



CALFed Progress Questionnaire
California Sea Grant College Program

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ProjectYear_2A 2nd Year
TypeQuestionnaire_2B Protistan Microzooplankton in the Suisun Bay Food Web:

ProjectNo_2C Interim Questionnaire

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Project Information

ProjectNo_2C Interim Questionnaire StartDate_3a August 1, 2003 EndDate_3b July 31, 2006
ProjectTitle_4 R/SF-5

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Additional Research Mentors and Community Mentors

Additional Research Mentors_8

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Additional Community Mentors_9

Form with 6 horizontal lines for entering additional community mentor information.

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

ProjectObjectives_10

My primary goals are to quantify the role of protistan microzooplankton in the planktonic food web of Suisun Bay and to provide insights into the structure, function and limits on productivity of the lower planktonic food web. While recognition of the importance of microzooplankton in pelagic food webs is rapidly increasing within the scientific community, this component of the planktonic system is still largely uninvestigated in many marine and estuarine environments, including San Francisco Bay.

My objectives are to examine the distribution, abundance, taxonomic composition, grazing rates and contribution to copepod diet of the protistan microzooplankton in Suisun Bay. These parameters will be compared across gradient of turbidity which may affect grazing efficiency of micro- and mesozooplankton. Examination of temporal variation will include inter-annual, seasonal (wet vs. dry), and monthly (during historically critical fish recruitment periods) sampling. I will also analyze historical data from the USGS Water Quality of San Francisco Bay Program to predict the periods when microzooplankton could have had a greater or lesser influence on both phytoplankton biomass and planktonic food web efficiency.

Summary of progress in meeting each of these goals and objectives

ProgressSummary_11

As noted in the Annual Report for Year 1 (ending July 31, 2004), in the first year of this project three sets of feeding experiments were conducted with microzooplankton as predators (dilution experiments) and prey (incubation experiments with mesozooplankton predators) between March and May 2004. A regular field sampling program was also initiated to assess the distribution, abundance and community composition of the microzooplankton in Suisun Bay and Grizzly Bay on a bi-monthly basis, with additional samples added during the spring fish recruitment period.

Year 2 (August 1, 2004 ñ July 31, 2005) was a heavy field and experimental sampling year, with another four sets of feeding experiments conducted and the regular sampling for assessment of distribution and abundance continued. In addition, microscopical analyses of all field samples collected in both years 1 and 2 to enumerate and identify the microzooplankton and algae in Suisun and Grizzly Bays have been completed. Moreover, all samples from the mesozooplankton incubation experiments have been enumerated, and the chlorophyll samples measured from all dilution experiments.

Results to date indicate the microzooplankton (i.e. heterotrophic ciliates, dinoflagellates and other flagellates) comprised a large proportion of the total assemblage of plankton <200 microns in size, with algal taxa (i.e. diatoms, Mesodinium rubrum, autotrophic flagellates) generally present to an equal or lesser degree. Diatoms and other algae were relatively more abundant during April and May of both 2004 and 2005. Microzooplankton were the dominant taxa in terms of biomass throughout the rest of the year, in particular during August of 2004 and 2005.

In terms of the trophic role of microzooplankton in Suisun Bay, the dilution experiments showed that microzooplankton grazing accounted for a substantial proportion of phytoplankton growth in all but one time period (May 2004). Moreover, on three occasions in 2005 (April, May, August) microzooplankton grazing rates exceeded phytoplankton by as much as 10-fold, which likely accounted for low and/or negative phytoplankton growth rates observed at those times. In the concurrent incubation experiments, microzooplankton comprised the bulk of many mesozooplankton predators' diets and were often the preferred prey compared to algal taxa.

These results give further weight to our earlier observations in Year 1 that microzooplankton are very important players in the overall plankton community, in particular in transferring phytoplankton carbon to higher trophic levels.

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

Invited Colloquium:

Department of Environmental Science and Resources, Portland State University, Portland, OR. iQuestions about Microzooplankton in Aquatic Food Webs: Answers from the San Francisco Estuary. i March 2005.

Presentations/Posters:

Rollwagen Bollens, G., Gifford, S.M., Slaughter, A.M. Bollens, S.M. Microzooplankton in the northern San Francisco Estuary: Important food resources and phytoplankton grazers. ASLO Aquatic Sciences Meeting, Salt Lake City, UT. February 2005.

Rollwagen Bollens, G. The Role of Microzooplankton in the San Francisco Estuary. DIALOG VI Symposium, co-sponsored by the American Society for Oceanography & Limnology (ASLO) and the Estuarine Research Federation (ERF). Dauphin Island Marine Laboratory, Mobile, AL. November 2004.

Rollwagen Bollens, G., Gifford, S.M., Slaughter, A.M., Bollens, S.M. Microzooplankton in the Suisun Bay food web: Source or sink? 3rd Biennial CALFED Science Conference, Sacramento, CA. October 2004.

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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

Romberg Tiburon Center for Environmental Studies, San Francisco State University (research vessel and laboratory space)
Washington State University Vancouver (research space and support)

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

I was selected to participate in the DIALOG VI Symposium, co-sponsored by the American Society for Oceanography & Limnology (ASLO) and the Estuarine Research Federation (ERF). Dauphin Island Marine Laboratory, Mobile, AL. November 2004.

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

Keywords_17

microzooplankton, dilution experiments, Suisun Bay, mesozooplankton, grazing, feeding experiments

PATENTS: List any patents associated with your project.

Patents_18

Does not apply.

