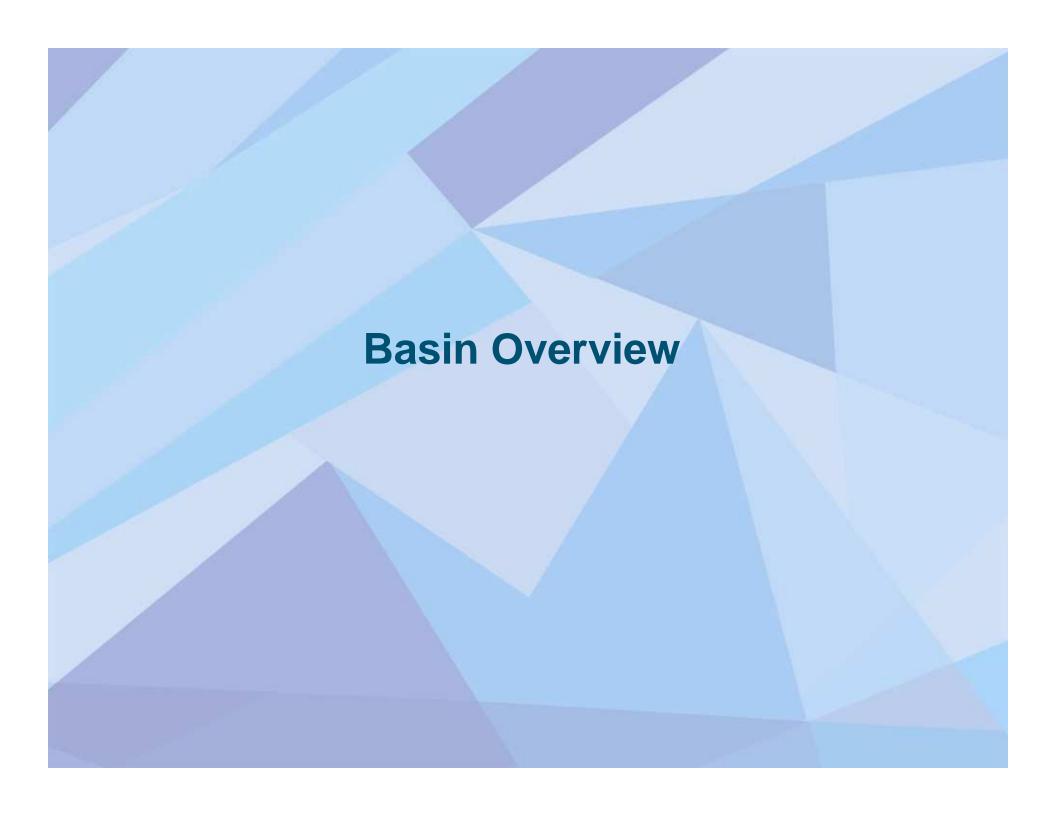
### Approved Water Management Plan for the Battle River Basin (Alberta)

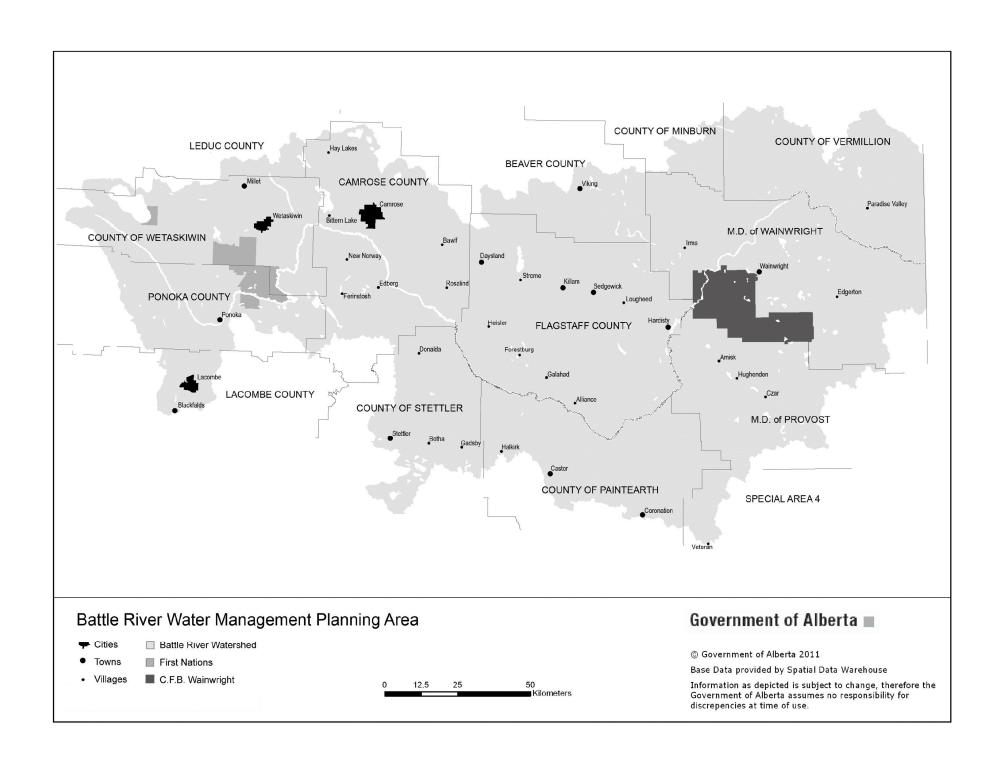
#### **Draft for Discussion**

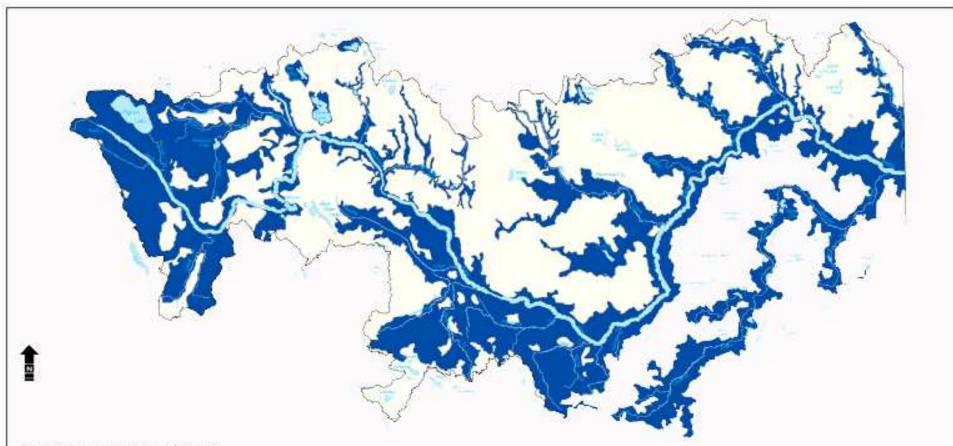


### **Presentation Outline**

- Basin Overview
- Water Management Planning: A Balance Between Water Consumption and Environmental Protection
- Stakeholder Advisory Group Recommendations
- Draft Water management Plan Recommendations
- Draft Water management Plan Discussion







#### BATTLE RIVER WATERSHED EFFECTIVE DRAINAGE AREA

Highway

River/Creek

Effective Drainage Area

Lake/Major River

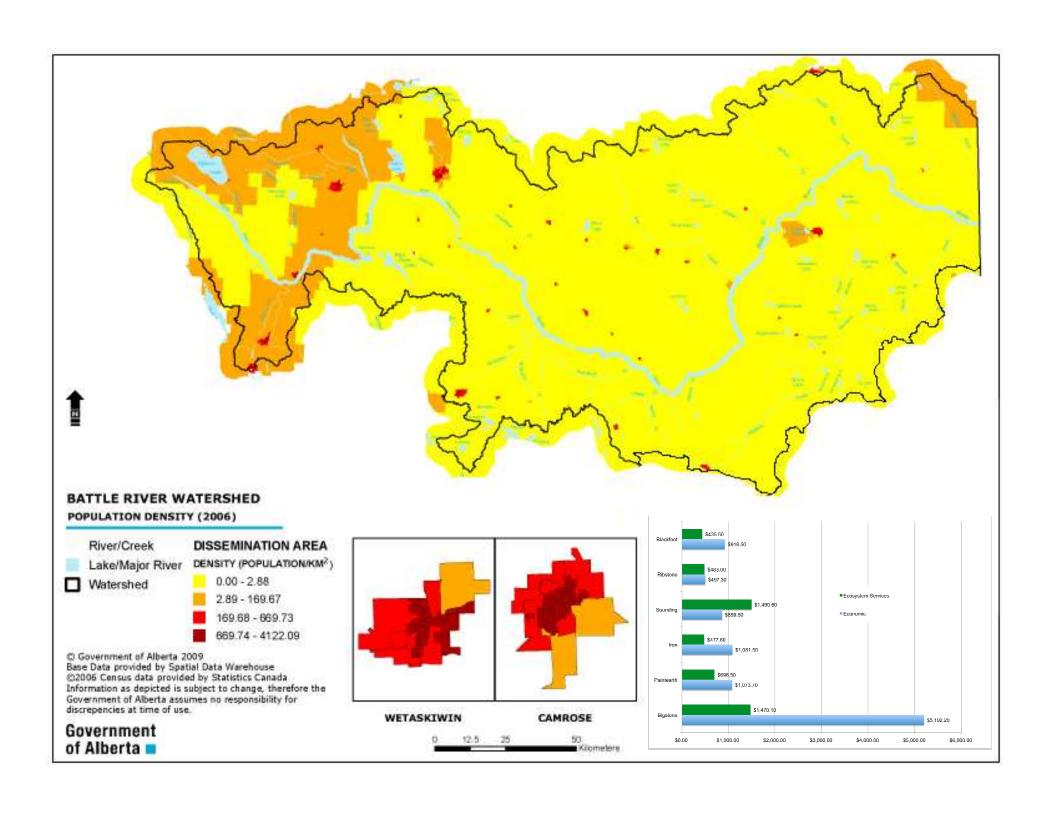
■ Watershed

© 2009 Government of Alberta Base Data provided by Spatial Data Warnhouse Effective Dramage Areas provided by FFRA - Agriculture & Agri-Food Canada Produced by Alberta Environment Information as depicted is subject to change, therefore the Government of Alberta assumes no responsibility for discrepencies at time of use

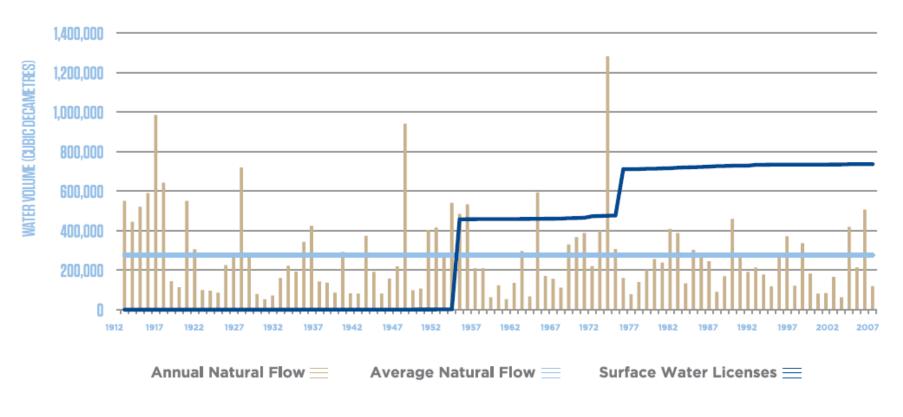
Go	vernme	1
of	Alberta	ı

Sub-Basin	EDA	Non-Contributing	ontributing GDA	
	(sq.km)	(sq.km)	(sq.km)	Ratio
Bigstone	3,425	3,829	7,254	47%
Blackfoot	1,399	2,911	4,310	32%
Iron	1,314	4,230	5,543	24%
Paintearth	2,789	1,938	4,727	59%
Ribstone	1,274	2,460	3,734	34%
Total	10,201	15,367	25,568	40%





### **Basin Overview**

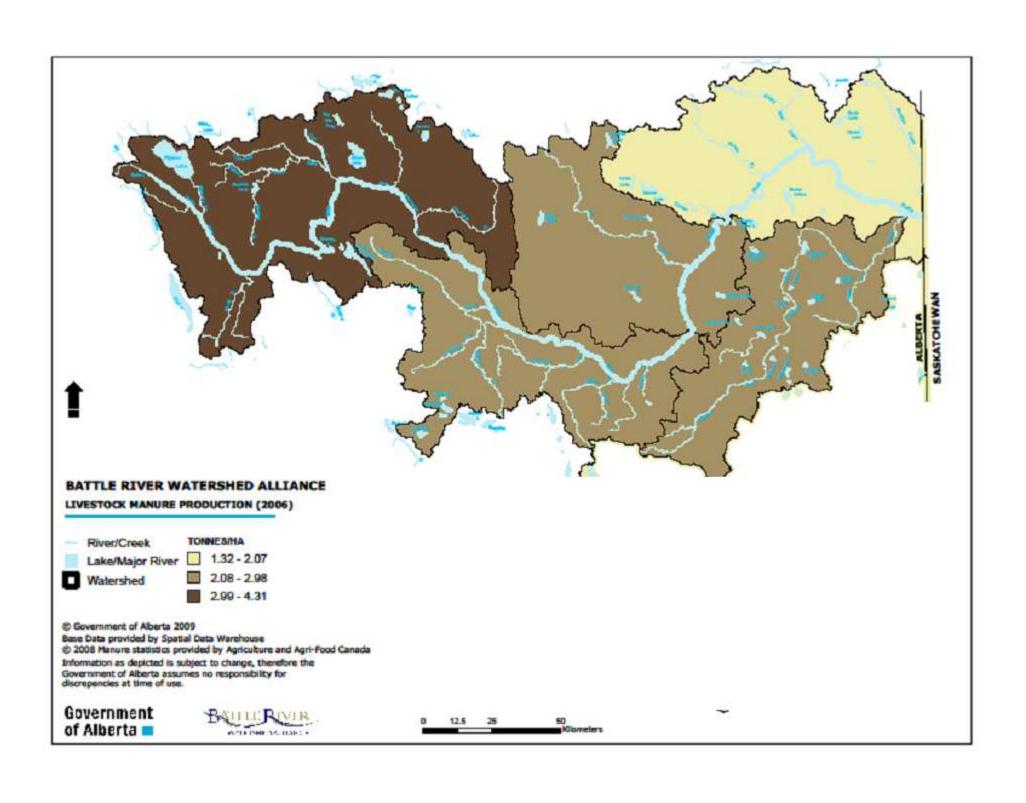


Mean =  $279 \ 235 \ dam3$ 

Median = 213 328 dam3

Min = 52 900 dam3 (1930)

Max = 1.32 million dam3 (1974)



# 2003-2010 Alberta River Water Quality Index Scores for the two Long-Term River Network monitoring stations on the Battle River.

LTRN stations are located 1) upstream of Ponoka, downstream of highway 53; and

2) upstream of Driedmeat Lake at highway 21.

### **Basin Overview**

Location		Sub-Index Values					
	Metals	Nutrients	Bacteria	Pesticides	Index		
	2009-2010						
Highway 53	90	29	100	91	78		
Driedmeat Lake	88	33	96	52	66		
		2008-2	009				
Highway 53	90	31	72	93	72		
Driedmeat Lake	91	29	100	78	75		
		2007-2	008				
Highway 53	97	60	71	83	78		
Driedmeat Lake	92	46	91	64	73		
		2006-2	007				
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		2004-2					
Highway 53	97	61	97	79	83		
Driedmeat Lake	91	32	100	81	76		
		2003-2					
Highway 53	91	34	90	95	77		
Driedmeat Lake	91	21	100	66	69		
Excelle (96-10	( indelm	Guidelines almost always met; best quality					
Good	Guidelin	Guidelines occasionally exceeded, but usually by small amounts;					
(81-95	threat to	threat to quality is minimal					
Fair	Guidelin	Guidelines sometimes exceeded by moderate amounts; quality					
(66-80	) occasion	occasionally departs from desirable levels					
Margin	al Guidelin	Guidelines often exceeded, sometimes by large amounts; quality					
(46-65	is threate	is threatened, often departing from desirable levels					
Poor	l l	Guidelines almost always exceeded by large amounts; quality is					
(0-45)	(0-45) impaired and well below desirable levels; worst quality						

### **Background**

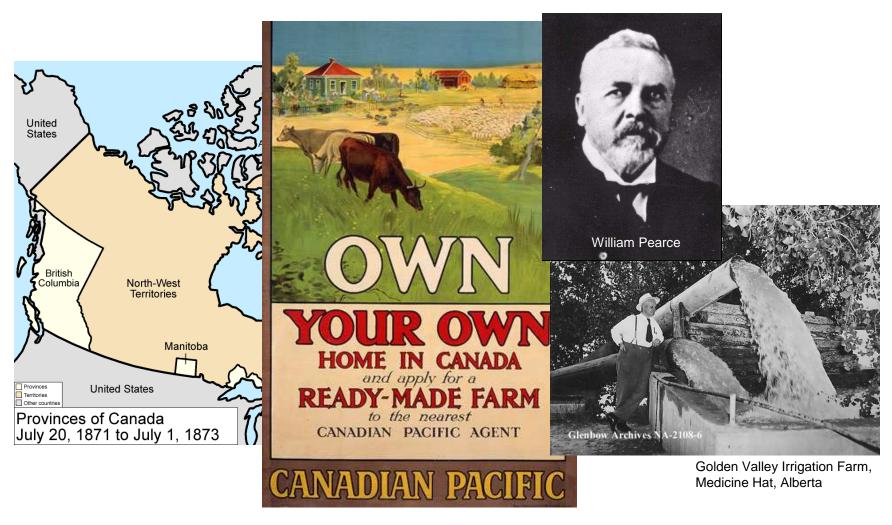
- Low flow years of 2002-04 brought to light increasing pressures on the Battle River's water supply.
  - Apportionment = 56%
- Concerns about the health of the aquatic ecosystem
- Reaffirmed with low flow in 2009
  - Apportionment = 57%





# Water Management Planning: A Balance Between Water Consumption and Environmental Protection

### A Brief History of Water



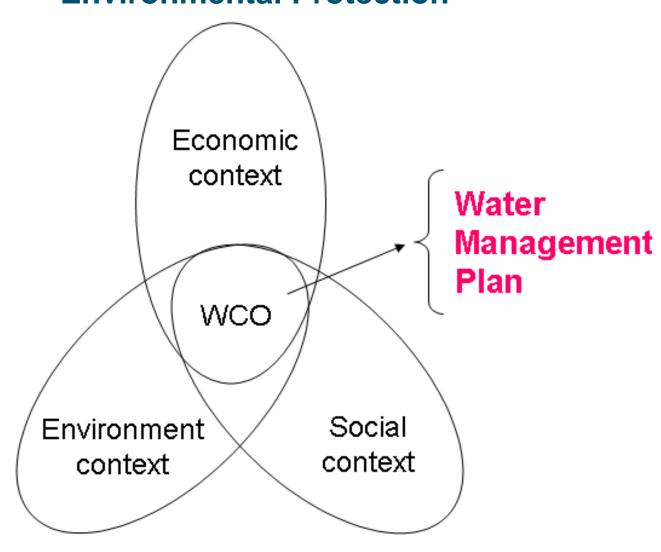
North West Irrigation Act 1894; Natural Resources Transfer Agreement 1930; Water Resources Act 1931

### A Brief History of Water



EPEA 1993; Water Act 1999; Water For Life 2003

# Water Management Planning: A Balance Between Water Consumption and Environmental Protection

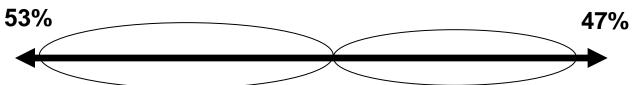


# Water management Planning: A Balance Between Water Consumption and Environmental Protection

- What is your bias?
  - Biocentric world view
  - Anthropocentric world view

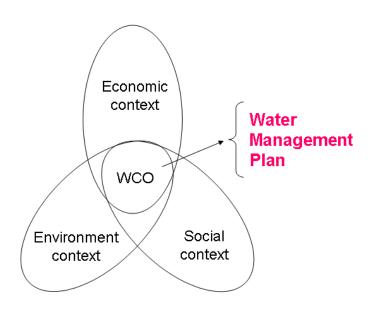






# Water Management Planning: A Balance Between Water Consumption and Environmental Protection

- Phase One: Water Quantity
  - Alberta Environment is the lead agency
    - Water Act and Framework for Water Management Planning
  - Identifies Recommendations for Director Decisions under Water Act
  - Sets Water Conservation Objectives (WCO's)
    - Amount of water to remain in river
    - Strategy for Protection aquatic environment
  - Permit Water Allocation transfers
  - Matters and Factors to consider for Water Act approval process



# Water Management Planning: A Balance Between Water Consumption and Environmental Protection

- Phase Two: Water Quality
  - Battle River Watershed Alliance is the lead
    - Designated Watershed Planning and Advisory Council under Water For Life Strategy



- State of the Watershed Report
  - Completed in 2010
  - Assesses relative sustainability of subwatersheds in the Battle River and Sounding Creek Basins



- Watershed Management Plan
  - Terms of Reference approved in 2011.
  - Drought Management
  - Non-point source pollution
  - Anticipated completion in several years.



### **Background**

- Where we are at:
  - Formation of Steering Committee, 2004
  - Formation of Stakeholder Advisory Group, 2004
    - Education Strategy (Series of Forums)
    - Recommendations Workshop Nov 2005
  - Battle River Watershed Alliance is established 2007
  - Recommendations nearly finalized Jan 2007
  - 2 year break in planning process
  - Recommendations Group reconvened Oct 22, 2009
  - Reconfirmed original recommendations (slight adjustments were made)
  - Completed Licence Review
  - Updated Natural Flow Data Set
  - New set of modeling
  - Consensus on draft recommendation
  - Model calibration work (time of travel)
  - First Nations Consultation
  - Draft plan presented to the public

- Variable Flows
- Additional 2500 dam<sup>3</sup> (NOT close basin)
  - Licence review (cancellation of existing licences not in good standing)
- Then WCO = IFN (Close basin)
- Enable Water Allocation Transfers

#### Variable Flows -

 Active Management of AENV Infrastructure to more closely mimic natural flow patterns to provide for different ecosystem services, including flows for channel maintenance, riparian regeneration, fish habitat and water quality.







#### Additional 2500 dam<sup>3</sup> (NOT close basin) –

- Modeled three different economic growth scenarios and their associated water requirements.
- Sector representatives selected a middle growth scenario, which project growth of 5.6% over the next 25 years,
- Using this scenario, 2500 dam<sup>3</sup> of water is required
- 2500 dam<sup>3</sup> would be allocated through the cancelation of existing licenses not in good standing.

### Establish Water Conservation Objective equivalent to Instream Flow Needs (Close basin) –

- 85% of natural flows until the lowest 20th percentile is reached
- 100% of natural flows when flows are below 20<sup>th</sup> percentile (at which point water mastering would be required)
- Natural flows: annual volume
  - Median = 213 328 dam<sup>3</sup>
  - Min = 52 900 dam<sup>3</sup>
  - $Max = 1.32 \text{ million } dam^3$
- Water use (actual): annual volume
  - 48 200 dam<sup>3</sup>
- Median Natural Flow / actual water use = 23%

#### Water Allocation Limit –

 A water allocation limit be set at 57,500 dam<sup>3</sup> of licenced water use, and that once this limit has been reached, the Battle River Basin be closed to new water allocations.

### Water Allocation Limit may be adjusted based on outcome of recommendation 5.1.2 –

- Secure an allocation of water for First Nations at Hobbema based on further consideration of either:
  - (1) the extension of the North Red Deer Regional Water Services Commission water line, pursuant to licence no. 00189571-00-00;
  - (2) a gross diversion of water from the Battle River not to exceed 3729 dam<sup>3</sup>.

#### **Enable Water Allocation Transfers Immediately –**

 The Director (as designated under the Water Act) is hereby authorized to consider applications for transfer of water under existing licences in the Battle River Basin in Alberta, subject to sections 81, 82 and 83 of the Water Act.

# Draft Water Management Plan Recommendations and Discussion

#### Establish Water Conservation Holdbacks –

- The Director is hereby authorized to withhold up to 10 per cent of an allocation of water under a licence that is being transferred, if the Director is of the opinion that withholding water is in the public interest to protect the aquatic environment or to implement a Water Conservation Objective.
- It is recommended that the Director withhold the maximum of 10% allowable under the Water Act.
- It is recommended that water withheld from a transfer be assigned to a WCO licence with the priority of its original licence, or through a crown reservation.

#### **Establish Water Conservation Objective Immediately –**

- A rate of flow that is 85% of the natural flow that is to be left in the watercourse; and during those times when natural flow approaches the lowest quintile (20%) flow reductions shall be applied based on the greater of either:
  - a) 15% instantaneous reduction from natural flow or;
  - b) the lesser of either the natural flow or the 80% exceedance natural flow based on available time step data.
- New Junior Licences stemming from applications received on or after January 1, 2005 should be given conditions for water conservation objectives.

#### Recommended Water Management Strategies -

- Flow restoration strategy
- Riparian areas monitoring and restoration strategy
- Site-specific water quality objectives
- Improvements to water management administration







After

### Conclusions

#### **Stakeholder Advisory Group**

- Variable Flows
- Water Allocation Limit
  - basin remains open
- WCO = IFN
  - basin is closed
- Water Allocation Transfers
   Enabled

#### **Draft Plan**

- Water Allocation Limit
- Water Allocation Transfers
- Water Conservation Holdbacks
- WCO = IFN
- Flow Restoration
- Riparian Areas Management
- Site Specific Water Quality
   Objectives
- Improvements to Water
   Management and Administration

### Conclusions

#### **Stakeholder Advisory Group**

- Live within carrying capacity of watershed
- Respects existing agreements
- Business as usual approach for roughly 20-25 years (operational)
- WCO is a guide for allocation decisions,
  - i.e. close the basin to new licences (administrative)

#### **Draft Plan**

- Live within carrying capacity of watershed
- Respects existing agreements
- Changes to business begin immediately (operational and administrative)
- Uses WCO as a target or restoration objective
  - i.e. attempt to keep the basin open

Opportunities to Comment

Government of Alberta

### **Opportunity for Comment**

- Response Forms and initial reactions should be submitted before leaving
- Organization responses can be submitted using the response forms provided, or formal letter with feedback from your organization by March 15, 2013
  - www.battleriverwatershed.ca/WMP-response-form
  - Battle River Watershed Alliance,
     Box 16, 4825 51 Street (Second Floor),
     Camrose AB T4V 1R9.

### Draft Water Management Plan Discussion

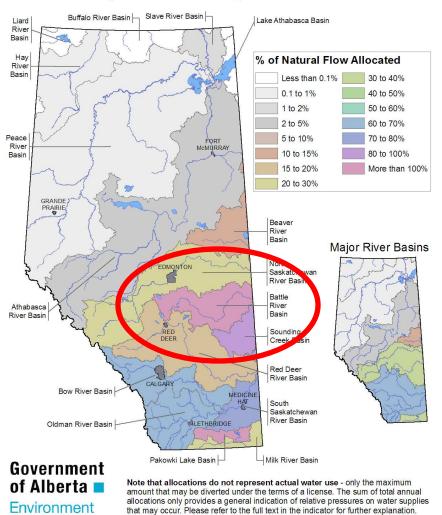
Water Allocation Limit

Government of Alberta

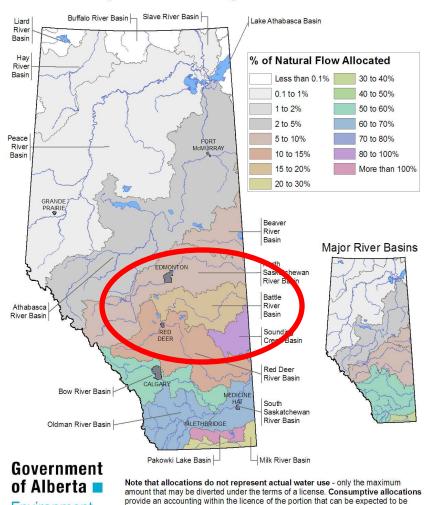
### Discussion: Water Allocation Limit

Environment

#### Licence Allocations in 2010 by River Basin Compared to Average Natural Flow



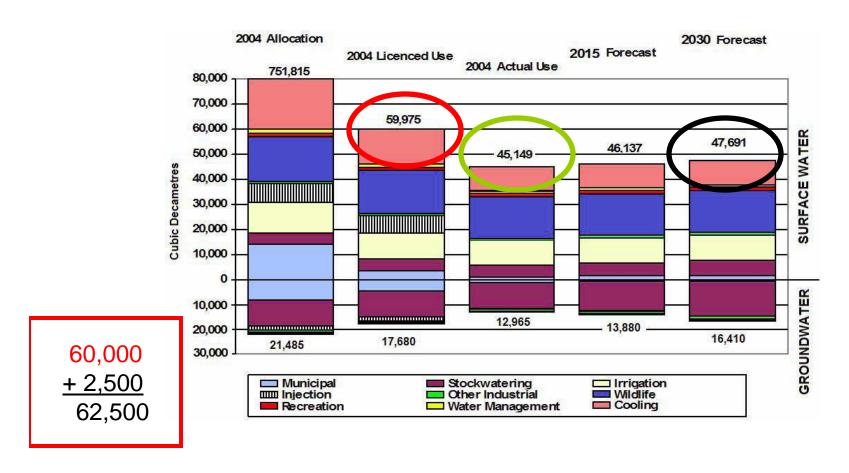
#### Consumptive Allocations in 2010 by River Basin Compared to Average Natural Flow



consumed or lost. Please refer to the full text in the indicator for further explanation

### Discussion: Water Allocation Limit

	No. of licences	Gross Diversion (dam <sup>3</sup> )	Licenced Water Use (dam³)	Actual Water Use (dam³)	<b>Licenced Return Flow</b> (dam <sup>3</sup> )
Power Generation licences (cooling)	3	691,737	13,741	9,620	677,996
Surface Water Licences	791	58,123	44,726	33,563	13,849
Traditional Agricultural Registration	6,674	1,966	1,966	1,966	0
TOTAL	7,468	751,826	60,433	45,149	691,845



- Future demand (2542 dam³) of water consumption to accommodate 25 years of economic development.
- Stakeholder Advisory Group water be secured through a review and cancellation of existing licences.

- 330 surface water licenses were reviewed (95% of allocation by volume). The review was designed to achieve the following:
  - An accurate database of licenses in the Battle River basin
  - More detailed water use data
  - Evaluation of licenses that are not in good standing or subject to cancellation
  - Evaluate if licenses are in good standing in anticipation of transfers being enabled in the basin
- The license review determined the following:
  - Licence review was conducted covering 95% of allocations by volume
    - Cancelled
      - 5 licences were cancelled
      - 4985.73 dam³ ←
    - > Name Amendment
      - 11 licences required a name amendment
    - No Changes
      - 8 licences
    - > Peter or Andrew Files
      - 8 licences were taken over by Andrew or Peter
    - > Backflood Licences

138 Licences = 10,062 dam<sup>3</sup>

62,500 - 5,000 57,500

#### Water Allocation Limit -

 A water allocation limit be set at 57,500 dam<sup>3</sup> of licenced water use, and that once this limit has been reached, the Battle River Basin be closed to new water allocations.

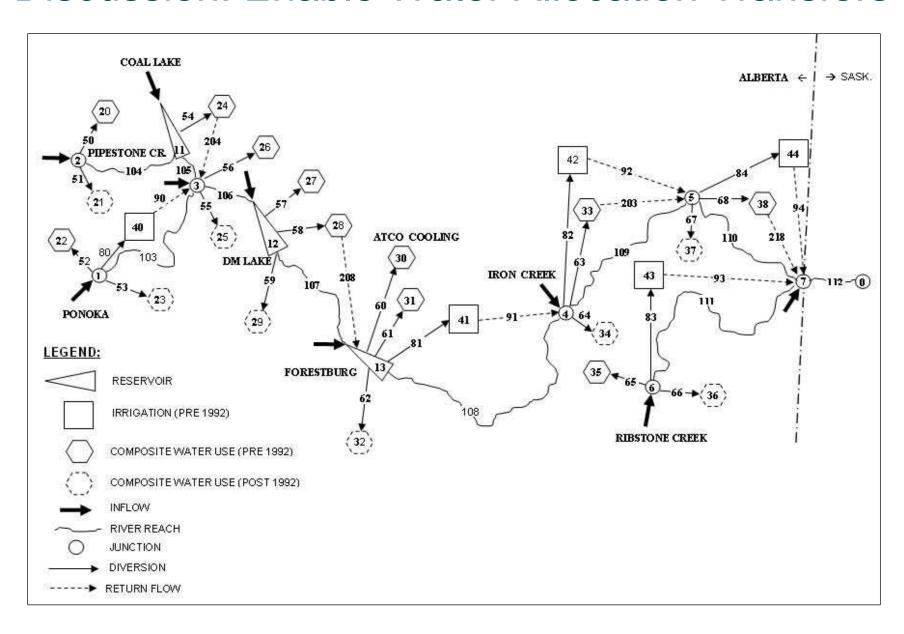
### Water Allocation Limit may be adjusted based on outcome of recommendation 5.1.2 –

- Secure an allocation of water for First Nations at Hobbema based on further consideration of either:
  - (1) the extension of the North Red Deer Regional Water Services Commission water line, pursuant to licence no. 00189571-00-00;
  - (2) a gross diversion of water from the Battle River not to exceed 3729 dam<sup>3</sup>.

1. Do you agree with the recommendation to establish a water allocation limit of 57,500 dam3 of licenced water use and to stop accepting applications for new water allocations in the Battle River Basin once this limit has been reached? (see page 49 of draft plan)

### Draft Water Management Plan Discussion

**Enable Water Allocation Transfers** 



	Description of Input Options					
Scenario	Water Use License levels	WCQ Targets	Storage Release based on:	Priority of Allocation		
8.1	Historic	old	Downstream demands & IFN	1. Pre-92 licenses 2. IFN (=IO) 3. Post-92 licenses		
8.2	Max	old	Downstream demands & IFN	1. Pre-92 licenses 2. IFN (=IO) 3. Post-92 licenses		
8.3	Max + 2500 dam <sup>3</sup>	old	Downstream demands & IFN	1. Pre-92 licenses 2. IFN (=IO) 3. Post-92 licenses		
8.4	Max + 2500 dam <sup>3</sup> - 4000 dam <sup>3</sup>	old	Downstream demands & IFN	1. Pre-92 licenses 2. IFN (=IO) 3. Post-92 licenses		
8.5	Max + 2500 dam <sup>3</sup>	new (85:20)	Downstream demands & IFN	1. Pre-92 licenses 2. IFN (=WCO) 3. Post-92 licenses		

#### Mean Annual Consumptive Use Deficits (%)

Component number	Scenario	Scenario	Scenario	Scenario	Scenario
in Schematic	8.1	8.2	8.3	8.4	8.5
40	12.45	14.02	14.29	14.18	14.54
41	0.01	0.02	0.02	0.01	0.02
42	0.00	0.00	0.00	0.00	0.19
43	14.44	14.82	14.82	14.82	14.82
44	0.00	0.00	0.00	0.00	0.27
20	11.21	11.62	12.08	11.76	12.71
21	24.81	25.64	26.19	26.46	27.70
22	11.21	13.33	13.65	12.91	12.48
23	21.02	23.01	23.33	23.55	66.96
24	21.86	24.28	25.06	24.21	20.89
25	28.12	29.69	30.44	30.92	41.60
26	10.09	14.94	15.41	14.86	13.66
27	7.96	9.52	9.54	8.97	9.44
28	13.14	14.46	14.95	14.83	13.87
29	10.88	11.85	11.87	11.69	12.62
30	1.37	2.04	2.07	1.60	2.35

Component number	Scenario	Scenario	Scenario	Scenario	Scenario
in Schematic	8.1	8.2	8.3	8.4	8.5
31	3.20	6.34	6.40	4.82	5.31
32	8.71	10.71	10.85	9.64	83.46
33	1.41	2.16	2.24	2.44	2.15
34	10.30	13.13	13.59	11.65	65.02
35	7.80	11.90	11.91	11.85	11.56
36	26.64	41.24	41.24	41.24	41.24
37	13.40	18.34	18.77	15.52	76.65
38	17.18	22.13	22.55	19.99	54.10
150	_	_	28.86	28.99	68.75
151	-	-	18.69	14.37	27.36
152	-	-	23.89	21.06	66.85

Scenarios 8.1 and 8.2 water deficits are frequent, but low in magnitude

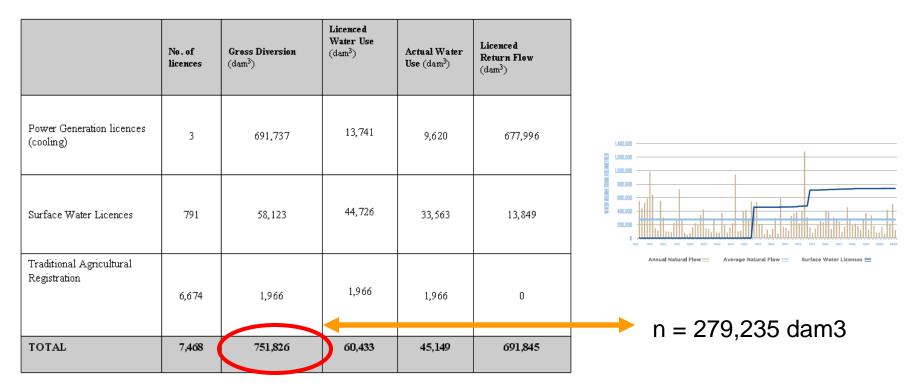
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44	0.00	0.00	0.00	0.00	0.27
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21	24.81	25.64	26.19	26.46	27.70
22	11.21	13.33	13.65	12.91	12.48
23	21.02	23.01	23.33	23.55	66.96
24	21.86	24.28	25.06	24.21	20.89
25	28.12	29.69	30.44	30.92	41.60
26	10.09	14.94	15.41	14.86	13.66
27	7.96	9.52	9.54	8.97	9.44
28	13.14	14.46	14.95	14.83	13.87
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Component number	Scenario	Scenario	Scenario	Scenario	Scenario
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34	10.30	13.13	13.59	11.65	65.02
35	7.80	11.90	11.91	11.85	11.56
36	26.64	41.24	41.24	41.24	41.24
37	13.40	18.34	18.77	15.52	76.65
38	17.18	22.13	22.55	19.99	54.10
150	_	_	28.86	28.99	68.75
151	-	-	18.69	14.37	27.36
152	-	_	23.89	21.06	66.85

Scenario 8.5 – significant increase in the magnitude of water deficits at specific components when an WCO objective is applied.

<sup>\*</sup> Remember, scenario 8.5 assumes full use of existing licences



**Table 5.1-2 Matters and Factors for Transfers of Allocation** 

<ul> <li>Matters and factors that must be considered in making decisions on applications for a <u>transfer</u> of an allocation of water under a licence in the Battle River Watershed</li> </ul>						
Matters and Factors	• Guideline					
With respect to a transfer of all or part of an allocation of water from a licence	Only that portion of a volume of water allocated and defined as <i>licenced water use</i> shall be eligible for transfer					

2. Do you agree with the recommendation to enable transfers of water from existing water licences in the Battle River Basin, subject to sections 81, 82 and 83 of the *Water Act*, keeping in mind that only that portion of a licence deemed licenced use is eligible for transfer? (see page 53 of draft plan)

### Draft Water Management Plan Discussion

**Establish Water Conservation Holdbacks** 

Government of Alberta

## Discussion: Establish Water Conservation Holdbacks

water allocation limit / average natural flow x 100
 57,500 dam³ / 279,235 dam³ x 100
 = 20.5 %

- Holdback will help us:
  - Work toward achieving the WCO (85%)
  - Holdbacks are a step toward flow restoration

### Discussion: Establish Water Conservation Holdbacks

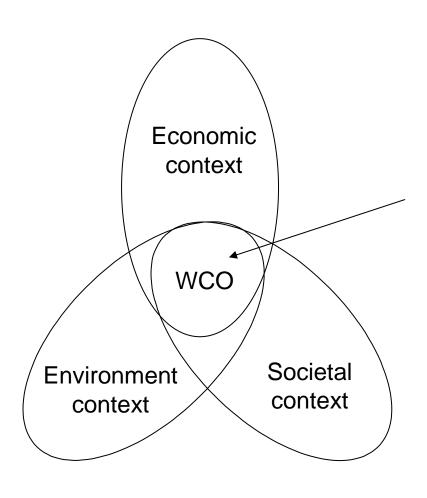
3. Do you agree with the recommendation to enable water conservation holdbacks of up to 10 percent to restore flows in the Battle River? (see page 55 of draft plan)

4. Do you agree with the recommendation that water withheld from a transfer be secured through either a Water Conservation Objective licence (with the priority of its original licence) or a crown reservation? (see page 56)

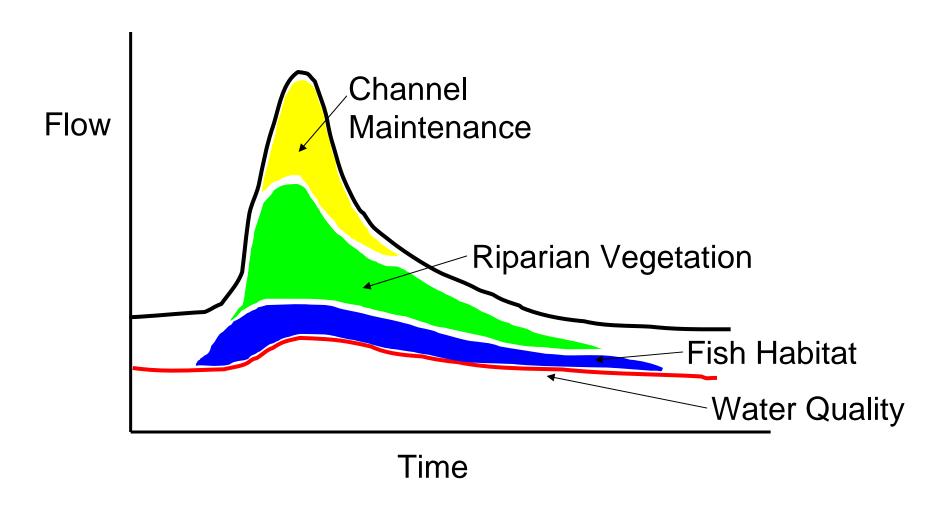
### Draft Water Management Plan Discussion

Establish a Water Conservation Objective

Government of Alberta



A Water Conservation Objective is the volume and quality of water to remain in the river for the protection of a natural water body and its aquatic environment. It is a flow target under the *first-in-time*, *first-in-right* priority water allocation system and will apply to all new licences and may be applied to existing licences with a retrofit provision.



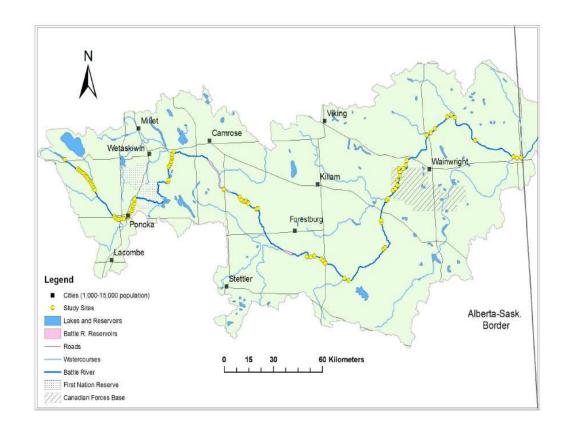
### Discussion: Establish Water Conservation

Waste
Assimilation
capacity has been
exceeded for
nutrients

	•							
т.	ocation		Sub-Index Values					
ъ	ocation	Metals	Nutrients	Bacteria	Pesticides	Index		
	2009-2010							
	way 53	90	29	100	91	78		
Dried	meat Lake	88	33	96	52	66		
	2008-2009							
	way 53	90	31	72	93	72		
Dried	meat Lake	91	29	100	78	75		
			2007-2					
	way 53	97	60	71	83	78		
Dried	meat Lake	92	46	91	64	73		
			2006-2	007				
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			2005-2	006				
	way 53	100	63	94	89	86		
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			2004-2	005				
	way 53	97	61	97	79	83		
Dried	meat Lake	91	32	100	81	76		
			2003-2					
	way 53	91	34	90	95	77		
Dried	meat Lake	91	21	100	66	69		
	Excellen	t Guidelin	es almost alwa	are met heet a	nality.			
	(96-100	)			•			
	Good		Guidelines occasionally exceeded, but usually by small amounts;					
(81-95) threat to quality is minimal								
Fair			Guidelines sometimes exceeded by moderate amounts; quality					
(66-80) occasionally departs from desirable levels								
	Margina		Guidelines often exceeded, sometimes by large amounts; quality					
	(46-65)		is threatened, often departing from desirable levels					
	Poor		Guidelines almost always exceeded by large amounts; quality is					
	(0-45) impaired and well below desirable levels; worst quality				lity			

#### Index of Biotic Integrity (IBI)

- ranks community along scale of disturbance
- modified for inverts, birds, mammal...worldwide applications and acceptance
- Developed IBI for Battle River (2006 – 2008)
- Scientifically robust technique



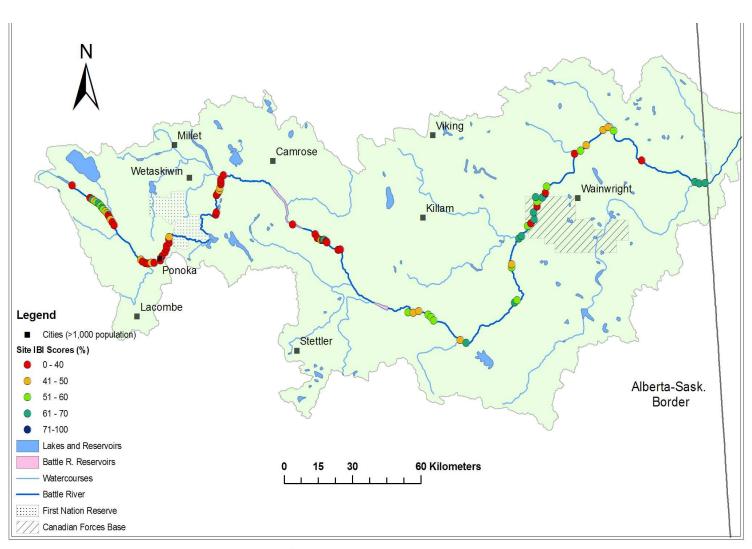
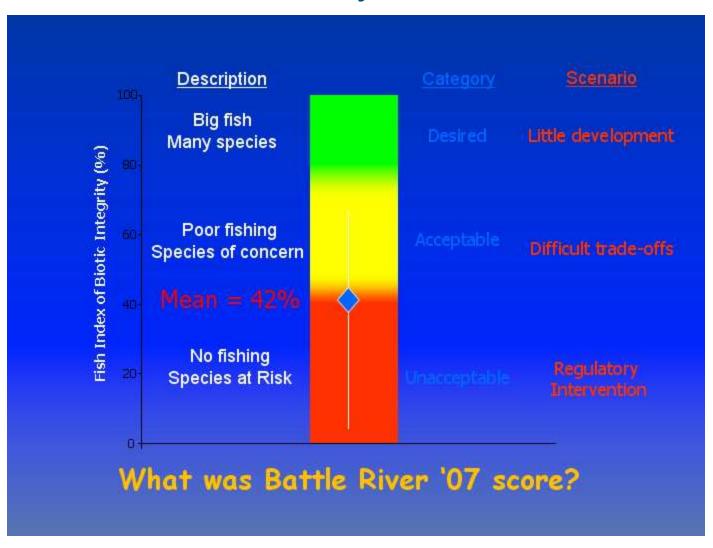


Figure of study sites in the Battle River and their IBI scores calculated using basin area and the sum of standardized values of 3 metrics: species richness, %carnivores, and %omnivores (mean IBI score = 42%; range = 4 - 69%)



### Discussion: Establish Water Conservation

Table 4.3-1 Estimated Effect of River flow on Aquatic Ecosystems from Channels 106 and 108 above Foresthurg Reservoir

Low	. 1	Moderate	High		
<u> </u>					
	Natural Flow	Instream Flow Need	Current Conditions		
Aquatic	Natural Populations, habitats	Some species measurably			
Ecosystem	and ecosystem functions are maintained at natural levels.	affected, ecosystem level functions are maintained.			
Water Quality	Naturally occurring levels of water quality. However, desired levels of water quality may not be met due to current and historic loading. Greater than natural flow required to meet desired levels.	Most water quality guidelines are met, with the exception of nutrients and oxygen due to current and historical loadings.	Nutrient guidelines are almost always exceeded year round, oxygen guidelines not met durin winter ice covered periods.		
Fisheries	Fish populations are at natural levels. Natural population structure, function, and taxonomic integrity preserved.	Undetectable changes to population structure and function. Similar to natural community. Fish populations are fully maintained.	Viability of sensitive populations threatened. Detectable changes is population structure and function for most species, but viability maintained. Some change in natural community composition.		
Riparian	Natural rates of riparian regeneration and growth occur. Natural vegetation community supported by flow regime. Riparian condition may be affected by land-use activities.	Minor changes from natural riparian community attributable to flow modification over the long term. Current riparian condition may be below natural levels due to local land manage ment.	Measurable reduction in recruitment of riparian species.  Likely insufficient recruitment to support the riparian community over the the long-term. Riparian condition highly vulnerable to impacts of local land management.		
Channel	Sediment transport balanced	Sediment transport			
Maintenance	to maintain natural channel	balance is maintained over			

effect on natural channel shape and meandering

Objective

Table 4.3-2 Estimated Effect of Riverflow on Aquatic Ecosystems from the Battle River below

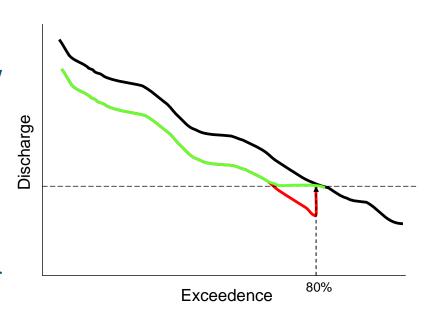
Table 4.3-2 Estimated Effect of Riverflow on Aquatic Ecosystems from the Battle River below Foresthurg (channels 109 and 110)

Low		Moderate		H	High		
				<u> </u>	,		
	Natural	Natural Flow		Instream Flow Need		Conditions	
Aquatic	Natural Populat	ions, habitats	Some species	measurably	Many species r	neasurably	
Ecosystem	and ecosystem :	functions are	affected, ecos	ystem level	affected. Ecosy	stem functions a	
	maintained at no	atural levels.	functions are	maintained.	in decline		
Water Quality	Naturally occur	ring levels of	Most water q	uality	Nutrient guidel	ines are almost	
	water quality. I	However,	guidelines are	met, with	always exceede	d year round,	
	desired levels of	f water	the exception	of nutrients	oxygen guidelii	nes not met durin	
	quality may not	be met due	and oxygen d	ue to curren	t winter ice cove	red periods.	
	to current and h	istoric	and historical	loadings.			
	loading. Greate	r than natural					
	flow required to	meet desired					
	levels.						
Fisheries	Fish population	s are at	Undetectable changes to		Changes in birt	Changes in birth and death rates	
	natural levels. 1	Natural	population structure and		lead to serious	lead to serious decline or	
	population structure,		function. Similar to		extirpation for	extirpation for several fish	
	function, and ta	xonomic	natural community. Fish		populations. V	populations. Wholesale changes	
	integrity preser	ved.	populations are fully		in fish commun	in fish community composition.	
			maintained.		Organism cond	Organism condition will be poor	
Riparian	Natural rates of	riparian	Minor changes from		Measurable red	Measurable reduction in	
	regeneration and	l growth	natural riparia	m	recruitment of	iparian species.	
	occur. Natural	vegetation	community at	tributable to	Likely insuffici	ent recruitment to	
	community sup	ported by	flow modification over the		e support the ripe	arian community	
	flow regime. R	iparian	long term. Cu	ırrent	over the the lor	g-term. Riparian	
	condition may b	e affected by	riparian condi	ition may be	condition highl	y vulnerable to	
	land-use activiti	es.	below natural	levels due t	impacts of loca	l land	
			local land mar	nage ment.	management.		
Channel	Sediment transp	Sediment transport balanced		sport			
Maintenance	to maintain natu	to maintain natural channel		balance is maintained over			
	shape and mean	dering	the long term	with limited	i		
	process.		effect on natu	ral channel			
			shape and me	andering			
			processes.				

### Draft Water Management Plan Recommendations

A rate of flow that is 85% of the natural flow that is to be left in the watercourse; and during those times when natural flow approaches the lowest quintile (20%) flow reductions shall be applied based on the greater of either:

- a) 15% instantaneous reduction from natural flow or;
- b) the lesser of either the natural flow or the 80% exceedance natural flow based on available time step data.
- New Junior Licences stemming from applications received on or after January 1, 2005 should be given conditions for water conservation objectives.



- 5. Is the proposed WCO for the Battle River acceptable? (see page 56 of draft plan)
- a. Do you agree that junior licences stemming from applications received on or after January 1, 2005, should be given conditions for a WCO? (see page 57)

### Draft Water Management Plan Discussion

Recommended Watershed Management Strategies

Government of Alberta

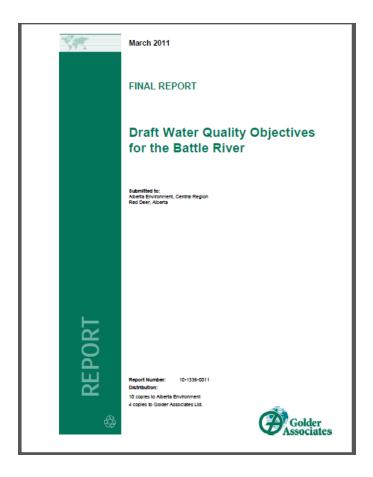
- Flow restoration strategy
  - General idea is to try and restore flows in order to achieve the recommended WCO and improve water security.
  - Voluntary flow restrictions for senior licence holders
  - Reservoir Management Operation strategies are designed and implemented.

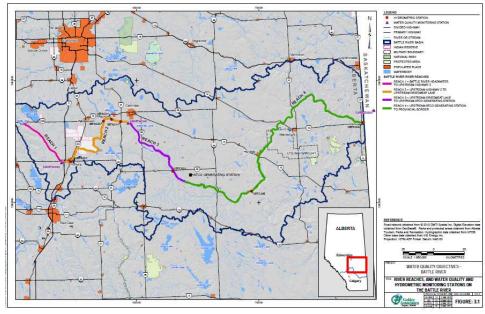
#### Riparian areas monitoring and restoration strategy

Table 4.2-3 Results of Videography assessment of Riparian Vegetation, delineated by reach.

Location	Rating
Battle Lake:	Good = 82% Fair = 12% Poor = 6%
Reach 1: (Battle Lake to to 7.9 km west of	Left Bank: Good = 8% Fair = 16% Poor = 76%
Ponoka)	<b>Right Bank:</b> Good = 23% Fair = 21% Poor = 56%
Reach 2: (7.9 km west of Ponoka to 5.0 km	Left Bank: Good = 34% Fair = 15% Poor = 51%
south west of Gwynn —total distance 86.6 km)	<b>Right Bank:</b> Good = 43% Fair = 21% Poor = 43%
Reach 3: (5.0 km south west of Gwynn to 9.4	<b>Left Bank:</b> Good = 22% Fair = 10% Poor = 68%
km upstream of HWY 53 Bridge west of	Right Bank: Good = 25% Fair = 11% Poor = 64%
Forestburg - total distance 67.2km)	
Reach 4: (9.4 km upstream of HWY 53	<b>Left Bank:</b> Good = 40% Fair = 17% Poor = 43%
Bridge west of Forestburg to 10 km south of	Right Bank: Good = 61% Fair= 17% Poor = 22%
Hardisty	
Reach 5: (10 km south of Hardisty to HWY	<b>Left Bank:</b> Good = 24% Fair = 30% Poor = 48%
41 bridge 19.2 km north of Wainwright – total	Right Bank: Good = 46% Fair = 29% Poor = 25%
distance 80.7 km)	
Reach 6 (HWY 41 bridge 19.2 km north of	<b>Left Bank:</b> Good = 43% Fair = 18% Poor = 39%
Wainwright to Alberta/Sask Border):	<b>Right Bank:</b> Good = 56% Fair = 15% Poor = 29%

Site-specific water quality objectives (see page 60)





#### Improvements to water management administration

- 1. Tracking actual licenced water use
- 2. Developing criteria for ensuring and monitoring no significant adverse effect on the aquatic environment
- 3. Reviewing Water Act section 55 files to ensure they are up-to-date
- 4. Upgrading quantity monitoring capabilities to increase year round monitoring stations
- Upgrading computer modeling capabilities, including incorporating weekly flow data
- 6. Exploring innovations and improvements in water licencing and legislation in order to better match allocations with needs
- 7. Store all water use files for the planning area in one location.
- 8. Developing capability of active forecasting for Battle River flows
- 9. Develop and maintain a list of water licences deemed to be in good standing to assist parties in arranging transfers. This list should include the point of diversion, volume allocated and priority for each licence.

- 6. Do you agree that the following watershed management strategies should be included in the Plan?
- a. Flow restoration strategy (see page 58)
- b. Riparian areas monitoring and restoration strategy (see page 59)
- c. Site-specific water quality objectives (see page 60)
- d. Improvements to water management administration (see page 60)