



# Crater Lake National Park Inventory & Monitoring

## Overview

Students will gain an understanding of the importance of long term ecological studies. They will explore the career of a field biologist who conducts such studies.

## California Science Standards

Grade 6: 7a-d,g,h

Grade 8: 6a

High School: 1a-n

## Oregon Science Standards

Grade 6: 2L.2

Grade 7: 3S.1,3

High School: 2L.2

## National Standards

Content Standard A:  
Science as Inquiry  
Content Standard C:  
Life Sciences

## Materials Included

- \* Student Journal
- \* Scientist Interview questions
- \* Protocols for setting up school yard monitoring

## Activity Time

Preparation: 20 min.  
Activity Time: 40 min.  
to 1 hour

## Best Season

All Seasons

## Vocabulary

- \* Monitoring
- \* Ecological Vital Sign
- \* Park Network
- \* Inventory

**Grade Level:** 6th-12th (O.S.S 6th-12th) (C.S.S. 6th, 8th, &12th)

## Learner Objectives

Student will:

- Understand the ecological importance of long term monitoring
- Learn why birds are important indicators of habitat health
- Define at least four new ecological terms
- Gain a better understanding of career paths based in science

## Background Information

Natural resource monitoring is the collection and interpretation of repeated observations or measurements to better understand changes in environmental conditions. How does natural resource monitoring fit into our National Parks? Part of the mission of the National Park Service is to preserve our National Parks for the enjoyment of future generations. In order to do this, park managers must first know the conditions of the natural resources within our parks by conducting inventories of the plant and animal communities within the parks. By continuing with long-term monitoring projects, park managers not only better understand the ecological conditions within the park, but also increase their understanding of the park's ecosystem.

To facilitate monitoring in the United States' parks, the National Park Service has taken the 270 National Parks and formed 32 networks of parks and monuments that share similar geographic and ecological features. Forming networks of parks creates units for inventory and monitoring studies. The parks in southern Oregon and northern California, make up the Klamath Network (KLMN) that includes: Crater Lake National Park; Lassen Volcanic National Park; Lava Beds National Monument; Oregon Caves National Monument; Redwood National and State Parks; Whiskeytown National Recreational Area.

The KLMN, in conjunction with the other Park Networks, are conducting extensive inventory studies and applying the data to conduct informed monitoring studies of the Park's ecological vital signs. Just like human vital signs (blood pressure, heart rate, pulse), ecological vital signs are select physical, chemical and biological elements and processes of the park ecosystem that represents overall health. In the Klamath Network there are ten vital signs that are considered priorities. This lesson will focus on one of the vital signs - landbird communities - and a Klamath Bird Observatory

# Background Information

Biologist who studies the landbird communities with the KLMN.

## Crater Lake National Park Case Study

In partnership with the National Parks Service, the Klamath Bird Observatory (KBO) conducted an extensive two year inventory effort of landbirds and vegetation at Crater Lake National Park. From KBO's two year study, 13 species that had not been documented in the park were confirmed to reside at Crater Lake National Park. Some examples of new bird species recorded at Crater Lake National Park include the Three-toed Woodpecker, Common Nighthawk, Violet-green Swallow and Vesper Sparrow. Following the inventory, KBO and NPS Klamath Network wrote a long term landbird monitoring plan for the Network. Long-term studies conducted over multiple years are important in natural resource monitoring because they provide more comprehensive information than similar studies conducted in a single season. According to the monitoring plan surveys will be complete every third year throughout Crater Lake National Park beginning in 2010.

Conclusions: Effective inventory and monitoring programs are crucial to understanding the role that National Parks, such as Crater Lake National Park, play in fulfilling conservation objectives. Long term monitoring studies help land managers better understand ecosystem processes within the park and through adaptive management monitoring provides insight about how effective our ecosystem management efforts are allowing for continued evaluation and improvement. This helps ensure that the wild places that are protected in our National Parks can be enjoyed for future generations to come.

## Career in Biology

Careers in natural science can provide fulfilling jobs in an outdoor setting working to better understand ecosystem functions. Jaime Stephens is the Research and Monitoring Director at the Klamath Bird Observatory.

A graduate student at Southern Oregon University, Jaime spent countless hours in the field collecting data for her master's thesis on the effects of different methods of timber harvests on songbirds. The research study that Jaime conducted was used by the timber industry to help design wildlife-friendly management practices.

Working for KBO since 2002, Jaime directs extensive monitoring and

## Top 10 KLMN Vital Signs

- \*Non-native species
- \*Keystone and sensitive species
- \*Terrestrial vegetation
- \*Landbird communities
- \*Intertidal communities
- \*Freshwater and aquatic communities
- \*Cave collapse and entrance communities
- \*Water quality
- \*Land cover, use, patterns
- \*Environmental conditions in

## Birds as Indicators

Birds react quickly to changes in environmental conditions - either coming into an improved habitat or leaving unstable habitat. After a wildfire burned in Southern Oregon there was an increase of Downy Woodpeckers in burned areas. KBO data from a riparian restoration project found that more Yellow Warblers had moved into the area after the restoration project was completed. These two examples illustrate that by knowing the habitat needs of birds and monitoring the occurrence of birds in an area land managers gain an indication of the health of that ecosystem.

# Lesson Plan

and research of bird communities and their habitats. Projects that fall under this program include short-term studies that assess impacts of habitat restoration, wildfire, fuels reduction, and grazing on bird populations. Through her work with the National Park Service on their a long-term monitoring program for the Klamath Inventory and Monitoring Network, Jaime is monitoring the birds and habitats at Crater Lake National Park. When not in the field collecting data, Jaime also serves as the database manager for point count, vegetation, nest search, spot map, and GIS location data. Her job includes data analysis, report and manuscript writing, giving scientific presentations, grant writing, and study design and development. In addition, she holds the position of Oregon/Washington Partners in Flight Chair, helping to advance KBO's efforts to use science to integrate bird conservation and land management at regional and national levels.

## Getting Ready!

1. Read background information.
2. Copy enough the *Student Journal: Crater Lake Inventory and Monitoring* sheets.

## Discuss!

1. Discuss with students the importance of long term monitoring studies. Use the Crater Lake National Park case study and additional internet links as resources (See side panel).
2. Have students analyze data from KBO's inventory monitoring study at Crater Lake National Park.
3. Read the profile of a field biologist to the class and have students compose questions that they would ask if they were to interview a field biologist.
4. Facilitate a discussion with the class about careers in field biology and natural resource management. Do these careers appeal to any of the students?

## Investigate!

1. Have students research other inventory and monitoring projects that are being conducted in National Parks.
2. Conduct one of the extension activities for this lesson.

## Follow-up!

At the end of a study term have students review the monitoring data they collected and create a report.



Jaime Stephens KBO  
Research and Monitoring  
Director.

## Internet Resources

Klamath Network Website:  
<http://science.nature.nps.gov/im/units/klmn/index.cfm>

Klamath Bird Observatory  
Field Science Projects:  
<http://www.klamathbird.org/Projects/projects.htm>

Crater Lake National Park  
Natural Resources:  
<http://www.nps.gov/archive/crla/crlanr.htm>

# Extension

## Suggested School Yard Monitoring and Extensions:

- \*Contact a local field biologist to come in and speak to the class about field work that he/she is working on. Have students prepare for the guest speaker by doing research on the biologist and preparing questions. Or visit the “Ask a Researcher” link on the Science and Learning Center website.
- \*Create your school’s own eBird page and help promote citizen science. Use the eBird and Common Birds of the Klamath Basin as a reference tool. (See *Citizen Science Lesson*)
- \*If your school is near a creek, lake or pond conduct monthly water quality tests and macro-invertebrate sampling. By graphing your data in the class room you will see changes throughout the year!
- \*Conduct research on how global climate change could affect Crater Lake National Park.
- \*On a field trip to Crater Lake National Park, work with a Ranger to conduct a snow project.

## Fledglings!



Have older (9th-12th) students see if they can job shadow or volunteer with a field biologist!

## Careers in Field Biology



Bird banding interns with the Klamath Bird Observatory get a start on their careers as field biologists! Banding interns operate mist nets (see *Bird Banding Reveals* lesson) to capture songbirds. Data on species, age, sex, and feather molt is recorded to learn what birds are using the habitat.