

Surface Water Management in Alberta's Industrial Heartland

October 11, 2023
Regional Advisory Council



Outline

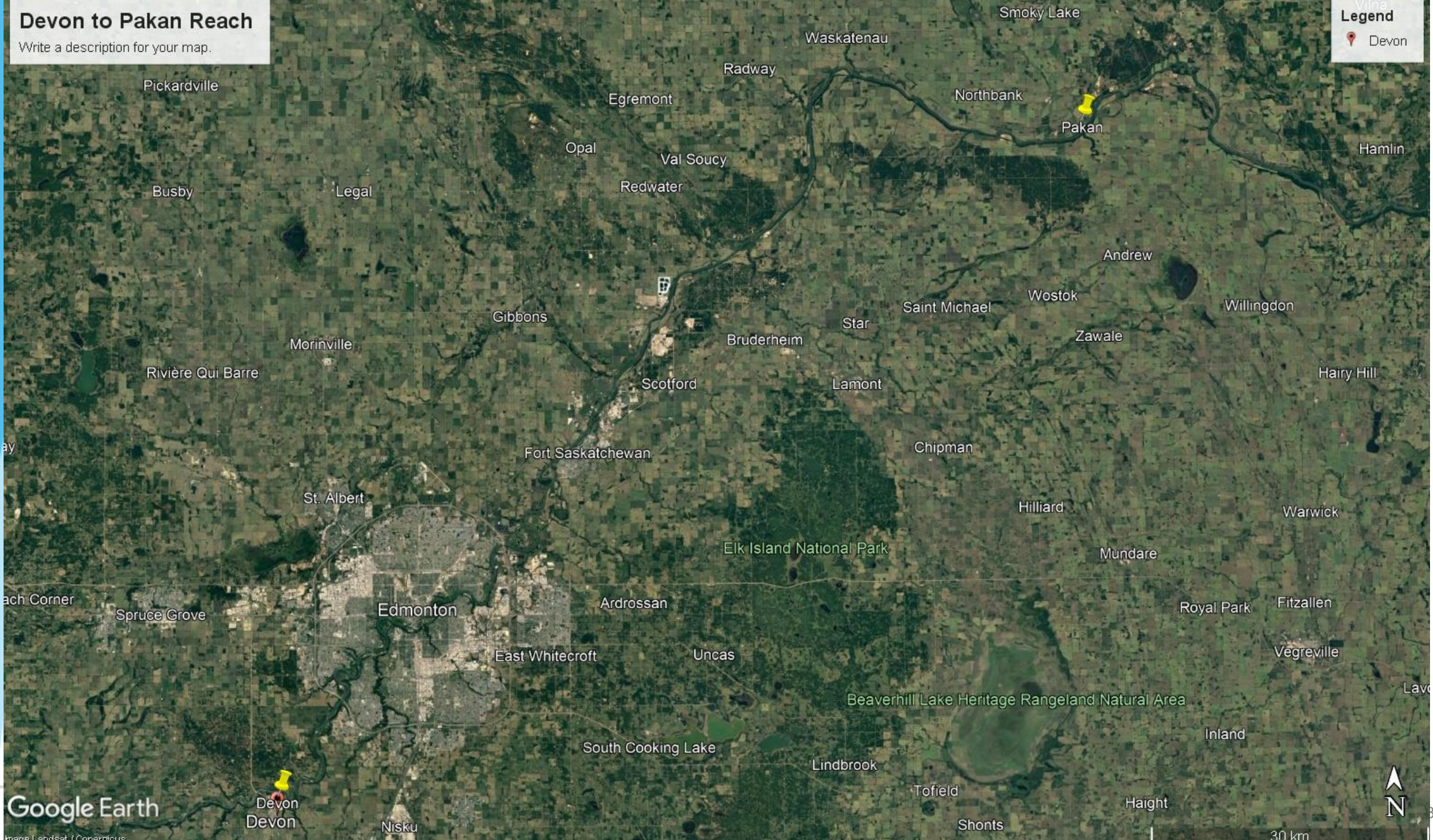
1. Devon to Pakan Reach of NSR
2. A River Runs Through It!
3. Who uses water in this Reach?
4. Who discharges effluent in this Reach?
5. Effluent Characterization Programs
6. What We Learned from the ECP Study
7. IH-DIZ Water Management
8. What we are working on for the future
9. Questions



Devon to Pakan Reach

Write a description for your map.

Vina
Legend
Devon



Devon
Devon

Nisku

30 km

COLUMBIA PICTURES PROUDLY PRESENTS A NEW FILM BY ACADEMY AWARD-WINNING DIRECTOR ROBERT REDFORD

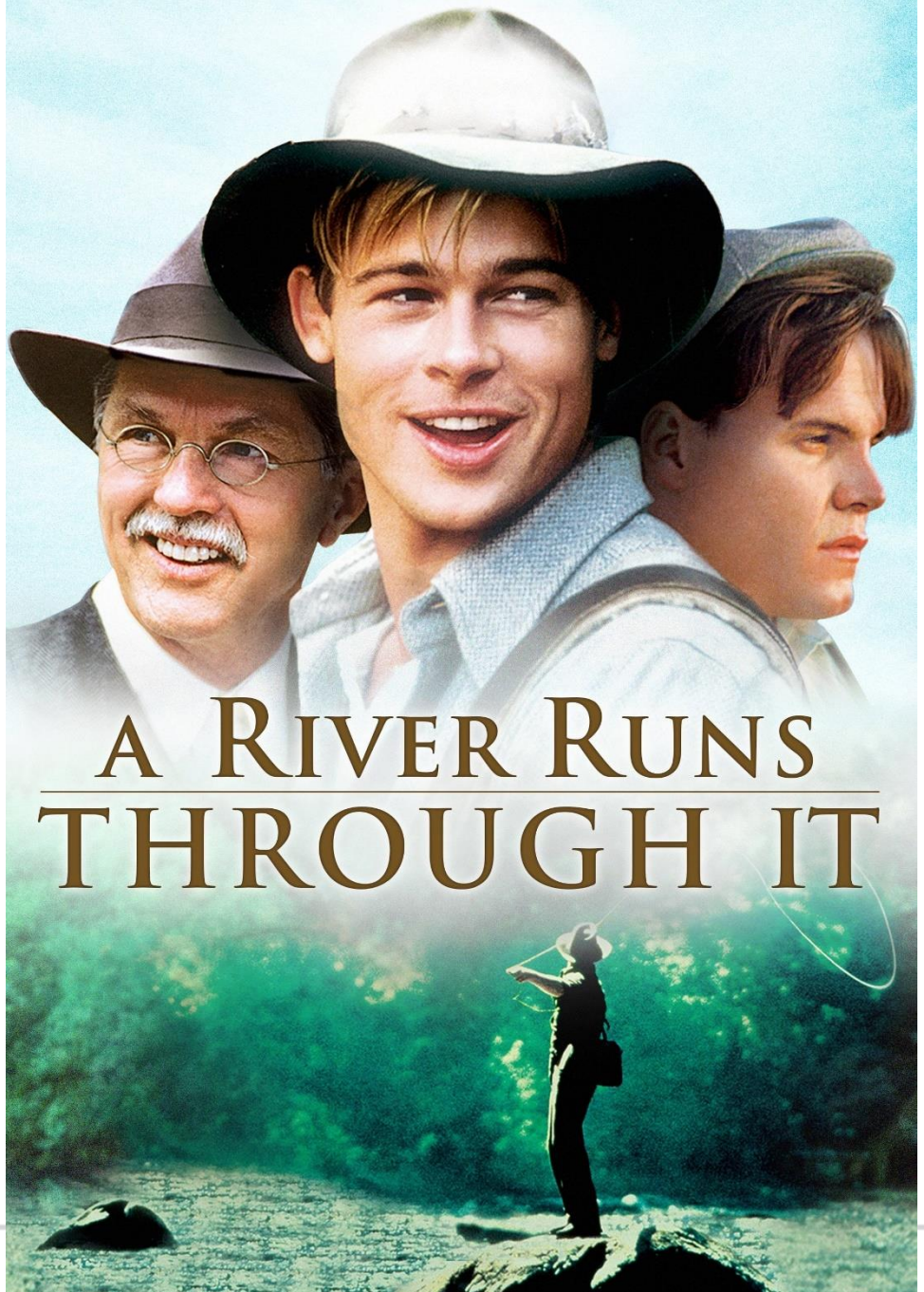
Nothing perfect lasts forever.
Except in our memories.

A RIVER RUNS THROUGH IT

The story of an American family.



COLUMBIA PICTURES PRESENTS
A FILM BY ROBERT REDFORD "A RIVER RUNS THROUGH IT" CHARLES SHEPHERD BRAD PITT TIM SISKETT BRUNO BLYTHON AND EMILY LYONS
DIRECTOR OF PHOTOGRAPHY ROBERT POLLACK COSTUME DESIGNER KATHY O'BRIEN EXECUTIVE PRODUCERS MARK ISHAM PRODUCED BY ANNOCK SMITH WILLIAM KUTTRIDGE AND BARBARA MURPHY
EDITED BY LYNZEE KLINGMAN MUSIC BY JOHN HUTMAN EXECUTIVE PRODUCERS PHILIPPE BOUASSERIE EXECUTIVE PRODUCERS JAMES EDDY EXECUTIVE PRODUCERS NORMAN MACLEAN
EXECUTIVE PRODUCERS RICHARD FRIEDENBERG EXECUTIVE PRODUCERS ROBERT REDFORD EXECUTIVE PRODUCERS PATRICK MARKEY EXECUTIVE PRODUCERS ROBERT REDFORD
COLUMBIA PICTURES J.



A RIVER RUNS THROUGH IT

1992 Film starring
Brad Pitt



Map label	Owner / Authorization Holder	Type	Regulator	Location	Side of river	AEP File #
1	Town of Devon	M	AEP	SE 2-51-26-4	S	8355
2	Devon Golf & CC	C	AEP	SW 1-51-26-4	S	237460
3	Windermere Golf	C	AEP	SW 29-51-25-W4	S	18196
4	EL Smith EPCOR	M	AEP	SE 9-52-25-4	N	219
5	Cedar Creek Energy Ltd	I	AER	NE 9-52-25-4	N	9581
6	Hawrelak Park	O	AEP	NE 25-52-25-4	S	12485
7	Mayfair Golf	C	AEP	NE 36-52-25-4	S	2805
8	U of A	O	AEP	SE 31-52-24-4	S	11990
9	Rossdale EPCOR	M	AEP	SW 32-52-24-4	N	219, 27455
10	Highlands Golf	C	AEP	SW 11-53-24-4	N	15262
11	Imperial Oil Resources Ltd.	I	AEP	NW 6-53-23-4	S	8109
12	Suncor Energy Inc.	I	AEP	NE 7-53-23-4	S	8806
13	ECO-Industrial Business Park Inc	I	AEP	NW 17-53-23-4	S	9024
14	Capital Power Clover Bar	C	AEP	SW 20-53-23-4	S	12258
15	Legends Golf	C	AEP	NE 34-53-23-4	S	26435
16	Riverbend Gardens	C	AEP	SW 14-54-23-4	N	21122
17	Pembina NGL Corp	I	AER	NW 6-56-21-4	N	16821
			AER			355027
18	707176 Alberta Ltd	I	AEP	SE 9-55-22-4	S	27639
19	Dow Chemical Canada ULC	I	AEP	NE 10-55-22-4	S	16434
20	Shell Scotford	I	Both	SE/NW 6-56-21-4	S	14675
21	Agrium Inc.	I	AEP	NE 17-56-21-4	N	12290
22	ATCO (AESL)	I	Both	NE 8-56-21-4	S	20375
23	SIL Industrial Minerals	C	AEP	SW 9-57-20-4	S	36957
24	Village of Waskatenau	M	AEP	NE 32-58-19-4	N	11661
25	Plains Midstream Canada ULC	I	AER	SW 23-55-22-4	S	15813

Table 4-3: AIH DIZ Diversion Licenses

Intake No.	Entity	Allocation (m ³ /year)	2020 Use (m ³ /year)	Ave 10-Yr Use (m ³ /year)	Ave Div. Rate (m ³ /hr)
1	707176 Alberta Ltd.	9,777,020	6,359,096	6,335,331	723
	Agrium	3,808,630	4,190,526	3,952,007	451
	Sherritt	5,154,300	2,168,570	2,383,324	272
	Chemtrade	789,420	*	*	*
2	Dow Chemical	24,949,948	6,272,528	6,602,008	754
	Dow	21,493,390	5,387,284	5,545,506	633
	Keyera	995,420	493,946	516,137	59
	Linde	1,433,658	391,298	519,421	59
	Pembina Marketing	1,027,480	*	20,945	2
3	Plains Midstream	2,146,260	40,630	438,762	50
4	Shell Scotford	28,013,320	13,642,012	13,642,012	1,557
5	Pembina NGL Corp.	2,496,750	479,956	985,389	112
6	AESL	17,683,500	3,801,759	3,010,543	344
	AESL / ATCO	3,700,440	340,854	492,740	56
	Value Creation	3,703,200	6,578	*	*
	NWR	5,571,360	2,412,733	2,412,733	275
	Air Products	1,445,400	1,048,172	104,817	12
	ATCO Caverns	2,628,000	*	253	*
	InterPipeline	635,100	*	*	*
7	Agrium Inc.	15,646,544	11,182,517	9,713,797	1,109
8	SIL Industrial Minerals	2,386,780	24,522	165,018	19
Totals		103,100,122	41,809,597	40,892,860	4,668

*Denotes zero withdrawal or non-reported withdrawal

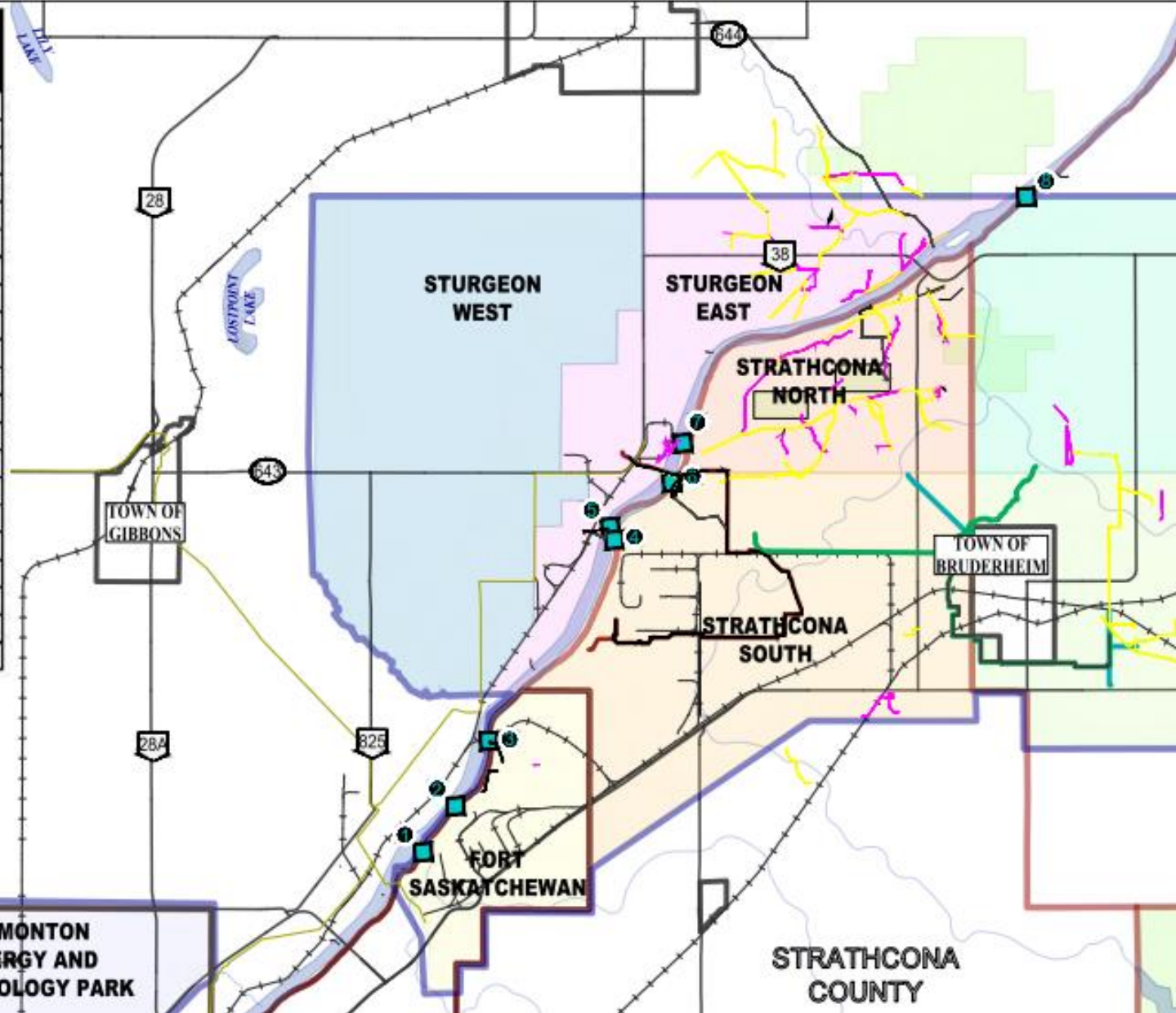
707176 Alberta Ltd.
is Sherritt
International
Corporation

Annual Average flow
of NSR = 241m³/s or
7,605,381,600
m³/year

Total allocation to
straws in region =
1.35% of annual
average flow of NSR

Actual Use = 0.54%

Intake	Entity	Allocation (m3/year)	2020 Use (m3/year)	Ave 10-Yr Use (m3/year)
No. 1	707176 Alberta Ltd	9,777,020	6,359,096	6,335,331
	Agrium	3,808,630	4,190,526	3,952,007
	Sherritt	5,154,300	2,168,570	2,383,324
	Chemtrade	789,420	0	0
No. 2	Dow Chemical	24,949,948	6,272,528	6,602,008
	Dow	21,493,390	5,387,284	5,545,506
	Keyera	995,420	493,946	516,137
	Linde	1,433,658	391,298	519,421
	Pembina Marketing	1,027,480	0	20,945
	Plains Midstream	2,146,260	40,630	438,762
No. 3	Shell Scotford	28,013,320	13,642,012	13,642,012
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NSR Effluent Dischargers (Devon to Pakan)

Devon WWTP

Edmonton EL Smith WTP

Edmonton Rossdale WTP

Edmonton Gold Bar WWTP

Imperial Oil Strathcona Refinery

Alta Steel Edmonton

Suncor Edmonton Refinery

Capital Power (once through cooling water)

Alberta Capital Region WWTP*

Linde Canada Fort Saskatchewan

Dow Canada

Air Liquide Canada Scotford

Shell Scotford

Plains Midstream Canada

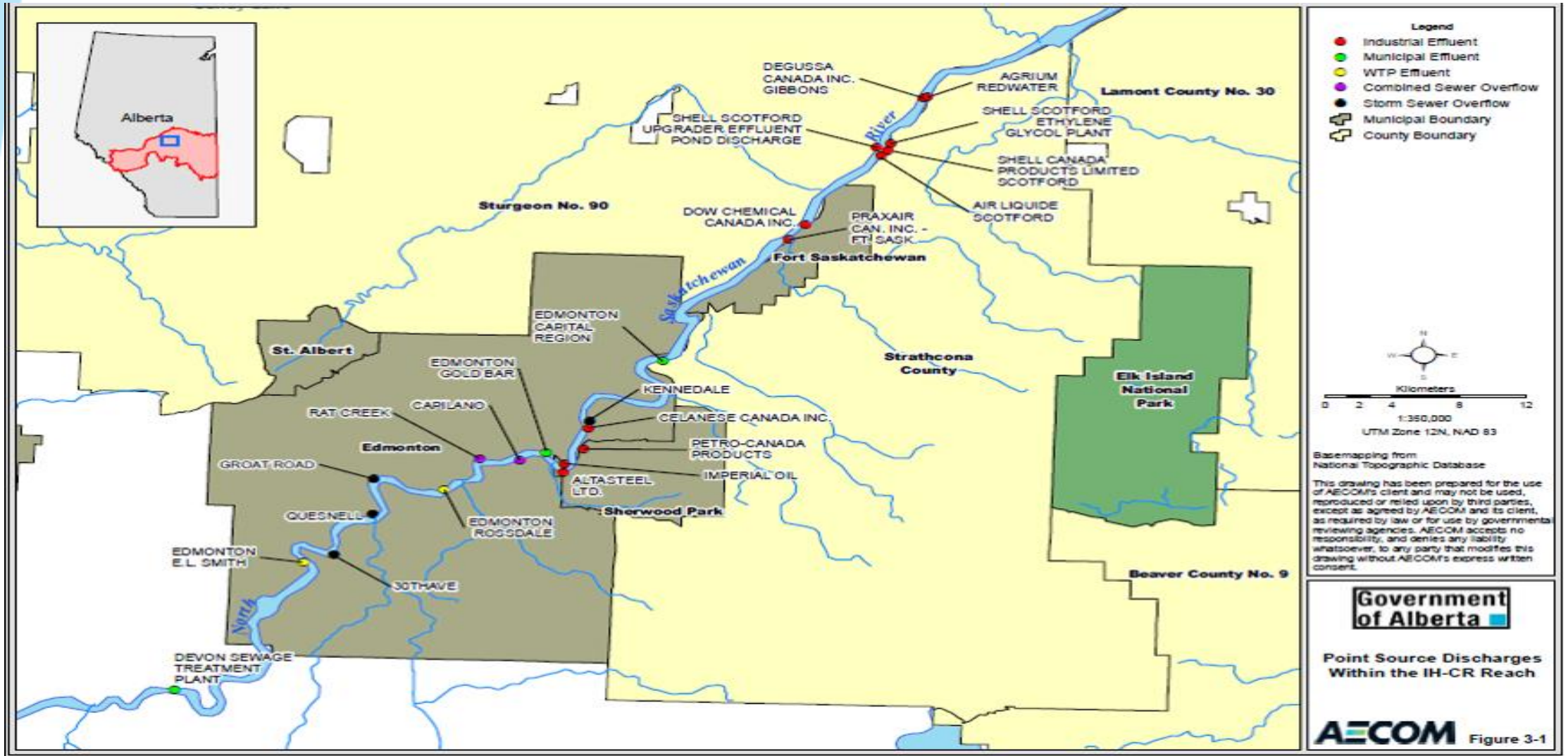
InterPipeline

Nutrien Redwater Fertilizer Operations

*Now called Arrow Utilities



Effluent Dischargers in the Devon to Pakan Reach



Other Effluent not captured in the previous slide

- There are several Storm Water outfalls and Combined Storm and Sewer outfalls (CSOs) within the **City of Edmonton** that discharge into the North Saskatchewan River.
- **Sherritt International Corporation, Nutrien (Fort Nitrogen Operations), Northwest Redwater Partnership Sturgeon Refinery, Evonik** and a portion of the **Nutrien Redwater** site send treated effluent to Arrow Utilities (formerly the Capital Region Water Treatment Plant).

Effluent Characterization Program (ECP)

- As part of the federal CCME requirements, the municipal wastewater treatment plants completed effluent characterization studies in 2013/2014.
- In 2016/2017 an ECP for industrial effluents discharged into the North Saskatchewan River was completed.
- 300 parameters were included in this monitoring program for 4 samples representing the key flow periods (seasons) of the river.



What we learned from the ECP work

- WWTPs account for about 65% of the effluent entering the North Saskatchewan River.
- Storm water outfalls account for about 27%.
- Industry accounts for about 6%.
- WTPs about 2%.

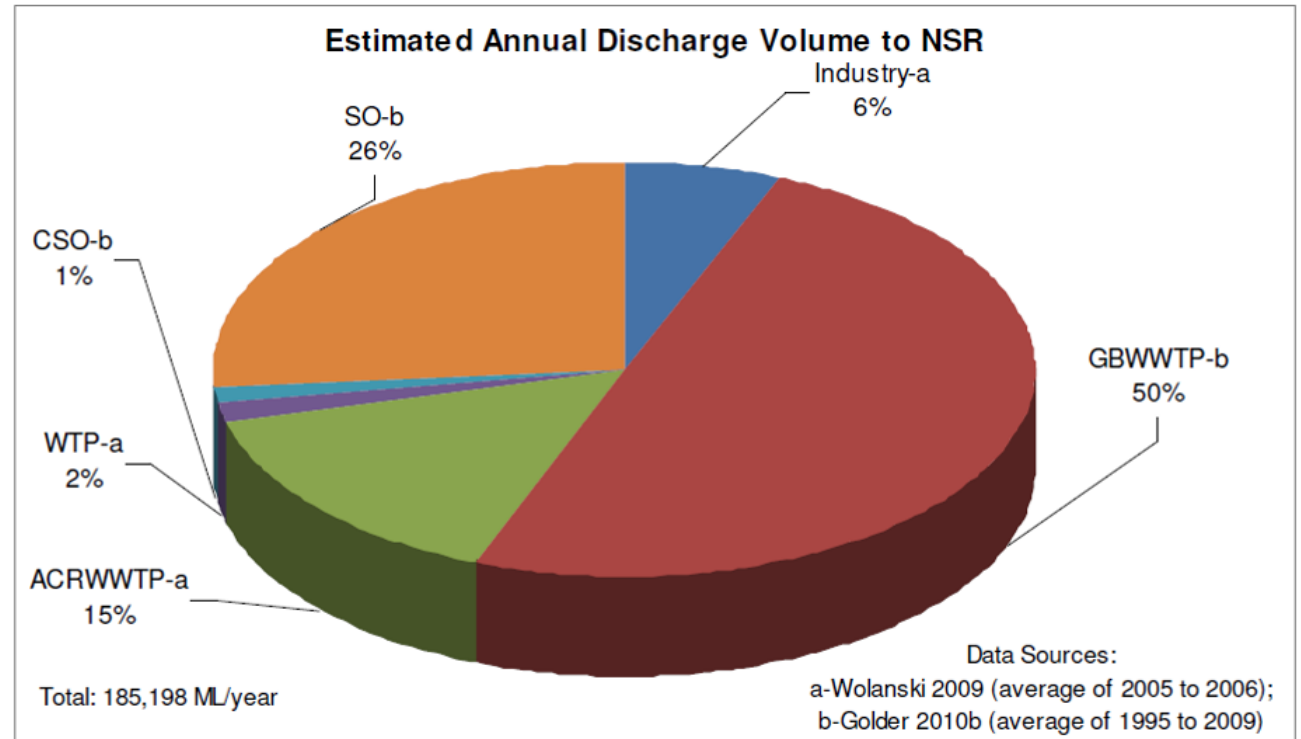


Figure 3-2. Estimated Annual Total Volume Discharged to the NSR in the IH-CR Water Management Region¹

What we learned

90% of the nutrient loading to the North Saskatchewan River comes from the two WWTPs.

Although the average daily loads contributed by municipal discharges have declined substantially since 2005, municipal wastewater treatment plants remain the largest sources of inorganic nitrogen (ammonia and nitrate) to the NSR.

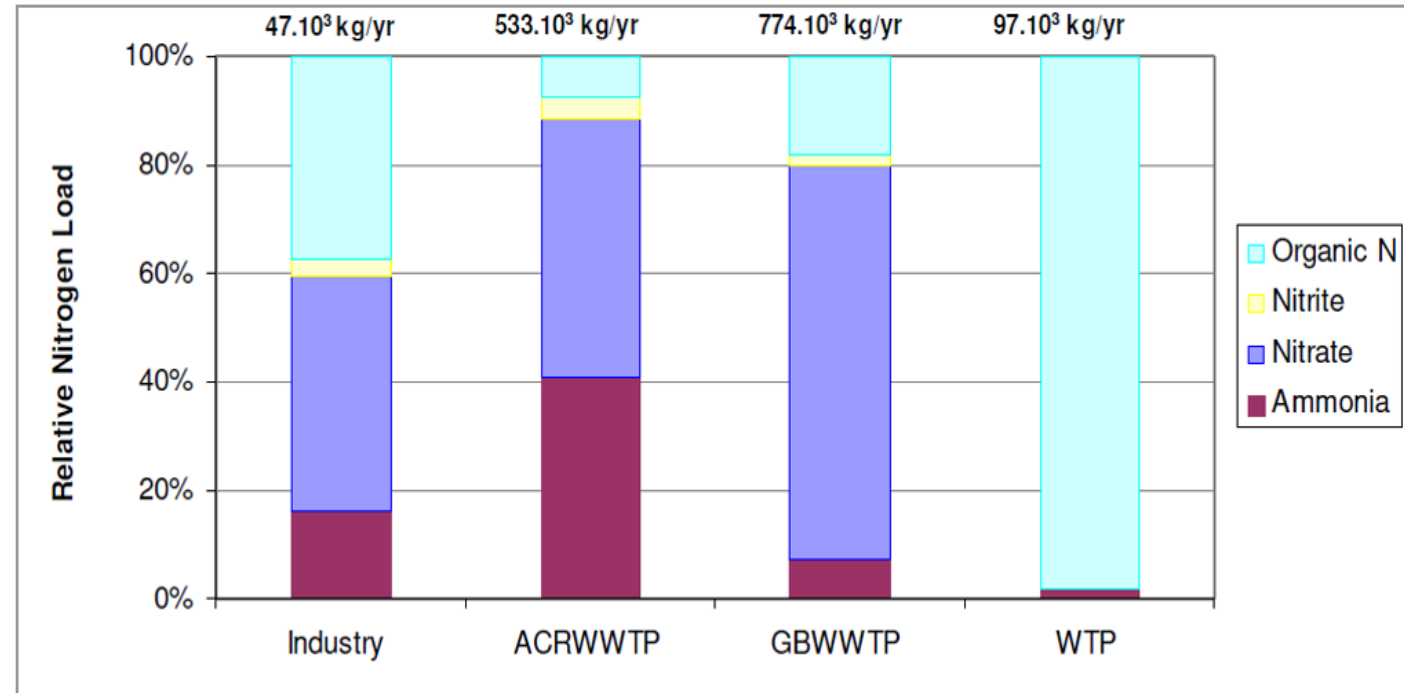


Figure 3-8. Relative Contribution of Ammonia and Nitrate from Industry and Municipalities (WWTP, WTP)

What we learned

- 75% of the Phosphorous loading to the North Saskatchewan River comes from the WWTPs and the WTP.
- 25% comes from industrial effluent.

- *Despite major reductions in the total phosphorus load from WWTP over the years, WWTP remain the largest sources of phosphorus in the IH-CR.*
- *Most of the phosphorus supplied by WWTP and industries is in dissolved form.*
- *Large headwater tributaries are also important contributors of total phosphorus, most of which is in particulate form, contributed primarily in the spring and in high run-off events.*

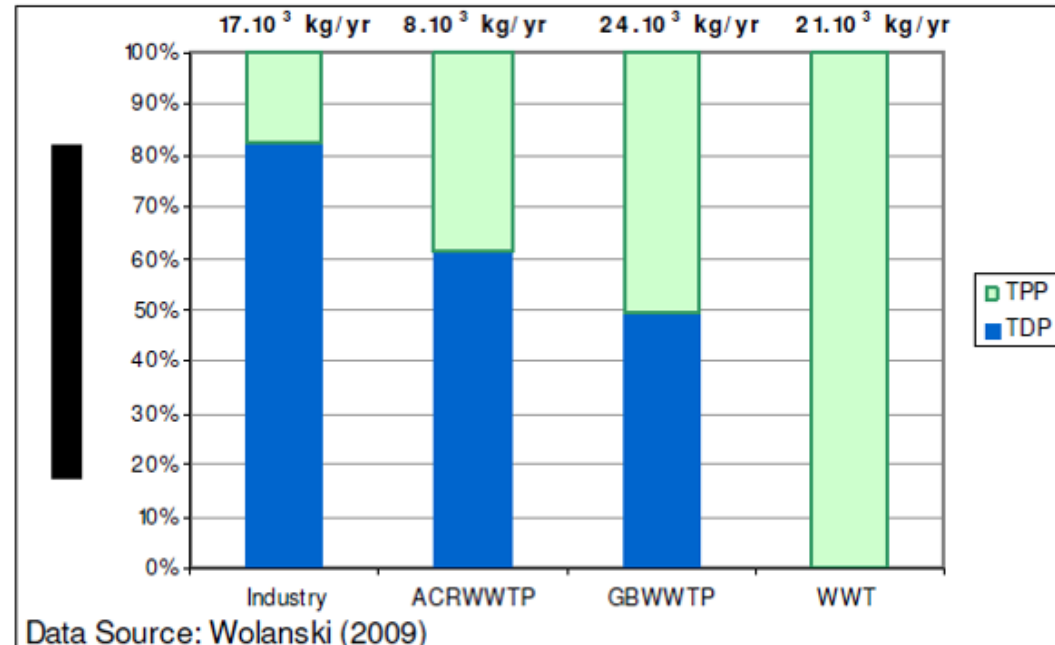


Figure 3-12. Relative Contribution of Phosphorus from Industry and Municipalities (WWTP, WTP)

That led to ECP Round 2.0

- A more targeted round of effluent characterizations began in March of 2020 and was completed in January of 2022.
- Twice monthly samples were analyzed for 40 parameters of concern that were identified in the earlier screening (300 parameters of concern measured for 4 seasonal samples).
- Both Industry and Municipal dischargers participated in ECP Round 2.0.
- Complete results were provided to Alberta Environment and Protected Areas in January 2022.



2007



**the water
management
framework**

FOR THE INDUSTRIAL HEARTLAND
AND CAPITAL REGION



Vision

A world-class integrated water management system within the North Saskatchewan River to sustainably support the environment, and social and economic development.

Reporting Requirements

Through the operating approval process, industry and municipalities are required to monitor several things, including their effluent discharges.

Alberta Compulsory Industry Monitoring

Alberta Environment and Parks regulates a wide range of industrial facilities in the province under our mandated legislation. This is most commonly done through conditions set out in approvals, codes of practice. Approvals and codes of practice are designed to ensure the environment is protected from a facility's operations. The approval sets out conditions for a facility's operations, including the type of monitoring the facility must conduct.

Compulsory monitoring is consistent with the "polluter pays" principle. The objective is to obtain reliable data on the environmental performance and impacts of industrial operations. Compliance inspections conducted by the department ensure that monitoring is conducted in accordance with approval or code requirements.

Purpose of Monitoring

Compulsory industry monitoring serves a number of purposes for both industry and the government, including:

- Ensuring that pollution control technologies are operating effectively
- Providing an early warning system for potential contamination issues
- Characterizing complex emissions to determine potential environmental impacts
- Providing information for provincial and national emission inventories that are used in environmental management
- Assessing the impact of releases on the environment
- Providing data for tracking trends in environmental performance and effects

Compulsory monitoring provides essential information on the environmental performance and impact of industrial operations.

Types of Monitoring

Compulsory industry monitoring can cover a wide range of environmental issues depending on the

nature and complexity of the particular industrial operation.

For example, approvals for large industrial operations may include the following types of monitoring:

- Air emissions
- Wastewater and potentially contaminated stormwater releases
- Groundwater
- Soil
- Treated sewage releases
- Drinking water
- Hazardous wastes
- Ambient air and water quality

The intent is to require monitoring of all emission sources and components of the environment that could be impacted.

Specific Monitoring Requirements

Monitoring requirements are tailored for each industrial operation based on the types and quantities of emissions. Therefore, monitoring requirements vary within industry sectors. Monitoring requirements specifically outlined in approvals and codes of practice specify:

- Monitoring or sampling locations
- Frequency of monitoring or sampling, e.g. continuous, three times per week, etc.
- Type of sample, e.g. online, composite
- Parameters to be measured
- Monitoring method(s)
- Analytical method(s)
- Data recording, record keeping and reporting (note: any measured exceedance of a performance limit must be reported immediately)

In general, the larger the emission source or the greater the potential for environmental impact, the more frequent and detailed the compulsory monitoring requirements will be.

Spills and Releases

Those same approvals require reporting spills and releases that exceed approval limits or other Alberta and Federal guidelines.



The *Environmental Protection and Enhancement Act (EPEA)* requires any release of substances that could cause an adverse effect to the environment be reported to Alberta Environment and Parks.

The *Release Reporting Regulation* sets out what must be reported, when, how and to whom reports must be made. Individual approvals and codes of practice may also have requirements for reporting contraventions of the terms and conditions of the approval or code of practice, monitoring results and sampling programs.

When to Report

Releases of a substance into the environment that may cause, is causing or has caused an adverse effect must be reported to Alberta Environment and Parks. An adverse effect is impairment of, or damage to, the environment, human health or safety, or property.

Who Must Report

The person who releases, causes or permits the release, or has control of the substance released, is responsible for reporting.

Prompt reporting helps to ensure adverse impacts are addressed properly and minimized if possible, and directly affected parties are notified.

How to Report

Releases must be reported to Alberta Environment and Parks at the first available opportunity as soon as the person responsible knows or should know about the release.

- Reports must be made by calling 1-800-222-8514

Electronic reporting may also be available. For further information please contact your regional Alberta Environment and Parks office.

When reporting, please provide:

- The location and time of the release;
- A description of the circumstances leading to the release;
- The type and quantity of substance released;
- The details of any action proposed or taken at the release site; and
- A description of the immediate surrounding area.

A reference number will be issued to confirm that the report was made.

Written Report

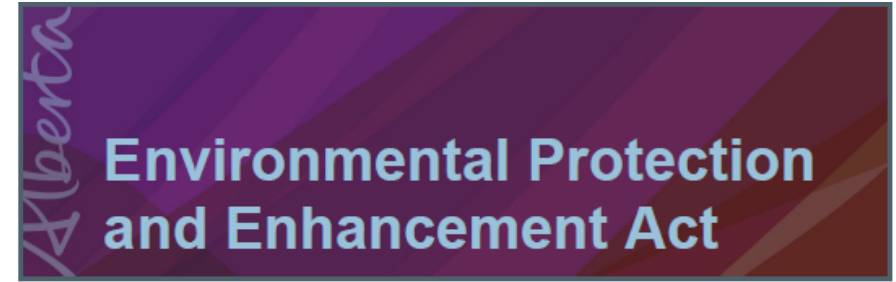
A written report must be submitted to the appropriate Alberta Environment and Parks Director within seven days after the immediate report.

Written reports must include:

- The date and time of the release;
- The location of the release;
- The duration of the release and the release rate;
- The concentration, total weight, quantity or amount released;
- A detailed description of the circumstances leading to the release;
- The steps or procedures which were taken to minimize, control or stop the release;
- The steps or procedures which will be taken to prevent similar releases in the future; and
- Any other information required by the Director.

Environmental Protection and Enhancement Act

All these mandatory monitoring and reporting requirements stem from the Alberta Environmental Protection and Enhancement Act and the Federal Transportation of Dangerous Goods Act.



The *Environmental Protection and Enhancement Act*, proclaimed in 1993, supports and promotes the protection, enhancement and wise use of Alberta's environment.

The Act is built on several key principles, including:

- Recognition of the role a high quality environment plays in the integrity of ecosystems, human health and the wellbeing of society;
- Environmental responsibility that ensures economic growth today does not harm the environment for future generations;
- Shared responsibility for all Albertans to ensure the protection and wise use of the environment through individual actions;
- Government leadership in research, technology and standard development; and
- Polluter responsibility for their actions.

Standards and Guidelines

The *Environmental Protection and Enhancement Act* allows Alberta Environment and Parks to develop regulations, standards, guidelines and ambient objectives to protect Alberta's air, land and water.

Involving Albertans

A cornerstone of the Act is public involvement in decisions affecting the environment.

Public involvement ranges from participation in environmental assessment and approval processes to the right to appeal certain department decisions to the Environmental Appeals Board.

Reviews, Approvals and Registrations

Alberta's environmental assessment process ensures environmental protection is considered in the early stages of planning. This process helps predict potential environmental consequences of

an activity and minimize any adverse impacts before they occur.

The department regulates a wide range of activities under the Act through conditions set out in regulations, approvals and codes of practice.

Conditions detail specific construction, operating and reclamation requirements that activities must meet, such as emission limits, and the type of monitoring and reporting required.

Reporting Releases

Anyone who releases a substance into the environment that could cause environmental harm is required to immediately report the release to Alberta Environment and Parks by phoning 1-800-222-6514 or by visiting a department office.

Immediate reporting allows Alberta Environment and Parks, and local first response teams, to respond quickly and provide advice on clean up and containment.

Compliance Assurance

Alberta Environment and Parks uses a balance of education, prevention and enforcement to ensure compliance with the *Environmental Protection and Enhancement Act*.

Regular inspections and monitoring ensure activities comply with environmental standards and conditions set out in regulations, approvals and codes of practice during and after operation.

Every suspected violation that comes to the attention of our department is assessed and responded to in an appropriate and timely manner.

Various education, prevention and enforcement tools are available under the Act, including administrative penalties, enforcement orders, environmental protection orders and prosecutions.



IH-DIZ Water Management

Industrial Heartland Designated Industrial Zone

Water Quality Management Program



OCTOBER 2022

Alberta

Water Quality Management Program

The Industrial Heartland Designated Industrial Zone (IH-DIZ) Water Quality Management Program (WQMP) establishes a clear and consistent wastewater and runoff management approach in the IH-DIZ.

Any changes will first be vetted through the DIZ Operational Committee (avoids unilateral changes by the regulator)

Industrial Heartland Designated Industrial Zone

Surface water supply and distribution
operational guidance



Surface Water Supply and Distribution Operational Guideline

This document provides guidance for applicants of new water intake works on the North Saskatchewan River to support developments in the Industrial Heartland Designated Industrial Zone.

AIHA is working with the government on getting 3 proposed new water intakes regulatory ready.

Industrial Heartland Designated Industrial Zone

Regulatory process description for the authorization of new water intake works on the North Saskatchewan River



SEPTEMBER 2022

Alberta

Regulatory Process Description for the Authorization of New Water Intake Works on the North Saskatchewan River

Describes the regulatory process for applicants looking to construct new water intake works on the North Saskatchewan River for industrial developments in the Industrial Heartland Designated Industrial Zone.

Identifies the provincial and federal regulatory and Indigenous consultation processes and information requirements for new water intake works.

Ten-Year Plan

Load Management

- water quality management

Maximum Allowable Loads

- acceptable loading levels and seasonality
- upstream conditions

Effluent Characterization Program

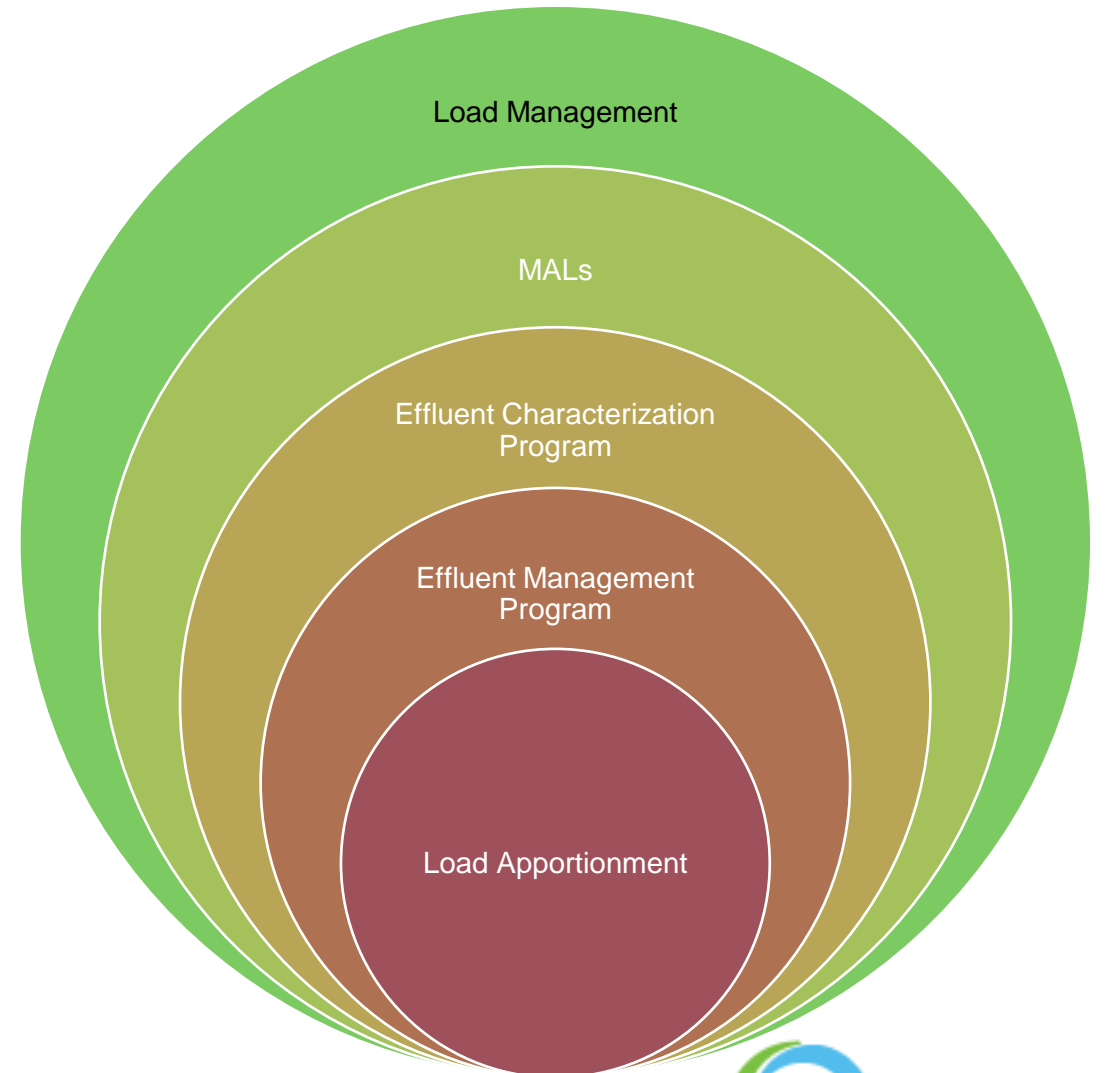
- sector management

Effluent Management Plan

- facility management

Load Apportionment

- parameter limits in facility approvals



Industry Working Together

- Shared infrastructure (reduces the number of straws in the river).
- Sending industrial effluent to WWTPs to provide additional treatment and reduce the ultimate footprint on the river.
- Increasing reuse of water on industrial sites.
- Management of storm water on sites prior to discharge to the North Saskatchewan River.



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 [Northeast Capital Industrial Association](https://www.linkedin.com/company/northeast-capital-industrial-association)

