

Oil Sands Mining Cooperation to Meet the Athabasca River Water Management Framework.

CAPP Environmental Forum

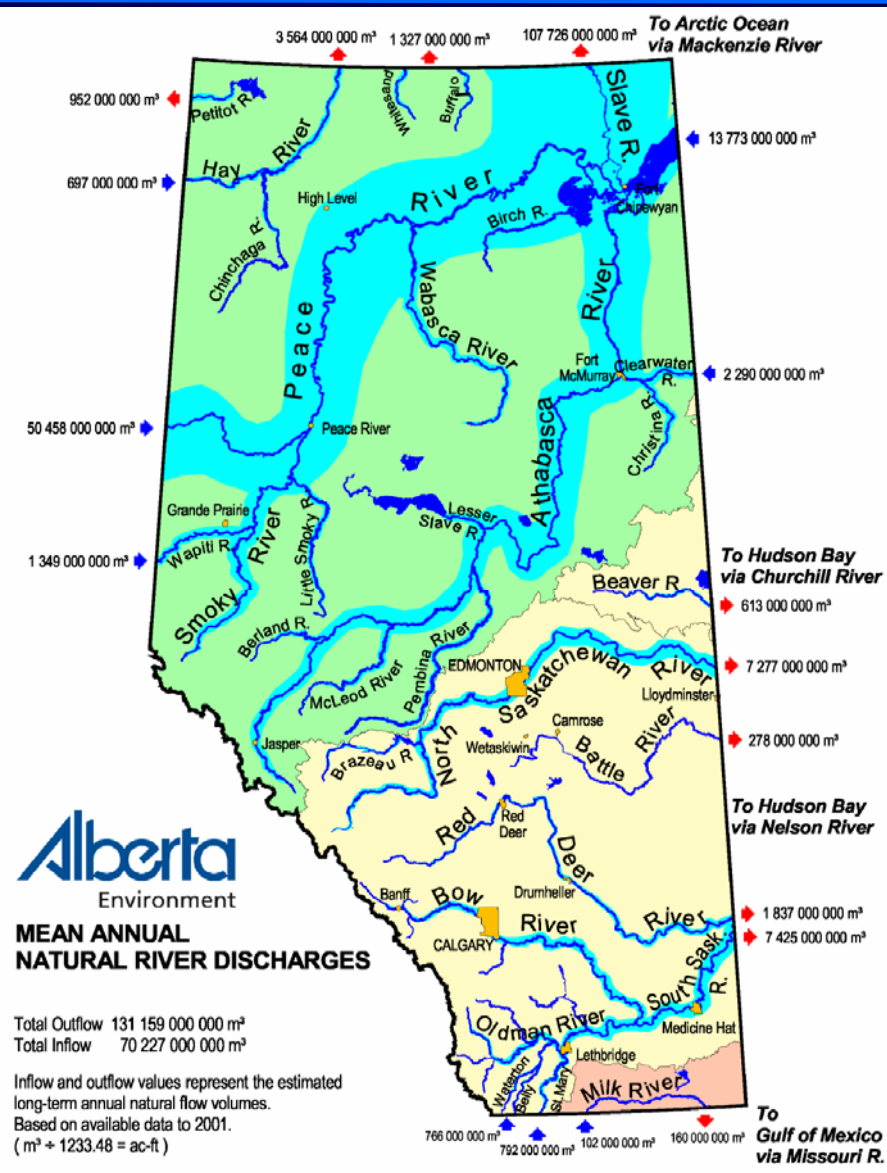
Jan 21, 2008

Stuart Lunn, Ph.D. P.Eng

Presentation topics

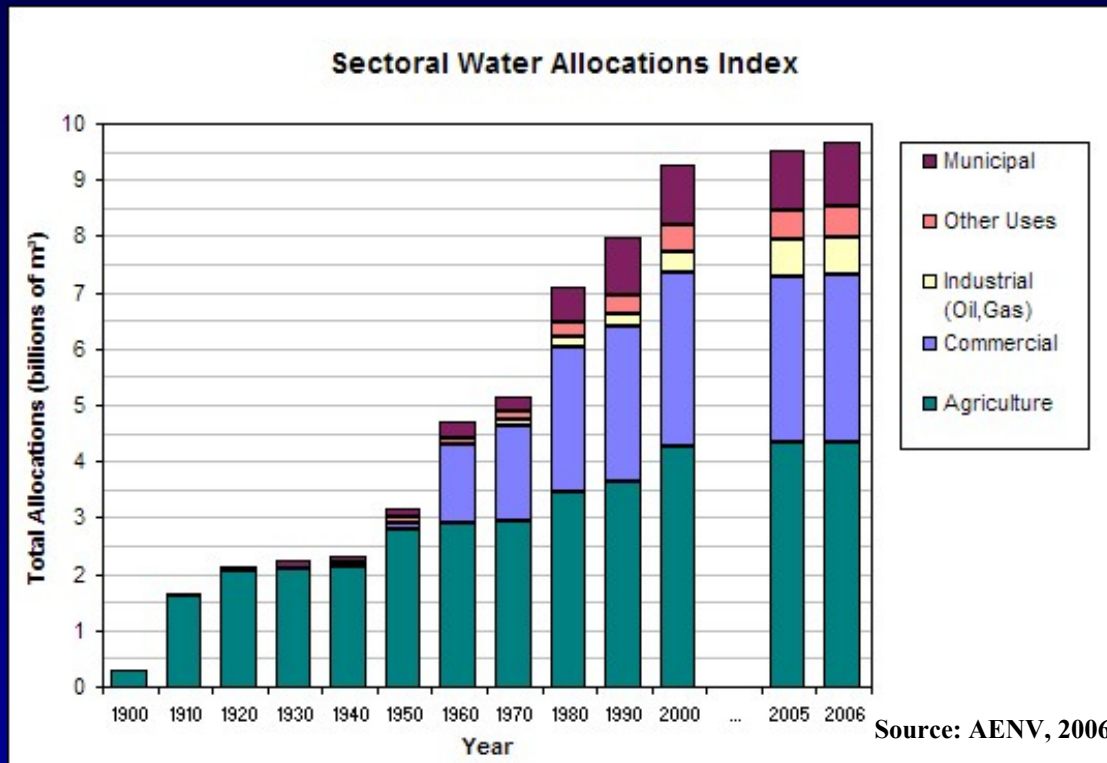
- Perspective
 - The distribution and use of water in Alberta
 - The Athabasca River
- The Water Management Framework for the Athabasca River
 - Weekly cumulative caps on water withdrawals
 - Comparison to licensed oil sands water use
- Oil Sands Industry Cooperation
 - Implementation plan to meet the Framework
 - Water requirements and forecast (2007-2030)
 - Perspective on requirements to meet the Framework

Perspective: Water availability in Alberta



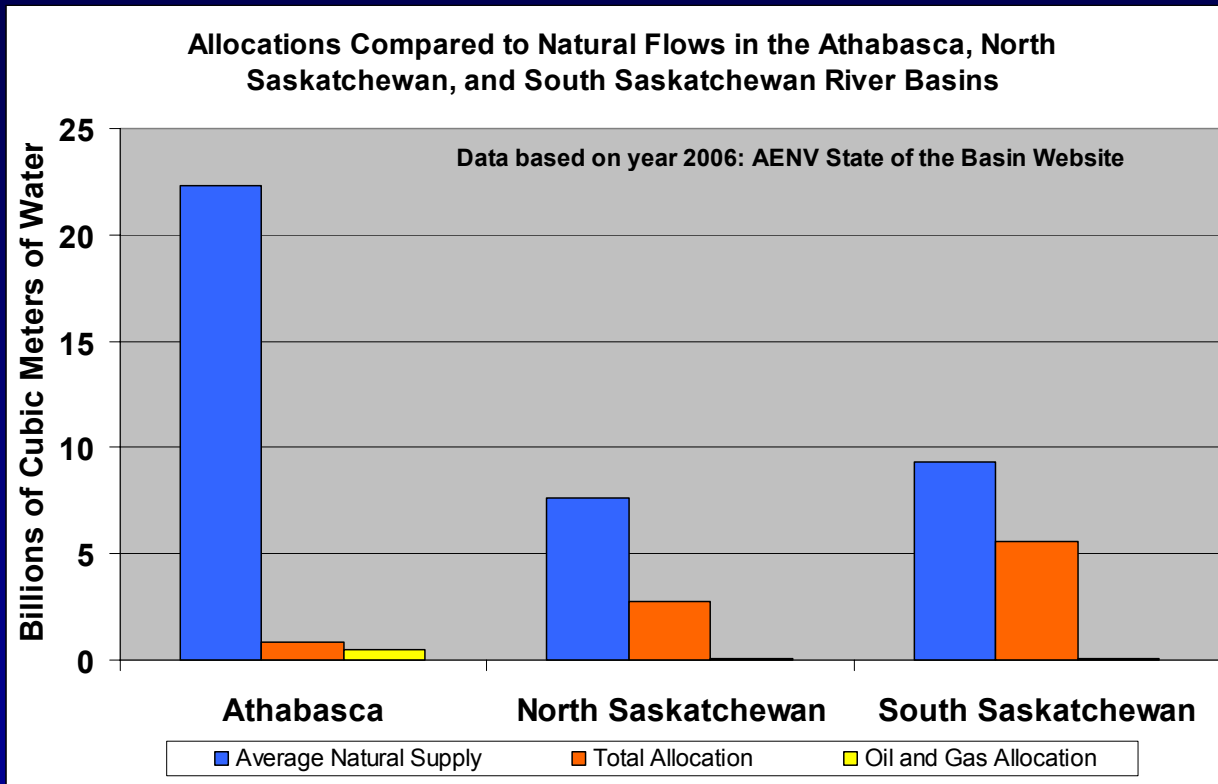
- 131 billion m³ of water flows out of AB each year
- 85% of the water flows north
- The Athabasca River represents 17% of Alberta's supply (23 billion m³)
- All the river basins summed together south of the Athabasca River account for 15% of Alberta's water supply
- 88% of water allocation is from these southern river basins

Perspective: Provincial water use in Alberta



- Alberta's annual allocation is currently 9.6 billion m³/year
 - The oil and gas industry accounts for about 7% of the allocation
 - Most of this is in the Athabasca Basin (70%)
 - Small volumes of water are used by the oil and gas industry in southern basins
-
- Criticism of the oil sands use of water often fails to recognize that the use is in the northern basins where water supply is plentiful and water use is a small percentage of natural supply

Perspective: Water use from Alberta river basins



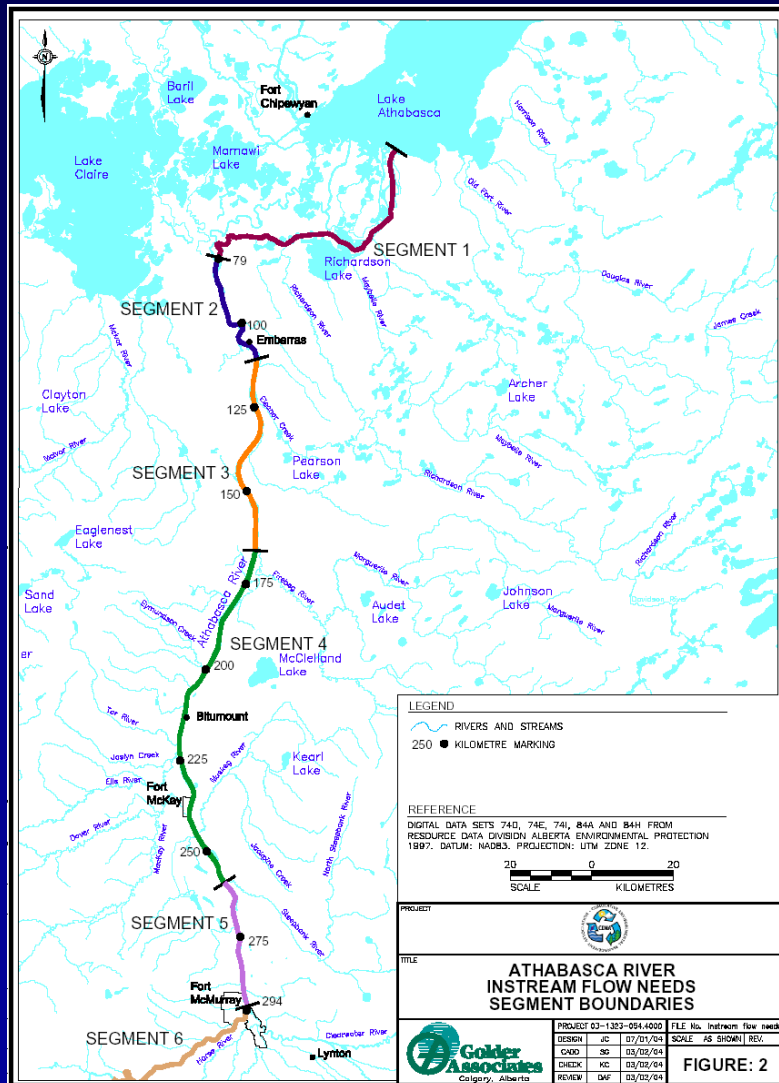
- The total amount of water allocated to the oil and gas sector for the Athabasca River is 2.2% of natural flow
- Note that actual water use is less than allocation

- Concerns and water shortages in central and southern Alberta have led to misperceptions about water supply from the Athabasca
- Including forecast growth of the oil sands industry, the Athabasca River remains a lesser utilized river basin

So why is there so much concern about water use from the Athabasca River?

- The Athabasca is ice covered for 5-6 months per year
- Winter flows are about 10 times lower than open water flows
- Athabasca flows are not regulated by dams
- The oil sands industry is not seasonal
- Concerns about withdrawals during low winter flow weeks
- Withdrawals during low flow periods have been capped (AENV and DFO in the *Water Management Framework: Instream Flow Needs and Water Management System for the Lower Athabasca River, Feb, 2007*)

AENV/DFO Water Management Framework



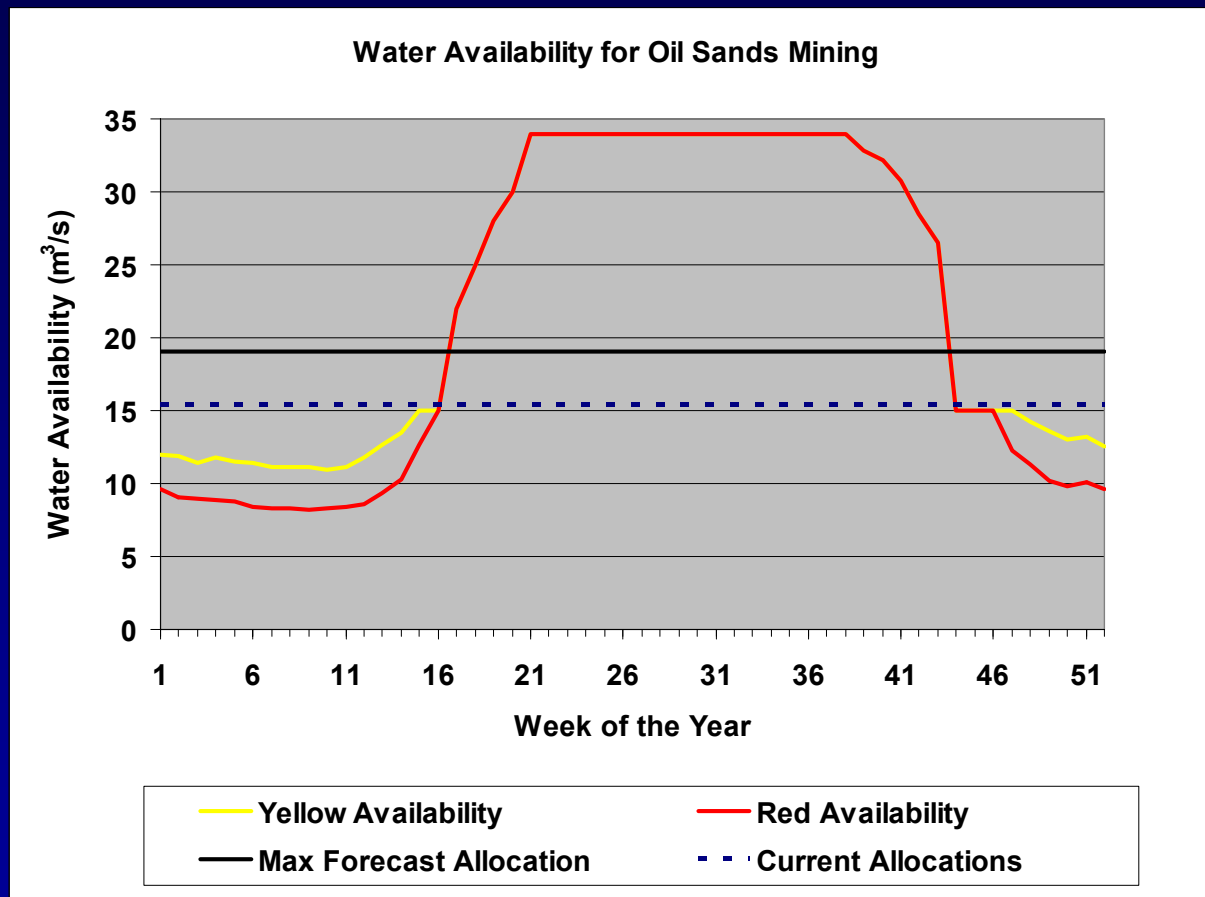
- Released in Feb, 2007
- Applies to the Lower Athabasca River (Grand Rapids to Lake Athabasca)
- Limits water withdrawals during low flow periods
- Framework currently set for reaches 4 and 5
- Will be refined over time with Phase 2 scheduled for implementation in 2011

Framework summary

- Water restrictions under the Phase 1 Framework (until 2011) are set weekly depending on river flow
 - **GREEN Zone:** 15% of actual river flow (variable)
 - **YELLOW Zone:** 10% of historic median weekly flow (fixed)
 - **RED Zone:** 5.2 % of historic median weekly flow (fixed)

For Winter Weeks (October 29 – April 22) water availability for oil sands mining is capped between **8-15 m³/s** during red or yellow flow periods.

Water allocations and projected use exceed caps



Caps on oil sands water withdrawals no longer allow all current or forecast licensed allocations during low winter flow periods

Oil sands mining cooperative efforts

- In January 2007, nine oil sands mining companies submitted an implementation plan to AENV/DFO committing to:
 - Cumulatively meeting the water restrictions in the framework
 - Completing a forecast of water requirements for the oil sands mining industry
 - Cooperate in the development of a detailed operational water management agreement
- This work is being completed by the Athabasca Regional Issues Working Group (RIWG) Environment Committee
- Work on Phase 2 of the Framework is being conducted by CEMA (Cumulative Environmental Management Association)

How will the oil sands companies meet the Framework?

Principles of Jan, 2007 Implementation Plan

- All license holders will steward net instantaneous withdrawals during yellow and red periods to meet the IFN Framework;
- Suncor and Syncrude will steward net instantaneous withdrawals, as necessary, during yellow and red periods to a maximum of rates equal to their average annual allocation rate;
- All other companies will use available water storage, as necessary, to supplement withdrawals for the Athabasca River during red periods to ensure that the Framework targets are met; and,
- Industry will continue to work together on joint programs and initiatives to improve the management and efficiency of water use.

Forecast water requirements for the oil sands mining industry (2007 to 2030)

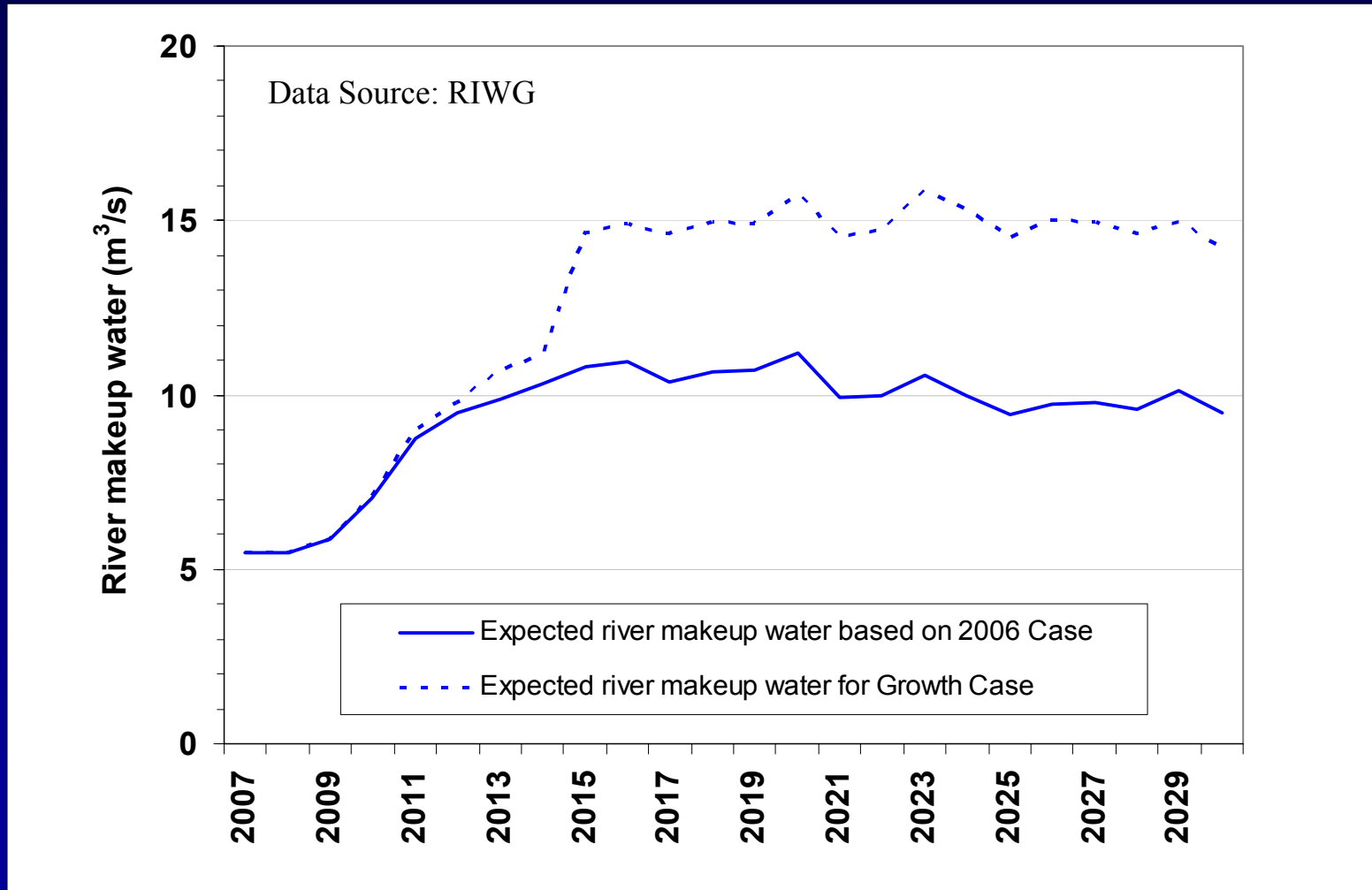
1. 2006 case

- Mines disclosed by year end 2006
- Growth of mining up to 2.5 million barrels per day bitumen

2. Growth case

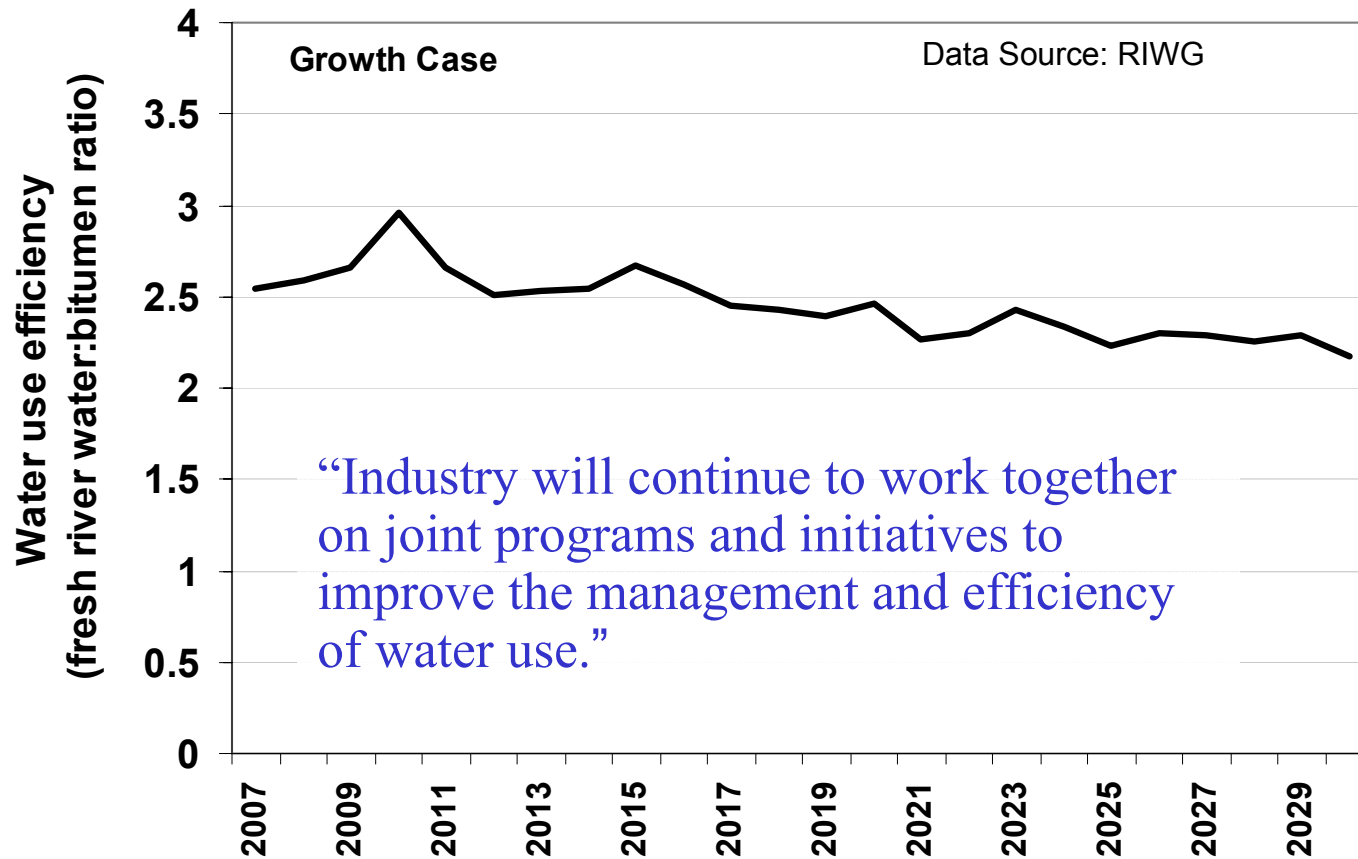
- All future mines including growth and expansion for existing and approved operations

Forecast water requirements for the oil sands mining industry (2007 to 2030)



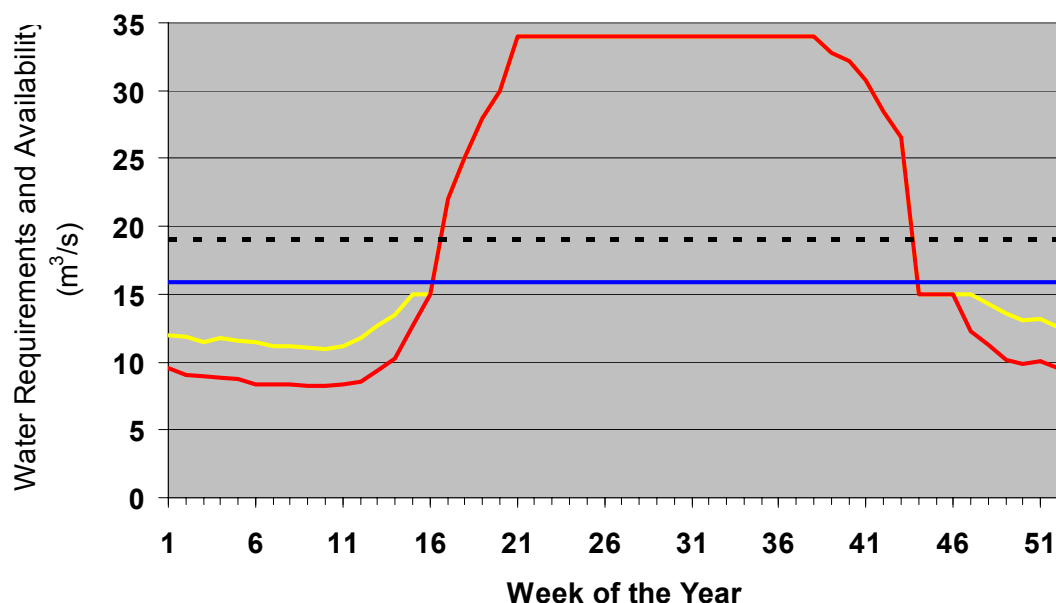
Forecast water use efficiency

Forecast Water Use Efficiency (Production Weighted Average)



Meeting the red and yellow period targets

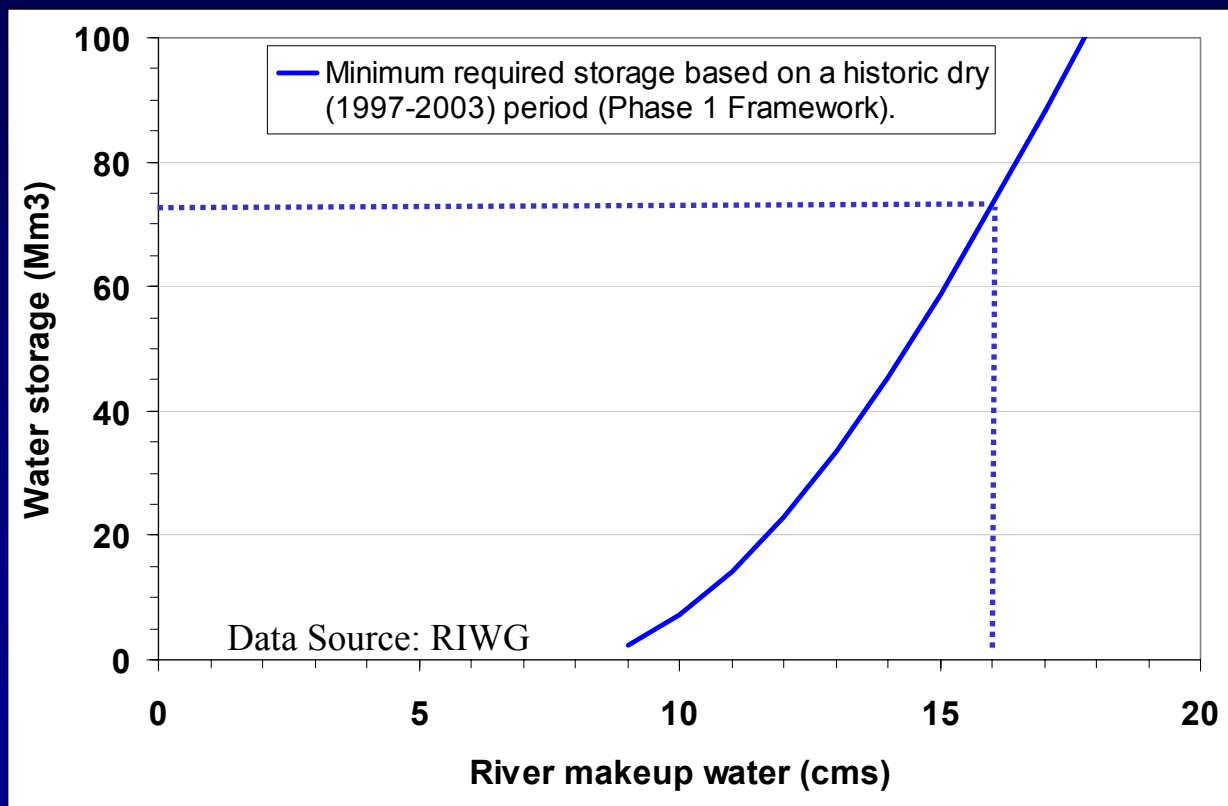
Water Availability under the Phase 1 Framework and Maximum Forecast Requirements (2007-2030) for Oil Sands Mining



— Yellow Availability — Red Availability
- - - Max Forecast Allocation — Max Forecast Water Use

“Companies will use available water storage, as necessary, to supplement withdrawals for the Athabasca River during red periods to ensure that the Framework targets are met;”

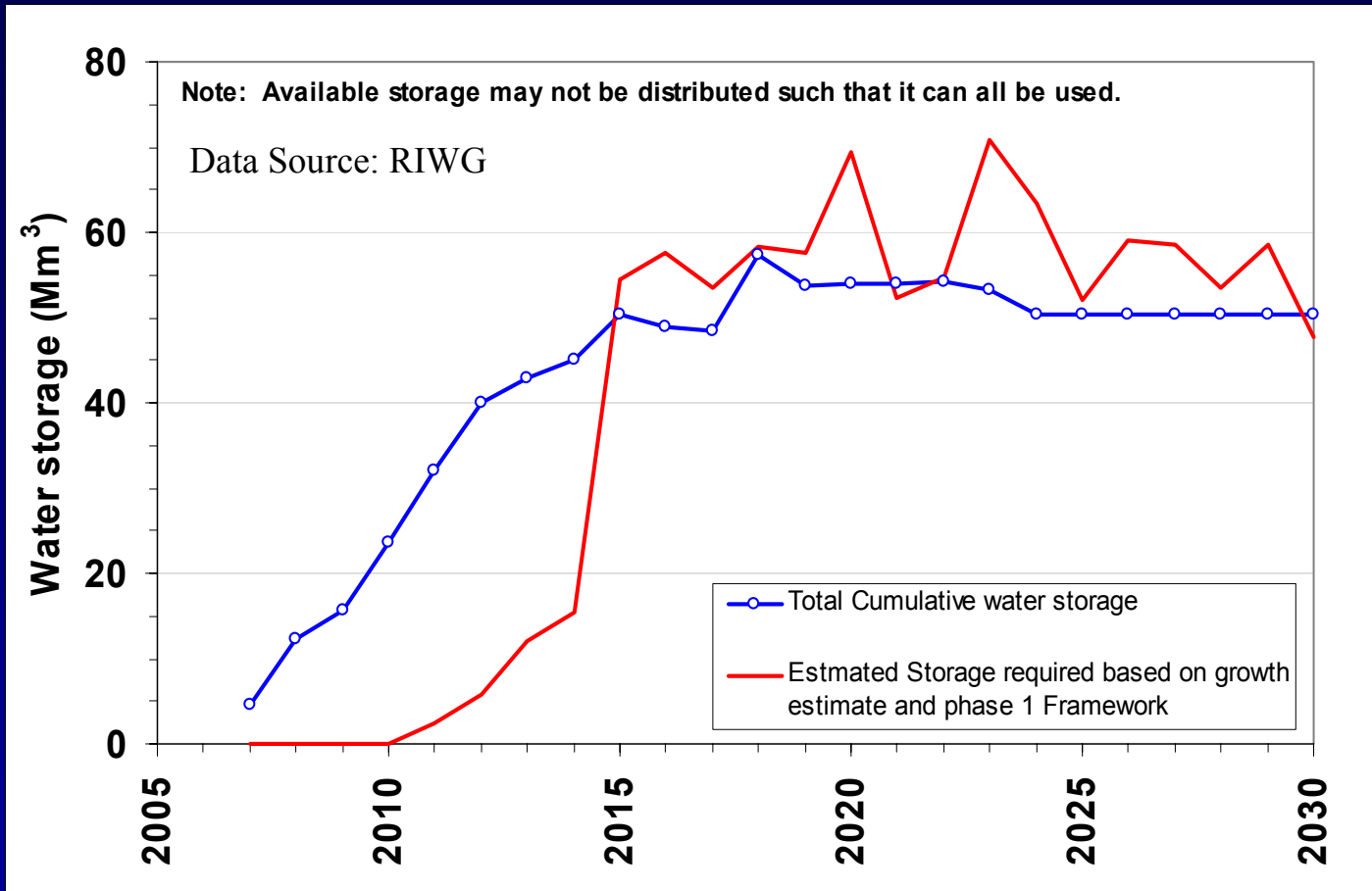
Storage required to meet water demand



- Storage calculated using Phase 1 Framework and a dry period
- Minimum storage requires that the water is accessible to water users

- A water agreement between industry will assist in achieving the most efficient use of storage

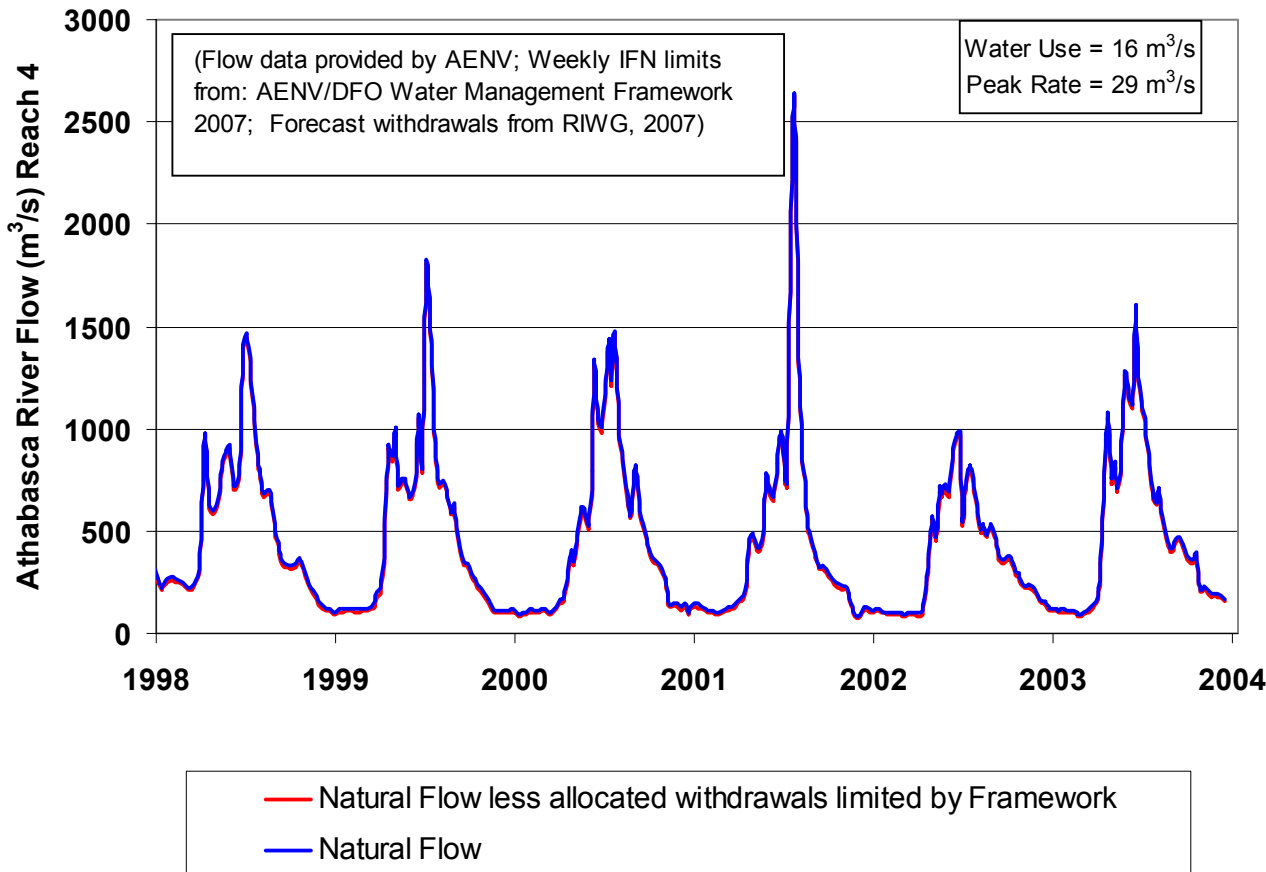
Storage requirement and forecast availability



For perspective, a storage reservoir 1 km by 1 km by 10m deep holds 10 million cubic meters of water.

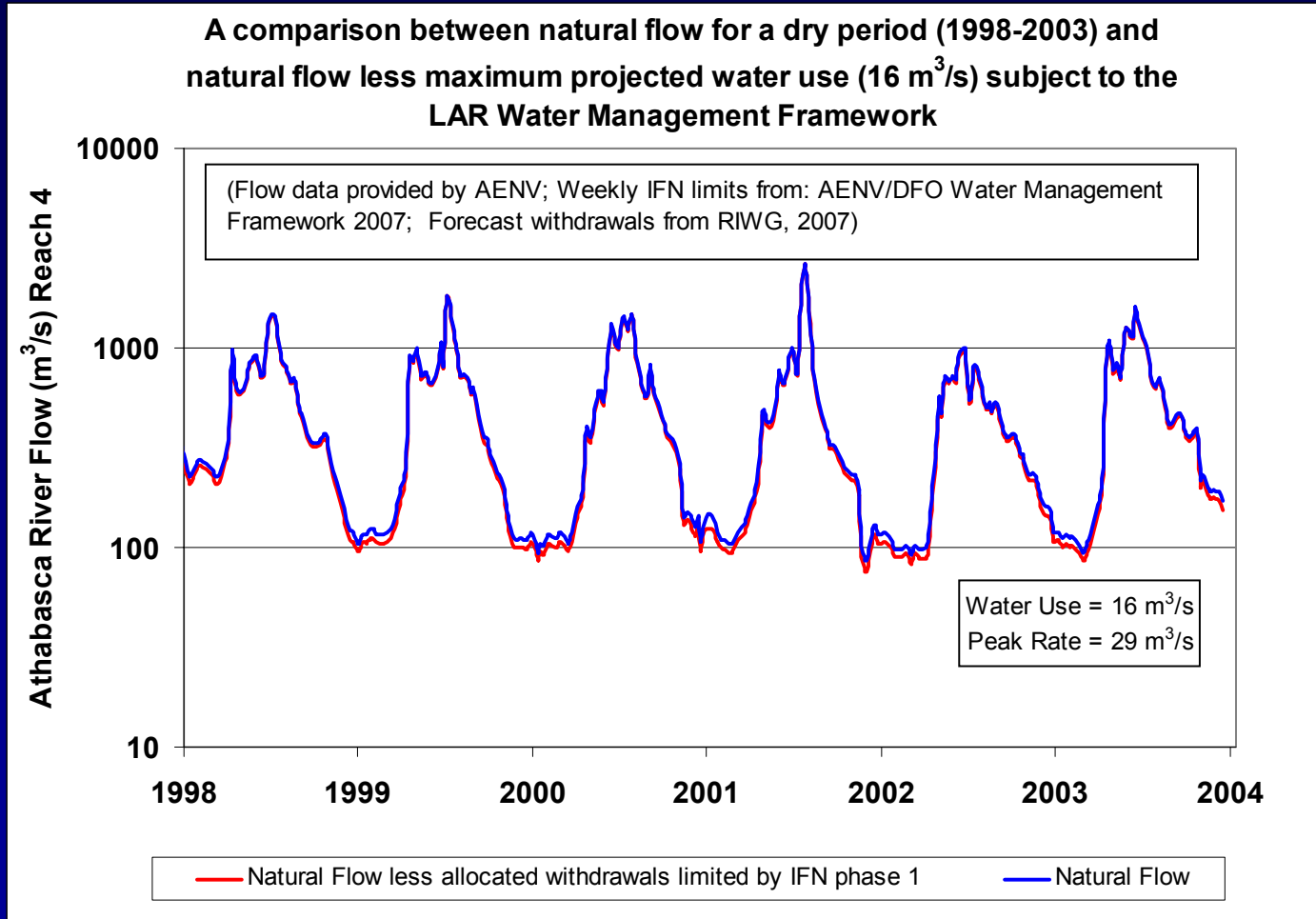
Perspective: How will oil sands mining growth change natural flows?

A comparison between natural flow for a dry period (1998-2003) and natural flow less maximum projected water use subject to the LAR Water Management Framework



The change to natural flows due to oil sands mining water withdrawal is almost imperceptible to the natural flow paradigm

Perspective: How will oil sands mining growth change natural flows? (Log Scale)



On a log scale it is possible to discern the difference during low winter flows

Key observations

- Even with ambitious growth of the oil sands mining industry the Athabasca River Basin will remain a lesser utilized basin in Alberta
- Forecast water use in the oil sands mining industry may grow to about 2% of natural flow
- The Athabasca River is not short water
- For concerns during low winter flow periods, the AENV and DFO Framework caps water use

Key observations

- Industry has developed principles of an implementation plan to meet the regulatory Framework while maintaining production
- A detailed water management agreement is under development and an interim 2007-2008 agreement has been completed
- Industry will continue to work together on joint programs and initiatives to improve the management and efficiency of water use