Sturgeon River State of the Watershed Report 2012

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Prepared by

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for the Sturgeon River Watershed Alliance

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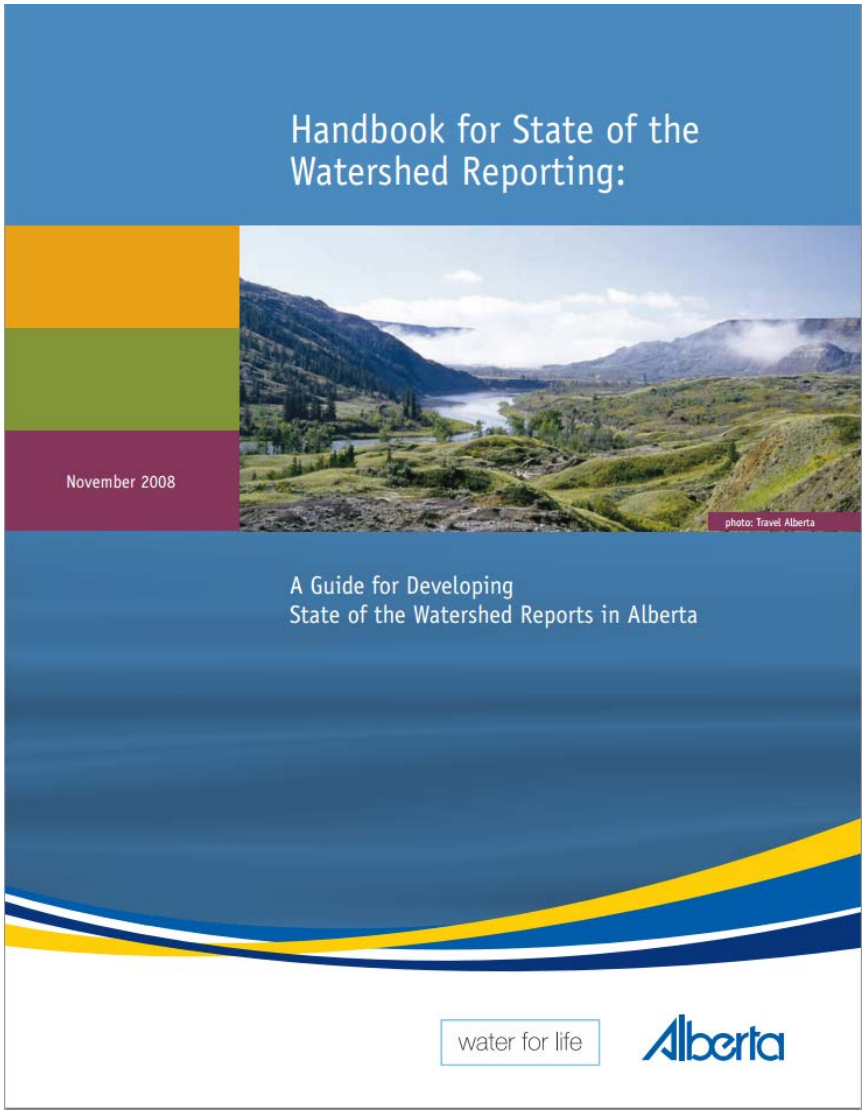
- certified Alberta Professional Biologist and Interim Wetland Science Practitioner (IWSP)
- earned his M.Sc. degree from the University of Alberta, working with Ducks Unlimited Canada on Frank Lake, the largest wetland restoration project in Canada
- research associate at the University of Alberta for three years as the Land-Aquatic Program Administrator for the Sustainable Forest Management Network
- Alberta Water Council representative for the Lake Environment Conservation Sector for the past 10 years, been involved with the Provincial Water Strategy (Water for Life) since its creation in 2003
- involved with several non-profit groups such as the Alberta Lake Management Society, Inside Education, Ducks Unlimited Canada and Trout Unlimited Canada

State of the Watershed Reporting



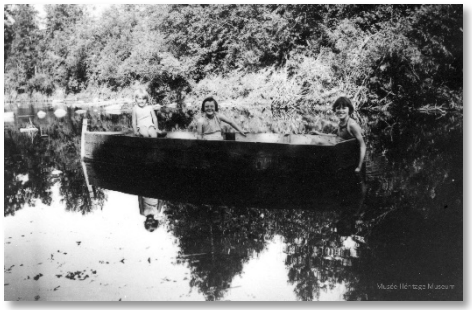
- First stage in Watershed Management Planning, under Alberta's *Water for Life* Strategy and aims to:
  - Assess the nature and status of the watershed
  - Identify issues
  - Define and evaluate short- and long-term goals and actions
  - Assess benefits and costs
  - Implement and evaluate actions

State of the Watershed Report: Sturgeon River Watershed

Outline:

1. Current conditions of the watershed
2. Cumulative impacts
3. Critical or emerging environmental, economic or social issues
4. Data/knowledge gaps
5. Indicators used to monitor and assess watershed health
6. Mechanisms currently in place or required to be in place to maintain and protect the Sturgeon River Watershed

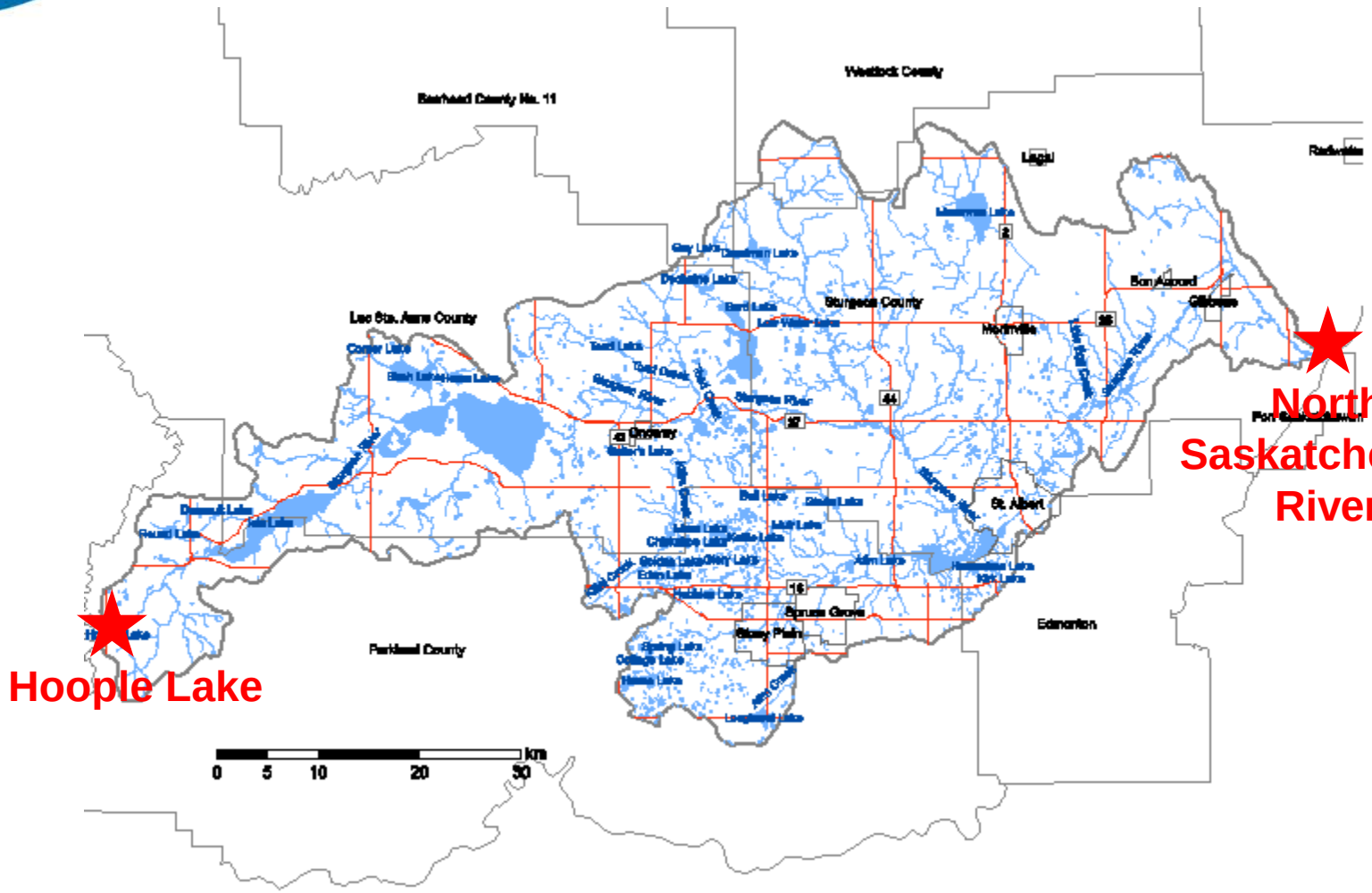
Sturgeon River Watershed



https://www.nswa.ab.ca/sites/default/files/NSR%20watershed%20For%20WEB.jpg

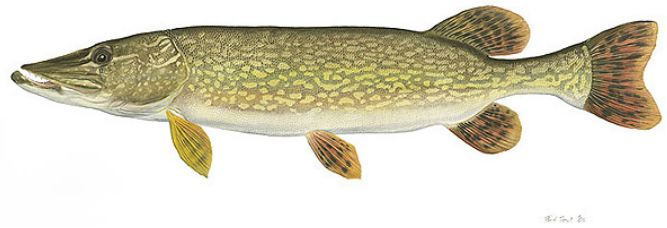
- Sub-watershed of the North Saskatchewan River located in central Alberta
- Non-glacial fed prairie river
  - Snowmelt
  - Seasonal precipitation
- High flow variability
  - Peak flows in spring
  - Extended periods of low flow during summer and fall
- Groundwater recharge
- Total watershed area of 3301 km^2
- 1 of 12 sub watersheds that comprise the North Saskatchewan River Watershed

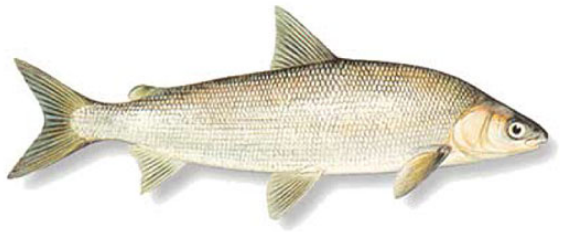
Sturgeon River Watershed



Sturgeon River Watershed

- Class “C” fish bearing watercourse
- Restricted activity period of April 16 to June 30
- Northern Pike
  - Healthy adult populations found throughout watershed
- Walleye
- Whitefish
- Cannot sustain significant populations of gamefish during the winter
  - Low flow and shallow water depths





Sturgeon River Watershed

1. What is the **current condition** of the watershed?

- Overall health assessed as **"Fair"**
  - Based on an average of 15 indicators
  - 3 ranked as "Good"
  - 5 ranked as "Fair"
  - 3 ranked as "Poor"
  - 4 had insufficient data

- Wetland Inventory
  - Ducks Unlimited Canada (DUC) inventory found 6.8% of the Sturgeon River Watershed to be composed of permanent and temporary wetlands.
  - High density of Gleysols on the landscape (525 km^2 or 16% of the watershed) suggests that a much higher proportion of the watershed consisted of wetlands in the past.
  - Losses of 70-71% for settled area of Alberta

Sturgeon River Watershed

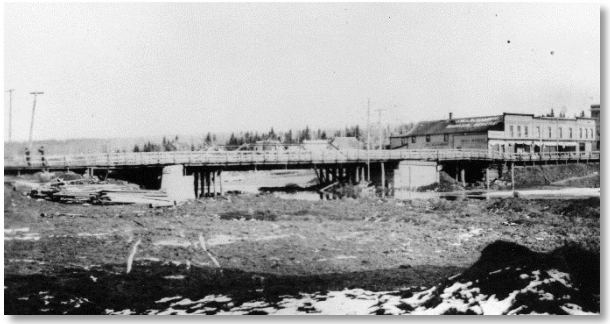
2. Cumulative impacts?

- **High population growth rate**, particularly in major communities = increased anthropogenic disturbance
  - From 2001 – 2006 population growth was 10.9% (NSWA, 2006), higher than the average for the entire province of Alberta.
- **Increased agricultural development and practices**
  - 78% of the total land base within the Sturgeon River Watershed is taken up by agricultural operations.
- **Increased recreational use**
  - 18 camp grounds and several summer villages

Sturgeon River Watershed

3. What are the critical or **emerging environmental impacts?**

- **Increased industrial influences**, developments and disturbances
  - 5, 263 km's of linear development
    - Total area of 79.2 km^2
    - 2.3% of the total land base
  - 62 mines/pits, 4 landfills, 7 auto wreckers and 1 lumber yard



Development Type	Total Length (km)	Width (m)	Area (km2)
Roadways	4,249	15	63.7
Pipeline	446	15	6.7
Railway	260	15	3.9
Transmission line	127	30	3.8
Forest cutline	163	6	1.0
Trail	18	6	0.1
Total	5,263		79.2

Natural Resources Canada, 2010

Sturgeon River Watershed

4. What are the **data/knowledge gaps** that need to be filled in?

- Riparian Area Health
  - Broad assessment required
- Surface Water Quality Index
  - More data and consistent sampling required over space and time
- Aquatic Macrophytes
  - Widespread surveys required throughout the watershed
- Benthic Invertebrates
  - Widespread sampling required throughout the watershed
- Wetland inventory
  - Little information on wetland habitat loss available

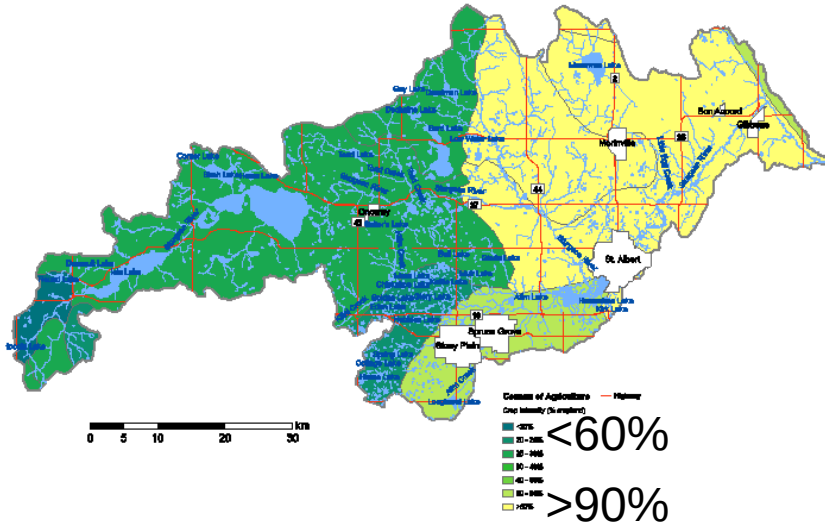
Sturgeon River Watershed

5. **Indicators** used to **monitor** and **assess** the health of the watershed

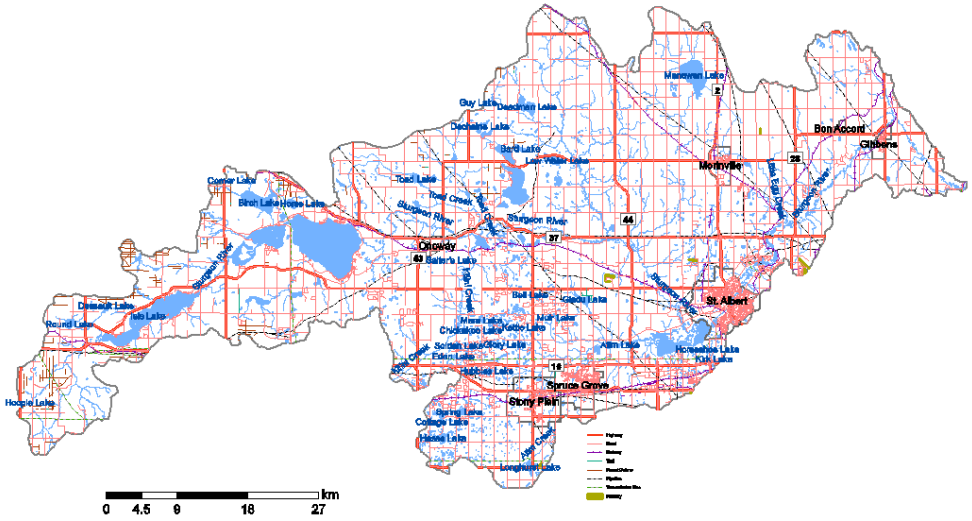
- Land Use Indicators
  - Land use inventory, linear developments, riparian health and livestock density

Livestock	Total number	Number of Farms
Cattle	80,038	639
Poultry	672,091	113
Pigs	19,005	33
Sheep	7,464	58
Goats	922	35

Statistics Canada, 2008 and Agriculture and Agri-Food Canada, 2005



Crop intensity in the Sturgeon River Watershed (Statistics Canada, 2008 and Agriculture and Agri-Food Canada, 2005)



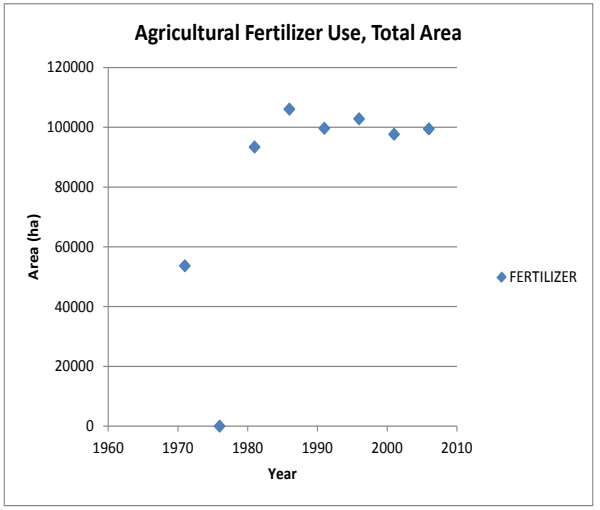
Linear developments and impervious features in the Sturgeon River watershed (Natural Resources Canada, 2010).

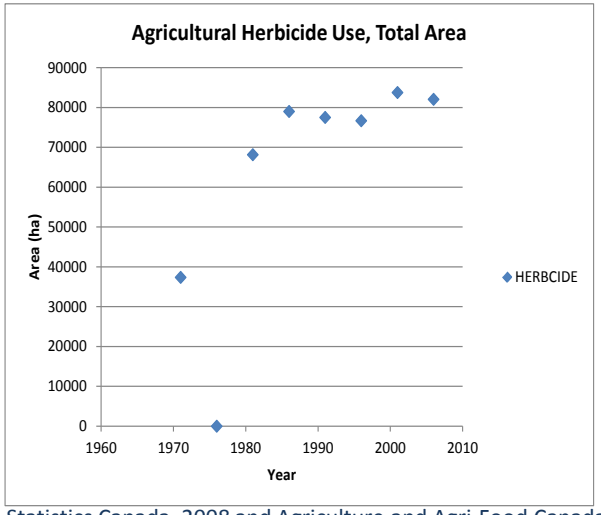
Sturgeon River Watershed

5. **Indicators** used to **monitor** and **assess** the health of the watershed

- Water **Quality** Indicators
  - Includes Surface Water Quality Index, bacteria (*E.coli*), nitrogen and phosphorus, and pesticides
    - Overall consistent trends that are in exceedance of guidelines
    - Prairie fed rivers/watersheds tend to have higher nutrient concentrations
    - Trends likely due to land use

Trend	Indicators
↑	Bacteria, total phosphorus and total suspended solids
↓	Nitrate-nitrite and total dissolved solids





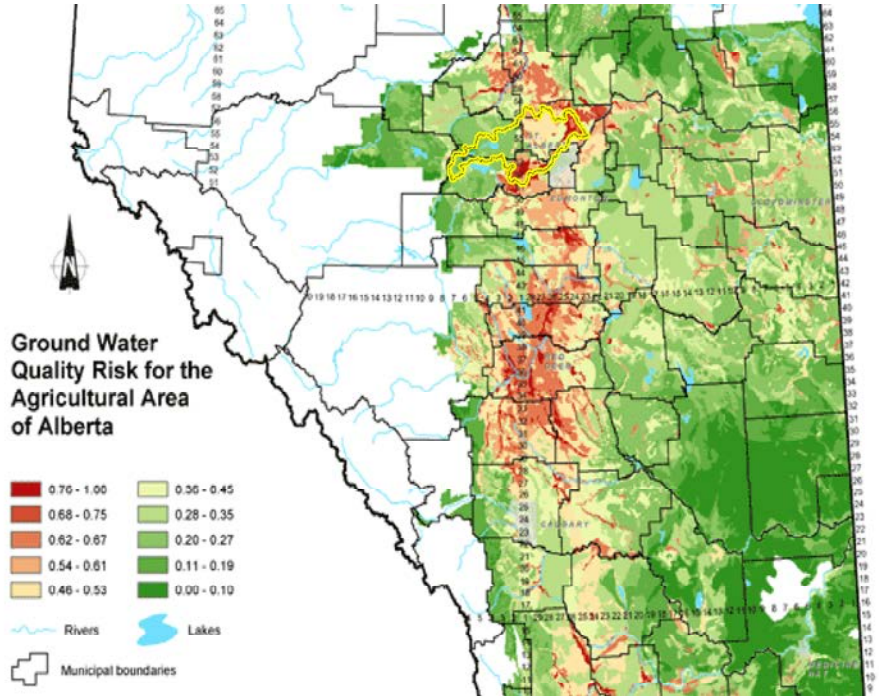
Statistics Canada, 2008 and Agriculture and Agri-Food Canada, 2005.

**No data available from 1976.

Sturgeon River Watershed

5. **Indicators** used to **monitor** and **assess** the health of the watershed Continued…

- Water **Quantity** Indicators
  - Water allocations by sector and groundwater diversions
  - ~9.5 million cubic meters of groundwater allocated annually
  - Vast majority of Sturgeon River Watershed land base functions as groundwater recharge areas (Hydrogeological Consultants Ltd. 1998a-c, 2000, 2001)
    - Increased risk for groundwater contamination
    - Increased importance for wetlands that function as sources of recharge



Alberta Agriculture and Rural Development, 2005b

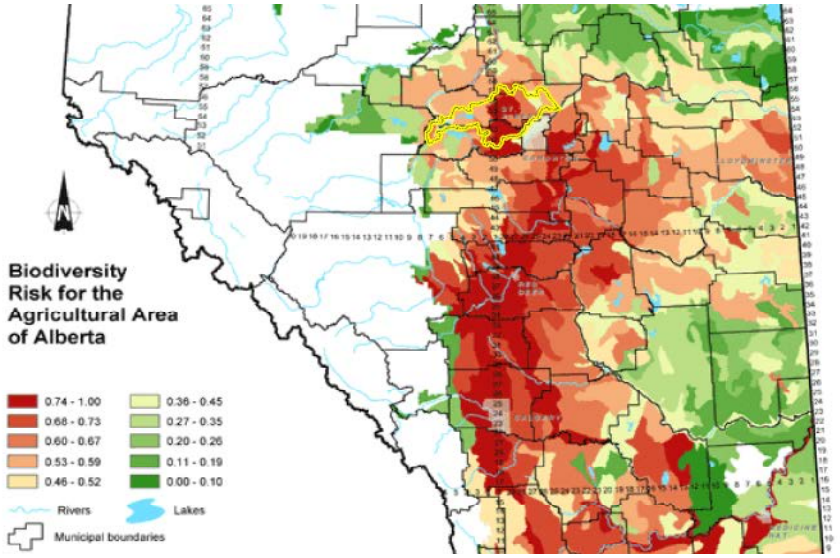
Sturgeon River Watershed

5. Indicators used to **monitor** and **assess** the health of the watershed Continued…

- Biological Indicators
  - Vegetation types, aquatic macrophytes, fish, and benthic invertebrates.
  - No Lake Sturgeon

Common Name	Scientific Name
Walleye	*Sander vitreus*
Northern Pike	*Esox Lucius*
Rainbow Trout	*Oncorhynchus mykiss*
Lake Whitefish	*Coregonus clupeaformis*
Burbot	*Lota lota*
Yellow Perch	*Perca flavescens*
Brook Stickleback	*Culea inconstans*
Lake Chub	*Couesius plumbeus*
White Sucker	*Catostomus commersonii*
Fathead Minnow	*Pimephales promelas*
Iowa Darter	*Etheostoma exile*
Spottail Shiner	*Notropis hudsonius*
Pearl Dace	*Margariscus margarita*

Summary of Fish Species Found in the Sturgeon River Watershed.



Biodiversity risk map for the agricultural region of Alberta (from Alberta Agriculture and Rural Development, 2005a).

Sturgeon River Watershed

5. Indicators Summary

Indicator	Overall Health
1) Land Use Indicators	
a) Land Use Inventory	Fair
b) Linear Developments	Fair
c) Wetland Inventory	Fair (with uncertainty)
d) Riparian Health	Insufficient Data
e) Livestock Density	Fair
2) Water **Quality** Indicators	
a) Surface Water Quality Index	Insufficient Data
b) Bacteria (*E.coli*)	Good
c) Nitrogen and Phosphorus	Poor
d) Pesticides	Good
3) Water **Quantity** Indicators	
a) Water Allocations by Sector	Good
b) Groundwater Diversions	Fair
4) Biological Indicators	
a) Vegetation Types	Poor
b) Aquatic Macrophytes	Insufficient Data
c) Fish	Poor (with uncertainty)
d) Benthic Invertebrates	Insufficient Data
Overall Health of the Sturgeon River Watershed	**Fair**

Sturgeon River Watershed

6. What **mechanisms** are in place or need to be in place to **maintain** and **protect the health** of the Sturgeon River watershed?

- Fill in the data/knowledge gaps
- Maintain or improve water quality
- Maintain or improve water quantity (flow)
- Maintain or improve aquatic ecosystem health
- Protect groundwater quality and quantity
- Align water and land-use planning at the regional scale

Questions?

Fun Facts:

- ~9.5 million cubic meters of groundwater allocated annually
- Consumptive use is 3.4 million cubic meters
- Return flows total over million 5.5 cubic meters
- 0.6 million cubic meters designated as losses
- Where are the Lake Sturgeon?