Slide 1

Fire

Lecture 16

Slide 2

Learning Outcomes

- Fire
- Fire Regimes
- Adaptations to Fire
- Annual plants
- Perennial Plants
- Fire Suppression Policy
- Prescribed Burns

Slide 3

Fire

- Fire is natural
  - Lightening strikes
- Fire regime
- Interval between natural fires
- Determined by climate and vegetation type
- Native American Fire Regime
  - Hunting
  - Resource management

Slide 4

Anthropogenic Landscapes

- For 9000 years fire was used to manage natural resources
- Kill woody plants to maintain grasslands
- Coastal prairies
- Maintain oak groves
- Encourage regrowth
- Straight stems for basketry

Slide 5

Fire Behavior

- Weather
  - Sun- removes moisture by evaporation
- Wind
  - Dries fuel
  - Provides oxygen
  - Spreads burning embers
- Topography
  - Warm air rises
  - Wildfires spread upslope as heat dries fuel

Slide 6

Fire Regimes

- Plant communities provide fuel and reflect responses to fire
- Return interval
- frequency of fires
- Short intervals between fires selective pressure for adaptations to fire
- Chaparral shrubs
- Long fire return intervals correspond to fire sensitive species with no adaptations to survive fire

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Fire Followers

- Species whose reproductive strategies or survival depend upon fire
- Annual plants
- Grow from established seed bank
- Require a fire cue (heat, smoke, charred wood) to germinate
- Fire Poppy
- Fireweed
- Golden Eardrops (***Dicentra chrysantha***)
- Whispering Bells
- (***Emmenanthe penduliflora***)
- Reduced competition
- More light
- More nutrients

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Fire Adapted Perennial Species

- Obligate seeders
- No adaptations to survive fire
- Seeds germinate following fire cues
- Buckbrush
- *(Ceanothus cuneatus)*
- Manzanitas

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Protecting Vital Parts

Slide 10

Fire Adapted Perennial Species

- Respouters
- Crown sprouters have basal burls below ground
- Contain stored water and energy reserves
- Redwood
- *Sequoia sempervirens*
- Chamise
- *(Adenostoma fasciculatum)*
- Toyon
- *(Heteromeles arbutifolia)*

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Fire Cones

- Knobcone Pine
- (Pinus attenuata)
- Bishop Pine
- (P. muricata)
- Seritonous cones do not open until intense heat melts pitch
- Monterey Pine
- (P. radiata)
- Both seritonous and non seritonous cones
- Cypresses typically have seritonous cones
- Seeds drop a few days later
- Seeds germinate in bare soil (and full light)
- Regeneration of Bishop Pine decreased with Fire Suppression Policy

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Fire Suppression

- Introduced 1910
- Results…
  - Prevented natural cycle of small local fires –
    - regeneration
  - Forest composition changed
  - Accumulation of 100 years of fuel
  - Large intense destructive fires
  - Exposes large area of unprotected soil to erosion

Role of Fire

- Periodic fires part of natural history throughout California
- Native Americans used fire to manage natural resources
- Human prevention of fire altered balance of conifer species in Sierra Nevada
- Favored Shade tolerant species
  - Incense Cedar, White Fir
- Detrimental to shade intolerant conifers
  - Ponderosa Pine, Jeffrey Pine, Sugar Pine, Giant Sequoia
- Require light and/or bare soil to germinate

Prescribed Burns

- Indigenous Land Management
- Conservation
- Burn off fuel to avoid future fires
- Control invasive non-native species
- Russian Ridge OSP
- Edgewood