



BREEDING GRASSLAND - OAK SAVANNAH LANDBIRDS

13





# CHAPTER SUMMARY

The landscape of the Central Valley includes grassland and oak savannah ecosystems that are important both to native wildlife and to the people living in this region. These upland ecosystems form a ring of open country, foothills and rangelands surrounding the valley floor. Though more than half of historical grassland and oak savannah acreage has been lost, the remaining habitat supports a thriving community of native landbirds.

This chapter describes the conservation objectives for enhancing existing grassland and oak savannah lands and restoring additional acreage of these habitat types. The goal is to support resilient populations of Central Valley upland bird species.

The Conservation Delivery chapter in Section I integrates these habitat objectives with the habitat objectives for other bird groups in the Implementation Plan to present total habitat needs in the Central Valley. The chapter then describes conservation actions for achieving these integrated habitat objectives.

## HABITAT TYPE

Grasslands in the Central Valley are landscapes dominated by grasses and other herbaceous plant species with less than 10 percent tree canopy cover. Oak savannahs are woodlands with sparse (10 percent to 40 percent) canopy cover, with oaks (*Quercus* spp.) as the dominant tree species and primarily grass-dominated understories.



## BREEDING DENSITY OBJECTIVES:

Three actions are needed to reach the breeding density objectives:

- Enhance existing habitat to increase breeding density of focal species. Goal: reach viable (>10,000) or large (>50,000) populations, depending on the species.
- Restore additional acres of habitat.
- Protect existing habitat from development.

## GRASSLAND AND OAK SAVANNAH HABITAT: A New Focus

Grassland and oak savannah ecosystems in the Central Valley provide multiple economic and social benefits, ecosystem services, and vital bird habitat. There is a growing interest in protecting, restoring, and managing these ecosystems, and the Central Valley Joint Venture provides leadership in the formulation of conservation goals and objectives.

### SHORT TERM HABITAT OBJECTIVES: WHAT'S NEEDED?"

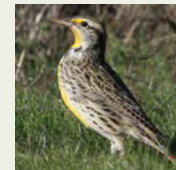
**10,300 ADDITIONAL ACRES OF HIGH-QUALITY GRASSLAND HABITAT**

**8,500 ADDITIONAL ACRES OF HIGH-QUALITY OAK SAVANNAH HABITAT**

### BIRD SPECIES INCLUDE:

Representative bird species of the Central Valley's grassland-oak savannah:

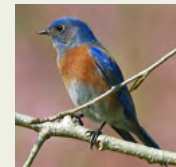
Species of heightened conservation concern:



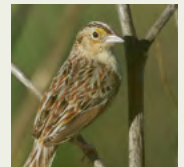
Western meadowlark\*



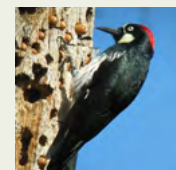
Burrowing owl\*\*\*



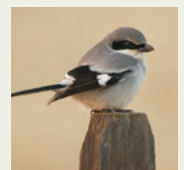
Western bluebird\*\*



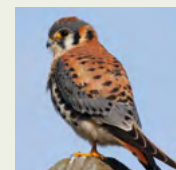
Grasshopper sparrow\*\*\*



Acorn woodpecker\*\*



Loggerhead shrike\*\*\*



American kestrel\*\*\*



Yellow-billed magpie\*\*

\* Stephen Fettig \*\* Brian Gilmore \*\*\* Tom Grey

(1) Western bluebirds - Tom Grey (2) Native perennial grasslands, Llano Seco Ranch - Joe Silveira (3) Yellow-billed magpie - Brian Gilmore (4) Mixed grassland-oak savannah habitat, South Fork American River - Mark Leder Adams

# INTRODUCTION

Grassland and oak savannah ecosystems are an important component of Central Valley uplands, particularly the ring of open country, low-elevation (<3,000 feet) foothills and rangelands surrounding the valley floor (Figure 13.1). Roughly 60 percent of the Central Valley's historic grasslands have been lost due to conversion to intensive agriculture and urban development (CPIF 2000; DGP-GIC 2003). Comparable historical data on the extent of oak savannah ecosystems in the Central Valley are lacking, but the magnitude of loss is believed to be similar, based on the reported loss of rangeland habitat in the state (which by definition includes oak savannah; Cameron et al. 2014). Today, grasslands and oak savannahs are still at risk of conversion to land uses that do not provide the suite of ecosystem services that these land types currently generate (Cameron et al. 2014; Byrd et al. 2015).

These ecosystems are critically important to landbirds. Across North America, grassland-associated birds have declined by as much as 40 percent since 1968 (NABCI 2014). In California, several landbird species associated with grassland and oak savannah have declined in abundance and are now considered Species of Special Concern (Shuford and Gardali 2008).

Ensuring that these species do not become threatened or endangered in the future will help to minimize regulatory oversight on private landowners. Furthermore, a number of other conservation targets overlap with these ecosystems, including the many special status species associated with vernal pools and the habitat for the Central Valley population of California tiger salamanders (*Ambystoma californiense*).

In addition to providing important habitat for landbirds and other wildlife, these ecosystems provide a number of important functions, including providing nutrient and water cycling, sequestering carbon, supporting pollinator populations, and producing food and fiber for people through livestock operations (Havstad et al. 2007; Kroeger et al. 2009; Chaplin-Kramer et al. 2011).

## CONSERVATION GOAL

The Central Valley Joint Venture's long-term goal is for Central Valley grassland and oak savannah ecosystems to have sufficient high-quality habitat to support genetically robust, self-sustaining, and resilient native bird populations.



Vernal pool, Llano Seco Ranch - Joe Silveira

## WHICH SPECIES ARE INCLUDED?

The conservation objectives focus on 12 bird species that breed in grassland and oak savannah ecosystems and that represent a broad range of life histories and a continuum of specific habitat needs (Table 13.1).

The focal species are divided into two major groups: five species that principally use grassland vegetation and seven that principally use oak savannah vegetation. Managing habitat to support local populations of the full suite of focal species should in turn support diverse and healthy grassland and oak savannah ecosystems (Chase and Geupel 2005).



Western kingbird - Stephen Fetting

SPECIES (SCIENTIFIC NAME)	CONSERVATION STATUS <sup>a</sup>	MIGRATORY STATUS	NEST SUBSTRATE	HABITAT & VEGETATION ASSOCIATIONS
<b>GRASSLAND</b>				
<b>Northern harrier</b> ( <i>Circus cyaneus</i> )	BSSC	Resident/ migrant	Ground/ shrub	Forages over a variety of open landscapes but prefers to nest in shrubby or weedy fields
<b>Burrowing owl</b> ( <i>Athene cunicularia</i> )	BSSC	Resident/ migrant	Burrow	Open, low stature grassland, and/or a significant amount of bare ground
<b>Horned lark</b> ( <i>Eremophila alpestris</i> )	CBSD	Resident/ migrant	Ground	Open, low stature grassland, and/or a significant amount of bare ground
<b>Grasshopper sparrow</b> ( <i>Ammodramus savannarum</i> )	BSSC, CBSD	Migrant	Ground	Grassland; tolerant of some shrub cover; may favor sloped landscapes rather than flat areas
<b>Western meadowlark</b> ( <i>Sturnella neglecta</i> )	--	Resident	Ground	Grassland, though will use trees for singing perches
<b>OAK SAVANNAH</b>				
<b>Acorn woodpecker</b> ( <i>Melanerpes formicivorus</i> )	--	Resident	Tree, 1° cavity	Oak savannah and oak woodland
<b>American kestrel</b> ( <i>Falco sparverius</i> )	--	Resident	Tree, 2° cavity	Dense understory oak savannah and grassland
<b>Western kingbird</b> ( <i>Tyrannus verticalis</i> )	--	Migrant	Tree	Oak savannah
<b>Loggerhead shrike</b> ( <i>Lanius ludovicianus</i> )	BSSC, CBSD	Resident	Shrub/ tree	Grassland, oak savannah, and open shrubland; less frequently riparian and oak woodland
<b>Yellow-billed magpie</b> ( <i>Pica nuttalli</i> )	CCV, UCC, NT	Resident	Tree	Oak savannah, woodland, and riparian edge
<b>Western bluebird</b> ( <i>Sialia mexicana</i> )	--	Resident	Tree, 2° cavity	Oak savannah and woodland, nests in tree cavities but often forages in open areas and grassland edge
<b>Lark sparrow</b> ( <i>Chondestes grammacus</i> )	--	Resident/ migrant	Ground	Oak savannah and grassland/woodland ecotones; requires trees for foraging and singing

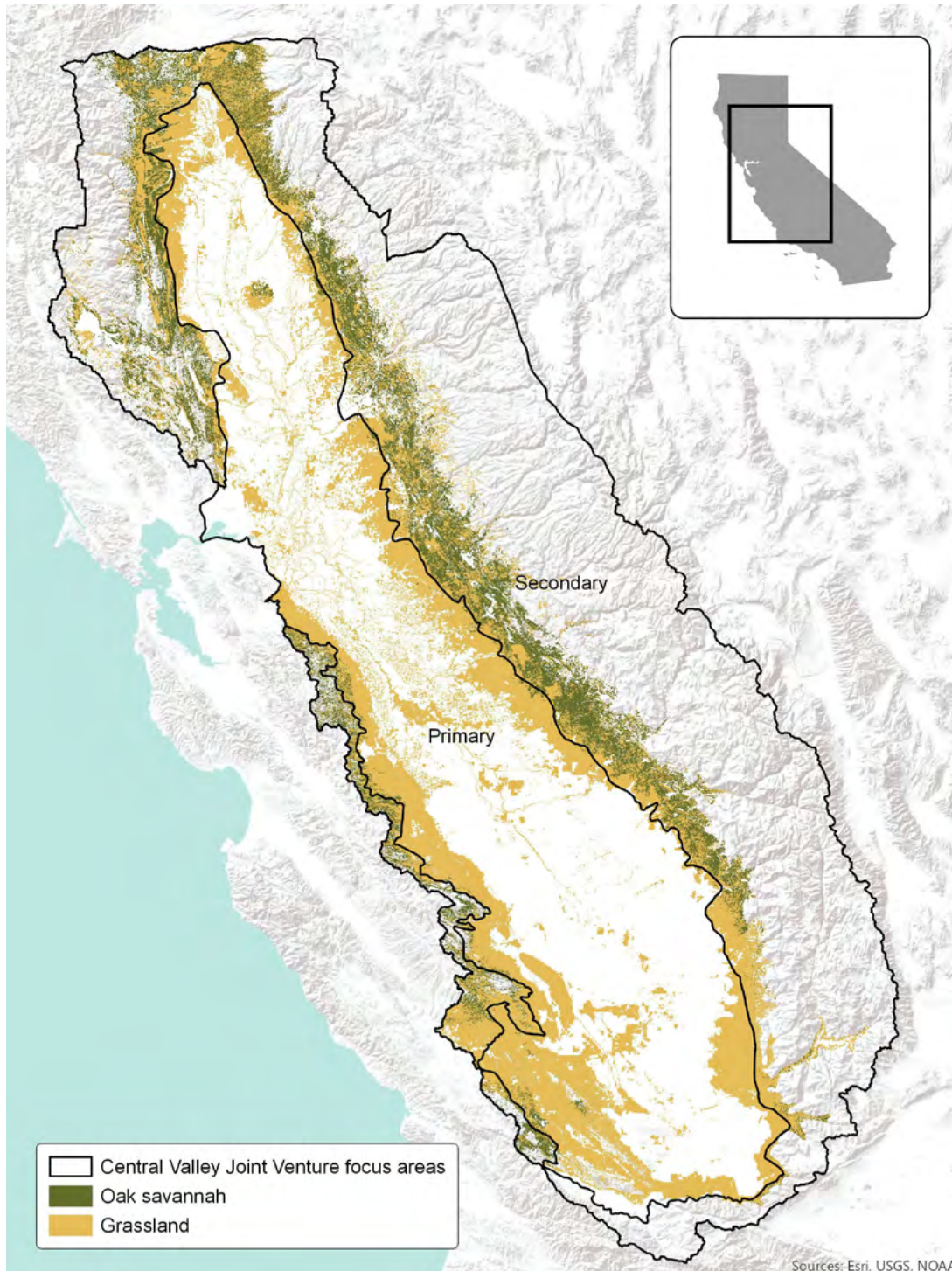
<sup>a</sup> Conservation status designations: BSSC, state bird species of special concern (Shuford and Gardali 2008); CCV, species ranked among the most vulnerable to climate change (Gardali et al. 2012); CBSD, common birds in steep decline (PIF 2012); UCC, U.S.-Canada species of conservation concern (PIF 2012); and NT, near threatened (BirdLife International 2014)

**TABLE 13.1 Breeding grassland and oak savannah focal species: Conservation status, life history traits, and habitat/vegetation associations. Species are listed under their principal breeding habitats.**



# WHICH GEOGRAPHIC AREAS ARE INCLUDED?

The conservation objectives encompass the CVJV's Primary Focus Area (the valley floor) and the Secondary Focus Area (the surrounding foothills; Figure 13.1). Because mountain meadows are ecologically distinct and should be treated separately from valley and foothill grasslands, the conservation objectives only address grassland and oak savannah in the Secondary Focus Area up to a maximum elevation of 3,000 feet. This is the first time the CVJV has defined conservation objectives for the Secondary Focus Area.



**FIGURE 13.1** Central Valley Joint Venture perimeter and Primary and Secondary Focus Areas, showing extent of grassland and oak savannah habitats. Estimated current extents of grassland and oak savannah vegetation are shown up to a maximum elevation of 3,000 ft.

# CURRENT CONDITIONS

## Current Population Sizes and Trends

Researchers used survey data collected between 2002 and 2015 to estimate current breeding population sizes that ranged widely from very small (310 burrowing owls in the Secondary Focus Area) to large (more than 300,000 western meadowlarks in the Primary Focus Area) (Figure 13.2). Burrowing owl, loggerhead shrike, and yellow-billed magpie had the smallest population size estimates; current population sizes of northern harrier and American kestrel are unknown. Fully two-thirds of the focal species have significant long-term declining trends in the Coastal California Bird Conservation Region (BCR 32), and both horned lark and burrowing owl are estimated to have steeply declining trends, with an average decline of more than 30 percent every 10 years.

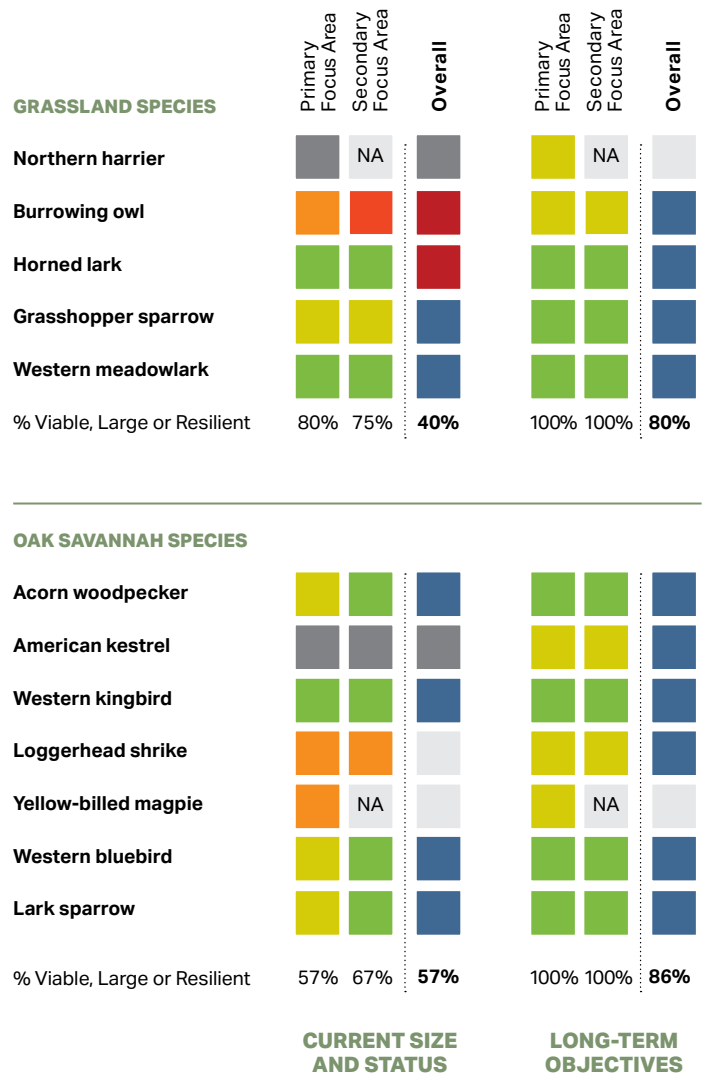
## Current Habitat

The CVJV's Primary and Secondary Focus Areas currently contain an estimated six million acres of grassland habitat, with more than half (64 percent) in the Primary Focus Area on the valley floor (Table 13.2). These estimates include annual and perennial grassland and pasture. These areas also contain an estimated 1.8 million acres of oak savannah habitat, with the vast majority (94 percent) in the Secondary Focus Area, including valley oak woodland, coast oak woodland, blue oak-foothill pine, and blue oak woodland. These estimates indicate that oak savannah habitat is extremely limited in the Primary Focus Area.

As a further indicator of current habitat conditions, the finding that two-thirds of the focal species have declining population trends and two focal species have steeply declining population trends suggests significant, ongoing habitat loss and degradation. In addition, only four of the seven focal species associated with oak savannah habitat (57 percent) and two of the five focal species associated with grassland habitat (40 percent) are currently resilient, with viable or large populations in each focus area (Figure 13.2). These findings indicate there is considerable room for improvement in the restoration and enhancement of Central Valley grassland and oak savannah ecosystems.



Horned lark - Stephen Fettig



**CURRENT SIZE AND STATUS**      **LONG-TERM OBJECTIVES**

### Population Status Key

Unknown	Unknown	Resilient	Resilient
Very small (<1,000)	Very small (<1,000)	Steeply declining	Steeply declining
Small (<10,000)	Small (<10,000)	Stable but vulnerable	Stable but vulnerable
Viable (>10,000)	Viable (>10,000)		
Large (>50,000)	Large (>50,000)		

**FIGURE 13.2** Population status and objectives for Central Valley grassland and oak savannah bird species.

Current size and status of each focal species population, and Long-Term Objectives, grouped by grassland species (top) and oak savannah species (bottom). A status of NA (Not Applicable) in one of the focus areas means the species is not expected to breed in that focus area. A status of "unknown" means the current population size or trend is currently unknown and the species is assumed not to be viable, large, or resilient. Thus, the calculation of "% Viable, Large or Resilient" represents a minimum value.



# DEVELOPING THE CONSERVATION OBJECTIVES

## Population Objectives

To develop the long-term population objectives for each focal species in each region, researchers first developed a population status framework based on general principles of conservation and population biology (Dybala et al. 2017). The framework is structured as a hierarchy of four population size categories that mark milestones in becoming a genetically robust, self-sustaining, and resilient population: very small (<1,000), small (<10,000), viable (>10,000), and large (>50,000). There are two additional modifiers that describe steeply declining populations (>30 percent decline over 10 years), which are at high risk of extirpation regardless of population size, and resilient populations, which should be more capable of recovering from an environmental catastrophe in one part of the range if they have more than one self-sustaining sub-population.

To meet the conservation goal of supporting genetically robust, self-sustaining, and resilient focal species populations, this population status framework was used to define long-term (100-year) population objectives for each focal species population in each focus area. For the less common and special status species that currently have small, very small, or unknown population sizes, the CVJV set lower targets for the long-term population objectives. Population objectives for northern harrier and yellow-billed magpie were only defined for the Primary Focus Area since these species historically have scarcely ever occurred in the Secondary Focus Area (CWHR 1995; Shuford and Gardali 2008).

## Density and Habitat Objectives

Because so much historical grassland and oak savannah vegetation has been lost and degraded, many of the focal species populations are likely to be limited by available habitat, and the

current densities of many of the focal species may be unusually low due to reduced habitat quality. Therefore, meeting the population objectives will require both habitat restoration and habitat enhancement efforts, to increase both the total area of habitat available to species and their average breeding densities. Long-term habitat and density objectives were defined such that achieving both will result in meeting the long-term population objectives.

For many of the focal species, researchers believe that improvements in habitat quality could produce at least half of the additional individual birds needed to meet the population objectives. This assumption was incorporated into the objectives by calculating the average breeding densities in each species' principal breeding habitat required to meet half of that species' target population size. Long-term objectives for the restoration of additional acres of habitat were defined to bridge any remaining gap to the population objectives. This assumes the same breeding densities will also be met in any newly restored habitat.

To track progress during the lifespan of this Implementation Plan (hereafter, "the Plan"), short-term (10-year) habitat objectives for additional acres needed by 2030 were set at 10 percent of the long-term objectives.

Breeding density objectives were defined last for the less common and special-status species that currently have small, very small, or unknown population sizes. These objectives were set by calculating the density required to meet the species' population objectives, once the habitat objectives are met.

Additional details on the sources of data, methods, results, and references can be found in DiGaudio et al. (2017).



(1) Image: Valley oak woodland - Llano Seco Ranch (2) Burrowing owls - Tom Grey (3) Lark sparrow - Stephen Fetting

# CONSERVATION OBJECTIVES

## Habitat

The Plan defines separate short-term (10-year) and long-term (100-year) habitat objectives for grassland and oak savannah, in both the Primary and the Secondary Focus Areas (Table 13.2). Where the long-term habitat objectives are equal to the current estimated extent and no additional acres are needed (i.e., grassland in the Primary Focus Area and oak savannah in the Secondary Focus Area), the objective is to maintain and enhance the current extent and ensure that no net loss occurs. Because much of this habitat already exists, the restoration needs are relatively modest. The habitat objectives represent the estimated total area of each habitat type required to enable focal species to reach the long-term population objectives in both CVJV focus areas.

## Population

The long-term (100-year) population objectives are to reach >50,000 individuals for the majority of the focal species in each focus area, and >10,000 for species that currently have small, very small, or unknown population sizes (Figure 13.2). These population objectives represent the estimated population sizes needed to reach the goal of genetically robust, self-sustaining, and resilient populations.

## Breeding Density

The Plan defines long-term (100-year) average breeding density objectives for each species' principal habitat type in each focus area (Table 13.3). The density objectives represent the estimated average breeding densities that could be reached with improvements in the both the quality (enhancement) and quantity (restoration) of grassland and oak savannah habitat in each focus area.

HABITAT TYPE FOCUS AREA	LONG-TERM HABITAT OBJECTIVE	CURRENT ESTIMATE	ACRES NEEDED (DIFFERENCE)	ACRES NEEDED BY 2030 (10%)
<b>Grassland</b> (<10% canopy cover)				
Primary	3,872,771	3,872,771	0	0
Secondary	2,277,867	2,174,499	103,367	10,337
<b>Total</b>	<b>6,150,637</b>	<b>6,047,270</b>	<b>103,367</b>	<b>10,337</b>
<b>Oak Savannah</b> (10–40% canopy cover)				
Primary	197,541	112,712	84,829	8,483
Secondary	1,672,076	1,672,076	0	0
<b>Total</b>	<b>1,869,617</b>	<b>1,784,788</b>	<b>84,829</b>	<b>8,483</b>

**TABLE 13.2 Short-term (10-year) and long-term (100-year) habitat objectives for breeding grassland and oak savannah landbirds.** Objectives are shown in acres, along with current estimates of each habitat type, the estimated additional acres needed to meet the long-term habitat objectives, and the short-term objective of meeting 10% of those acres by 2030. (Sums may not be exact, due to rounding in original data.)

SPECIES	PRIMARY FOCUS AREA	SECONDARY FOCUS AREA*
<b>Grassland</b>		
Burrowing owl	0.002	--
Grasshopper sparrow	0.020	0.020
Horned lark	*0.038	*0.059
Northern harrier	0.002	--
Western meadowlark	*0.079	*0.071
<b>Oak Savannah</b>		
Acorn woodpecker	0.235	*0.087
American kestrel	0.051	0.006
Lark sparrow	0.197	*0.118
Loggerhead shrike	0.029	0.004
Western bluebird	0.150	*0.037
Western kingbird	*0.208	*0.125
Yellow-billed magpie	0.051	--

<sup>a</sup> No density objectives were defined for burrowing owl, northern harrier, or yellow-billed magpie in the Secondary Focus Area.

\* Density objective is to maintain current average density.

**TABLE 13.3 Long-term breeding density objectives for grassland and oak savannah focal species.** Objectives are listed as individuals/acre. Species are grouped by focus area and principal breeding habitat.



# APPLYING THE CONSERVATION OBJECTIVES

## Habitat Objectives

The habitat objectives represent the estimate of the total area of grassland and oak savannah habitat that is required to enable focal species populations to reach the long-term population objectives, and therefore the total area required to reach the CVJV's conservation goal. Subtracting the estimated current extent of each habitat type provides the estimated additional acres needed, assuming none of the current extent is lost. Securing the required additional acres can be achieved through habitat restoration.

“Habitat restoration” is defined here as conversion of land that does not currently consist of the target land cover type into the target land cover type. For grassland and oak savannah habitat, this includes establishing new areas with native and/or naturalized grassland- and oak savannah-associated plants, that are not already shown in the CAL-FIRE 2015 GIS layer ([http://frap.fire.ca.gov/data/frapgisdata-sw-fveg\\_download](http://frap.fire.ca.gov/data/frapgisdata-sw-fveg_download)). The acreage of new grassland or oak savannah habitat created by a restoration project in one of the focus areas and up to a maximum elevation of 3,000 feet would count as contributing to these habitat objectives.

“Habitat enhancement” in this situation indicates managing existing grassland or oak savannah habitat to improve habitat quality. The acreage of enhanced grassland or oak savannah habitat should not be counted toward the habitat objectives. Instead, habitat enhancement should be measured using the breeding density objectives, as described below.

## Breeding Density Objectives

The breeding density objectives can be used in several ways. At habitat restoration sites, they can be used to demonstrate that the restoration activities are creating quality habitat in which the focal species are ultimately able to meet or exceed the density objectives. Similarly, in existing habitat, they can be used to demonstrate the effectiveness of habitat enhancement activities in which the focal species' breeding densities improve and ultimately meet or exceed the density objectives. Finally, they can be used as part of a project planning process to project the potential number of individuals of each focal species that a restoration or enhancement project site may be able to support. Progress toward the breeding density objectives can be tracked through regular surveys of grassland and oak savannah breeding birds at project sites, and overall by surveying throughout each focus area.

By improving species densities, fewer acres of habitat are required to meet the population objectives, and in turn the conservation goal. Therefore, efforts to improve conditions in existing grassland and oak savannah habitat should be prioritized. Such habitat enhancement efforts might include the removal of noxious weeds, such as yellow star-thistle (*Centaurea solstitialis*), and encouraging regeneration of blue oaks (*Quercus douglasii*) and greater cover of native bunch grasses, such as purple needlegrass (*Stipa pulchra*).



Northern harrier - Tom Grey



## SUCCESS STORY

# LOCAL LAND TRUSTS IN THE SIERRA NEVADA FOOTHILLS

In the Sierra Nevada foothills, local land trusts can play an important role in conserving grassland and oak savannah habitat that would otherwise be threatened by development. For example, the American River Conservancy and the Sierra Foothill Conservancy have protected a combined total of over 50,000 acres of foothill rangelands, which include substantial areas of grassland and oak savannah habitat.



Bird surveys on various parcels owned by these land trusts have found thriving populations of several CVJV grassland and oak savannah focal species. In El Dorado County between 2014 and 2018, the American River Conservancy protected over 3,000 acres of healthy oak savannah habitat along the Cosumnes River that was threatened by development. The group is now working to acquire an adjacent 6,200 acres of habitat. Spring bird surveys found abundant bird life, including seven CVJV focal species and nesting golden eagles.

Both land trusts are actively working with partner biologists at Point Blue Conservation Science and the Natural Resources Conservation Service to develop, implement and evaluate management practices that enhance biodiversity and soil health.



(1-3) El Dorado Ranch, Cosumnes River - Elena DeLacy, American River Conservancy



# ADDITIONAL CONSERVATION CONSIDERATIONS

## Increase patch size and connectivity

There are numerous examples of relatively small-scale (<250 acres) grassland restoration projects in the Central Valley. While these sites have been readily colonized by some species (e.g., northern harriers), for certain other species (e.g., grasshopper sparrows), grassland restoration has had limited success in supporting breeding grassland birds. Researchers believe these restored grasslands are smaller than the patch size requirements for many grassland birds (DiGaudio et al. 2009; Young and DiGaudio 2011), limiting breeding success. Future restoration projects should be strategically located to improve habitat connectivity and patch size.

## Manage habitat for species-specific needs

Given that each of the focal species has its own distinct set of habitat requirements (e.g., horned larks and burrowing owls prefer short-stature grassland whereas meadowlarks prefer taller grassland), managers of each restoration or enhancement project should consider what the target management species are relative to their habitat requirements and attempt to create habitat mosaics across the landscape to accommodate multiple species' needs. Recommendations have been put forward for improving habitat conditions for the grassland and oak savannah focal species; however, most recommendations are hypothetical, and evaluating their effectiveness will require further testing and validation. For example, grasshopper sparrows are associated with the perennial bunch grasses, such that increasing perennial grass cover should increase grasshopper sparrow density (Vickery 1996). Specific recommendations can be found for each focal species in the California Partners in Flight grassland bird conservation plan (CPIF in review).

## Investigate the role of livestock grazing practices

Managed livestock grazing could play a significant role in enhancing grassland and oak savannah habitat for birds, especially given that the vast majority of California's grasslands and oak savannahs are currently used for livestock production (Stromberg et al. 2007). There is still much to learn, however, about rangeland management and livestock grazing practices for the benefit of birds.



(1) Cattle grazing with greater white-fronted geese at vernal pool - Joe Silveira (2) Grasshopper sparrow - Tom Grey

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