FROM BINGO BURNS TO BISON CORRIDORS
Integrating Fire Management in the Yellowstone to Yukon Bioregion

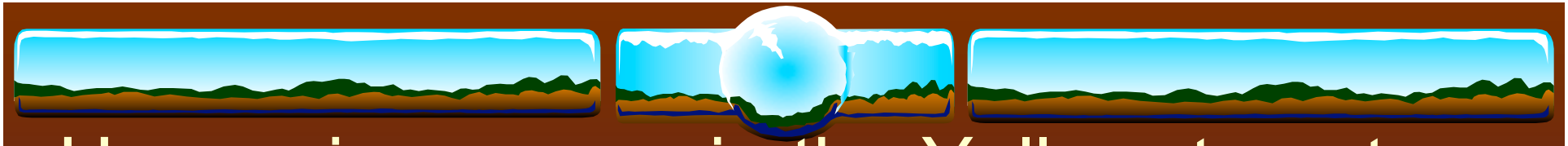
Cliff White

Canadian Rockies Bison Initiative

October, 2012


Yellowstone to Yukon
Protected Areas
Fort Good Hope
Dawson
Fort Norman
YUKON TERRITORY
MACKENZIE MOUNTAINS
Fort Simpson
NORTHWEST TERRITORIES
Whitehorse
Watson Lake
Fort Liard
Cassiar
Liard River
Dease Lake
Fort Nelson
Meander River
Telegraph Creek
Fort Vermillion
ALBERTA
Fort McMurray
Fort St. John
Peace River
Dawson Creek
Mackenzie
Grand Prairie
Smithers
Prince George
Edmonton
BRITISH COLUMBIA
McBride
Hinton
Jasper
Pacific Ocean
Clearwater
Banff
Calgary
Canmore
Vernon
Kelowna
Lethbridge
Cranbrook
Vancouver
Cut Bank
Bonners Ferry
Kalispell
MONTANA
Great Falls
Spokane
Lewistown
Missoula
Helena
WASHINGTON
Lewiston
Butte
Billings
Bozeman
Salmon
Cody
Challis
Jackson
OREGON
Boise
Idaho Falls
IDAHO
Pocatello
Twin Falls
WYOMING
Yellowstone to Yukon
CONSERVATION INITIATIVE
LEGEND
Major Highways
Protected Areas
Y2Y Region
70 0 70 140 210 280 350 Km
50 0 50 100 150 200 Miles
January 2005 Big Sky Conservation Institute GIS


PHOTO SHOP



Use various areas in the Yellowstone to Yukon Bioregion (Y2Y) to evaluate fire management futures:

- **ECOLOGICAL AND CULTURAL INTEGRATION:** Linking eco-cultural fire into restoration and maintenance of high value ecosystems;
- **SPATIAL INTEGRATION:**
  1) Fire- No fire interface
  2) Managed forest interface
  3) Urban interface

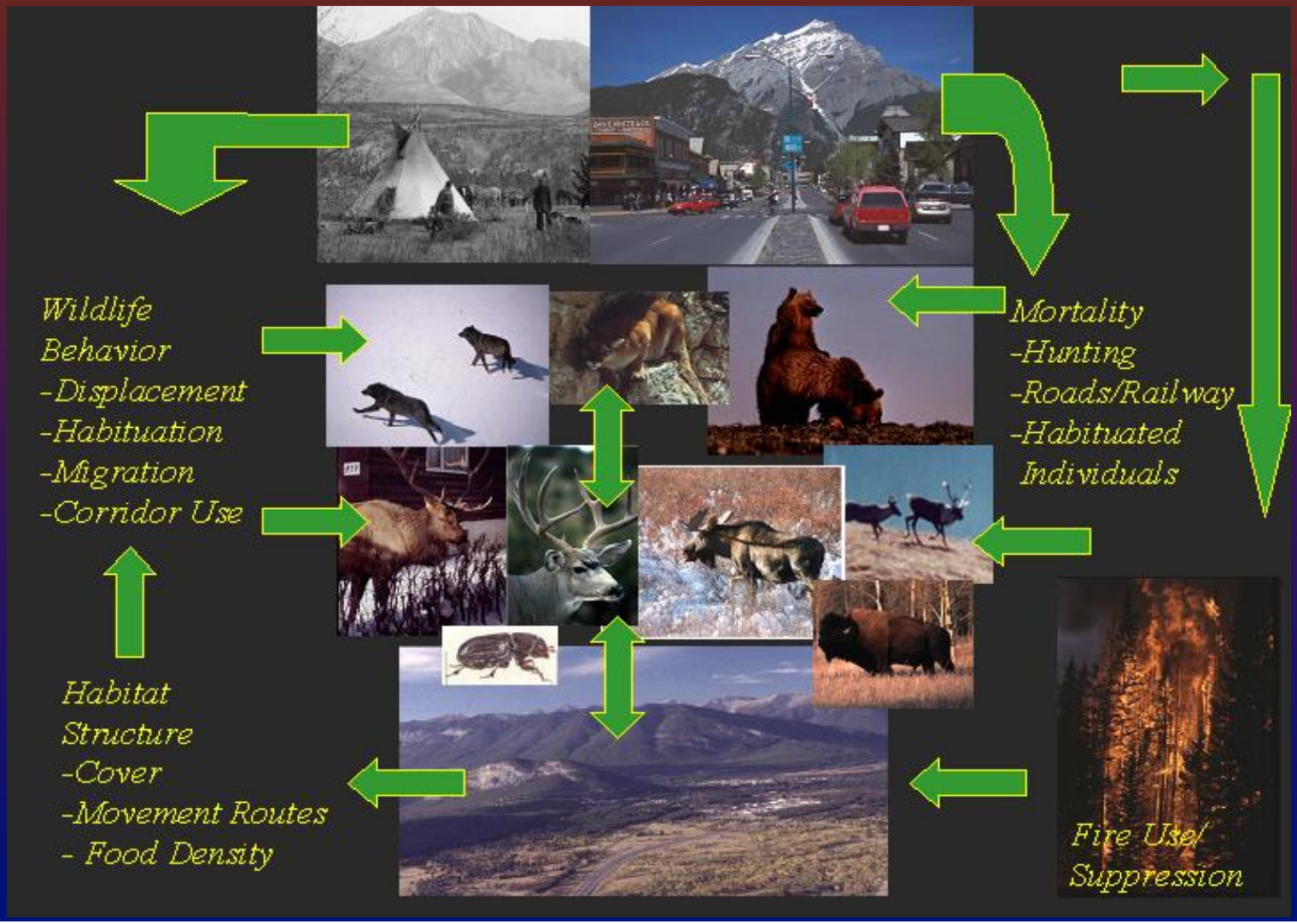
Y2Y: GLOBALLY ICONIC LANDSCAPE FOR CONSERVATION

William Henry Jackson, c1881

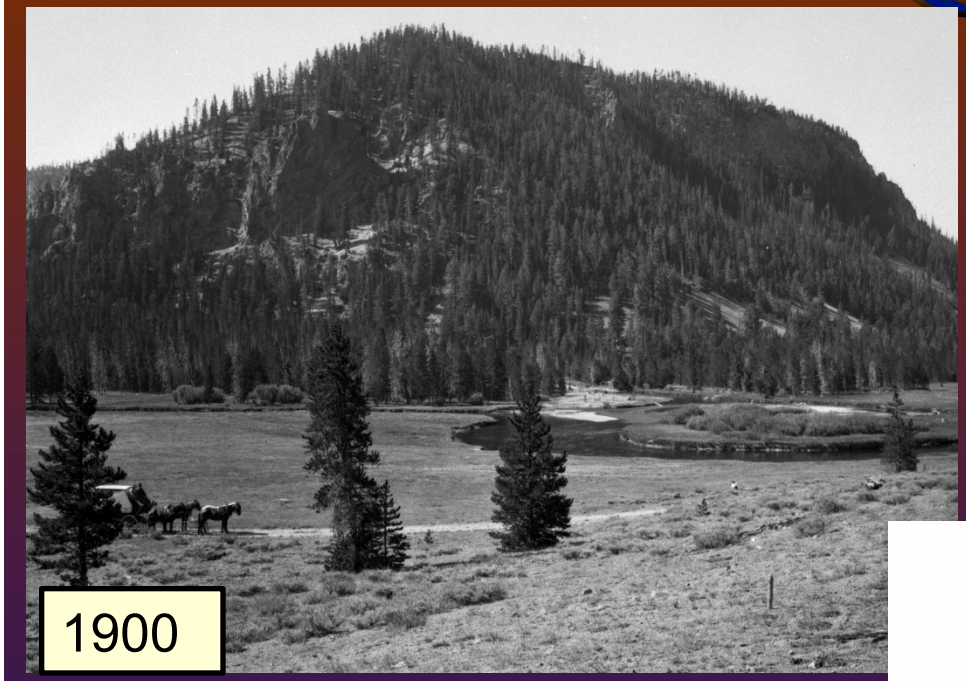
Grand Teton National Park

CW, October, 2009

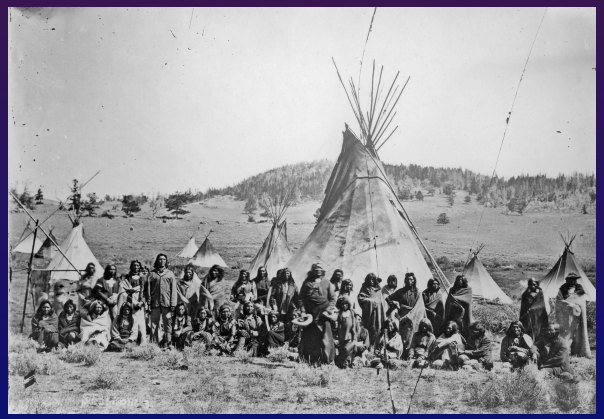
CHANGES IN CULTURE CAUSING ISSUES IN Y2Y ECOSYSTEMS



National Park Mountain, Yellowstone National Park



1900

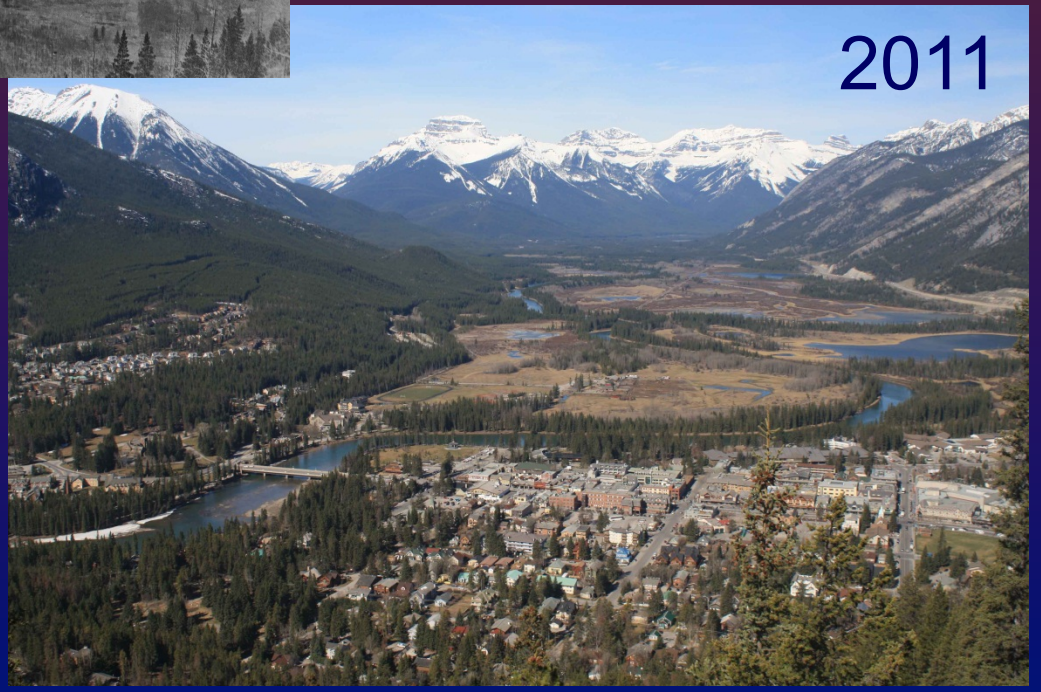


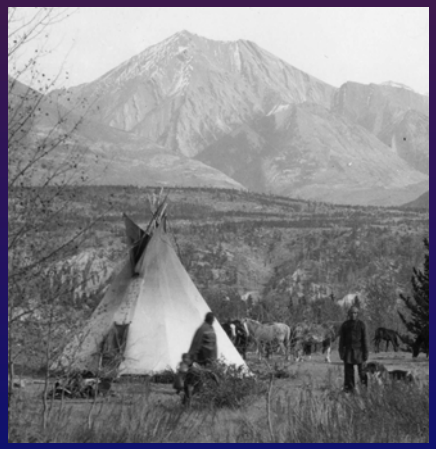
Shoshone Tribal Homelands

1996

BANFF NATIONAL PARK

Town of Banff and
Cave and Basin
Hotspring





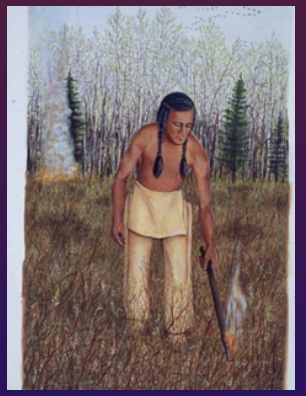
Stoney Nakoda
First Nation Homelands

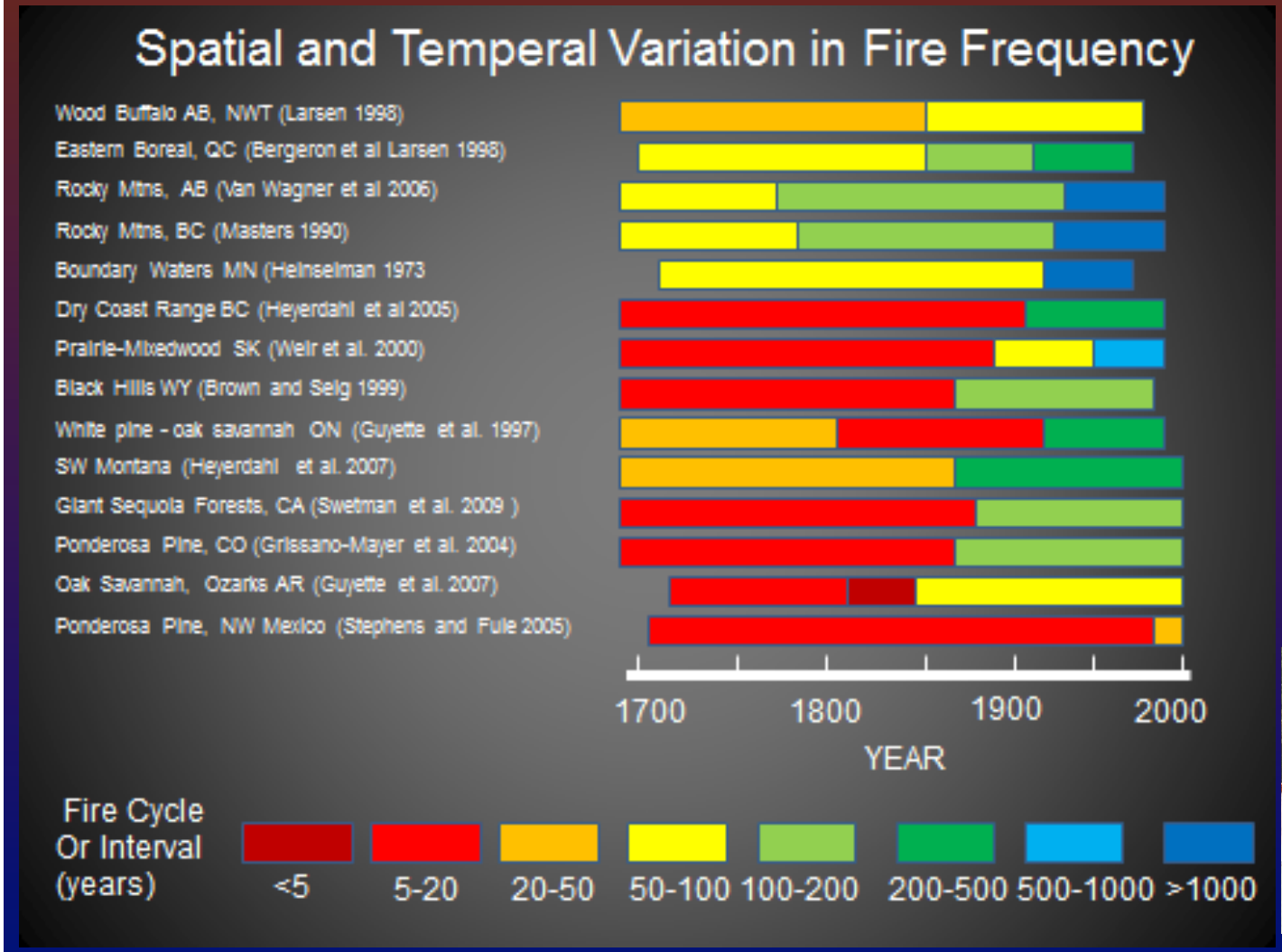
Y2Y FIRE MGMT ISSUE #1:

Loss of human ignitions and fire suppression policies alter plant communities, wildlife habitat and aquatic ecosystems

Teton Canyon, Idaho

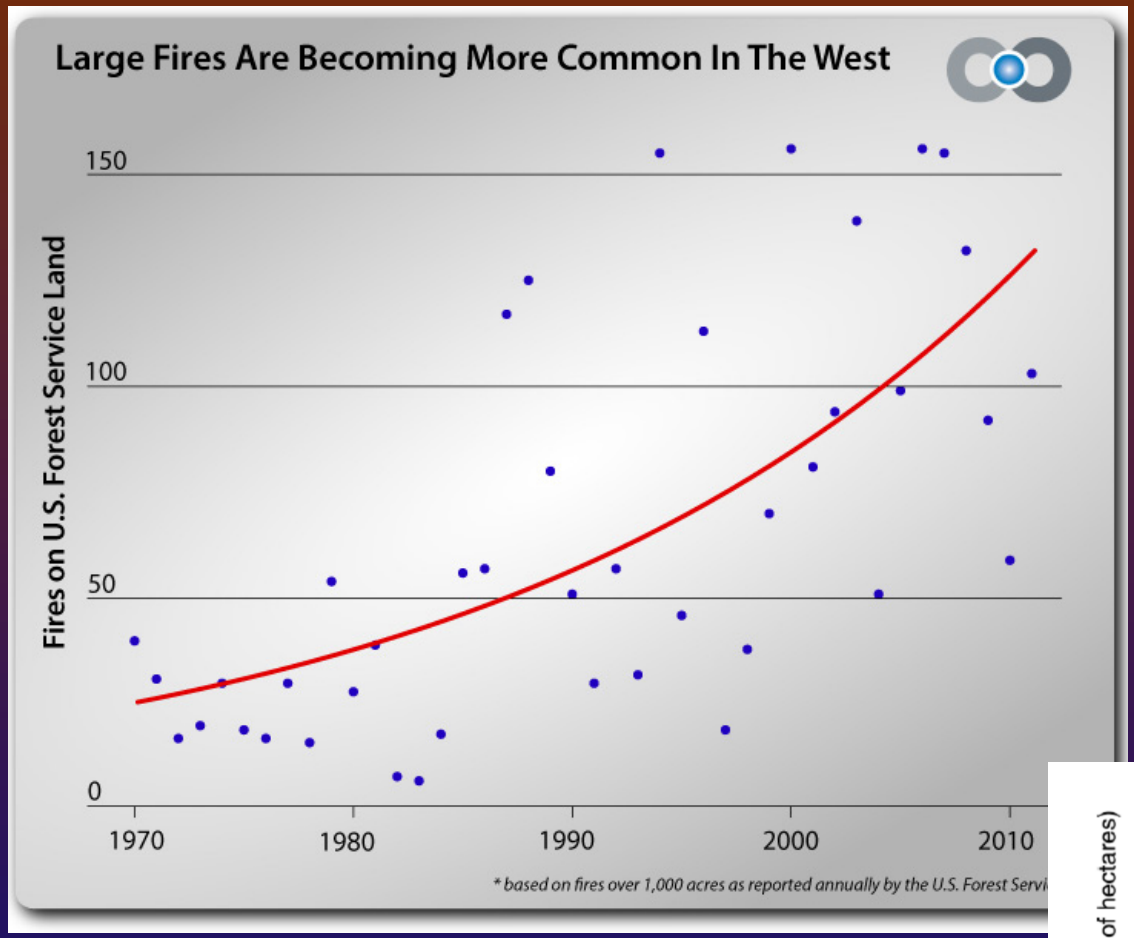
Declining fire frequency





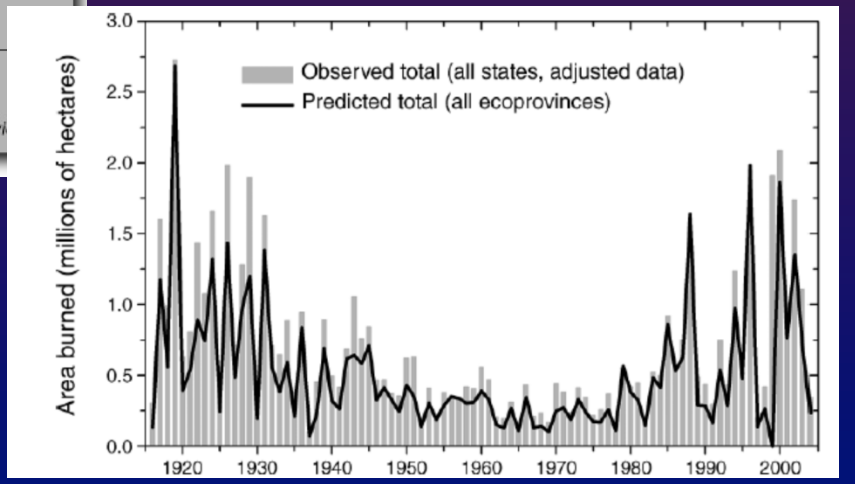
Y2Y FIRE MGMT ISSUE # 2:

Loss of human ignitions and fire suppression policies create vegetation and fuel conditions prone to large-area forest insect and disease outbreaks, and extreme fire behavior



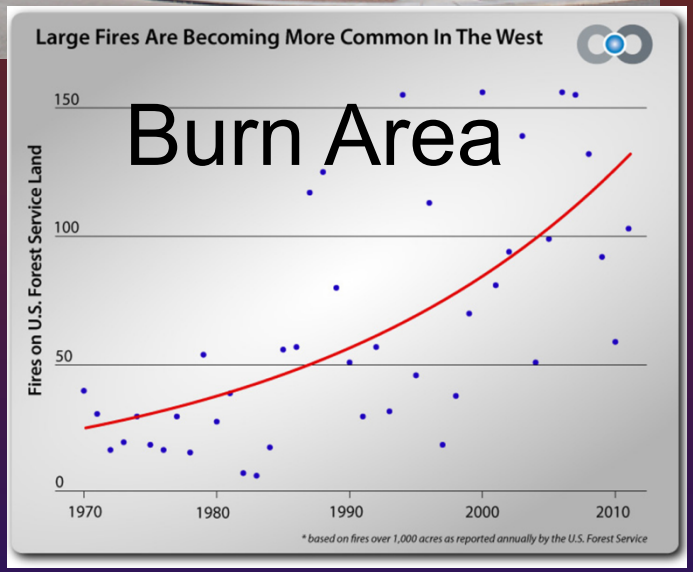
BURN AREA= INTERACTION BETWEEN WEATHER, FUELS AND CULTURE

Burn area and weather correlation



M580 FIRE IN ECOSYSTEM MANAGEMENT COURSE

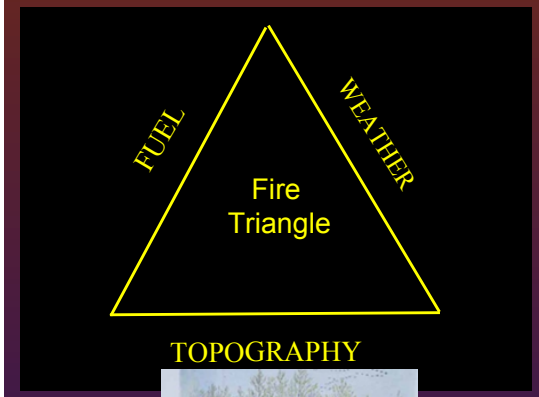
Tucson, Arizona

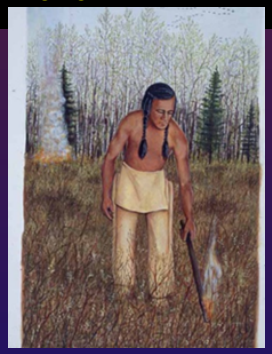


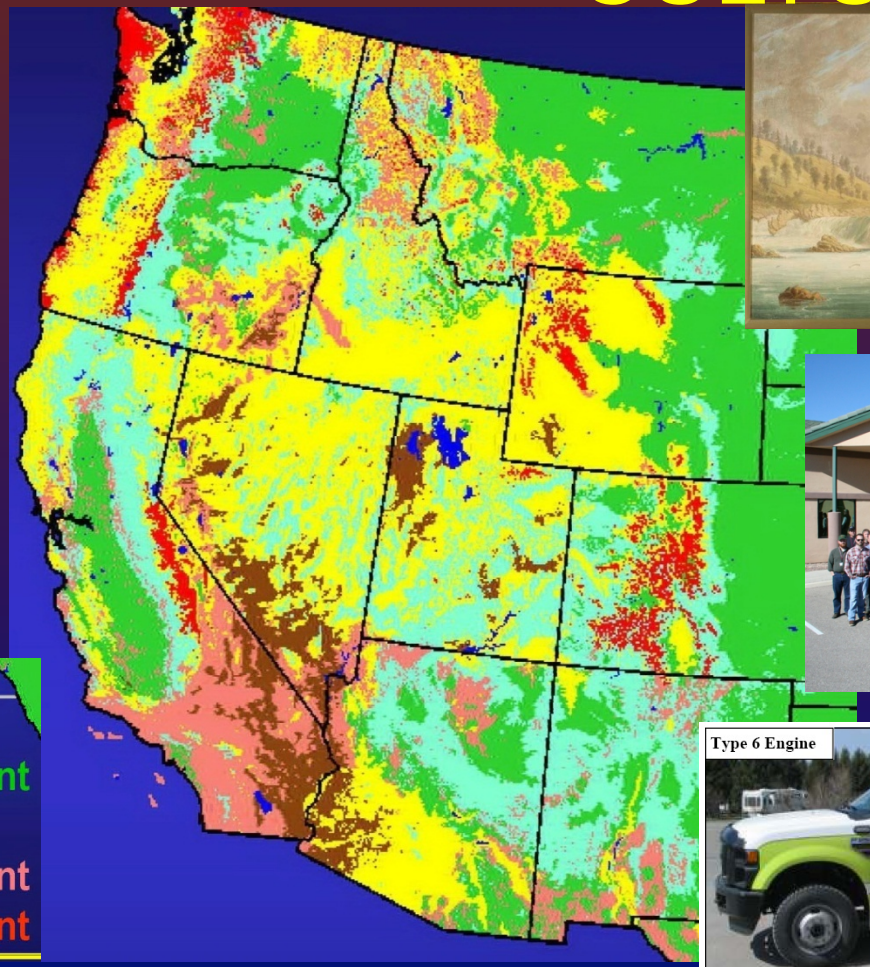
>3000 graduates Since 1978

USFS, NPS, BLM, USFW, Parks Canada, BC, AB, SK, ON, NWT, Yukon, Mexico, Brazil

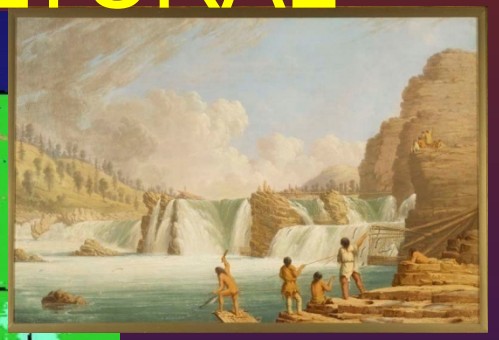
SPATIAL FIRE REGIME = ABIOTIC BIOTIC CULTURAL

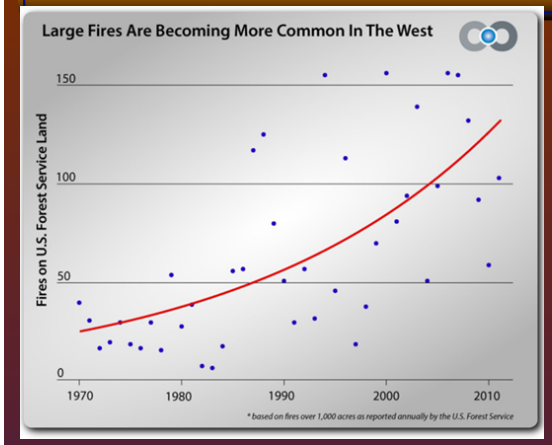






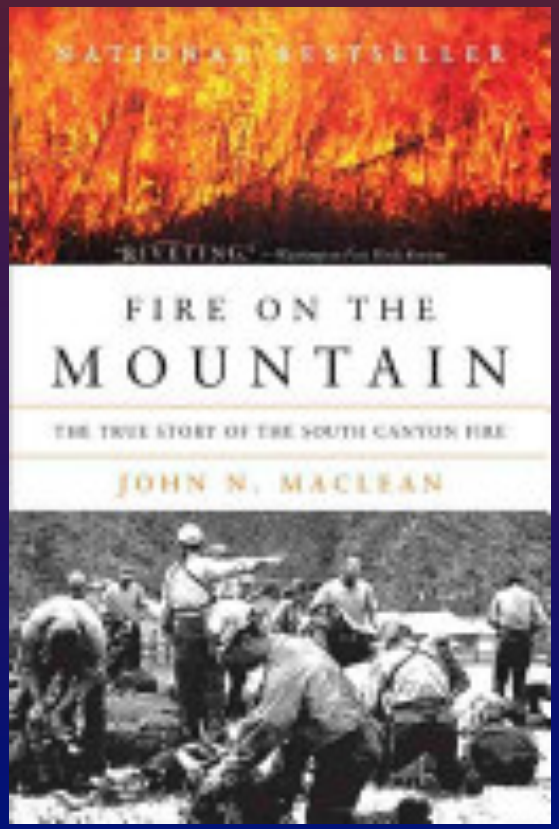
Frequency	Severity
0-35 year	Low
0-35 year	Stand Replacement
35-100 year	Mixed
35-100 year	Stand Replacement
200+ year	Stand Replacement

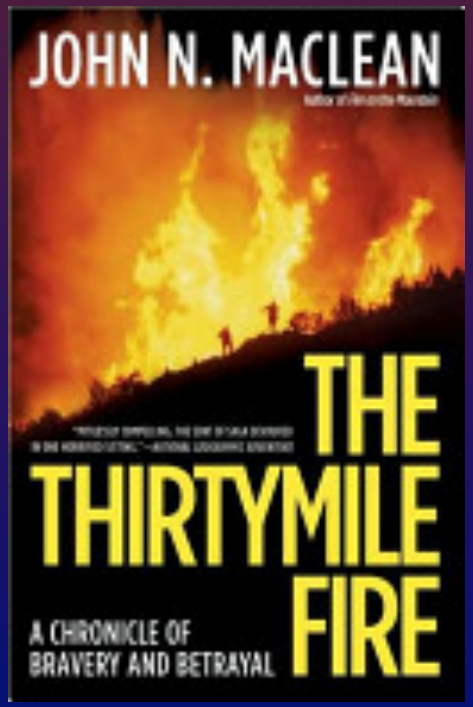




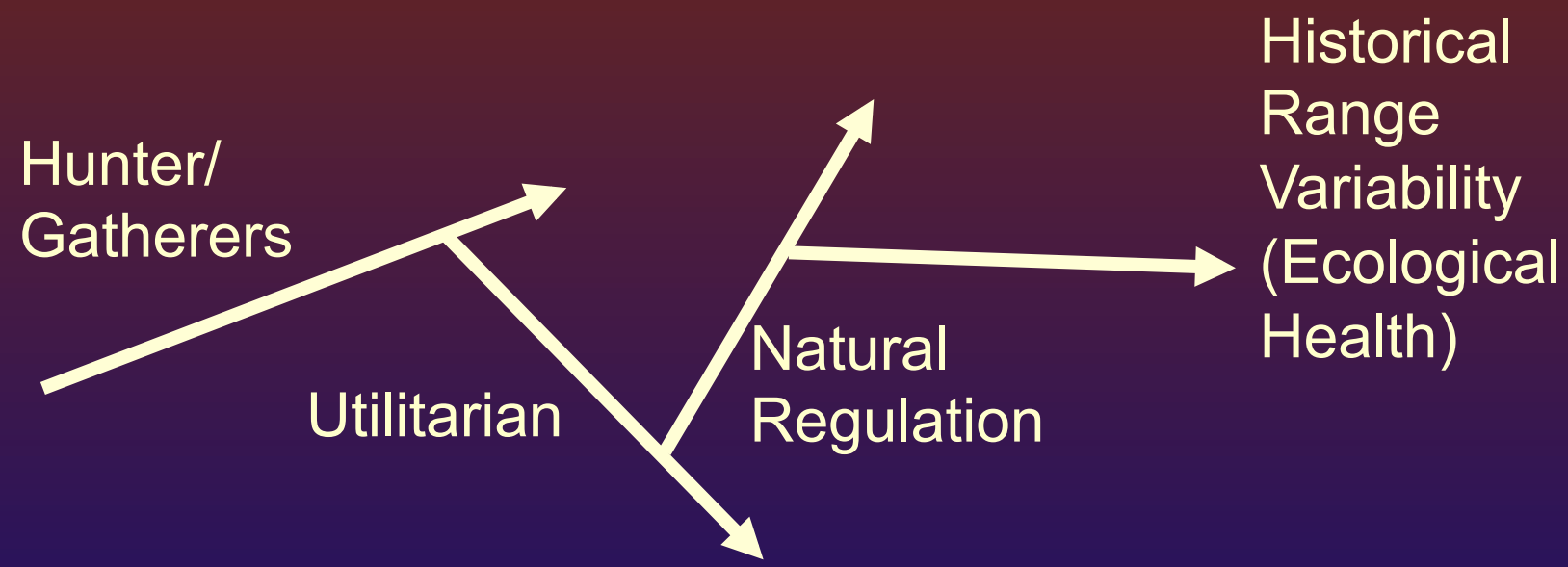
WEATHER AND CULTURAL INTERACTION:

Fatality fires have hugely impacted firefighting priorities and techniques





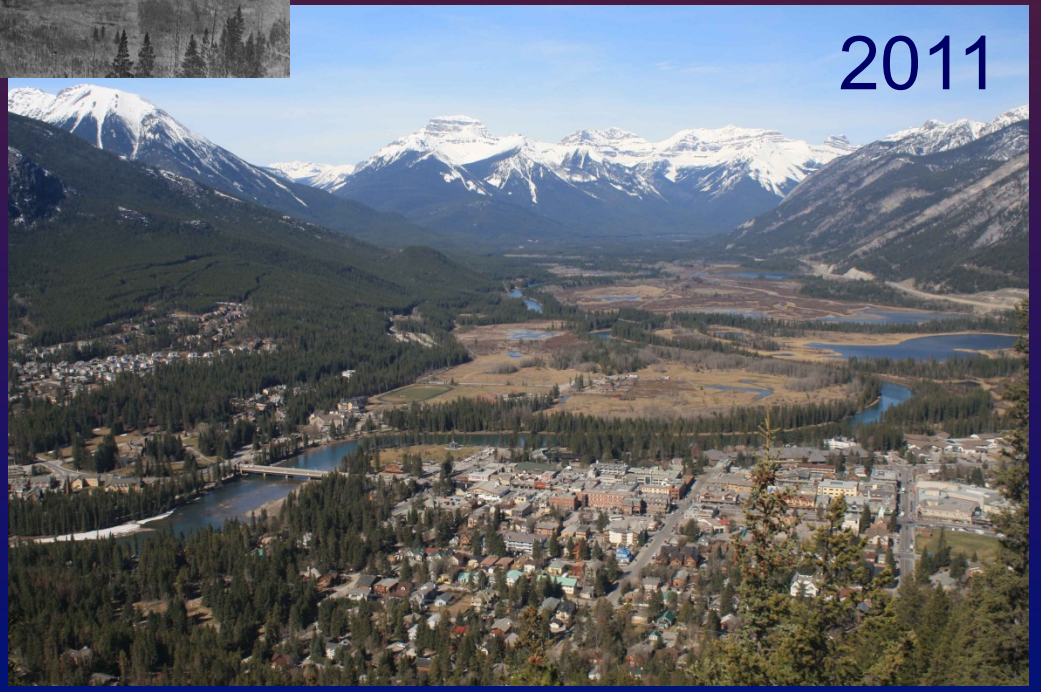
PROTECTED AREA ECOSYSTEM MANAGEMENT PHILOSOPHY

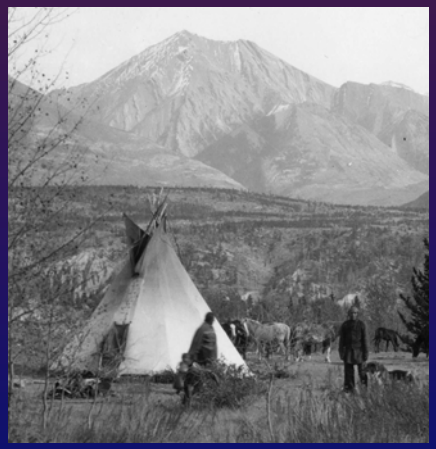


Pre-1900 1900s-1950s 1950s-1990s Post 1990s

BANFF NATIONAL PARK

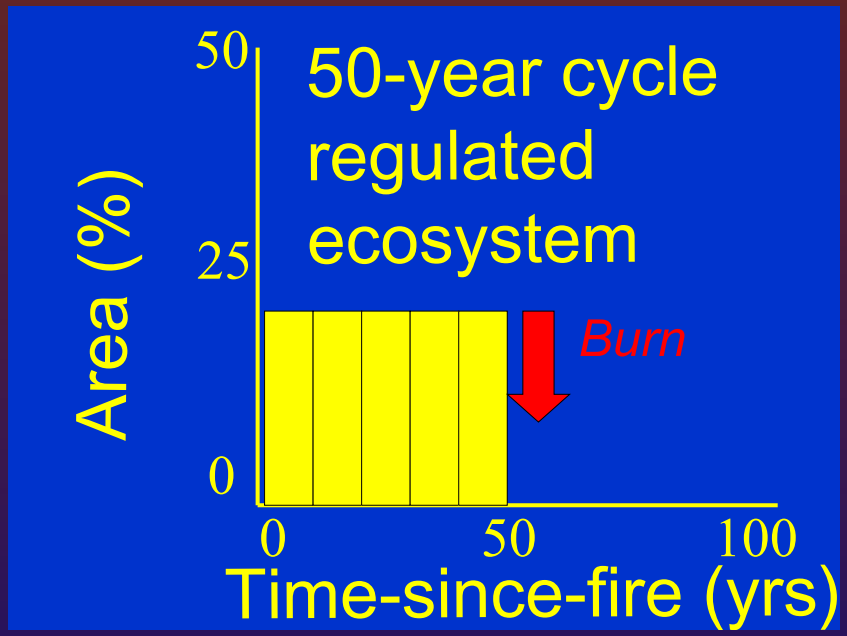
Town of Banff and
Cave and Basin
Hotspring



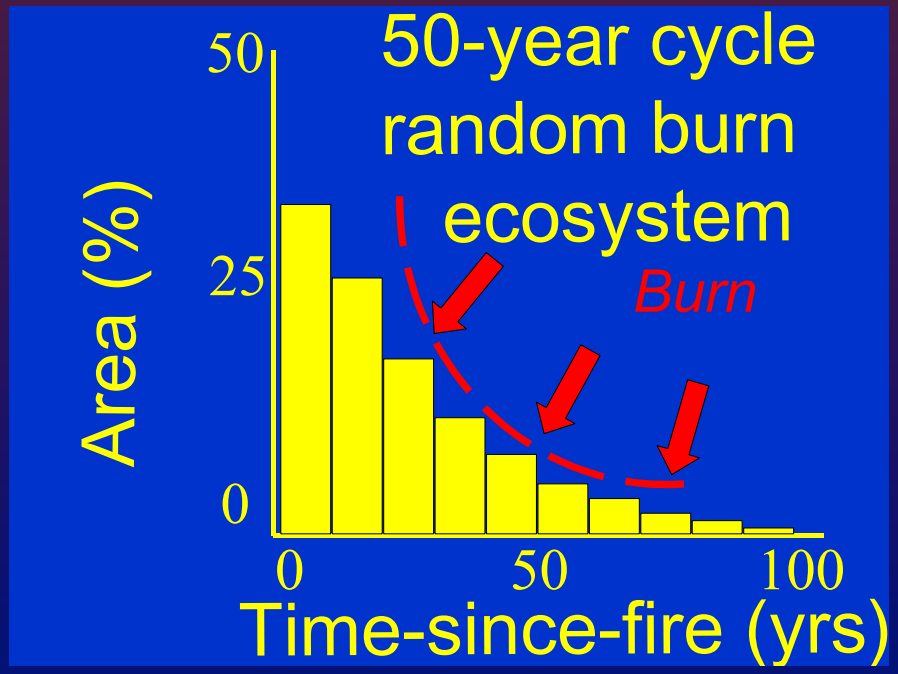


Stoney Nakoda
First Nation Homelands

How Do You Choose Your Prescribed Burn Units ???

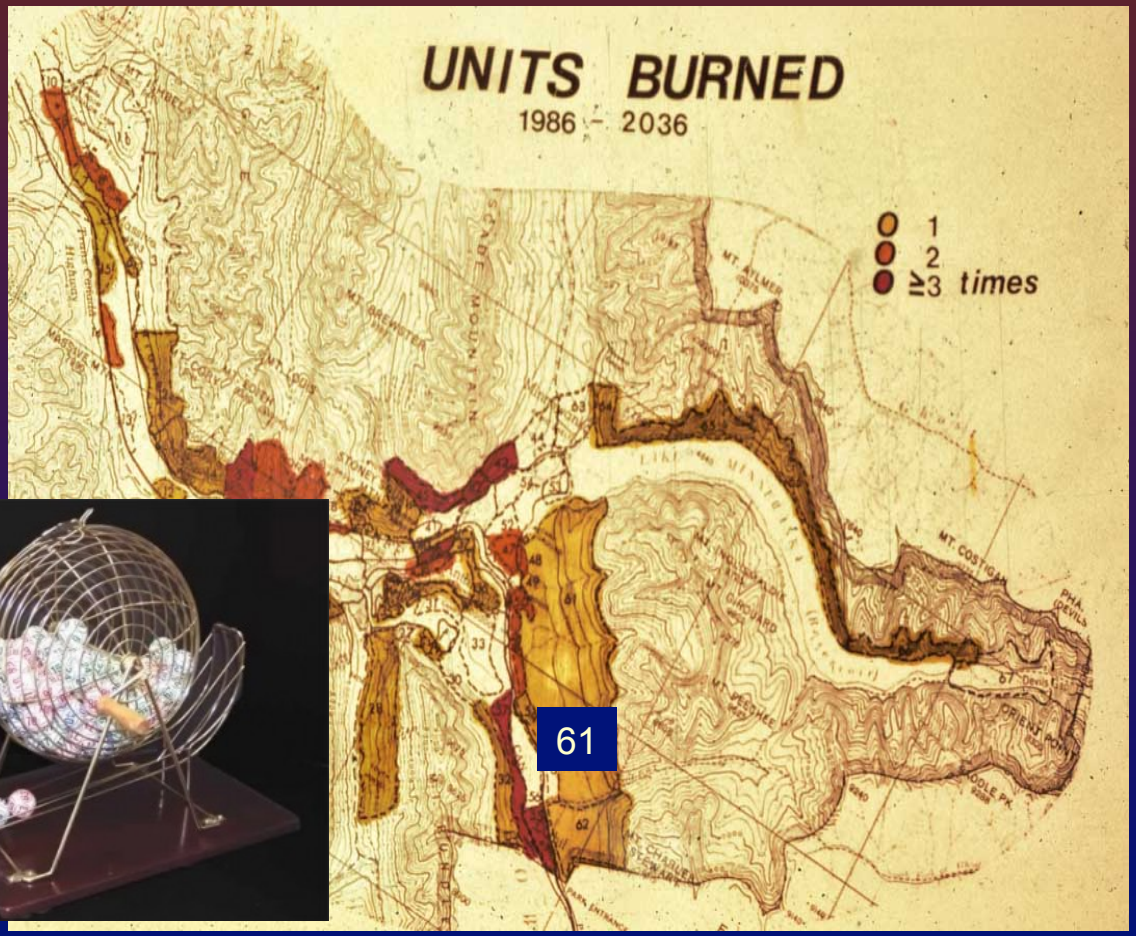


Negative exponential distribution



HOW TO CHOOSE BURN UNITS?

1984 Bingo Ball Machine Simulation for Selection of Prescribed Burning Units

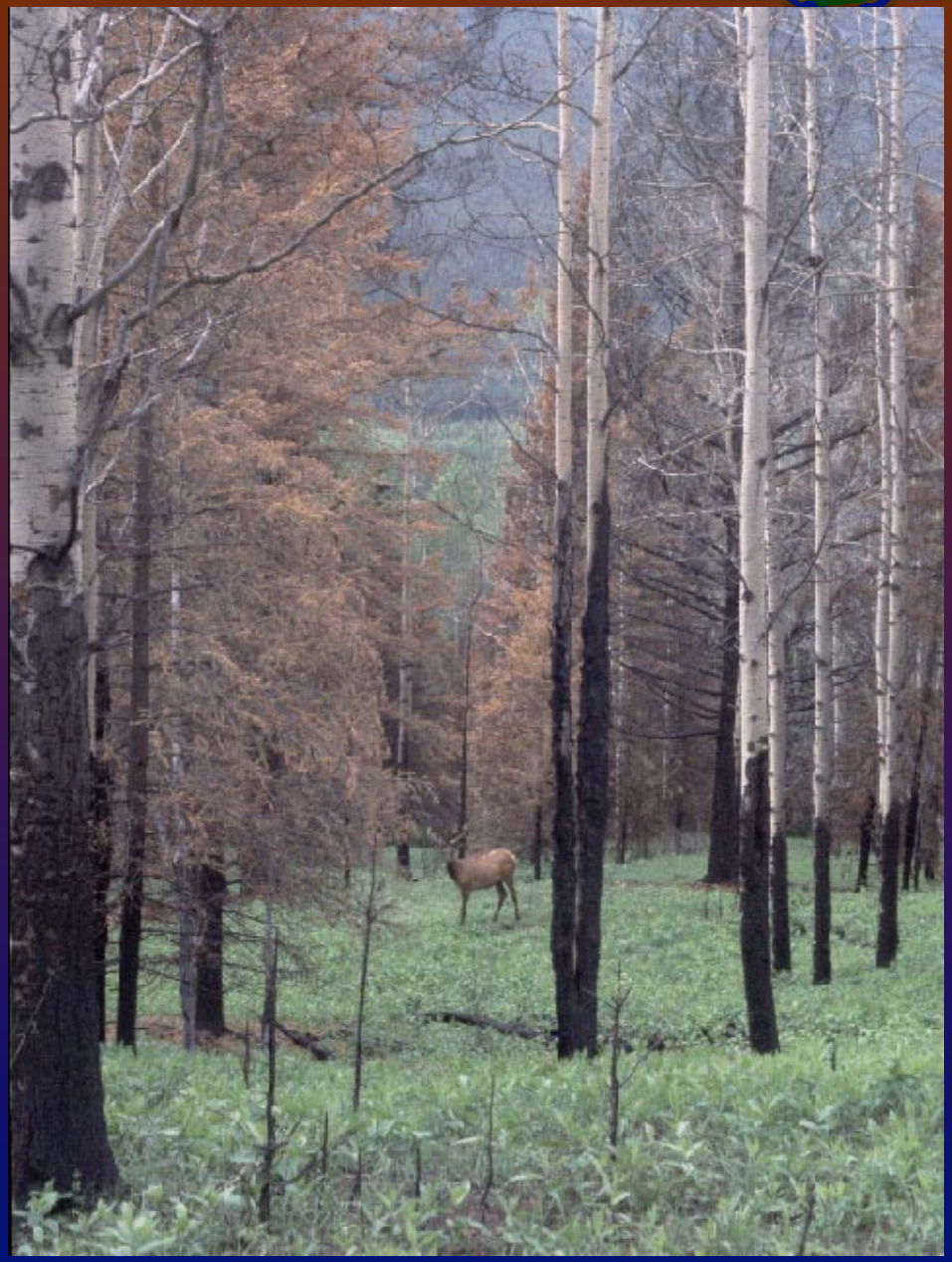


75 BURN UNITS:
25 year fire cycle
= draw 3 balls per year with replacement
(AND AVOID BALL 61!!)

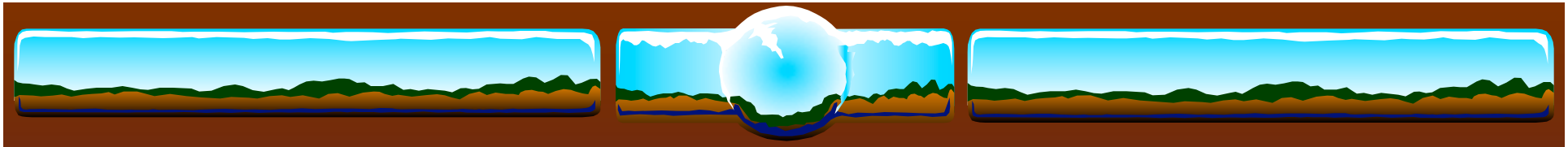
“FIRE JUST AIN’T WHAT IT USED TO BE”
Preliminary Steps Restore Aspen in Banff National Park

TwoJack1
Prescribed burning to restore aspen

Sawback 2 prescribed burn to regenerate aspen
1993



No aspen regeneration in Sawback 2



ECOLOGICAL INTEGRITY: NATIONAL PARKS ACT OF CANADA (1988)

Section 2: "Ecological integrity" means, with respect to a park, a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes.

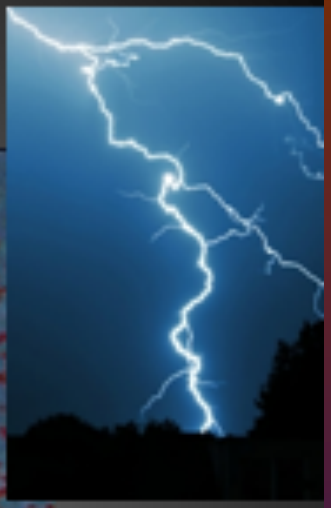
Wildlife
Behavior
-Displacement
-Habituation
-Migration
-Corridor Use

Mortality
-Hunting
-Roads/Railway
-Habituated
Individuals

Habitat
Structure
-Cover
-Movement Routes
- Food Density

Fire Use/
Suppression

Lightning Fires 1961 to 1994

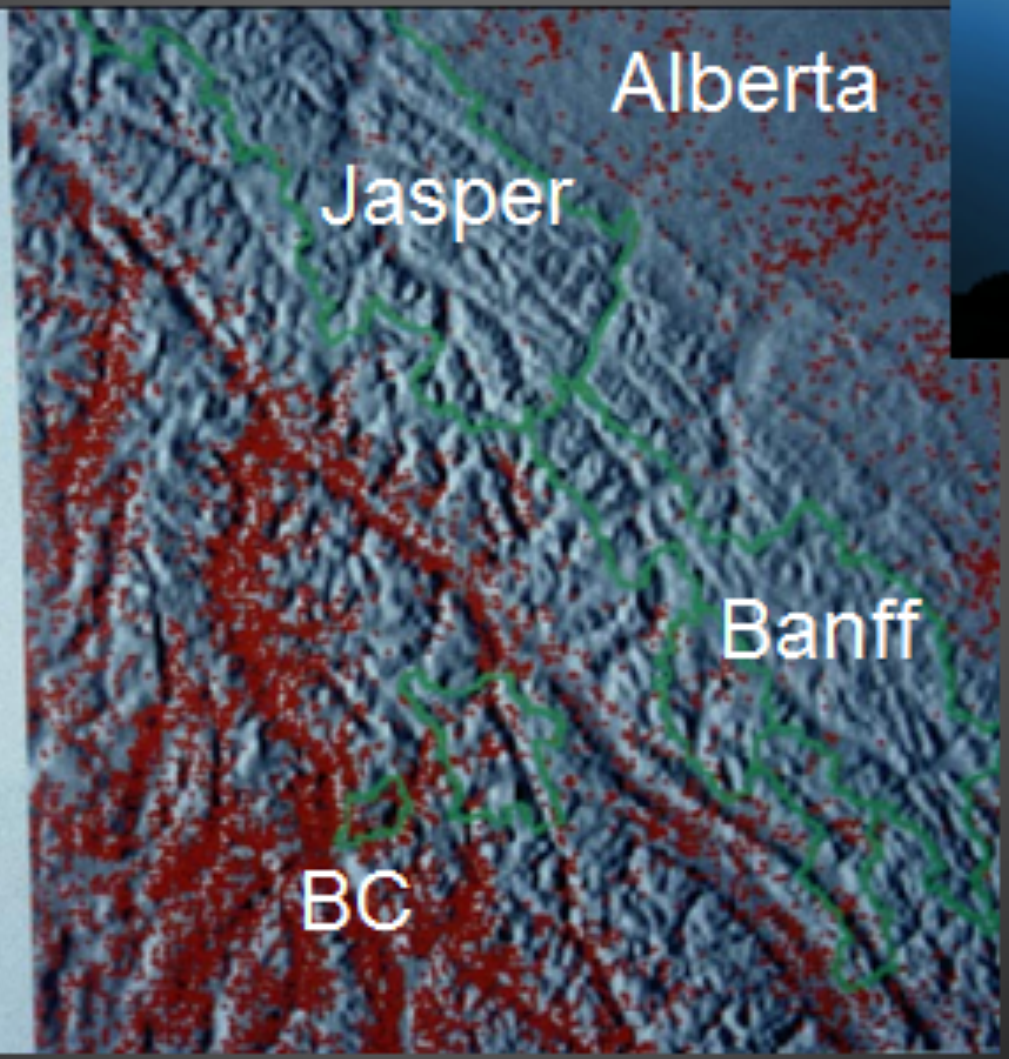


Lightning Fires
1961 to 1994

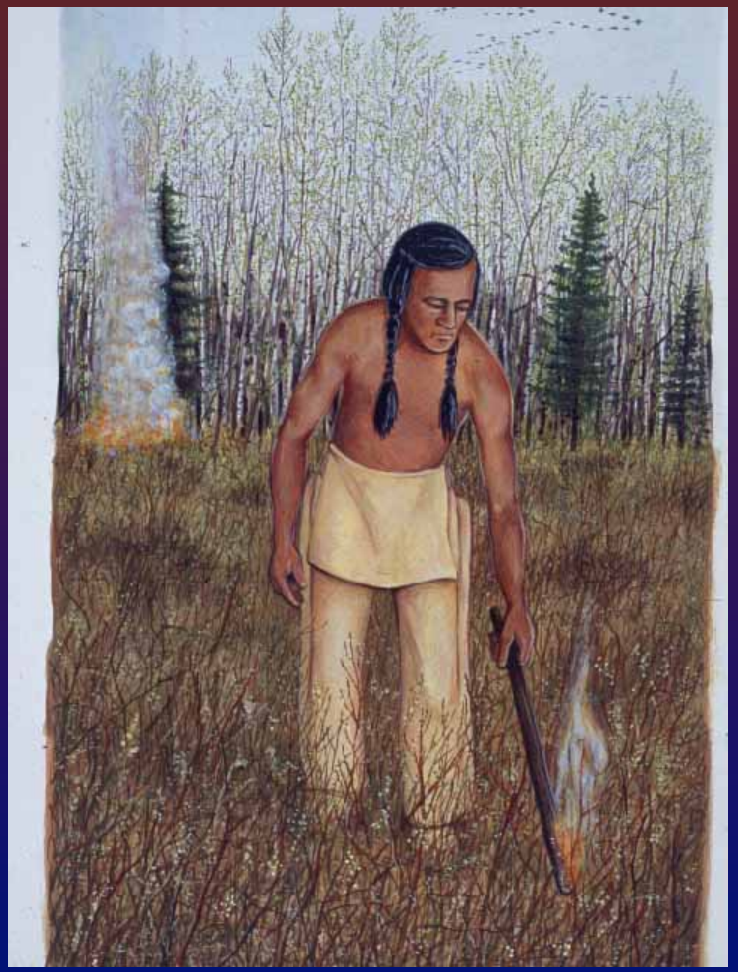
14,626 fires
179,515.3 ha.

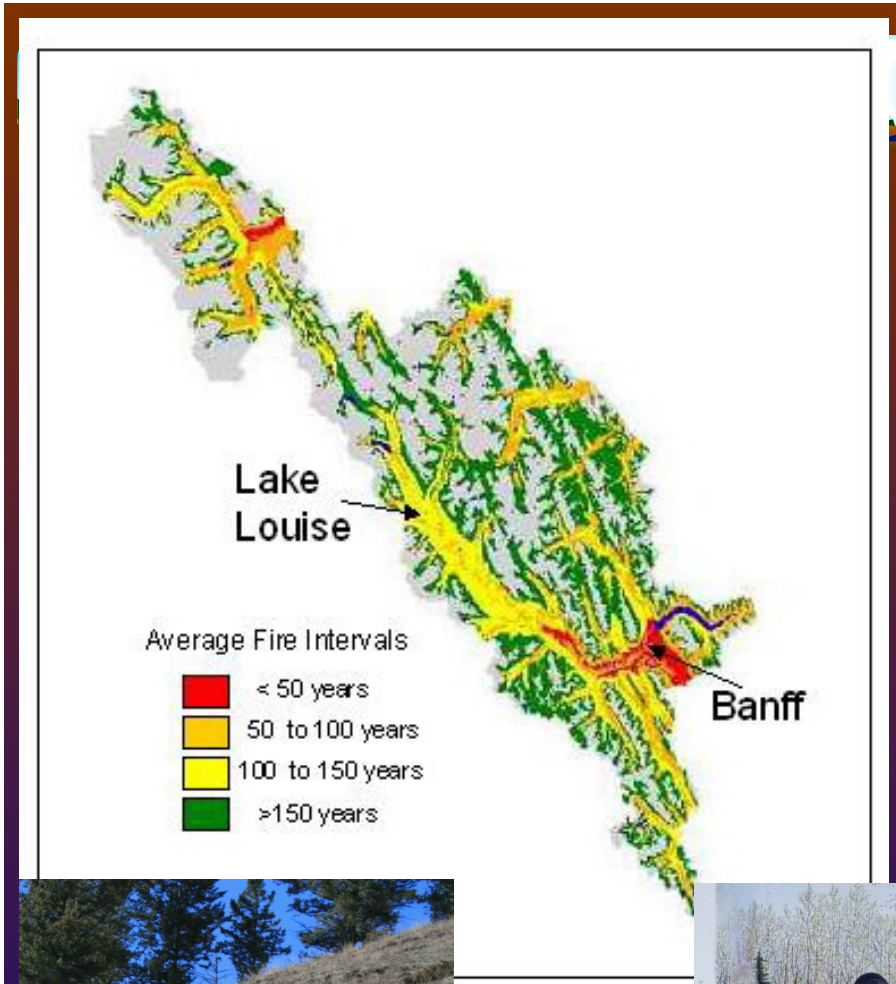
British Columbia
12,763 fires 87%
155,716.5 ha. 87%

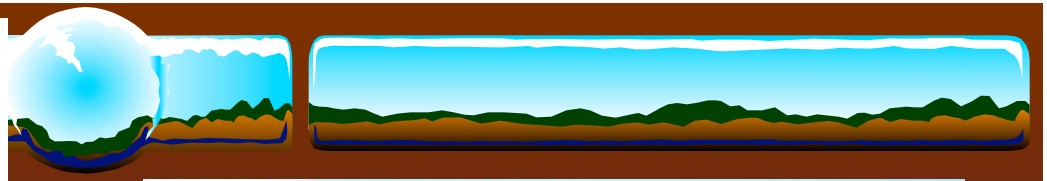
Alberta
1863 fires 13%
23798.8 ha. 13%

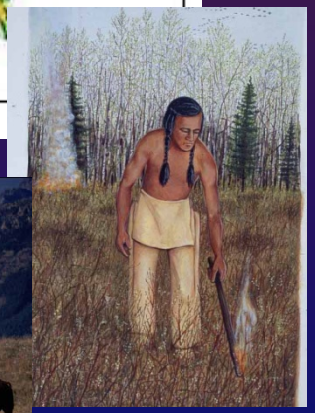


Fire history: Fire scar and interval analysis, traditional knowledge

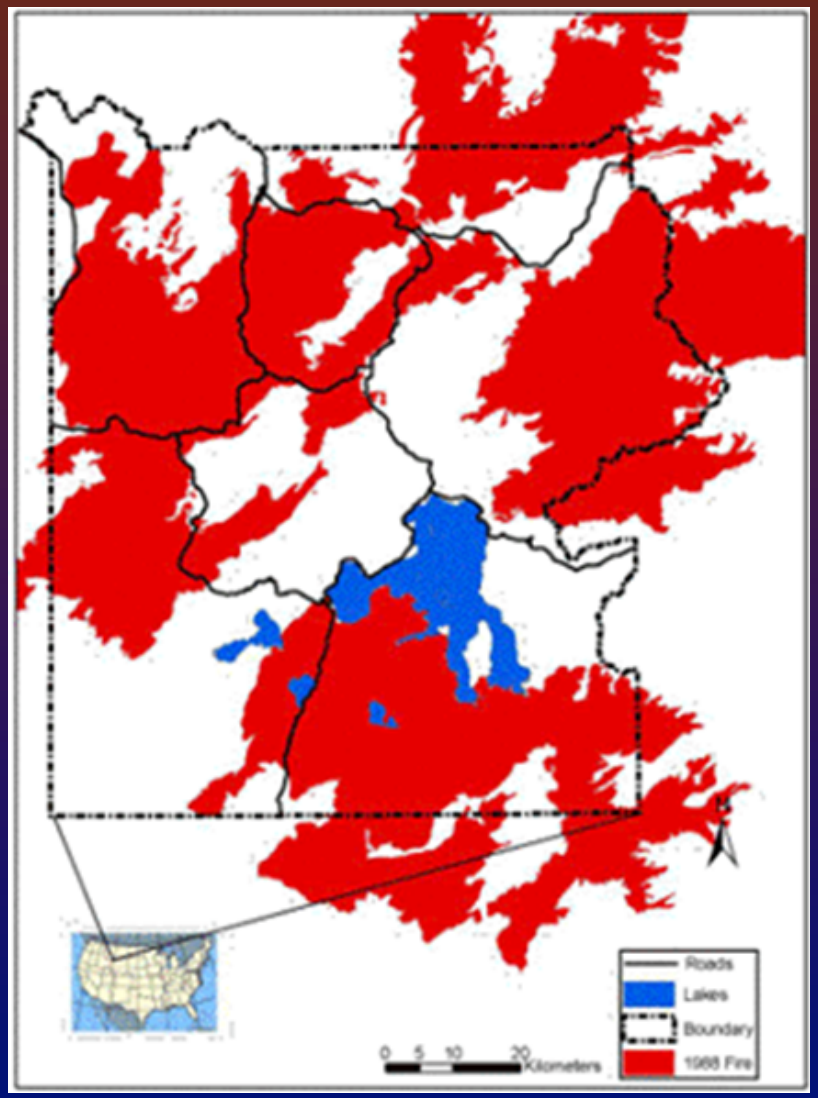



Lake
Louise
Banff
Average Fire Intervals
< 50 years
50 to 100 years
100 to 150 years
>150 years

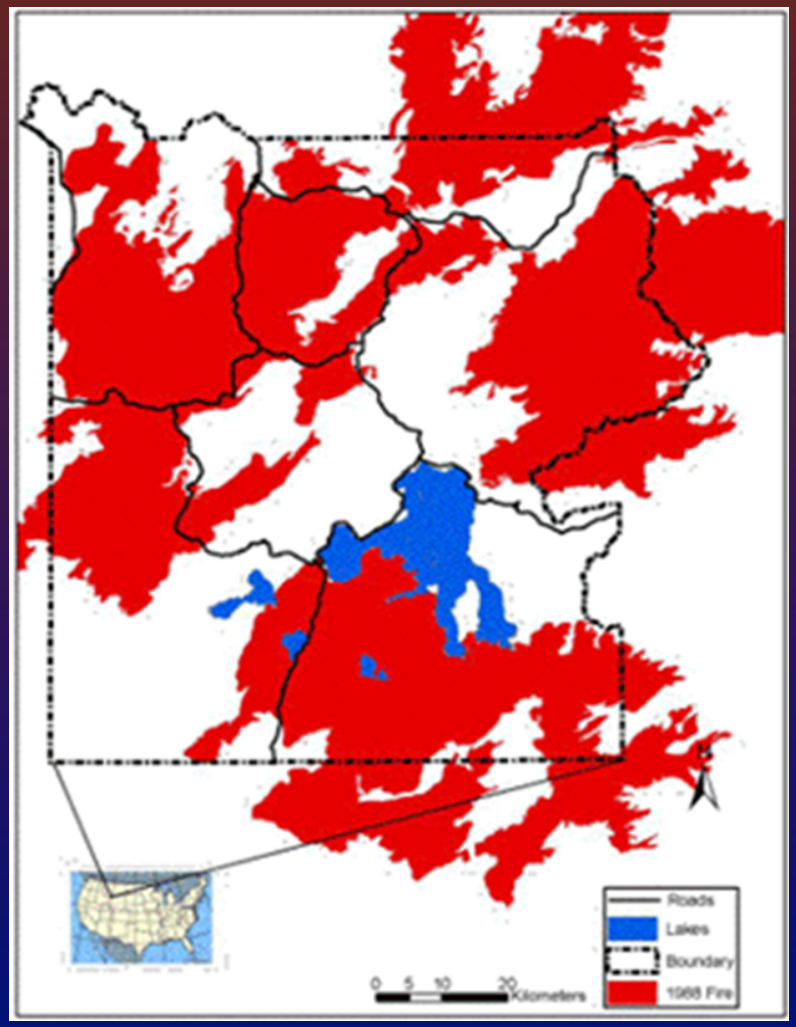


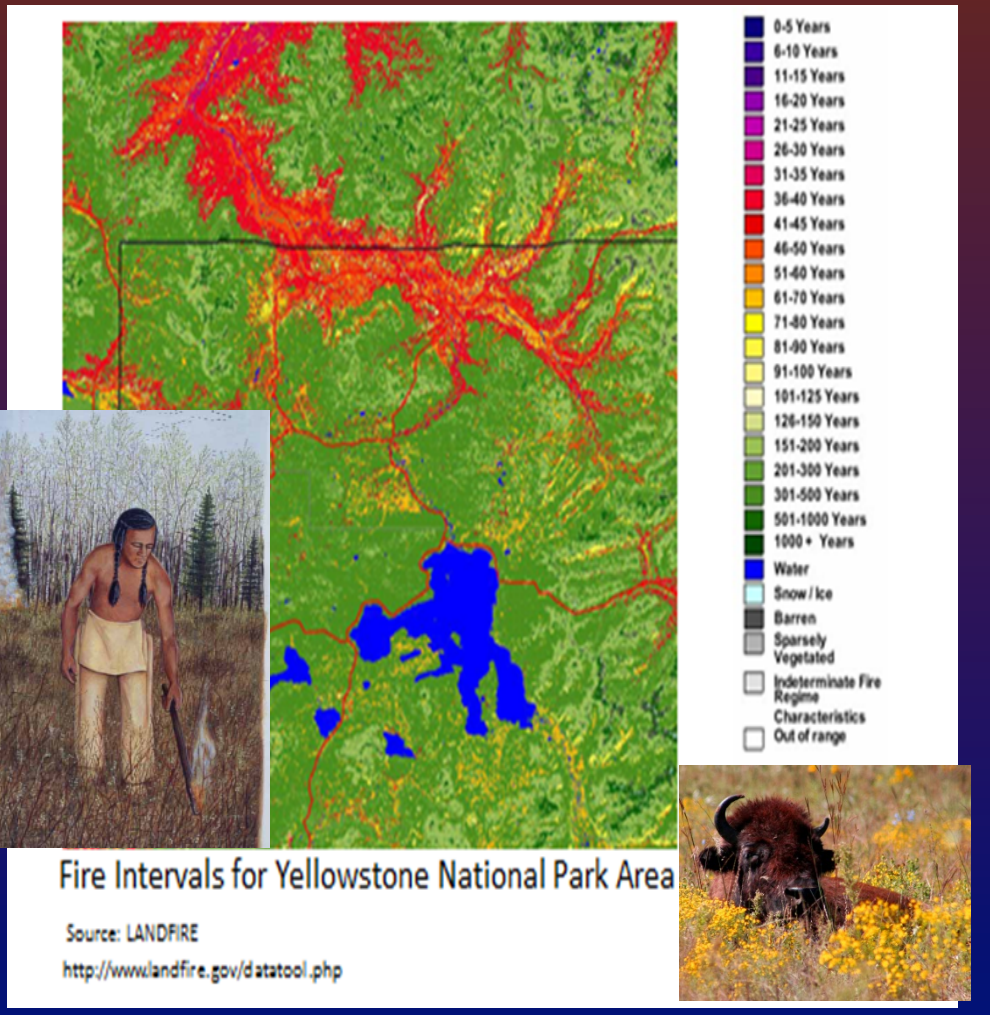


Yellowstone 1988 Fires



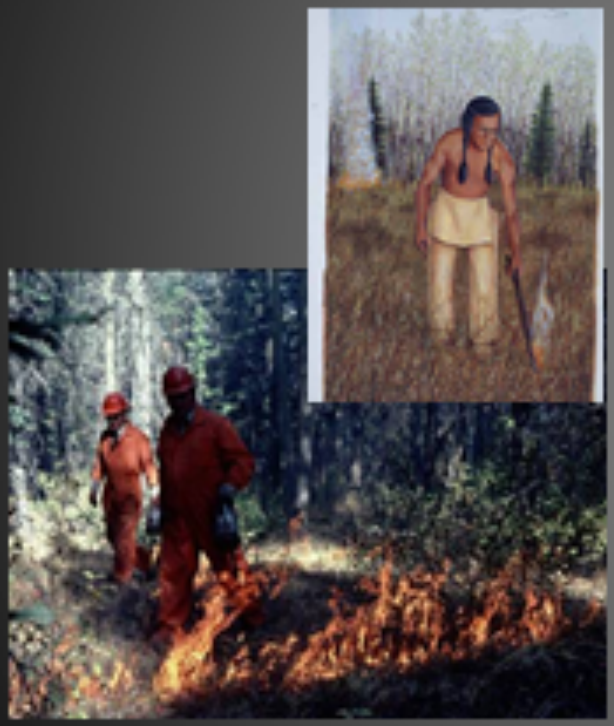
SPATIAL BURN PATTERNS:
1988 Yellowstone Fires vs. Long-term Fire Intervals





Range of Fire Regimes

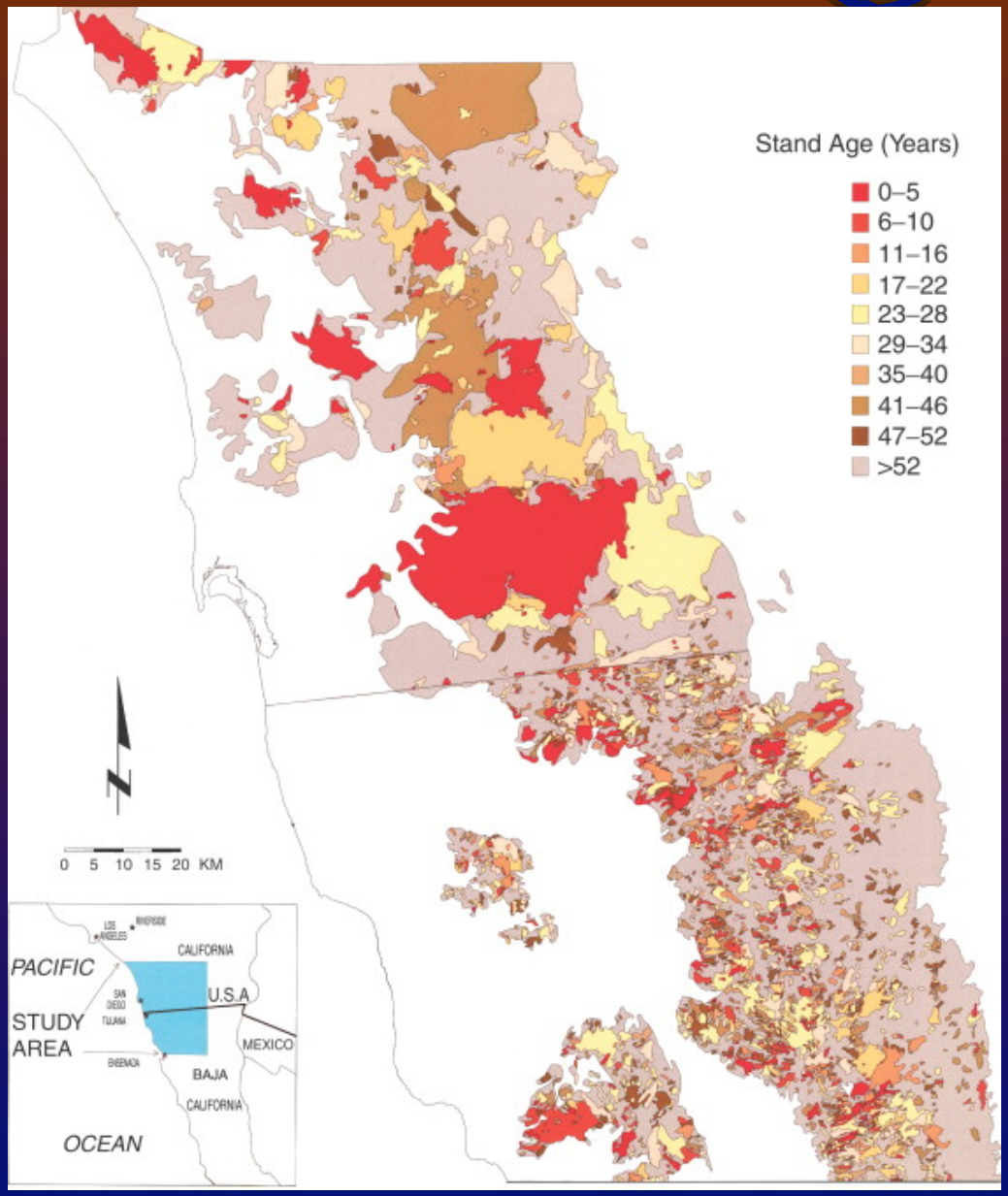
Eco-cultural fire management model:

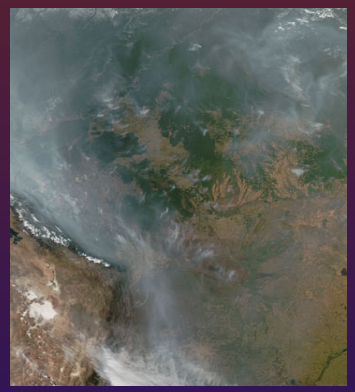


Fire often human caused, high frequency, smaller with low intensity in shoulder season

Bio-physical fire management model:

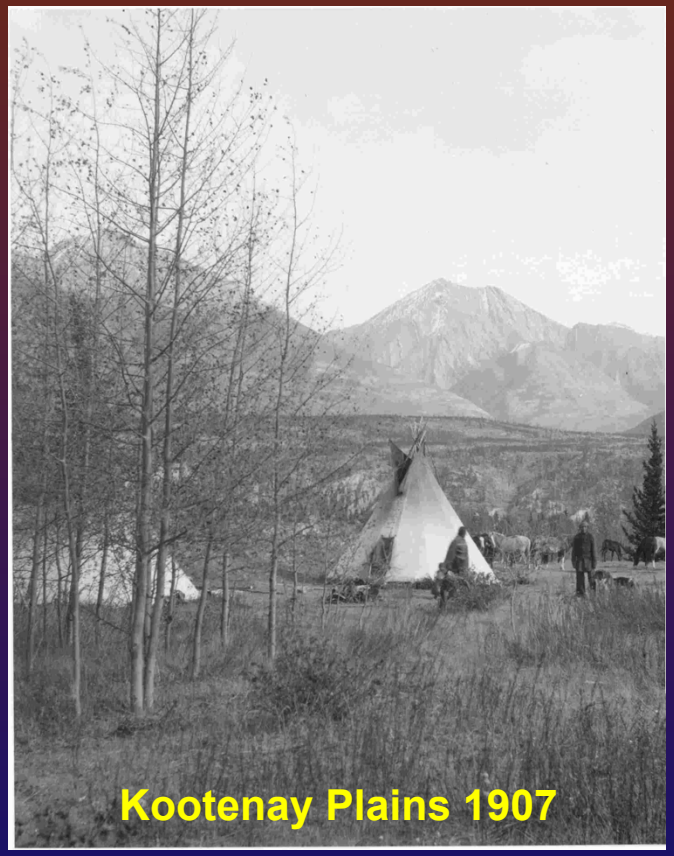
Fire often lightning caused, lower frequency, large fires with high intensity in peak of fire season





Source: Minnich, RM,, Southern vs. Baja California fire patterns
US 2003 fires above,
June 2009 Baja Mexico fires below

High Predation and Frequent Fire



Kootenay Plains 1907

Low Predation and Infrequent Fire

Banff Townsite 1995

WIN A 6-PACK OF CANADIAN BEER!!!

Send “Elk and Tipi” photos to:
cliffawhite@gmail.com

Banff Indian Days Archery Competition 1940s

Best photo so far!!

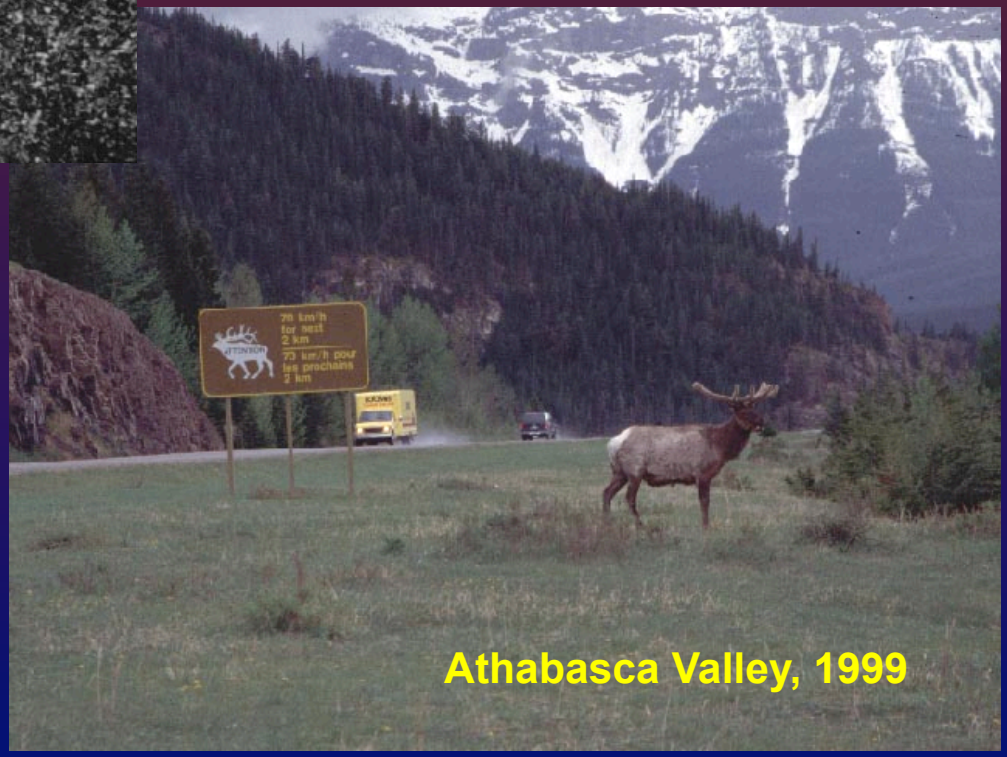
(photo found by Brad Hawkes Forestry Canada)

Kananaskis Valley , c.1904

Predation Risk

High
(with frequent fire)

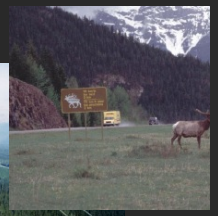
Low
(with fire suppression)



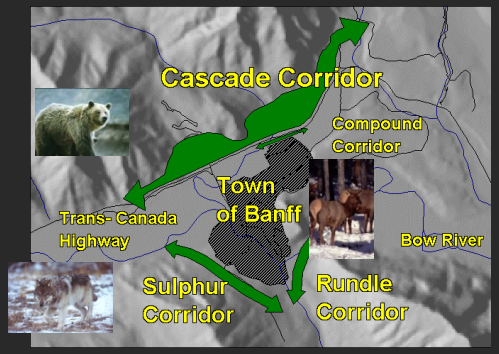
Athabasca Valley, 1999

BANFF MONTANE RESTORATION

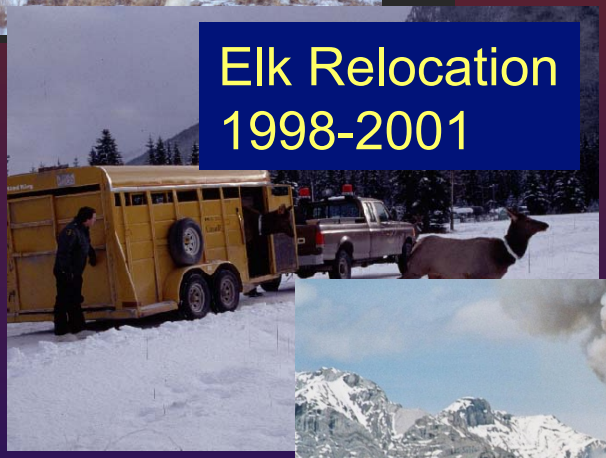
HIGHWAY MITIGATION:
Fencing and Crossing Structures



RESTORE WILDLIFE CORRIDORS



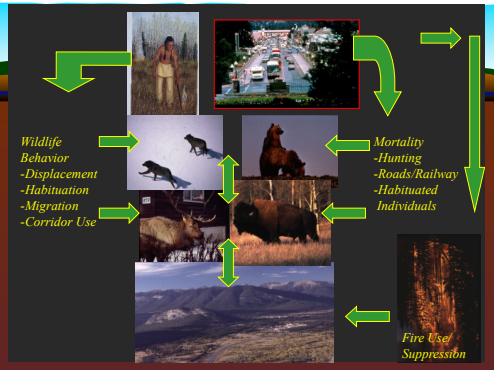
WOLF RECOLONIZATION
1985-2000



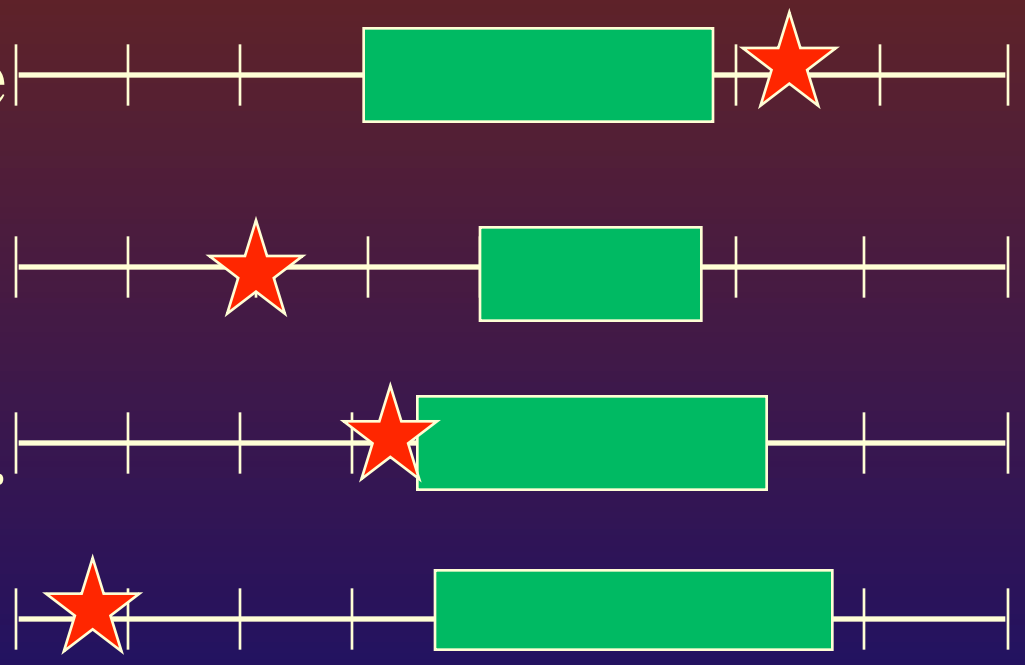
Elk Relocation
1998-2001

Elk Culling
after 2006

Prescribed Burning



MANAGING FOR ECOLOGICAL INTEGRITY(HRV)



Characteristic Range of Variability

Current conditions

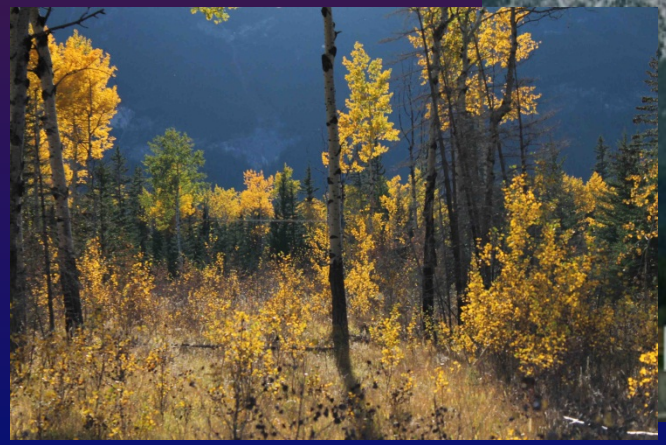
BANFF ASPEN AND WILLOW RECOVERY

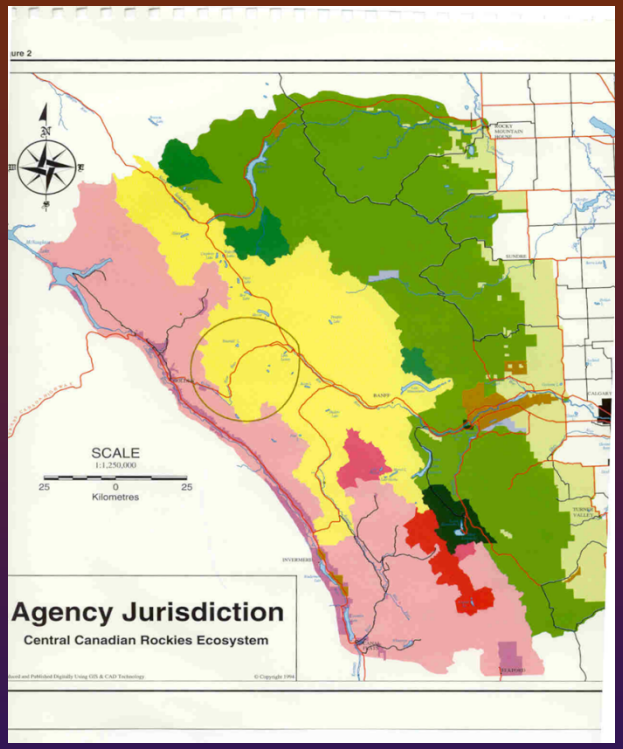
First Vermilion Lake Exclosure

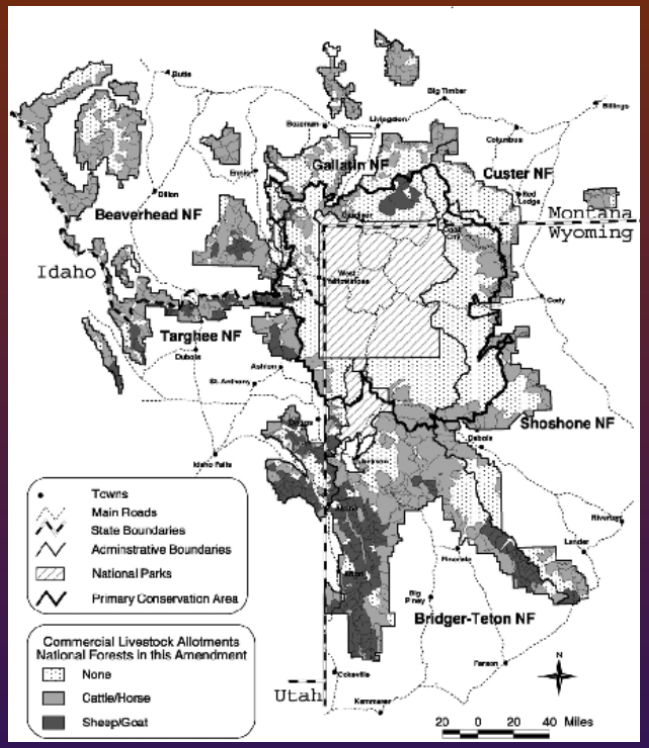
Stoney and Siksika Banff Traditional Use Elk Hunt

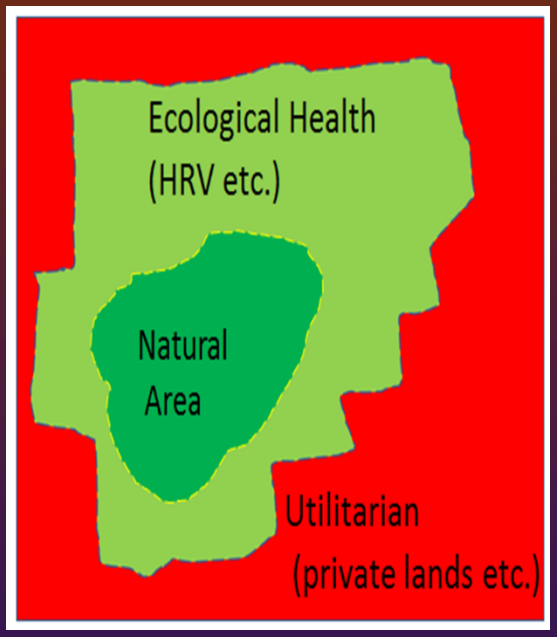
Banff Prescribed Burning Program:

Target: >=50% long-term fire cycle, 14 sq km/year





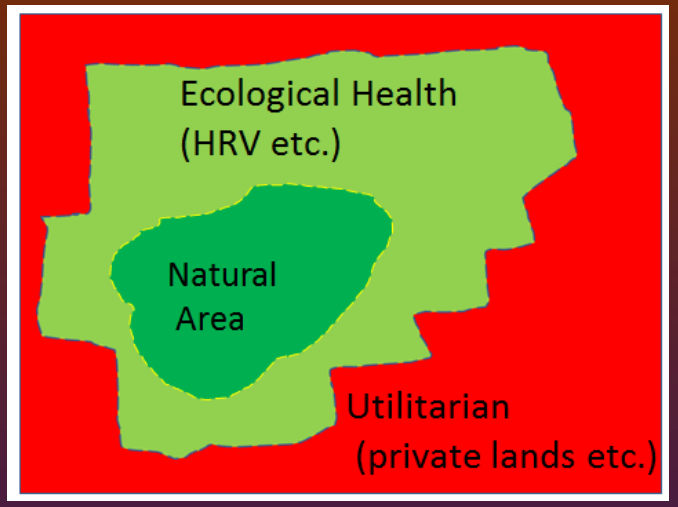




Banff National Park and Central Canadian Rockies Ecosystem

Greater Yellowstone Ecosystem

Where/how do we manage for historic range variability/ ecological integrity??

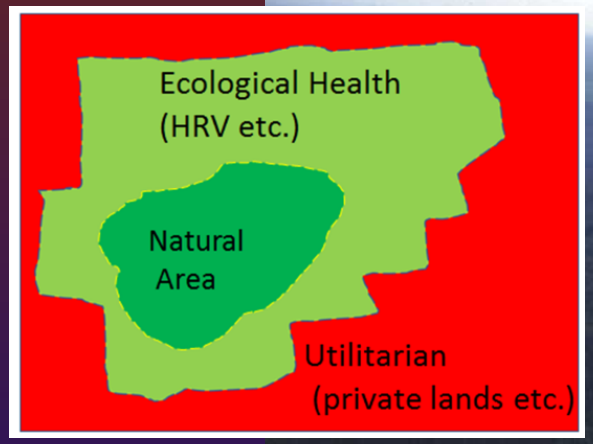


Spatial Integration Of Fire Management:

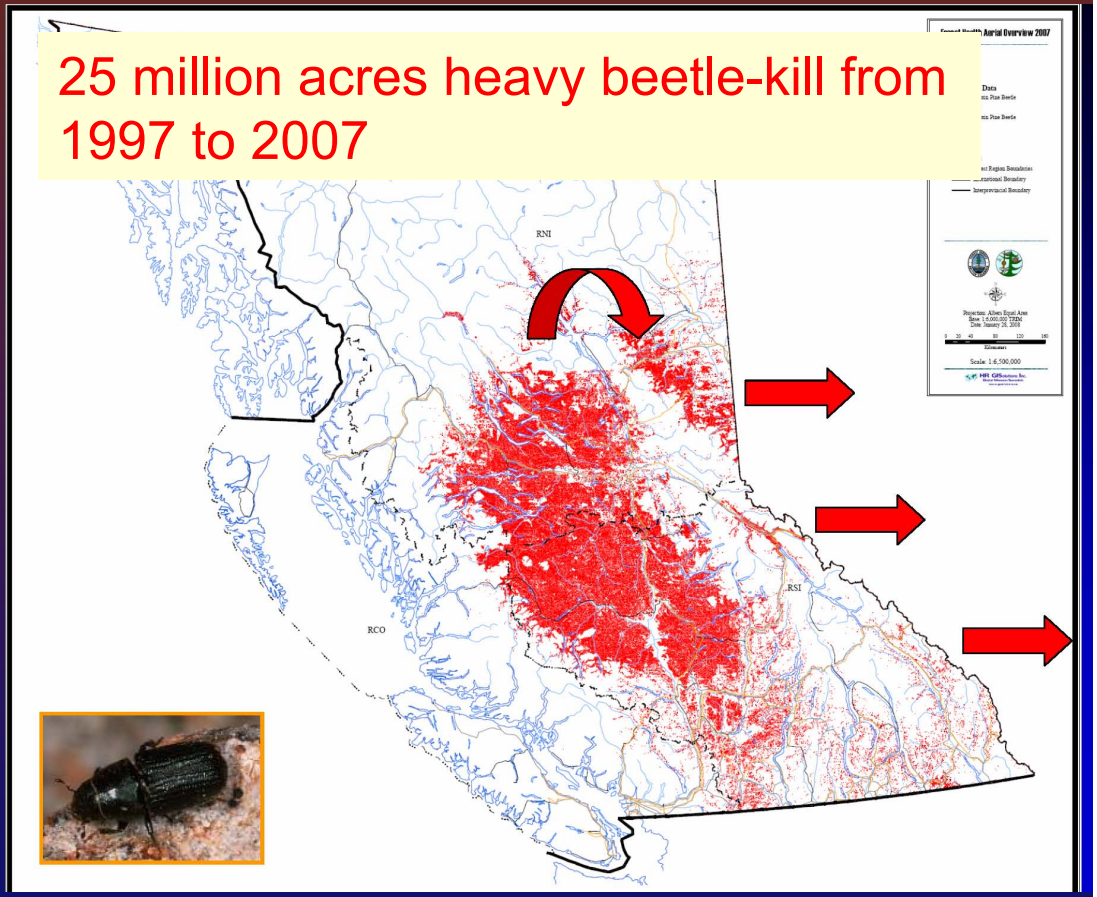
- fire-no fire interface
- managed forest interface
- urban interface

“FIRE-NO FIRE” INTERFACE

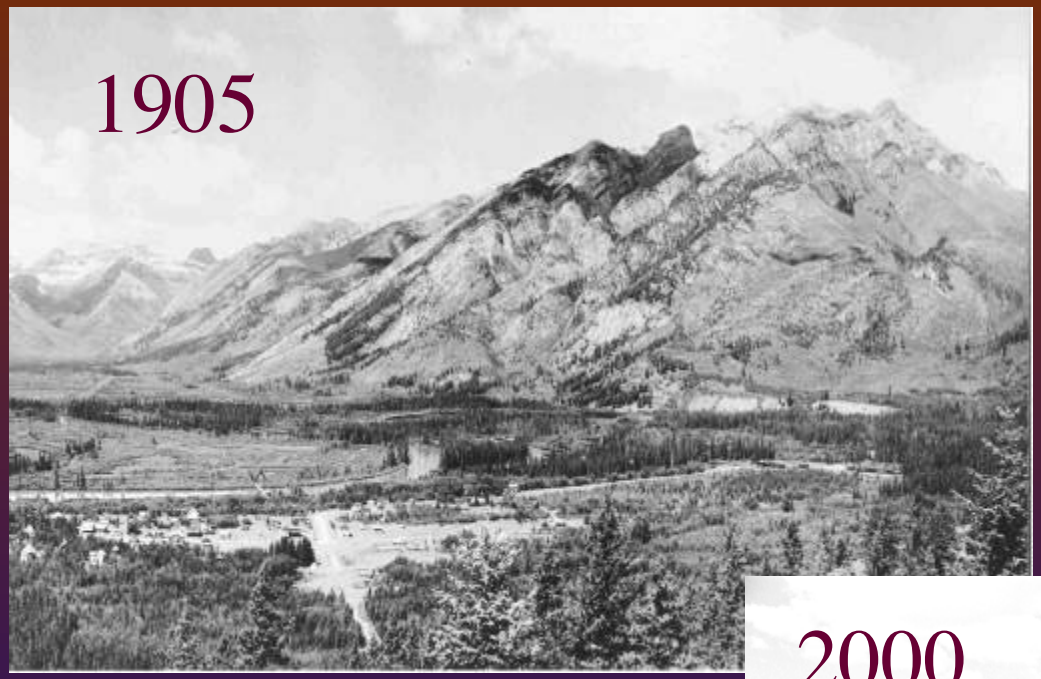
Evening burnout on a park boundary



IMPLEMENTING A “FIRE-NO FIRE ZONE”
A Quick Case History

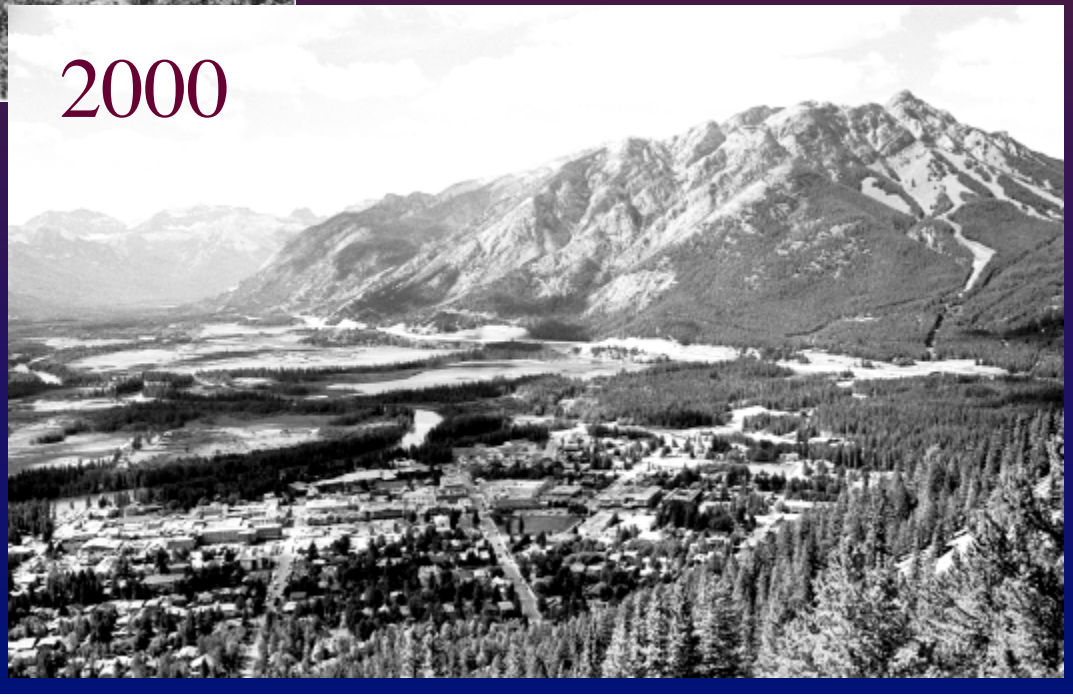


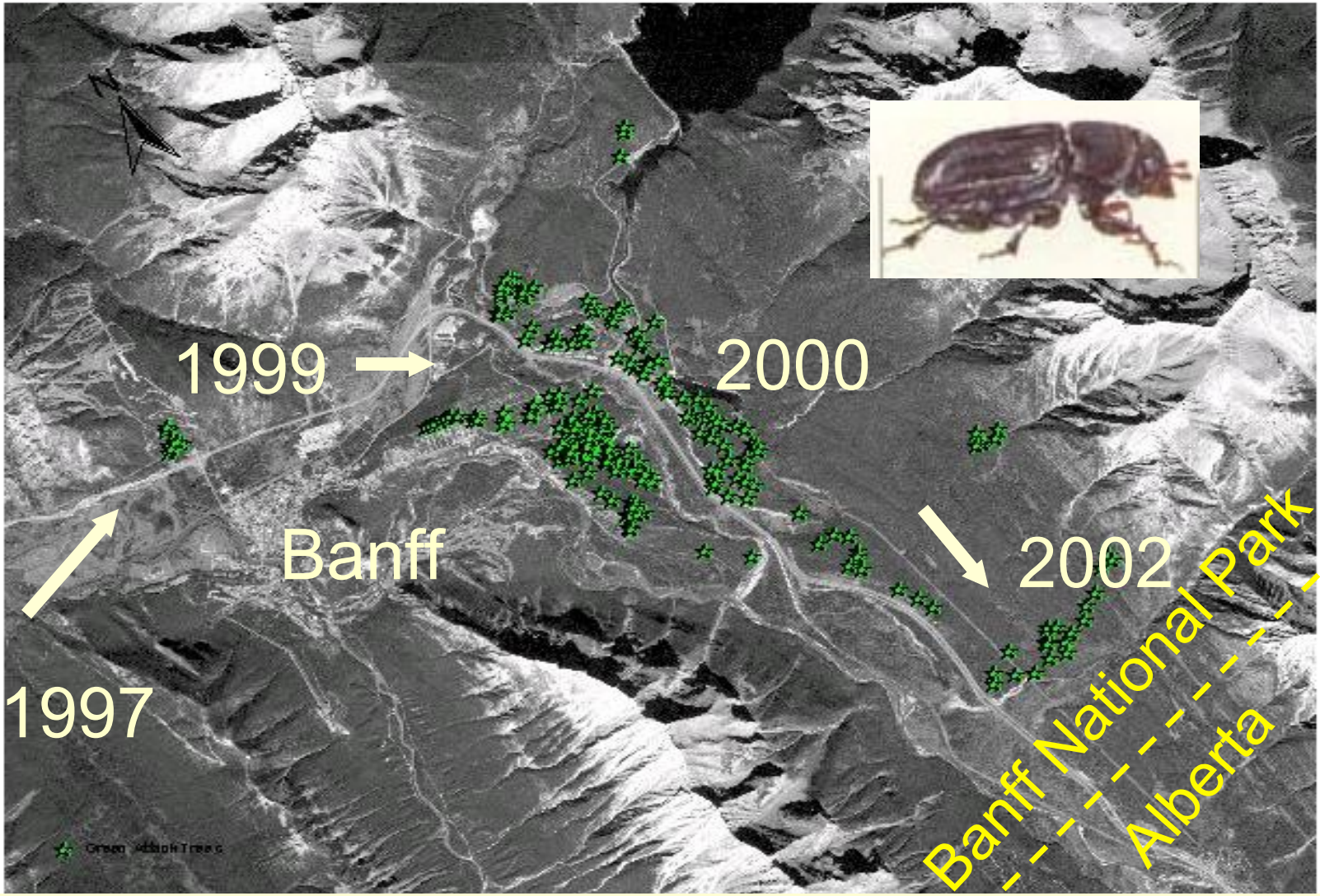
British Columbia



Fire suppression creates high quality mountain pine beetle habitat

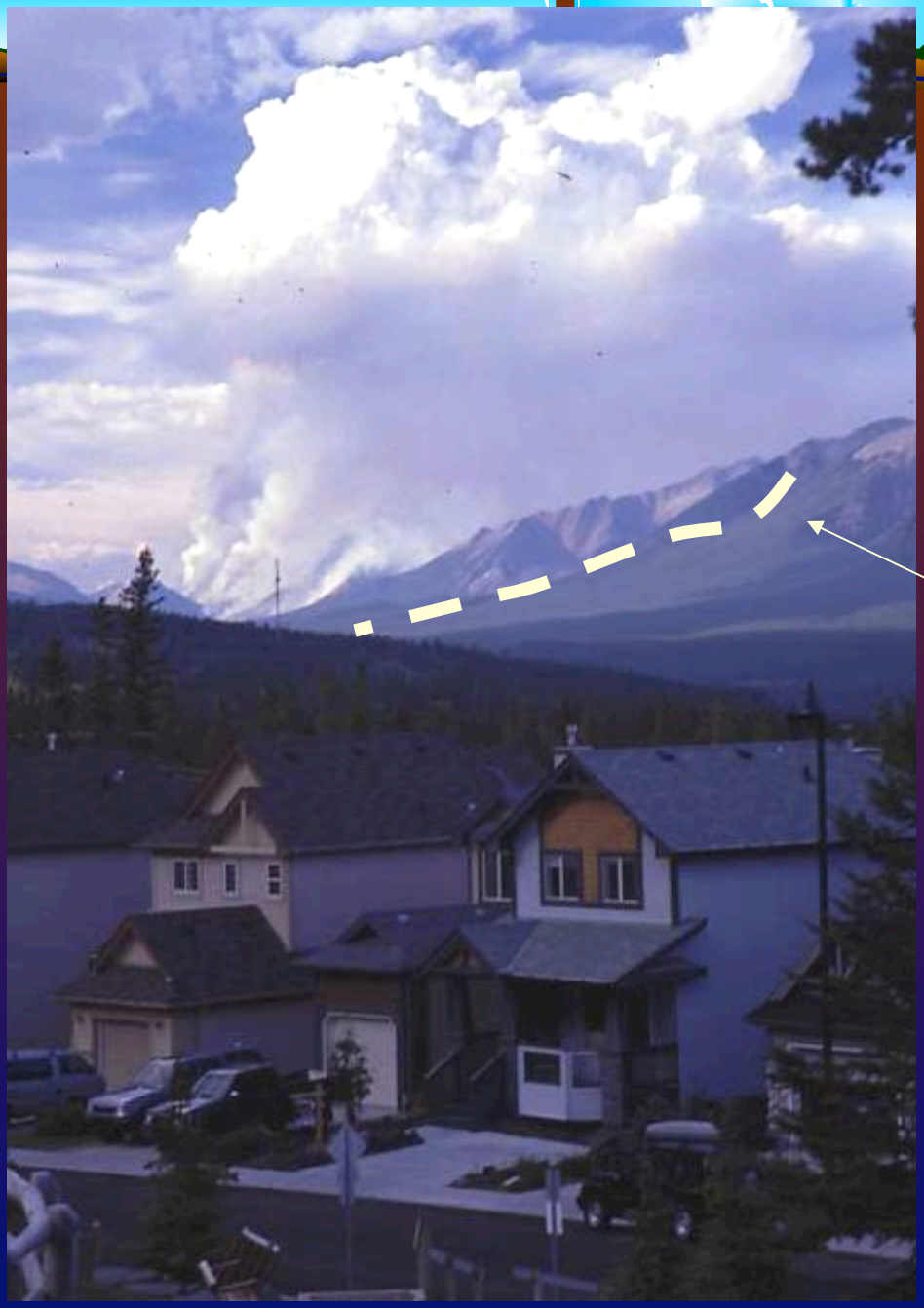
Banff Bow Valley





Mountain pine beetle migration through BNP

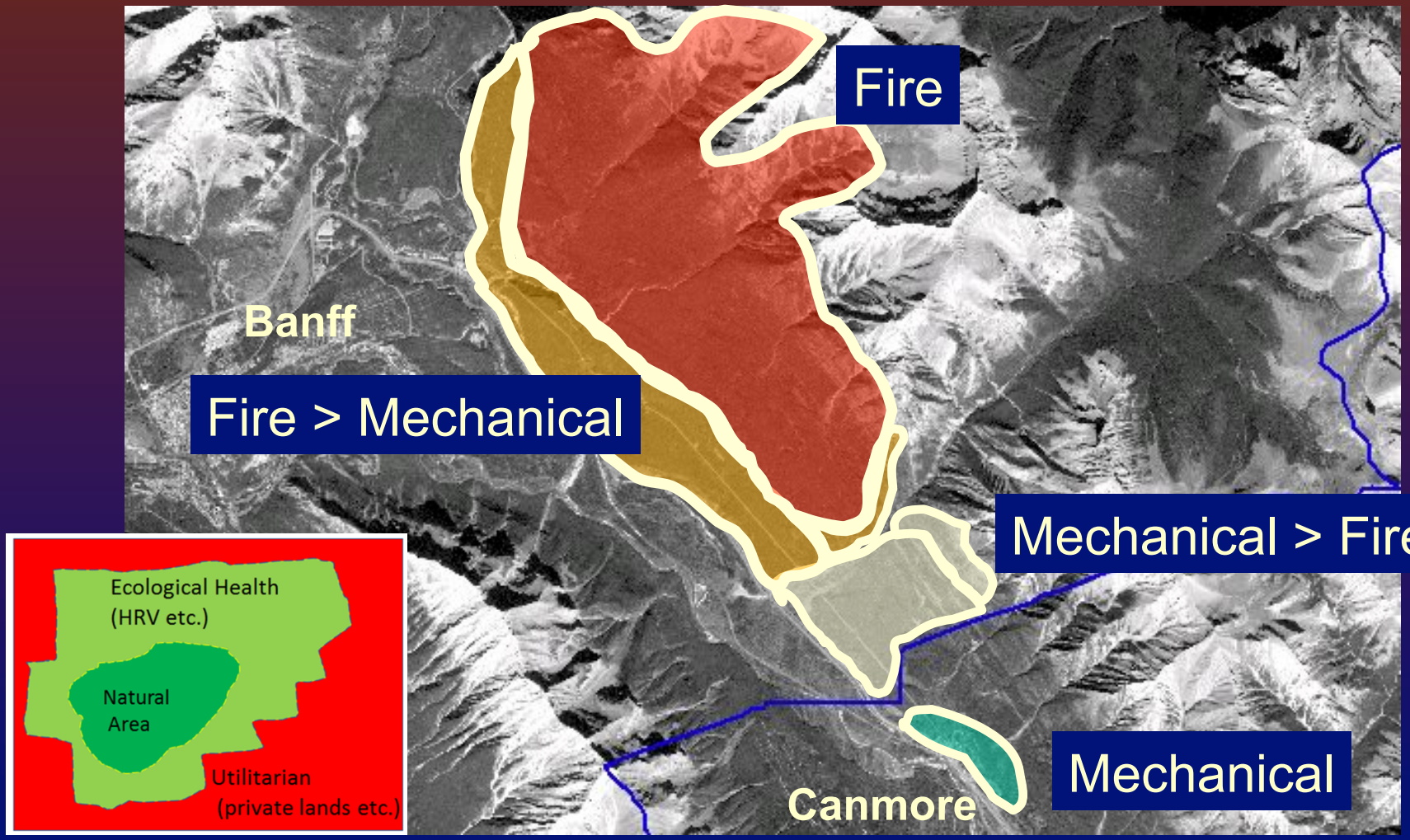

Banff East
Boundary
Survey Line
Bingo Ball Unit 61!!

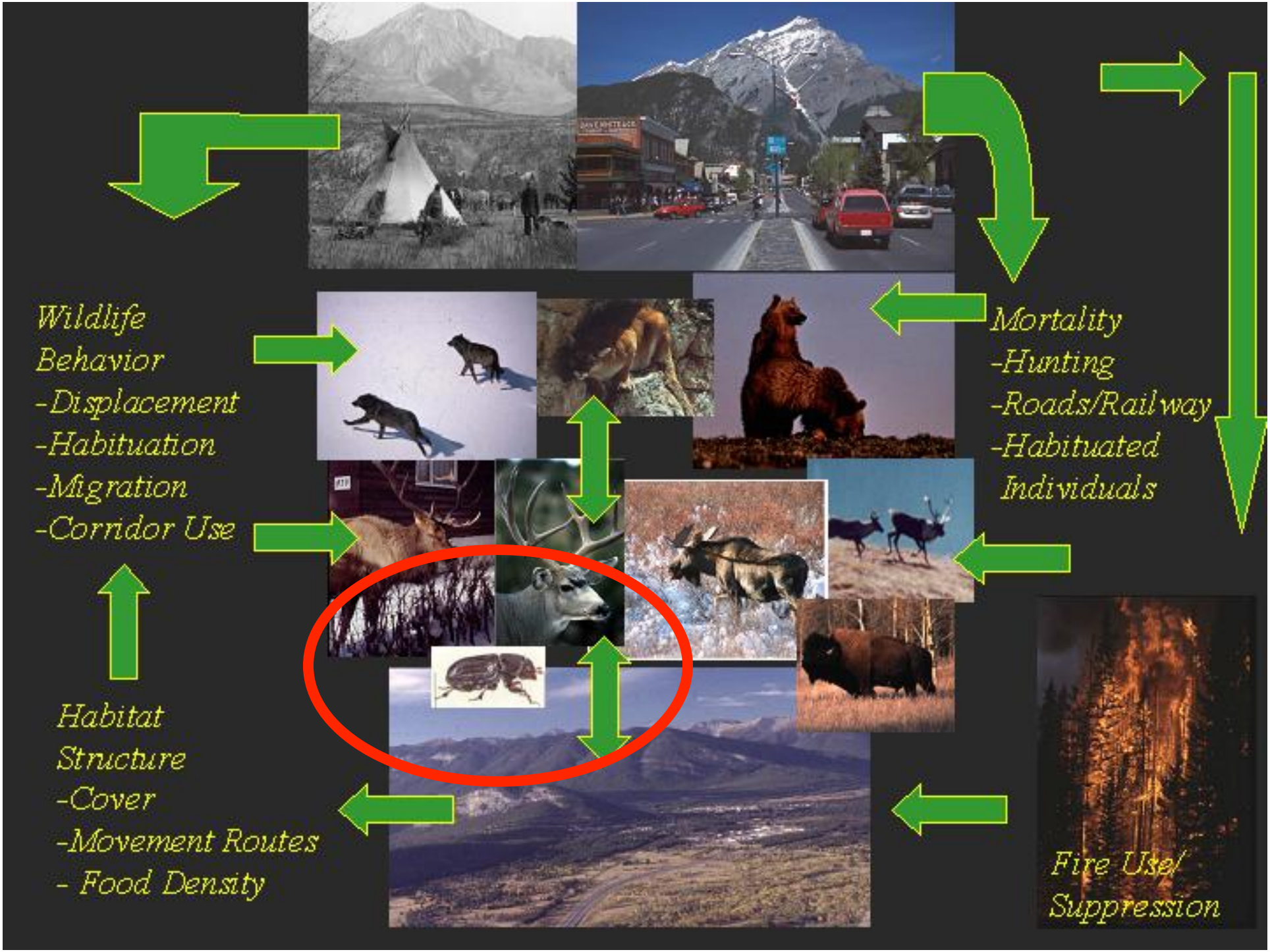


Banff East
Boundary
Fuel Break

Los Alamos, New Mexico
After April, 2000
Cerro Grande Fire

Integrated Landscape-Level Fire Management
Use of a Balanced "Inside-out" Approach



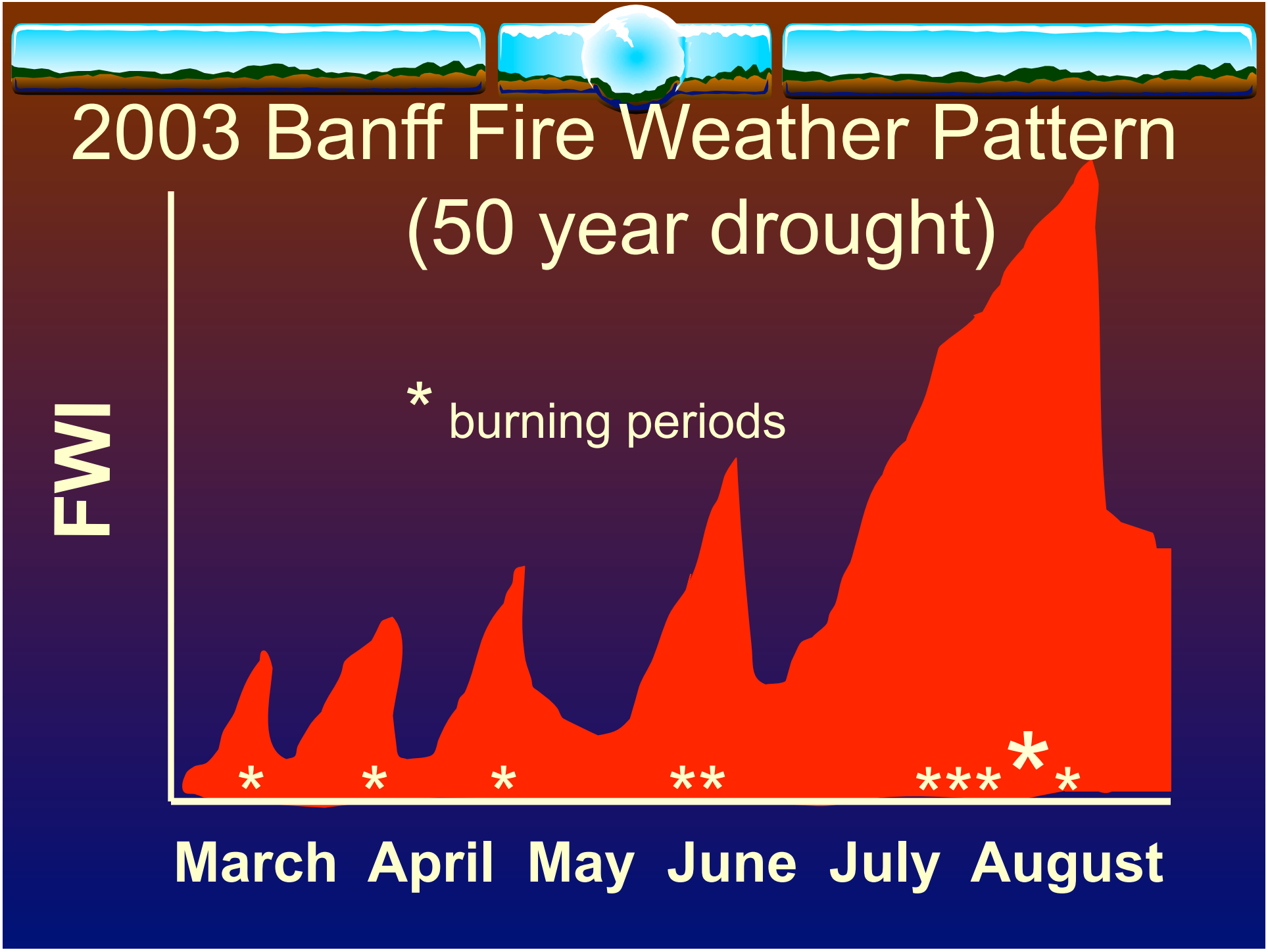

Wildlife
Behavior
-Displacement
-Habituation
-Migration
-Corridor Use
Habitat
Structure
-Cover
-Movement Routes
- Food Density
Mortality
-Hunting
-Roads/Railway
-Habituated
Individuals
Fire Use/
Suppression

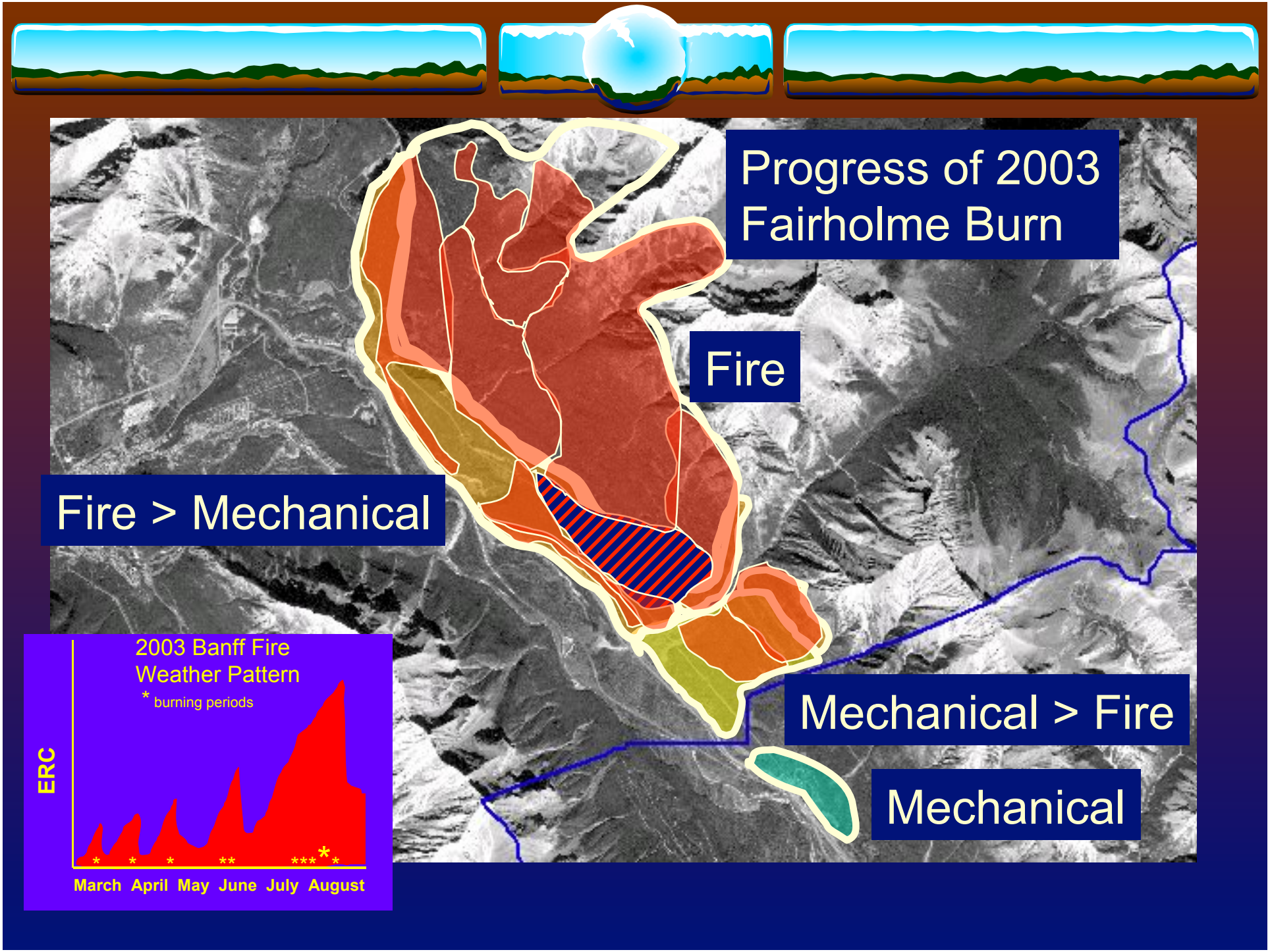
700 truck loads of logs from legislated wilderness with stakeholder support

Banff Boundary Fuel Break Project (March, 2002)

Banff National Park
East Boundary Fuelbreak

2003 Banff Fire Weather Pattern (50 year drought)



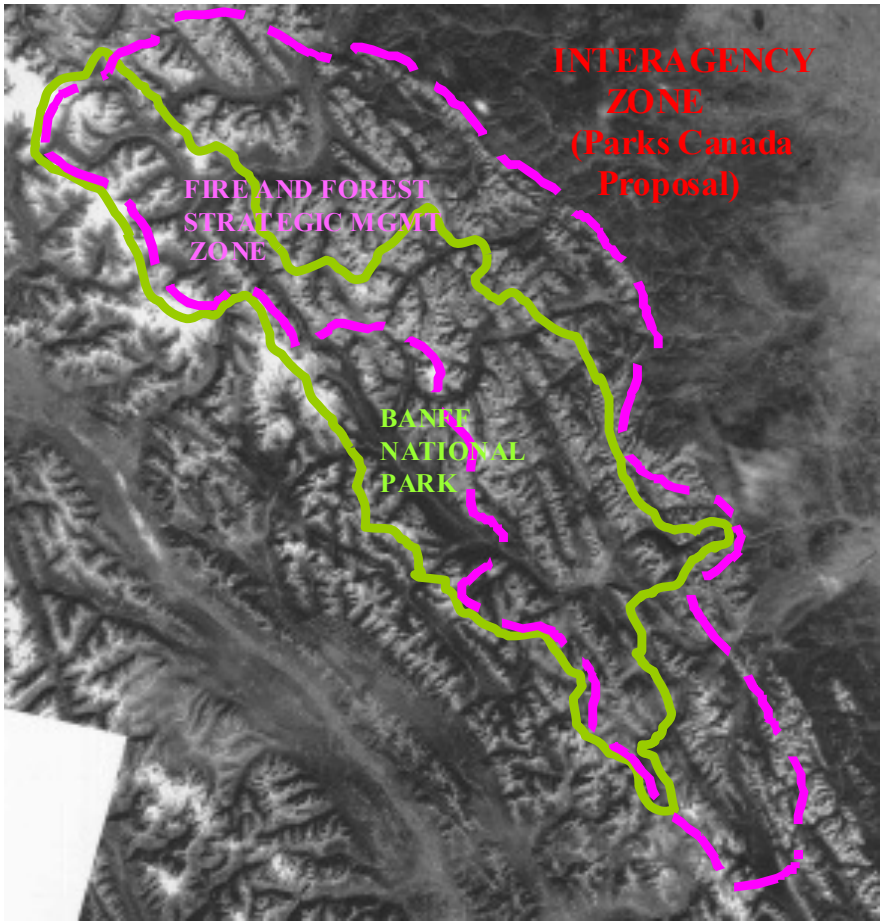

Progress of 2003
Fairholme Burn
Fire
Fire > Mechanical
Mechanical > Fire
Mechanical
2003 Banff Fire
Weather Pattern
* burning periods
ERC
March April May June July August

Burn Run,
Banff Boundary
August 15, 2003
(held by spring burns and fuelbreak)

View from town of Canmore

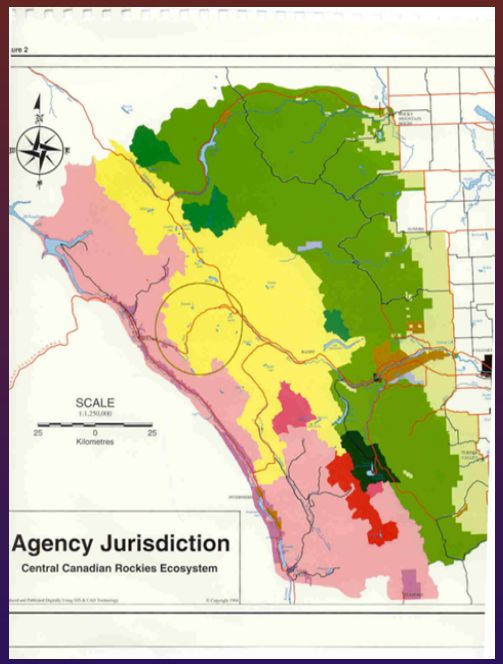
Interagency Cooperative Zones for Fire and Pine Beetle Management

PROUDLY BRINGING YOU CANADA AT ITS BEST

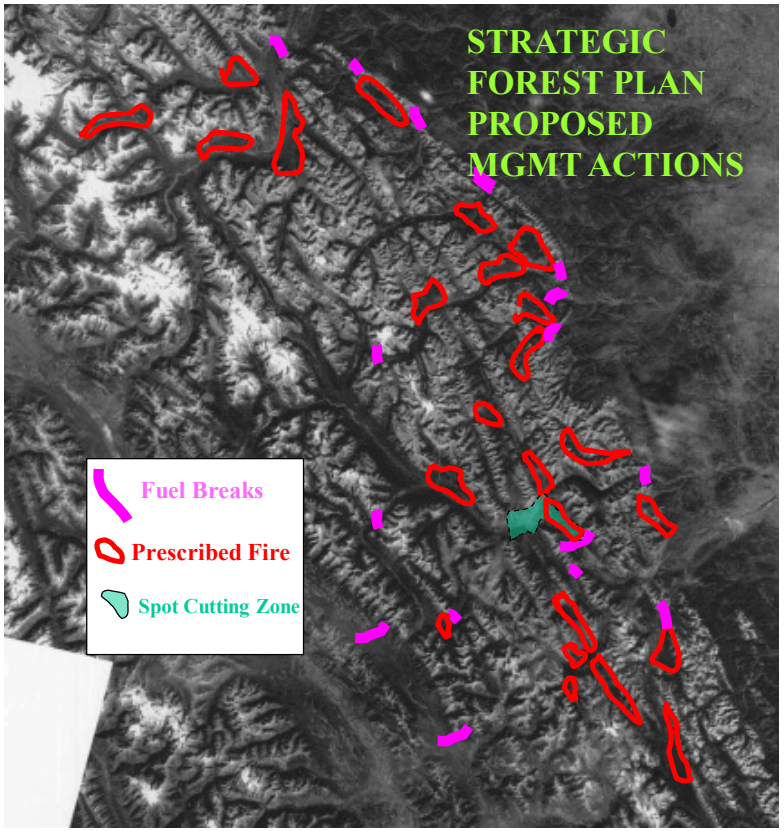


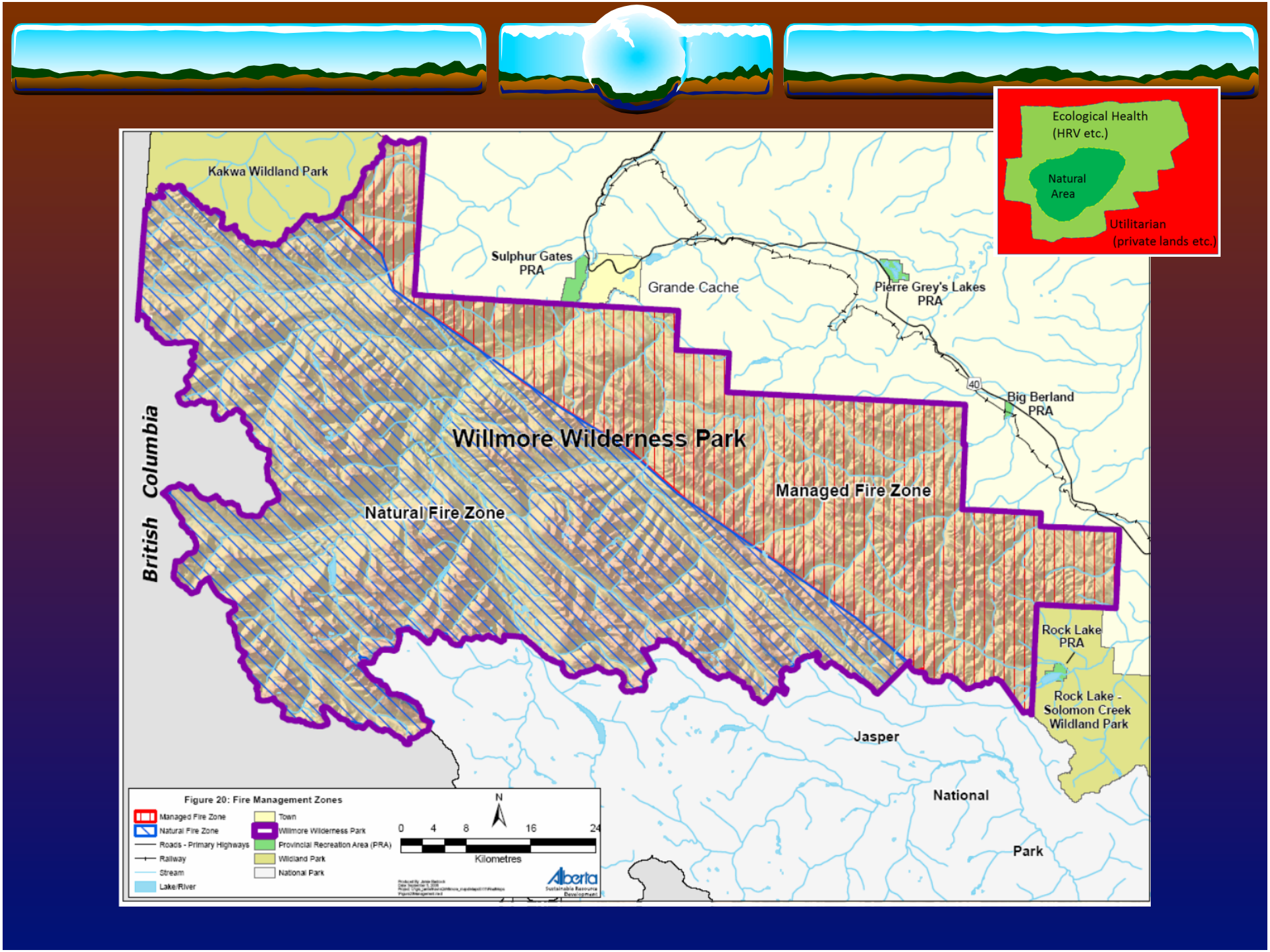
Parks Canada Parcs Canada

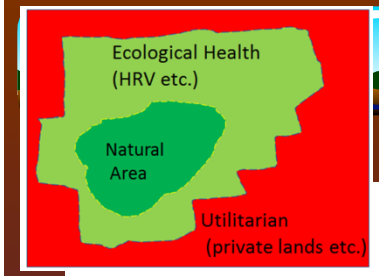
Central Rockies Interagency Strategic Fuel Breaks and Planned Ignition Fires



Rationalizing the "fire-no fire" interface




Ecological Health
(HRV etc.)
Natural
Area
Utilitarian
(private lands etc.)
Kakwa Wildland Park
Sulphur Gates
PRA
Grande Cache
Pierre Grey's Lakes
PRA
40
Big Berland
PRA
British Columbia
Willmore Wilderness Park
Managed Fire Zone
Natural Fire Zone
Rock Lake
PRA
Rock Lake -
Solomon Creek
Wildland Park
Jasper
National
Park
Figure 20: Fire Management Zones
Managed Fire Zone
Natural Fire Zone
Roads - Primary Highways
Railway
Stream
Lake/River
Town
Willmore Wilderness Park
Provincial Recreation Area (PRA)
Wildland Park
National Park
N
0 4 8 16 24
Kilometres
Alberta
Sustainable Resource
Development



USDA

United States
Department of
Agriculture

Forest
Service

December 2010

Correction
January 2011

Proposed Action

Teton to Snake Fuels Management Project

Jackson Ranger District, Bridger-Teton National Forest
Teton and Lincoln Counties, Wyoming

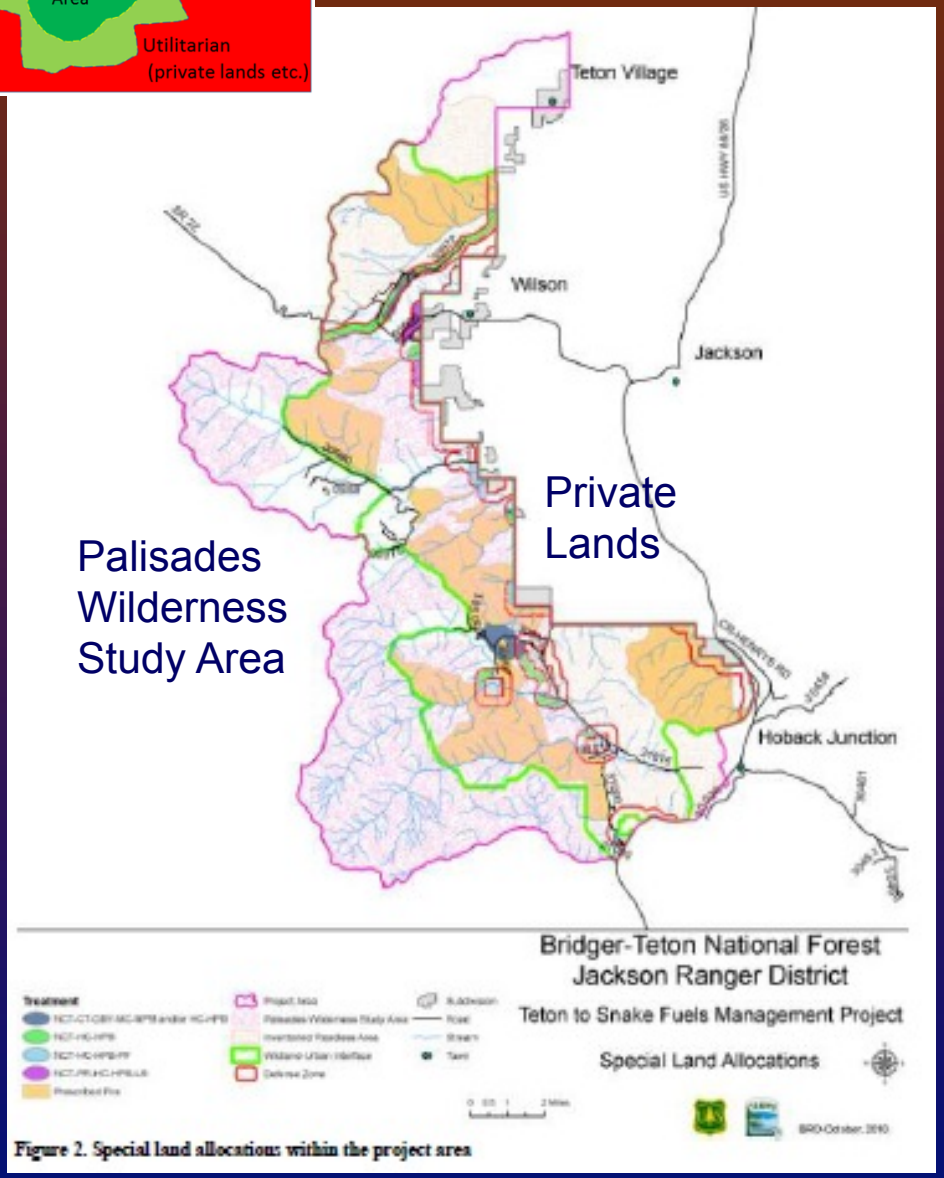


Figure 2. Special land allocations within the project area

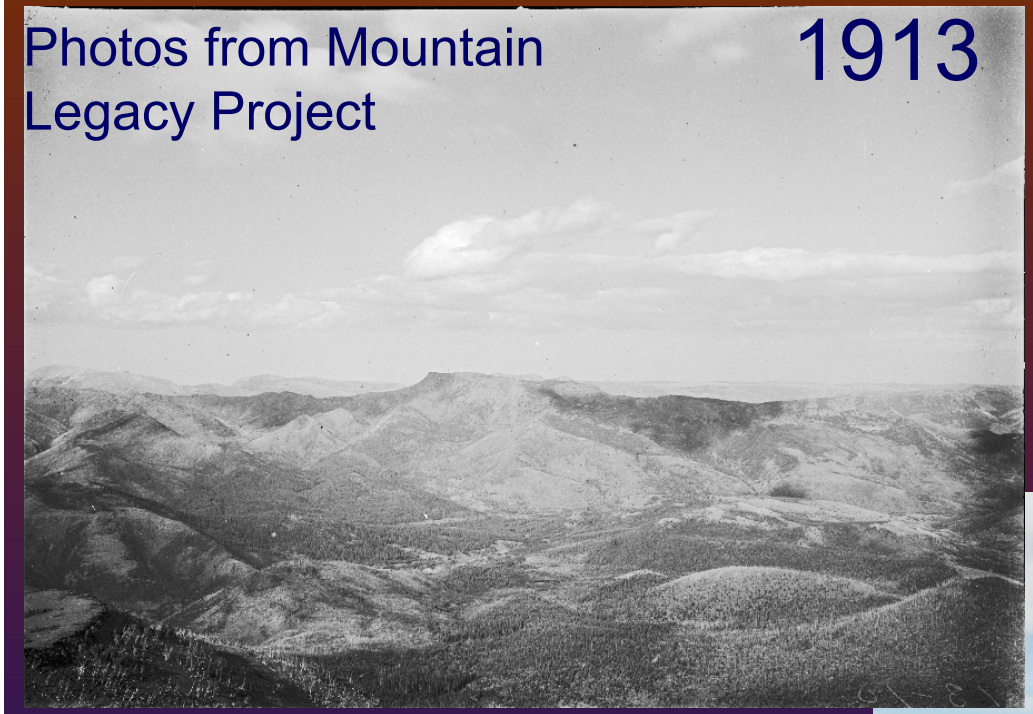
Teton Village

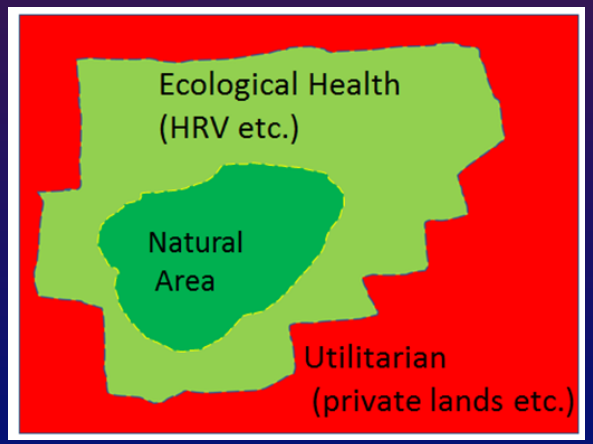
MANAGED FOREST INTERFACE:

Legal obligation to maintain ecological health

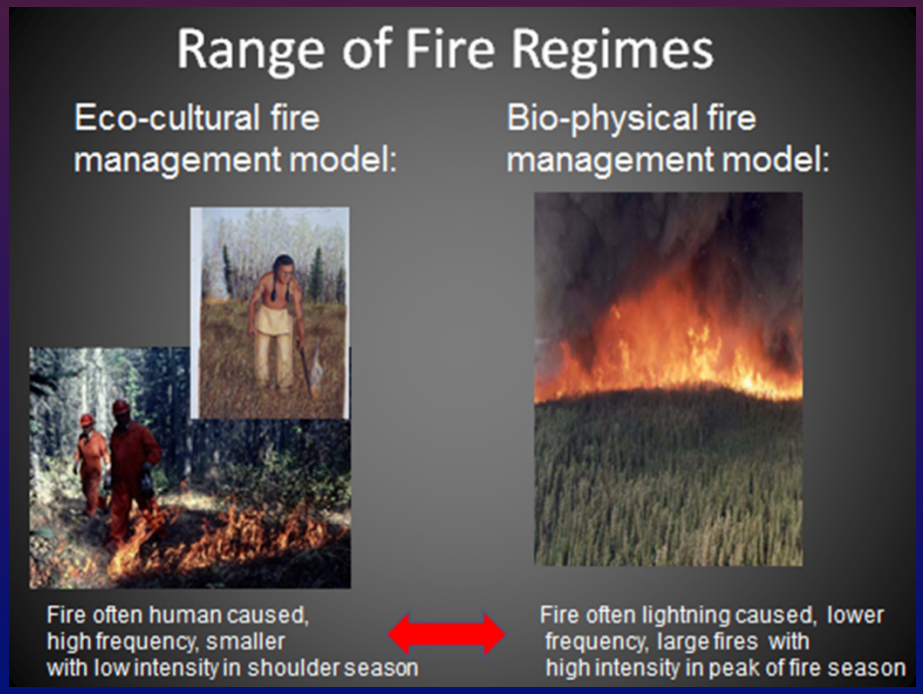
Photos from Mountain Legacy Project

1913





2008



Fire and forest management relatively easily integrated in high frequency-low severity regimes…

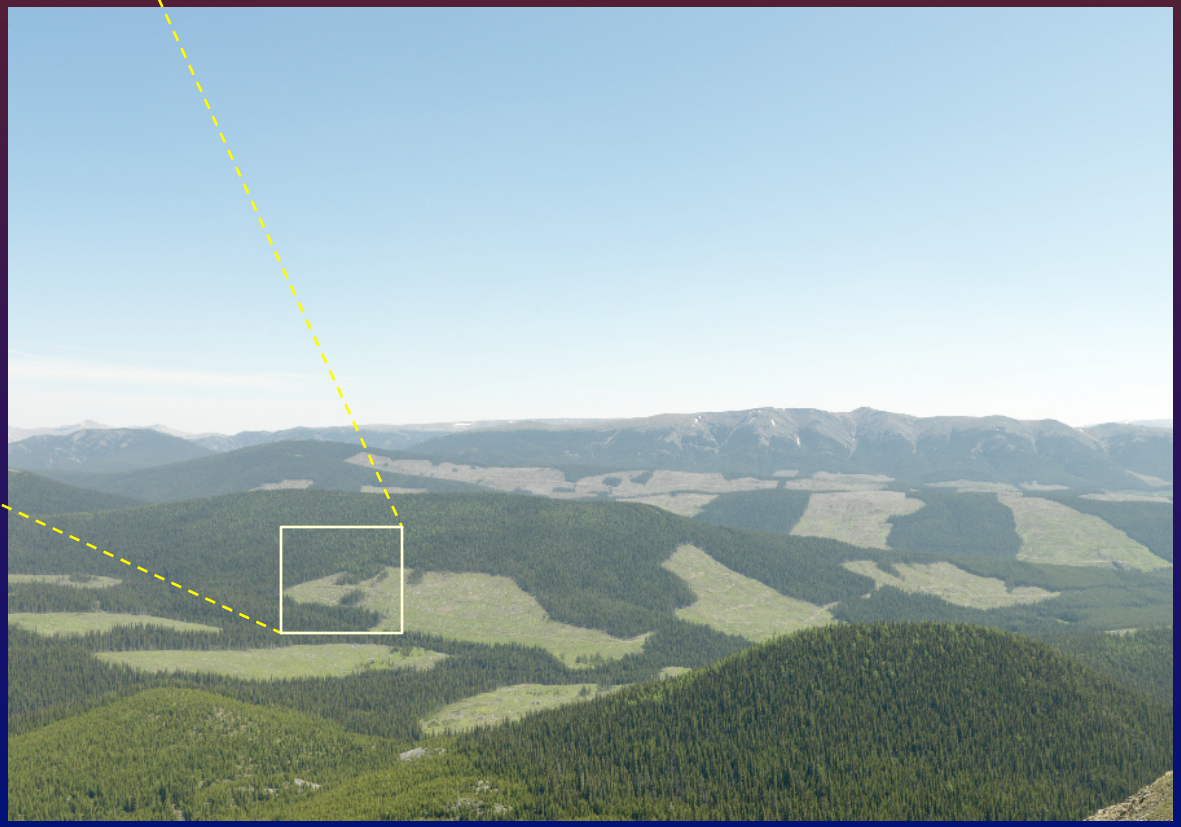
but what about moderate and high severity areas??

Comparisons between wildfire and forest harvesting and their implications in forest management

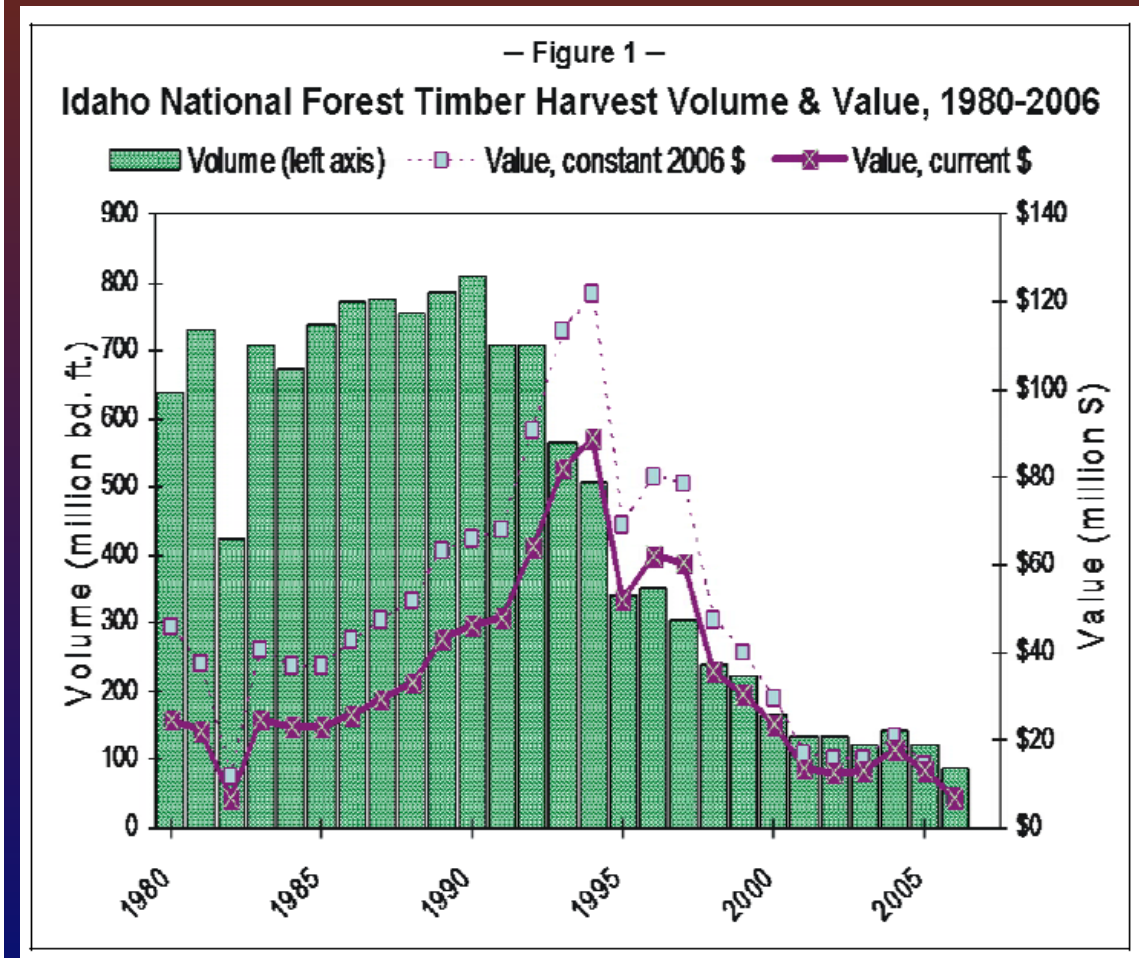
D.J. McRae, L.C. Duchesne, B. Freedman, T.J. Lynham, and S. Woodley

Logging may partially emulate fire at a site level, but not at a landscape level.

Whitebark pine conservation in SW Alberta: Does fire suppression, clearcutting, and "leave trees"= ecosystem health??



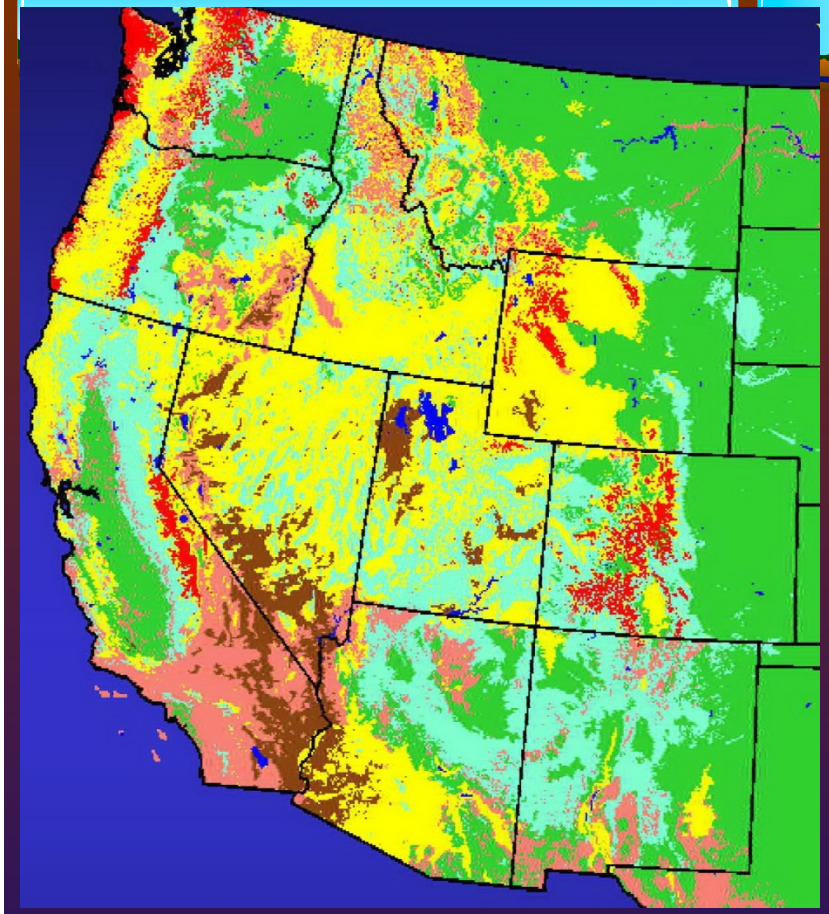
THE UNITED STATES SITUATION



Source: Compiled from U.S. Forest Service data [Ref. #3].

Ongoing litigation and appeal of timber sales have nearly eliminated logging on public lands.

Supreme court has ruled that USFS forest plans must give priority to ecosystem heath over timber harvest



US Fire Policy

1)US fire regimes mapped across all lands (LANDFIRE)

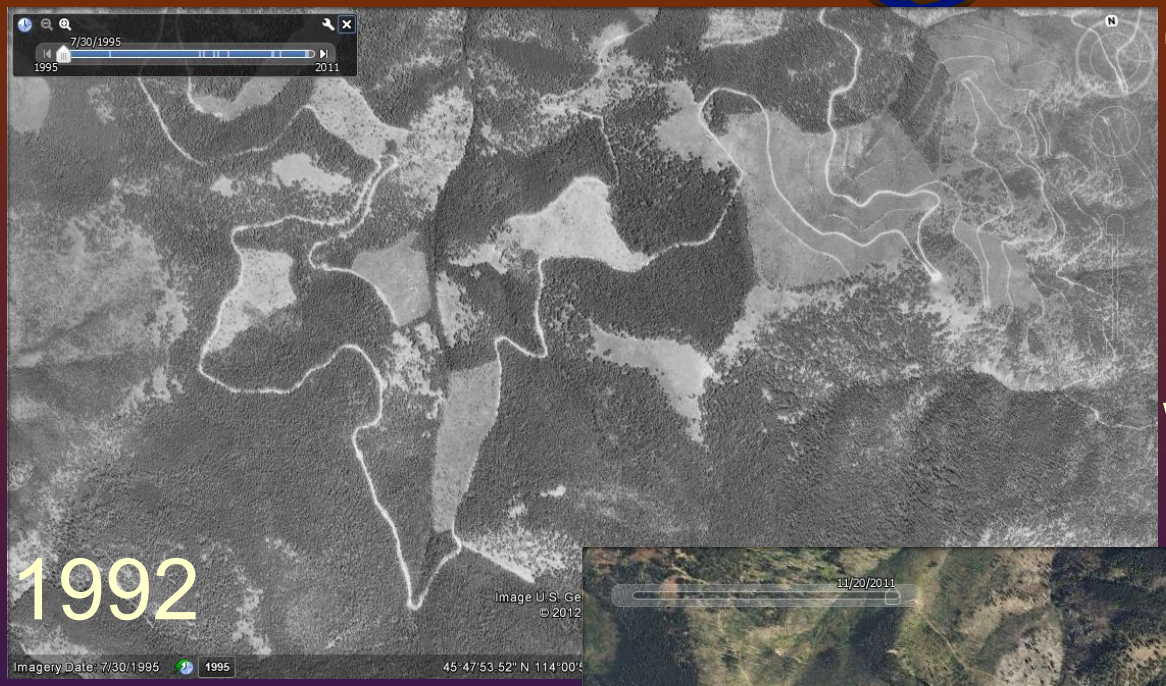
2) Restoration needs prioritized (FCC);

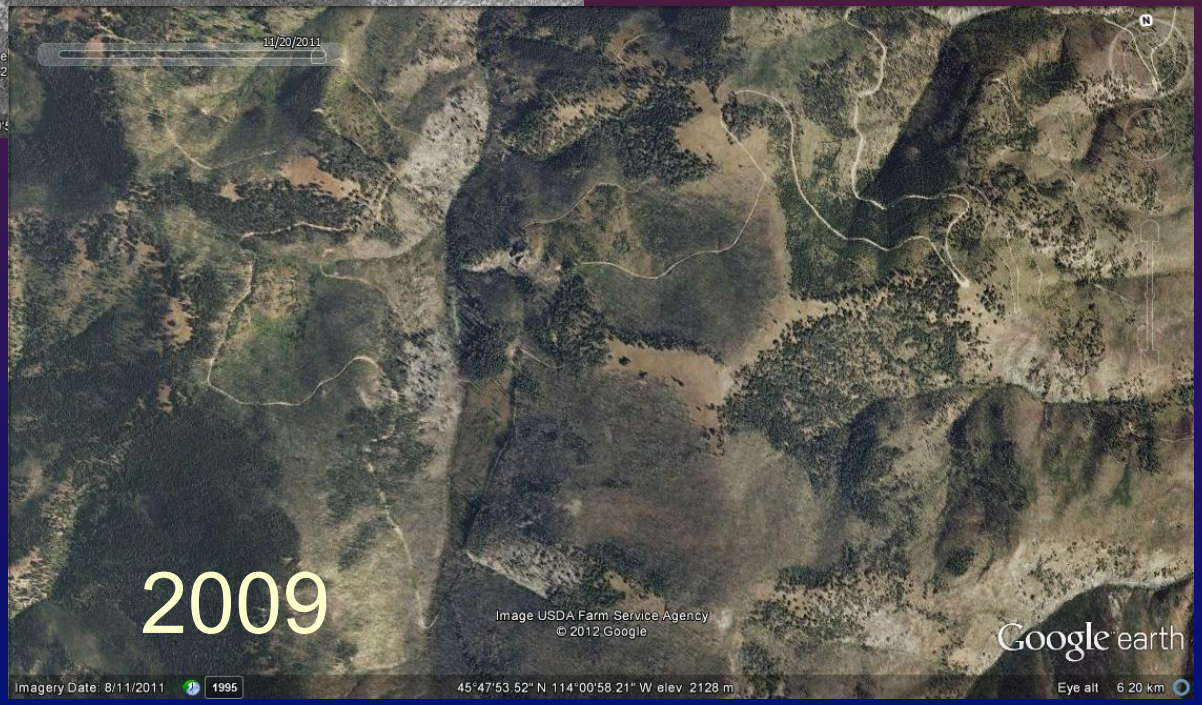
3) Implement “Appropriate Management Response”

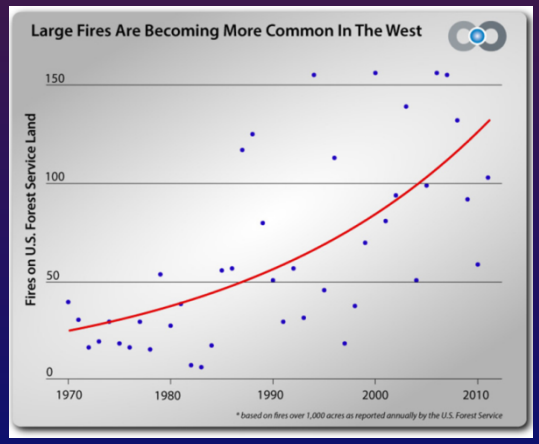
Fire and Ecosystem Mgmt:
(>3200 students since 1976)
Evolving target in many districts is to burn >1% area year

"Appropriate Management Response" in Y2Y:

USDA National Forest West Fork Bitterroot River, Montana



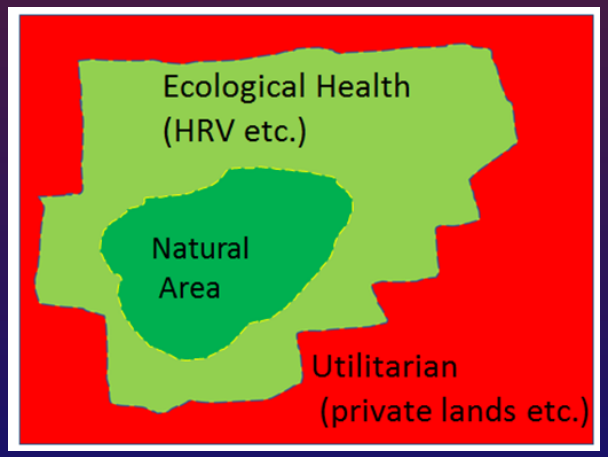




M580 grads in action!!

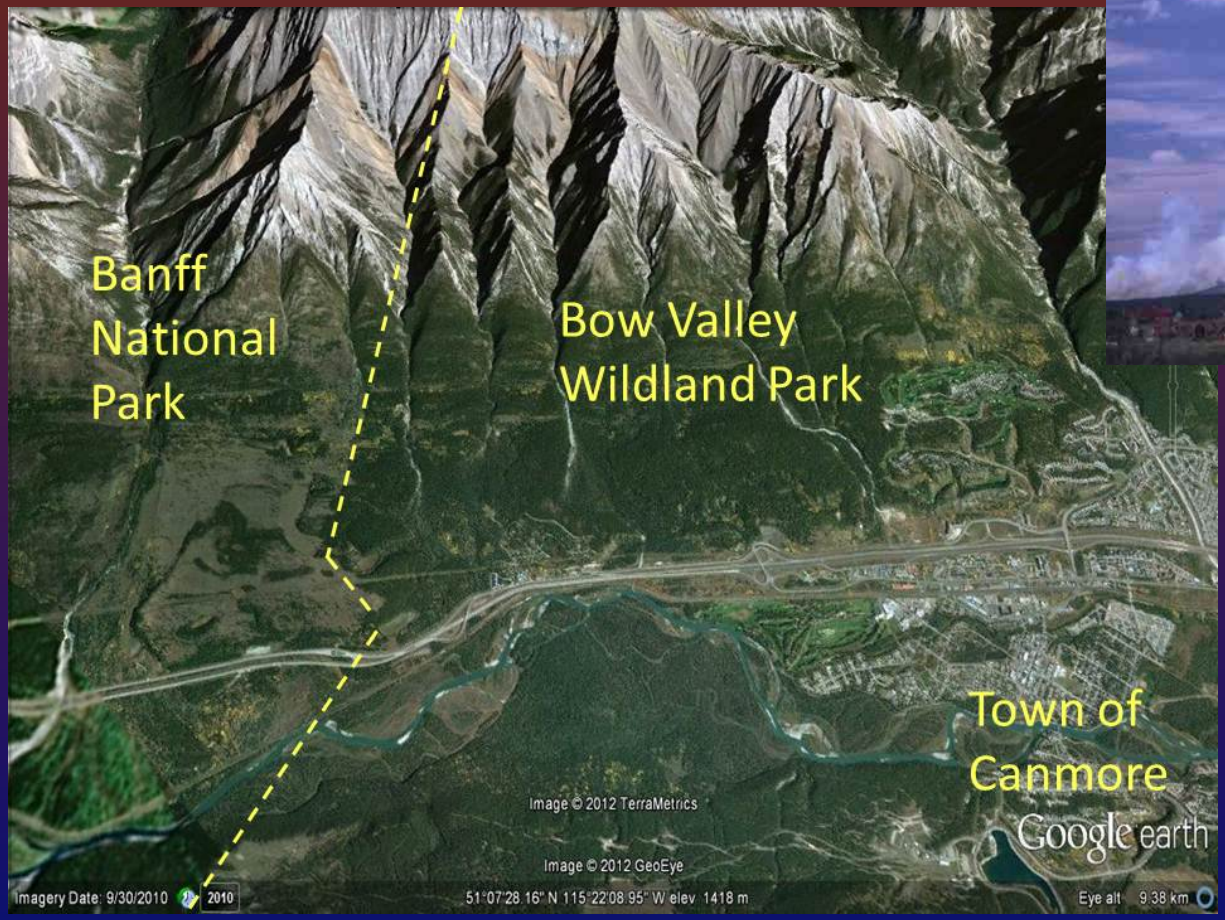
MANAGED FOREST INTERFACE:

Design cutblocks and schedule timber harvesting to encourage periodic landscape level use of fire (random and planned ignition)

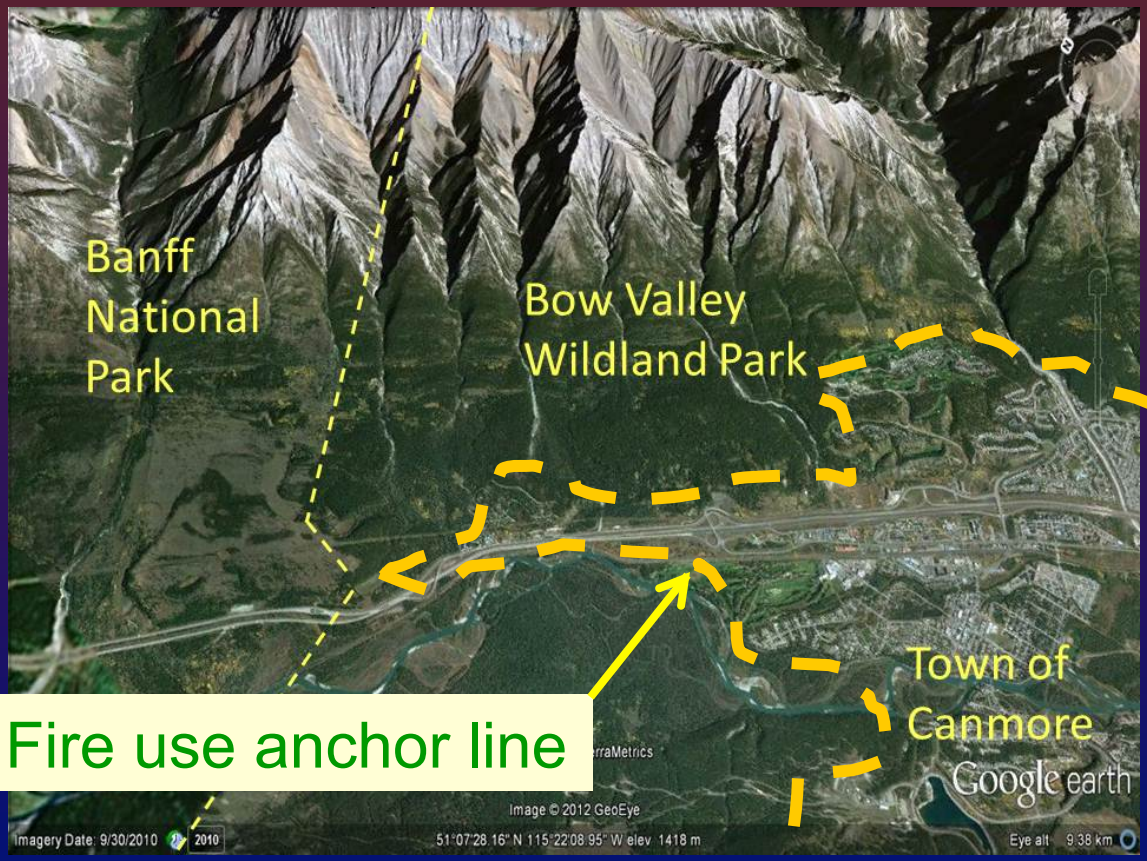


Remember: “Nature Bats Last”

FUTURE MANAGEMENT OF THE URBAN INTERFACE



REQUIRE THAT "**FIRE USE ANCHOR LINES**" BE MAPPED AND MAINTAINED AS PART OF ALL INTERFACE PLANS

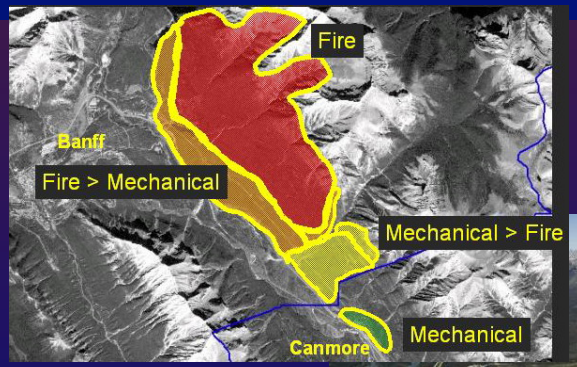


All properties immediately adjacent to a fire use line, or that are inholdings within a potential fire use zone will have special zoning requirements in addition to normal FireSmart practices

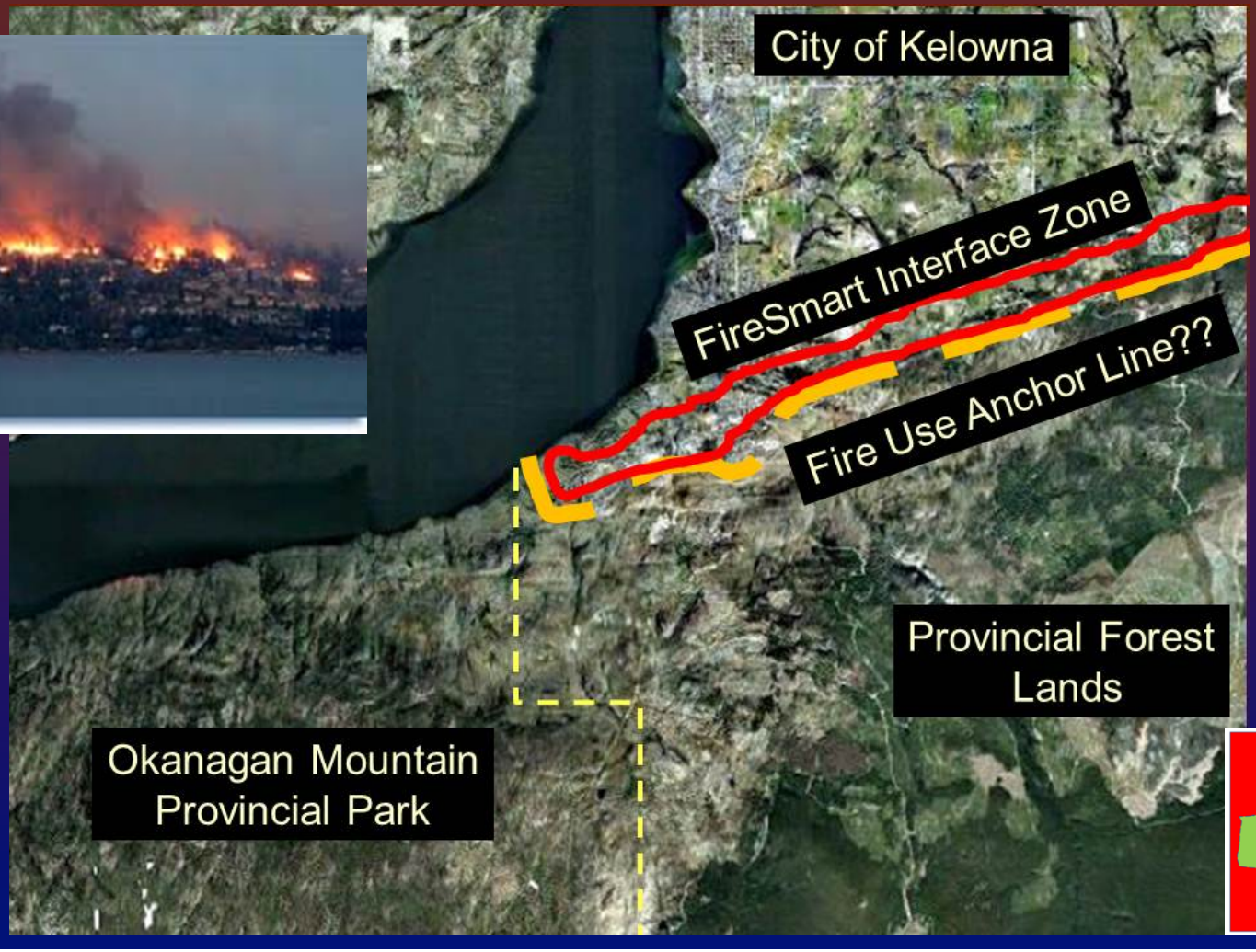
“FIRE USE ANCHOR LINE” LAND OWNER REQUIREMENTS TO ENGAGE CITIZENS AND PRIVATE INDUSTRY IN FIRE MANAGEMENT

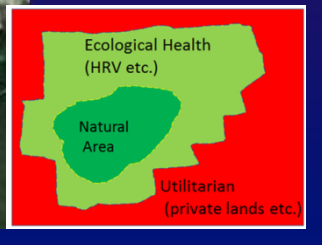
-Land use regulations require FUAL land owners to contract to a licensed fire interface contractor of their choice;
-Contractors will have authority to conduct interface work along property lines and assist agencies in prescribed and wildfire operations (absentee owner issue solved);
-Contractors have authority to train owners to “Stay and defend” under their direction;
-Who Pays?? interface zone tax, mandated insurance industry incentives, agency payments for resource benefits

Municipal and Volunteer Fire Departments could be key “Fire Use Anchor Line” contractors:
(e.g. Banff and Canmore fire departments doing spring maintenance burns on Carrot Creek fuelbreak).



WILDLAND FIRE CANADA 2014: "INTEGRATED LANDSCAPE FIRE MANAGEMENT AWARD"??

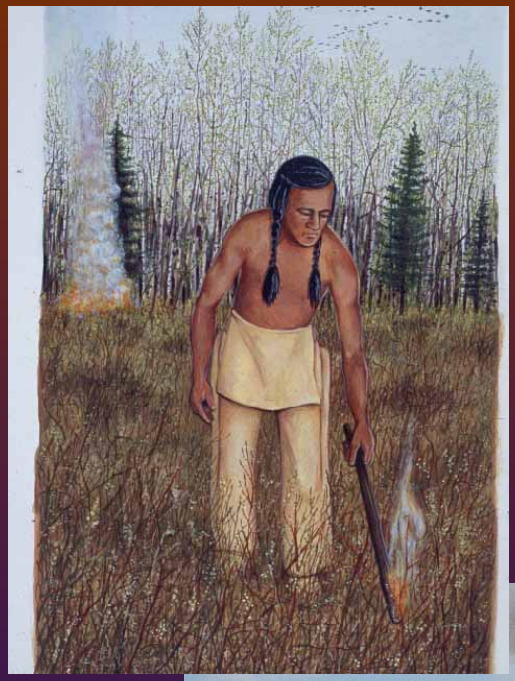


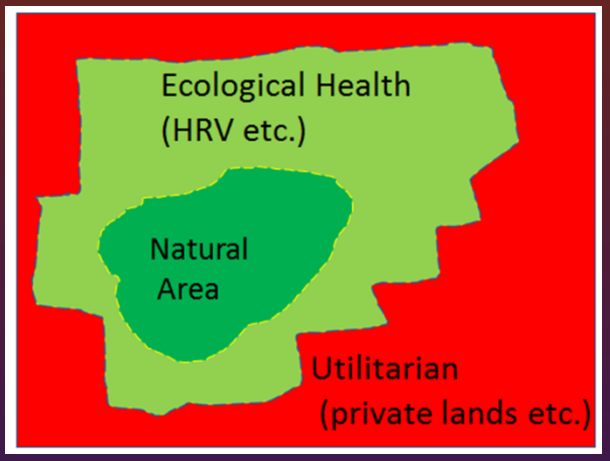



Yellowstone to Yukon
Protected Areas
Fort Good Hope
Dawson
Fort Norman
YUKON TERRITORY
MACKENZIE MOUNTAINS
Fort Simpson
NORTHWEST TERRITORIES
Whitehorse
Watson Lake
Fort Liard
Cassiar
Liard River
Dease Lake
Fort Nelson
Meander River
Telegraph Creek
Fort Vermillion
ALBERTA
Fort McMurray
Fort St. John
Peace River
Dawson Creek
Mackenzie
Grand Prairie
Smithers
Prince George
Edmonton
BRITISH COLUMBIA
McBride
Hinton
Jasper
Pacific Ocean
Clearwater
Banff
Calgary
Canmore
Vernon
Kelowna
Lethbridge
Cranbrook
Vancouver
Cut Bank
Bonners Ferry
Kalispell
MONTANA
Great Falls
Spokane
Lewistown
Missoula
Helena
WASHINGTON
Lewiston
Butte
Billings
Bozeman
Salmon
Cody
Challis
Jackson
OREGON
Boise
Idaho Falls
IDAHO
Pocatello
Twin Falls
WYOMING
Yellowstone to Yukon
CONSERVATION INITIATIVE
LEGEND
Major Highways
Protected Areas
Y2Y Region
70 0 70 140 210 280 350 Km
50 0 50 100 150 200 Miles
January 2005 Big Sky Conservation Institute GIS

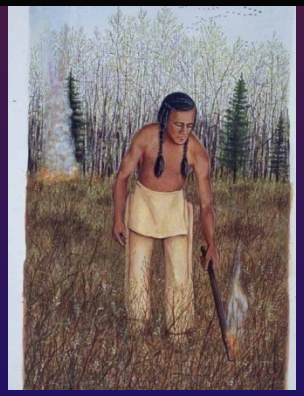

PHOTO SHOP

Ecosystem management is getting complicated!!

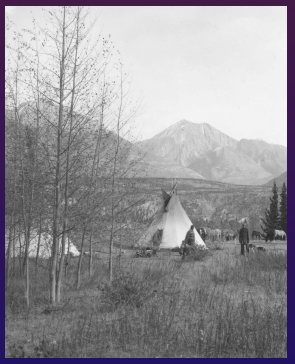


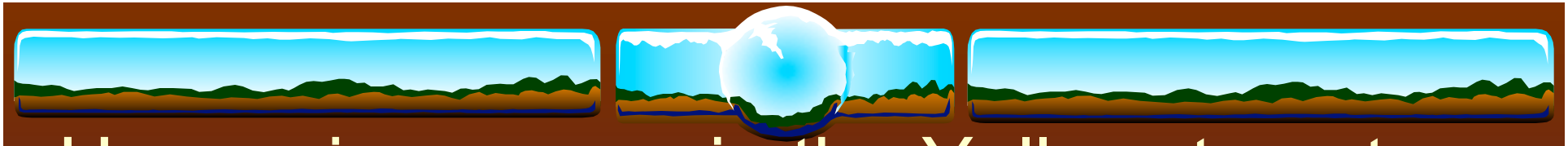


BANFF INDIAN DAYS AND BISON FESTIVAL
By September 2014 (hopefully)



- Join us to celebrate the restoration of bison and First Nation's cultural practices to Banff
- Stoney, Siksika and K'tunaxa First Nations cultural festival
- Cowboy and Indian Poetry
- Rocky Mountain First Nation's Bison Cook-off and BBQ
- Traditional knowledge, prescribed burning and ecosystem restoration workshops





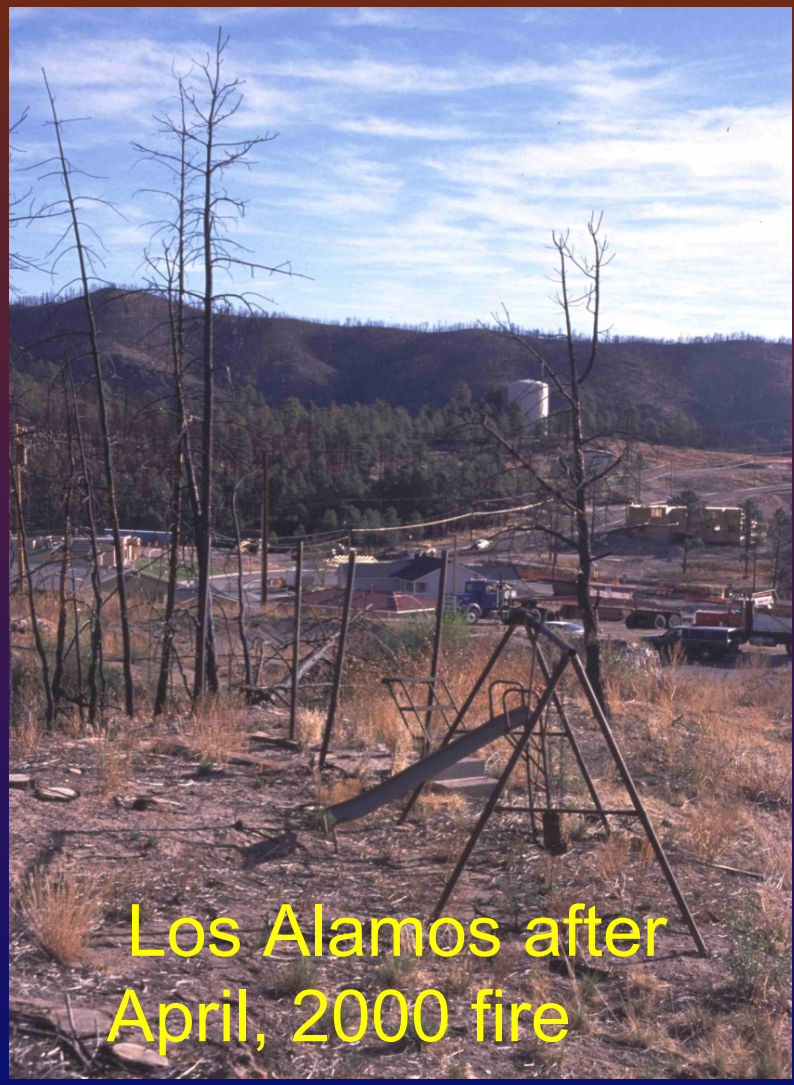
Use various areas in the Yellowstone to Yukon Bioregion (Y2Y) to evaluate fire management futures:

- **ECOLOGICAL AND CULTURAL INTEGRATION:** Linking eco-cultural fire into restoration and maintenance of high value ecosystems;
- **SPATIAL INTEGRATION:**
  1) Fire- No fire interface
  2) Managed forest interface
  3) Urban interface

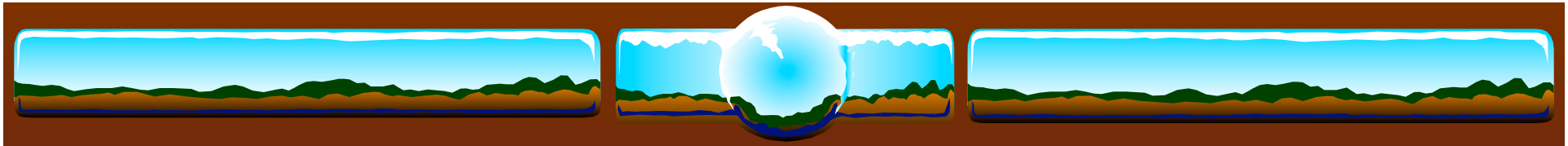
This…

Canmore, May 2003

Not This



Los Alamos after
April, 2000 fire



It seems that whether we like it or not we are about to take over nature's ancient role in the management of fire dependent ecosystems in areas called "wilderness." I suppose that, if nature really is conscious, she must be vastly amused at the trouble we are having duplicating something she has been doing so easily for untold thousands of years.

Charlie Van Wagner 1985

Acknowledgements:

Canadian Forest Service: Charlie Van Wagner, Dennis Dube, Ian Methven, Marty Alexander, Brad Hawkes, Brian Stocks, Kelvin Hirsch, Bill DeGroot, Doug McCrae, Mike Flanigan…

Alberta Government, U Alberta: Ray Hill, Peter Murphy, Dennis Quintilio, Paul Woodward, Cliff Smith, Cliff Henderson, Cordy Tymstra, Eldon Bruns, Rick McArthur, Kelly O'shae, Bruce Mayer….

Parks Canada Ottawa: Dave Lohnes, Nik Lopoukhine

Super Superintendents: Dave Day, Charlie Zinkan, Bill Fisher, Jillian Roulet, Kevin Van Tighem…

Fire Veg Specialists: Ian Pengelly, Mark Heathcott, Brian Low, Jane Park, Carl Cibart, Rob Osoiwy…..

Wildlife Specialists:Tom Hurd, Jesse Whittington, Blair Fyten, Dave Norcross, Tom Davidson, Andrea Kortello, Mark Hebblewhite….

Ecosystem Mgmt and Chief Park Wardens: Dave Dalman, Keith Everts, Bob Haney, Perry Jacobson, Dave Dalman, Ian Syme…

Communications: Heather Dempsey, Mary Dalman, Jackie Syroteuk, Wendy Karhoffer…

QUESTIONS??
(after Brian)