

Natural Shoreline Landscapes on Michigan Inland Lakes

A workshop for local government officials.

Healthy Lake Ecosystems

MICHIGAN NATURAL SHORELINE PARTNERSHIP
Promoting Natural Shoreline Landscaping to Protect Michigan's Inland Lakes

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This Certifies that

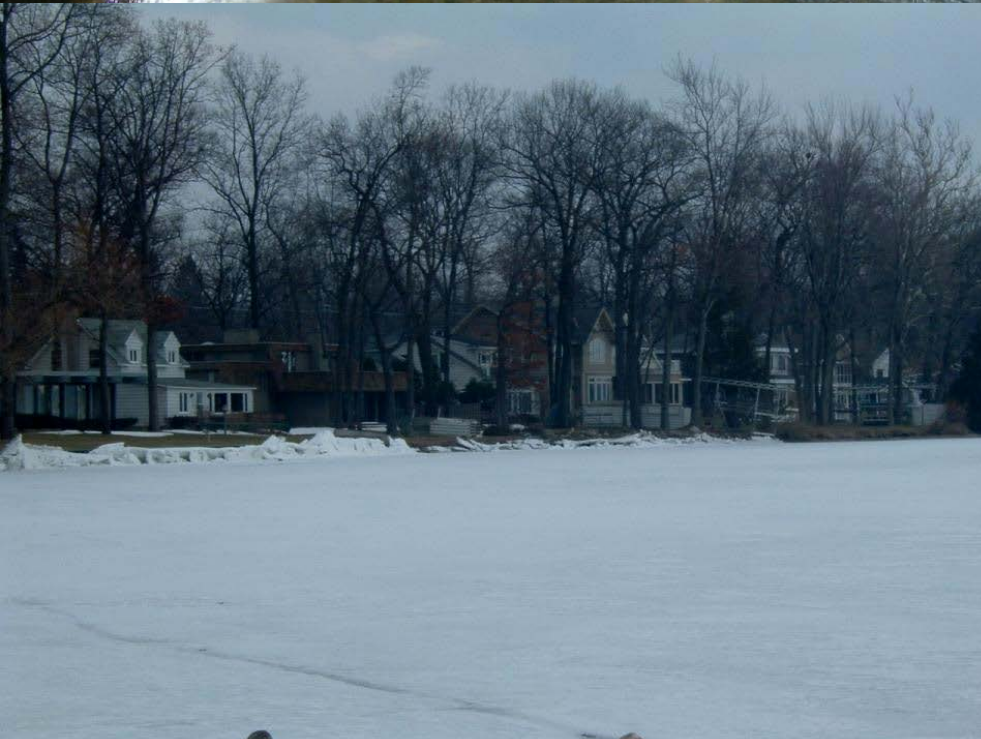
Heidi Shaffer

*Has successfully completed the Michigan Natural
Shoreline Professional Training
and
Certification Program*



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Shoreline vegetation removal: Consequences on inland lakes

- Lawn to the water's edge
- Loss of fish and wildlife habitat
- Nuisance animal habitat
- Shoreline erosion and hardening
- Loss of shade
- Deadwood removal
- Sandy beach maintenance
- Polluted stormwater
- Excessive plant growth and algae blooms
- Oxygen loss
- Recreation impacts
- Chemical treatment



What Can We Do?

- Natural Shorelines
- Buffers
- Stormwater Management
- Work together to enlighten property owners
- Change the mindset



Naturalize shorelines to restore habitat, stabilize shorelines AND improve 'curb' appeal





This Certifies that

Diane Crandall

*Has successfully completed the Michigan Natural
Shoreline Professional Training
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Certification Program*



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Soft engineering...

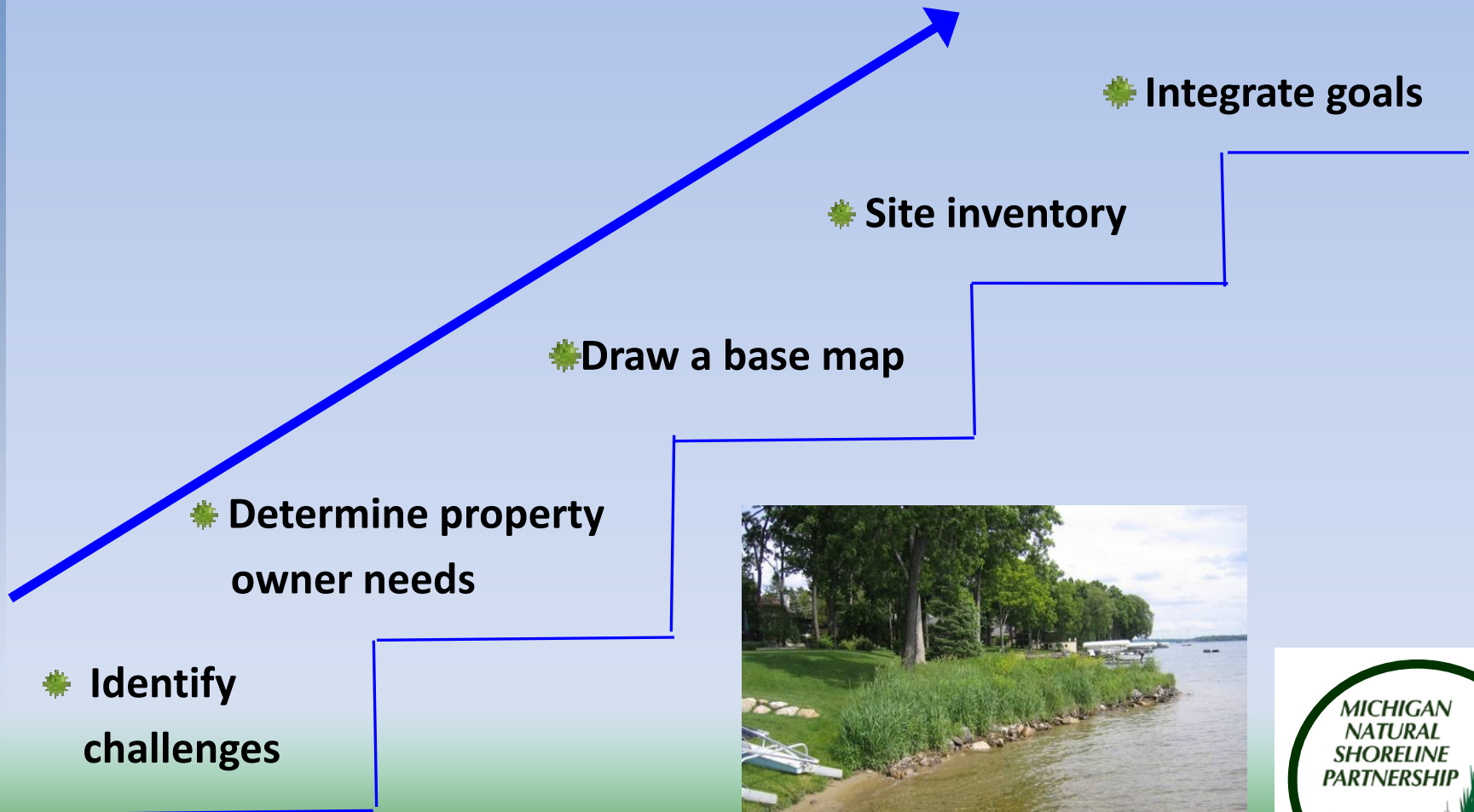


...uses plants, plant products and special techniques to protect soil surface and create structure within the soil to withstand erosive forces.

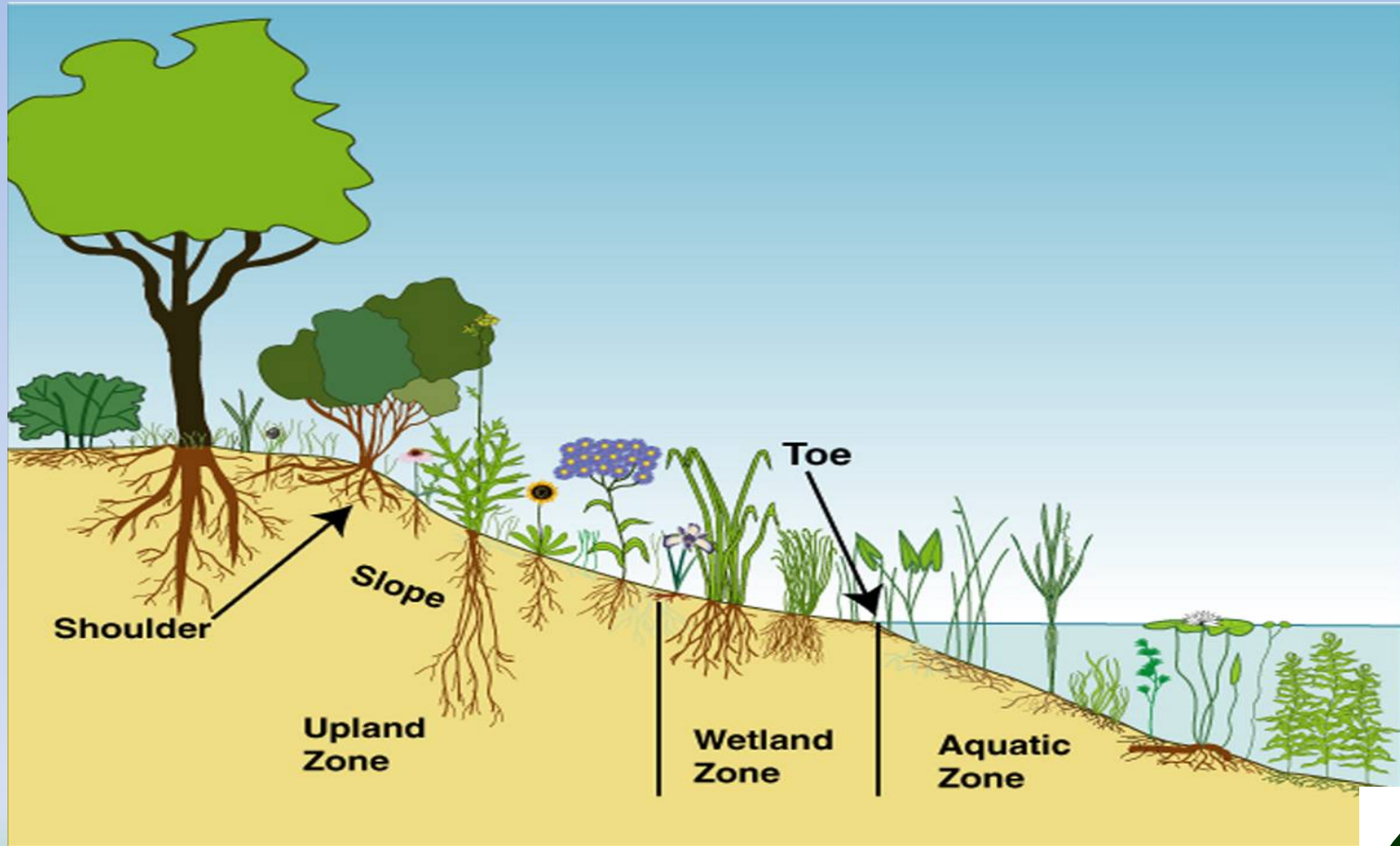
Overarching concept of any soft engineering technique is the reintroduction of deep-rooted native plants, creating a system that mimics naturally stable shorelines.



Steps for Successful Natural Shoreline Landscape

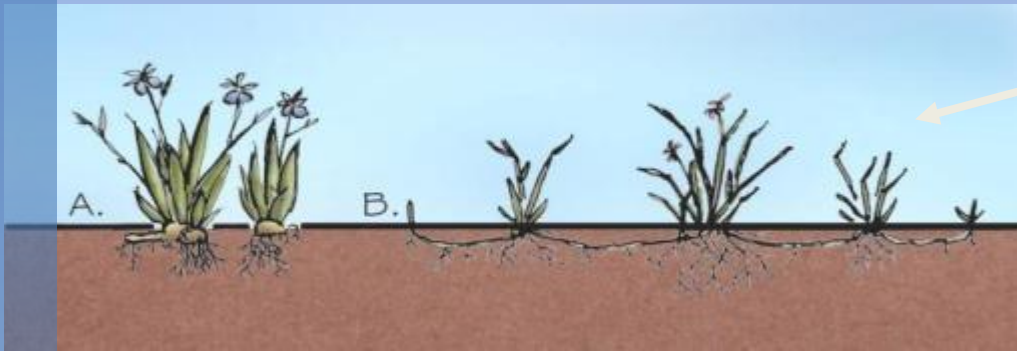


Shoreline Plant Communities



Cross section of a natural shoreline depicting ecological zones. Source: Michigan State University Extension Land & Water Unit.)





Showing horizontal root structure

Native Plant Root Systems



Showing vertical structure

Designing for Buffers

Buffers can be used to:

- Attract wildlife
- Discourage wildlife
- Filter stormwater runoff
- Maintain a stable shoreline



Photos: Jane Herbert



Key to Success

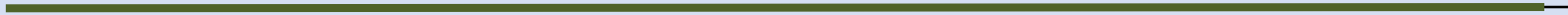
- ✓ A design is appropriate for site conditions
- ✓ The project is correctly installed
- ✓ Maintenance is adequately planned and implemented



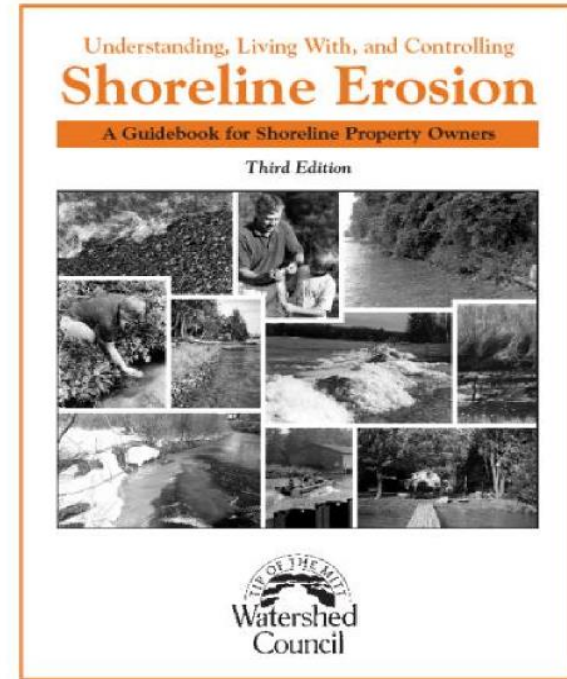


Jennifer Gelb

- *Tip of the Mitt Watershed Council*
 - *Restoration Ecologist*
 - *Natural Shoreline Specialist*
 - *Natural Shoreline Partner*



Bioengineering on High Energy Lakes



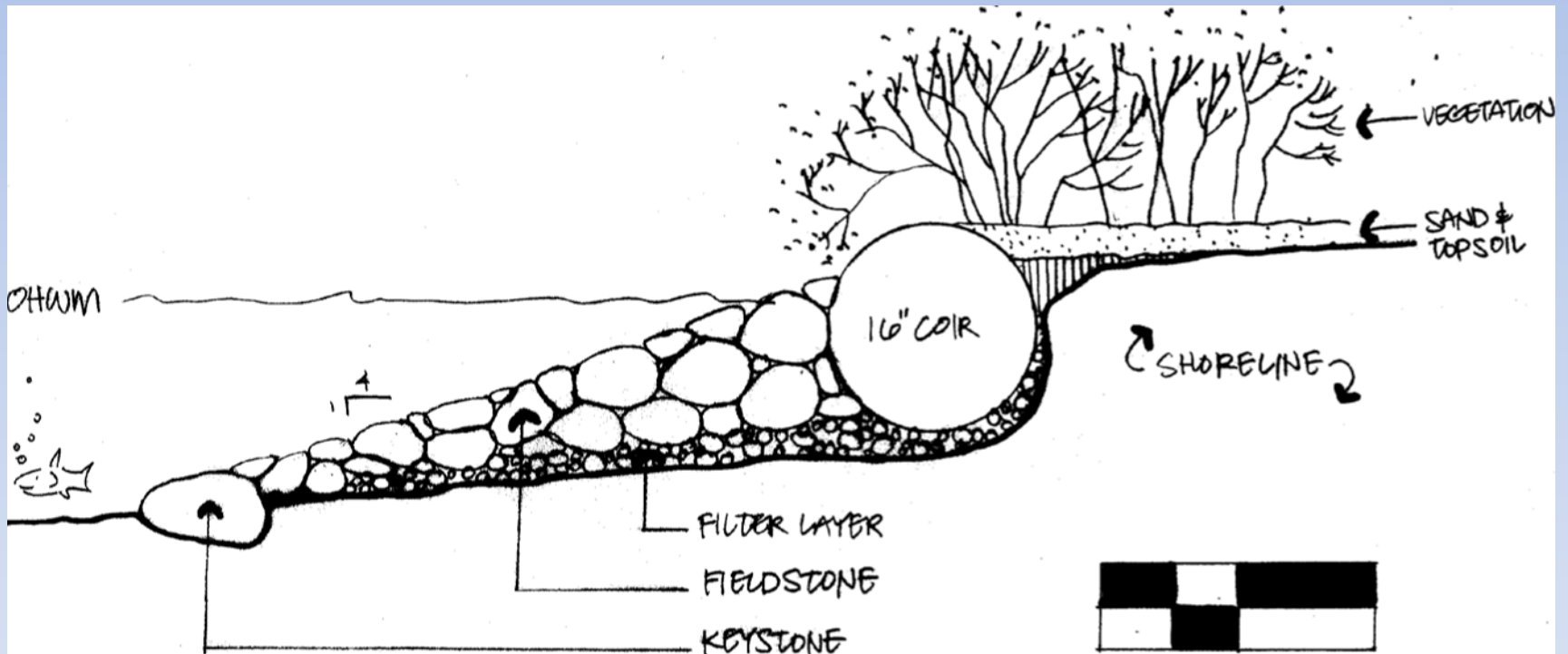
Available for download at:

www.watershedcouncil.org

Typical Eroding Bank



Typical Natural Shoreline Cross Section



Natural Shoreline Installation



Designing Rock Revetment

-In order to determine rock size one must know:

- Fetch
- Wind speed

-Use table (right) to determine significant wave heights

Average Sustained Over-Water Wind Speed (MPH)

	10	20	35	50
1.0	0.30	0.60	1.05	1.50
2.0	0.40	0.85	1.45	2.15
5.0	0.70	1.35	2.35	3.30
10.0	0.90	1.90	3.30	4.75
15.0	1.20	2.35	4.10	5.80
20.0	1.35	2.70	4.70	6.75

In Northern Michigan, we have determined that significant wave heights generated by wind speed of 35 MPH is an appropriate estimate.

Little rocks work....but how little is little?

- Rock sizes: should vary...not all being close to the median size
 - Multiply median size by 1.5 to determine max.
 - Multiply median size by 0.5 to determine min.
- Thickness: about 2-2.5 x thickness of the average rock size

	Rock Weight (pounds)	Rock Diameter (inches)
0.5	1	2.0
1.0	10	4.5
1.5	20	6.5
2.0	50	9.0
2.5	100	11.0
3.0	160	13.0
4.0	390	18.0
5.0	750	26.0
7.0	2100	48.0

Table 2: recommended median rock sizes for various significant wave heights.



Average significant wave height = 2.64'

Average rock diameter = just over 11"

Smallest rock diameter = about 5.5"

Largest rock diameter = about 16.5"

Fetch = 6.6 miles

Project site









**Dekraker: SHORELINE
RESTORATION PROJECT**
FIGURE 2 OF 5: Photo
WATER BODY: Intermediate
COUNTY: ANTRIM CITY:
Bellaire STATE: Michigan
**APPLICATION BY: Tip of the
Mitt Watershed Council**
DATE: 8-23-11





Project Installation

- Site access challenges
- Minimize impacts during installation
 - Limit heavy equipment
 - Stage materials away from shoreline
 - Use creative solutions
 - Restore disturbed areas immediately



NOT Bioengineering



Thank You!

Jennifer Buchanan Gelb

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