

PROFILES IN LAND AND MANAGEMENT:
Adaptive Grazing on Public Lands

U.S. Fish and Wildlife Service

Sacramento River National Wildlife Refuge

A 12,000 acre wildlife refuge using adaptive grazing to control weeds and reduce fire risk, and to promote native grass, wildflowers, and wildlife habitat in the heart of a major agricultural region.



Sacramento River National Wildlife Refuge

RAINFALL

18 inches per year

PROPERTY DESCRIPTION

A mix of grassland/savanna, forest, scrub, oxbow wetlands, and gravel bars.

PROPERTY SIZE

12,030 acres

ACRES IN GRAZING LANDS

3,100 acres

PLANNED GRAZING SINCE

1991

SPECIES

Number of cattle varies: usually one paddock per unit at a time, generally with 60 to 90 head

GRAZING SEASON

December–March;
plus May–August

PARTNERS

1 year trial period,
then 3 yr agreements with
4 local ranchers

DOES THIS SAVE YOU MONEY?

Yes

GRAZING PERIOD

Until the prescription is met,
varies from 7–28 days

LENGTH OF RECOVERY

Varies from 90–240 days

MANAGING FOR

- Improve wildlife habitat, especially waterfowl
- Reduce mowing and spraying, be efficient with resources
- Reduce fuel loads / fire danger
- Improve the community of native plants



“Once you can get away from the fear of impact, you can really start to see positive benefits on the diversity of vegetation”

—BREANNA OWENS, REFUGE GRAZIER;
CSU, CHICO CENTER FOR REGENERATIVE
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The Central Valley of California is among the most productive agricultural areas in the world. As a result, the landscape is dominated by row crops as well as orchards and groves growing almonds and walnuts. The Sacramento River National Wildlife Refuge is an oasis of green—truly a “refuge” given the land use around it and the severe loss of habitat in the riparian zone. Songbirds, raptors, wild turkey and black tailed deer frequent the site, and their presence and population sizes are indicators of success for this refuge.

The refuge was established in 1989 and currently consists of 34 units totalling 12,030 acres in a sinuous checkerboard scattered across 81 river miles. This site includes a diverse mix of riparian forests, woodlands, savannas and oxbow sloughs. The refuge coincides with the active floodplain, and winter and spring storms can result in overbank flooding and river channel meandering.

Adaptive grazing is used on 3,100 acres to achieve multiple goals, including providing disturbance to maintain healthy vegetation, promoting wildflowers, reducing fire risk, and supporting the wildlife and recreation goals of the National Wildlife Refuge System.

HISTORY

Since the refuge was assembled from multiple owners, the site history varies considerably, but grazing was the predominant land use for the floodplain historically. Many parts of the refuge have now come full circle, having been wild lands occupied by various wildlife, then settled and used commercially, and now back to wildlife habitat and public recreation opportunities, with occasional grazing. Today’s grazing impact is closer to that of native graziers than the continuous grazing of the past.

The Nature Conservancy (TNC), River Partners, and Point Blue Conservation Science have been key allies and supporters of the refuge and its large-scale ecological restoration. Prescribed grazing was

originally incorporated into the annual habitat management plans in 1991 as a tool for achieving both vegetation management and supporting wildlife. Grazing acreage has increased as the refuge has grown: from 650 acres in 1991 to 3,100 acres in 2018.

WHY GRAZING?

Wildlife refuge manager Joe Silveira notes that this site is not fire-adapted, and that “cattle are the best tool for the job” of providing disturbance and vegetation management. He ticks off a list of benefits grazing provides, including “reducing fire risk, controlling weeds, supporting wildlife habitat and promoting native wildflowers, pollinators and biodiversity.”

Air quality permits limit the use of prescribed burns, and mowing is not practical at this scale and spreads weed seeds. Grazing has been a very successful and cost-effective alternative that also reduces the need for spraying herbicides. Joe notes that “without grazing, refuge habitats would degrade and wildlife populations would decline,”

Over-wintering geese and ducks benefit from grazing after the cattle, as they much prefer short grass for its digestibility and its lack of cover for predators.

Wildflower restoration efforts at the refuge support native pollinators, including the Monarch Butterfly. Prescribed cattle grazing

Benefits of adaptive grazing



Efficiency & Cost Savings

Without grazing, the refuge staff would spend considerable time and money on mowing, which would be less effective



Wildlife

Grazing improves forage quality and stimulates new grass growth, which increases nesting and concealment cover



Reduced Fire Risk

By reducing thatch, RDM and ladder fuels, grazing decreases fire risk



Native Plant Diversity & Abundance

Spring and summer wildflowers are more abundant in areas grazed by cattle

“Livestock are perfect: you can write prescriptions and move them on, and then move them off”

—JOE SILVEIRA, WILDLIFE REFUGE MANAGER

has improved conditions for native wildflowers through the reduction of grass thatch and grass height.

Invasive species are another concern for the refuge: Joe considers planting native grasses and managing them with cattle to be part of an integrated pest management (IPM) strategy. He uses locally-adapted ecotypes of native grasses to suppress weeds, such as yellowstar thistle, johnsongrass, milk thistle, and black mustard. In places where these weeds invade the native grasses, grazing is used to lower the height of the perennial grasses, preparing the site for herbicide application.

WHO GRAZES?

Currently, Joe works with four local livestock operators to develop and implement grazing plans on the refuge. The grazing plans are designed to address specific wildlife habitat and native plant needs, reduce hazardous fuels near refuge boundaries, and avoid conflicts with refuge visitors seeking recreation.

Cooperators are required to check their cattle daily, and to move the hotwire fencing and mineral blocks frequently to shift the animal impact. Animals are moved once the prescription is achieved for each paddock, which varies based on herd size and growing conditions. Paddock sizes vary, with some as small as 15 acres for high-intensity grazing; the average size is approximately 40 acres. Joe has been working with the cooperators to try different intensities of grazing and smaller paddocks. The grazing plans are adaptive, based on changing conditions and vegetative response, as well as flooding.

The refuge uses two grazing seasons in areas that are open to hunting: one mid-November to mid-March, and another mid-May to mid-August. This schedule accommodates multiple hunting seasons in spring and fall, but does not avoid bird nesting season. To reduce impacts to ground nesting birds, Joe is careful to avoid grazing the same paddock site in consecutive years. Monitoring has shown that this approach is working.

SUCCESSES

Joe reports that his supervisors and peers see the use of grazing on this site as very successful, noting the positive results for the wildlife, which are a priority. He feels that “there’s a lot of support for cattle grazing as a tool now” within the agency, with growing recognition that grazing can promote native plant diversity. The wildflowers in the refuge demonstrate this: the best wildflower populations are found on grazed pastures.

On a practical level, grazing is an efficient tool for achieving the management goals for this site. The locals like seeing the land being used, and the neighbors like the reduced fire risk.

Advice to Other Agency Staff Considering Using Grazing:

“Timing is everything.” To achieve your management goals with prescribed grazing, you must incorporate into your plans the native plant life cycle, the wildflower seasons, weed phenology, ground nesting birds life cycle, hunting seasons, and seasonal flooding.

“Visit a site using grazing, find out about their management goals; and compare their grazed land to neighboring ungrazed land”

—Joe Silveira,
wildlife refuge
manager

Refuge grazer and former Point Blue scientist Breanna Owens suggests that agency staff “build as much flexibility into their plans from the get-go” and “think about infrastructure up front... design your water infrastructure for flexibility (in paddock size and shape)”. She stressed the importance of a good relationship and the need to “keep conversation going between agency staff and the grazer.”



CHALLENGES

- Finding livestock operators willing to graze small paddocks of low value forage while moving animals and fencing frequently.
- Unpredictable flooding from the river: cooperators have to remove their cattle on very short notice, incurring costs and forcing changes to management plans.
- Developing a grazing plan aligned with multiple hunting seasons each year.
- Lack of infrastructure for supporting grazing: cooperators use a variety of methods to bring water to their animals, including trucking it.

CHANGES & MONITORING

Studies on the refuge found that while adaptive grazing enhanced winter bird diversity in some areas, there were no consistent differences in bird abundance between grazed and ungrazed plots.

A wildflower study found that cattle grazing “can be an effective tool for increasing site availability to support successional habitat management of floodplain grasslands, providing the grazing period does not interfere with critical growth phases of the seeded native wildflowers.” (Frediani 2014) As grazing has reduced the buildup of thatch on the refuge, the wildflower abundance and diversity have increased.

This reduction in thatch has also reduced the risk of serious fires; grazing has decreased RDM and knocked down ladder fuels that could spread a fire. Without grazing, the abundant annual ryegrass would lay over and smother new growth, leading to bare spots and invasive prickly lettuce. Grazing stimulates new growth that provides vertical structure, which is used by wildlife for concealment and nesting. Monitoring on the refuge has shown that the survival rates of small birds and fawns are increasing as nesting cover and concealment cover have increased.

While grassland bird monitoring began in 2007, in-depth annual monitoring of this site began more recently, in 2016, as part of the Rangeland Monitoring Network supported by Point Blue Conservation Science. This monitoring includes bird diversity, vegetation composition and cover, soil bulk density and soil carbon.

Basic monitoring is part of the daily routine for Joe Silveira during the grazing season: he monitors each site weekly and is continually adapting grazing plans with the cooperators, in response to conditions on the ground, including grass height and the prevalence of weed species. Cattle are moved when the prescription is met: this includes residual grass height for annual grasses of 1 to 3 inches; and residual grass height for perennial grasses of 3 to 8 inches. ■

*“Flexibility from the refuge staff makes
[working together] much easier—and that
goes both ways”*

—BREANNA OWENS, POINT BLUE CONSERVATION
SCIENCE PARTNER AND REFUGE GRAZIER



The Profiles in Land and Management Series features the work of innovative ranchers and land managers who are achieving economic and ecological benefits on working lands.

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