

PLEASE NOTE:

- 1) This report contains preliminary information and interpretations and may be subject to future revision. Any release of the information contained in this report, in whole or in part, to parties other than the landowners of the Municipal District (M.D.) of Rocky View will not be the responsibility of Cows and Fish. Liabilities with the release of this report or use of the information beyond the original intent of the work will be the responsibility of the M.D. of Rocky View.
- 2) All information in this report is a summary and does not share any specific information on individual landholdings assessed based on Cows and Fish's commitment of confidentiality with the landowners who participated. Only general findings, reflecting the overall state of riparian health of the Nose Creek and West Nose Creek project areas are presented in this report.
- 3) This inventory and assessment of the functioning condition (health) of riparian habitat does *not* address any in-stream, hydrological (i.e. issues associated with water flow regimes, water diversions, extractions, dam impacts) or water quality parameters associated with the the Nose Creek and West Nose Creek project areas.

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Riparian Health Assessment Community Report

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Project Area:

This report is a summary of riparian health assessments completed within the Nose Creek and West Nose Creek project areas by Cows and Fish field crews during June, July and August of 2000. The project areas are defined as selected riparian areas of Nose Creek from the headwaters downstream to the confluence of the Bow River and West Nose Creek from the headwaters downstream to the confluence with Nose Creek (refer to project area map – Figure1).

Funding for this project was provided by Alberta’s Environmentally Sustainable Agriculture program (A.E.S.A.), the Nose Creek Watershed Partnership, the M.D. of Rocky View, Alberta Environment and the Cows and Fish partners.

Year	Stream	# Landowners Contacted	# Landowners Participated	# Polygons Assessed	Stream Distance Assessed (km)
2000	Nose Creek	18	10	17	17.3
2000	West Nose Creek	21	12	19	10.7
	Total	39	22	36	28.0

COWS AND FISH

In 1992, the Cows and Fish partnership was formed to foster a better understanding of how improvements in grazing management on riparian areas can enhance landscape health and productivity for the benefit of producers and others who use and value riparian areas. A key feature empowering Cows and Fish is the declaration of ownership of the riparian grazing issue by cattle producers, through the Alberta Cattle Commission (A.C.C.) and the Canadian Cattleman’s Association (C.C.A.). Refer to Appendix A for more on Cows and Fish.

Figure 1. Nose Creek and West Nose Creek project areas (Map)

WHY A RIPARIAN HEALTH ASSESSMENT?

The intent of riparian health assessments is to provide a *state of the environment report* to the local community. Hopefully, this report will provide better information on riparian health or function to assist your community in making the best decisions on how to manage riparian range resources most effectively.

Combining this information with existing practical knowledge of the rangeland resources will provide the best alternatives for the sustainability of healthy riparian areas within the M.D. of Rocky View. In general, this information assists producers and local communities to identify and effectively develop non-legislated or voluntary action plans to address specific riparian land use issues within local watersheds.

Riparian areas are simply the portions of the landscape strongly influenced by water and are recognised by water-loving vegetation along rivers, streams, lakes, springs, ponds and seeps. When in a properly functioning condition or *healthy* state, these *green zones* are one of the most ecologically diverse ecosystems in the world. Healthy riparian areas sustain fish and wildlife populations, provide good water quality and supply, provide forage for livestock, and support people on the landscape.

Today, riparian areas are seen to be among the most valuable, productive, and vulnerable areas of the agricultural sector. In Alberta, growing public concern over water quality and land use issues is foreshadowing the U.S. experience where concern over these issues has led to legislated solutions. **This report is a first-step approach** by you and your community to find non-legislated solutions to help face current and future riparian land use issues.

Riparian health assessments allow communities, landowners and professionals to:

- **Create awareness** amongst local producers and their communities and build common understanding on riparian management issues in their watersheds.
- **Take voluntary action** by assisting local decision-makers develop strategies to find local solutions to address riparian land use issues.
- **Demonstrate the agricultural sector is willing to face the issues** by first acknowledging the need to take stock or determine the *state of the environment* of their watersheds and operations.
- **Identify the “good news” stories** of producers already managing healthy riparian areas.
- **Temper the need for legislation and regulation** as proactive efforts by producers and their communities values cooperation over conflict, demonstrating their willingness to face the issues.
- **Monitor progress** in improving, maintaining and protecting riparian health for their operation or watershed.
- **Identify environmental risk** and integrate into farm and ranch planning

Working together on riparian management issues, including riparian health assessments, displays a proactive message to the public that your community and the agricultural sector in general are taking steps to ensure the health of our landscapes and water supplies are being protected, maintained and improved.

WHY ARE HEALTHY RIPARIAN AREAS IMPORTANT?

Riparian areas can be viewed like a jigsaw puzzle, as they can be broken into pieces that are important to the whole image or function. How these individual *pieces* or components (e.g. vegetation, especially deep-rooted plant species) function together affect the health of the riparian ecosystem including the stream, its watershed, and overall landscape health and productivity.

To be healthy, riparian areas need to perform certain functions: trapping sediment to maintain and build stream banks; recharge groundwater supplies; provide stable flows; flood protection; habitat for fish and wildlife; plus, shelter and forage for livestock. Even though riparian areas comprise a small percentage of the total land area within the M.D. of Rocky View, they are critical to the long-term sustainability of a healthy landscape.

The *Pieces* Of Riparian Health

To effectively understand the current status of riparian function we ask a number of questions regarding the functioning condition of the riparian area (Is it *healthy?*). Healthy riparian areas have the following *pieces* intact and functioning properly:

- successful reproduction of seedling, sapling and mature tree and shrub species,
- unbrowsed or lightly browsed trees and shrubs (by livestock or wildlife),
- floodplains and stream banks with abundant cover of woody plant growth,
- stream banks with deep-rooted plant species (trees, shrubs and sedges),
- very few, if any, noxious weeds (e.g. Canada thistle),
- not many disturbance-caused plant species (e.g. Kentucky bluegrass),
- very little human-caused bare ground or altered stream banks, and
- ability of stream to access (1-2 years) a floodplain at least double the channel width.

To determine the overall riparian health for Nose Creek and West Nose Creek, 13 parameters (seven vegetative and six soil/hydrology) concerning riparian function were addressed for each polygon. A glossary detailing the interpretation of these parameters is found in Appendix B. The overall lotic health assessment score sheets are in Appendix C. A list of all plant species found in the project area is available in Appendix D.

Each parameter was assessed and placed into one of the following three categories:

- 1) **Healthy**¹ (*Properly functioning*); implies no impairment to any riparian functions,
- 2) **Healthy but with problems** (*Functional at risk*); some impairment to riparian functions due to management or natural causes,
- 3) **Unhealthy** (*Non-functional*); severe impairment to riparian functions due to management or natural causes.

¹ Healthy	80 – 100%
Healthy, but with problems	60 – 79%
Unhealthy	<60%

WHAT DID WE FIND?

- **A lot of helpful and keen landowners.** The level of interest and co-operation demonstrated by landowners in the Nose Creek and West Nose Creek project areas was exceptional. Thanks to everyone who allowed access to your land and supported this riparian assessment initiative. In all, 36 riparian sampling sites (polygons) were assessed on 22 landholdings within the project areas in 2000.
- **Some concerns with riparian health.** In general, Nose Creek and West Nose Creek are *healthy but with problems* in relation to the proper functioning condition guidelines within the assessment protocol. The overall assessment of riparian health for both project areas is as follows (Figures 2 and 3);

Nose Creek

- Overall average of 17 polygons assessed: **60% (*healthy but with problems*)**.
- Of the 17 polygons assessed: 12% are *healthy*, 23% are *healthy but with problems*, and 65% are *unhealthy*.

West Nose Creek

- Overall average of 19 polygons assessed: **70% (*healthy but with problems*)**.
- Of the 19 polygons assessed: 16% are *healthy*, 63% are *healthy but with problems*, and 21% are *unhealthy*.

Photographs of typical polygons in each of the three health assessment categories are shown for the Nose Creek project area in Figures 4, 5 and 6 and for the West Nose Creek project area in Figures 7, 8, and 9.

Remember: All information is confidential and is in the process of being provided to each landowner through individual landowner reports. ***This is not a finger pointing exercise; it's an awareness process.***

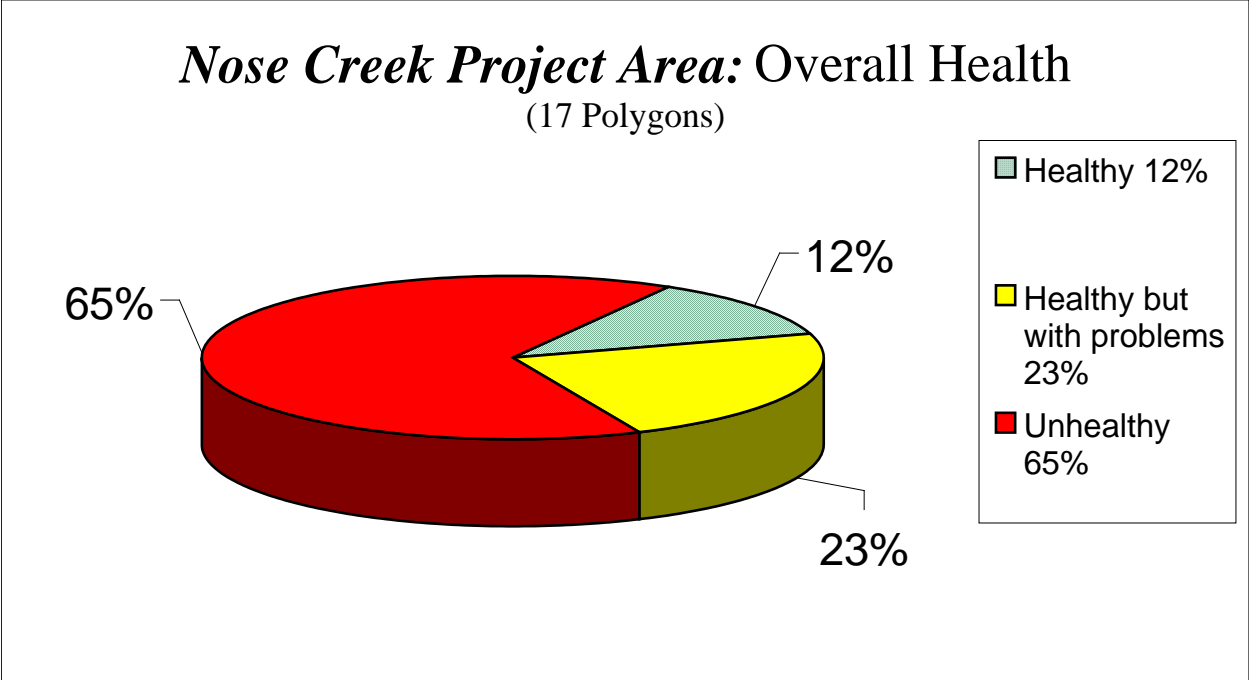


Figure 2. Breakdown of riparian health assessment results for 17 polygons within the Nose Creek project area.

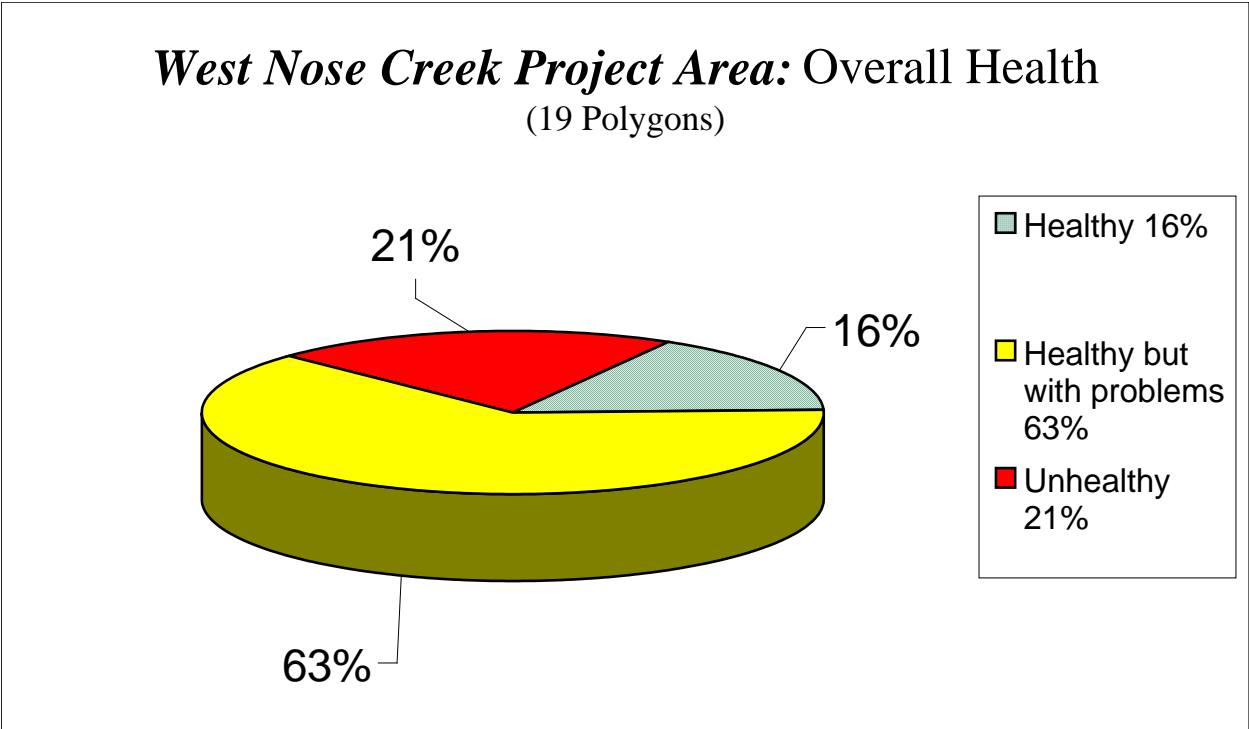


Figure 3. Breakdown of riparian health assessment results for 19 polygons within the West Nose Creek project area.

Nose Creek



Figure 4. Nose Creek project area; typical polygon assessed as *healthy*.

Photo: Suzanne Witham

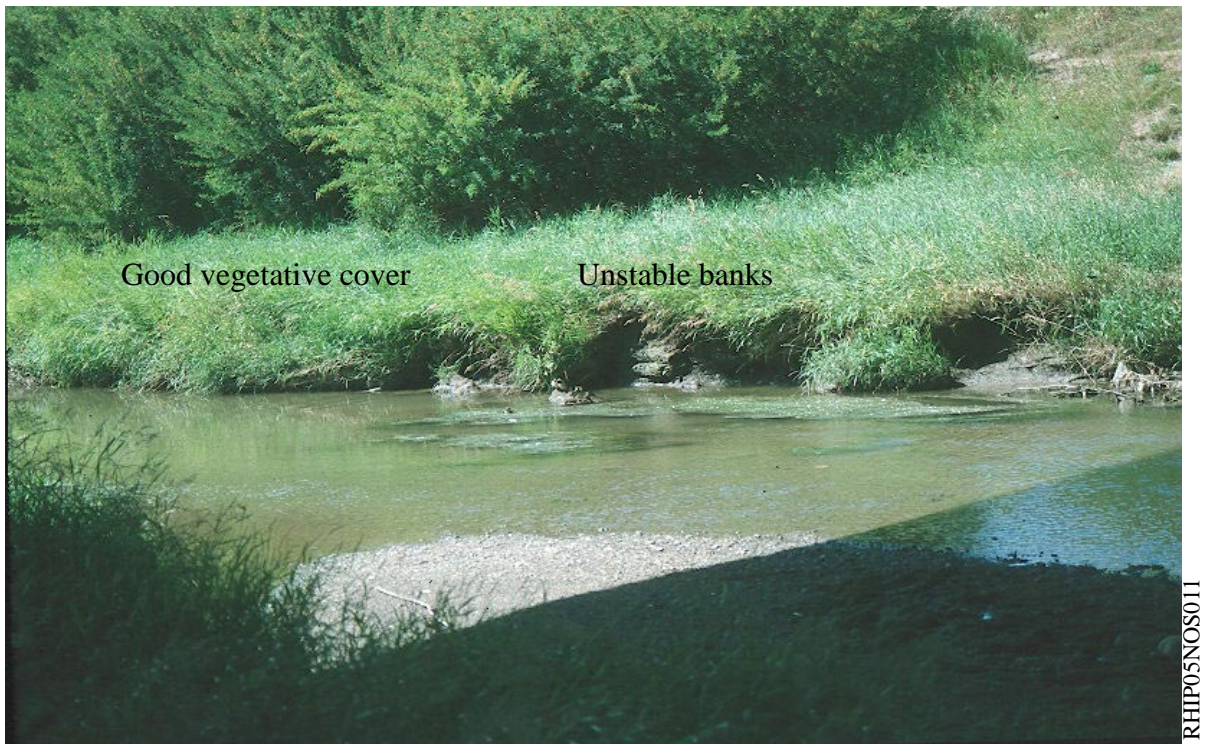


Figure 5. Nose Creek project area; typical polygon assessed as *healthy but with problems*.

Photo: Suzanne Witham



Figure 6. Nose Creek project area; typical polygon assessed as *unhealthy*.
 (Photo: Andrea Markiewicz)

West Nose Creek



Figure 7. West Nose Creek project area; typical polygon assessed as *healthy*.
 (Photo: Kerri O'Shaughnessy)



Figure 8. West Nose Creek project area; typical polygon assessed as *healthy but with problems*.
 (Photo: Nicole Bach)



Figure 9. West Nose Creek project area; typical polygon assessed as *unhealthy*.
 (Photo: Kerri O'Shaughnessy)

RIPARIAN MANAGEMENT DISCUSSION

A Closer Look At The Pieces

Riparian areas are complex, dynamic systems that have a variety of attributes or health parameters that perform certain functions. These health parameters are like *pieces of a puzzle*. If all the *pieces* are intact, a riparian area functions properly or is healthy and, for example, provides shelter and forage for livestock and wildlife. When riparian health degrades, one or more of the *pieces* are impacted by natural or human-caused disturbances such as grazing, flooding or fire. Riparian areas are *healthy but with problems* when a few health parameters experience light to moderate impacts. As the rate and intensity of disturbance increases, the severity of health degradation can reach a point when the riparian area fails to perform its functions properly and becomes *unhealthy*. Generally, it is often difficult to see specific parameters decline in health, especially if the degradation occurs gradually over a long period of time. This health assessment establishes an important baseline to compare to in the future, to keep track of whether riparian health is being maintained, improved or is declining.

During our riparian health assessment we looked closely at each of the 13 health parameters and assessed their functioning condition (Figures 10 and 11). By objectively examining each of these health parameters we can determine which *pieces* are adequately performing the necessary functions of a healthy riparian area, and which are not. This examination provides us with a better understanding of where to concentrate efforts if improvements in riparian management are required, and what land use practices are currently maintaining riparian health.

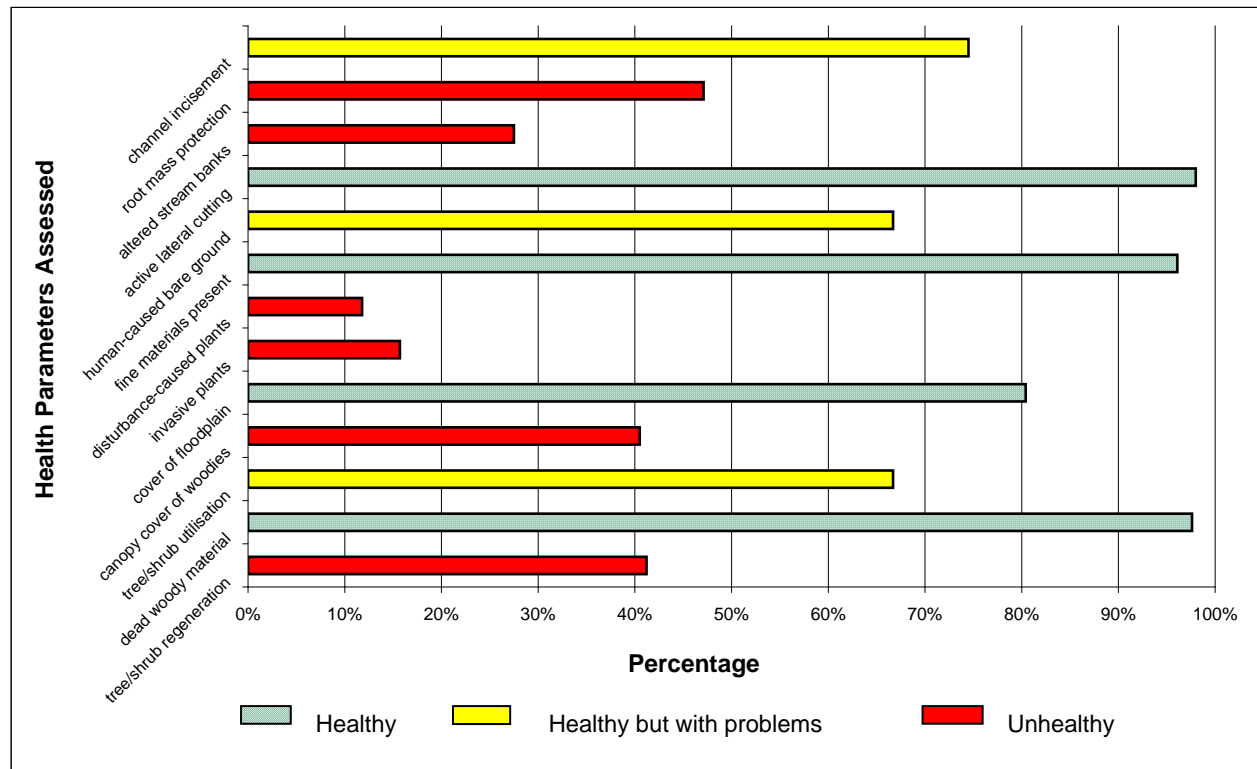


Figure 10. Breakdown of riparian health assessment results for 13 parameters assessed for the Nose Creek project area.

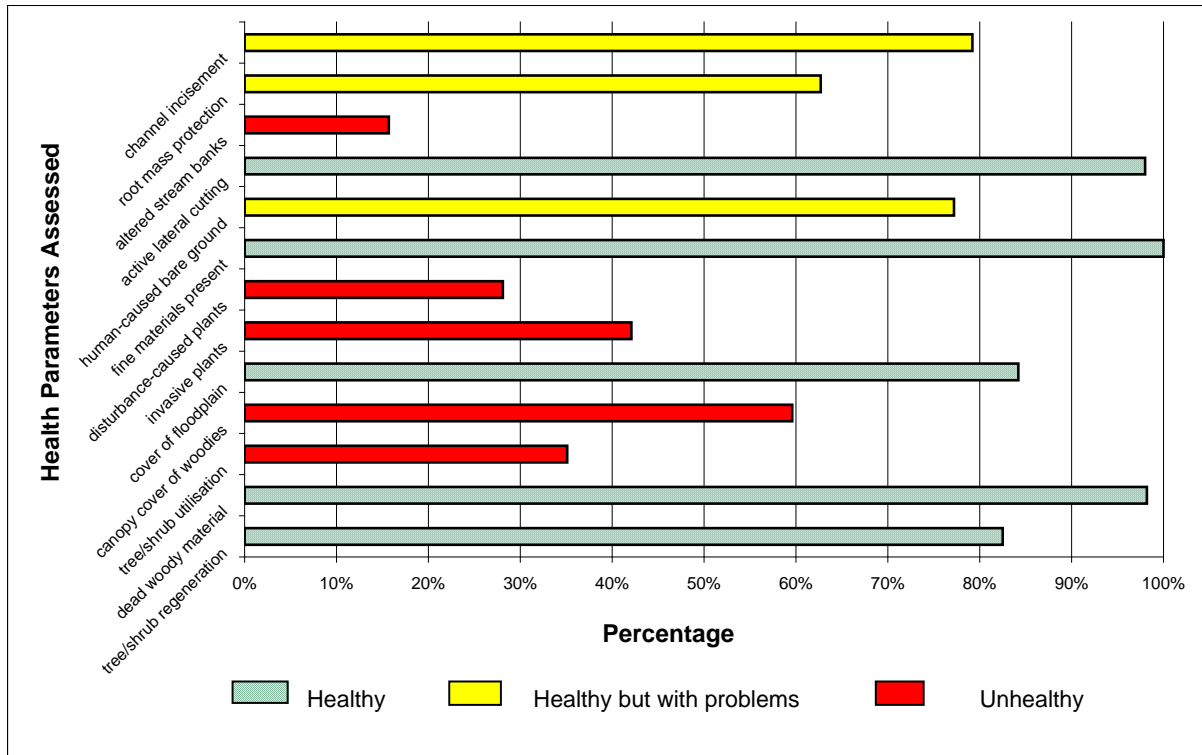


Figure 11. Breakdown of riparian health assessment results for 13 parameters assessed for the West Nose Creek project area.

Please Keep in Mind

The objective of completing these riparian health assessments is to provide a *coarse filter* review of the status of riparian health or function within the project area assessed. The riparian health assessment scores provide a general status of riparian health, not an absolute one. Riparian areas are dynamic and are in constant change. Because of this natural variability, the range of possible scores in each category is broad and one assessment is only an approximation of health. Assessments over a period of years at the same locations will provide a better picture of whether current management is maintaining, improving or negatively impacting riparian health.

The most important aspect of the following discussion involves integrating riparian management objectives with riparian management principles. An overview of riparian management principles can be found in Caring for the Green Zone: Riparian areas and Grazing Management (available from Cows and Fish). Refer to Appendix E for a list of non-technical resources available. A list of additional riparian and range management references has been included in Appendix F. The following discussion provides some insights regarding the current status of the health of riparian areas within the project area.

Riparian Plant Communities

- A well-known stockman, A.E. Cross, once stated, “Look after the grass, and the grass will look after you.” If there is one thing a land manager, landowner or community can do to improve riparian health, it is to keep riparian plant communities healthy by using proper grazing management strategies and land use practices.

Classification of Riparian Plant Communities

Understanding the type of riparian plant communities that a stream system has the potential to grow is important to know for a number of reasons, including:

- Allows producers and land managers to know if the desired plant communities are growing there already and if not, why not? For example, will West Nose Creek grow cottonwoods or willows? How extensive should the plant communities be?
- Provides insight into the feasibility of improving existing site conditions and recovering desired and healthier plant communities, if the desired plant community does not exist or is limited.
- Knowing how far existing plant communities are from the potential natural community (PNC) of the riparian area allows us to:
 - set realistic goals to either improve or maintain existing riparian health,
 - understand how long recovery may take if improvement is needed, and
 - obtain insight into what management strategies need to be implemented for improvement to occur or to maintain existing riparian health.

Nose Creek

- 16 plant communities were identified.
- Graminoid communities (mostly grasses) are the most prevalent plant communities identified, occupying half (51%) of the project area.
- Four different sedge communities combined, occupy 23% of the project area.
- Shrub communities occupy only 10% of the project area. Half of the 10% is comprised of the grazing resistant shrub communities of common wild rose and snowberry.

Although shrub communities occupy only 10% of the study area, sandbar willow (*Salix exigua*) communities were found on the inside curves and banks of the stream and have the potential to become more abundant and healthier. Management efforts should focus to increase the health of these communities by adding longer periods of rest from grazing during the growing season. A positive attribute of the Nose Creek riparian areas is the abundance of sedge plant communities. These sedges have deep binding rootmasses, which are contributing to the streambank stability within the Nose Creek project area.

Finding tree and shrub communities along Nose Creek indicates that the potential exists for growing these communities. Considering the limited presence of trees and shrubs along the entire length of Nose Creek, however, realistic goals to recover healthy shrub communities could focus on sites that presently have any trees or shrubs.

Recovering shrub communities within the riparian areas along Nose Creek is very important for livestock forage, shelter and flood protection.

West Nose Creek

- 19 plant communities were identified.
- Shrub communities occupy 66% of the project area. Of this 17%, is comprised of the grazing resistant shrub communities of common wild rose and snowberry.
- Graminoid communities (mostly grasses) occupy 13% of the project area and sedge communities occupy 12% of the project area.

There is a good diversity of willow communities although there is potential for them to become more abundant and healthier. Many of these communities are heavily utilised remnants occurring in isolated areas like oxbows and inaccessible areas. Management efforts should focus on increasing the health of these communities by adding longer periods of rest from grazing during the growing season. In many willow communities the understory is comprised of sedge communities. These sedges have deep binding rootmasses, which are contributing to the streambank stability within the West Nose Creek project area.

Finding a lot of tree and shrub communities within the West Nose Creek project area indicates that the potential for growing these communities is good, and sets a goal for sites that do not have tree and shrub communities at all or have them in lesser amounts or levels of health. Maintaining tree and shrub communities along West Nose Creek is, again, very important for livestock forage, shelter, and flood protection.

Woody Plants - Trees and Shrubs: Presence, Reproduction and Health

Presence

Nose Creek

- 7 tree species and 21 shrub species were recorded within Nose Creek project area.
- Total area covered by all trees and shrubs combined is only 8%.
- The dominant shrub is snowberry (*Symphoricarpos occidentalis*) with sandbar willow and silverberry (*Elaeagnus commutata*) found in lesser amounts.

West Nose Creek

- 3 tree species and 23 shrub species were recorded within West Nose Creek project area.
- Total area covered by all trees and shrubs combined is 31%.
- Snowberry and five different species of willows comprised the majority of the tree and shrub canopy cover.

- The presence of many different tree and shrub species is often a good indicator of structure and diversity. A diversity of plants provides “habitat layers” – low, medium, and high, benefiting wildlife and livestock.

Reproduction

Nose Creek

- There are concerns with the reproduction and establishment of *preferred*² shrubs.
- In 59% of polygons less than 10% of the total canopy cover of shrubs is represented by seedlings and saplings. In 35% of polygons trees and shrubs are absent.
- Overall, the presence of shrubs has been reduced to small isolated areas within the project area and, in many areas, it is uncertain whether recovery of shrub communities can be achieved.
- Recovery of healthy shrub communities will depend on improvements in riparian management practices from the agricultural and urban/residential sectors.

West Nose Creek

- Although preferred shrub reproduction is occurring in most polygons, there are some concerns with the long-term reproduction and establishment of shrubs.
- In most polygons, at least 10% of the total canopy cover of shrubs is represented by seedlings and saplings. The overall presence of shrubs, however, has been reduced to less than a third of the project area.
- Long-term reproduction and establishment of shrubs (and some trees) will depend on continued and increased efforts to implement sound grazing management practices (e.g. rest, rotation, distribution).

Health

Nose Creek

- There are some concerns with the overall health of trees and shrubs because over half (53%) of the shrub canopy cover is comprised of only two grazing-resistant, disturbance-caused shrubs (snowberry and common wild rose [*Rosa woodsii*]).
- Of the 65% of polygons that have trees and/or shrubs present, 36% are receiving moderate browse pressure from livestock (to a lesser degree from wildlife).
- This browse pressure is removing new growth and preventing the establishment of seedlings and saplings.

² native, palatable shrubs (willows etc.) that contribute to riparian function or health

West Nose Creek

- There are a few concerns with the overall health of trees and shrubs because 23% of the shrub canopy cover is comprised of the disturbance-caused shrubs, snowberry and common wild rose.
 - In three-quarters of polygons (74%) the browse utilisation of trees and shrubs is moderate to heavy.
 - This browse pressure is removing new growth and, in many areas, is preventing the seedlings and saplings from reaching a mature age class.
- The indicators of heavy browse pressure are *umbrella-shaped* mature shrubs where animals have browsed the accessible limbs and *flat-topped* or *hedged* seedling and saplings.

How the Health of Trees and Shrubs Could Be Improved

- ***Reduce browse pressure on trees and shrubs.*** The level of browse utilisation of trees and shrubs is fairly heavy within both project areas. Within West Nose Creek, continued moderate to heavy utilisation could pose problems with the reproduction and long-term presence of preferred trees and shrubs. Within Nose Creek, sustained long-term browse utilisation has removed many shrub communities and it is unknown to what extent these shrubs could be recovered.
- ***Reduce the presence of grazing-resistant, disturbance-caused shrubs.*** It is important to ensure existing shrub communities of snowberry and common wild rose do not increase. All woody species provide some riparian function but some do it better than others; snowberry and rose are rated as having only moderate to low streambank protection potential compared to willows, for example. The presence of preferred trees and shrubs on the majority of polygons indicates they are able to grow along West Nose Creek (and to a lesser extent on Nose Creek) but they are still not well established or abundant.

Where Efforts Could Be Focussed

- ***Increase rest period from grazing during the growing season.*** Rest from continuous browse pressure is one step toward maintaining existing levels of regeneration of existing preferred trees and shrub communities and improving future reproduction and establishment. Attention to livestock management options such as distribution, timing and rotation should enable preferred trees and shrubs to be maintained and increased. By not addressing browsing pressure, existing tree and shrub communities could decline and lesser palatable species (e.g. snowberry and rose) increase.

Non-Woody Riparian Plants: Diversity and Health

Diversity

Nose Creek

- 41 species of grasses and grass-like plants (graminoids) and 80 species of broad-leafed plants (forbs) were recorded within the Nose Creek project area.
- 69% (81 species) of the non-woody riparian plants recorded are native plants. 71% of polygons have greater than 45% of the riparian area covered in disturbance-caused plants and 24% of polygons have 25-45% of the riparian area covered in disturbance-caused plants.
- 4 plants with poisonous properties, seaside arrow-grass (*Triglochin maritima*), water-hemlock (*Cicuta maculata*), showy locoweed (*Oxytropis splendens*) and common horsetail (*Equisetum arvense*), were recorded within the project area but do not occur in high enough amounts to cause concern.

West Nose Creek

- 40 species of grasses and grass-like plants (graminoids) and 80 species of broad-leafed plants (forbs) were recorded within the West Nose Creek project area.
 - 73% (88 species) of the non-woody riparian plants recorded are native plants.
 - 79% of polygons have 25-45% of the riparian area covered in disturbance-caused plants.
 - 5 plants with poisonous properties, seaside arrow-grass, water-hemlock, showy locoweed, common horsetail, and white camas (*Zigadenus elegans*) were recorded within the project area but do not occur in high enough amounts to cause concern.
- Native plants provide riparian functions including deep, binding rootmasses and summer and winter forage production for livestock and wildlife. Disturbance-caused plants typically do not have a deep, binding rootmass and, therefore, do not provide streambank protection as well as other non-disturbance native species.

Health

Nose Creek

- Almost all polygons have adequate amounts of plant cover (85-95%). In a few polygons, the plant cover is reduced to 75-85% of the soil surface.
- The percent of total area occupied by disturbance-caused plants is high (24% overall). Of the 22 disturbance-caused plants present, the most prevalent are Kentucky bluegrass (*Poa pratensis*), foxtail barley (*Hordeum jubatum*) and common dandelion (*Taraxacum officinale*)³.

³ Disturbance caused grasses such as Kentucky bluegrass, timothy and smooth brome are tame or introduced species that have invaded many rangelands over the past decades. Opinions vary on how these grasses should be viewed in terms of contributing to riparian or pasture health but generally are thought to reduce long-term productivity. For the purpose of this assessment, points were subtracted for the presence of these non-native species.

- **The prevalence of invasive plants (noxious weeds) is a concern.** Canada thistle (*Cirsium arvense*) infests 27% of the Nose Creek project area. Perennial sow thistle (*Sonchus arvensis*), scentless chamomile (*Matricaria perforata*), toadflax (*Linaria vulgaris*), common tansy (*Tanacetum vulgare*), bladder campion (*Silene cucubalus*), and blueweed (*Echium vulgare*) are present, but in smaller amounts.
- Nodding thistle (*Carduus nutans*), a restricted weed, was also observed in one polygon.

West Nose Creek

- All polygons have adequate amounts of plant cover (greater than 85%).
- The percent of total area occupied by disturbance-caused plants is relatively high (19% overall). Of the 20 disturbance-caused plants present, the most prevalent are Kentucky bluegrass, common dandelion and smooth brome.
- **The prevalence of invasive plants (noxious weeds) is a concern.** Canada thistle infests 34% of the West Nose Creek project area. Perennial sow thistle, tall buttercup (*Ranunculus acris*), common hound's tongue (*Cynoglossum officinale*) and scentless chamomile (*Matricaria perforata*) are present, but in smaller amounts.

How the Health of Non-Woody Riparian Plants Could Be Improved

- ***Reduce the presence of disturbance-caused plants.*** Complete elimination of disturbance-caused plants is not realistic but with sound riparian management strategies the prevalence of disturbance-caused plants could be reduced. From a grazing perspective, disturbance-caused plants do provide some forage for livestock at specific times of the year but require specific management, because they *green-up* and mature earlier than most native grasses. Providing maximum rest during the growing season, skim grazing and time-controlled grazing management practices can be applied reducing the potential for an increase in these species while maintaining an abundance of native species. In urban areas, the prevalence of disturbed areas due to industrial, residential and recreational development (e.g. golf courses) promotes the establishment of these disturbance-caused plants. Disturbance-caused plants are also introduced by reclamation re-seeding using seed mixes that are comprised of non-native grasses.
- ***Reduce the presence of invasive plants.*** The abundance of noxious plant species can fluctuate greatly from year to year and should, therefore, be monitored closely. The first step is to reduce the amount of exposed soil where invasive plants become established. Each landowner has been notified of the location of these plants along with contact information for the municipal agricultural fieldman or local weed representative.

Where Efforts Could Be Focused

- Achieving the above goals requires ensuring plant communities have enough rest from grazing during the growing season to reduce the amount of bare ground and to allow native plants to out-compete disturbance-caused and invasive plants for nutrients and water. A combination of improved grazing strategies and weed control measures will be required.

Streambanks and Floodplain: Alterations and Stability

Alterations

Nose Creek

- Overall, there are concerns with the overall condition of streambanks within the Nose Creek project area.
- 65% of the polygons have greater than 35% of the streambanks structurally altered by human activities. The majority of alterations that exist have been caused by livestock activity (hoof shear, trailing). Urban development (roads, footpaths, stormwater outfalls etc.) are also contributing to alterations.
- Exposed soil surface or bare ground was evident within several polygons. Of the bare ground overall, 8% is naturally occurring (depositional material from recent flood events) and 92% is human-caused. Most human-caused bare ground is resulting from livestock activity and urban development (roads, bike paths, recreational activity). As mentioned, noxious weeds can quickly become established in areas of bare ground.

West Nose Creek

- There are concerns with the overall condition of streambanks within the West Nose Creek project area.
 - 82% of the polygons have greater than 35% of the streambanks structurally altered by human activities. Almost all alterations that exist have been caused by livestock activity (hoof shear, trailing).
 - Exposed soil surface or bare ground was evident within a few polygons. Of the bare ground overall, 6% is naturally occurring (depositional material from recent flood events) and 94% is human-caused. The human-caused bare ground is almost entirely caused by livestock activity. Urban development (roads, bike paths, recreational activity) is contributing in several isolated locations.
- Historic and on-going stream channel re-location and channelisation was *not* included in the assessment of structurally altered banks. Although the extensive modifications to Nose Creek, in particular, have been well documented, the impacts on riparian health have not been addressed.
- Future riparian health assessments could include the impacts of these alterations on riparian health using aerial photography and historic survey information (The Straightening Plan⁴) as benchmarks.

⁴ Nose Creek Fact Sheet – provided by the Nose Creek Watershed Partnership

Stability

Nose Creek

- Less than half of the polygons within the project area are covered with adequate amounts of deep, binding rootmass. However, due to the low gradient of Nose Creek (little stream velocity or *horsepower*) there is little active lateral cutting and only a few streambank areas were assessed as unstable.
- Streambanks along Nose Creek consist of mostly silt, clay and sand that are highly susceptible to erosion. This emphasises the importance of the root systems of sedge and shrub communities in holding the banks together.
- Nose Creek appears to have experienced some down-cutting (vertical instability) in the past. Currently, the channel appears to be stable with a limited lower floodplain developing within the old incisement. Regular high water events can still access the floodplain but only a portion of its entire width.

West Nose Creek

- Most polygons within the project area are covered with adequate amounts of deep, binding rootmass.
 - There is very little active lateral cutting and only a few streambank areas were assessed as unstable.
 - Streambanks along West Nose Creek consist of mostly silt, clay and sand which are highly susceptible to erosion. Again, due to the silt-clay-sand composition of the streambanks of West Nose Creek, the deep binding root systems of sedge and shrub communities are very important for streambank stability.
 - West Nose Creek appears to have experienced very little down-cutting (vertical instability) in the past. Currently, the channel appears to be stable. Regular high water events can still access the floodplain but only a portion of its entire width.
- Flooding is an important factor in dispersing moisture throughout the riparian areas and in the formation of point bars (necessary for riparian vegetation establishment). The successful establishment of preferred shrubs, and possibly even cottonwood seedlings in the Nose Creek and West Nose Creek project areas, depends on flooding. Recent and historical natural flood impacts are recognised as naturally occurring events and are acknowledged in the evaluation of physical characteristics of the stream.

How Health of Streambanks and Floodplains Could Be Improved

- **Reduce alterations to streambanks and active floodplain** to allow damaged areas time to heal. There is excellent potential for the recovery of altered streambanks within both project areas. For example, limiting livestock access will increase deep-rooted woody plants, which will help rebuild streambanks. Once again, rest is needed during the sensitive portions of the growing season such as early spring to promote recovery. Any additional channelisation or development in floodplain areas, particularly through urban areas, should be avoided.

Historic and Present Influences on Riparian Health

- **Grazing animals** (including livestock and wildlife) have primarily dominated land use in Alberta's riparian zones for hundreds of years. Prior to the introduction of cattle, bison provided the greatest grazing pressures on riparian areas within the project areas. Currently, livestock grazing continues to be the dominant land use influencing riparian health along the *non-urban* polygons of Nose Creek and West Nose Creek and adjacent lands⁵.
- **Urban and Industrial activity**, including channelisation, dams, transportation corridors, golf courses, and stormwater / wastewater discharge has influenced stream dynamics and riparian health over time. Incremental effects of urban and industrial activities on riparian health and water quality have coincided with agricultural practices for the past 100 years and together have influenced the current health of the Nose Creek and West Nose Creek watersheds. Determining the significance of these factors to the health of riparian areas was beyond the scope of this study. However, these factors should be included in future investigations, in particular water quality, into the overall function of the Nose Creek and West Nose Creek watersheds.
- **Cropland cultivation** and tame pasture 'improvements' for grazing and hay, including some localised, prolonged continuous season-long grazing by livestock, have contributed to an increased presence of disturbance-caused undesirable plants within the riparian zones. Opinions vary on how these plant species, in particular Kentucky and smooth brome should be viewed in terms of contributing to riparian health, but generally they are thought to reduce long-term productivity.

⁵ Based on aerial photo interpretation and observations from Cows and Fish field crews.

THE NEXT STEPS

Community and Individual Action

- **Take stock of current and past conditions.** The first step in addressing riparian management issues has been made; the collection of baseline information on riparian health and a review of historical land use practices have answered the question “*Where are we now?*”.
- **Highlight and profile what’s working on the landscape right now.** The next step is to use this knowledge along with the application of sound range management techniques (e.g. rest. rotation, distribution) towards the restoration of riparian health. By working with landowners wanting to improve riparian health, practical examples of good grazing management can be demonstrated to other landowners and communities. Landowners already managing healthy riparian areas in the area can be profiled, meaning their *good news* stories can be shared with others to speed up our knowledge of what works. Appendix F provides other *Tools for Riparian Management* available from Cows and Fish. As these sites yield results, the landowners in the M.D. of Rocky View will be closer to answering the question “*Where do we want to go?*”.
- **Take control of the reins.** Every participating landowner has received a report on the assessment of riparian health for their landholding indicating what *pieces* of riparian health are there and what might be missing. Within these landowner reports are some basic range management principles specific to their riparian pastures, providing insight into the question “*How do we get there?*”.
- **Continue riparian assessment work over the long-term.** Monitor progress of community and individual effort to address riparian land use issues. With the application of sound range management principles on an individual and watershed basis, it is inevitable that the trend in riparian health will be positive over time.
 - A single evaluation cannot define the absolute status of site health. To measure trend (improving, declining or staying the same) monitoring should be pursued in subsequent years. This can be achieved by establishing demonstration and profile sites, or another overall riparian health assessment – every 3 to 5 years.
 - Within both project areas, management objectives should include maintaining the existing sedge communities and in many areas increasing the presence of willows. However, with minimal new point bar formation (due to current hydrological conditions) the potential for the development of extensive cottonwood communities is limited.
 - Within West Nose Creek, restoration of healthy shrub communities and / or reduction of damaged streambanks will be slow. However, some improvement should be recognised within a few years, depending on the commitment of the individual, riparian site potential and the riparian management strategy implemented.

- There is less potential for recovery of healthy shrub communities within Nose Creek than West Nose Creek. Shrub establishment is limited by physical constraints (more entrenched channel and less point bar formation) and urban and industrial development. In many areas of Nose Creek, sustained periods of rest (many years) would be required for the reproduction, establishment and subsequent recovery of healthy shrub communities.
- Long-term riparian monitoring and refinement in management will answer the question “*Did we make it?*”.

Please Note:

The field workbook entitled Riparian Health Assessment for Streams and Small Rivers is available from Cows and Fish. This workbook is based on the same procedure that was used to complete the M.D. of Rocky View riparian health assessment and will allow landowners and managers to monitor and track their own progress regarding riparian health. Further, an invitation is extended to all participating landowners to follow-up this general report and their individual assessment reports with an on-ranch visit.

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APPENDIX A

Cows and Fish – Facing the Issues

APPENDIX B

Glossary of Riparian Health Assessment Parameters

Interpretation of Score Sheet and Health Assessment Parameters

The *Lotic Health Assessment* presents 13 basic questions pertaining to riparian health. However, before these can be answered, some explanation is required of why these questions are asked. This appendix addresses the guidelines and stipulations followed when each parameter was answered. Keep in mind that these parameters are meant to encompass a broad range of ecological diversity that stream systems can potentially express. The interpretations are not completely specific to any one type of lotic system yet still capture the essential factors of riparian health and function.

Many different factors must be considered when answering any one of these parameters and it is quite possible that every scenario one would encounter when conducting assessments is not covered here. Personal judgment based on sound riparian knowledge and good visual estimations are critical tools necessary for answering these questions consistently.

This score sheet interpretation is based on the Lotic Health Assessment (Derived) Codes and Instructions (2000) and Lotic Health Assessment (Stand-Alone) Codes and Instructions (2000) as created by the Riparian and Wetland Research Program (RWRP) at the University of Montana.

APPENDIX C

Lotic Health Assessment Scoresheets

APPENDIX D

Riparian Plant Inventory

APPENDIX E

Riparian and Range Management References

APPENDIX F

Tools for Riparian Management