# Using science to preserve biological diversity and improve habitat in the Cascade-Siskiyou National Monument

*Birds as indicators in adaptive management*

## Biodiversity and the Cascade-Siskiyou National Monument: why is it important?

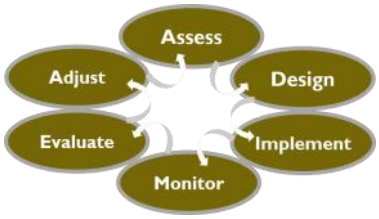
The Cascade-Siskiyou National Monument lies within the heart of a unique ecological landscape that is unlike anywhere else in the world. The region intersects three mountain ranges—the Cascades, Klamath-Siskiyous, and Sierra Nevadas. Plants and animals here are characteristic of the Great Basin, the mountains and valleys of Oregon and California, and the Pacific coast. The Monument was created to protect a core of this area's outstanding biological diversity.

## Adaptive management: an integration of science, management, and learning

How do we ensure that management activities promote diversity? In part, by using science. "Adaptive management" is a structured series of decisions that allow managers to use the best available science to create desired ecological conditions. Adaptive management involves using the best available information to guide management actions, and then using scientific methods to study the effects of those actions. The results of those studies are then directly incorporated into the next actions, allowing us to improve ecosystem management over time. The process is often depicted as a six-stage circular loop, explained below.

**Assess**: Available science is used to identify management needs and set specific, measurable goals.

**Adjust**: Based on science, changes in management are made, if necessary, to better achieve goals.




**Design** and **Implement**: Management plans designed to meet the specific goals are developed and put into action.

**Monitor** and **Evaluate**: The effects of actions are studied to determine whether goals are being met.

### *The role of bird monitoring*

Klamath Bird Observatory uses standard protocols to survey for birds, which are easy to monitor and respond quickly to changes in vegetation. Each species serves as a measuring stick, telling us whether specific habitat needs are being met. Understanding whether the presence or abundance of each species changes following action is a useful tool for evaluating management success.

*Assess*

## Assessing management needs: why birds need our help

KBO is a member of Partners in Flight (PIF), an international network of more than 150 organizations working together to achieve bird conservation in the Western Hemisphere. PIF uses a multi-species, science-based approach to assess and identify bird population and habitat objectives. Bird population and habitat objectives outlined in PIF conservation plans can be used in every stage of the adaptive management process, and thus can serve as a catalyst for improving ecosystem management on public lands.

PIF used existing bird monitoring data to assess population trends and identify species that most require management to prevent or reverse population declines. Of those species, neotropical migrants—birds in the western hemisphere that travel long distances between wintering and breeding grounds—are specifically identified as needing more protection.[1]

*Design and Implement*

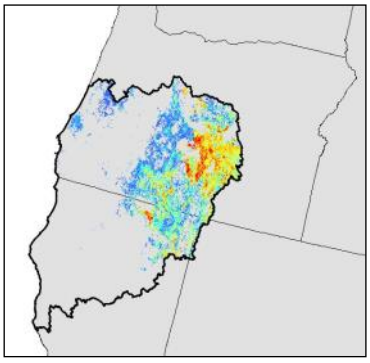
## The Cascade-Siskiyou National Monument Proclamation

In 2000, President Clinton signed a proclamation creating the Cascade-Siskiyou National Monument. The proclamation directs the Bureau of Land Management (BLM) to protect the Monument's "objects of biological interest," including migratory birds. The original boundaries included 65,269 acres of forests and grasslands that are managed by the BLM. It was the first U.S. National Monument set aside specifically for preservation of biodiversity.

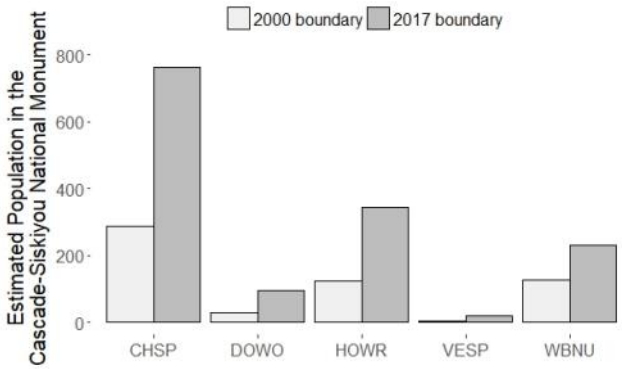
*Monitor and Evaluate*

## Expanding the Monument to meet the conservation needs of birds and their habitats

Distribution models that map the abundance of bird species within the Klamath-Siskiyou Bioregion and analyses of bird communities within public lands provide insight into which birds and habitats occur in the region's protected areas (e.g. national parks, monuments, and wildlife refuges). Results show that relatively few oak and grassland habitats occur in the protected areas, which is important because birds in oak and grassland habitats are among the most at-risk bird species in North America.[2,3] The analyses also highlight the Cascade-Siskiyou National Monument, and areas around the Monument, as very important because they do include habitat for these under-protected species. In 2017, President Obama signed a new proclamation expanding the Monument by 47,660 acres. The Monument now includes 119,928 acres of BLM lands that protect more oak and grassland habitats and associated at-risk species.



Above: The map shows the results from a distribution model for the Vesper Sparrow within the Klamath-Siskiyou Bioregion. The color range from blue to red indicates increasing abundance based on the predictions from the model.




Above: The expanded boundaries of the Monument included a greater proportion of oak and grassland habitat, resulting in increased protected areas for species identified as at-risk by Partners in Flight.

*Species codes : CHSP= Chipping Sparrow, DOWO= Downy Woodpecker, HOWR= House Wren, VESP= Vesper Sparrow, WBNU= White-breasted Nuthatch*

*Assess*

## How does grazing affect bird communities?

When the Monument was created in 2000, grazing activity was widespread across its lands. The proclamation included a directive to determine how livestock grazing activity affected the Monument's objects of biological interest, including birds. Livestock grazing changes vegetation structure in riparian zones and the understory of oak woodlands and can reduce habitat availability for birds and other wildlife. In 2003-2004, KBO conducted a study to determine the impacts grazing had on birds and habitat. KBO found significant differences in bird communities between low and high grazed areas in oak habitats, suggesting that the grazing was having significant impacts on migratory birds in the Monument.[4]

Left: Two different plots surveyed for birds in 2003-2004 show how low grazing intensity (left) and high grazing intensity (right) affects grass and shrub cover.

*Design and Implement*

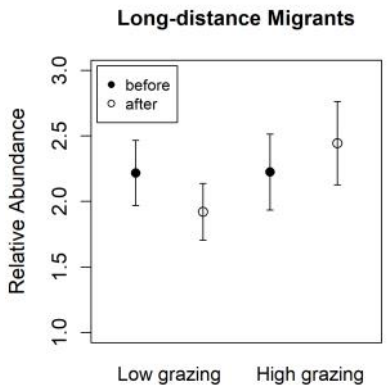
## Eliminating grazing from protected lands to preserve key wildlife habitat

After the Monument was created, negotiations between environmental and grazing communities resulted in the Omnibus Public Land Management Act of 2009. Among its many provisions, this bill authorized a voluntary buy-out program for grazing leases within and adjacent to the Monument. As a result, 93% of authorized livestock grazing in the Monument was eliminated.

The elimination of livestock grazing gave scientists the opportunity to learn how removal of grazing affected habitats in the Monument, particularly oak woodlands. KBO studied how bird communities changed following the removal of livestock from heavily grazed areas to provide important information about whether removing livestock grazing from protected areas was an effective bird conservation action. The study also determined whether eliminating grazing met the proclamation objective to protect "objects of biological interest."

*Monitor and Evaluate*

## Removing livestock grazing improves habitat and benefits birds




Seven years after grazing was removed from oak woodlands in the Cascade-Siskiyou National Monument, KBO returned to the original sites from the 2003-2004 study to measure how removing grazing affected migratory birds in the Monument. The new surveys and analysis demonstrated that bird communities in oak woodlands had changed in the formerly heavily grazed sites, but not in the lightly grazed sites.[5] After grazing was eliminated, the formerly high-grazed sites supported a higher abundance of long-distance migrants, including Nashville Warbler, Wilson's Warbler, Chipping Sparrow, and Black-headed Grosbeak. The results indicate that the removal of livestock has improved habitat conditions for migratory birds at previously grazed sites.

Above: Low-grazing sites were a control, and high-grazing sites had significant reductions in grazing impacts seven years after livestock were removed. Abundance of long-distance migrants in formerly high-grazing sites increased significantly more than abundance in control sites over the same time period, indicating that removing livestock improved habitat on high-grazing sites.

## How science supports community-driven action

Klamath Bird Observatory is a non-advocacy science-based organization. Our science uses birds as indicators of ecological conditions and is designed to inform conservation and management.

KBO was officially incorporated in 2000, the same year the Monument was declared. We were able to work with multiple partners to design and implement a study of grazing impacts in the Monument, using research to fill information gaps. Our science has informed discussions and negotiations among interest groups regarding grazing in the newly protected area, and in the area's expansion. KBO's studies have demonstrated measurable benefits of removing livestock from the Monument, as well as the benefit of increasing the amount of bird habitat that is protected within the boundaries of the expanded Monument.

## What else can we learn in the Cascade-Siskiyou National Monument (and beyond)?

There are many other ways we are using science to improve habitat management and ecological outcomes for biodiversity in the Monument and elsewhere in the Klamath-Siskiyou Bioregion. We apply our approach using birds as indicators throughout southern Oregon and northern California to provide rapid assessments of management and ecological conditions. To learn more about our scientific programs, visit www.KlamathBird.org.


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Photo credits: Page 1: Jim Livaudais (top), Bob Altman (bottom). Page 2: Jim Livaudais. Page 3: Caitlyn Gillespie (top), Frank Lospalluto (habitat photos). Back: Caitlyn Gillespie. Map on Page 2 is modified from Alexander et al (2017).


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