upper souris watershed association

Upper Souris River Watershed

Drought and Excessive Moisture Preparedness Plan

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Acknowledgements

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Upper Souris Watershed Drought and Excessive Moisture Preparedness Plan

In spring 2008, Saskatchewan Watershed Authority (SWA) planners approached stakeholders in the Upper Souris River Watershed to participate in watershed and aquifer planning. The Upper Souris River Watershed Protection Plan is the product of subsequent planning efforts which involved rural and urban municipal representatives, First Nations and Métis, nature-based conservation groups, agricultural agencies, and the oil, gas and energy sectors. Committee members discussed the challenges, options and opportunities around source water protection in their watersheds. The finished watershed plan was released in October 2010.

In November 2010, SWA approached the newly formed Upper Souris Watershed Association (USWA) to engage in Drought and Excessive Moisture Planning. A large section of the watershed plan dealt with objectives and actions to address drought and excessive moisture. USWA took advantage of this opportunity to further develop its watershed plan. Specifically, USWA partnered with SWA to engage in activities which developed specific action items in the watershed plan to address drought and excessive moisture.

1.1 Upper Souris Watershed Overview

The Souris River, known as the Mouse River in the United States of America, has its headwaters in Saskatchewan, flows into North Dakota and then travels back north into Manitoba. About 20,400 square km of the Souris River basin in southeastern Saskatchewan are encompassed by the Upper Souris River Watershed, including sub-watershed areas of the Souris River main stem, Long Creek and Moose Mountain Creek. The Upper Souris River Watershed is part of the larger Assiniboine River basin and the major basin of the Nelson River, which eventually contributes to the Arctic Ocean via Hudson's Bay. Glacial moraines and the remnants of glacial lake plains dot this region. The highest point is found in the Moose Mountain uplands, which rise about 300meters above the Souris plain. A portion of the Missouri Couteau forms the southwestern boundary of the watershed.

Generally, area soils belong to three major groups. Chernozemic (dark coloured grassland) soils cover much of the area, regosolic (weakly developed) soils are present in the Souris River main stem area, and podzolic (light coloured forest) soils are found in the Moose Mountain upland. Natural vegetation varies in the watershed. Slightly dryer areas in the southwest are characterized by mixed grass prairie vegetation. As moisture increases to the north and east, vegetation ranges from parkland (widely spaced

trees or groves of trees) to hardwood forest. Much of the native vegetation has been eradicated by cultivation and drainage.

Figure 1: Upper Souris Watershed Basin

1.2 What is Drought?

Drought is considered to be one of the most complex but least understood of all natural hazards, affecting more people than any other hazard. Drought originates from a reduction in the amount of precipitation over an extended period of time, resulting in a water shortage, usually a season or more in length. Droughts are unique in their intensity, duration and spatial extent. Drought is a slow-onset, creeping natural hazard that is a normal part of climate; it results in economic, social and environmental impacts.

The onset and cessation of drought is difficult to predict, as is the severity of a drought. Human activities and a specific area's water supply characteristics influence sensitivities to drought in a given watershed. Droughts can be categorized as meteorological, hydrological, agricultural or socioeconomic, each of which results in different impacts.

The greatest natural disasters in Canada (in terms of economic costs) have been attributed to drought, specifically the 1930s drought and 1999-2004 drought. The 2001-2002 drought, which largely occurred

in Saskatchewan and Alberta, resulted in a national loss of $6 billion in gross domestic product (GDP) and the loss of 41,000 jobs.

Drought conditions can impact communities and individuals in a variety of ways. In the Swift Current Creek Watershed drought-related impacts include land degradation, water shortages and irrigation deficits, feed shortages, unstable economics (lower crop yields, crop damage/failure), soil moisture shortages and increased stress.

Effective drought management has three major components:

- Monitoring and early warning;
- Risk and vulnerability assessment;
- Preparedness, response and recovery.

Previous attempts to manage drought have been borne from a reactive, crisis-management approach which inherently results in costly remedies. The goal is to reduce drought vulnerability by identifying relevant impacts and assess their underlying causes.

1.3 What is Excessive Moisture?

Too little water can be just as damaging as too much water, which may negatively impact water supplies, agriculture and ecosystems. Increased variability and changes in the frequency and severity of extreme events such as droughts and floods is occurring. A broad suite of management practices is required in preparing for such extreme events.

Heavy precipitation events result in crop damage, soil erosion and the inability to crop land. Excessive moisture can adversely affect the quality of surface and groundwater, as well as contaminate water supplies. The Souris River basin experienced excessive moisture and flooding in 2011, and was impacted in many of these ways.

1.4 About This Plan

This plan is a logical extension of the Upper Souris watershed planning process. This drought and excessive moisture plan organizes all key actions from the watershed plan which address this issue. The plan then tries to go one step forward to further develop and implement some of the recommendations.

1.5 Drought and Excessive Moisture in the Upper Souris Watershed Plan

Many of the objectives and actions in the Upper Souris Watershed Plan focus specifically on drought and excessive moisture. These actions are listed below:

5.3.7 Objective: Improve the environmental health of the Souris River main stem downstream of the three major dams from a holistic perspective.

Key Action 17: Develop a Souris River Main Stem Restoration Project downstream of Rafferty, Boundary and Alameda Dams to enhance the ecology of the river for the benefit of the river itself.

5.3.8 Objective: Develop an overall Watershed Drought Contingency Plan.

Key Action 18: Support the provincial government in developing Provincial Drought Contingency Plans on an individual watershed basis involving watershed residents in plan development and implementation.

5.3.9 Objective: Improve watershed residents' understanding and response to droughts within the watershed.
Key Action 19: Develop a "drought scale" as an educational tool to better convey what problems may occur with various types and durations of drought.

5.3.10 Objective: Help watershed residents prepare and adapt to potential future climate change involving drought.
Key Action 20: Educate the public on ways to mitigate the effects of drought.

5.3.11 Objective: Improve the drought-preparation capabilities of the watershed.

Key Action 21: Explore the feasibility of developing more community pipeline networks to mitigate expected long term droughts.

Beyond organizing key actions, this plan further developed and began implementation of the actions and objectives of the plan. This was done by the following activities:

1. Ecological Change Workshop for the Souris River: A participatory mapping workshop was conducted for the portion of the Souris River downstream of Rafferty dam to the American border. This mapping exercise was designed to have local residents document their knowledge about change in the Souris River in response to excessive moisture and drought. This workshop addressed the Objective 5.3.7. This information will form the foundation of the Souris River Restoration Project which will seek to set targets for setting flow for in-stream needs. Understanding past changes and adaptive capacity of the system will be critical for such management.

2. Drought Planning Workshop for Cattle Producers: This was a workshop where cattle producers used a drought preparedness tool developed by Saskatchewan Research Council. The workshop helped build capacity and awareness within the agricultural community to cope with drought. This workshop addressed Objective 5.3.10. The workshop served as a pilot for an extension model which could be extended across the watershed to help cattle producers manage through drought.

3. Watershed Awareness Survey: A public survey was conducted to assess the public's knowledge and capacity to deal with excessive moisture and drought. This survey helps address Objective 5.3.9. This survey will provide a baseline for USWA to measure over time the effectiveness of activities to improve this capacity and knowledge.

The outcomes of each of these activities comprise the remainder of this document.

II

Ecological Change Workshop for the Souris River

2.1 Project Rational

Understanding historic ecological change in a watershed is important when developing preparedness plans for future change. The Upper Souris Watershed Association (USWA) completed the watershed plan for the basin. One of the actions items identified is to develop a Drought and Excessive Moisture Preparedness Plan through a series of workshops involving key stakeholders. The Upper Souris River Ecological Change Project will document past changes in ecological conditions for the Upper Souris Watershed.

The portion of the Souris River downstream of Rafferty Dam to the US border is of special concern to watershed residents. The Rafferty Dam was constructed to help deal with the impacts of hydro-climatic variability and extreme events, such as droughts and floods, in the region. Since its construction, it has been an important driver of ecological change in the watershed. This project seeks to document local knowledge about historic water, vegetation and fish resources in this portion of the watershed to complement existing biophysical data sources.

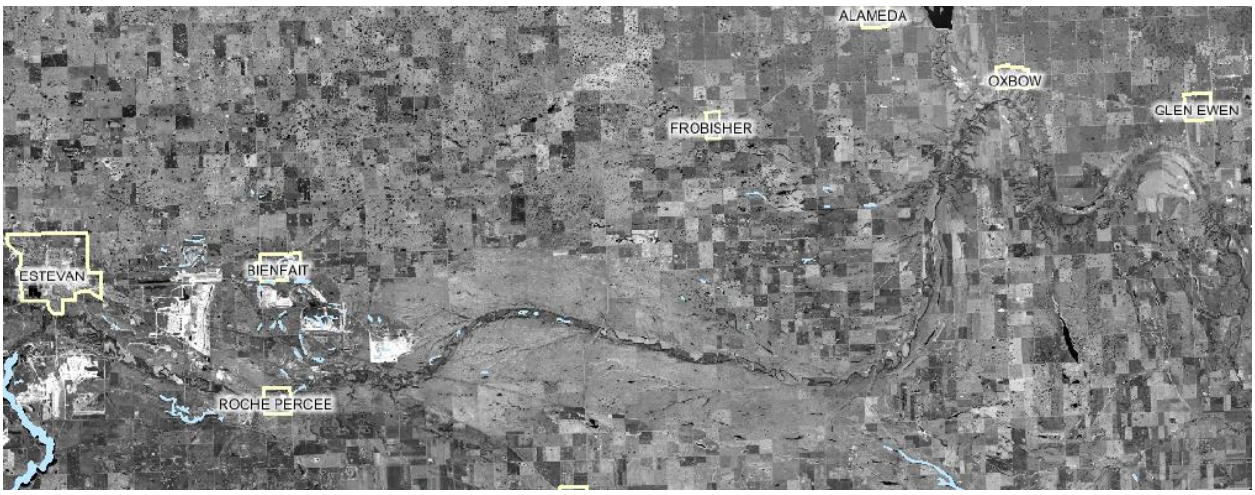


Figure 2: Portion of the Souris River downstream of the Three Major Reservoirs

2.2 Objectives

- Document current and historic states of water (flow and quality), vegetation and fish resources along the portion of the Souris River downstream of Rafferty Dam using Public Participatory GIS (PPGIS) in a workshop setting to complement existing biophysical data sources
- Summarize this information in a short report with map products
- Present this information for use in drought and excessive moisture planning workshops

2.3 Methods

As an initial step, a search was conducted to find photos of the Souris River from the Provincial Archives. Secondly, historic air photos from the Souris River were compared with current imagery to document changes. After these initial steps a PPGIS approach was taken.

Maps and diagrams are an important part of any planning activity. Participatory mapping is the creation of maps by local communities and stakeholders, with the involvement of organizations such as government, universities, and non-government organizations. Generally, mapping and timeline initiatives are conducted by outsider groups and the maps created contribute to an outsider's agenda.

Participatory mapping provides valuable visual representation of what stakeholders perceive as its place, and features they feel are significant (i.e. beaver dams, culverts, flooding activities, washouts, etc.). The process of participatory mapping contributes to community cohesion, may stimulate stakeholders to engage in land and resource-related decision-making. This process raises awareness of land-related issues and ultimately empowers local communities and stakeholders.

Local knowledge will be documented through a workshop to be held in late October in Roche Percee. Locals who are knowledgeable about the river were recruited and led through a workshop where they will provide information about the vegetation, water and fisheries ion the river and how they have changed over time. Geography students from the University of Regina will be on hand to input to local knowledge into GIS.

2.4 Results

2.4.1 Photos from the Saskatchewan Archives

The Saskatchewan Archives was searched for photos of the vegetation and river morphology of the Souris River downstream of the major structures. Nineteen photos were found. Most date from the early 20th century though one line drawing is from the late 19th century (Appendix I). Most of the photos appear to show a large well developed forest along the edges of the Souris River. One exception is a photo of a bridge near Oxbow from 1904. The banks of the river in this photo appear to have little woody vegetation. These photos will be critical for determining long term ecological goals for the river.

2.4.2 Comparison of Current and Historic Air Photos

Air photos from 1953 of the Souris River were gathered from the Saskatchewan Watershed Authority (SWA) air photo library. This was compared with 2006 panchromatic satellite imagery from SWA. Identifiable reaches of the Souris River starting south of Estevan and east towards Highway 9 were compared from both sets of imagery. A total of 11 sets of photos were compared (Appendix II). Photos were visually compared to qualitatively determine trends of vegetation and land use change. As one might expect there has been continued development of the flood plain in the 53 year period between the photos. Especially close to Estevan there appears to have been more commercial and residential development. However, along the entire length of the river, the extent of riparian forest appears to be remarkably stable.

2.4.3 Results from PPGIS Workshop

In November 2010, a PPGIS workshop was held in Roche Percee. Twelve local people attended the workshop as well as SWA and USWA staff to facilitate the process. From the GIS data recorded at the meeting and the transcriptions of the workshops, the following major trends were noted:

- **Water Quantity** – Lower flows occur in the winter since Rafferty and Alameda dams have been constructed

- **Water Quality –** Water quality in the system dramatically improved after improvements were made to City of Estevan's sewage treatment process. Water quality in the winter is poorer since the construction of Rafferty and Alameda dams. This lower quality is attributed to the lower amount of flow.

- **Vegetation:** Since the 1990's the elm trees have almost completely died out from Dutch Elm disease.

- **Wildlife –** In recent some species of wildlife are much more abundant including Jack rabbits, mule deer and beaver.

2.5 Next Planning Steps

As a result from the information gathering portion the ecological change workshop, the local watershed group has developed an explicit vision and goals for the river. These goals will form the basis for adapting to expected climatic change over time:

VISION STATEMENT:

Souris River is a naturally diverse and evolving ecosystem within the limits of the landscape and landuse pressures. It holds cultural, economic and ecological importance both locally and internationally. The River provides recreational opportunities and people have pride and knowledge envisioning this healthy functioning river ecosystem. Maintaining the function of the river will ensure it is resilient for future generations to value.

Culture and People

The river provides opportunities for swimming, canoeing, fishing and other outdoor recreation.

People value the river and its water and have pride and knowledge to protect it.

The values of the river are protected within the realities of legal obligation, the landscape and landuse.

Water Quality

Water Quality will support fish and recreational use.

Water Quality will be improved and maintained for passing on to North Dakota and Manitoba.

Ecology

The river is a diverse natural ecosystem which changes over time and provides the following services recognizing that human alterations of changed the system.

- A riparian forest with large trees, shrubs, and a variety of natural vegetation
- A sustainable fish populations
- Ecology which supports the goals of this plan
- Flows which support the goals of this plan

III

Pasture Planning for Drought Workshop

3.1 Workshop Results

A workshop was held in Lake Alma on February 22, 2011 attended by 30 local producers. The purpose of the project was to test extension tools to help increase capacity in the cattle sector to adapt to drought. A presentation was given by Etienne Soulodre from SWA on calculating stocking rates and calculating water demand and available volumes (Appendix III). Cattle producers were provided large laminated airphotos of their ranches to serve as templates for planning. The bulk of the workshop was based around an SRC tool for planning drought (Appendix IV). The producers worked through the planning tool an engaged in peer to peer to discussions about adapting to drought.

From the discussions, the following strong points emerged:

- For 2 year droughts most producers can adapt by having enough water infrastructure and stocking conservatively. It was widely felt that most producers currently have some capacity to deal with this sort of drought. Producers in this area regularly deal with this sort of drought.
- For 2-5 year droughts there was considerable debate about the best strategies to adapt. Many of the producers in the room had dealt with such a drought in their lifetime. The two competing strategies were either to sell off large portions of the herd or to ship the cattle to other portions of the prairies where forage was available. While there was some capacity to deal with this sort of drought, this still remains a substantial challenge for producers.
- For greater than 5 year droughts it was agreed that there was no current strategy. A lack of capacity exists to deal with this kind of event.

3.2 Workshop Outcomes

The content of the workshop of was well received and the SRC planning tool provided a good template for discussion, however the most valuable results came from the peer to peer discussion which the workshop facilitated. Such an extension approach would be useful throughout the watershed to deal with building capacity to deal with drought.

IV

Watershed Awareness Survey

A public survey was conducted in 2010/11 to assess the public's knowledge and capacity to deal with excessive moisture and drought. This survey helps address Objective 5.3.9 of the Upper Souris watershed plan. This survey will provide a baseline for USWA to measure over time the effectiveness of activities to improve this capacity and knowledge. The entirety of the survey questions and result are presented below. From the survey, the following points will be useful for planning public awareness activities for adapting to drought and excessive moisture (DEM):

- The public needs some basic education on the function and value of watersheds.
- While the public was not well educated about watersheds, there was a high awareness of the local watershed organization.
- A large percentage (52%) of residents use private wells for drinking water. Targeting well owners will be an important component of any DEM plan.
- The public feels a strong ownership over watershed issues.

USWA Public Benchmark Watershed Awareness Survey 2010-11

40 residents that live within the Upper Souris Watershed were interviewed.

1. **Do you live on a:**
    a. Farm: 57.5%
    b. Acreage: 7.5 %
    c. Town/city: 35%

2. **How far do you live from a lake or stream?**
    a. Over 5 k: 37.5%
    b. 1 - 5 km: 32.5%
    c. less than 1 km: 30%

3. **Do you know what a watershed is?**
    a. Yes: 40%
    b. No: 60%
    Answers to" What is a Watershed":
    - Where all the water drains into a main stream
    - Area that supplies water to a river or stream or tributaries
    - Whole drainage area along a creek
    - Something that houses the purification system for water
    - How the water gets away
    - Group that controls the rules of water
    - Any place where spring runoff
    - Water flowing into meet a point
    - Where water runs
    - Area where the water drains
    - Area where all the water gathers
    - When water moves through the area
    - Piece of land where trees are

4. **Are you concerned about any activities that may have an impact on water quality or the quantity of water in your area?**
    a. No: 40%
    b. Yes: 60%, and what are they?
    - Flooding
    - Wells going dry
    - Coal, oil, carbon capture
    - Livestock
    - Level of the lakes rise
    - Floods
    - Cattle pastures

- Extra people trenching
- Flooding
- Pollution on our river
- People trenching the land
- Too much water, flooding
- Oil patch, salt water spills, drainage from cattle, misuse of fertilizer
- Trenching and ditching. Flooding
- Flooding
- Oil
- Oil
- Oil
- Oil, cattle.
- Flooding
- Oil wells that are leaking by water around Lampman, diesel fuel,
- Flooding our pasture
- Oil

5. **Where do you get the water you use?**
    a. Municipal service: 47.5%
    b. Private Well: 52.5%
    c. Private surface water supply (eg. dugout): 2.5%
    d. Regional Pipeline: 0%
    e. Other: 0%

6. **If you have a private water supply, have you had your water tested at a lab?**
    a. Yes: 85.7% No: 14.3% (21 total private wells in this survey)
    b. If yes, how often?
        - 5 years ago
        - 15 years ago
        - 3-4 years
        - 15 years ago
        - Every few years
        - 20 years ago
        - Couple of year since
        - 5 years ago
        - Every 5 years
        - Tested 3 months ago
        - Every 2 years
        - Years
        - 2 years ago
        - Regularly
        - Every couple of years
        - 3 years ago
        - Once a year

- Tested yearly

7. **Do you buy bottled water for drinking and beverages?**
   Never: 30%
   Always: 45%
   Seldom: 22.5%
   Often: 2.5%

8. **On a scale of one to ten (one being poor and ten being excellent), what is the quality of your water?**

Scale	# people responded	%
1 - poor	3	7.5
2	1	2.5
3	1	2.5
4	0	0
5	3	7.5
6	3	7.5
7	10	25
8	10	25
9	4	10
10 - excellent	5	12.5

9. **In your home do you use the following water conservation measures?**

a) Use low flow shower heads?	Yes: 60%	No: 40%
b) Use a water efficient toilet?	Yes: 72.5%	No: 27.5%
c) Use tap restrictors?	Yes: 45%	No: 55%
d) Restrict yard watering?	Yes: 87.5%	No: 12.5%
e) Only wash full loads of laundry?	Yes: 92.5%	No: 7.5%
f) Use a front loading washing machine?	Yes: 72.5%	No: 72.5%
g) Only run dishwasher when it is full?	Yes: 97.5%	No: 2.5%
h) Do you currently collect rain water?	Yes: 52.5%	No: 47.5%

10. **Would you like information on closing down an abandoned well?**
    No: 92.5%
    Yes: 7.5%
    Already decommissioned: 0%
    Other - none

11. **Do you think action is needed to improve the quality of surface water in your area?**
    No: 60%
    Yes: 27.5%
    Unsure: 12.5%

12. **What do you do with unused pills?**
    a. Throw them in the trash: 37.5%

b. Flush them down the toilet: 0%
c. Take them back to the pharmacy: 42.5%

13. Where do you get information on water quality issues?

a. Peer groups: 0%
b. Municipal office: 12.5%
c. Regional health authority: 7.5%
d. Local watershed organization:7.5%
e. Government departments: 10%
f. All of the above:55%
g. Unsure: 7.5%
h. Other: 2.5%

14. Do you consider these sources reliable?

Yes: 95%
No: 5% Why not? Not the watershed authority, I don't think they care they had issues for years with beavers and flooding and nothing was ever done.

15. Do you feel that there is enough water currently available for your long term needs?

Yes: 85%
No: 7.5%
Don't Know: 7.5%

16. Using a scale of one to ten (one being no negative impact and ten being a highly negative impact) please rate the impact that you believe the following have on water quality.

	Impact	1	2	3	4	5	6	7	8	9	10
A	Road Salt	9	5	5	2	7	4	1	3	1	3
B	Urban Storm Water	6	6	7	3	10	5	0	1	1	1
C	Urban Waste Water	5	3	3	1	9	5	4	5	2	3
D	Private Sewage Systems (eg. septic tanks)	12	9	3	4	2	0	3	4	1	2
E	Fertilizer & Pesticide Application	2	5	0	2	6	5	5	7	2	6
F	Livestock Production	5	6	2	4	8	4	5	5	1	0
G	Annual Crop Production	9	5	6	4	6	3	2	3	0	1
H	Agriculture Drainage	5	9	5	3	6	3	3	4	0	1
I	Wetland Loss	9	6	4	5	3	2	1	3	1	4

J	Oil & Gas Industry	2	7	1	2	3	4	4	7	4	6
K	Abandoned Water Wells	9	16	1	6	2	0	2	2	1	0
L	Gravel Pits	15	13	2	7	0	1	1	0	0	0
M	Chemical Storage Sites	6	4	4	4	5	3	3	6	1	4
N	Fuel Storage Sites	4	5	5	5	4	2	5	4	2	4
O	Household Chemicals & Cleaners	5	6	3	7	7	2	2	4	1	3

17. Who do you feel should be responsible for protecting water quality?

- Federal Government: 5%
- Provincial Government: 7.5%
- Municipal Government: 5%
- Industry: 2.5%
- Individual Citizens: 2.5%
- Everyone: 100%
- Unsure: 0%

18. Do you think action is needed to improve the quality of water in your area?

Yes: 17.5%
No: 72.5%
Unsure: 10%

19. Have you heard of the Upper Souris Watershed Association Inc.?

Yes: 62.5%
No: 37.5%

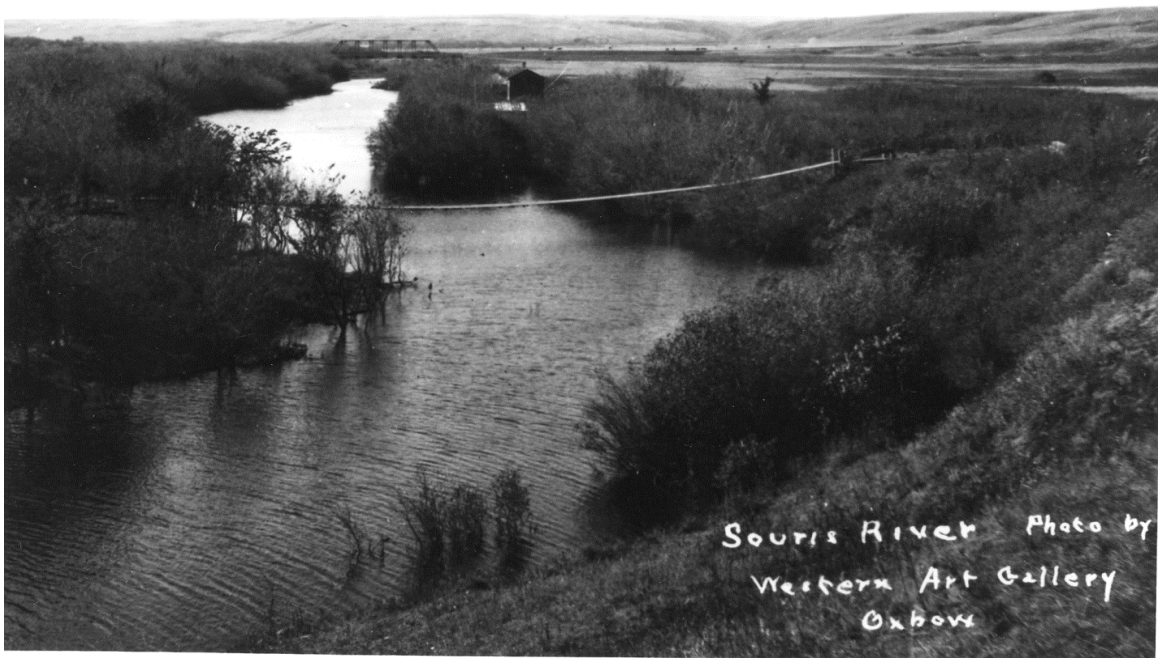
20. Which of the following age categories do you fall in?

a. 19-29: 7.5%
b. 30-39: 5%
c. 40-49: 32.5%
d. 50+: 55%

21. Gender

Male: 40%
Female: 60%

Appendix I: Photos from Saskatchewan Archives documenting Historic Vegetation and Morphology of the Souris River


Souris River Photo by
Western Art Gallery
Oxbow


Bathing House Souris River
Oxbow No 13


Enjoying a Holiday at Beaver Park Oxbow
No 14


Swing Bridge
Oxbow

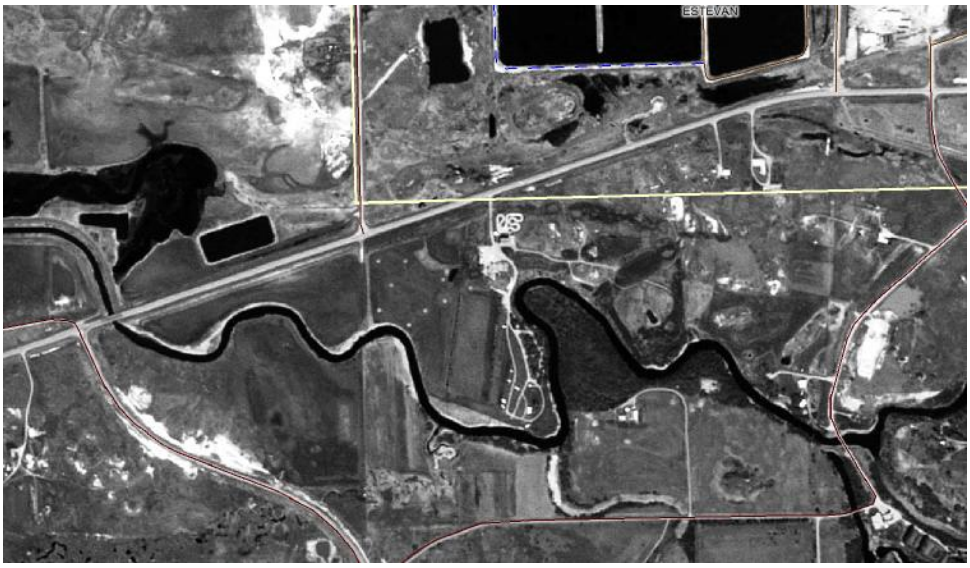

Another View


Boat House Oxbow Park


Oxbow
Oxbow
Bridge April 04
1904

Appendix II: Comparison of Current and Historic Air Photos for the Souris River Restoration

Historic (1953) air photo imagery of the Souris River south and west of Estevan

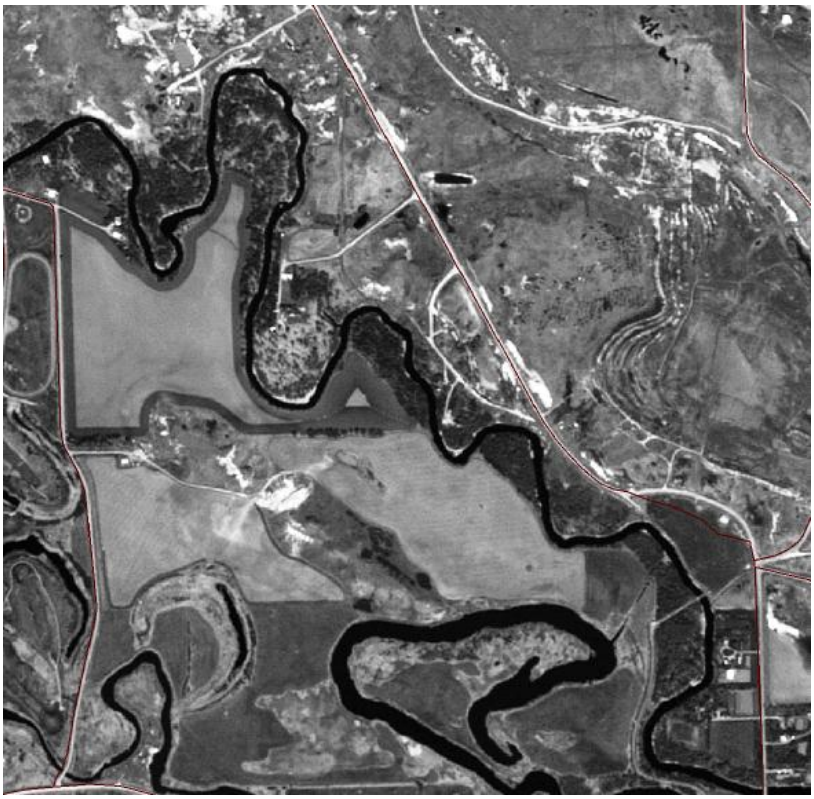


Current (2006) imagery of the Souris River south and west of Estevan

Historic (1953) air photo imagery of the Souris River south of Estevan

Current (2006) imagery of the Souris River south of Estevan

Historic (1953) air photo imagery of the Souris River east of Estevan



Current (2006) imagery of the Souris River east of Estevan

Historic (1953) air photo imagery of the Souris River east of Estevan

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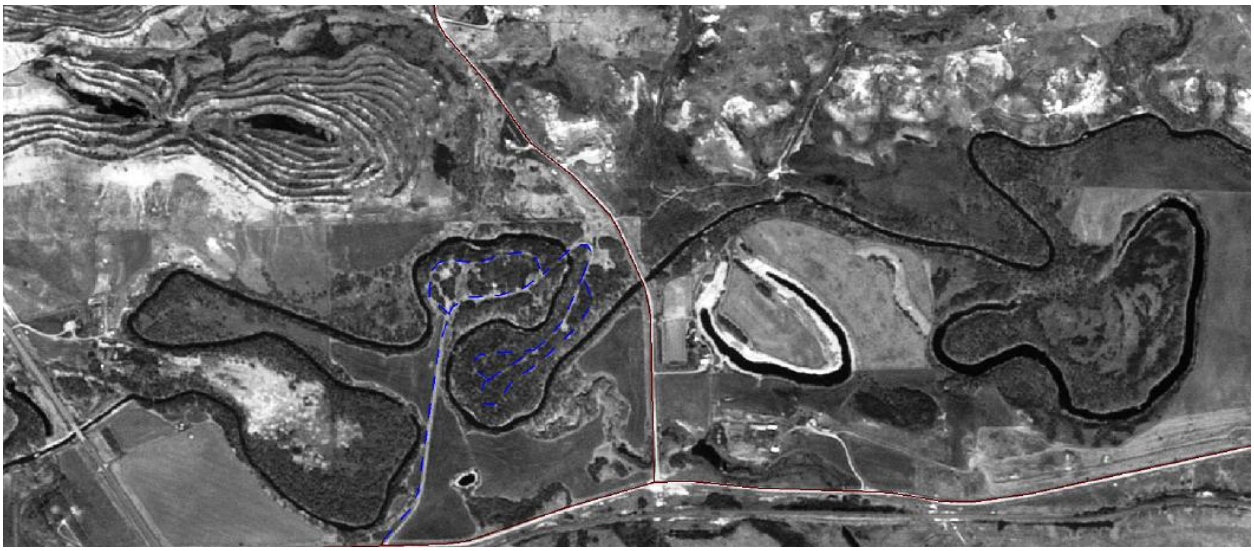

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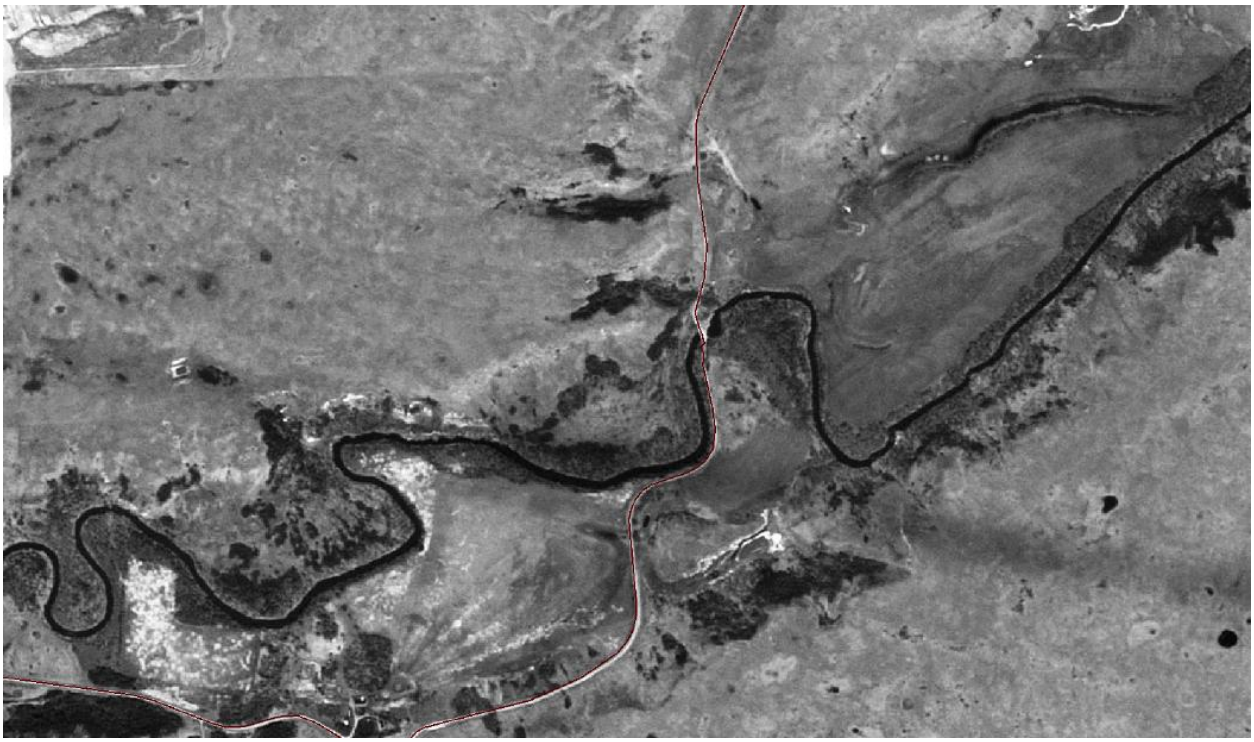

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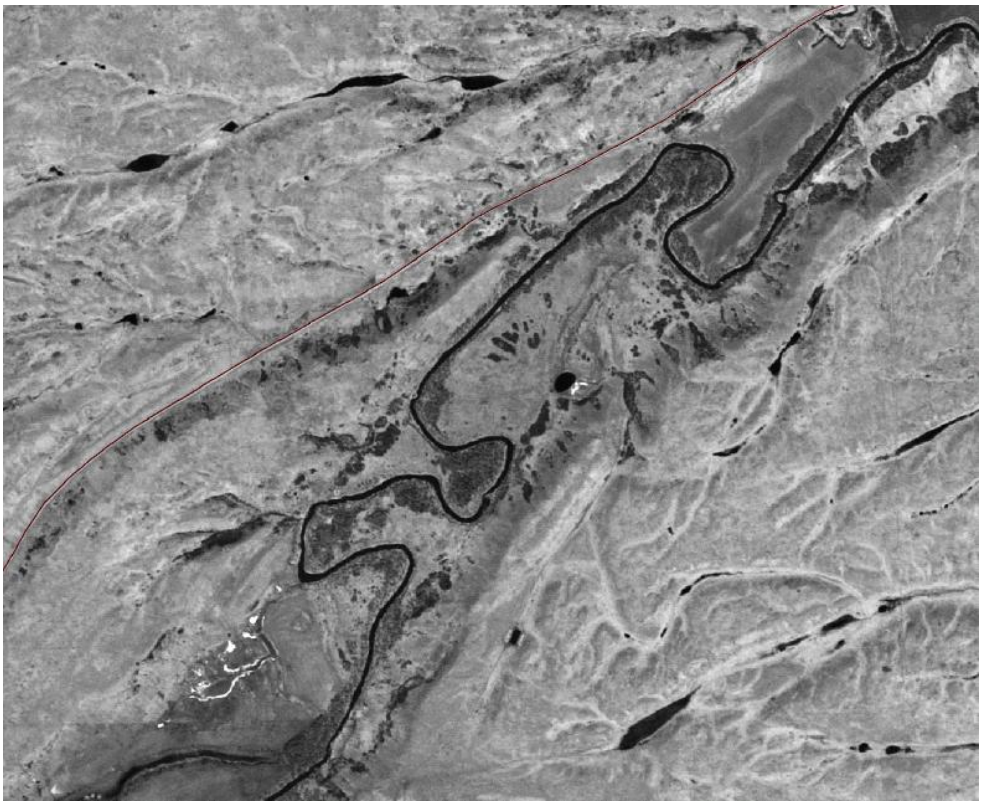

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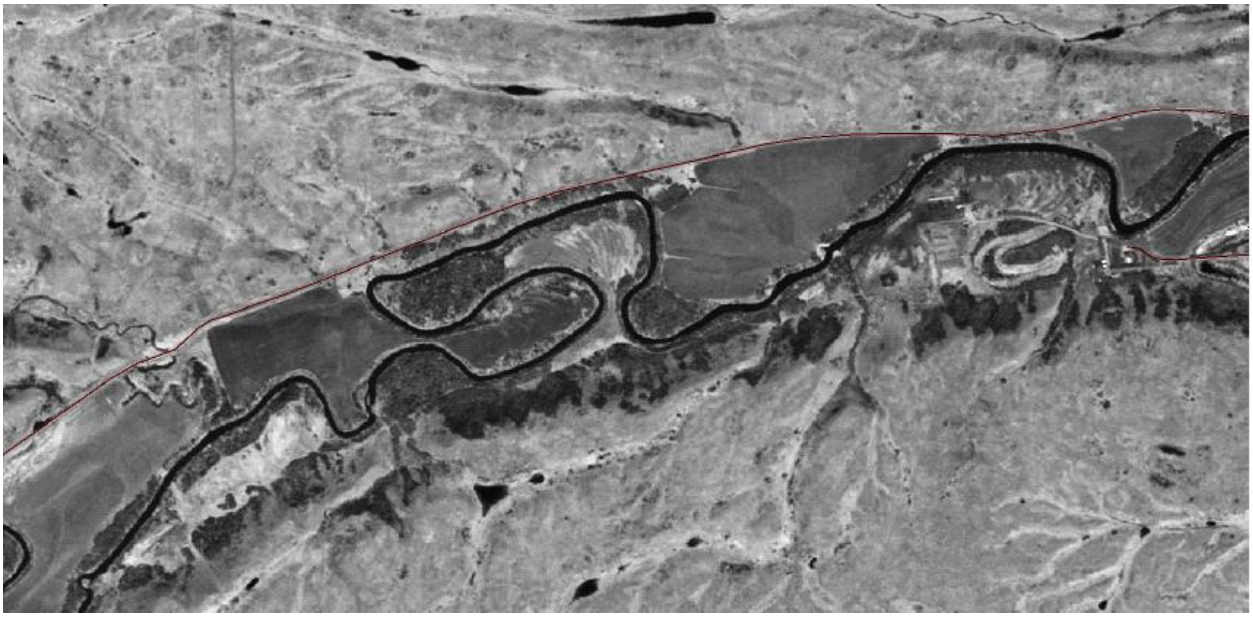
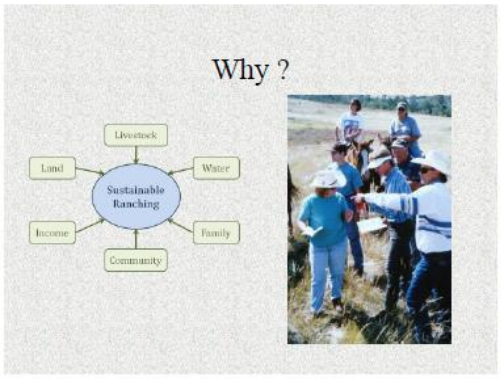
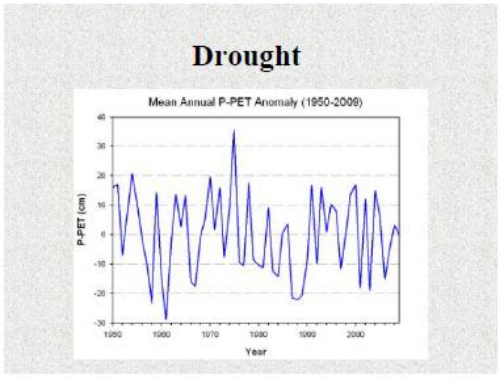
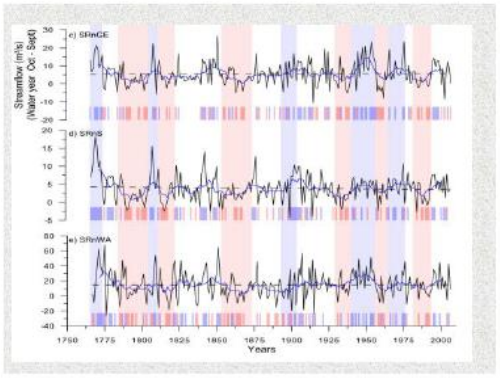


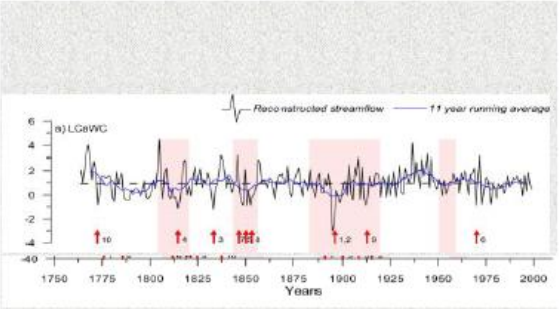
Current (2006) imagery of the Souris River east of Roche Percee

Appendix III: Presentation Given at Drought Planning Workshop for Cattle Producers







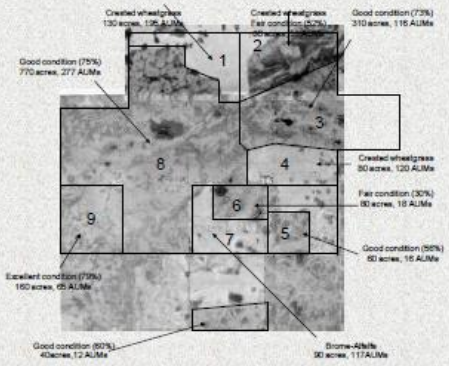


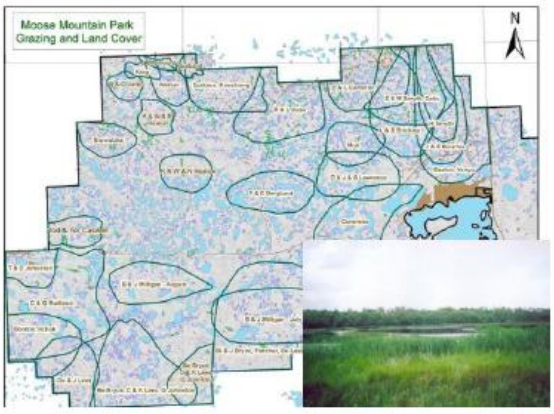
Steps for Planning

- Goals setting
- Inventory
- What are you going to do
- Monitoring

Inventory

- Fences
- Water
- Soils
- Forage supply





Module 1: Objectives and Goal Setting

Goal:

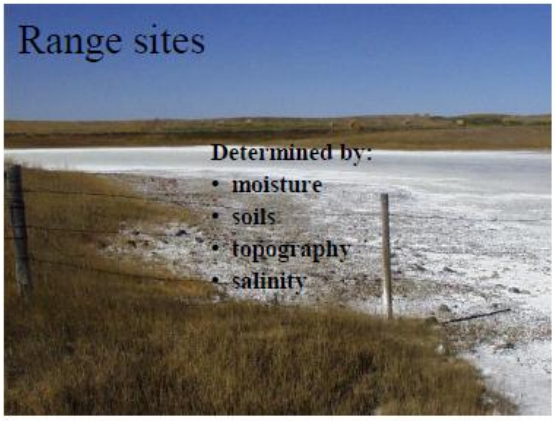
Key Questions:

- What are your priorities when managing drought?
- Mission statement?

Pasture inventory

How much grass do you have?

Range sites

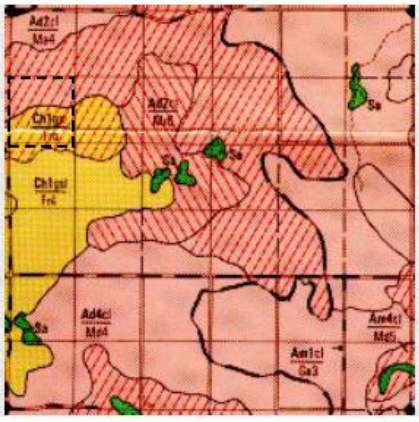


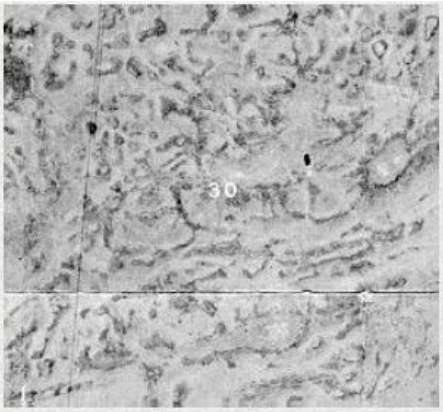
Range Condition/Health

- Range Site
- Water
- Slope
- Aspect
- Fences

Considerations for Calculating Stocking Rates

- Range condition/health
- Range site
- Soil/climatic zone
- Exposed soil/club moss/Litter
- Landscape features: topography, slope, aspect
- Water locations
- Patchiness: weeds,exotics, shrub
- Grazing patterns: potholes, class of animal





Calculating Stocking Rates

Soil/Microsite	Range Sites	Size (ac)	Range Condition Class/Range Score		Stocking Rates (AUMs/ac)	Stocking Rates (AUMs)
Ardill CL	Loamy	320	Low-Good	55	0.26	83
Chaplin	Gravel	280	Good	65	0.16	45
Basins	Wetland	40	Functioning	80	0.56	22
Total		640				150
30% reduction in stocking rates due to steep slopes (0.3*150)						45
Initial recommended SR						105

Field	Forage Type	Acres	Condition	Stocking Rate	AUMs
Pasture 1	Native	80	Fair	0.29	23
	Riparian	20	Healthy	0.9	18
	Brome-Alfalfa	10	Good	0.9	9
	All	110			50
Pasture 2	Native	75	Good	0.36	27
	Riparian	5	Healthy	0.9	4.5
	Water	5	NA	0	0
	All				32
Pasture 3	Native	40	Good	0.36	15
	Riparian	5	Healthy	0.9	4.5
	All				19.5
Pasture 4	Tame	80	Excellent	1.35	108
Total					209

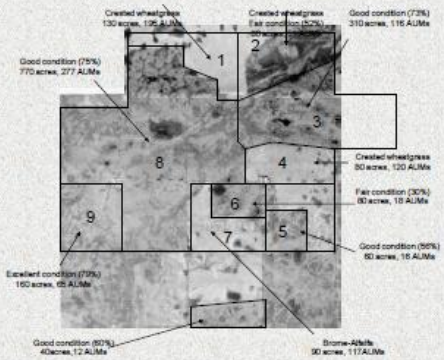
Water inventory

How much water do you have?

Water Source - Dugouts

Look at sizing charts - $1.50/cubic yard

- **600,000 gallons divide by 169 ga/yard =3500 yards**



Ranch Planning

MODULE 4: PREPAREDNESS ASSESSMENT

Do you know the minimum number of animals required to maintain the genetic integrity of your herd?
Do you know which animals in your herd you would prefer to keep and those that are disposable?
Do you have a predetermined selling order?
Do you have a critical rain date?
Do you have a destocking plan?
Pasture quality?
Water systems?

Appendix IV: Drought Preparedness Tool used in Lake Alma Workshop

Rangeland Drought Preparedness Planning and Management Tool

Droughts are natural and reoccurring features of Saskatchewan's climate. Past droughts on the Prairies have been the most costly natural disasters in Canada's history largely due to their impacts on agriculture. Cattle operations are innately dependent on climate conditions, and are therefore extremely sensitive to drought. As such, droughts have implications for the land, the livestock, the waters supply, the income, the family life, and the community on which sustainable ranching livelihoods depend. Knowledgeable producers have successfully dealt with drought in the past and will continue to deal with drought in the future. The key to effectively managing drought impacts is to start in advance. Actions taken prior to the onset of drought can go a long way in reducing the impact of droughts when they occur. Also, knowing what you are going to do and doing it early when a drought occurs are integral parts of an effective drought response.

Module 1: Objectives and Goal Setting

Goal:

Information:

Drought risk table (PRAC – PARC work or other statistician?)

Threshold/definition of drought?

Drought Duration (years)	Paleo-record (%)	Instrumental record (%)
1		
2		
3		
4		
5		

Key Questions:

1.1 What are your priorities when managing drought?

1.2 Mission statement?

Module 2: Rangeland and Water Inventory

Mapping exercise

Feed inventory

Feed inventory and source (Tom's book)

Field	Forage type	Acres	Ecosite	Community	Condition	Average stocking rate

Month	Native	Seeded Pasture	Hay	Stubble	Others	Total (AUM)
May						
June						
July						
August						
September						
October						
November - April						

Water inventory

Water inventory and source (AB example)

Existing wells

ID on map	Purpose	Date constructed	Depth	Casing diameter	Production	Expected annual volume supplied

Dugouts

ID on map	Purpose	Date constructed	Length	Width	Depth	Capacity	Expected annual volume supplied

Module 3: Vulnerability and Risk Assessment

Has your cattle operation been impacted by drought in the past?

How frequently are you impacted by drought?

	Observed impacts
Water	
Land	
Livestock	
Family	
Community	
Income	

Have you run out of water?

Have you run out of feed?

Which usually runs out first, water or feed?

How much do you stock in a normal or average year?

How much do you stock in an above average or good year?

How much do you stock in a below average or bad year?

How much do you need? (Calculate variability based on instrumental record)

	May	June	July	August	September	October	November – April	
Bulls								
Cows								
Replacements								
Yearling Steers								
Calves								
Purchased Steers								
Total								

Quality of feed and water supplies?

Potential impacts – related to risk management goals

	Potential impacts				
Drought duration (years)	1	2	3	4	5
Water					
Land					
Livestock					
Family					

Community					
Income					

0=unimpacted, 1=minimally impacted, 2=moderately impacted, 3=severely impacted

Module 4: Preparedness Assessment

Do you know the minimum number of animals required to maintain the genetic integrity of your herd?

Do you know which animals in your herd you would prefer to keep and those that are disposable?

Do you have a predetermined selling order?

Do you have a critical rain date?

Do you have a destocking plan?

Pasture quality?

Water systems?

Module 5: Developing the Plan

Preparedness

Response

Recovery

Outcome 1: Draft Drought Plan

Outcome 2: Drought Management Suggestions

This would be tied to the BMPs in the Farm Stewardship Program and other programs.

Environmental Farm Plan Chapter	Beneficial Management Practices	Fits within the drought plan

Farm and Ranch Water Infrastructure Program	Beneficial Management Practices	Fits within the drought plan

North American Waterfowl Management Program	Beneficial Management Practices	Fits within the drought plan

Other tools	Beneficial Management Practices	Fits within the drought plan