National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Inventory & Monitoring Division

Checking Oregon Caves' Vital Signs

Klamath Network Science in the Monument and Preserve

National parks are the guardians of our unique American natural and cultural history. But perhaps more than ever before, parks exist in a rapidly changing landscape. Urban growth, replacement of native species by exotics, air and water pollution, increasing visitor use, and climate change all impact the natural web of life. This leads us to ask:

How healthy are our parks? How are they changing?

To answer these questions, the National Park Service clustered parks into 32 Inventory and Monitoring Networks. In 2012 at Oregon Caves and nearby parks, the Klamath Network began monitoring natural resources, called "vital signs," that serve as red flags if conditions deteriorate. Through repeated visits to fixed sampling sites over time, we track status and trends in park conditions to support park managers' efforts to make science-based management decisions.

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What do we monitor at Oregon Caves National Monument and Preserve?

Cave Entrance Communities and Cave Environments

Endemic grylloblattid *(Grylloblatta siskiyouensis)*

Intricate geologic features, bats, and exotic-looking invertebrates are some of the natural treasures found inside the large marble cave complex at Oregon Caves. Hundreds of microbes and dozens of invertebrates that scavenge organic matter or "graze" on bacteria, or prey on each other, represent over 340 species found in the Caves. This rich cave fauna includes rare, endemic species, like the grylloblattid—a cold-loving insect that looks like a cross between a cricket and a grasshopper and will die in minutes if held in a warm human hand! We monitor cave resources and their potential stressors, like human visitation and changing climate, to help protect this unique ecosystem.

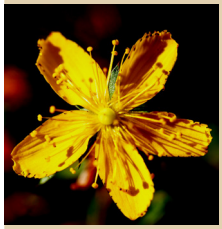
https://www.nps.gov/im/klmn/caves.htm

Some resources we measure:

- cave climate: temperature and humidity
- water levels in subterranean pools
- cave entrance vegetation, including lichen, moss, and ferns
- hibernating bats during the winter
- scat and other organic matter
- cave invertebrates
- amount of human visitation

Terrestrial Vegetation and Early Detection of Invasive Species

Trillium (*Trillium ovatum*)



Klamath weed

In the Oregon Caves uplands, lush, emerald green old-growth forest mirrors the famously biodiverse Klamath-Siskiyou region. A unique blend of conifers and hardwoods supports a greater number of insects than either type alone could support. The resulting mix of tree heights also creates a multilayered canopy, boosting the variety of food and shelter available. Because healthy forests mean healthy wildlife, soil, and water, we monitor this vital sign at Oregon Caves. We also track forest floor fuel conditions, like duff and woody debris, which affect fire behavior.

While our upland plots occur in remarkably intact, native forests, other areas in Oregon Caves contend with invasive, nonnative plants, like Klamath weed (*Hypericum perforatum*) and knapweed (*Centaurea* spp.). These invaders can wreak havoc, outcompeting native plants, monopolizing water, and changing soil characteristics. We survey park travel corridors, like roads and trails, where invasives most commonly appear.

Some resources we measure:

- cover and diversity of native plants
- cover and diversity of nonnative plants
- regeneration, by tree seedling counts
- mortality, by counting recently dead trees
- fuel availability, by measuring woody debris and litter and duff depths
- live tree characteristics, like volume (basal area), canopy health, and height

https://www.nps.gov/im/klmn/vegetation.htm
https://www.nps.gov/im/klmn/invasives.htm

Stream Water Quality and Aquatic Communities

Stonefly nymph (Plecoptera) (top) and mayfly adult (Ephemeroptera) (bottom)

Life flourishes in and near water, from the tiny aquatic insects that feed frogs and colorful warblers, to the lush vegetation prized by myriad wildlife. Streams at Oregon Caves are not only life-sustaining, but also unique. A section of Cave Creek known as the River Styx is the first underground stretch of the nation's Wild and Scenic River System. Lake Creek contains an unusually high diversity of aquatic macroinvertebrates—like stoneflies and mayflies—due to its pristine water and the complexity of its streambed. Though most of the monument's streams are fishless, the tailed frog (*Ascaphus truei*)—uniquely adapted to fast-flowing streams—occurs here, as well as Pacific giant salamanders (*Dicamptodon*). We track the condition of these valuable stream resources, as well as their potential stressors, like invasive species, climate change, and the effects of upland land use, like past cattle grazing.

Some resources we measure:

- water quality, like oxygen, pH, and cloudiness (turbidity)
- water chemistry, like nutrients (nitrogen, phosphorous) and salts
- water quantity, like stream discharge
- habitat features, like streamside vegetation and in-stream woody debris
- amphibians, algae, and aquatic macroinvertebrates (stream bugs)

https://www.nps.gov/im/klmn/streams.htm

Landbird Communities

Pileated woodpecker (©Frank Lospalluto)

Landbirds delight us with song and beauty, but also with scientific data! Easily detected, they are good indicators of ecological health because they respond quickly to changes in the environment. In collaboration with the Klamath Bird Observatory, we monitor landbirds at Oregon Caves, like the pileated woodpecker (*Dryocopus pileatus*). Landbird monitoring in the park also feeds into larger-scale datasets that track the health of landbird communities across the region, like the Avian Knowledge Network (Northwest).

https://www.nps.gov/im/klmn/landbirds.htm

We document the abundance of birds and variety of bird species at Oregon Caves

- during breeding season point counts
- at a mist-netting station during spring and fall, where we also age and sex birds to track their population structure
- at 2 Area Search plots near the mist-netting stations

Explore the Klamath Network website

Learn more about inventory and monitoring in the park and find:

- Featured Creature articles and Klamath Kaleidoscope newsletters
- species lists for the park
- an 8-minute video telling our vital signs monitoring story

Contact us!

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