CALFed Progress Questionnaire
California Sea Grant College Program

ConfirmationNumber 20050801161854

Printed: 8/15/2005 12:19:23 PM

ProjectYear_2A 2nd Year **ProjectNo_2C** Interim Questionnaire

TypeQuestionnaire_2B Impacts of inundation regime, floodplain vegetation, and

Preparer Information

PrepName_1A Sandra M Clinton
PrepEmail_1B sclinton@berkeley.edu
PrepPhone_1C 510-643-9294

Project Information

ProjectNo_2C Interim Questionnaire **StartDate_3a** 1 July 2003 **EndDate_3b** 30 June 2006
ProjectTitle_4 R/SF-1

CALFed Fellow contact information

FelTitle_5A Dr **FelLast_5B** Clinton **FelFirst_5C** Sandra **FelInit_5D** M
FelInstitution_5E University of California, Berkeley
FelDepartment_5F Department of Integrative Biology
FelStreetAddr_5G 3060 Valley Life Sciences Building #3140
FelCity_5H Berkeley **FelState_5I** CA **FelZip_5J** 94720-3140
FelPhone_5K 510-643-9294 **FelFax_5L** 510-643-6264
FelEmail_5M sclinton@berkeley.edu
FelPositionTitle_5N Postdoctoral Fellow

Research Mentor (for additional please see #8)

RMTitle_6A Dr **RMLastName_6B** Power **RMFirstName_6C** Mary **RMInit_6D** E
RMInstitution_6E University of California, Berkeley
RMDepartment_6F Department of Integrative Biology
RMStreetAddr_6G 3060 Valley Life Sciences Building #3140
RMCity_6H Berkeley **RMState_6I** CA **RMZip_6J** 94720-3140
RMPhone_6K 510-643-7776 **RMFax_6L** 510-643-6264
RMEmail_6M mepower@berkeley.edu
RMPositionTitle_6N Professor

Community Mentor (for additional please see #9)

CMTitle_7A Dr **CMLastName_7B** Swenson **CMFirstNamt_7C** Ramona **CMInit_7D**
CMInstitution_7E The Nature Conservancy
CMDepartment_7F
CMStreetAddr_7G 2015 J Street, Suite 103
CMCity_7H Sacramento **CMState_7I** CA **CMZip_7J** 95814
CMPhone_7K 916-449-2850 Ext. **CMFax_7L** 916-448-3469
CMEmail_7M rswenson@tnc.org
CMPositionTitle_7N Ecoregional Ecologist

Additional Research Mentors and Community Mentors

Additional Research Mentors_8

N/A

Additional Community Mentors_9

N/A

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

ProjectObjectives_10

Overall Objective: understand the links between flood pulse, habitat diversity and soil invertebrate communities on floodplain soil fertility and diversity.

Objective 1: quantify floodplain soil fertility and diversity in relation to floodplain vegetation and inundation regime (Progress Report for 2003)

Objective 2: quantify the amount and quality of organic matter (aquatic and terrestrial) delivered to the floodplain in relation to floodplain vegetation and inundation regime

Objective 3: quantify whole system respiration in relation to floodplain vegetation and inundation regime

Objective 4: quantify the role of burrowing animals (oligochatetes) on the incorporation of carbon into floodplain soils

Summary of progress in meeting each of these goals and objectives

ProgressSummary_11

Please see 2003 Progress Report for study site locations and description.

Obj 2: For each permanent plot, leaf litter was collected monthly for 1 year, sorted by species and type (leaves, seeds), weighed and measured for total carbon and nitrogen. I quantified the amount of periphyton deposited on the soils by placing 20 petri dishes in each permanent plot prior to flooding. After flood recession petri dishes were scrubbed to remove the deposited algae and sediment then subsampled for chlorophyll a, phaeophytin, algal abundance/diversity, AFDM, C:N, and stable isotopes of C and N. Twigs and leaves and any invertebrates were removed from the dishes prior to subsampling. Invertebrates were preserved in ethanol for later identification and organic matter was analyzed for AFDM.

Obj 3: During the 2004-2005 flood season, I measured whole system metabolism at 3 points along 2 transects using diel changes in dissolved oxygen concentration with Hydrolab datasondes. Data were collected in the forest, at the forest edge, and in the adjacent meadow on 5 dates. Data were collected at the high and low algae plots and an intermediate site in between on 3 dates.

Obj4: I am conducting a series of field and greenhouse experiments that manipulate the amount of organic matter (algae and leaves) and density of worms to investigate the role of animals in the movement of carbon into floodplain soils. In the field 2 experiments are ongoing in the forest and meadow. In the greenhouse, radish plant growth is being used as a measure of soil fertility. In these experiments I have crossed 4 soil types (1 from each permanent study location) with amount of organic matter (leaves and algae) and burrowing animals (worm or no worms).

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

Quantifying periphyton production has been one of the hardest aspects of this project. Since the project focus is on carbon reaching the soils, a simple method using petri dish bottoms secured to the floodplain soils with a long nail was employed. As the floodplain dries, algae and sediment are deposited on the soils and collects in the petri dishes. This allows me to estimate the amount of algae deposited on the soils as a per area measurement. This method however, does not account for algae that remains attached to vegetation and later becomes deposited due to rain or animal action.

The availability of 3 Hydrolab datasondes from Dr. Mary Powerís lab allowed me to make several whole system metabolism measurements during the flood season. There are few metabolism measurements for floodplains and this application will provide additional information to ongoing work by Drs. Anke Muller-Solger and Ted Groholz. These metabolism measurements can be extrapolated to the floodplain and provide and be related to the amount of carbon deposited on the floodplain.

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

Although data analysis and interpretation are still ongoing, this project will contribute much need information on floodplain soils and their communities to our overall understanding of floodplain ecosystems. Whole system metabolism measurements will be integrated into the larger CALFED funded study (led by Dr. Jim Quinn, UC-Davis) to determine if these measurements agree with the overall prediction that heterotrophy will dominate in areas where resource distribution from flooding has isolated suspended algal biomass. Carbon inputs to soils from deposited algae, will also provide an estimate of the importance of periphyton relative to phytoplankton in this system during inundation. Integrating these components of floodplain ecology into our overall knowledge of the Cosumnes floodplain is necessary to continue to have successful system management.

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

Clinton, S. M. (in prep). Whole system floodplain metabolism along an organic matter gradient on the Cosumnes River. Suggested journal: Journal of the North American Benthological Society.

Clinton, S.M., and M. E. Power. (in prep). The influence of aquatic versus terrestrial production on soil invertebrate communities in a floodplain ecosystem. Suggested journal: Biology and Fertility of Soils.

Clinton, S. M., G. Benigno, and M. E. Power. 2004. Soil invertebrate communities in meadow and forest habitats on the Cosumnes River floodplain. CALFED Science Conference, Sacramento, California (poster)

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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

N/A

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

N/A

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

Keywords_17

floodplain, organic matter, carbon, soil invertebrates, oligochaetes, metabolism, stable isotopes, periphyton, alage, soil fertililty

PATENTS: List any patents associated with your project.

Patents_18

N/A

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

Additions_19

N/A

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