Saving the Salton Sea: A Needs Assessment Workshop
Biology Team Proposal
August 6, 1997

Title: Fish Ecology of the Salton Sea

Introduction

The Salton Sea was the most productive inland recreational fishery in California from the 1960s through the 1980s. During this period, it was a significant contributor to the southern California economy. The Salton Sea fishery is still highly productive but there have been changes, including changes in the species composition of the fish community, which have caused a decline in its recreational popularity.

The productive fishery that remains is a key factor in the importance of the Sea to piscivorous resident and migratory birds of the Pacific Flyway. The Salton Sea Basin is also home to the federally and state endangered desert pupfish.

Justification:

The last reasonably comprehensive study of Salton Sea fishes was published in 1961. Since then a new species has become important in the Sea's fish fauna: tilapia. The previous work is therefore, largely obsolete. Scientific work on Salton Sea fishes since 1961 has largely been confined to creel surveys and salinity tolerance work on a few species.

A knowledge of present day fish population dynamics, spawning requirements, and food webs, relative to salinity levels, potential project sites, and pathogen transfers to birds, is an essential component of any proposal to rehabilitate the Salton Sea. Because of their positions at the top of the aquatic food web, an understanding of fish ecology will be a critical building block on which to base any management plan.

Objectives:

1) Abundance and distribution

General abundance surveys will be performed by netting (gill, seine, or trawl) or trapping (especially for desert pupfish). This will provide baseline data relative to bird distribution. Since corvina and bairdiella (members of the drum family) produce audible sounds, sonic surveys may also be useful indicators of abundance for these species.

Scale or otolith samples will be collected to allow calculation of past growth dynamics. This will compensate slightly for the lack of historical data. Size-frequency analysis during the course of this study will allow calculation of current population dynamics.

2) Condition and feeding habits

Samples of various-sized fish from both deep and shallow water stations will be a) weighed and measured to allow calculation of condition factors, and b) sacrificed for stomach content analysis.

3) Spawning habitats and requirements

Although the body of the Sea is hypersaline, freshwater channels may provide important spawning grounds for corvina and bairdiella. This must be determined by surveys for planktonic eggs (may be combined with zooplankton sampling in limnology proposal) or tracking tagged fish. Additional laboratory work on the salinity tolerance of eggs and larvae may also be necessary.

4) Fish kill response program

A contact phone number for reporting fish kills will be set up and local residents notified of its availability. A response team will be on call and a standard response protocol developed to assess the severity of all reported fish kills and collect specimens for contaminant and pathogen analysis.

5) Synergistic tolerance studies

Although many factors (temperature, dissolved oxygen, ammonia, sulfide, algal toxins, etc.) have been implicated in fish kills, there is little work on the interaction among these factors. By changing one or more factors, a Salton Sea management plan might profoundly alter the toxic effect of a different factor. This needs detailed study.

6) Tilapia feeding studies

Tilapia in the Salton Sea are apparently largely herbivorous (Stuart Hurlbert, SDSU, personal communication). A detailed knowledge of their feeding selectivity might be important in explaining the occurrence of phytoplankton blooms.

Schedule

Year 1: species composition, distribution and population dynamics; food habits
Year 2: species distribution and population dynamics; identification of spawning habitat; tilapia feeding studies; synergistic toxicity studies
Year 3: species distribution and population dynamics; spawning requirements; synergistic toxicity studies

Budget:

Assuming availability of boat with one man crew funded by other means:
$1,100,000 = field work: 3 people x 3 years with fisheries-specific equipment and supplies
$200,000 = laboratory work: tolerance and feeding selectivity studies
$1,300,000 = total

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