CALFed Progress Questionnaire
California Sea Grant College Program

ConfirmationNumber 20061015154505

Printed: 4/25/2008 1:01:10 PM

ProjectYear_2A 1st Year **ProjectNo_2C** R/SF-12

TypeQuestionnaire_2B Interim Questionnaire

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Project Information

ProjectNo_2C R/SF-12 **StartDate_3a** 9/1/05 **EndDate_3b** 8/31/08
ProjectTitle_4 Addressing Stakeholder Concerns: Pests and Pest Control in the Sacramento River Conservation Area

CALFed Fellow contact information

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Additional Research Mentors and Community Mentors

Additional Research Mentors_8

Additional Community Mentors_9

Project Objectives: Please type your responses, and answer the questions in a style appropriate for laymen.

ProjectObjectives_10

Our research goal is to determine how distance to natural habitat and landscape diversity affects pest abundance and natural pest control. Our first objective is to use extensive fieldwork and existing data to answer the following questions concerning the interactions between riparian restoration areas and adjacent farmlands:

1) What are the quantities and distribution patterns of serious agricultural pests, including weeds and insects, from riparian forest into farmlands?

2) Does crop production benefit from elevated densities of pest enemies, including both arthropod and avian predators, that move from riparian forest areas into nearby farmlands? If so, how far does this beneficial effect of riparian forest sites extend into farmlands?

Our second major objective is to use these empirical results to inform stakeholders in the region, so that their perceptions of the costs and benefits of restoration are better grounded with real information.

Summary of progress in meeting each of these goals and objectives

ProgressSummary_11

In order to determine weed abundance and diversity with distance to riparian habitat we have collected data and begun analysis of 432 seed bank samples. We are also currently analyzing how dispersal mode, pest status, and native/exotic characterization affects these patterns.

In order to determine affects of bird diversity and abundance on pest control on the walnut farms, we have collected bird point count surveys at 126 points at different distances from riparian forest habitat. These surveys were conducted once per month during winter with detections of ~11,200 individual birds. We also conducted surveys twice in spring with a total of ~4,800 birds detected during the first survey period. We are currently analyzing these data to determine densities of birds with distance to riparian habitat and other land uses. We also conducted foraging surveys of forest insectivores at a subset of these sites, collecting ~200 individual foraging observations. We are currently mapping these foraging data in order to determine differences in amount and type of foraging with distance from riparian forest habitat. In order to determine possible effect of birds on arthropods and walnut tree growth, we placed 42 walnut branch exclosures and 42 controls on 7 farms at different distances from riparian forest. We collected these branches in order to determine: arthropod abundance and diversity, herbivory levels, and numbers of nuts. We are currently quantifying herbivory damage by digitizing leaf and herbivory area. We are currently rearing 2000 codling moth larvae to be used in bird feeding experiments this winter.

We collected information on abundance of walnut husk fly at different distances from riparian forest by placing 5 sticky traps in walnut trees 30m into the riparian habitat, on the edge of the riparian-farm habitat, 30m into the farm, and 300m into the farm. We did not capture any walnut husk flies during these surveys, most likely because of late emergence of the flies. We collected malaise trap arthropod samples at 7 sites over two periods (4 sites during the first period and 6 sites during the second period). We are currently sorting insects. We currently have tree bands on 105 trees at 7 sites, five tree bands on walnut trees on the edge of the riparian-farm habitat, 30m into the farm, and 300m into the farm. We will be collecting these bands at the end of November to determine abundance of overwintering codling moth at different distances to riparian forest habitat. We will also rear these codling moths in orderto determine parasitism rates.

PROJECT MODIFICATIONS: Please explain any substantial modifications in research plans, including new directions pursued. Describe major problems encountered, especially problems with experimental protocols and how they were resolved. Describe any ancillary research topics developed.

Modifications_12

Due to time constraints as outlined in our comments from the fellowship reviewers and in order to investigate more closely the relationship between riparian forest habitat and natural enemies, we decided not to conduct mammal surveys. These surveys are also being conducted mammal specialists through The Nature Conservancy. We also decided not to continue the navel orange worm surveys due to discussions with growers who believe that management (how many nuts are left in trees or on the ground) is

the main cause for navel orange worm presence or absence.
In order to investigate more closely how riparian forest habitat affects the interactions between pests and natural enemies, we are using two methods to look at parasitism rates with distance to riparian forest habitat. First, tree bands used for codling moth overwintering surveys will be brought into the lab and all codling moths captured in the bands will be reared to determine parasitism rates. Second, codling moth larvae that are being placed caged and uncaged at different distances from riparian forest habitat to determine bird predation rates will also be brought into the lab at the beginning of spring to determine parasitism rates of the caged larvae (those not vulnerable to bird predation).

BENEFITS AND APPLICATIONS: Suggest the relevance of these new findings to management. Describe any accomplishment, that is significant effects your project has had on resource management or user group behavior. CALFED is looking for "management cue" (see http://science.calwater.ca.gov/pdf/soemgmtcues.pdf).

BenefitsApplic_13

Currently the results from this project have not been used. However we will be using results in the future to provide information services to both restoration practitioners and other stakeholders in the region to address and improve restoration and management in the Sacramento River Conservation Area.

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PUBLICATIONS: List any publications, presentations, or posters that have resulted from this funded research. Give as many details as possible, including status of paper (e.g., in review; in press), journal name, conference location and date of presentation. Please note (as outlined in the conditions of the award) that each fellow is required to submit an abstract for an oral or poster presentation at each State of the Estuary conference and CALFED Science Conference during the duration of the fellowship.

Publications_14

Langridge, S.M., M. Buckley, K.D. Holl. To be published summer 2007. Strategies for overcoming obstacles to restoring natural capital: Large-scale restoration on the Sacramento River. In Restoring Natural Capital, Island Press.

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COOPERATING ORGANIZATIONS: List those agencies and/or persons who provided financial, technical or other assistance to your project since inception. Describe the nature of their collaboration.

CoopOrganiz_15

The Nature Conservancy provided housing for field assistants during the past year.

AWARDS: List any special awards or honors that you, or mentor or members of the research team, have received during the duration of this project.

Awards_16

none

KEYWORDS: List keywords that will be useful in indexing your project.

Keywords_17

Sacramento River, riparian forest restoration, birds, arthropods, codling moth, walnut husk fly, pests, natural enemies, parasitoids, walnuts

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PATENTS: List any patents associated with your project.

Patents_18

does not apply

Additions: Additional information can be added here. Please begin the text with the number of the question you are adding to.

Additions_19