

Healthy Shorelines Initiative

Upper Tippecanoe River Watershed

LARE Final Report

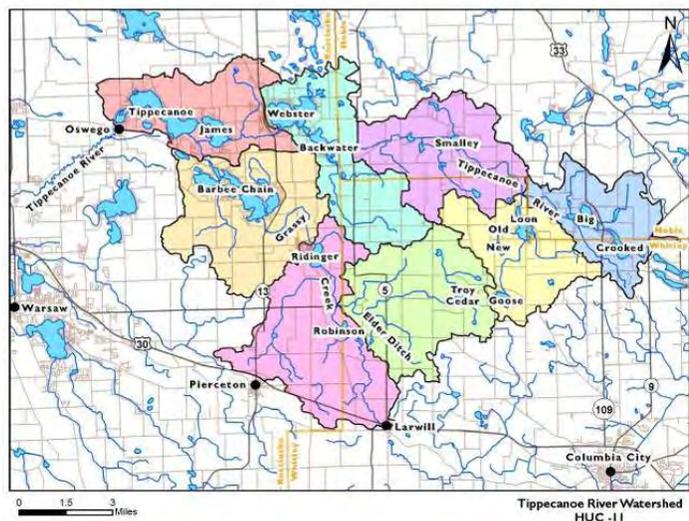


Tippecanoe Watershed Foundation (TWF)
March 31, 2015
Lyn Crighton, Executive Director

"A lake is the landscape's most beautiful and expressive feature. It is earth's eye; looking into which the beholder measures the depth of his own nature." - Henry David Thoreau, Author

The Watershed

The 114 mi² Upper Tippecanoe River watershed (0512010601) is not only the headwaters for the Tippecanoe River, it also contains more than 50 lakes greater than one acre in size. Many streams and ditches, as well as the Tippecanoe River, flow into and through many of these lakes.



Resource Need to be Addressed

The U.S. Environmental Protection Agency's 2010 National Lakes Assessment found that 44% of the nation's lakes are in poor biological health, and that lakes with poor lakeshore habitat were three times more likely to be in poor overall condition than lakes with good quality shorelands. Shoreland vegetation protects lakes from the effects of polluted runoff, stabilizes the soil along the lake's edge, and provides habitat, shelter, food, and cooling shade for fish.

The accepted norm on many of our lakes is to have a mowed lawn up to the edge of a concrete seawall. Lake Tippecanoe is one local example with 21 miles of shoreline, and 60% are concrete seawalls. Concrete seawalls are not natural; healthy shorelines (and adjacent lawns) have an abundance of native plants both on the land and in the water.

Project Description

In 2011, the Tippecanoe Watershed Foundation (TWF) created the Healthy Shorelines Initiative (HSI) to improve the quality and health of shorelines and lakes in the Upper Tippecanoe River Watershed. The program was expanded in 2012 with the addition of funding from the Indiana Department of Natural Resources (IDNR) Lake and River Enhancement (LARE) program.

Through a competitive grant application process, TWF provided cost-share funds to landowners for various shoreline projects that reduce erosion and nutrient from the shoreline, reduce wave action, and reduce scouring and re-suspension of bottom sediments. Eligible projects included bioengineered seawalls, new glacial stone seawalls, and re-facing with glacial stone. An application form, educational packet, and final reporting/reimbursement form were developed as part of the program.

To encourage the implementation of practices preferred by IDNR, TWF offered a tiered cost-share program. Cost-share did not exceed 75% of total project cost for any practice. In addition, the maximum cost-share for bioengineered seawalls was \$3,000; maximum for new glacial stone was \$2,500; and maximum for glacial stone re-facing was \$1,500.



Education and Outreach

TWF held two educational/informational workshops to promote the program and answer landowner questions about the practices, permits, and the grant process. The process included an optional site visit with an IDNR representative prior to the grant application deadline. HSI participants have agreed to maintain their healthy shoreline project for no less than five years.

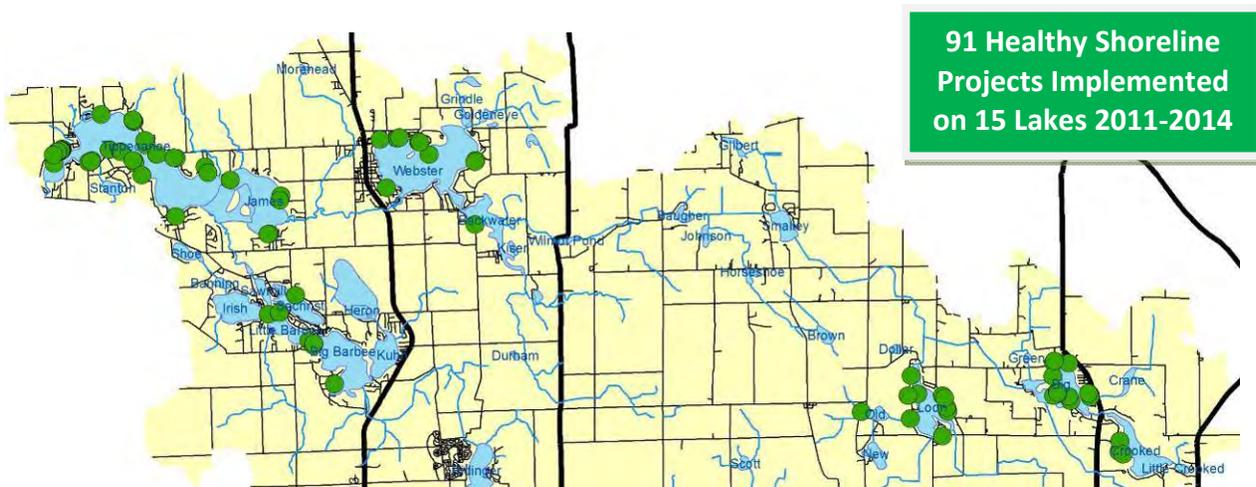
Beyond the positive impacts to water quality, the success of this program has garnered much visibility for TWF and excitement by residents, supporters, and partner organizations. Participants placed large colorful signs on their shorelines to increase visibility and recognition for their projects. Social indicator survey results obtained in 2014 confirmed the increased use of these practices, as well as an increased willingness to try them among lake residents in the watershed.



Project Results

A total of twenty-nine (29) healthy shoreline projects were funded through the LARE program. These projects improved 2,029 feet of shoreline. The resulting pollution load reductions include 133.3 tons of sediment per year, 133.3 pounds of phosphorus per year, and 265.9 pounds of nitrate per year. See Appendix A for a breakdown of shoreline types.

The popularity and success of the Healthy Shorelines Initiative has been tremendous. From 2011-2014, ninety-one (91) HIS projects have been completed on 6,438 feet of shoreline on 15 lakes.



The success of the Healthy Shorelines Initiative was recognized with the 2013 Lake/ Watershed Implementation Project of the Year Award from the Indiana Lakes Management Society. In addition, TWF was the first group in Indiana to be honored by the National Fish Habitat Partnership as one of the 10 “Waters to Watch” across the country.

The Healthy Shorelines Initiative approach and materials have been and are currently being used as a model to develop similar programs in the Upper White River watershed and at Clear Lake in Steuben County.

H.S.I. Participant Survey Results

In 2014, the TWF conducted a 10 question survey of 58 Healthy Shorelines Initiative participants for whom we had an email address. We had a 31% response rate, and the results are provided in Appendix B. Overall, the participants had a positive experience with the program and 100% of respondents said they would recommend healthy shorelines to their friends. All but one rated their contractor highly. Maintenance has been good; some difficulty with weeds, but it is what they expected. Wildlife benefits include more turtle, frogs and butterflies – as well as reduction in Canada Geese loitering on their lawns. None have noticed an improvement to water quality or clarity.

Half of those surveyed also reported increased emergent aquatic plants (i.e. lily pads) taking root in front of their glacial stone seawalls. One documented example is in the channel between Lake Tippecanoe and Oswego Lake. The channel is actually the Tippecanoe River, which flows through the lakes. It is narrow enough that it is idle-speed only for boat traffic. Eight adjacent property owners participated in the Healthy Shorelines Initiative – placing glacial stone along 500 feet of contiguous lakeshore. In addition to having favorable conditions, these residents were agreeable to allowing increased growth of the lily pad beds.



Figure 1 - Shoreline before installation of Healthy Shoreline project 10/19/12.



Figure 2 - Shoreline after installation of Healthy Shoreline project 8/14/14.

Social Indicator Survey Results

In addition to the small information survey conducted of Healthy Shorelines Initiative participants. The Tippecanoe Watershed Foundation also worked with Purdue University to implement a watershed-wide social indicator survey of lake residents in the Upper Tippecanoe River Watershed. These 2014 surveys represented a follow-up to baseline surveys completed in 2010, and were created for the purpose of understanding the awareness, attitudes, capacity, and behaviors of watershed residents.

Results of the 2014 survey (see Appendix C) of lake residents showed that 37% are using vegetation or glacial stones for shoreline protection and another 50% are willing to try it. The highest level of implementation is on Lake Tippecanoe with 46% of respondents already using vegetation or glacial stones. Webster Lake has the most resistance with 23% stating their unwillingness to use these methods. The percentage of usage on the Barbee Chain of Lakes increased by a statistically-significant 18% (from 21% - 39%) over the past four years.

In addition, survey results show that the behavior and willingness to implement native plants, glacial stones and healthy shorelines of year-round residents have improved by statistically-significant amounts more than that of seasonal residents. And although TWF has not changed the minds of all residents, the survey shows that the residents have become more informed. The percentage reporting “Never heard of it” had decreased by an average of 10-15%

Tippecanoe Watershed Foundation - Healthy Shorelines Initiative LARE 2012-2014

29 projects

	TOTALS	2,029	\$ 49,781	\$ 95,944	51%	\$ 46,841	Ave Cost/ft	\$ 50.02
Lake Name	Kind of Project	Ft Shoreline	Grant \$ Awarded	Actual Total Project Cost	% cost share	Recipient Match	Contractor	Cost per foot
Big Barbee	bioengineered seawall	175	\$ 3,000.00	\$ 5,669.18	52.9%	\$ 2,669.18	Self, Newton, Cardn	\$ 32.40
Loon	bioengineered seawall	89	\$ 3,000.00	\$ 4,550.00	65.9%	\$ 1,550.00	Fultz Exc.	\$ 51.12
Loon	bioengineered seawall	53	\$ 1,947.75	\$ 2,697.00	72.2%	\$ 749.25	Ben's	\$ 50.89
Tippecanoe	bioengineered seawall	150	\$ 4,725.00	\$ 7,350.00	64.3%	\$ 2,625.00	Ben's	\$ 49.00
Tippecanoe	bioengineered seawall	50	\$ 2,325.00	\$ 3,100.00	75.0%	\$ 775.00	Rico's	\$ 62.00
Big	new glacial stone seawall	45	\$ 1,500.00	\$ 3,000.00	50.0%	\$ 1,500.00	GW Sedgwick Se	\$ 66.67
Big	new glacial stone seawall	50	\$ 1,500.00	\$ 2,350.00	63.8%	\$ 850.00	Fultz Exc.	\$ 47.00
Big	new glacial stone seawall	50	\$ 1,500.00	\$ 2,400.00	62.5%	\$ 900.00	Fultz Exc.	\$ 48.00
Big	new glacial stone seawall	42	\$ 2,000.00	\$ 3,270.00	61.2%	\$ 1,270.00	Renaissance Lan	\$ 77.86
Big Barbee	new glacial stone seawall	77	\$ 2,000.00	\$ 3,719.00	53.8%	\$ 1,719.00	Ben's	\$ 48.30
James	new glacial stone seawall	30	\$ 978.75	\$ 1,405.00	69.7%	\$ 426.25	Fultz Exc.	\$ 46.83
James	new glacial stone seawall	50	\$ 2,000.00	\$ 2,900.00	69.0%	\$ 900.00	Fultz Exc.	\$ 58.00
Sechrist	new glacial stone seawall	45	\$ 2,000.00	\$ 3,030.00	66.0%	\$ 1,030.00	Fultz Exc.	\$ 67.33
Tippecanoe	new glacial stone seawall	88	\$ 2,000.00	\$ 4,100.00	48.8%	\$ 2,100.00	Ben's	\$ 46.59
Tippecanoe	new glacial stone seawall	88	\$ 1,667.74	\$ 2,329.76	71.6%	\$ 662.02	Self	\$ 45.45
James	glacial stone reface	50	\$ 1,136.96	\$ 1,515.95	75.0%	\$ 378.99	Self	\$ 30.32
Tippecanoe	glacial stone reface	50	\$ 1,500.00	\$ 2,350.00	63.8%	\$ 850.00	Ben's	\$ 47.00
Tippecanoe	glacial stone reface	50	\$ 1,500.00	\$ 2,200.00	68.2%	\$ 700.00	Ben's	\$ 44.00
Tippecanoe	glacial stone reface	50	\$ 1,500.00	\$ 2,000.00	75.0%	\$ 500.00	Ben's	\$ 40.00
Tippecanoe	glacial stone reface	50	\$ 1,500.00	\$ 2,000.00	75.0%	\$ 500.00	Rico's	\$ 40.00
Tippecanoe	glacial stone reface	60	\$ 1,500.00	\$ 3,900.00	38.5%	\$ 2,400.00	Fultz Exc.	\$ 65.00
Tippecanoe	glacial stone reface	253	\$ 1,500.00	\$ 15,235.88	9.4%	\$ 14,414.07	Hamman	\$ 50.00
Tippecanoe	glacial stone reface	50	\$ 1,500.00	\$ 3,750.00	40.0%	\$ 2,250.00	Fultz Exc.	\$ 75.00
Tippecanoe	glacial stone reface	48	\$ 1,500.00	\$ 3,500.00	42.9%	\$ 2,000.00	Fultz Exc.	\$ 72.92
Webster	glacial stone reface	38	\$ 1,500.00	\$ 2,470.00	60.7%	\$ 970.00	Fultz Exc.	\$ 65.00
Webster	glacial stone reface	50	\$ 1,500.00	\$ 2,000.00	75.0%	\$ 500.00	Fultz Exc.	\$ 40.00
Big	glacial stone reface of existing stone seawall	83	\$ 750.00	\$ 1,924.35	39.0%	\$ 1,174.35	Buesching's Pea	\$ 23.18
Crooked	glacial stone reface of existing stone seawall	115	\$ 750.00	\$ 1,228.00	61.1%	\$ 478.00	Daniel Landscap	\$ 10.68

133.3	133.3	265.9
Sediment Load Reduced (tons/year)	Phosph Load Reduced (lb/year)	Nitrogen Load Reduced (lb/year)
14.9	14.9	29.8
2.9	2.9	5.8
4	4	8
6.4	6.4	12.8
4.3	4.3	8.5
3.8	3.8	7.7
4.3	4.3	8.5
4.3	4.3	8.5
3.8	3.8	7.7
6.5	6.5	13.1
2.9	2.9	5.8
4.9	4.9	9.9
3.8	3.8	7.7
4.3	4.3	8.5
7.5	7.5	15
4.3	4.3	8.5
2.6	2.6	5.1
4.3	4.3	8.5
4.3	4.3	8.5
4.3	4.3	8.5
4.3	4.3	8.5
5.1	5.1	10.2
10.8	10.8	21.5
4.3	4.3	8.5
4.1	4.1	8.2
3.2	3.2	6.5
2.6	2.6	5.1
2.8	2.8	5.6
2	2	3.9

Appendix B

TWF Healthy Shorelines Initiative Survey of Participants from 2011 – 2014



- 31% return rate (N=18 out of 58 possible participants)

1. What is the Name of the Lake? What was the Type of Project (rock refacing, new rock seawall, bioengineering)? What was the Length of Shoreline?

North Webster bioengineered 50 ft.
Tippecanoe - rock refacing - about 30'
Webster Lake Glacial Stone reface of 50 feet.
Lake Jame "Little Tippy" Rock Refacing 100'
Tippecanoe, rock seawall 120 ft
Loon seawall 48 feet
Loon lake and bio engineering I do not know the length of the shoreline.
new rock seawall 77 feet
Loon Lake. We reinforced the river rock along our entire shoreline and planted native plants in 3 beds along the shore.
Tippecanoe Glacier Seawall 88'
Big Lake New rock seawall 50 feet
Lake Tippecanoe, IN glacial rock refacing, 50'
LOON LAKE, NEW ROCK SEAWALL WITH PLANTINGS 60 FT
Webster Lake New rock seawall 118 feet
Loon Lake, We had new rock with plants.
Barbee lake, bioengineering, 200+w
Crooked Lake Glacial stone seawall 111 ft.
Loon lake,, rockrefacing with removal of rotted railroad ties, 100'

2. Rate your satisfaction with the grant process and healthy shorelines information provided by the program. Provide any comments or suggestions for improvement.

Went very slick!
A+
no answer
Very satisfied
very easy and happy
good
Everything went smoothly from start to finish.
Excellent. The support team was great help with any needs or questions.
We were very happy, on a scale of 1-10, I'd rank it a 9.
Process was concise and easy to follow.
Very good
Very well organized, very pleased with the entire process.
VERY GOOD
I was Very Satisfied!
We were very happy with the grant process. We had wanted to put in a seawall for a lot of years & the grant was very helpful in letting us do just that!
This was a great program, I would rate this a 10.
Very satisfied. TWF was outstanding in guiding us through the process.
Grant process was easy and straight forward.

3. How satisfied were you with your shoreline contractor? Would you recommend this contractor to a friend or family member? Name of your contractor (optional).

Very Yes Headland Restoration

C- Sadly, I did recommend him and wish I would not have. Job was done shabbily and no follow up.

Very and yes I would highly recommend the contractor that did my father's and my neighbor's.

very satisfied, and yes would

fine

The contractor was fine. It was the first time they did this kind of thing so it was a learning curve.

Yes, very satisfied. Ben's Seawall Service

I did it myself and/or with family. (4)

Excellent job Yes Tim Fultz

We utilized Tim Fultz and was very pleased with his work and especially his crew. Very professional and

Tim explained just how he was going to do the project and was there for the entire process.

VERY SATISFIED, WOULD RECOMMEND

Troy Ousley was great and I would highly recommend him to anyone.

We thought that the contractors worked very hard and did a good job and we did recommend them to our neighbors.

Contractor was not accustomed to this type of Landscaping but quickly got into it and did a great job.

Contractor provided written quote, work was completed per the quote. I was satisfied.

4. Comment about your satisfaction with the maintenance of your shoreline project. (Examples might include rock placement, survival of native plants, aquatic weeds.)

We were satisfied but some of the flowering plants froze out last year.

Rock, of course, are shifting. That is to be expected, especially with last winter's ice. Plant infiltration has been what I consider excessive.

I would suggest larger stones. The stones we used met the 6-12 inch requirement. Between the kids and the ice we had to restore quite a bit. My neighbors and my father on the other hand had larger stones. Their walls have survived the ice much better although the kids still throw the smaller stones.

Very satisfied with rock placement. Had bad luck with survival of native plants.

had to add more rock after first year and fix some but due to high water 2 years ago. have basically no maintenance now

fine

Not good. Takes more work then I expected.

The only problem is the water seaweed washes in to shore and embeds in the rock. Then tall weeds do grow and they must be pulled. It is really a small amount of maintenance for the quality look of our shoreline. I did this weed pulling about 3 times this year.

Shoreline maintenance was similar or better than years past.

Rock placement has held up well even with harsh winter.

The project was to 'build up' our existing seawall and the results were very good.

VERY SATISFIED, ROCK PLACEMENT GOOD, STAYED QUITE WELL THROUGH OUT SEASONS
PLANTS GOOD SURVIVAL

I am very pleased, I have lily pads on the south side of the pier and the rocks have helped with erosion and wave feedback from the ski show that it right in front of our house.

Since we had a really rough winter last year the rocks have shifted and really do need to be adjusted, as far as the plants some didn't come back at all & others WOW! They are really going strong.

I did not have good success with my plants. I think I was a timing reason. time of year that I planted Everything went well. The native wildflowers were a bit excessive and "took-over" the rest of the vegetation and now will need to be thinned out before next year.

We live on east side of the lake and get all the floatson because of prevailing winds. Cleaning all the weeds, leaves, and grasses is a twice a season task. We recognized that when we bought our place.

5. Since installing your new seawall or native plant project, are new aquatic plants growing in the lake in front of your shoreline? Examples include lily pads, spatterdock, arrowhead, pickerelweed, cattails.

No we already had some of that.

Yes - but mostly there is still a lot of matt algae and floating debris. The rocks make it a little more difficult to pick up weeds with a rake.

n/a

No, could not get lily pads to take.

not yet

no (2)

Some invasive plants that I did not plan on..some of what they planted did not survive.

Not really. The water level has been lower than the bottom rocks of the seawall. This whole summer the water was low.

We are seeing lily pads returning

I have seen some lily pads.

no, but in front of our neighbors property there are cattails.

WE do have some growth, mostly grasses and weeds.

The lily pads have spread closer to chore now.

I do see a few lily pads but I wouldn't be able to recognize the others, so not sure.

There is some new plant life. I have tried to keep weeds from growing on rocks.

There are no "new" ones, just more of the same.

We already have most of those. What's new is lizard tail. It is native but I can be invasive. It is endangered in CT.

6. Comment on any wildlife benefits you have noticed. Examples might include reduced geese loitering, reduced muskrat damage, increased beneficial insects (dragonflies, butterflies and/or honeybees), increased frogs, turtles or fish.

Geese less likely to come up there. The musk rats worked in area left blank for pier placement instead.

There has been a very marked decrease in sink holes caused by muskrats since so many property owners in a row have installed rock refacing. Geese and swans lingering on the lawns has also decreased a bit. No significant increase in fish that I have noticed, and we have always had an abundance of flying insects thanks to the buttonbush.

Too early to tell although we have noticed it is much quieter when the waves hit.

Increased turtle population

ours was already sand etc. so nothing new

none of the above

Kept geese from entering lawn at that point

The geese have now found their way up our neighbors and still come on our lawn. They are the most frustrating animals around the lake. I am constantly cleaning their waste in our yard.

I have not noticed any change.

Have seen some water snakes. Had some geese in the yard, but not long.

No noticeable change in wildlife activity.

MILKWEED, HAD SEVERAL MONARCH LARVA THIS YEAR, AND HONEY BEES

There is a definite decrease in muskrat damage since the rock was put in. They were digging under the seas wall and making holes in my yard. Nothing since...

We had an abundance in BUTTERFLIES, they were beautiful! We also had more dragonflies.

There are a lot of frogs, and other animals. It has been a great place for water animals of all kinds

Geese are less of a problem due to lack of access to the yard. Frogs and turtles seem to be more plentiful.

more frogs and small turtles now.

7. Have you noticed an improvement to water quality or clarity?

No (5)

No particularly - but I live on a channel where there is not a lot of wave action/washing. This has been an incredible year for clarity on the lake. Whether the seawall is a contributor? Appears to be slightly improved

possibly

The water was very good this year for most of the summer. This is along our shoreline and out about 50 feet. I hope to see this continue.

This summer our water quality was outstanding.

I have not noticed any difference to date.

The water seems to be clearer and does not 'crash' against the wall as much as before.

The water clarity of the whole lake is fantastic this Fall.

Maybe some.

It has improved the channel water quality

Our water quality is always incredible..... can't tell any difference between it and tap water.

Since I have 30' of lily pads the clarity remained the same.

8. What have been the downsides or disadvantages to your shoreline project?

The neighbors didn't follow through on their grants which would have made the area better.

Decreased accessibility to the lakeshore; difficulty removing sunken/floating weeds.

Lake access is more difficult. Had to build stairs over the glacial stones.

None (11)

Weeds

Makes it a bit more difficult to remove weeds.

I don't like that weeds start growing between the rocks, probably from mowing. I am not physically able to pull them out.

Absolutely no downside other than cost but that was offset with grant fr TWF.

9. Would you recommend participation in the Healthy Shorelines Initiative and/or implementation of shoreline projects like yours to your friends, family and neighbors?

Yes! (18) We already have (5).

10. Any additional comments, questions, or concerns?

Choose your contractor carefully and visit sites that contractor has completed.

Thank you, thank you, thank you.

This is a great project. Wish more would participate.

Thank you very much for this opportunity!

The project was a definite benefit for my property and has enhanced the shoreline of the lake for everyone.

Very well managed program and thank you for the grant money we received. It was very helpful.

Thanks for this grant project. It has helped me, the lake, and the life on and under the water.

I totally appreciate the program and I am glad I was able to participate, but I also think it is a bit unfair that other lake property owners are able to just put in a seawall and not get permits, or adhere to the other requirements.

Would like to thank everybody involved.

We're glad we applied for the grant. It stimulated us to get out there and "do something" positive to enhance our lake.

**Appendix C – 2014 Social Indicator Survey Results
Related to the Healthy Shorelines Initiative**

1. Do you protect streambanks and/or shorelines with vegetation and/or glacial stones? (n=328)

- 37.2% Currently use
- 33.2% Never use
- 29.6% Don't currently use

2. How familiar are you with protecting streambanks/lakeshore with vegetation and/or glacial stones? (n=329)

- 35.6% Somewhat familiar with it
- 28.3% Currently use
- 22.2% Know about protecting, not doing
- 14.0% Never heard of it

3. Are you willing to protect streambanks/lakeshores with vegetation and/or glacial stones? (n=327)

- 48.3% Yes or already do
- 39.1% Maybe
- 12.5% No

4. How much do the following factors limit your ability to protect streambanks and/or shorelines with vegetation and/or glacial stones?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (9)	Mean (Without 9) (n)
Cost (n=322)	38.5%	12.7%	12.7%	20.2%	15.8%	2.2 (271)
The features of my property (n=321)	48.3%	10.3%	11.2%	20.9%	9.3%	2.1 (291)
Desire to keep things the way they are (n=319)	50.2%	10.7%	13.5%	15.4%	10.3%	1.9 (286)
Physical limitations (n=322)	57.1%	9.6%	12.4%	13.0%	7.8%	1.8 (297)
Lack of information or skills (n=321)	53.0%	12.1%	14.0%	12.1%	8.7%	1.8 (293)
Time required (n=320)	56.3%	12.2%	10.9%	9.1%	11.6%	1.7 (283)

Upper Tippecanoe Watershed-Post Lake Resident Survey Results

5. Have you used native plants to control waterfowl? (n=330)

- 63.9% Never planted
- 24.8% Don't currently have
- 11.2% Currently use

6. How familiar are you with planting native plants to control waterfowl? (n=333)

- 49.2% Never heard of it
- 27.0% Somewhat familiar with it
- 14.7% Know about native plants, not using
- 9.0% Currently plant

7. Are you willing to plant native plants to control waterfowl? (n=320)

- 48.8% Maybe
- 32.5% Yes or already do
- 18.8% No

8. How much do the following factors limit your ability to plant native plants to control waterfowl?

	Not at all (1)	A little (2)	Some (3)	A lot (4)	Don't Know (9)	Mean (Without 9) (n)
Lack of information or skills (n=326)	32.2%	15.0%	18.4%	23.9%	10.4%	2.4 (292)
The features of my property (n=323)	39.9%	11.8%	14.6%	21.1%	12.7%	2.2 (282)
Cost (n=322)	34.8%	16.5%	15.8%	13.4%	19.6%	2.1 (259)
Desire to keep things the way they are (n=323)	49.8%	9.0%	15.8%	13.0%	12.4%	1.9 (283)
Physical limitations (n=324)	55.6%	10.8%	13.9%	9.9%	9.9%	1.8 (292)
Time required (n=322)	50.6%	14.3%	14.0%	7.8%	13.4%	1.8 (279)