



Alberta Sustainable Resource Development

Development of an Integrated
Wildland Fire Economic
Framework for Alberta

Alberta 

Presentation Outline

*Economic
Principles*

Valuation

*Alberta Project -
Framework*

Current Policy

*Wildland Fire
Management*

*2010 Zig Zag
Fire*

Challenges

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Cost + NVC

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Current Policy

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Challenges

There is increasing recognition that it is neither economically feasible nor ecologically desirable to eliminate all wildfires from the landscape.

In an economic context costs must be weighed with benefits to support the most appropriate response in all four pillars of wildfire management – mitigation, preparedness, suppression and recovery.

From a theoretical perspective economic models focus on minimizing the sum of suppression costs plus the net value change resulting from the fire.

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Approach – *How many and where are they?*

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Challenges

Balancing costs with benefits is difficult.

Costs are usually not the problem as they are measured in dollars and generally available - but not all benefits are measured in dollars and so are difficult to quantify.

Some examples of benefits include public safety, protection of critical habitat and watersheds. These are difficult to value in \$s.

Some of the benefits of fire include ecosystem renewal, insect and disease control, reduction of potential fire intensity through reduced fuel loading. These are also difficult to assign \$ values to.

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Approach – *How many and where are they?*

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Challenges

Knowing the exact dollar values of the resources involved still doesn't provide all the answers in terms of decision making. The strictly economic approach must be balanced with the social expectation that forest fire management is provided by the government as a public service

For example, a million dollar home does not currently merit more protection than a hundred thousand dollar home.

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Approach – *How many and where are they?*

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Challenges

We completed a literature search and looked at other jurisdictions to see what their approaches were.

United States forest protection agencies have invested considerably in their Wildland Fire Decision Support System (WFDSS). This was very useful for us to look at.

The approach they have taken is to locate and count values, as opposed to attempting to calculate total dollar values.

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Integrated WFEF

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Challenges

In 2010, Alberta Sustainable Resource Development initiated the development of an integrated wildland fire economics framework

Short term: Look for easy but effective changes that can be made immediately.

Long term: Integrate wildfire economics tools with existing wildfire management decision support systems to provide a more risk-informed, and cost-effective approach to managing wildfires.

It's called a framework rather than a model because we want to link existing models and systems already in use.

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Integrated WFEF

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Challenges

Short term objectives: Began by examining our business processes and identifying all cost/value inputs, and asking if this data could be improved using existing sources.

We also asked whether the right people were getting the right information at the right time.

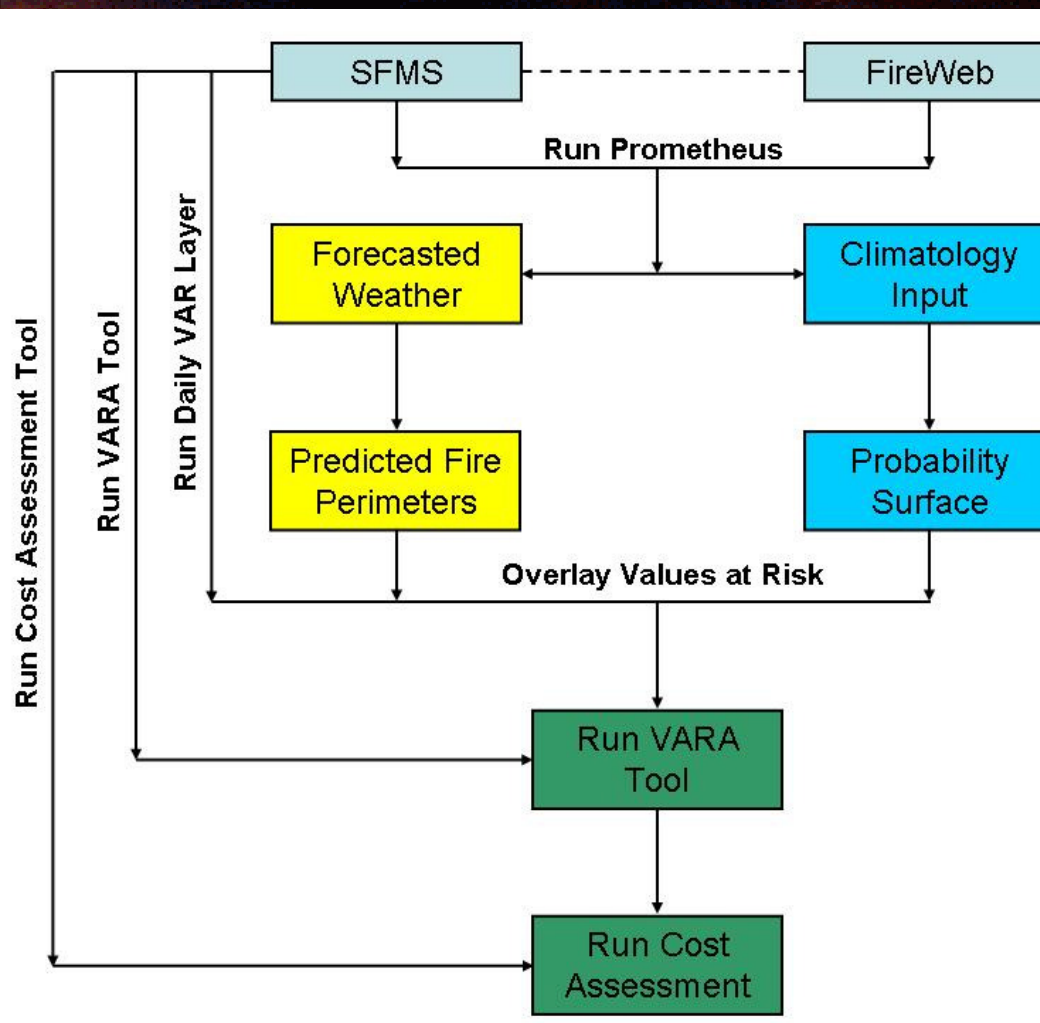
Long term objectives: The final product must be a system that is flexible, simple to use on the part of operational staff, and risk informed.

The conceptual framework is developed, however it may change as the project continues to evolve.

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Integrated WFEF

Conceptual IWFEF framework



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Economic Principles

Valuation

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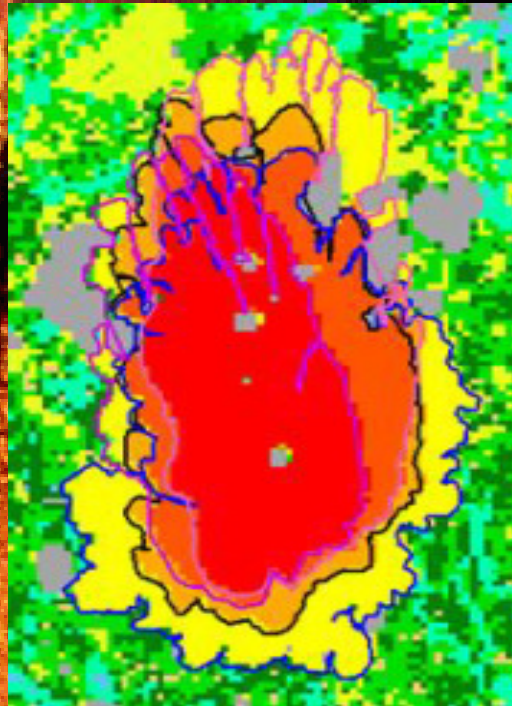
Current Policy

Wildland Fire Management

2010 Zig Zag Fire

Challenges

Spatial Fire Management System



50	50	50	50	50	50
50	50	50	50	50	50
50	50	50	50	50	50
50	50	50	50	50	50
50	50	50	50	50	50
50	50	50	50	50	50

Fire Spread Probability Zone	Zone Mid Point	Structure Count Per Zone	Expected by Zone
> 80 %	0.9	62	56
60 – 80 %	0.7	74	52
40 – 60 %	0.5	93	47
20 – 40 %	0.3	110	33
5 – 20 %	0.125	161	20
1 – 5 %	0.03	250	8

Fire Spread Probability Zone	Zone Mid Point	Critical Watershed Grid Cell Count Per Zone	Expected by Zone
> 80 %	0.9	0	0
60 – 80 %	0.7	0	0
40 – 60 %	0.5	0	0
20 – 40 %	0.3	368	110
5 – 20 %	0.125	452	57
1 – 5 %	0.03	895	27

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Economics should be an integral consideration for all wildfire management

Decision Support

Economic Principles

Mitigation

FireSmart Landscape
Assessment – Stratified
Cost Index

Valuation

Pre-suppression

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Suppression

Current Policy

Recovery

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Budget Justification

Challenges

Area/values burned
versus area/values
saved

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Challenges

Provincial Priority and Resource Allocation

1. Human Life
2. Communities
3. Watershed and Sensitive Soils
4. Natural Resources
5. Infrastructure (major impact on public safety or local economy)

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Current Policy

Wildfire Management Branch

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Challenges

- Existing Policy's and Standard Operating Procedures need to be updated
- Recognition that we need to adjust current suppression culture and policies
- Resource availability, fuel loading, budgets
- Fire's role on the landscape, disturbance will occur
- Mega fires are a reality!!

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Wildland Fire Management Strategic Plan

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Challenges

- 18 Initiatives
- Wildland Fire Management Assessment and Planning Process

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Wildland Fire Management Strategic Plan

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Challenges

Completion of the Wildfire Analysis and Strategy (WAS) document for wildfires that are considered sustained action

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Wildland Fire Management Strategic Plan

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Challenges

Lesser Slave Containment Strategies Pilot Project

- Northeast Liege Fire
Management Project

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Wildland Fire Management Strategic Plan

Northeast Liege Fire Management Project

- Favorable environment for increased area burned
- Capping Units created will limit fire spread to adjacent forests
- Low Values at Risk (VAR)
- Natural fire cycles endemic to the area
- Limited resource commitment

Economic Principles

Valuation

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Current Policy

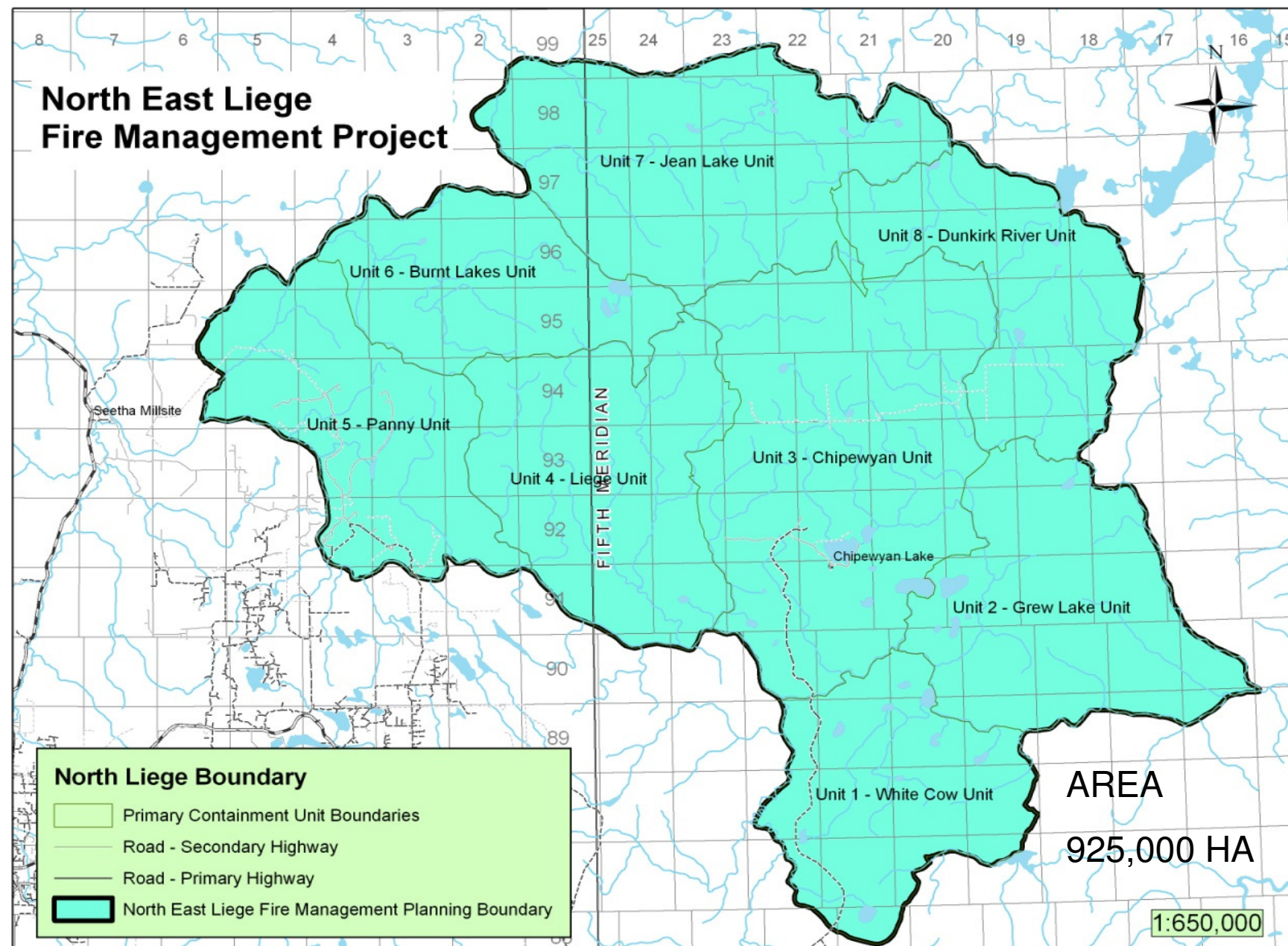
Wildland Fire Management

2010 Zig Zag Fire

Challenges

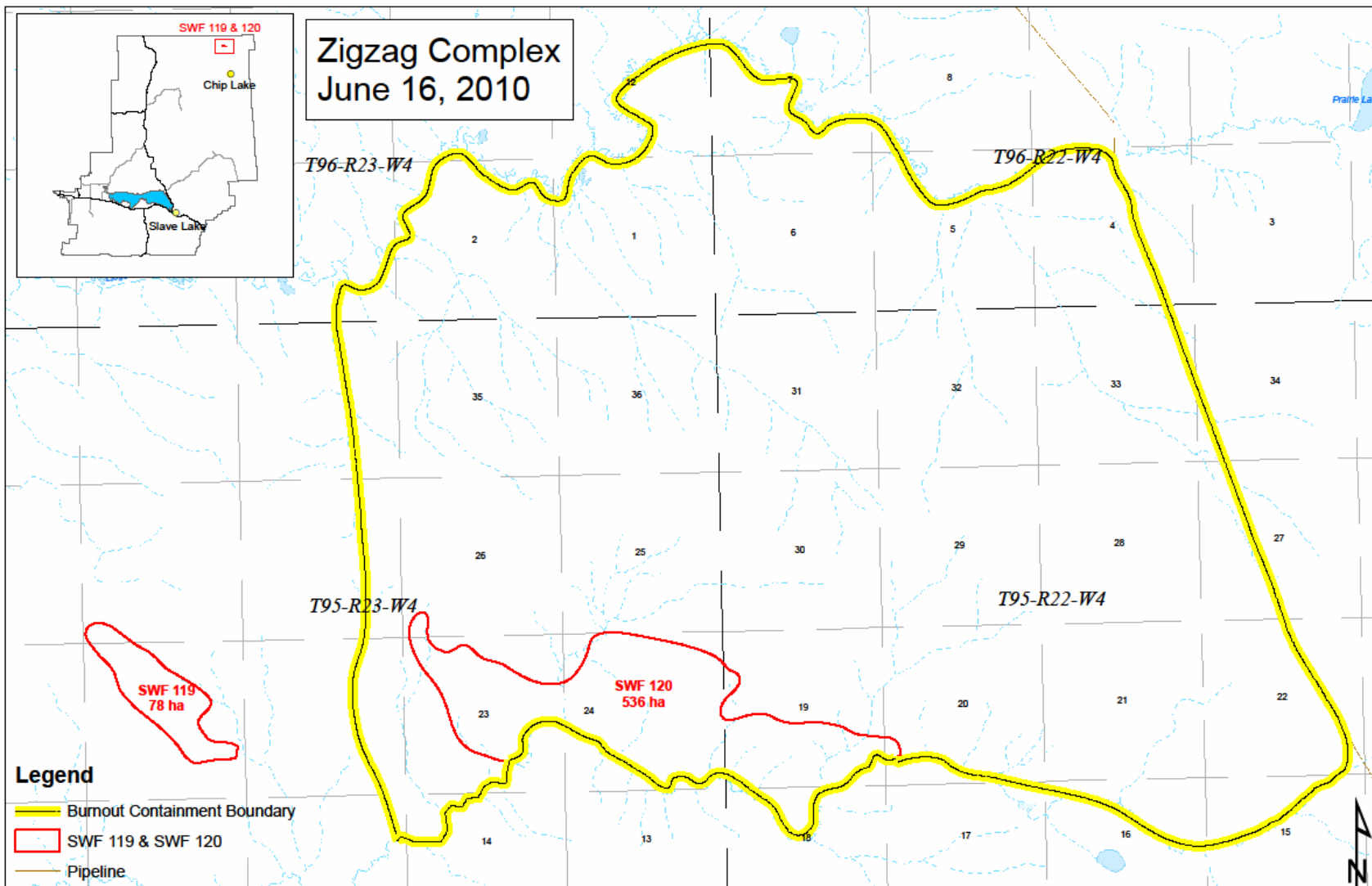
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North East Liege Fire Management Project





20/06/2010



Wildland Fire Management

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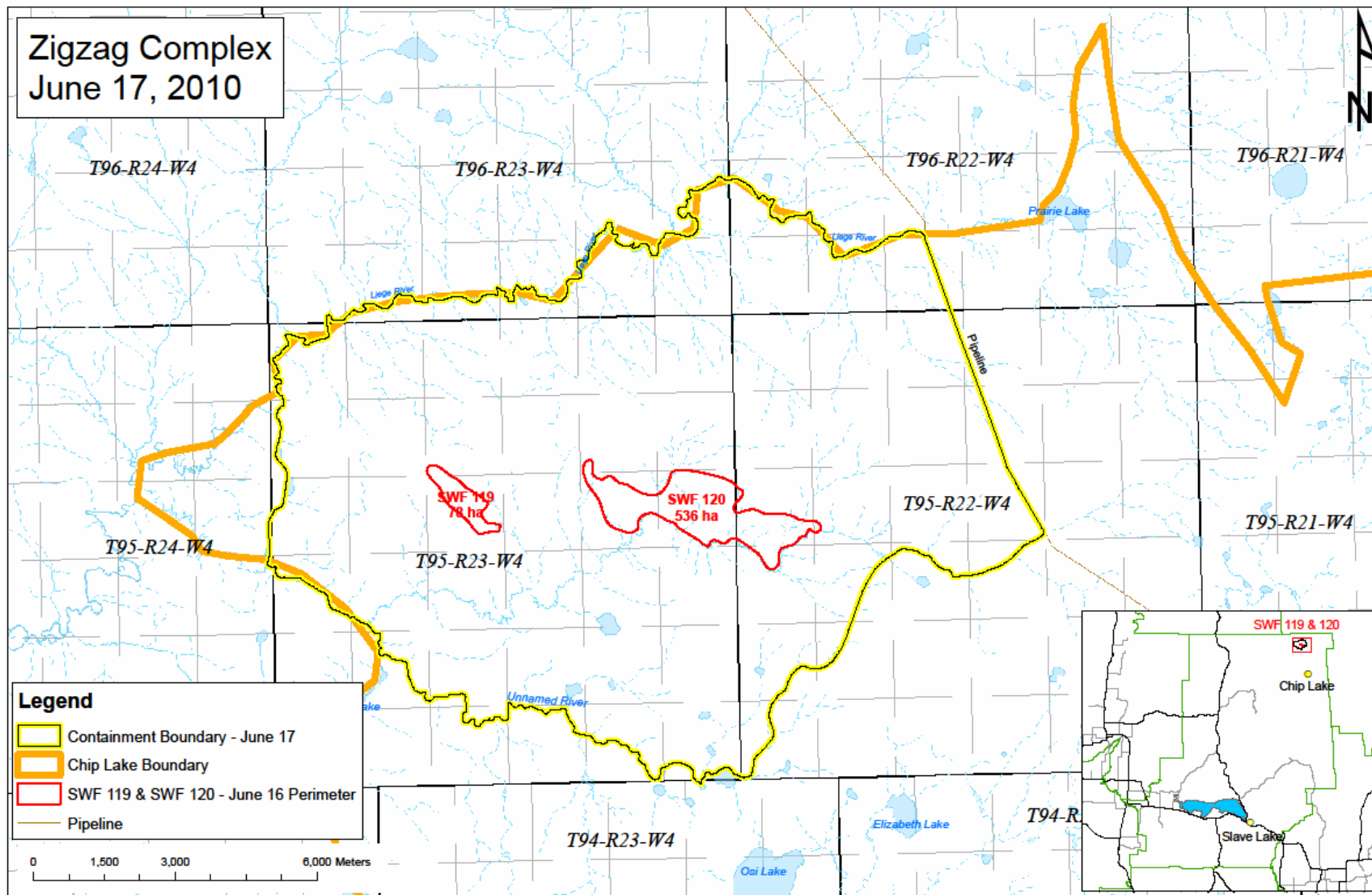
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Fire*

Challenges

Initial Resource Commitments

- Type 2 team
- 6 – 8 person sustained action crews
- 5 Helicopters
- 1 Airtanker group
- 1 Ignition team

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Wildland Fire Management

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Challenges

Resource Commitments

- Type 2 team
- 2 Ignition team
- 3 Helicopters

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Provincial Fire Load – June 15 - 24

Economic Principles

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Current Policy

Wildland Fire Management

2010 Zig Zag Fire

Challenges

Calgary	– 1 Fire
Edson	– 16 Fires
Grande Prairie	– 11 Fires
High Level	– 29 Fires
Lac La Biche	– 11 Fires
Fort McMurray	– 6 Fires
Peace River	– 41 Fires
Rocky Mtn House	– 3 Fires
Slave Lake	– 74 Fires
Whitecourt	– 21 Fires

213 Fires

Provincial – C Class (40 Ha+) or Larger Fires –
13 Fires

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District Fire Load June 15 - 24

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Valuation

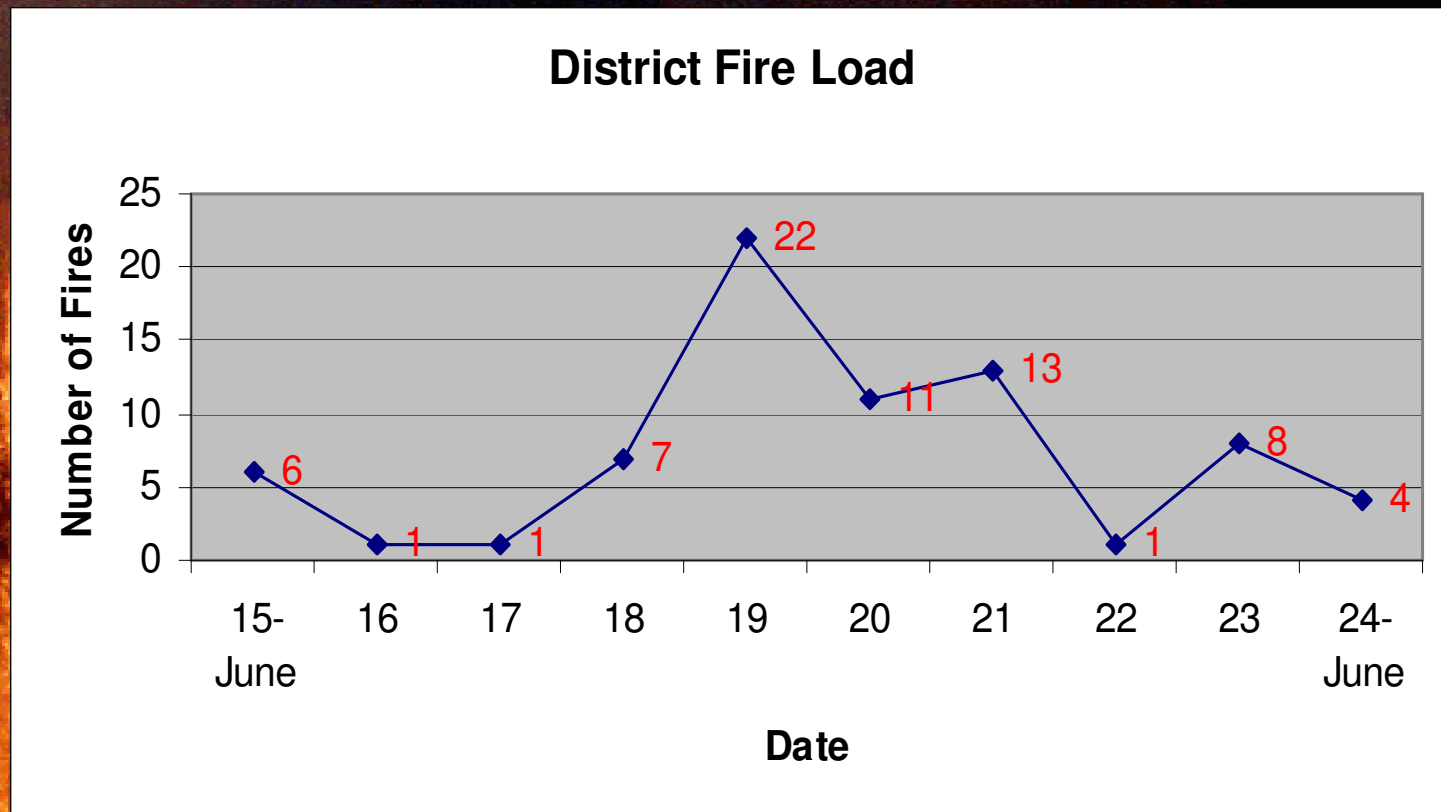
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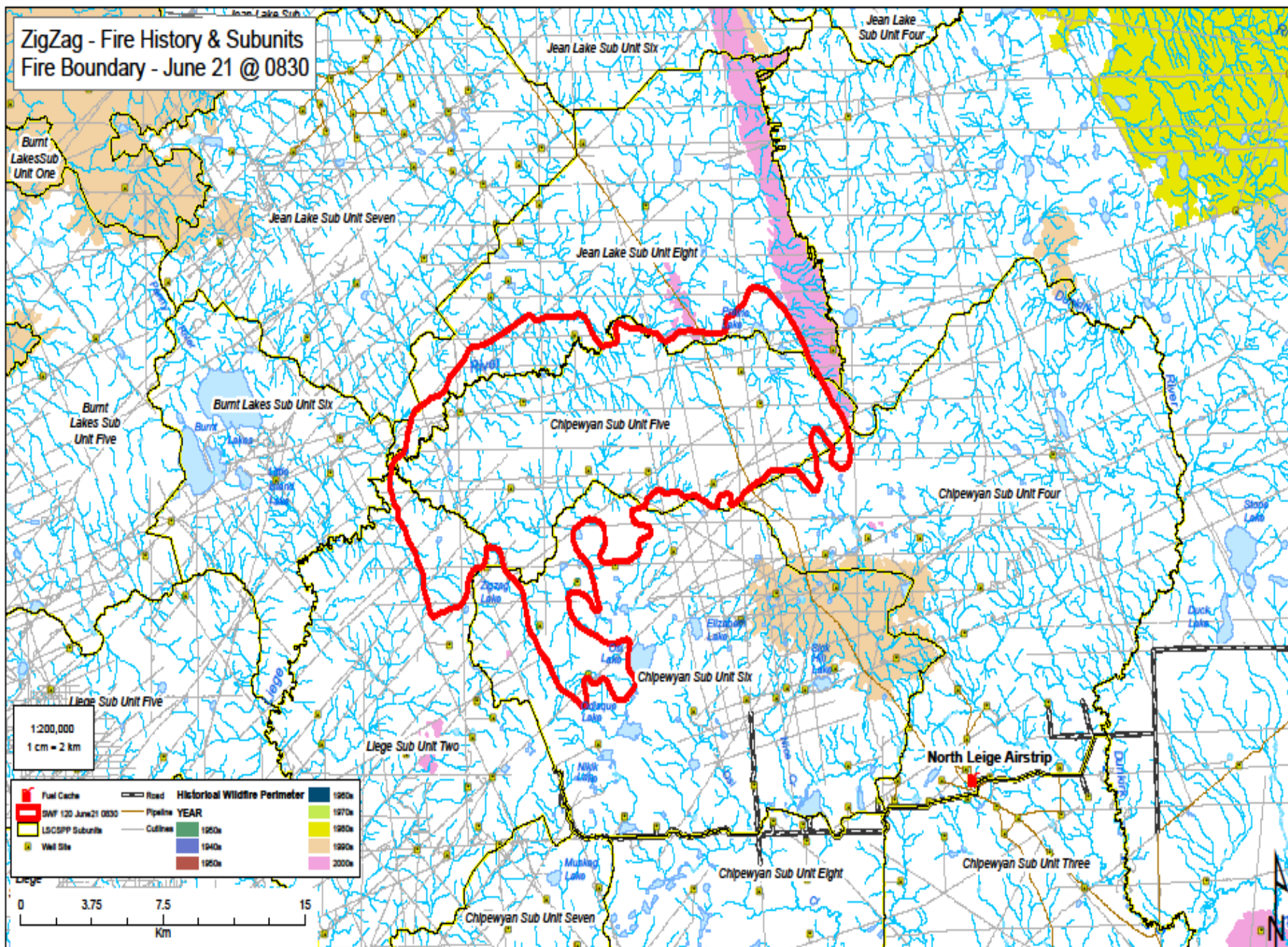
Challenges



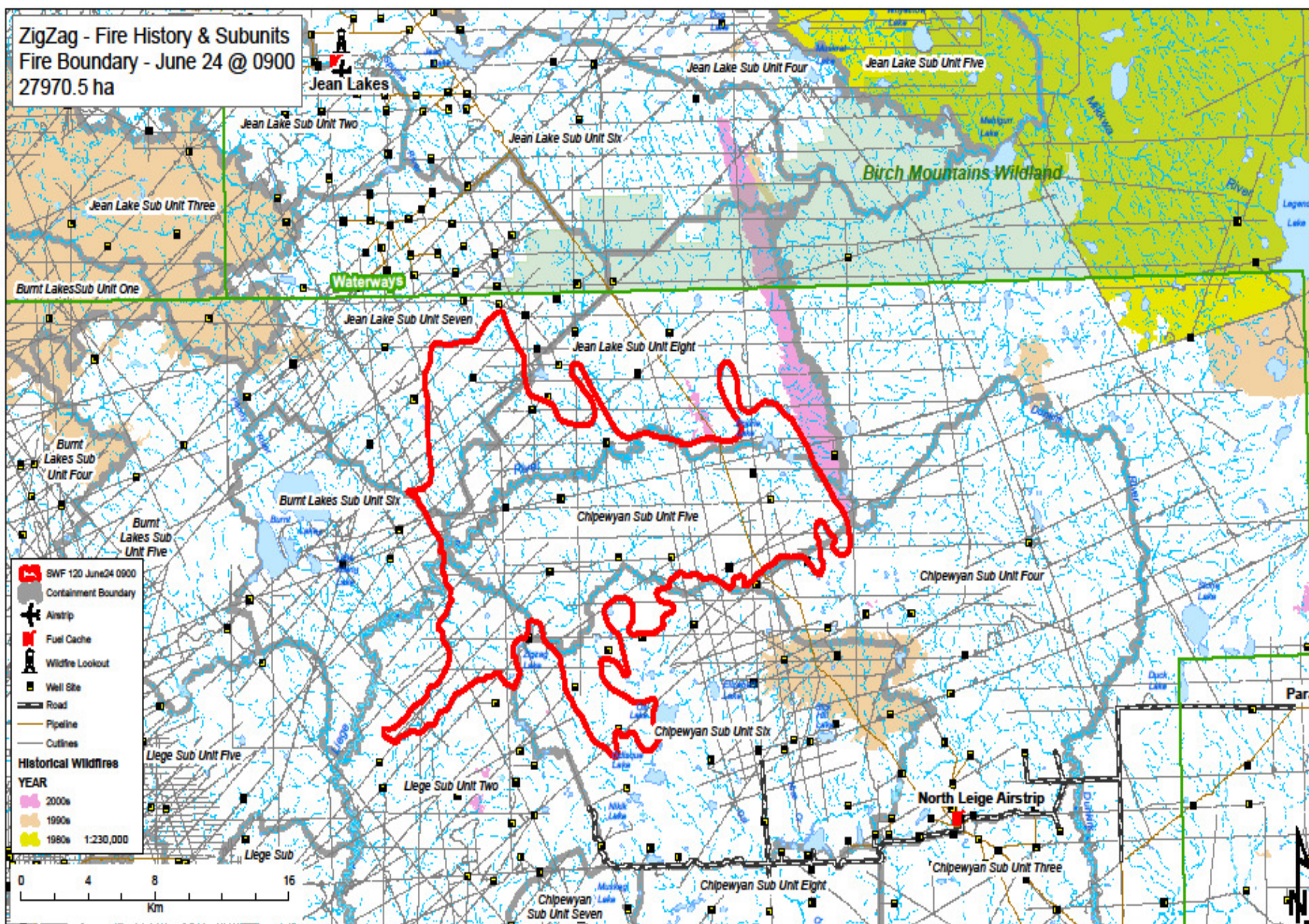
Total of 8 Fires - C Class (40 Ha+) or Larger
Total of 74 fires before weather downtrend

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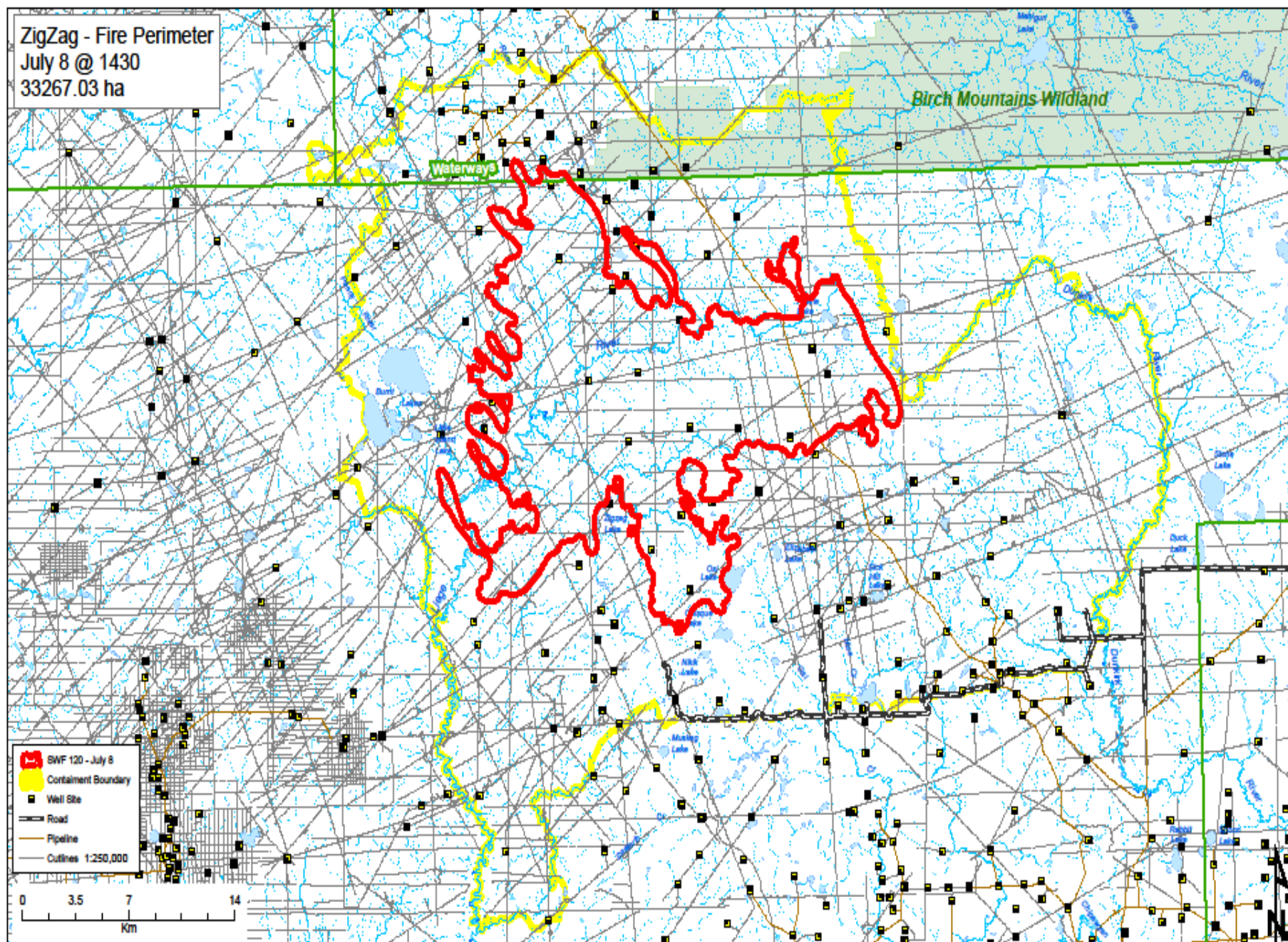
ZigZag - Fire History & Subunits Fire Boundary - June 21 @ 0830



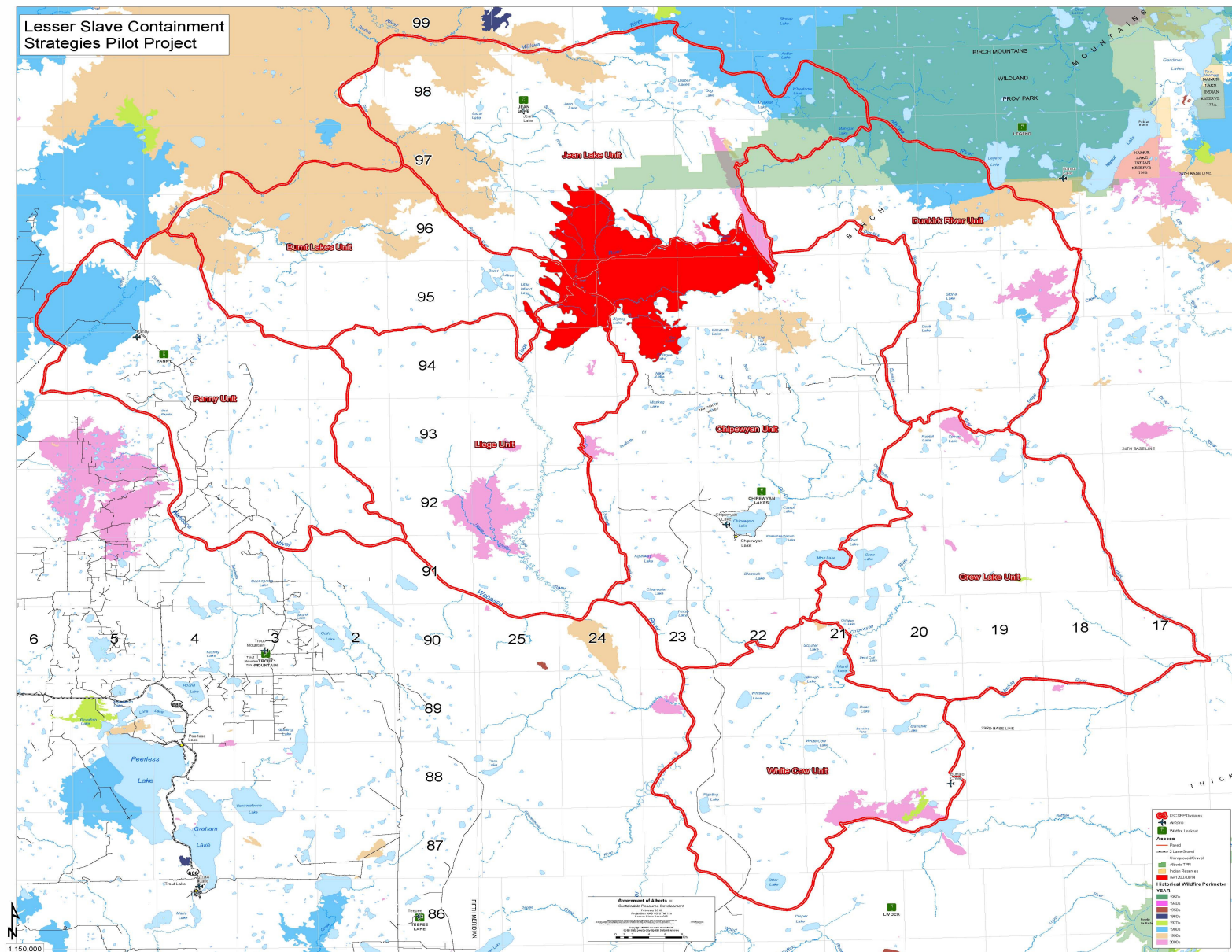
ZigZag - Fire History & Subunits Fire Boundary - June 24 @ 0900 27970.5 ha



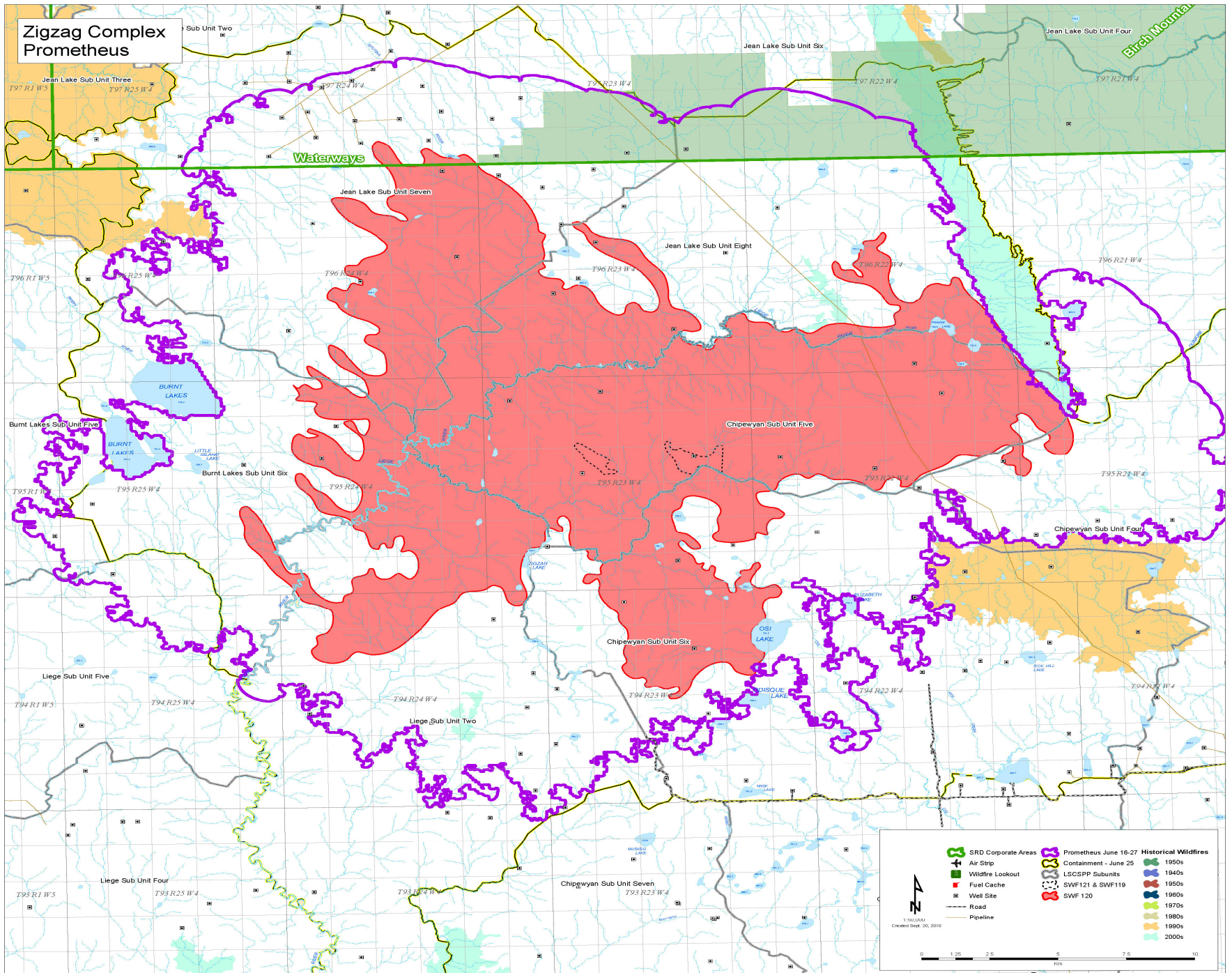
ZigZag - Fire Perimeter
July 8 @ 1430
33267.03 ha



Lesser Slave Containment Strategies Pilot Project



Zigzag Complex Prometheus



Fire Cost Comparisons

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Challenges

Fire Number	Size (ha)	Cost	Cost/ha
W05-165-1998	12,600	\$695,628	\$55
E04-083-1999	4,027	\$5,523,403	\$1,371
SWF-099-2001	165	\$286,891	\$1,749
SWF-092-2002	56,690	\$17,385,582	\$306
SWF-136-2003	3,273	\$1,821,655	\$556
SWF-130-2006	4,960	\$4,035,975	\$813
SWF-137-2010	309	\$2,115,379	\$6,845
SWF-120-2010	33,267	\$1,803,842	\$54

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CHALLENGES

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Challenges

- Fire starts in close proximity to perimeter of containment area?
- What strategy is used when there are multiple large fires within the containment area or in several fire management units?
- How much do we invest prior to implementing the management plan? (Time, resources, dollars)
- Development of go go-no matrix.

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CHALLENGES

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Challenges

- Sufficient staff in critical positions
- Culture shift is not without risk
- Walk the Talk
- Where should the cost-benefit analysis be implemented?

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