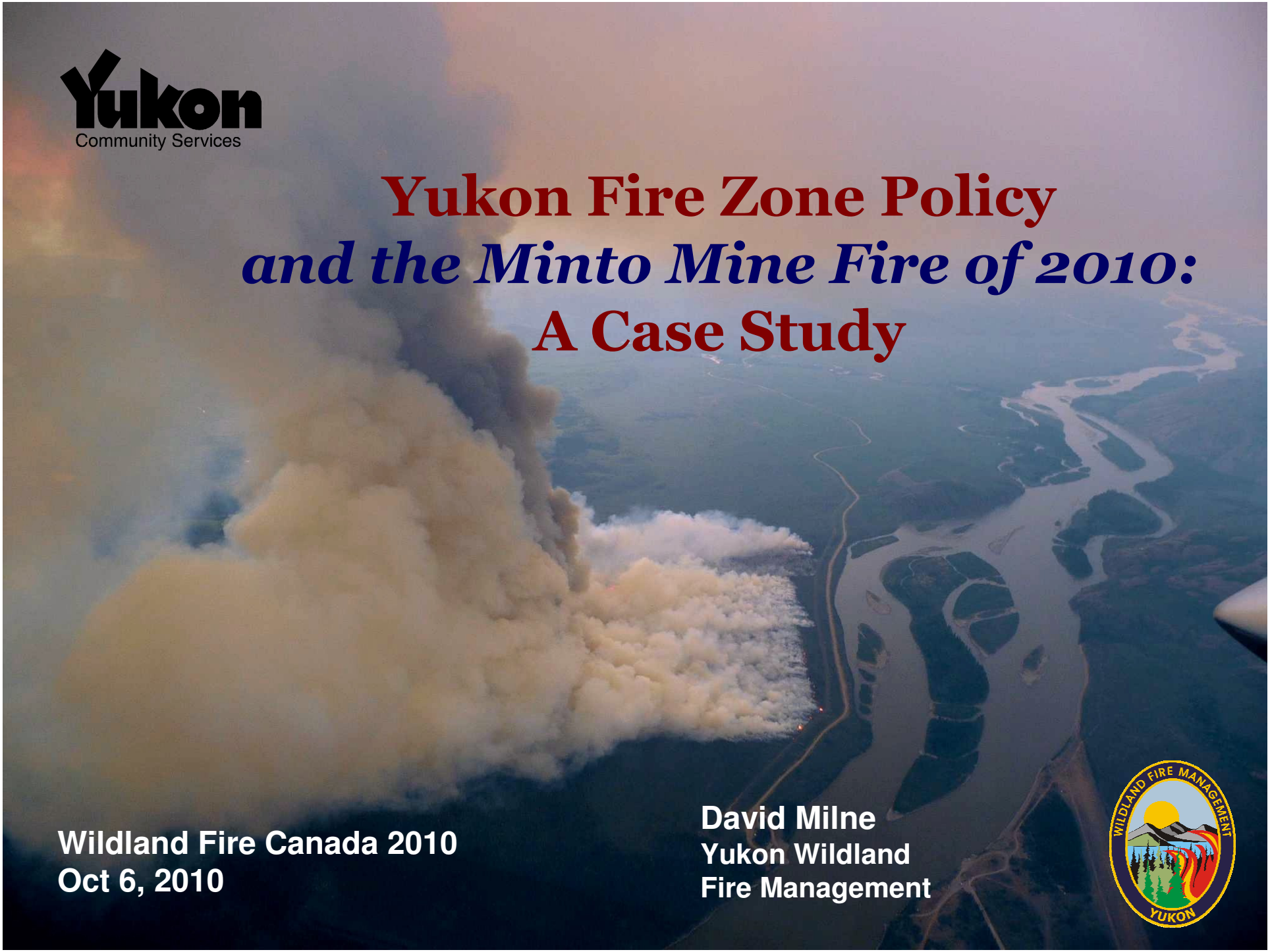


Yukon
Community Services

Yukon Fire Zone Policy *and the Minto Mine Fire of 2010:* A Case Study

Wildland Fire Canada 2010
Oct 6, 2010

David Milne
Yukon Wildland
Fire Management

WILDLAND FIRE MANAGEMENT
YUKON

1958: "Forest Fire Threatens Whitehorse!"

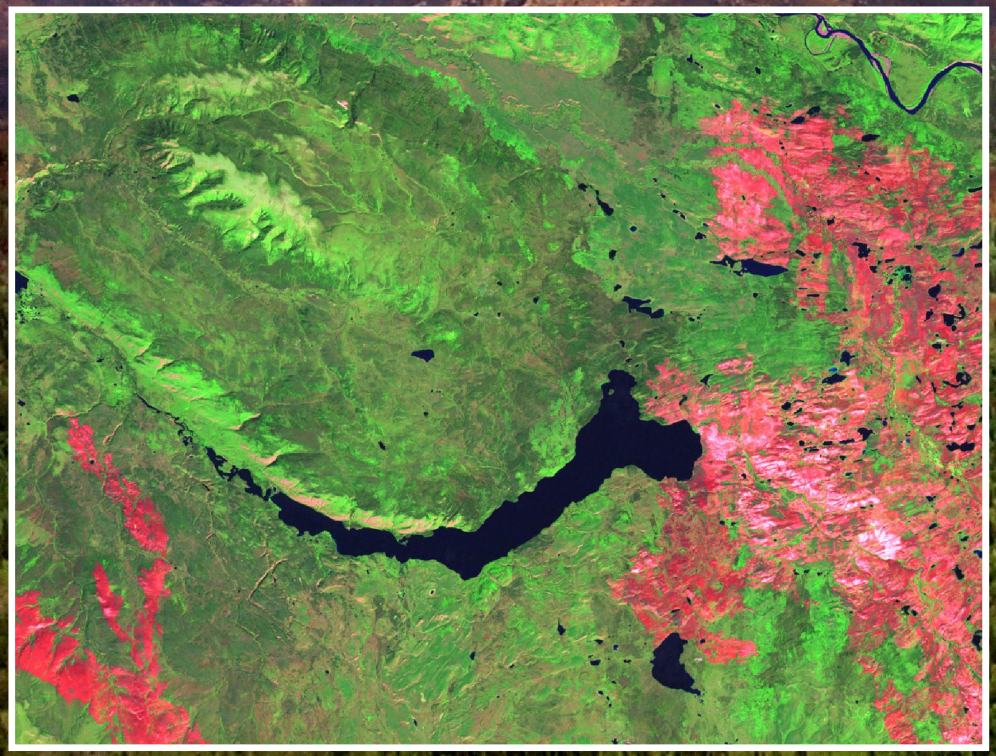
Yukon Archives Photo


1991 Haeckel Hill Fire

Burwash Landing
1999

Fire is a natural and beneficial process

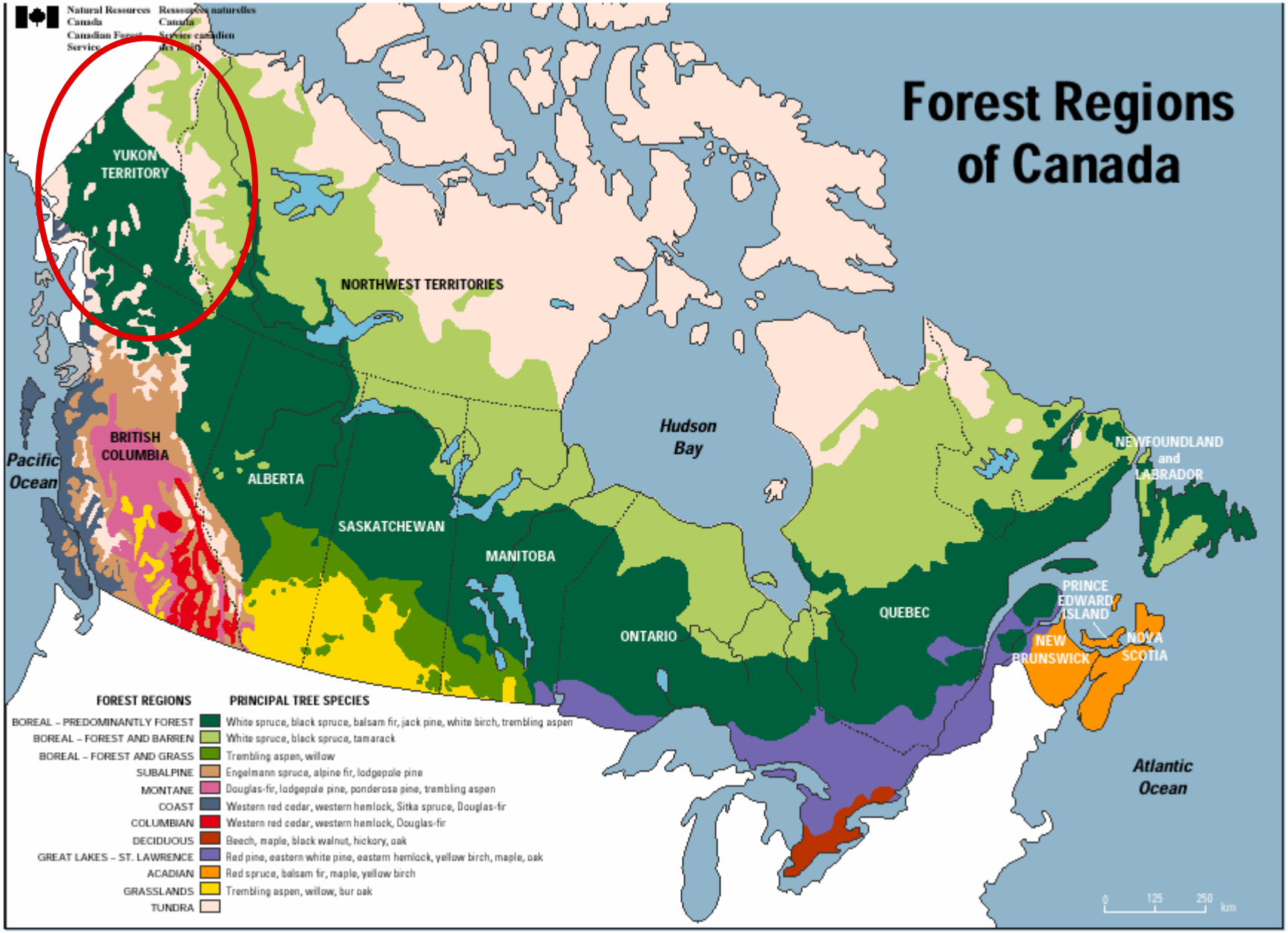
Variety of landscape patterns or habitats



Wildland Fire Management

... protecting communities while providing for ecological benefit

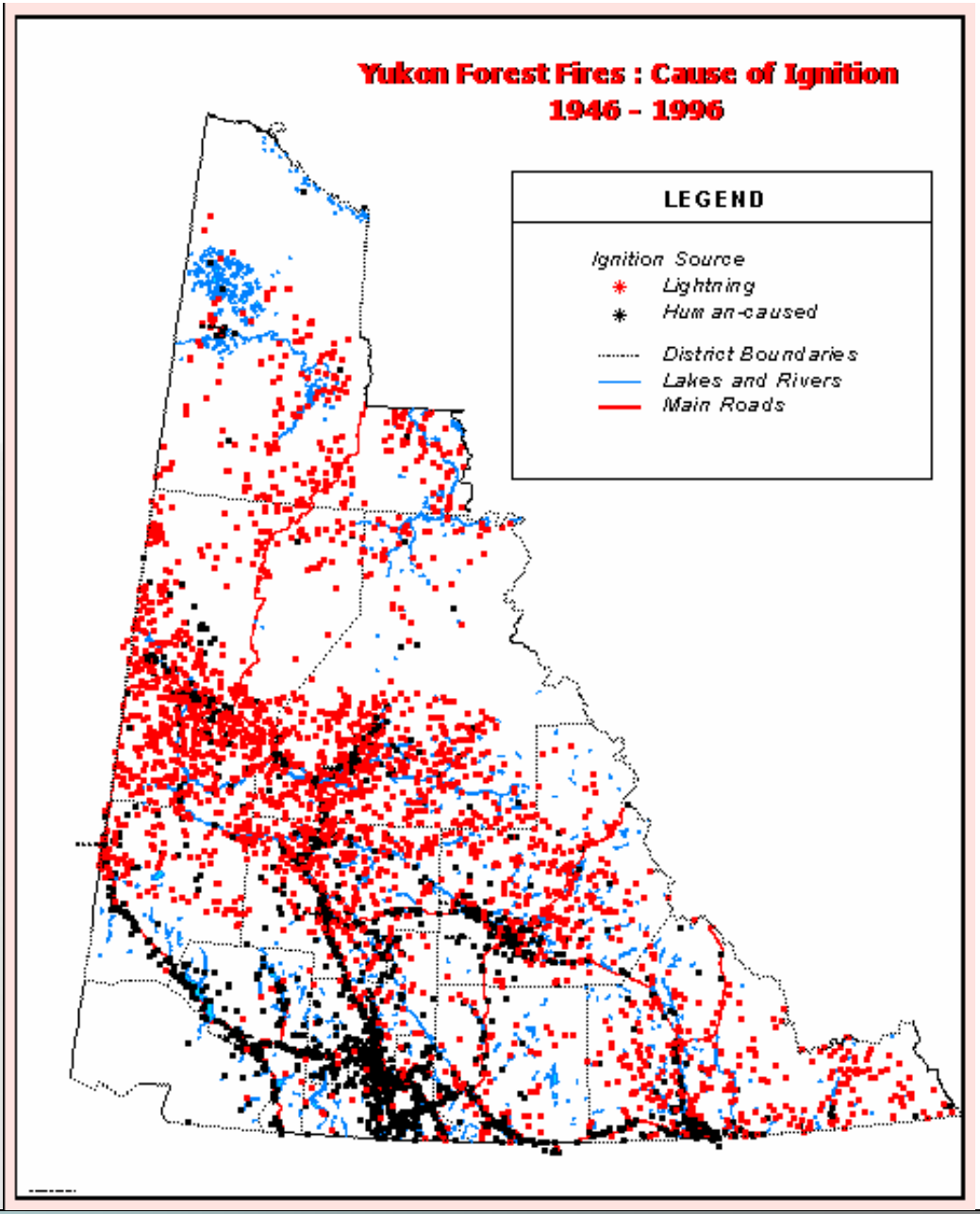
... providing for the balance of the positive and negative effects of fire


Natural Resources Canada
Canadian Forest Service
Ressources naturelles Canada
Service canadien des forêts
Forest Regions of Canada
YUKON TERRITORY
NORTHWEST TERRITORIES
Hudson Bay
Pacific Ocean
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND and LABRADOR
PRINCE EDWARD ISLAND
NEW BRUNSWICK
NOVA SCOTIA
Atlantic Ocean
FOREST REGIONS
PRINCIPAL TREE SPECIES
BOREAL – PREDOMINANTLY FOREST
White spruce, black spruce, balsam fir, jack pine, white birch, trembling aspen
BOREAL – FOREST AND BARREN
White spruce, black spruce, tamarack
BOREAL – FOREST AND GRASS
Trembling aspen, willow
SUBALPINE
Engelmann spruce, alpine fir, lodgepole pine
MONTANE
Douglas-fir, lodgepole pine, ponderosa pine, trembling aspen
COAST
Western red cedar, western hemlock, Sitka spruce, Douglas-fir
COLUMBIAN
Western red cedar, western hemlock, Douglas-fir
DECIDUOUS
Beech, maple, black walnut, hickory, oak
GREAT LAKES – ST. LAWRENCE
Red pine, eastern white pine, eastern hemlock, yellow birch, maple, oak
ACADIAN
Red spruce, balsam fir, maple, yellow birch
GRASSLANDS
Trembling aspen, willow, bur oak
TUNDRA
0 125 250 km

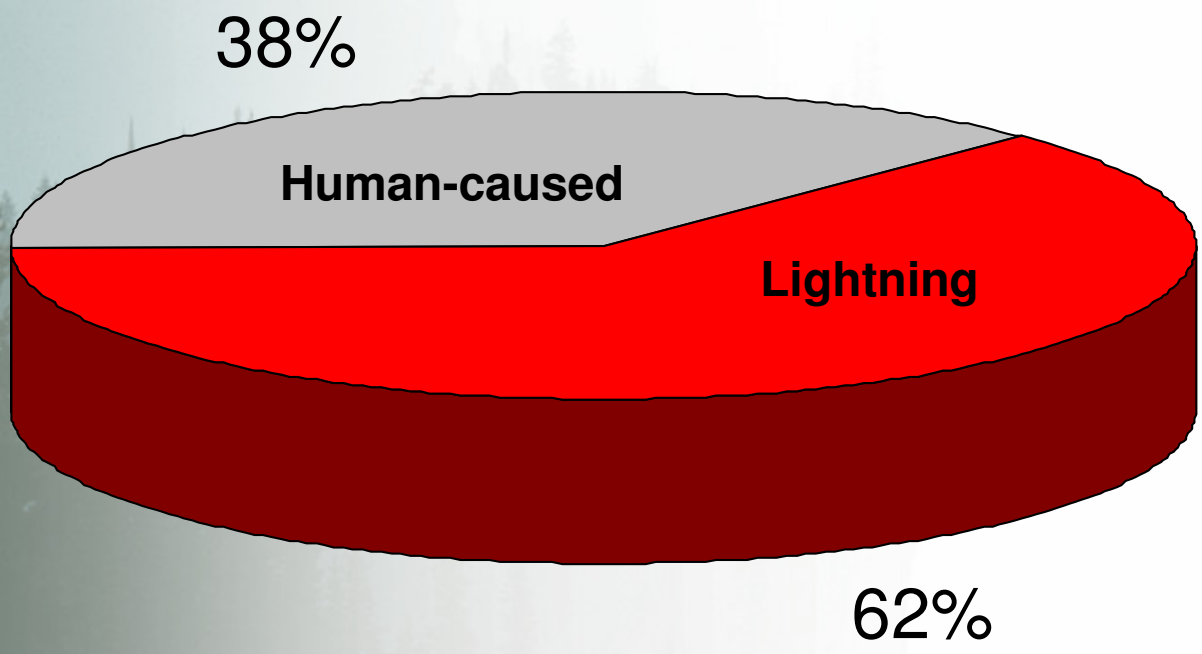
Fire Cause

Lightning Fires:
- more remote
- larger
- lower priority

Human-caused Fires:
- near communities
- or transportation corridors
- highest priority



Ignition Source

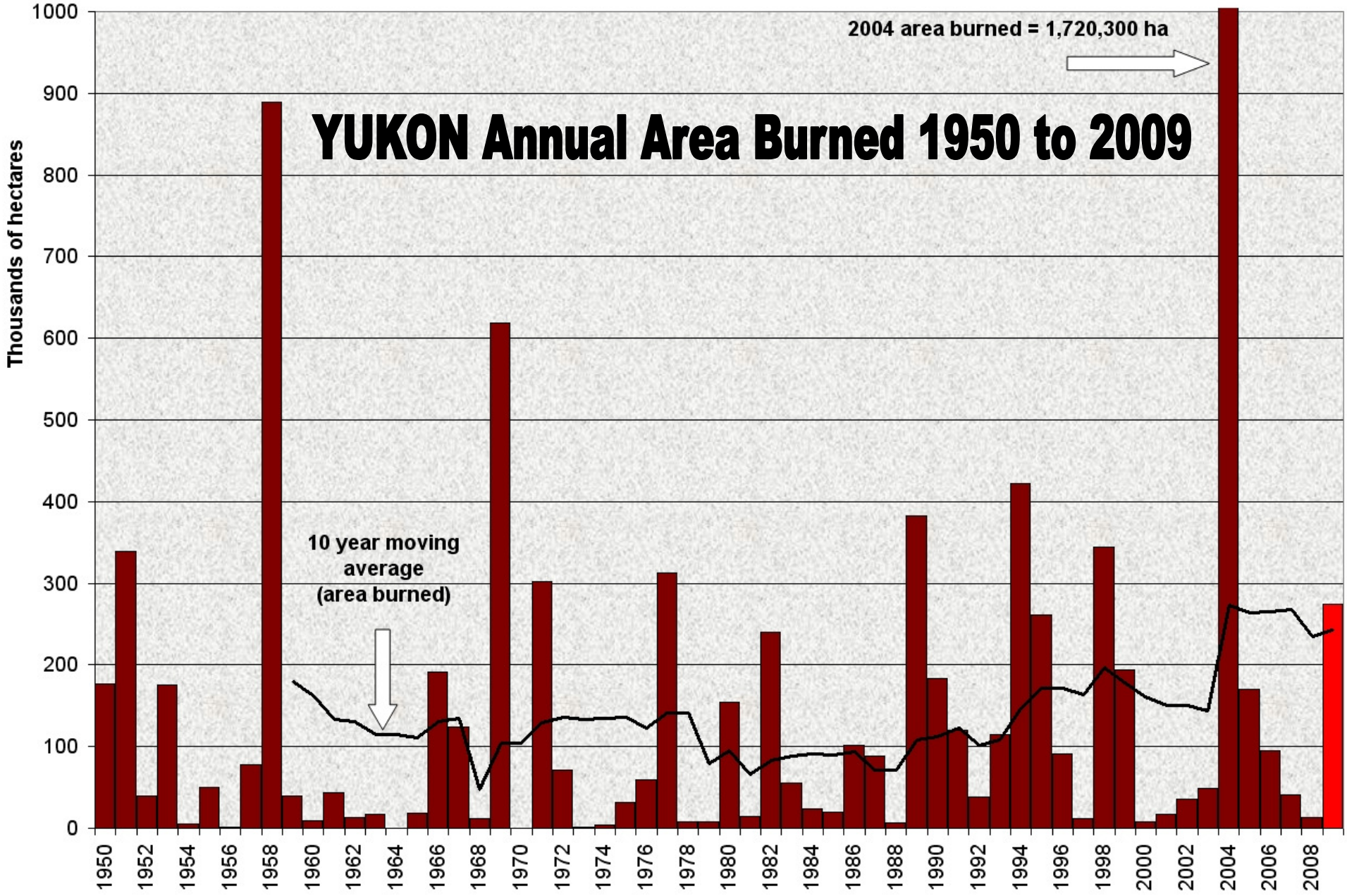


Yukon Long Term Average

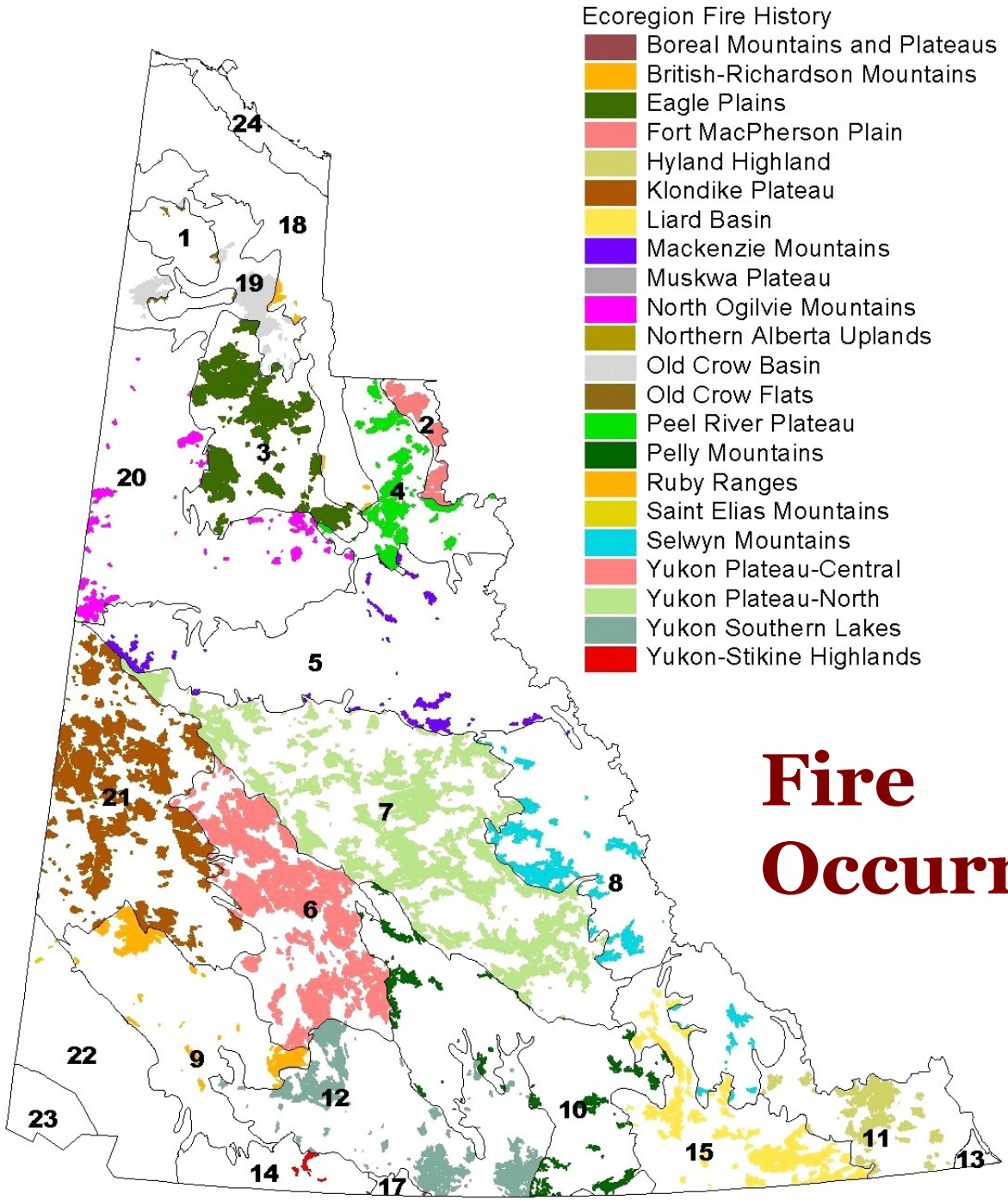
Fire Season Summary

25 Year Average

- **150 files**
- **190,000 hectares**


YUKON Annual Area Burned 1950 to 2009
2004 area burned = 1,720,300 ha
Thousands of hectares
10 year moving average (area burned)
0
100
200
300
400
500
600
700
800
900
1000
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008

Fire Occurrence



Fire Operations

- 6 Response Centres
- 22 X 3 person IA crews
- 9 Detection Lookouts
- 35 Weather Stations
- 2 Air tanker Groups
- 18 ICS Supervisor Types (Type 2)

Remote Sensing Applications Center - USDA Forest Service - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://activefiremaps.fs.fed.us/canada/recent3.php?PHPSESSID=099a18cfb26c31a018cca3a643e7f29c Go

USDA FOREST SERVICE REMOTE SENSING APPLICATIONS CENTER

USA Fire Maps

MODIS Active Fire Mapping Program

Search go

- RSAC Home
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- Programs and Services
- BAER
- Active Fire Maps
  - Regional Maps
  - ArcIMS Maps
  - Imagery
  - GIS Data
  - Fire Detections
  - Other Products

Regional Maps | ArcIMS Maps | Imagery | GIS Data | Fire Detections | Other Products

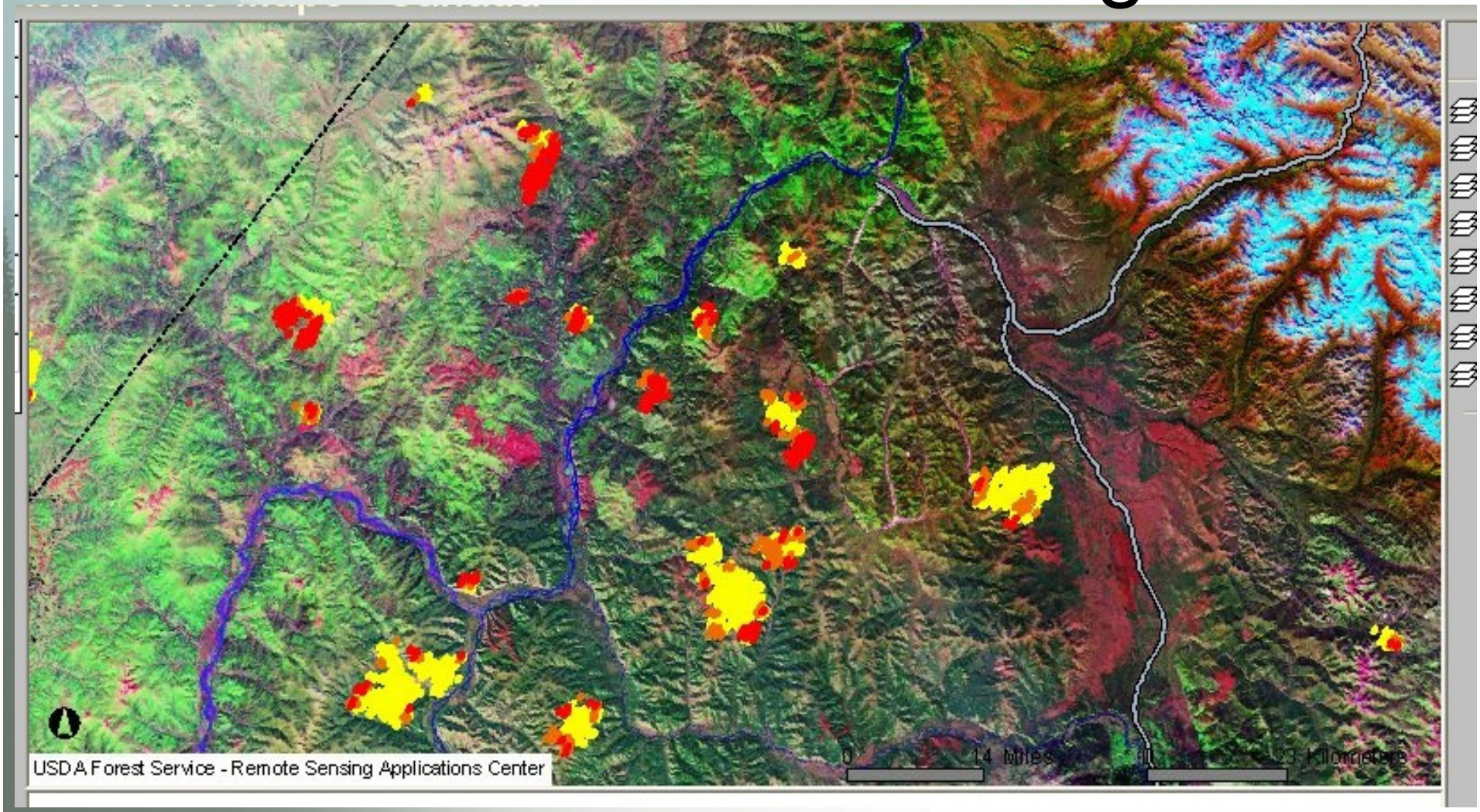
Current MODIS Fire Detections From 6/23/2004, 7 PM MST to 6/24/2004, 7 PM MST

Remote Sensing Applications Center
2222 W. 2300 South
Salt Lake City, UT
84119 - 2020
voice: (801) 975-3750
fax: (801) 975-3478

USDA

Internet

MODIS - Monitoring



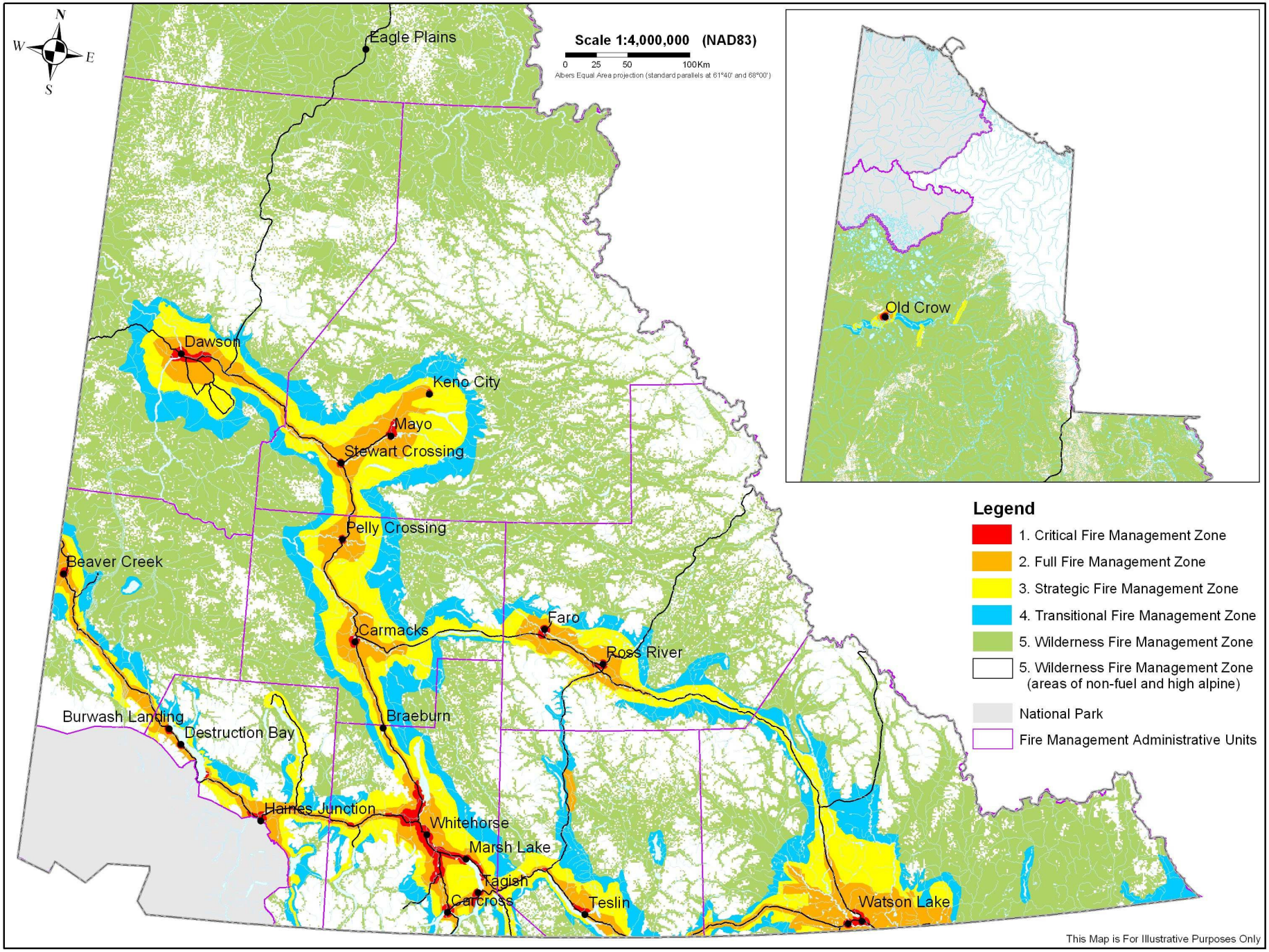
Yukon Wildland Fire Management Program Policy

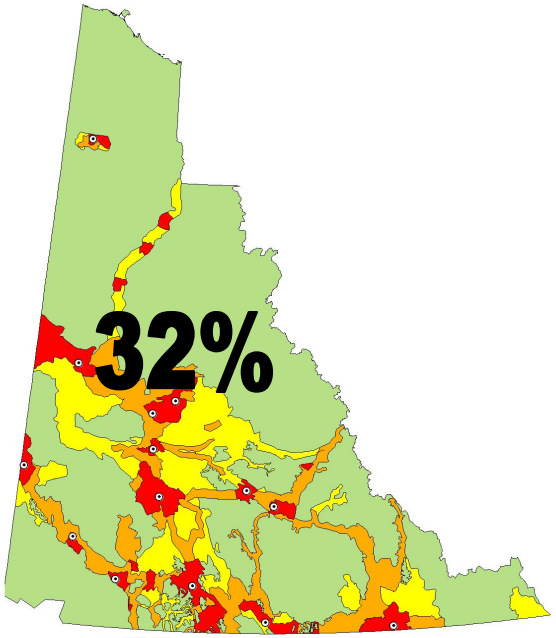
- Prevent personal injury and loss of life from wildfire.
- Minimize negative impacts of wildfire on communities, property and identified resource values.
- Manage wildland fire in the Yukon in an economically responsible manner.
- Ensure natural benefits of wildland fire are recognized and incorporated into application.
- Adaptable fire management planning and decision-making based upon best available knowledge and science.

Factors Affecting Fire Management in the Yukon:

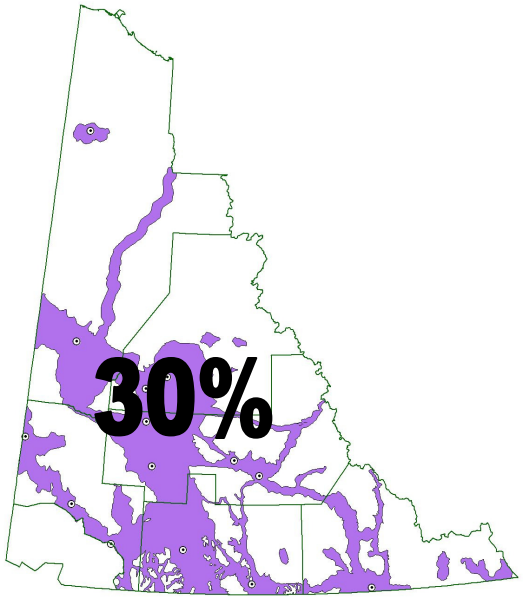
- Somewhat limited fire fighting capacity
- Lightly populated landscape
- Small population = small tax base
- Little industry demand on forests
- Lots of visible fire activity over past 50 years

Yukon Fire Management Policy: Wildland Fire Managment Zones 2003

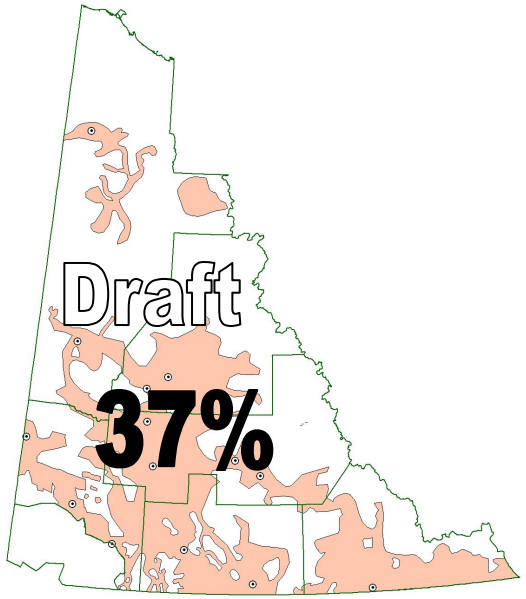




1975 to 1986

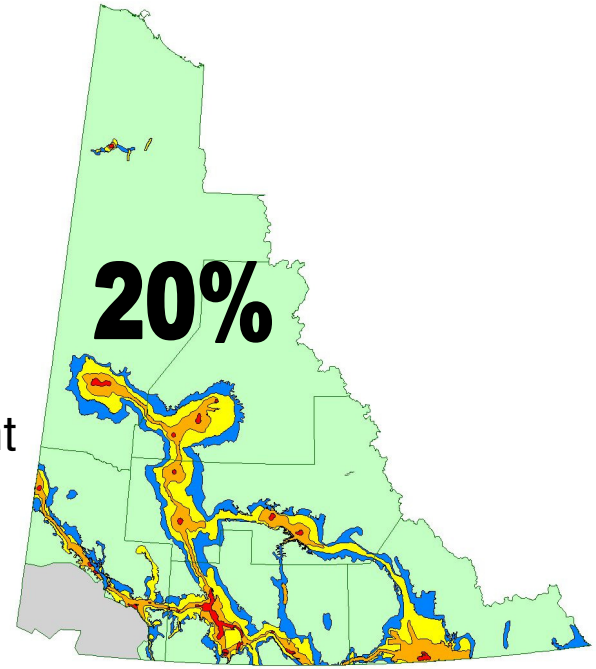


1986 to 1999



1999 to 2003

2003
to
Present



Yukon Wildland Fire Zone Policy 1975 to 2003

Yukon Fire Management Zones

Critical Zone: ➢ **Homes, highest community infrastructure value.**

Full Fire Mgmt Zone: ➢ **Homes, industrial, some infrastructure, transportation, recreation.**

Strategic Zone: ➢ **Some industrial, transportation, recreation, resource values.**

Transitional Zone: ➢ **Outlying values at risk, bridge between developed and undeveloped.**

Wilderness Zone: ➢ **Highest ecological value, lowest infrastructure value.**

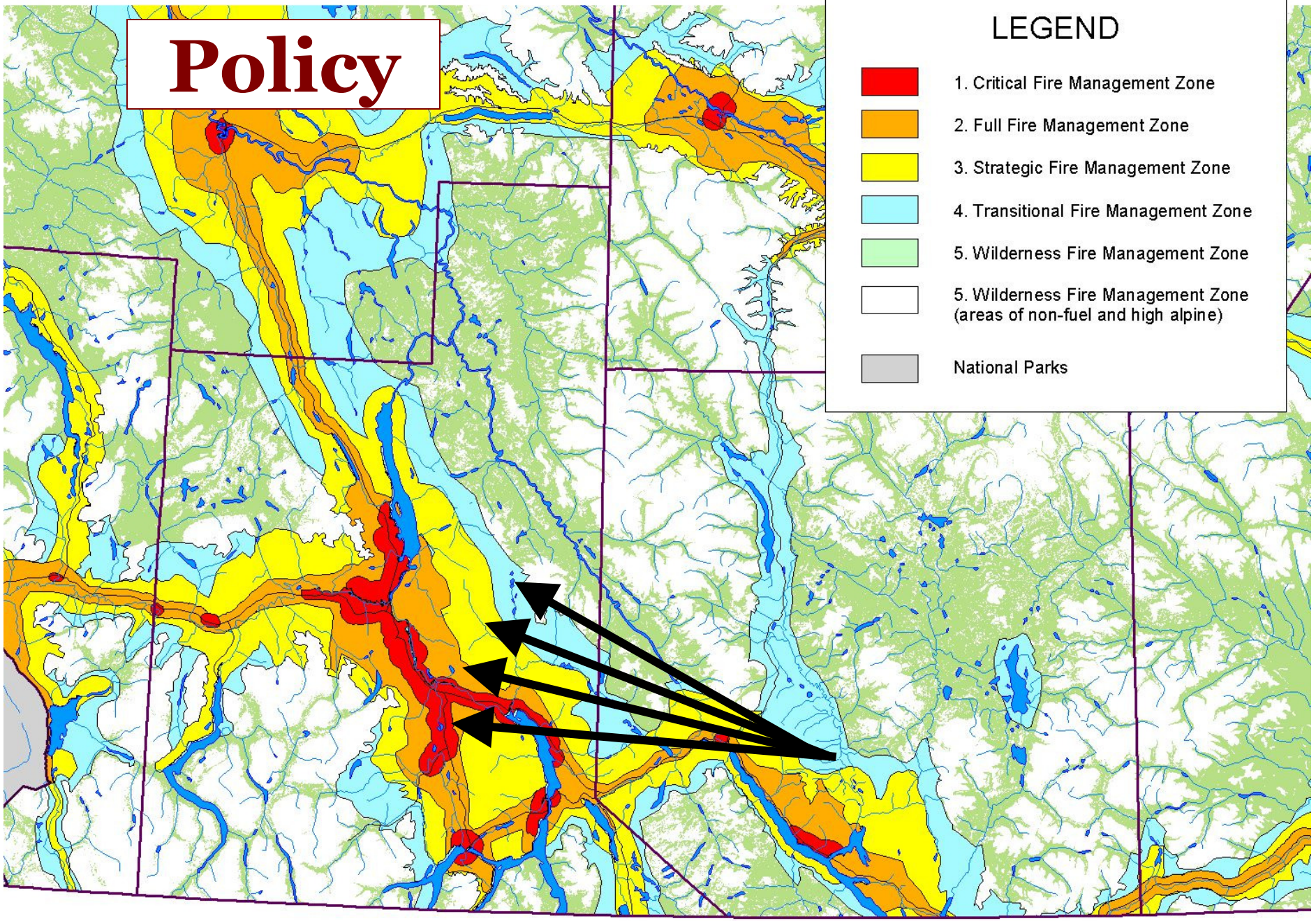
Fire Zone Details

Zone	Response Protocols	Area (millions of ha)	Percent of Total
1. Critical	SUPPRESSION	0.2	0.5%
2. Full Fire Mgmt	SUPPRESSION	2.0	4.3%
3. Strategic	MODIFIED SUPPRESSION #1	3.4	7.5%
4. Transitional	MODIFIED SUPPRESSION #2	3.4	7.5%
5. Wilderness	MONITORING	37.0	80.1%

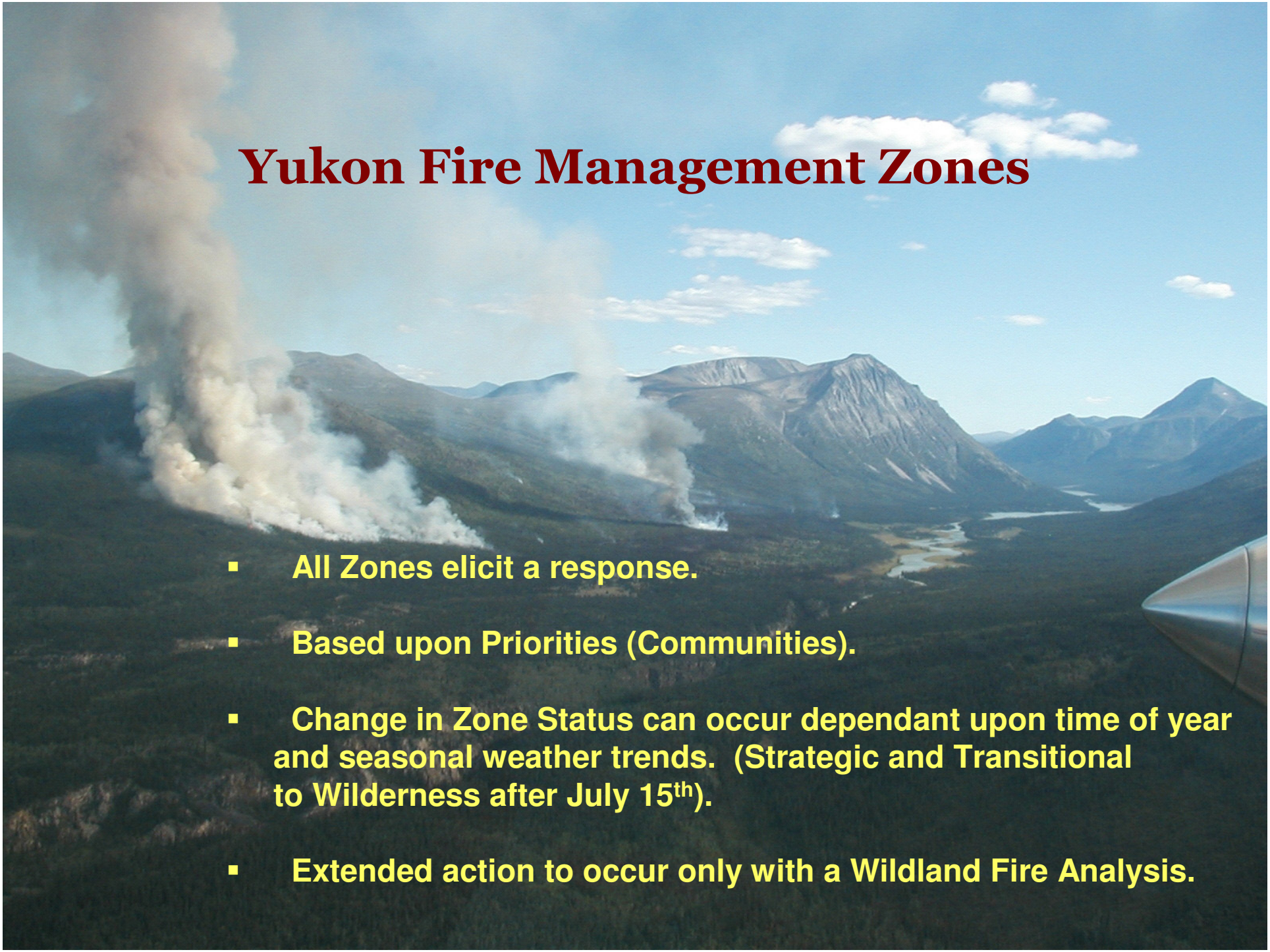
Fire Zone Details

Zone	Human (Soc-Economic) Value	Ecological Value	Percent of Total
1. Critical	VERY HIGH Homes, Community Infrastructure	LOW	0.5%
2. Full Fire Mgmt	HIGH Infrastructure, Recreation, Transportation	LOW	4.3%
3. Strategic	MODERATE Transportation, Recreation, Resource Values	MODERATE	7.5%
4. Transitional	LOW Outlying Properties	HIGH	7.5%
5. Wilderness	LOW	VERY HIGH	80.1%

Policy

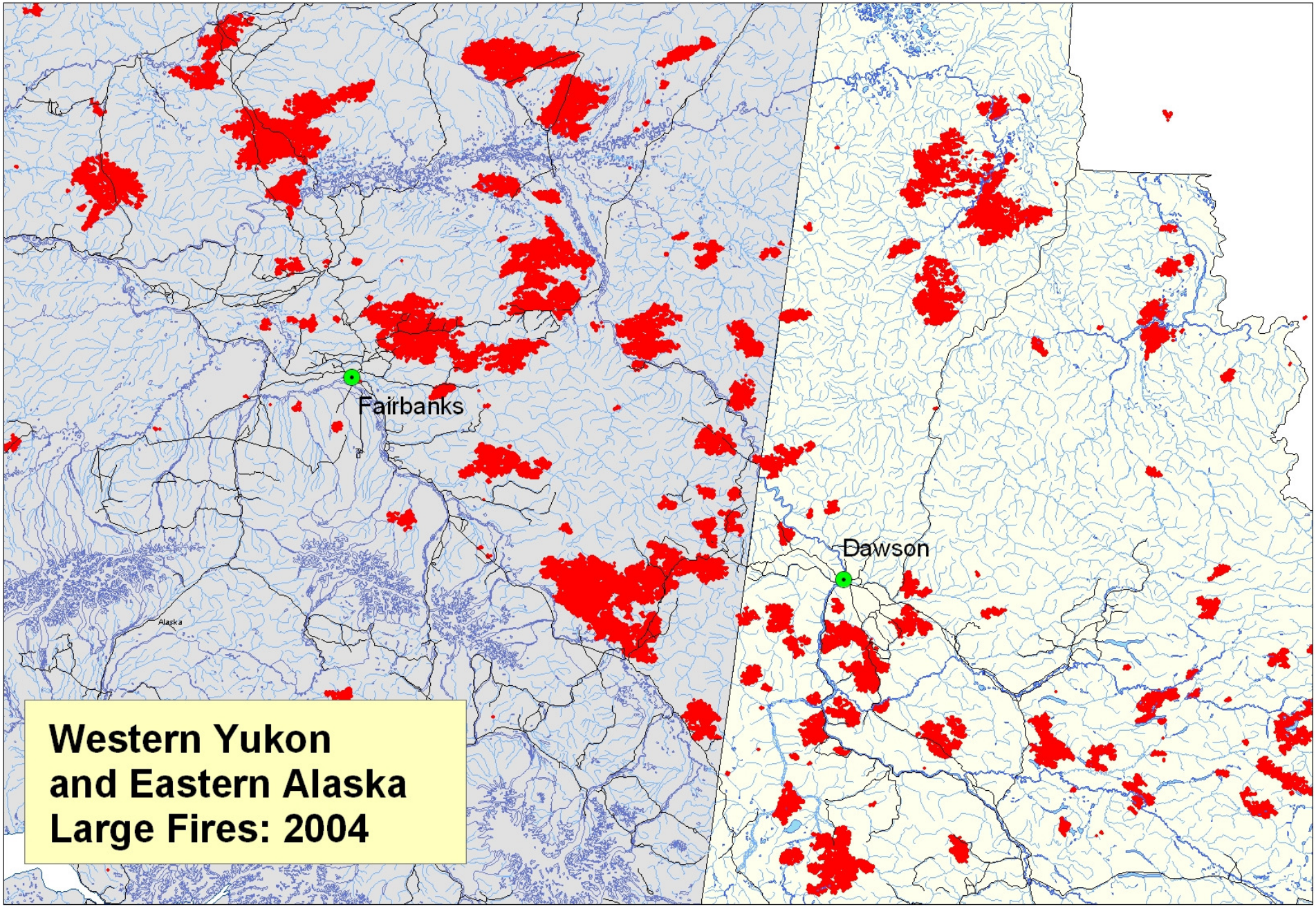


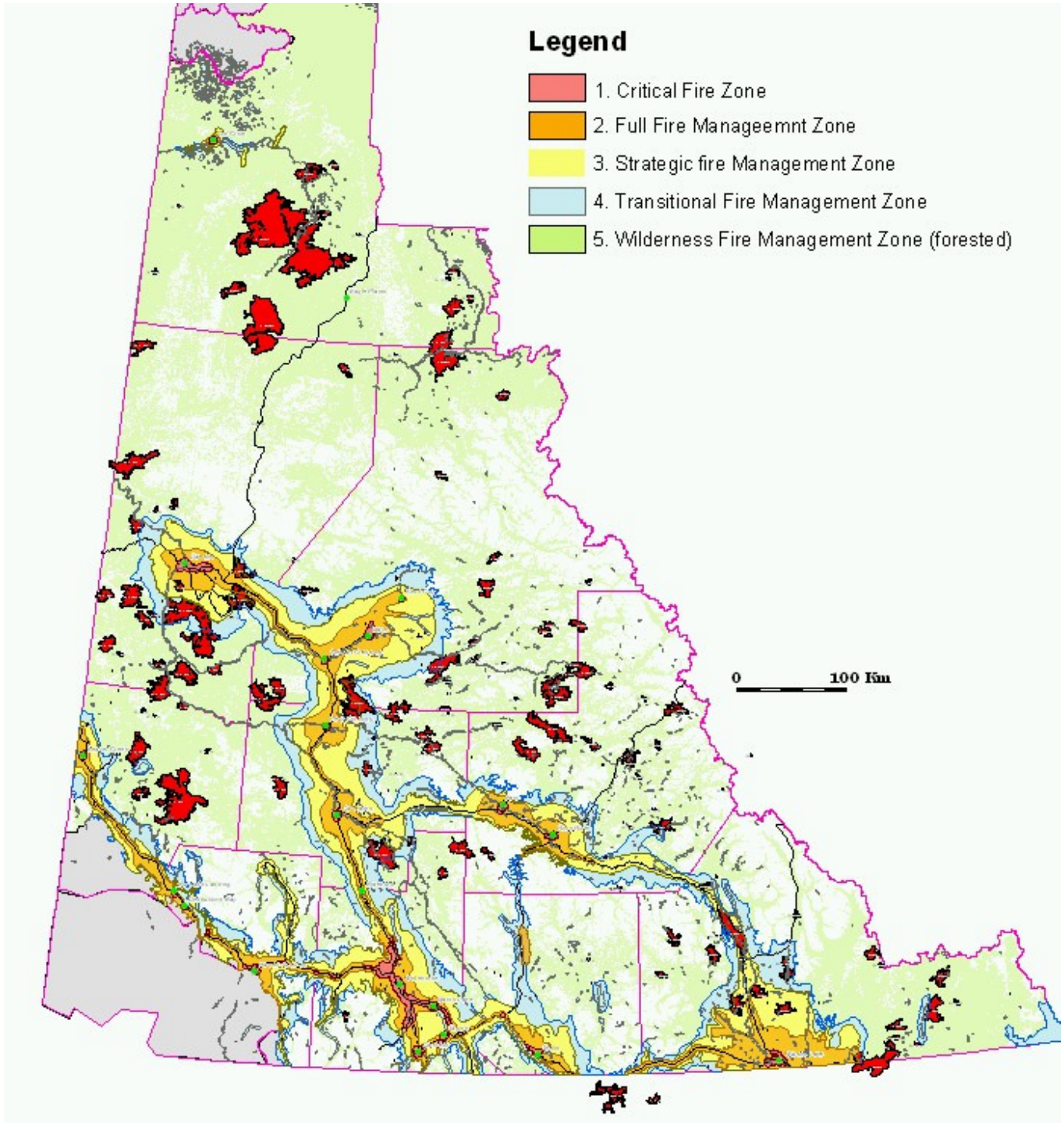
Yukon Fire Management Zonation 2003



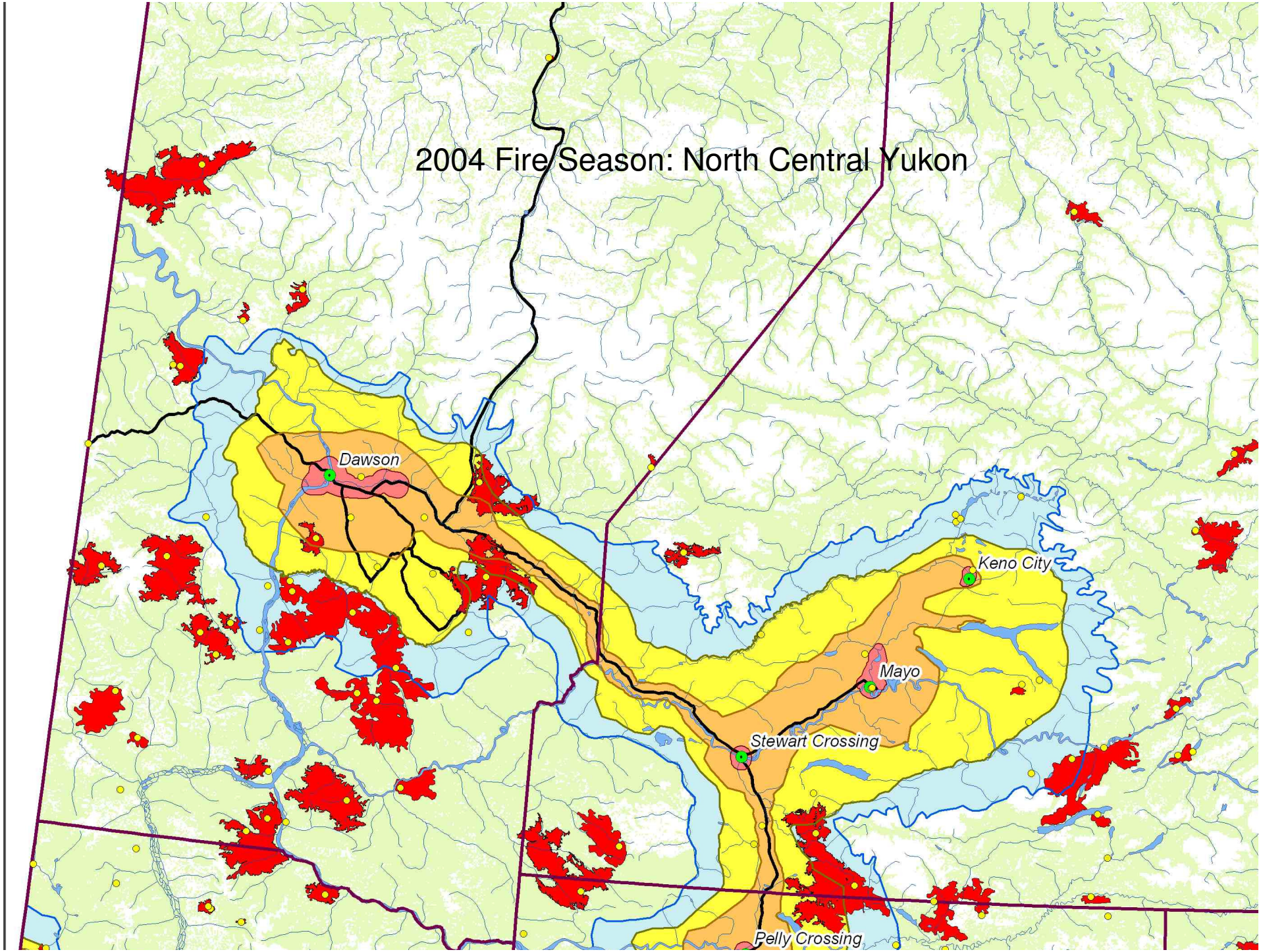
Yukon Fire Management Zones

- All Zones elicit a response.
- Based upon Priorities (Communities).
- Change in Zone Status can occur dependant upon time of year and seasonal weather trends. (Strategic and Transitional to Wilderness after July 15th).
- Extended action to occur only with a Wildland Fire Analysis.

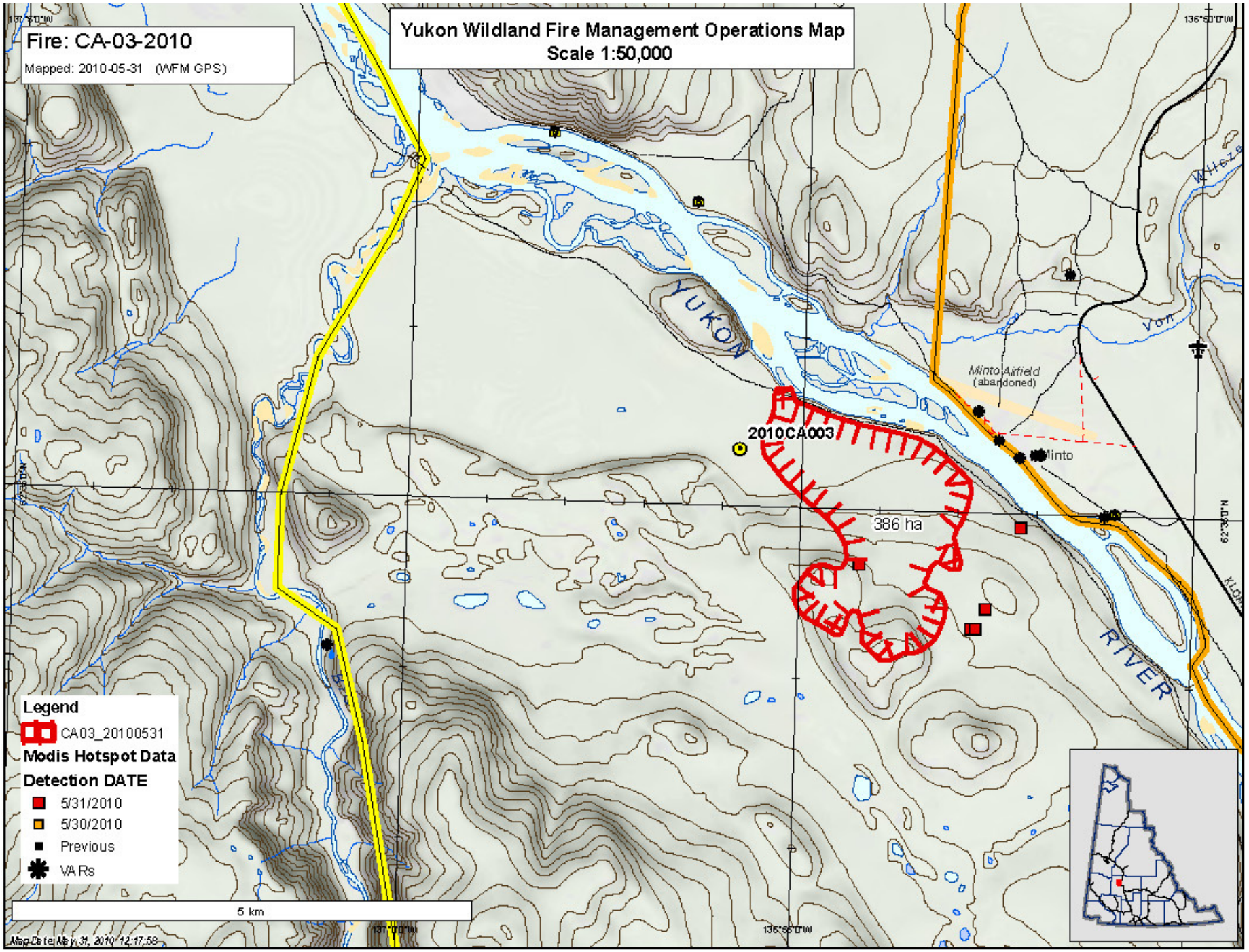

Fairbanks
Dawson
Alaska
Western Yukon
and Eastern Alaska
Large Fires: 2004

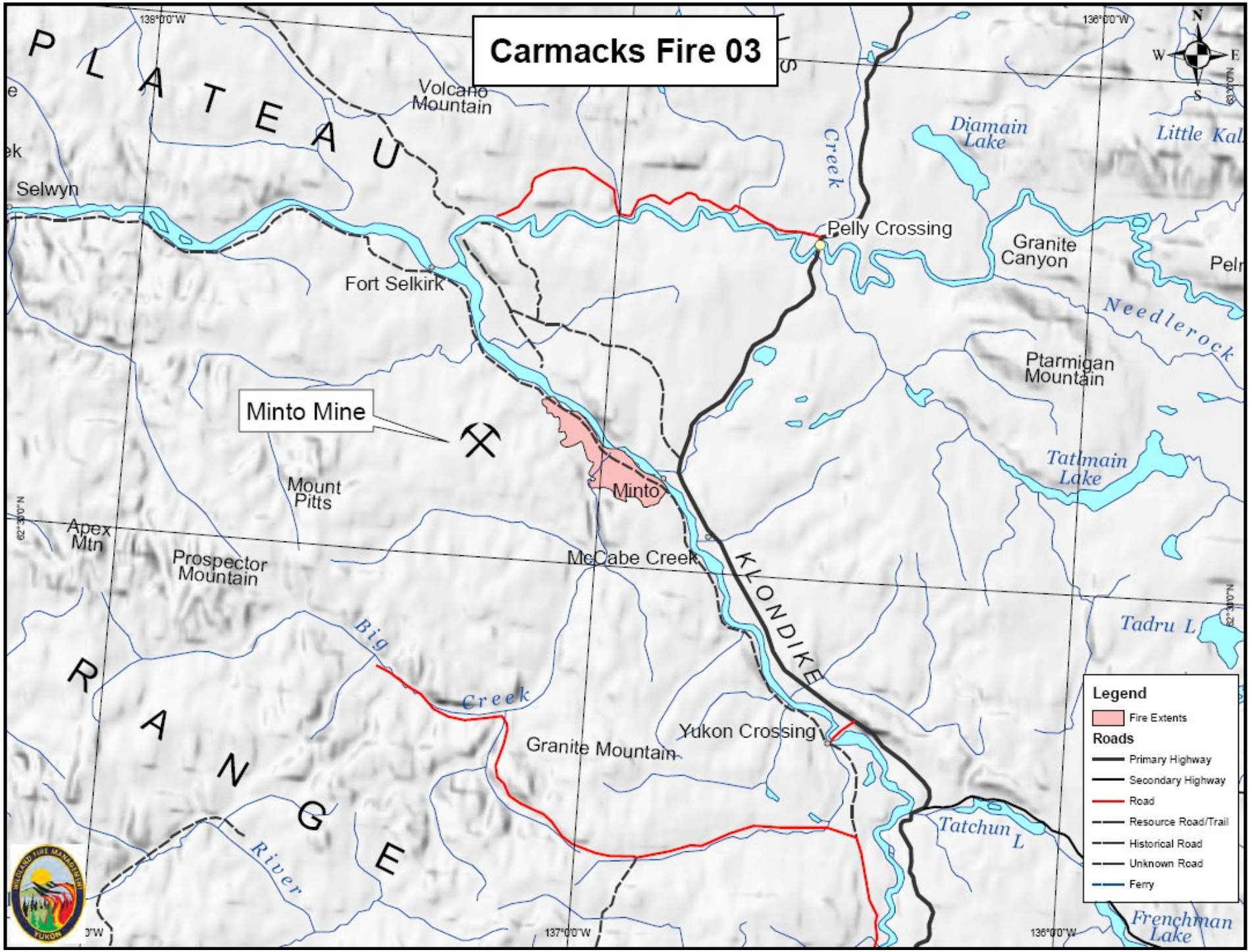


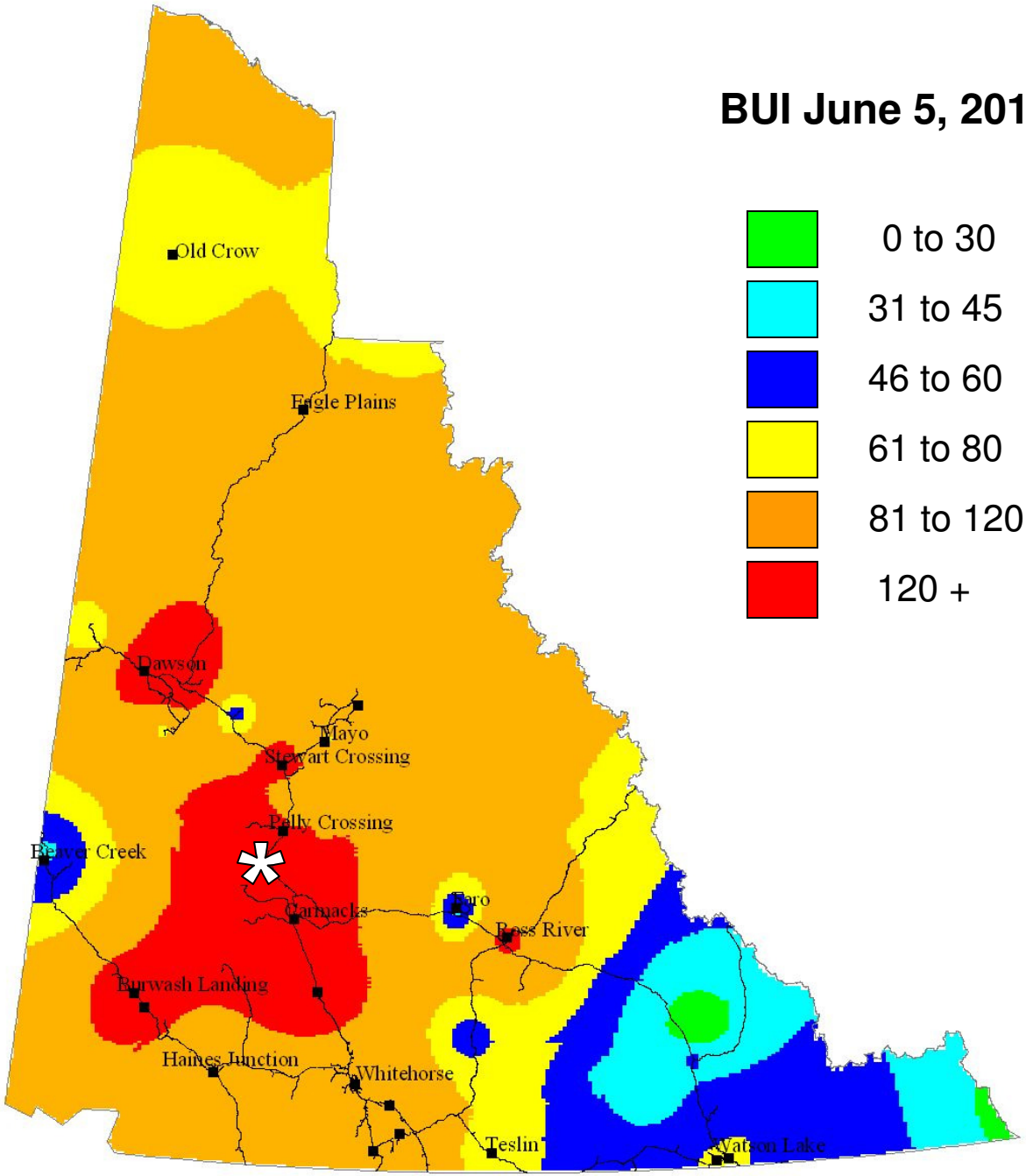
Fire Management Zones with 2004 Fires

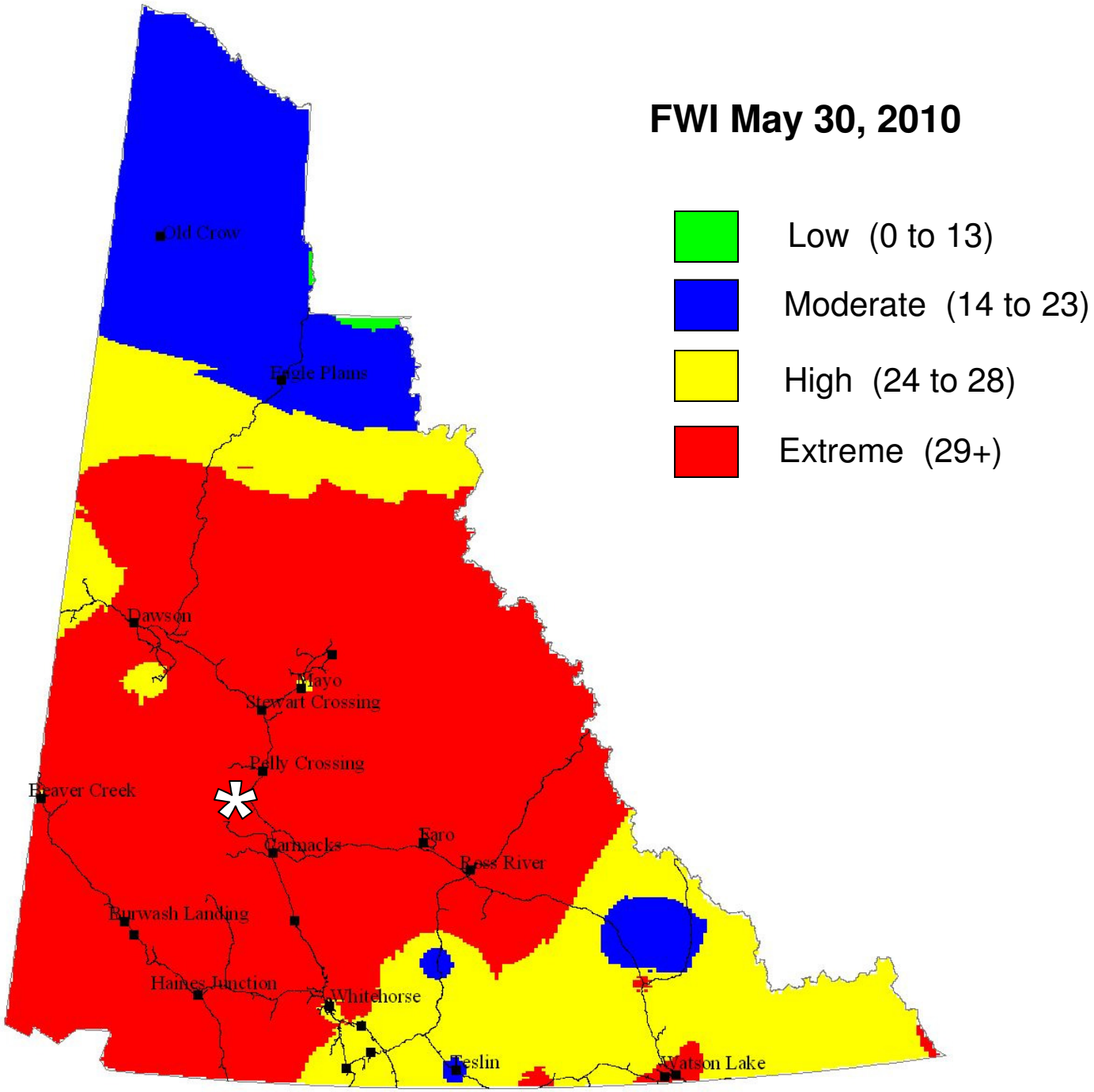

2004 Fire Season: North Central Yukon
Dawson
Keno City
Mayo
Stewart Crossing
Pelly Crossing


Minto Mine Fire (CA-03-10)


Yukon Wildland Fire Management Operations Map
Scale 1:50,000
Fire: CA-03-2010
Mapped: 2010-05-31 (WFM GPS)
YUKON
Minto Airfield
(abandoned)
2010CA003
386 ha
Minto
RIVER
Legend
CA03_20100531
Modis Hotspot Data
Detection DATE
5/31/2010
5/30/2010
Previous
VARs
5 km


Carmacks Fire 03
PLATEAU
RANGE
Volcano Mountain
Selwyn
Fort Selkirk
Pelly Crossing
Granite Canyon
Diamain Lake
Little Kal
Creek
Needlerock
Ptarmigan Mountain
Minto Mine
Minto
Mount Pitts
Tatmain Lake
Apex Mtn
Prospector Mountain
McCabe Creek
KLONDIKE
Tadru L
Big Creek
Granite Mountain
Yukon Crossing
Tatchun L
River
Frenchman Lake
136°0'0"W
137°0'0"W
N
S
E
W
Legend
Fire Extents
Roads
Primary Highway
Secondary Highway
Road
Resource Road/Trail
Historical Road
Unknown Road
Ferry


BUI June 5, 2010
0 to 30
31 to 45
46 to 60
61 to 80
81 to 120
120 +
Old Crow
Eagle Plains
Dawson
Mayo
Stewart Crossing
Pelly Crossing
Beaver Creek
Carmacks
Faro
Ross River
Burwash Landing
Haines Junction
Whitehorse
Teslin
Watson Lake


FWI May 30, 2010
Low (0 to 13)
Moderate (14 to 23)
High (24 to 28)
Extreme (29+)
Old Crow
Eagle Plains
Dawson
Mayo
Stewart Crossing
Pelly Crossing
Beaver Creek
Carmacks
Faro
Ross River
Burwash Landing
Haines Junction
Whitehorse
Teslin
Watson Lake

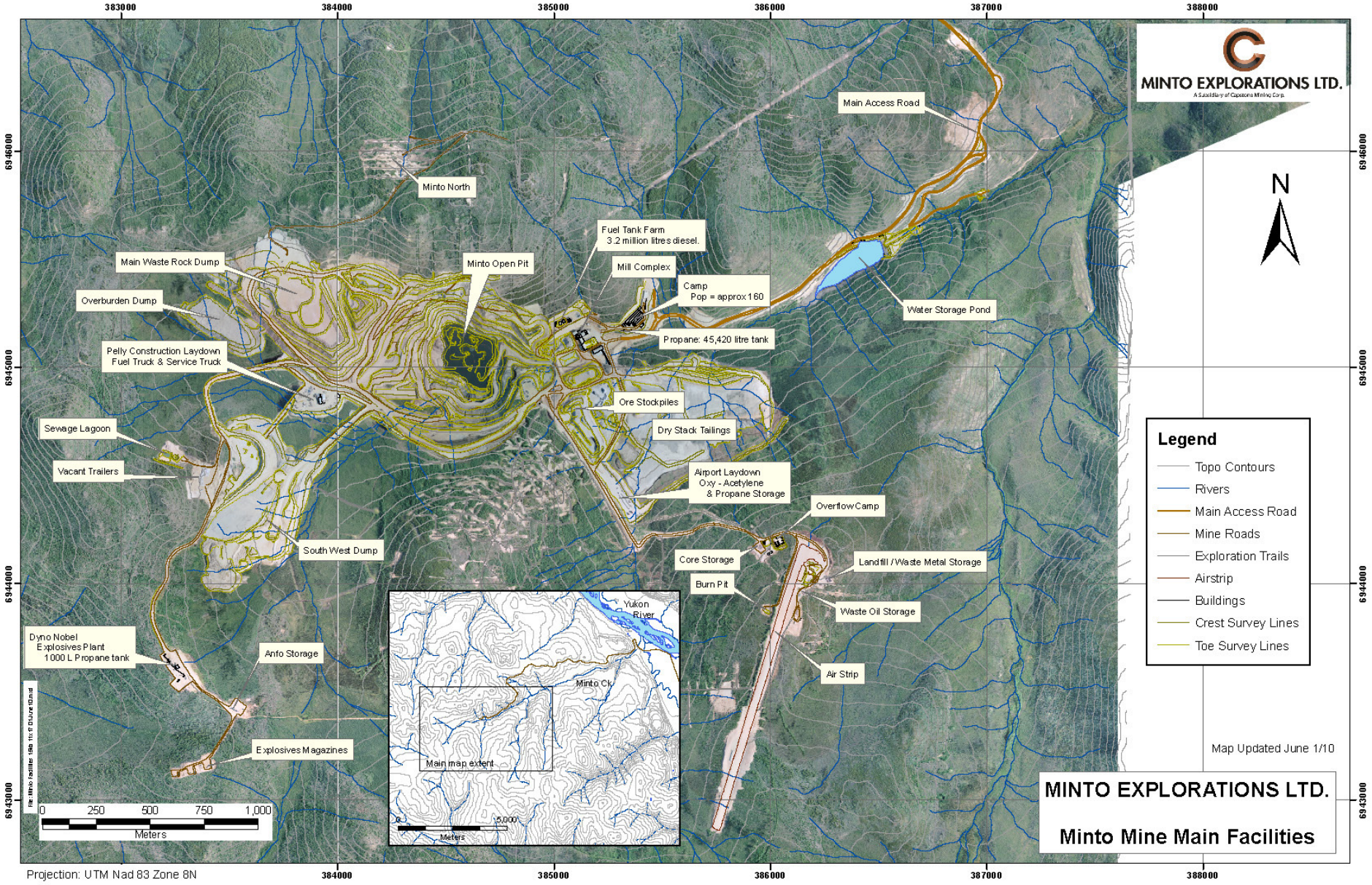
Pelly Farm Weather Station
May 25 – June 8, 2010

STN	Date	Time	temp	RH	Dir	Wnd Spd	Rn 24	ffmc	DMC	DC	ISI	BUI	FWI	DSR
			℃	%	°	kph	mm							
PE	05/25/2010	12:00	23.5	25.0	245	9.6	0.00	92.7	73.7	380.5	10.2	99.3	31.8	12.4
PE	05/26/2010	12:00	24.1	18.0	89	9.1	0.00	94.3	79.1	387.2	12.3	104.8	36.9	16.2
PE	05/27/2010	12:00	23.7	18.0	141	18.1	0.00	94.5	84.5	393.9	19.8	110.0	51.1	28.8
PE	05/28/2010	12:00	24.5	16.0	145	19.4	0.00	95.0	90.2	400.7	23.0	115.4	57.1	34.9
PE	05/29/2010	12:00	25.6	23.0	75	9.3	0.00	95.0	95.6	407.7	13.7	120.5	42.0	20.3
PE	05/30/2010	12:00	26.5	21.0	205	5.3	0.00	95.1	101.3	414.9	11.3	125.8	37.6	16.7
PE	05/31/2010	12:00	25.0	18.0	110	19.8	0.00	95.2	106.9	421.8	23.8	130.9	61.0	39.3
PE	06/01/2010	12:00	22.5	23.0	138	17.9	0.00	94.8	111.7	428.3	20.6	135.2	56.4	34.3
PE	06/02/2010	12:00	24.9	21.0	70	12.0	0.00	94.9	117.1	436.2	15.4	140.1	47.6	25.3
PE	06/03/2010	12:00	23.5	31.0	120	17.0	0.00	93.7	121.6	443.8	16.9	144.3	50.9	28.6
PE	06/04/2010	12:00	15.9	56.0	170	8.0	0.00	89.7	123.6	450.1	6.1	146.5	26.1	8.7
PE	06/05/2010	12:00	17.8	41.0	120	12.0	0.00	89.7	126.5	456.7	7.5	149.5	30.4	11.4
PE	06/06/2010	12:00	15.5	48.0	90	7.0	0.00	89.0	128.8	462.9	5.3	151.9	23.9	7.5
PE	06/07/2010	12:00	19.7	42.0	220	7.0	0.00	89.0	132.0	469.9	5.3	155.1	24.1	7.6
PE	06/08/2010	12:00	19.2	38.0	250	9.0	0.00	89.3	135.3	476.8	6.1	158.3	26.7	9.1

Fuels

Values at Risk

- Capstone Resources
- Fort Selkirk Historic Site
- Powerline
- First Nation cultural camp
- RV Park
- Assorted cabins
- Highway corridor

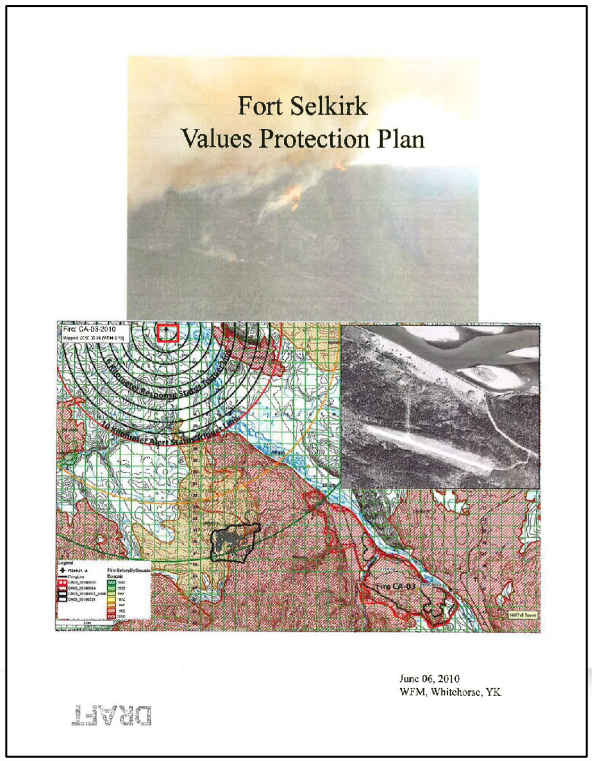

MINTO EXPLORATIONS LTD.
A Subsidiary of Capstone Mining Corp.
N
Main Access Road
Minto North
Fuel Tank Farm
3.2 million litres diesel.
Mill Complex
Minto Open Pit
Main Waste Rock Dump
Camp
Pop = approx 160
Overburden Dump
Water Storage Pond
Propane: 45,420 litre tank
Pelly Construction Laydown
Fuel Truck & Service Truck
Ore Stockpiles
Dry Stack Tailings
Sewage Lagoon
Vacant Trailers
Airport Laydown
Oxy - Acetylene
& Propane Storage
Overflow Camp
South West Dump
Core Storage
Landfill / Waste Metal Storage
Burn Pit
Waste Oil Storage
Dyno Nobel
Explosives Plant
1000 L Propane tank
Anfo Storage
Air Strip
Explosives Magazines
Yukon
River
Minto Ck
Main map extent
0
250
500
750
1,000
Meters
0
5,000
Meters
Legend
Topo Contours
Rivers
Main Access Road
Mine Roads
Exploration Trails
Airstrip
Buildings
Crest Survey Lines
Toe Survey Lines
Map Updated June 1/10
MINTO EXPLORATIONS LTD.
Minto Mine Main Facilities
Projection: UTM Nad 83 Zone 8N
383000
384000
385000
386000
387000
388000
6946000
6945000
6944000
6943000

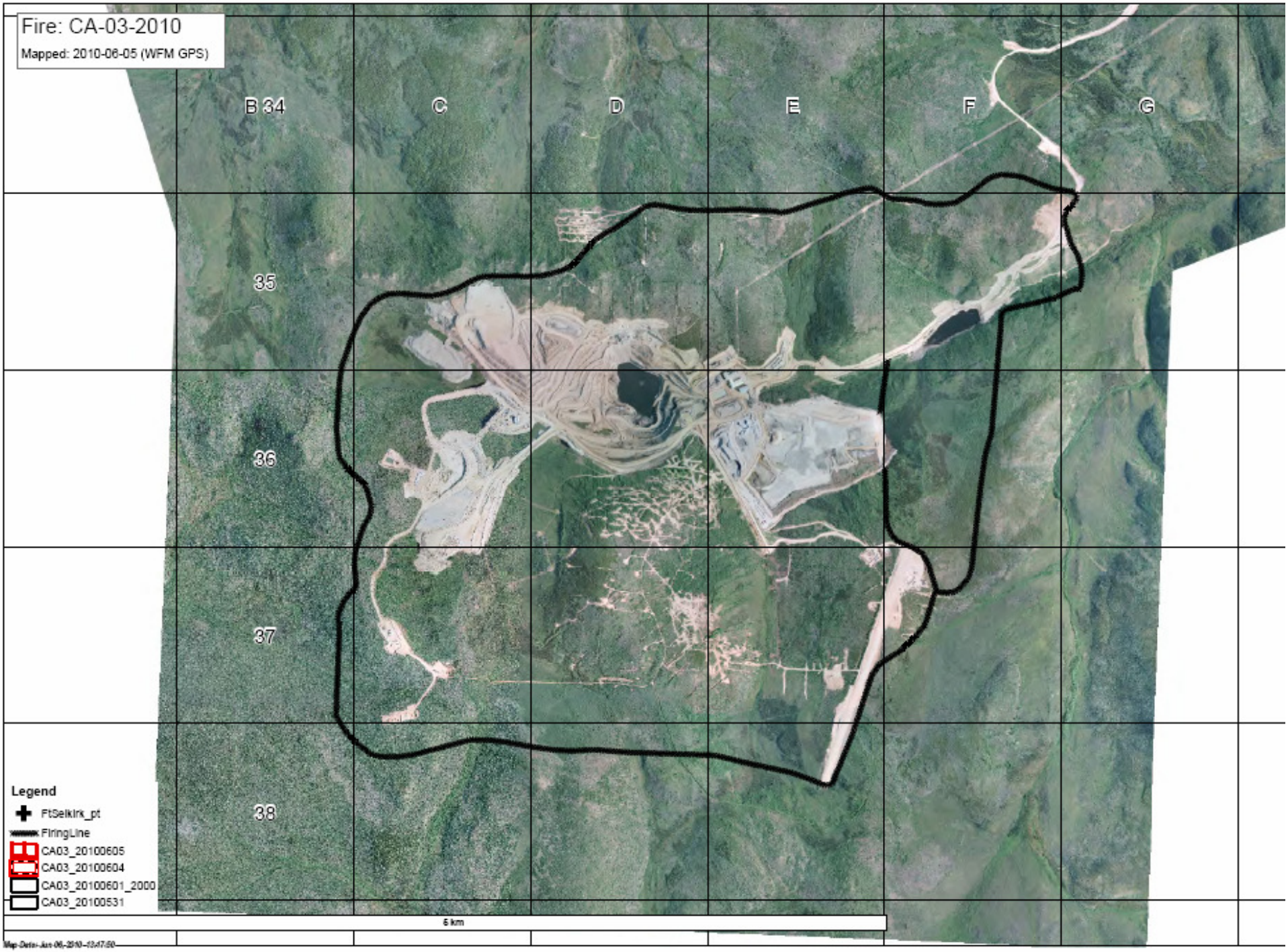
Minto Mine Fire (CA-03-2010)

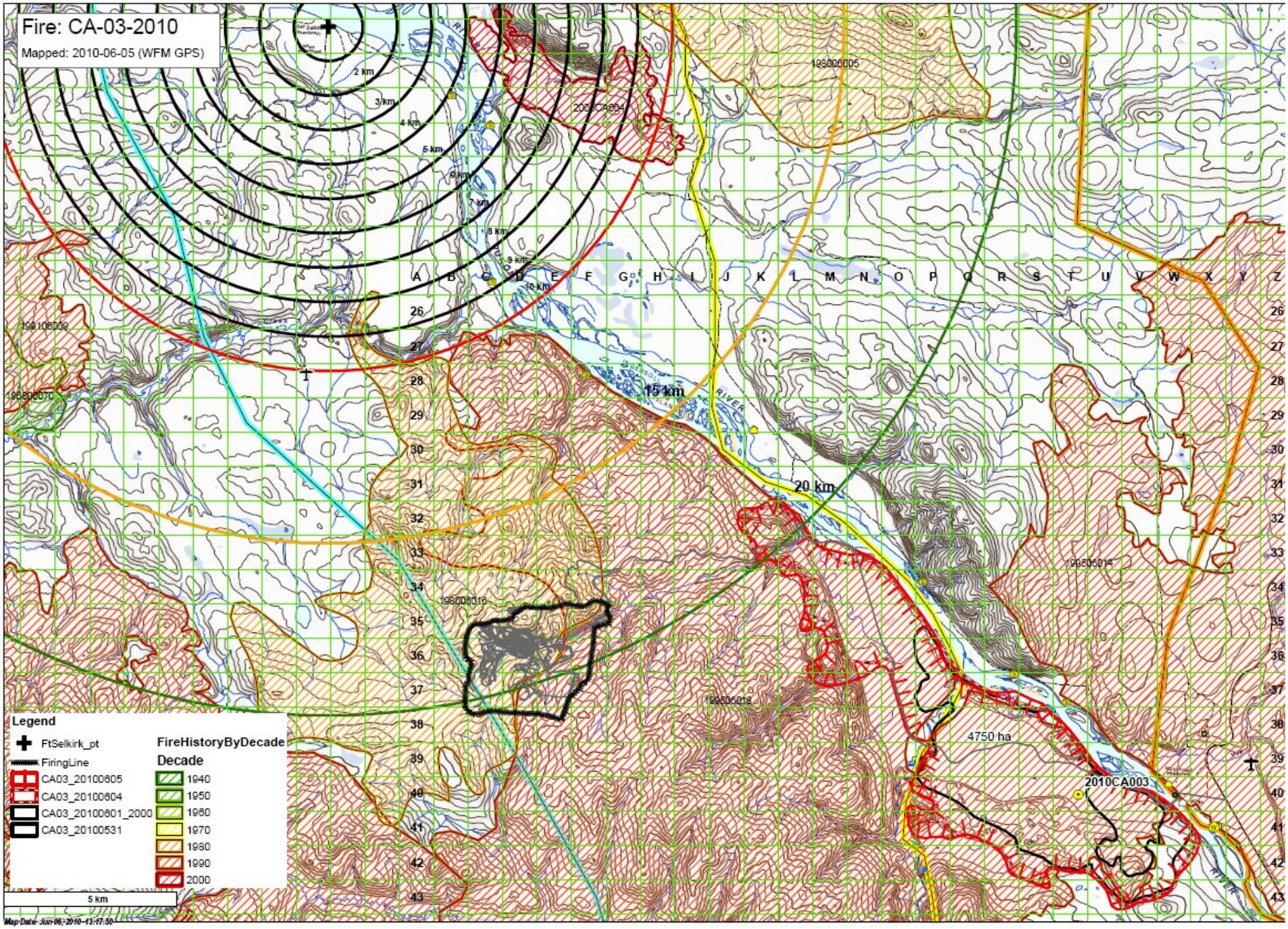
May 30:	Fire detected by aircraft in 14 yr old burn. Air tankers work the fire till late. Limited success. Fire size 380 ha.
May 31: to Jun 3	Active fire behaviour - winds and high BUI's. Complete control objective not feasible. Protection of powerline, bridges, ferry landing and facilities on east side of Yukon R. Type 2 team (Alberta) resources established. Fire size 3500 ha.
Jun 4: to Jun 10	Attention on mine site with 4 km run and evacuation of most mine staff. Cat guards and burnout at mine. Spot extinguishment on east river side. Protection plan for Ft. Selkirk. Fire size 5100 ha.
Jun 11: to Jun 30	With moderate precip. on fire and downturn in activity, resources are scaled back. Hot spotting on south end. No sig. fire growth.
Jul 1:	30 mm of rain over three days. Operations shut down. Monitor only. No further significant fire activity.

Minto Mine Fire (CA-03-10)

- Minimize impacts of fire to Minto Mine operations
- Prevent fire from crossing to east side of Yukon River
- Protect values at risk in the area
- Implement site protection plan for Fort Selkirk




Fire: CA-03-2010
Mapped: 2010-06-05 (WFM GPS)
B 34
C
D
E
F
G
35
36
37
38
Legend
FtSelkirk_pt
FiringLine
CA03_20100605
CA03_20100604
CA03_20100601_2000
CA03_20100531
5 km


Fire: CA-03-2010
Mapped: 2010-06-05 (WFM GPS)
2 km
3 km
4 km
5 km
6 km
7 km
8 km
9 km
10 km
15 km
20 km
4750 ha
2010CA003
Legend
FtSelkirk_pt
FiringLine
CA03_20100605
CA03_20100604
CA03_20100601_2000
CA03_20100531
FireHistoryByDecade
Decade
1940
1950
1960
1970
1980
1990
2000
5 km

CA-03-10 Challenges

- How best to ascertain risk?
- Large fires are difficult to model.
- Politics.
- Differences in management objectives.

CA-03-10 Successes

- Policy sorted out priorities.
- Costs were kept manageable.
- Protection plans.
- Scaled up and down appropriately.

Summary

- Prioritize. Prioritize. Prioritize.
- Flexibility is important - adaptive.
- Complexity creates more risk.
- Hard lines on a map still need a human touch.
- Resource availability may determine how fires are managed.
- Opportunities for education. (public, staff, senior mgmt)