Resource Improvement Projects
to Benefit Species of Concern

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Fall 2012

Internship project in partnership with the Natural Resource Conservation Service and the Fish and Wildlife Service
# Table of Contents

- **Introduction** .................................................................................................................. 5  
  - *Internship Background* .................................................................................................. 5  
  - *Internship Objectives* ................................................................................................... 5  

- **Habitat Pond, Monterey County** ....................................................................................... 6  
  - *Project Background and Design* ................................................................................... 6  
  - *Budget Overview* .......................................................................................................... 7  

- **In-stream Salmonid Habitat Features, Santa Cruz County** ............................................. 8  
  - *Project Background and Design* ................................................................................... 8  

- **Burrowing Owl Artificial Burrow Installation, San Benito County** ................................ 10  
  - *Project Background and Design* ................................................................................... 10  
  - *Budget Overview* .......................................................................................................... 11  

- **Conclusions** .................................................................................................................... 12  

- **Citations** ......................................................................................................................... 13
Acknowledgments

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Executive Summary

This report summarizes three projects I worked on during an internship in Fall 2012. The internship was with the Natural Resource Conservation Service (NRCS) to plan, design and construct habitat improvement projects on private lands in Santa Cruz, Monterey and San Benito counties. My objective during the internship was to assist the engineer at the NRCS in Salinas, CA design and inspect construction of the projects. As the habitat improvement projects were funded through a partnership between the NRCS and the U.S. Fish and Wildlife Service (USFWS), I also worked between the NRCS and USFWS to plan future projects.

The first project described in this report is a habitat pond in Monterey County. The site was historically ponded, but a breach in the embankment left the area unable to enough water for a long enough period to be of use to listed amphibians in the area. A new embankment was established and the pond re-contoured to hold water for most of the year but dry up in the Fall. This wet and dry cycle favors the California red-legged frog (Rana draytonii), which has been sighted in other nearby ponds. The second project described is the installation of in-stream habitat improvement features called Large Woody Debris. These features are constructed of one or more large logs placed in the stream in order to create favorable habitat for salmonid species. The construction of the project took place in 2011, and during this internship we resurveyed the site to monitor topographic and bathymetric change. The third project described is the installation of three artificial burrows for the burrowing owl (Athene cunicularia). The features are relatively small and constructed with materials typically found in a hardware store. If successful, the project should create a loose colony between the nesting pairs in the three artificial burrows.

This internship has strengthened my determination to work in the field of land management and habitat improvement. The opportunity to work with professionals on real world projects was invaluable experience for me. I am sure this internship will help me secure a job with one of the many agencies working to improve our nation’s resources.
Introduction

Internship Background

This internship focused on several resource enhancement projects to benefit species of special concern. The projects were led by a partnership between the U.S. Fish and Wildlife Service (USFWS) and the Natural Resource Conservation Service (NRCS). Both agencies have programs to aid landowners improve resources on private lands. The USFWS has a program entitled the Partners for Fish and Wildlife (Partners), which has the stated mission “to efficiently achieve voluntary habitat restoration on private lands, through financial and technical assistance, for the benefit of Federal Trust Species” (USFWS 2012). The NRCS has a program entitled the Environmental Quality Incentives Program (EQIP), which is summarized as

a voluntary program that provides financial and technical assistance to agricultural producers through contracts up to a maximum term of ten years in length. These contracts provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland. In addition, a purpose of EQIP is to help producers meet Federal, State, Tribal and local environmental regulations (NRCS 2012).

The overlap between the missions of the two federal programs regarding special status species resources led the USFWS and NRCS to form a partnership. As the USFWS has broad expertise in biology and the NRCS in resource engineering, a biologist from the USFWS works in cooperation with an engineer from the NRCS.

Internship Objectives

My objectives through this internship project were to assist the NRCS engineer on various habitat improvement projects in the Central California region. Work included site surveys and engineering inspections of construction sites, as well as aiding the USFWS biologist on permitting and documenting current and proposed project activities.

My aim is to have a career in resource restoration and improvement, and this internship offered me the opportunity to gain practical and professional work experience in the field of habitat restoration.
Habitat Pond, Monterey County

Project Background and Design

This project is located in the relatively high elevations of the Gabilan Mountain Range, on the east side of the Salinas Valley. The site was formerly a manmade agricultural pond in the upland grazing habitat on the landowner’s property, which is a habitat type identified as a potential good producer of CRLF in the USFWS Recovery Plan (2002). The embankment of the original pond was eroded, essentially eliminating the ability of the site to pool water. This project enhanced approximately 3050 square feet (0.07 acres) of pond/wetland habitat to improve native aquatic and wetland species habitat. Specifically the project was engineered to benefit California red legged frog (*Rana draytonii*; CRLF) breeding habitat. The pond is located just downstream of a natural spring, which is essentially the sole source of water, aside from small amounts of overland flow and direct rainfall.

Figure 1. Aerial view showing contours of the shallow and deep sections of the pond, and cross section showing the eroded embankment and new design for the embankment.
The volume of the pond was engineered to hold water from late fall to early summer. Allowing the pond to go dry in the summer ensures the habitat is unsuitable for invasive species such as the bull frog, which can prey on CRLF. CRLF have been sighted in the area in the past, so there is a high probability that they will be recruited to the new pond. In addition the pond bathymetry was designed to have both deep and shallow water habitat during the wet season. This allows for both shallow water breeding habitat and deeper tadpole refuge (USFWS 2002). The project was constructed with engineering design plans drafted by the NRCS engineer, and overseen by the USFWS biologist. Construction was done with a bulldozer and a rubber tire backhoe.

**Budget Overview**

In this project the USFWS was the main financial contributor and biological consultant, while the NRCS offered technical support in the form of engineering design.

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<thead>
<tr>
<th>Breakdown of Cost-shares</th>
<th>Cash</th>
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<th>Total</th>
<th>Detail of In-kind Services (hours, supplies, etc.)</th>
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![Figure 2](image1.jpg)

Figure 2. (a) Pre-construction site with eroded embankment, (b) post construction, but before any rain, and (c) photo of the site after the first large rains in early December 2012.
In-stream Salmonid Habitat Features, Santa Cruz County

Project Background and Design

This project is located near the coast on a salmonid bearing stream in northern Santa Cruz County. Many federal, state and local agencies monitor the stream because of its value to steelhead (*Oncorhynchus mykiss*) and coho (*Oncorhynchus kisutch*) salmon. Two adjacent reaches of stream were identified as having very little complexity (i.e. pools, riffles, meander bends), which results in less valuable habitat for spawning or rearing. In 2011 the Resource Conservation District of Santa Cruz County secured funding from the California Department of Fish and Game Fisheries Restoration Grant Program to construct several in-stream features to promote complexity. The NRCS was contracted to offer technical design and construction assistance to the Resource Conservation District.

The project design has seven large woody debris (LWD) features. Each feature consists of one or more 16 – 30 inch diameter trees placed in the stream. The trees are stripped of most of their branches, and anchored to large rocks keyed into the stream banks. Several different configurations of LWD were used in this project, including ‘diggers,’ ‘spiders,’ and ‘combination’ structures. The construction was done using an excavator with several members of a ground crew. Large 2 – 3 ton rocks were keyed into the banks at each feature site, and logs were placed adjacent to the anchor rocks on the upstream side. Large bolts and waterproof epoxy were used to secure the logs to the anchor rocks to ensure they would not float downstream during large storm flows.
As part of the monitoring requirements of the Fisheries Restoration Grant Program pre and post-construction topographic surveys were completed using a total station. The surveys were interpolated into raster surfaces and subtracted to quantify the changes in the streambed around each of the LWD features. The features had been in place for approximately one year at the time of the post-construction survey, and had been through one mild winter. In the course of the first year post-construction approximately 27% of the lower site had scoured while 72% of the upper site experienced scour.

Figure 4. Photographs from the construction phase showing (a) redwood log being moved into place, (b) placement of the feature in the stream, (c) the final look of the feature, and (d) post-construction survey crew.

Figure 5. Maps showing the change in topography between 2011 (pre-construction of features) and 2012 (post-construction).
Burrowing Owl Artificial Burrow Installation, San Benito County

Project Background and Design

This project was aimed at creating nesting and rearing habitat for burrowing owls (Athene cunicularia, BUOW). The BUOW is not listed under the federal Endangered Species Act, but is considered a species of special concern (USFWS 2012b) and does have protection under the Migratory Bird Act. The USFWS offered technical and financial assistance to a private landowner in San Benito County to install three artificial burrows. The funding for the project came from a specific fund called the Central California Intercoast Range Upland Enhancement/Restoration Project. This fund allows the USFWS to offer cost sharing options on projects which enhance the upland areas in the Intercoast Range in Central California. The Partners biologist for the USFWS offered the technical assistance on burrow design and installation, and the NRCS was not involved with this project.

Figure 6. Example images of the (A) trenching, (B and C) installation and backfilling process, and (D) final artificial burrow product

One goal with installing three burrows is to create a loose community of nesting owl pairs. This increases their success at occupying the burrows and rearing their young (Johnson et al. 2010). The design for the artificial burrows comes from a compilation of recent publications, with slight modifications to suit the project site conditions. Some of the specific requirements of the construction process as outlined by the Partners biologist were:

- Artificial burrows will not be constructed within 6 feet of existing burrows
- The tubing for the entranceway will have an open bottom so it does not pipe water into the nesting chamber
- Excess dirt from the excavation will be mounded no higher than 60 cm, which will reduce use by other predators
- Burrows will be installed 15-30 feet apart from each other to help facilitate the coordination of a loose colony between the three owl pairs in the three burrows

**Budget Overview**

This project was funded entirely by the USFWS. Engineering designs were taken from previously constructed artificial burrows. At the time of this report the NRCS was being consulted with for advice on archeological resource surveys in the area.

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Conclusions

My internship in Fall 2012 with the NRCS and USFWS gave me real world experience in the field of habitat restoration. I worked an engineer and a biologist on several different types of habitat improvement projects, including pond rehabilitation and river restoration. It was an exciting and invaluable experience for me to be able to work with professionals in this field. I was able to gain insight into what a future career with these agencies might be like and strengthened my resolve to have a future career in land management.

The aspect of the internship that helped me the most was to see the construction process with the various habitat enhancement projects. As a student I have had the opportunity to plan and design projects, but never have had the opportunity to see projects built. However, during this internship I was able to witness and help during the construction of two pond projects. Construction is a critical phase of every project, and it was interesting to see how the physical product compared to the stated plans. Several times small unforeseen obstacles had to be overcome through in the field meetings between agency staff onsite and the contractor.
Citations


