

Industrial Wildfire Preparedness, an Alberta Perspective

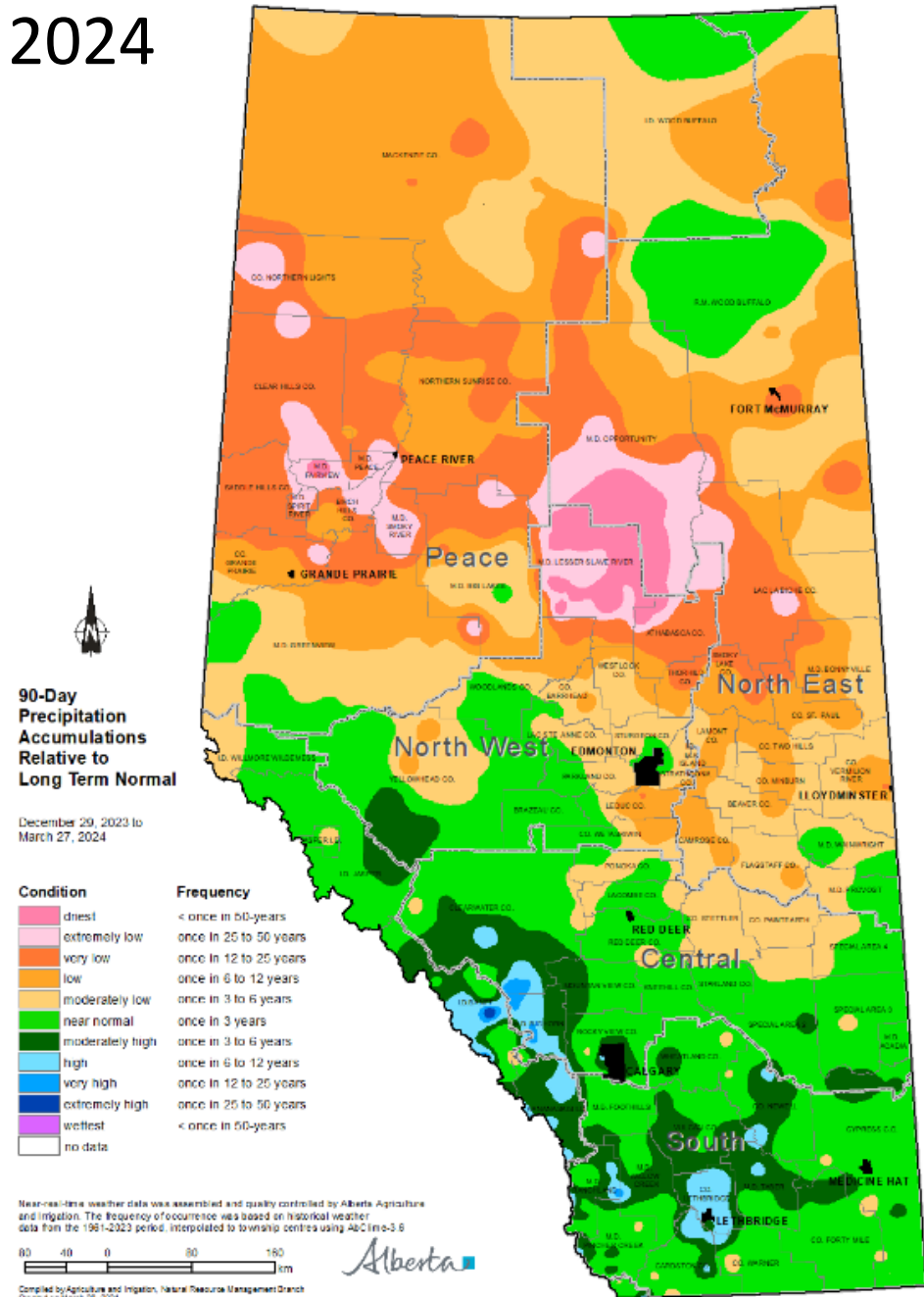
Connor Wollis, RPF
Forestry and Parks
Wildfire Management Branch
connor.wollis@gov.ab.ca
780-920-7593



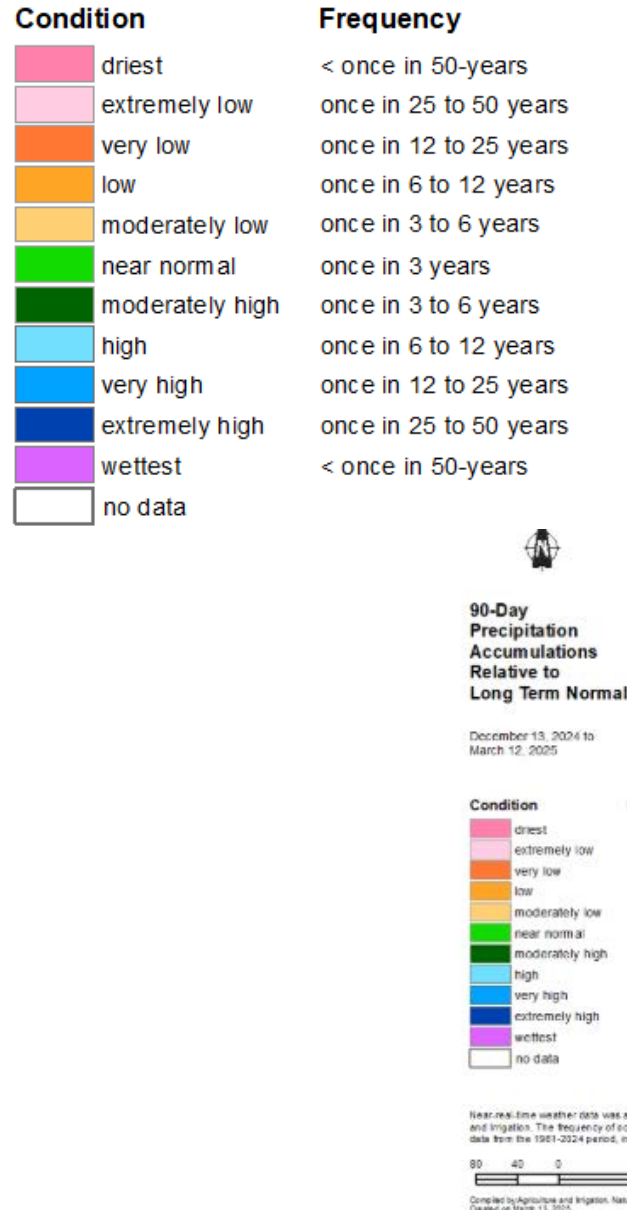
Outline

- Fire Season Outlook
- Wildfire Operations
- Wildfire Preparedness
- Wildfire Prevention and Mitigation
- Alberta Wildfire Contacts

2024



2025



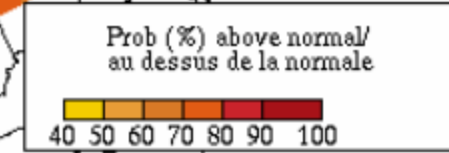
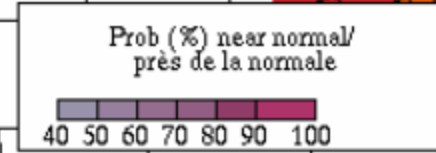
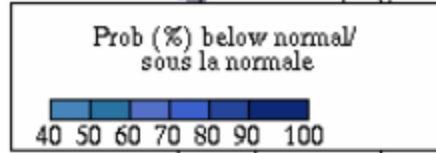
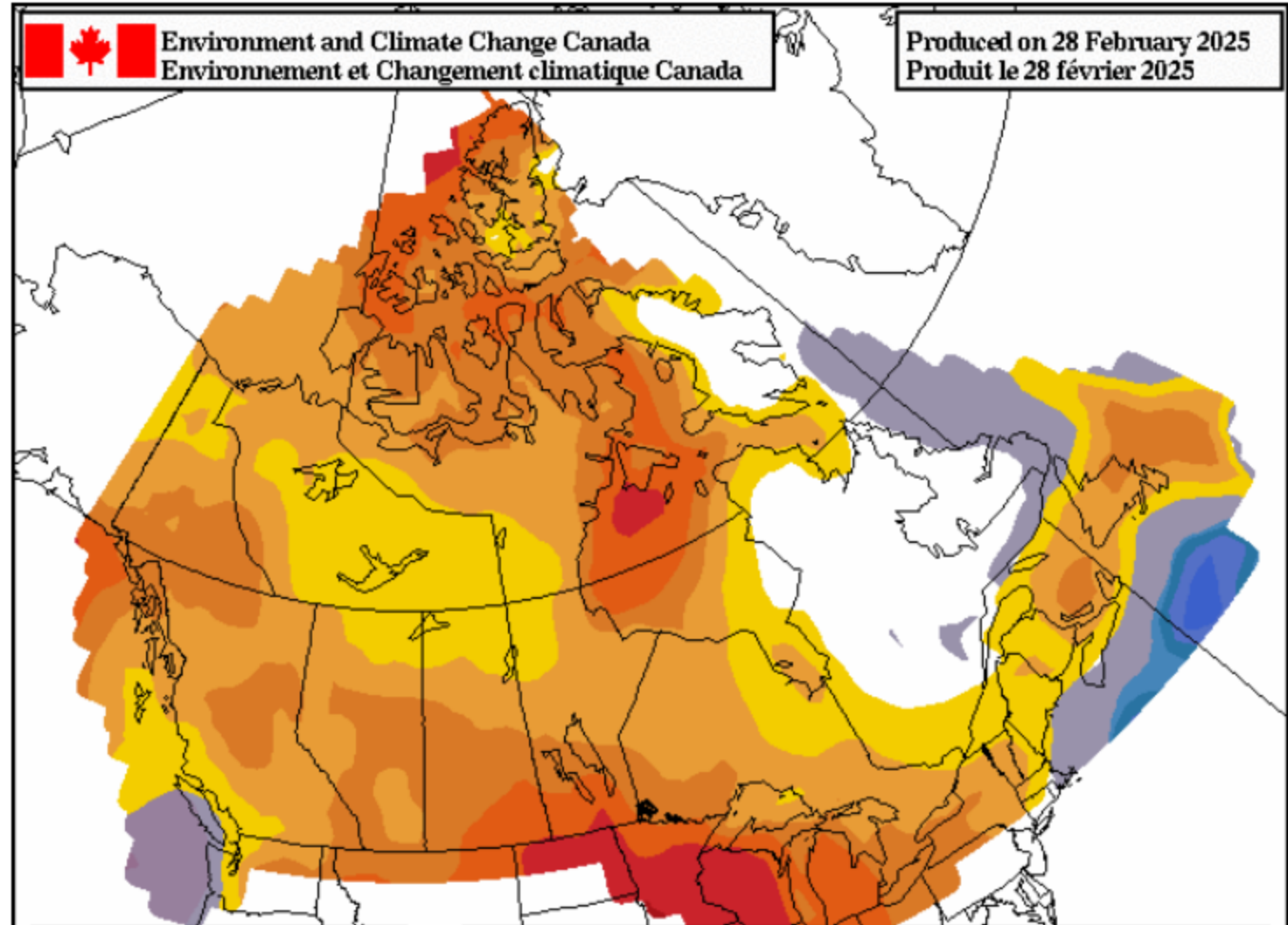
Visit weatherdata.ca for additional maps and meteorological data

Visit weatherdata.ca for additional maps and meteorological data

Monthly Snowfall Averages (cm)

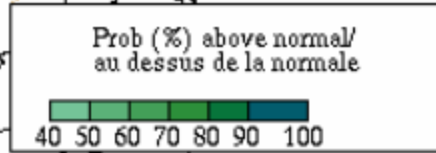
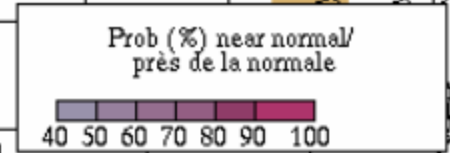
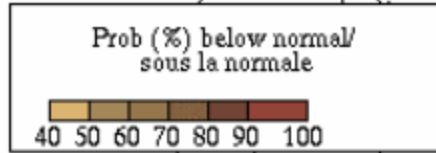
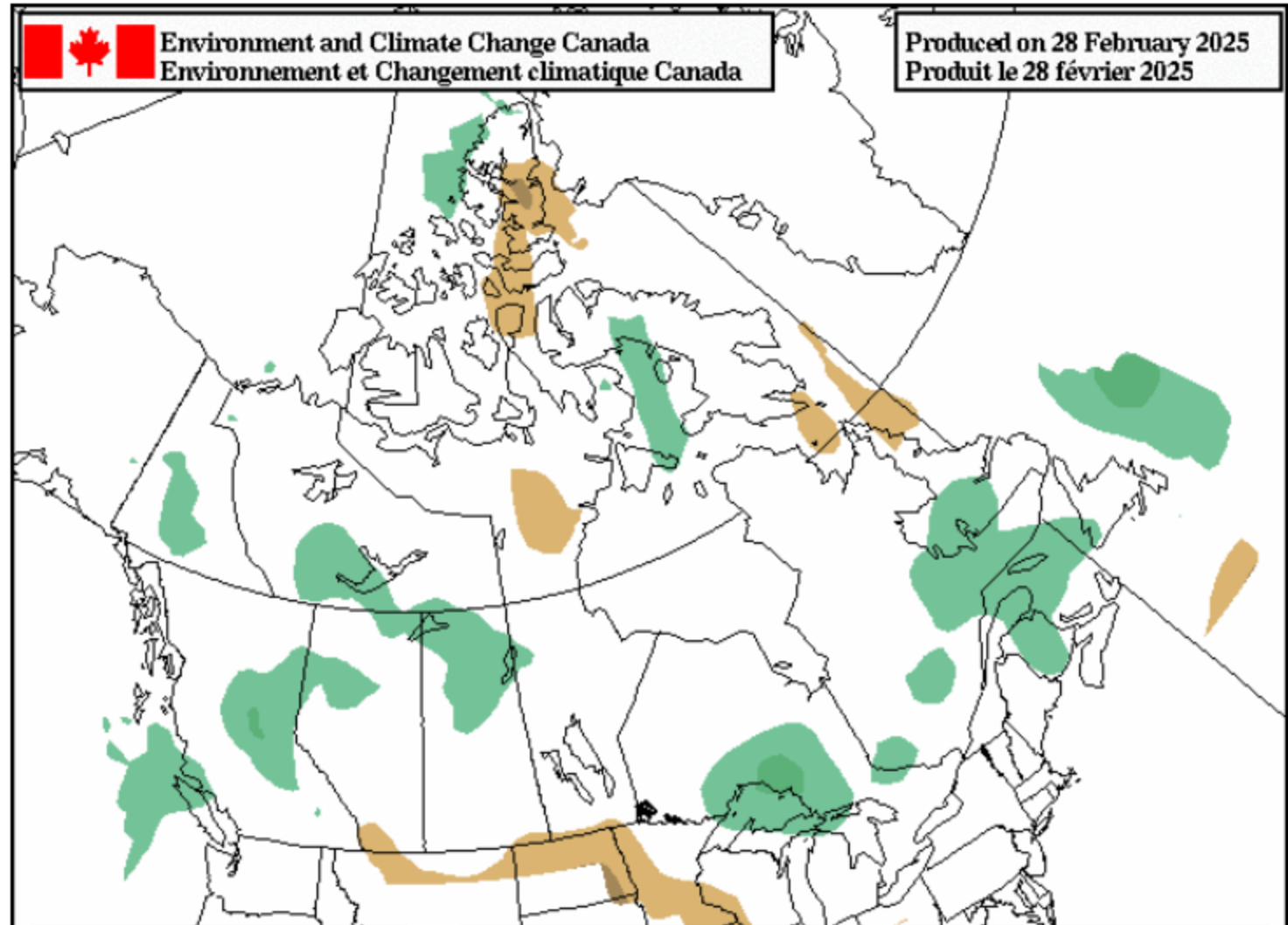
1991-2020 Climate Data

	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
Fort McMurray	0.0	1.4	8.3	18.3	16.6	20.3	18.9	17.1	7.2	2.5	0.0
Grande Prairie	0.0	1.6	14.8	27.8	25.3	34.3	20.4	21.6	11.2	5.0	0.2
Edmonton International Airport	0.1	0.6	10.1	19.1	16.3	24.2	14.4	19.2	16.3	6.4	0.1
Red Deer	0.4	2.4	10.2	20.0	18.8	20.2	15.1	23.3	18.1	9.5	0.0
Calgary	0.0	2.2	11.5	18.8	16.3	16.6	16.9	23.8	22.9	9.6	0.2



Forecast probability of Temperature above, below and near normal (calibrated)
Period: March-April-May 2025
Based on 3 equiprobable categories from 1991-2020 climatology

Probabilités prévues de températures au-dessus, sous et près de la normale (calibrées)
Période: mars-avril-mai 2025
Basé sur 3 catégories équiprobables de la climatologie 1991-2020

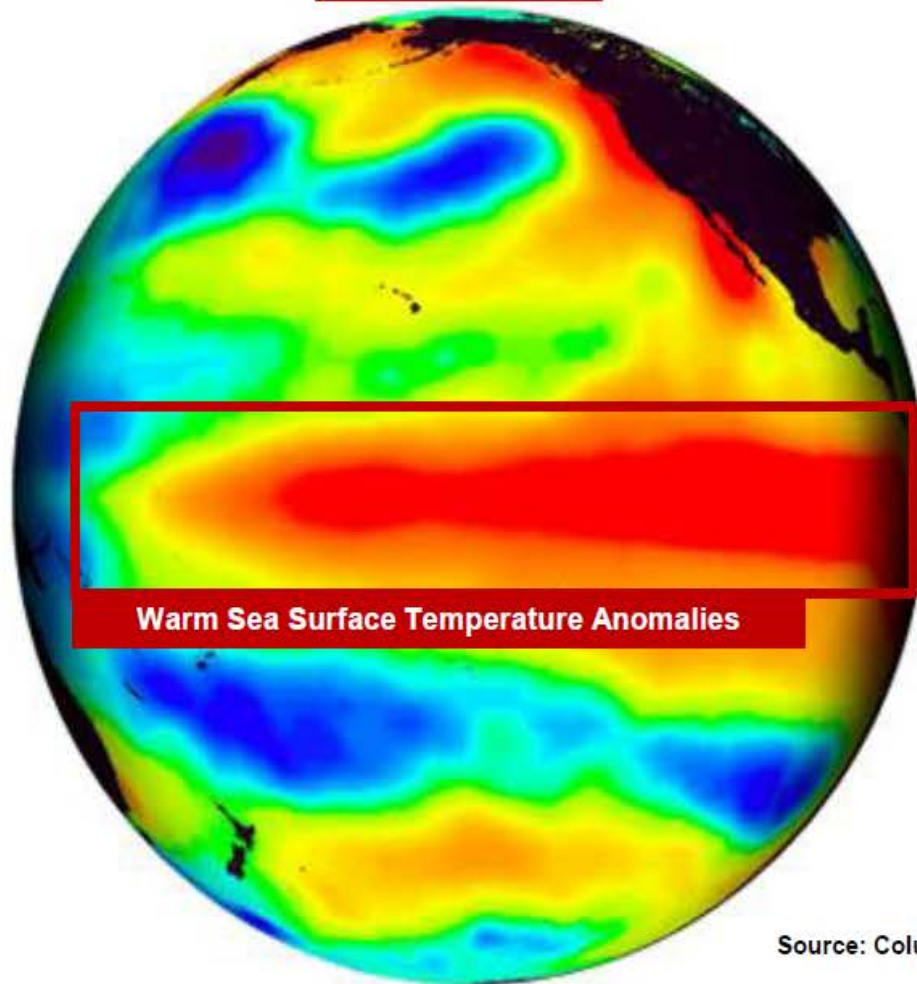


**Forecast probability of Precipitation
above, below and near normal (calibrated)**
Period: March-April-May 2025
Based on 3 equiprobable categories
from 1991-2020 climatology

**Probabilités prévues de précipitations
au-dessus, sous et près de la normale (calibrées)**
Période: mars-avril-mai 2025
Basé sur 3 catégories équiprobables
de la climatologie 1991-2020

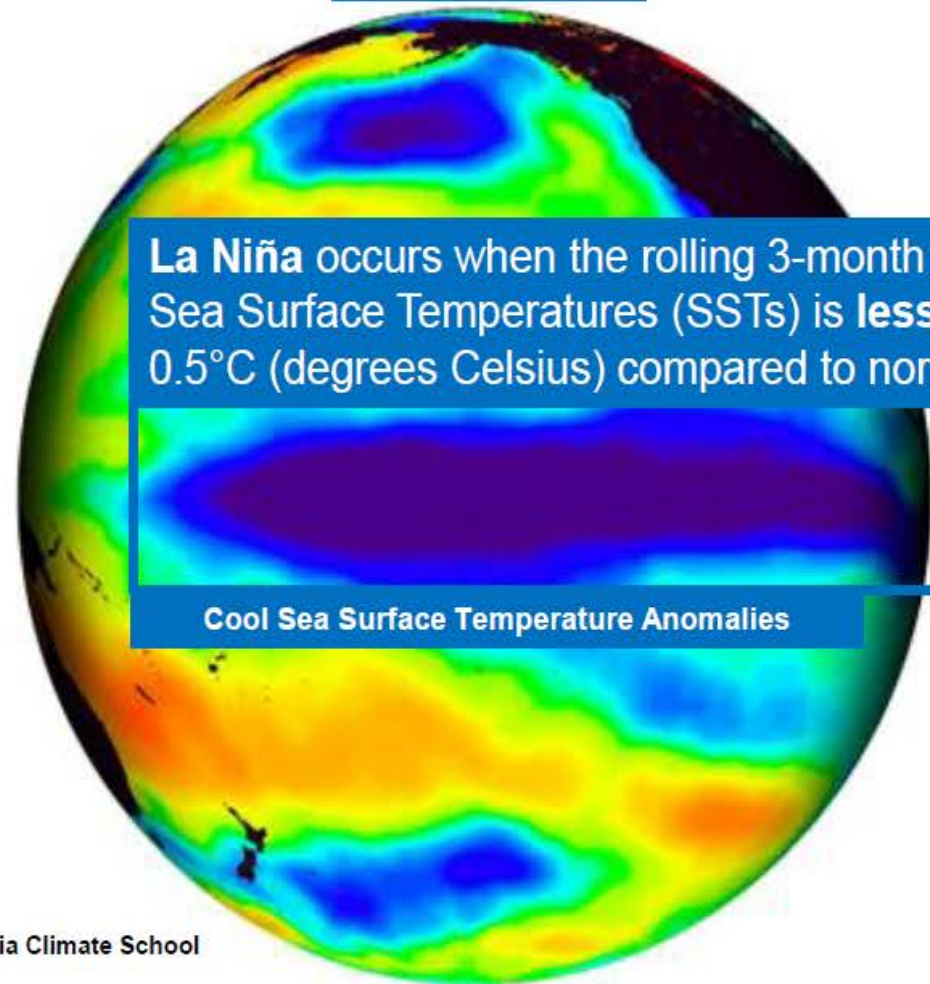
El Niño & La Niña: When and How?

El Niño



Warm Sea Surface Temperature Anomalies

La Niña



La Niña occurs when the rolling 3-month average Sea Surface Temperatures (SSTs) is **less than 0.5°C** (degrees Celsius) compared to normal

Cool Sea Surface Temperature Anomalies

Source: Columbia Climate School

Sea Surface Temperature Anomaly (°C)



-4 -2 0 2 4

Periodic fluctuation between the two phases usually occurs every 2-7 years

Credit A. Pederson ECCC

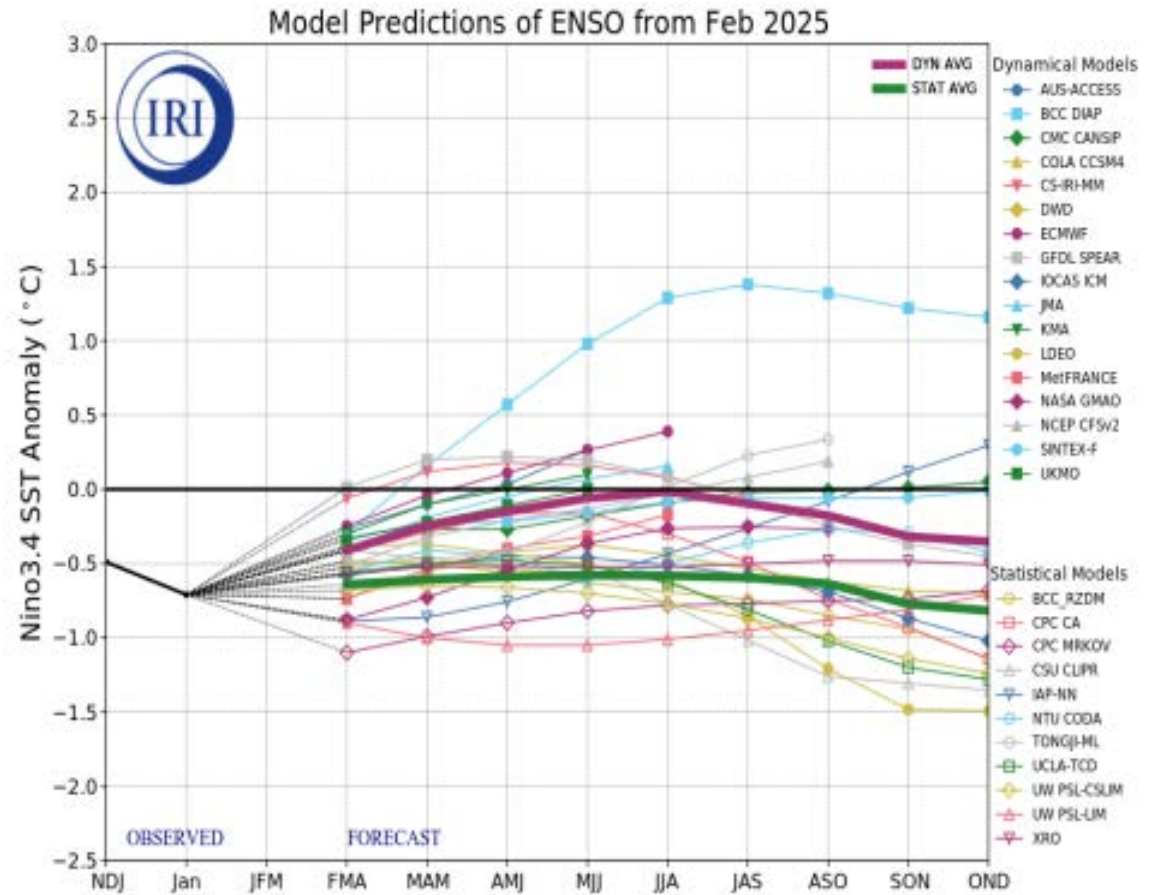
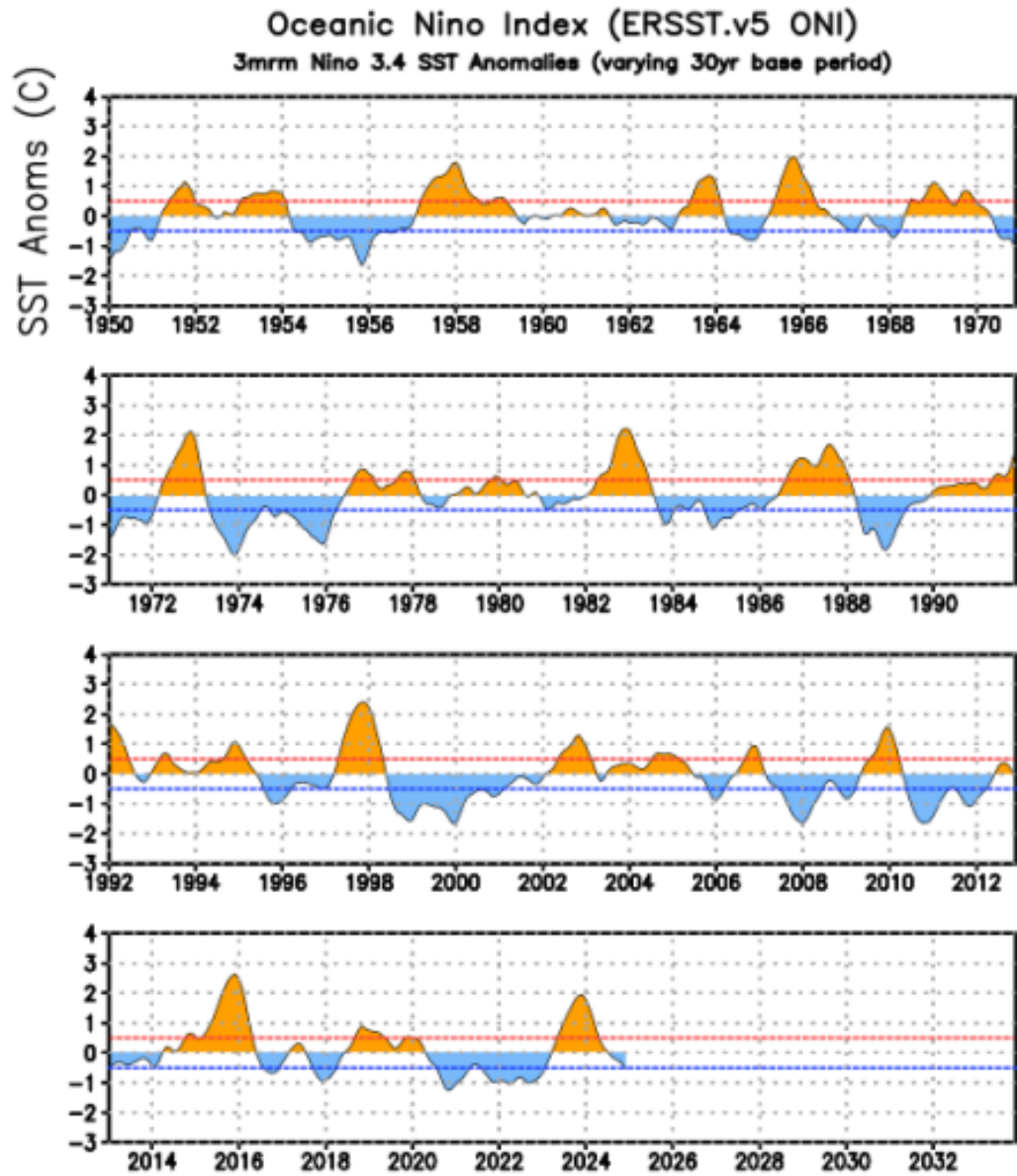


Figure provided by the International Research Institute (IRI) for Climate and Society (updated 19 February 2025).

SPRING FORECAST SUMMARY

La Niña (Now) → ENSO-Neutral (Soon):

ENSO-Neutral means we are in between La Nina and El Nino

- ENSO-Neutral is not correlated to temperature and precipitation patterns in Spring
- Consider inferring from historic climatological trends and follow the latest forecasts

Spring Forecast (next 3 months – March, April, May):

Temperatures Trend:

- **Warmer than normal temperature signal**
(moderate to high certainty)

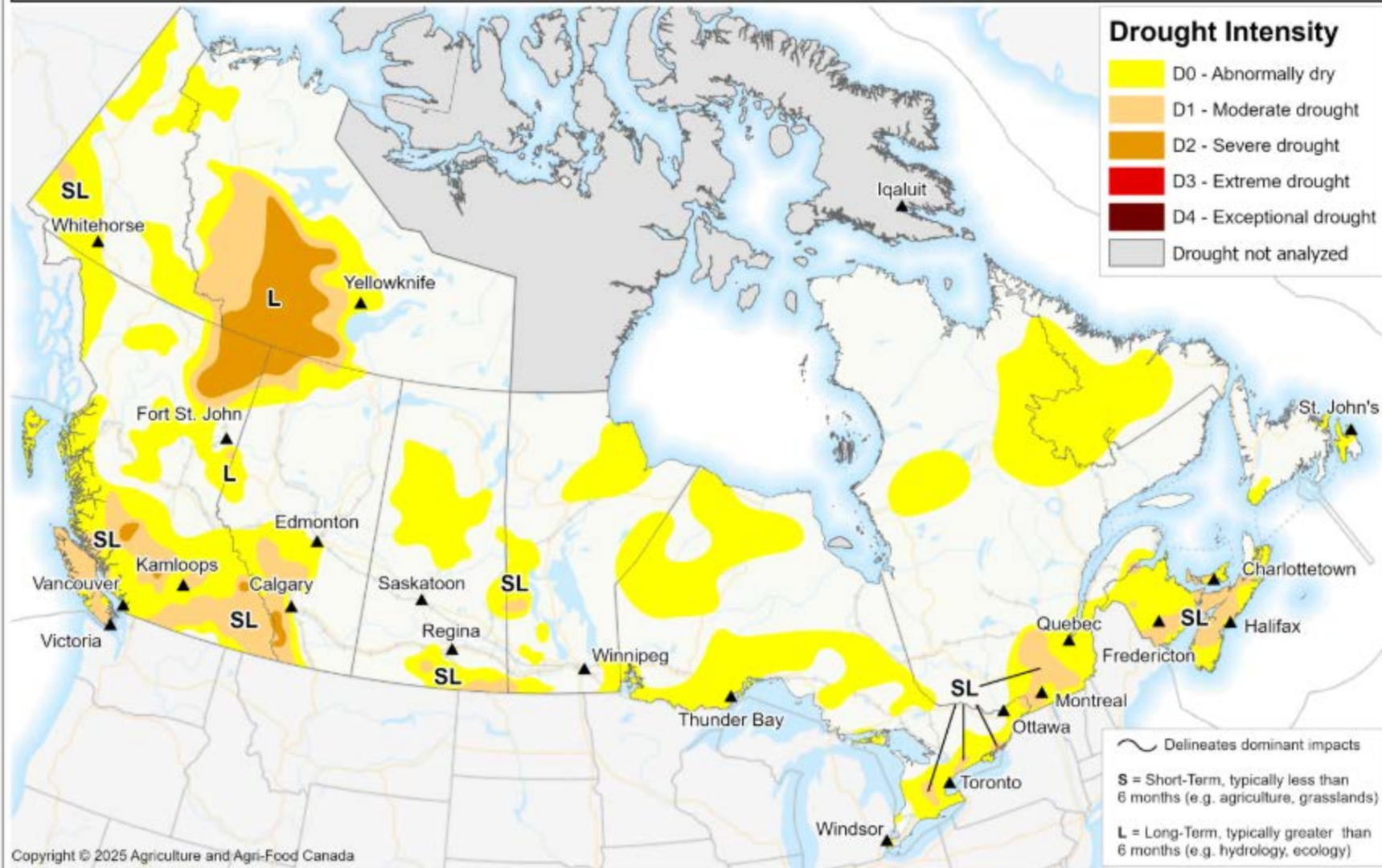
Precipitation Trend:

- **A slightly wetter than normal signal** for select parts of Alberta
(low to moderate certainty)



Canadian Drought Monitor

Conditions as of February 28, 2025



Copyright © 2025 Agriculture and Agri-Food Canada

Prepared by Agriculture and Agri-Food Canada's National Agroclimate Information Service. We also acknowledge various provincial, territorial and non-government organizations whose reports and assessments are consulted. The Drought Monitor focuses on broad-scale conditions. Regions in northern Canada may not be as accurate as other regions due to limited information.

Created: 2025-03-06
www.agr.gc.ca/drought



**Starting Drought Code Projection
April 1, 2025
100% Precipitation Forecast (Mar)**

Spring Drought Code (DC)

Forecast DC on APR01 will be:

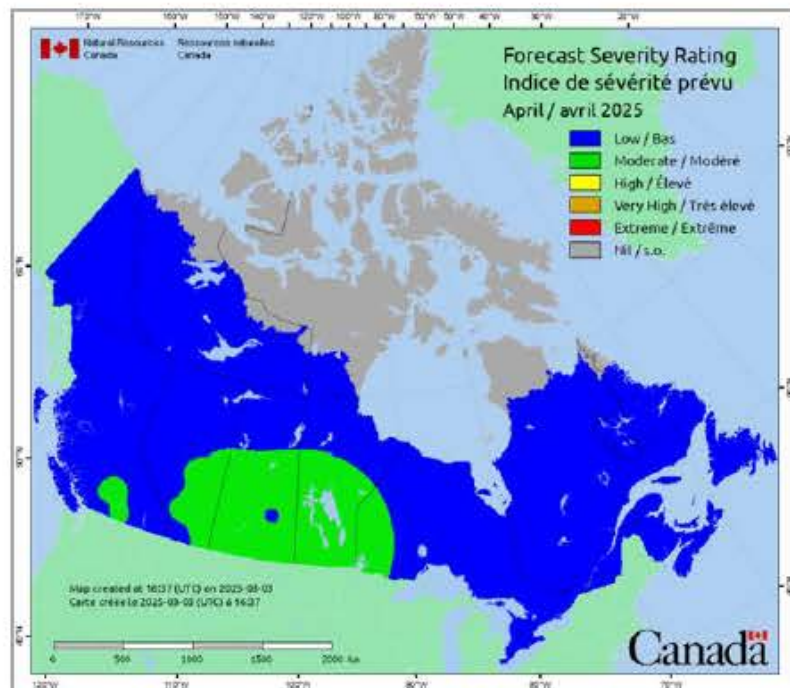
- Moderate – NE Slopes
- High – majority of province
- Very High – NW Boreal and SE AB

Drought Code (DC)

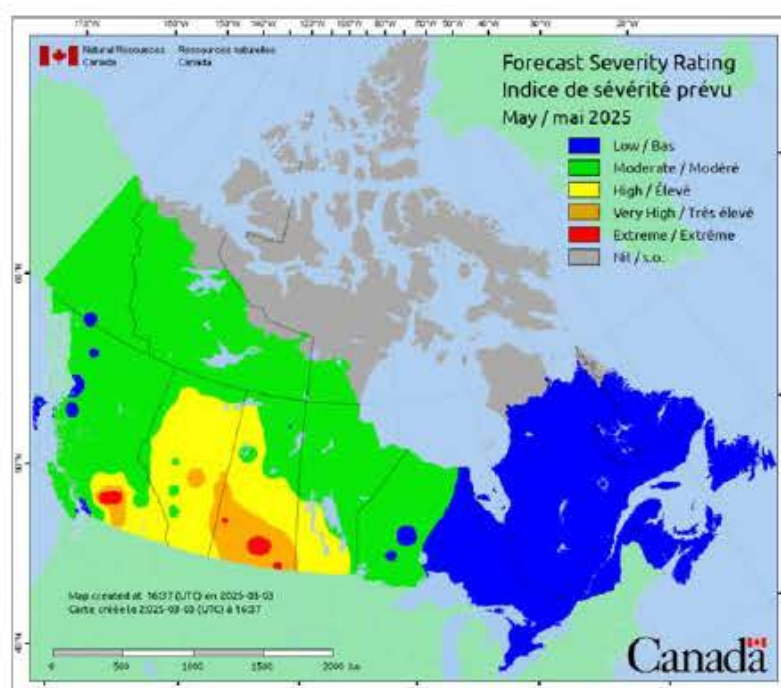
- Low (< 80)
- Moderate (80 - 189)
- High (190 - 299)
- Very High (300 - 424)
- Extreme (≥ 425)

"Better than 2024"

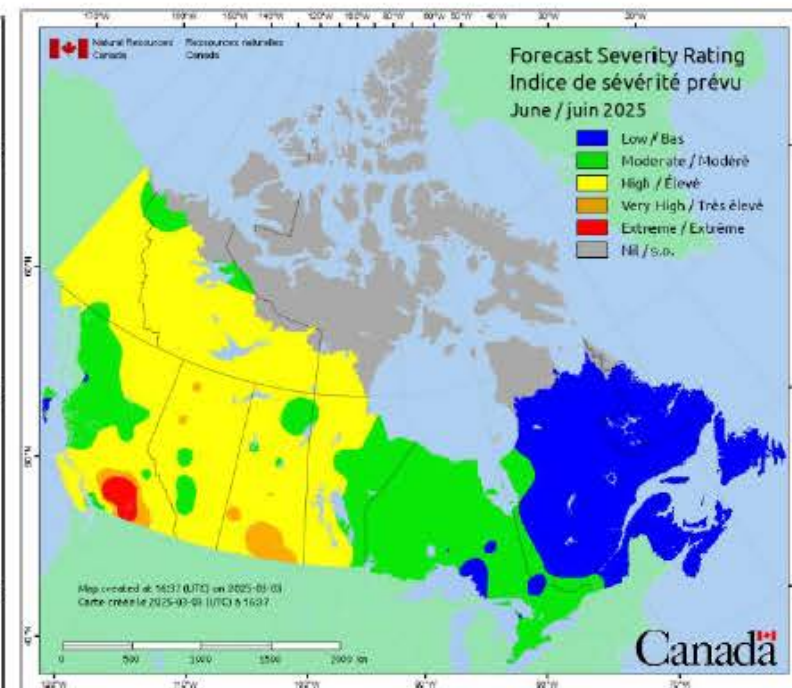
Fire Danger



April



May



June

"Average"

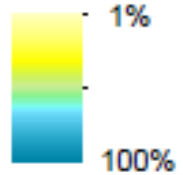
March 19, 2025

MODIS Daily Ice and Snow Cover

500m spatial resolution

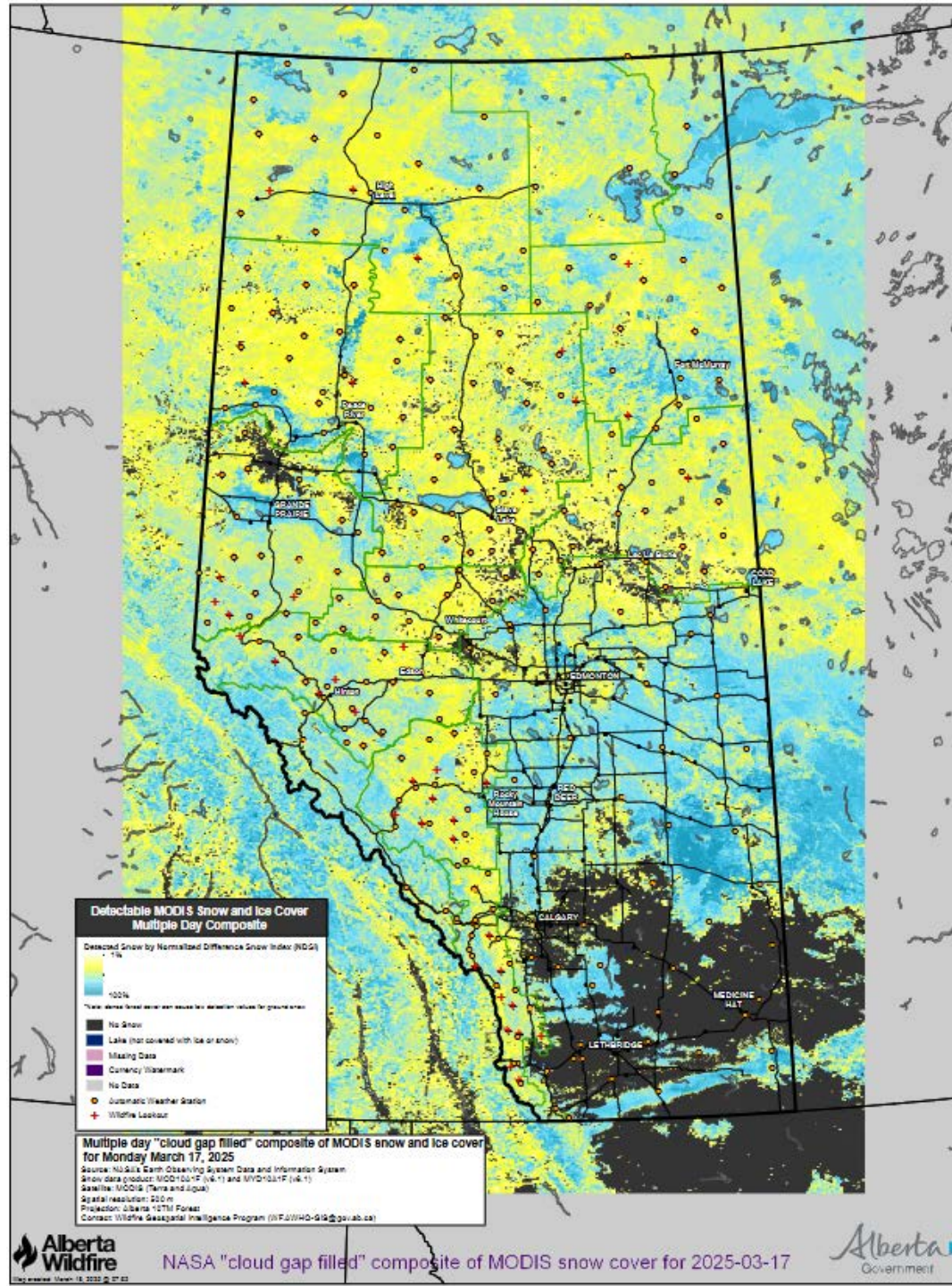
Detectable MODIS Snow and Ice Cover Multiple Day Composite

Detected Snow by Normalized Difference Snow Index (NDSI)



*Note: dense forest cover can cause low detection values for ground snow

- No Snow
- Lake (not covered with ice or snow)
- Missing Data
- Currency Watermark
- No Data
- Automatic Weather Station
- Wildfire Lookout



**Detectable MODIS Snow and Ice Cover
Multiple Day Composite**

Detected Snow by Normalized Difference Snow Index (NDSI)

1%
100%

*Note: dense forest cover can cause low detection values for ground snow

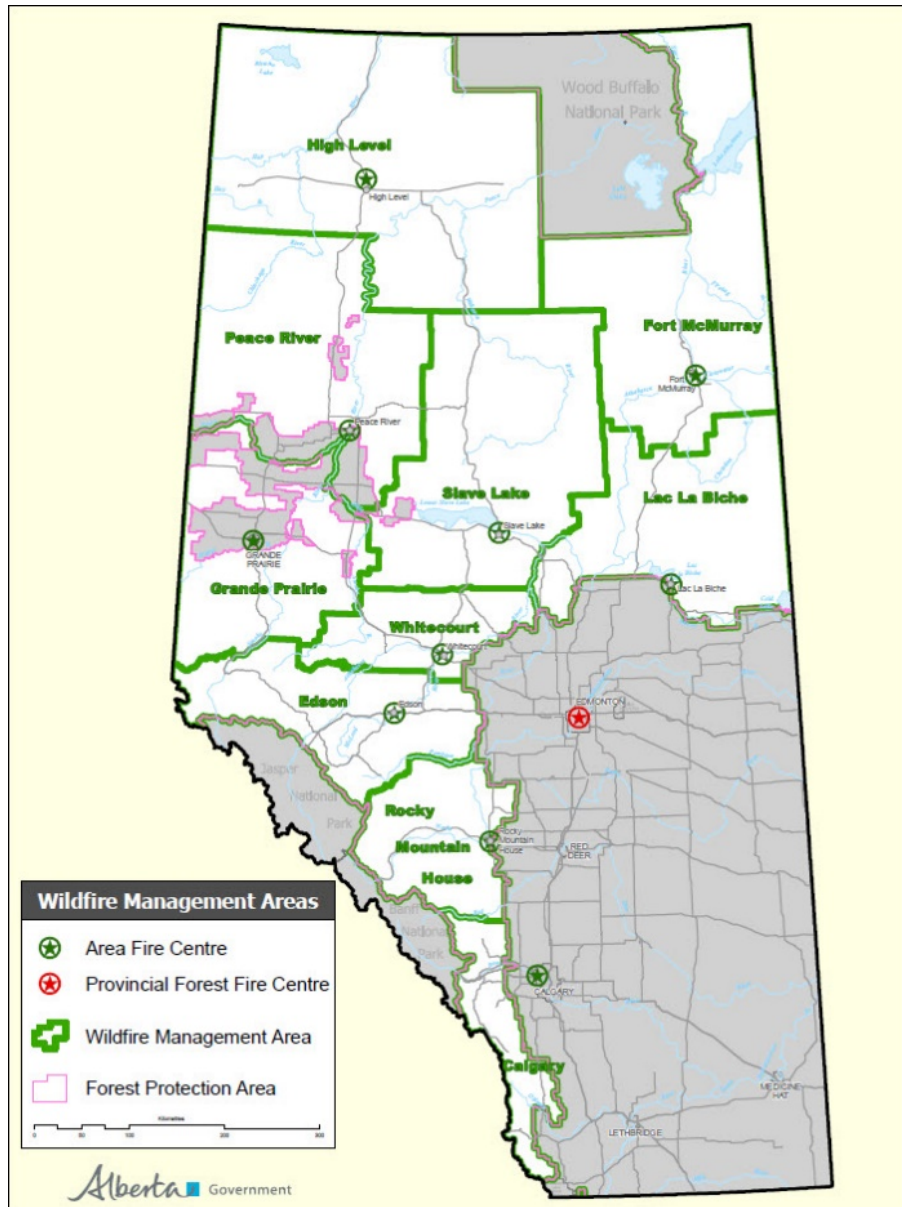
- No Snow
- Lake (not covered with ice or snow)
- Missing Data
- Currency Watermark
- No Data
- Automatic Weather Station
- Wildfire Lookout

Multiple day "cloud gap filled" composite of MODIS snow and ice cover for Monday March 17, 2025
Source: NASA's Earth Observing System Data and Information System
Snow data product: MOD1021 (V4-1) and MOD1023 (V4-1)
Satellite: MODIS (Terra and Aqua)
Spatial resolution: 500 m
Projection: Albers 10TM Forest
Contact: Wildlife Geospatial Intelligence Program (616-974-6144@gov.ab.ca)

5 Carryover Fires – From 2024 compared to 50+ in 2023



Alberta's Forest Protection Area



Province

- 662,581 square kilometers

Forest Protection Area

- 392,856 square kilometers

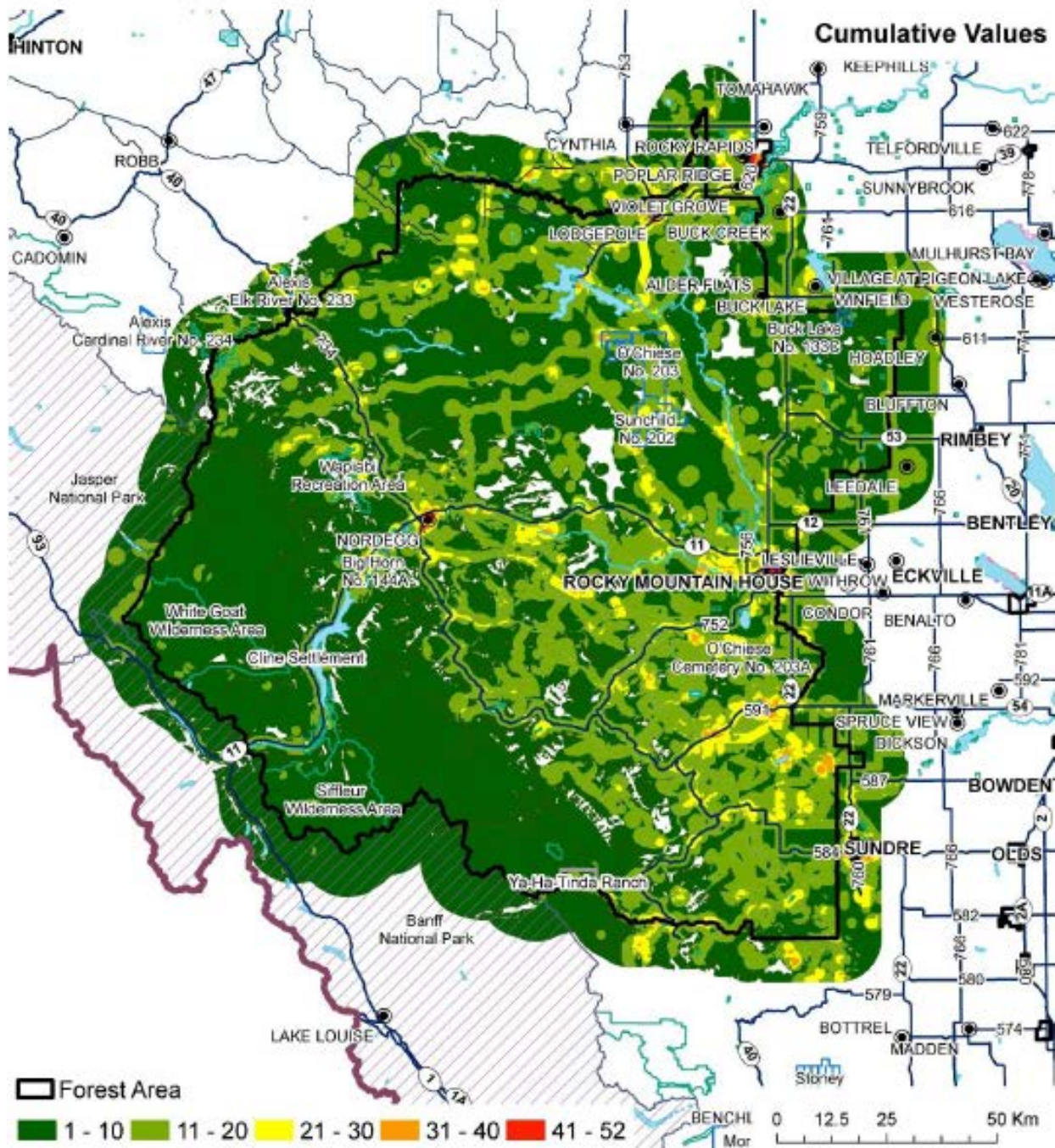
Fire Season

- March 1 to October 31

Alberta Wildfire Protection Priorities

1. Human Life
2. Communities
3. Watersheds and Sensitive Soils
4. Natural Resources
5. Infrastructure (critical to life safety and the economy)

SPC Approved April 2000



Risk Modelling - Cumulative Values

Used to inform wildfire prioritization where resources are limited.

Figure 5. Cumulative values roll-up understanding of consequences or impacts related to threatened

Wildfire Facilities

- 32 Fire Bases
- 13 Airtanker Bases
- 100 Active lookouts
- 150 Firenet sites
- 4 Incident Command Trailers
- Maintenance of 130 Alberta First Responders Radio Communication Sites



Wildfire Crews

- Helitack
 - 54 crews x 4 = 216
 - 6 crews x 8 = 56
- Unit Crews
 - 13 crews x 20 = 160
- Firetack Crews
 - 35 Base crews X 8 = 280
 - Additional crews available through as needed contracts



2025 Helicopter Fleet

- Long terms contracts (18)
 - 2 Heavy Helicopter
 - 10 Conventional Medium Helicopters
 - 6 Intermediate Helicopters
- Casual Charter Contract
 - 90 + companies
 - Call when needed
 - Minimums apply depending on time of year
- Nighttime Helicopters
 - 2 Medium and one Heavy NVIS Helicopter



2025 Airtanker Fleet

- Group 1: Air Tractor AT802A (4)
 - Group 2: CL215T (2)
 - Group 3: CL215T (2)
 - Group 4: Electra L188 (1)
 - Group 5: Air Tractor AT802 (4)
 - Group 6: DH8 Q400 (1)
 - Group 7: Electra L188 (1)
 - Group 8: Electra L188 (1)
 - Group 9: DH8 Q400
 - Group 10: Next Gen
- * All birddogs FLIR equipped



Wildfire Detection

- 100 active lookouts (10 active alpine sites)
 - Backbone of detection system
 - Weather reporting
 - Communications
 - Point of interest for recreationists
- Portable Cameras
- Researching Camera Detection Technology



Incident Management Teams



Weather – Remote Automatic Weather Stations

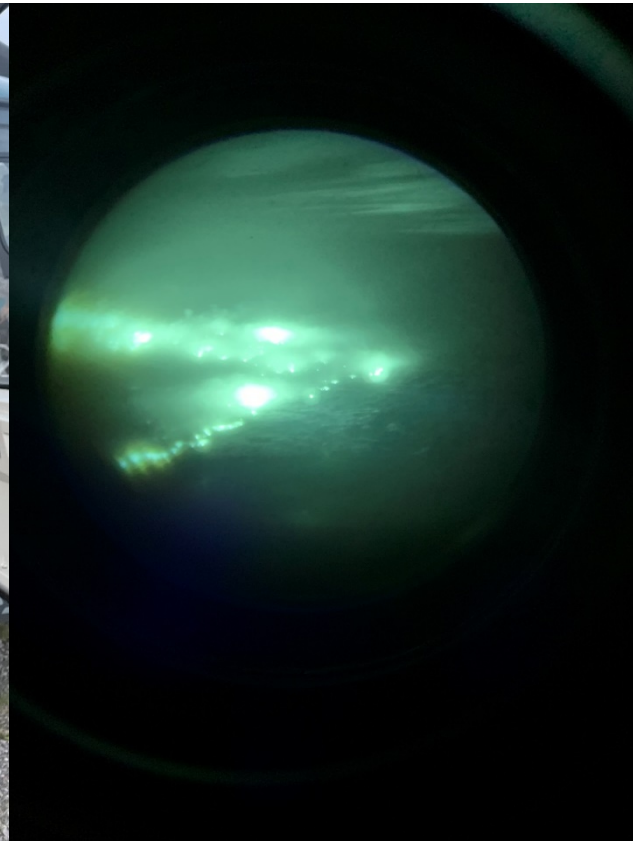
- RAWs program continues to advance:
 - 147 stations with 28 additional RAWs from other agencies
 - Provincially 500 approved stations (between all partners)
 - Hired two new staff and contractors to update 100 stations over 3 years
 - Installing all year precip gauges, incorporating industry stations
 - Industry partnerships to enhance network



RAWs - B4 in Kananaskis Country

Nighttime Firefighting Operations – Increasing Suppression Efficiency

- Successful in 2024 – Three RW NVIS fleet, RPAS
- Supported by overnight and early morning wildfire operations (crews, bucketing)
- Continue to evaluate effectiveness and adapt program into 2025





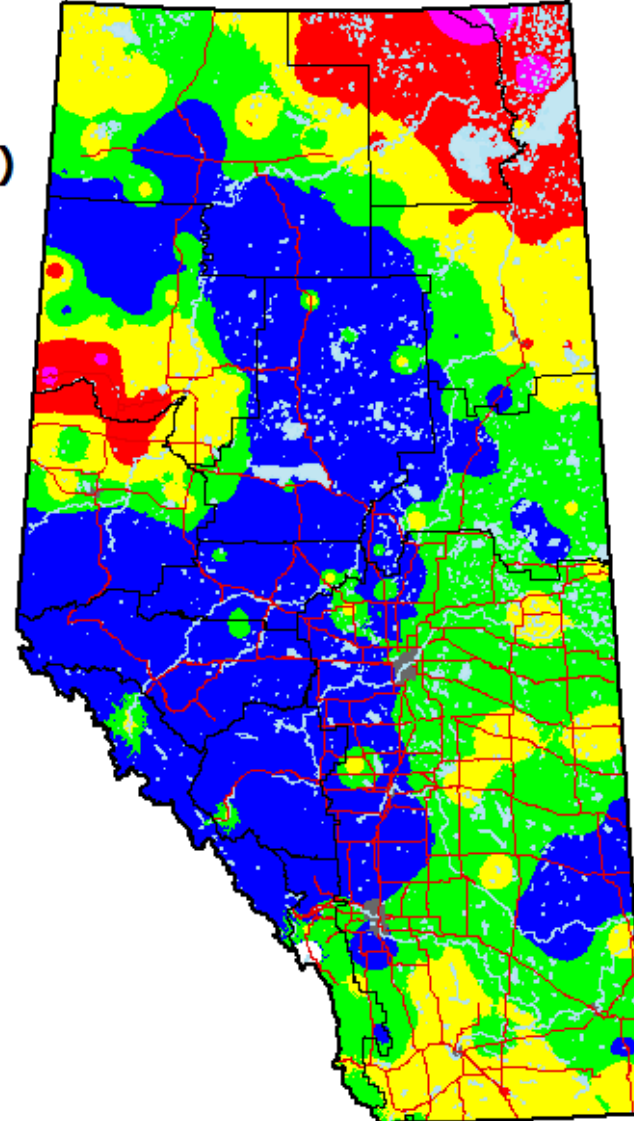
Industry Partnerships to Enhance
Detection Network

Provincial Fire Danger Map

Alberta

Fire Danger (Fire Weather Index)
for May 27, 2024

-  Low
-  Moderate
-  High
-  Very High
-  Extreme
-  No Data



Alberta  Government

© 2024 Government of Alberta

Map created on May-27 at 14:45



Active wildfires

7

Includes carryover wildfires but not mutual aid

Active wildfires

Current year active wildfires

3

Does not include carryover or mutual aid wildfires

Current year extinguished wildfires

28

Does not include carryover or mutual aid wildfires

Current wildfires

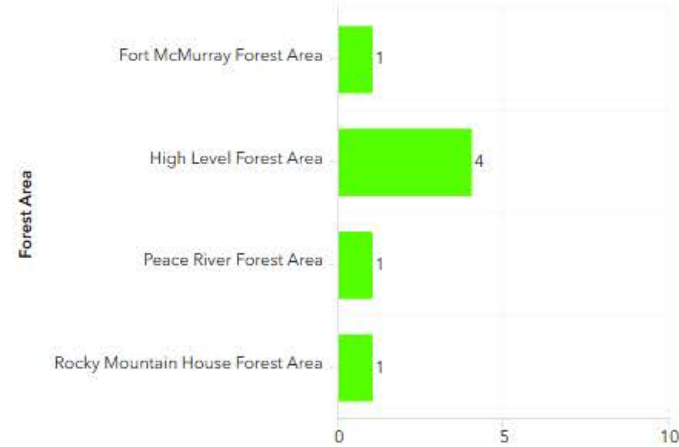
Wildfire status

Suspected cause

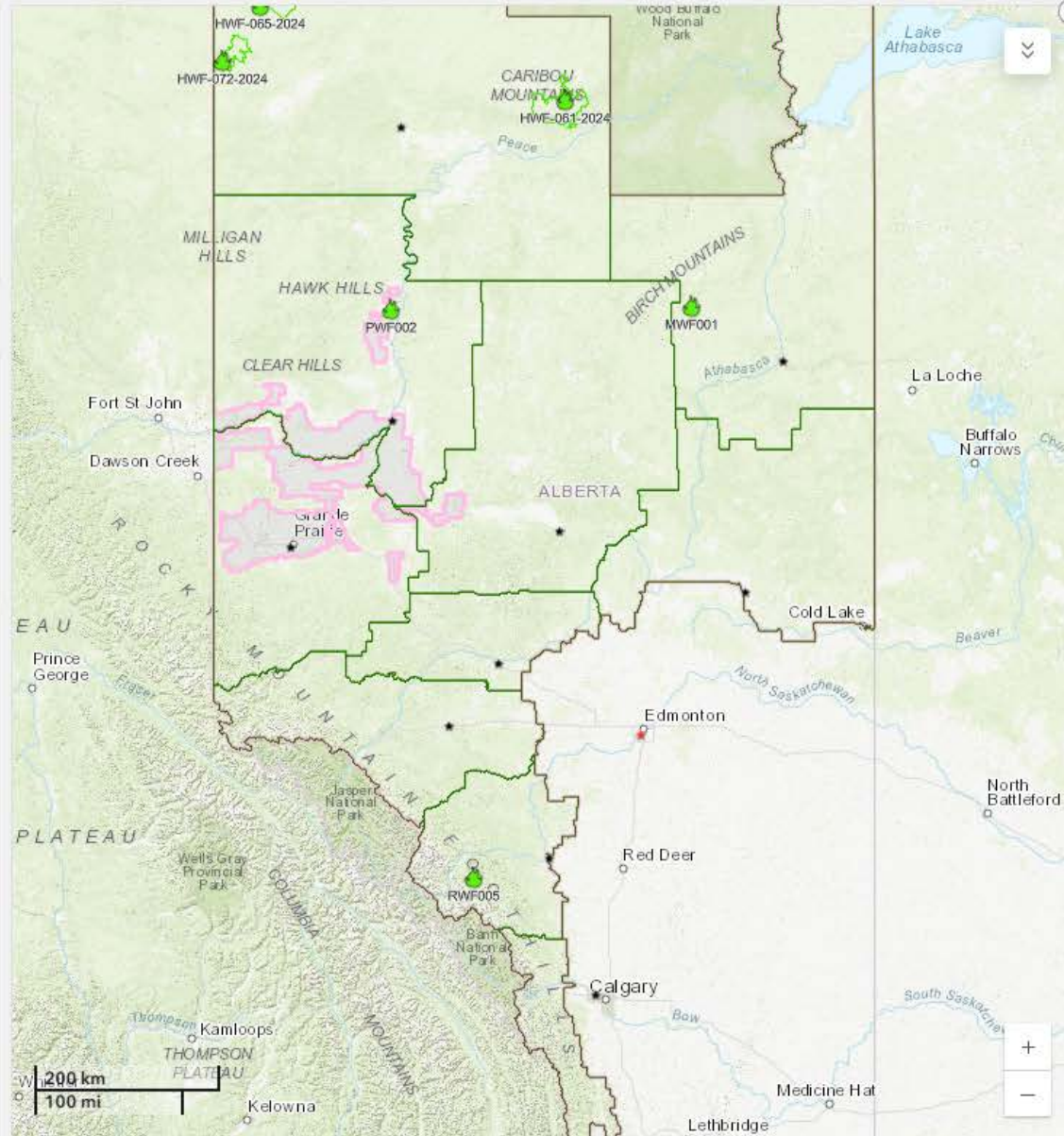
Legend – wildfire status terms

- Out of control (OC): the wildfire is burning and is expected to continue growing.
- Being held (BH): given current weather conditions and resources, the wildfire is not anticipated to grow past expected boundaries.
- Under control (UC): the wildfire is completely contained and will

Active wildfire status by forest area

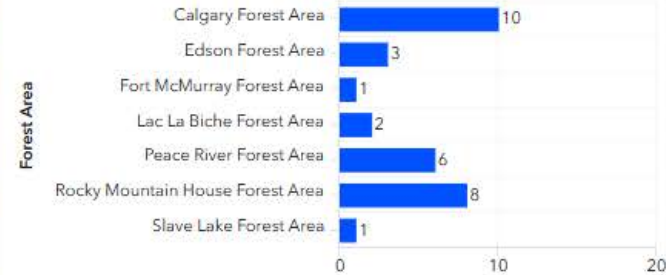


Select bar to filter map, click again to reset



Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS, AAFC, NRCAN | Government of Alberta | Alberta Agriculture and Forestry | Powered by Esri

Current year wildfires by forest area



Select bar to filter map, click again to reset

Wildfires / Forest area

Fire Advisory

- Bashaw
- Bondiss
- Camrose County
- City of Red Deer

Fire Advisory Details

Alberta Fire Bans

Select Fire Advisory to zoom in on map, click again to reset map

Select Fire Advisory to display details, click again to reset

Active / Forest area

Active area burned / Forest area

Map

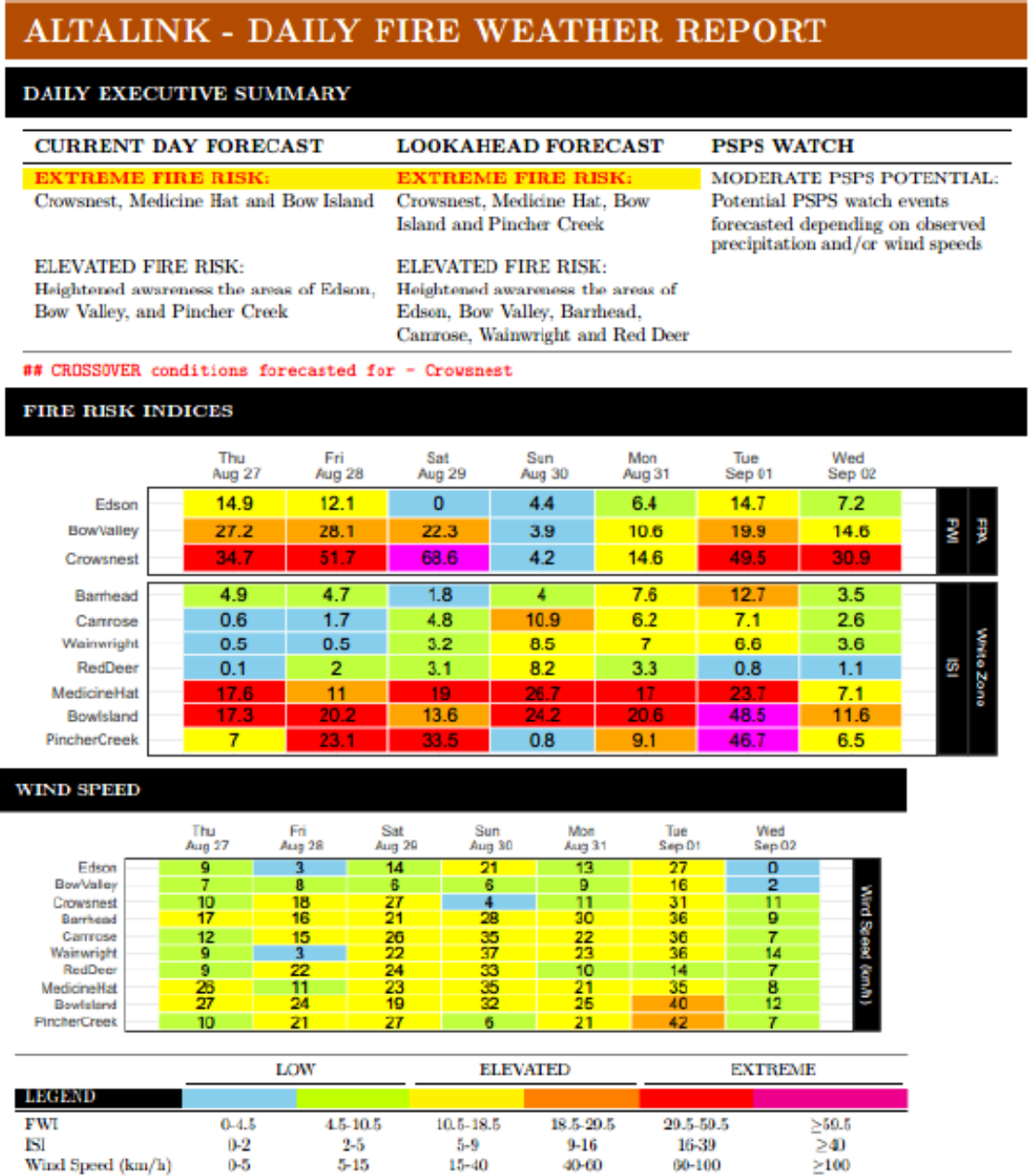
Disclaimer

Wildfires of note

Fire Advisory

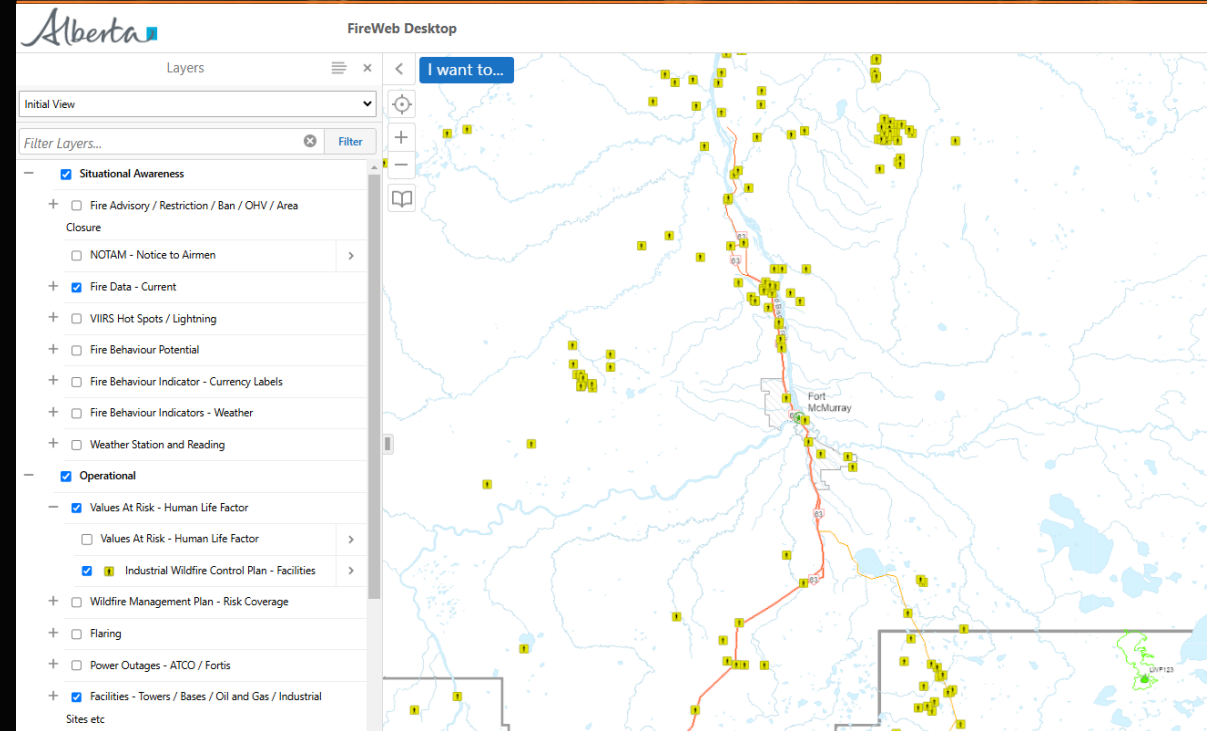
An example screenshot of the Daily Fire Weather Report is shown below:

Consult your internal situational awareness tools and modify your operations accordingly to reduce wildfire ignitions on days with high fire danger.



Industrial Wildfire Control Plans

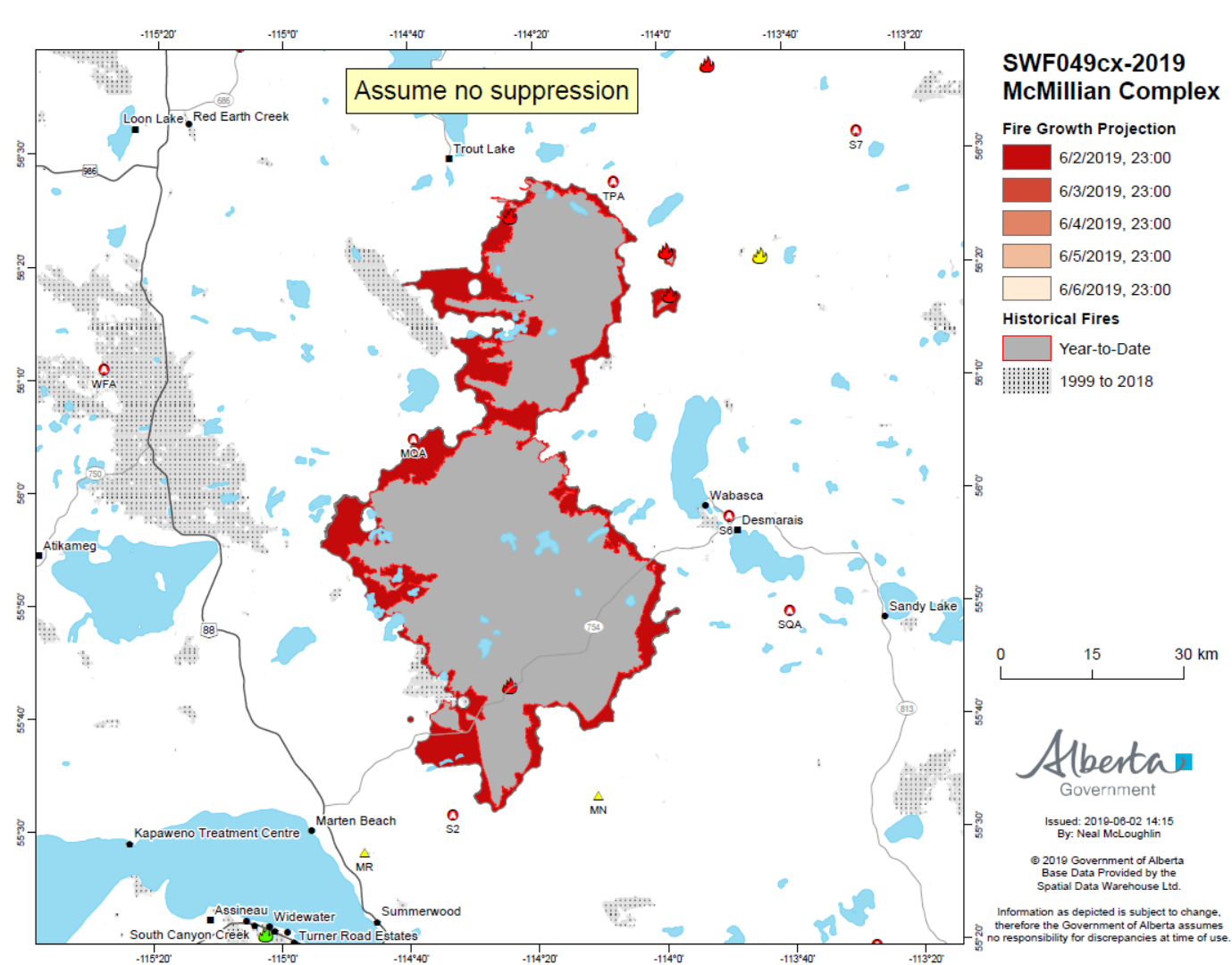
- Mandatory submission within the Forest Protection Area
 - Sites occupied 4+hours per day on average
 - Alberta Wildfire uses this data to inform wildfire prioritization and emergency evacuation notification
 - Plans are made inactive at calendar year end to ensure data and contacts are current
-



Communication with Alberta Wildfire

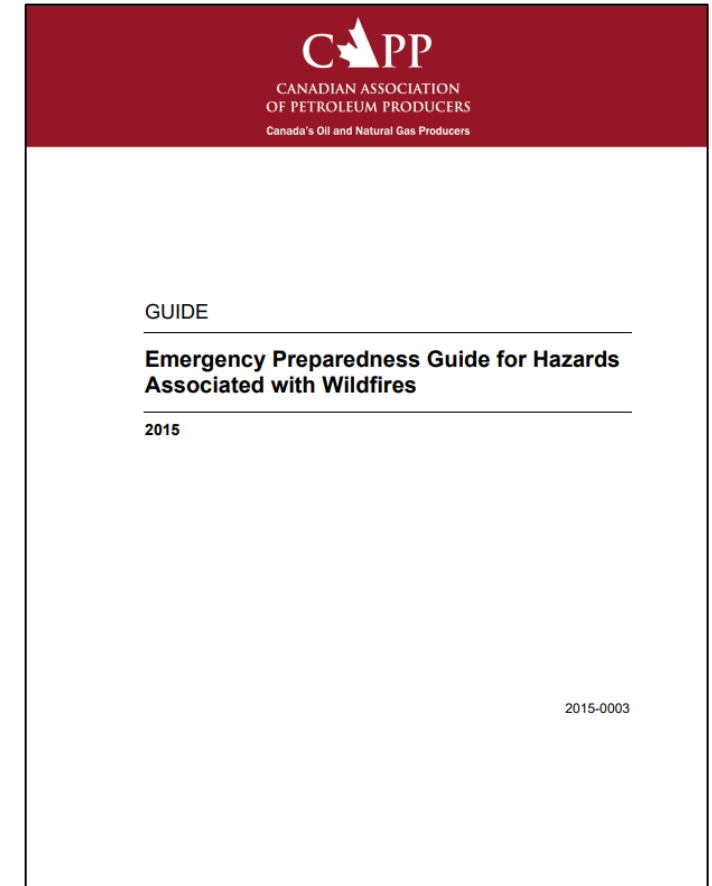
- Alberta Wildfire will reach out to industry in advance of a threatening wildfire in priority sequence.
- Each Forest Area or Incident Management team will have an Industry Liaison or Information Officer that will be the point of contact for Industry.
- Forest Areas maintain their own email distribution lists.
- Non-Emergency Firesmart Inquires – Wildfire Prevention Officer

Fire Growth Projections



Emergency Response Planning Considerations

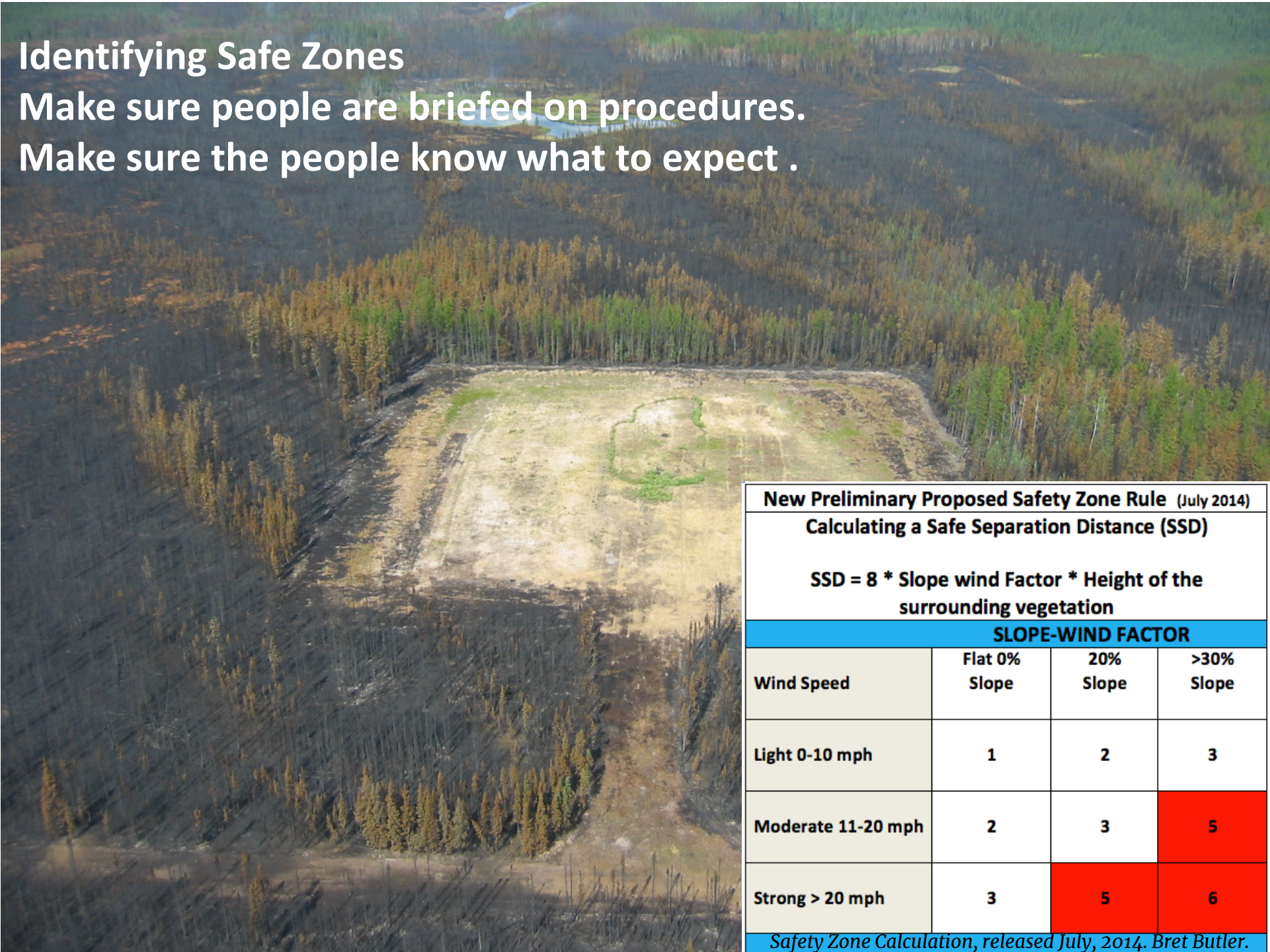
- Establish trigger points
- Secure evacuation routes
- Capacity to transport all personnel
- Availability of shelter in place plans and locations
- Collaborative relationships and partnerships
- Capacity to respond co-operatively and effectively with neighboring facilities, residents and communities
- Presence of known check-in points and procedures
- Availability of adequate protection equipment
- Recovery considerations following a wildfire or wildfire smoke event
- **Are ALL Staff/Contractors/Visitors Briefed on Wildfire Evacuation Procedures?**



Identifying Safe Zones

Make sure people are briefed on procedures.

Make sure the people know what to expect .



New Preliminary Proposed Safety Zone Rule (July 2014)

Calculating a Safe Separation Distance (SSD)

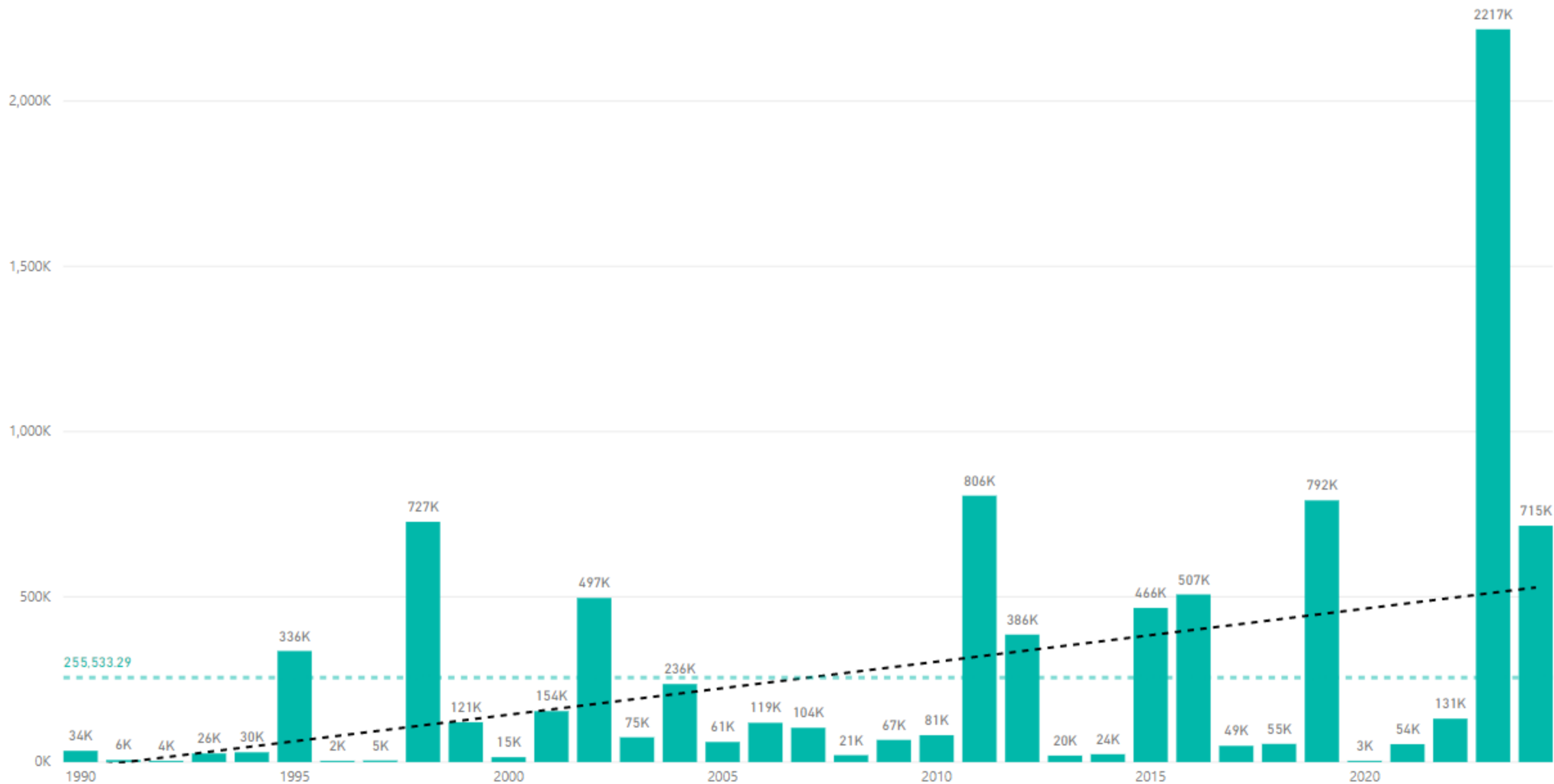
$$\text{SSD} = 8 * \text{Slope wind Factor} * \text{Height of the surrounding vegetation}$$

SLOPE-WIND FACTOR

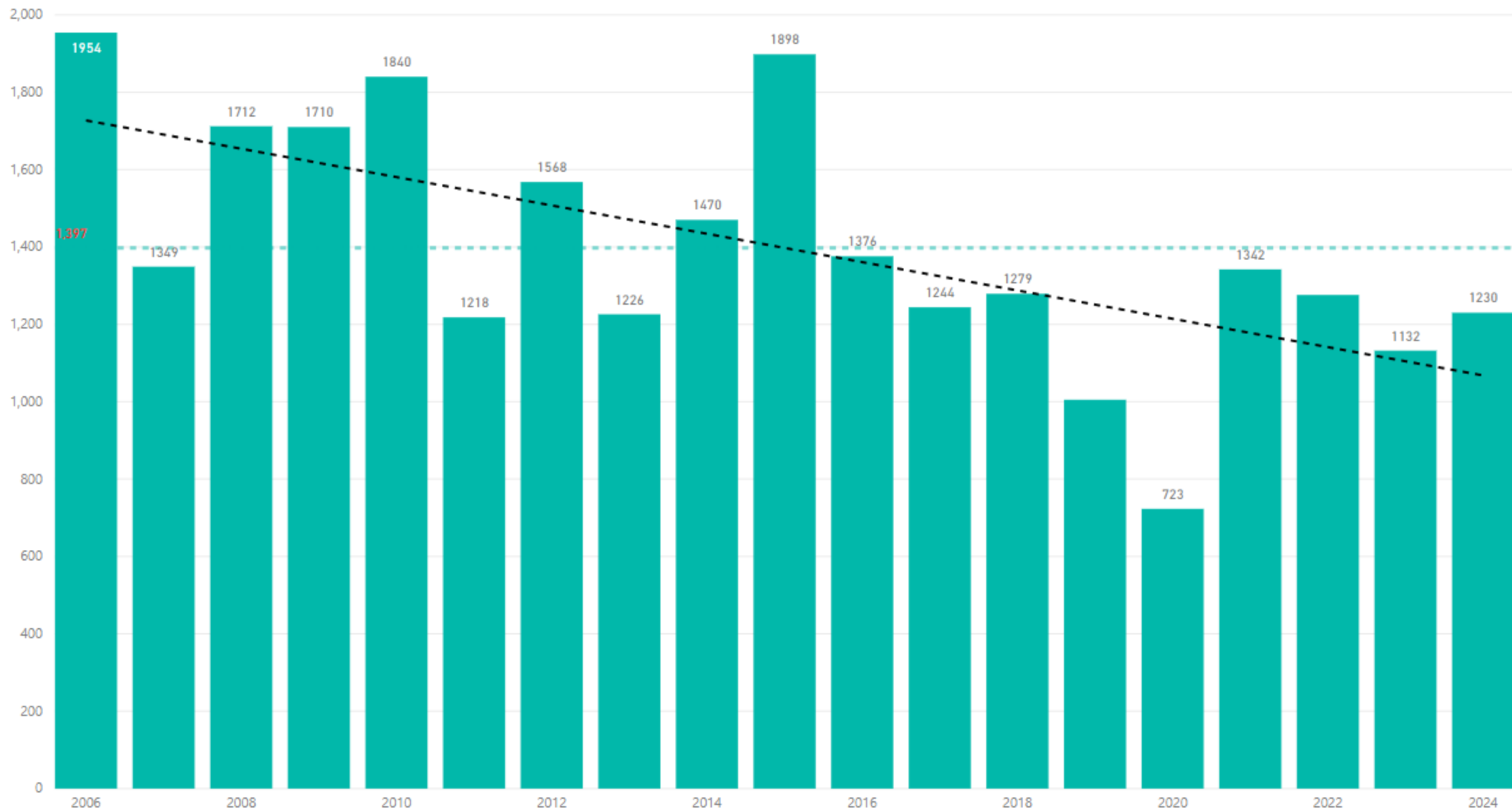
Wind Speed	Flat 0% Slope	20% Slope	>30% Slope
Light 0-10 mph	1	2	3
Moderate 11-20 mph	2	3	5
Strong > 20 mph	3	5	6

Alberta

Hectares Burned in Alberta - 1990-2024_Oct21 *From FIRES Database, by calendar year

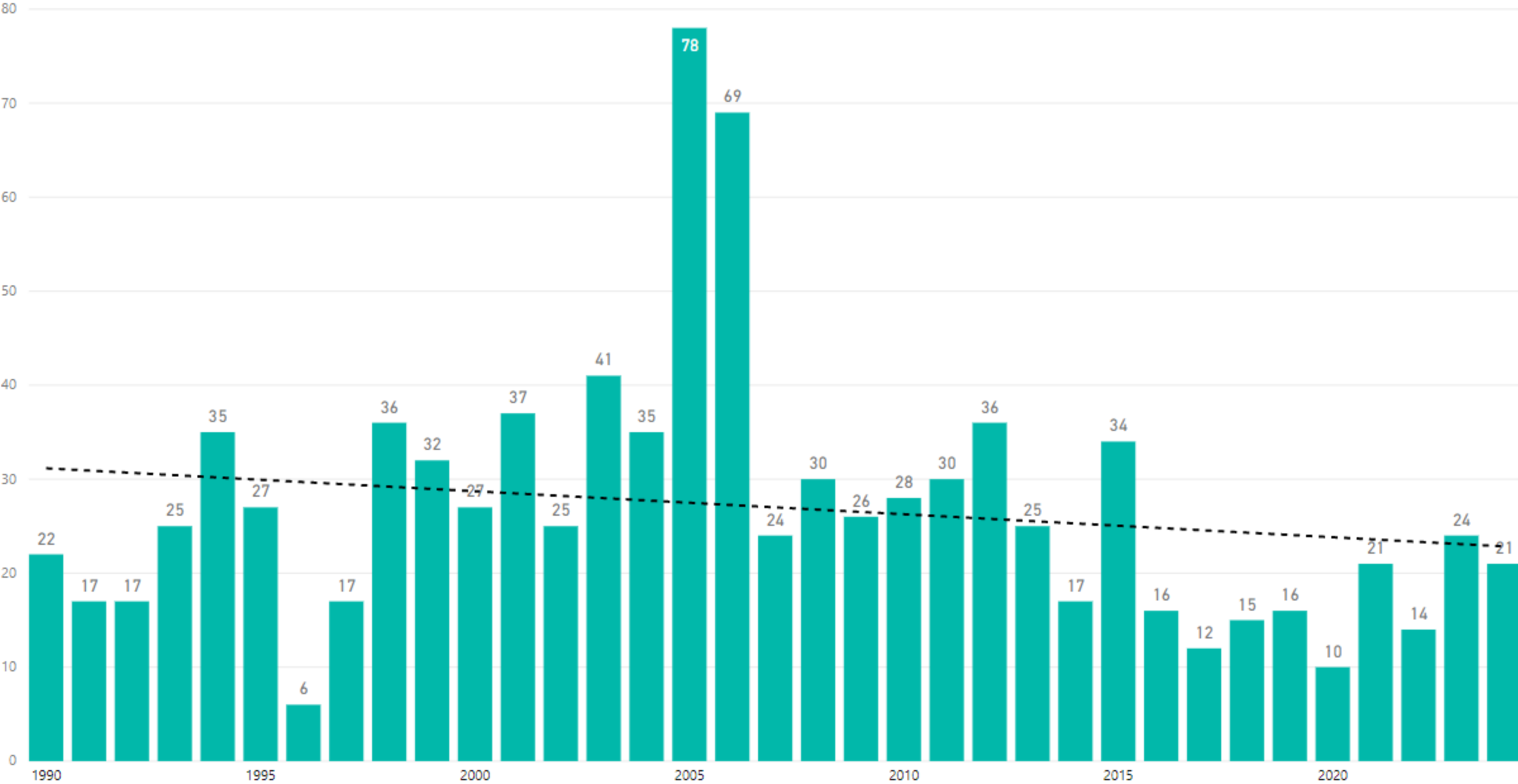


Wildfire Ignitions in Alberta - 2006-2024_Oct21 *From FIRES Database, by calendar year



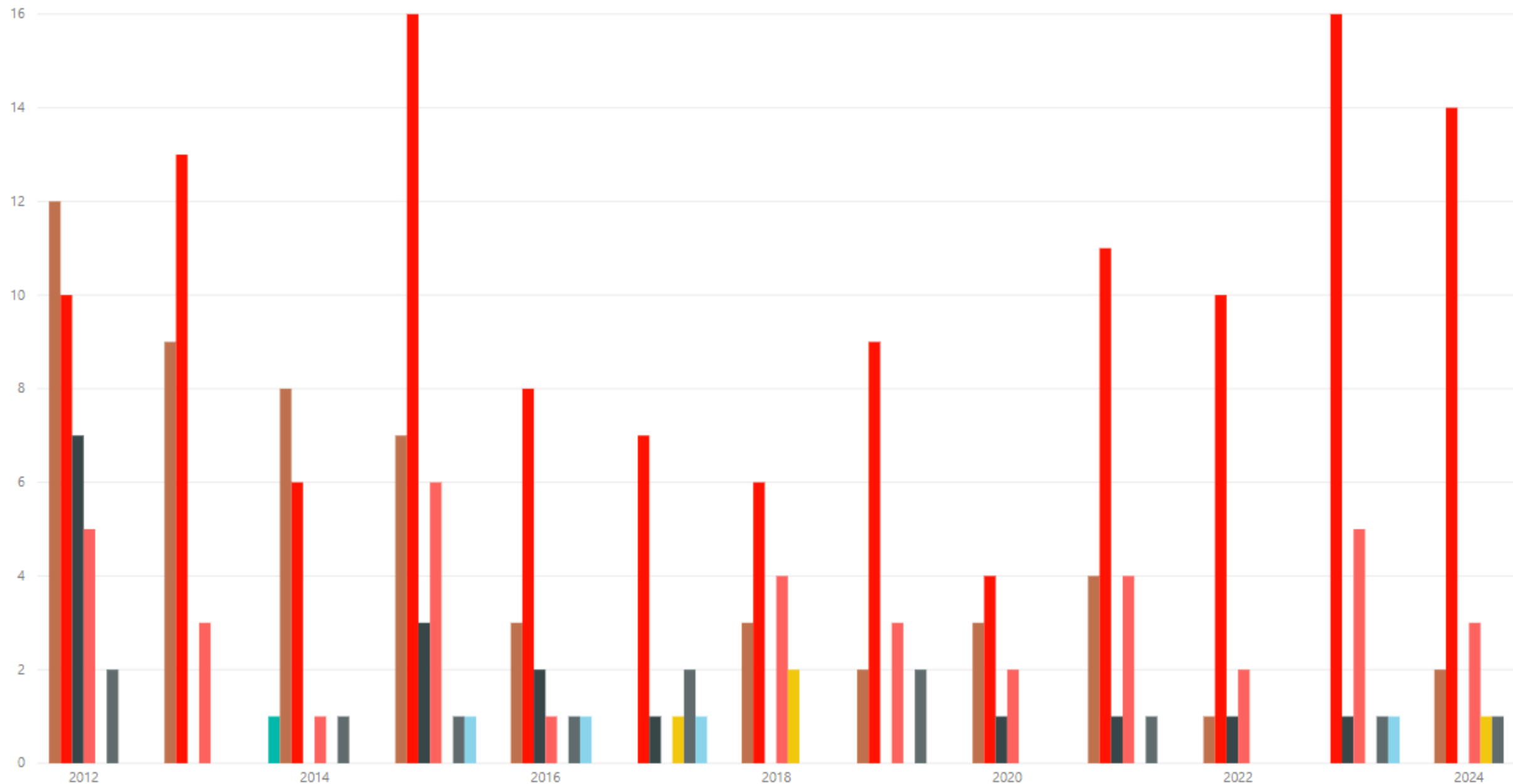
Oil and Gas Industry Caused Fires in Alberta - 1990-2024_Oct21 *From FIRES Database, by calendar year

general_cause_desc ● Oil & Gas Industry



Oil and Gas Industry Caused Fires in Alberta by Activity Class 2012-2024_Oct21 *From FIRES Database, by calendar year

activity_class ● Cooking and Warming ● Debris Disposal ● Flaring Gas ● OHV Operation ● Operations ● Refuse Disposal ● Transportation ● Unclassified





Date & Time: Wed, May 13, 2020, 12:51:42 MDT
Position: +054.707330° / -110.406908° (±420.0ft)
Altitude: 2419ft (±733.3ft)
Datum: WGS-84
Azimuth/Bearing: 183° S03W 3253mils True (±10°)
Elevation Angle: -13.8°
Horizon Angle: +05.6°
Zoom: 2.0X



Debris Burning



Flare Stack

OFF Highway Vehicle

BEST MANAGEMENT PRACTICES

Wildfire Prevention

July 2007

Publication Number

Wildfire Prevention Best Practices

- Preventing industry caused wildfires
- Reducing industry corporate liabilities
- Assessing risks within operations
- Reducing potential impacts personnel, infrastructure and production.
- Regulatory requirements for wildfire prevention

LEGISLATED FIREFIGHTING TOOLS & EQUIPMENT REQUIREMENTS

The Forest and Prairie Protection (Ministerial) Regulation has defined specific firefighting equipment required for a given work crew size at the work site during the fire season (typically March 1 to October 31). Contractors must adhere to these requirements and they shall be included in the Fire Plan.

Table 1: Required Fire Fighting Equipment as per Work Crew Size

Men Employed at the Site of Operations										
Required Equipment for Fire Control	1	2	3	4	5	6-10	11-20	21-30	31-40	41+
Shovels	1	1	2	2	3	5	10	15	20	As provided in accordance with section 11(3) of the Regulation.
Back pack w/pump	1	1	1	2	3	5	10	15	20	
Axe or Pulaski	1	1	1	1	2	5	10	15	20	
Fire pump	0	0	0	0	0	0	0	1	1	
Fire hose (metres)	0	0	0	0	0	0	0	450	450	
Power saw	0	0	0	0	0	0	0	1	1	



The Safety Association for Canada's Upstream Oil and Gas Industry



FireSmart® Field Guide for Upstream Oil and Gas Industry

A field guide for frontline operators to help prevent wildfires and reduce the impact of catastrophic wildfire on industry infrastructure, operations, personnel safety, liability and the environment

RELEASED • 2012

Prepared for Canadian Petroleum Producers and Alberta Sustainable Resource Development

By industry, for industry



FireSmart® Guidebook for the

OIL AND GAS INDUSTRY



Provincial Wildfire Mitigation Strategy



Municipalities are now required to report ALL wildfires to the Government of Alberta

- Emergency statuses amendment act came into effect spring of 2024 – intended to give the Province more authority during emergencies through amendments to the Forest and Prairie Protection Act (FPPA)
- *Reporting to the Minister*
- *7.1 A municipality shall report to the Minister any information requested by the Minister, at the times required by the Minister, in respect of*
 - *Any fires within the municipality, and*
 - *The municipality's fire control activities*

Time: Fri, Aug 09, 2024 at 15:40:29 MDT
Coordinates: 54°25.7618'N / 114°41.0715'W (±15.5ft)
Elevation: 362ft (±11.1ft)
GS-84
Bearing: 057° N57E 1013mils True (±10°)
Angle: -28.8°
Angle: +03.9°
X

WH05 Isaac Mutch



Alberta Wildfire Contact Information

Alberta Wildfire Forest Area Duty Officer or Industry Liaison	Forest Area Wildfire Prevention Officer
Calgary: (403) 297-8822	Calgary: (403) 297-8800
Edson: (780) 723-8361	Edson: (780) 723-8527
Fort McMurray: (780) 743-7218	Fort McMurray: (780) 743-7125
Grande Prairie: (780) 538-8093	Grande Prairie: (780) 538-5560
High Level: (780) 926-5405	High Level: (780) 926-3761
Lac La Biche: (780) 623-5245	Lac La Biche: (780) 623-5388
Peace River: (780) 624-6191	Peace River: (780) 624-6190
Rocky Mtn House: (403) 845-8243	Rocky Mtn House: (403) 845-8272
Slave Lake: (780) 849-7429	Slave Lake: (780) 849-7431
Whitecourt: (780) 778-7265	Whitecourt: (780) 778-7153
Fire Danger Update, FWI Maps	wildfire.alberta.ca/wildfire-status/danger-forecast.aspx
Wildfire Data Services	www.alberta.ca/wildfire-maps-and-data#jumplinks-2
Industry FireSmart Information	wildfire.alberta.ca/firesmart/firesmart-industry/default.aspx
Canadian Fire Weather Index System	www.cwfis.crs.nrcan.cg.ca
Alberta Climate Information Service	www.agriculture.alberta.ca/acis

To Report a Wildfire in the Alberta call 310-FIRE or 911 - AlbertaFirebans.ca

Thank You

Connor Wollis, RPF

Wildfire and Land Management Specialist

780-920-7593

Connor.Wollis@gov.ab.ca

