



Wildlife Habitat in Dynamic Landscapes

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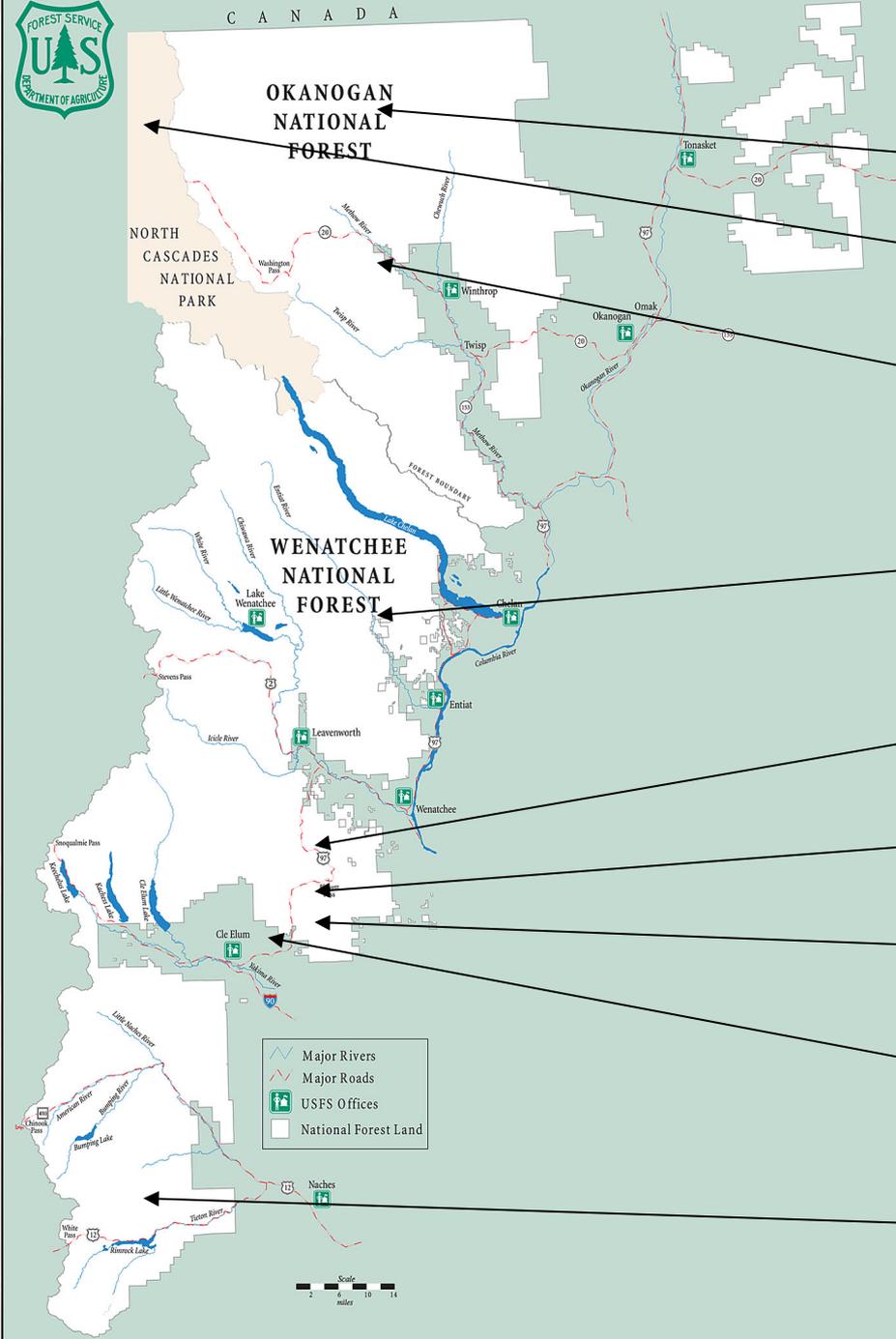
Washington Conservation Science Institute

Pacific Northwest Area Ecology Meeting

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Presentation Outline

- Brief Overview of Fire and Wildlife Ecology
- Fire, Habitat, and Climate Change
- Forest Restoration and Wildlife Habitat
- Lessons Learned So Far



Fire History Studies

Fahnestock 1976

Agee et al. 1990

Ohlson 1996

Everett et al. 2003

Harrod et al. 1999

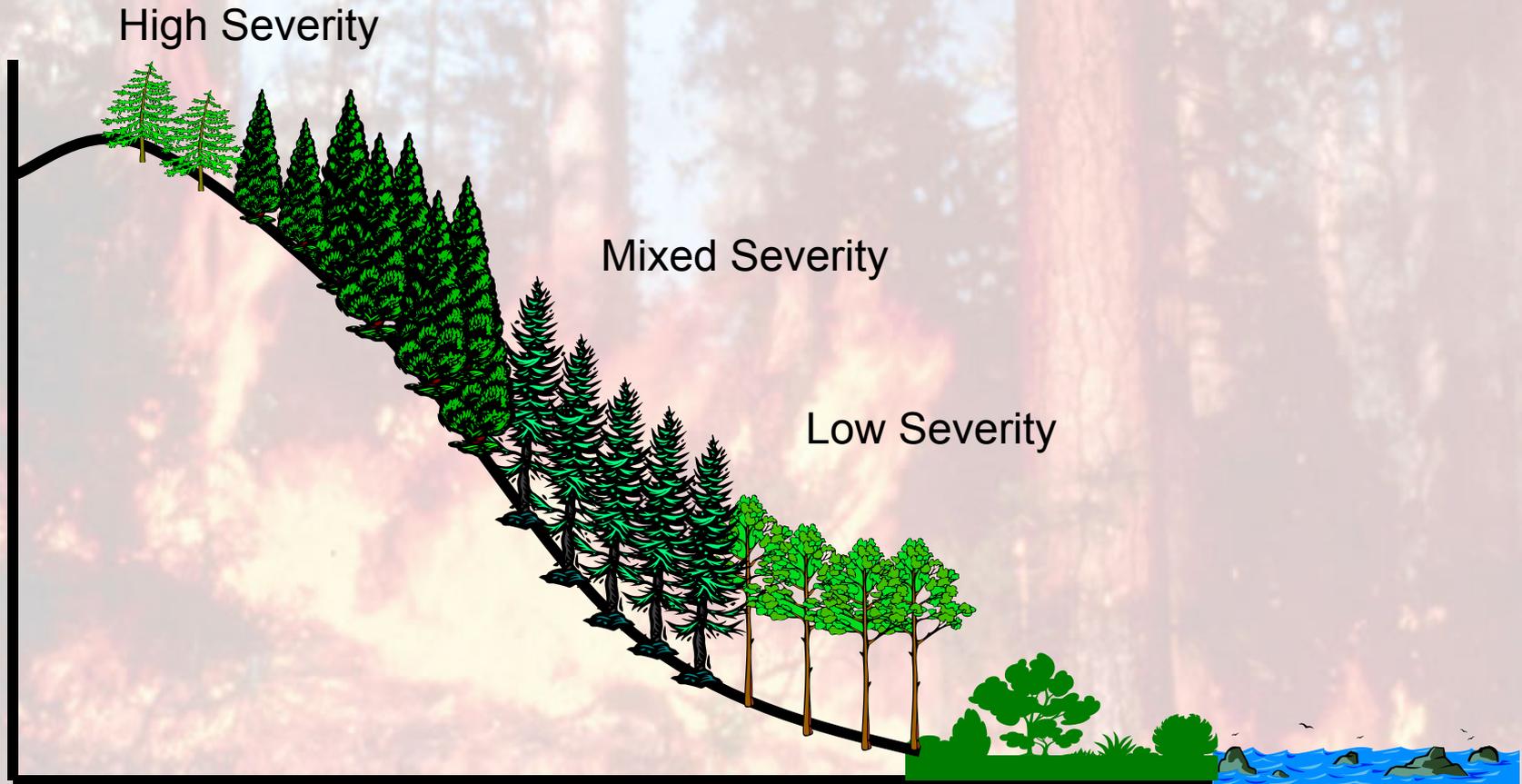
Camp et al. 1997

Everett et al. 1997

Wright and Agee 2004

Everett et al. 2000

Fire Disturbance Ecology



**Whitebark
Pine**

**Subalpine
forests**

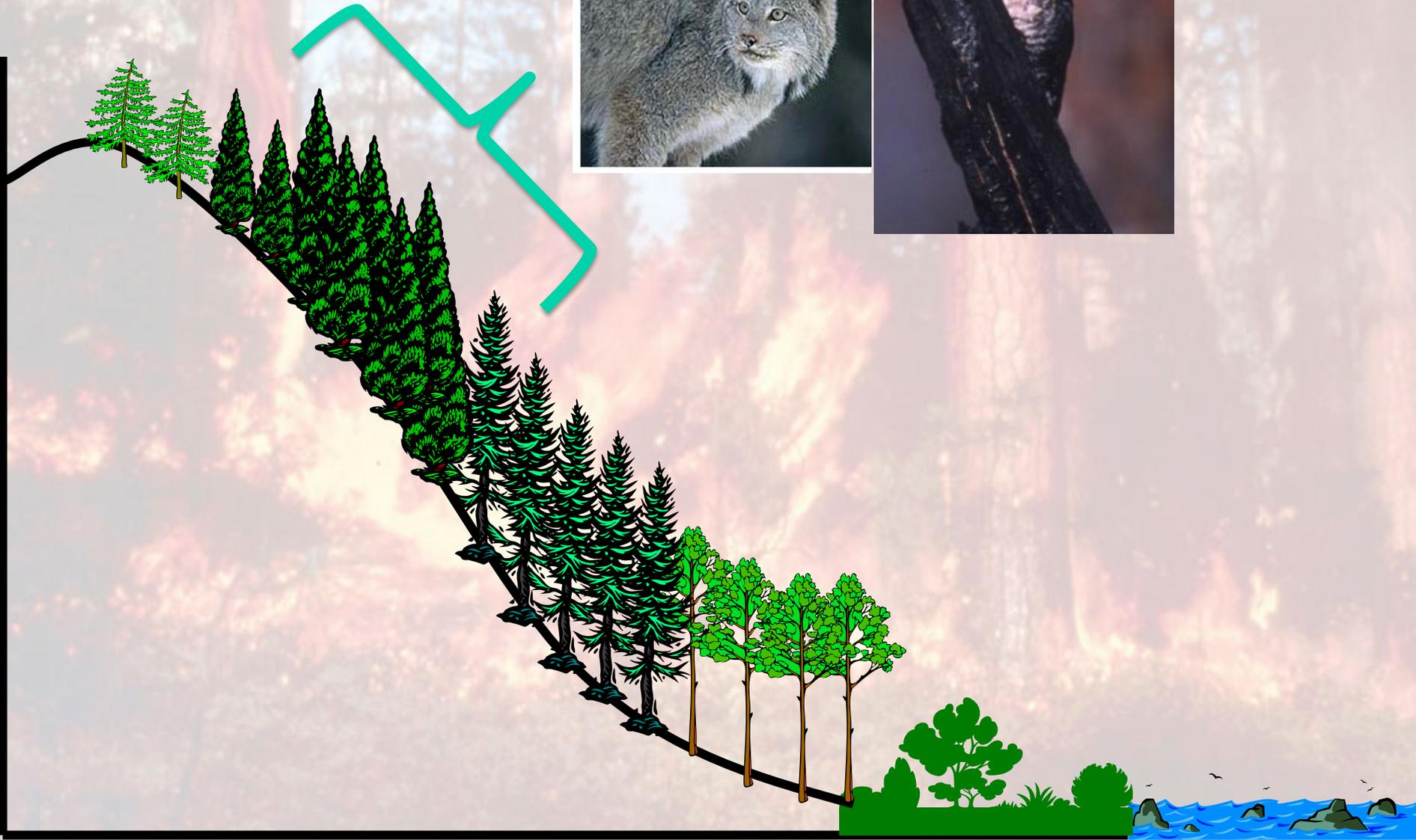
**Douglas-
fir/Mixed
conifer**

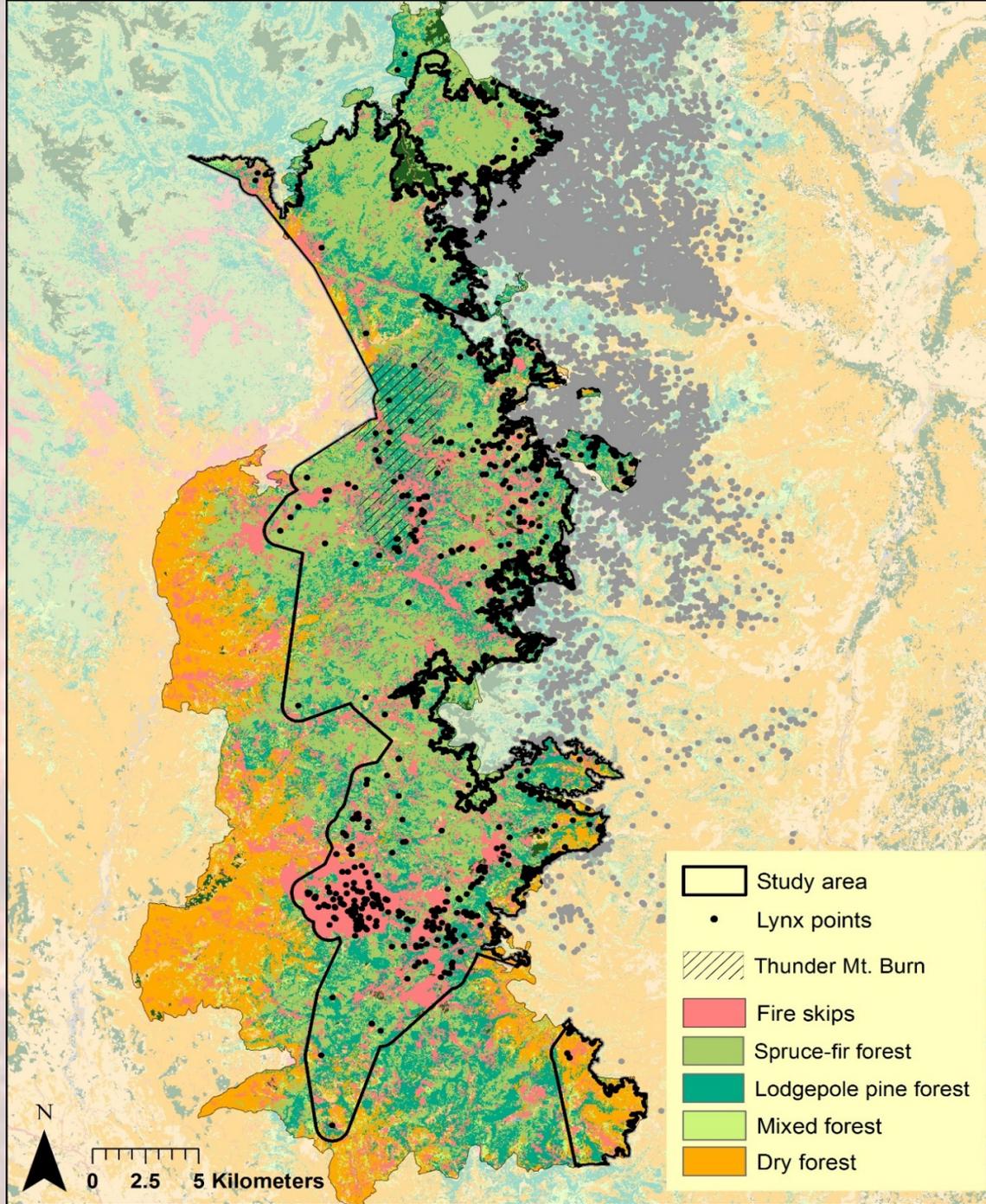
**Ponderosa
Pine**

**Grassland/
Steppe**

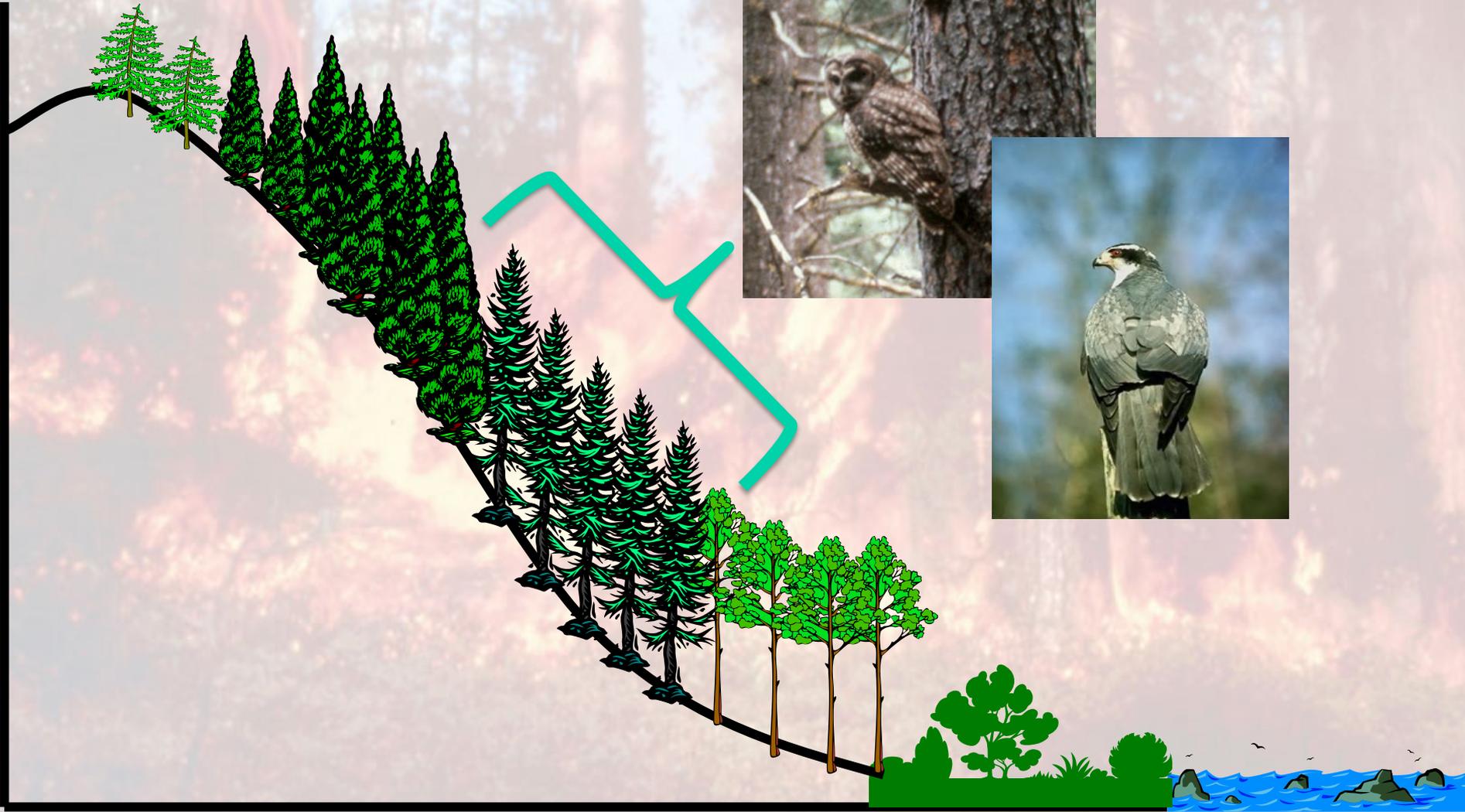
**Columbia
River**

High Severity Fire and Wildlife



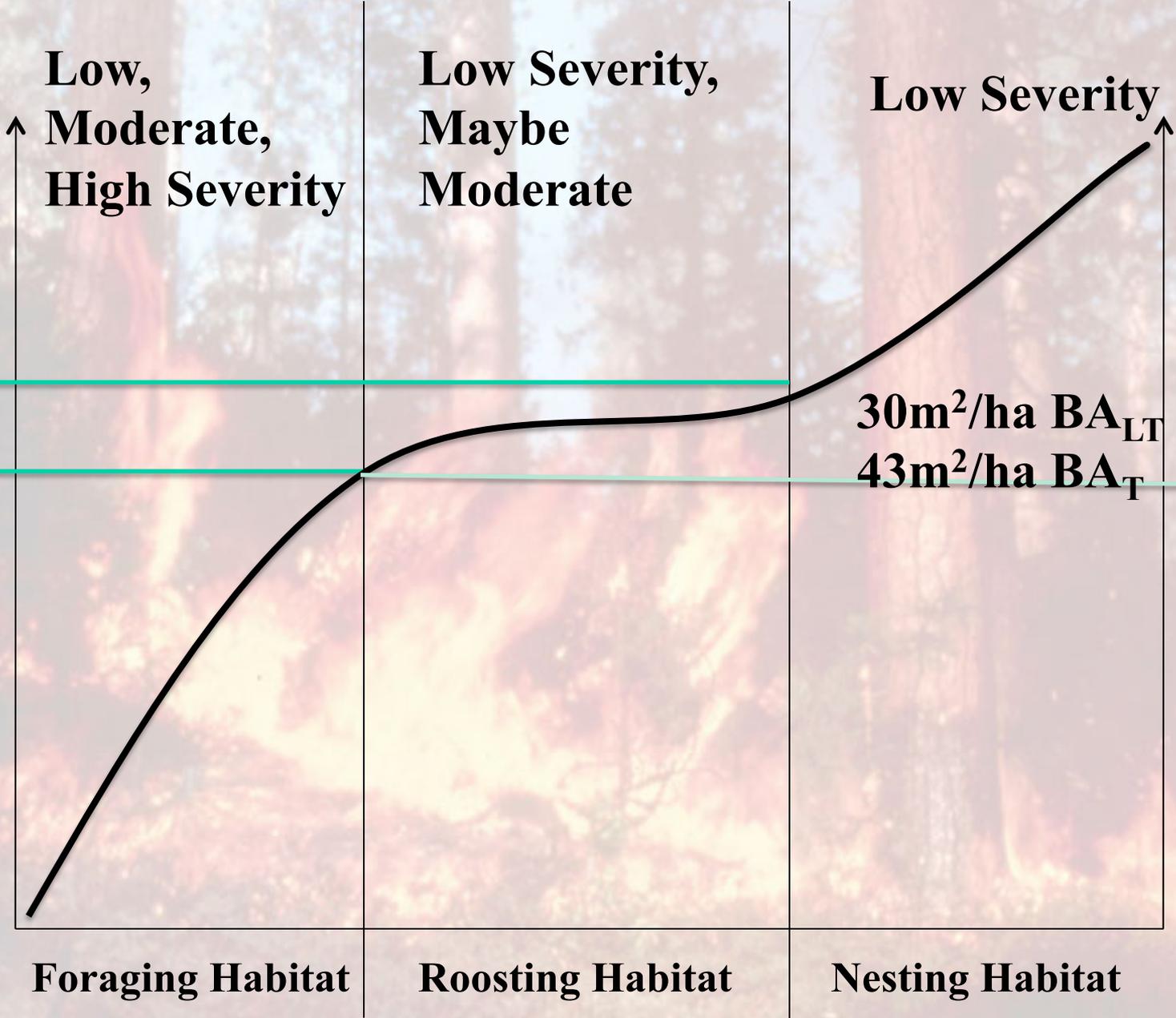


Mixed Severity Fire and Wildlife



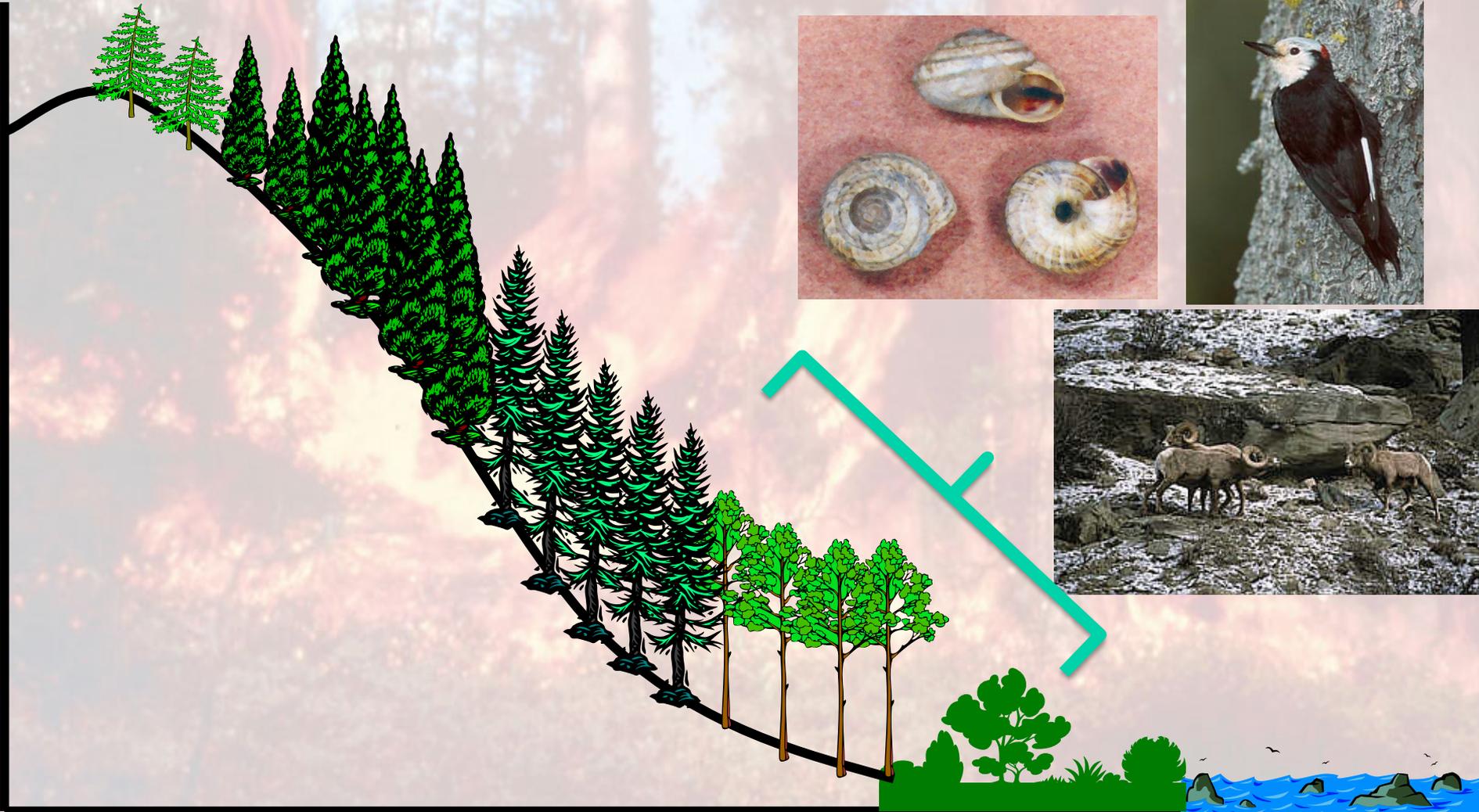


Increasing Canopy Closure



**Increasing Structural Complexity
(Total BA, Large Tree BA, Mistletoe)**

Low Severity Fire and Wildlife



Forest Restoration Treatments:

-Thinning

-Prescribed Fire



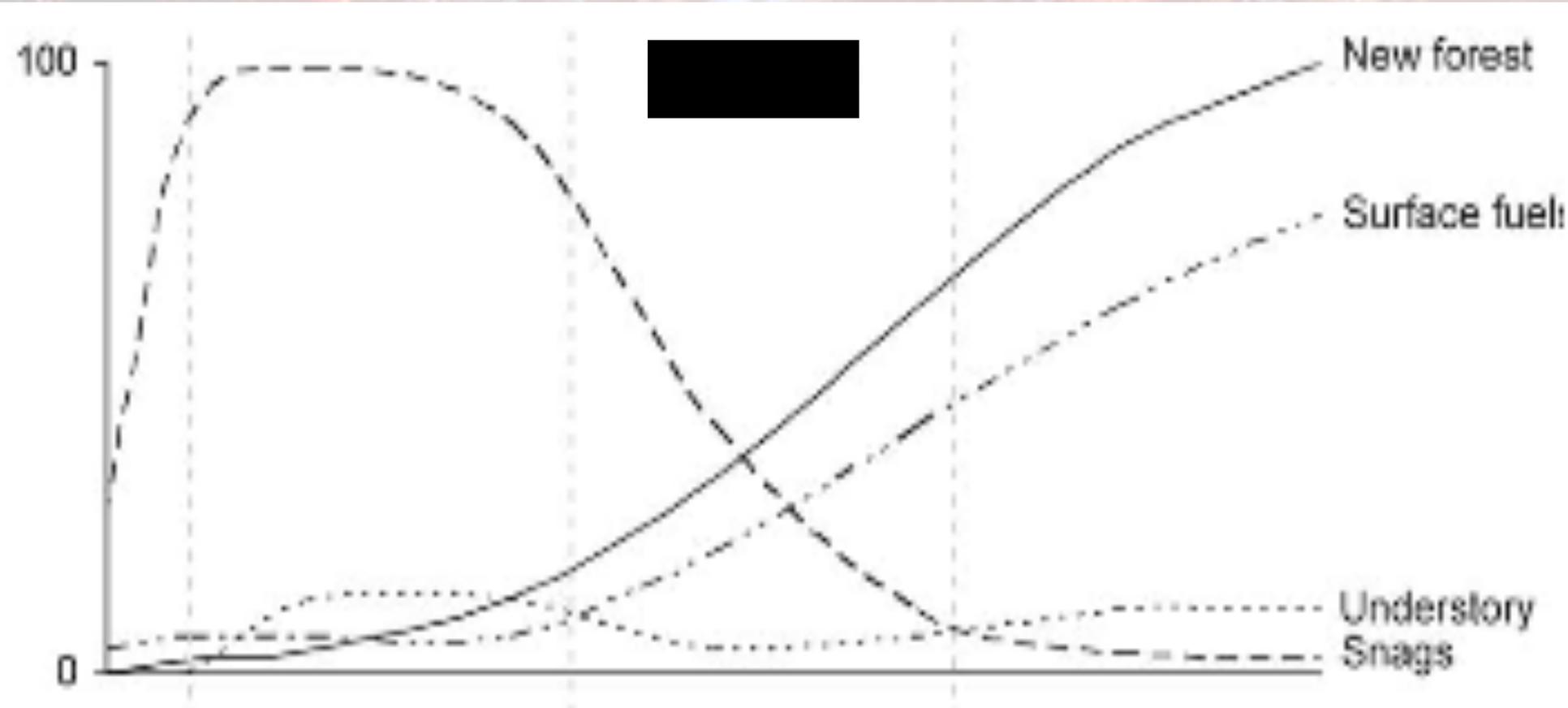
**Restoration of Native
Bird Communities**

Forest Succession and Bird Succession

**Black-backed and
3-toed Woodpeckers**

**Secondary
Cavity Nesters**

**Lewis's Woodpecker
Shrub Nesters**



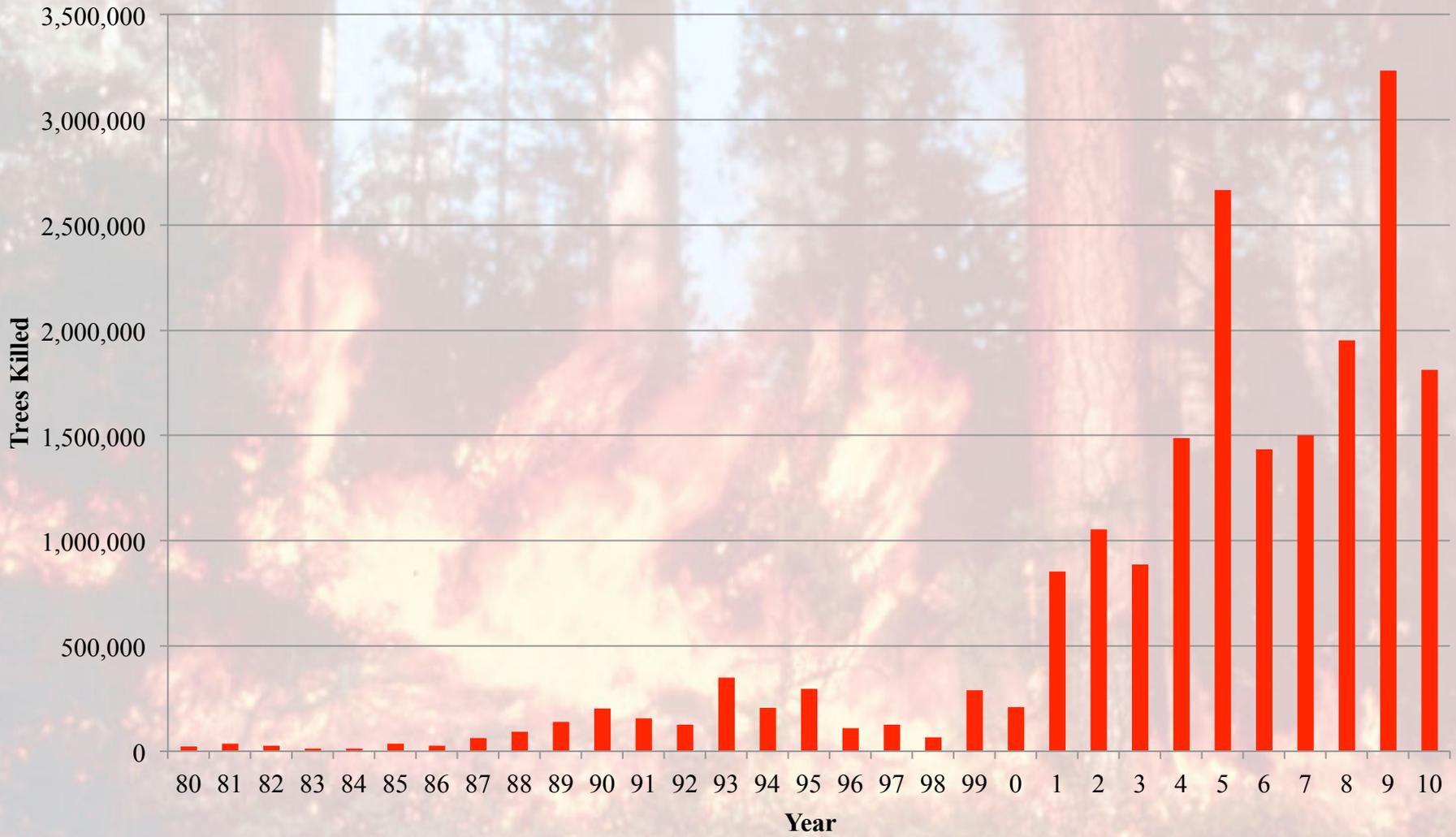
A photograph of a forest fire. In the foreground, there are large, bright orange and yellow flames. In the background, several tall, thin trees stand against a hazy, smoke-filled sky. The overall scene is one of a wildfire in progress.

Fire, Habitat, and Climate Change





OWF - Trees killed by Pine Beetles, 1980-2010



Trees Killed by Pine Beetles, Okanogan-Wenatchee National Forest 1980-2010 From Aerial Survey

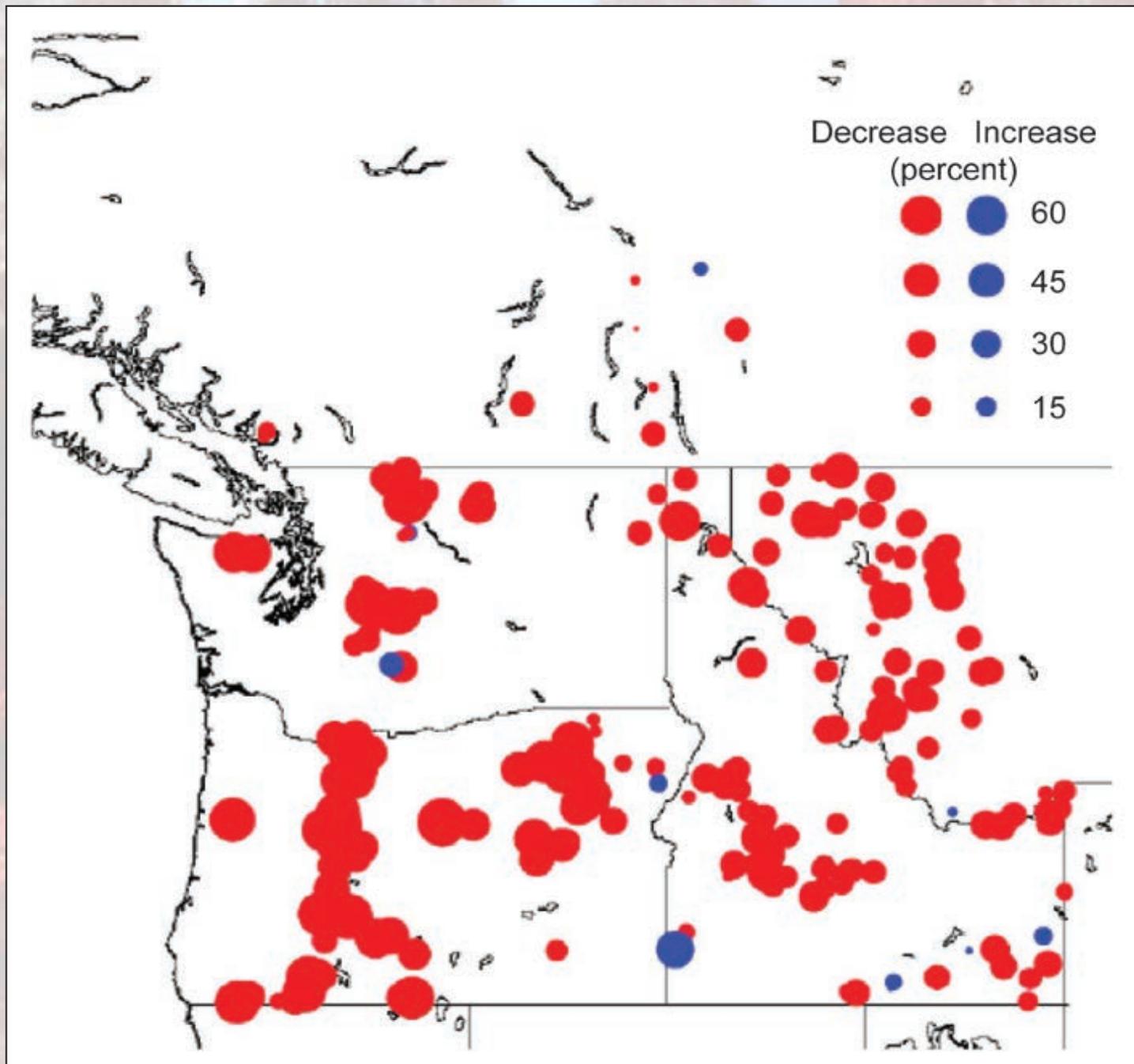
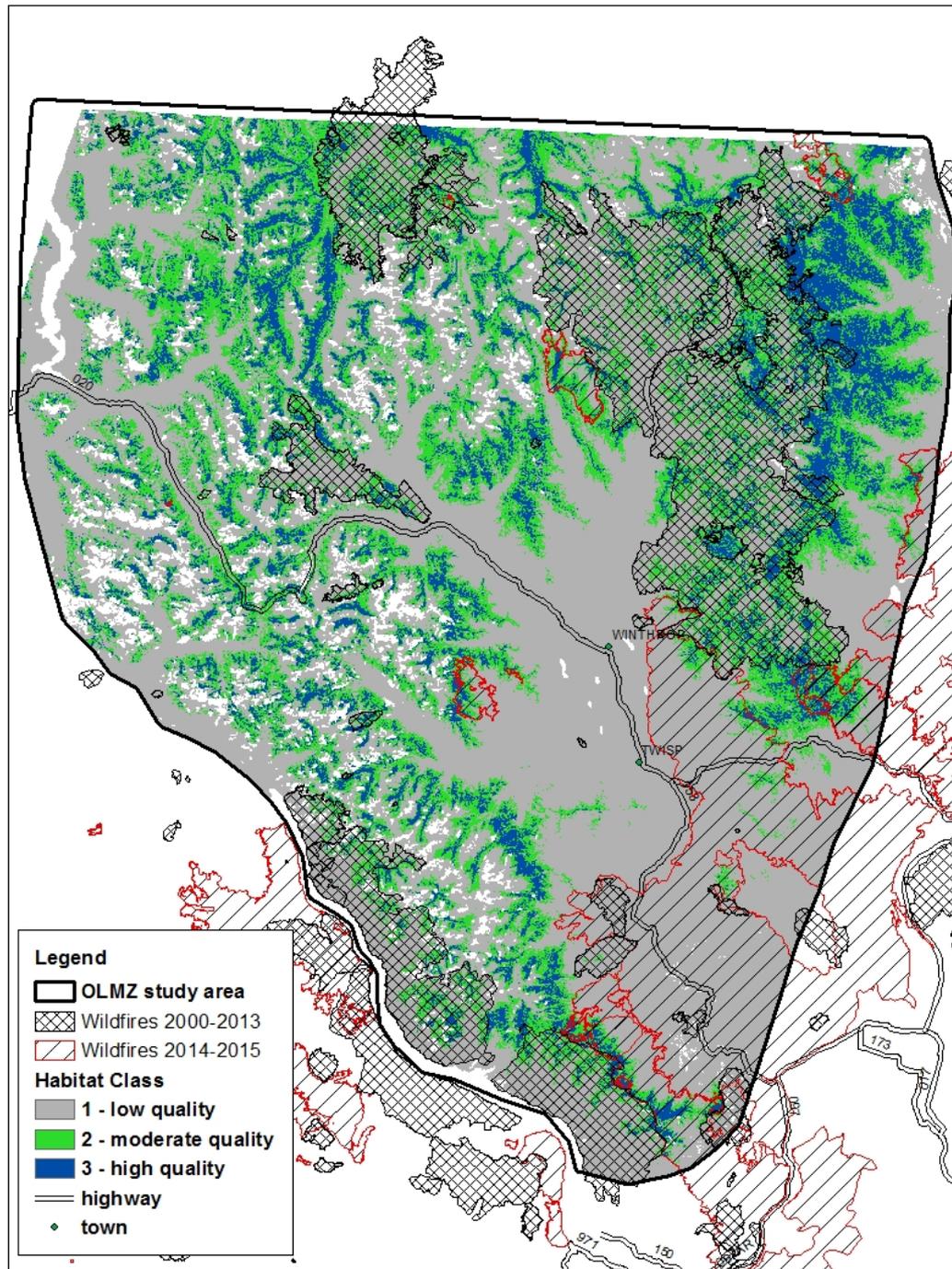


Figure 2—Percentage change in snowpack within the Pacific Northwest during 1920–2000







A photograph of a forest fire. Large, bright orange and yellow flames are visible in the foreground, rising from the ground. Thick, dark smoke billows upwards from the fire. In the background, several tall, thin trees stand against a hazy, blue sky. The overall scene is one of a controlled or natural fire in a forest setting.

Forest Restoration and Wildlife Habitat

Listed Species and Forest Restoration

- Northern Spotted Owl

- “The Service continues to recommend that active forest management and disturbance-based principles be applied throughout the range of the spotted owl with the goal of maintaining or restoring forest ecosystem structure, composition and processes so they are sustainable and resilient under current and future climate conditions in order to provide for long-term conservation of the species”. USFWS 2011.
- “Design and implement restoration treatments at the landscape level. Treatments need to be placed in context with the surrounding landscape to be most effective and to accommodate the inherent disturbance regime (OWNF 2010)”. USFWS 2011.

- Canada Lynx

- “Conduct a landscape evaluation to identify needs or opportunities for adaptation to climate change. Identify reference conditions relative to the landscape’s ecological setting and the range of future climate scenarios. For example, the range of variability could be derived from landscape reconstructions”. LCAS 2013

Eastern Washington

- Forest Restoration
 - Science/Management Collaboration
 - Key Landscape Indicators
 - Vegetation Pattern
 - Disturbances - Fire
 - **Focal Wildlife Habitats**
 - Aquatics
 - Landscape Evaluation
 - Space and time
 - Collaboratives



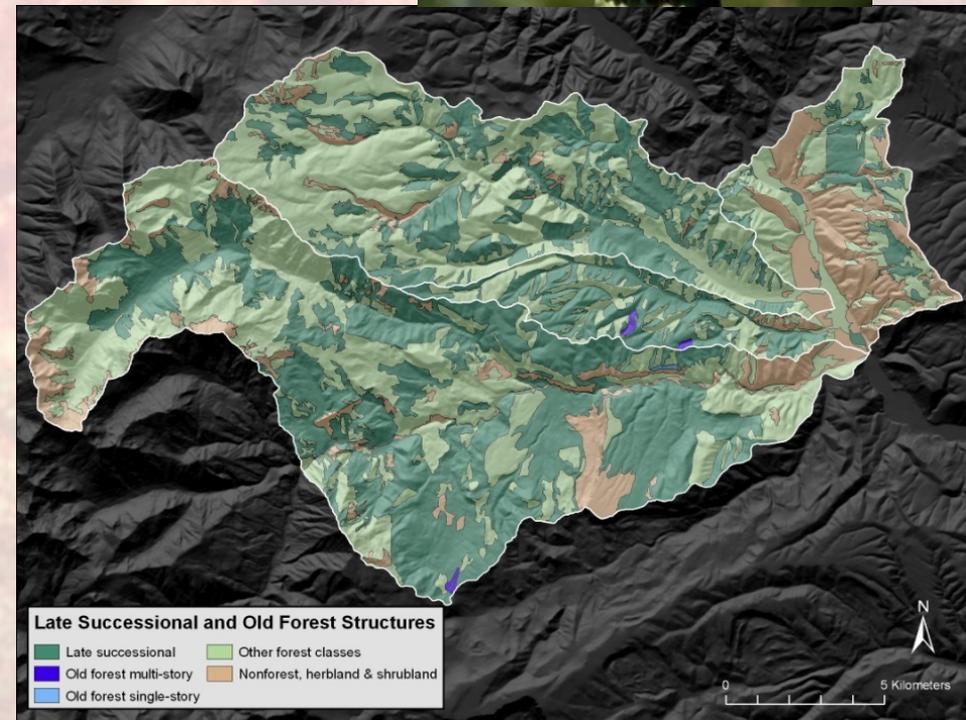
Landscape Evaluation

“landscape evaluations concerned with the restoration of ecosystems might be based on a set of ecological indicator measures against reference conditions for those same indicators” from Reynolds and Hessburg 2005

Wildlife Habitat

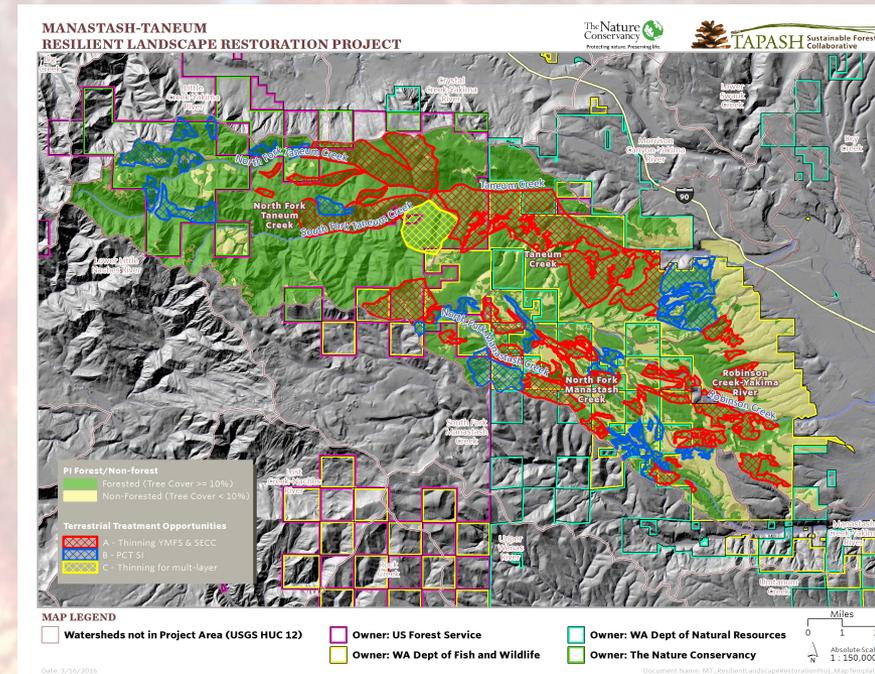


- Focal Wildlife Species
 - Northern spotted owl
 - Northern goshawk
 - White-headed woodpecker
 - Canada lynx
 - American marten
 - Pileated woodpecker
- Reference Conditions
 - Spatial
 - Amount and arrangement of habitats
 - Temporal
 - HRV, Current, FRV



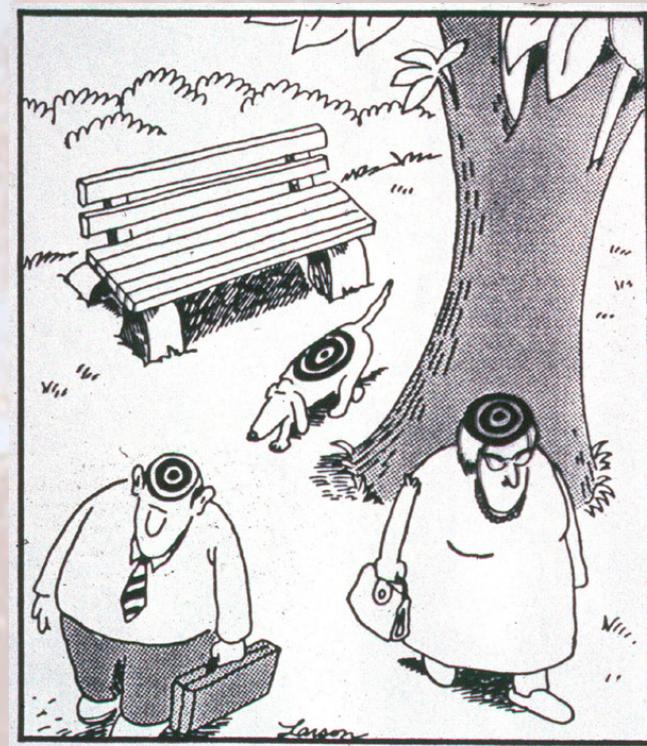
Landscape/Watershed Prescription

- Restoration of Landscape and Watershed Resilience
- Address key departures in vegetation composition and structure
- Restoration of focal species wildlife habitat amount and spatial arrangement
 - LSOF
 - Large Trees
- Identifies amount and location of potential terrestrial and aquatic restoration treatments
- An integrated package of restoration opportunities and priorities vetted by scenario evaluation
- Used to Inform Project Planning



Lessons Learned So Far

- Must integrate disturbance regimes and wildlife habitats
- View wildlife habitat as “dynamic” over space and time
 - Restoration planning at multiple spatial and temporal scales
- Restoration treatments can be effective in restoring wildlife habitats if integrated
- Climate change creates a sense of urgency to increase the pace and scale of forest restoration
- Collaboration to create social acceptance and accountability

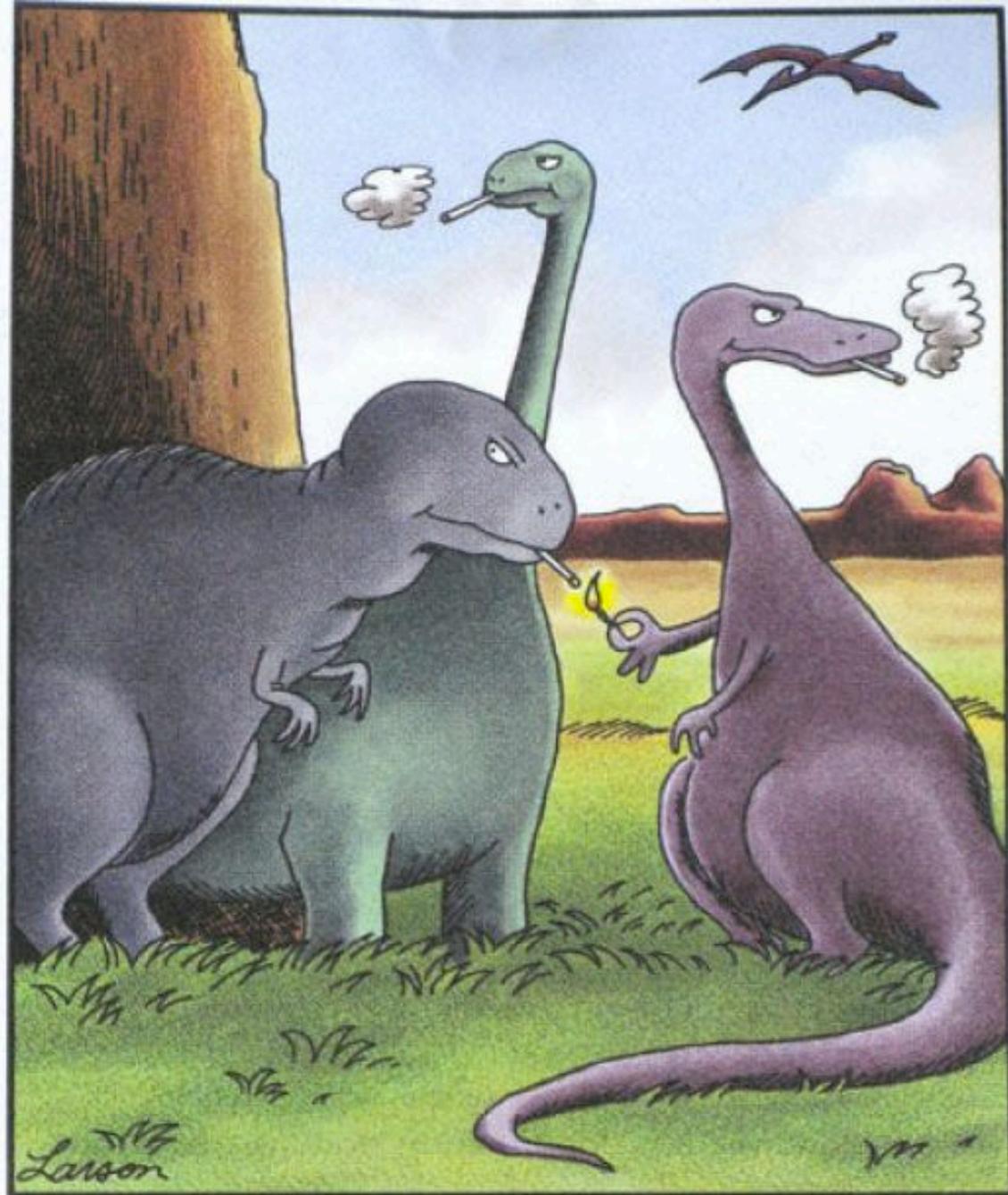


How birds see the world.



It is not the strongest of the species that survive, nor the most intelligent, but the most responsive to change.

-Charles Darwin (1858)



The real reason dinosaurs became extinct