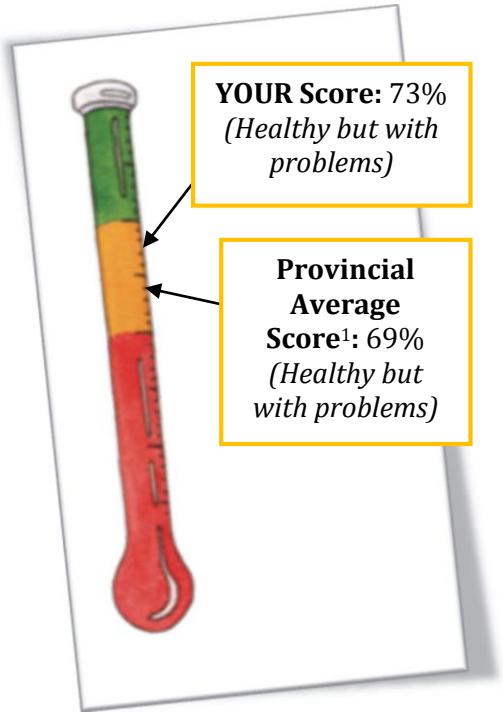
Cows and Fish

Alberta Riparian Habitat Management Society

Riparian Health Summary Report 2021

Sarah Rice, Town of Bonnyville
Jessie Lake



A Riparian Health Inventory is a tool designed to help evaluate and understand the health of riparian areas within your landholdings.

This summary report provides information on the current health of **Jessie Lake in NE 12-61-6 W4M** based on data we collected on **June 22, 2021**. This information is intended to help direct your efforts to promote important riparian functions such as improved water quality, forage production, and wildlife habitat.

This project was initiated by the **Lakeland Industry and Community Association (LICA)** and this Riparian Health Inventory was funded through **Watershed Resiliency and Restoration Program (WRRP)** and Cows and Fish. Two sites were assessed within the town of Bonnyville on Jessie Lake. Overall, the average riparian health for sites assessed in Alberta is *healthy but with problems* (69%).[1] Currently, your site scores 73% (*healthy but with problems*), above the provincial average. An explanation of your score begins on page 2.

L. Givogue Stevenson, RHIP01JES010

[1] Cows and Fish Riparian Health Inventory Data 1996 – 2020. Based on 3,061 sites, on 868 waterbodies in Alberta.

Your Riparian Health Score

A description of how health score categories are derived can be found in the *Riparian Health Score Sheet Categories for Lakes and Wetlands* (Appendix C, page 13).

Waterbody:	Jessie Lake	**Location:**	NE 12-61-6 W4M
East End Waypoint:	515759 E, 6012638 N 12U	**Site Code:**	JES1
West End Waypoint:	515132 E, 6012698 N 12U	**Inventory Date:**	June 22, 2021

QUESTION	YOUR SCORE	MAXIMUM SCORE	%
VEGETATION			
1. Vegetative Cover of Site	6	6	
2a. Invasive Plant Species (Cover)	1	3	
2b. Invasive Plant Species (Density Distribution)	0	3	
3. Disturbance-Caused Undesirable Herbaceous Species	0	3	
4. Preferred Tree and Shrub Establishment and Regeneration	6	6	
5a. Utilization of Available Preferred Trees and Shrubs	2	3	
5b. Live Woody Vegetation Removal Other Than Browse	3	3	
6. Human Alteration of Site Vegetation	0	6	
VEGETATION RATING	**18**	**33**	**55%**
SOIL/HYDROLOGY			
7a. Human Alteration of Site Physical Structure	12	12	
7b. Severity of Human-Caused Alterations to Physical Site	1	3	
8. Human-Caused Bare Ground	6	6	
9. Degree of Artificial Removal/Addition of Water	9	9	
SOIL/HYDROLOGY RATING	**28**	**30**	**93%**
OVERALL RATING	**46**	**63**	**73%**

Healthy (80-100%) – Little or no impairment to riparian functions.

Healthy but with problems (60-79%) – Some impairment to riparian functions due to human or natural causes.

Unhealthy (<60%) – Impairment to many riparian functions due to human or natural causes.

Riparian Site Description

Riparian areas are defined by the presence of vegetation and soils that are highly influenced by water. In some wetland habitats, this may extend some distance inland and/or into the water, including the littoral zone where cattails, bulrushes, and sedges typically grow. This riparian site is located west of 55th street, along the south shore of Jessie Lake, is approximately 3.5 hectares (8.6 acres) in size and encompasses 720 meters of shoreline. The riparian area varies in width from 2 to 100 meters, with an average width of approximately 70 meters. See the aerial image included in Appendix A – Aerial Photograph Comparisons (page 8) for a representation of the riparian site boundaries.

This riparian site does not have any recreational trails, and is generally unmaintained. In 2019 and 2020, with the help of LICA, native shrubs (willows and red-osier dogwood) were planted (rooted-stock and live-staked) within the riparian area to increase woody plant cover and improve site stability. At the time of the site visit water levels were much higher than in past years, leaving some of the willow stakes and plantings under water along the shoreline. Possible future plans for this site include connecting it to the Town of Bonnyville trail system.

Benchmark photographs of the site are provided in Appendix A (page 8). A list of plant species found in the riparian area is given in Appendix B (page 11).

Riparian Health Score Discussion

The following points elaborate on the Riparian Health Score outlined in the table above:

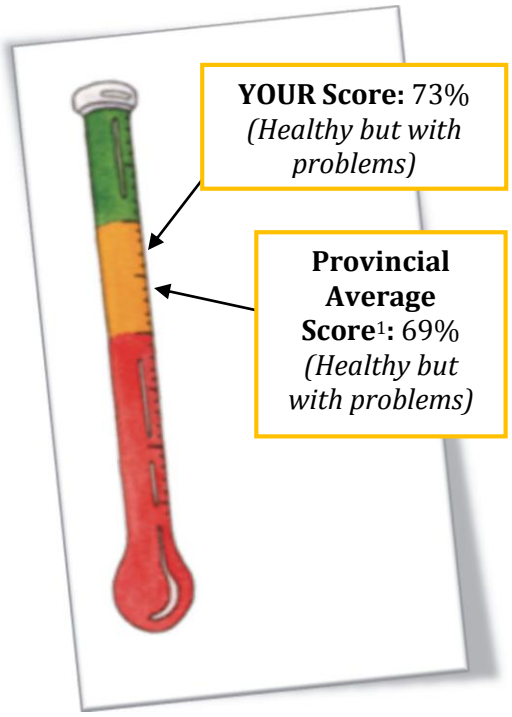
- **Overall, the riparian area is well vegetated.** A diversity of mostly grasses and grass-like plants, dominated by Kentucky blue grass, smooth brome, quack grass and wire rush provide nearly full vegetative cover throughout the riparian area. Common cattail, a native forb (broad-leaf plant), is prominent surrounding the water's edge, along with awned sedge. Shrubs cover about 3% of the site, with a variety of willows, mainly sandbar and beaked willow, being the dominant shrubs. A small amount of mostly young trees are present (less than 1% cover). A high amount of vegetative cover helps to perform riparian functions such as filtering nutrients and stabilizing shorelines and soil surfaces.
- **Invasive plant species are *present*.** Invasive plants include ***prohibited noxious*** and ***noxious*** weeds listed under the Alberta *Weed Control Act,* and other non-native species known to be problematic in riparian areas. Perennial sow-thistle covers approximately 10% of the site, white cockle covers between 1 to 5% of the riparian area, and Canada thistle is present in trace amounts (less than 1% cover). All three of these species are distributed throughout the site in a few patches plus several well-spaced plants. An iris species that is possibly the prohibited noxious pale yellow iris was observed near the east end of the site, away from the water's edge. This single iris plant was not flowering at the time of the site inventory, and the colour of the flower was inferred from dissecting an immature flower bud, and therefore, the identification may be incorrect. Further investigation into correctly identifying the species of this iris is recommended. The presence of invasive plants should always be monitored as these plants tend to fluctuate in abundance from year to year and there is always the potential of new invasive plant species establishing. Invasive plants decrease the ecological health of the landscape, which is reflected in the score of this parameter. Since invasive plants can spread rapidly into areas of exposed soil, it is important to limit further disturbance to the site and to maintain the health and vigor of native riparian plants.
- **Disturbance-caused undesirable plant species are *abundant*.** These plants are typically non-native grasses and forbs that tend to aggressively displace native plants once the soil surface has been disturbed, but also include some native species with similar tendencies. Disturbance-caused plants are generally shallow rooted and have limited value for bank binding, nutrient filtration, and erosion prevention. The main disturbance species in this riparian area are Kentucky bluegrass, smooth brome, and quackgrass, which together cover over 75% of the site, mostly away from the water's edge. Once these non-native disturbance-caused plants have become established within the riparian area it may not

be realistic for the plant community to revert completely back to native species; however, their progression can be minimized by limiting further disturbance to the soil surface.

- **Preferred woody plants (e.g. willows) are present and display signs of regeneration.** 'Preferred' woody plants refer to native trees and shrubs that have high forage and habitat values for livestock and wildlife. Plants such as willows have extensive root systems and help stabilize shorelines and soil surfaces. Willow diversity is high in this site, with six different species growing in this riparian area. Sandbar willow covers approximately 3% of the site, and is composed primarily of young individuals planted as part of the LICA project. About half of these young planted individuals are plugs (planted rooted stock), while the other half are willow stakes (dormant cuttings). Overall, they appear to have good survival, aside from close to the shoreline where many have been flooded out by high water. While having overall low cover, flat-leaved willow, pussy willow, and basket willow display a high proportion of young plants, while false mountain willow and beaked willow are predominantly mature individuals. Although preferred woody plants cover a small portion of the site (less than 5%), the high proportion of young plants is particularly important to ensure the longevity of woody communities since they are needed to replace the older individuals as they die off.
- **Browse (utilization of preferred woody plants by livestock or wildlife) is *light*.** This parameter relates specifically to browse of preferred woody plants – while there is no domestic grazing on this site, wildlife browse can also contribute to this parameter. Some beaked willow individuals show small amounts of browse, though overall the woody plants display their normal growth form and not the *flat-topped* or *umbrella-shaped* appearance of heavily used plants, indicating that browse is not too severe. Currently utilization of preferred species is not a major issue, but when browse turns from light to heavy, mature shrubs will take on an umbrella-shape and seedlings and saplings will become flat-topped. These are indicators of heavy browse, which can prevent the establishment or regeneration of these important species, eliminate them from the community, and/or result in their replacement by less desirable species.
- **The amount of live woody vegetation removal by means other than browsing animals is minimal.** This parameter includes the removal of parts of, or whole, trees and shrubs by beaver and/or human causes (such as clearing or cutting). Neither beaver nor human removal were observed on this site. Continuing to maintain healthy and diverse tree and shrub communities benefits riparian health.
- **Plant communities within the riparian area are *extensively* altered.** Alterations to plant communities are a deviation from the expected or native plant mix that would otherwise be there if certain disturbances had not happened. Approximately 60% of the site is considered altered, and is composed of disturbance species instead of native species. This alteration has likely been influenced by past disturbances, including what appears to be an old road or trail that runs east/west within the site, and a berm that was constructed at the back edges of the site.
- **Human-caused bare ground is limited and structural alterations to the riparian area are present.** Less than 1% of the site, mainly along the water's edge, is bare soil due to natural drawdown of water. This natural bare ground does not contribute to the score of this parameter. Only a trace amount of bare ground is due to human activity, which is positive, and includes a remnant vehicle trail apparant at the east end of the site. Structural alterations include physical changes to the soil structure, including soil compaction. The berm that has been constructed along the back edges of the site is the only structural alteration present. Soil structure changes can affect the hydrology of the site; when soil is compacted water infiltration rates decrease. Although the structural alterations to the site (i.e. the berm) are not widespread, they rate ***moderate*** in severity, leading to a decrease in score for this parameter.
- **This waterbody is *not subjected* to artificial water level change (i.e. removal or addition of water by human activities).** Naturally, lakes and wetlands experience cycles of higher and lower water. Native vegetation is typically adapted to respond to this variability, particularly by growing in areas of exposed shore when the water level goes down. While overall the water levels were elevated compared to past years, at the time of the assessment, no artificial water level changes (i.e. drawdown, stabilization, or addition) were impacting the riparian area.

How Can You Improve or Maintain Riparian Health?

Now that you know and understand the current health of your riparian area it is important to set management goals that will maintain this state of health. Some riparian areas may take a long time to recover to a healthy state, but there is generally room for improvement in the short term.



Priority Management Goals

From our observations, your riparian area would benefit most from the following management actions:

- Reduce invasive and disturbance-caused plant cover,
- Promote and maintain tree and shrub cover, and,
- Retain and protect natural vegetation along your lakeshore

Combining what we have observed with your own practical and intimate knowledge of the landscape will provide the best foundation for sound management planning. The shrubs that have been planted with the help of LICA is a great first step in improving riparian health.

Riparian Management Strategies

To maintain your riparian health, here are a few helpful **management strategies** to consider:

- **Monitor and control invasive plants.** Ensure that invasive plant control efforts avoid harm to desirable native plants. Minimizing ground disturbance will help reduce the potential for invasive plants to spread. Mowing and hand-pulling are also management techniques useful in riparian sites. Please contact Janice Boden, Assistant Agricultural Fieldman at M.D. of Bonnyville (Ph: 780-826-3951, Email: jboden@md.bonnyville.ab.ca) for further information. For additional information on invasive plant management and identification refer to the Alberta Invasive Species Council website: www.abinvasives.ca.

    - Canada thistle is difficult to control since it is widespread in the watershed and rapidly invades riparian areas by wind dispersal of seeds and its aggressive rhizomatous growth habit. Repeatedly cutting Canada thistle before seed set for several years can help to reduce its vigour and prevent additional dissemination of seeds.

    - Determining the species of iris identified within the riparian area is recommended, as the pale yellow iris is a listed prohibited noxious weed. If the identification is confirmed as pale yellow iris, swift control of this species is highly recommended, as it can outcompete native species, quickly take over a shoreline, and easily spread to other waterbodies. For more information, please see: https://abinvasives.ca/fact-sheet/iris-pale-yellow/.

- **Monitor young plantings.** Woody plants are the most vulnerable when they are young. Keep an eye out for them. As this area may see many recreators, providing signage or other notices to protect these vulnerable young plantings could prove helpful.
- **Retain and protect natural vegetation along your lakeshore – the wider your natural riparian buffer, the bigger the benefits!** A healthy shoreline, with abundant native vegetation growing in the water (e.g. cattails) and along the shore (e.g. willows) benefits water quality and fish and wildlife habitat. Vegetated shorelines protect against wind, water and ice, which erode shorelines over time. Vegetation

traps sediments and nutrients, rebuilding shorelines and improving water quality. If you have the space, retain a riparian buffer of at least 30 meters in width.

- **Save time, money and your lake – keep it natural not neat!** Let natural debris such as fallen branches, leaves, driftwood and other natural organic matter accumulate along the shoreline. Natural debris adds organic matter and nutrients to the soil and helps to trap soil moisture and prevent against erosion.
- **"Soften" your shoreline and minimize creation of hardened surfaces.** Paved surfaces in a riparian area limit the moisture holding capacity of the floodplain and increase overland run-off of snowmelt and rainfall. Unfiltered runoff from paved surfaces is a contributor to degraded lake water quality. If any trails are planned, consider a permeable or semi-permeable surface such as wood chips or gravel, rather than a hardened surface like ashphalt or concrete. You can also 'soften' your shoreline by letting natural debris wash ashore and by planting native plants in and around hardened structures.
- **Monitor and reduce impacts from recreational activities.** Restrict recreational use to designated trails and close-off sensitive areas to vehicle traffic.
- **Get to know your watershed.** Watershed activities may alter flow or water levels, impacting your riparian area.
- **Continue learning.** Watch for opportunities to learn more about workshops, field days, and other events.

> ***Please note:*** *For a more specific Management Plan and more in depth analysis of your current management, further understanding of your operation's goals would be required. If this is something you are interested in, please contact us for more information.*

Monitoring

To track your progress toward improving the health of your landscape, we encourage you to document and take photographs of riparian sites where management changes are made. Monitoring may be as simple as re-taking photographs taken during our inventory or at other locations that are of interest to you.

To assess riparian health trends, we recommend that health assessments be repeated every three to five years. The field workbook ***Riparian Health Assessment for Lakes, Sloughs, and Wetlands*** is available from Cows and Fish. This workbook explains how to conduct a rapid survey to quickly check the health status of your riparian area.

Please contact Cows and Fish if you would like assistance in monitoring the long-term health of your riparian area. The Cows and Fish website (www.cowsandfish.org) has additional information on riparian areas, community tools for dealing with riparian issues, and community and producer riparian success stories.

This report was prepared by the Cows and Fish Riparian Analyst team (Field Crew). For further information on any aspect of this summary, please contact:

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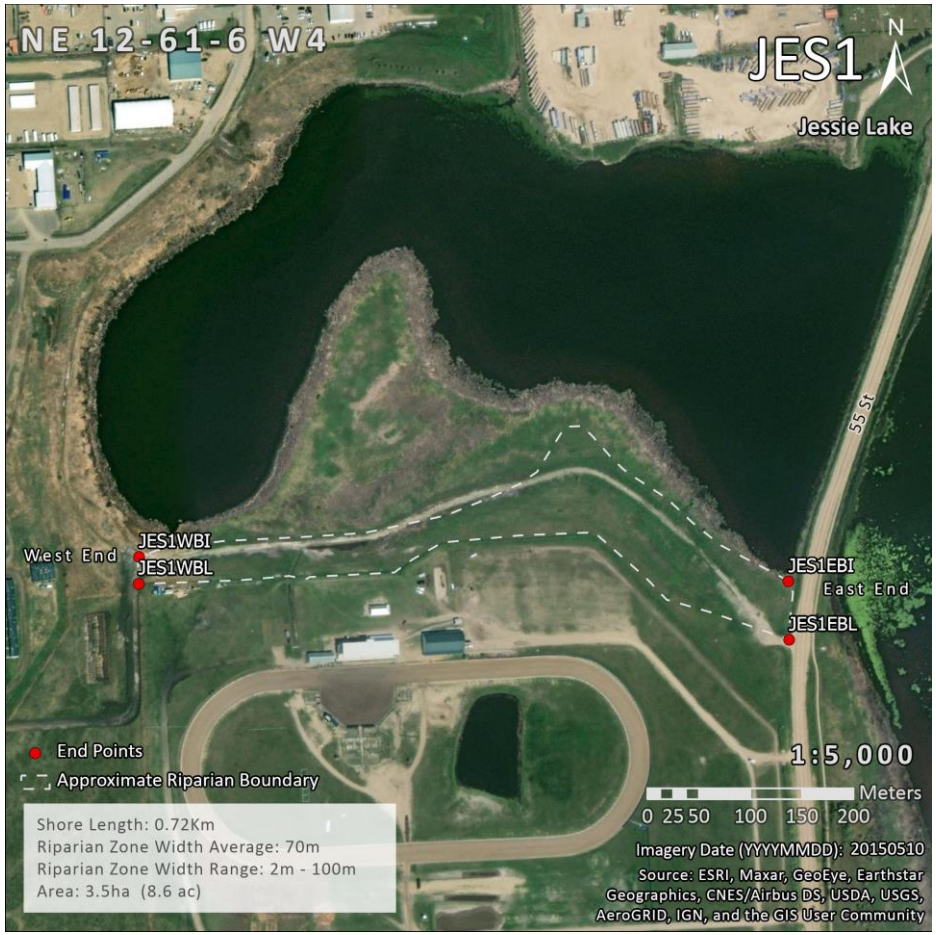
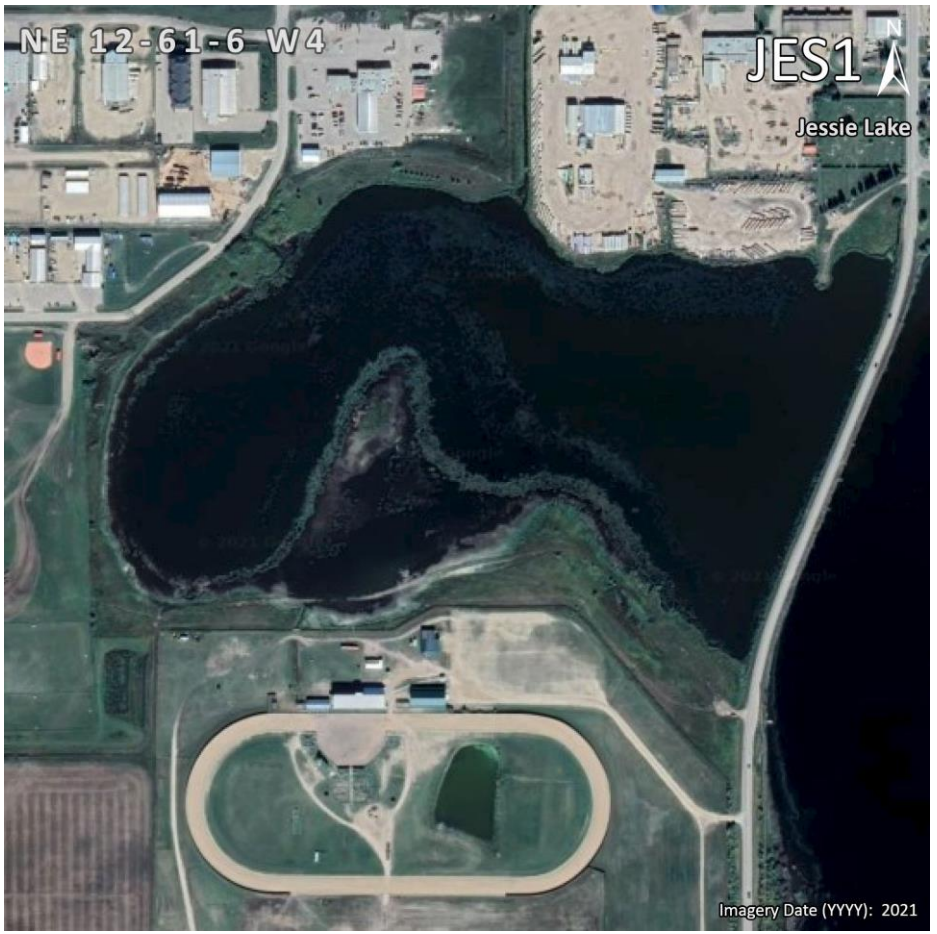
Appendix A – Aerial Photograph Comparisons



Air Photo Date: circa 2015

Air photo with the boundary of the assessed riparian site. Mapping software uses an older image, which does not show recent flooding in the area.



Air Photo Date: 2021

More current air imagery from Google Earth showing the recent high water in the area. The darker lobe on the southern shoreline shows the area which was flooded at the time of the inventory, and helps to visualize the rationale of the riparian area assessed in the current report. (See boundary in left image).

Benchmark Photography

L. Givogue Stevenson, RHIP01JES004

JES1EBI. East end, south view. There is an excellent vegetation buffer along water's edge, consisting primarily of cattails and native sedges. This provides important habitat for wildlife while protecting the shoreline from erosion.

L. Givogue Stevenson, RHIP01JES010

JES1WBI. West end, north view. High water levels over the last few years have encroached on the shoreline at this end of the site. Cattails are growing closer to shore in response to this higher water.

Additional Photos of Your Riparian Area

L. Givogue Stevenson, RHIP01JES013

JES1 A. Young willow plantings (left) appear to have a relatively high success rate of survival within the site. The addition of woody vegetation will help in stabilizing the riparian zone and filtering nutrients.

L. Givogue Stevenson, RHIP01JES012

JES1 B. Some areas away from the shoreline are wet and marshy, which could possibly be influenced by the higher water table. Lots of dense sedges in the area are providing great habitat. These wet, open areas were present parallel to the shoreline, only occuring in parts of the site.

L. Givogue Stevenson, RHIP01JES011

JES1 C. Emergent vegetation, with native sedges along the shoreline and cattails farther into the water, provides excellent habitat, and many birds were observed within this riparian site.

L. Givogue Stevenson, RHIP01JES015

JES1 D. Non-native grasses such as Kentucky bluegrass and smooth brome dominated this site farther from shore. A few mature willows are present, while many willow plantings are beginning to establish (tall wispy vegetation visible in the foreground).

L. Givogue Stevenson, RHIP01JES017

JES1 E. Some of the willow stakes that were planted along the shoreline are now inundated with water, and seem not to have survived. Many of the plantings farther away from the shoreline have good survival.

Appendix B – Riparian Plant Information (JES1)

Category	Species Common Name *(Scientific Name)*	Plant Status[1]	% Canopy Cover[2]
Trees	aspen *(Populus tremuloides)*	native	0.5
	balsam poplar *(Populus balsamifera)*	native	0.5
	green ash *(Fraxinus pennsylvanica)*	native	0.5
	Manitoba maple *(Acer negundo)*	native	0.5
Shrubs	basket willow *(Salix petiolaris)*	native	0.5
	beaked willow *(Salix bebbiana)*	native	3.0
	choke cherry *(Prunus virginiana)*	native	0.5
	common wild rose *(Rosa woodsii)*	native	0.5
	cotoneaster *(Cotoneaster spp.)*	*introduced*	0.5
	false mountain willow *(Salix pseudomonticola)*	native	0.5
	flat-leaved willow *(Salix planifolia)*	native	0.5
	northern gooseberry *(Ribes oxyacanthoides)*	native	0.5
	pussy willow *(Salix discolor)*	native	0.5
	sandbar willow *(Salix exigua)*	native	3.0
	Saskatoon *(Amelanchier alnifolia)*	native	0.5
Grasses (and grass-like species)	awned sedge *(Carex atherodes)*	native	3.0
	common great bulrush *(Scirpus validus acc. Schoenoplectus tabernaemontani)*	native	0.5
	creeping meadow foxtail *(Alopecurus arundinaceus)*	*introduced*	0.5
	fowl bluegrass *(Poa palustris)*	native	3.0
	foxtail barley *(Hordeum jubatum)*	*disturbance*, native	0.5
	graceful sedge *(Carex praegracilis)*	native	3.0
	Kentucky bluegrass *(Poa pratensis)*	*disturbance, introduced*	50.0
	marsh reed grass *(Calamagrostis canadensis)*	native	0.5
	Nuttall's salt-meadow grass *(Puccinellia nuttalliana)*	native	0.5
	prairie bulrush *(Scirpus paludosus acc. Bolboschoenus maritimus)*	native	0.5
	quack grass *(Agropyron repens acc. Elymus repens)*	*disturbance, introduced*	20.0
	smooth brome *(Bromus inermis)*	*disturbance, introduced*	20.0
	spangletop *(Scolochloa festucacea)*	native	0.5
	sweet grass *(Hierochloe odorata acc. Anthoxanthum hirtum)*	native	0.5
	three-square rush *(Scirpus pungens acc. Schoenoplectus pungens)*	native	3.0
	timothy *(Phleum pratense)*	*disturbance, introduced*	0.5
	wire rush *(Juncus balticus)*	native	10.0
Forbs (broad-leaf plants)	alfalfa *(Medicago sativa)*	*introduced*	3.0
	alsike clover *(Trifolium hybridum)*	*disturbance, introduced*	0.5
	bull thistle *(Cirsium vulgare)*	*introduced*	0.5

Forbs cont'd	Canada goldenrod *(Solidago canadensis)*	native	0.5
	Canada thistle *(Cirsium arvense)*	***invasive**, introduced*	0.5
	celery-leaved buttercup *(Ranunculus sceleratus)*	native	0.5
	common cattail *(Typha latifolia)*	native	3.0
	common dandelion *(Taraxacum officinale)*	*disturbance, introduced*	0.5
	common horsetail *(Equisetum arvense)*	native, ***poisonous***	0.5
	common plantain *(Plantago major)*	*disturbance, introduced*	0.5
	common yarrow *(Achillea millefolium)*	native	0.5
	curled dock *(Rumex crispus)*	*introduced*	0.5
	Fremont's goosefoot *(Chenopodium fremontii)*	native	0.5
	hemp-nettle *(Galeopsis tetrahit)*	*disturbance, introduced*	0.5
	long-stalked chickweed *(Stellaria longipes)*	native	0.5
	many-flowered yarrow *(Achillea sibirica)*	native	0.5
	marsh hedge-nettle *(Stachys palustris)*	native	0.5
	pale yellow iris *(Iris pseudacorus)*	***invasive**, introduced*	0.5
	perennial sow-thistle *(Sonchus arvensis)*	***invasive**, introduced*	10.0
	prairie sagewort *(Artemisia ludoviciana)*	native	0.5
	purple-stemmed aster *(Aster puniceus)*	native	0.5
	sea milkwort *(Glaux maritima)*	native	0.5
	seaside arrow-grass *(Triglochin maritima)*	native, ***poisonous***	0.5
	seaside buttercup *(Ranunculus cymbalaria)*	native	0.5
	silverweed *(Potentilla anserina)*	*disturbance*, native	0.5
	sweet clover *(Melilotus spp.)*	*introduced*	0.5
	tufted white prairie aster *(Aster ericoides)*	native	0.5
	white cockle *(Silene pratensis acc. Silene latifolia)*	***invasive**, introduced*	3.0
	wild vetch *(Vicia americana)*	native	0.5
	wormseed mustard *(Erysimum cheiranthoides)*	*disturbance, introduced*	0.5
	yellow avens *(Geum aleppicum)*	native	0.5
	yellow lady's-slipper *(Cypripedium calceolus)*	native	0.5

[1] Plant status is designated by Cows and Fish in association with Alberta Public Lands and the Alberta Weed Control Act.

[2] Based on visual estimates of the amount of ground the canopy of the plant covers. The percent cover values presented are the mid-values for the following ranges: 0.5=less than 1%; 3.0=1%-5%; 10.0=5%-15%; 20.0=15%-25%; 30.0=25%-35%; 40.0=35%-45%; 50.0=45%-55%; 60.0=55%-65%; 70.0=65%-75%; 80.0=75%-85%; 90.0=85%-95%; 97.5=greater than 95%.

Appendix C – Riparian Health Score Sheet Categories for Lakes and Wetlands

Each riparian health parameter is rated according to conditions observed on the site at the time of evaluation. Parameters are assessed using ocular estimates by trained practitioners. The parameter breakout groupings and point weightings were developed by a collaboration of riparian scientists, fisheries biologists, range professionals, and land managers. Some riparian health parameters will not apply on all sites. For example, sites without potential for woody species are not rated on questions concerning trees and shrubs. On severely disturbed sites, vegetation potential can be difficult to determine. On these sites, clues to potential may be sought on nearby sites with similar landscape position.

1. Vegetative Cover of Site

6 = More than 95% of the riparian area is covered by plant growth.
4 = 85% to 95% of the riparian area is covered by plant growth.
2 = 75% to 85% of the riparian area is covered by plant growth.
0 = Less than 75% of the riparian area is covered by plant growth.

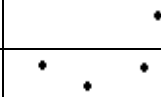
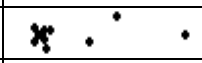
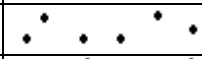
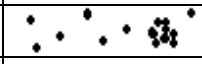
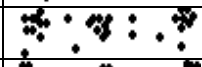
2a. Total Canopy Cover of Invasive Plant Species

3 = No invasive plants (weeds) on the site.
2 = Invasive plants present with total canopy cover less than 1% of the site.
1 = Invasive plants present with total canopy cover between 1% and 15% of the site.
0 = Invasive plants present with total canopy cover more than 15% of the site.

2b. Density/Distribution of Invasive Plant Species (Table 1)

3 = No invasive plants (weeds) on site.
2 = Invasive plants present with density/distribution in categories 1, 2 or 3.
1 = Invasive plants present with density/distribution in categories 4, 5, 6, or 7.
0 = Invasive plants present with density distribution in categories 8 or higher.

Table 1. Density/distribution of invasive plant species.

CLASS	DESCRIPTION OF ABUNDANCE	DISTRIBUTION PATTERN
0	No invasive plants on the site	
1	Rare occurrence	
2	A few sporadically occurring individual plants	
3	A single patch	
4	A single patch plus a few sporadically occurring plants	
5	Several sporadically occurring plants	
6	A single patch plus several sporadically occurring plants	
7	A few patches	
8	A few patches plus several sporadically occurring plants	
9	Several well-spaced patches	
10	Continuous uniform occurrence of well-spaced plants	
11	Continuous occurrence of plants with a few gaps in the distribution	
12	Continuous dense occurrence of plants	
13	Continuous occurrence of plants associated with a wetter or drier zone within the site	

3. Disturbance-Caused Undesirable Herbaceous Species

3 = Less than 5% of the site covered by disturbance-caused undesirable herbaceous species.
2 = 5% to 25% of the site covered by disturbance-caused undesirable herbaceous species.
1 = 26% to 50% of the site covered by disturbance-caused undesirable herbaceous species.
0 = More than 50% of the site covered by disturbance-caused undesirable herbaceous species.

4. Preferred Tree and Shrub Establishment and Regeneration

(N/A will appear in the Riparian Health Score Table if the site lacks potential for preferred trees or shrubs)
6 = More than 15% of the total canopy cover of preferred trees/shrubs is seedlings and/or saplings.
4 = 5% to 15% of the total canopy cover of preferred trees/shrubs is seedlings and/or saplings.
2 = Less than 5% of the total canopy cover of preferred trees/shrubs is seedlings and/or saplings.
0 = Preferred tree/shrub seedlings and saplings absent.

5a. Livestock or Wildlife Browse Utilization of Available Preferred Trees and Shrubs

(N/A will appear in the Riparian Health Score Table if the site lacks potential for preferred trees or shrubs)
3 = None (0% to 5% of available 2nd year and older leaders of preferred species are browsed).
2 = Light (5% to 25% of available 2nd year and older leaders of preferred species are browsed).
1 = Moderate (25% to 50% of available 2nd year and older leaders of preferred species are browsed).
0 = Heavy (More than 50% of available 2nd year and older leaders of preferred species are browsed).

5b. Live Woody Vegetation Removal Other Than Browsing (i.e. beaver use/human clearing of trees and/or shrubs)

(N/A will appear in the Riparian Health Score Table if the site lacks potential for trees or shrubs)
3 = None (0% to 5% of live woody vegetation expected on the site is lacking due to cutting and/or removal by beaver).
2 = Light (5% to 25% of live woody vegetation expected on the site is lacking due to cutting and/or removal by beaver).
1 = Moderate (25% to 50% of live woody vegetation expected on the site is lacking due to cutting and/or removal by beaver).
0 = Heavy (More than 50% of live woody vegetation expected on the site is lacking due to cutting and/or removal by beaver).

6. Human Alteration of Site Vegetation

3 = Less than 5% of site vegetation is altered by human causes.
2 = 5% to 15% of site vegetation is altered by human causes.
1 = 15% to 35% of site vegetation is altered by human causes.
0 = More than 35% of site vegetation is altered by human causes.

7a. Human Alteration of Site Physical Structure

12 = Less than 5% of the site is physically altered by human causes.
8 = 5% to 15% of the site is physically altered by human causes.
4 = 15% to 35% of the site is physically altered by human causes.
0 = More than 35% of the site is physically altered by human causes.

7b. Severity of Human-Caused Alteration of Site Physical Structure

3 = ***No physical alterations*** to the site by human causes.
2 = Human alterations to the physical site are ***slight*** in effect.
1 = Human alterations to the physical site are ***moderate*** in effect.
0 = Human alterations to the physical site are ***severe*** in effect.

8. Human-Caused Bare Ground

6 = Less than 1% of the site is human-caused bare ground.
4 = 1% to 5% of the site is human-caused bare ground.
2 = 5% to 15% of the site is human-caused bare ground.
0 = More than 15% of the site is human-caused bare ground.

9. Degree of Artificial Removal/Addition of Water (Table 2)

9 = The waterbody is 'Not Subjected' to artificial water removal/addition.
6 = Degree of artificial water removal/addition is 'Minor'.
3 = Degree of artificial water removal/addition is 'Moderate'.
0 = Degree of artificial water removal/addition is 'Extreme'.

Table 2. Categories of Lentic Water Removal Severity.

CATEGORY	DEFINITION
Not Subjected	The waterbody is not subjected to artificial drawdown.
Minor	The waterbody is subject to no more than minor artificial water level change. The shore area remains vegetated and withdrawal of water is limited or slow enough that vegetation is able to maintain growth and prevent exposed soil. A relatively narrow band affected by the water level fluctuation may support only annual plants.
Moderate	The waterbody is subject to moderate quantities, speed and/or frequency of artificial water level change. Where water is removed, it is done in a way that allows pioneer plants to vegetate at least half of the exposed area resulting from drawdown. Where water is added, some flooding may occur at levels or times not typical to the area/season.
Extreme	The waterbody is subjected to extreme changes in water level due to volume (extent), speed and/or frequency of artificial water addition or removal. Frequent or unnatural levels of flooding occur where water is added, including extensive flooding into riparian and/or upland areas; or no natural annual drawdown is allowed to occur. In extreme artificial drawdown situations, a wide band of exposed bottom remains unvegetated.