Rogue Basin Ecological Integrity Assessment and Climate Change – Management Interactions

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Human Modification Nationwide
Landscape Permeability Nationwide
Flow Routes/Connectivity in Washington and Western Montana
Landscape Context:
Connectivity, surrounding land use, patch size, and stressors
Conservation Opportunities & Intact Landscapes
Wetlands Landscape Integrity at Finer Scales
Potential Natural Vegetation
Forest Canopy Cover
Tree Diameter
Tree Diameters in the Major Rogue River Sub-basins
Percent Stand Replacement Fires (Land Fire - 2010)
Presence or Absence

Oregon Spotted Frog (*Rana pretiosa*)
Predicted Habitat within Occupied Watersheds

California mountain kingsnake
* Lampropeltis zonata
Predicted Habitat within Occupied Watersheds
Predicted Habitat within Occupied Watersheds
Ecological Integrity Measures (by area)

- Landscape features
  - Size
  - Fragmentation
  - Landscape, stream connectivity and permeability
  - Landscape context

- Habitat characteristics
  - Type and importance
  - Condition and vulnerability (riparian or forest structure, water chemistry, cover)
  - Biotic composition (native, invasive, noxious)
  - Key processes (fire, hydrology, flood, nutrients)

- Representative species
  - Unique native species
  - Vertebrates species status
  - Vascular plant species status
  - Large concentrations (migrations, flyway stopovers)
  - Keystone species

- At-risk species
  - Relative rarity
  - Population size and vulnerability
  - Support systems (pollinators, prey, etc.)
  - Type and intensity of threats

- Nature’s benefits
  - Population size
  - Annual variance in population size
  - Adjacent threats
  - Threat immanence
  - Habitat quality

Bridge to people
How Do We Use this Information?

- Inform state-and-transition models used to evaluating alternatives in various plans.
- Develop information needed to evaluate impacts of climate change.
- Help identify conservation priorities.
Use Data to Run Models and Hook to Interpretations

Design management scenario

State and Transition Models

Interpretations

Fuels
Wildlife habitat
Treatment finances
Watershed

Ecosystem Services

Economic potential
Terrestrial habitat

Aquatic habitat
Wildfire-fuel hazards
Lower Joseph Forest Structure
No Management, After 30 Years

- Grass/forb/shrub
- Large tree closed forest
- Large tree open forest
- Medium tree closed forest
- Medium tree open forest
- Not forested
- Pole tree closed forest
- Pole tree open forest
- Recent disturbance
- Small tree closed forest
- Small tree open forest
- Young, closed forest
- Young, open forest
Integrating Climate Change & Land Management Models

Climate Information

MC2 Dynamic Global Vegetation Model

Modified CENTURY model

Climate-informed State-and-Transition Models

Oak woodlands
- Early
- Mid
- Late
- Old-growth

Ponderosa Pine
- Early
- Mid
- Late
- Old-growth

Douglas-fir
- Early
- Mid
- Late
- Old-growth

Fire occurrence

Lifeform mixture

Lifeform gradient model

MC2 Dynamic Global Vegetation Model

Modified CENTURY model

Biomass mortality and consumption

Nutrient loss and release

Carbon pools

Soil moisture

Live biomass

Linking Upland and Stream Outputs

• Ecological integrity measures, and the models are separate for aquatic & terrestrial habitats
• Upland land management changes (forestry, development, restoration) impacts rivers and streams
• We need to learn how to measure these impacts, and the corresponding changes in water quantity, quality, and aquatic habitat.