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William R. Davis: *Late Days*

Shoreland Inventory of Big Round Lake, Polk County, Wisconsin

Date of Inventory: August 2003

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This report has three parts:

1. **Summary of shoreland conditions on Big Round Lake.**
This section summarizes the results of evaluating shoreland conditions for 74 parcels on Big Round Lake at normal water levels.

2. **List of potential corrective measures to improve shoreland conditions.**
This section describes techniques for improving natural conditions in upland areas. Our evaluation found a number of parcels that have the potential to improve natural conditions. Techniques discussed in this section can serve as a guide for erosion control and improving natural shoreland conditions.

3. **Photographic shoreland inventory evaluation for individual shoreland parcels.**
This section is the photographic inventory. Photographs of 74 parcels have been evaluated. Results of these individual evaluations are found in Table 3.

1. Summary of Shoreland Conditions

The shoreland area encompasses three components: the upland fringe, the shoreline, and shallow water area by the shore. A photographic inventory of the Big Round Lake shoreline was conducted in August of 2003 by lake resident volunteers, Wayne Schue and Denis Tinkhan. The objectives of the survey were to characterize existing shoreland conditions which will serve as a benchmark for future comparisons.

For each photograph Blue Water Science staff looked at the shoreline and the upland condition. Our criteria for natural conditions were the presence of 50% native vegetation in the understory and at least 50% natural vegetation along the shoreline in a strip at least 15 feet deep. We evaluated shorelines and uplands at the 75% natural level as well (Figure 1 illustrates the methodology).

A summary of the inventory results is shown in Table 1. Based on our subjective criteria about 27% of the parcels in the Big Round Lake shoreland area meet the natural ranking criteria for shorelines and upland areas. This is slightly below median for "country lakes" where 50% of the parcels meet the "natural" criteria. County lakes are defined as lakes found about 1 to 2 hours driving time outside of a major Metropolitan area such as Minneapolis/St. Paul or Milwaukee.

In the next 10 years proactive volunteer native landscaping could improve the natural aspects of a number of parcels.

Table 1. Summary of shoreline buffer and upland conditions in the shoreland area of Big Round Lake. Approximately 74 parcels were examined.

Big Round Lake	Natural Shoreline Condition		Natural Upland Condition		Undevel. Photo Parcels	Shoreline Structure Present	
	>50%	>75%	>50%	>75%		riprap	wall
TOTALS (no. of parcels = 74)	39% (29)	34% (25)	27% (20)	24% (18)	14% (10)	12% (9)	1% (1)

A comparison of Big Round Lake conditions to other lakes in Minnesota and Wisconsin is shown in Table 2 and in Figure 2.

Table 2. Summary of shoreland inventories from Big Round Lake and 25 other lakes in Minnesota and Wisconsin.

Lake	Eco-region	Date of Survey	Total Number of Parcels (#)	Undevel. Parcels % (#)	Natural Upland Condition		Natural Shoreline Condition		Parcels with Erosion % (#)	Parcels with Shoreline Revetment % (#)
					> 50% % (#)	>75% % (#)	> 50% % (#)	>75% % (#)		
Big Round Lake, Polk Co, WI	CHF	8.03	74	14 (10)	27 (20)	24 (18)	39 (29)	34 (25)	1 (1)	14 (10)
Lake Volney, Le Sueur Co, MN	CHF	9.21.02	79	25 (20)	54 (43)	42 (33)	56 (44)	47 (37)	0	30 (24)
Diamond Lake, Kandiyohi Co, MN	CHF	8.13-14.02	344	2 (7)	13 (44)	11 (39)	16 (56)	12 (42)	1 (5)	49 (168)
Green Lake, Kandiyohi Co, MN	CHF	9.19.01	721	1 (9)	20 (146)	12 (88)	19 (140)	14 (100)	0	62 (446)
Orchard Lake, Dakota Co, MN	CHF	9.17.01	109	4 (4)	47 (51)	30 (33)	53 (58)	32 (35)	0	54 (59)
Ravine Lake, Washington Co, MN	CHF	7.19.01	9	100 (9)	100 (9)	100 (9)	100 (9)	100 (9)	0	0
Rush Lake, Chisago Co, MN	CHF	9.16.00	524	11 (58)	48 (253)	28 (147)	51 (267)	38 (201)	1 (3)	18 (92)
West Rush	CHF	9.16.00	332	12 (40)	52 (171)	31 (103)	55 (184)	43 (142)	1 (2)	15 (50)
East Rush	CHF	9.16.00	192	9 (18)	43 (82)	23 (44)	43 (83)	31 (59)	1 (1)	22 (42)
Maple Grove Lake Summary, MN	CHF	9.30 - 10.12.99	644	14 (89)	67 (431)	48 (312)	60 (385)	48 (310)	1 (3)	20 (129)
Cedar Island	CHF	9.30 - 10.12.99	93	5 (5)	62 (58)	35 (33)	55 (51)	39 (36)	0	22 (21)
Eagle	CHF	9.30 - 10.12.99	90	14 (13)	64 (58)	52 (47)	47 (42)	41 (37)	0	35 (32)
Edward	CHF	9.30 - 10.12.99	34	12 (4)	91 (31)	88 (30)	76 (26)	71 (24)	6 (2)	3 (1)
Fish	CHF	9.30 - 10.12.99	170	7 (12)	74 (126)	44 (75)	57 (97)	41 (70)	1 (1)	20 (34)
Pike	CHF	9.30 - 10.12.99	9	56 (5)	100 (9)	100 (9)	100(9)	100 (9)	0	0
Rice	CHF	9.30 - 10.12.99	137	33 (45)	71 (97)	64 (87)	81 (111)	74 (102)	0	19 (25)
Weaver	CHF	9.30 - 10.12.99	111	5 (5)	47 (52)	28 (31)	44 (49)	29 (32)	0	14 (16)
Powers, Woodbury, MN	CHF		30	90 (27)	90 (27)	90 (27)	97 (29)	97 (29)	0	0
Upper Prior, Scott Co, MN	CHF	9.30-10.12.99	366	10 (37)	51 (187)	36 (132)	35 (128)	31 (113)	4 (15)	46 (168)
Lower Prior, Scott Co, MN	CHF	9.24-30.99	691	10 (66)	36 (249)	24 (166)	22 (152)	17 (117)	5 (35)	54 (373)
Comfort, Chisago Co, MN	CHF	10.9-11.2.98	100	--	62 (62)	--	50 (50)	--	--	12 (12)
Big Bear Lake, Burnett Co, WI	LF	9.11.02	87	13 (11)	82 (71)	62 (54)	86 (75)	76 (66)	0	9 (8)
Upper Turtle Lake, Baron Co, WI	CHF	7.23-24.02	309	28 (85)	72 (224)	58 (178)	76 (234)	68 (209)	0	20 (63)
Pike Chain, Price & Vilas Co, WI			722	380	92 (633)	87 (626)	95 (684)	91 (654)	--	5 (34)
Plum Lake, Vilas Co, WI	LF	7.26.01	225	13 (30)	75 (169)	58 (130)	81 (182)	708(158)	--	9(4)
Nancy Lake, Washburn Co, WI	LF	9.21.00	217	19 (41)	77 (167)	65 (141)	80 (174)	72 (156)		5 (11)
Big Bearskin, Oneida Co, WI	LF	8.10.99	130	--	73 (95)	63 (82)	80 (104)	67 (87)	--	0
Ballard chain, Vilas Co, WI	LF	7.23.99	110	--	98 (108)	96 (106)	96 (106)	95 (105)	--	0
Bear, Oneida Co, WI	LF	6.8.99	115	6 (7)	93 (107)	78 (90)	84 (97)	77 (89)	1 (1)	8 (9)

* CHF = Central Hardwood Forest Ecoregion
** LF = Lake and Forests Ecoregion

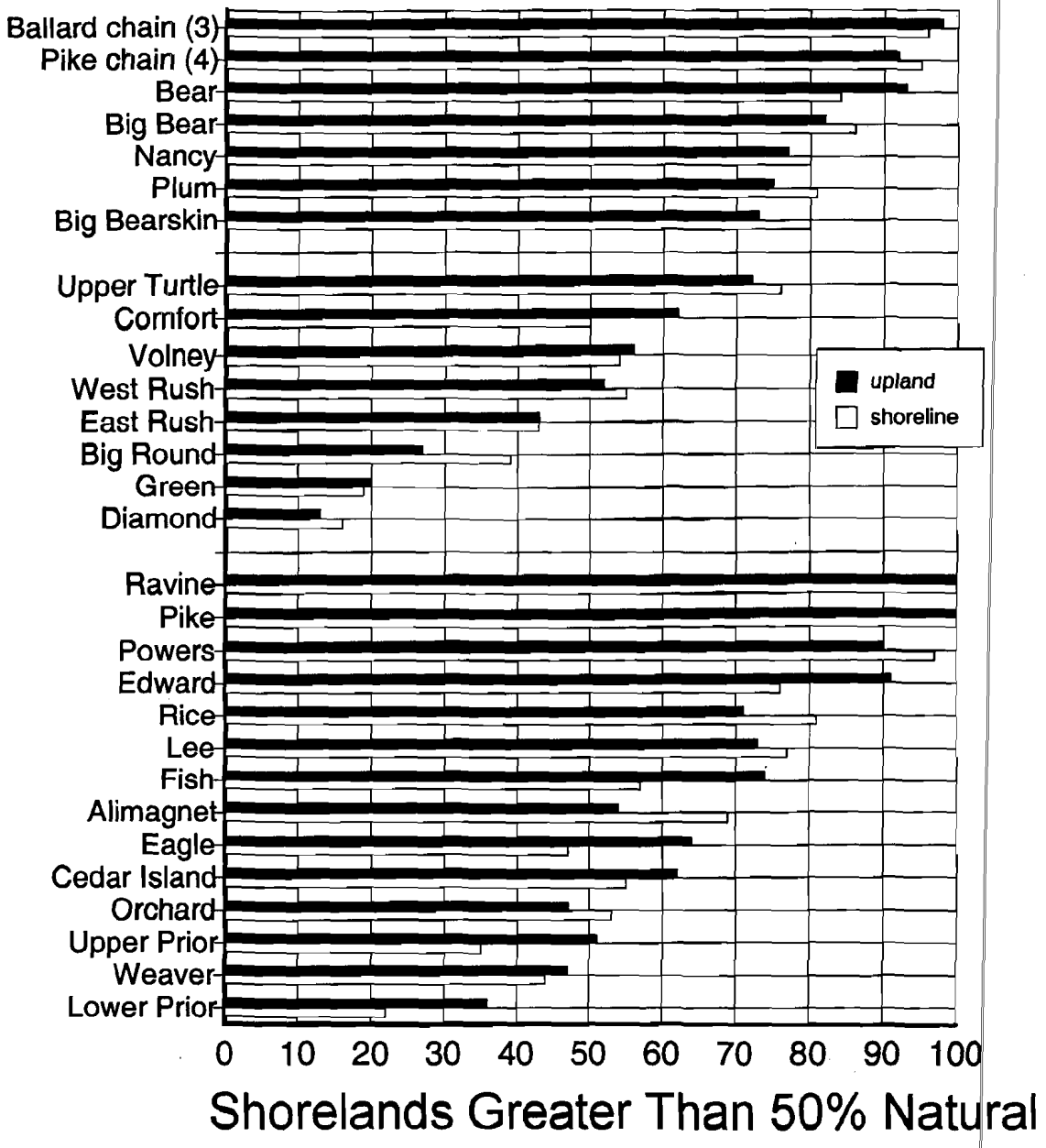


Figure 2. A summary of shoreland inventory results for lakes using an evaluation based on shoreland photographs. For each lake the percentage of shoreline and upland conditions with greater than 50% natural conditions is shown. The first tier of lakes are located in northern Wisconsin. The lower tier of lakes are in the Twin City Metropolitan area and are considered urban lakes. Although several lakes are "urban" lakes most of the shoreland is owned by the city and there is a high percentage of natural conditions. The middle tier of lakes are about an hour or two drive from the Twin Cities, and are not considered to be urban lakes, they are "country" lakes.

Big Round Lake is a country lake. It's natural shoreland conditions are slightly below average compared to the other country lakes in the middle tier.

2. Overview of Corrective Measures

Improving Upland Native Landscape Conditions

In the glacial lake states, three broad vegetative groups occur: pine forests with a variety of ground cover species including shrubs and sedges: hardwood forests with a variety of understory species, including ferns: and tallgrass prairie with a variety of grasses as well as bur oaks and willow trees. Residences around Big Round Lake are in the hardwood forest group.

Reestablishing native conditions in the shoreland area not only improves stormwater runoff quality, it also attracts a variety of wildlife and waterfowl to the shoreland area. Benefits multiply when other neighbors naturalize because the effects are cumulative and significant for water quality and wildlife habitat.

When installing native vegetation close to the shoreline residents are actually installing a buffer. A buffer is a strip of native vegetation wide-enough to produce water quality and wildlife improvements. Much of the natural vegetative buffer has been lost in shoreland areas with development where lawns have been extended right down to the shore.

Lawns are not necessarily bad for a lake. However they can be overfertilized and then runoff carries phosphorus to the lake. Also, lawns function as a low grade open prairie, with poor cover for wildlife and a food supply that is generally poor, except for geese who may find it attractive. Replacing lawn areas with native landscaping projects reduces the need for fertilizer, reduces the time it takes to mow, increases the natural beauty of a shoreland area, and attracts wildlife.

Lawns do not make very good upland buffers. With runoff, short grass blades bend and do not serve as a very effective filter. Tall grass that remains upright with runoff is a better filter. Kentucky bluegrass (which actually is an exotic grass) is shallow-rooted and does not protect soil near shorelines as well as deep-rooted native prairie grasses, shrubs, or other perennials. Grass up to the shoreline offers poor cover, so predators visit other hiding areas more frequently reducing the prey food base and limiting predator populations in the long run. Also with short ground cover, ground temperatures increase in summer, evapotranspiration increases and results in drying conditions, reducing habitat for frogs and shoreline dependent animals.

Buffer Strip Considerations

A functional upland buffer should be at least 15 feet deep. With this you start getting water quality and wildlife habitat benefits. But a 25 foot deep buffer is recommended. In the past, before lakeshore development, buffers ringed the entire lake. For lakeshore residents it is recommended the length of the buffer extend for 75% of the shoreline, although 50% would produce buffer benefits.

A buffer strip can address two problem areas right away. Geese are shy about walking through tall grass because of the threat of predators. There will always be a few who charge right through but it is a deterrent for most of them. Also, muskrats shouldn't be a problem. They may burrow into the bank, but generally not more then 10 feet. With a buffer going back 15 to 25 feet, you won't be mowing over their dens. An occasional den shouldn't produce muskrat densities that limit desirable aquatic vegetation.

Several types of buffers can be installed or propagated that offer nutrient removal as well as wildlife benefits. Examples include:

Tall grass, sedge, flower buffer: Provides nesting cover for mallards, blue-winged teal and Canada geese. Provides above ground nesting habitat for sedge wrens, common yellow throat and others.

Shrub and brush buffer: Provides nesting habitat for lakeside songbirds such as yellow warblers, common yellowthroat, swamp sparrows, and flycatchers. It also provides significant cover during migration.

Forested buffers: Provides habitat for nesting warblers and yellow-throated vireo, herons, woodducks, hooded mergansers, and others. Upland birds such as red-winged blackbirds, orioles, and woodpeckers use the forest edge for nesting and feeding habitat.

Even standing dead trees, which are referred to as snags, have a critical role. When they are left standing they serve as perching sites for kingfishers and provide nesting sites for herons, egrets, eagles, and ospreys. In the midwest over 40 bird species and 25 mammal species use snags. To be useful, they should be at least 15 feet tall and 6-inches in diameter.

The initial step for lake residents to get started is to simply make a commitment to try something. Just what the final commitment is evolves as they go through a selection process. The next step in the process is to conduct a site inventory. On a map with lot boundaries, house and buildings, driveway, turf areas, trees, shrubs, and other features are drawn. If there is a chance, the property is checked during a rainstorm. Look for sources of runoff and even flag the routes. Find out where the water from the roof goes, and see if there are temporary ponding and infiltration areas. Are the paths down to the lake eroding? Then the next step is to consider a planting approach.

Native Landscaping for Buffers: Three Approaches

Native landscaping efforts can be put into three categories:

1. Naturalization
2. Accelerated Naturalization
3. Reconstruction

1. Naturalization: With this approach, the resident is going to allow an area to go natural. Whatever is present in the seedbank is what will grow. If they want to install a buffer along the shoreline, let a band of vegetation grow at least 15 feet deep from the shoreline back and preferably 25 feet or deeper. Just by not mowing will do the trick. Residents can check how it looks at the end of the summer. It will take up to three years for flowers and native grasses to grow up and be noticed. Residents can also select other spots on their property to "naturalize".

2. Accelerated Naturalization: After developing a plant list of species from the area, residents may want to mimic some features right away. They can lay out a planting scheme and plant right into existing vegetation. Several Minnesota nurseries can supply native plant stock and seeds. The nurseries can also help select plants and offer planting tips. Wildflowers can be interspersed with wild grasses and sedges. Mulch around the new seedlings. With this approach lake residents can accelerate the naturalization process.

3. Reconstruction: To reestablish a native landscape with the resident's input and vision, another option is to reconstruct the site with all new plants. Again plant selection should be based on plants growing in the area. Site preparation is a key factor. Residents will want to eliminate invasive weeds and eliminate turf. This can be done with either herbicides or by laying down newsprint or other types of paper followed by 4 to 6 inches of hardwood mulch. Plantings are made through the mulch. This is the most expensive of the three native landscaping categories. Residents can do the reconstruction all at once, or phase it in over 3 to 5 years. This allows them to budget annually and continue evolving the plan as time goes by.

Also mixing and matching the level-of-effort categories allows planting flexibility. Maybe a homeowner employs naturalization along the sides of the lot and reconstruction for half of the shoreline and accelerated naturalization for the other half. Examples of the three approaches are shown in Figure 3.

A book that covers the shoreland improvements is "Lakescaping for Wildlife and Water Quality" by Carrol Henderson and others and is available from the Minnesota Department of Natural Resources for $21 (651.296.6157).

1. Naturalization: The easiest way to implement a natural shoreline setting is to select an area and leave it grow back naturally.

2. Accelerated Naturalization: To accelerate the naturalization, plant shrubs, wild flowers, or grasses into a shoreland area.

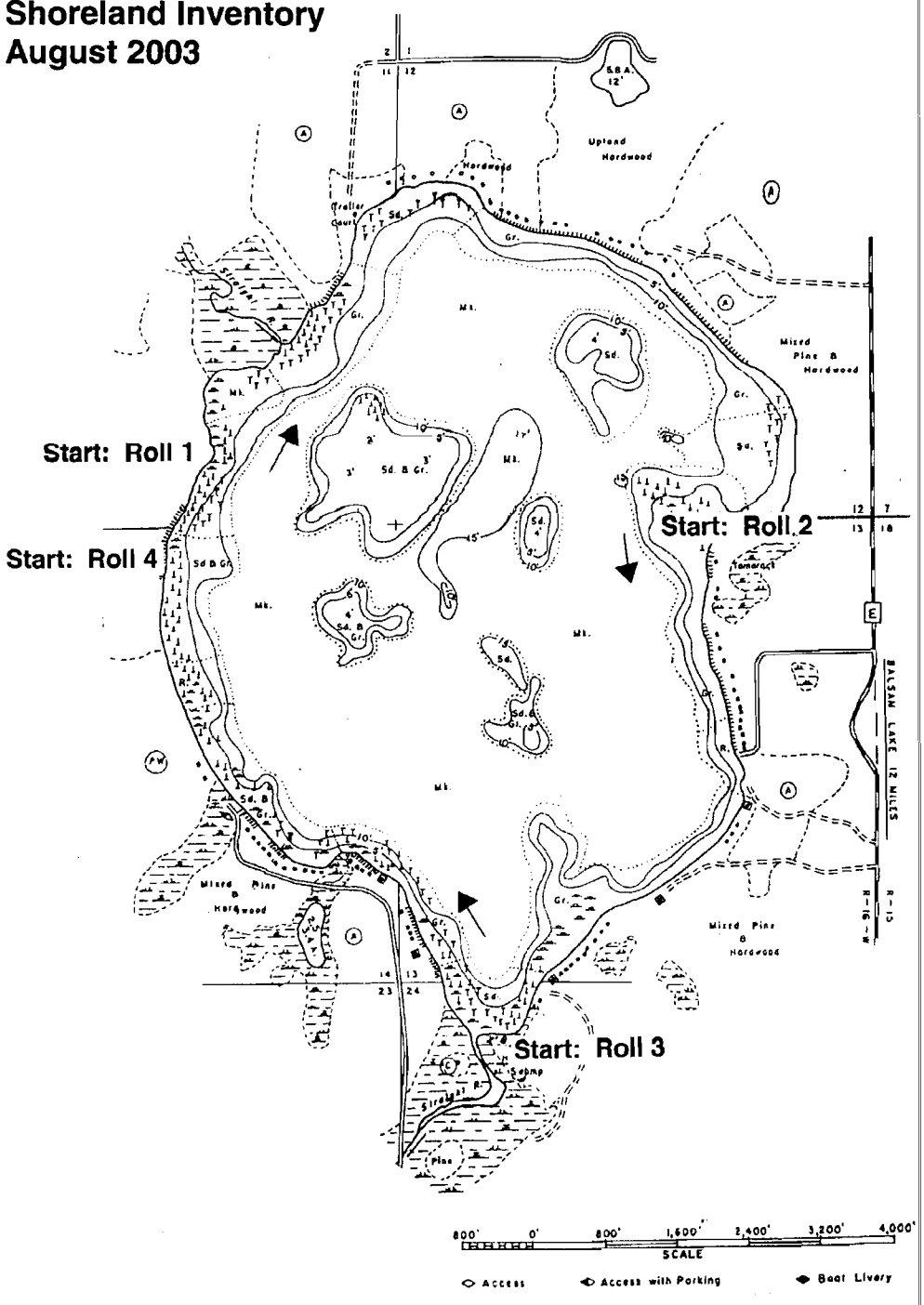
3. Restoration: This involves removing existing vegetation through the use of paper mats and/or mulching and planting a variety of native grasses, flowers, and shrubs into the shoreland area.

Figure 3. Examples of three shoreland management options.

3. Shoreland Inventory Evaluation

Results of individual parcel evaluations are shown in Table 3. A key to parcel locations is shown on the map on the next page.

A "parcel" represents either a photo of an undeveloped shoreline area or an approximation of a developed lot. It's possible several lots were missed or boundary lines were misinterpreted. However, the overall "picture" of the shoreland conditions should be accurate.



Key to shoreland photo parcels for Big Round Lake, August 2003.

Table 3. Big Round Lake shoreline inventory, August 2003. Shorelands that meet the natural condition of either 50% or 75% of natural cover are shown with a "X". Shorelands with less than 50% or 75% natural cover are shown with an open box or "-".

ID #	Natural Upland Condition		Natural Shoreline Condition		Shoreline Erosion		# of Lots	Undev. Lots	Shoreline Structure			Comments
	>50%	>75%	>50%	>75%	No	Yes*			No	Yes		
										riprap	wall	
R1-1			X		X		1		X			Landing.
R1-2	X	X	X	X	X		1	X	X			
R1-3	X	X	X	X	X		1	X	X			
R1-4	X	X	X	X	X		1	X	X			
R1-5	X	X	X	X	X		1		X			
R1-6	XX	XX			XX		2			XX		
R1-7					XXX		3		XXX			
R1-8			XX	XX	XX		2		XX			
R1-9			X	X	X		1		X			
R1-10			X	X	X		1		X			
R1-11			XX	X-	XX		2		XX			
R1-12					X		1		X			
R1-13			X	X	X		1		X			
R1-14					X		1		X			
R1-15	X	X	X	X	X		1	X	X			
R1-16	X	X	X	X	X		1	X	X			
R1-17						Slight	1		X			Road. Clear bank with slight overland erosion.
R1-18	X	X	X	X	X		1	X	X			
R1-19	X		X	X	X		1		X			
R1-20	X	X	X	X	X		1	X	X			
R1-21	X	X	X	X	X		1		X			
R2-1					XX		2		-X	X-		
R2-2					X		1		X			
R2-3					XX		2		XX			
R2-4					XX		2		-X	X-		
R2-5	X	X	X	X	X		1		X			
R2-6			X	X	X		1		X			
R2-7					X		1			X		
R2-8					X		1		X			
R2-9					X		1		X			
R2-10					X		1		X			
R2-11					X		1		X			New construction.
R2-12					XXX		3		XXX			
R2-13					X		1			X		
R2-14					X		1		X			
R2-15					XX		2		XX			
R2-16					X		1		X			
R3-1	X	X	X	X	X		1	X	X			
R3-2	X	X	X	X	X		1		X			
R3-3					X		1			X		
R3-4	X	X			X		1			X		
R3-5					X		1				X	

ID #	Natural Upland Condition		Natural Shoreline Condition		Shoreline Erosion		# of Lots	Undev. Lots	Shoreline Structure			Comments
	>50%	>75%	>50%	>75%	No	Yes*			No	Yes		
										riprap	wall	
R3-6					XX		2		XX			
R3-7					XX		2		XX			
R3-8					XX		2		XX			
R3-9			XX	XX	XX		2		XX			
R3-10	X	X	X	X	X		1		X			
R3-11					X		1			X		
R3-12					XX		2		XX			
R3-13			X		X		1		X			
R3-14	X	X	X	X	X		1	X	X			
R3-15	X	X	X	X	X		1	X	X			
R4-1					XX		2		XX			
R4-2					X		1		X			
R4-3	X		X		X		1		X			
R4-4					XX		2		XX			
Totals	20	18	29	25	73	1	74	10	64	9	1	

*Slight, Moderate, Severe