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### Title

The Science of Setting Conservation Objectives for Birds in California's Central Valley: An Introduction

### Permalink

<https://escholarship.org/uc/item/2hr1m395>

### Journal

San Francisco Estuary and Watershed Science, 15(1)

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### Publication Date

2017

### DOI

10.15447/sfews.2017v15iss1art1

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**CENTRAL VALLEY JOINT VENTURE SPECIAL ISSUE**

# The Science of Setting Conservation Objectives for Birds in California's Central Valley: An Introduction

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Volume 15, Issue 1 | Article 1

<https://doi.org/10.15447/sfews.2017v15iss1art1>

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## INTRODUCTION

The papers in this special issue provide the scientific methods used to develop quantitative population and habitat objectives for birds in the Central Valley of California as part of the Central Valley Joint Venture's (CVJV's) Implementation Plan update (CVJV 2006). The approaches described in the papers are meant to provide a methodology that is transparent, repeatable, and can be applied to other ecosystems and taxa. Topics include focused approaches to conservation objective setting for non-breeding and breeding shorebirds as well as non-breeding and breeding waterbirds. Two papers outline the process for setting population and habitat objectives for riparian and grassland-oak savannah ecosystems. At-risk bird species are treated separately. A final paper provides an overall framework for quantitative objective setting that can be more generally applied to wildlife conservation.

## What Are Conservation Objectives and Why Set Them?

Objectives in conservation are formal statements detailing a desired outcome of a plan or project. The most effective objectives are those that are specific, measurable, result-oriented, practical, and transparent. Objectives can be made at the population level—the desired number of organisms in a population or specific geography—and then translated into space—the number of hectares needed to meet the population objective.

Setting conservation objectives is central to conservation planning and implementation. Conservation objectives can provide focus for conservation planning efforts by defining how much habitat; how many individuals or populations, and where conservation should occur to meet an overarching conservation goal (Tear et al. 2005). Conservation objectives can also unify stakeholders, make conservation actions more efficient, focus monitoring efforts, and help prioritize the investment of resources.

Though generating clear and scientifically defensible conservation objectives is a critical component of many planning efforts, the process of establishing objectives is not straightforward, is infrequently documented, and information on how to do it is sorely lacking (Nicholson and Possingham 2006; Wilhere 2008; Brown et al. 2015). The papers in

this special issue address the challenges of setting conservation objectives for birds in California's Central Valley. These papers use the best available science and local data to set objectives in a manner that is transparent, well-documented, and repeatable.

### **Why Set Conservation Objectives for Birds in California's Central Valley?**

Despite massive losses of habitat, the Central Valley's wetlands, riparian forests, and grassland-oak savannah woodlands still provide some of the most important bird habitat in North America. For example, nearly three million ducks, two million geese, and 350,000 shorebirds continue to overwinter in this region (Shuford et al. 1998; Olson 2014), making the Central Valley an internationally important area for migratory waterbirds in the Pacific Flyway (Fleskes 2012; Gilmer et al. 1982; WHSRN 2003). Hence, prioritization of conservation actions in the Central Valley for these waterbirds and landbirds is a critical step toward increasing their populations.

While these conservation efforts focus on increasing habitat for a diversity of birds, they offer a number of co-benefits. In general, biodiversity may be crucial for long-term resilience of ecosystem functions and the services they underpin (Oliver et al. 2015). In particular, restored riparian areas filter water and promote groundwater recharge (Tabacchi et al. 2000; Mander et al. 2005), capture carbon and prepare ecosystems for change (Lewis et al. 2015; Matzek et al. 2015; Seavy et al. 2009), provide habitat for native fish and wildlife (Knopf and Samson 1994; Pusey and Arthington 2003; Gardali et al. 2006; Golet et al. 2008), protect soil and support pollinators (Kremen et al. 2002; Power et al. 2010), and increase property values and provide recreational opportunities (Colby and Smith-Incer 2005; Bark et al. 2008).

### **The Central Valley Joint Venture Implementation Plan**

The Central Valley Joint Venture (CVJV)—a coalition of 20 state and federal agencies, private conservation organizations, and one regulated utility—is in the process of setting conservation objectives for birds, and identifying strategies to meet those objectives.

Recognizing the need to have scientifically defensible objectives, the CVJV prioritized the peer-reviewed publication of the methods used to develop these quantitative population and habitat objectives for birds in the Central Valley. This special issue provides the results of this effort. Although the details of the approach for each of the bird groups varies based on the amount and type of available data, each manuscript covers the following components of objective setting: (1) specific framework/process, (2) analytical methods, (3) current status (e.g., population size, trends), (4) long-term and short-term objectives by geography, and (5) a discussion of the strengths and limitations of the approach.

The papers in this special issue cover the approaches used for setting conservation objectives in the Central Valley for non-breeding shorebirds (Dybala et al. 2017c), breeding shorebirds (Strum et al. 2017), and non-breeding and breeding waterbirds (Shuford and Dybala 2017). Two papers present the processes used to set population and habitat objectives for conservation of birds in riparian (Dybala et al. 2017b) and grassland-oak savannah ecosystems (DiGaudio et al. 2017). Shuford and Hertel (2017) present a framework for setting objectives for at-risk species in the Central Valley. Finally, Dybala et al. (2017a) offer a broad framework for setting quantitative objectives for wildlife conservation. We believe these papers provide an example for similar planning efforts that will be useful to other researchers and conservation planners around the world.

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