



CALFed Progress Questionnaire
California Sea Grant College Program

ConfirmationNumber

20081211000000

Printed: 12/14/2009

12:44:42 PM

ProjectYear_2A 3rd Year

ProjectNo_2C R/SF-9

TypeQuestionnaire_2B Final

Preparer Information

PrepName_1A James A. Hobbs

PrepEmail_1B iahobbs@ucdavis.edu

PrepPhone_1C 707-875-1935

Project Information

ProjectNo_2C R/SF-9 StartDate_3a 9/01/2005 EndDate_3b 8/31/2008

ProjectTitle_4 Looking Back to Go Forward: The application of otolith growth and micro-chemistry to determine spatio-temporal variability in recruitment success for

CALFed Fellow contact information

FelTitle_5A Dr. FelLast_5B Hobbs FelFirst_5C James FelInit_5D

FelInstitution_5E University of California. Berkeley

FelDepartment_5F Geography

FelStreetAddr_5G 513 McCone Hall

FelCity_5H Berkeley FelState_5I CA FelZip_5J 94720

FelPhone_5K 707-875-1935 FelFax_5L

FelEmail_5M iahobbs@ucdavis.edu

FelPositionTitle_5N Post-Doc Fellow

Research Mentor (for additional please see #8)

RMTitle_6A Dr. RMLastName_6B Ingram RMFirstName_6C Lynn RMInit_6D B

RMInstitution_6E UC Berkeley

RMDepartment_6F Dept of Geography

RMStreetAddr_6G 513 McCone Hall

RMCity_6H Berkeley RMState_6I CA RMZip_6J 94720

RMPPhone_6K (510) 643-1474 RMFax_6L 510-642-3370

RMEEmail_6M ingram@eps.berkeley.edu

RMPositionTitle_6N Faculty

Community Mentor (for additional please see #9)

CMTitle_7A Dr. CMLastName_7B Ted CMFirstName_7C Sommer CMInit_7D

CMInstitution_7E Department of Water Resources

CMDepartment_7F Aquatic Ecology Section
CMStreetAddr_7G 1416 9th Street
CMCity_7H Sacramento **CMState_7I** CA **CMZip_7J** 95814
CMPhone_7K (916) 651-0180 **CMFax_7L** _____
CMEmail_7M tsommer@water.ca.gov
CMPositionTitle_7N Senior Environmental Scientist

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

Recent technological advancements in micro-chemical analysis has provided fisheries managers a unique opportunity to learn about elusive patterns and processes in population structure and recruitment dynamics. In this study we look back on the life history of the delta smelt by employing the laser ablation technique to resolve recruitment patterns for the threatened delta smelt, a key species in the pelagic organism decline in the upper San Francisco Estuary. We examined smelt collected during the juvenile and adult CDFG surveys (1999 to 2007) for natal and juvenile habitats using otolith strontium isotope ratios at the core and corresponding mid-points for adults and edge points for juveniles. Water $87\text{Sr}:86\text{Sr}$ values varied inter-annually at sites within the delta reflecting water transport operations. Therefore water strontium isotope ratios were modeled with a linear mixing model for mixtures of Sacramento and San Joaquin River waters and low-salinity waters to identify habitats.

Summary of progress in meeting each of these goals and objectives

ProgressSummary_11

Our strontium isotope geochemistry results clearly demonstrate the value of retrospective determination of natal and juvenile rearing habitats for populations undergoing selective mortality. Delta smelt originated in the freshwaters of the Sacramento River, however few individuals utilized the low-salinity zone during early life. During extreme wet years, the low-salinity zone can be the primary habitat for larval rearing. While the natal origins of delta smelt varied inter-annually, the habitats where juveniles reared appeared to be less variable, with a majority of fish utilizing the low-salinity zone. In 6 out of the 7 years of this study, individuals reared in San Joaquin River water during the juvenile period had very poor recruitment to the adult survey. Meanwhile juveniles reared in low-salinity waters appeared to exhibit the highest recruitment success. The outlying year, 2005 was an unusual water year, with high late season outflow resulting in poor recruitment of fish rearing as juveniles in the low-salinity zone. These observations highlight the movement patterns of delta smelt from their natal habitats in tidal freshwater habitats to the low salinity zone. However it is apparent that few individuals remain in upstream tidal habitats and have varying success.

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

