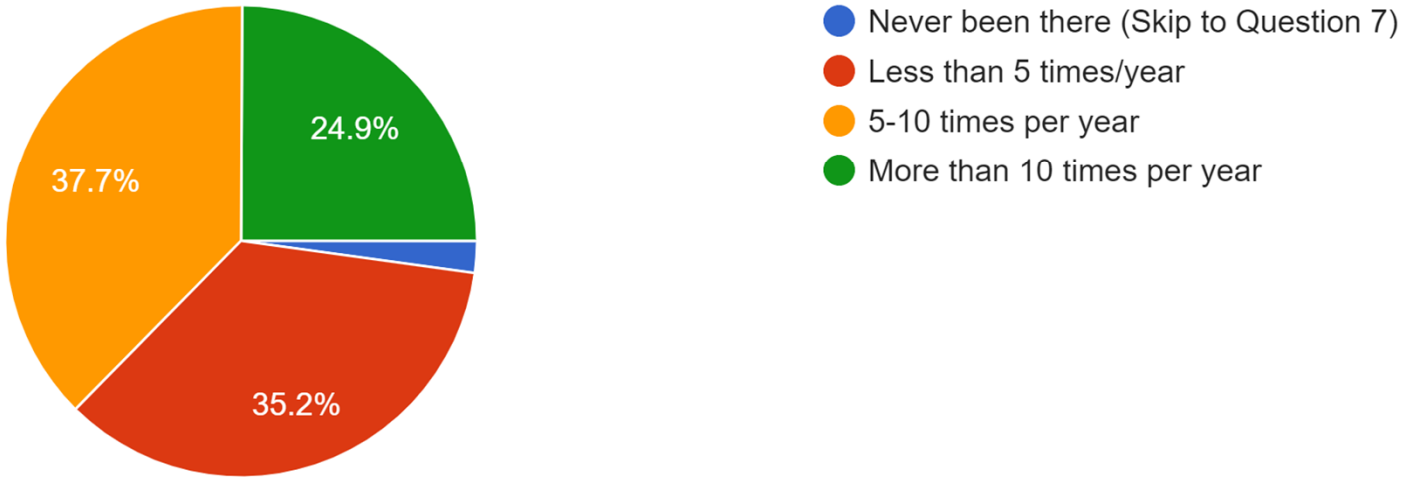
Public/Stakeholder Feedback

SURVEY RESULTS

2. How often do you normally visit Big Hollow Recreation Area annually?

321 responses

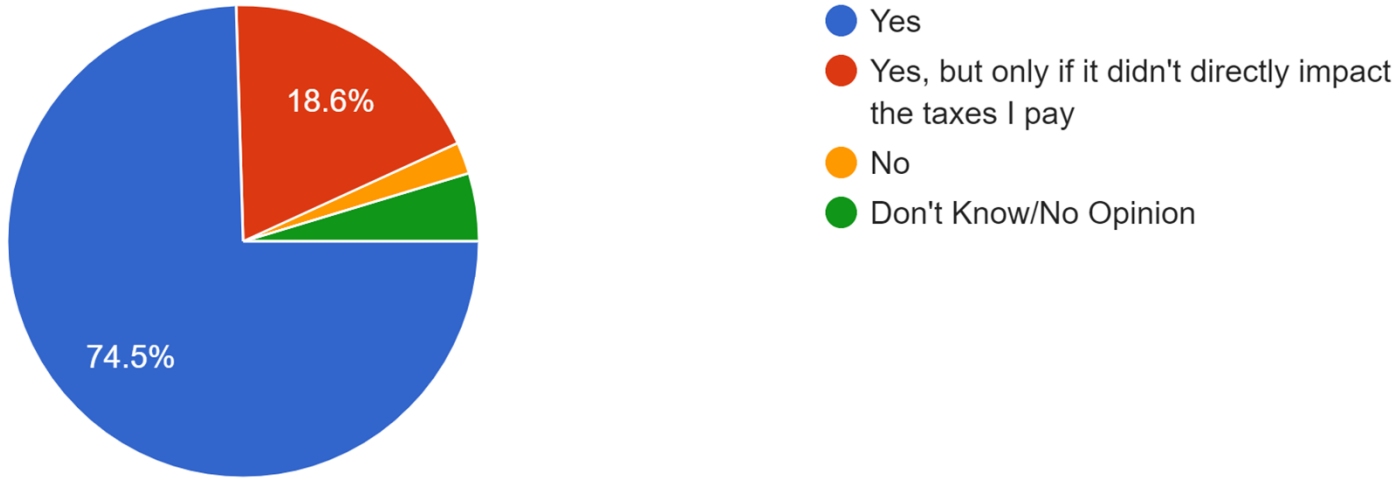


Public/Stakeholder Feedback

SURVEY RESULTS

10. Would you support additional government funding to improve the water quality at Big Hollow Lake?

322 responses



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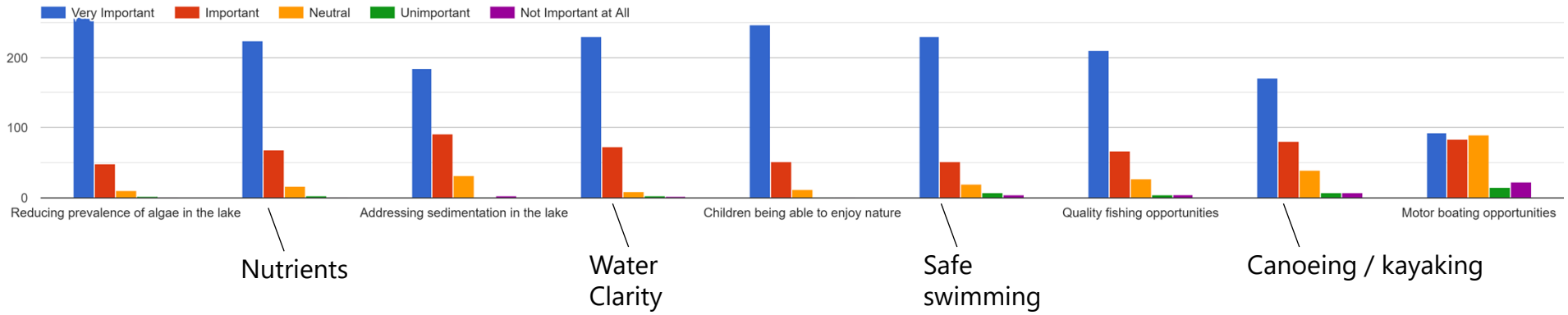
Public/Stakeholder Feedback

SURVEY RESULTS

7. Regarding Big Hollow Recreation Area, please indicate how important the following issues are to you.



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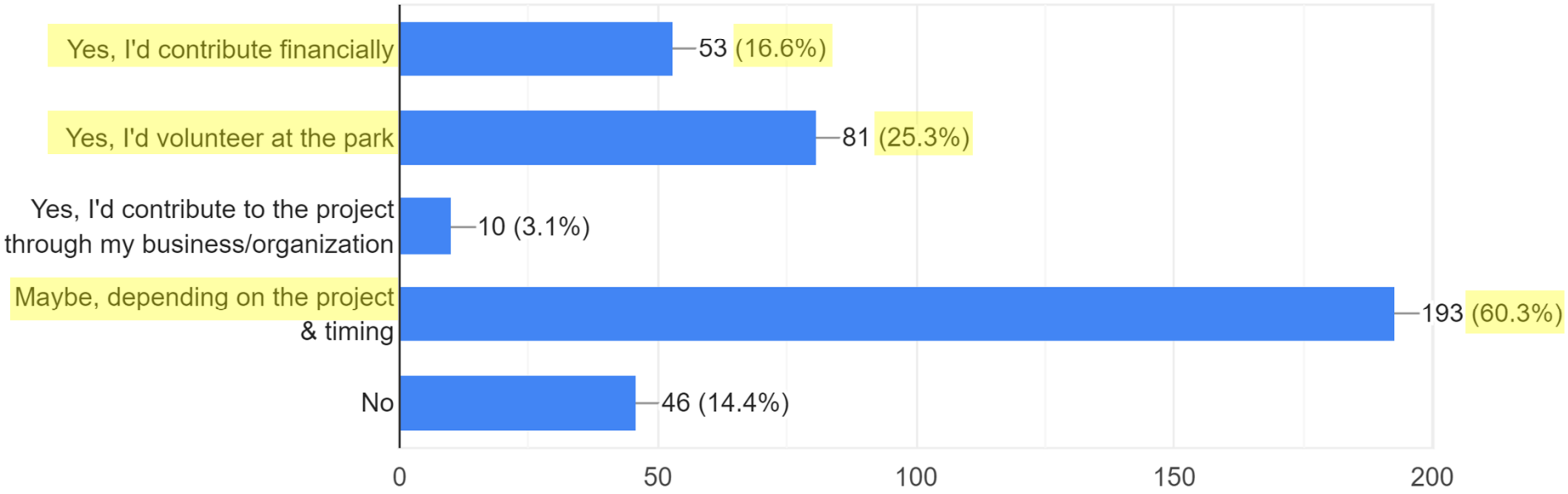
Public/Stakeholder Feedback

SURVEY RESULTS

11. Would you personally contribute either financially or with volunteer time to improve the water quality at Big Hollow Lake? (Check all that apply)

320 responses

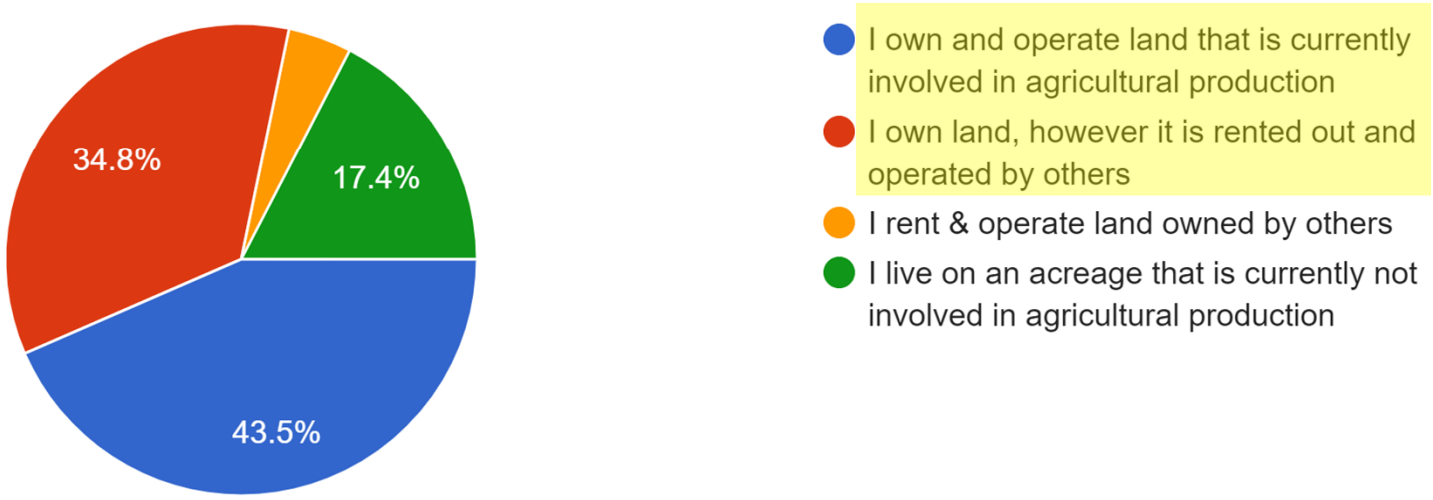


Landowner Feedback

SURVEY RESULTS

1a: To assist us to better understand your point-of-view, values, etc. please indicate which of the following best represents your role within this watershed:

23 responses



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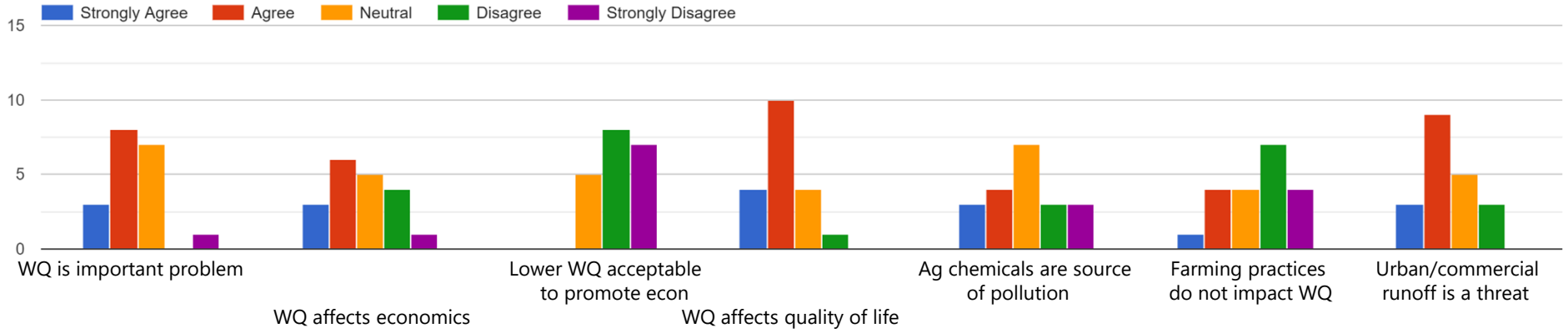
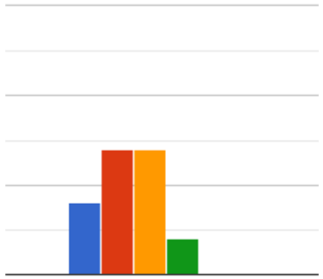
Landowner Feedback

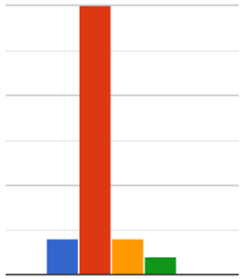
SURVEY RESULTS

3: In order to assist us in better understand the values/opinions of those living/working in the watersheds, please check your level of agreement or disagreement.





I know steps to protect soil and water



It is my personal responsibility to help protect WQ

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Next Steps

Assess	Lake Sediment Sampling • Evaluate potential internal phosphorus loads • Evaluate potential role of gypsum
Finalize Plan	Finalize BMP Adoption Goals Develop Implementation Plan and Schedule
Implement	Secure funding Get practices in the ground

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QUESTIONS & DISCUSSION

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