Lakeshore Erosion Control

Choose the right method

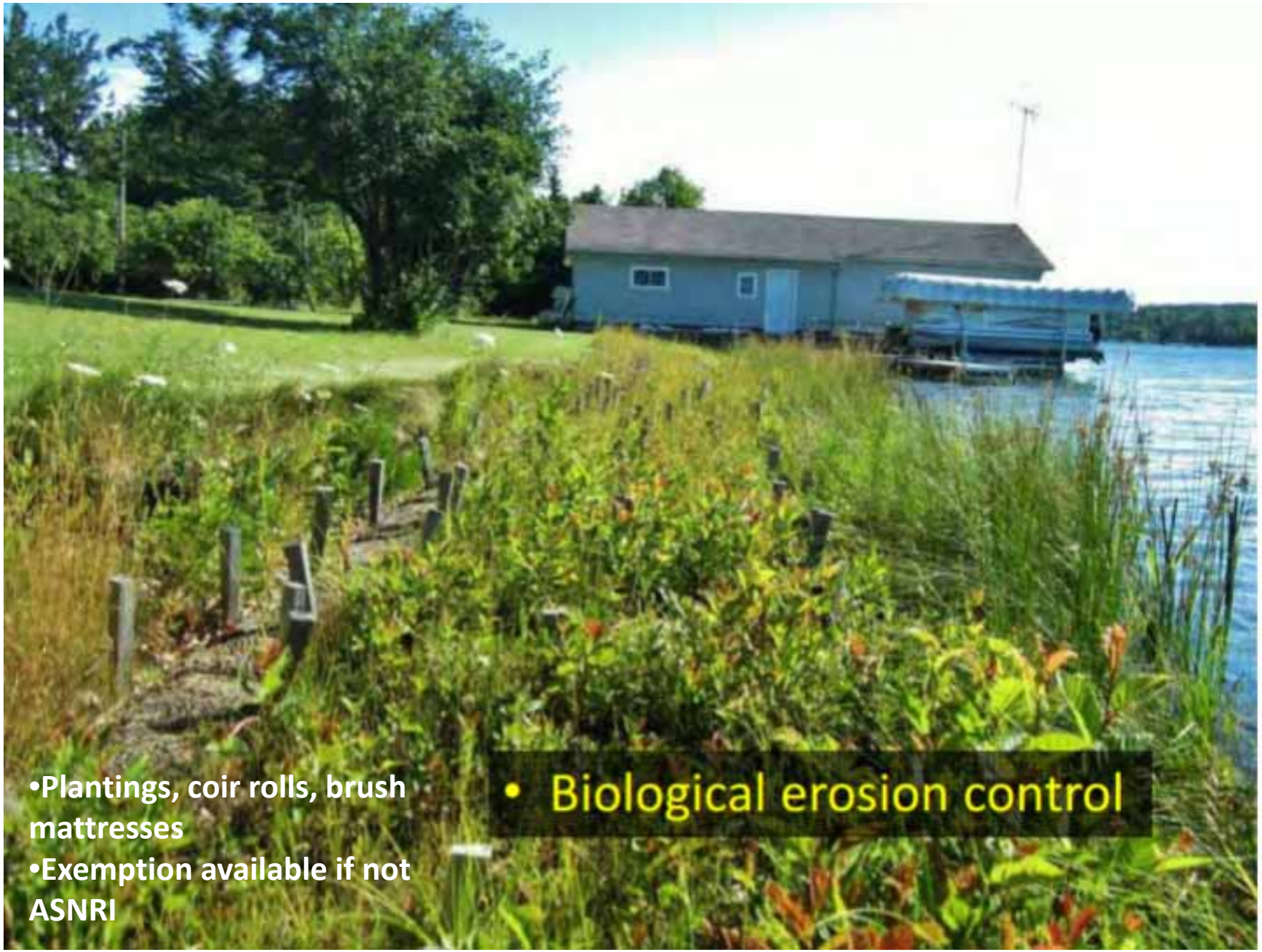
Apply for the permit

Permit Primer

- Exemptions
- General Permits
- Individual Permits
- Self-certified permits
- All categories meant to protect the public trust:
  - No material obstruction to navigation
  - Not detrimental to the public interest (water quality, fisheries, etc)
  - No decrease in flood capacity

Definitions

- OHWM – Ordinary high water mark
- ASNRI – Area of special natural resource interest
- GP – General permit
- IP – Individual permit


• Biological erosion control
•Plantings, coir rolls, brush mattresses
•Exemption available if not ASNRI


•Rock allowed to OHWM + Storm wave height
•Needs to be vegetated above OHWM
•Exemption available if not ASNRI for repair, replacement
Keystone for veg. riprap and biological is a good veg. plan.
• Vegetated riprap

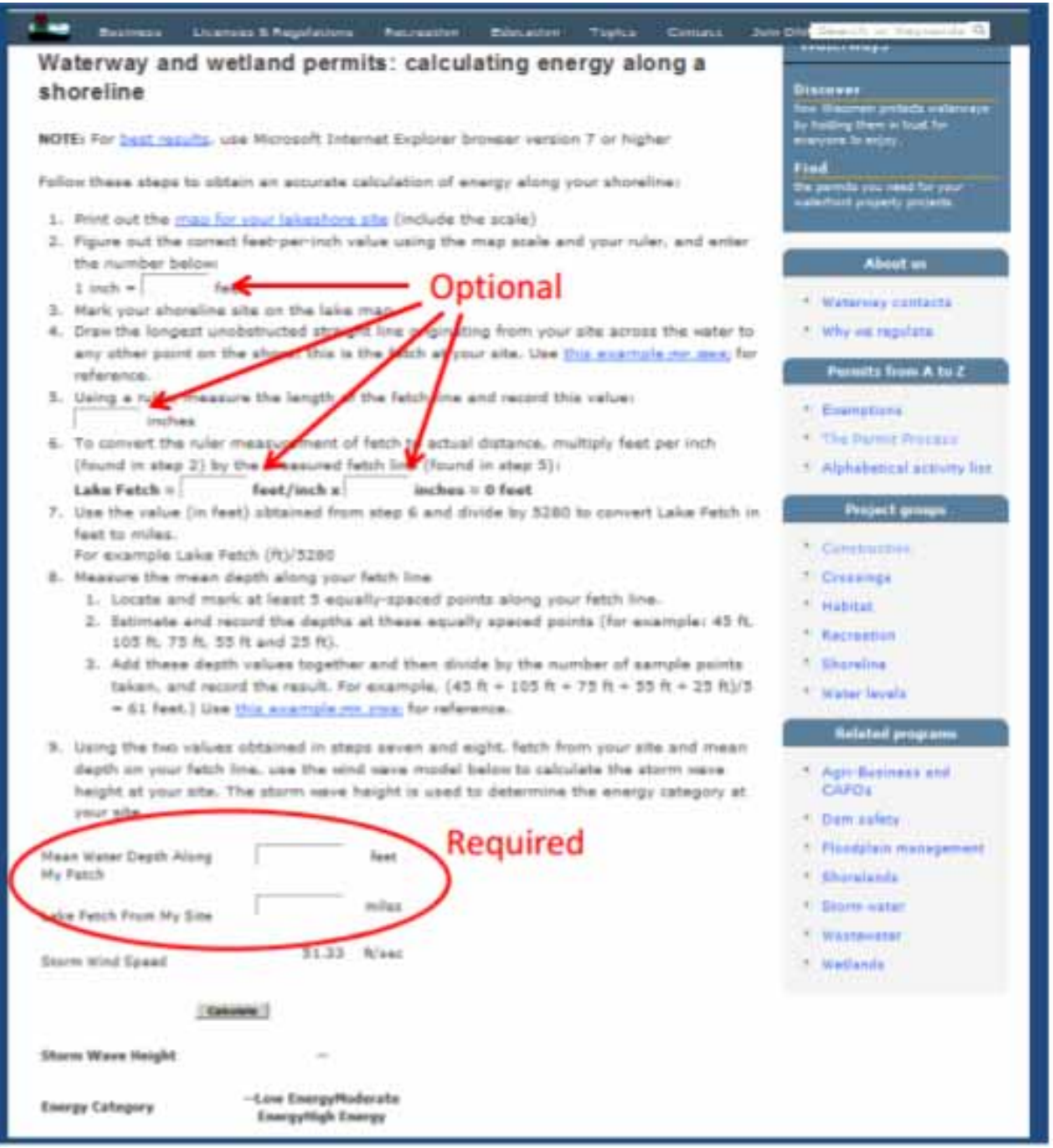

• Seawall
•Replacement allowed sometimes under GP
•$$$

Less intensive treatments are better

Permit process

Your decisions

Method 1: Wave Height Calculator



Waterway and wetland permits: calculating energy along a shoreline

NOTE: For best results, use Microsoft Internet Explorer browser version 7 or higher

Follow these steps to obtain an accurate calculation of energy along your shoreline:

1. Print out the map for your lakeshore site (include the scale)
2. Figure out the correct feet-per-inch value using the map scale and your ruler, and enter the number below:
   1 inch = [ ] feet
3. Mark your shoreline site on the lake map.
4. Draw the longest unobstructed straight line originating from your site across the water to any other point on the shore; this is the fetch at your site. Use this example.mor.www for reference.
5. Using a ruler, measure the length of the fetch line and record this value:
   [ ] inches
6. To convert the ruler measurement of fetch to actual distance, multiply feet per inch (found in step 2) by the measured fetch line (found in step 5):
   Lake Fetch = [ ] **feet/inch x** [ ] **inches = 0 feet**
7. Use the value (in feet) obtained from step 6 and divide by 5280 to convert Lake Fetch in feet to miles.
   For example Lake Fetch (ft)/5280
8. Measure the mean depth along your fetch line
   1. Locate and mark at least 5 equally-spaced points along your fetch line.
   2. Estimate and record the depths at these equally spaced points (for example: 45 ft, 105 ft, 75 ft, 55 ft and 25 ft).
   3. Add these depth values together and then divide by the number of sample points taken, and record the result. For example, (45 ft + 105 ft + 75 ft + 55 ft + 25 ft)/5 = 61 feet.) Use this example.mn.www for reference.
9. Using the two values obtained in steps seven and eight, fetch from your site and mean depth on your fetch line, use the wind wave model below to calculate the storm wave height at your site. The storm wave height is used to determine the energy category at your site.

Optional

Required

Mean Water Depth Along My Fetch [ ] feet

Lake Fetch From My Site [ ] miles

Storm Wind Speed 31.33 ft/sec

Calculate

Storm Wave Height --

Energy Category --Low EnergyModerate EnergyHigh Energy

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how Wisconsin protects waterways by holding them in trust for everyone to enjoy.

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the permits you need for your waterfront property projects.

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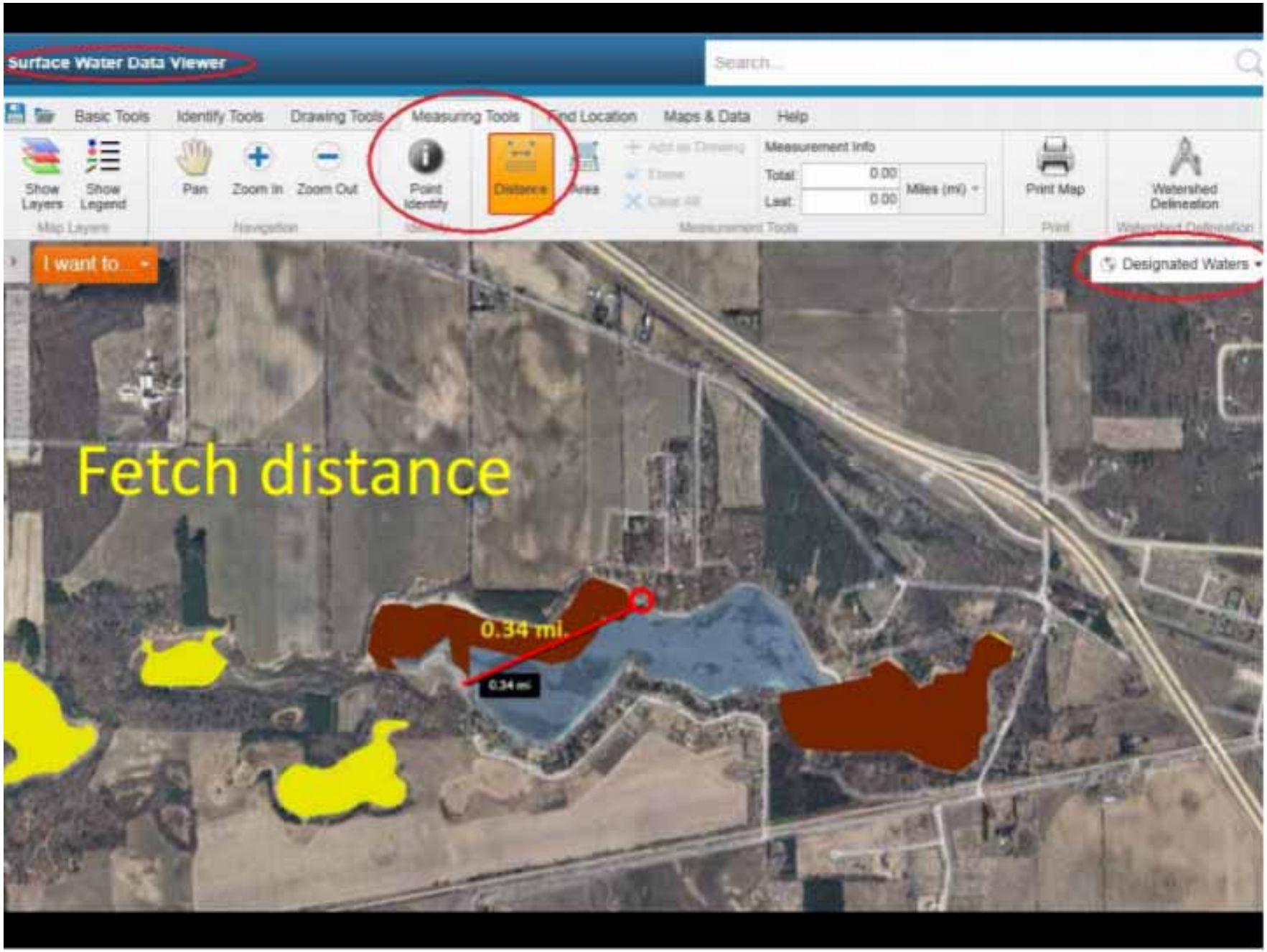
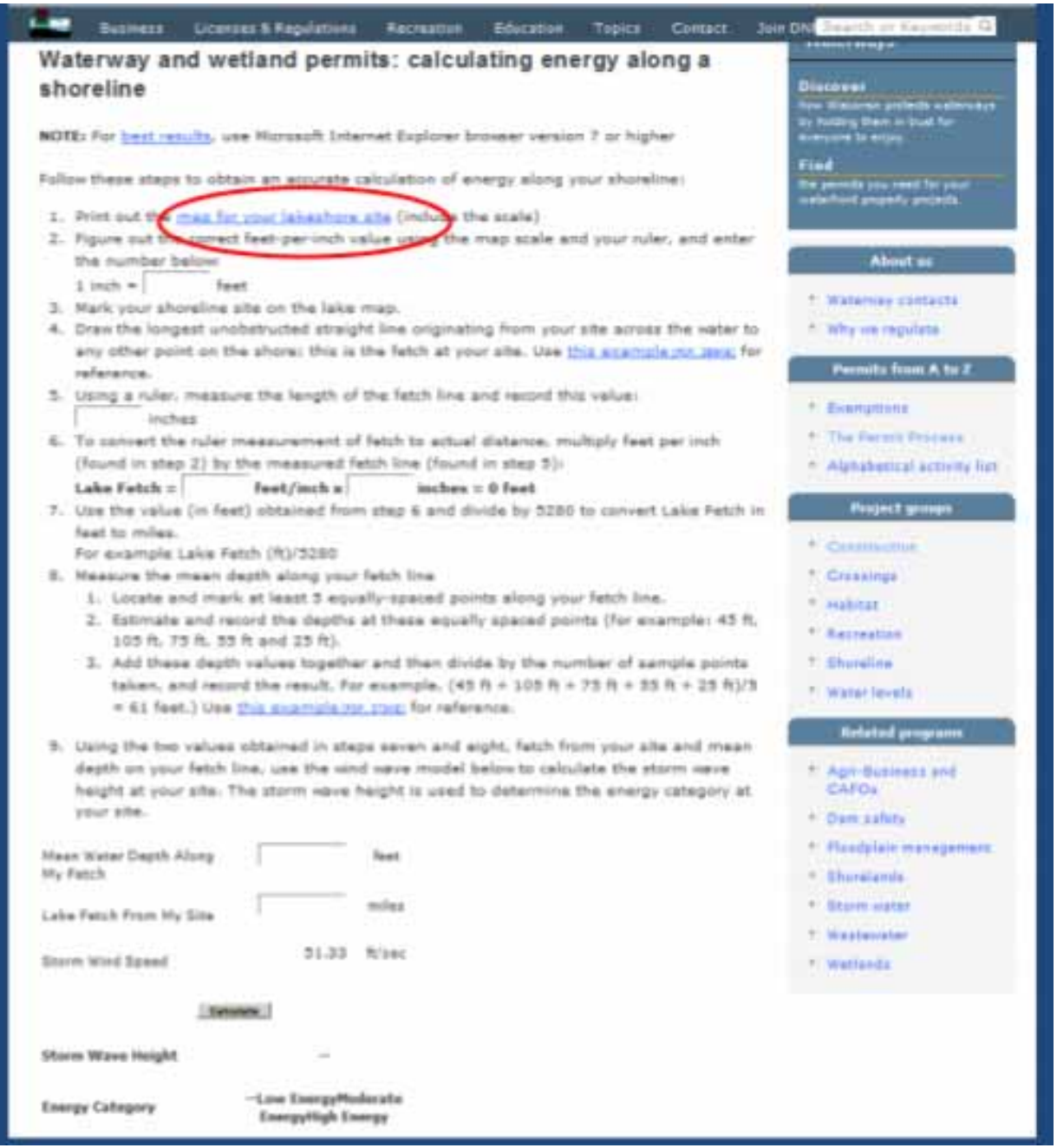
Project groups
- Construction
- Crossings
- Habitat
- Recreation
- Shoreline
- Water levels

Related programs
- Agri-Business and CAFOs
- Dam safety
- Floodplain management
- Shorelands
- Storm water
- Wastewater
- Wetlands


Surface Water Data Viewer
Search...
Basic Tools
Identify Tools
Drawing Tools
Measuring Tools
Find Location
Maps & Data
Help
Show Layers
Show Legend
Pan
Zoom In
Zoom Out
Point Identify
Distance
Area
Measurement Info
Total:
Last:
Miles (mi)
Print Map
Watershed Delineation
I want to...
Designated Waters
Fetch distance
0.34 mi.

Average Depth



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9. Using the two values obtained in steps seven and eight, fetch from your site and mean depth on your fetch line, use the wind wave model below to calculate the storm wave height at your site. The storm wave height is used to determine the energy category at your site.

Mean Water Depth Along My Fetch	[ ]	feet
Lake Fetch From My Site	[ ]	miles
Storm Wind Speed	51.33	ft/sec

Calculate

Storm Wave Height	--
Energy Category	--Low EnergyModerate EnergyHigh Energy

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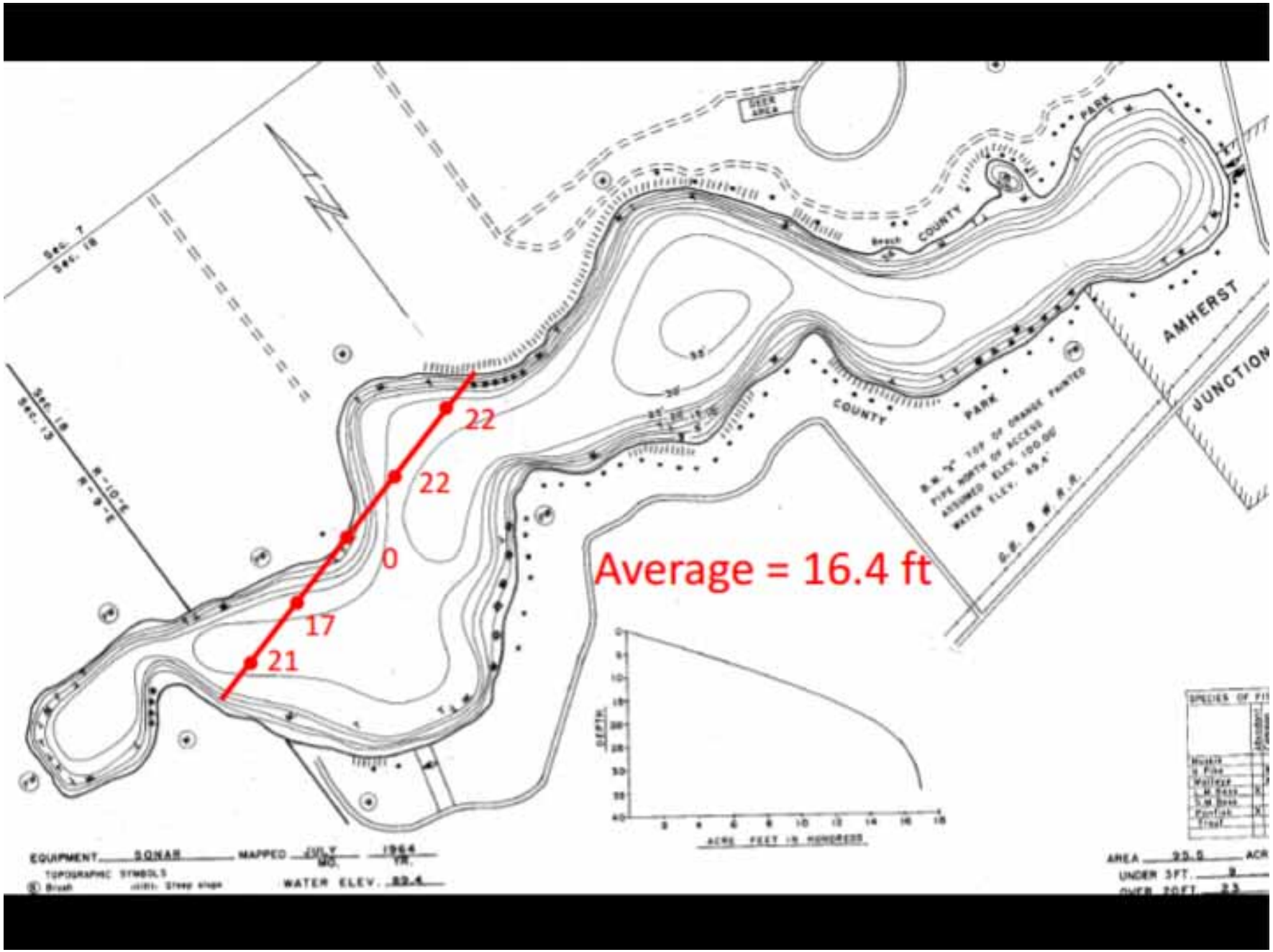
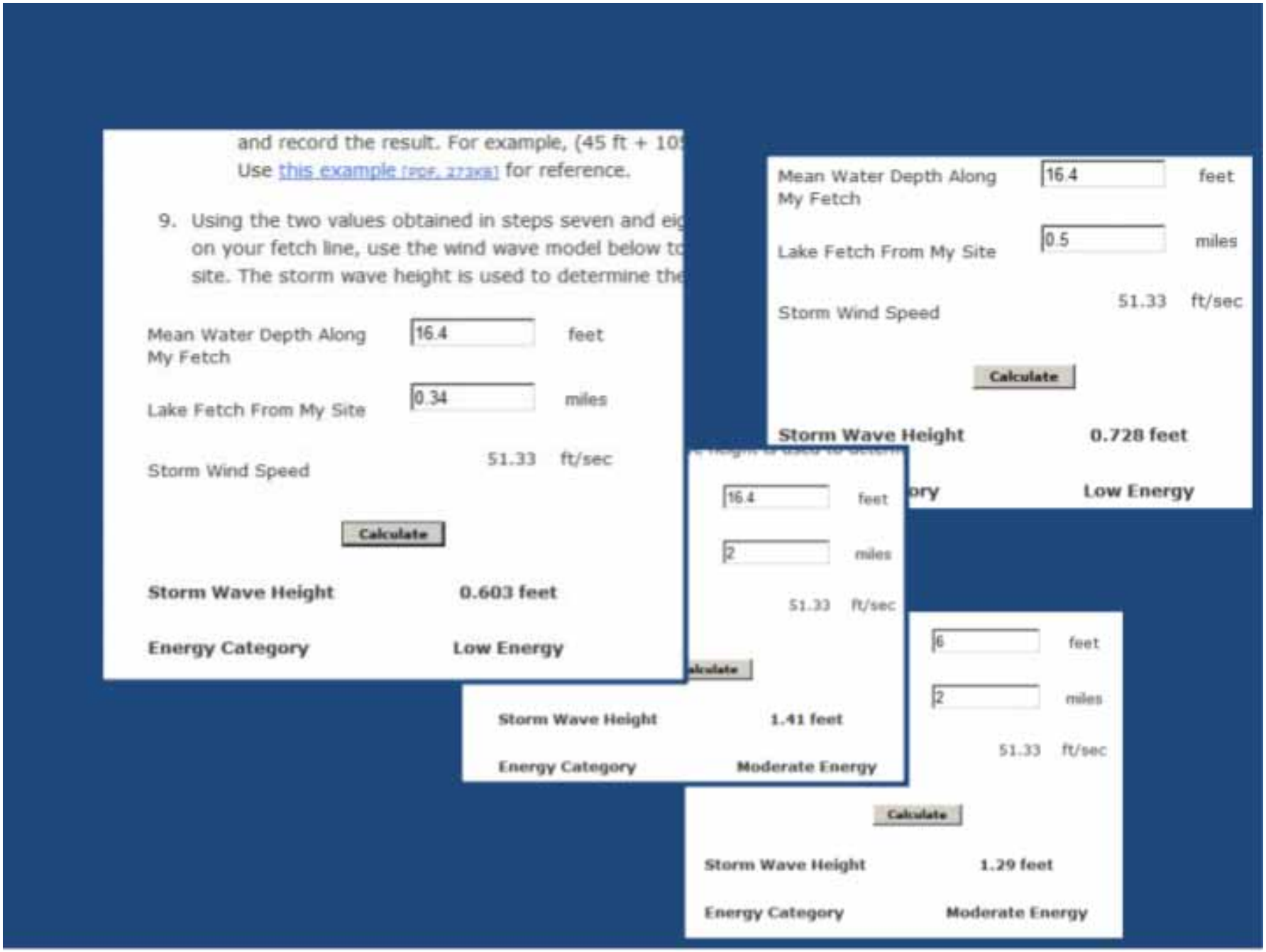

22
22
0
17
21
Average = 16.4 ft
AMHERST
JUNCTION
PARK
COUNTY
EQUIPMENT SONAR
MAPPED JULY 1964
WATER ELEV. 89.4
AREA 23.0 ACR
UNDER 3FT. 3
OVER 20FT. 23


and record the result. For example, (45 ft + 10
Use this example [PDF, 273KB] for reference.
9. Using the two values obtained in steps seven and eig
on your fetch line, use the wind wave model below to
site. The storm wave height is used to determine the
Mean Water Depth Along My Fetch
16.4
feet
Lake Fetch From My Site
0.34
miles
Storm Wind Speed
51.33 ft/sec
Calculate
Storm Wave Height
0.603 feet
Energy Category
Low Energy
Mean Water Depth Along My Fetch
16.4
feet
Lake Fetch From My Site
0.5
miles
Storm Wind Speed
51.33 ft/sec
Calculate
Storm Wave Height
0.728 feet
Low Energy
16.4
feet
2
miles
51.33 ft/sec
Storm Wave Height
1.41 feet
Energy Category
Moderate Energy
6
feet
2
miles
51.33 ft/sec
Calculate
Storm Wave Height
1.29 feet
Energy Category
Moderate Energy

Method 2:

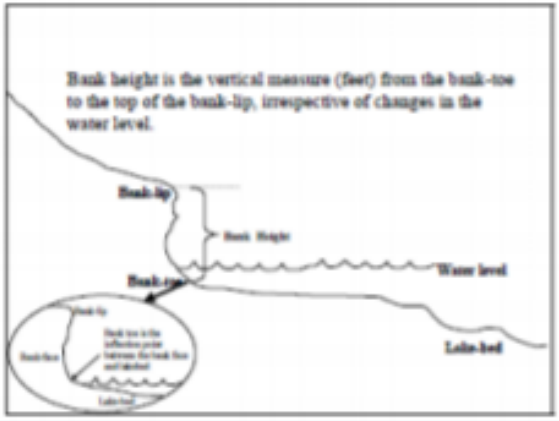
Erosion Intensity Worksheet

SHORELINE VARIABLES	DESCRIPTIVE CATEGORIES EROSION INTENSITY VALUE IS LOCATED IN PARENTHESIS ON LEFT SIDE OF EACH CATEGORY BOX							ASSIGNED EI
AVERAGE FETCH[1] - average distance (miles), across the open water to the opposite shore measure 45° other side of the perpendicular to the shoreline	(0) <1/10	(2) 1/10 – 1/3	(4) 1/3-1	(7) 1 –3	(10) 3-10	(13) 10-30	(16) >30	
DEPTH AT 20 FEET - Depth of water (feet) 20 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			
DEPTH AT 100 FEET - depth of water (feet) 100 feet from shoreline	(1) <1	(2) 1-3	(3) 3-6	(4) 6-12	(5) >12			
BANK HEIGHT[2] - height of bank (feet), measure from toe of the bank to top of the bank's slip	(1)<1	(2) 1-5	(3) 5-10	(4) 10-20	(5) >20			
BANK COMPOSITION composition and degree of cementation of the sediments	(0) rock, marl, tight clay, well cemented sand (dig with a pick)		(7) soft clay, clayey sand, moderately cemented (easily dug with a knife)		(15) uncemented sands or peat (easily dug with your hand)			
INFLUENCE OF ADJACENT STRUCTURES likelihood that adjacent structures are causing flank erosion at the site	(0) no hard armoring on either adjacent property	(1) hard armoring on one adjacent property	(2) hard armoring on both adjacent properties	(3) hard armoring on one adjacent property with measurable recession	(4) hard armoring on both adjacent properties with measurable recession adjacent to both structures			
AQUATIC VEGETATION[3] type and abundance of vegetation occurring in the water off the shoreline	(0) rocky substrates unable to support vegetation.	(1) dense or abundant emergent, floating or submerged vegetation		(4) scattered or patchy emergent, floating or submergent vegetation		(7) lack of emergent, floating or submergent vegetation		
BANK VEGETATION, type and abundance of the vegetation occurring on the bank face and immediately on top of the bank's slip	(0) bank compose of rocky outcropping unable to support vegetation		(1) dense vegetation, upland trees, shrubs and grasses, including lawns		(4) clumps of vegetation alternating with areas lacking vegetation		(7) lack of vegetation (cleared), crop or agricultural land	
BANK STABILITY, The degree to which bank and adjacent area (within 10 feet of the bank's slip) is stabilized by natural ground, shrub, and canopy vegetation (outside a 10' pier access corridor). Human disturbance is typified by tree removal, brushing, mowing, and lawn establishment.	(0) established lawn with few canopy trees	(1) established lawn with moderate to dense canopy trees	(4) moderate to dense natural ground vegetation and canopy trees with shrub layer substantially reduced; or few canopy trees with moderate to dense natural shrub layer.		(7) moderate to dense canopy trees with moderate to dense natural shrub layer; or other natural features prevents establishment of vegetation.			
SHORELINE GEOMETRY general shape of the shoreline at the point of interest plus 200 yards on either side	(1) coves or bays		(4) irregular shoreline or straight shoreline		(8) headland, point, or island			
SHORE ORIENTATION[4] geographic direction the shoreline faces	(0) < 1/3 mile fetch	(1) north to east to south-southeast (349°-360°, 1°-168°)		(4) south to west-southwest (169°-258°)		(8) west to north-northwest (259°-349°)		
BOAT WAKES[5] proximity to and use of boat channels	(1) no channels within 100 yards, broad open water body, or constricted shallow water body; or channels within no-wake zones		(6) thoroughfare within 100 yards carrying limited traffic, or thoroughfare 100 yards to ½ mile offshore carrying intensive traffic		(12) thoroughfare within 100 yards carrying intensive traffic (unregulated boating activity)			
EROSION INTENSITY SCORE (EI) →								

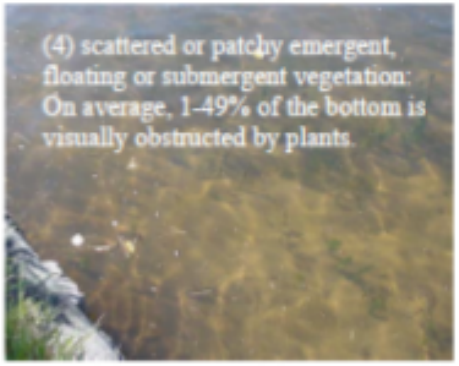
Worksheet instructions

[1] Average fetch: The following diagram describes the calculation of average fetch.

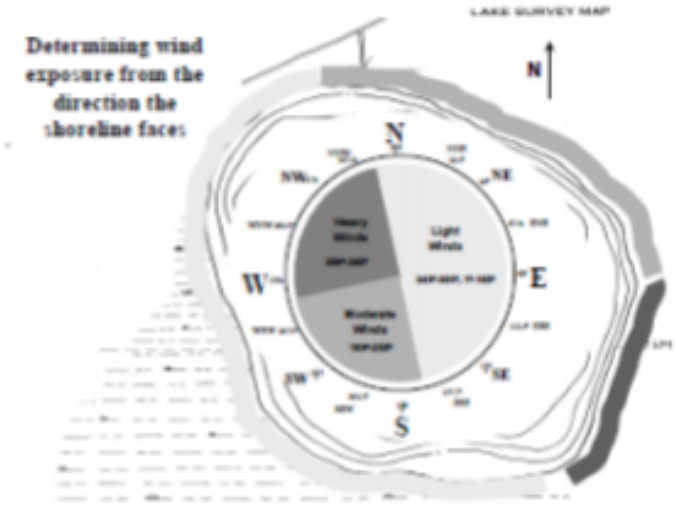
[2] Bank height: The following diagram describes the features of the bank for the purpose of accurately measuring bank height.



[3] Aquatic vegetation: Dense or abundant means that on average 50-100% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Scattered or patchy means that on average 1-49% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15. Absent means that on average < 1% of the bottom is visually obstructed by plants during the growing season, defined by the dates June 1 through September 15.

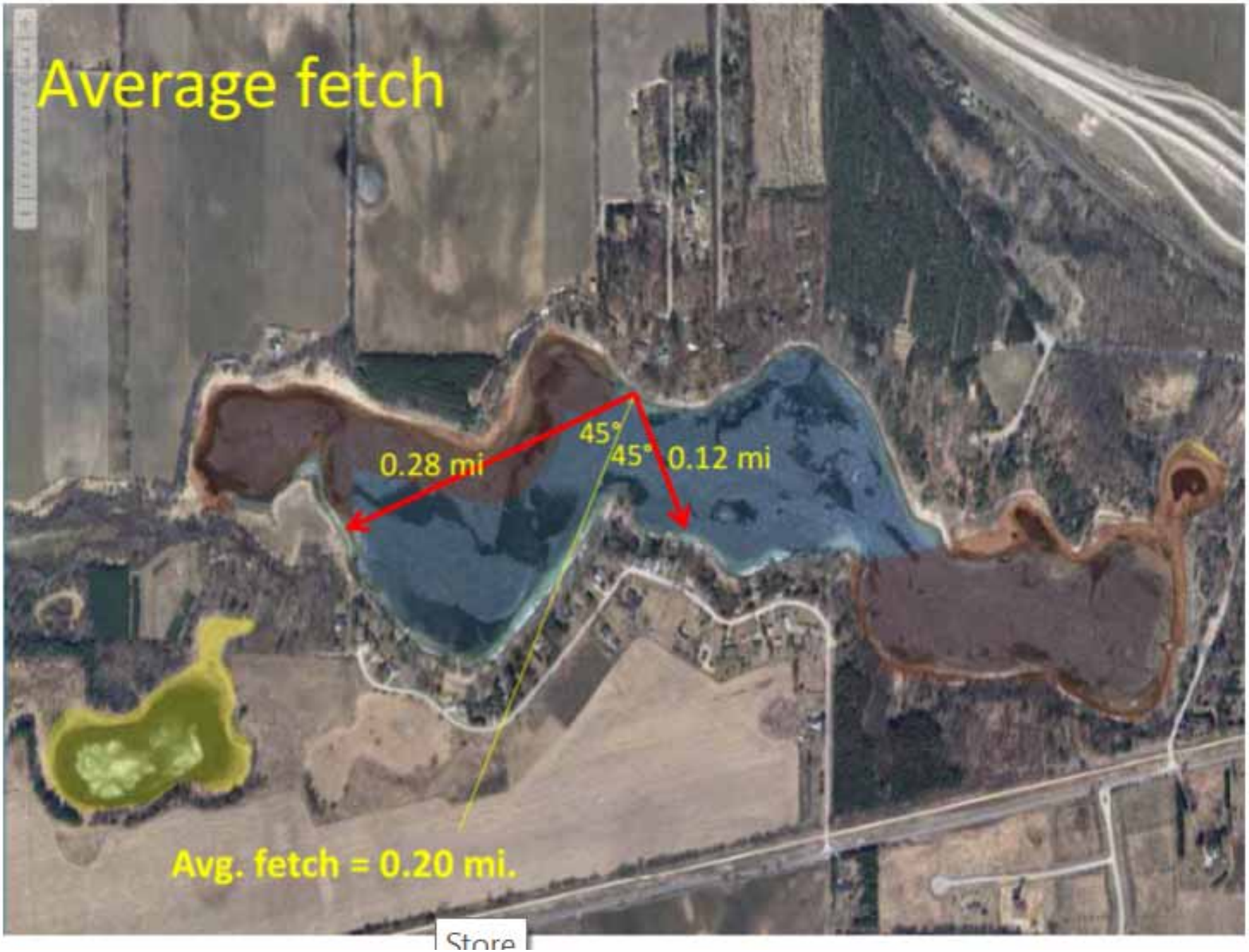


[4] Shoreline Orientation: The following lake map shows an example of accurately determining shoreline orientation

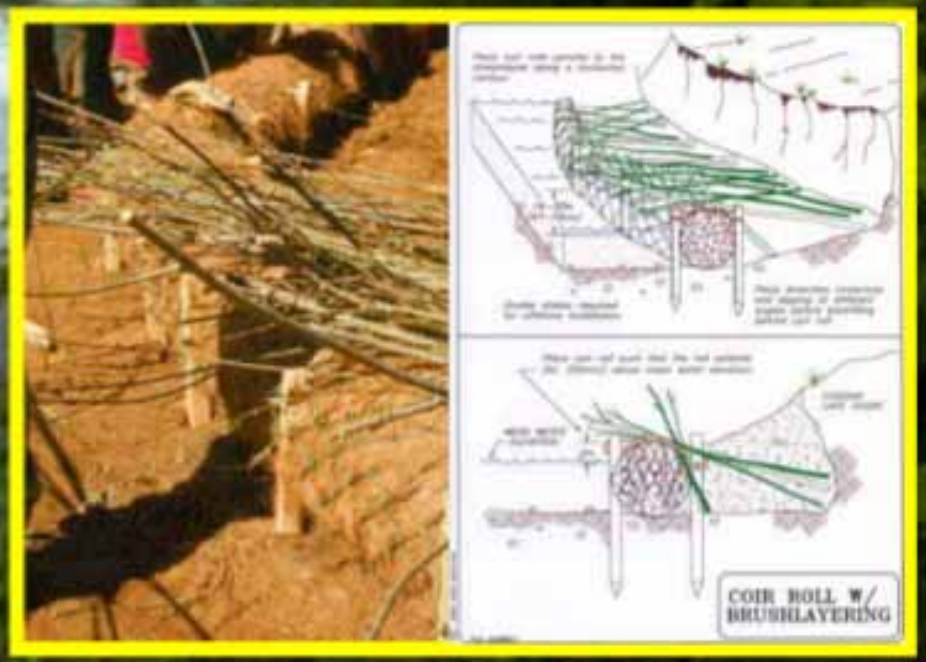


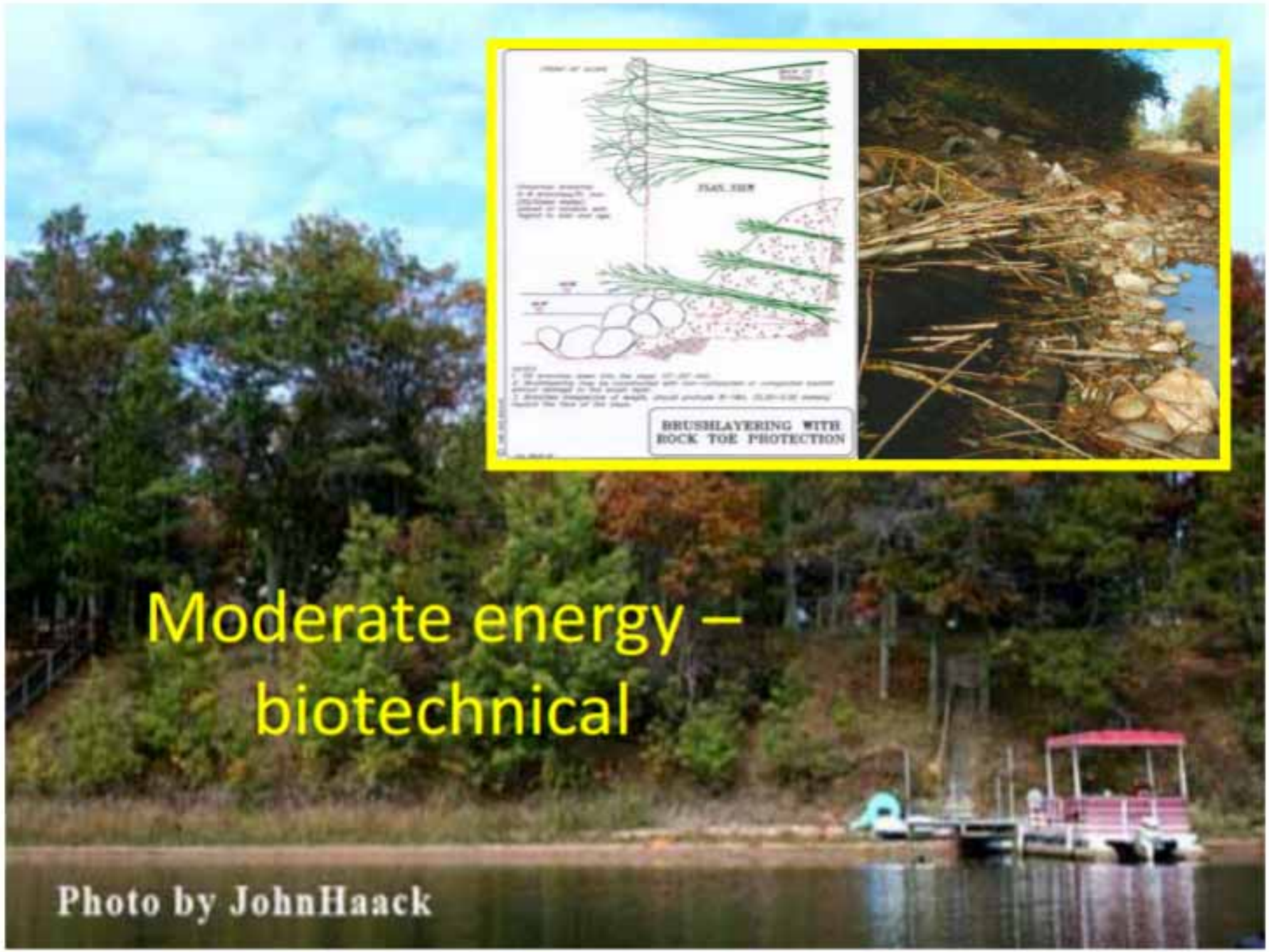
[5] Boating: A thoroughfare is identified as physical narrowing of the waterbody that by its nature intensifies boating activity near the shore. Thoroughfares which are 200 yards or wider are not scored 12 points, unless the depth contours of the thoroughfare constricts boating activity in close proximity to one shore, and the traffic is intensive. Intensive traffic is defined by a location where at least 50% of the public boating access available must pass through the thoroughfare to reach the open water of the lake, provided the waterway has a total of more than 60 car-trailer units. Limited traffic is defined by a location where at least 30% of the public boating access available must pass through the thoroughfare to reach the open water of the lake, provided the waterway has a total of more than 40 car-trailer units.


Average fetch


Average fetch
0.28 mi
45°
45°
0.12 mi
Avg. fetch = 0.20 mi.
Store

Low energy – biological




BRUSHLAYERING WITH
ROCK TOE PROTECTION
Moderate energy –
biotechnical
Photo by JohnHaack

High energy – technical

Thank you!

Any questions?