TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY iii

INTRODUCTION 1
Background 1
Land Retirement Program 1
Land Retirement Demonstration Project 2
Demonstration Project Location and Site Description 3
Demonstration Project Goals 4
Demonstration Project Objectives 4

DEMONSTRATION PROJECT HABITAT RESTORATION STUDY 6
Study Design 6
Native Plant Reintroduction 6
Microtopographic Manipulation 7
Animal Introduction 7
Irrigation Needs 7
Perimeter Planting Scheme 8
Disposition of Lands Not Subject to Treatments 8
Barley Production 8
Additional Restoration Studies 8
Hunting 8

MONITORING PROTOCOLS 9
Vegetation Inventory 9
Experimental Areas 9
Non-experimental Areas 9
Wildlife Inventory 9
Experimental Areas 10
Small Mammal Surveys 10
Bird Surveys 10
Herpetological Surveys 11
Insect Surveys 11
Photo stations 12
Non-experimental Areas 12
Spotlighting 12
Winter Raptor Survey 12
Track Stations 12
Weather Tracking 12
Contaminants Monitoring 13
Tiered Contaminants Monitoring 13
Contaminants Monitoring Protocols 14
Physical Impacts Monitoring 14
Ground Water Monitoring 14
Surface Water Monitoring 14
Soil Monitoring 14
Biota Monitoring 15
Vegetation 15
Invertebrates 15
Vertebrates 15
Detritus and Mushrooms 16

TABLE OF CONTENT0S--Continued

Page

Analysis of Biotic Samples 16
Performance Standards 16

SCHEDULE OF MONITORING AND IMPLEMENTATION ACTIVITIES 17
Monitoring 17
Implementation 17
Reports 17

LITERATURE CITED 18

APPENDIX A. 33

EXECUTIVE SUMMARY

Retirement of irrigated farmland characterized by high selenium, poor drainage, and poor productivity has been recommended as a method to reduce the volume of agricultural irrigation drainwater produced on fields on the west side of the San Joaquin Valley, California (SJVDP 1990). Drainwater frequently contains elevated concentrations of potentially toxic elements. Selenium is the primary element of concern as it has been found to cause teratogenic effects in breeding shorebirds which seasonally inhabit the Valley's remaining wetlands.

A Land Retirement Demonstration Project has been initiated on 1600 acres in western Fresno County to test various habitat restoration strategies in a scientifically rigorous manner prior to retirement of large acreages of land. The Demonstration Project will expand to 15,000 acres as further land acquisitions are made by the Department of Interior CVPIA Land Retirement Team (LRT) in Fresno, Kings and Tulare counties.

Strategies for restoration will be tested on twenty, 10-acre experimental plots. Five plots will undergo microtopographic manipulation in which earthen berms are formed in the leveled agricultural fields to create habitat heterogeneity. Five different plots will be revegetated with native seeds and plugs. Another set of five plots will receive both the microtopographic and revegetation treatments, and a final set of five will receive no treatment (controls).

This monitoring plan describes the survey protocols. Biotic and abiotic factors will be examined to detect differences between experimental treatments and to monitor for indications of selenium contamination. Abiotic factors that will be regularly monitored are surface and groundwater depth and selenium levels, soil selenium levels, and weather station data. Biotic surveys will include small mammal trapping, avian and herpetological transects, herpetological and invertebrate pitfall traps, spotlight surveys, track stations and winter raptor surveys. Similar protocols will be applied to the additional lands as they are acquired.

Contaminants monitoring will be conducted to determine if the selenium-contaminated ground- water beneath retired lands is reaching wildlife through the food chain. In addition to monitoring of groundwater levels and quality, vegetation, invertebrates, small mammals, and reptiles will be annually sampled and analyzed for selenium content. Results will be compared to the land retirement performance standards recommended in the San Joaquin Valley Upland Species Recovery Plan (FWS 1998). An adaptive management strategy will be used to link the processes of monitoring and management to allow for a rapid response to adverse circumstances, should they develop.