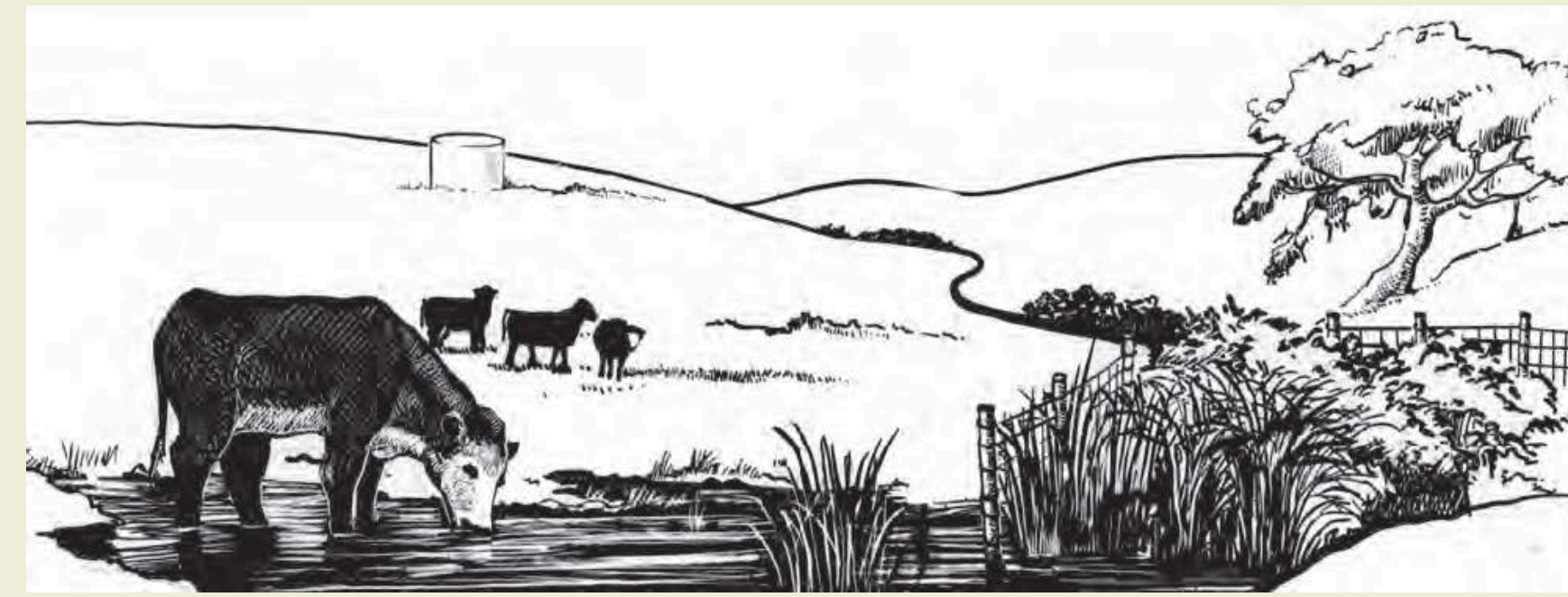


# Grazing Management Planning to Benefit Listed Species

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## Introduction

California annual grasslands are highly dominated by non-native species (D'Antonio et al. 2007), and are among the most invaded terrestrial systems in the world. To protect listed species and native biodiversity from the unchecked growth of non-native annuals, an increasing number of public rangeland owners are recognizing the need to graze livestock. This can present challenges to staff and regulators wary of grazing or unfamiliar with its operational requirements and limitations. An interdisciplinary, collaborative and performance-based approach can be key to maximizing the benefits of grazing while minimizing the potential for negative impacts.

We have developed over 30 regulator-approved grazing management plans for California grasslands, addressing the habitat needs of listed species such as California Red-legged Frogs (CRLF), California Tiger Salamanders (CTS), San Joaquin Kit Foxes, Bay Checkerspot Butterflies, and Ohlone Tiger Beetles (along with water quality and other ecological factors). Key elements of such plans include good scholarship, monitoring based on performance standards tied to objectives, and identification of special management areas for targeted grazing. Here we present species-specific habitat objectives and broadly applicable lessons learned.

## Ingredients of Successful Plans

### Translating Species Needs into Management Targets

At the foundation of successful management planning are clearly defined goals. These goals should then be translated into habitat objectives that are quantitative or at least monitorable. Defining objectives and performance standards (acceptable maximum and/or minimum values) provides all parties with a clear target. Variables should be limited to those that are reasonably under the grazer's control. For instance, it is relatively straightforward to assess how grazing is affecting a pond's percent cover of emergent vegetation, whereas the number of red-legged frogs will vary due to weather, predation, and many other factors unaffected by cows. This approach allows for an adaptive management framework in which results are monitored, assessed and, as needed, used to improve management practices. See box below for examples.

### A Focus on Results over Methods

Some management practices will work well in some locations and not others, or in rainy years but not drought years. Often, there are many ways to achieve the desired goal, allowing managers to choose the one that fits best within current operational constraints. The best chance of success is generally given by providing performance standards – and letting the grazer find solutions within that window. There are exceptions to this. For instance, when it isn't feasible to monitor a given environmental variable, the best solution can be to require the use of a Best Management Practice. And there may be certain practices (such as hunting or rodenticide use) that are strictly regulated on a given property.

### Interdisciplinary Scholarship

Grazing management planning often requires the synthesis of current literature with the expertise of researchers and experienced managers. An interdisciplinary approach is key, especially when published literature is scarce. Discussion between range ecologists and species biologists can be needed to develop appropriate objectives and performance standards.

### Flexibility

Every site and year brings unique challenges and opportunities. A results-oriented approach (versus a rigid one with fixed stocking rates and calendar-based on-off dates) allows managers to adjust to each year's conditions. Adaptive management also allows managers to respond to new information or new factors such as invasive species and nitrogen pollution. Flexibility is not a concession to the grazer but rather a tool necessary for achieving the desired results.



### Designating Fields for Special Management or Flexible Use

Fields with important habitat areas (such as a restored creek or patch of serpentine soil) should be designated as "special management fields" where specialized or targeted grazing is required. These fields can be prioritized for management effort, especially in response to drought, wildfire, or other unusual circumstances. There is often the temptation to exclude these areas completely from grazing, which often leads to excessive growth of non-native plants.

When possible, one or more fields without high-priority resources should be designated as "flexible use fields" that can be grazed less in high-productivity years and more in low-productivity years, so that the grazer can best meet performance standards in higher-priority fields.

### Providing Heterogeneity

A range of conditions can be needed to provide healthy habitat for multiple species. For instance, it may be best to keep some grasslands short for burrowing owls and kit fox, and others longer to benefit tule elk. For a large property with many ponds, it may be best if some of the ponds have very little emergent vegetation (for CTS), others are mostly full with emergent vegetation (for tri-colored blackbirds), and others have intermediate cover (for CRLF). Varying the grazing regime, from one field to another or one year to the next, may also help support diversity of native grasses and forbs (Huntsinger et al. 2007). Structural heterogeneity at the patch scale is also important for many plants and animals. Many wildflowers and ground-dwelling insects need patches of bare ground. And many species need a mix of short and tall vegetation to hunt for prey or hide from predators.

Infrastructure such as cross-fencing and watering troughs can be important in allowing the grazer to vary the timing and intensity of grazing based on the field's objectives. Large-acreage fields can also provide areas of high and low use. Conversely, high-intensity short duration grazing has been associated with reduced heterogeneity because it reduces the selectivity (pickiness) of livestock and the patchiness of their grazing pressure (Fuhlendorf and Engle 2001).

### Feasibility and Sustainability

Feasibility and sustainability concern the likelihood and degree of meeting conservation goals over the short and long term. Management practices and monitoring protocols must be reasonably feasible to implement, lest the plan become an exercise in futility. Unless the grazer is paid for their services, the operation must also be economically viable, without excessive expectations of their labor, transportation costs or other expenses. In time of emergencies such as extreme drought, it is important to provide reasonable accommodations such as a temporary relaxation of performance standards (especially in "flexible use fields" or other low-priority fields).



## Example Habitat Objectives and Management Targets

### Endangered Invertebrates

**Bay Checkerspot Butterflies.** Their host plants can be out-competed by annual grasses, especially if near freeways that add nitrogen pollution (Weiss et al. 2007).

- Host plant populations are promoted by winter-spring grazing that keeps grass below 10 inches, with temporary excess to 14 inches during rapid spring growth, and Residual Dry Matter levels at or near the recommended minimum.

This guidance is representative of that for many rare butterflies and wildflowers.

**Ohlone Tiger Beetles** need high amounts of bare ground, and livestock or recreational trails are important habitat (Arnold et al. 2012). This beetle is only known at a few locations. Species this rare can require more micromanagement and risk avoidance.

- Trails should have at least 50% cover bare ground or sparsely vegetated soil. In grassland habitat, there should be at least 12% cover in that condition.
- Livestock should be excluded when soils are moist during the winter breeding period, to avoid the trampling of eggs.



### Managing Ponds for CRLF and CTS

- CRLF prefer ponds with 10-70% emergent vegetation, while CTS prefer 0-35% emergent vegetation and (generally) turbid water. (Ford et al. 2013). Ponds can be managed to provide intermediate conditions, or some can be managed as "CRLF ponds" and others as "CTS ponds".
- If there is more emergent vegetation than desired, the pond can be grazed in the dry season when herbaceous green forage is lacking. If a pond has less emergent vegetation than desired, the manager can minimize dry season grazing, add an off-pond watering source, and/or fence out part of the pond. Please see Ford et al. 2013 for a more comprehensive treatment of managing ponds and other habitat elements for these amphibians.

### Ground Squirrels

Ground squirrels, a keystone species for many sensitive species, generally prefer short grasslands; patches of taller grasses are tolerable or beneficial (Fitzgerald and Marsh 1986, Loredo-Prendeville et al. 1994). Managing grasslands for ground squirrels benefits not only the species that depend on them for burrows or as prey, but for a broad suite of species not adapted to the dense, tall growth of non-native annuals. This includes burrowing owls and many rare plants.



- We generally recommend aiming for Residual Dry Matter levels at or near the minimums recommended by Bartolome et al. 2006, and herbaceous height at or below 12 inches, with temporary excesses acceptable in spring.
- Managers should avoid ground squirrel control methods that could harm the sensitive species involved. This includes fumigants and explosives, and for some species may include bait.

## Questions?

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**Illustrations by Katie Bertsche**  
**Ohlone Tiger Beetle photo: USFWS**