

# Salton Sea Fisheries Long-term Monitoring

## Draft Quarterly Report: Spring 2003

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### **Introduction:**

The California Department of Fish and Game (CDFG) is monitoring the status and trends of the Salton Sea fisheries. This will require a compilation of sampling results over several years. In the spring of 2003, Department personnel started quarterly sampling at fourteen stations around the sea, as the basis of a long term monitoring program. To allow comparison of current and future monitoring efforts by CDFG to past results, the following protocol was adapted from those previously used by researchers at the Salton Sea.

Each quarter, if conditions allow, this protocol will produce about 816 net-hours of sampling. After each quarter's sampling is completed this draft report will be prepared, summarizing the numbers and species of fish netted, and calculating the overall and species-based catch-per-unit-effort (CPUE). This report will also offer qualitative comments on the condition and breeding status of each species. After annual repetitions of seasonal sampling, enough data will be collected to allow statistical tests for significant differences in numbers, seasonality, and site use, by and among the four species of fish.

### **Methods:**

The sampling sites comprise three broad habitat types: pelagic (3 sites), near-shore (8 sites), and estuarine (3 sites). The pelagic sites are in the approximate middles of the north basin, south basin and inter-basin areas of the Sea. The near-shore sites are spaced widely apart, four each, near the west and east shores, to capture as much breadth of habitat as possible. The estuarine sites are in the body of the Sea, close enough to the mouths of the New, Alamo, and Whitewater Rivers, to be under the influence of their outflows. See Table 1. for the exact locations of all sites.

Sampling takes place during each of the putative seasons, as follows: spring- April and May; summer- July and August; fall- October and November; winter- January and February. We will attempt to compress the total sampling period into as few days as possible, to the extent that the weather, equipment maintenance, and personnel scheduling constraints allow. Nets are typically set at one or two sites in the morning, and hauled in after approximately 24 hours. The exact number of hours set is recorded for each net, to the nearest quarter-hour.

Fish are sampled by deploying multi-panel monofilament gill nets with 6 X 30 foot panels of 0.5, 1, 2, 3, and 4 inch mesh. Two nets are set at all sites at the water's surface. The nets are set far enough apart to allow room for maneuvering a boat during

setting and retrieval, usually 100-200 meters. The nets at near-shore and estuarine sites are set in 2.5 to 4.5 meters of water, typically 200-300 meters from the shore.

Two additional nets are set at the bottom of water column at the three pelagic sites. The conditions fish experience at the bottom in deep water is different enough from the surface water, in dissolved oxygen, light, food availability and temperature, that this can be considered a discrete habitat, and thus we sample it as though it were a separate site.

At the time of each set and retrieval, water depth, water temperature, conductivity, salinity, and dissolved oxygen are measured and recorded.

When nets are pulled in the following day, all fish are removed and immediately stored on ice. Data are collected from these fish as soon as possible, almost always the same day they are hauled in.

All fish are identified to species level and counted. For the four sport fish in the Salton Sea, (tilapia, Gulf croaker, orangemouth corvina and sargo) weights, lengths (fork length), sex, physical condition, and reproductive status are recorded. Fish above five pounds are weighed to the nearest ounce. Fish below five pounds are weighed to the nearest half ounce. Lengths of fish under 50 centimeters are recorded to the nearest millimeter. Lengths of fish over 50 centimeters are recorded to the nearest centimeter. The sex of all adult fish is determined by dissection. A sample of at least ten fish of each species is also dissected to determine physical condition and breeding status.

### **Results:**

The Spring 2003 sampling session took place from April 7 to June 12. Unusually windy weather prevented us from sampling the deep water sites, so only 11 of the 14 sites in the protocol were sampled during this period. Boat repairs kept us from completing the Spring sampling before the end of May. Table 2. shows the totals of fishes sampled at each site. Total numbers of fishes sampled, with CPUE in parentheses, were: 1 tilapia (.00), 180 Gulf croaker (.36), 19 orangemouth corvina (.04), 0 sargo (.00).

We had a sufficient number of individuals to assess the condition of Gulf croaker and orangemouth corvina, but not tilapia or sargo. Gulf croaker were in excellent condition. They had good flesh, almost all had fat bodies present, and most had plump gonads. Most females had well-developed, granular ovaries, but did not have visible ova; milt was present in the interiors of the testes of some males. Orangemouth corvina were generally in poor condition. Most were visibly thin, and none had fat deposits. Their gonads did not show the heightened developmental state associated with breeding readiness.

### **Discussion:**

Prior to initiating this program of long-term monitoring, we undertook a preliminary sampling period of approximately ten months. We gill-netted on a total of 30 days, at 10 sites, for a total of 220 net-hours. Our methods and sites were roughly comparable to those employed for this report, and provides reasonable baseline numbers for the previous year. These numbers, with CPUE in parentheses, were: 61 tilapia (.28), 116 Gulf croaker (.53), 15 orangemouth corvina (.07), 6 sargo (.03). The total CPUE was

1.04 fish per net-hour, which included 31 non-target fish (threadfin shad and striped mullet). Total CPUE of the four sport fishes was .90 fish per net-hour.

The current CPUE numbers for all species are lower than these baseline numbers, dramatically so for tilapia, which were reduced from .28 to .002. The total CPUE of all species combined is less than half of the previous number (.41 vs. .90). The reduction is even more stunning when compared to results from sampling done in 1999 by Riedel, Caskey, and Costa-Pierce which produced a CPUE for tilapia of 55.

Orangemouth corvina were always associated with Gulf croaker during the current sampling period, an expected result, since they are the only prey apparently available for the corvina, which is an obligate piscivore as an adult.

No fry or young-of-the-year fish were observed during the current sampling period. All orangemouth corvina were adults at least 62 cm. in length. All Gulf croaker sampled were adults, and at least 150 mm. in length. None had gonads in a state of complete reproductive readiness.

Dissolved oxygen levels at the four sites sampled after mid-May were below 2.0 mg/L, and these sites produced no fish when sampled. This factor by itself may prove to be the most significantly correlated indicator of fish presence. If so, continuing to sample sites with such low levels of dissolved oxygen may negatively skew the CPUE and undermine its value in determining changes in fish population levels. We will add an analysis of the dissolved oxygen data from the preliminary sampling period, along with the data from the next sampling period in the Summer 2003 draft report, to see if this phenomenon holds true for the combined data sets.

**Table 1. Locations of Sampling Sites**

<b>SITE NAME</b>	<b>HABITAT TYPE</b>	<b>UTM COORDINATES</b>
Whitewater River	Estuarine	11S 0587948
		3707343
New River	Estuarine	11S 0621567
		3666958
Alamo River	Estuarine	11S 0628480
		3675635
North Shore	Near-shore	11S 0598465
		3709237
North Wister	Near-shore	11S 0628368
		3685497
Bat Caves	Near-shore	11S 0607427
		3699864
South Salton City	Near-shore	11S 0604971
		3682198
North Desert Shores	Near-shore	11S 0589366
		3699424
The Dome	Near-shore	11S 0596997
		3690022
The Cliffs	Near-shore	11S 0615062
		3691509
Test Base	Near-shore	11S 008813
		3672196
North Basin *	Pelagic	11S 0596156
		3701218
Inter-basin *	Pelagic	11S 0606837
		3689452
South Basin *	Pelagic	11S 0618275
		3678697

\* These sites were not sampled during the Spring 2003 period, due to the weather.

**Table 2.**

<b>Date</b>	<b>Site</b>	<b>Net-hours</b>	<b>Tilapia</b>	<b>Croaker</b>	<b>Corvina</b>	<b>Sargo</b>	<b>Other</b>	<b>Total Fish</b>	<b>CPUE</b>
4/7/2003	Alamo River	46	0	9	2	0	1	12	0.26
4/9/2003	North Shore	49	0	20	7	0	0	27	0.55
4/9/2003	Whitewater River	48	1	13	1	0	0	15	0.31
4/24/2003	New River	48	0	11	0	0	0	11	0.23
4/24/2003	North Wister	49	0	82	4	0	0	86	1.76
5/12/2003	North Desert Shores	47	0	21	1	0	0	22	0.47
5/12/2003	Dome	47	0	24	4	0	0	28	0.60
5/28/2003	Bat Caves	46	0	0	0	0	0	0	0.00
6/3/2003	South Salton City	46	0	0	0	0	0	0	0.00
6/3/2003	Test Base	46	0	0	0	0	0	0	0.00
6/12/2003	Cliffs	24	0	0	0	0	0	0	0.00
	North Basin *								
	Inter-basin *								
	South Basin *								
<b>TOTALS</b>		<b>495</b>	<b>1</b>	<b>180</b>	<b>19</b>	<b>0</b>	<b>1</b>	<b>201</b>	<b>0.41</b>

\*High winds prevented sampling deep water sites this quarter  
"Other" fish at the Alamo River site was a striped mullet