



Introduction to Fire Ecology

The Carr Fire July 2018



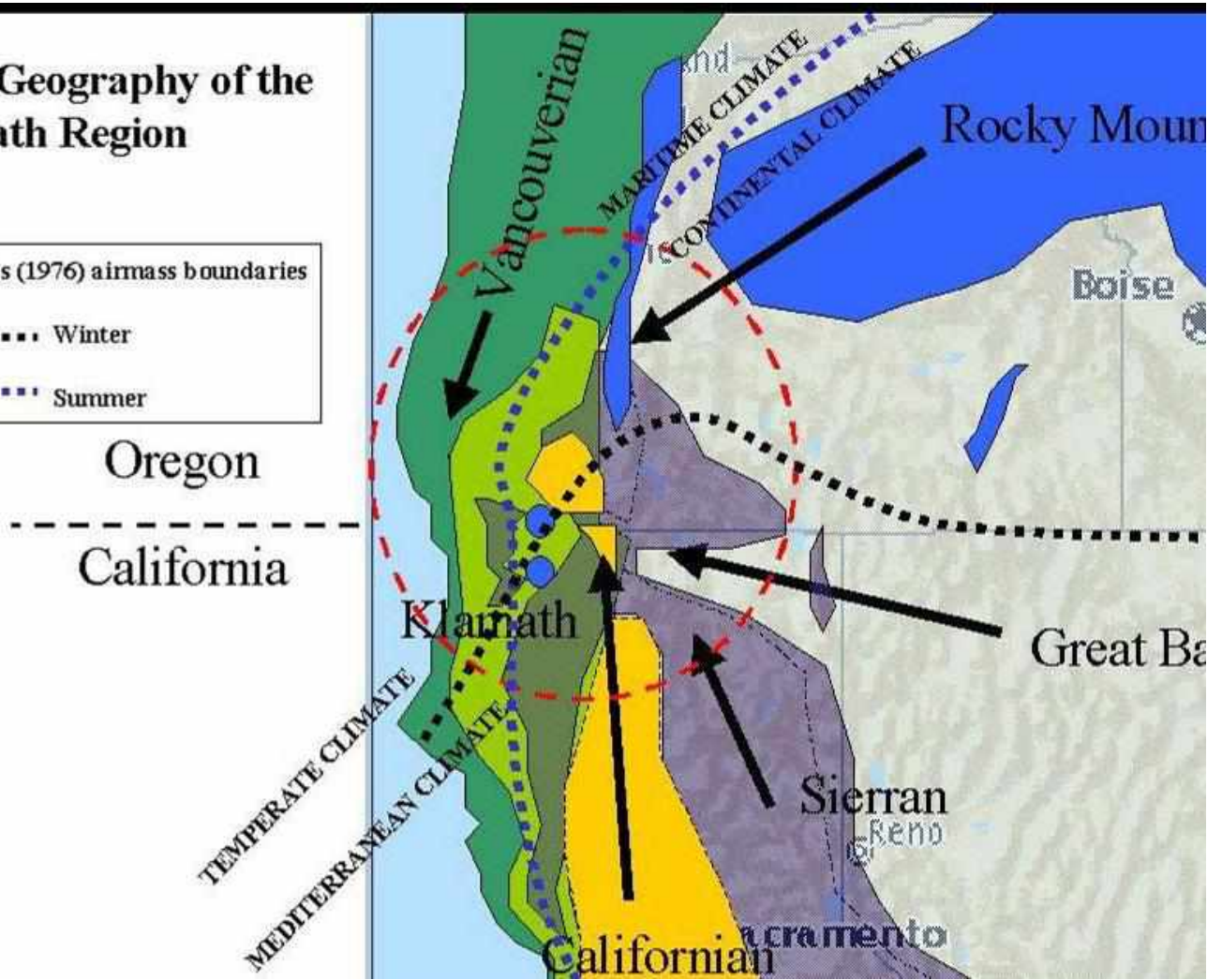




Plant Geography of the Klamath Region

Mitchell's (1976) airmass boundaries

- Winter
- Summer









NATION
PARK
SERVICE





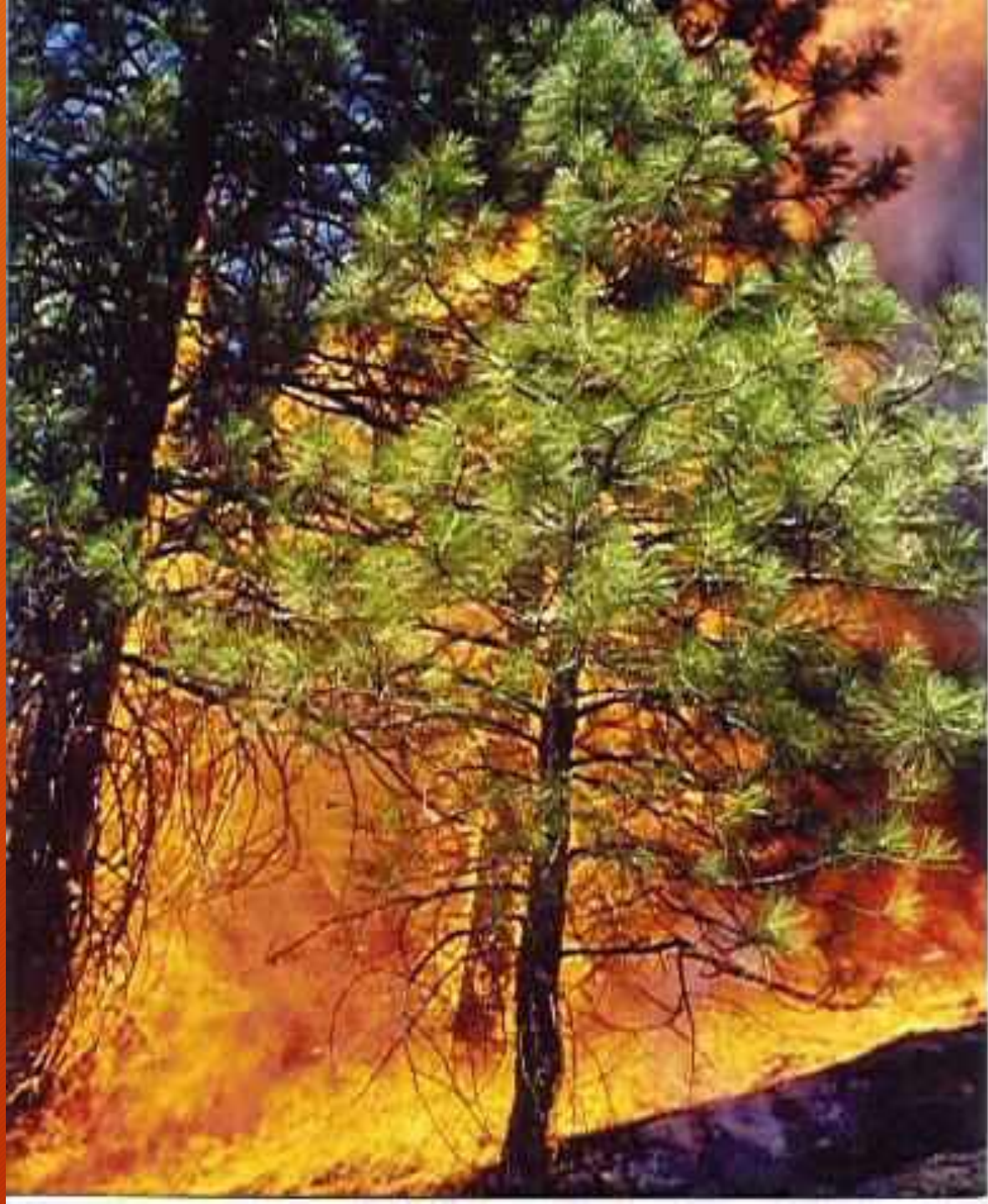


A diversity in habitats means...

...a diversity in wildlife...

Fire Ecology...

- **Ecology** – the study of relationships among living (biotic) and non-living (abiotic) elements of the environment.
- **Fire ecology** – the branch of ecology that studies the relationships of fire with living organisms and their environment.



The four basic concepts of Fire Ecology are...

- Fire Dependence
- Fire History
- Fire Regime
- Fire Adaptation





The idea that an ecosystem needs fire to function in a healthy manner.

Fire Dependency

Fire History or Frequency

...How often does fire return to an ecosystem

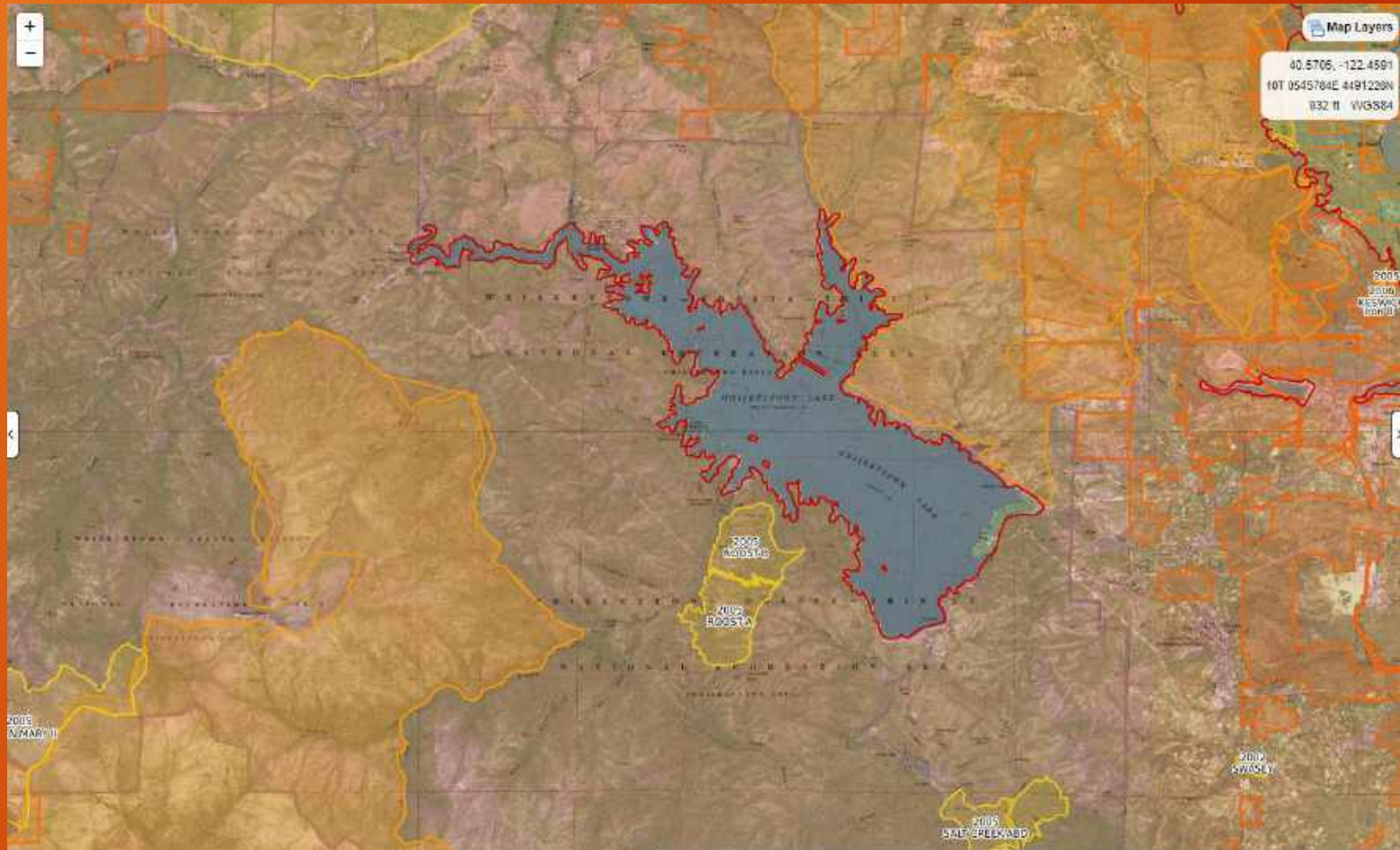
A common misconception is that Chaparral, as a fire adapted plant, needs fire to reproduce.

The truth is, Chaparral along with many other species that live in a fire ecosystem, are challenged to reproduce if fire returns to the landscape before they reach maturity.

The result is a potential for invasive species to establish a beachhead in a sensitive ecosystem.



More frequent fire has had negative environmental consequences, and long-term beliefs about prescribed fire use in chaparral have been challenged.



Fire Regimes or How do fire behave?

Intensity is a technical term used to describe the amount of energy released from a fire.

Severity is related to the change in the ecosystem caused by the fire.



Fire Adaptation...

...this concept applies to species of plants that have evolved with special traits that allow them to successfully survive, and even require fire.

Examples include:

- Closed cone pines that remain closed until opened by heat.
- Fire resistant bark.
- Fire resistant foliage (ice plant is an example...





Ponderosa pines have thick bark and self-pruning tree limbs which make large trees fairly resistant to fire...

Fire Adaptation...

Fire Adaptation...

Knobcone pines have thin bark, shallow roots, lots of sap, making them susceptible to fire. Crown fire kills knobcone pine of all size classes and vaporizes the resin sealing their cones. Cones are extremely fire resistant and are seldom consumed by fire.

Too frequent of fire can deplete the seed source...



Plants in a Chaparral ecosystem have many adaptations to fire.

These include:

- Flammable oils of chamise and other shrub species which promote fire.
- Chamise and Greenleaf manzanita resprout from the thick, well insulated mass just above ground called basal burls.
- Toyon, poison oak and other species resprout from the root crown.
- Perennials (such as shooting stars) survive as underground bulbs and sprout quickly in response to the addition of nutrients to the soil after a burn.
- Scorching increases germination in Ceanothus, manzanita and fire poppies.



Wildlife....



Most animals have developed different methods or strategies to escape fires.

- Runners - Animals such as deer, bear, and kangaroos, which are accomplished runners and jumpers, use their skills to escape flames.
- Burrowers - Animals such as mice shrews, snakes, lizards and tortoises use burrows to escape fires.
- Birds - Mature birds can fly to safer places. However, some nestling chicks may not be ready to fly and cannot escape. They will either flee the fire or, in the case of burrowing animals, move deeper underground.
- The remains of all that don't survive are used by scavengers.



Stream Habitats...

- Removal of streamside vegetation often increase erosion (sedimentation) which reduces available habitat and raises stream temperatures.
- Increased sedimentation has several affects on stream habitat:
 - reduces the size of spawning beds
 - deposits fine materials that smother eggs
 - prevents emergence of fry
- Decreased visibility (turbidity) causes fish to have trouble seeing their food
- reducing resting places as sediment fills up pools



Invertebrates...

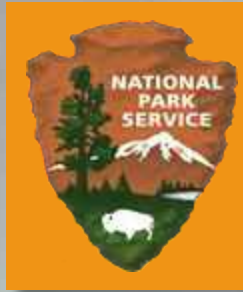
...tend to decrease because the animals or their eggs are killed by flames or heat.



- Fire destroys the sap that keeps bark insects away. These insects soon move into a burned forest followed by woodpeckers and other birds, especially those who nest in cavities.
- Flying insects are attracted to heat and smoke and to killed or damaged trees.
- Populations of certain species may increase during and after a fire.
- Fire provides immediate food for some insect pests while destroying food that many rely on in the "long run."



Adaptations...Big Picture...



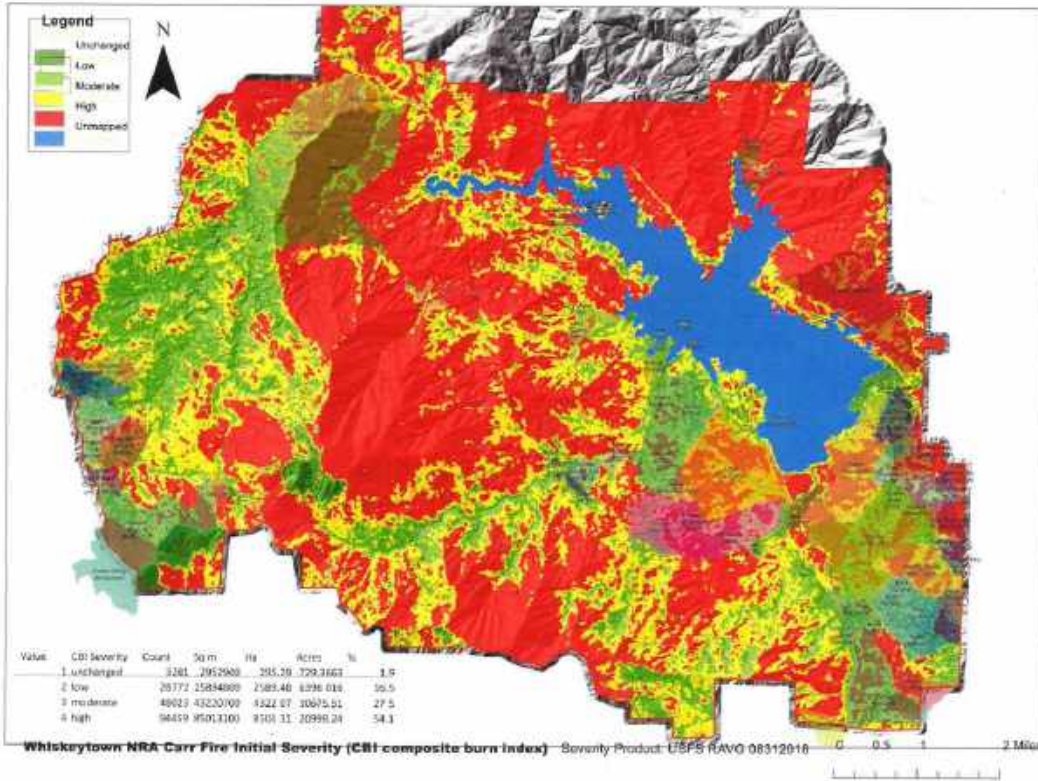
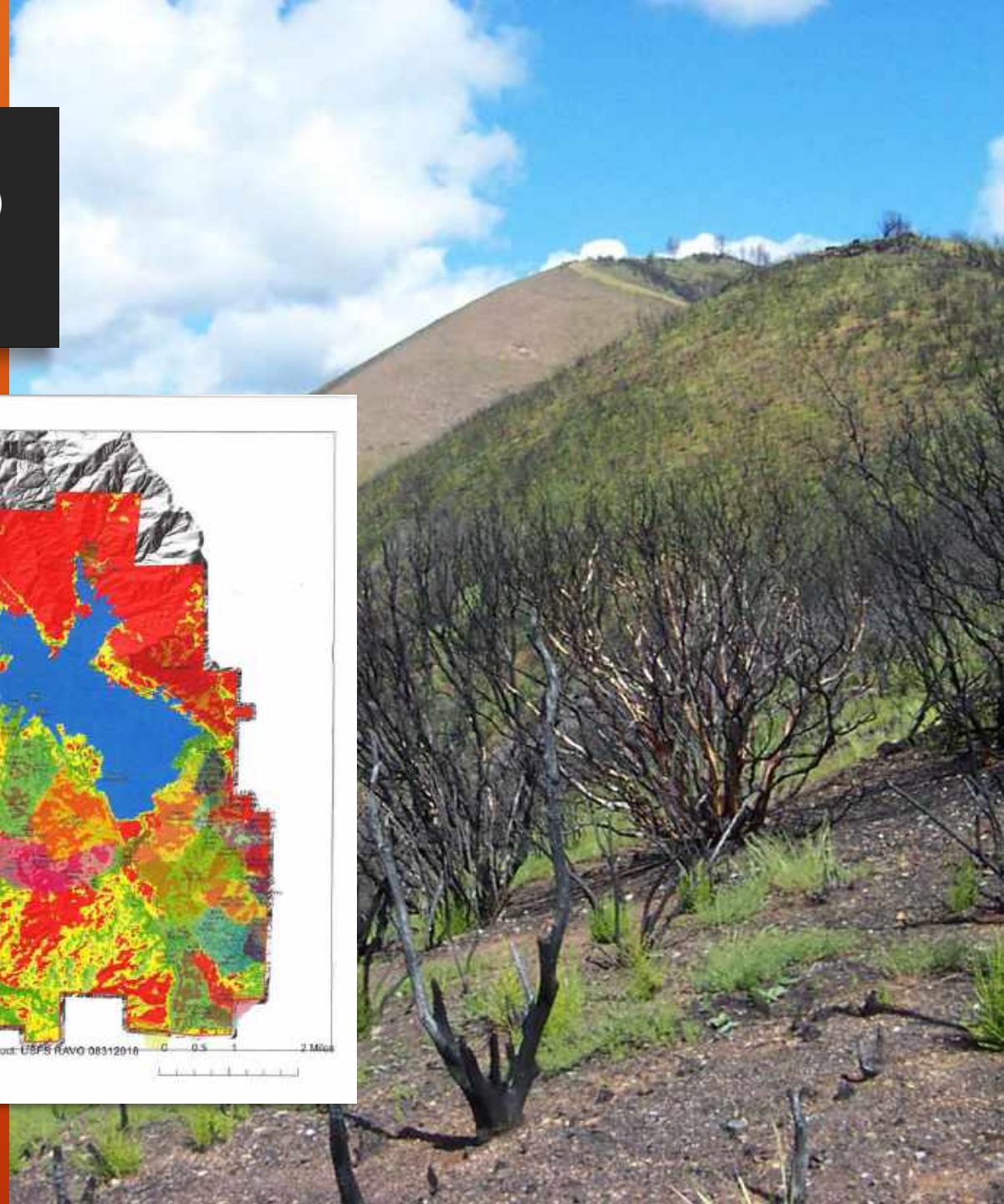
Different strategies for different species...

Species benefit from different successional stages...

The more flexible a species is, the more it will be able to survive...



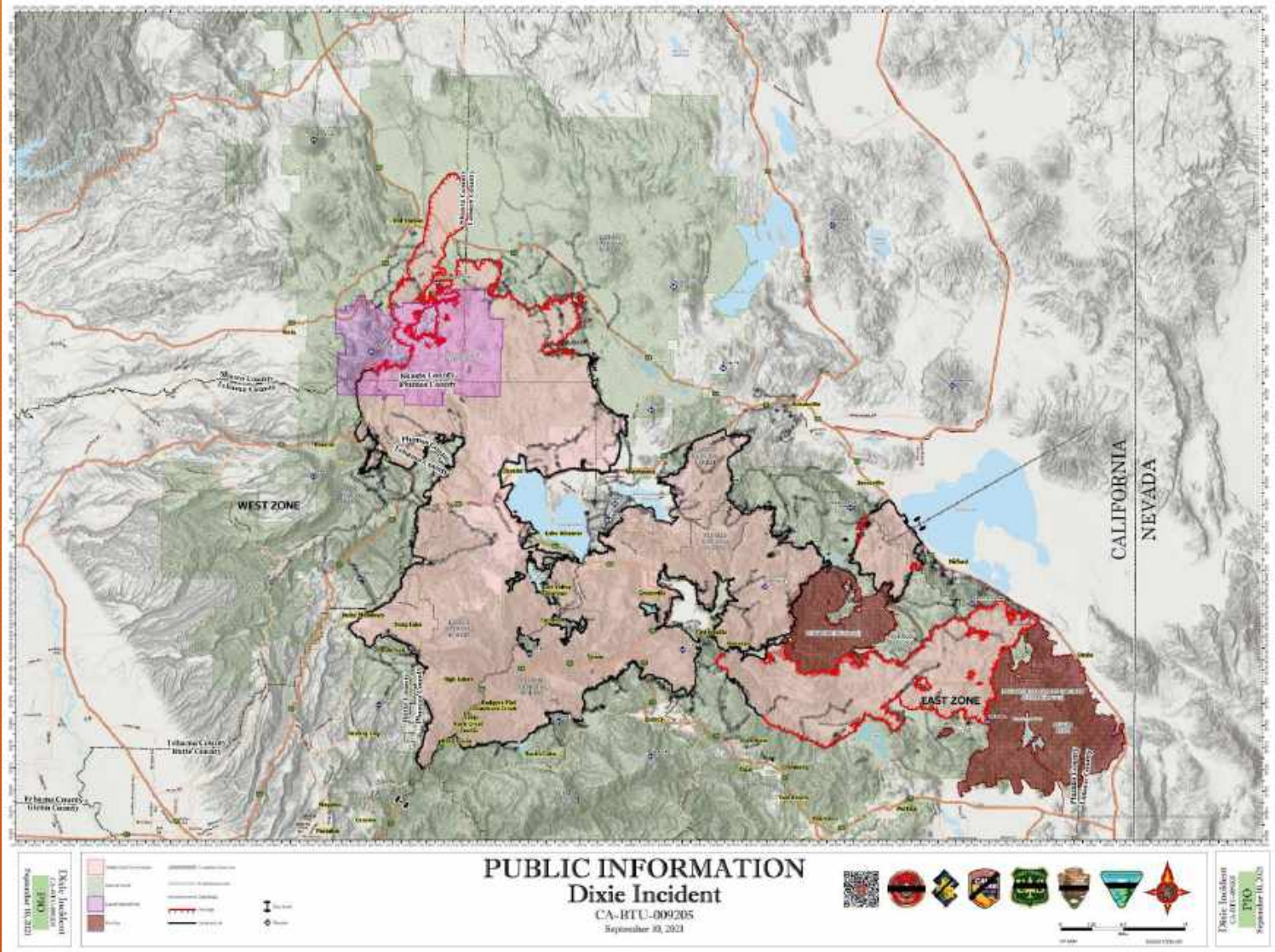
Fire provides habitat for a wide variety of animals by creating a burn pattern (mosaic) that provides diversity in vegetation (habitats) for wildlife use.



Where are we today?

- Fire Suppression
- Fire Compression
- Global Climate Change





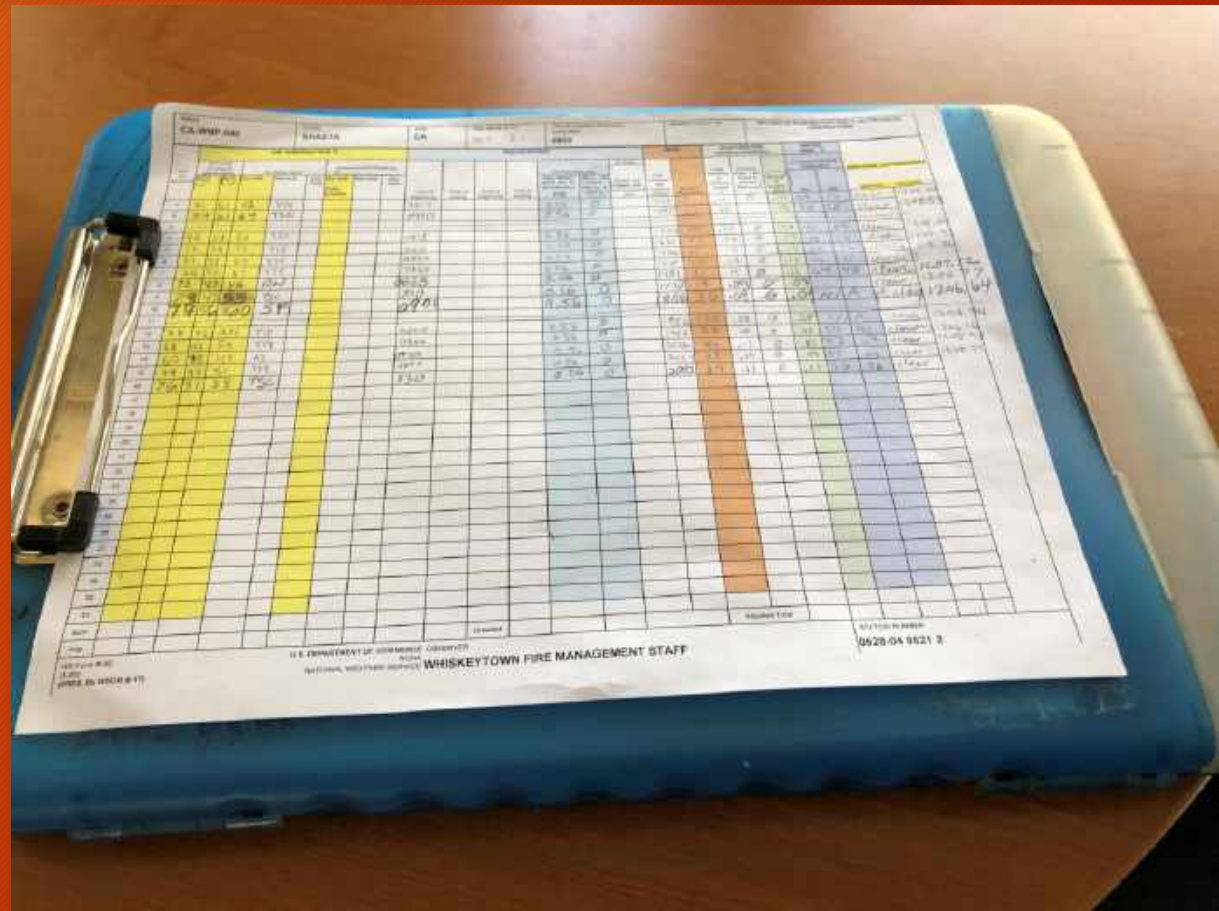
Dixie Fire September 10, 2021

Global Climate Change...



Higher temperatures in spring and summer and earlier melting of the snowpack in recent years have contributed to an increase in the frequency and duration of wildland fires.

Recent studies have concluded that a changing climate, not previous fire suppression policies or land-use changes, is the major cause.



Global Climate Change...

The 2021 wildfire season has set a record high in the number of acres burned. Particularly at risk are plant and animal species that are more restricted in their needs for habitat and have limited ability to relocate or have surrounding development that leaves them few options.



Challenges...

- Proximity to the urban interface.
- Air quality restrictions.
- Availability of resources.
- Short burn windows.



Fire Management Plan...

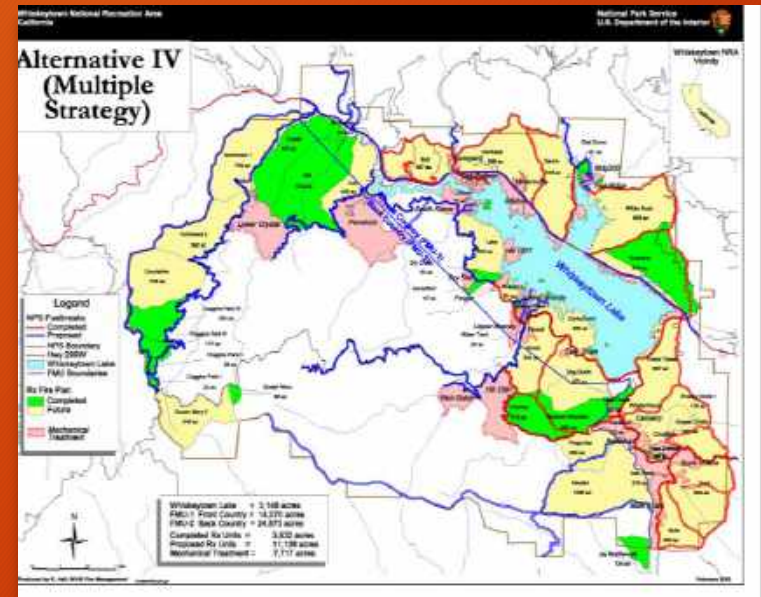
Whiskeytown has a full suppression policy in place.

Provide areas where containment of wildfires is more feasible (e.g., firing operations).

Slow the rate of spread of fires.

Provide safe exits and access for firefighters and public by reducing fire intensity.

Provide for prescribed burn unit boundaries.





Chipping



Mechanical Thinning



Burn Piles



Controlled Burns

11/19/2002

