Shale Gas
Water Management
Responsible Development

Zoe Robson
Nexen Inc.

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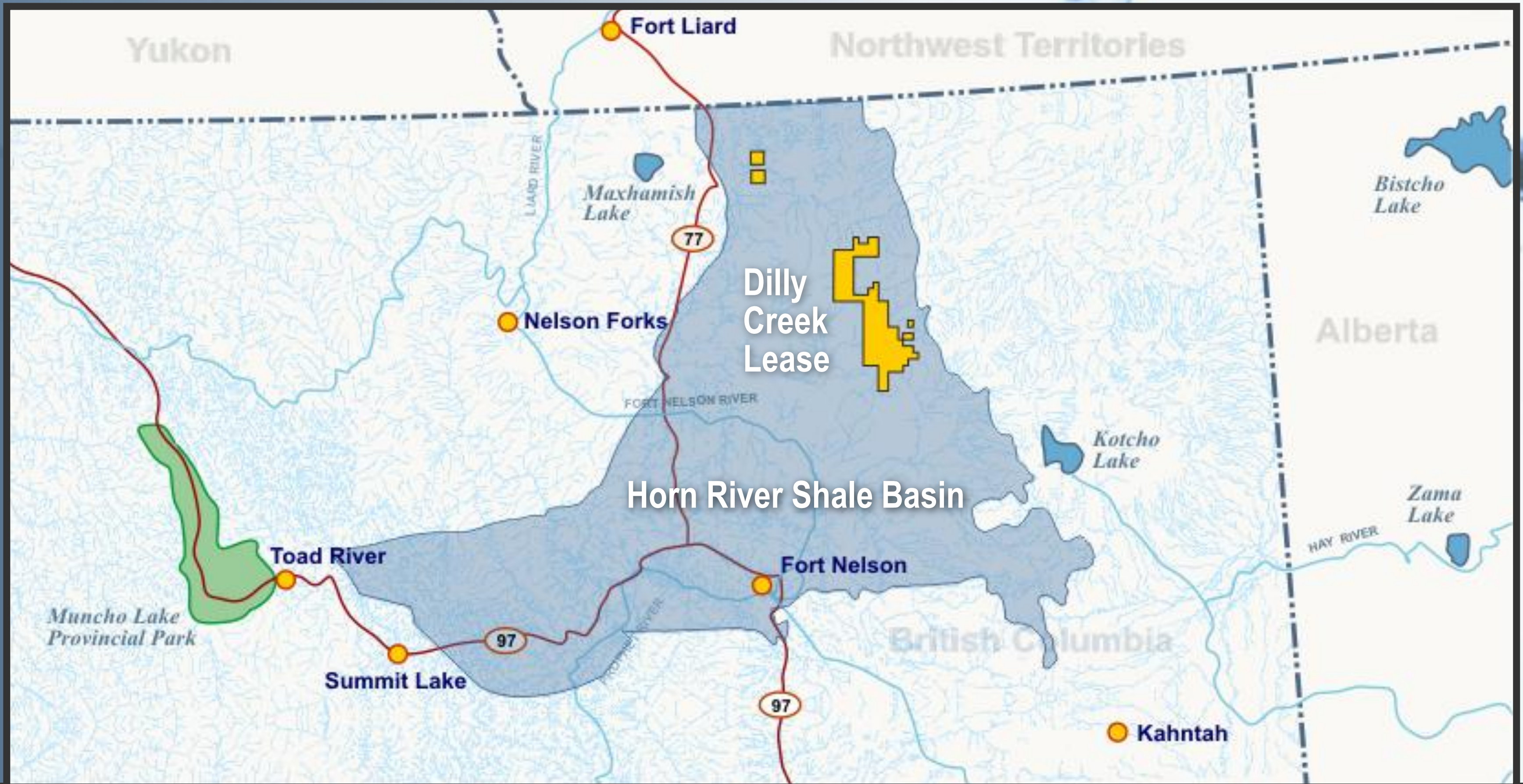
Water Management Plan

Dilly Creek Lease • Horn River Basin • NE British Columbia

April, 2012



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Water Management Plan

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April, 2012

Shale Gas
An Introduction

Water Management Plan
Concept & Implementation

Responsible Development
An Established Principle

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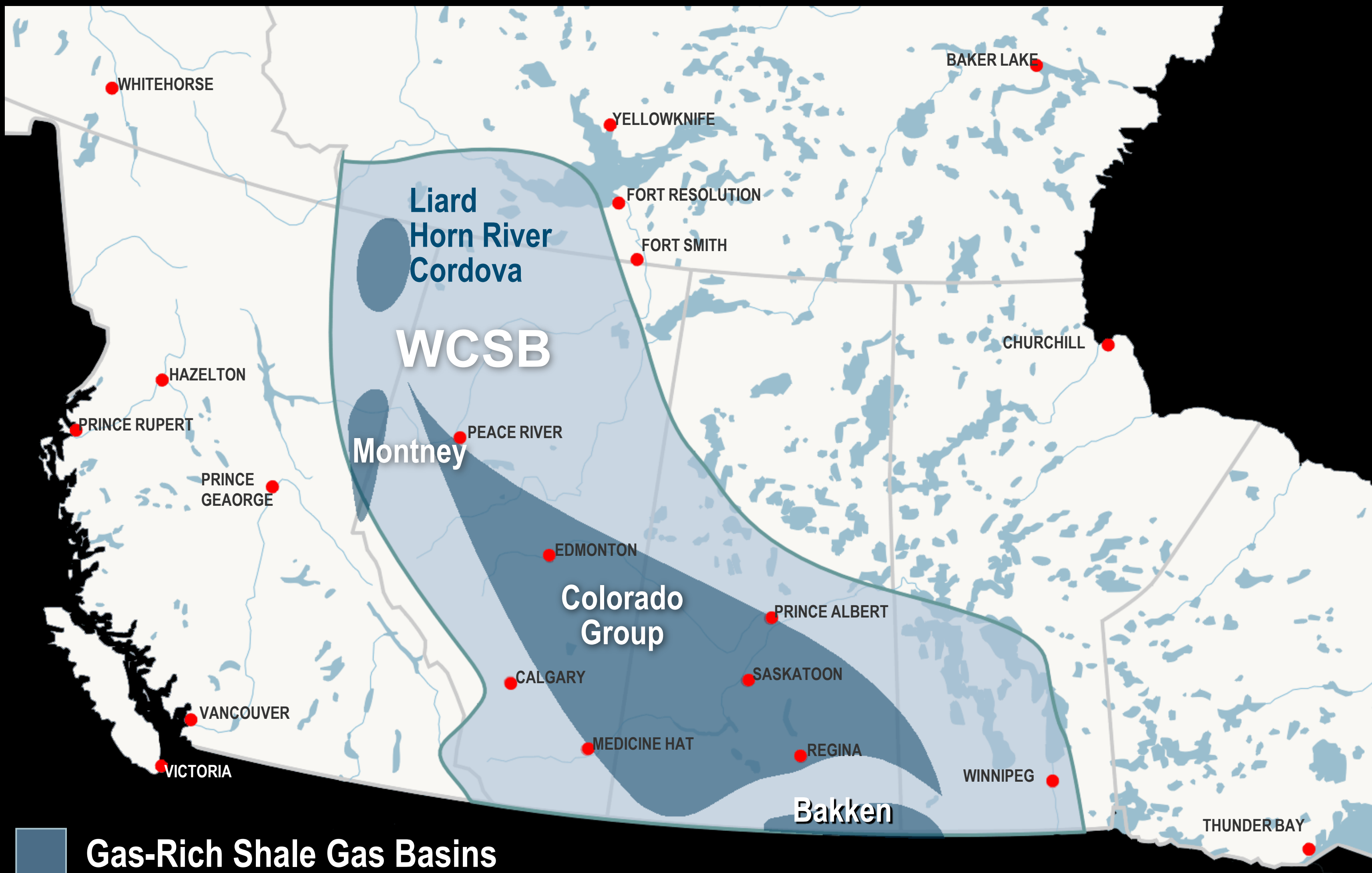
AN INTRODUCTION TO SHALE GAS DEVELOPMENT

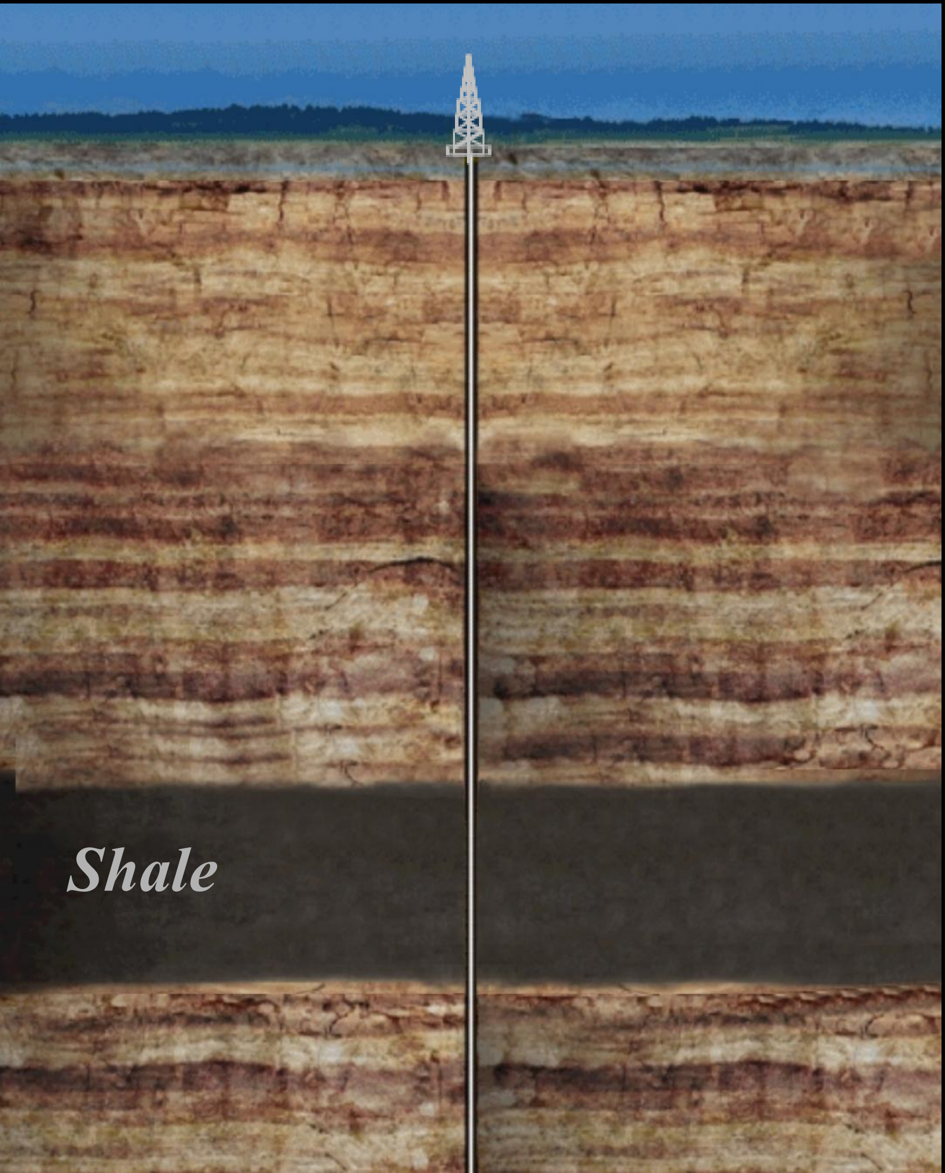
WESTERN CANADIAN SEDIMENTARY BASIN



THE NATURE OF SHALE

- Dense: derived from clay and mud
- Layers deposited over 500MM years
- Organic material trapped between layers
- In deep formations, heat and pressure breaks down the organics into oil and natural gas
- Some of the gas migrates out of the shale and congregates in discrete pools or above oil (conventional gas)
- The rest of the gas is adsorbed i.e. coats the surfaces of the shale or, it is trapped in sand between layers

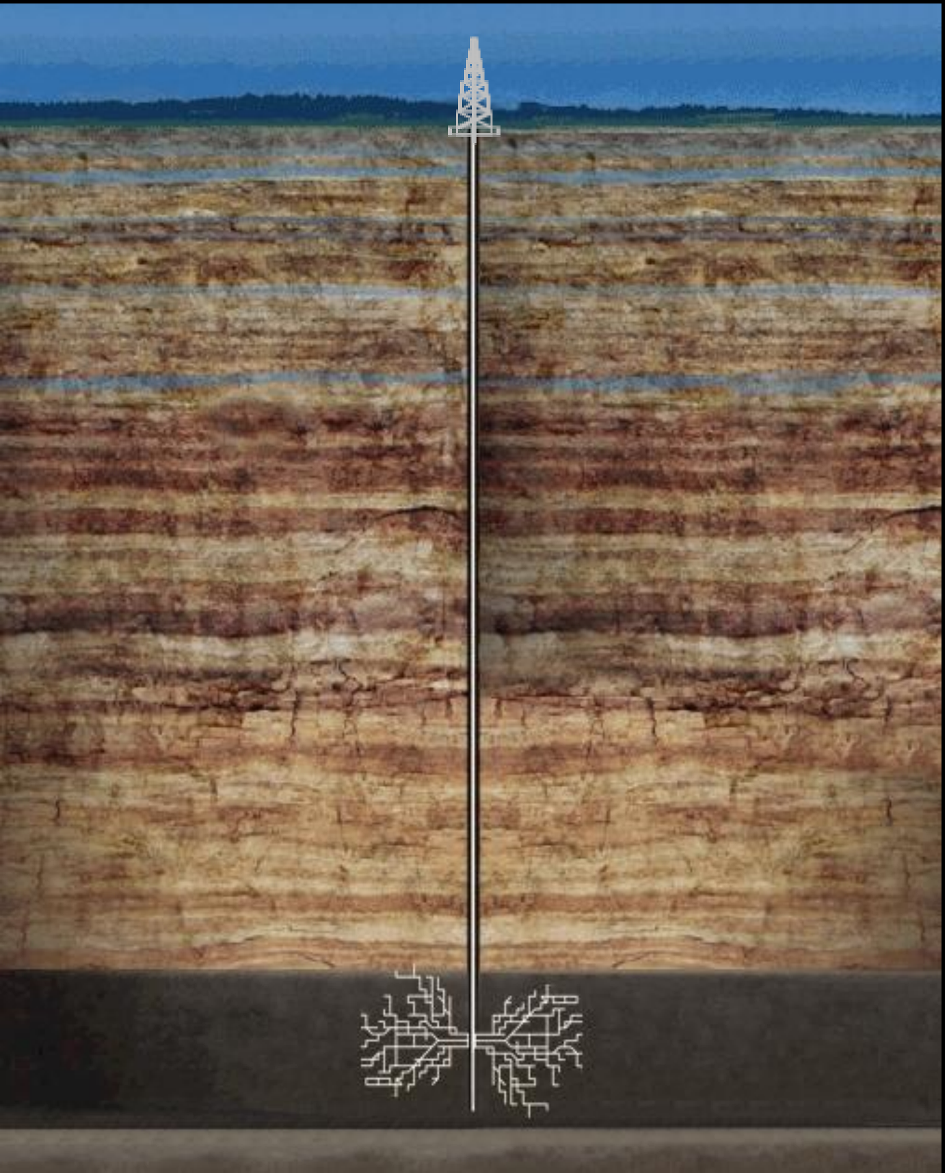
SHALE GAS - THE HISTORICAL VIEW



- Until ten years ago, shale gas was largely ignored
- Vertical drilling penetrated shale beds on the way to conventional oil and gas deposits
- The exposed surface area was never great enough to produce gas in commercial volumes

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

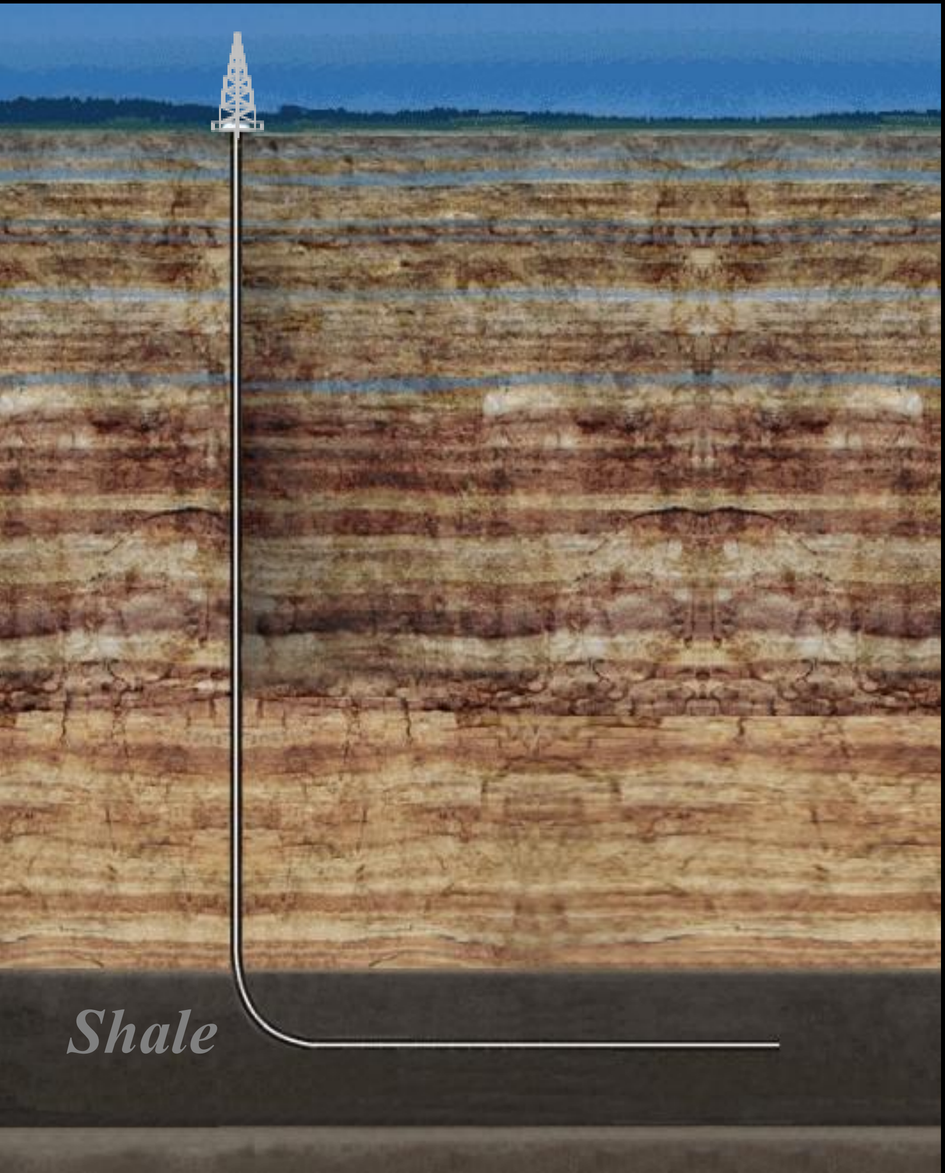
CONVENTIONAL HYDRAULIC FRACTURING



- Hydraulic fracturing or ‘fracking’ was first used to recover natural gas and oil in 1947
- Conventional hydraulic fracturing which, typically consumes 75,000 to 300,000 litres of fluid per well, has been used over the years to stimulate high-permeability conventional reservoirs

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

HORIZONTAL DRILLING



- 1920's Wells were deviating from vertical and resulting in lawsuits
- 1930 Sun Oil contracted the Sperry Corporation to modify small gyroscopic compasses to guide directional drilling
- 1940's & 1950's 'Bottom Hole Assembly' (BHA) drilling equipment was developed
- These gyro and BHA tools made directional drilling possible
- 1970 Downhole drilling motors propelled by 'mud' were developed
- Directional wells were first used to drill relief wells for 'blowouts'

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

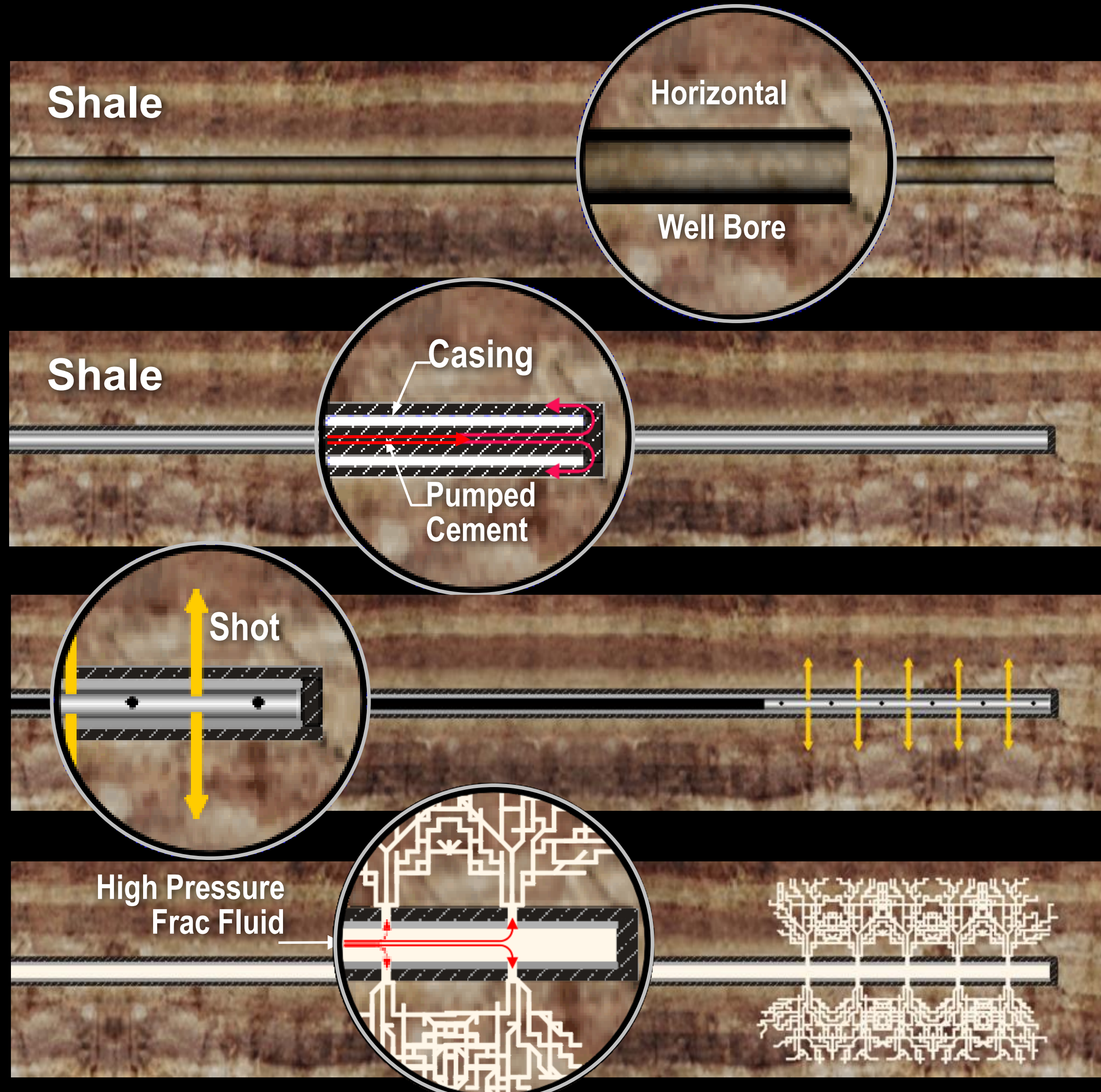
SHALE HYDRAULIC FRACTURING

Horizontal Drilling

Cement & Casing

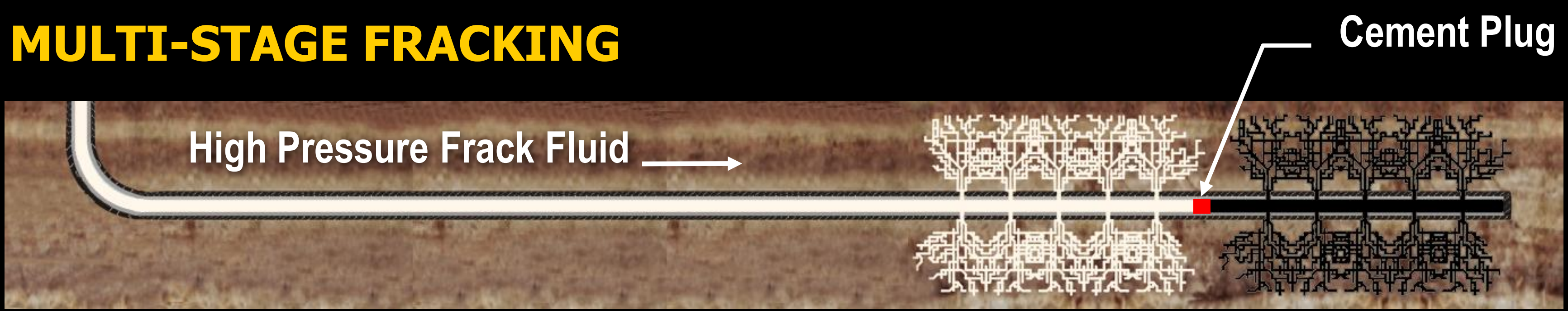
Perforation

Hydrofracking



SHALE HYDRAULIC FRACTURING - INNOVATION

MULTI-STAGE FRACKING



- In multi-stage fracking, a portion of the horizontal well bore is fracked and then, this section is isolated with a cement plug and another section is fracked continuing the process right back to the vertical well bore
- Once fracking is complete, the cement plugs are drilled out to allow the gas to escape
- This method of multi-stage fracking was first used in the late 1990s in the Barnett Shale Bed in Texas

SHALE GAS - RISE TO PROMINENCE

RISE TO PROMINENCE

- Commercially viable due to horizontal drilling and multi-stage fracking
- Outstanding success in the United States
- Wide-spread publicity
- Responsible for the U.S. 100-year supply of natural gas
- Major contribution to energy independence in the U.S.

IMPORTANCE

- In Canada, 40% of conventional gas has been produced
- Large reserves make it a viable replacement supply for the future
- Has the potential for a new industry, job creation and economic stimulus
- Represents a new source of revenue for Government
- Opens up the potential for new international markets and trade

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

HYDRAULIC FRACTURING - WATER IS A KEY ISSUE

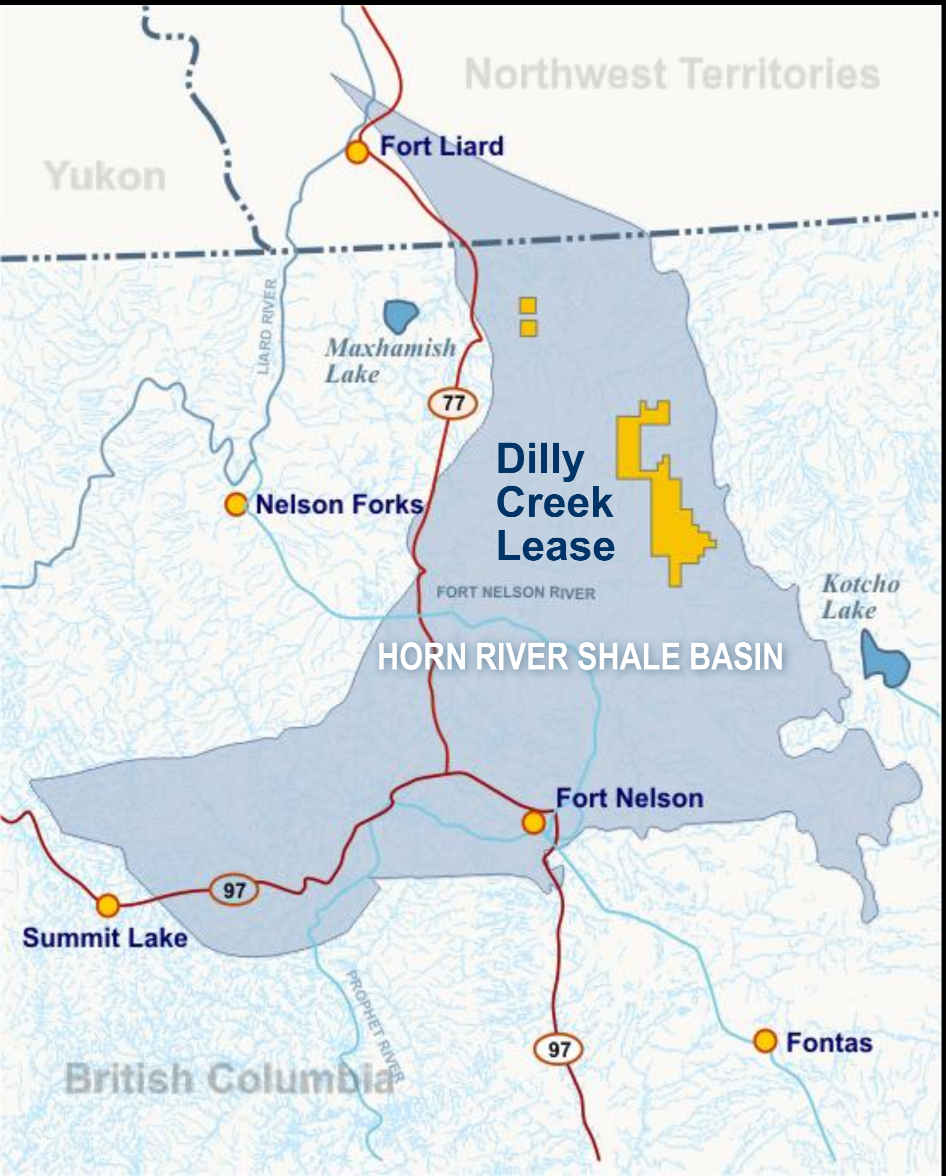
- Large quantities of water are required
- 3,000 - 5,000 m^3 of water are needed per ‘frac’
- Most wells require multiple ‘fracs’
- Most drilling operations involve multiple wells
- As gas economics improve, the number of wells will increase
- Competition with: agriculture, ranching, mining, municipalities
- Water depletion can affect wildlife habitat
- Concerns regarding water quality

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

NEXEN'S HORN RIVER SHALE GAS PROJECT

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

NEXEN'S SHALE GAS STRATEGY



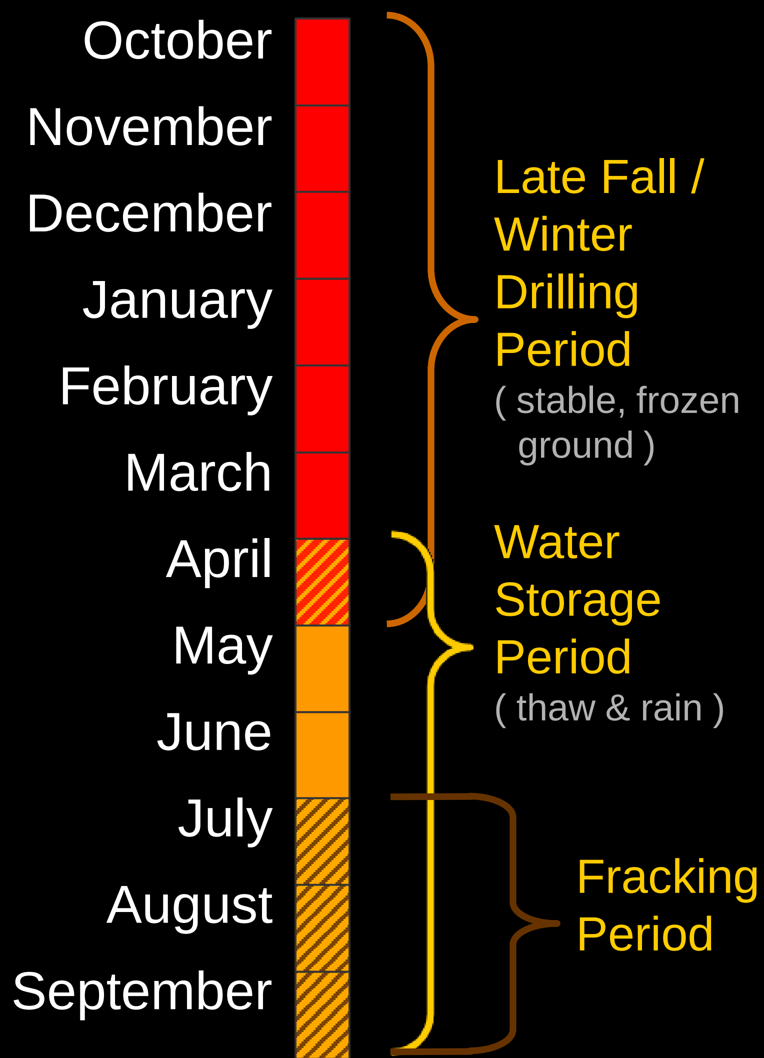
- The NE B.C. Leases are considered long-term assets
- A resource for the future
- Establish a strong land position
- Develop these leases at a measured pace
- Gear the pace of development to: gas demand, gas price, new markets and return-on-investment
- Develop an efficient, cost-effective method of production
- Invest in new technologies

HORN RIVER DEVELOPMENT TO DATE

- Development began in 2007
- Production began in 2009
- Currently working with a short-term water permit
- 24 wells drilled and completed
- 18 wells to be completed July 2012
- 10 wells scheduled to drill in 2012
- Etsho North Gas Plant upgrade completed in 2011
- Tsea Gas Plant scheduled to be on-stream by the end of 2012 (150MMCF/D raw)

AN INTRODUCTION TO SHALE GAS DEVELOPMENT

SEASONAL NATURE OF HORN RIVER ACTIVITY



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WATER MANAGEMENT PLAN

NEXEN'S WATER MANAGEMENT STRATEGY

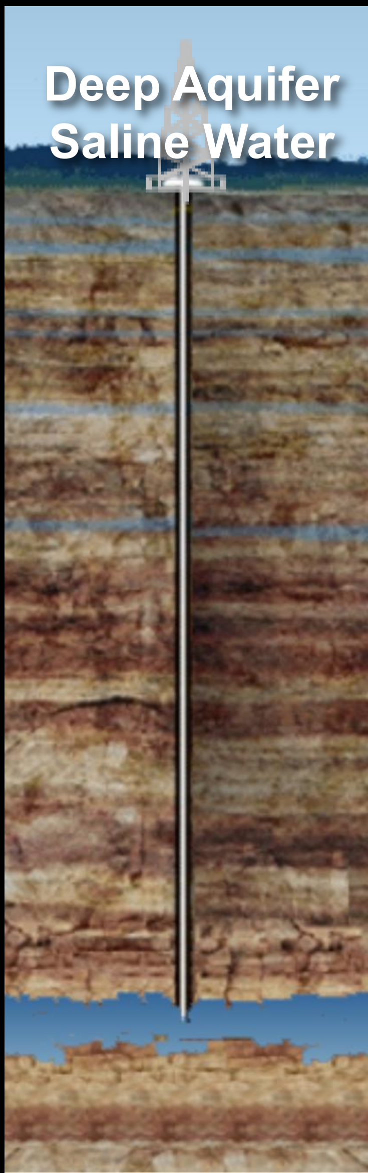
- Obey the law
- Manage Responsibly
- Think Long-Term
- Consult with Stakeholders
- Create and Maintain a Water Management Plan
- Publish Performance Results
- Invest in New Technology
- Reduce Fresh Water Use
- Safe Disposal of Frac Fluid

HORN RIVER – ESTIMATED WATER NEED

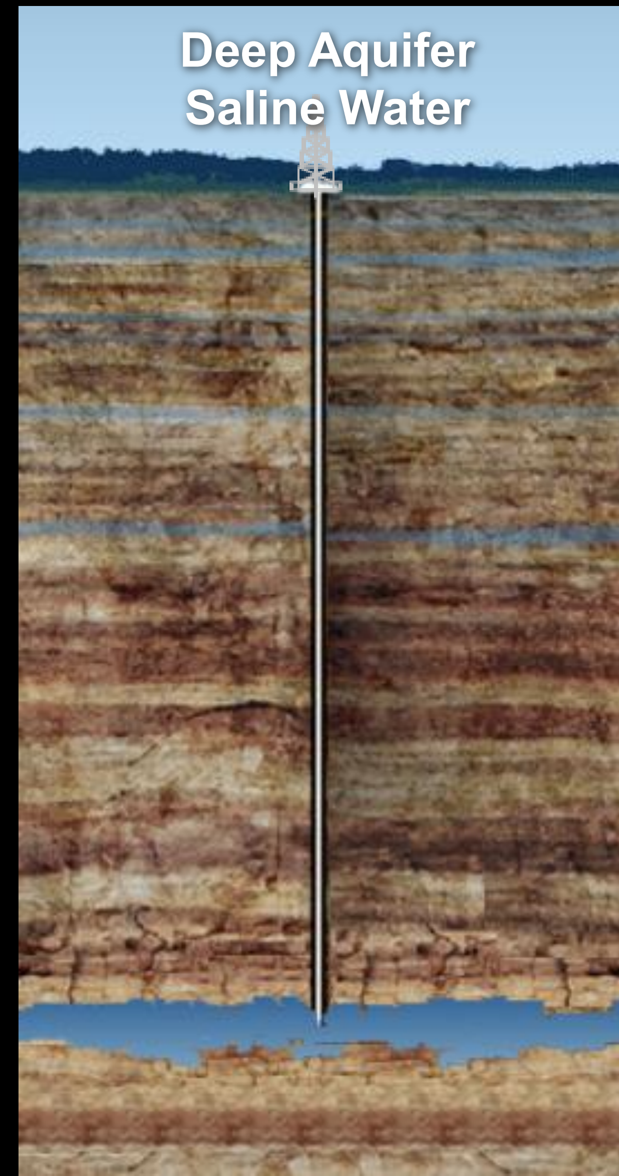
- 1 pad /year
- 20 wells /pad
- 20 fracs /well
- 3,000-5,000 m^3 of water /frac
- 60,000-100,000 m^3 of water /well
- 1.2 million m^3 to
  2.0 million m^3 of water/year

WATER MANAGEMENT PLAN

POSSIBLE SOURCES OF WATER

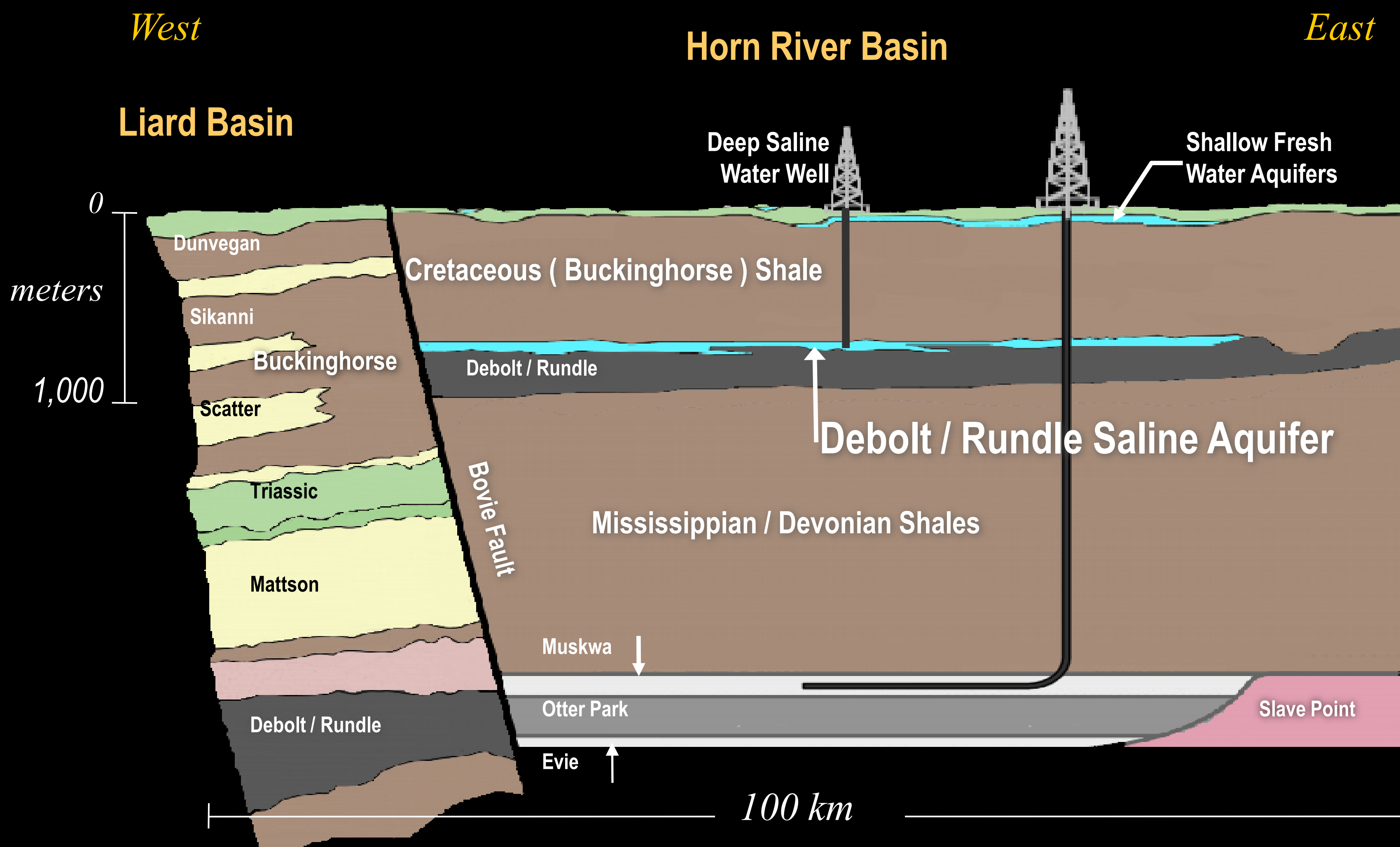


SOURCES OF WATER CONSIDERED



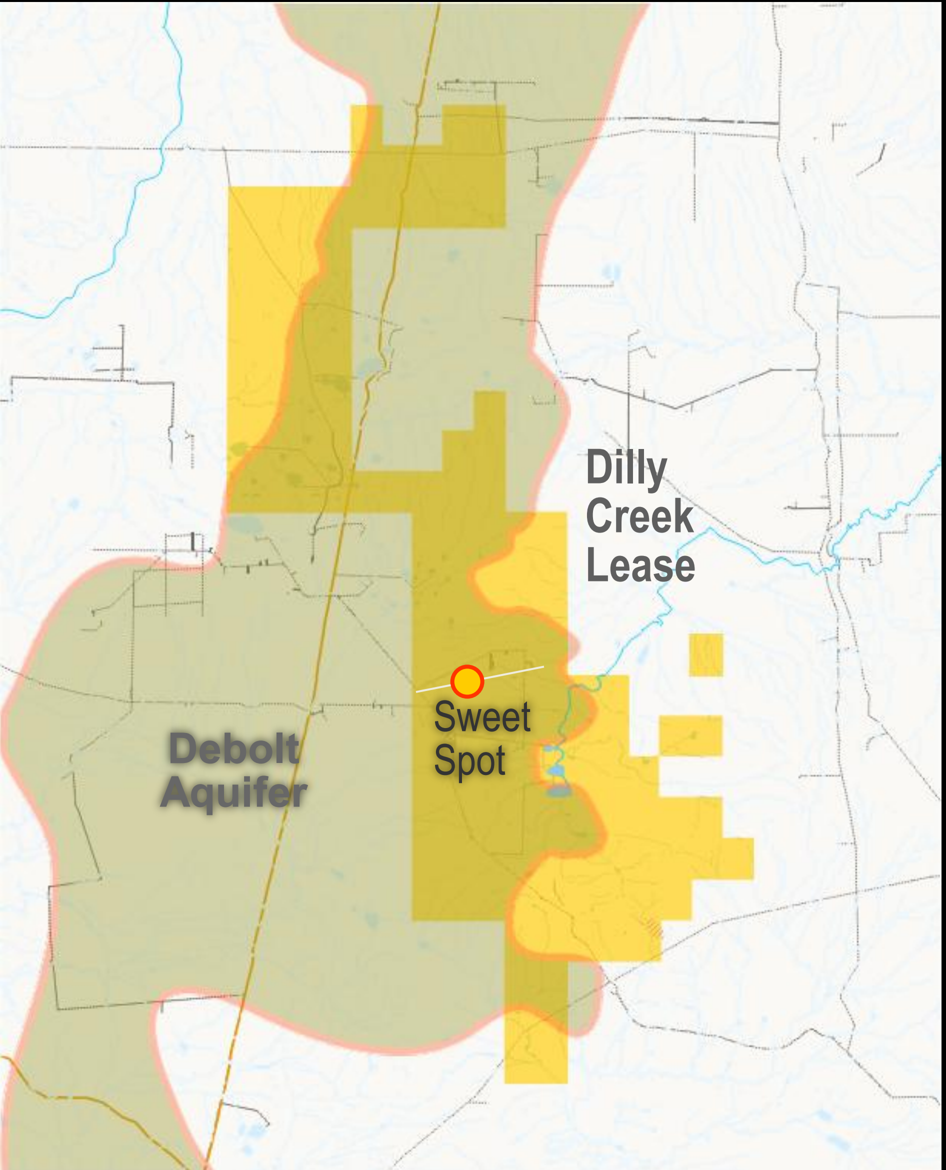
WATER MANAGEMENT PLAN

THE DEBOLT DEEP SALINE AQUIFER



THE DEBOLT AQUIFER - A VIABLE OPTION

WATER MANAGEMENT PLAN



- The aquifer runs under the Dilly Creek Lease
- The top of the aquifer is 645 m below the surface
- Total thickness: 83 meters
- Estimated porosity over the current wells: 35%
- Reservoir pressure: 4,550 kPa or ~6.4 kPa/meter
- The 'sweet spot' is in a highly porous area - an advantage not found throughout the Basin
- Need a solution to the H_2S problem before the option is feasible

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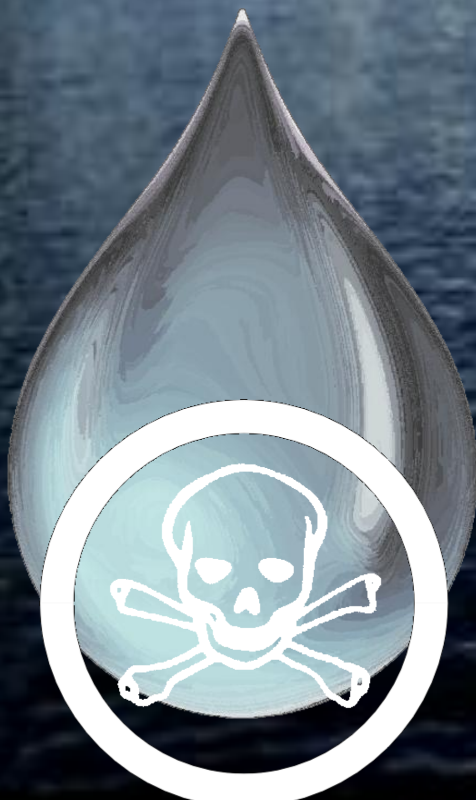
DEBOLT WATER - THE PROBLEM



H_2S

Lethal Hydrogen Sulfide Gas

- Too salty to drink
- Salt water containing ~22,000 TDS
  (total dissolved solids)
- Sea water is ~35,000 TDS
- Heavy to pump
- Gas:Water Ratio: 1.35 m^3/m^3
- Gas content: 57% methane (C_1), 42% carbon dioxide (CO_2) and 0.5% hydrogen sulfide (H_2S)
- H_2S gas is lethal
- H_2S dissolved at reservoir pressure
- Atmospheric pressure is less than the gas 'bubble point' therefore, in air, Debolt water releases H_2S gas

DEBOLT WATER - POTENTIAL SOLUTIONS

OPTIONS

1. **TREAT TO FRAC SPEC** i.e. remove the H_2S
   Encana & Apache used this method at their Two Island Lake Plant
   It is a very expensive approach (est. $87MM in Capital + OPEX)

2. **TREAT TO POTABLE SPEC** i.e. remove the H_2S and dissolved solids.
   To date, this is unproven technology with field trials underway
   Frac water can be treated to a lower standard if used again for fracking
   (est. cost of \$3-\$5/m^3 of water treated and it is also energy intensive)

3. **PRESSURIZED FRAC ON DEMAND (PFOD)** A Closed Loop System
   i.e. keep the Debolt water in its raw state, at formation pressure, unexposed to the atmosphere and dispose of returned frac fluid to the Debolt aquifer after use

DEBOLT WATER - THE CURRENT SOLUTION

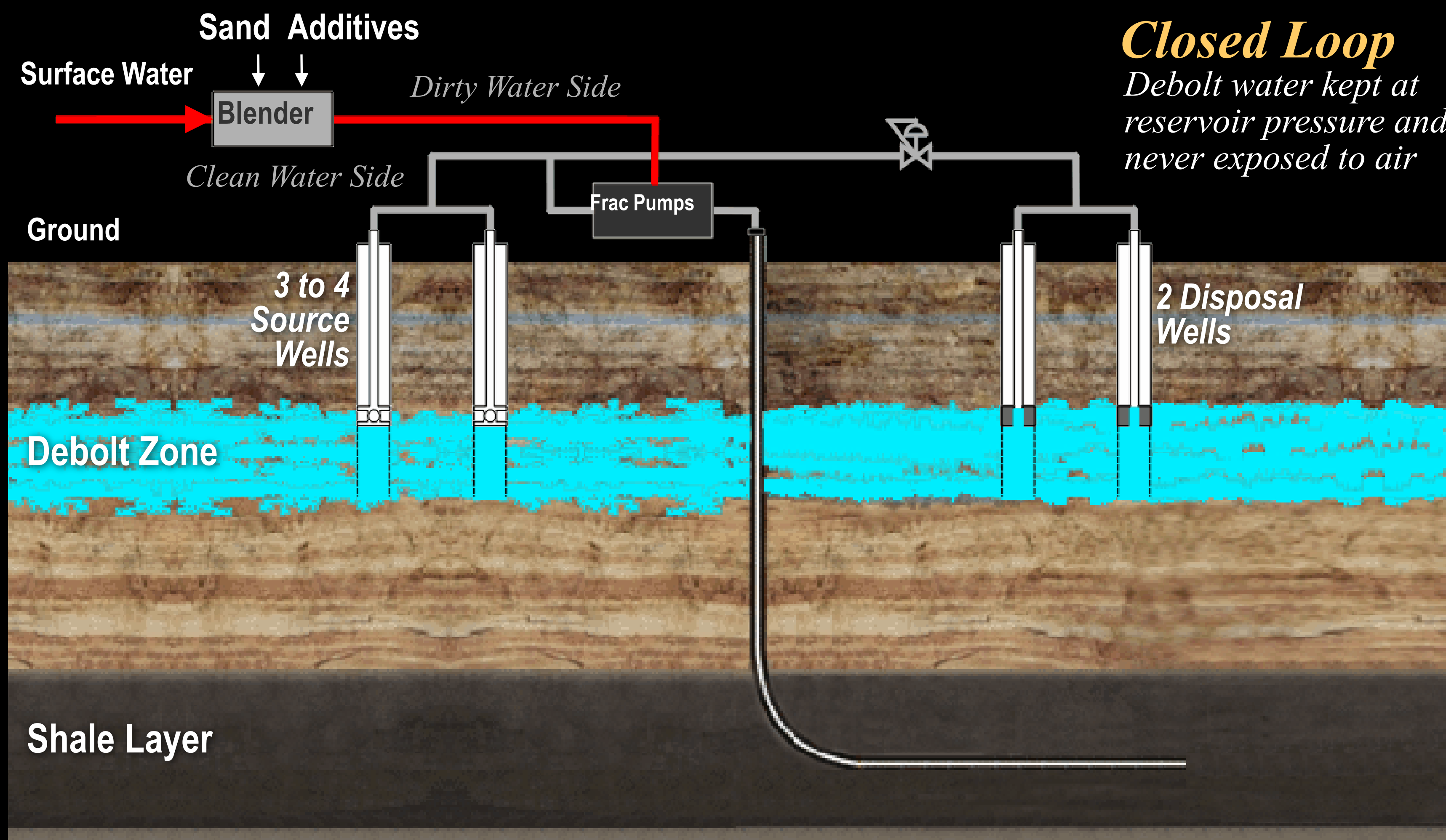
WATER MANAGEMENT PLAN

Purpose-Built Water Treatment Plant

WATER MANAGEMENT PLAN

DEBOLT WATER - PREFERRED SOLUTION

OPTION 3 PRESSURIZED FRAC ON DEMAND (PFOD)



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WATER MANAGEMENT PLAN

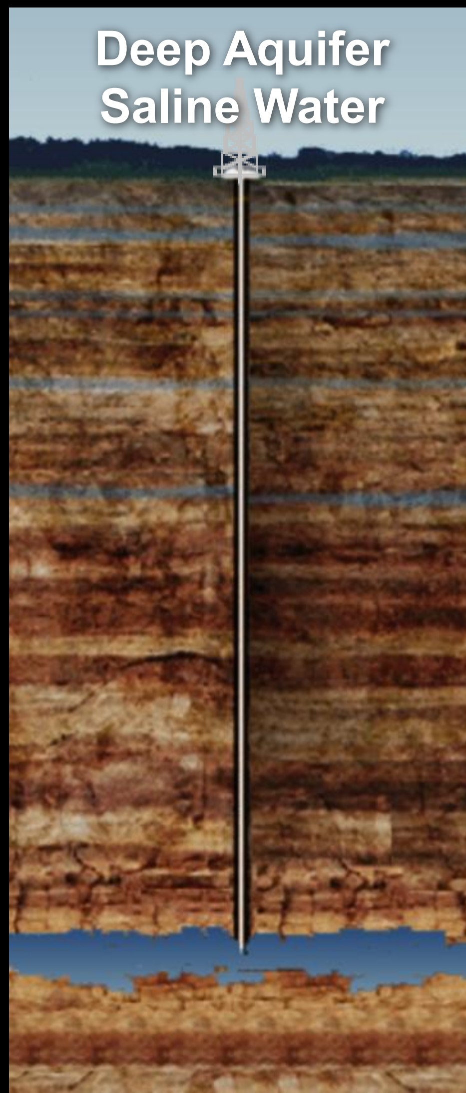
DEBOLT WATER - PREFERRED SOLUTION

OPTION 3 PRESSURIZED FRAC ON DEMAND

WATER MANAGEMENT PLAN

NEXEN'S WATER SOURCE PLAN

FUTURE



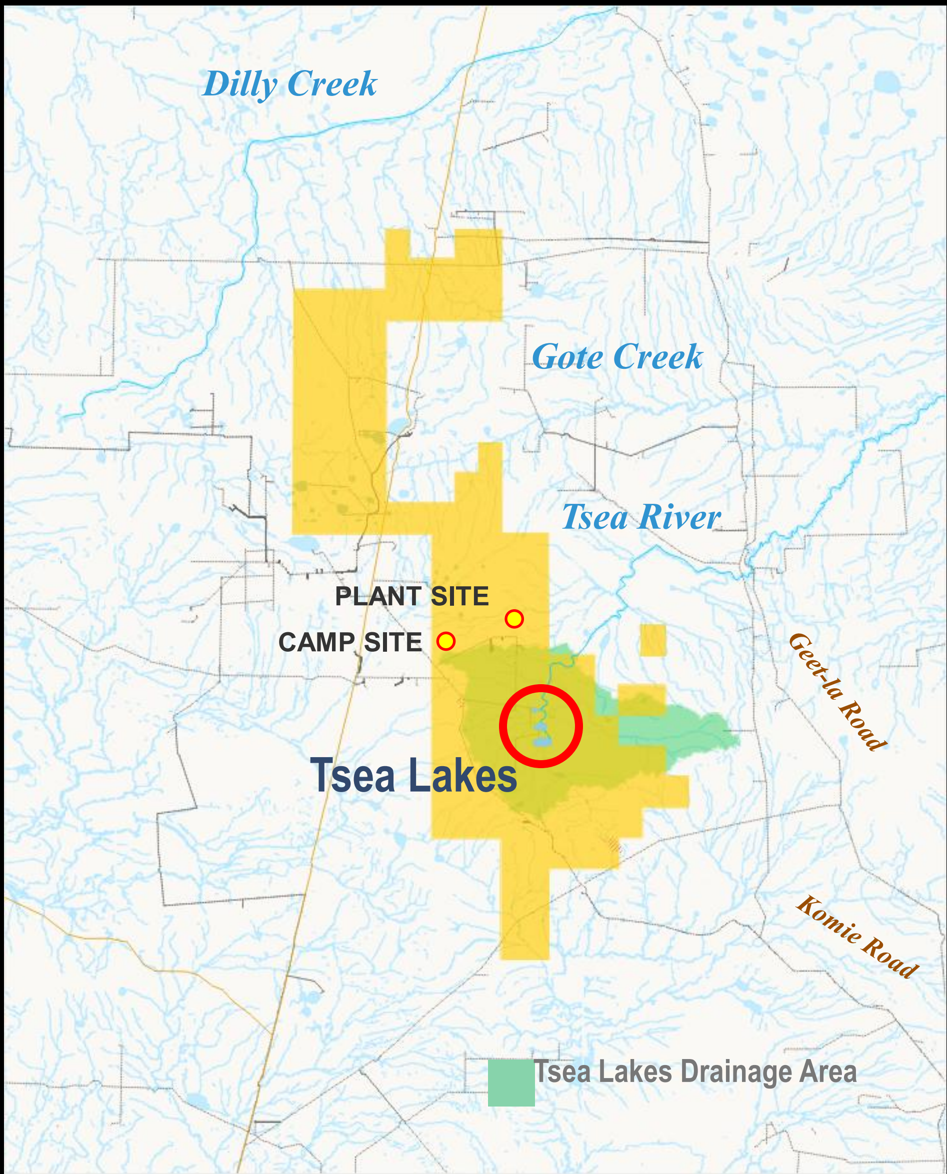
NEXEN'S WATER SOURCE PLAN

FUTURE

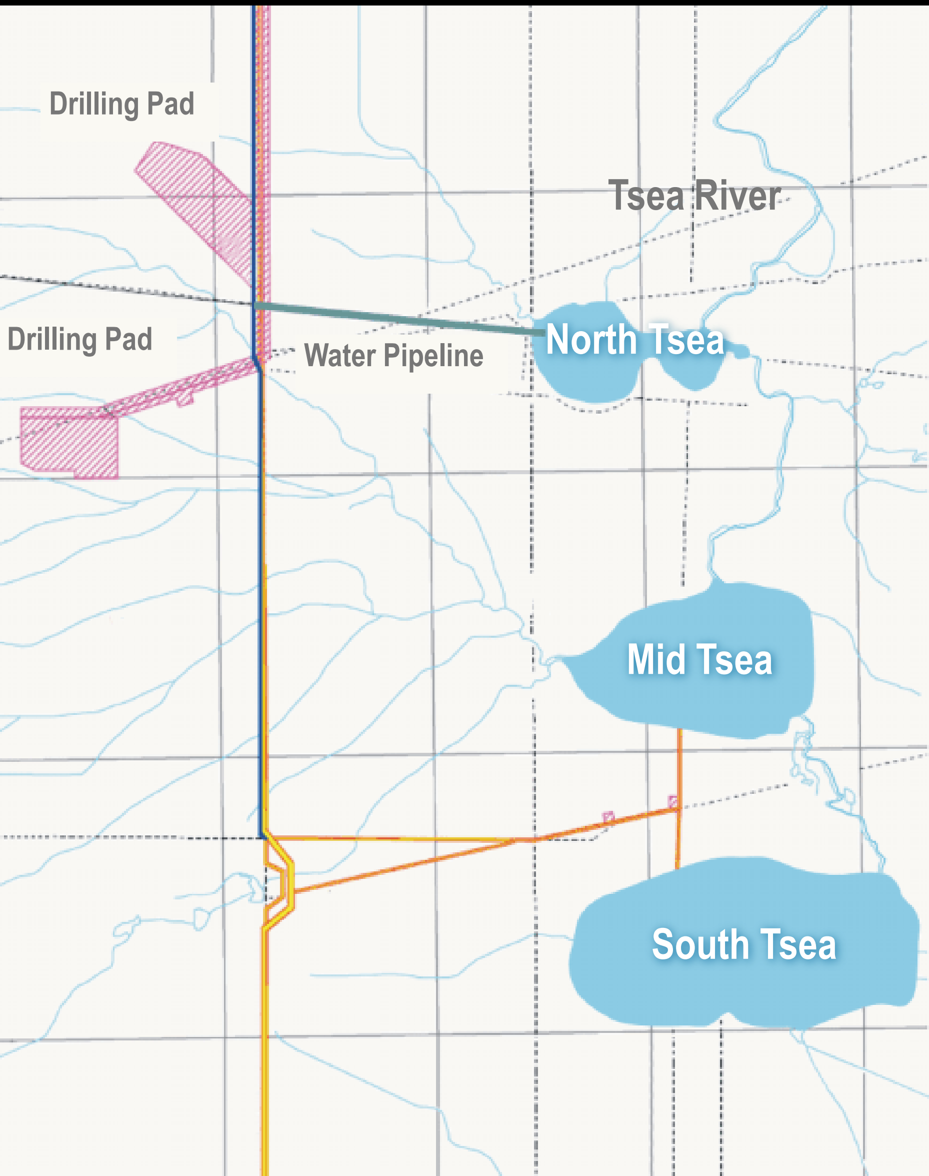
PRESENT

WATER MANAGEMENT PLAN

SELECTED WATER SOURCE - THE TSEA LAKES



SELECTED WATER SOURCE - THE TSEA LAKES



North Tsea Lake

PERMISSION TO USE WATER IN B.C.

Short-term Water Permits

Oil & Gas Commission

Regulatory Body

- Permits may be suspended during B.C. droughts
- Less security for planning purposes
- Permits issued annually
- Regulating multi-users is difficult

Water License

B.C. Ministry of Forests, Lands & Natural Resource Operations (FLNRO)

B.C. Water Stewardship Branch

- Proposal based on real-time monitoring of water availability
- Reduces the need to draw water in periods of naturally low flow
- Enhances long-term security of water supply
- Increases certainty of annual water allocation

NEXEN'S DECISION CONCERNING PERMISSION

Short-term

Short-term Water Permit

(B.C. Oil & Gas Commission)

- Applied for annually since 2009
- Currently operate on this basis

Long-Term

Water License

(B.C. Ministry of Forests, Lands & Natural Resource Operations (FLNRO))

- Application submitted in 2009
- A unique, adaptive Water Management Plan to govern the license was submitted in 2011

WATER MANAGEMENT PLAN

TIMELINE

GETTING TO KNOW THE TSEA LAKES

- Establish a site-specific data base
- Collect data for baselines for on-going impact monitoring

GETTING A HANDLE ON A CONCEPT

- Identify a characteristic hydrologic profile
- Develop a concept for The Water Management Plan

STRUCTURING & SUBMITTING THE PLAN

- Develop the rationale for The Water Management Plan
- Structure, quantify and submit The Plan to FLNRO

COMMITTING THE PLAN TO PRACTICE

- Commit all aspects of The Plan to practice in anticipation of a license
- Refine and enhance monitoring capabilities

WATER MANAGEMENT PLAN

2009 FIELD WORK

WATER MANAGEMENT PLAN

2009 FIELD WORK - OBJECTIVES

- Establish a site-specific data base
- Document the as-found conditions to create a baseline for monitoring impacts
- Determine the size of the catchment area that feeds the Tsea lakes
- Refine the understanding of seasonal changes suggested by regional data
- Identify animal species that depend on the Tsea River

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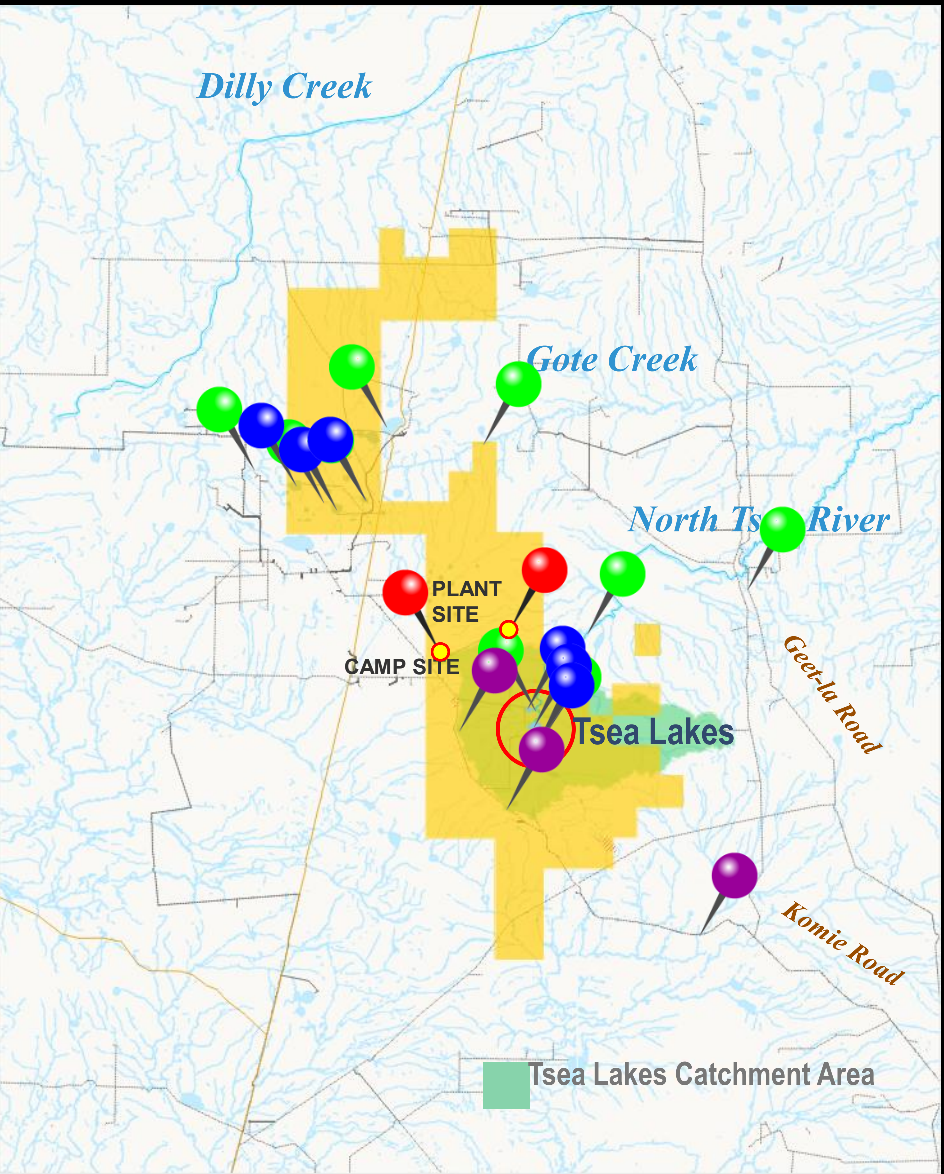
WATER MANAGEMENT PLAN

2009 FIELD WORK - IMPACT BASELINE DATA

WATER MANAGEMENT PLAN

2009 FIELD WORK - DATA COLLECTION



- Precipitation
- Stream water levels and discharge
- Lake water levels and bathymetry (depth/volume)
- Snow course

- An effort to confirm the amount of water in the system
- Establishing data collection points
- Collecting site data for comparison with regional data

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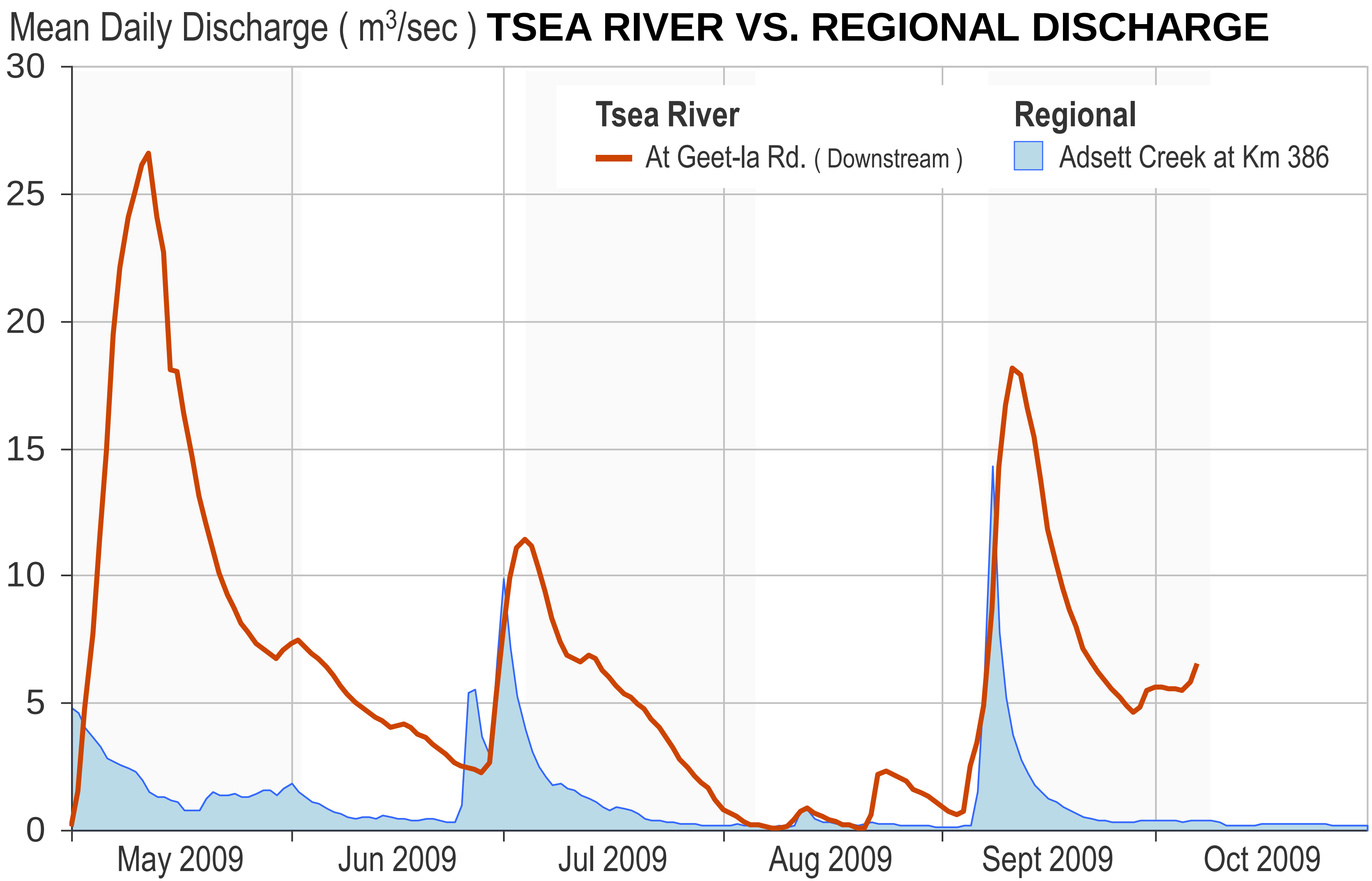
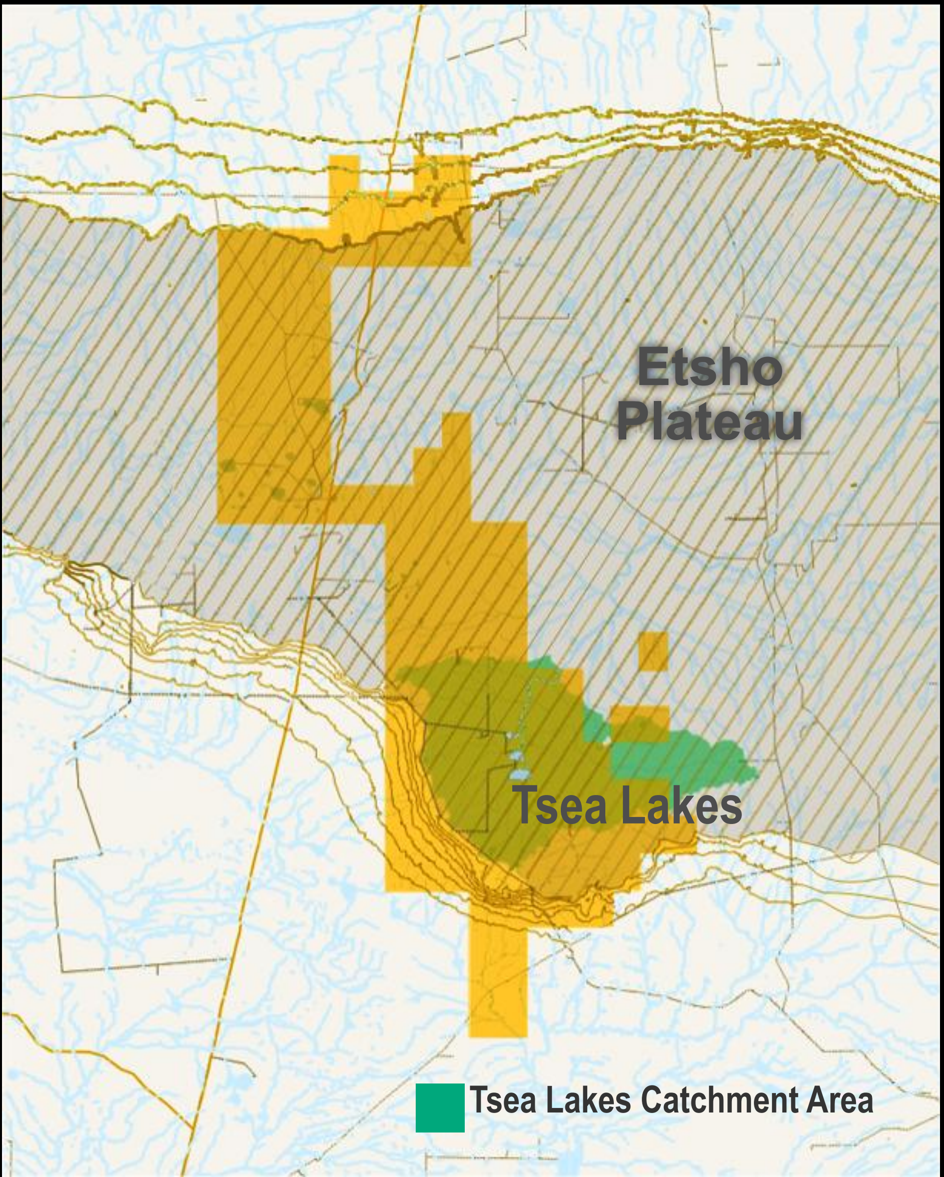
WATER MANAGEMENT PLAN

2009 FIELD WORK FINDINGS - DISCHARGE



THE ETSHO ESCARPMENT & PLATEAU



- Approximately 340 meter increase in elevation
- An expected, corresponding increase in precipitation
- The discharge from Tsea Lakes is expected to be greater than the regional data suggests

WATER MANAGEMENT PLAN

2010 FIELD WORK

2010 FIELD WORK - OBJECTIVES

- Identify the natural cycle of discharge from the Tsea Lakes and the Tsea River i.e. the timing of the peaks and the lows
- Understand how precipitation effects flow levels
- Test the assumptions concerning amount of water available made in 2009 on the basis of regional data
- Examine all of the data with a view to defining a concept for The Water Management Plan

2010 FIELD WORK - DATA COLLECTION

WATER MANAGEMENT PLAN

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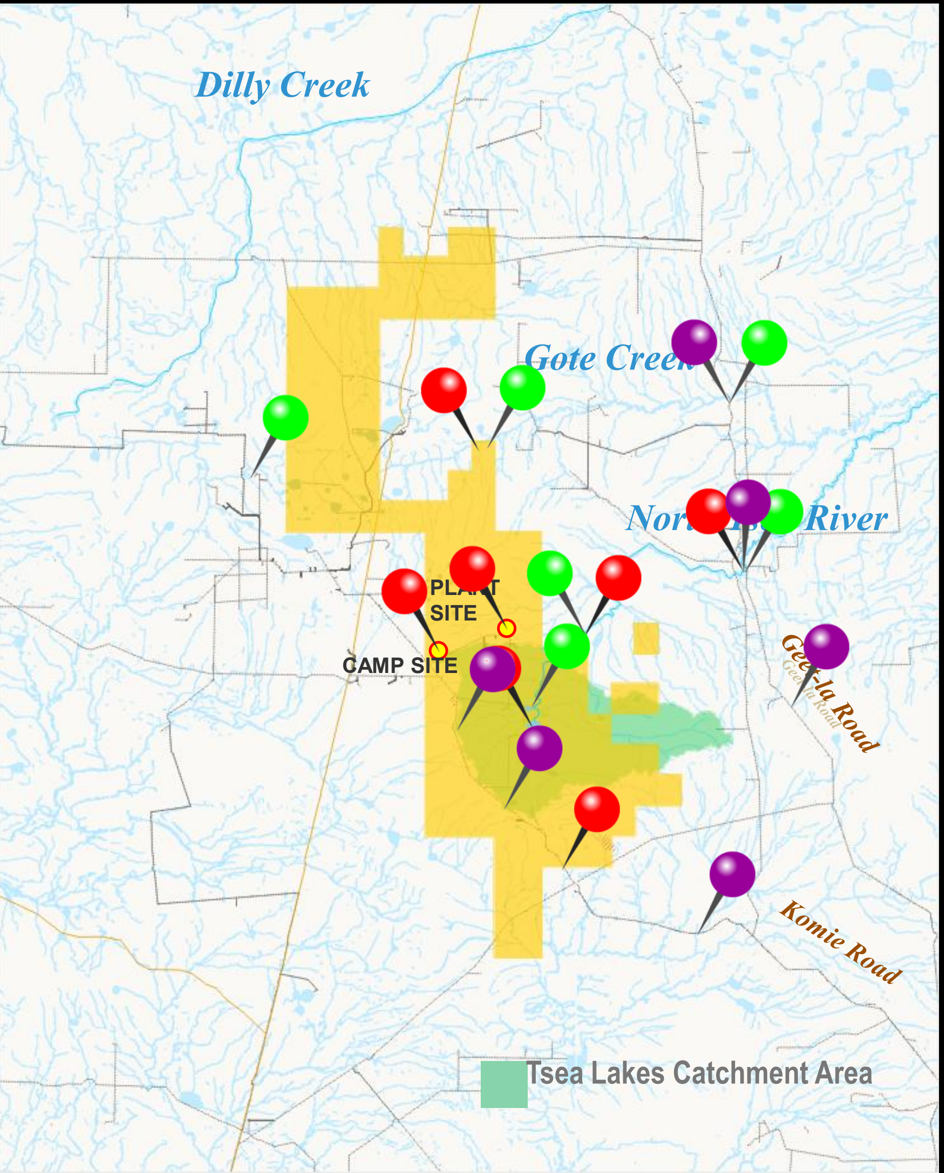
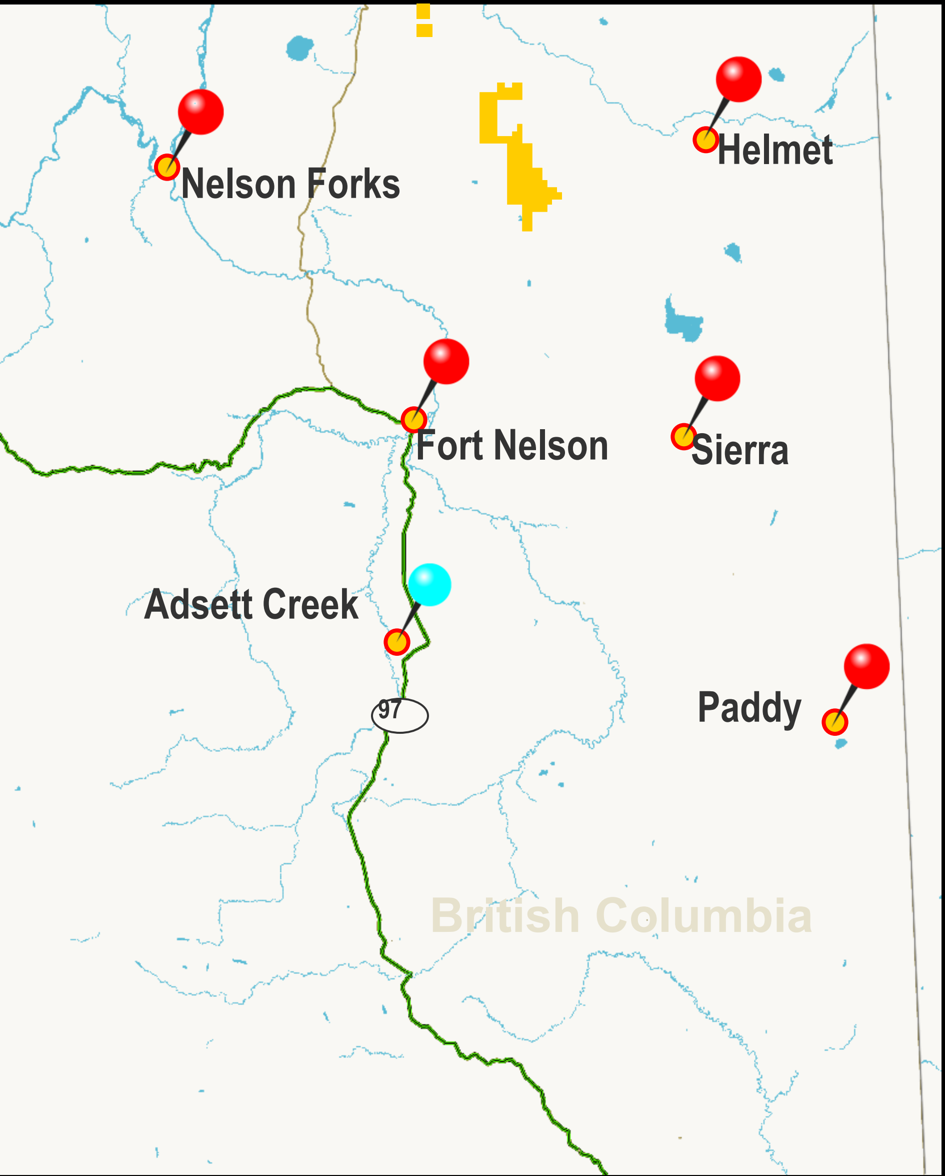


- Precipitation
- Stream water levels and discharge
- Snow course
- Regional Stream Flow Stations

- Snow course sampling on and off the plateau
- Refined and expanded water level and water discharge sites

2010 FIELD WORK - REGIONAL DATA



- Precipitation
- Stream water levels and discharge
- Snow course
- Regional Stream Flow Stations

- Current data from the regional stations operated by the federal and provincial governments was compared to the data collected

WATER MANAGEMENT PLAN

2010 FIELD WORK FINDINGS - DISCHARGE

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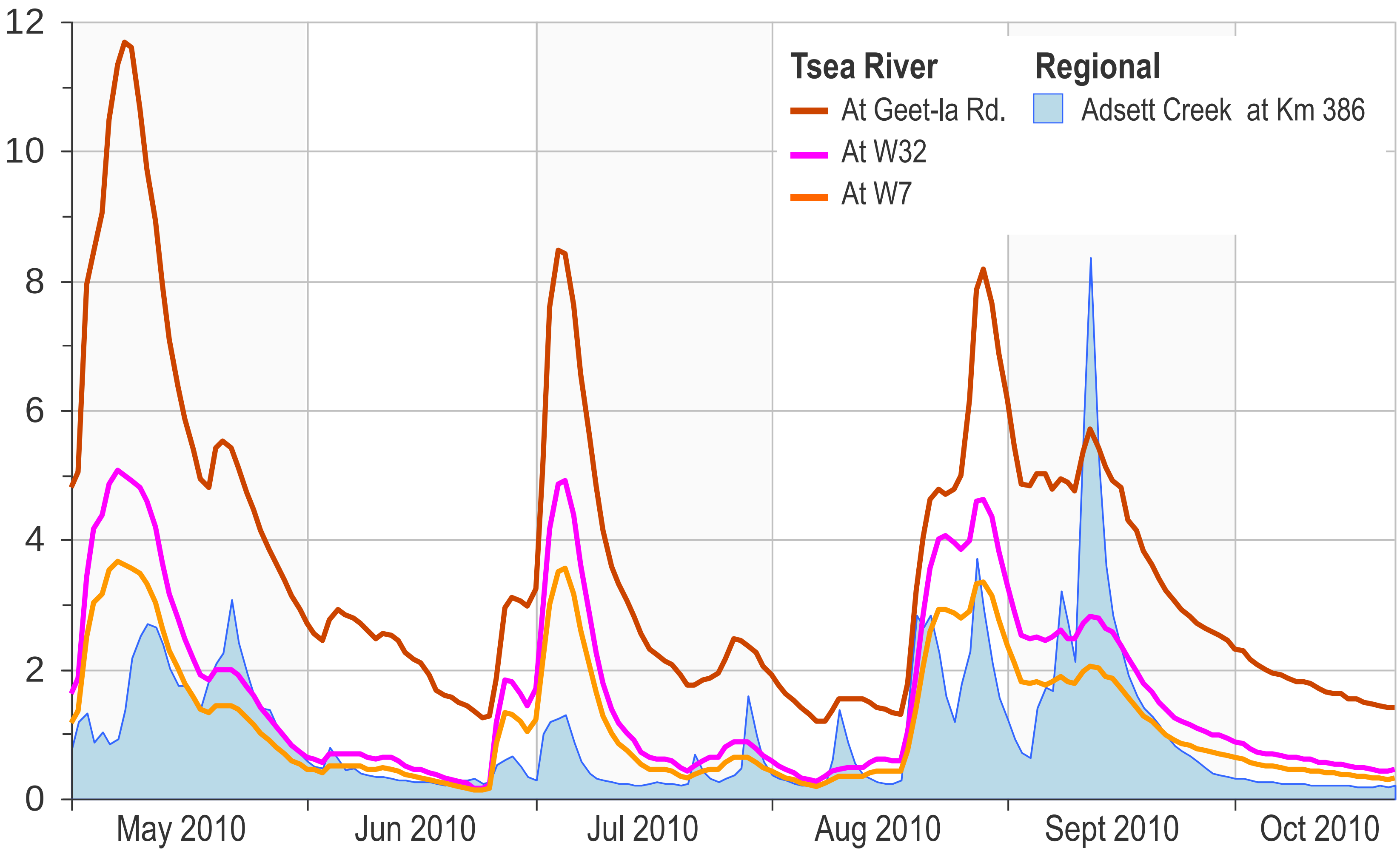
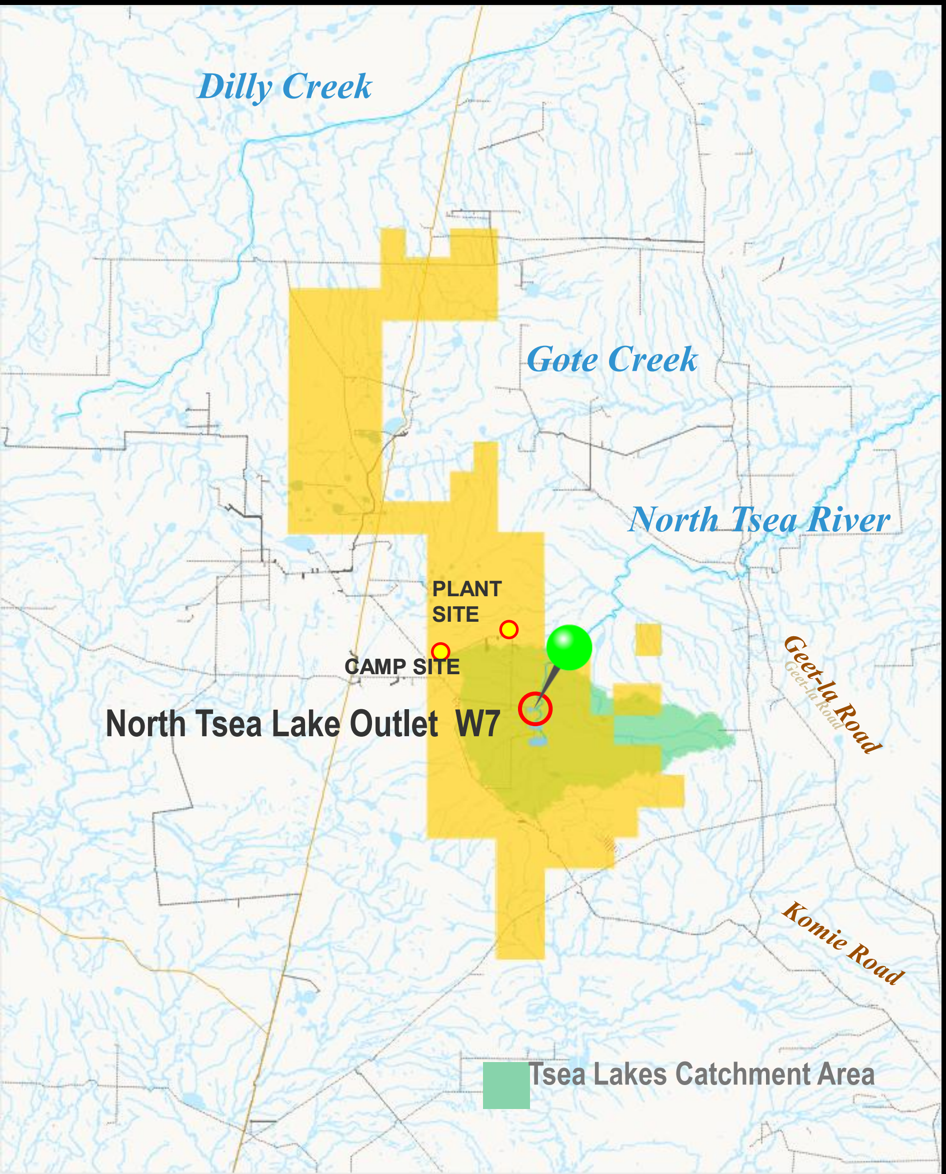
TSEA RIVER VS. REGIONAL DISCHARGE



2010 FIELD WORK - NORTH TSEA LAKE AT W7

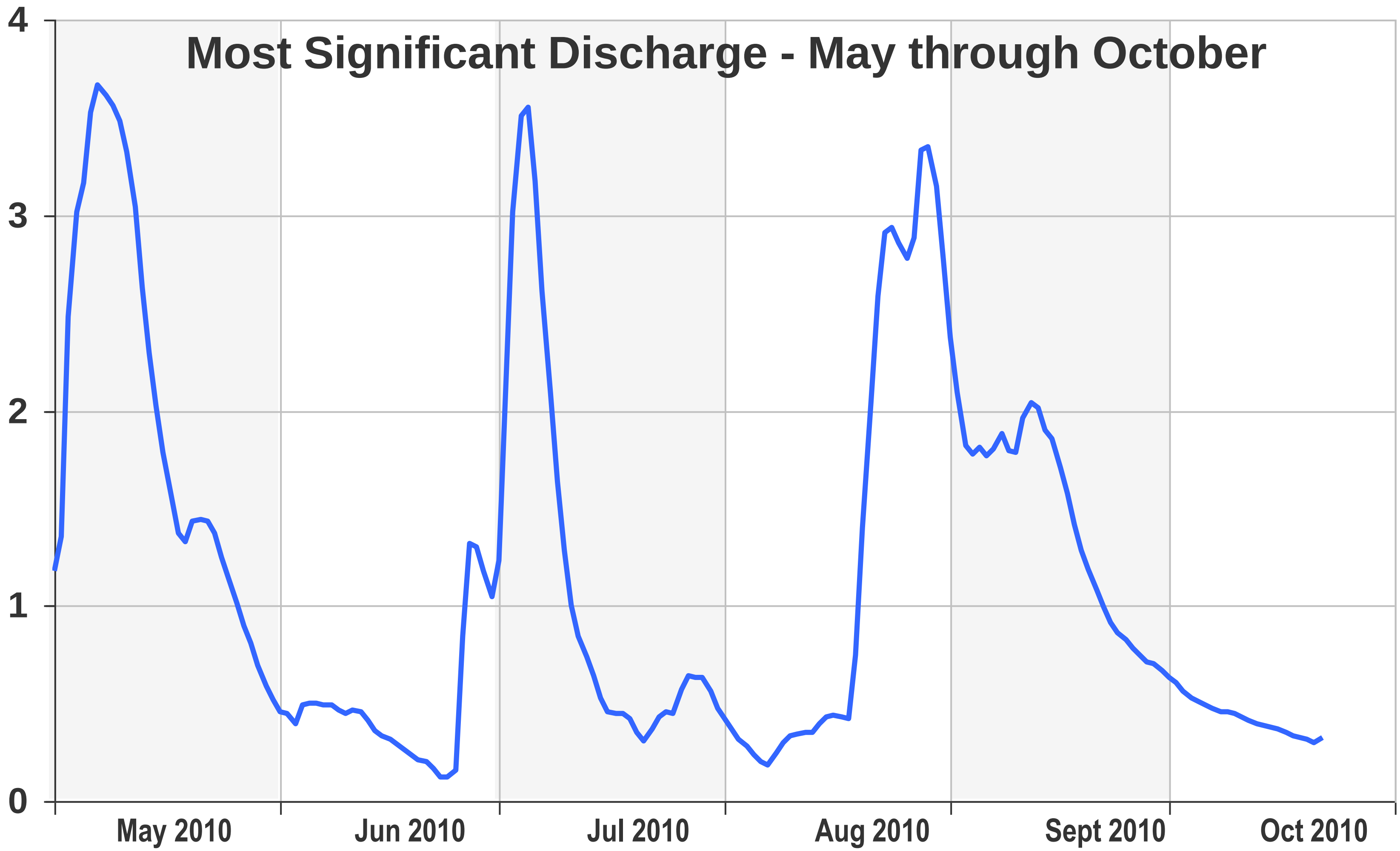


- Precipitation
- Stream water levels and discharge
- Regional Stream Flow Stations

WATER MANAGEMENT PLAN

2010 FIELD WORK - CHARACTERISTIC CURVE

Mean Daily Discharge (m³/sec) TSEA RIVER AT W7- NORTH TSEA LAKE OUTLET



2010 FIELD WORK - CHARACTERISTIC CURVE

WATER MANAGEMENT PLAN

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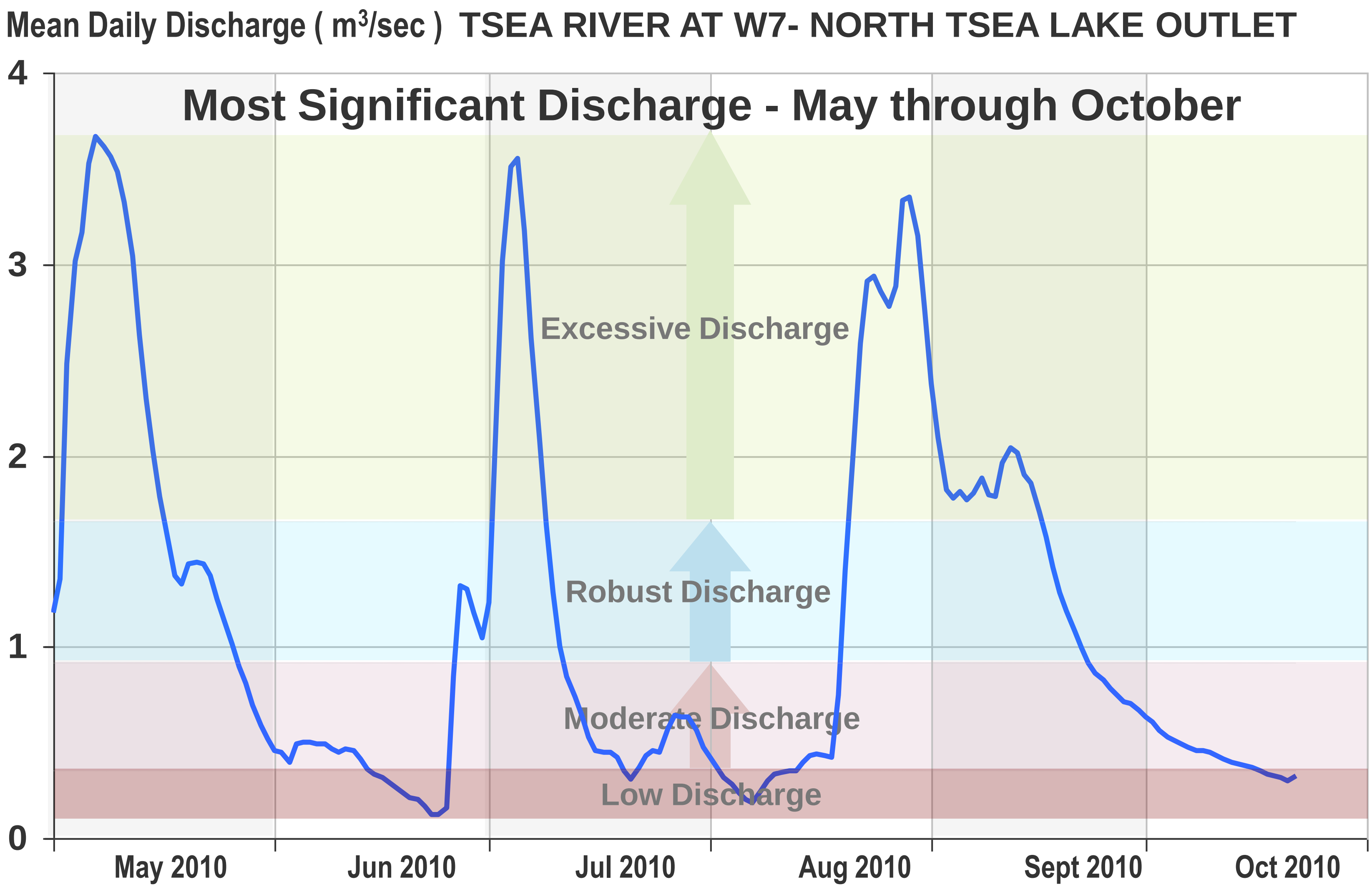


WATER MANAGEMENT PLAN

CONCEPT

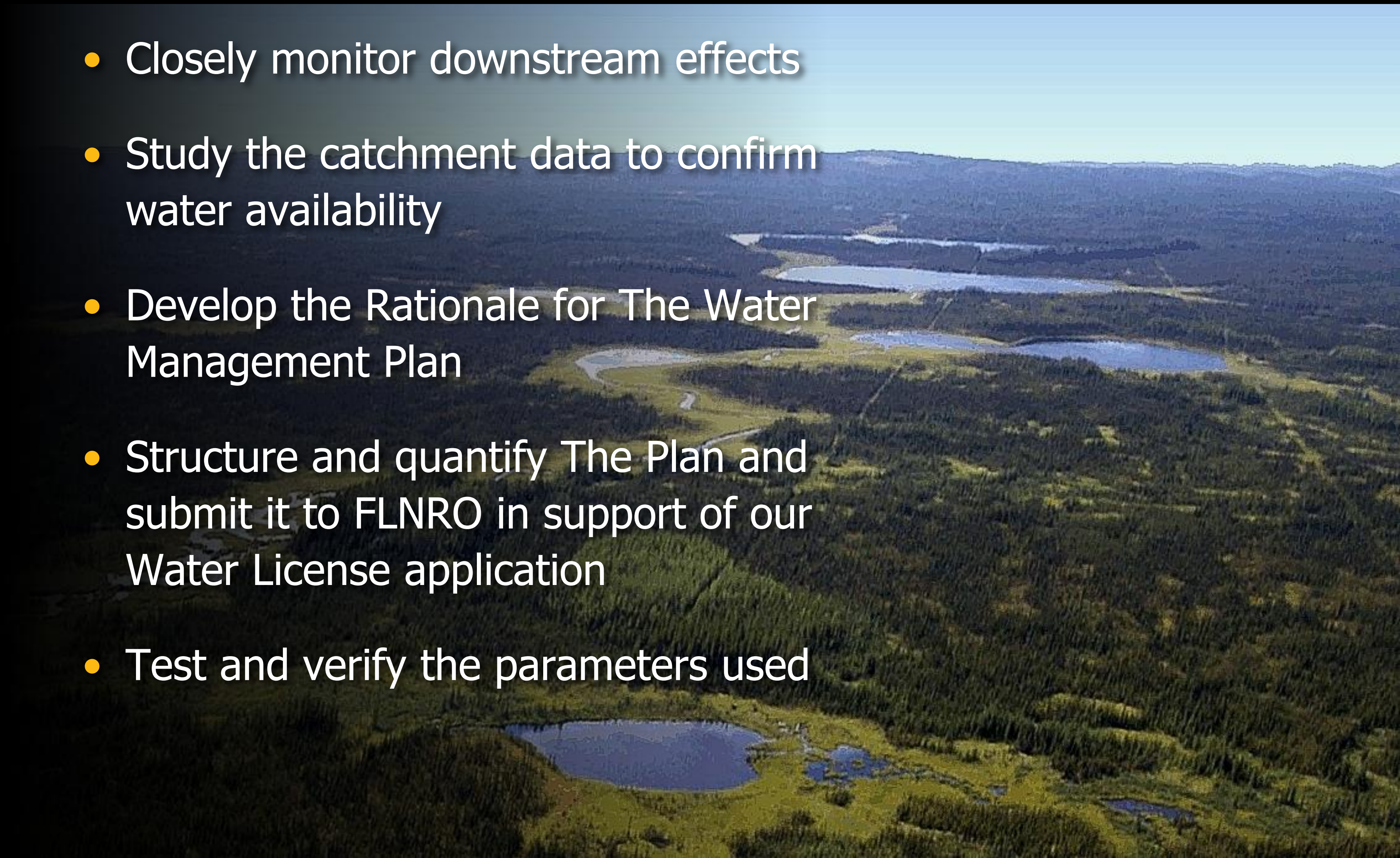
SUPPLY	DRAW
Flow Conditions (m^3/sec)	**Licensed Withdrawal**
Excessive Discharge Stage	XX% of Daily Discharge
Robust Discharge Stage	XX% of Daily Discharge
Moderate Discharge Stage	XX% of Daily Discharge
Low Discharge Stage	No Withdrawal
Annual Withdrawal Limit	X,XXX,XXX m^3/year

WATER MANAGEMENT PLAN

2011 FIELD WORK

Structuring & Submitting the Plan

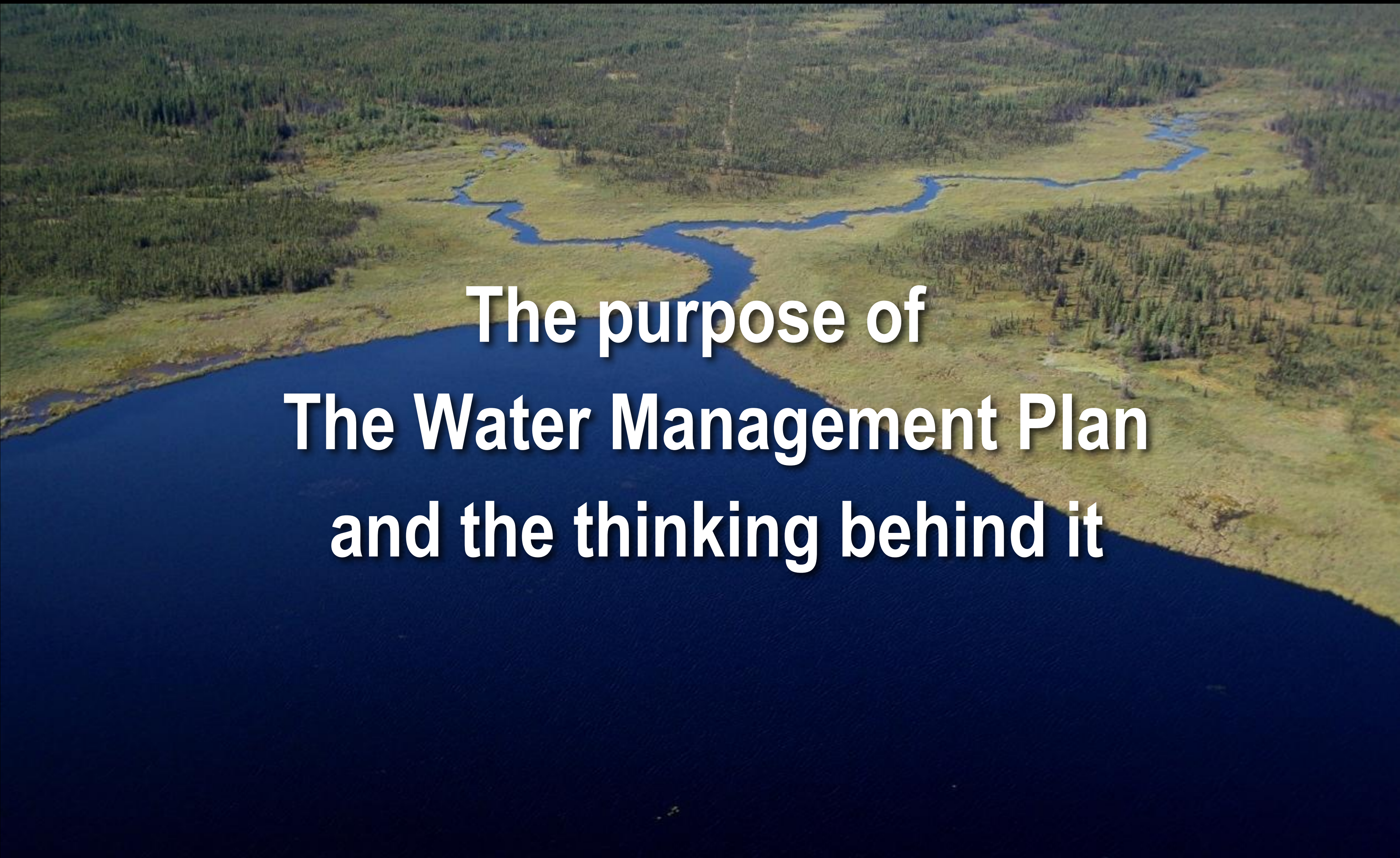
2011 FIELD WORK - OBJECTIVES



- Closely monitor downstream effects
- Study the catchment data to confirm water availability
- Develop the Rationale for The Water Management Plan
- Structure and quantify The Plan and submit it to FLNRO in support of our Water License application
- Test and verify the parameters used

WATER MANAGEMENT PLAN

RATIONALE



The purpose of
The Water Management Plan
and the thinking behind it

WATER MANAGEMENT PLAN

RATIONALE

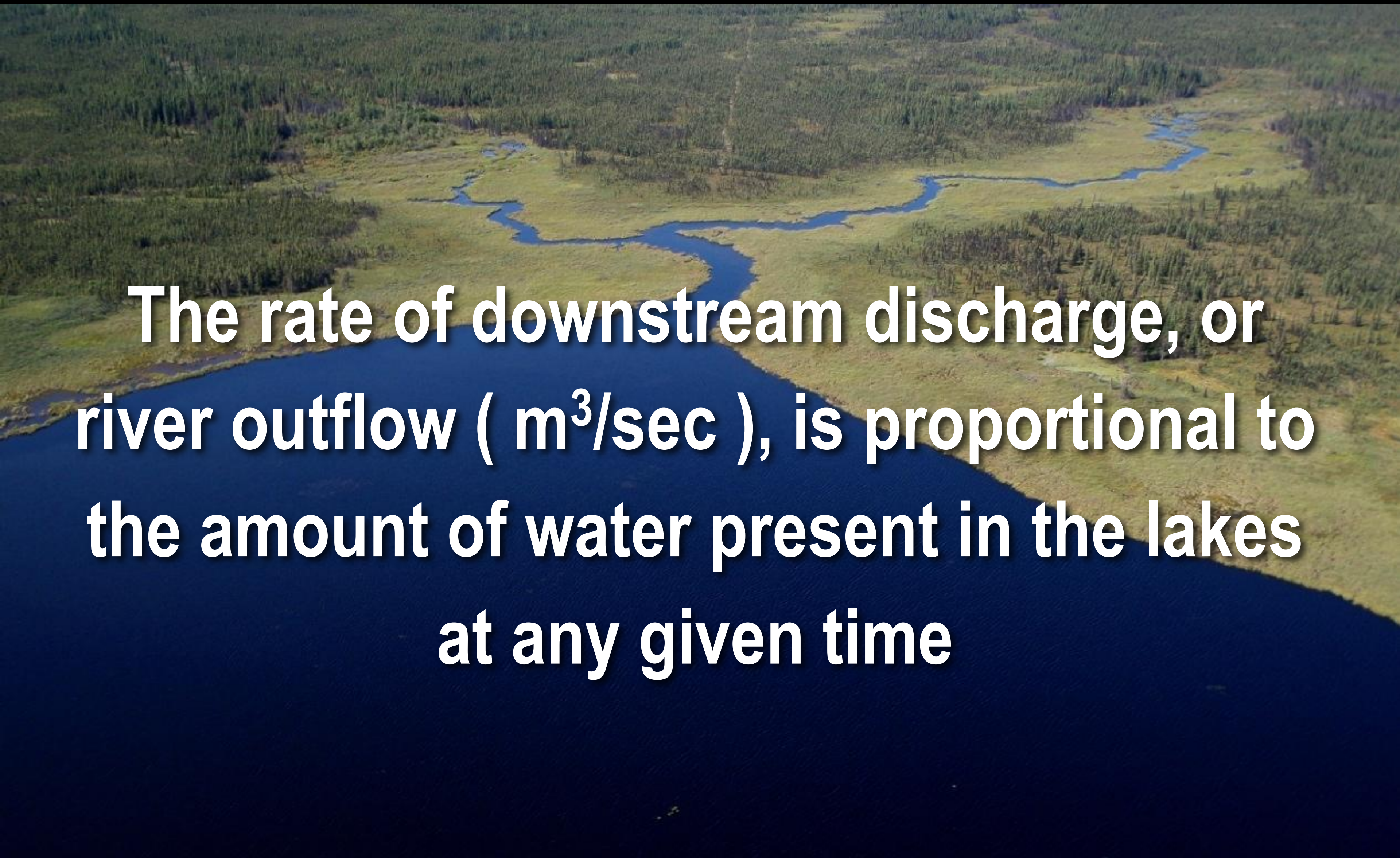
Preserve the natural integrity of the Tsea Lakes ecosystem

WATER MANAGEMENT PLAN

RATIONALE

WATER MANAGEMENT PLAN

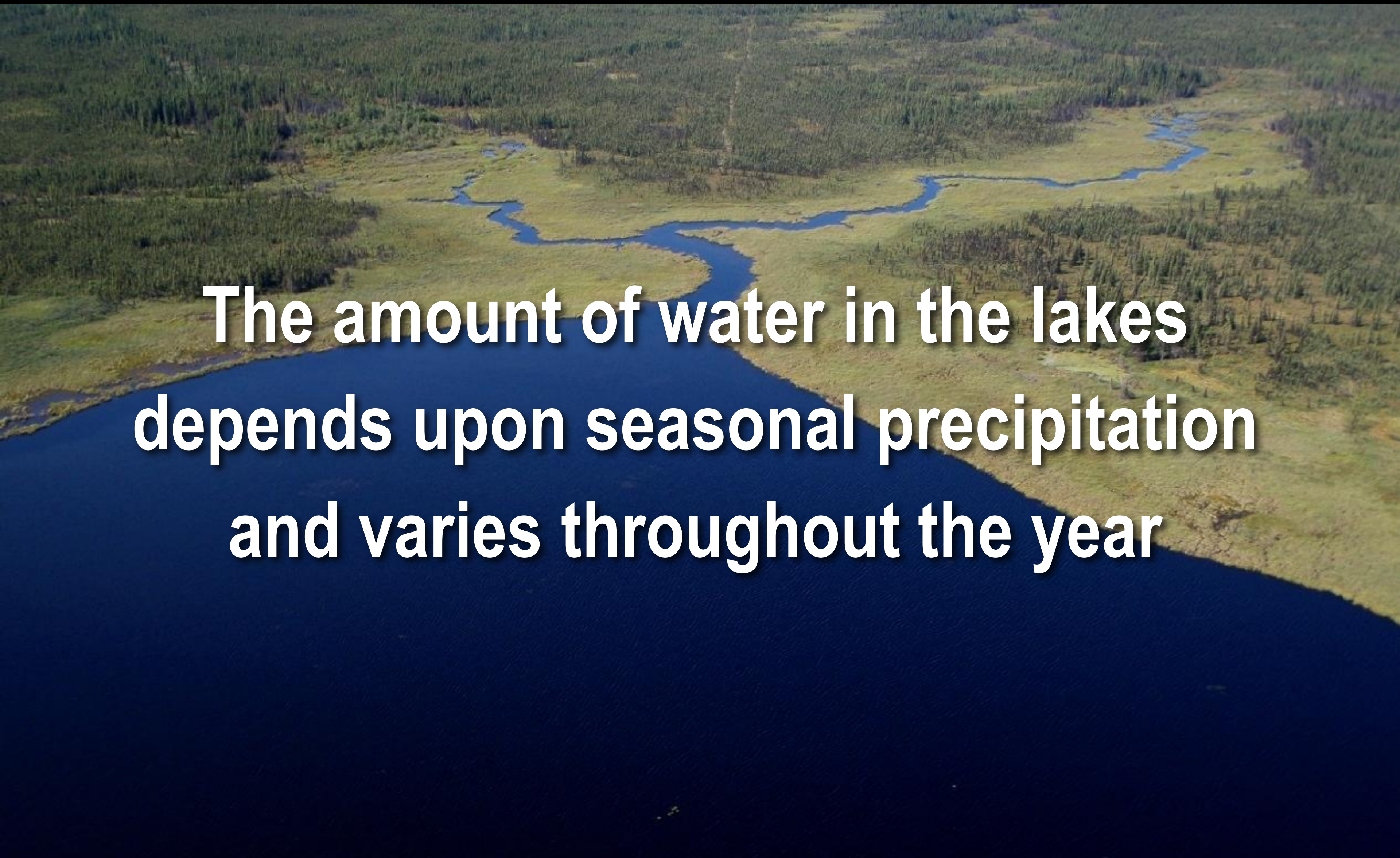
RATIONALE



The rate of downstream discharge, or river outflow (m^3/sec), is proportional to the amount of water present in the lakes at any given time

WATER MANAGEMENT PLAN

RATIONALE



The amount of water in the lakes depends upon seasonal precipitation and varies throughout the year

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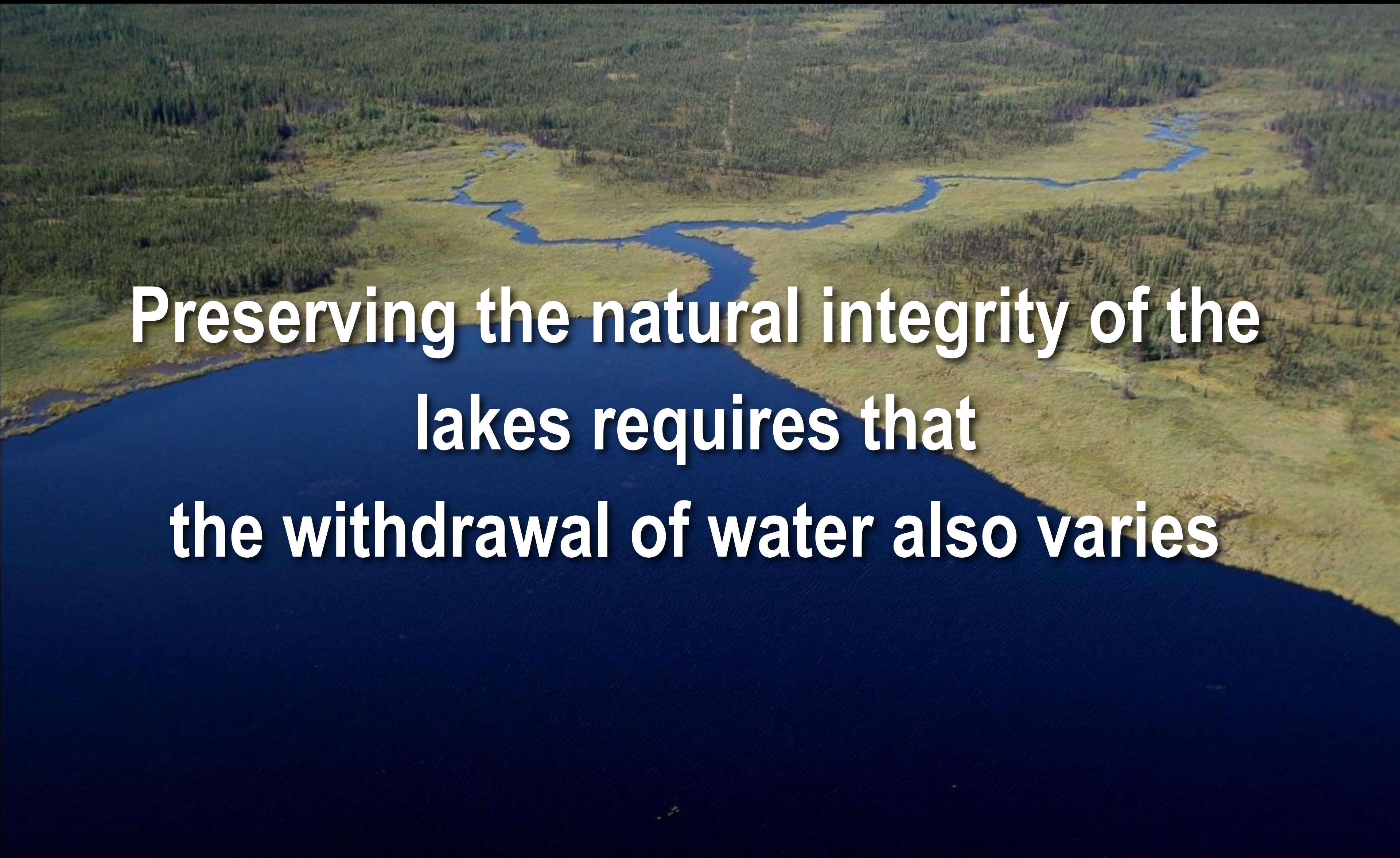
WATER MANAGEMENT PLAN

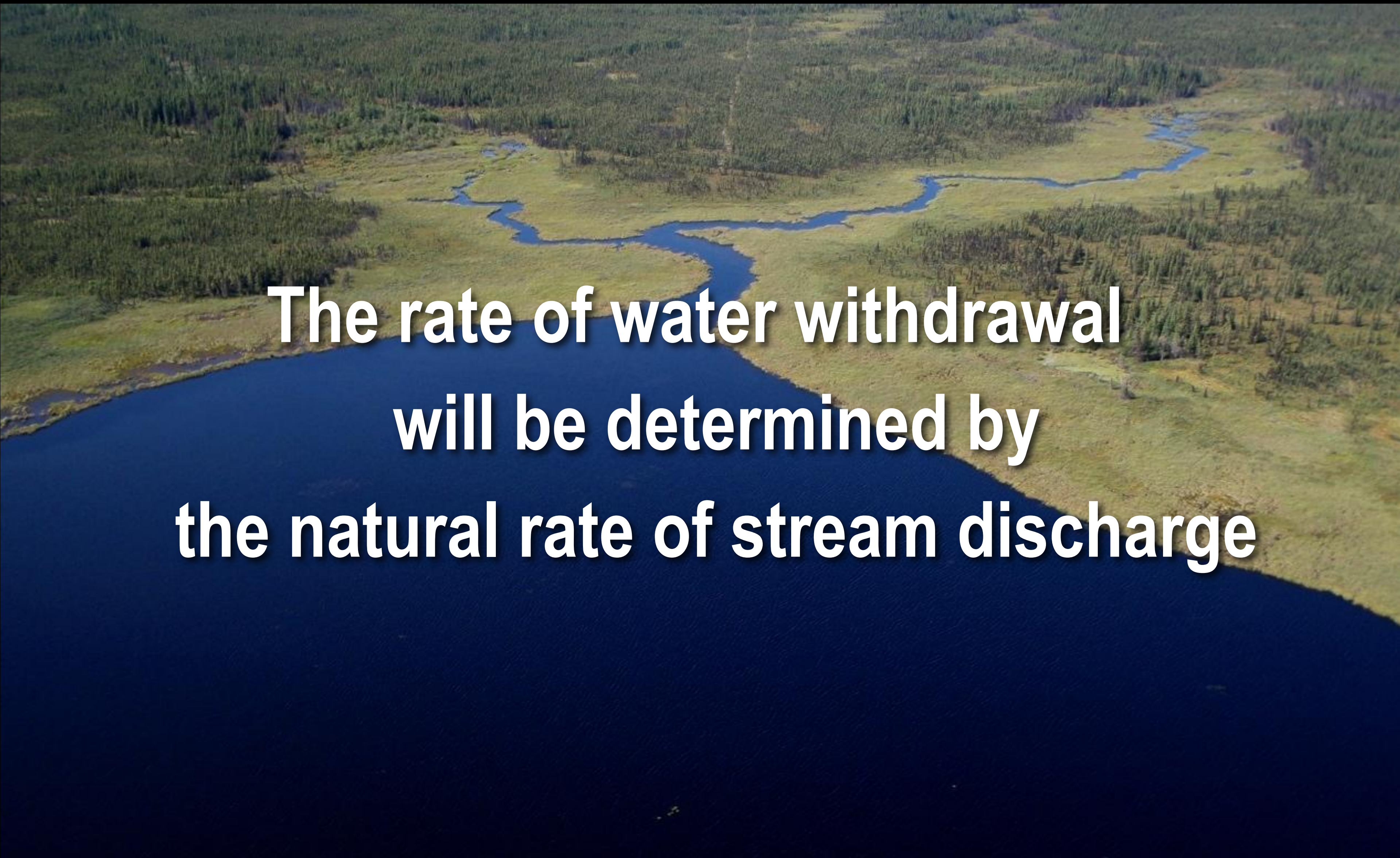
RATIONALE



Preserving the natural integrity of the lakes requires that the withdrawal of water also varies

WATER MANAGEMENT PLAN

RATIONALE



The rate of water withdrawal will be determined by the natural rate of stream discharge

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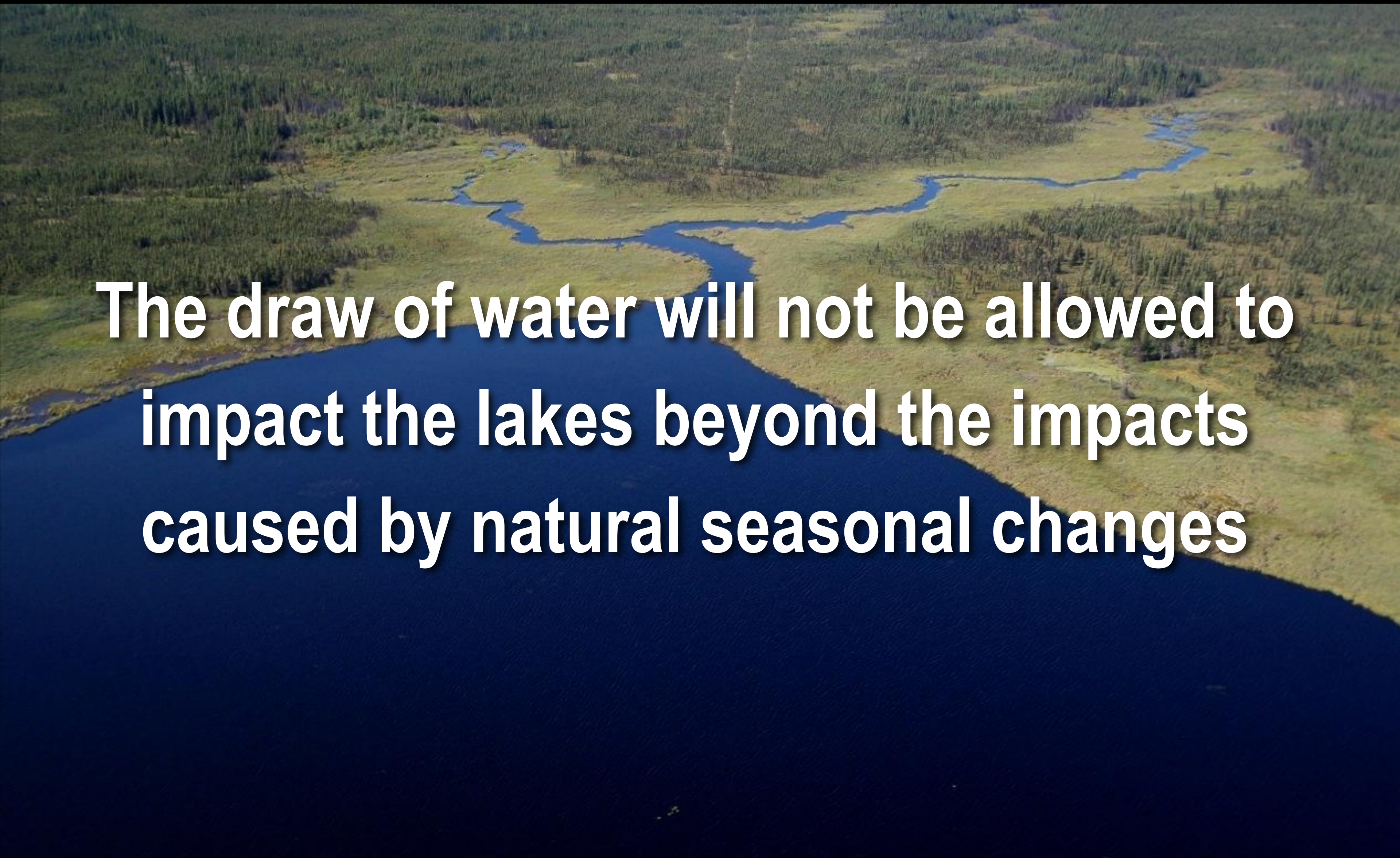
WATER MANAGEMENT PLAN

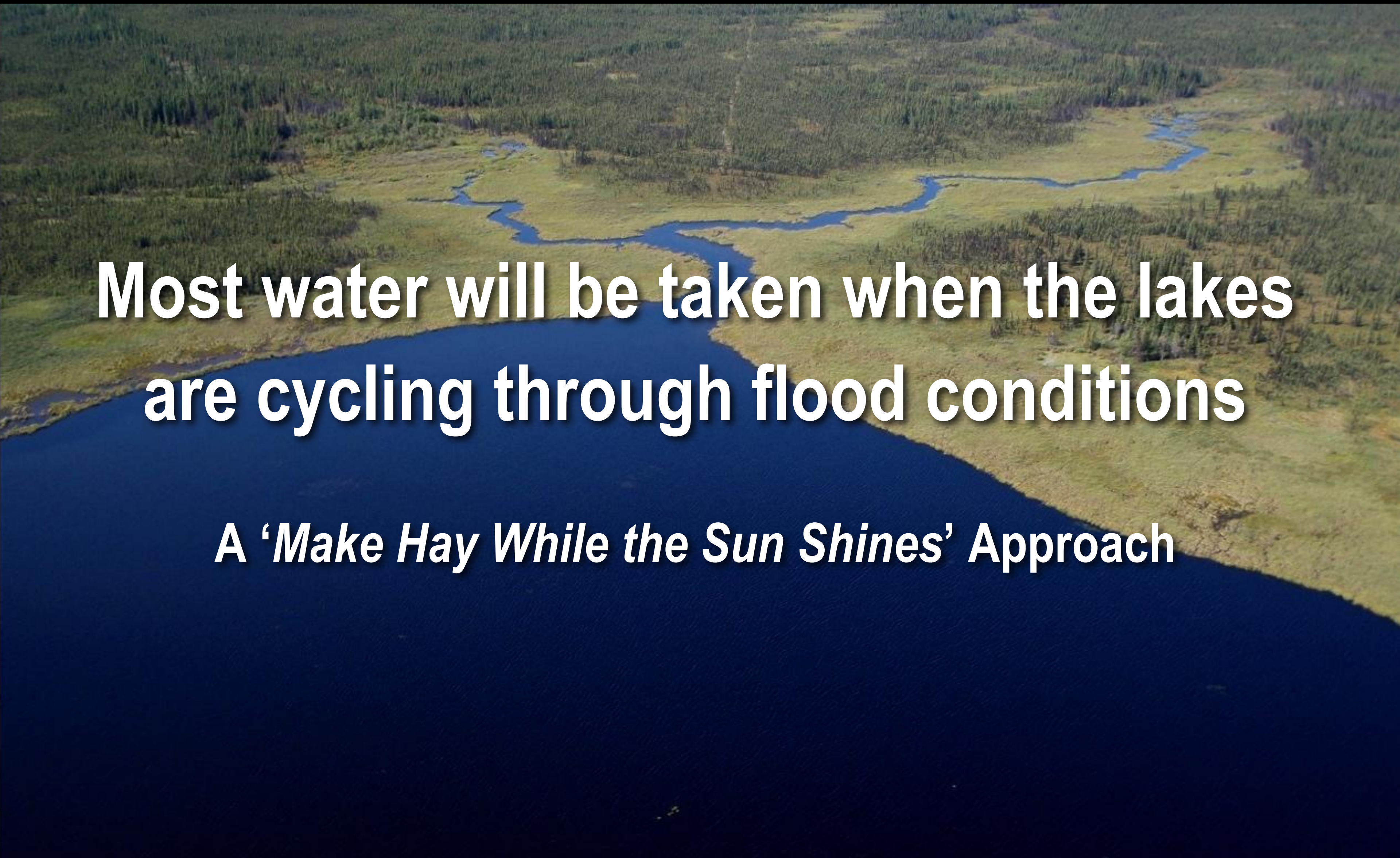
RATIONALE



The draw of water will not be allowed to impact the lakes beyond the impacts caused by natural seasonal changes

WATER MANAGEMENT PLAN

RATIONALE



Most water will be taken when the lakes are cycling through flood conditions

A '*Make Hay While the Sun Shines*' Approach

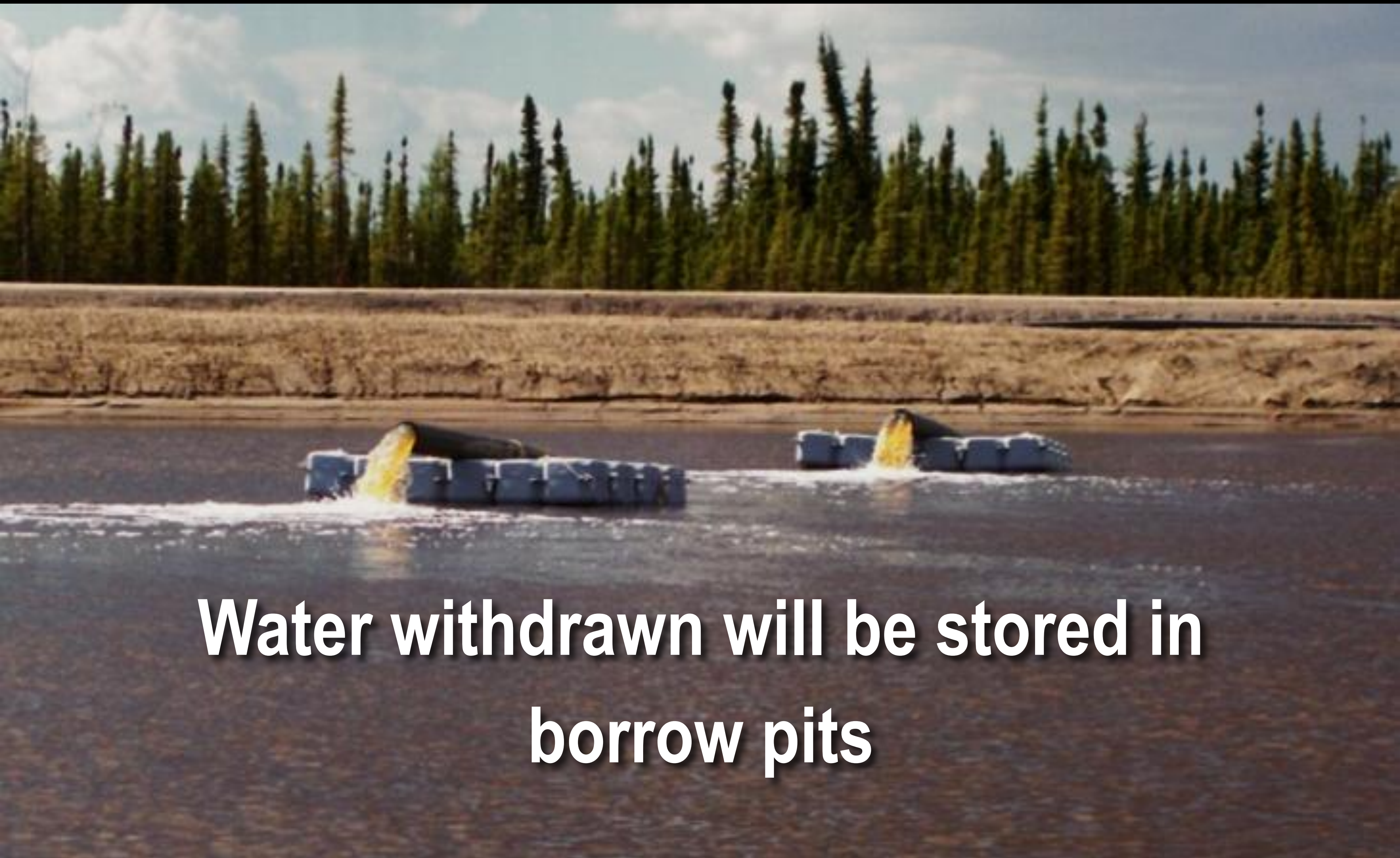
WATER MANAGEMENT PLAN

RATIONALE

Withdrawals may occur on a daily basis

WATER MANAGEMENT PLAN

RATIONALE



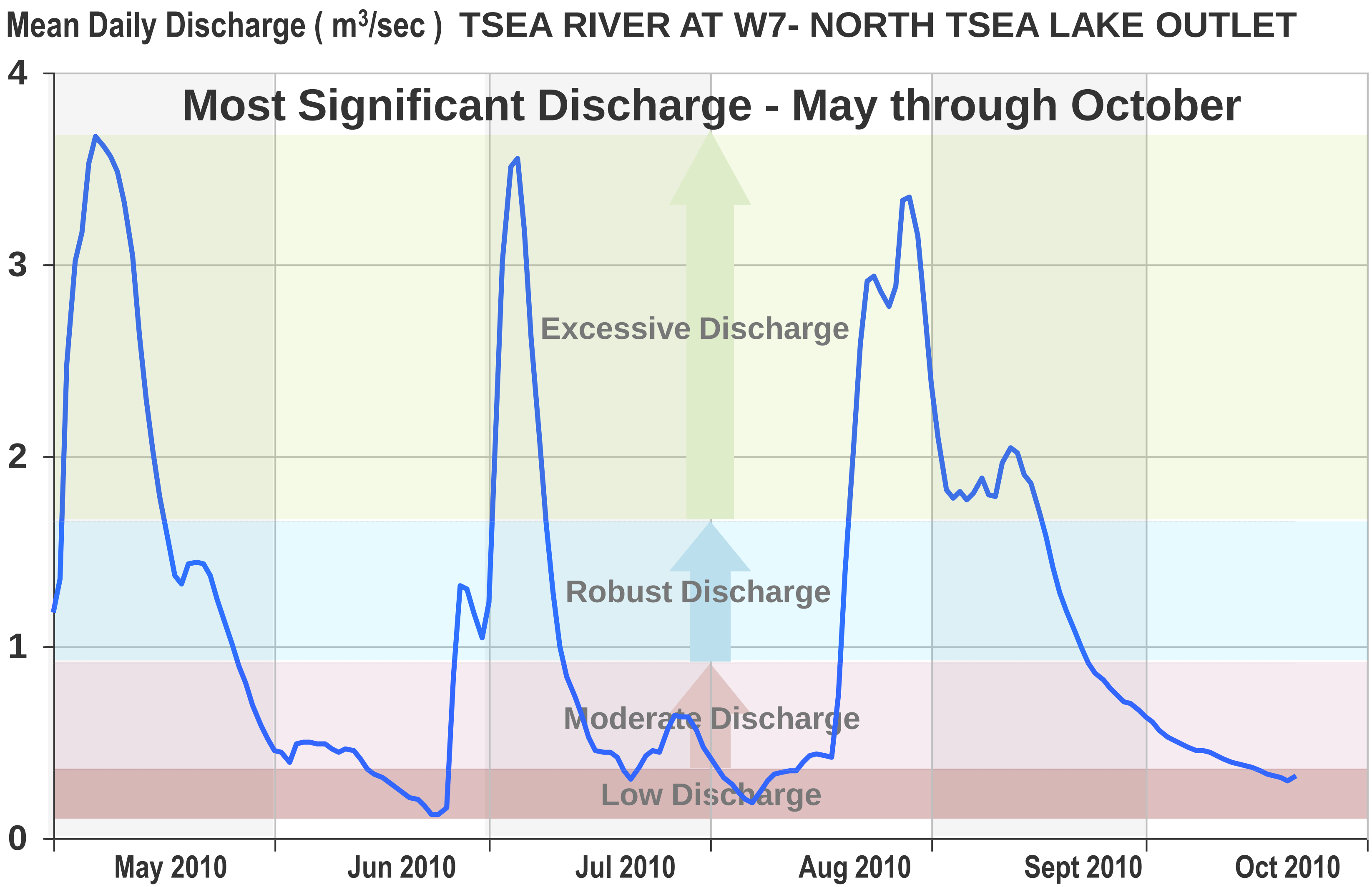
Water withdrawn will be stored in borrow pits

WATER MANAGEMENT PLAN

RATIONALE

All water used for fracking will be drawn from these borrow pits

2010 FIELD WORK - CHARACTERISTIC CURVE



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Low Discharge Stage	XX% of Daily Discharge
Annual Withdrawal Limit	X,XXX,XXX m^3/year

WATER MANAGEMENT PLAN

STRUCTURING THE SUPPLY SIDE

nexen

SUPPLY

Flow Conditions (m^3/sec)
Excessive Discharge Stage
Robust Discharge Stage
Moderate Discharge Stage
Low Discharge Stage
Annual Withdrawal Limit

MEDIAN DISCHARGE RATE

WATER MANAGEMENT PLAN

STRUCTURING THE SUPPLY SIDE

SUPPLY

Flow Conditions
(m^3/sec)

Excessive Discharge Stage

Above Median Flow
Up to XX% above the Median Rate

MEDIAN DISCHARGE RATE

Below Median Flow
Down to XX% below the Median Rate

Critically Weak Stage

Annual Withdrawal Limit

STRUCTURING THE SUPPLY SIDE

SUPPLY

Flow Conditions (m^3/sec)
High Flow Greater than XX% above the Median Rate
Above Median Flow Up to XX% above the Median Rate
Below Median Flow Down to XX% below the Median Rate
Low Flow Below XX% of the Mean Annual Flow
Annual Withdrawal Limit

MEDIAN DISCHARGE RATE

WATER MANAGEMENT PLAN

QUANTIFYING THE SUPPLY SIDE

SUPPLY

Flow Conditions
(m^3/sec)

High Flow
Greater than XX% above the Median Rate

FLOOD THRESHOLD

Above Median Flow
Up to XX% above the Median Rate

MEDIAN DISCHARGE RATE

Below Median Flow
Down to XX% below the Median Rate

LOW FLOW THRESHOLD

Low Flow
Below XX% of the Mean Annual Flow

Annual Withdrawal Limit

- Median Discharge Rate
  0.918 m^3 /sec
- Flood Threshold
  80% above the Median
  1.652 m^3 /sec
- Low Flow Threshold
  30% below the Mean Annual Flow
  0.351 m^3 /sec

QUANTIFYING THE SUPPLY SIDE

SUPPLY

Flow Conditions (m^3/sec)
High Flow Greater than 80% above the Median Rate
FLOOD THRESHOLD: 1.652 m^3 /sec
Above Median Flow Up to 80% above the Median Rate
MEDIAN DISCHARGE RATE: 0.918 m^3 /sec
Below Median Flow Down to 30% below the Median Rate
LOW FLOW THRESHOLD: 0.351 m^3 /sec
Low Flow Below 30% of the Mean Annual Flow

Annual Withdrawal Limit

WATER MANAGEMENT PLAN

QUANTIFYING THE DRAW SIDE

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SUPPLY	DRAW
Flow Conditions (m^3/sec)	**Licensed Withdrawal**
High Flow Greater than 80% above the Median Rate	XX% of Daily Discharge
FLOOD THRESHOLD: 1.652 m^3 /sec	
Above Median Flow Up to 80% above the Median Rate	XX% of Daily Discharge
MEDIAN DISCHARGE RATE: 0.918 m^3 /sec	
Below Median Flow Down to 30% below the Median Rate	XX% of Daily Discharge
LOW FLOW THRESHOLD: 0.351 m^3 /sec	
Low Flow Below 30% of the Mean Annual Flow	XX% of Daily Discharge
Annual Withdrawal Limit	X,XXX,XXX m^3/year

WATER MANAGEMENT PLAN

QUANTIFYING THE DRAW SIDE

SUPPLY	DRAW
Flow Conditions (m^3/sec)	**Licensed Withdrawal**
High Flow Greater than 80% above the Median Rate	**25%** of Daily Discharge
FLOOD THRESHOLD: 1.652 m^3/sec	
Above Median Flow Up to 80% above the Median Rate	**15%** of Daily Discharge
MEDIAN DISCHARGE RATE: 0.918 m^3/sec	
Below Median Flow Down to 30% below the Median Rate	**10%** of Daily Discharge
LOW FLOW THRESHOLD: 0.351 m^3/sec	
Low Flow Below 30% of the Mean Annual Flow	**No Withdrawal**
Annual Withdrawal Limit	**2,500,000 m^3/year**

WATER MANAGEMENT PLAN

FINAL CONSTRUCT

SUPPLY Flow Conditions (m^3/sec)	DRAW Licensed Withdrawal
High Flow Greater than 80% above the Median Rate	25% of Daily Discharge
FLOOD THRESHOLD: 1.652 m^3 /sec	
Above Median Flow Up to 80% above the Median Rate	15% of Daily Discharge
MEDIAN DISCHARGE RATE: 0.918 m^3 /sec	
Below Median Flow Down to 30% below the Median Rate	10% of Daily Discharge
LOW FLOW THRESHOLD: 0.351 m^3 /sec	
Low Flow Below 30% of the Mean Annual Flow	No Withdrawal
Annual Withdrawal Limit	2,500,000 m^3/year

WATER MANAGEMENT PLAN

IN EFFECT

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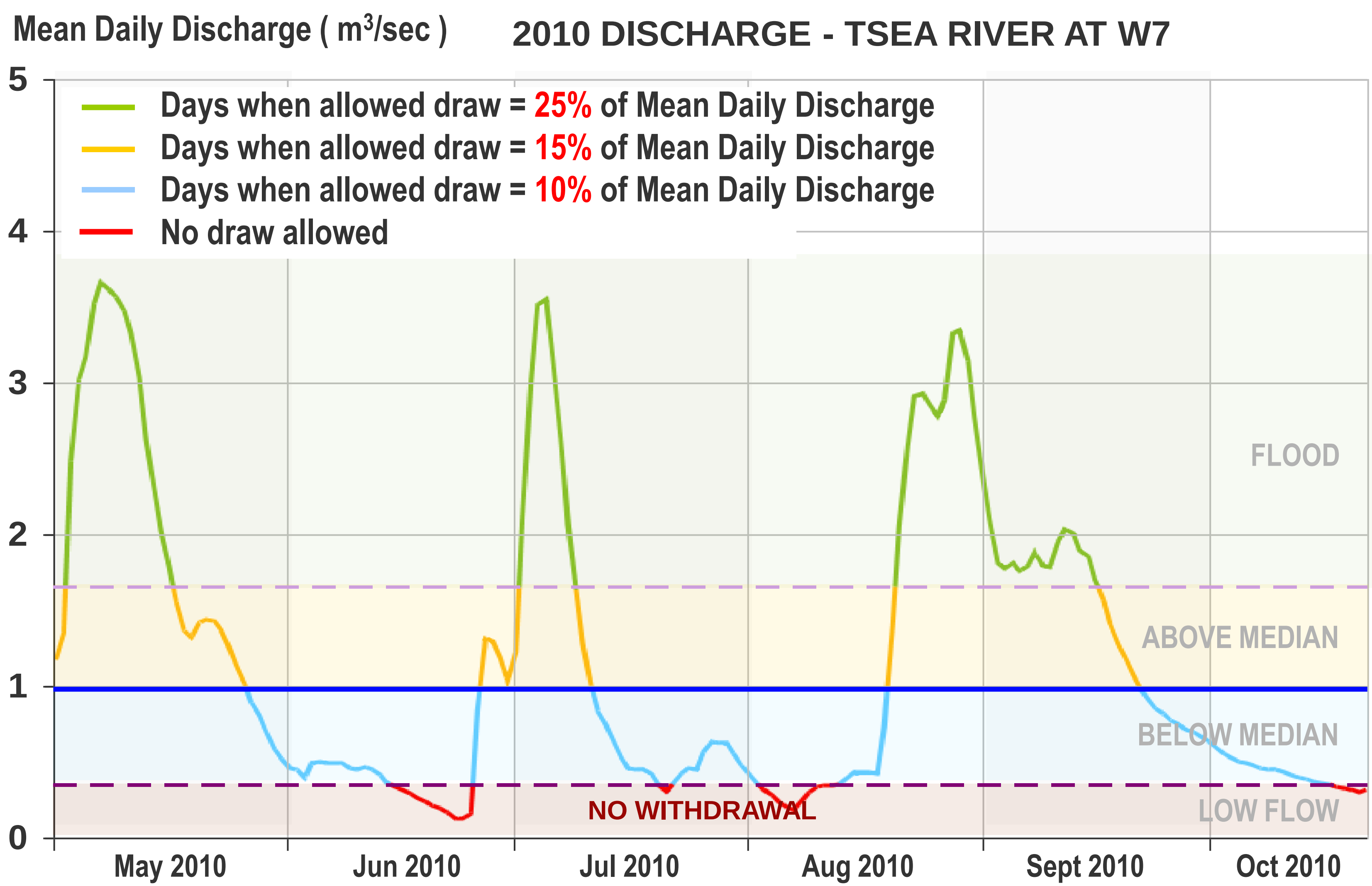
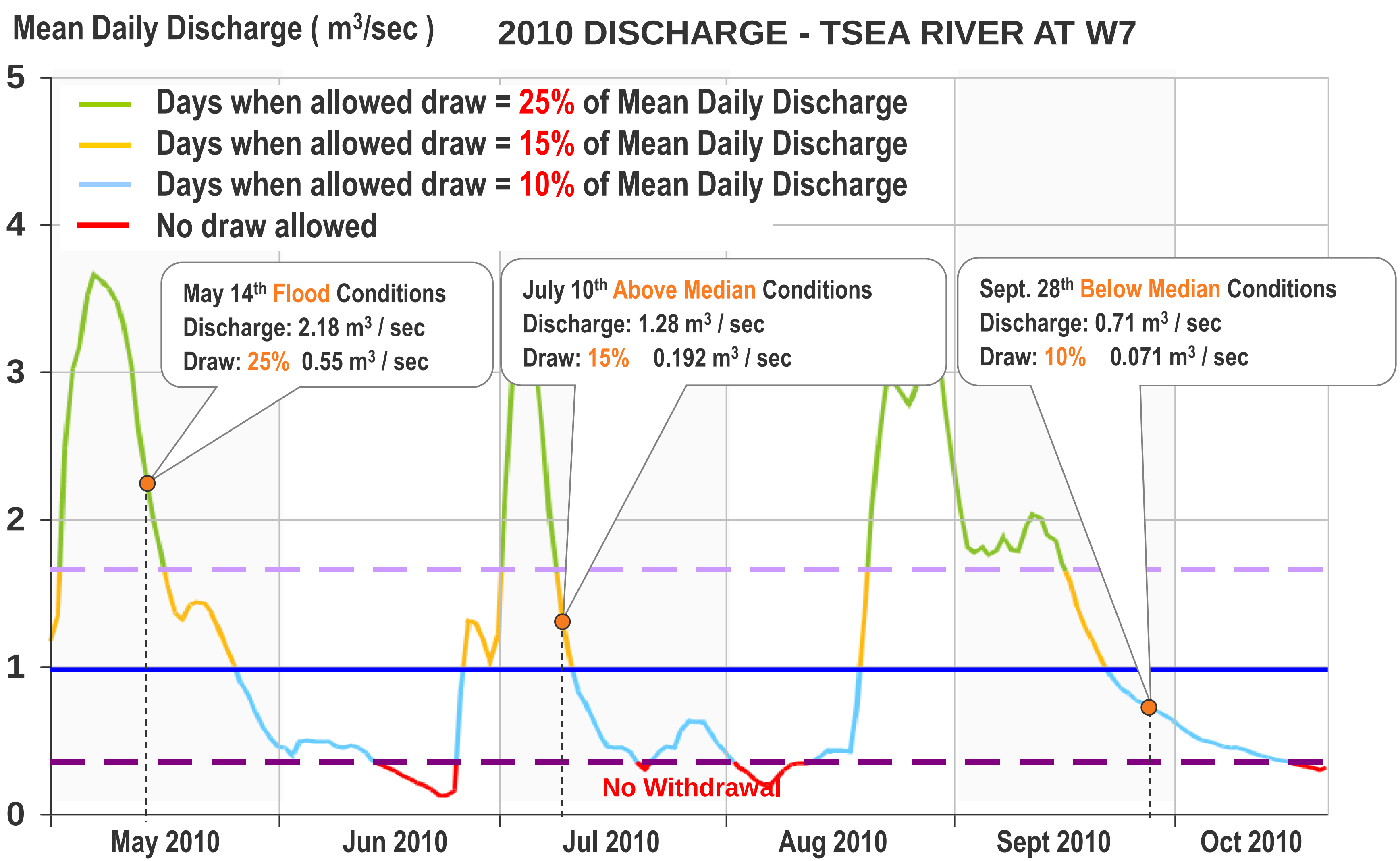


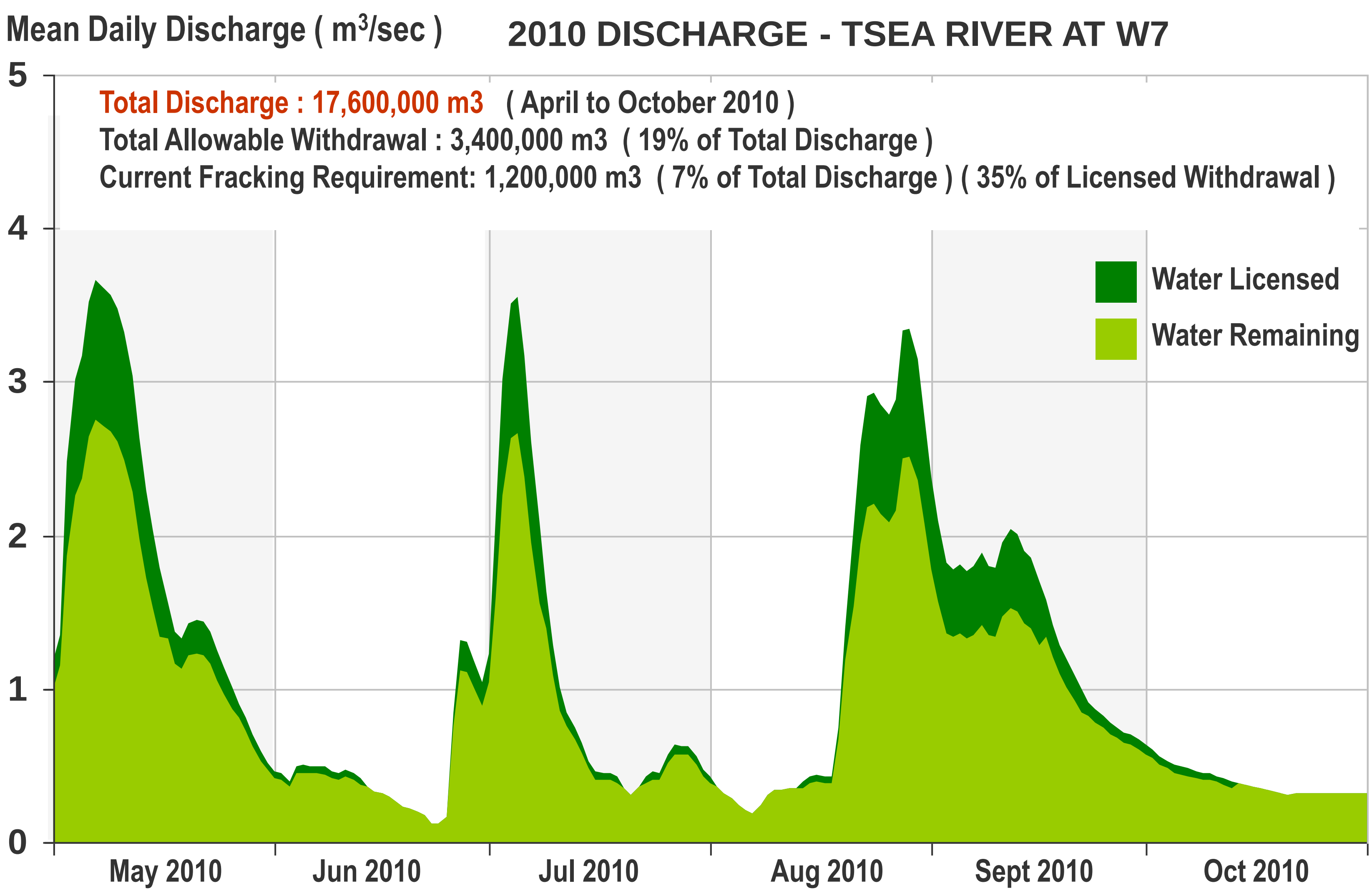
WATER MANAGEMENT PLAN

IN EFFECT



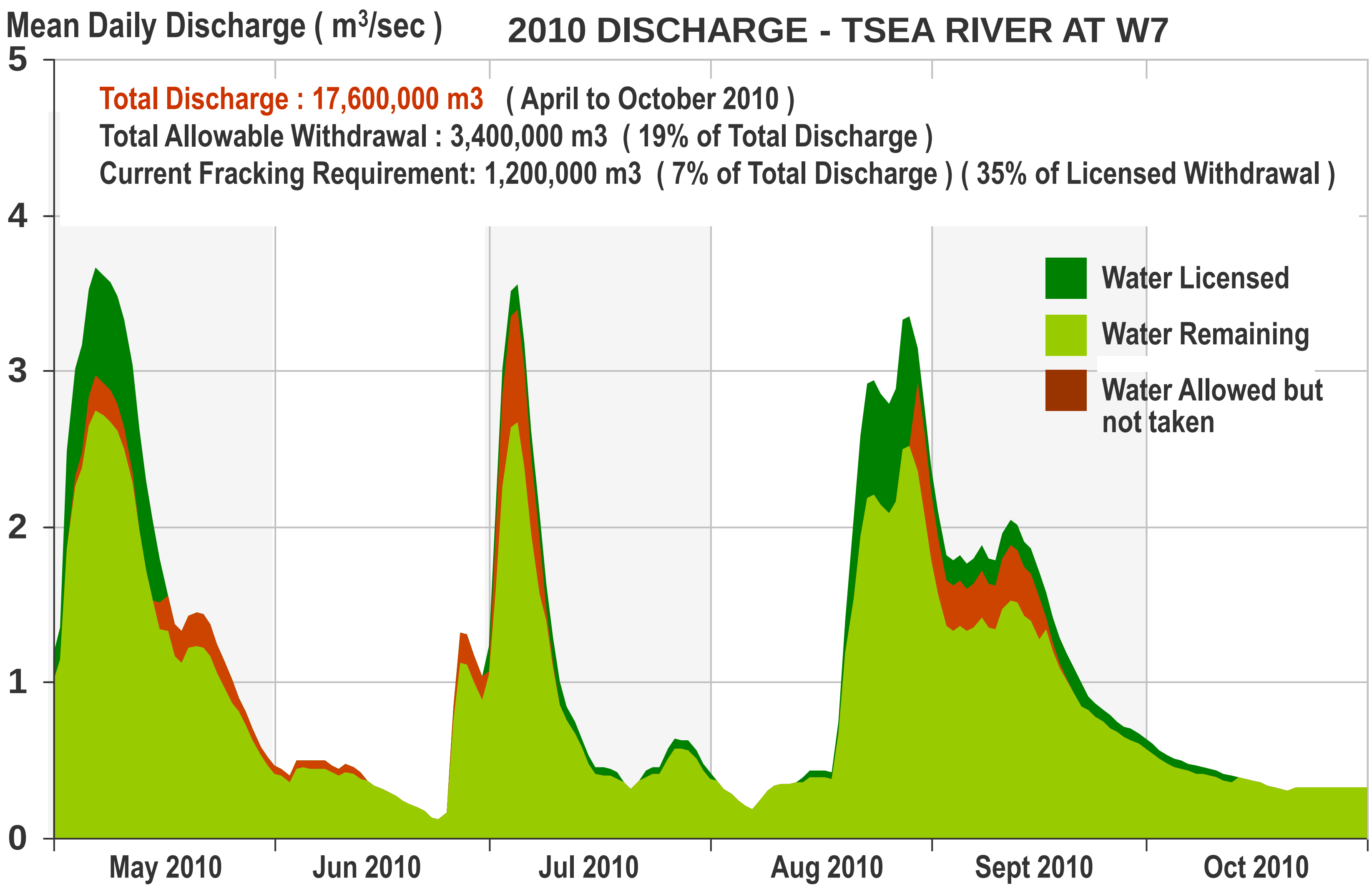
IN EFFECT

WATER MANAGEMENT PLAN



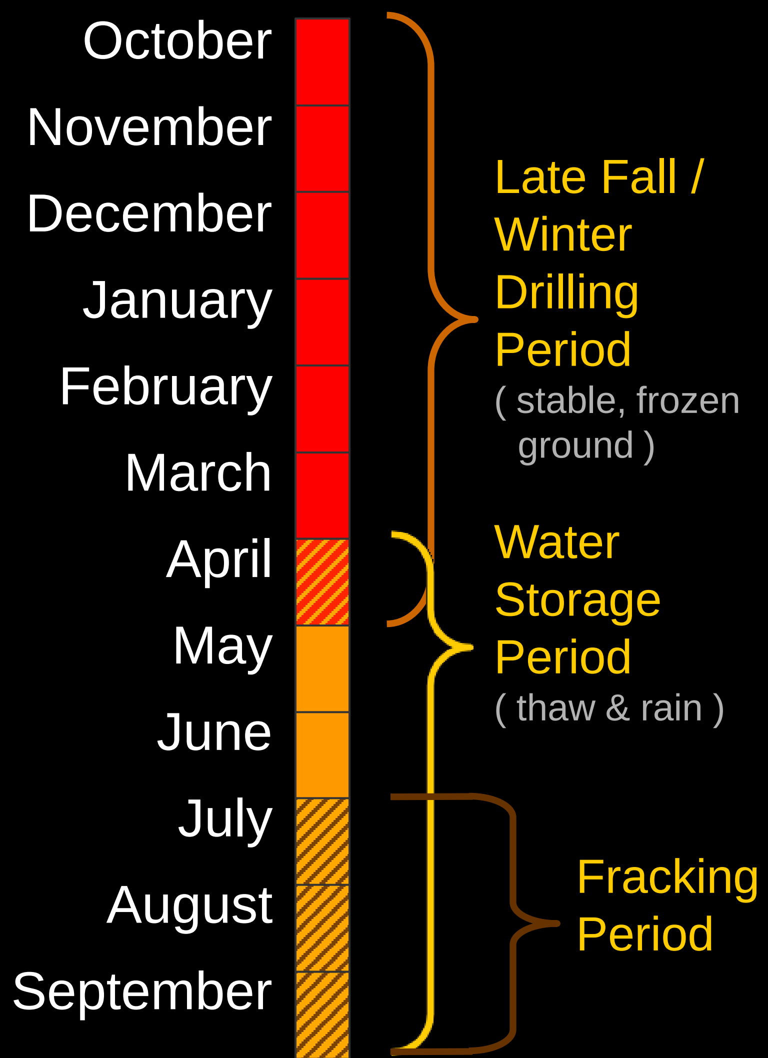
WATER MANAGEMENT PLAN

IN EFFECT



WATER MANAGEMENT PLAN

SEASONAL NATURE OF HORN RIVER ACTIVITY



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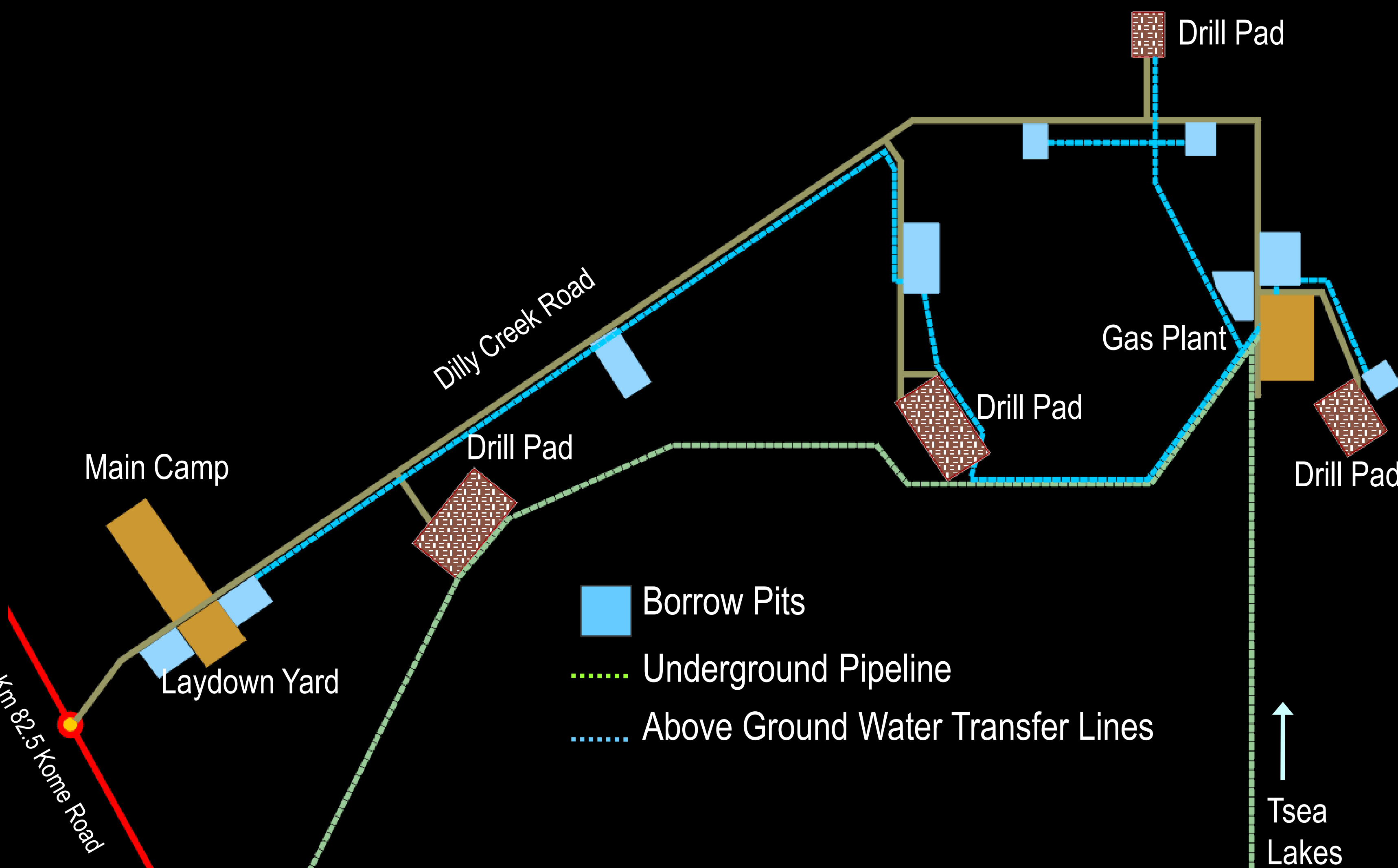
BORROW PIT DEVELOPMENT

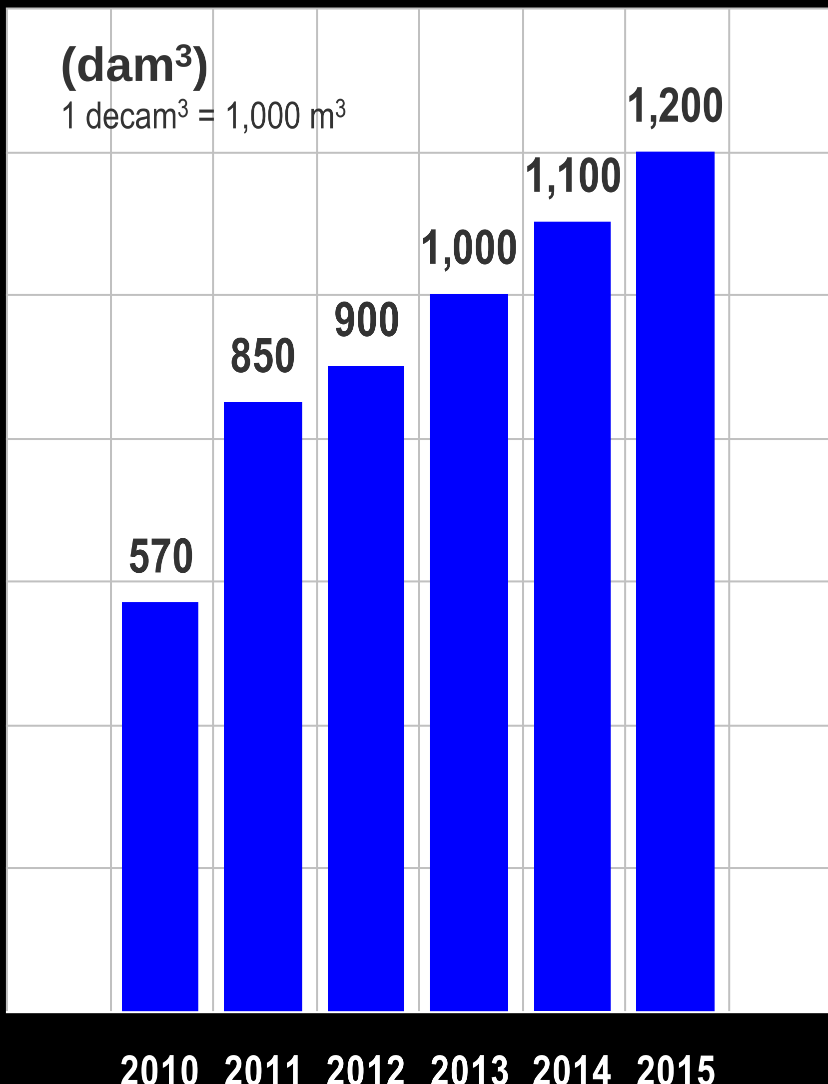
- Material is excavated for roads and well-pad construction
- The excavated pits are used as water storage pits
- Water storage serves to separate water source from water demand for the frack program

WATER MANAGEMENT PLAN

BORROW PIT STORAGE FACILITIES



FUTURE BORROW PIT STORAGE CAPACITY



- At current rate of drilling, i.e. one 20-well pad per year, water storage capacity will equal the annual water requirement in 2015

WATER MANAGEMENT PLAN

WATER LICENSE - CONSTRUCT

SUPPLY	DRAW
Flow Conditions (m^3/sec)	**Licensed Withdrawal**
High Flow Greater than 80% above the Median Rate	25% of Daily Discharge
FLOOD THRESHOLD: 1.652 m^3 /sec	
Above Median Flow Up to 80% above the Median Rate	15% of Daily Discharge
MEDIAN DISCHARGE RATE: 0.918 m^3 /sec	
Below Median Flow Down to 30% below the Median Rate	10% of Daily Discharge
LOW FLOW THRESHOLD: 0.351 m^3 /sec	
Low Flow Below 30% of the Mean Annual Flow	No Withdrawal
Annual Withdrawal Limit	2,500,000 m^3/year

WATER MANAGEMENT PLAN

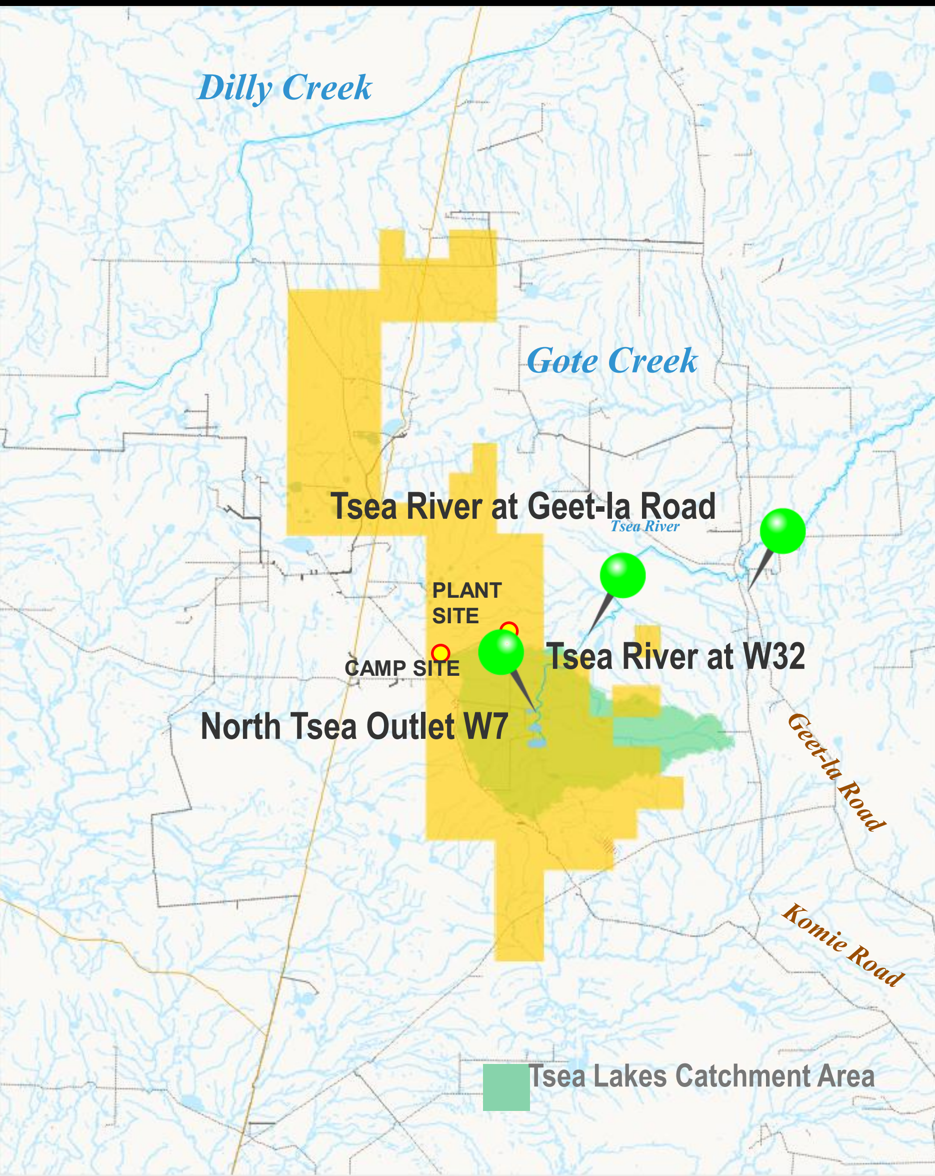
WATER LICENSE - ADDITIONAL COMMITMENTS

ENVIRONMENTAL

- As part of our water license proposal, Nexen has committed to an extensive environmental monitoring and reporting program to track potential impact on:

- Hydrology
- Climate
- Shallow Groundwater

DOWNSTREAM EFFECTS



- Precipitation
- Stream water levels and discharge
- Lake water levels and bathymetry (depths/contours)
- Snow course

WATER MANAGEMENT PLAN

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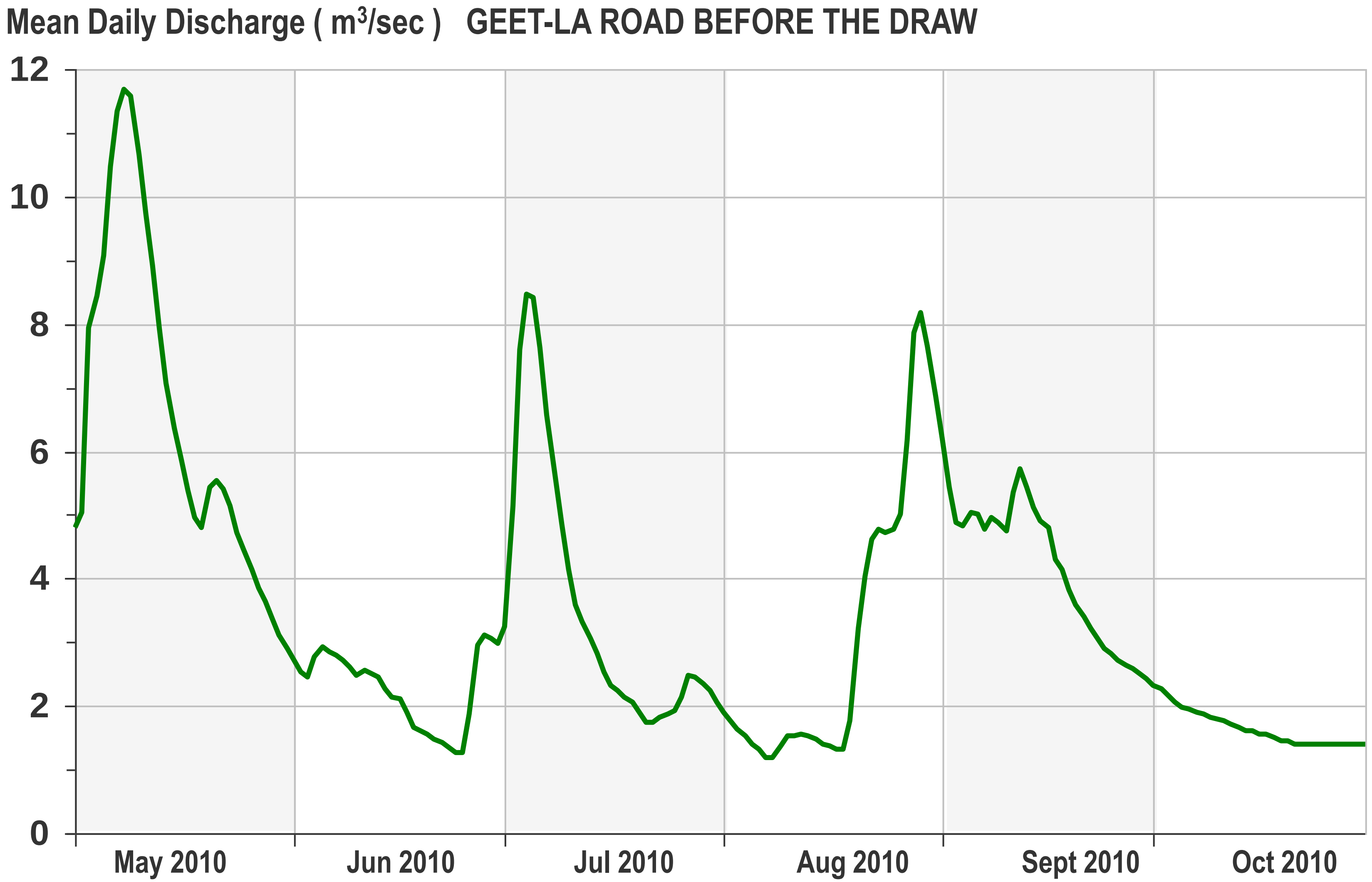
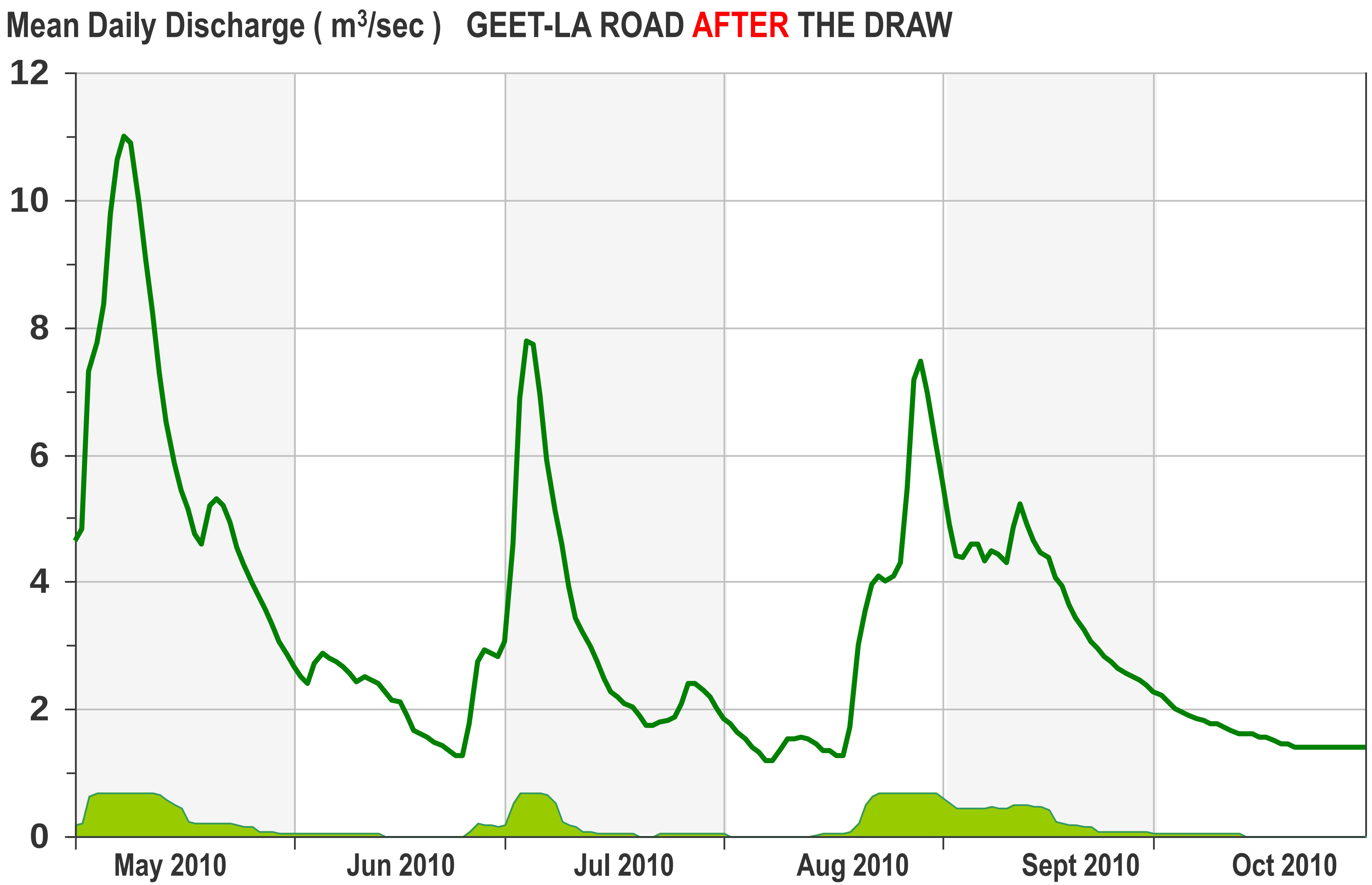
DOWNSTREAM EFFECTS - DISCHARGE



DOWNSTREAM EFFECTS - DISCHARGE



WATER LICENSE - ADDITIONAL COMMITMENTS

IMPACT MONTORING

In 2009, samples were taken across the region at various times to provide pre-impact baselines for periodic monitoring of…

Water Quality

Fish

Birds

Mammals

Communities

nexen

WATER LICENSE - ADDITIONAL COMMITMENTS

REPORTING

- Ministry of Environment

  Nexen will provide the results of its monitoring program in an annual report and review

- Fort Nelson First Nations and other Downstream Communities

  Nexen will confer with community groups whenever requested, involve them in the monitoring program and, at a minimum, conduct an annual meeting and review of results

BRITISH COLUMBIA
The Best Place on Earth

FORT NELSON FIRST NATION

WATER MANAGEMENT PLAN

2012 FIELD WORK

WATER MANAGEMENT PLAN

2012 FIELD WORK - OBJECTIVES

- Complete the implementation of The Water Management Plan in anticipation of the Water License
- Add data to and understanding of the factors that effect the catchment and control water availability
- Monitor the downstream effects of The Water Management Plan
- Standardize the collection of data to achieve continuity with the provincial and federal monitoring programs

WATER COLLECTION - FACILITIES

- An automatic interface is being installed to measure lake discharge and adjust the water withdrawal pump rate in accordance with The Water Management Plan
- This process is facilitated by the fact that both the discharge from the lake and the pump speed are measured in m^3/sec

Shale Gas

An Introduction

Water Management Plan

Concept & Implementation

Responsible Development

An Established Principle

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Water Management Plan

Dilly Creek Lease • Horn River Basin • NE British Columbia

April, 2012

Shale Gas
An Introduction

Water Management Plan
Concept & Implementation

Responsible Development
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Water Management Plan
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April 2012

NEXEN & RESPONSIBLE DEVELOPMENT

Nexen has a long-standing record of good stewardship and responsible resource development. These principles have been incorporated in the Water Management Plan

- The company has a strong commitment to health, safety and the environment and social responsibility
- The primary rationale for The Water Management Plan is to preserve the integrity of the Tsea Lakes
- The current 'Debolt Solution' is unacceptable
- Nexen always looks for and invests in 'a better way'
- A measured approach to shale gas development… determined by economics…has been used as an opportunity to find a better Debolt water solution
- Site excavations are planned as borrow pits
- Borrow pits separate water demand from the source
- Our water license approach mitigates unintended, potentially harmful effects of short-term licensing
- Nexen is committed to impact monitoring, reporting to stakeholders and protecting the environment

Shale Gas
Water Management Plan
Responsible Development

Zoe Robson

Nexen Inc.

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