AGENDA
Cascade Charter Township
Thornapple River SAD Ad-Hoc Committee
Monday, October 14, 2024
5:30 pm
5920 Tahoe Dr. SE

ARTICLE	**1.**	Call the meeting to order
ARTICLE	**2.**	Approval of the Agenda
ARTICLE	**3.**	Acknowledge Visitors & Public Comment (Limited to five minutes per speaker.)
ARTICLE	**4.**	Approval of the Minutes of the June 10, 2024 Meeting
ARTICLE	**5.**	Summer Water Quality Report-Jaimee Desjardins, PLM
ARTICLE	**6.**	Financial Report
ARTICLE	**7.**	MI Natural Shorlines
ARTICLE	**8.**	Safety & Navigational Marking Project Update
ARTICLE	**9.**	Any Other Business
ARTICLE	**10.**	Roundtable/Q&A
ARTICLE	**11.**	Public Comment (Limited to five minutes per speaker.)
ARTICLE	**12.**	Adjournment

MINUTES
Cascade Charter Township
THORNAPPLE RIVER SAD AD-HOC COMMITTEE MEETING
June 10, 2024 at 5:30pm
Cascade Charter Township Office
5920 Tahoe Dr. SE
Grand Rapids, MI 49546

ARTICLE 1. The meeting was called to order at 5:31pm.

Members Present: Scott Rissi, Leann Rowland, Trustee Shipley, Chuck Whitley, Thomas Keith
Absent: Michael Wiegand, Jeff Carpenter
Others Present: Parks & Recreation Director Melanie Manion, Township Manager Jade Smith, Management Office Administrative Assistant Jessica Stine

ARTICLE 2. Approve the current Agenda

Motion was made by Trustee Shipley to approve the agenda as written. Supported by Member Rissi. Motion carried.

ARTICLE 3. Acknowledge Visitors & Public Comment

There was no one who wished to comment at that time.

ARTICLE 4. Approve the Minutes of the February 12, 2024 Meeting

Motion was made by Trustee Shipley to approve the minutes as written. Supported by Member Rowland. Motion carried.

ARTICLE 5. Weed Treatment

Members requested a new, more professionally produced treatment map. The treatment area was larger than it had been the last few years due to the warm winter. One resident attempted to opt out of the weed treatment but found out the property he wanted to opt out of was Township property, not his. Another resident requested more treatment of the river because he still saw many weeds around the portion of the river he lives on. Even with further treatment, it's possible the weeds won't respond because the treatment is targeted to exotic weeds or the weeds may be too close to the shoreline for effective treatment. The members noticed high phosphorus and nitrogen levels on the water quality report and many think that's due to the golf course but that is not the case because it is against state regulations to use phosphorus when doing anything except establishing grass.

ARTICLE 6. Water Level

Manager Smith will reach out to the company who owns the dam for additional statistics that the committee requested.

ARTICLE 7. River Access

The Township now has an access license agreement to launch the navigational marking boat at Maricaibo Shores, through the Township's lawyers.

ARTICLE 8. Safety & Navigational Marking Project Update

The buoys are set to be placed in late October. Residents will be contacted when a date has been solidified.

ARTICLE 9. Any Other Business

The Township now has the mapping data for the river since Member Whitley brought the flash drive to the meeting.

ARTICLE 10. Roundtable Q & A

Finance and Budget Director Nenciarini was out of the office until the next Wednesday and will provide staff with the current financial report when she returns.

Parks and Recreation Director Manion recommended working with MI Natural Shorelines. They work with EGLE and MSU Extension. They would help with biodiversity and could be a long-term solution in regards to sedimentation and bank stabilization. She will request one of their employees to present at a future meeting.

Member Rissi and Member Carpenter will put together an idea of what the committee budget will look like for the next five years. They can look up how much the assessments collected are worth, but they don't know the expenses for 2024.

Member Rissi noted a typo that said PLM's contract ends in 2025 when it really ends in 2024. The Township may need to put the contract out for bid again. Chemical prices have increased extensively and treatment companies will need to anticipate future price increases.

Members discussed Senate bill 662. The bill doesn't mention townships, only the drain commission. Members were concerned that there may be problems with the gate and turbine at they dam. They think the turbine my not be operating at full capacity.

ARTICLE 11. Public Comment

There was no one who wished to comment at that time.

ARTICLE 12. Adjournment

Motion was made by Member Rowland to adjourn. Supported by Trustee Shipley. Motion carried. The meeting was adjourned at 6:13 p.m.

Approved by the Thornapple River SAD Ad-Hoc Committee - TBD

PLM
LAKE & LAND
MANAGEMENT CORP

October 9, 2023

Cascade Charter Township
Attn: Jade Smith, Township Manager
5920 Tahoe Dr. SE
Grand Rapids, MI 49546

Thank you for the opportunity to submit a proposal to continue to work with your group on the Thornapple River. The following proposal is for your review for the 2025-2027 seasons. To highlight a few of the advantages to working with PLM: All billings are post service/treatment with itemized details. Reports and follow up information are readily available following service. In addition to any scheduled service, PLM is always available for treatment/lake evaluation if something changes unexpectedly. Please review the following proposal and if any changes, additions, or modifications are required to suite your specific program needs, please contact me without hesitation.

PLM Lake & Land Management Corp. is a Michigan based company with a specific focus of lake management in and around Kent County. We have numerous offices throughout Michigan to serve our customers with the fastest response time and a highly educated and experienced staff with the latest technologies available in aquatics.

Management Program for 2025-2027: The primary goal of aquatic plant management in the Thornapple River is the control of exotic aquatic plants. The exotic plant species, Eurasian watermilfoil, should be controlled throughout the river. The abundance of this species should be reduced to the maximum extent possible, and efforts should be made to reduce their recovery after treatment.

Aquatic plant management should preserve species diversity and cover of native plants sufficient to provide habitat for fish and other aquatic organisms. Native plants should be managed to encourage the growth of plants that support the Thornapple River fishery (by creating structure and habitat) provided that they do not excessively interfere with recreational uses of the lake (e.g., swimming and fishing) in high-use areas. Where they reach recreational nuisance levels, management techniques that reduce the stature of native plants without killing them (e.g., harvesting, contact herbicides) should be used whenever possible. Specific areas should be set aside where native plants will not be managed, to provide habitat for fish and other aquatic organisms. Management will also include performing surveys (AVAS surveys when required), pre/post treatment surveys, water quality analysis and algae treatments if required.

Below are the associated costs (on a per acre basis) of products that may be used as part of the aquatic weed management program.

Unit Cost per acre:

Contact Herbicides:

Diquat	$160.00 (exotics)
Diquat	$220.00 (hybrid/natives)
Aquathol K	$180.00 (exotics)
AquaStrike	$445.00
Flumioxazin 100ppb w/Contacts	$445.00
Flumioxazin 200ppb	$575.00

Systemic Herbicides:

Renovate 3 (liquid)	$400.00
Renovate OTF	$615.00
ProcellaCOR	$105.00/PDU

Algaecides:

Copper sulfate/Chelated copper	$45.00
Chelated copper	$128.00
SeClear, filamentous algae	$200.00
SeClear G, SSW Control	$385.00
Green Clean	$310.00
Phycomycin	$130.00

PO Box 132 · Caledonia, Michigan 49316
phone 616.891.1294 · fax 616.891.0371
www.plmcorp.net

PLM Consulting Services:

Vegetation AVAS Survey	$575.00
Mid-summer brief checks	No Charge
Water Quality Program	$925.00
Lake Management Plan	$770.00
EGLE Permit Fee	~$1600.00

Estimated Budget for 2025-2027: **$20,000.00 to $40,000.00**

This budget is an estimate and can be adjusted to meet the needs of the residents of the Thornapple River. Any management tool listed is an option and is the suggestion of PLM to meet those expectations. You will only be charged for the actual amount of control required, at the unit per acre prices listed above. All treatments are pending the approval of the Department of Environment, Great Lakes & Energy (EGLE). Treatments must be timed accordingly and conducted during low flow conditions. If native plant control is requested or recommended through the use of herbicides or mechanical harvesting, the high-end budget may be needed.

Mechanical Harvesting Program:

Mechanical harvesting is best suited for nuisance native plant species. Mechanical harvesting can be used to provide relief from native plant species if they are causing a recreational nuisance. Harvesting does not kill the plants, but simply reduces it's stature, leaving lower growth for fish habitat and sedimnet stabilization. PLM will not harvest Eurasian watermilfoil, as this plant spreads by fragmentation.

PLM owns and operates 3 mechanical harvesting machines that operate throughout the state. We will cut down to a maximum depth of five (5) feet and require a minimum of 18 inches of water depth for harvester flotation. Harvested vegetation will be dumped at a predetermined location designated by the client within a ten (10) mile radius of the river. Any cost associated with the disposing of vegetation is the responsibility of the client, i.e., landfill disposing costs. There will be no set-up or breakdown fees of our equipment if a suitable access site is available. Expenses of an unsuitable launch site will be the responsibility of the river. A representative of the client will be required to periodically evaluate workmanship.

Cost of Harvesting: $300.00/hour with a minimum per cutting of $2,500.00

Description of Technical Management Services:

On-site Lake Evaluations: Each time a PLM representative is on Thornapple River, to perform a survey, WQ testing, treatment, etc, the following will typically occur: Pre-notice to Lake Representative of schedule (i.e email the week before of estimated date). Following the service, a follow up evaluation to Lake Representative of services provided, condition of lake, future recommendations are made. Arrangement can be made to send information via email or voicemail. This is standard as part of our program to keep Lake Board/Association aware and involved in all decision making and serves as a checks and balances of lake management.

Water Quality Program: The water quality program consists of sampling two sites on the river twice a season, spring and late summer. Parameter such as secchi disc, pH, D.O., conductivity, alkalinity and nutrient sampling of nitrates and total phosphorus give us the ability to monitor lake trends more efficiently. This information will enable us to include the tropic status of your lake. The program also tests your water for Fecal bacteria (E. Coli), in mid-summer at three separate locations, which can determine the condition of your river and if the water is safe for swimming. Reports will be issued annually in the fall.

Surveys: Performing surveys is a vital part of any lake management program. PLM surveys a lake in the spring and fall as well as surveying for pre/post treatments. Lake representatives are welcome to arrange joining PLM for a survey. Depending on the type of survey performed, a cost may apply. An AVAS survey is a more specific survey performed for specific reasons. Performing a fall AVAS survey of the lake will allow for all vegetation within the lake, native and exotic, to be recorded along with density. This data is important in determining management plans and treatment areas. A full understanding of the vegetation growing within the lake can indicate problems within an aquatic environment. Surveys will be supplied to the association upon completion with a breakdown of what the survey indicates.

Meeting Attendance/Presentation: A representative of PLM is available to attend association/board meetings upon request. This request has to be made prior to meeting to allow for conflict in representative's schedule. If conflict in meeting time does arise, alternative dates and times need to be determined between representative and board. Residential concerns can always be brought to the lake association/board and then to PLM or directly to PLM by calling our office.

Contract Period:

Multiple Year Treatment Program 2025-2027: As an incentive to establish a multiple year agreement, the unit cost per acre will increase by 5% or less per year. If total chemical cost increases 10% from the previous year, PLM will only pass on the percentage over 10%. If during the life of the contract, EGLE or other regulatory agencies significantly change the approved treatment procedures, either party may terminate this agreement upon giving ninety (90) days advance written notice thereof.

One Year Treatment Program: Pricing is based on the type and the amount of vegetation or algae present at the time of treatment, as well as, the products applied. Unlike the multiple year program, an agreeable price structure is not contracted into a one-year program. Therefore, an increase in the cost of products, labor, or changes made by EGLE or other regulatory agencies may have a drastic effect on the pricing for following years.

Permit Fee: PLM Lake & Land Management Corp. is responsible for completing and submitting aquatic nuisance permit applications. PLM Lake & Land Management Corp. will send an invoice for the yearly EGLE permit application fee. It is your responsibility to send a check made out to the "State of Michigan" to our office prior to the due date. We must include this check with the EGLE permit application. Waterbodies less than 10 acres, with no outlet and single ownership, may be subject to "permit by rule" conditions, therefore not incurring an actual permit fee.

Posting of Treatment Areas: Posting of shoreline treatment areas is the responsibility of PLM Lake & Land Management Corp. and will be conducted according to EGLE regulations. Due to EGLE guideline changes and specific residential concerns, posting fees may apply. Signs will be attached to thick barked trees, posts or other suitable fixtures already on site. If homeowners wish to have signs posted in designated areas or on specific fixtures they must notify PLM Lake & Land Management Corp., providing lake address, location of property, and where the signs are to be posted. Pictures are the most informative way to relay this information. Notification of alternate posting must be made at least 14 days prior to treatment and additional fees may apply. The removal of posting signs after the restrictions have expired is the responsibility of the homeowner.

Notification of Treatments: It is your responsibility to notify each resident within 100 feet of the treatment area at least seven days in advance, but no more than forty-five days prior to the first treatment date, that products will be applied to the lake (with a provided list of addresses from the lake board). This notification requirement must be administered to each and every property owner within 100 feet of any treatment area. PLM Lake & Land Management Corp. will provide a tentative treatment schedule and the Notice of proposed products to be used during the spring of each year.

Non-Target Species: Please be aware that we only control specific weeds and algae present at time of treatment. Emergent vegetation (cattails, bulrush, purple loosestrife, lily pads) and beneficial native plants will not be addressed unless specifically mentioned in the management program. We have no control over future weed or algae growth based on the current chemicals registered for aquatic use in Michigan.

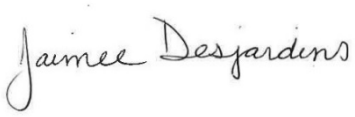
Electronic Treatment Notification: In addition to the above-required notification procedures, the Department of Agriculture allows for electronic notification i.e. email with the contracting entity. Therefore, if the contracting entity is a township, lake board, or municipality, you will also receive the same information that is being distributed to each resident (Posting Sign) prior to the treatment. By signing this agreement with PLM Lake & Land Management Corp and providing us the contracting entity email address, we can legally implement the electronic notification procedure.

Invoicing and Payments: PLM Lake & Land Management Corp. will submit an invoice following treatment that will include the following information; lake and/or pond(s) treated, date of treatment and type of treatment or acres treated. Monies will be due net thirty (30) days after each treatment. The invoice may be subject to a fuel surcharge of up to 3% of the total treatment cost. Interest of 1.25% may be added to your bill for each additional sixty (60) days that payment is not received.

Liability Issues: We are responsible for workman's compensation and liability insurance for the duration of the contracted period. PLM Lake & Land Management Corp. is not responsible for fish loss due to low oxygen levels caused by winter turnover or during warm water conditions.

Please sign, check multiple or one-year program and return one copy of this proposal as our contract by December 15, 2024.

For further clarification or modifications please contact.



Jaimee Desjardins, Environmental Scientist
West MI Regional Manager
PLM Lake & Land Management Corp.
616-891-1294 ext 2005
jaimeed@plmcorp.net

For: Thornapple River, Cascade Township

Multiple Year Program, 2025-2027 _____

One-Year Program _____

_____ _____

Print Name Date

_____

Signature

Bacteria Sampling Report

Waterbody:
Thornapple River

Thornapple River Cascade

Date Sampled:
7/23/2024

Location	*E. coli*	Total Coliforms	Interpretation
1	12		Water meets bacteriological standards for safe swimming.
2	32		Water meets bacteriological standards for safe swimming.
3	52		Water meets bacteriological standards for safe swimming.

Bacterial counts are expressed as the number of Colony Forming Units per 100 milliliters (CFU/100mL).

For full body contact recreation (including swimming) counts of E. coli should not exceed 130 (CFU/100mL)as a monthly geometric mean of at least five samples per the State of Michigan standard, or single samples should not exceed 298 (CFU/100mL) [235 CFU/100mL in a designated bathing beach area] per Federal (EPA) guidelines.

Current recreational water quality standards do not rely on Total Coliform counts.

Approved by _____ Date 09-Aug-24
Mrs. Jaimee Desjardins, Technical Services Manager

PLM Lake & Land Management Corp
P.O. Box 132
Caledonia MI 49316-
Phone: (616) 891-1294

2024016

LAKE CHECK Water Quality Monitoring Report

Customer
Thornapple River Cascade

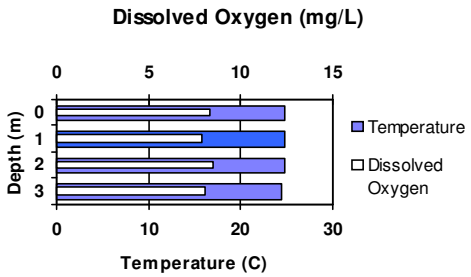
Waterbody
Thornapple River Cascade

Sample Information
Date: 8/29/2024

Site: #1

On-Site Results

Depth (m)	Temperature (degrees C)	Dissolved Oxygen mg/L	Dissolved Oxygen %
0	24.8	8.3	77
1	24.8	7.9	73
2	24.8	8.5	78
3	24.5	8.1	76



Secchi Disk Depth	1.5	meters
Thermocline Depth		meters

Analytical Results

Parameter	Result	Units	Interpretation
Fecal Bacteria (E. coli		CFU/100 mL	N/A
Conductivity	526	uS/cm	Moderate concentration of dissolved salts
Total Dissolved Solids	406	mg/L	
pH	8.4	S.U.	Water is slightly alkaline
Alkalinity	245	mg CaCO3/L	Water is very hard
Total Phosphorus	17	ug/L	Moderately phosphorus enriched
Nitrates	1190	ug/L	Moderately nitrogen enriched
Chlorophyll	N/A		

Trophic State Evaluation

	TSI	Trophic Status
Based on Secchi Disk Depth	54	moderately eutrophic
Based on Total Phosphorus	41	mesotrophic
Based on Chlorophyll	N/A	

Conclusions

- Conditions are good for fish growth.
- Minimum dissolved oxygen is adequate for good fish production.
- pH is within acceptable limits.
- Sample is somewhat nutrient (N and P) enriched. Adopt appropriate lakeshore landscaping and lawn care practices.
- REPEAT LakeCheck NEXT YEAR!

- WARNING, condition requires immediate attention.
- CAUTION, condition requires further evaluation.
- OK, condition within acceptable limits.
- NEUTRAL, condition neither good nor bad.

Notes

Report describes conditions at the time the sample was collected.

Approved by Jaimee Desjardins Date 10/7/2024

Mrs. Jaimee Desjardins, Technical Services Manager

FROM YOUR WQ PRO DEALER

PLM Lake & Land Management Corp
P.O. Box 132
Caledonia MI 49316-
Phone: (616) 891-1294

2024017

Lake Check Water Quality Monitoring Report

Customer
Thornapple River Cascade

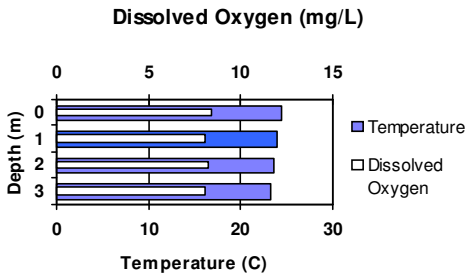
Waterbody
Thornapple River Cascade

Sample Information
Date: 8/29/2024

Site: #2

On-Site Results

Depth (m)	Temperature (degrees C)	Dissolved Oxygen mg/L	Dissolved Oxygen %
0	24.5	8.4	77
1	24.0	8.1	71
2	23.6	8.2	73
3	23.2	8.1	72



Secchi Disk Depth	1.5	meters
Thermocline Depth		meters

Analytical Results

Parameter	Result	Units	Interpretation
Fecal Bacteria (E. coli		CFU/100 mL	N/A
Conductivity	523	uS/cm	Moderate concentration of dissolved salts
Total Dissolved Solids	404	mg/L	
pH	8.4	S.U.	Water is slightly alkaline
Alkalinity	252	mg CaCO3/L	Water is extrmely hard
Total Phosphorus	21	ug/L	Moderately phosphorus enriched
Nitrates	1240	ug/L	Nitrogen enriched
Chlorophyll	N/A		

Trophic State Evaluation

	TSI	Trophic Status
Based on Secchi Disk Depth	54	moderately eutrophic
Based on Total Phosphorus	44	mesotrophic
Based on Chlorophyll	N/A	

Conclusions

- Conditions are good for fish growth.
- Minimum dissolved oxygen is adequate for good fish production.
- pH is within acceptable limits.
- Sample is somewhat nutrient (N and P) enriched. Adopt appropriate lakeshore landscaping and lawn care practices.
- REPEAT LakeCheck NEXT YEAR!

- WARNING, condition requires immediate attention.
- CAUTION, condition requires further evaluation.
- OK, condition within acceptable limits.
- NEUTRAL, condition neither good nor bad.

Notes

Report describes conditions at the time the sample was collected.

Approved by Jaimee Desjardins Date 10/7/2024

Mrs. Jaimee Desjardins, Technical Services Manager

FROM YOUR WQ PRO DEALER

PLM Lake & Land Management Corp
P.O. Box 132
Caledonia MI 49316-
Phone: (616) 891-1294

BUDGET REPORT FOR CASCADE CHARTER TOWNSHIP

Calculations As Of 12/31/2025

GL Number	Description	2023 Activity	2024 Amended Budget	2024 Activity	2024 PROJECTED	2025 REQUESTED
THORNAPPLE RIVER IMPROVEMENT FUND						
TAXES						
230-000-401-445	INTEREST & PENALTIES ON TAXES	0	0	3	0	0
	TAXES	0	0	3	0	0
SPECIAL ASSESSMENT REVENUE						
230-000-452-014	S/A REVENUE- TRD - RIVER	91,500	90,900	101,709	101,709	90,900
	SPECIAL ASSESSMENT REVENUE	91,500	90,900	101,709	101,709	90,900
INTEREST AND RENTS						
230-000-665-000	INTEREST ON INVESTMENTS	7,382	7,000	7,472	9,000	7,000
	INTEREST AND RENTS	7,382	7,000	7,472	9,000	7,000
	Total Department :	98,882	97,900	109,184	110,709	97,900
S/A IMPROVEMENT FUNDS						
OTHER SERVICES AND CHARGES						
230-444-802-000	CONTRACTUAL SERVICES	17,131	50,000	25	25	47,000
230-444-816-000	INSECT&WEED CONTROL/DRAIN MAI	20,816	40,900	27,784	40,900	40,900
	OTHER SERVICES AND CHARGES	37,947	90,900	27,809	40,925	87,900
	Total Department S/A IMPROVEMENT FUNDS:	(37,947)	(90,900)	(27,809)	(40,925)	(87,900)
TRANSFERS OUT						
TRANSFERS OUT						
230-966-955-230	TRANSFER TO GF FROM TRIF	0	10,000	0	10,000	10,000
	TRANSFERS OUT	0	10,000	0	10,000	10,000
	Total Department TRANSFERS OUT:	0	(10,000)	0	(10,000)	(10,000)
Fund 230 - THORNAPPLE RIVER IMPROVEMENT FUND:						
TOTAL ESTIMATED REVENUES		98,882	97,900	109,184	110,709	97,900
TOTAL APPROPRIATIONS		37,947	100,900	27,809	50,925	97,900
NET OF REVENUES & APPROPRIATIONS:		60,935	(3,000)	81,375	59,784	0
BEG. FUND BALANCE - ALL FUNDS		120,542	181,477	181,477	181,477	241,261
END FUND BALANCE - ALL FUNDS		181,477	178,477	262,852	241,261	241,261

SHORELAND STEWARDS

PROGRAM GUIDE

MICHIGAN NATURAL SHORELINE PARTNERSHIP

www.mishorelinepartnership.org

www.mishorelandstewards.org

The Michigan (MI) Shoreland Stewards Program is an initiative of the Michigan Natural Shoreline Partnership (MNSP) designed to recognize lake front property owners who maintain their properties using lake-friendly practices.

Prepared by:
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269-312-2760
Michigan Department of Environmental Quality
Water Resources Division Nonpoint Source Program

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www.midwestglaciallakes.org

www.fws.gov

Environmental Assistance Center
1-800-662-9278
www.mi.gov/deq

www.watershedcouncil.org

MI Shoreland Stewards Program Guide

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Protecting Our Lakeshores

Where the land meets the water is an amazing area full of life with many plants, animals and fish that spend all or part of their lives near the lake. How the shoreland, including the upland, wetland, and water, areas are managed determines lake health. An undeveloped lakeshore will have a mix of trees and shrubs, flowers, grasses (native), ferns, and aquatic plants in the nearshore areas in many of Michigan's lakes. This natural vegetation helps keep a lake healthy by protecting the shoreline from erosion; providing homes, food, and refuge for fish and wildlife; and filtering pollutants from runoff.

However, the National Lakes Assessment indicates that Michigan's inland lakeshores are losing too much natural vegetation and need better care. The results of the assessment show the loss of lakeshore habitat is the biggest threat to the overall health of Michigan's inland lakes. Fifty percent (50%) of Michigan inland lakes have shoreline and nearshore habitat in poor condition while nutrient conditions are poor in about ten percent (10%) of Michigan lakes. This threat is a result of the cumulative effects of lakeshore development. Native plants are replaced with expansive lawns up to the water's edge, excessive impervious surfaces and houses built too close to the lake and too large for the lot. Seawalls and lake level control structures are installed and nearshore aquatic plants and woody habitat (trees and branches) are removed. Overdeveloped lakeshores cannot support fish, wildlife, or clean water.

A landscaping approach that has expansive lawns, with few trees, shrubs, wildflowers and few or no aquatic plants and logs in the water is typical of an urban, park-like landscape. Often lakefront property owners bring with them this traditional (high-impact) landscaping idea. Unfortunately, this landscaping approach causes many problems for the lake.

The different layers of vegetation of an undeveloped lakeshore. *Photo: Jane Herbert*

Fifty percent (50%) of Michigan inland lakes have shoreline and nearshore habitat in poor condition while nutrient conditions are poor in about ten percent (10%) of Michigan Lakes.

(2012 National Lakes Assessment)

Habitat is eliminated, easy pathways for water pollution are created, the shoreline is left unprotected against erosion, and the water is exposed to more sunlight. Without shade at the water's edge, the water becomes warmer and oxygen levels in the water decrease, causing problems for fish and their food supplies. Lawns are also a perfect invitation for Canada geese. They can be a nuisance and their droppings can easily wash into the lake, adding nutrients and bacteria. Owning a lakefront property and deciding how it is developed is a choice. Many properties are already overdeveloped, but others are not. Protecting or restoring your lakefront property will show you care about the lake and the other life that call the lake and surrounding land home. This booklet provides information about being better shoreland stewards. Share your shore with the fish and wildlife that live there because it is their only home.

Showing how expansive lawns have replaced natural shoreland vegetation.

WHO IS AT RISK?

67% of threatened or endangered birds, fishes, reptiles and amphibians in Michigan spend all or part of their lives in shoreland areas.

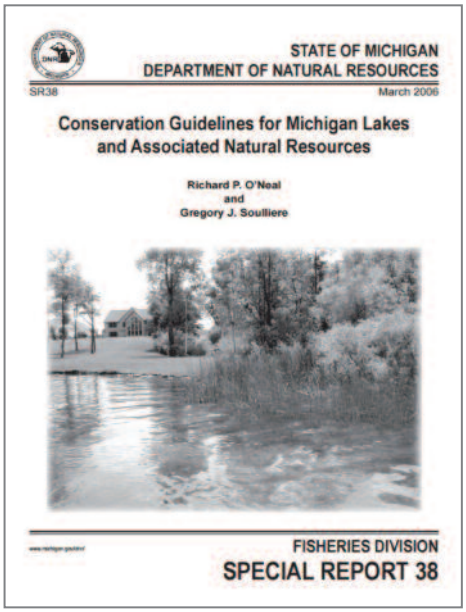
Under the public trust doctrine, Michigan holds all fish, amphibians, reptiles, mussels, mammals, birds and other wildlife in trust for the benefit of the people of Michigan.

(Conservation Guidelines for Michigan Lakes and Associated Natural Resources)

Program Introduction

Conserving Michigan Lakes

Lakeshore development, landscaping, and erosion control can be done in a way that minimizes negative impacts to the lake and meets lakefront property owners' recreational needs. But what is best for Michigan lakes? The Michigan Department of Natural Resources offers an answer to this question in the report titled *Conservation Guidelines for Michigan Lakes and Associated Natural Resources*. Recommendations for protecting and restoring the natural resources of Michigan lakes are outlined in this report.



These guidelines follow an ecosystem-based approach to natural resource management that combines ecological, social, and economic considerations towards the goal of conserving and sustaining our natural resources. In short, these guidelines are development recommendations that provide for recreational enjoyment and lake health.

The MI Shoreland Stewards Program was developed to recognize lakefront property owners who maintain their lakefront properties with lake-friendly practices. Conservation guidelines have been integrated into the program where applicable to individual properties. The program is an online educational tool to help lakefront property owners:

- ⇨ Evaluate their shoreland management practices.
- ⇨ Get advice about being a good steward of the lake.

In general, research indicates that 25% or less alteration or development of any inland lake habitat component is recommended to provide reasonable access and recreational use while still preserving the ecological integrity and protection of the public trust.

(O'Neal & Souilliere, 2006)

The MI Shoreland Stewards Program offers:
www.mishorelandstewards.org

- An online survey for lakefront property owners. At this time the survey is only designed for inland lake properties. While many practices do apply to the Great Lakes and riverfront properties, there are some questions that are inland lake specific.
- A personalized certificate for qualifying properties (participants with accounts only).
- An option to purchase a sign for qualifying properties to be placed on the lakeshore.
- An option for lake associations to register on the website.

Getting Started

Participation in the MI Shoreland Stewards Program is easy and can be done from your computer or a mobile device. To take the survey individuals can either create an account or take the survey without one. We prefer that you create an account because that helps us better understand what is happening at your inland lake and identify areas for improving the program and other lake protection efforts.

HAVE AN EXISTING SEAWALL?

See page 7, "Properties with Seawalls," for more information.

"Not only can you learn how to protect the lake waters and prevent erosion, you may also keep those pesky geese away," said Hal Willens, Vice President of the Pickerel-Crooked Lakes Association. "And if you already have a healthy shoreline, you can receive a recognition plaque to encourage your neighbors. There are even resources for beautiful native plants to add to your landscape and the appropriate people to help you accomplish your goals. I encourage you to try out the website today."

INDIVIDUAL REGISTRATION INFORMATION

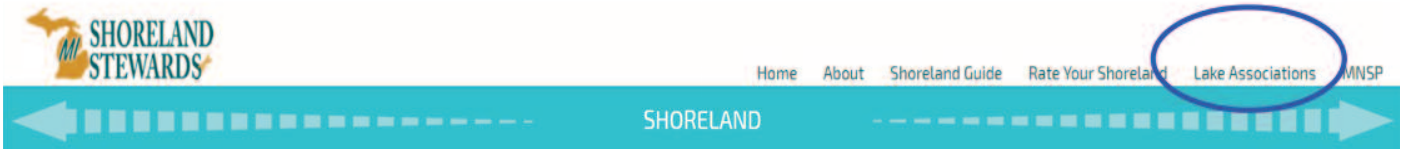
Registering for an account enables you to:

1) Save your answers. If you do not register your answers will be lost as soon as the browser is closed. You can register and save at any time throughout the survey.
2) Return to an unfinished survey exactly where you left off.
3) View your survey answers and suggested areas for improvement at any time.
4) Print your survey answers and suggested areas for improvement.
5) Showcase photos of your property.
6) Receive and print a personalized certificate at the end of the survey if your property qualifies.
7) Connect with your lake association (if they have registered on this site).

Place a sign on your qualifying lakefront property!
(See page 14)

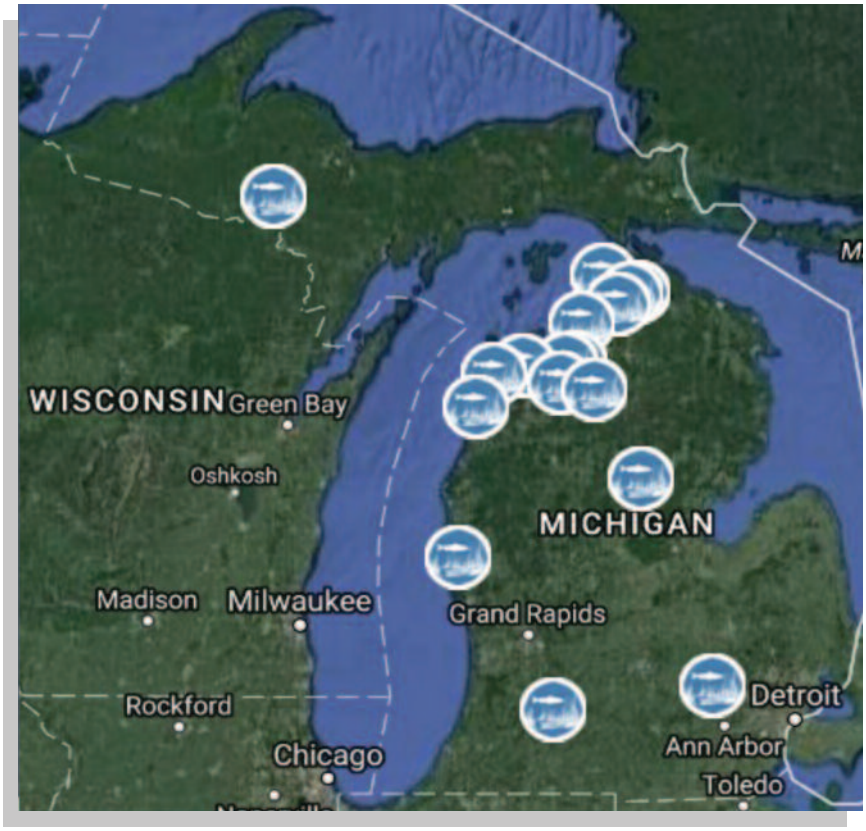
Lake Association Registration

Lake associations are provided an opportunity to register on the MI Shoreland Stewards Program website to connect with their members. Go to the “Lake Associations” page to find out how to register.



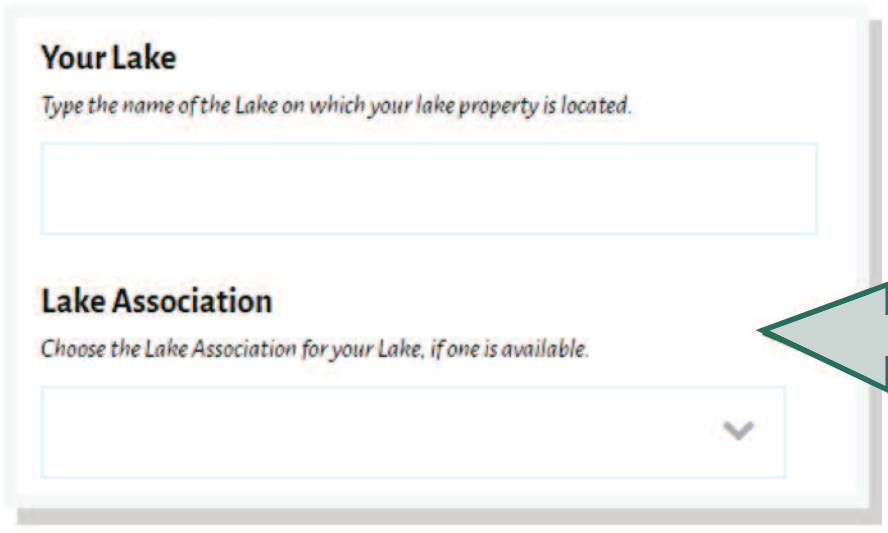
Lake associations that register on the MI Shoreland Stewards Program website will be provided their own lake association page on the Shoreland Stewards website. Lake association contacts can designate who can manage their account and contact information. There is also a short tutorial video available after login to help lake association contacts manage their page.

Once a lake association is registered, they are provided with different features and resource materials to connect and promote the program with their members.



FEATURE:
Map Icon

An icon will appear on the map at the location of the lake association once an account is activated. This icon is linked to the lake association page to provide information about the association.



FEATURE: Registration Listing

The name of a registered lake association is included in a drop down box for participants to choose during account registration.

The "Registration Listing" feature allows lake association contacts to be notified automatically through e-mail when a registered resident of their lake completes a survey. Lake association contacts are only able to view the survey results of the residents on their lake who have registered. This provides lake associations with the opportunity to recognize those landowners who have become Shoreland Stewards.

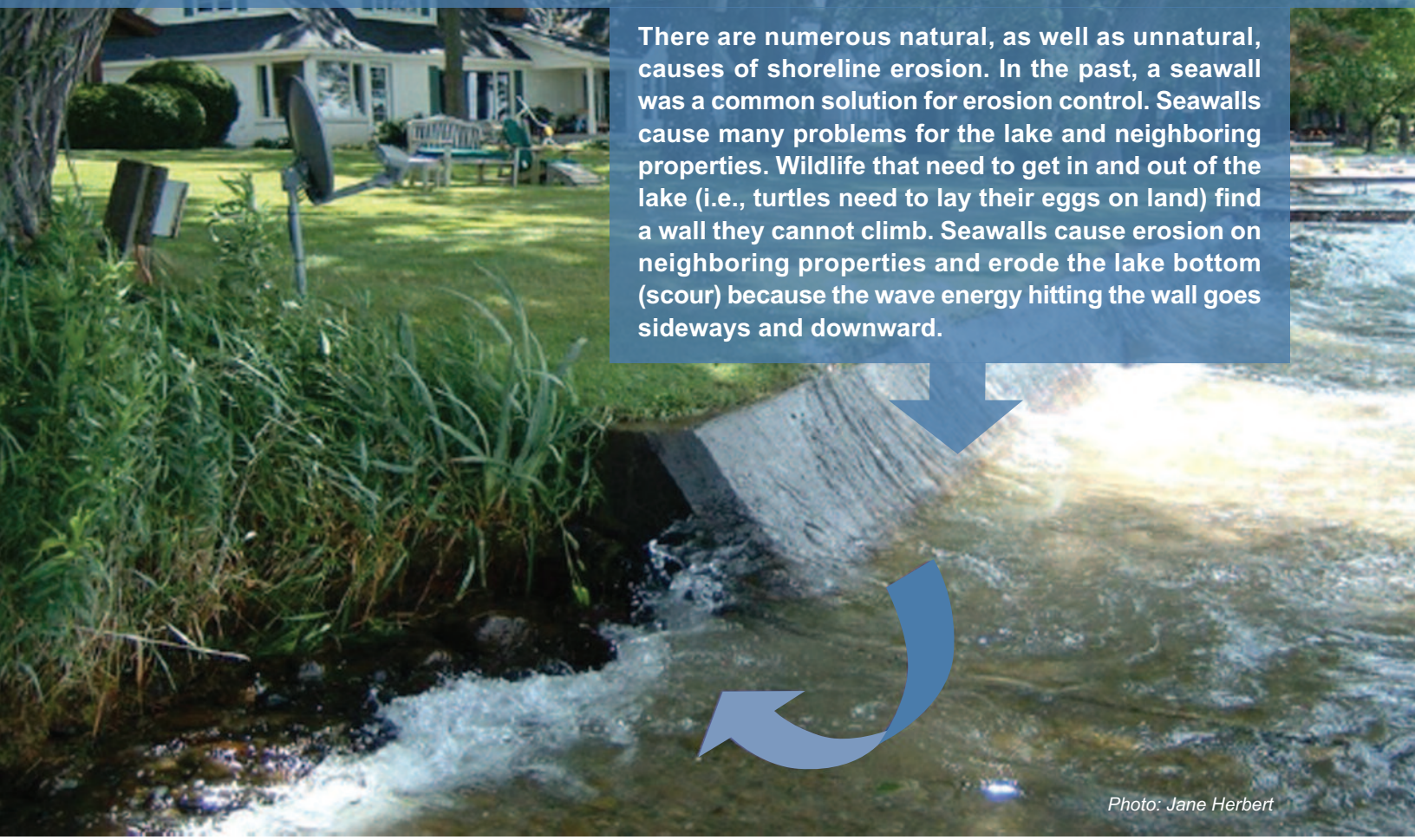
> *"As a lake association watershed biologist for Glen Lake, I find the lake association registration component of the Michigan Shoreland Stewards Program a valuable tool in evaluating our membership's participation with this exciting program. Not only does it give support and encouragement for other lake associations to participate, but it also provides us with excellent information to share with our membership."*
>
> *Rob Karner, M.S.*

FEATURE: MI Shoreland Stewards Promotional Materials

Registered lake associations are provided access to promotional materials that can be used to inform property owners about the program.

- Shoreland Stewards articles for lake association newsletters.
- Shoreland Stewards promotional ads (1/2 page and 1/4 page ads).
- Shoreland Stewards mailer.
- Shoreland Stewards electronic/digital files of the Shoreland Stewards signs if a lake association wants to add their logo to the sign. *Please note: The MNSP logo must remain on the sign. All costs are the responsibility of the lake association.*

Properties with Seawalls



There are numerous natural, as well as unnatural, causes of shoreline erosion. In the past, a seawall was a common solution for erosion control. Seawalls cause many problems for the lake and neighboring properties. Wildlife that need to get in and out of the lake (i.e., turtles need to lay their eggs on land) find a wall they cannot climb. Seawalls cause erosion on neighboring properties and erode the lake bottom (scour) because the wave energy hitting the wall goes sideways and downward.

Photo: Jane Herbert

No New Seawalls

The MI Shoreland Stewards Program discourages the installation of seawalls. Sites with new seawalls installed after December 31, 2018, will not be able to qualify to be a Shoreland Steward.

Existing Seawalls

Preventing new seawalls is important; however, there are existing seawalls where it may not be practical to remove and replace with a healthier option for the lake. If a seawall already exists on your property you can potentially still be recognized as a Shoreland Steward. There are management practices that can help improve a survey score though not every property with a seawall will be able to qualify as a Shoreland Steward.

Failing Seawalls

For the purposes of this program, a replacement seawall is not considered a new seawall. However, if your seawall needs replacing you are encouraged to look at more lake-friendly options. Replacing a failing seawall with a more lake-friendly option is a recommended practice when feasible.

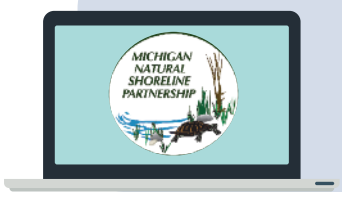
Maple Lake, Village of Paw Paw
Photo: Jane Herbert

Alternatives to Seawalls

The MI Natural Shoreline Partnership promotes bioengineering techniques for shoreline erosion. There many different options depending on site characteristics that are healthier for the lake. While not every site is a good candidate for bioengineering techniques, there are alternatives to seawalls for erosion control even for properties with high wave energy and ice problems. Solutions will vary depending on the site. In general, bioengineering control solutions are less expensive than seawalls.

A Michigan Department of Environmental Quality Permit is required for all construction at the shoreline.

www.mi.gov/deqinlandlakes



See the Michigan Natural Shoreline Partnership website for more information on problems with seawalls and bioengineering erosion control.

www.mishorelinepartnership.org

Survey: *What Level Are You?*

The MI Shoreland Stewards Program offers three different recognition levels: ***Gold, Silver, and Bronze.***

If a property does not qualify to be a MI Shoreland Steward, the survey will indicate a "Starter Level."

Can Every Property Qualify?

Every property is different. Some will qualify right away and some properties will need some practices changed before a gold, silver, or bronze level can be achieved. However, many properties may never qualify for recognition for a variety of reasons. The survey provides some general suggestions for improving your score. Once improvements are made the survey can be taken again.

Please note: Properties that have a seawall installed after December 30, 2018, will not qualify to be a MI Shoreland Steward. (See page 7 Properties with Seawalls for more information).

In general, a MI Shoreland Stewards property will have a high percentage of native vegetation, minimal impervious surfaces, limited storm water amounts entering the lake, natural/bioengineered erosion control instead of a seawall, and some aquatic plants and trees/branches remaining in the lake. There is a potential for a property with an existing seawall to qualify. Below are some general descriptions of what a property might look like for each level.

BRONZE

A property at this level may or may not have a seawall. If there is a seawall, best management practices are being used to reduce the negative impact of the seawall. This property will have natural vegetation, but may also have more lawn than a property at the Silver or Gold levels. Storm water runoff has been minimized and is not causing erosion.

SILVER

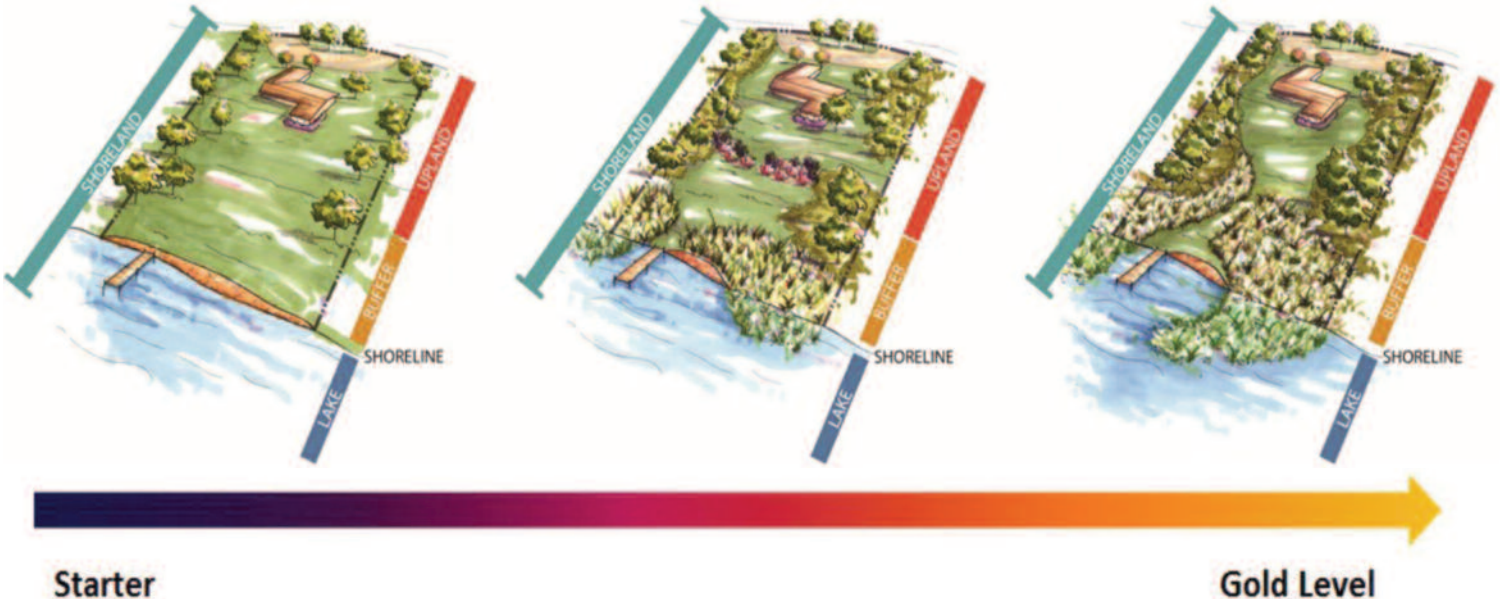
A property at this level will have fairly high levels of natural vegetation and will not have a seawall. However, there may be more lawn than the Gold level. Storm water runoff is not getting directly to the lake or causing erosion problems. Erosion at the shoreline is managed in a lake-healthy manner.

GOLD

A property at this level will have the most natural conditions with very high levels of natural vegetation and very little lawn. It will not have a seawall. Aquatic plants will be in the lake (where they would naturally exist), storm water runoff is not directly entering the lake or causing any erosion problems. Buildings may be difficult to see from the lake.

Starter: If the results of your survey indicate that your property is at the "Starter" level you are encouraged to make some improvements and take the survey again. The survey provides some general suggestions for improvements. If you are registered, your answers will be saved and you can also print your survey results. Remember, every property is different and while not every property will be able to qualify for a MI Shoreland Stewards recognition level everyone can do something to help their lake.

The illustration below shows a property that has transitioned from the starter level to the highest recognition level. It is initially a "Starter Level" due the amount of lawn in both the buffer and upland zones, the maintained/unnatural beach along the entire property, the entire shoreline being used to access the lake and all the plants removed in the aquatic zone. However, this property does have many positive characteristics such as no seawall, it hasn't been overbuilt with too many/too large of buildings, and does not have other impervious surfaces. Improving the survey results for this property can be accomplished fairly easily through reducing the lawn size. Native trees and plants have been added into the landscape while maintaining a view, access to the lake, and a swimming area. There are many properties similar to this one throughout Michigan where reducing the lawn size is needed to improve the survey score. However, other properties may have more challenges to overcome.

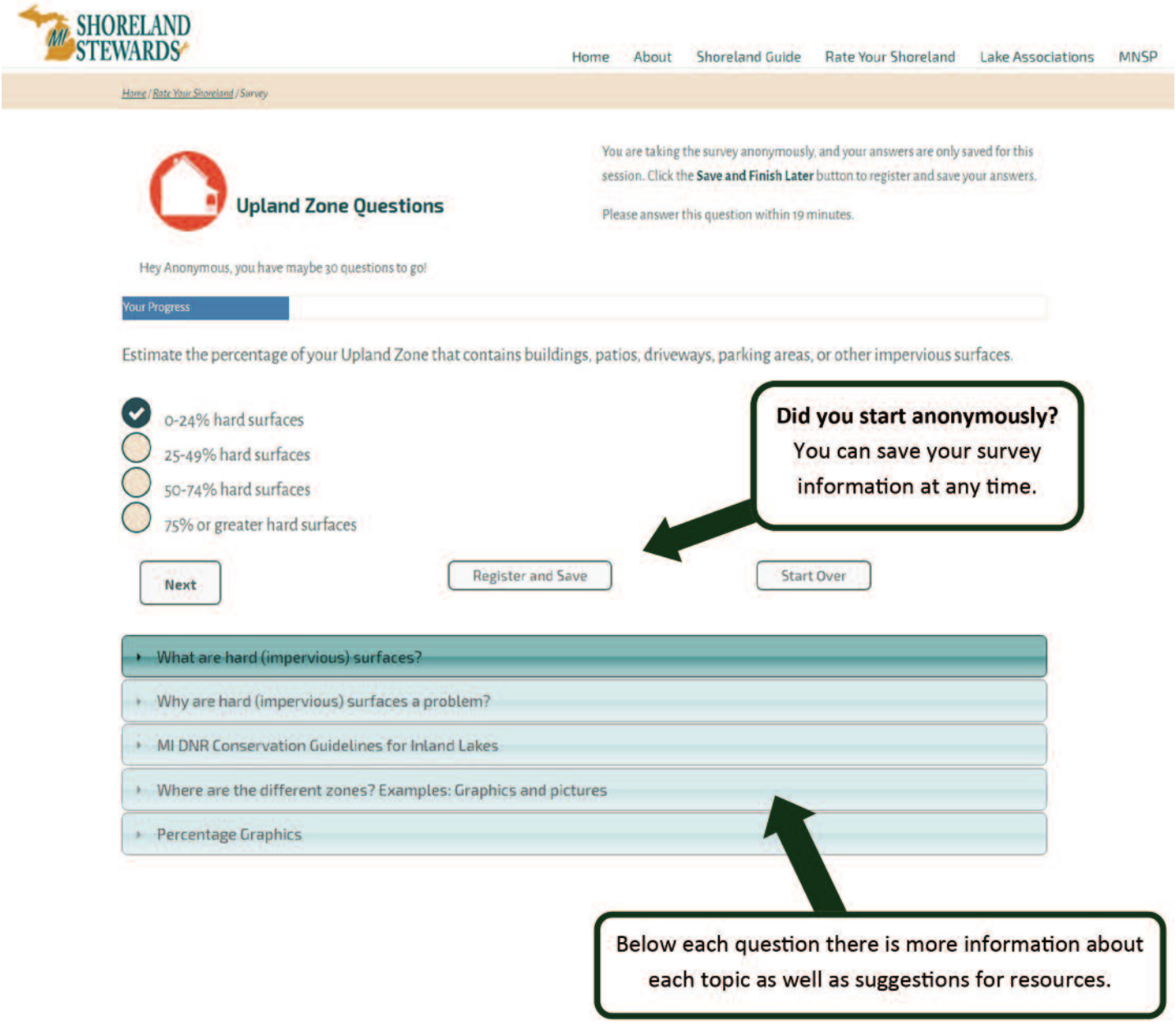


Illustrating a property moving from Starter Level to Gold Level. *Graphics: Kristin Faasse*

Survey: *What is in a Question?*

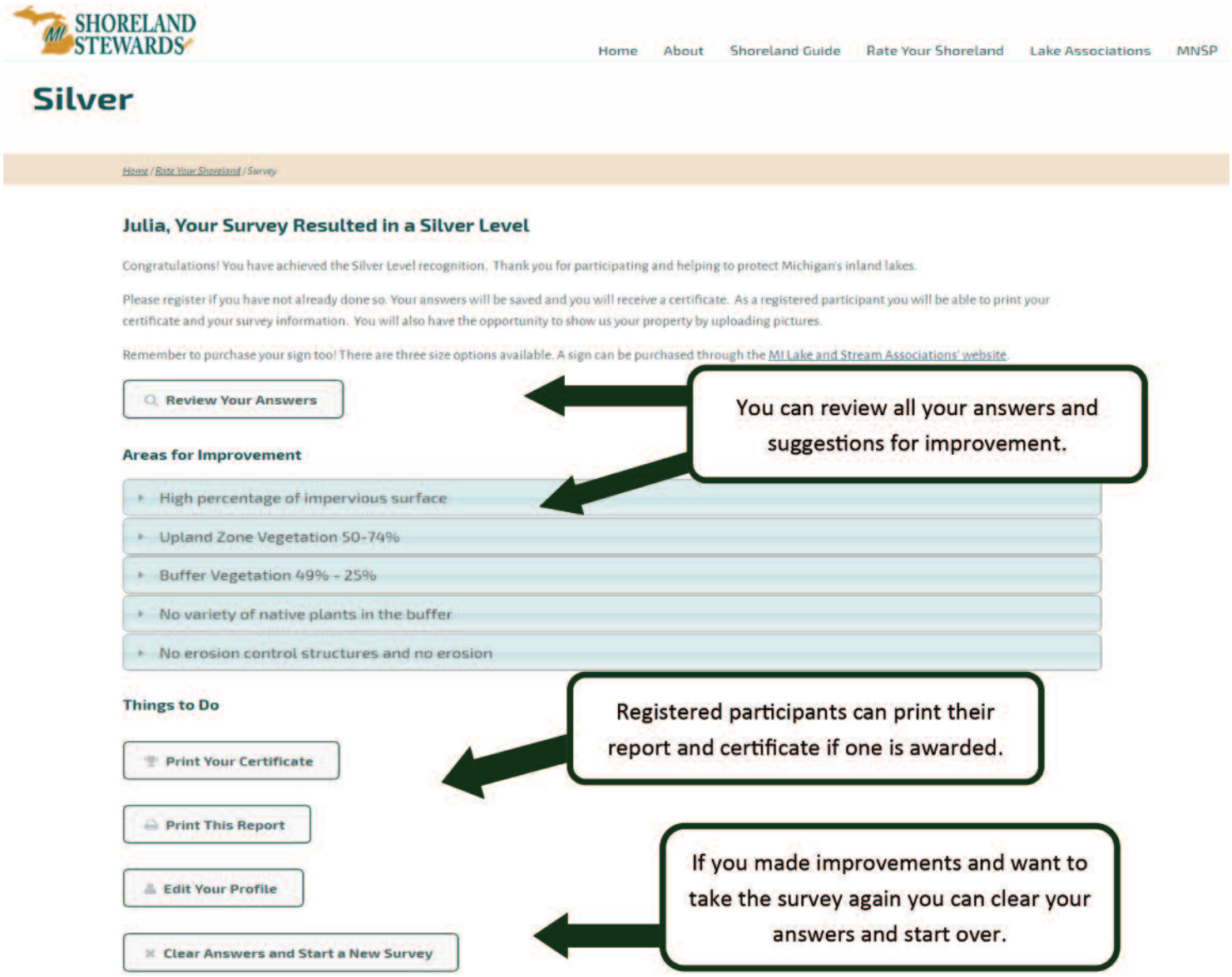
The survey includes questions about most aspects of property management, both on the land and in the lake. There are a total of 38 questions though not every respondent will be asked every question because some may not apply to a specific property. The survey is easy to use and takes approximately 30 minutes to complete.

Each question has its own page with information to help you along the way. Below is an example of what a question page looks like.



Survey: *End of Survey Information*

At the end of the survey, you will be provided information about the level you have achieved, your answers and areas for improvement, if any. If you have not yet registered, this is your last opportunity to register and save your answers.



Can I change my answers?

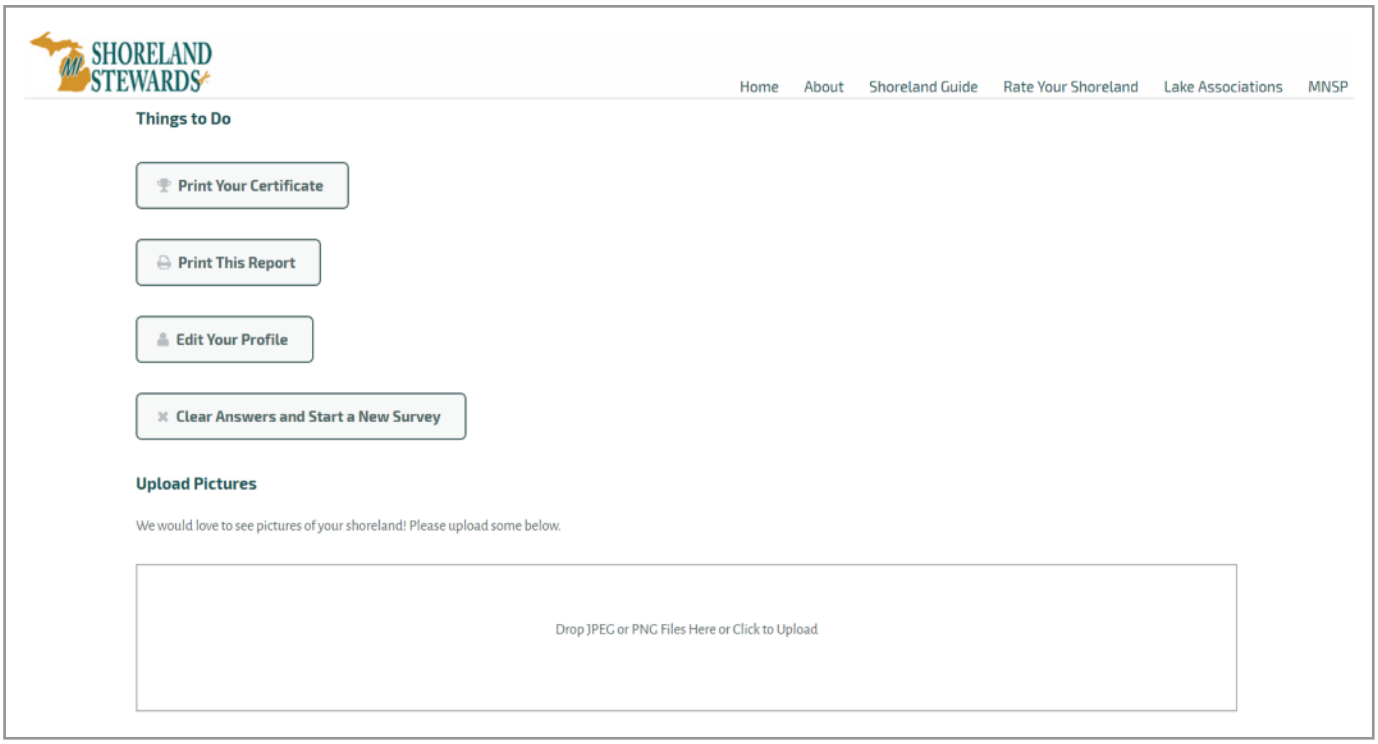
The internal design of the survey does not allow you to change one answer. If you want to change an answer, or if you have made improvements since your original survey, you can take the survey again.

Can I take the survey again?

Yes. Participants with an account have the ability to archive their original survey and then take the survey again.

Survey: *Uploading Pictures of Your Property*

Share your healthy shoreland property pictures! While uploading pictures is not a requirement, registered participants are encouraged to upload pictures of their property once they have completed the survey. In a participant's account under "Things To Do" you have the option to upload pictures: just drag and drop the picture file.



How are pictures going to be used?

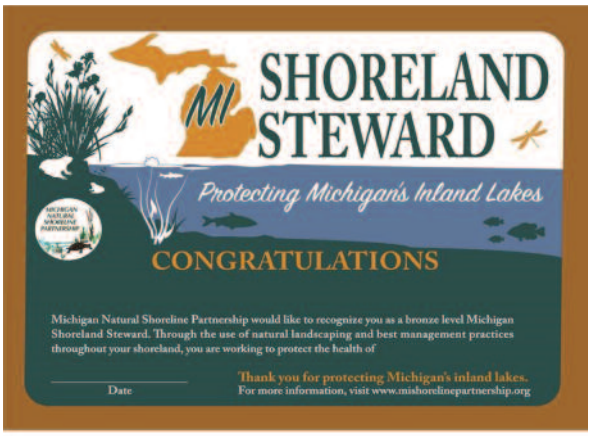
- ⇨ Pictures of properties help us evaluate the program and its effectiveness.
- ⇨ Pictures might be used in presentations, training videos, or informative publications to help us showcase a variety of different properties and to encourage others to become a Shoreland Steward.
- ⇨ Pictures are only used with property owner permission. Once you upload your pictures you can check a box to allow us to use them. Credit is provided whenever a photo is used.

Photo: Jill Baker,
Michigan Shoreland Steward

Certificates and Signs

MI Shoreland Steward Certificates

A certificate is awarded for registered participants of qualifying properties only. The certificate is automatically generated at the end of the survey for all three levels. The certificate is personalized with your name, lake name, and date. The color of the certificate's border will indicate the level your property has achieved. You can print it whenever you choose.



Sample Bronze Level Certificate

MI Shoreland Steward Sign

Signs are available to purchase for owners with qualifying properties. The signs can be placed in your yard or other location of your choice. There are three sizes available.

Sizes: 12" x 6", 16" x 8", and 24" x 12"
Small Medium Large

Material: .080 aluminum panel; pre-drilled holes

Border Color: There are 3 different border colors: gold, silver, and bronze.

Sample Gold Level and Silver Level small sign

Purchasing a Sign

The MNSP works with partners to make signs available for purchase. At this time there are two options available.

Option 1: Order online at the Michigan Lake and Stream Associations website, www.mylsa.org. This option provides signs with only the MNSP logo.

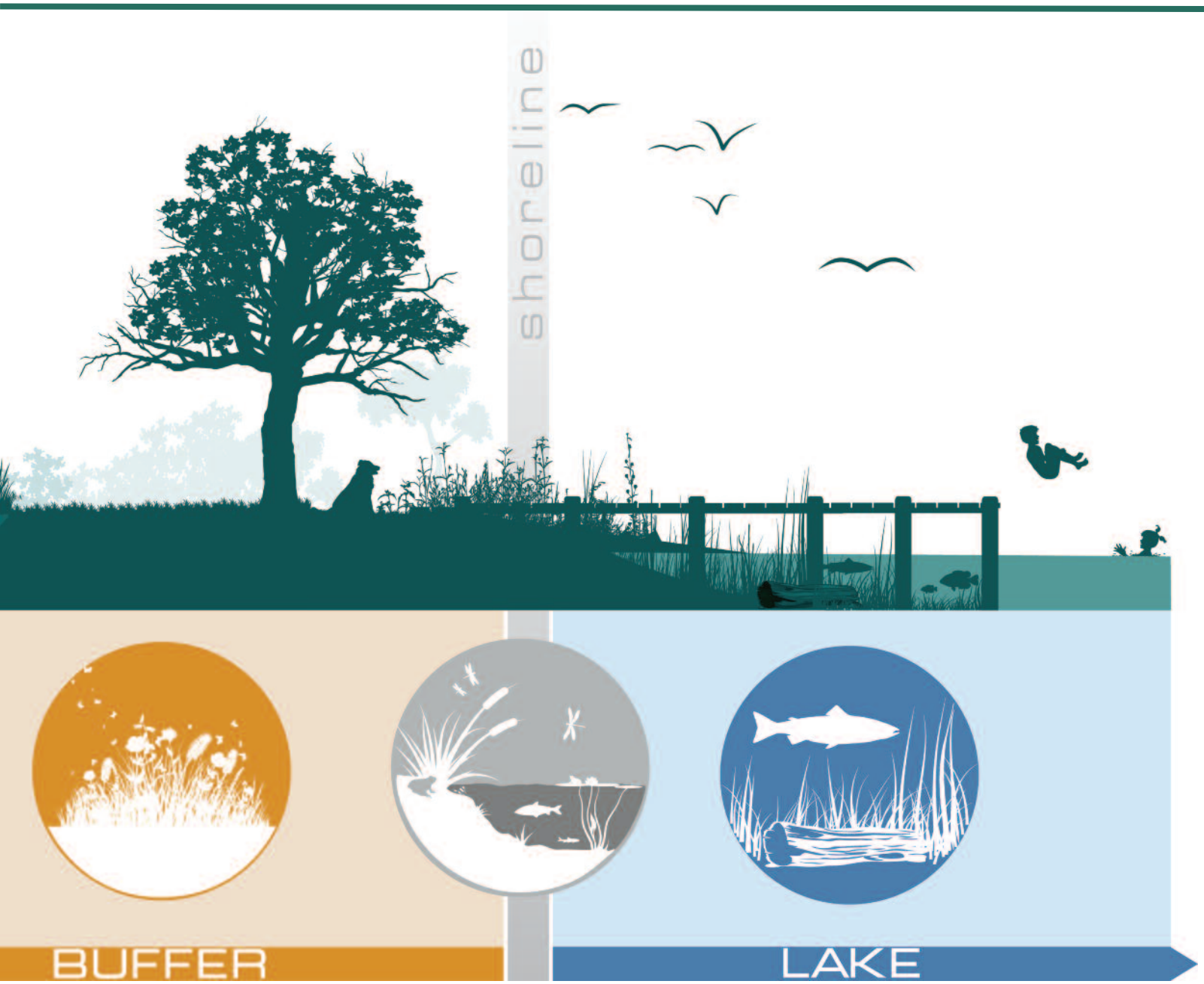
Cost: Small: $20; Medium: $28; Large: $38. Includes shipping charges.

Option 2: If a lake association has registered on the MI Shoreland Stewards website they have the ability to customize the signs with their lake association logo. The cost of a customized sign is determined by each individual lake association. See "Lake Associations" on the Shoreland Stewards website to find out if your lake association has registered on the site and offers signs.

Cost: Will vary depending on the lake association.

Evaluating Your Property: *Understanding the Four Zones*

Evaluating your property in each of the zones will require some observation, honesty, and your best judgement.



For the MI Shoreland Stewards Program the lakefront property has been divided into Four Zones: Upland, Buffer, Shoreline, and Lake.

The survey asks questions regarding specific management practices relative to each zone and the protection of the lake. Maintaining a high percentage of natural vegetation around a lake is very important to the overall health of the lake. Accordingly, some survey questions are weighted more heavily than others. Properties that are maintained in the most natural of conditions will produce the best results in the survey (e.g., properties with the highest percentage of natural vegetation, the lowest percentage of impervious surfaces, and no seawalls.)

Evaluating Your Property: *Understanding the Four Zones*

What do these zones look like on my property?

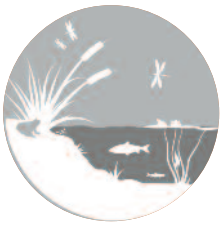
Every property is different so each zone will vary between properties too. These zones:

- Do not have distinct lines of separation.
- Vary in both size and shape depending upon many factors including, but not limited to, lot size, soil type, slope of the land, the shape and type of the lake, and water level fluctuations.

Some general descriptions and graphics of the zones are provided to help you determine where each zone begins and ends based on your property characteristics. These graphics and other information are also provided during the survey to help guide you.

Upland Zone: This zone is the furthest from the lake. It starts where the Buffer Zone ends 35 feet from the top of the shoreline bank. This zone typically includes most of the structures such as the house, driveway, and garage.

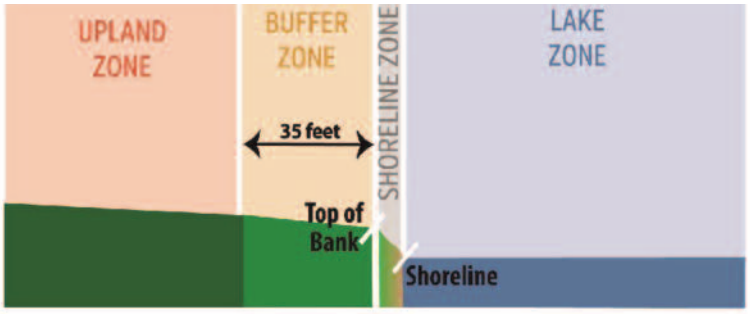
Buffer Zone: This zone is immediately next to the lake. It begins at the top of the bank (edge of the Shoreline Zone) and is the first 35 feet of the lakefront property.



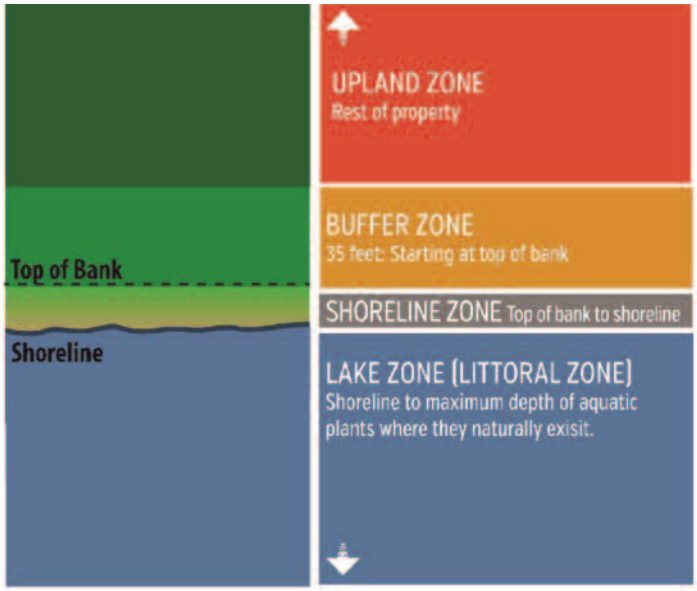
Shoreline Zone: This is the transition zone from water to land. There is not an exact line between the buffer and lake zones. It begins at the top of the bank and extends to the land-water interface. The shape and size will vary greatly depending on the lake, water level changes, soils, and other factors.

Lake Zone: This is the nearshore area or “littoral zone” of the lake. It is the shallow part of the lake where there is enough sunlight reaching the lake bottom to allow aquatic plants to grow. The size of this area will vary depending on the lake size, shape of the bottom of the lake (bathymetry), and water levels. Some lakes will have very large littoral zones with a lot of aquatic plants and some will have very small ones with few aquatic plants.

# of a Shoreland Property

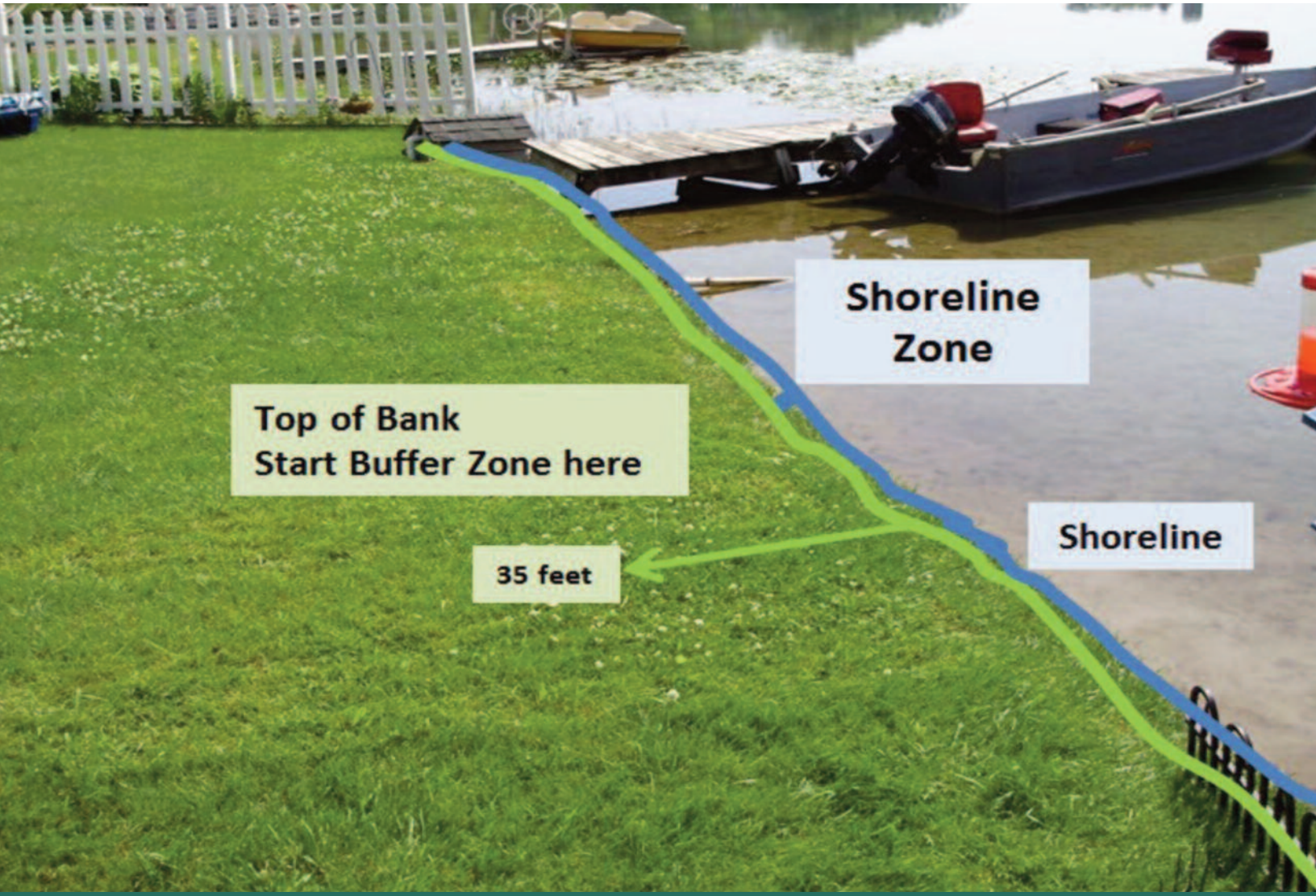


Cross-section view

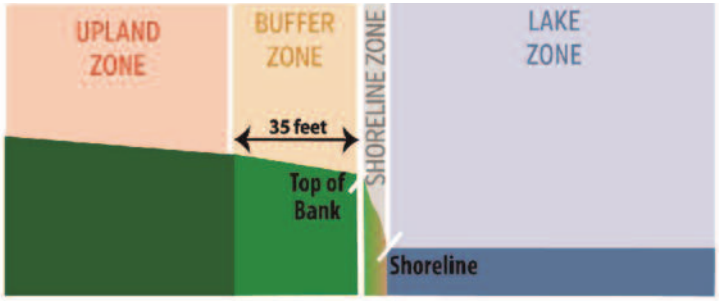


Plan view

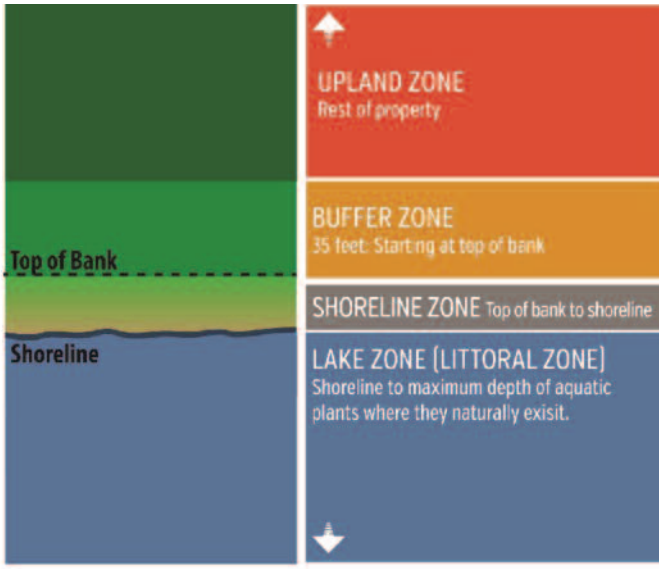
Shoreland Zones 1: Showing a small shoreline zone with little slope.



Continued: What do these zones look like on my property?

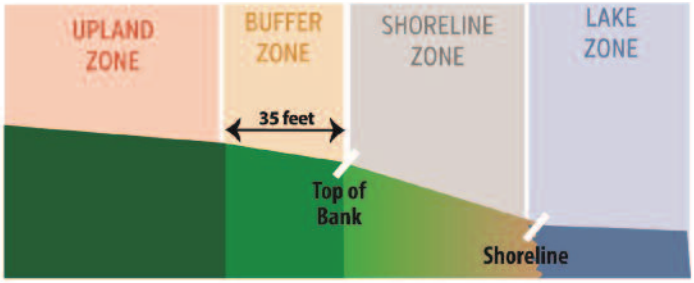


Cross-section view

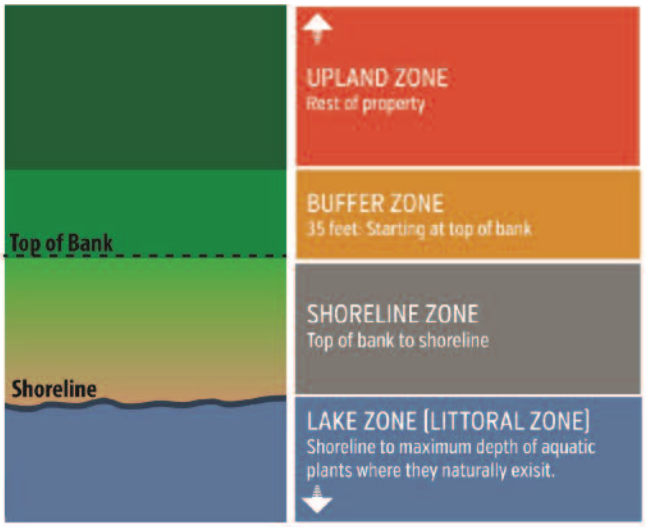


Plan view

Shoreland Zones 2: Showing a narrow shoreline zone with steep slope.



Cross-section view



Plan view

Shoreland Zones 3: Showing a wide shoreline zone with gradual slope.

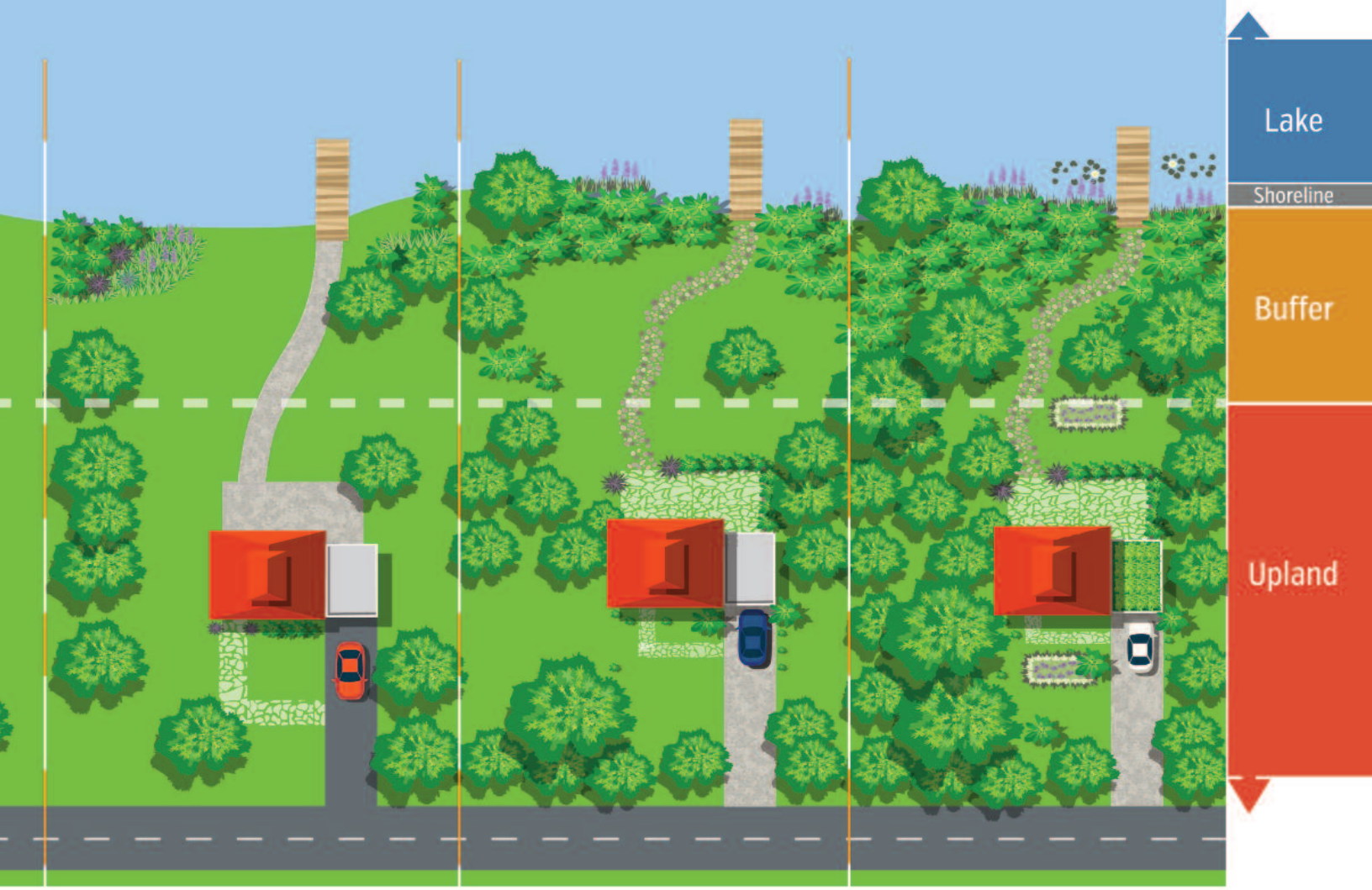
Guidelines for Michigan Lakes by Zone

The *Conservation Guidelines for Michigan Lakes* report recommends that development should be looked at from a whole lake and an individual property perspective. The MI Shoreland Stewards Program addresses individual property management. The guidelines, where they apply to individual properties, have been applied to each different zone to help property owners better evaluate their lakefront property. In general, the guidelines recommend shorelines should remain naturally sloped without a seawall, have at least a 35-foot naturally vegetated buffer strip, and trees and branches should remain in the lake where safety is not a concern.

This graphic is showing what different vegetation percentages for the Upland and Buffer Zones might look like. It also includes a depiction of differing amounts of impervious surfaces and aquatic vegetation. Every property is different, so each should be evaluated based on its own characteristics.

Upland Zone: Seventy-five percent (75%) or more of this zone should be naturally vegetated. Impervious surfaces should be minimized. This includes the number and size of buildings and their footprints (the area of ground they occupy). Storm water should be captured and infiltrated, not directly piped to the lake. Pet waste should be picked up. Septic systems or holding tanks, where applicable, should be functioning and maintained properly. Fertilizer use should be minimized or eliminated, included phosphorus-free fertilizers. Pesticides and herbicides should be minimized and used only to spot treat where necessary.

Buffer Zone: Properties should maintain a 35-foot vegetated buffer. Seventy-five percent (75%) of this zone should have native plants/trees/shrubs with twenty-five percent (25%) or less of this zone used for recreation and access to the lake. This zone should be vegetated in a way that allows for trees/branches to fall into the lake. There should be no impervious surfaces. Boat and dock storage should be minimized. Pet waste should be picked up. No fertilizer should be used in this zone. Only spot treatment of herbicides should be used if needed for invasive species control. Artificial beach creation is highly discouraged but where maintained this practice should be minimized to a small area.



Shoreline Zone: A naturally sloped and vegetated shoreline should be maintained. Seawalls should not be constructed and existing seawalls should be removed where possible. Twenty-five percent (25%) or less of this shoreline zone should be used for recreation and access (e.g., boat docks) to the lake. Vegetation should be maintained to allow trees/branches to fall into the lake. An artificial beach should not be constructed or maintained. Buildings/structures should not be built in this zone.

Lake Zone: Native plants should not be removed or reduced in the lake except for a small swim area or boating lane. Invasive plants should be controlled using selective methods that do not harm native plants. Boat docks and other structures should not interfere with navigation or natural movements of water or animals. Benthic barriers (mats placed on the lake bottom) or weed rollers for plant control should not be used unless temporarily for control of invasive plants. Sand should not be added to the lake bottom. Branches and trees that have fallen into the lake should not be removed unless safety is a concern.

Evaluating Your Property: *Survey Questions*

The MI Shoreland Stewards survey is designed to focus on management practices for an entire lakefront property. The survey questions are organized by zone and are provided below. You are encouraged to use these questions to observe your shoreland property prior to taking the survey. If you have a question about a topic there is more information on the question page in the survey.

UPLAND ZONE

Do you pick up pet waste?

What type of wastewater management do you have? If a septic/holding tank, are you managing it properly?

Do you ever use herbicides or pesticides to manage weeds, pests, or invasive plants?

How often do you apply fertilizer and are you only using phosphorus-free in your Upland Zone?

What is the percentage of your Upland Zone that contains buildings, patios, driveways, parking areas, or other impervious surfaces?

Is storm water getting to the lake and, if so, how? (Hint: check roofs, patios, driveways, paths, etc.) Are there any eroding areas in your Upland Zone?

BUFFER ZONE

Do you have any boats, docks, etc., stored here and has storage been minimized by stacking, vertical storage, or elevating on blocks?

Do you pick up pet waste?

Do you ever use herbicides or pesticides to manage weeds, pests, or invasive plants?

Do you ever apply fertilizer in the Buffer Zone?

What percentage of your Buffer Zone has trees, shrubs, flowers, native grasses (other than lawn)?

Is there a variety of native plants (other than lawn)?

What percentage of your Buffer Zone is maintained/artificial beach?

What percentage of your Buffer Zone is impervious surfaces (boathouses, decks and patios, storage sheds, etc.)

Do you leave ashes from a fire pit or piles of leaves in this zone where they may wash into the lake?

SHORELINE ZONE

What percentage of the Shoreline Zone do you use to put boats in the water, swim, or access the water?

Do you have any boats, docks, etc., stored here and has storage been minimized by stacking, vertical storage, or elevating on blocks?

Do you have erosion control structures and, if so, what type? (seawall, rip-rap, bioengineering, hybrid)

Has rip-rap been added in front of your seawall?

Have you planted or allowed native plants to grow in the rip-rap?

Is there a boathouse, boat well, or permanent dock?

LAKE ZONE

Is there a boathouse, boat well, or permanent dock?

Do you remove native nearshore vegetation?

Do you limit removal of native nearshore vegetation to small swim areas or to where access would be difficult?

Do you (personally) smother plant growth with mats (benthic barriers), sand, etc., or use weed rollers to control aquatic plants?

Are you (personally) controlling aquatic plants (native or invasive) or swimmer's itch with chemicals?

Do you coordinate with your lake association to manage aquatic plants?

Do you throw leaves, lawn clippings, or fire ashes into the lake?

Do you add sand to your lake?

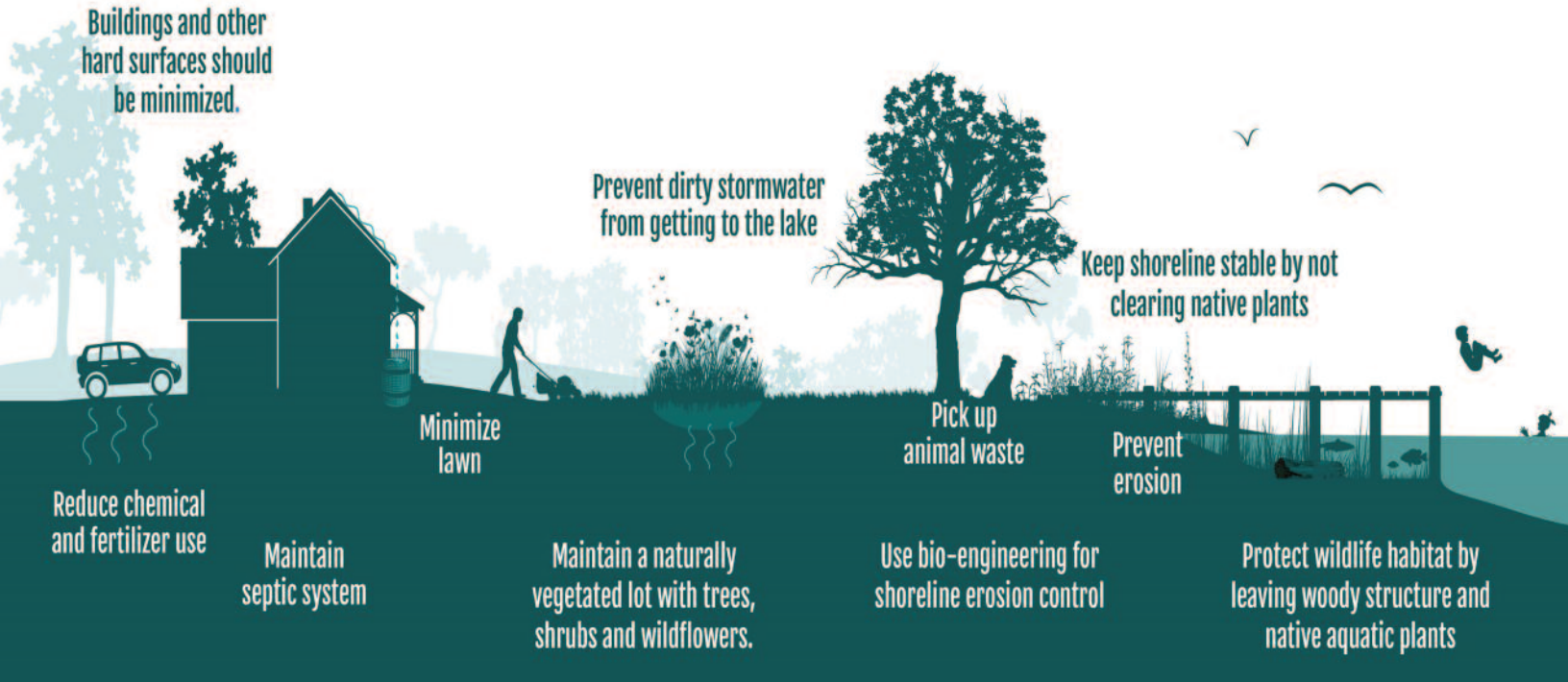
TIP: Walking your property in all types of weather and seasons can help you better understand such things as how and where storm water flows, what the waves look like and how ice impacts your shoreline.

Shoreland Best Practices:

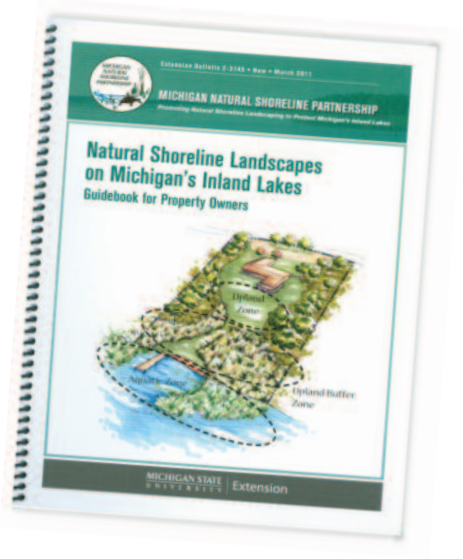
A well-designed lakefront landscape will protect and enhance shoreline and nearshore habitat areas. It can balance lake access, views, aesthetics, shoreline stabilization, water quality, and habitat restoration for fish and wildlife populations. Many properties are doing really well according to the recommendations outlined in *Conservation Guidelines for Inland Lakes* and can easily qualify as a Shoreland Steward. Other properties just need a little help to enhance natural landscapes to qualify. However, some lakefront properties are so highly developed a significant amount of restoration would be needed and may not be practical or even feasible. Nevertheless, every owner can do something to improve management of their property to help the lake.

Photo: *Howard Wandell - Gold Level Shoreland Steward*

Best Management Practices



The Michigan Natural Shoreline Partnership's website (www.mishorelinepartnership.org) includes additional information about the importance of natural shorelines. In addition, the guidebook *Natural Shoreline Landscapes on Michigan's Inland Lakes: Guidebook for Property Owners* includes additional information about actions to restore natural shorelines and protect inland lakes. The guidebook includes more detailed information about best management practices as well as regulatory requirements for work done at the lakeshore. The guidebook can be purchased through the Michigan State University Extension Bookstore (www.msue.msu.edu).



Graphic: *Glenn Wolff, www.glennwolff.com Courtesy of The Watershed Center at Grand Traverse Bay*

Common Concerns

Will I have a place to swim?

Yes, healthy shorelines can include access for swimming and other recreational activities.

How will restoration efforts affect my view?

Healthy shoreland properties can be landscaped/designed to maintain a view.

Will mosquitoes and other insects increase?

Mosquitoes will not likely increase. However, insects like butterflies and other pollinators – and birds that eat insects – will increase with the availability of their habitat.

Upland Zone Best Management Practices: *Capture the Rain*

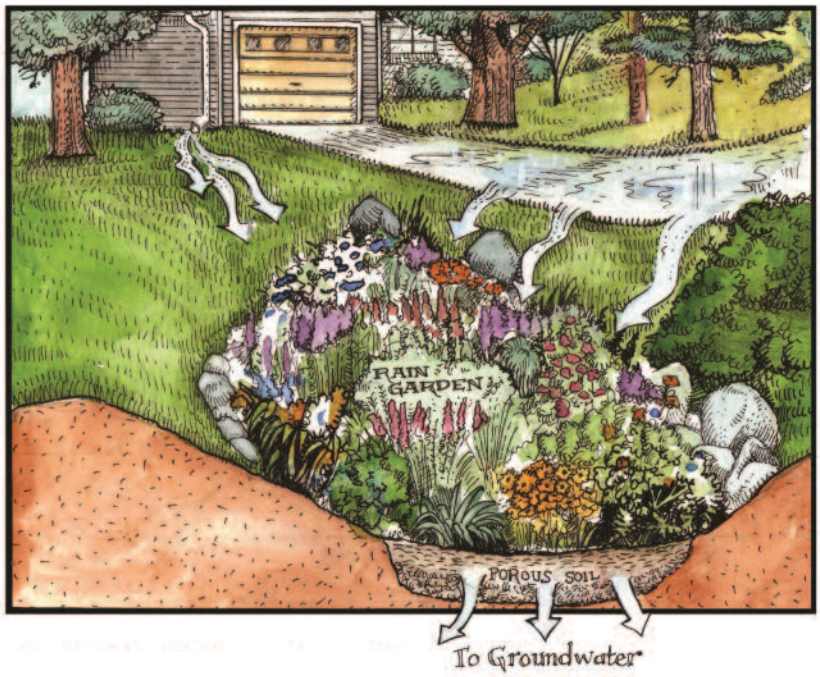
Storm water runoff increases when rain or melting snow is prevented from soaking into the ground by hard, impermeable surfaces like driveways and rooftops. Since the water cannot soak into the soil, it instead flows across the surface. When the flow is concentrated or strong, soil particles can break loose and erosion occurs. Also, runoff water can pick up pollutants like phosphorus and nitrogen from your yard or heavy metals and contaminants that come off cars, driveways, and rooftops. Since most shoreline properties are sloped towards the lake it is important to slow or stop storm water runoff near the source before erosion on your property and contamination of your lake occurs. It is also important to avoid directly piping storm water to a lake where possible. There are many best management practices both for an individual home or community to use to keep polluted storm water out of a lake.

The guidebook titled *Controlling Runoff and Erosion from Your Waterfront Property* provides landowners with practical, how-to information to address runoff and erosion. The descriptions and illustrations walk the reader through methods to assess runoff concerns and to address them through minimizing, diverting, and infiltrating runoff. This is a Wisconsin publication so some information such as permit requirements will be different for Michigan.

Controlling Runoff and Erosion from Your Waterfront Property: A Guide for Landowners

https://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/resources/healthylakes/RunoffGuide.pdf

Encourage Infiltration



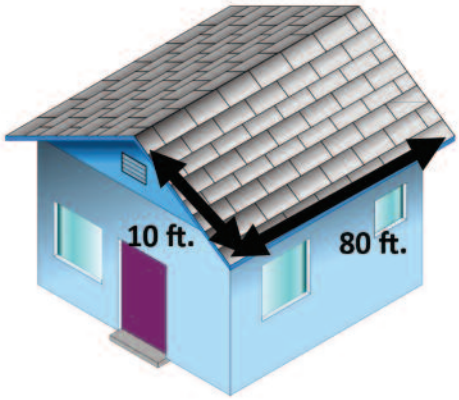
Graphic: *Glenn Wolff, www.glennwolff.com*
Courtesy of The Watershed Center at Grand Traverse Bay

One way to keep storm water out of your lake is to plant a rain garden. Rain gardens capture, filter, and allow water to soak into the ground. These gardens have a porous soil mixture of sand or gravel beneath a bed of native plants. Runoff water collects in the rain garden, soaks quickly into the soils, or is absorbed by the plants in the garden. You can collect roof or driveway runoff using this practice, while providing important food and nectar sources for pollinators.

How much runoff does a 1,600 square foot rooftop make in a 1-inch rain event?

997 gallons of water

If it rains 1 inch 10 times per year that is 9,970 gallons of water from just one house!



80 ft. x 10 ft. x 2 (sides) = 1,600 sq. ft.

Consider Alternative Pavements

When constructing pathways consider using porous alternatives like stepping stones, permeable pavers, or porous concrete that allow water to infiltrate into the ground.

Best Management Practices to Control Shoreline Erosion

Protecting a shoreline from accelerated erosion without installing a seawall can be challenging, but there are alternatives to seawalls. There are many techniques available to address shoreline erosion while supporting the lake ecosystem and protecting lakefront property. “Soft armoring” or bioengineering is a method that uses plants, plant products and other special techniques to protect the shoreline. Each site is unique and therefore generally requires a customized solution using a variety of different methods. Understanding shoreline erosion and developing solutions can be very simple or complex depending on the site and lake characteristics.

Low Wave Energy Site

A site that experiences low wave energy, has very limited erosion and lawn up to the water’s edge may only need a simple solution simple. One option may be to re-establish native plants in the Buffer Zone. Lawn grass has a shallow and weak root structure and cannot hold the soil in place against constant wave energy. Native plants that would naturally be found at a lakeshore have a stronger, deeper and more complex root structure to hold soil in place.

Photo: *Julia Kirkwood*

The more complex the site,
the more complex the solution.

Best Management Practices to Control Shoreline Erosion

Low-Medium Wave Energy Site

Other properties have a higher level of wave energy and may be experiencing a moderate amount of erosion. These sites will need a slightly more complex solution than just plants. One technique is to use coir (coconut) fiber logs to protect the shoreline. Plants will grow into the coir logs. Eventually, the coir logs will biodegrade, leaving behind well-established plants.

Before: June 2010
After: July 2013

Photos: Jane Herbert

Before: June 2014
Photo: Jane Herbert

After: June 2014
Photo: Jane Herbert

High Wave Energy with Ice Push Site

Some sites are challenging due to high wave energy and ice push. This bioengineered design included approximately 25 cubic yards of rock of varying sizes. This solution was designed to protect the shoreline against wave and ice action. The rock was sloped in a way that allows ice to “run-up” the rock and break under its own weight. It was also designed to allow the sand to fill in the spaces between the rock and eventually hide the rock. Notice that after two growing seasons the rock is almost completely covered.

After: October 2015
Photo: Jane Herbert

Native Plants

Returning or adding native plants to your lakefront landscape can seem overwhelming for a variety of reasons. Property owners often lack the knowledge about native plant selection and placement. The Michigan Natural Shoreline Partnership has created a list of recommended native plants to help with decisions. The selected plants have been divided into four different zones based on where the plants would be most successful along an inland lake shoreline. These plants are found widely throughout Michigan and are also currently available for purchase at Michigan native plant nurseries.

The Michigan Natural Shoreline Partnership's website has:

- ⇨ A list of native plants that are appropriate for each planting zone.
- ⇨ Links to a picture for each plant.
- ⇨ Some options for finding locations to purchase native plants.

Also check out the Michigan Native Plant Producers Association
www.mnppa.org

Not every plant will be successful in every location, so it is important to seek information about what plants are already in and around your lake for the best results.

Finding Help

Contractor Help
Certified Natural Shoreline Professionals

The Michigan Natural Shoreline Partnership initiated a contractor training program in 2010. This program is for contractors that work at the lake edge and want to learn about lake-friendly erosion control and bioengineering techniques.

To become a Certified Natural Shoreline Professional, contractors must complete two days of in classroom instruction, a field exercise and pass an exam.

For more information on the contractor training program and a list of contractors see the MNSP website.

www.mishorelinepartnership.org/contractors

2012 Certified Natural Shoreline Professional Training Field Day Photo: *Jane Herbert*

ARE PERMITS NEEDED?

When doing work at the water's edge there is a high likelihood that a permit or multiple permits may be needed. Many communities regulate the removal of vegetation, building setbacks and septic system locations. Contact your local planning office for ordinance information.

In general, a Soil Erosion and Sedimentation permit is required for any earth change activity that disturbs one or more acres of land or which is within 500 feet of a lake or stream. Contact your local Soil Erosion Permitting agency.

County Map—for SESC Permitting
www.mi.gov/soilerosion

Many activities along inland lake shorelines require a permit through the Michigan Department of Environmental Quality including, but not limited to, docks, any construction, dredging, filling or artificial beach creation.

For more information on permit information check with the Michigan Department of Environmental Quality's Water Resource Division.

www.mi.gov/deqinlandlakes

Permits are also required for aquatic plant chemical treatment and the use of benthic barriers.

www.mi.gov/anc

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