



Point Blue

Restoring Sierra Meadows

Improving Meadow Health and Bird Habitat in the Sierra Nevada

Meadows comprise less than one percent of Sierra Nevada lands and yet they provide extraordinary benefits to innumerable birds, other wildlife, fish, and people.

Unfortunately, many Sierra Nevada meadows are severely degraded. **We need your help restoring these important lands.**

This guide provides details on how you can assess and improve the health of your meadows. This includes balancing the need for late season livestock grazing with restoring much-needed habitat for native birds and other wildlife. We offer additional resources for assistance on the back panel.

Main Points

- Sierra Nevada meadows provide numerous benefits, from storing water to supporting important wildlife habitat, but many meadows are degraded.
- Visual inspections of stream channels and vegetation, along with bird surveys, are ways to assess the health of meadows.
- Options for improving meadow health include planning grazing, restoring natural floodplain functions, and removing encroaching conifers. Additional assistance is available for restoration and monitoring.

Meadow Services

Mountain meadows host a diverse array of wildlife, including many sensitive species. They store and filter water—helping to supply our drinking water and irrigation for crops—and they furnish needed range for livestock. These services are more important than ever as drought becomes more common and snowpack continues to dwindle.

Many Sierra Nevada meadows are degraded, reducing the benefits they provide. Healthy meadows hold water near the surface. Spring flows spill out across the meadow, recharging aquifers, improving plant vigor, absorbing peak flood flows, and increasing resilience to drought.

You can begin assessing the health of your meadows through visual inspections of stream channels and vegetation. Surveying bird species can complement visual assessments and help monitor the effectiveness of restoration efforts over time (assistance is available from Point Blue and others).



Healthy Sierra Nevada meadows provide many benefits, such as storing water, hosting a diverse array of wildlife, and furnishing range for livestock.



Monitoring meadow birds, such as this yellow warbler, provides a measure of meadow health.

Photo: Tom Grey

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Assessing, Improving, and Monitoring Meadow Health

How to Assess Meadow Health

Common causes of meadow degradation include: improperly located road and railroad grades that intersect meadow streams, channel alteration, ditching, culvert failure, overgrazing, and fire suppression. Look for the red flags listed below during your visual inspection.

Bare ground and high forb species cover:

Reduced sedge and grass cover indicates heightened disturbance by grazing or gopher activity, and a dry meadow. Deep-rooted species like sedges can no longer reach the water table.

Encroaching conifers: A lowered water table, bare ground, and a lack of fire can combine to cause conifer encroachment.

No riparian shrub regeneration: Most healthy meadows with streams grow thickets of young willows and other riparian species, especially after spring flood events.

High-lining of riparian shrubs: Livestock will browse willows, alders, aspen, and other shrubs, especially late in the season, reducing riparian health and nesting habitat for birds.

Channel incision: Stream channels down-cutting through the meadow can result in gullies, sloughing stream banks, sedimentation, a lower water table, and reduced forage production.



Downcut stream channels result in higher erosion, poorer wildlife habitat, and less forage production.

Headcuts and knickpoints: A stream channel flowing over an abrupt grade change, often seen as a waterfall, is a sign of increasing erosion and can lead to meadow degradation.

Ways to Improve Meadow Health

There are many ways you can improve the health of your meadows. Options range from adjusting grazing plans to engineered restoration.

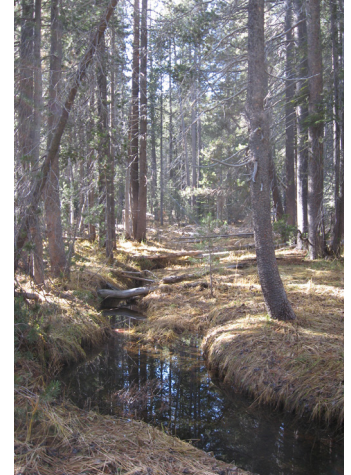
Fence creeks and plan grazing: Managing livestock access to sensitive riparian areas can protect stream banks and streamside vegetation. Flash-grazing riparian pastures can provide quality late-season forage and may be compatible with wildlife, once sensitive breeding periods are over.

Connect to the floodplain: Reconnecting down-cut channels to their floodplains is critical to restoring meadow health. Options range from filling gullies and realigning channels to installing stabilization structures such as rock or log check dams. A professional site evaluation may be the best place to start.

Restore vegetation: Restoring native grasses, sedges, and riparian shrubs, along with active removal of invasive weeds, will improve wildlife habitat. Sedge sod mats and willow cuttings can be acquired from nearby sources to speed recovery.

Remove conifers: Removing invasive trees reduces competition for limited groundwater and promotes shade-intolerant species like sedges, grass, willow, and aspen. Prescribed fire can help kill seedlings while hand or mechanical thinning is required to remove larger trees.

Incorporate beaver: Reintroducing or tolerating beaver can recharge groundwater storage, remove encroaching conifers, and increase meadow habitat complexity.



Above: conifers encroaching on a meadow stream. Below: a channelized stream that no longer floods the meadow in the spring.

Restoring degraded meadows increases the compatibility of grazing and high quality wildlife habitat.

Using Birds as Indicators of Meadow Health

Meadows provide important habitat for many species of wildlife, including birds. Most of the bird species of greatest conservation concern in the Sierra Nevada – including the greater sandhill crane, great gray owl and willow flycatcher – depend on meadow habitat. Many other species use meadows for breeding, molting, and staging grounds for migration.

We use birds to evaluate meadow health because they respond quickly to changes in habitat features, making them excellent indicators of habitat condition. For example, some birds rely on a lush understory, like the Lincoln's sparrow, while many species need dense patches of willow, like the yellow warbler. The warbling vireo uses cottonwoods and aspen, and the red-breasted sapsucker needs dead trees for creating nesting cavities.

Determining which species are present and which are absent in a meadow indicates what habitat is available, and what may be lacking.

Point Blue provides resources for using bird surveys to assess meadow health. (See back.)

Importance of Ongoing Monitoring

Monitoring your meadows can save time and money. Ongoing monitoring helps evaluate the effectiveness of management decisions and provides a way to make adjustments as needed.

Point Blue has studied bird habitat and the effectiveness of different restoration techniques in the Sierra Nevada since 2000. Our results show meadow restoration can be effective at restoring wildlife habitat while enhancing other ecological benefits.

The USDA Natural Resources Conservation Service (NRCS) offers monitoring assistance, including range, stream, and wildlife habitat assessments as well as recommended improvement practices that are compatible with your current land uses.

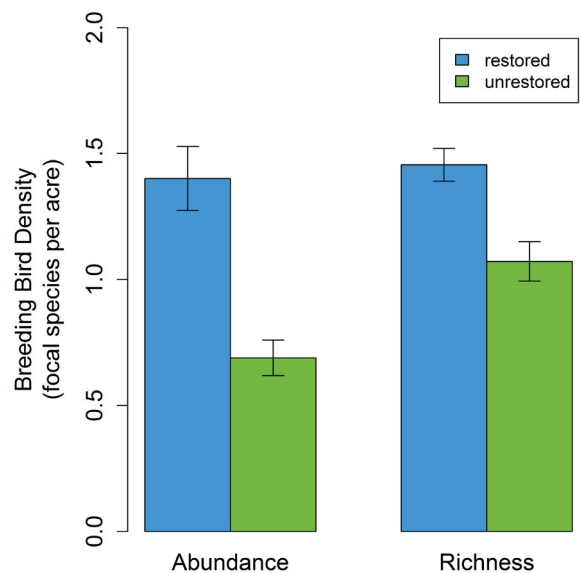


Greater sandhill cranes breed in large wet meadows in the Northern Sierra.



Dense stands of willow and aspen provide important habitat for wildlife.

Healthy Meadows Support More Birds



Pond-and-plug meadow restoration results in an increased number of birds (abundance) and more diverse bird species (richness) in the Feather River Watershed.

Restoration Increases Bird Habitat and Livestock Forage

In the Upper Feather River Watershed, Point Blue is working with livestock producers, the Plumas Corporation, and other partners to restore meadows on private land. Reconnecting degraded stream channels with the surrounding meadows has recharged groundwater. When combined with new grazing management, we have documented increases in meadow birds, forage production, and reduced erosion.

Livestock are excluded from riparian pastures during the bird breeding season (May - July in the Sierra). Cows have access to these wet areas for high-intensity, short-duration grazing for 10-20 days in early August, when forage in the higher parts of the meadow has dried. Even with reduced grazing in the riparian areas, the more abundant forage from restoring the water table has resulted in increased livestock weight gain.



Resources

There are resources available to help you improve your Sierra Nevada meadows. Point Blue's Sierra Nevada staff, NRCS, and our shared team of partner biologists can provide technical assistance and resources to help you improve the meadows you own or manage.

Ryan Burnett, Northern Sierra/Southern Cascades: rburnett@pointblue.org

Alissa Fogg, Central Sierra: afogg@pointblue.org

Melissa Odell, Southern Sierra: modell@pointblue.org

Tiffany Russell, Lassen county: trussell@pointblue.org

Find your local NRCS field office at: www.nrcs.usda.gov/wps/portal/nrcs/main/national/contact/local/.

Learn more at the Sierra Nevada Avian Monitoring Information Network: data.prbo.org/apps/snamin.

Seven years after restoration, the diversity and abundance of birds has grown on this Upper Feather River Watershed meadow. In addition, the livestock grazed here late in the season have increased weight gain.



Point Blue Conservation Science, founded in 1965, works to conserve birds, other wildlife and their ecosystems through scientific research, partnerships, and outreach.



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