

QUALITY ASSURANCE PROJECT PLAN

For:

Salton Sea Desert Pupfish Investigations

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Agency: U.S. Bureau of Reclamation
Technical Service Center
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Section A: PROJECT MANAGEMENT

A1 Salton Sea Desert Pupfish Investigations

Organization

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Project Staff

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A3 Distribution List

Michel Remington, Imperial Irrigation District

Tom Kirk, Salton Sea Authority

Barry Gump, EPA

A4 Project/Task Organization and Responsibilities (organizational chart)

The Ecological Planning and Assessment Group will lead the desert pupfish assessment effort. Ron Sutton would serve as the Principal Investigator. Mr. Sutton, a fishery biologist in the Ecological Planning and Assessment Group, will be responsible for directing all aspects of the desert pupfish study, including coordination with appropriate agencies, field and laboratory supervision, budget tracking, client interaction, and report preparation. Mr. Sutton will allocate about 25 percent of his time to this effort. Mr. Sutton will always be present during the field sampling. An additional technician from Reclamation will assist with sample collections and food habit analysis. Mr. Vince Reidman of the Ecological Planning and Assessment Group will provide GIS support for the project. Project responsibilities are summarized as follows:

Project Staffing

Position	Name	Principal Duties
Principal Investigator	Ron Sutton	Project management Study design Field supervision Data analysis and report writing Literature surveys
Project Officer	Michel Remington	Project oversight
QA/QC Officer	Barry Gump	Quality Control
GIS Specialist	Vince Reidman	GIS mapping and coordination
Technicians	Rick Wydoski, Tom Lacasse, Andrew Montano, Patty Jones, Elsa Romero, Terri Phipps	Sample collection; food habits

A5 Project Definition and Background

Objectives

The overall objective is to conduct a survey of the endangered desert pupfish (*Cyprinodon macularius*) community for the Salton Sea Restoration Project (Project). Spatial and temporal movements, habitat information, feeding, and spawning use would be determined in representative areas of past sampling success.

Specific Objectives

1. Determine the movement of desert pupfish within and between various habitat types.
1. Address the purposes (i.e., feeding, breeding, dispersal, and avoidance of predators) for which pupfish are utilizing these areas.

Sampling Stations and Sampling Times

About fifteen sampling sites will be established in order to compare spatial movements in representative areas of past sampling success mostly located in the northwest and southwest areas (i.e., shoreline pools, irrigation drains in close proximity to the Sea, and natural tributaries to the Sea that have suitable habitat (Figure 1):

- Two tributary stations, one each in Salt Creek and San Felipe Creek.
- Irrigation drain stations located in northwestern and southwestern areas.
- Six shoreline pools in close proximity to the drain and tributary sites. These pools will be identified by air during the May 1999 waterfowl aerial survey. A Rockwell HNV-560B PLGR Global Positioning System (GPS) will be used to determine coordinates of the shoreline pools during the aerial survey.

These stations will be sampled every 2 weeks starting in June 1999 after collecting permits are obtained and extending for 6 consecutive sample trips.

A6 Project/Task Description

Fish Survey Methods

Sampling gear will consist of baited (canned cat food) minnow traps set for 2 to 24 hours in a variety of habitats. Unbaited traps will be attempted for studies of food habits. Short trap sets of 2 to 3 hours will be necessary in the northwest area because of vandalism. Habitat descriptions (e.g., substrate, aquatic vegetation, access blockage to the Sea) will be noted at each site during each sample period and photographs taken of each sample location.



Depending on the location, as many as 30 traps will be set at each site during each sample period to obtain sufficient numbers of pupfish for tagging/markings and recapturing and for food habits analysis. Short drains may only require 10 traps, whereas the large shoreline pools may need 30 traps for adequate coverage (Glenn Black and Sharon Keeney, CDFG, pers. comm.). Sampling locations will be accurately located using GPS. A small inflatable boat will be used to reach shoreline pools because of shallow, muddy conditions. The airboat from the Salton Sea National Wildlife Refuge will be used to reach the mouth of San Felipe Creek.

Collected fish will be handled using disposable gloves and held in a live well with an airstone. All collected fish will be identified, enumerated, and checked for marks. Voucher specimens may be frozen for quality control if requested by CDFG and FWS. Marking techniques will be elastomer implants. Fluorescent elastomers have been successful for monitoring movements of juvenile reef fishes (8 to 57 mm standard length) (Frederick 1997). This technique will first be tested on sheepshead minnows (*C. variegatus*) in Reclamation's Denver laboratory. Sexes will be identified, if possible, and sexual maturity determined. Collected fish will be returned alive to the water.

The food habits portion of the study will be conducted in the southwest area. Five sites (San Felipe Wash, 3 irrigation drains, and one shoreline pool) will be selected and sampled for food selectivity. A maximum of 50 stomachs will be sampled using a non-lethal flushing technique to remove food items. Food availability will be determined in each of these sites using a D-frame dip net to collect 3 replicate samples per trip. Samples will be preserved in 10 percent formalin and examined in the laboratory for frequency of occurrence and proportions of available and selected food items.

Seasonal and spatial trends in relative abundances and catch rates (#/hour) will be plotted and catch rates among sites will be analyzed for statistical differences using one-way analysis of variance ($p=0.05$). Movements will be determined based on locations of recaptured pupfish.

Voucher fish specimens may be collected for identification verification. Field data sheets will be photocopied and secured in office files. Field notebooks will be scanned for completeness and accuracy before leaving the field. All data input into the database will be proofread to ensure accuracy. Only authorized personnel will have access to the data.

Schedule and Reporting Dates

A literature search and fish sampling will begin shortly after contract award. Tabular data will be submitted in GIS-compatible format, including GPS coordinates for all sampling sites, in a timely manner throughout the course of the study to the Science Subcommittee. A final report will be available within 3 months after field sampling ends. The final report will include summaries and evaluations of all data collected. Final data will be submitted in a format compatible with existing databases being developed as part of the overall Salton Sea restoration effort.

In addition to the final report, progress reports will be forwarded after each sample trip to the Science Subcommittee for review to assist other contractors in their related project work. Progress reports will include data summaries, but will not include complete analyses and interpretations. The Principal Investigator will also attend one meeting with the Salton Sea Authority and/or Science Subcommittee.

The Salton Sea desert pupfish assessment will require about 3 months of field work, with 3 additional months required to complete the final report. Sampling for the project is expected to begin in June 1999. The proposed project schedule is summarized below:

Proposed Project Schedule

Task	Months from Project Start					
	1	2	3	4	5	6
Development of a Detailed Quality Assurance Project Plan			x			
Selection of Sampling Locations	xx					
Desert Pupfish Field Surveys			xxxxxxx			
Project Documentation and Management			xxxxxxxxxxxxxxxxxxxx			
Final Report						x

A7 Quality Objectives and Criteria for Measurement Data

Data to be collected

Stations will be located by using a GPS system. Depending on the location, as many as 30 minnow traps will be set at each site during each sample period to obtain sufficient numbers of pupfish for tagging/markings and recapturing and for food habits analysis. Date and time traps are set and pulled will be recorded. Habitat descriptions (substrate, aquatic vegetation, access blockage to the Sea) will be noted at each station during each sample period and photographs taken of each sample location.

Collected fish will be held in a live well with an airstone and survivors will be returned alive to the water. All collected fish will be identified, enumerated, measured, and weighed. Voucher specimens may be preserved for quality control if requested by CDFG and FWS. Desert pupfish will be marked to track movements. Sexes will be identified, if possible, and sexual maturity determined.

The food habits portion of the study will be conducted in the southwest area. Five sites (San Felipe Wash, 3 irrigation drains, and one shoreline pool) will be selected and sampled for food selectivity. A maximum of 50 stomachs will be sampled using a non-lethal flushing technique to remove food items. Food availability will be determined in each of these sites using a D-frame dip net to collect 3 replicate samples per trip. Samples will be preserved in 10 percent formalin and examined in the laboratory for frequency of occurrence and proportions of available and selected food items.

A8 Special Training Requirements/Certification

The Principal Investigator has prior academic training in fisheries assessments, fisheries database construction and management, and preparation of technical reports. He is certified as a fisheries scientist by the American Fisheries Society. He also has experience with using minnow traps, marking fish, and food habit studies. Any inexperienced field technicians will be trained in the use of minnow traps.

A9 Documentation and Records

Data will be entered onto data sheets in the field. A daily journal will be kept to document all activities. Field data sheets will be photocopied and secured in office files. Field notebooks will be scanned for completeness and accuracy before leaving the field. All data input into the database will be proofread to ensure accuracy. Only authorized personnel will have access to the data. Data will be entered directly after field sampling into Excel spreadsheets by each sampling station. Each spreadsheet will contain data on fish identification, location (including GPS coordinates), sex, habitat, and mark code. Station coordinates will be documented using GPS units and locations will be entered as a layer in

an ArcView file.

Section B: MEASUREMENT/DATA ACQUISITION

B1 Sampling Process Design (Experimental Design)

Assessments of desert pupfish movements and use of various habitats will be accomplished by sampling about 15 stations representative areas of past sampling success mostly in the northwest and southwest areas of the Sea (i.e., shoreline pools, irrigation drains in close proximity to the Sea, and natural tributaries to the Sea that have suitable habitat). Sampling gear will consist of baited (canned cat food) minnow traps set for 24 hours in a variety of habitats. Unbaited traps will be attempted for studies of food habits. Short trap sets of 2 to 3 hours will be used in some areas where vandalism is a problem. Depending on the location, as many as 30 traps will be set at each site during each sample period to obtain sufficient numbers of pupfish for tagging/marketing and recapturing and for food habits analysis.

Habitat descriptions (substrate, aquatic vegetation, blockage to the Sea) will be noted at each site during each sample period and photographs taken of each sample location.

Collected fish will be held in a live well with an airstone. All collected fish will be identified, enumerated, and checked for marks. Voucher specimens may be preserved for quality control if requested by CDFG and FWS. Marking techniques may include fin clips and/or elastomer implants. Sexes will be identified, if possible, and sexual maturity determined. Collected fish will be returned alive to the water.

The food habits portion of the study will be conducted in the southwest area. Five sites (San Felipe Wash, 3 irrigation drains, and one shoreline pool) will be selected and sampled for food selectivity. A maximum of 50 stomachs will be sampled using a non-lethal flushing technique to remove food items. Food availability will be determined in each of these sites using a D-frame dip net to collect 3 replicate samples per trip. Samples will be preserved in 10 percent formalin and examined in the laboratory for frequency of occurrence and proportions of available and selected food items.

Procedures for Locating and Selecting Environmental Samples

About 15 sampling sites will be established mostly in the northwest and southwest areas order to compare spatial movements in representative areas of past sampling success (i.e., shoreline pools, irrigation drains in close proximity to the Sea, and natural tributaries to the Sea that have suitable habitat (Figure 1):

- Two tributary stations, one each in Salt Creek and San Felipe Creek.
- Irrigation drain stations.
- Shoreline pools in close proximity to the drain and tributary sites. These pools will be identified by air during the May 1999 waterfowl aerial survey. A Rockwell HNV-560B PLGR Global Positioning System (GPS) will be used to determine coordinates of the shoreline pools during the aerial survey.

Specific trap sets will be located in varied habitats of sufficient depth to cover the traps. Sampling will occur every 2 weeks for 6 consecutive sample trips.

Schedule for Project Sampling Activities

See methods above (Section A6).

Classification of Measurements as Critical or Noncritical

Measurements of desert pupfish movements are critical.

Validation of Any Nonstandard Methods

Minnow traps will be set for 2 to 24 hours in a variety of habitats. Unbaited traps will be attempted for studies of food habits. It may be necessary to reduce the length of time for trap sets to 2 to 3 hours in some areas where vandalism is a problem.

Stomach flushing and elastomer marking methods will initially be tested in a laboratory on sheepshead minnows.

B2 Sampling Method Requirements

Sampling Methods and Types of Samples to be Collected

See Methods above (Section A6)

Decontamination Procedures and Materials

NA

Sampling System Failure Response and Corrective Action Process

Adequate numbers of back up minnow traps, trap clips, and food sample bottles are available.

B3 Sample Handling and Custody Requirements

Parameter Table

NA

Custody Procedures

NA

B4 Analytical Methods Requirements

All collected fish will be identified, enumerated, and checked for marks. Sexes will be identified, if possible, and sexual maturity determined. Gut contents and food availability samples will be preserved in 10 percent formalin and examined in the laboratory for frequency of occurrence and proportions of food items.

Habitat descriptions (substrate, aquatic vegetation, blockage to the Sea) will be noted at each site during each sample period and photographs taken of each sample location.

Seasonal and spatial trends in relative abundances and catch rates (#/hour) will be plotted and catch rates among sites will be analyzed for statistical differences using one-way analysis of variance ($p=0.05$). Movements will be determined based on locations of recaptured pupfish.

B5 Quality Control Requirements

All captured fish at each station will be taken from each trap and put into one bucket with an airstone. Catch rates will be measured as numbers captured per hour per trap. Fish will be identified to species, and counted.

Stomach flushing and elastomer marking methods will initially be tested in a laboratory on sheepshead minnows.

At each station, substrate (e.g., silt, gravel), vegetation (e.g., rooted aquatic, algae), and will be measured.

B6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Mr. Sutton will be responsible for daily maintenance of all equipment. Mixed elastomer material will be stored in an iced cooler to slow the hardening process. Minnow traps will be checked and maintained after each set, including replacement of missing clips.

B7 Instrument Calibration and Frequency

NA

B8 Data Management

A daily field log will be maintained of all activities by Mr. Sutton. Data will be entered onto data sheets in the field. Field data sheets will be photocopied and secured in office files. Field notebooks will be scanned for completeness and accuracy before leaving the field. All data input into the database will be proofread to ensure accuracy. Only authorized personnel will have access to the data. Data will be entered directly after field sampling into Excel spreadsheets by each sampling station. Each spreadsheet will contain data on fish identification, location (including GPS coordinates), sex, habitat, and mark code. Station coordinates will be documented using GPS units and locations will be entered as a layer in an ArcView file.

B9 Data Acquisition Requirements

Data from past desert pupfish surveys conducted by the California Department of Fish and Game and the irrigation districts will be retrieved to help determine areas of past sampling success.

Section C: ASSESSMENT/OVERSIGHT

C1 Reports to Management

Mr. Sutton will be responsible for all reports to management. Mr. Sutton will make needed adjustments in reporting as the study progresses and note any changes in a section of each progress report. Mr. Remington will be responsible for approving any adjustments.

Action Date	Milestones
1998	
20 May	QAPP submitted
June-September	Progress reports
31 December	Final report submitted

Section D: DATA VALIDATION AND USABILITY

D1 Data Review, Validation, and Verification Requirements

Data will be reviewed after each field sampling trip at the time of reporting.

All sampling gear will be evaluated and minor repairs made after each sampling.

All data input into the database will be proofread to ensure accuracy. Only authorized personnel will have access to the data. Data will be entered directly after field sampling into Excel spreadsheets by each sampling station.

We will collaborate with the U.S. Biological Resources Division of the USGS, which is conducting a desert pupfish study in irrigation drains around the Salton Sea.

Reporting will be done in Microsoft Word text with tables and data analysis in Excel. **Appendix 1 Literature Cited**

Frederick, J. L. 1997. Evaluation of fluorescent elastomer injecting as a method for marking small fish. *Bull. Mar. Sci.* 61:399-408.

University of California, Los Angeles (UCLA). 1983. Enhancements of habitats for the Yuma Clapper Rail and Desert Pupfish in the vicinity of the Salton Sea, Calif. Environmental Science and Engineering. Report No. 83-52. February.