

Pacific Northwest Mountains

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- Elevation 5000-14,000 ft
- 60-140 inches precipitation

Klamath Mountains

- "Klamath Knot"
 - jumble of intrusive igneous, sedimentary & metamorphic mountains
 - no real alignment or north/south orientation
 - dissected by great rivers: **Klamath, Trinity**, Salmon, Scott

Klamath Mountains Rich Diversity

- One of the richest temperate coniferous forests in the world
- complex mosaic of habitats provided refuges
 - region spared volcanism of Cascades
 - escaped extensive glaciations of the Sierra Nevada
- At the junction of 5 major biotic regions: the Great Basin, Coast Range, Cascade Range, Sierra Nevada & Great Central Valley
- 131 endemic plant species
- >60% of 153 species of terrestrial & freshwater mollusks found here are nowhere else

Mixed Evergreen Forest

- Above 1000ft
- Mixture of broad-leaved evergreens and conifers
- 4 types of this forest
 - Douglas fir dominated
 - Broadleaf evergreens common
 - Canyon live oak dominated
 - Port Orford & Incense Cedar/White Pine dominated

Douglas fir dominated

- gentle slopes
- north-facing slopes
- ridges w/deep soils
- river terraces

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Broad-leaved evergreens common

- granitic soils of lower elevations
- Common trees: tanoak, chinquapin, Canyon Live Oak

Coast Live Oak

- steep slopes with coarse soils

Port Orford & Incense Cedar/White Pine dominated

- Accreted soils (ophiolitic)
- Common on serpentine

Serpentine Soils

- extensive areas of serpentinite rock
- ~20% of California's endemic plants grow on serpentine soils
- Harsh soil conditions that most plants can not grow on
 - high magnesium
 - low calcium
 - May also contain nickel, platinum, mercury & chromium
- dominant trees are Jeffrey pine and Knobcone pine
- islands of serpentine with relics of Port Orford cedar

Wild & Scenic Rivers

- Largest concentration of un-dammed wild & scenic rivers in the USA
- **Klamath, Trinity, Salmon, Scott**
- Chinook Salmon

Cobra Lilies "pitfall pitcher plant"

- live on nutrient-poor soils (bogs & freshwater springs)
- cobra lily stalk
 - modified leaf folded to form a tube with a hood (up to 40 inches tall)
 - Short, stiff hairs on hood's forked-tongue point towards opening of pitcher & guide insect inside
 - trap insects to supplement their diet (commensals digest insects)

Southern Cascade & Modoc Plateau

- Volcanic origin & activity
 - igneous extrusive
 - vast basalt flows
 - composite volcanoes & southern extent of volcanic chain
- steppe climate
- sparse vegetation like sagebrush
- Includes:
 - **Mt. Shasta:** 14,162' looms 10,000 feet above Shasta Valley
 - **Mt. Lassen N.P.:** erupted in 1914; active fumaroles and mud pots
 - Mt. Burney **Lava Beds NP**

Volcanoes

- 75% of the world's active & dormant volcanoes on land form a ring around Pacific Ocean basin called the ("Ring of Fire").
- All 4 types of volcanoes found in the entire world are represented in Lassen Volcanic National Park
- shield volcano (Prospect Peak)
- plug dome (Lassen Peak)
- cinder cone (Cinder Cone)
- composite (Brokeoff Volcano)

Plug Dome Volcano

- formed by lava that is too thick to flow any great distance
- lava piles up around the vent to form a plug
- Small, active up to 20 years

Cinder Cone

- Simplest, erupting only once
- Small particles of lava blown from the volcano fall around the vent to form a circular or oval cone
- most have a bowl-shaped crater, rising <1000 ft

Composite Volcano

- steep-sided symmetrical cones built from alternating layers of lava flows, volcanic ash, cinders, lava blocks & bombs.
- can rise over 10,000 feet & have a central lava vent at summit
- Can be active for 500,000-1 million years

Shield Volcanoes

- formed slowly from the build-up of many basalt lava flows that spread thinly over a great distance, building broad, gently-sloping symmetrical cone
- largest volcanoes in the world (e.g. Mauna Loa in Hawaii)

Hot Springs

- single-celled micro-organisms called *Sulfolobus*, that belong to a newly discovered life form called Archaea, live deep in hydrothermal systems
- microbes similar to Archaea may have spawned life on Earth 3.5 billion years ago in undersea hot springs

Fungal-Plant Symbiosis "mycorrhizae"

- Increase plant productivity
- 2 types:
 - Ectomycorrhizae—form mantle around root
 - endomycorrhizae—penetrate root cortex
- Fungus provides minerals & water
- Plant provides food

Red Tree Vole

- "mice of the moist forests"
- live high in trees, seldom coming to the ground
- Diet: needles
- Nests made of inedible parts of needles
- Reproduction:
 - Produce 1-3 offspring/litter with 48 day gestation
 - Lower reproductive capacity than most mice—why?
 - low-calorie diet of fir needles
 - Reflect adaptation to environment so not need to "hedge their bets" by producing lots of offspring

Wolverine

- Rare & fierce weasel
 - In 1980s, 50-100 were estimated to be in California
 - In 1993, extensive survey of previously occupied sites did not find any
- solitary & secretive, living in dens at high elevations in remote locations
- opportunistic scavengers & predators
- do not hibernate in the winter
 - thick coat, short, rounded ears, and a strong build,
 - bounding gait & stiff hairs on the bottom of their feet help them move across snow

Pileated Woodpecker

- eat insects, fruits & nuts, as well as carpenter ants & beetle larvae.
- uses its sharp bill to pull bark off a tree to expose ant colonies; it uses its long, sticky tongue to poke into holes and drag out the ants
- digs out large rectangular holes in trees to create roosting & nesting spots & to expose insects!

Mountain Beaver

- Range: northern California to southern British Columbia
- nocturnal
- Oldest living north American rodent (not a true beaver)
- Primitive physiology
 - Can't pant or sweat
 - Can't concentrate waste well (uric acid), so needs to take in a lot of water (~20% body weight daily)

Mountain Beaver burrows & feeding:

- Large burrows (5-6 inches in diameter) show signs of activity throughout the year
- Feeding Behavior
 - generalist herbivores
 - build haystacks
 - piles of vegetation left to wilt at burrow entrance before being transported to a feeding chamber
 - Reflect seasonal availability of food—spring/summer has herbaceous plants; fall/winter has evergreen plants

Northern Spotted Owl

- name "spotted" comes from white spots among their brown feathers
- dark, black-brown eyes which are surrounded by white facial disks
- facial disks aid owl in hunting by directing sounds to the ear holes
- saw-toothed edge on their primary (flight) feathers helps them fly silently
- name "spotted" derives from the white spots among their brown feathers.
The northern spotted owl has dark, black-brown eyes which are surrounded by white facial disks that look like half moons.
- These facial disks aid the owl when hunting by directing sounds to the ear holes. Northern spotted owls have a saw-toothed edge on their primary (flight) feathers, which helps them to fly silently.

Northern Spotted Owl

- nocturnal hunter
 - Diet: Rats, white-footed mice, deer mice, birds, red tree voles, small bats, moths, crickets, large beetles, flying squirrels.
 - Often swallow prey whole, then regurgitate bones, hair & skin that can't be digested
 - remarkable night vision
 - eyes have limited movement because they are so large; deal with this limitation by having ability to turn head 270 degrees
- Life Span: Up to 15 years in wild
- Reproduction:
 - Breed at age 2-3 years, monogamous
 - Builds nests in old-growth forests
 - female incubates 1-2 eggs for 28 days, then sits with the owlets
 - male hunts for food for his mate & owlets

Porcupine

- Common east of the crest of the Klamath Mountains & throughout Cascades
- Generally nocturnal
- Diet:
 - Summer: leaves & herbaceous plants, new branch buds on trees
 - Winter: bark of young trees ("thinning effect" of forest floor)
- Prevent predation
 - erecting their spines & slap predators with their spiny tail
 - BUT—martens successful eat them by burrowing under snow and attacking them from underneath

Roosevelt Elk

- largest mammal of this region (up to 1000lbs), habitat destruction has made them less common
- Found typically along meadows in herds
 - single dominant male and 12 cows, and sometimes young bulls
 - Mature bulls are 5+ years; fight to establish dominance during the rut (autumn); sound a challenge by bugling
 - Sometimes sub-dominant males sneak into herd and copulate
- Diet: grasses & leaves of trees.