Project Description

Wuskwatim Generation Project and Wuskwatim Transmission Project

Clean Environment Commission Hearing

March-April 2004

EXHIBIT NUMBER: MH/NCN 1000
File Name: Wuskwatim
Date: March 1, 2004
Received by: R.C.
(Commission Secretary)

NISICHAWAYASIHK CREE NATION

Manitoba Hydro

Wuskwatim Generation Project and Wuskwatim Transmission Project

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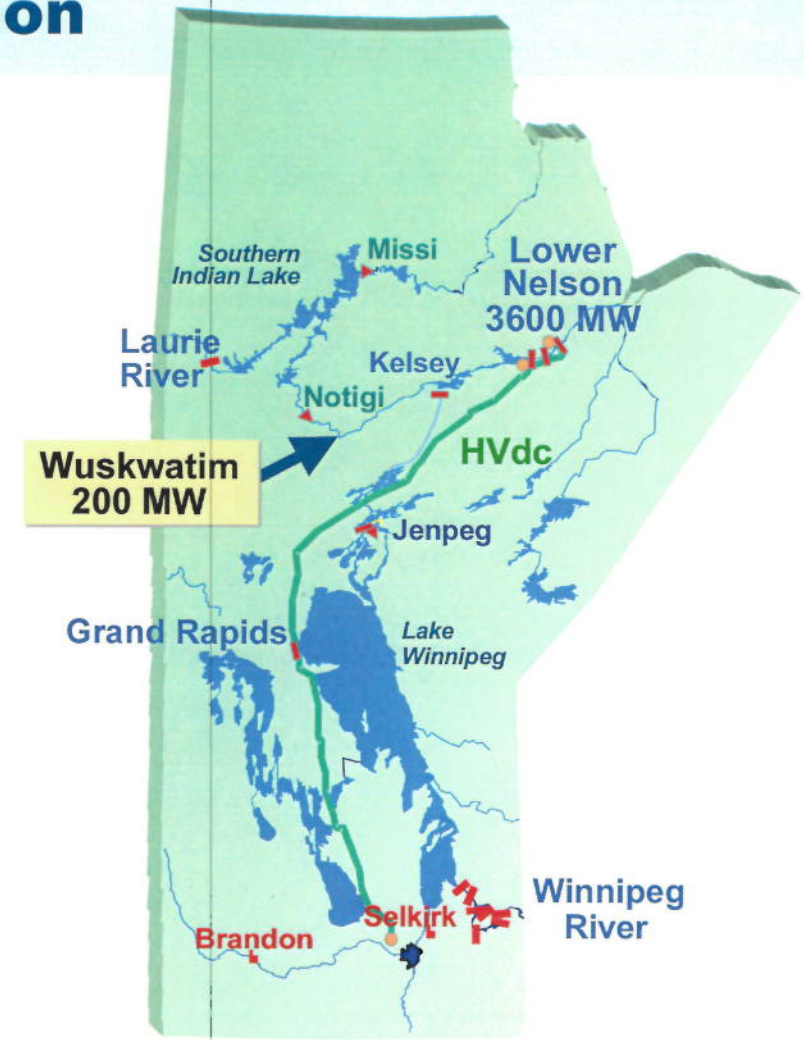
Introduction



Introduction: Wuskwatim Generation Project

- A 200 megawatt generating station at Taskinigup Falls on the Burntwood River
- Associated access road, construction camp and other infrastructure
- Six-year construction schedule with completion in 2010

Introduction: Wuskwatim Transmission Project

- Transmission lines and stations to connect the new Wuskwatim Generating Station to the existing Manitoba Hydro transmission system

Wuskwatim Generation Project

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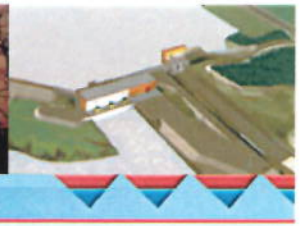
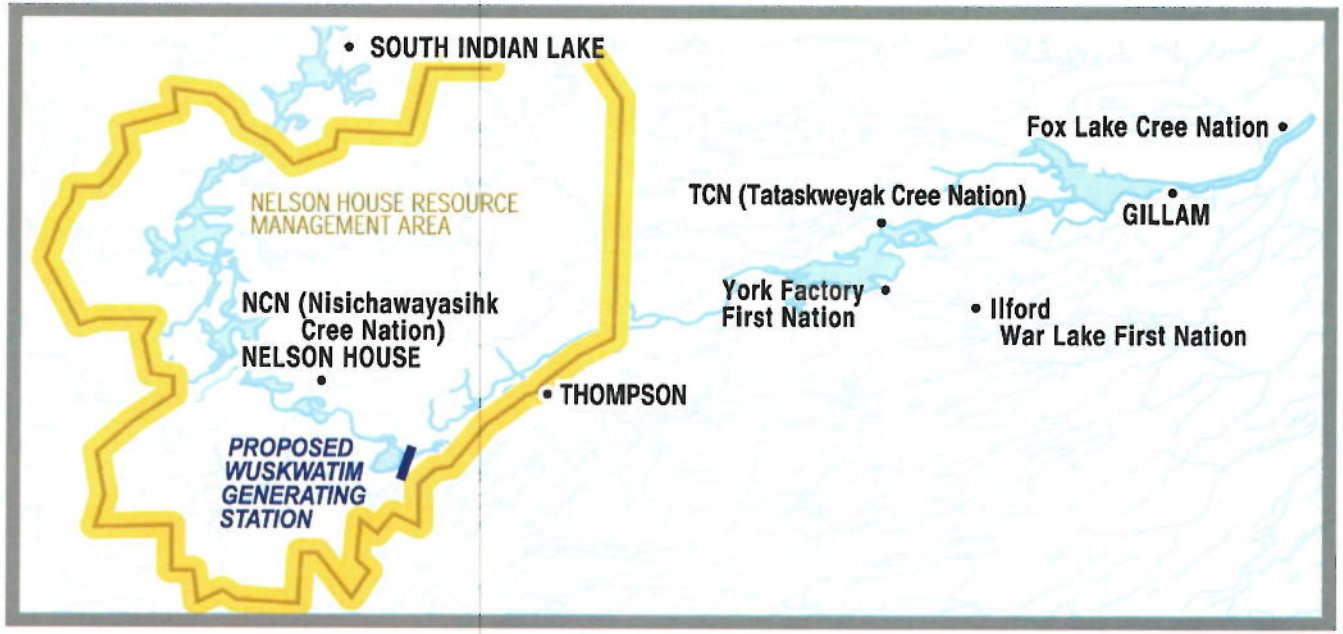
Wuskwatim Generation Site



Project Location

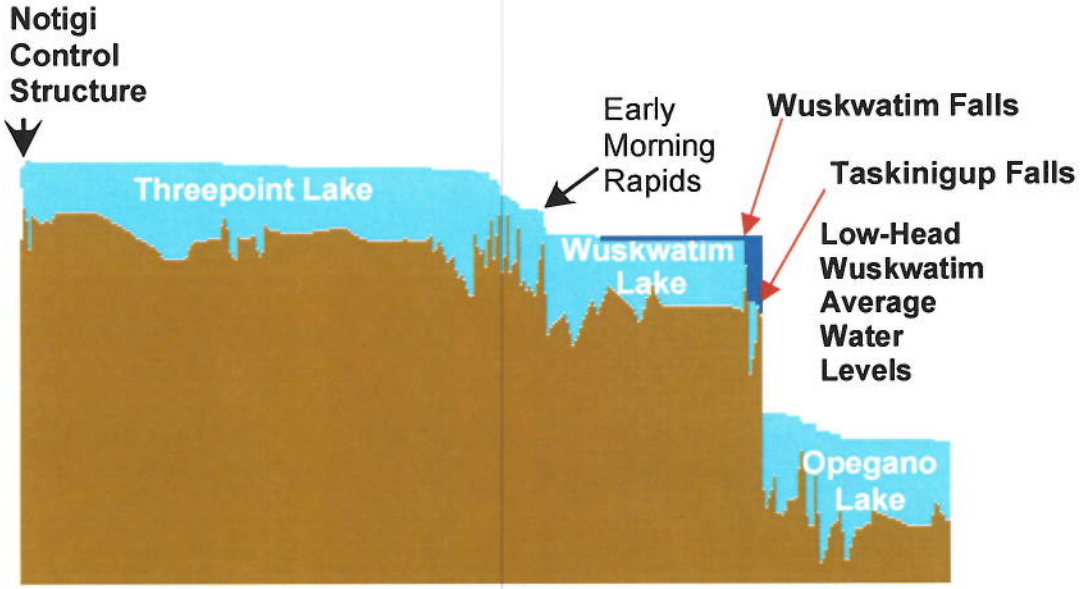
- **The Project is located just downstream of Wuskwatim Lake (at Taskinigup Falls), 37 km southeast of Nelson House:**
  - ***Combined drop of 22 m (about 72 feet) at Wuskwatim and Taskinigup Falls***



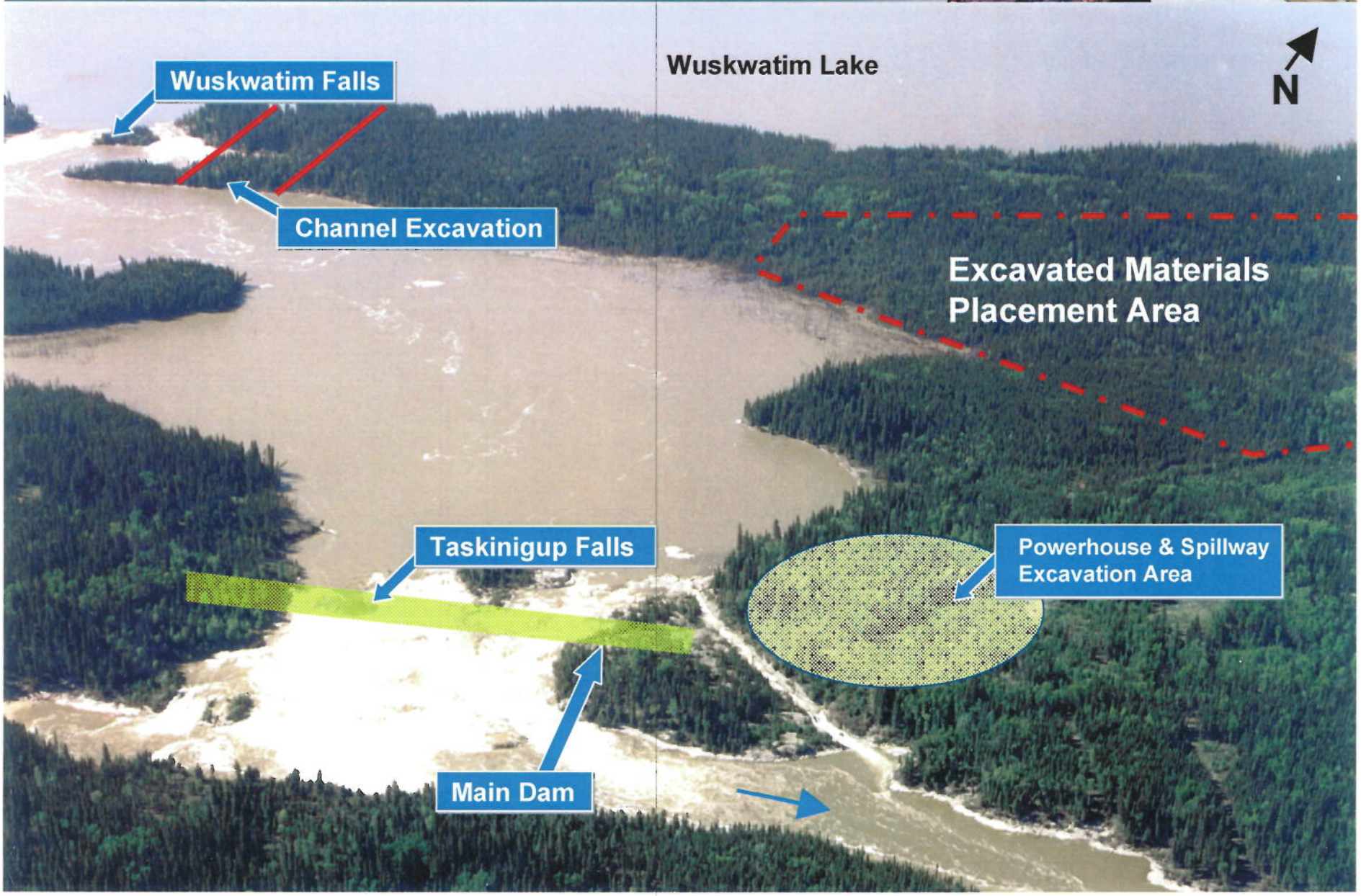
Minimal Flooding

- **Manitoba Hydro and NCN selected a low-head design for the Generation Project**
- **Minimizes environmental effects by reducing the amount of flooding to less than one-half square kilometre**
  - ***The low-head design produces about 200 megawatts of power compared to 350 megawatts from a high-head design***
  - ***A high-head design (not chosen) would have resulted in about 140 square kilometres (54 square miles) of flooding***
  - ***Low-head design has smallest amount of flooding of any generating station in Manitoba Hydro's system***

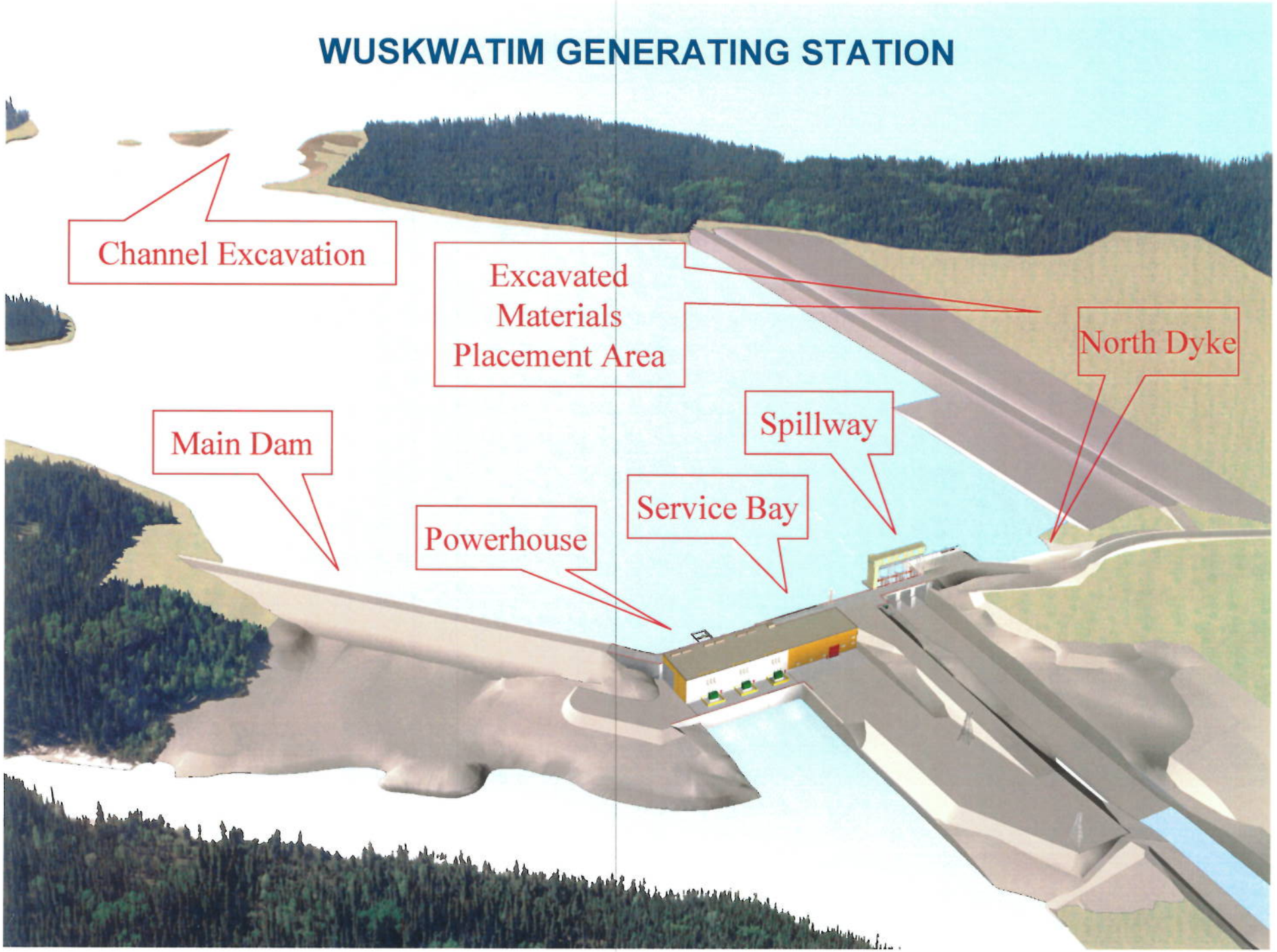
Water Level Change with Low-Head Design



- Increase in water levels between Taskinigup and Wuskwatim Falls, where less than one-half square kilometre of land will be flooded
- Reduced seasonal water level fluctuations on Wuskwatim Lake


Wuskwatim Falls
Channel Excavation
Wuskwatim Lake
N
Excavated Materials
Placement Area
Taskinigup Falls
Powerhouse & Spillway
Excavation Area
Main Dam

WUSKWATIM GENERATING STATION



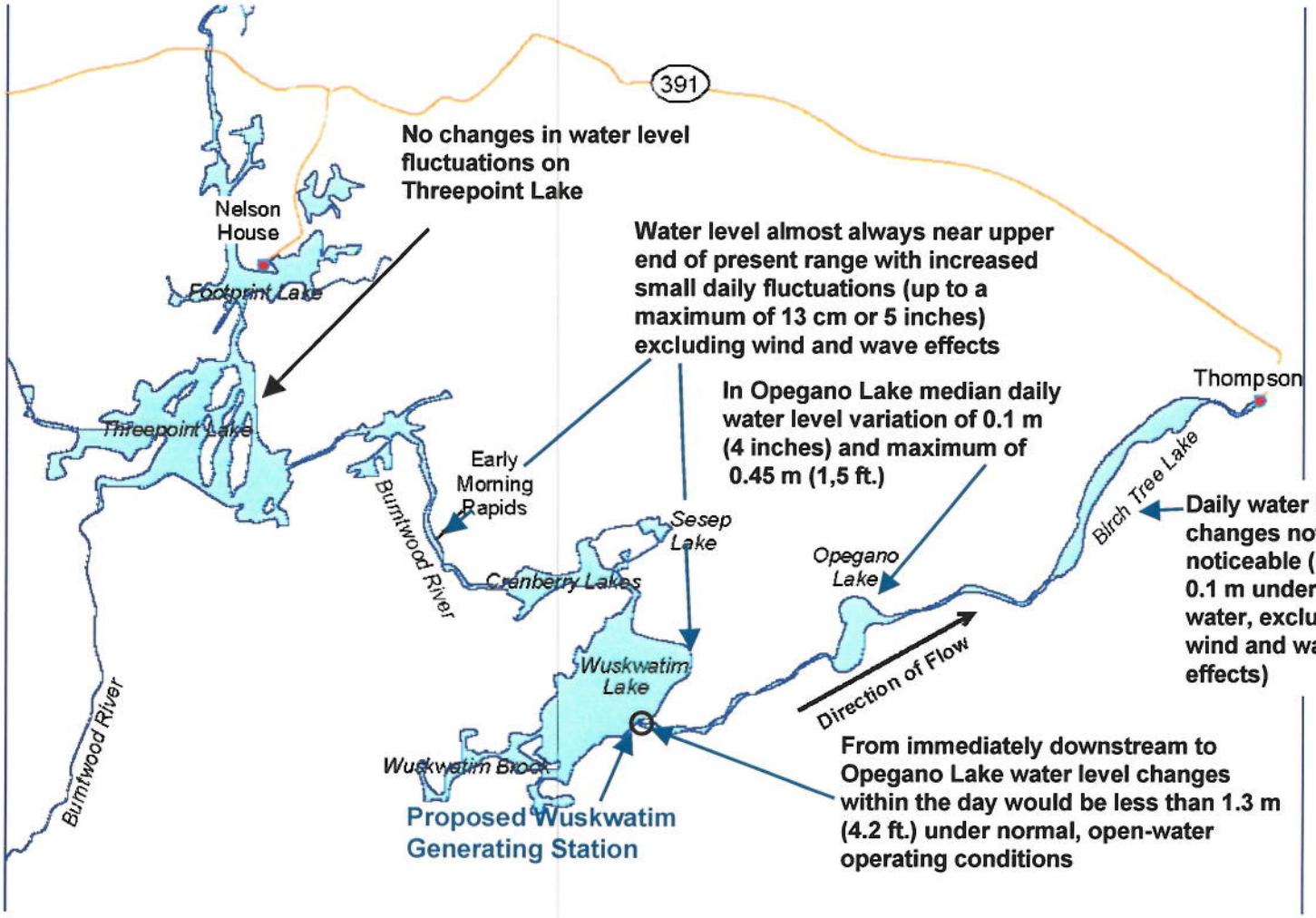
Wuskwatim Will Not Change Churchill River Diversion (CRD) Operation

- Design and planning for Wuskwatim assumed that CRD in its current form will continue to be operated as it is today
  - *Including annual modifications to the Interim License made through the augmented flow program*
- It will not change CRD flow patterns except for daily flow shaping in local area of Wuskwatim Generating Station
- Flow into Wuskwatim Lake will normally equal flow out over 24-hour period

Wuskwatim Plant Operation

- Wuskwatim Lake will be kept at or near the full supply level of 234 m above sea level (asl) 97.5% of the time
  - *234 m asl is high-end of the historical range*
- The generating station will operate in a "modified run-of-river mode" by shaping outflows to balance daily inflows, by either:
  - *Turning one unit on and off during the day; or*
  - *By adjusting turbine flow when all units are on*
- Downstream of the plant water levels and flows will vary due to the daily cycling

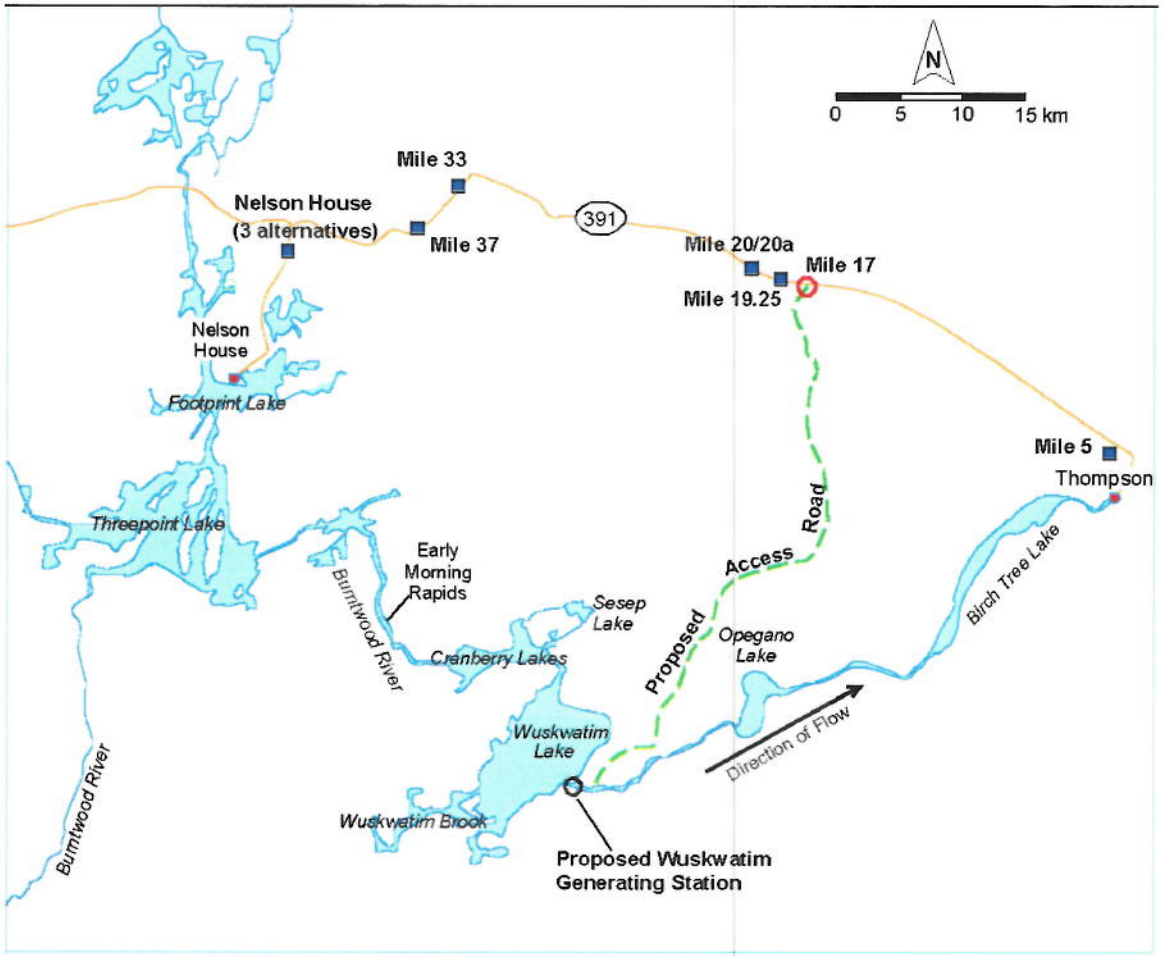
Effects on Water Levels and Flows (Normal Operating Conditions)



Access Road and Construction Camp

- Permanent access road (48 km) and a construction camp to house workers during construction are required
- Preferred locations for the camp and access road were identified by representatives of Manitoba Hydro and NCN, with consideration of:
  - *Environmental effects*
  - *Benefits and drawbacks*
  - *Effects on the cost and schedule for the Generation Project*
  - *Traditional Knowledge*
  - *Sustainability*

An Access Road Will Be Constructed From PR 391 at Mile 17 to the Project Site



- Manitoba Hydro and NCN are preparing an Access Management Plan to maximize positive effects while minimizing potential negatives

Access Road Management Plan

- The plan will specify how access will be managed on the new access road
- It will consider:
  - *How the benefits of the road can be retained*
    - For example, improved access for resource harvesting
  - *How concerns can be mitigated*
    - For example, concern about possible over-hunting, over-fishing and vandalism to trappers' cabins

Project Description

Wuskwatim Transmission Project

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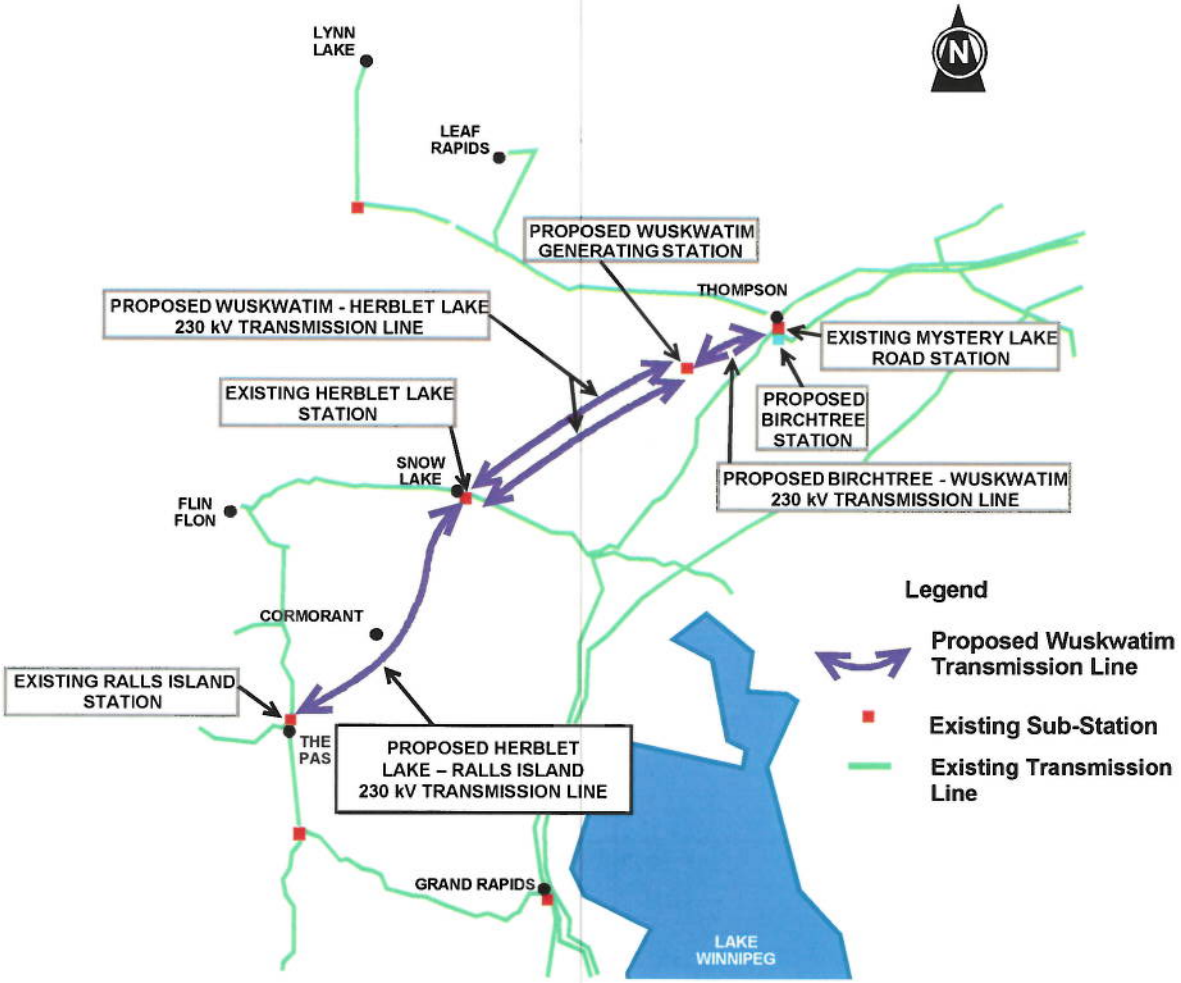
Proposed Wuskwatim Transmission Facilities



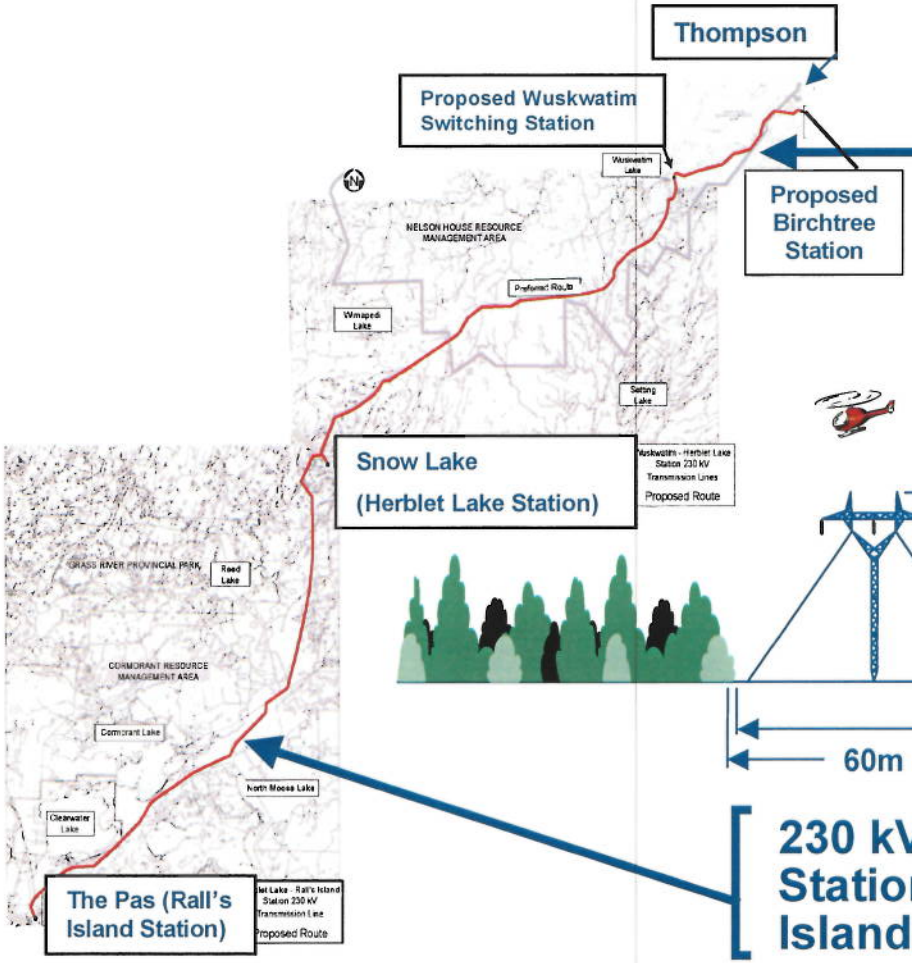
Site Selection and Environmental Assessment Process

- Route selection balances biophysical, socio-economic, technical and cost perspectives along with public input
- Involves local First Nations, Aboriginal people, elected officials, environmental groups, resource users and the general public in the identification and comparison of alternative routes and the selection of a preferred route
- Aims to reduce adverse environmental effects and enhance potential benefits where possible and practical

Proposed Transmission Line Routes

- **Alternative routes were compared based on:**
  - *Traditional Knowledge and local input*
  - *Effects on people*
  - *Effects on the environment*
  - *Technical limitations and routing opportunities*
  - *Cost*
- **Preferred routes were selected to:**
  - *Minimize disruption to people and the environment*
  - *Meet technical and cost considerations*
- **Detailed environmental studies were conducted on preferred routes to determine effects on people and the environment**

Proposed Lines: Birchtree Station to Wuskwatim & Herblet Lake to The Pas

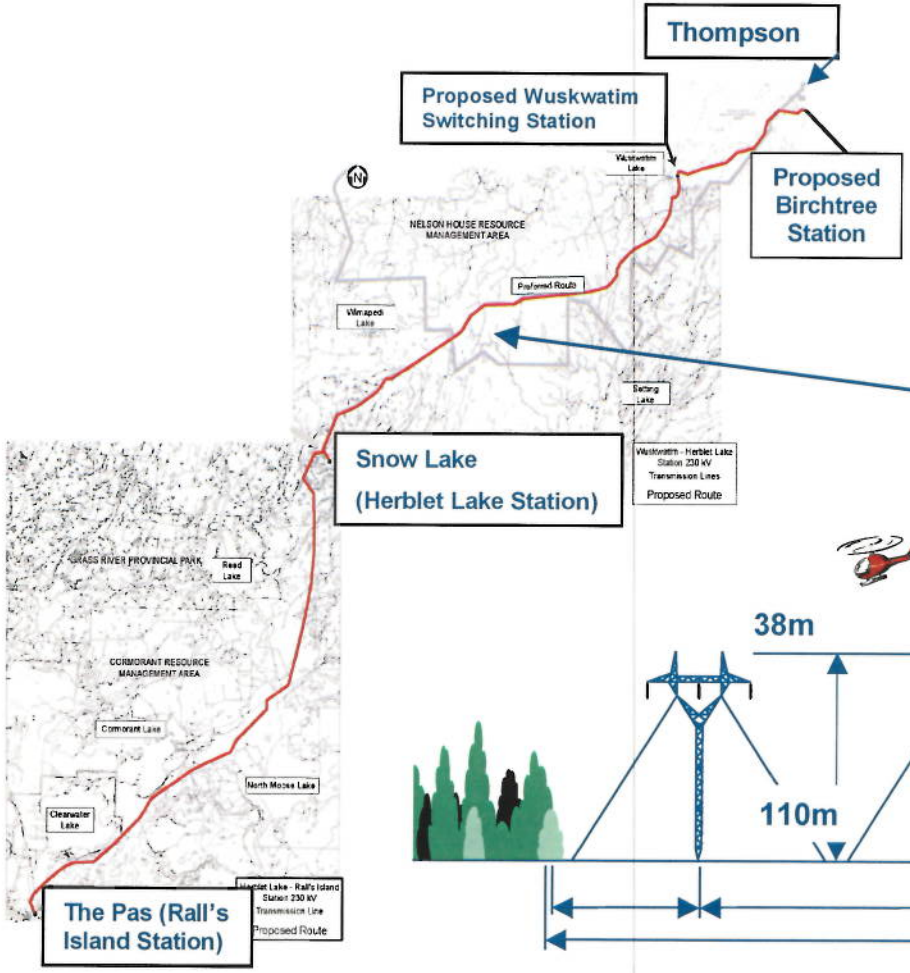


230 kV transmission line between Wuskwatim and the Birchtree Station:

- *First line built (45 km)*
- *Will initially provide construction power for the generating station*

230 kV line between Herblet Lake Station and the existing Rall's Island Station at The Pas (165 km)

Proposed Lines: Wuskwatim to Herblet Lake



Two 230 kV lines between Wuskwatim and the existing Herblet Lake Station at Snow Lake (137 km)

Wuskwatim Development Cost

- **Project in-service costs for Wuskwatim Projects - 2010 in-service date (ISD):**
  - **Generation Facilities - $800 million**
    - Capital cost plus interest during construction and escalation to in-service-year dollars
  - **Transmission Facilities - $180 million**
    - Does not include Herblet Lake to Rall's Island transmission
  - **Total In-Service Amount (Generation and Transmission Projects Combined) - $980 million**

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System Operations

Potential for Water Regime Changes Due to the Wuskwatim Development

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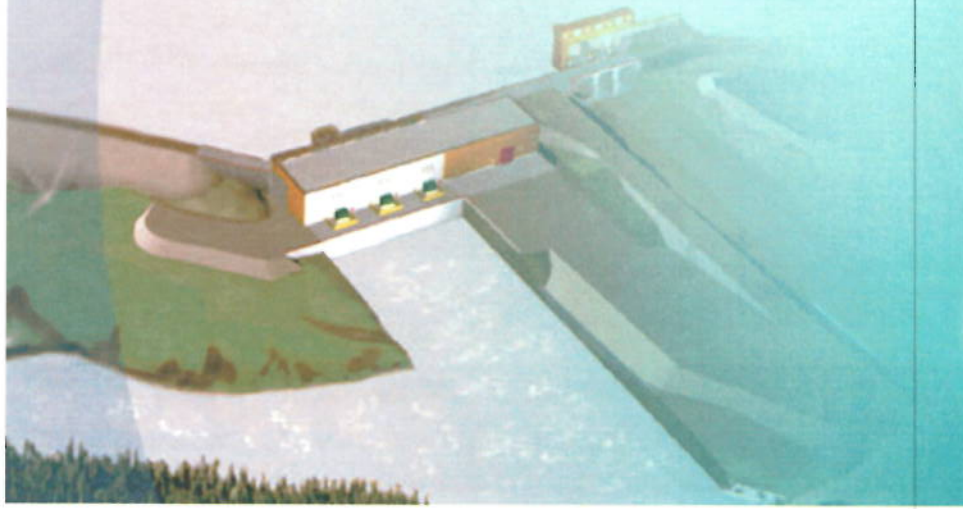
March-April 2004



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Manitoba Hydro

Introduction

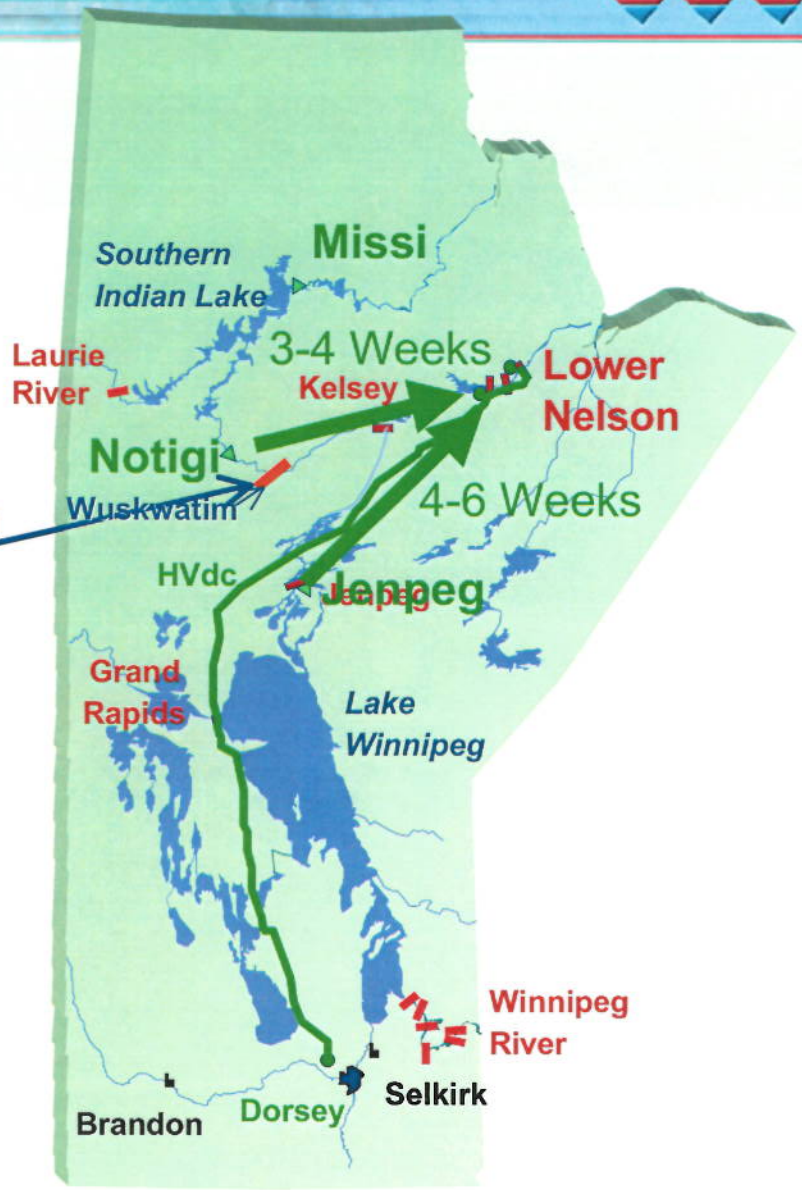
The addition of Wuskwatim is not expected to lead to any perceptible change in water regimes beyond the study area.

- **Manitoba Power System**
- **Matching Electricity Supply to Demand**
- **Major Factors Affecting Water Levels**
  - *Churchill River Diversion*
  - *Lake Winnipeg Regulation*
- **Water Level Changes**
  - *As a Result of Wuskwatim*
  - *Cumulative Effects*
- **Conclusions**

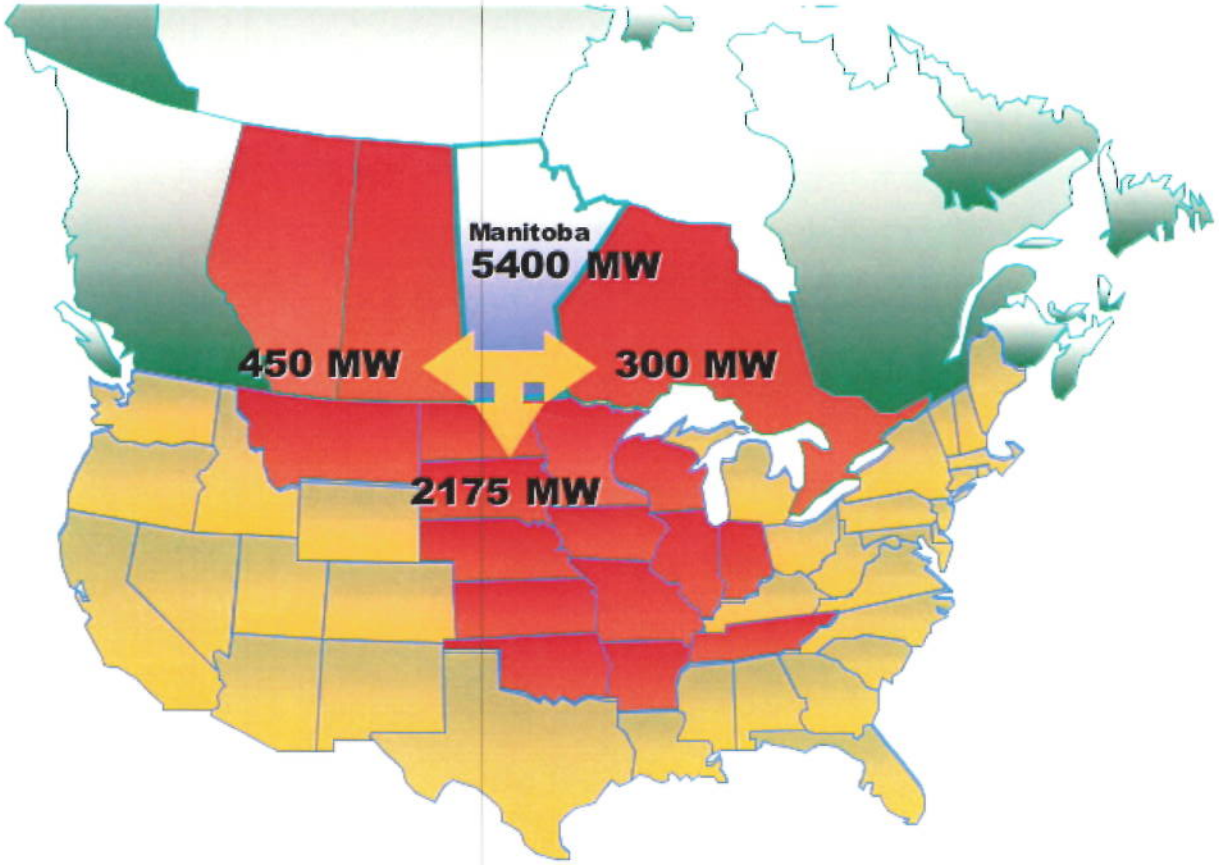
Existing Capacity: 5,400 Megawatts

- **Hydro (4,900 MW)**
  - *Winnipeg River*
  - *Grand Rapids*
  - *Jenpeg*
  - *Kelsey*
  - *Laurie River*
  - *Lower Nelson*
- **Lake Winnipeg Regulation**
  - *Jenpeg Control*
- **Churchill River Diversion**
  - *Notigi Control*
  - *Missi Control*
- **Thermal (500 MW)**
  - *Selkirk Gas*
  - *Brandon Coal and GT*

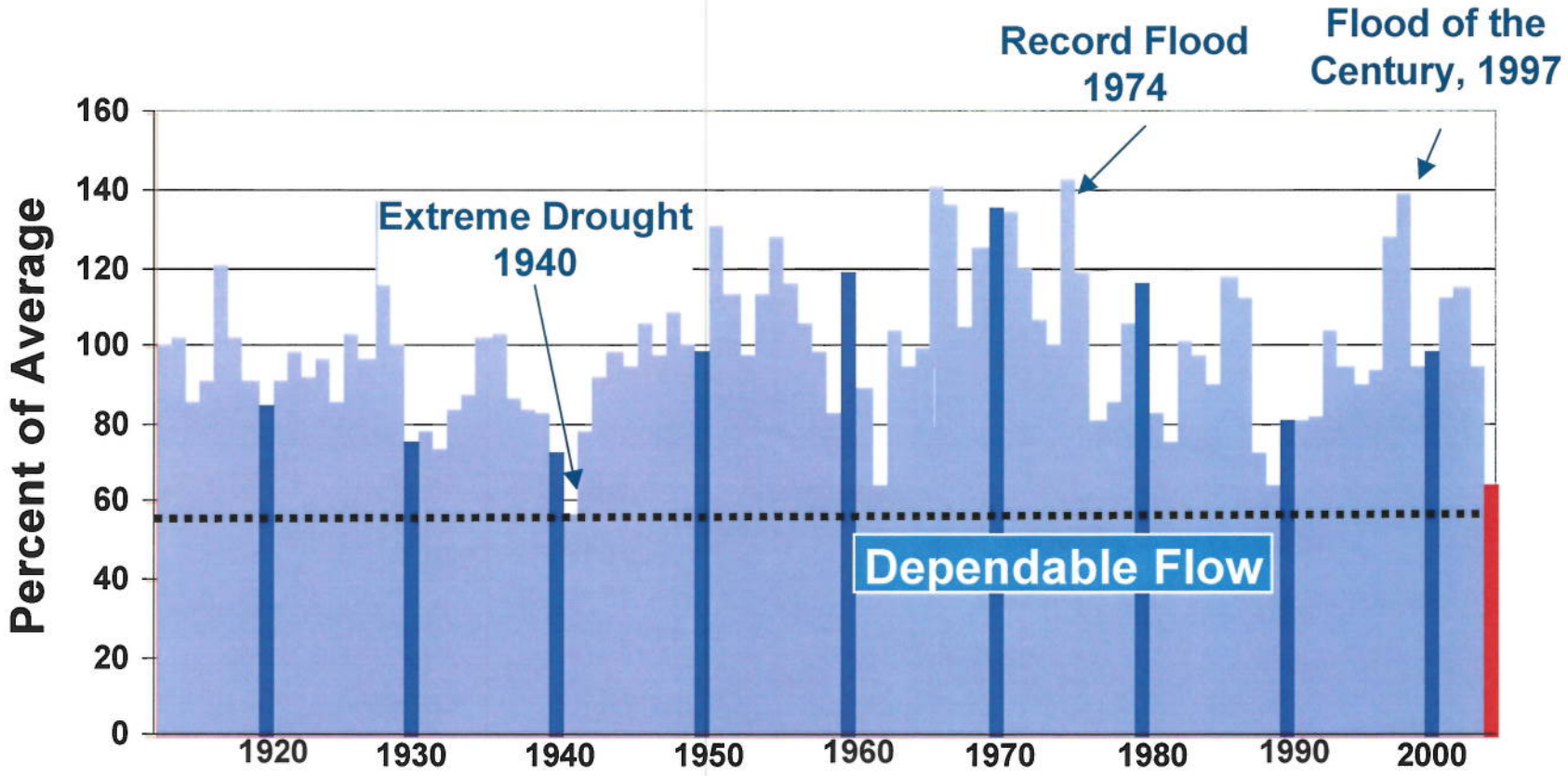
Wuskwatim
200 MW



Interconnections Provide Market Access

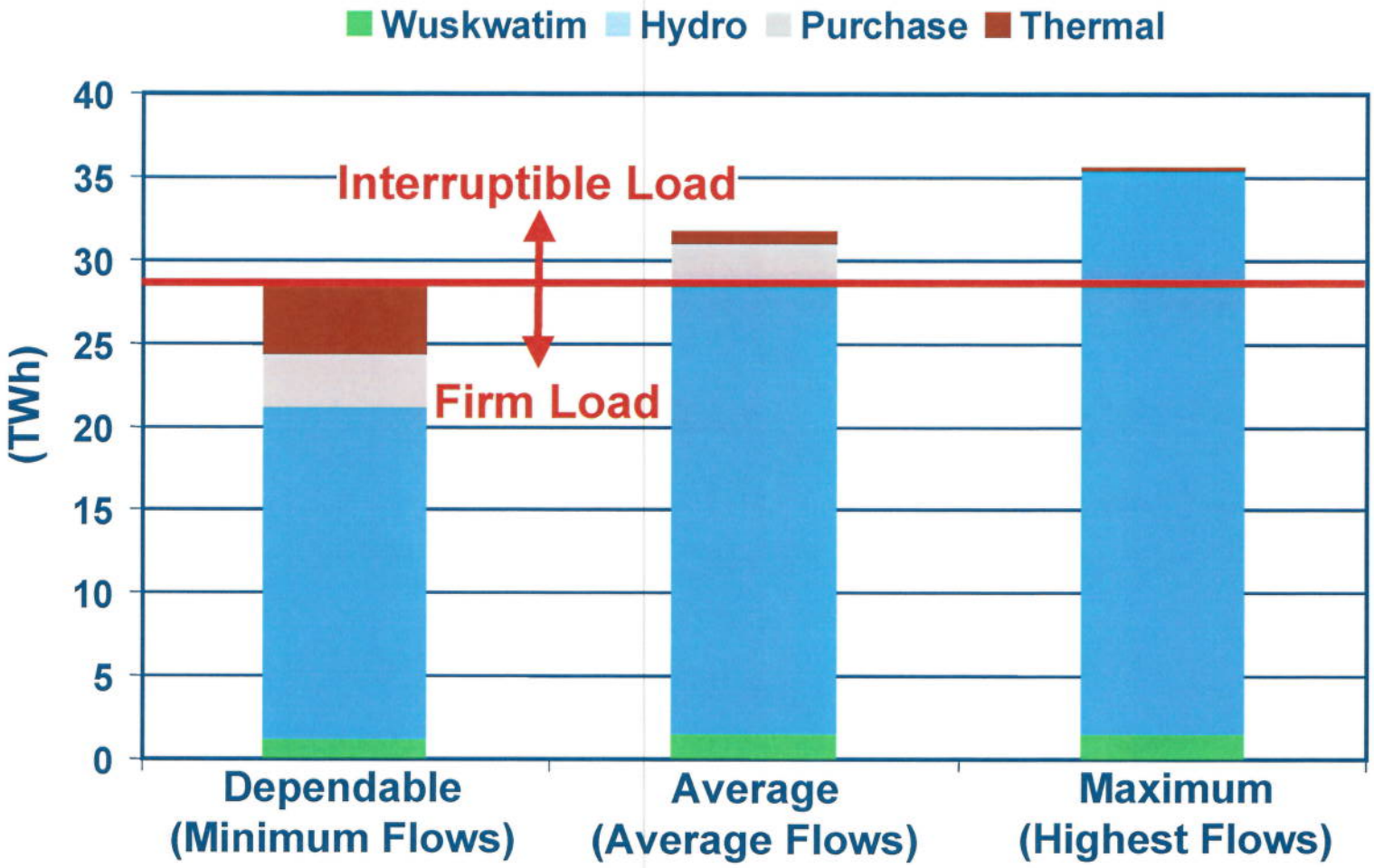


Historical System Water Supply

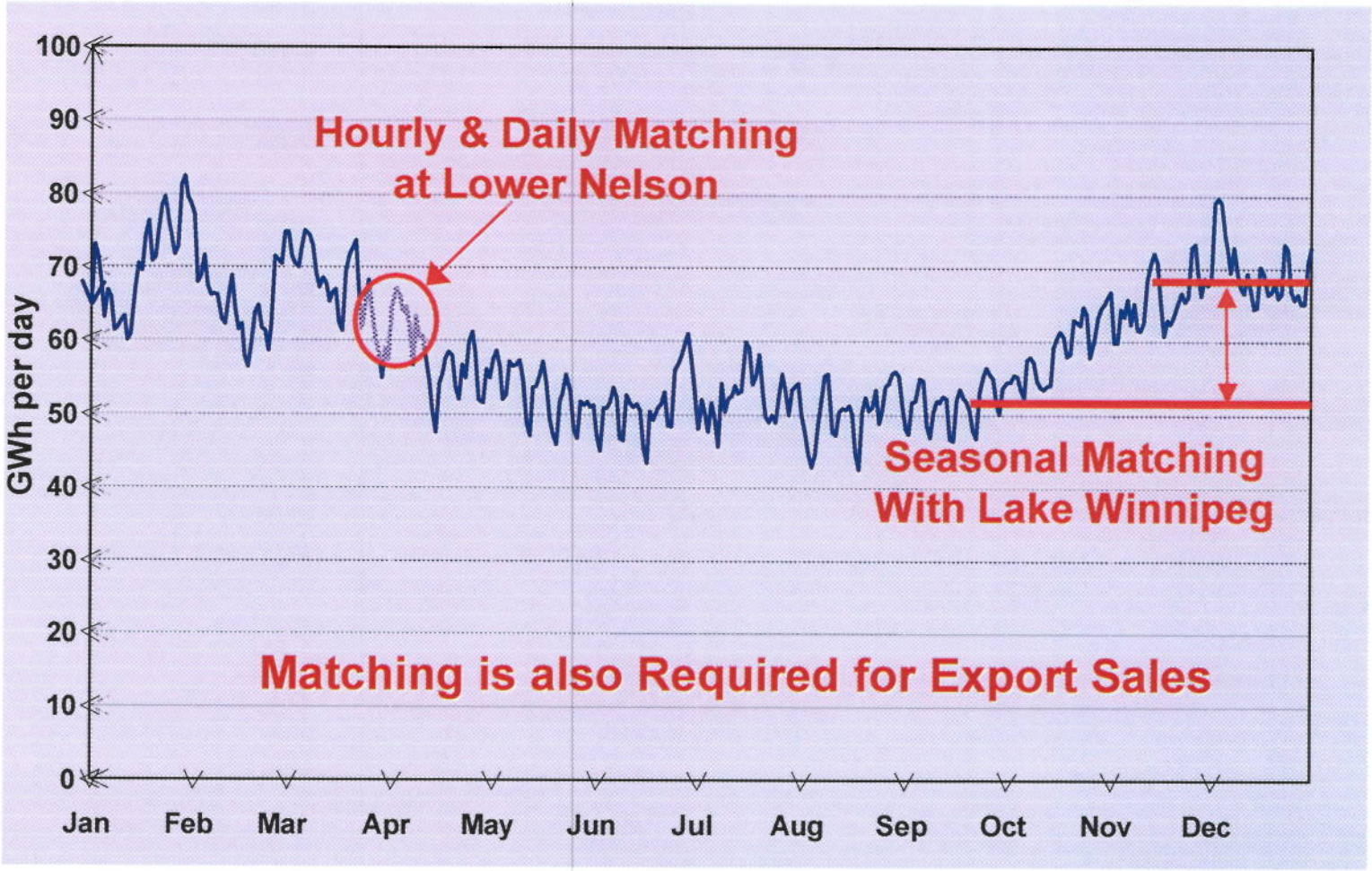


Sufficient energy supplies must be available under dependable flow conditions

Variation in Annual Energy Supply



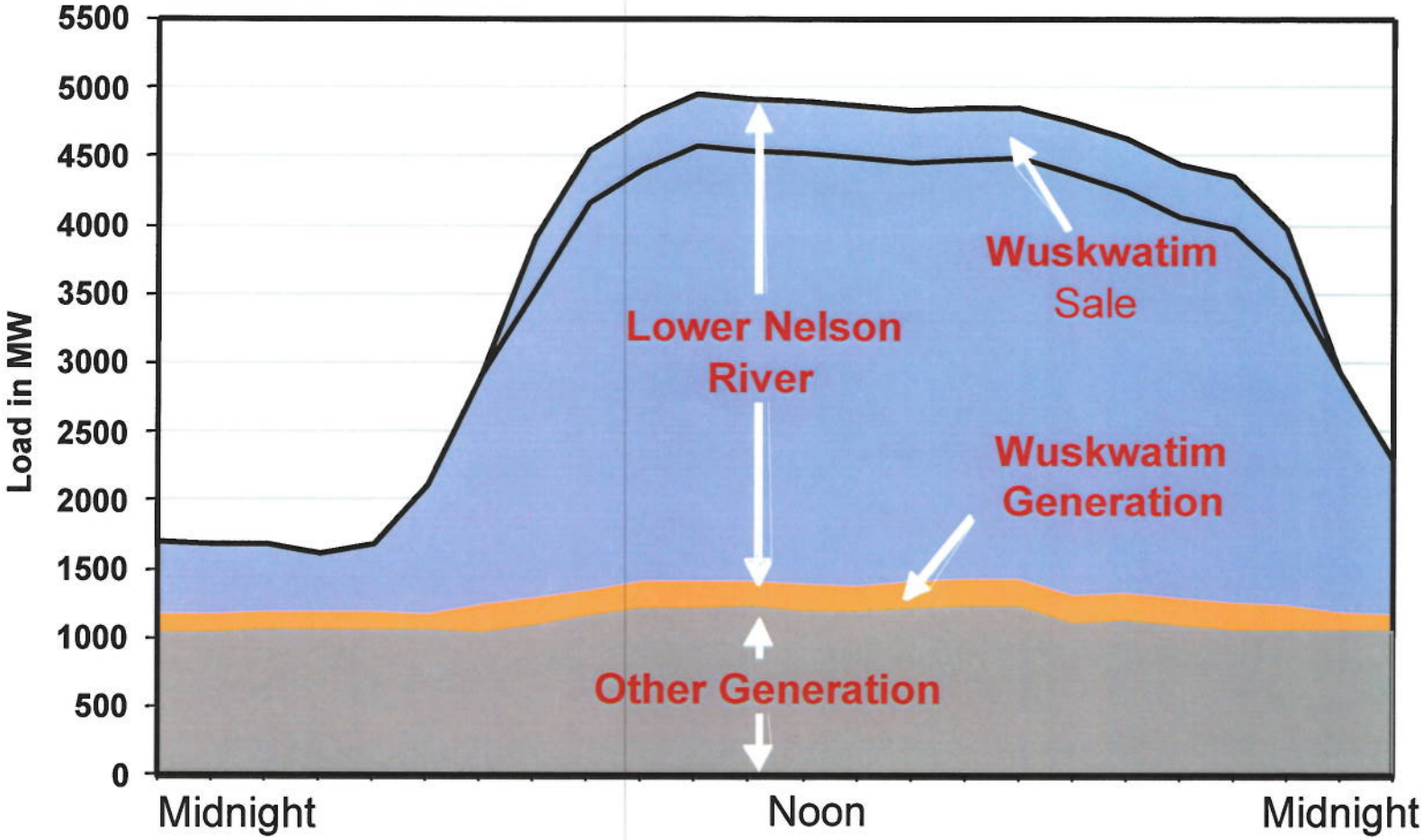
Manitoba Power Demand Varies Hourly, Daily and Seasonally



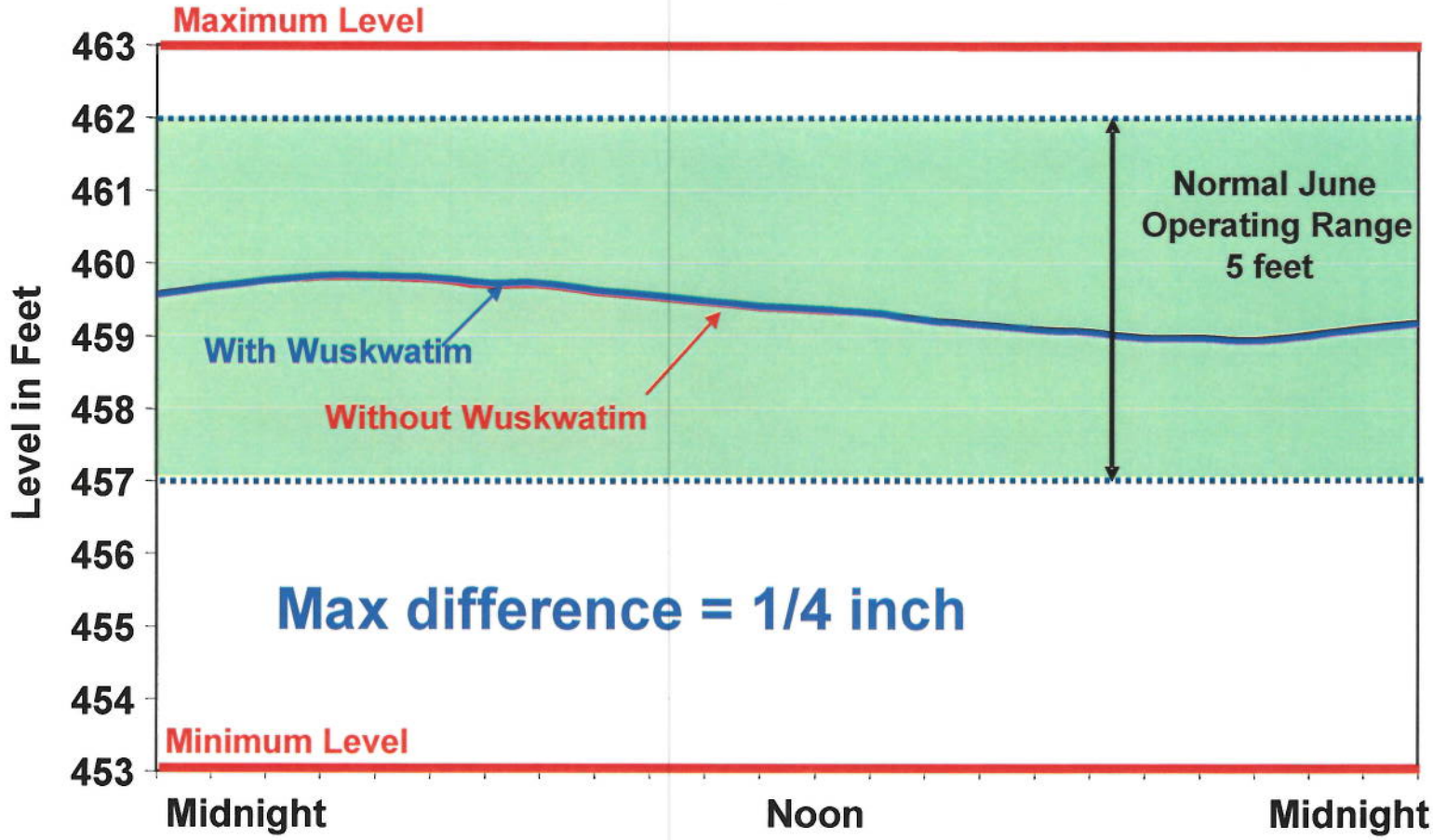
Matching Wuskwatim Output to Export Sales

- **Perfect Match**
  - *Wuskwatim output equals export*
  - *No change in system operation*
- **Not Matched**
  - *Hourly, Daily Mismatch*
    - Balancing on Lower Nelson using Stephens Lake reservoir
    - Not CRD/LWR – travel times too long
  - *Seasonal Mismatch*
    - Balancing with Lake Winnipeg seasonal storage

90% of Hourly & Daily Matching of Supply to Demand at Lower Nelson

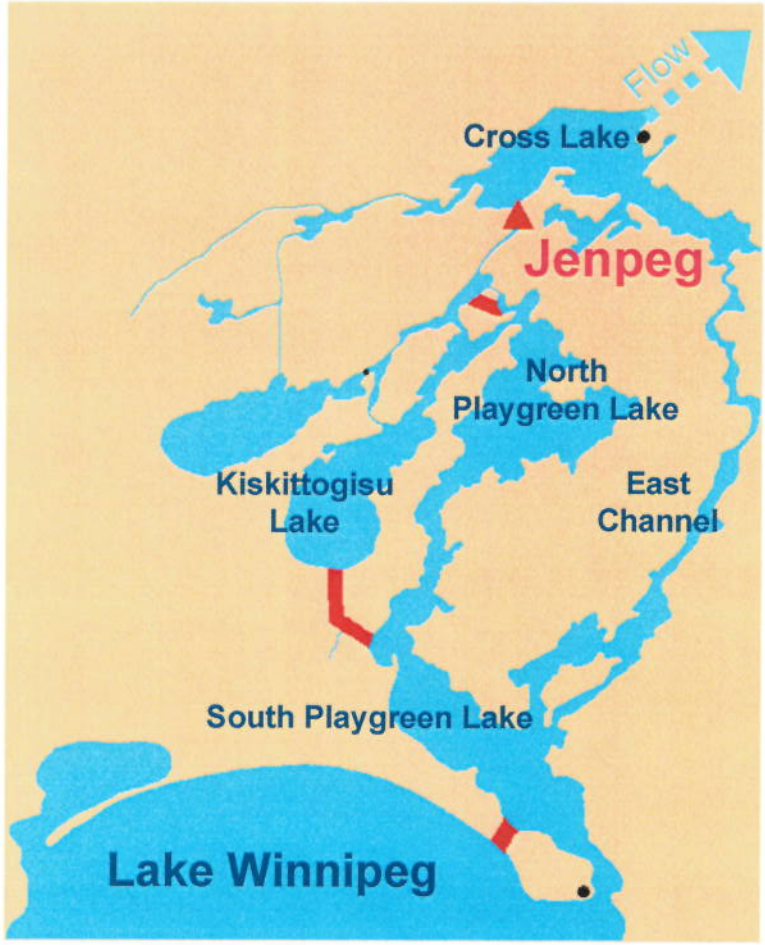


Typical Lower Nelson - Stephens Lake Daily Operations



Lake Winnipeg Provides Seasonal Matching

- Lake Winnipeg is a seasonal balancing reservoir
- Matches water supply to power demand
- Jenpeg controls 85% of the outflow
- Lake Winnipeg outflow is the main determinant of Nelson River water levels



Lake Winnipeg Regulation
Modes of Operation

Flood Conditions
- Regulate for flood control

715 feet

Normal Conditions
- Regulate for power system economics
- Potential for Wuskwatim related seasonal change in outflows

4 feet for power purposes

Conservation
- Outflows are set to ensure energy supply security

711 feet

Extreme Drought
- Outflows set by Minister of Water Stewardship

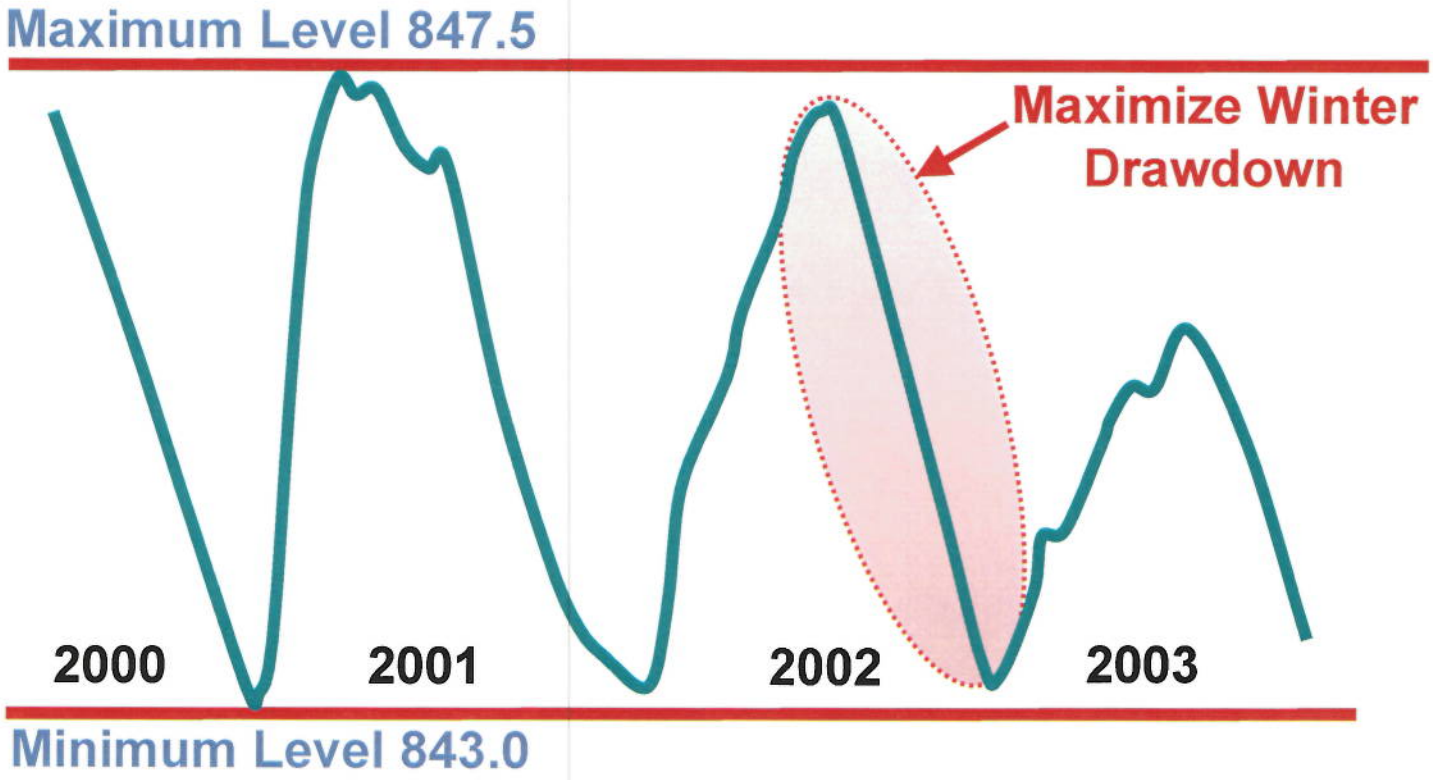
Lake Winnipeg Regulation
Major Factors

- Ice Restrictions
- Operation of Churchill River Diversion
- Water Supply
- Firm Power Demand
- Relative Power Prices
- Interconnection Capability

Ice Restrictions Severely Limit Lake Winnipeg Outflow Capability

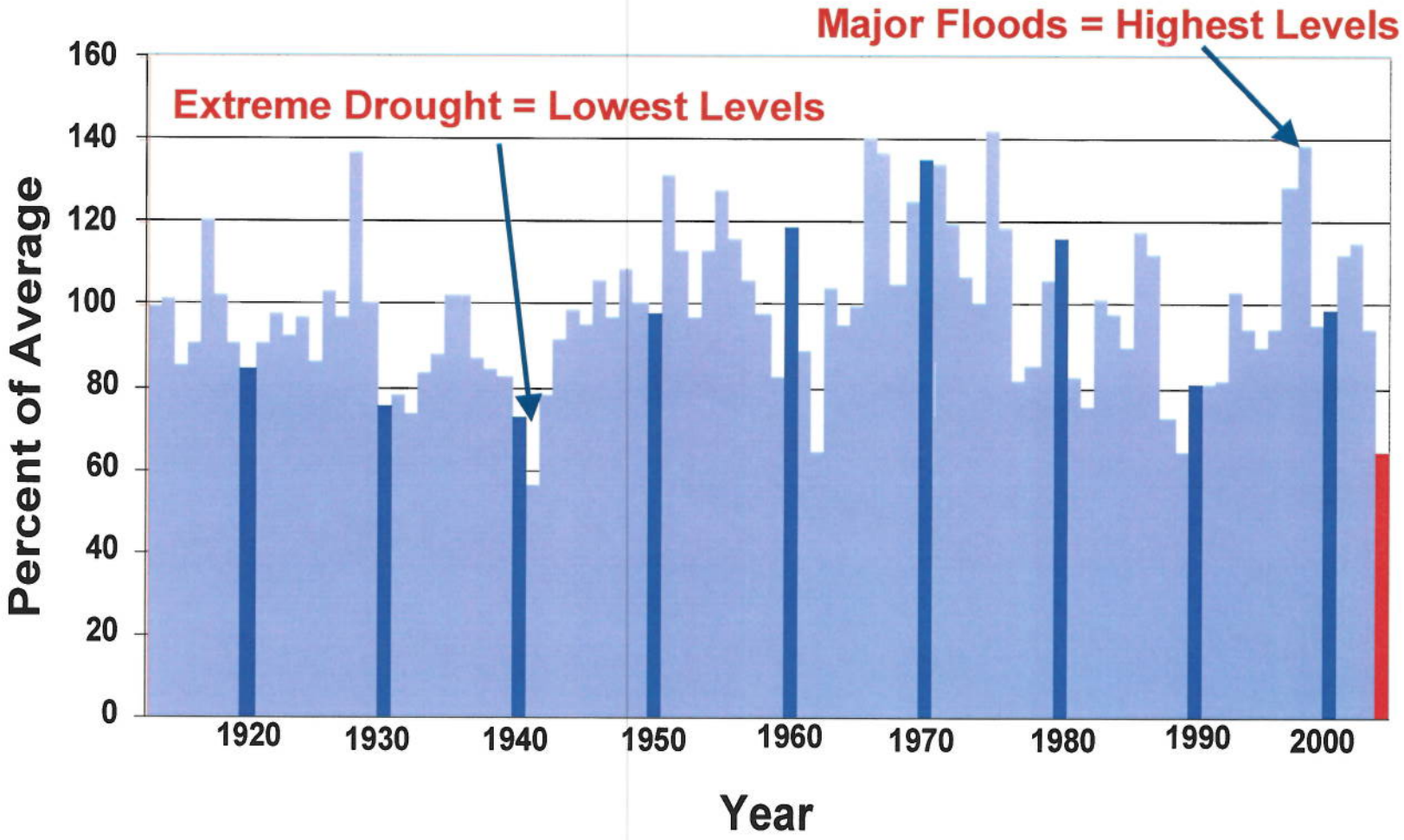
Churchill River Diversion Water Is Most Useful in Winter

Southern Indian Lake Water Levels

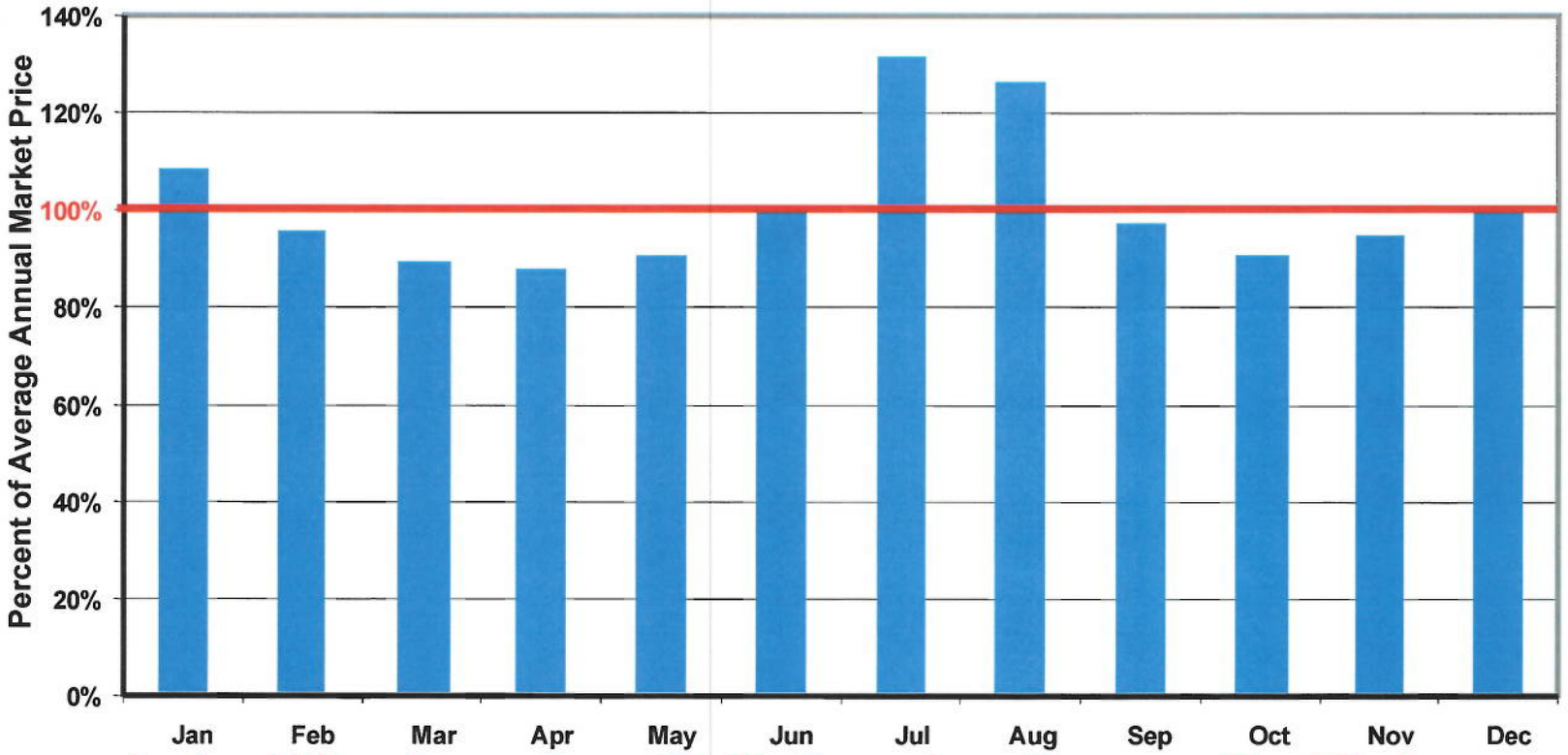


CRD Operation Follows Predictable Seasonal Patterns Which Will Not Change With Wuskwatim

Water Supply is the Most Significant Driver for Lake Winnipeg Regulation



Export Market Prices Vary Seasonally

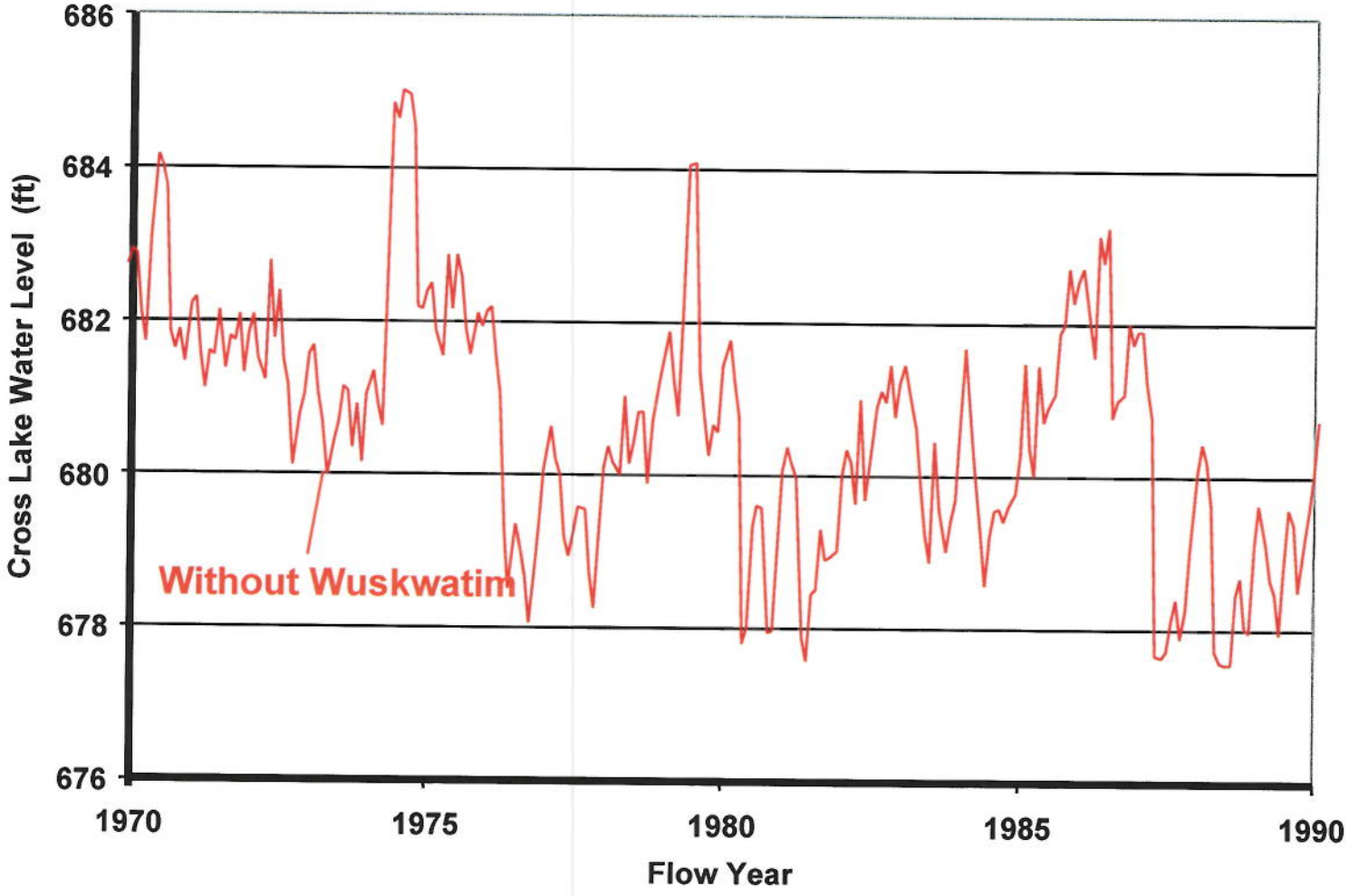


Lake Winnipeg Can Shift Surplus Energy To Higher Value Months if Possible

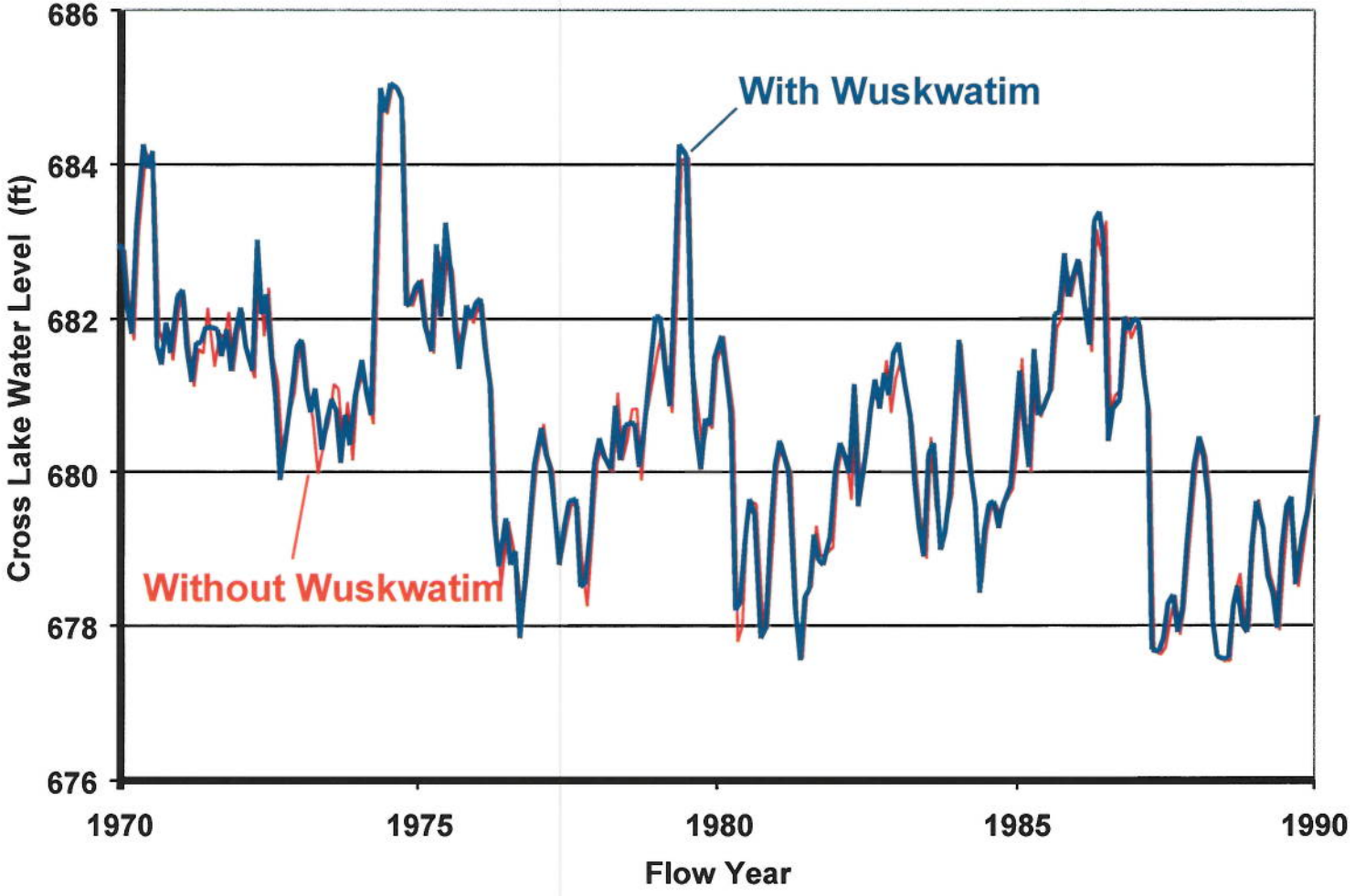
Predicting Water Regime Changes

- **Computer modeling (SPLASH)**
  - *Manitoba load forecast*
  - *Firm export commitments*
  - *Historical water supply record*
  - *Export market price forecast*
  - *Interconnection capability*
  - *With and without Wuskwatim*
- **Example: Nelson River at Cross Lake**

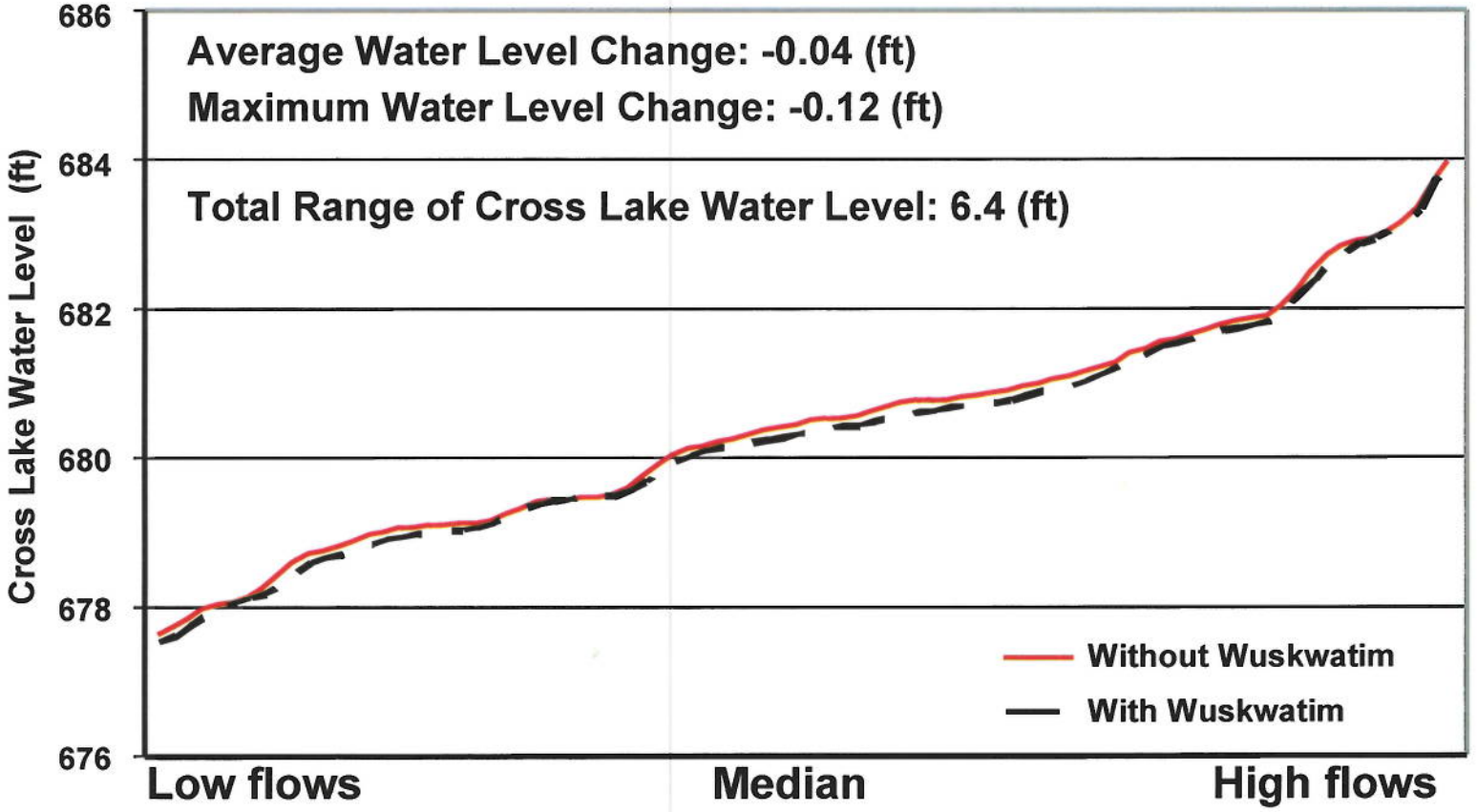
Cross Lake Levels, 1970 - 1990 Flows
Without Wuskwatim and Firm Sale (2012 Load Year)



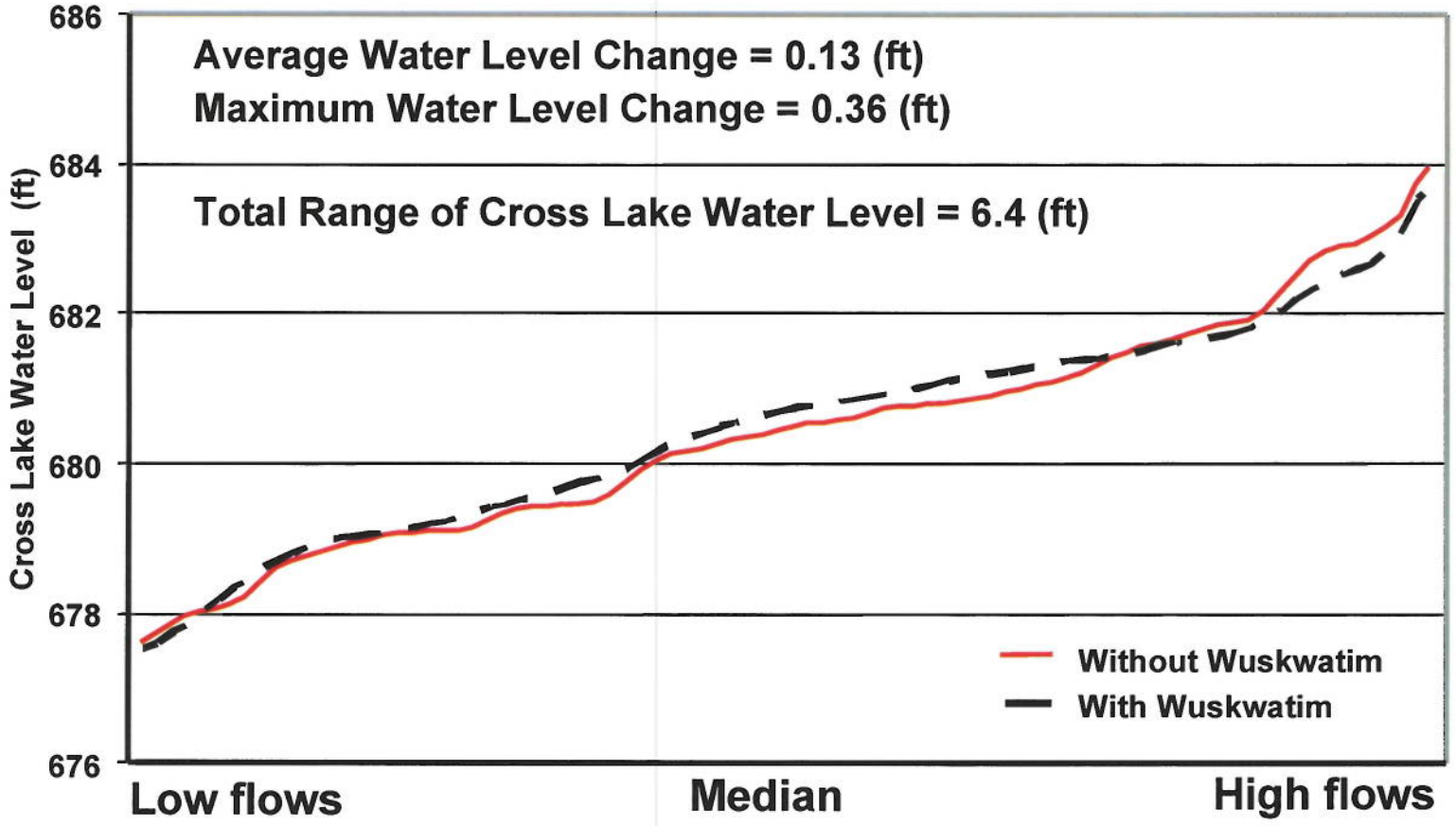
Cross Lake Levels, 1970 - 1990 Flows With Wuskwatim and Firm Sale vs Without Wuskwatim
(2012 Load Year)



Cross Lake Summer Levels With Firm Sale (2012 Load Year)



Sensitivity Analysis Cross Lake Summer Levels Without Firm Sale (2012 Load Year)

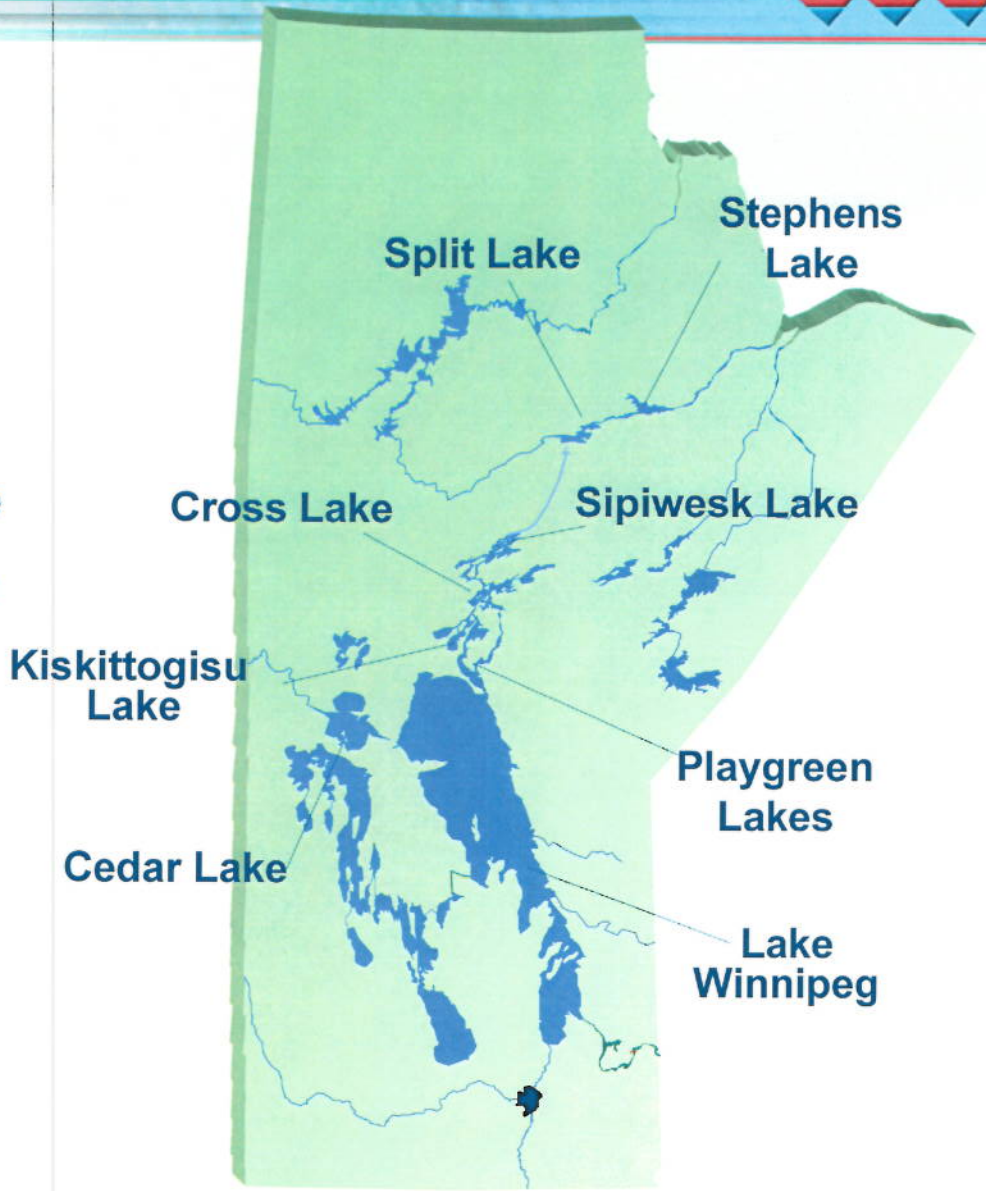


Nelson River at Cross Lake

	Maximums
Factors Affecting Water Levels	
• *Water Supply*	*8 feet*
• *Waves*	*4 feet*
• *Ice Effects*	*0.8 foot*
• *Wind Setup*	*0.5 foot*
• *Jenpeg G.S. Daily Cycle*	*0.2 foot*
Wuskwatim Summer Water Level Changes	
• *With Firm Sale*	*-0.1 foot*
• *Without Firm Sale (Sensitivity)*	*+0.4 foot*

Other Lakes

- Water level changes on other lakes will be even smaller than on Cross Lake



Cumulative Effects on Water Regime Notigi, Gull and Conawapa with Wuskwatim

Considering possible future generating stations…

- No changes to CRD beyond the study area
- No perceptible change to LWR from Notigi G.S.
- Changes to LWR dependent upon Gull/Conawapa assumptions
  - *Affects direction and magnitude*
  - *Interconnection size and matching are critical*
  - *Other factors can also be significant*
  - *No one scenario is likely today*

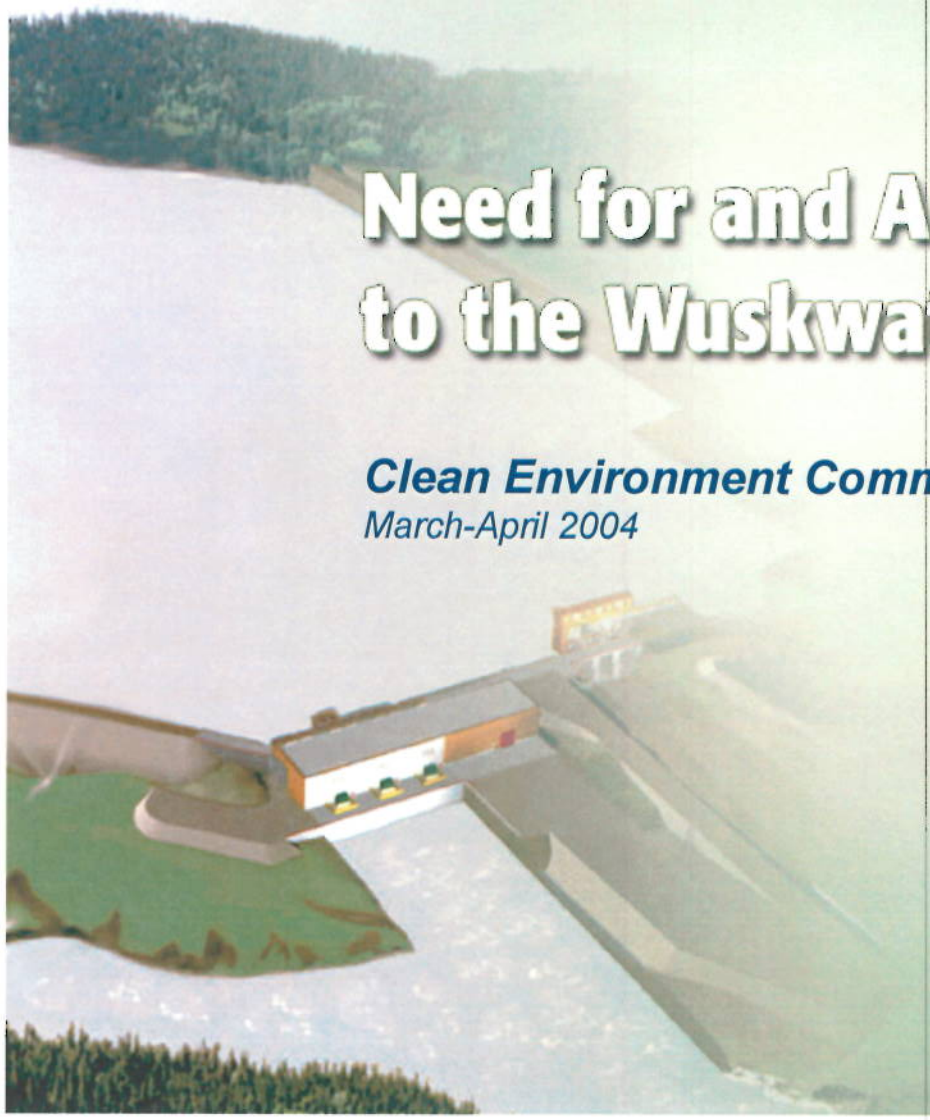
Conclusions

- No change to CRD operation or water regime beyond the study area
- No perceptible change in Lower Nelson water levels
- No perceptible change in Lake Winnipeg outflows
- No perceptible change in water levels affected by Lake Winnipeg Regulation
- These results provided to EIS team for review

Need for and Alternatives to the Wuskwatim Project

Clean Environment Commission Hearing

March-April 2004



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CEC Review Scope: Need For and Alternatives To the Wuskwatim Project

- All alternative options considered, Wuskwatim was selected on reasonable grounds including economic viability as an export project and relevant technical factors
  - *Wuskwatim in its entirety*
- Effect on Manitoba Hydro customer rates and Manitoba Hydro financial stability
  - *NCN / Manitoba Hydro partnership to be described to the degree required to understand the financial analysis*

Why Wuskwatim?

Need For…

- Economic, financial, environmental and reliability benefits from increased electricity exports
- Clean, renewable energy
- Relatively low, manageable risks
- Economic stimulus in Manitoba

Alternatives To…

- Simultaneous pursuit of economic Power Smart and alternative energy initiatives (e.g. wind)
- Better than other generation options

Benefits From Exports

- Significant profits keep Manitoba rates low
- Energy from Wuskwatim reduces global greenhouse gas emissions
- Building Wuskwatim early for export provides supply in event of higher Manitoba load growth and improves system reliability for Manitobans

Relatively Low, Manageable Risks

- Extensive experience building hydro plants and marketing export energy
- Extensive engineering and environmental studies and investigations
- Independent reviews/analysis of capital cost estimates and export price forecasts
- Sensitivity analysis of numerous other factors

Provides Economic Stimulus

- Training, jobs and business opportunities in Manitoba and Canada
  - *Special focus on Aboriginal people in Northern Manitoba*
- Direct Aboriginal participation in project and enduring benefits through partnership with NCN
- Significant social net benefits to economy as a whole

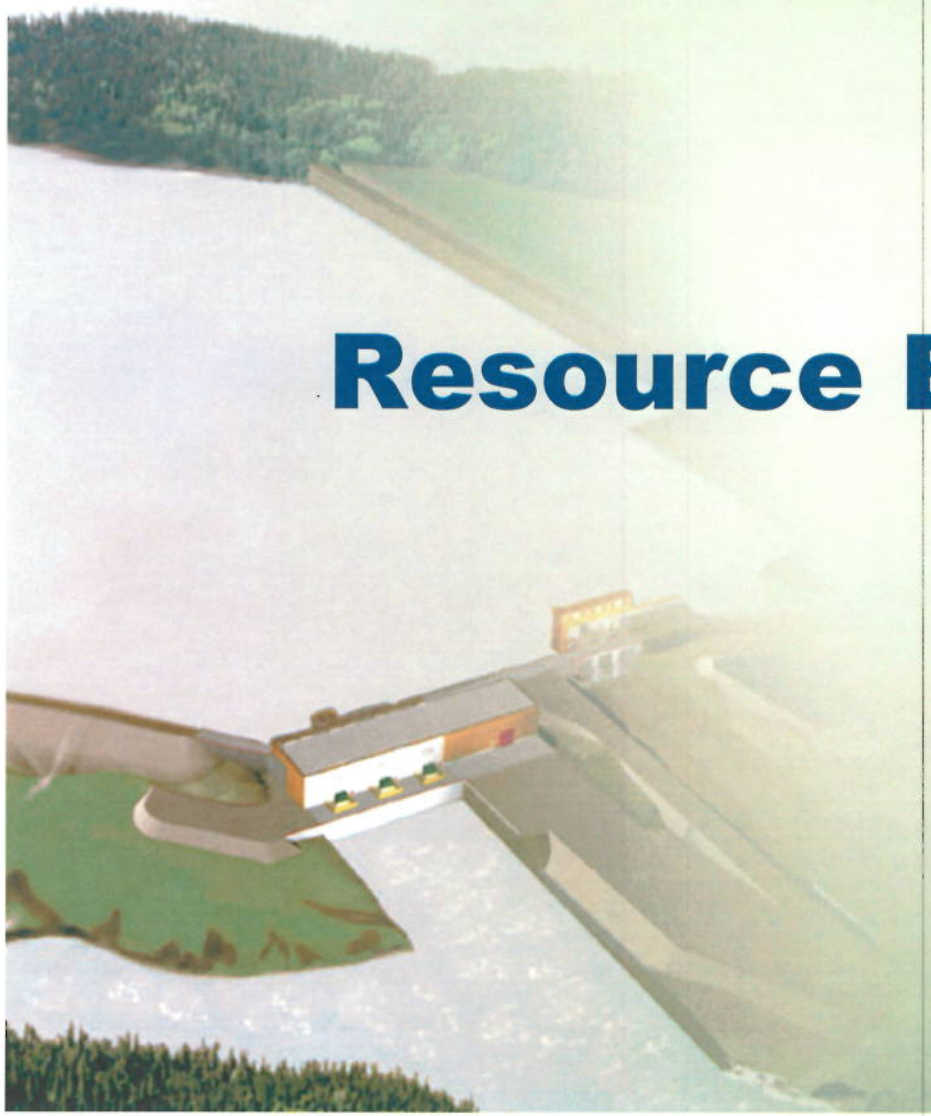
Simultaneous Pursuit of Power Smart and Alternative Energy

- Current demand-side management (DSM) target of 356 MW by 2011/12
- Plans for further expansion of DSM
- Efficiency enhancements to existing plants totaling 382 MW by 2011/12
- 250 MW wind generation commitment
  - *(NUG and /or MH)*
- Diverse portfolio of economically and environmentally attractive options

Better Than Other Generation Options

- Wuskwatim most economic
- Does not preclude possibility of future development of Gull, Conawapa or Notigi
- More attractive than thermal generation

Resource Evaluations



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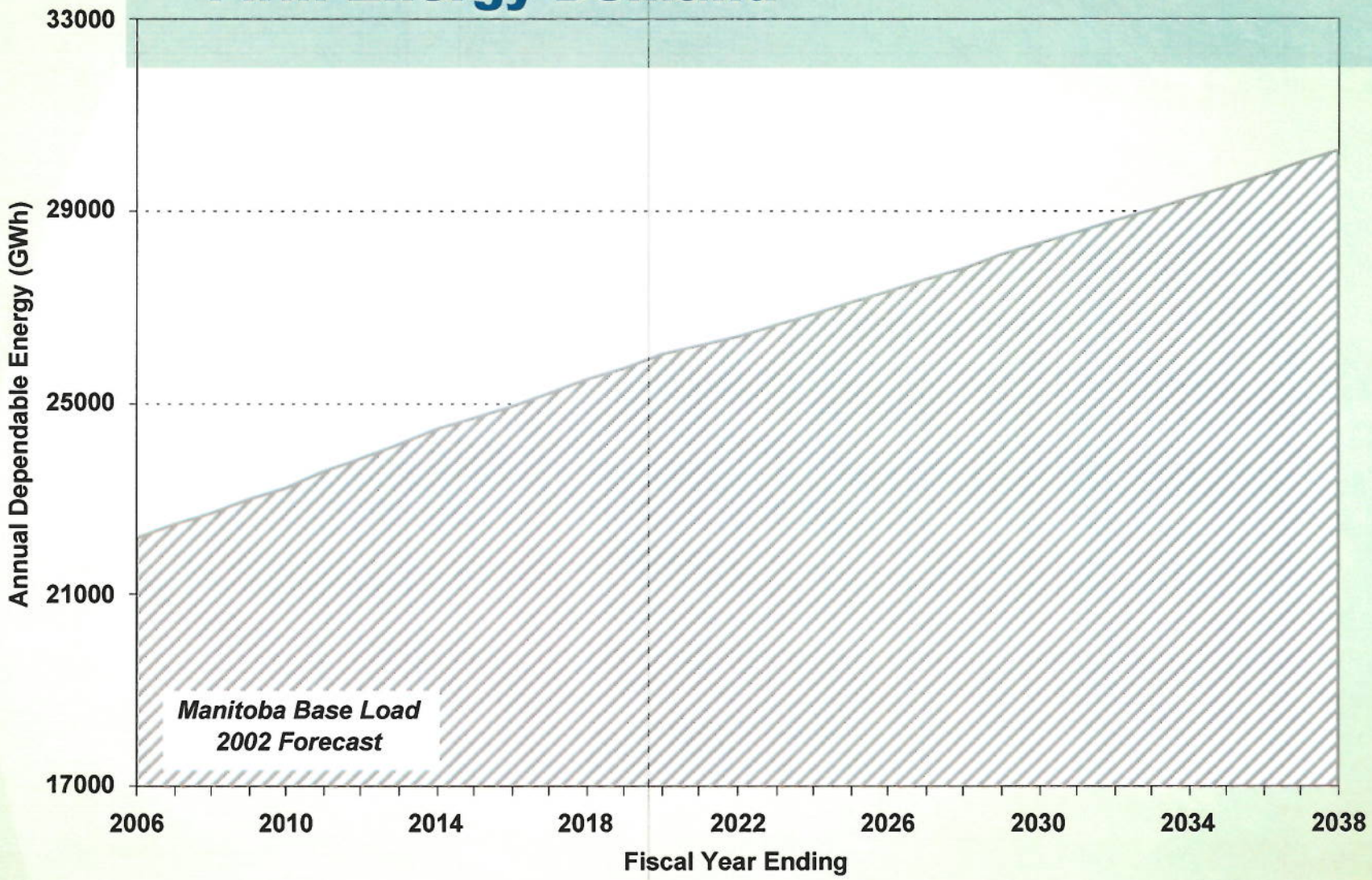
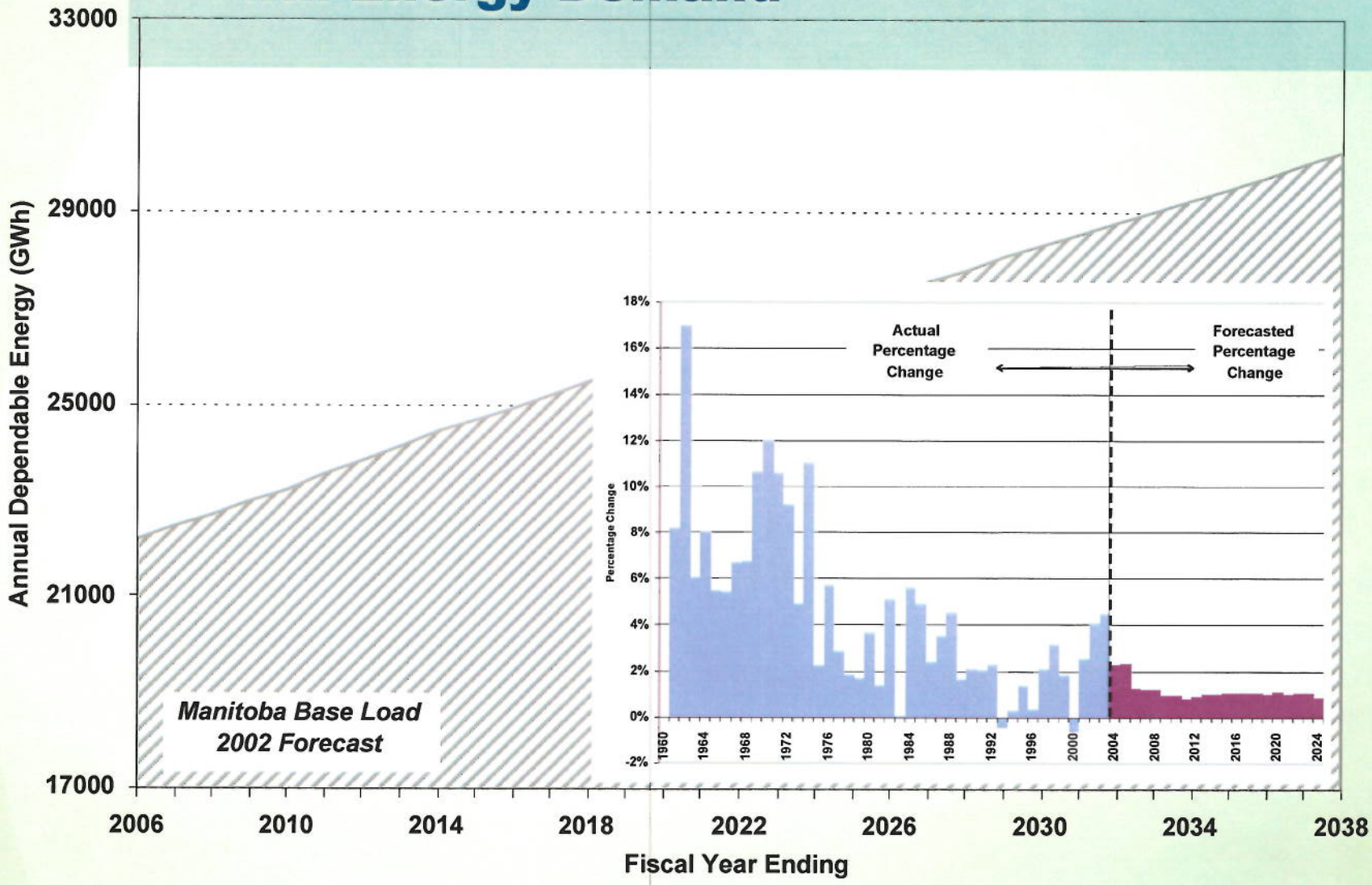
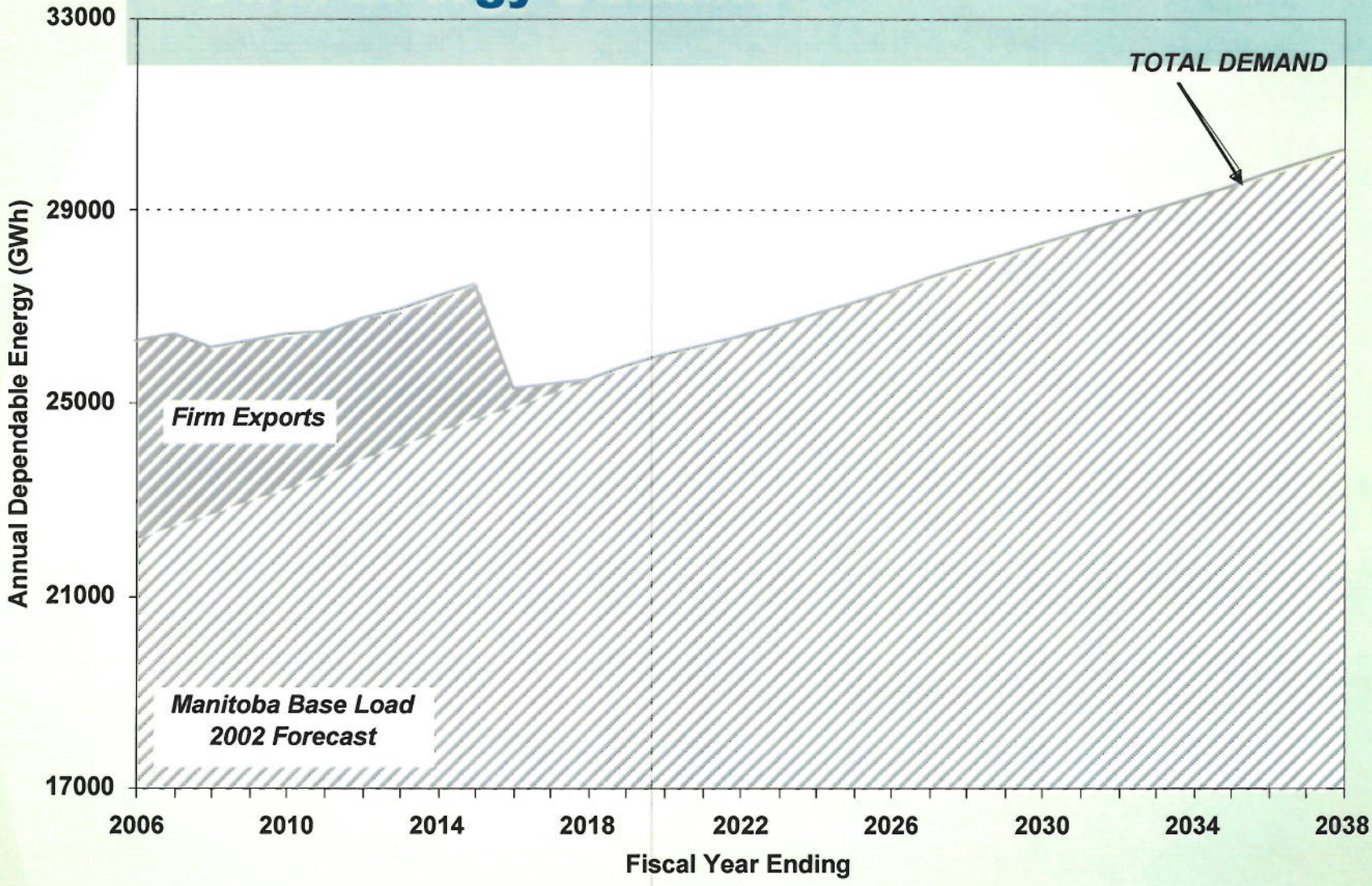
Firm Energy Demand



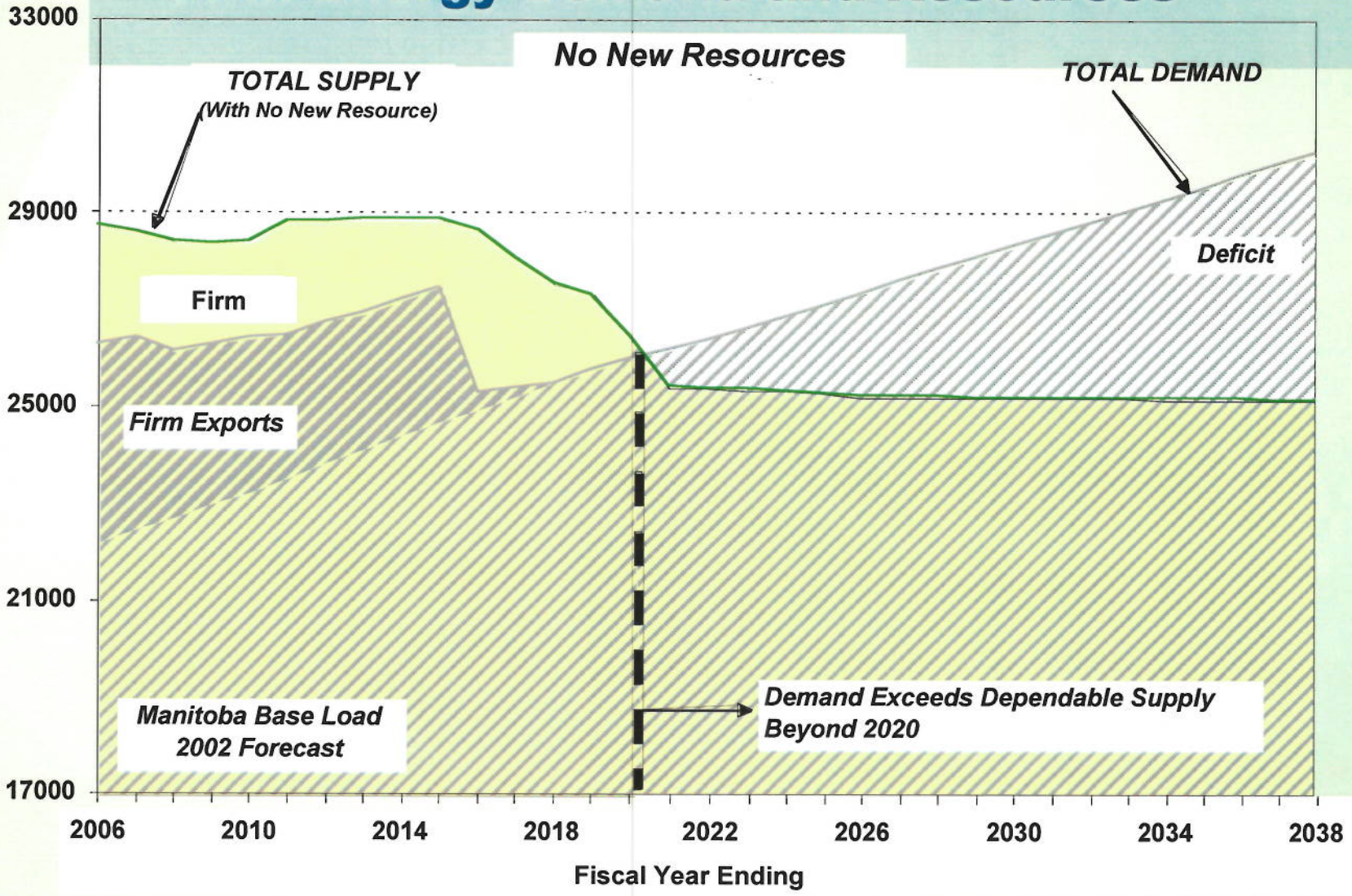
Firm Energy Demand



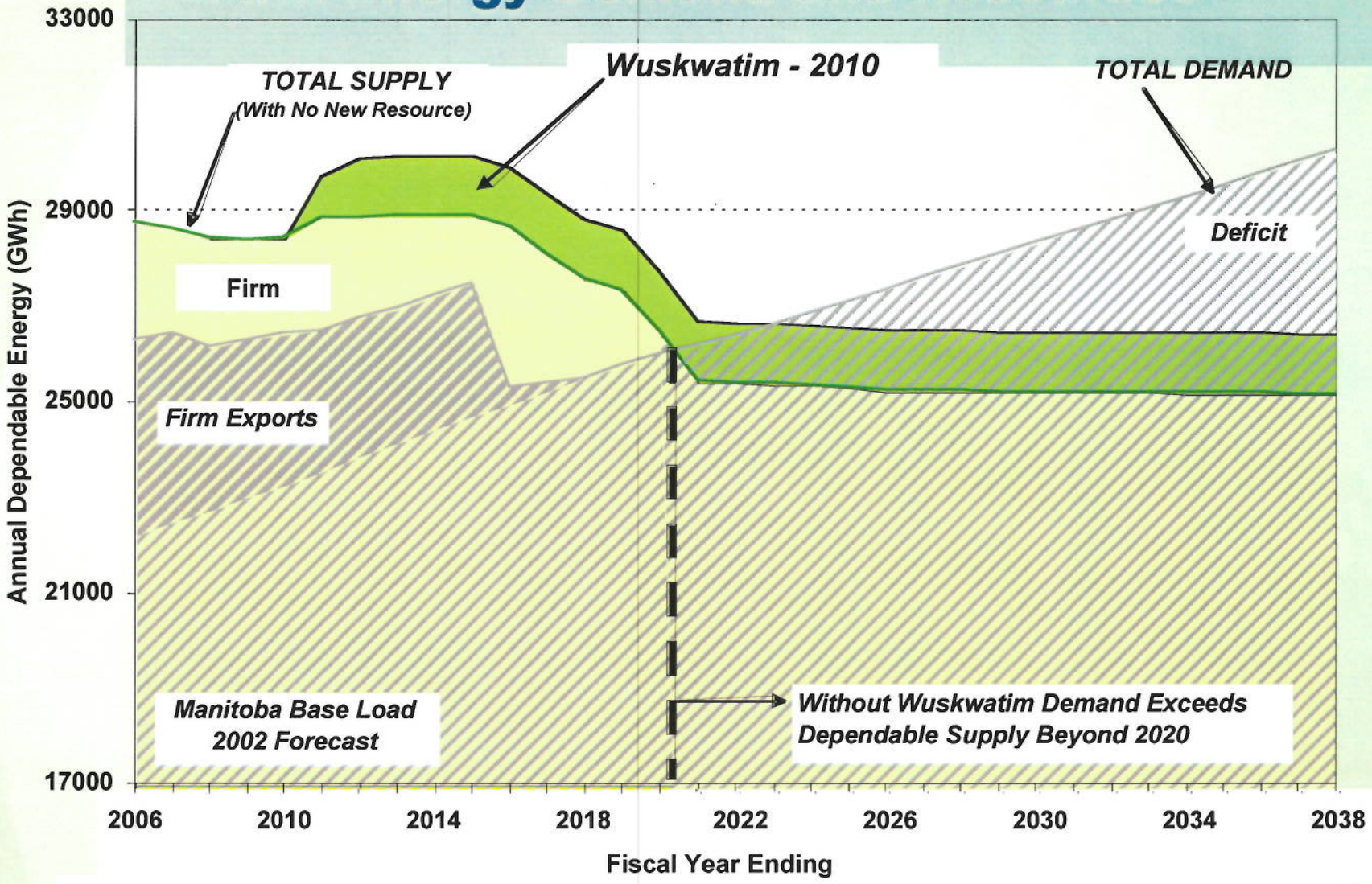
Firm Energy Demand



Firm Energy Demand and Resources



Firm Energy Demand and Resources



Annual Export Prices – Historic and Forecast

Average of All Export Sales

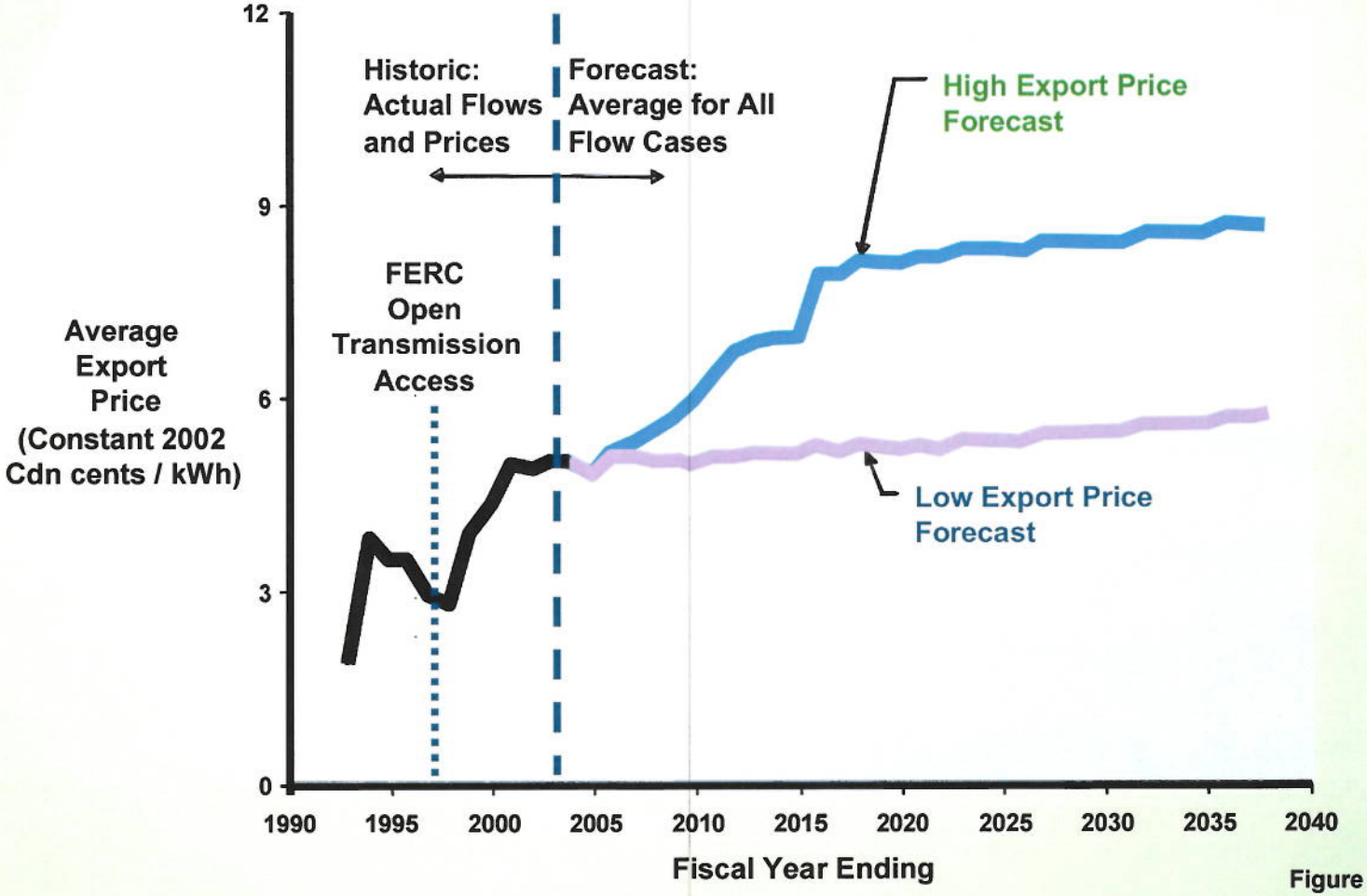
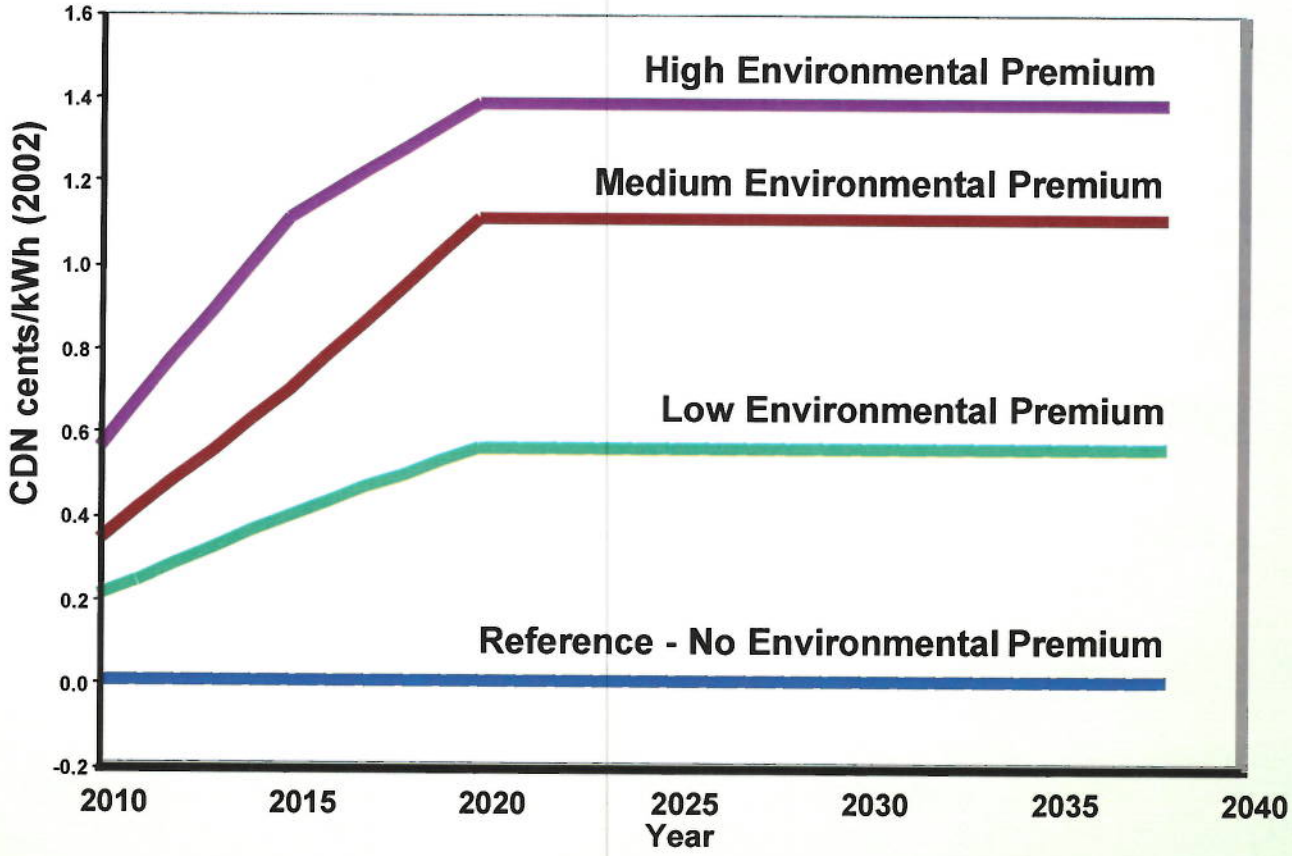


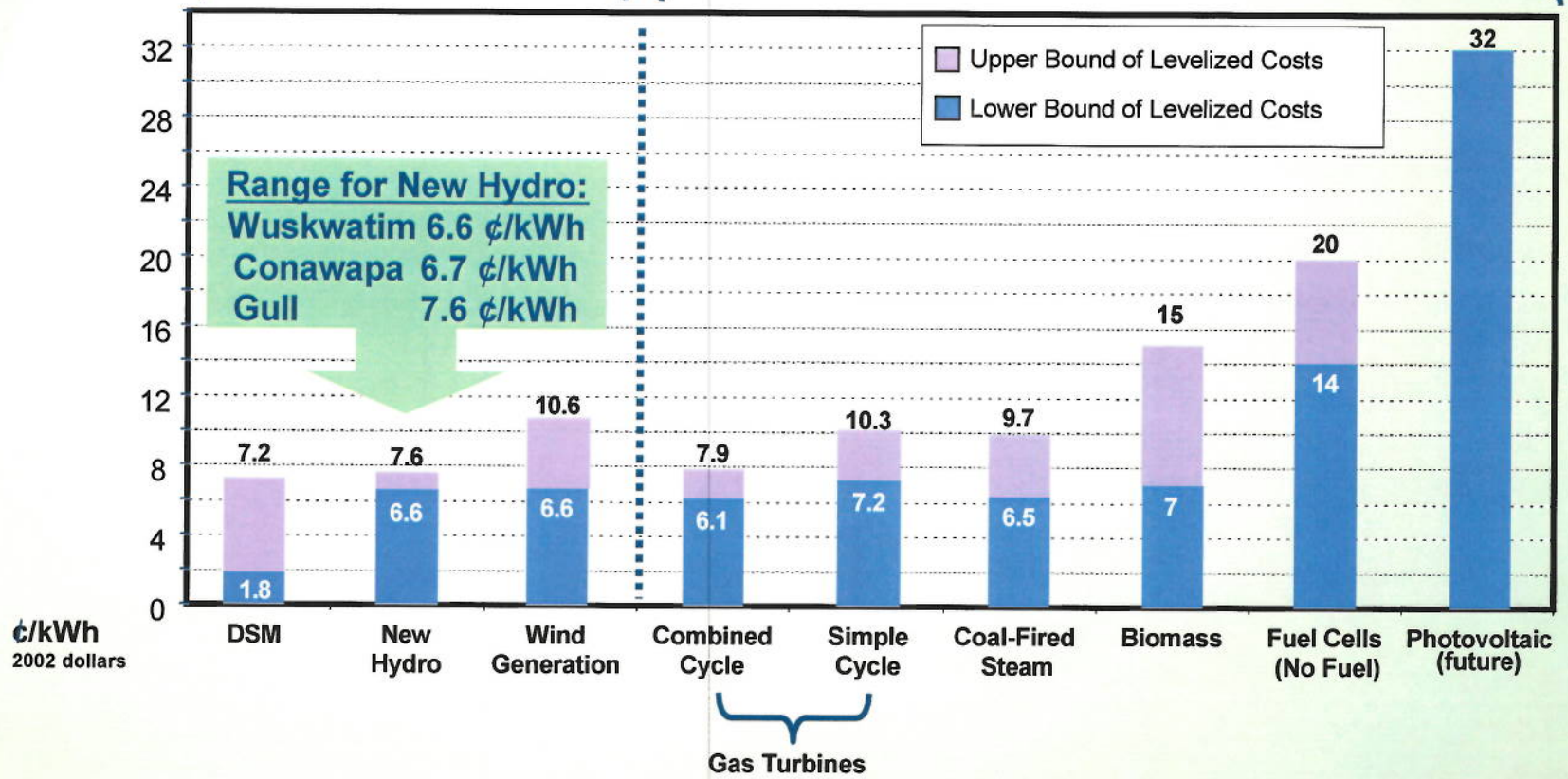
Figure 5.9,Ch 5, Pg 46

Environmental Premiums for Combined Cycle Combustion Turbine (CCCT)

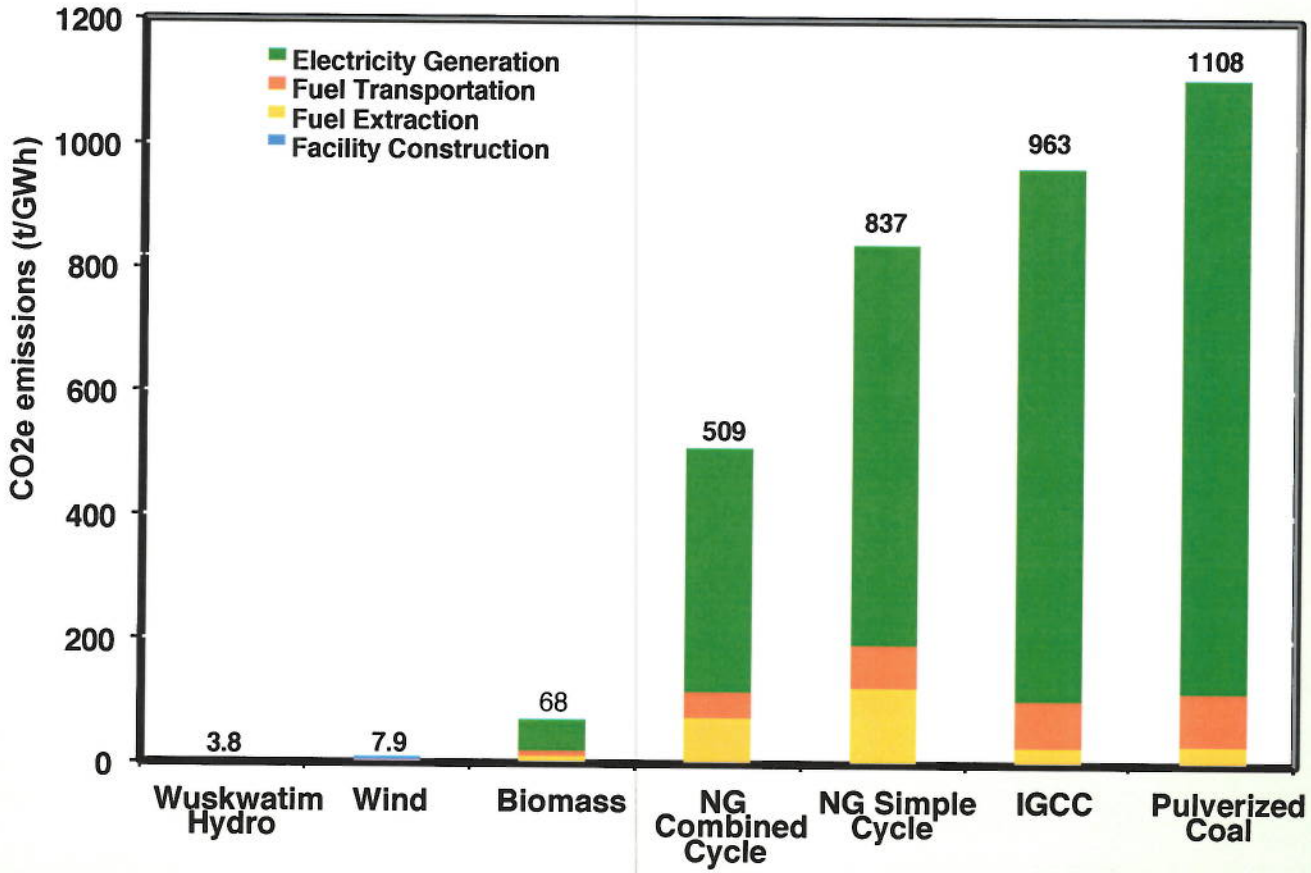


Comparison of Levelized Costs 10% Discount Rate

Most Attractive Options | **Least Attractive Options**

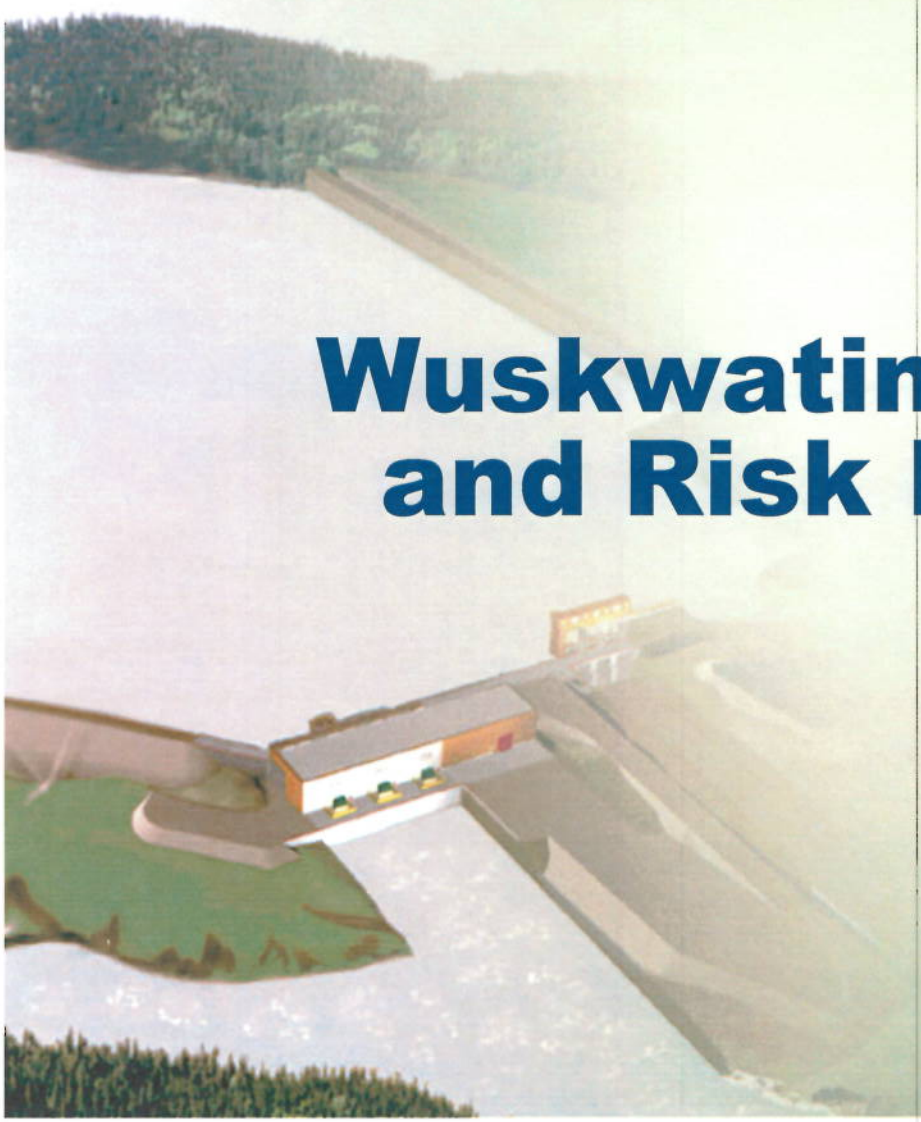


Life-Cycle Greenhouse Gas Emissions



Source: Pembina Institute for Appropriate Development Study on Life Cycle GHG Emissions and land change related to selected power generation options in Manitoba

Wuskwatim Economic and Risk Evaluation



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Internal Rate of Return (IRR)

- IRR = long-term average monetary return to project proponent from investment (non-technical definition)
- Economic criteria for low-to-medium risk project is that IRR must be greater or equal to 6% to 10% real return (based on Manitoba Hydro hurdle rate practice)
- Difference between:
  real 6% to10% IRR and
  real borrowing rate of 5.34%
  (5.34% = 7.45% debt rate after removing inflation)

  provides profit and buffer against risk

IRR (Real) of Wuskwatim Advancement

April 2003 NFAAT Main Submission

Generation Sequence	Low Export Prices	Expected Export Prices	High Export Prices
Wuskwatim 2009 Advanced From 2020	8.5%	10.3%	12.3%

November 2003 Update

Generation Sequence	Low Export Prices	Expected Export Prices	High Export Prices
Wuskwatim 2010 Advanced From 2019	8.2 %	10.0%	12.0%

Sensitivity Analysis Long-Term Economics

Sequence Assumptions (Expected)	IRR (Real)	Difference From "A"
A. WUSKWATIM LONG-TERM ECONOMICS	10.3%	
Low and High Export Price Forecasts		
Low Export Price Forecasts	8.0%	-2.4%
High Export Price Forecasts	12.1%	1.8%
Reference and Environmental Export Price Forecasts		
Reference Forecast (No EEPs)	9.2%	-1.1%
Low Environmental Export Premium Forecast	10.2%	-0.1%
Medium Environmental Export Premium Forecast	10.9%	0.5%
High Environmental Export Premium Forecast	11.4%	1.1%
Sensitivities		
Capital Cost Increase of 15% ($95 million)	9.2%	-1.1%
Capital Cost Decrease of 15% ($95 million)	11.7%	1.4%
10% reduction on the Burntwood River	9.8%	-0.5%
+300 MW Interconnection Capability Adjustment	10.5%	0.2%
-300 MW Interconnection Capability Adjustment	10.0%	-0.3%
Wuskwatim 2010 ISD with added costs during delay	10.2%	-0.1%
Extreme Downside Combination of Low export price, 15% capital cost increase and 10% flow reduction	*6.6%*	*-3.7%*

Sensitivity Analysis
Wuskwatim Advancement

Sequence Assumptions (Expected)	IRR (Real)	Difference From "B"
B. WUSKWATIM ADVANCEMENT (2020 vs 2009)	10.3%	
Low and High Export Price Forecasts		
Low Export Price Forecasts	8.5%	-1.8%
High Export Price Forecasts	12.3%	2.0%
Reference and Environmental Export Price Forecasts		
Reference Forecast (No EEPs)	9.6%	-0.7%
Low Environmental Export Premium Forecast	10.4%	0.1%
Medium Environmental Export Premium Forecast	11.0%	0.7%
High Environmental Export Premium	11.5%	1.2%
Sensitivities		
250 MW of Wind (ISD – 2009)	10.25%	-0.05%
(2x) DSM	10.25%	-0.05%
Wind in 2009 and increased DSM	10.2%	-0.1%
System Drought	9.7%	-0.6%
2003 Power Resource Plan Update (2009 vs 2019)	10.2%	-0.1%
Wuskwatim 2010 ISD with added costs during delay	10.0%	-0.3%
Medium-low Load Growth	10.0%	-0.3%
Power Resource Plan, load forecast, capital cost and financial indicator update	10.0%	-0.3%

IRR Comparison of Wuskwatim vs Wind

- Updated long-term economics evaluation of 450 MW wind

Wuskwatim 2009	**10.3% IRR**
450 MW Wind 2009	**6.1% IRR**

Social Net Benefits of Advancing Wuskwatim to 2009 (2002 NPV)

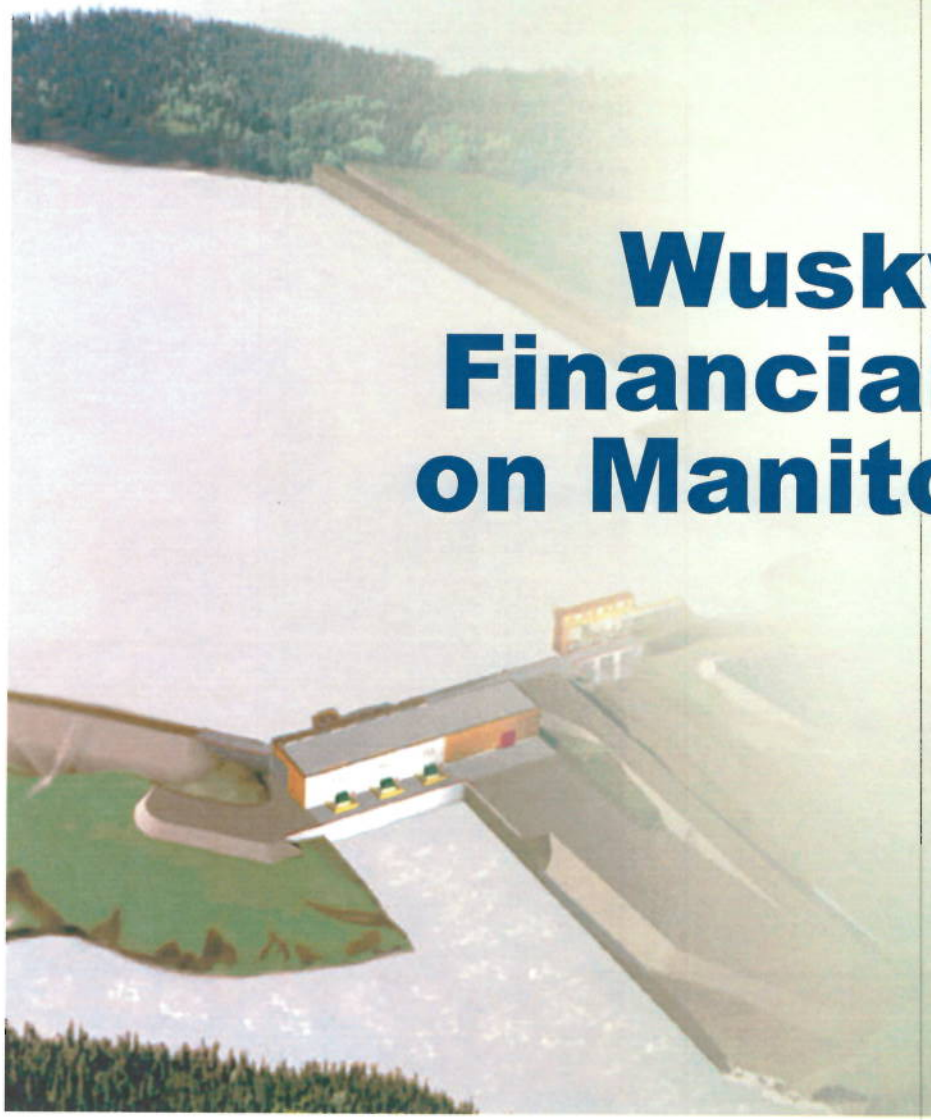
- Economic analysis is adjusted for taxes, wages benefits, government costs and environmental and social costs

6% Real Discount Rate	8% Real Discount Rate
$267 million	$151 million

Economic Conclusions

- Internal Rate of Return of 10% (real) is very attractive given the relatively low level of risk
- Risk sensitivities demonstrate that the Wuskwatim economics are robust, e.g. export prices, drought
- Sensitivities indicate even with much higher DSM (5X current) and/or much higher wind generation, Wuskwatim IRR only reduces by 0.3%

Wuskwatim Financial Impacts on Manitoba Hydro



NISICHAWAYASIHK CREE NATION

Manitoba Hydro

Focus of the Financial Analysis

- Shows the impacts of Wuskwatim advancement (generation and transmission) on Manitoba Hydro's
  - *Income statement*
  - *Balance sheet*
  - *Financing requirements*
- Quantifies potential rate savings to customers
- Fully includes the effect of the Partnership arrangement and Manitoba Hydro's loans to NCN

Proposed Capital Structure for Partnership With Nisichawayasihk Cree Nation

(based on $756M in-service cost – Generating Station)

Project Equity 25% ($189M)

- NCN Cash Equity $20.5M
- NCN Financed Equity (by MH) $41.5M

- NCN Interest Up to 33%
- General Partner* .01%
- Manitoba Hydro Interest 66.99%+

Limited Partnership

Project Debt 75% ($567M)

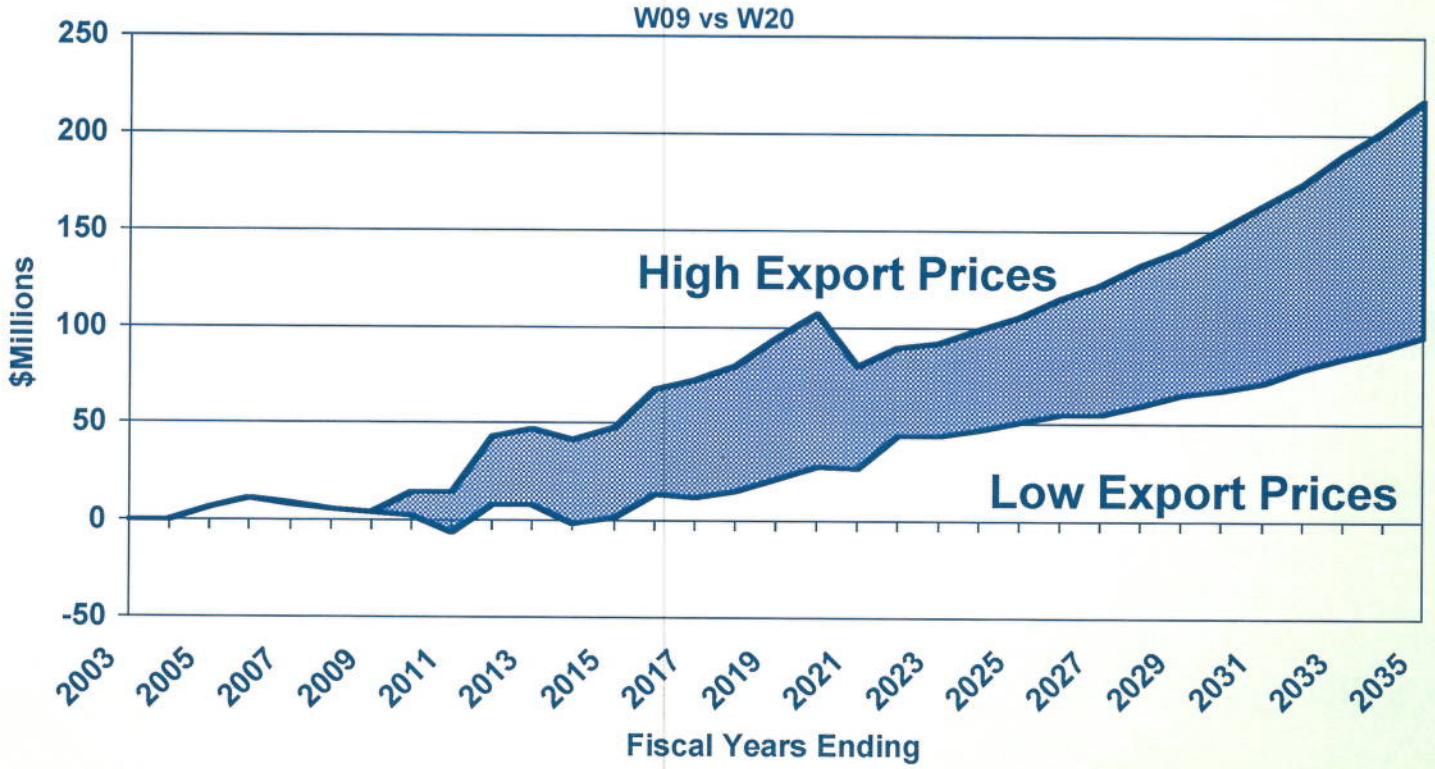
Project Financing (Manitoba Hydro)

* 100% owned by Manitoba Hydro

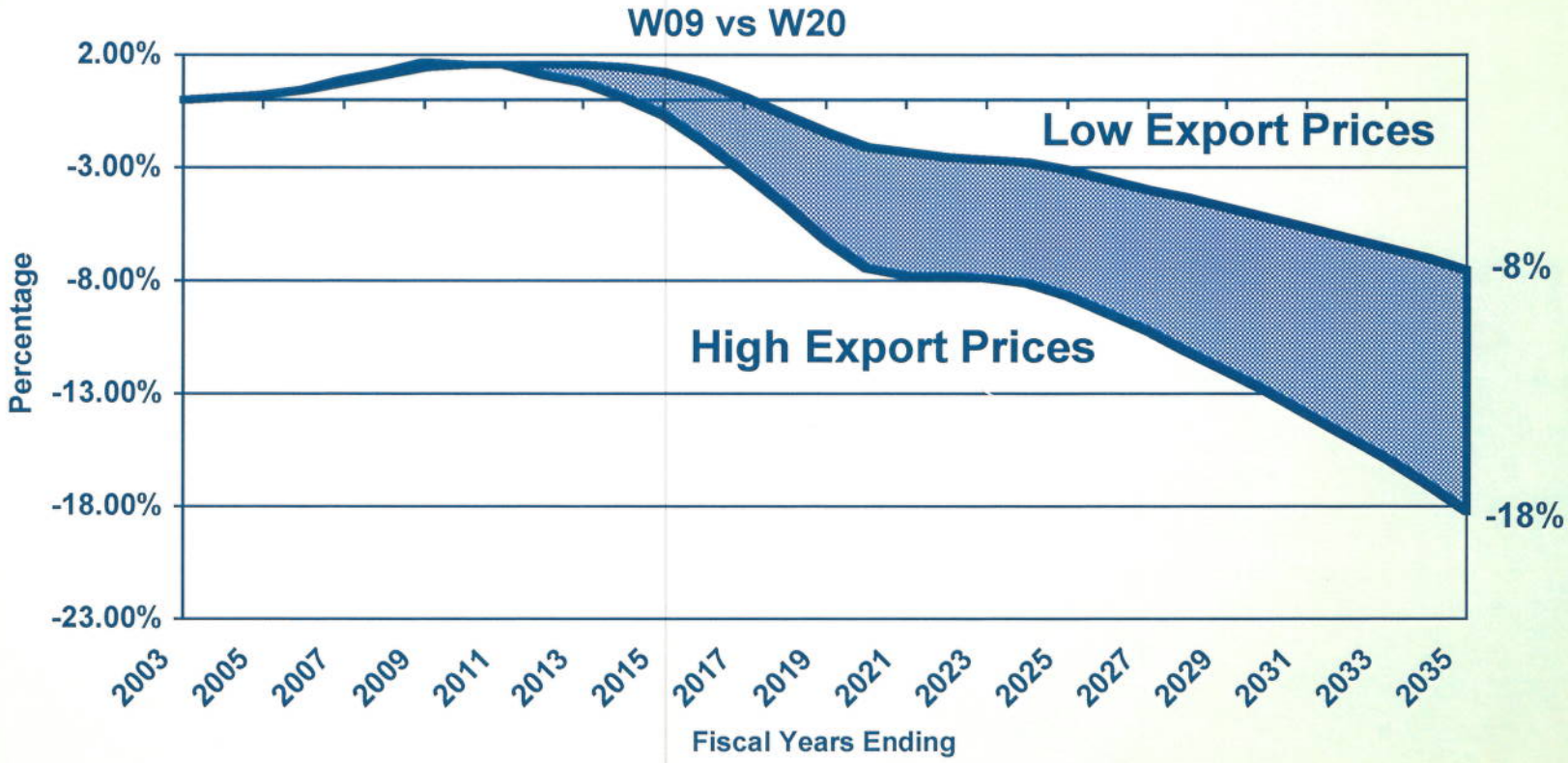
Analysis of Financial Impacts on Manitoba Hydro

- Manitoba Hydro will accrue 67% of dividends from the Partnership plus interest on its loans to NCN
- The financial effects of Wuskwatim commencing in 2009/10 are compared to the 2020/21 base case including similar partnership arrangement:
  - *Compare financial performance – assuming same rates as base case*
  - *Compare rate increases – assuming same financial performance as base case*

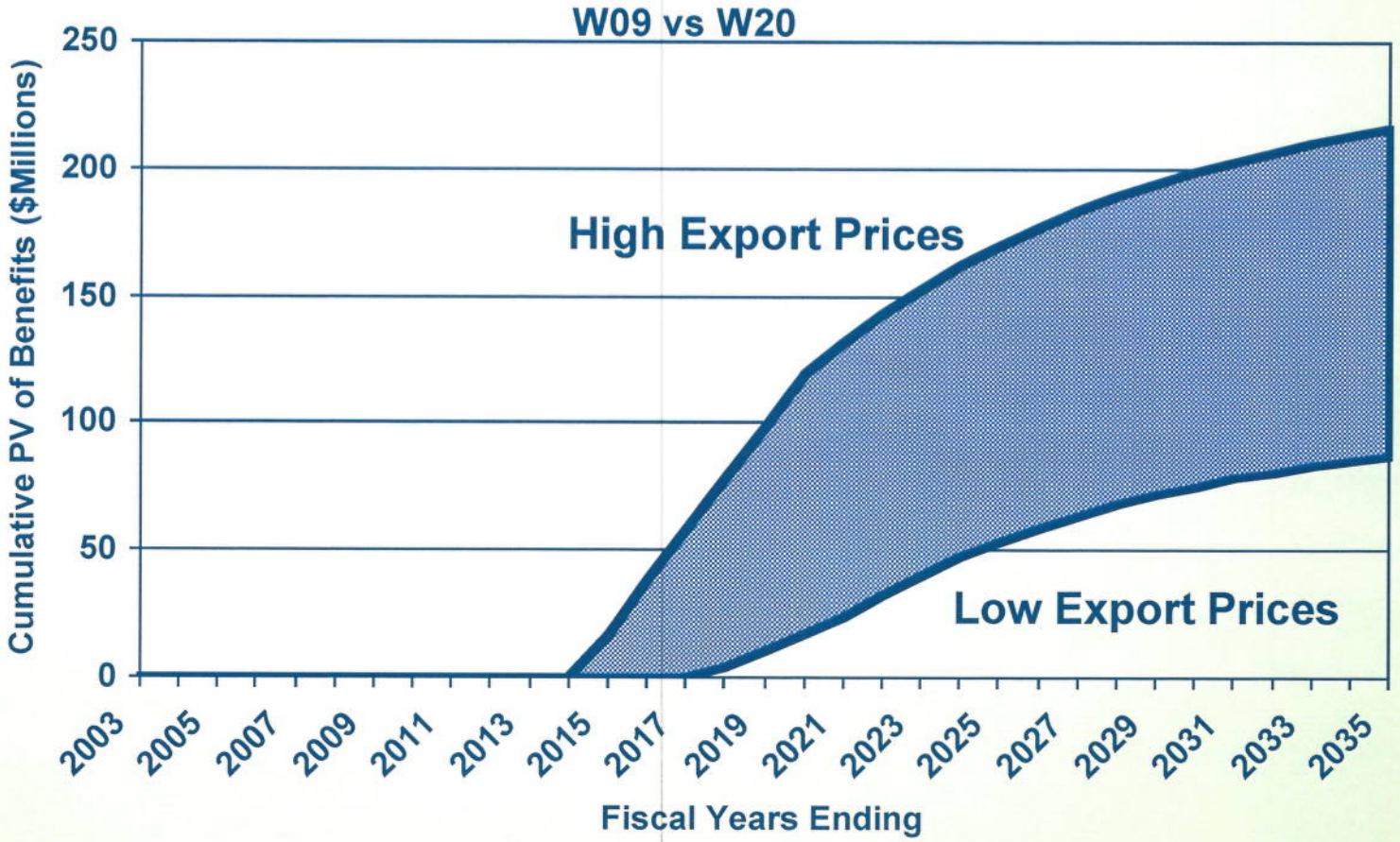
Wuskwatim Advancement Can Improve Manitoba Hydro's Net Income



Wuskwatim Advancement Can Improve Manitoba Hydro's Debt Equity Ratio



Wuskwatim Advancement Can Lower Customer Bills



Financial Risk Analysis

	Max. temporary increase in debt ratio	Rate savings to 2035 (2002 $)
Base case	1.6%	$143M
Base case – low prices	1.6%	$ 87M
15% Capital cost increase	+0.5%	($ 14M)
Extreme drought at startup	+0.3% or less*	($ 12M or less)
ADVERSE COMBINATION	2.4% or less*	$ 61M or more
Base case – high prices	1.6%	$216M
15% capital cost decrease	(0.2%)	+$ 25M
FAVOURABLE COMBINATION	1.4%	$241M

*adverse impacts are overstated because drought costs would be reduced by low export / import prices.

Financial Conclusions

- No adverse effects on Manitoba Hydro's financial stability as a result of investing in Wuskwatim
  - *Impacts on debt ratio and net income are negligible in the early years of project start-up*
  - *Will not cause additional rate increases*
- Improved long-term financial performance from Manitoba Hydro's share of Wuskwatim net revenues
- Opportunity for customer rate savings beginning six to eight years after project start-up and continuing thereafter

Thank You

NISICHAWAYASIHK
CREE NATION

Manitoba Hydro

Environmental Impact Statements

Clean Environment Commission Hearing

March-April 2004

NISICHAWAYASIHK CREE NATION

Manitoba Hydro

Part 1
Integrated Approach to EIS

- *Regulatory Review Process*
- *Assessment Approach*
- *Public Consultation and Involvement*
- *Overview of EIS Studies*

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Regulatory Review Process Ongoing Cooperative Manitoba/Canada Activities

- The Wuskwatim Projects require federal and provincial environmental approvals
- Generation and Transmission Projects are two separate projects for licensing applications and review
- Regulatory and public review has continued since EIS filings in April 2003 and extends beyond CEC hearing process

Environmental Impact Statements (EIS) Prepared in Accordance With EIS Guidelines

- EIS Guidelines set out the information required by government agencies
- Project description and refinement
- Assessment by environmental components (existing baseline environment, effects assessment and mitigation for the Projects, cumulative effects, residual effects, environmental monitoring)
  - *Physical Environment*
  - *Aquatic Environment*
  - *Terrestrial Environment*
  - *Socio-Economic Environment*
  - *Heritage Resources*
- Public consultation and involvement throughout

Assessment Incorporated Local and Traditional Knowledge and Scientific Information

- **Local and Traditional Knowledge was an essential part of the planning and environmental assessment process for the Wuskwatim Projects**
- **Information was shared by NCN members:**
  - *Their own Traditional Knowledge interview study*
  - *NCN members who worked with study scientists in field programs*
- **Information was provided by others beyond NCN:**
  - *Ongoing public consultation / involvement activities beyond NCN with First Nations and Aboriginal people*
  - *Local governments*
  - *Potentially affected stakeholders and resource users*
  - *The general public*

EIS Documents Detail Over Four Years of Research and Public Review

- Environmental studies for both Projects underway since late 1999 – some studies underway since 1998
- EIS describe refinement of the Projects to avoid and mitigate expected construction and operation effects
- Table of Contents volume outlines the EIS reports:
  - *Public Summary* – Integrated Executive Summary of the two EIS
  - *Main Technical Volumes* – for review by regulators and the CEC
  - *Supporting Documentation* – extensive technical, scientific or other information supporting specific sections of the main reports
- Extensive supplemental materials filed since EIS submissions in April 2003:
  - *Responds to questions from government regulators, the public, and participants in the CEC hearing*

Public Consultation and Involvement Was an Integral Part of the Assessment Process

- Since 1997, NCN has been actively involved with Manitoba Hydro in all aspects of planning for the two Projects
- Since 2001, five rounds of public consultation and involvement beyond NCN have been undertaken:
  - *Extensive opportunities to receive information and provide input*
    - Website information, open houses, community meetings, and newsletters
  - *CEC participant workshop in July 2003*

Public Input Helped to Refine and Improve the Projects and the Assessments - Examples

- NCN participation in evaluation and selection of road, camp and transmission line locations, and key choices about design and other matters related to the developments
- Elected Officials' input in design of the Public Involvement Plan
- Downstream communities' input to field work design re: water quality sampling locations
- Communities' requests for further information on system operations potential for water regime changes
- Communities' and others' inputs to the identification and evaluation of alternative transmission line routes and selection of the preferred transmission line routes

Environmental Effects Were Predicted Specific to the Wuskwatim Developments

- Potential effects of each Wuskwatim Project were predicted separately for each environmental component by comparing:
  - *What would be expected without the Projects (existing baseline without the Projects)*

    AND
  - *What is expected to happen with the Projects (effects pathways)*
- Residual environmental effects, and their significance, were assessed separately for each environmental component
  - *Considered mitigation, monitoring and follow-up measures*

Cumulative Effects Assessment Was an Integral Part of the Overall Effects Assessments

- Cumulative Effects Assessment (CEA) approach for both Projects
  - *Reflects the EIS Guidelines*
  - *Looks at all effects that are likely to result from the Wuskwatim Projects when they are anticipated to occur in combination with other projects or activities that have been or will be carried out*
  - *Intended to meet single-project regulatory assessment requirements as reviewed by TAC & PAT*
  - *Differs from broader regional planning approaches to CEA*
- Consistent with Canadian Environmental Assessment Agency's Practitioner's Guide – CEA is "an Environmental Impact Assessment (EIA) done well"
  - *Integrated throughout each EIS for each environmental component*
  - *Considered local and Traditional Knowledge*

Cumulative Effects Were Assessed With Regard to Past and Current Projects / Activities

- **Past and current projects / activities were considered to form an integral part of the existing baseline environments**
  - *Considered current and ongoing effects of Churchill River Diversion (CRD), including augmented flow program, as well as other specified projects/activities*
  - *Assessed separately for each environmental component*
- **Scoping for each environment was based on the potential for overlapping pathways**
  - *Reflected local areas directly impacted by Wuskwatim Projects*
  - *Reflected zones within which there may be regional or global effects from Wuskwatim Projects*
  - *Considered overlaps with past and current projects and activities*

Cumulative Effects Were Assessed With Regard to Specific Future Projects/Activities

- Future projects/activities scoped for the cumulative effects assessment for each Wuskwatim Project
  - *Included projects being considered by Manitoba Hydro for possible construction starting within the next five to ten years, as well as other specified projects/activities*
  - *Assessed separately for each environmental component*
- Generation Project scoping for each environment is based on the potential for overlapping pathways
  - *Biophysical study area*
  - *Socio-economic study regions*
  - *System water regime study regions*

Part 2
Specific Environments

Studies Extended to Siting and Refinement of Project Components and Assessment of Effects On:

- Physical Environment
- Aquatic Environment
- Terrestrial Environment
- Socio-Economic Environment and Heritage Resources

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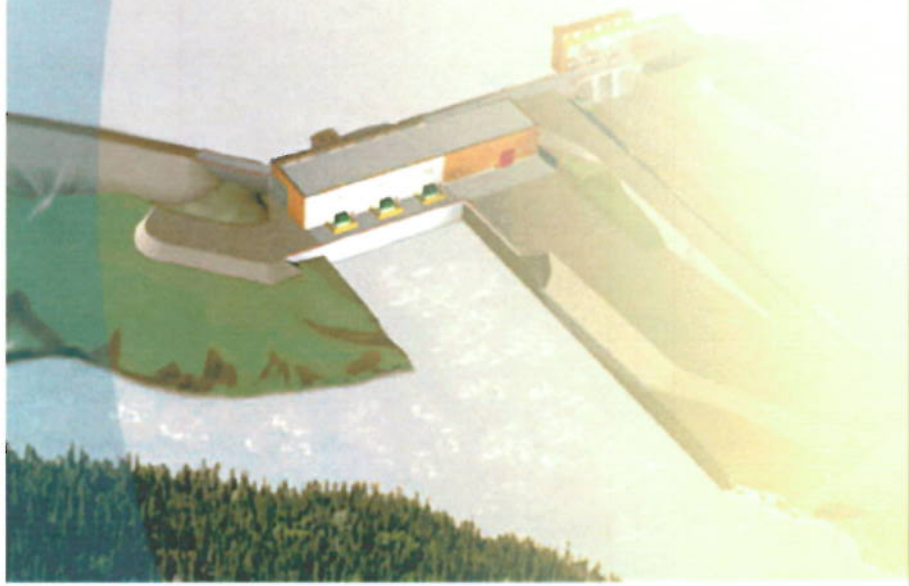
Physical Environment



NISICHAWAYASIHK CREE NATION

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Physical Environment Components

- The Generation and Transmission EIS considered:
  - *Climate*
  - *Geology / soils*
  - *Water regime*
  - *Ice processes*
  - *Erosion / sedimentation*
  - *Debris*

Overall Climate Effects Are Positive

- Generation Project is expected to result in a net reduction of greenhouse gas emissions considering:
  - *Reduced need to produce power elsewhere using coal or gas*
  - *Minimal flooding*
- Transmission Project is expected to result in removal of carbon stocks at station sites and along rights-of-way

Water Regime Changes Are Minor

- **Upstream of Generating Station:**
  - *Raise water levels between Taskinigup and Wuskwatim Falls*
  - *Reduce annual water level fluctuations on Wuskwatim Lake*
  - *No water regime changes upstream of Early Morning Rapids*
- **Downstream of Generating Station:**
  - *Daily open water level changes downstream in Burntwood River*
  - *Largest daily changes will occur in 9 km reach immediately downstream (up to 1.3 m daily water level change under normal open-water conditions)*
    - Changes dampened by Opegano Lake (up to .45 m)
    - Changes further "smoothed out" downstream of Opegano by storage in lakes and by rapids
    - Changes will not be noticeable by Birch Tree Lake (daily water level changes on Birch Tree Lake will be kept within 0.1 m under open water conditions)

Wuskwatim Will Not Change CRD Operation

- Wuskwatim Project will not change CRD operation at Notigi or at Missi Falls
- Monthly and seasonal flow patterns on CRD will not change
- In the immediate area of the new Generating Station:
  - *Daily flows will be shaped with a modified run-of-river operating mode*
  - *Inflows and outflows will normally be balanced on a 24-hour basis*

Wuskwatim Will Not Have Perceptible Effects on LWR Water Regime

- EIS findings filed in April 2003 were based on assessment that no perceptible effects were expected on overall system water regimes relating to LWR and Lower Nelson River from Wuskwatim Generation
- Subsequent review by participants resulted in Manitoba Hydro conducting extensive further analyses and consultations to test this conclusion
- System modeling showed no perceptible changes are expected in water levels for waterbodies downstream of Lake Winnipeg, including Cross Lake:
  - *No perceptible water regime changes are expected = no pathways for measurable environmental effects*
  - *No cumulative effects assessment appropriate*

Erosion Rates on Wuskwatim Lake Will Initially Increase

- **About 30% of the shorelines on Wuskwatim Lake and adjoining waters are eroding today:**
  - *Most of these shorelines are in the main part of Wuskwatim Lake*
  - *Erosion rates on these shorelines increased with CRD, and have been declining over past 25 years – today approaching long-term rates*
- **Keeping water levels on Wuskwatim Lake at upper end of the current range during Wuskwatim operation will:**
  - *Initially increase amount of erosion on eroding shorelines*
  - *After about 5 years, erosion rates for all eroding shorelines will begin to decline*
  - *After about 25 years, erosion rates for all eroding shorelines are expected to be about the same as they would be without the Wuskwatim Project*

Effects on Sedimentation in the Burntwood River to Be Managed During Construction

- **Some sediments will be released into the river during cofferdam construction:**
  - *Most effects will occur during the open water seasons of Years 2 and 5 (e.g., during cofferdam removal)*
  - *A Draft Sediment Management Plan has been submitted to Fisheries and Oceans Canada (DFO):*
    - Specific design and contingency measures to mitigate sediment increases
- **The downstream extent of sediment transport will be monitored throughout the construction period**

Some Initial Localized Increase in Shoreline Debris

- **Increased erosion will result in more woody debris near erodible Wuskwatim Lake shorelines:**
  - *Analysis indicates that most new debris will be trapped by existing debris and remain against the shore and not move out into the lake*
  - *NCN Elders have stated that they believe some additional debris may be carried out into the Lake as a result of the Project*
  - *Will be monitored through Debris Management Program and mitigation actions taken as required*

Transmission Effects on Soils and Terrain Will Be Confined and Minimized

- Effects will be confined primarily to rights-of-way and immediately adjacent areas
- Selective clearing, winter clearing and winter construction (where appropriate) will greatly reduce potential impacts
- Limited access during construction to minimize effects

Aquatic Environment

NISICHAWAYASIHK CREE NATION

Manitoba Hydro

Aquatic Environment Components

- The Generation Project EIS considered:
  - *Water quality*
  - *Aquatic habitat*
  - *Lower trophic levels (aquatic plants, algae, invertebrates)*
  - *Fish*
  - *Stream crossings*
- The Transmission Project EIS considered:
  - *Watersheds and stream crossings*
  - *Fish and fish habitat*

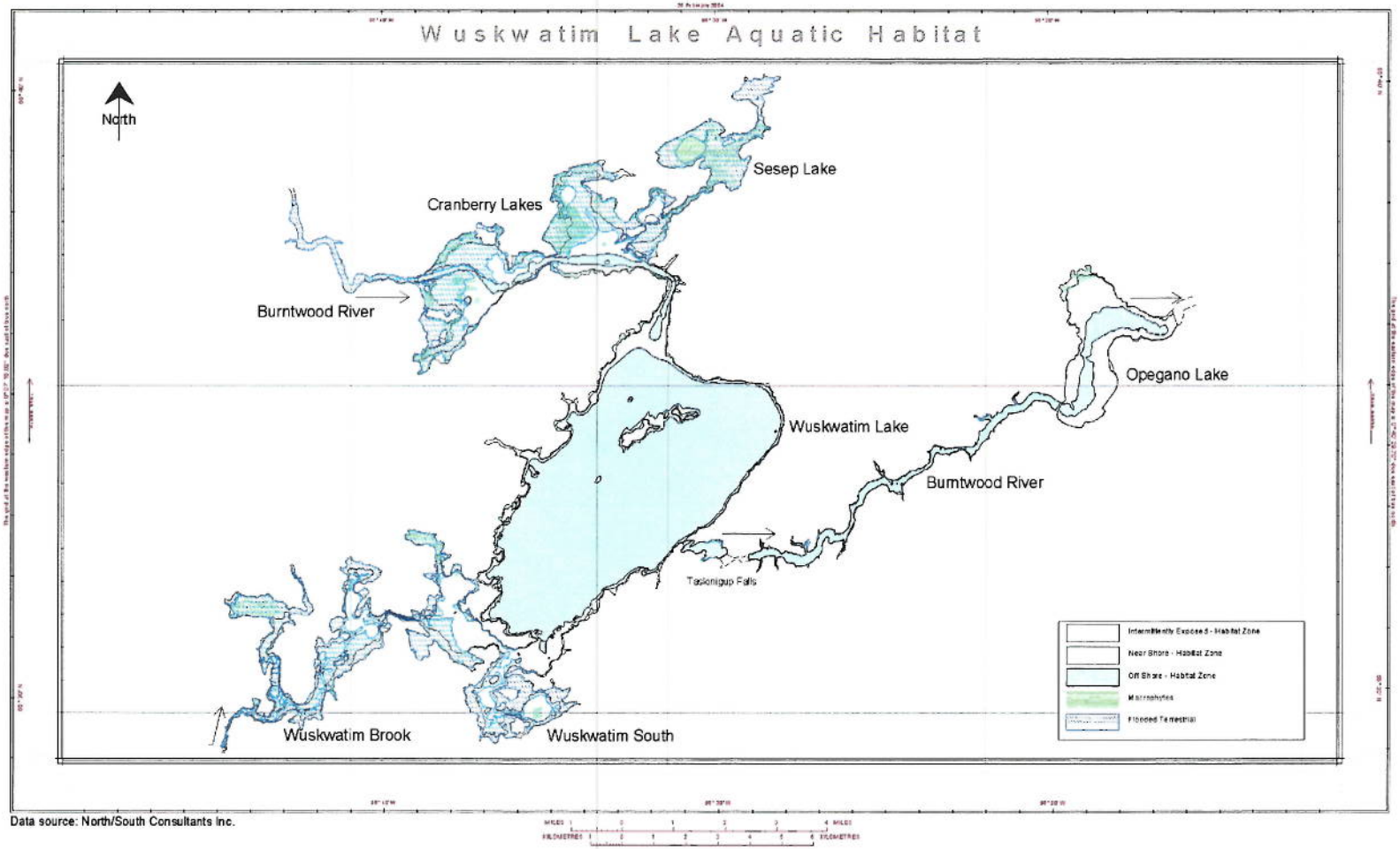
Generation - Measurable Water Quality Changes Will Be Short Term or Local

- Extensive water quality sampling conducted:
  - *Large geographic area sampled*
  - *Broad range of parameters*
- During construction, some specific construction activities will cause short-term water quality changes
- During operation, no measurable changes are expected to water quality except at local areas

Generation - Long-term Effects on Fish in Wuskwatim Lake Will Be Positive

- In Wuskwatim Lake, reduced water level fluctuations increase the amount of habitat:
  - *Increase in invertebrates and forage fish eaten by larger fish*
  - *Increase in the amount of spawning habitat available to fish*
- Initially, increased erosion on Wuskwatim Lake main may reduce the suitability of some areas for invertebrates/fish
- Long-term increases in pickerel, jackfish, lake cisco, and lake whitefish production
- Long-term populations will depend on the amount of harvest

Wuskwatim Lake Aquatic Habitat



Data source: North/South Consultants Inc.

Generation - Downstream Effects Will Occur for a Short Distance to Opegano Lake

- Operation of the Generating Station will have a negative effect on fish and fish habitat in this reach
  - *Increased water level fluctuations*
  - *Decreased movement of fish from upstream areas*

Generation - Effects on Fish Movements

- Fish currently can not move upstream over Wuskwatim Falls or Taskinigup Falls
- Some fish move downstream over Taskinigup Falls
  - *Movement over the falls is not a migration for a specific purpose (e.g., spawning)*
- Fewer fish may move downstream after construction:
  - *Fish will be able to move back over Wuskwatim Falls*
  - *Change in fish habitat*
- Most fish that move downstream will go through the turbines
  - *80% to 90% of fish are expected to survive*

Generation - Overall Effects on Fish Are Positive

- The net effect on fish in the study area as a whole is expected to be positive (a small increase in the production of key fish species)
- DFO plays an important role in regulating aquatic developments
  - *Habitat compensation is required for site specific negative effects to fish habitat*
- A Draft Fish Habitat Compensation Plan was provided to DFO that compensates for negative effects on fish habitat
- The Compensation Plan will further increase fish production

Generation - No Significant Changes in Mercury Concentrations in Fish

- Small increases in fish mercury concentrations are expected in Wuskwatim Lake (small amount of flooding)
  - *Increases may not be large enough to be detectable over natural variation*
- Concentrations in individual fish resident near peat areas in Opegano Lake may increase slightly
- Concentrations in fish downstream of Opegano Lake will not be measurably affected

Generation - Aquatic Monitoring Program

- As requested by DFO, a Draft Aquatic Monitoring Program for the Generation Project has been provided to DFO for its review
- The Monitoring Program includes:
  - *Water quality*
  - *Invertebrates*
  - *Fish and fish habitat*
  - *Mercury levels*
- Among other things, the results of the Monitoring Program will be used to:
  - *Confirm impact predictions*
  - *Identify unexpected impacts*
  - *Refine mitigation as required*

Transmission - Effects on Fish and Aquatic Habitat

- Local knowledge was used to avoid important fish habitat and fishing areas during routing
- No habitat critical to sustaining local fish populations was identified along the proposed transmission routes
- All potential negative effects on aquatic habitat can be mitigated
- Site specific mitigation plans will be provided in the EnvPPs
- Follow-up monitoring will minimize the potential for negative impacts to surface water flows and at stream crossings

Terrestrial Environment

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Terrestrial Environment Components

- EIS considered the following terrestrial wildlife/habitat features:
  - *Plants / habitat*
  - *Insects*
  - *Amphibians and reptiles*
  - *Birds*
  - *Mammals*

Generation - Effects on Habitat and Plants Will Be Site-Specific or Local

- Construction of the Generating Station and associated infrastructure, including the road, will potentially affect about 2,600 hectares:
  - *Only 660 hectares will be permanently removed*
- No endangered, threatened, or very rare plants were found
- Most of the affected habitats are common in the area
- Specific mitigation measures target three uncommon habitat types:
  - *Jackpine forest on dry soil*
  - *Balsam fir forest*
  - *White spruce forest*

Generation - Effects on Shoreline Habitat and Plants Will Vary by Location

- Upstream of the Generating Station, reduced water level fluctuations will favour the growth of plants adapted to these conditions:
  - *Increase in peatlands/sedges*
  - *Decrease in cattails*
- Downstream, increased frequency of water level fluctuations could:
  - *Increase the break up peatlands along shore*
  - *Reduce the abundance of plants that prefer a more stable water regime*

Transmission - Effects on Forest and Plants Will Be Small

- Rights-of-way clearing will result in minor removal and long-term loss of trees – clearing will occur within the rights-of-way (about 2800 hectares)
- Shrub cover will be maintained/encouraged along rights-of-way
- A rare plant survey will occur along rights-of-way
- Potential effects on vegetation will be reduced by constructing during winter

Generation and Transmission - Effects of Construction on Wildlife Will Not Be Significant

- Site-specific measures to minimize effects during construction, will be described in the EnvPPs
- Construction effects will be short-term and local (e.g., noise may temporarily scare away some wildlife in areas near the sites being developed for the Projects)

Generation and Transmission - Effects of Operation on Birds Will Not Be Significant

- Operational effects on birds will be small and long-term
- Generation Project
  - *Changes in amounts of marsh and peat habitat and habitat losses through erosion*
  - *Merging peatlands will reduce the protection currently provided nests*
  - *Reduced fluctuations in water levels upstream of the station: will benefit shoreline nesting areas but reduce areas of offshore marsh habitat preferred by some species*
- Transmission Project
  - *Altered bird community in/adjacent to rights-of-way*
  - *Potential small risk of bird collision*

Generation and Transmission – Operational Effects on Mammals Will Be Small & Not Significant

- Loss of habitat at some sites
- Habitat alteration and use
- Access management

Generation and Transmission – Effects on Woodland Caribou Will Not Be Significant

- Changes in habitat will be relatively small
- Generation Project:
  - *Road avoids important winter range and calving habitat*
  - *Only a small number of caribou are present in the area directly affected*
- Transmission Project:
  - *Routing avoided known sensitive caribou range*
  - *Minor altered habitat usage in/adjacent to rights-of-way*
  - *Rights-of-way not a barrier to caribou movements*

Generation and Transmission - Effects on Moose Will Be Small and Not Significant

- Habitat is widespread and changes in habitat relatively small
- High quality habitat avoided through access road routing
- Transmission Line rights-of-way anticipated to have neutral effect
  - *Better forage but no demonstrated increase in habitat use*

Effects on Furbearers - Vary Between Species and Projects: Overall Will Not Be Significant

- **Generation Project**
  - *Negative effects on aquatic furbearers include:*
    - Small loss of habitat from flooding and erosion
    - Reduction in food (cattails)
    - Increased water level fluctuations downstream of the GS
  - *Positive effects on aquatic furbearers include:*
    - More stable water levels on Wuskwatim Lake
    - Increased shoreline peat habitat
  - *Net effect is no significant change*
- **Transmission Line**
  - *Small habitat effects on furbearers*
  - *Potential fragmentation effects on some furbearers*

Monitoring and Follow-up - Terrestrial

- Monitoring during construction will ensure that mitigation measures described in the Environmental Protection Plans (EnvPPs) are effective
- Monitoring plans for the operation phase are being developed
- Increased access by resource users along the access road has the potential to affect wildlife:
  - *A Road Access Management Plan has been developed to address concerns related to over-harvesting*
- Transmission Access Management Plans will be developed if a community has concerns about increased access

Socio-Economic Environment

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Socio-Economic Environment and Heritage Resource components

- Resource Use
- Land and Water Use (Transmission only)
- Economy
- Infrastructure and Services
- Personal, Family and Community Life
- Heritage Resources

Generation Effects on Resource Use Will Be Long-term and Positive

- Resource harvesting in Wuskwatim Lake area currently limited due to difficult access
- Increased access provided by Wuskwatim access road expected to have a long-term, positive effect on domestic harvesters, commercial fishers and trappers
- Road Access Management Plan being developed to address over-harvesting concerns

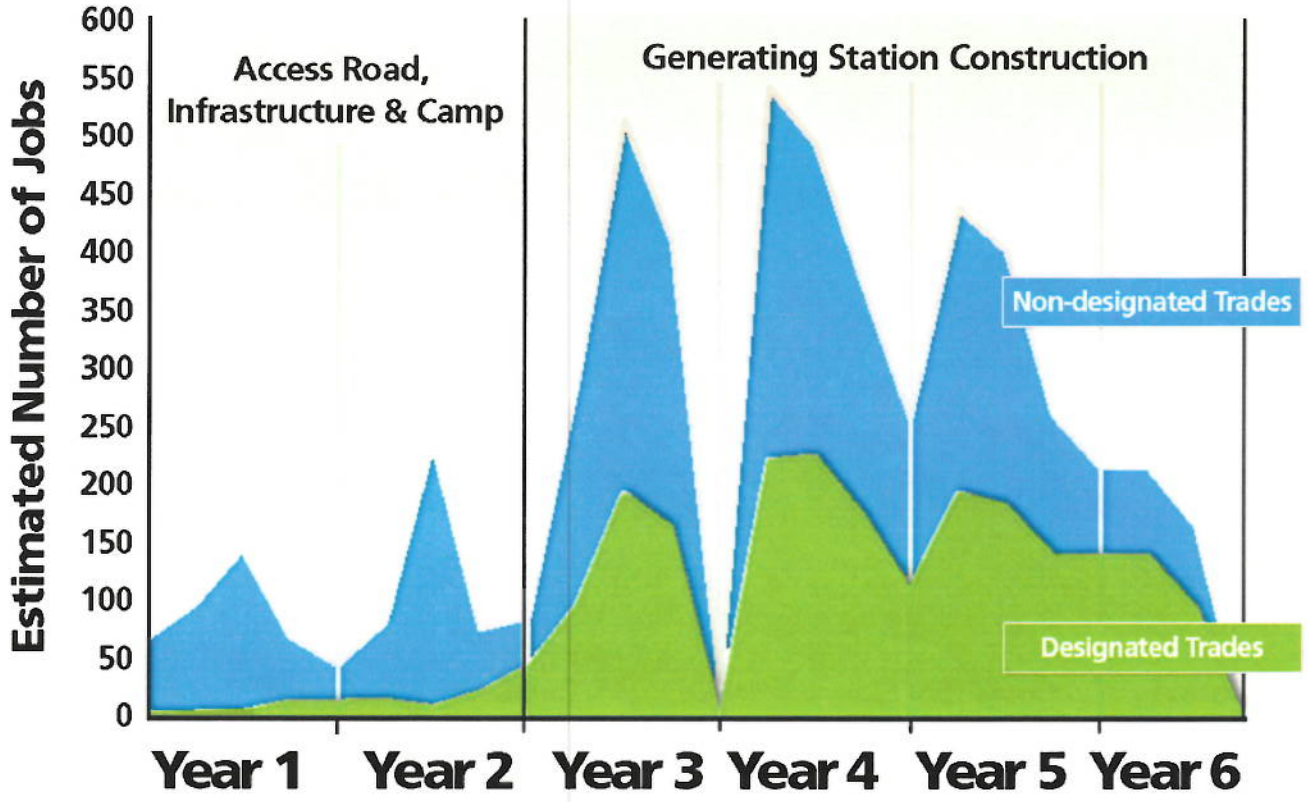
Transmission Effects on Resource Use Will Be Both Negative and Positive

- Clearing and construction activities may cause some wildlife to temporarily move away from areas near the rights-of-way:
  - *Short-term and minor effects*
  - *Trappers will be notified in advance of the schedule for clearing and construction activities*
  - *Manitoba Hydro will reimburse trappers for lost fur harvest during construction/clearing*
- After construction, some trappers may benefit from improved access to their traplines
- If a community has concerns about increased access, a Transmission Access Management Plan will be developed with them

Transmission Effects on Land and Water Use Have Been Identified

- **None of the proposed routes are located on existing Reserve Lands:**
  - *Two treaty land entitlement selections are affected by proposed routes*
  - *Discussion will be required with the affected First Nation (NCN) and Provincial Government regarding any necessary use by Manitoba Hydro*
- **Proposed routes cross through the Nelson House RMA, the Cormorant RMA and portions of OCN's traditional territory**
- **Proposed route crosses the Tom Lamb Wildlife Management Area (WMA), an Area of Special Interest (ASI) under Manitoba's Protected Areas Initiative, for approximately 47 km:**
  - *Approximately 16 of these 47 km are parallel to an existing rail line*
  - *Transmission line expected to have a minimal effect on the WMA*

Estimated Total Generation Construction Jobs -- 2004 to 2010



Actual Employment Requirements Will Vary From Estimate

Generation Effects on Employment for Aboriginal Northerners Will Be Positive

	NCN, including SIL	Other Northern Aboriginal Residents
STAGE 1 Infrastructure Construction	***81-93 potential jobs*** *(52-59% of peak positions)*	***57-69 potential jobs*** *(36-44% of peak positions)*
STAGE 2 Generating Station Construction	***80-113 potential jobs*** *(10-15% of peak positions)*	***181-256 potential jobs*** *(23-33% of peak positions)*

Generation Construction Effects Will Include Northern Business Opportunities

- Negotiated contracts being pursued with NCN
- Limited opportunities may also be available for entrepreneurs to start small businesses as a result of Wuskwatim spin-offs
- If a contract cannot be negotiated with a qualifying NCN business, Manitoba Hydro will ask for tenders from qualified northern businesses (restricted tendering) or from all businesses (open tendering)
- Most contracts, including the general civil contract, will be open tender

Generation Will Benefit NCN Through Ownership Investment

- NCN has an option to be a partner in the Project with an interest of up to 33%
- Revenue from this investment will be main economic benefit realized by NCN during operations phase
  - *Several million dollars annually in early years after 2010 and growing to tens of millions in the long term*
  - *However, NCN also shares in some of the risk and actual revenue will be based on financial performance of the Generation Project*

Transmission Effects on Employment and Business Are Positive and Small

- Contracting opportunities will be available under Manitoba Hydro's Northern Purchasing Policy; discussions with First Nations and Aboriginal communities in the vicinity of the transmission lines will help to assess and improve opportunities
- Employment opportunities for transmission line construction will be during the winter months
- Operation and maintenance may result in some small, short-term contracts for brush clearing
- Station construction requires highly specialized workers but is likely to provide some local site preparation job opportunities

Effects on Infrastructure and Services Will Be Mitigated

- **Generation Project**
  - *Community-based training and construction employment may result in some NCN members and their families returning to Nelson House*
  - *Return migration may strain housing, some infrastructure and services*
  - *Measures will be taken to monitor and reduce this effect*
- **Transmission Project**
  - *Proposed routes cross or are in proximity to some existing infrastructure (i.e., roads, railways, airports, float plane bases)*
  - *Special requirements or mitigative measures currently not anticipated*
  - *No effects expected on local community infrastructure and services*

Transportation, Safety and Aesthetic Effects Will Not Be Significant

- **Generation Project**
  - *Some additional traffic during construction (on PR 391, within the City of Thompson and on PTH 6 south of Thompson)*
  - *Measures to warn newcomers about existing travel hazards on Wuskwatim Lake and along the Burntwood River system*
  - *Physical changes affecting area appearance will be limited to the land at the Project site, borrow areas and along access road*
- **Transmission Project**
  - *Route selection, where feasible, avoided residences and cabins*
    - In one instance a cabin is approximately 120 m away but will be screened from Transmission Line right-of-way by a buffer of trees
    - Community of Umpherville is located east of proposed route - a vegetative buffer separates it and right-of-way
    - Impacts are expected to be minor and incremental in nature

Generation Effects on NCN Health and Social Well-being Will Be Managed

- No direct effect on health due to water quality changes at Wuskwatim Lake
- Mercury levels in pike and walleye in Wuskwatim Lake may temporarily rise – the levels would remain lower than those found at Threepoint and Footprint Lakes
- During construction, indirect effects (positive and adverse) on community health and social well-being to be managed:
  - *Income, employment and training*
  - *Returning population*
  - *Concern about environmental changes*
- In long term, potential new revenue from NCN's investment could help address community priorities and contribute to improvements in health and social well-being

Transmission Project Will Not Result in Adverse Health Effects

- Design and operating standards will avoid risks to health and safety
- No adverse health effects are anticipated from exposure to electric and magnetic fields associated with the transmission facilities
  - *General consensus of worldwide scientific community is that a public health risk from exposure to electric and magnetic fields (EMF) not established – this position is supported by:*
    - Federal and provincial health agencies
    - Manitoba Clean Environment Commission sponsored EMF experts' workshop and position statement (2001)
  - *Manitoba Hydro continues to monitor studies on this subject*
    - Measurements of EMF in individual homes will be made available, on request

Generation Project Effects on NCN Culture Will Be Managed

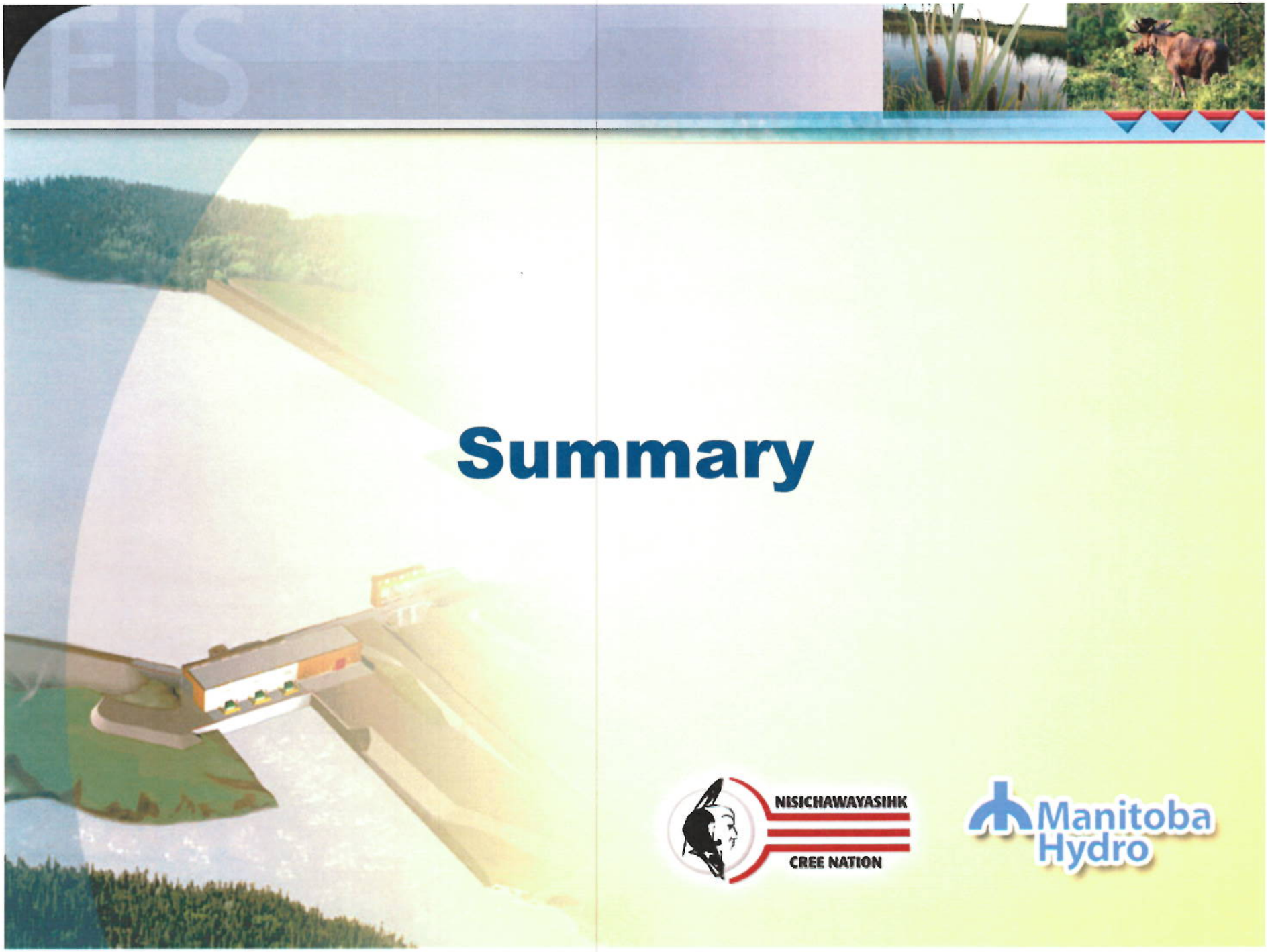
- NCN has identified the need for ceremonies to be undertaken before changes to Taskinigup and Wuskwatim Falls and area
- NCN Members could more easily visit important sites in the Wuskwatim Lake area
- Monitoring and contingency plans to protect Wuskwatim Lake cultural sites
- NCN will establish Culture and Heritage Committee

Generation Effects on Heritage Resources Will Not Be Significant and Will Be Monitored

- Heritage resource surveys conducted at areas for construction camp, site of the generating station, access road, and borrow areas:
  - *No significant archaeological sites were found*
  - *A "waymarker" was found and has been relocated*
  - *When areas are being cleared for construction, archaeologists will check again for artifacts*
- NCN Elders and Members were consulted to ensure cultural and other sites were identified and protected

Transmission Effects on Heritage Resources - Minimized Through Routing and Will Be Monitored

- Routing process avoided known important cultural and heritage sites
- Construction phase of Project has potential to affect unknown heritage resources:
  - *Before construction, field surveys along rights-of-way to identify unknown heritage resources*
  - *Newly identified sites flagged and/or removed before construction begins*
  - *Manitoba Historic Resources Branch and First Nations will be advised as appropriate*



Summary

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Summary of Effects - Wuskwatim Generation Specifically Designed to Be Low Impact Project

- A "low head" design was selected to reduce amount of flooding
- Modified run-of-river operation balances inflows with outflows
- Operation will reduce water level fluctuations on Wuskwatim Lake and limit the extent of water level fluctuations downstream
- Environmental and cultural considerations are incorporated into the route selection and management of the access road
- Environmental Protection Plans to be developed, before construction starts, to ensure work is carried out so as to meet:
  - *Regulatory requirements and Project approvals*
  - *Proven environmental protection practices*

Summary of Effects - Wuskwatim Transmission Designed to Minimize Effects

- Potential effects from the Transmission Project have been or will be minimized through:
  - *Careful selection of the proposed routes*
  - *Suitable design and construction standards and practices*
  - *Application of Manitoba Hydro's standard environmental protection practices*
  - *The use of local and Traditional Knowledge*
  - *Development of Environmental Protection Plans, before construction starts, that outline site-specific mitigation measures*

Wuskwatim Projects - Summary of Effects

- The Projects were designed to avoid and minimize adverse effects:
  - *They are expected to create no significant adverse effects on the environment or related effects on people*
  - *Adverse effects in some areas are anticipated (for example, erosion and land use changes), but not considered to be significant*
- Positive biophysical effects are likely to result from displacing global green house gas emissions and from reducing annual fluctuations in levels at Wuskwatim Lake that were caused by CRD
- Positive socio-economic effects are likely to result during construction and operation for people in the local region of the Projects as well as throughout the province

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Conclusions

Need For and Alternatives To
&
Environmental Impact Statements

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Wuskwatim Embodies Manitoba's Sustainable Development Principles

- **Integration of environmental and economic decisions**
  - *Environmental and economic factors have been integrated, resulting in a profitable project that:*
    - Minimizes negative local environmental impacts
    - Creates positive global environmental impacts, and
    - Produces overall positive social benefits
- **Shared responsibility and understanding**
  - *Through NCN-Hydro partnership and consultation with other people and communities*
- **Global responsibility**
  - *Wuskwatim will contribute to global efforts to reduce greenhouse gases*

Wuskwatim Embodies Manitoba's Sustainable Development Principles

- *Conservation:* Wuskwatim makes sustainable use of renewable resources with no anticipated significant adverse environmental effects
- *Prevention:* major adverse effects are avoided; others are mitigated
- *Rehabilitation:* construction sites will be rehabilitated
- *Stewardship:* current and future generations will benefit

Thank You

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