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Energy and Ocean Resources
Staff: JJJ, SMH—SF
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**STATUS REPORT ON SONGS MITIGATION PROGRAM
OCTOBER – DECEMBER 2003**

Following is a brief status report for the October-December 2003 period for the mitigation projects required in Southern California Edison Company's (SCE) coastal development permit for the San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 (permit no. 6-81-330, formerly 183-73). The Commission originally adopted the conditions in 1991 to mitigate the adverse impacts of the power plant on the marine environment. The 1991 conditions (Condition D) also require SCE to provide the funds necessary for Commission technical oversight and independent monitoring of the mitigation projects, to be carried out by independent contract scientists under the direction of the Executive Director. In 1993, the Commission added a requirement for the permittee to partially fund construction of an experimental fish hatchery. The Commission has since approved amendments to the conditions in April 1997 and October 1998.

Implementation of the mitigation projects is the responsibility of SCE whereas the Commission is responsible for implementing its independent monitoring and technical oversight function, including the wetland pre-restoration monitoring program and experimental reef monitoring program described below. The Commission has operated under approved work programs and budgets since 1993. The Commission unanimously approved the work program and budget for calendar years 2004 and 2005 on November 5, 2003.

Another aspect of the Commission's monitoring and oversight is periodic public review of the performance of the mitigation projects. For greater convenience of the scientific community and the general public, this year the staff intends to conduct separate review workshops for the wetland and reef mitigation projects. Workshops are *tentatively* scheduled as follows:

San Dieguito Wetland Restoration Project
February 18, 2004
Del Mar

Experimental Reef Monitoring Program
March 22, 2004
San Clemente

Final dates, times and agendas will be posted on the Coastal Commission website at www.coastal.ca.gov.

WETLAND RESTORATION MITIGATION

The Project

Condition A of the permit requires the permittee to create or substantially restore a minimum of 150 acres of wetlands to mitigate for the reduction in the standing stocks of nearshore fishes caused by the operation of SONGS. In April 1997, the Commission reaffirmed its 1992 approval of the permittee's choice of the San Dieguito River Valley as the site for the wetland restoration project and allowed for up to 35 acres credit for enhancement at San Dieguito Lagoon on the condition that the ocean inlet is maintained open to tidal flow in perpetuity.

Progress Report

Wetland Restoration Planning. The Commission approved SCE's preliminary wetland restoration plan for the San Dieguito Lagoon in November 1997. The CEQA/NEPA environmental review incorporated the mitigation project into the overall San Dieguito River Valley Regional Open Space Park project. The lead agencies for the CEQA/NEPA review were the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA) and the U.S. Fish and Wildlife Service.

In September 2000, the JPA certified the EIR after public hearing. The EIR/S designated the Mixed Habitat plan as the environmentally preferred alternative. As required by NEPA, the availability of the final EIR/EIS was published in the Federal Register in September 2000; however, the USFWS had not yet issued a final Record of Decision (ROD) when lawsuits on the Final EIR (FEIR) were filed. The lawsuits have now concluded (see next paragraph) and staff expects USFWS to issue the ROD by the end of 2003.

Litigation on Final EIR. Lawsuits challenging the adequacy of the FEIR were filed by the Del Mar Sandy Lane Association and Citizens United to Save the Beach. Although in a July 2001 decision the Court rejected certain of the plaintiff's claims, it determined that the FEIR was inadequate with regard to several issues, most significantly that there was insufficient evidence supporting the FEIR's conclusion that the project will not increase scour and loss of sand at the river mouth. The Court set aside the JPA's certification of the FEIR and remanded the matter back to the JPA. Both parties appealed the Court's decision. In August 2003, the Court of Appeal ruled that there is substantial credible evidence supporting each of the JPA's conclusions concerning the environmental impacts of the restoration project and the appropriateness of the mitigation measures, thus reversing the judgment of the trial court. All appeals are final; on October 6, 2003, the Appeals Court issued its order directing the Superior Court to issue the revised judgment.

Outstanding issues/Next steps in implementing wetland restoration. The permit requires SCE to submit a final plan and coastal development permit application to the Commission that substantially conforms to the preliminary restoration plan approved by the Commission in November 1997, unless the CEQA/NEPA review concludes that an alternative plan that meets the conditions for minimum standards and objectives is the environmentally superior alternative, and to obtain other agency approvals and permits.

Throughout the appeal of the trial court ruling on the FEIR, the JPA, SCE and USFWS moved forward in consultation with Commission staff to address the additional analyses that will be

needed at the time of the Commission's review of the final plan and coastal development permit application for the restoration project. In addition, the staff continued to work with representatives of the Attorney General's Office to facilitate resolution of the remaining issues involving Least Tern nesting sites. Although the Least Tern nesting sites are included in the overall plan, they are a previous requirement from a coastal development permit granted to the 22nd Agricultural District (CDP No. 6-84-525), and not a requirement of SCE's SONGS permit.

SCE submitted a final restoration plan in October 2001, which has been held in abeyance until the lawsuit was concluded. (The permit does not specify when the Commission must act on the final plan.) The staff is reviewing this submittal to provide guidance to SCE to ensure that the plan meets the requirements of the permit and to ensure that Coastal Act issues will be addressed. An October 1998 amendment to the SONGS permit provided for a two-step approval process: first, approval of the final plan to provide a checkpoint to verify that the plan substantially conforms to the EIR/S preferred alternative, and second, approval of the coastal development permit. However, this process is no longer practical because the final plan as submitted in October 2001 still contains many areas where detailed final design and engineering is needed. SCE is currently preparing its final design and engineering plans; thus, it makes more sense for SCE to revise the October 2001 final plan after completing the engineering design and to recombine approval of the revised final plan with the coastal development permit.

Pre-restoration Monitoring. The SONGS permit establishes physical and biological performance standards that must be met by the restored wetland. As part of the Commission's technical oversight, monitoring and management responsibilities under Condition D, the contract scientists are conducting pre-restoration monitoring in San Dieguito Lagoon and in other southern California wetlands that may be used as reference sites in post-restoration monitoring. Pre-restoration monitoring includes the collection of baseline physical and biological data on the wetland attributes to be monitored during post-restoration monitoring. Pre-restoration data are required to assess changes in the existing wetland following construction. Pre-restoration monitoring data are also needed to develop sampling designs for post-restoration monitoring that can effectively determine whether the various performance standards have been met. Contract scientists continued to collect pre-restoration data on water quality, invertebrates, and fishes in San Dieguito Lagoon and prospective reference wetlands.

Results of the pre-restoration monitoring activities undertaken during 2003 will be reviewed at an annual public workshop *tentatively* scheduled to be held on February 18, 2004, in Del Mar. The Commission's contract scientists will discuss the sampling effort, statistical methods for estimating similarity in evaluating performance standards, and selection of sites used for reference in wetland restoration.

Evaluation of sampling methods for adverse effects. Vegetated marsh and channel banks can be greatly impacted during fish sampling, especially with the use of seines. Contract scientists continue to explore the use of sampling gear, such as enclosure traps, that minimize impacts to marsh habitats while permitting the concurrent sampling of replicate areas for effective comparison of the abundance and number of species of fishes between San Dieguito Lagoon and reference wetlands.

Appropriate spatial and temporal scales of sampling. One focus of the pre-restoration monitoring is the analysis of data collected to determine the appropriate number and spacing of samples for use in the post-restoration monitoring of intertidal epibenthic and infaunal

invertebrates and fishes. Fieldwork for this study is being carried out in three wetlands that may serve as reference sites in post-restoration monitoring (Tijuana Estuary, Mugu Lagoon, and Carpinteria Salt Marsh). Data collected on invertebrates and fishes analyzed using spatial statistics and analysis of variance to determine the appropriate number and spacing of samples for use in post-restoration monitoring of species richness and abundance.

Effectiveness of types of sampling gear. Another major focus of the contract scientists' pre-restoration monitoring tasks is to develop sampling designs that will allow unbiased comparisons of the abundance and number of species of fish in the restored and reference wetlands and will minimize any adverse effects of sampling on fish and invertebrate populations. Recent work has focused on evaluating the effectiveness of enclosure traps. Results to date suggest that enclosure traps are between 50 to 100 times more effective at sampling gobies—small fish that dominate wetland fish communities and serve as an important source of food for larger fish and many species of wading birds—than other sampling gear. Enclosure traps also have minimal impact on wetland habitats. Analyses are now under way to determine whether habitat type influences estimates of abundance obtained using different sampling gear and protocols.

Contract scientists have begun work involving fish sampling with beach seines and purse seines to determine the appropriate configuration of gear and minimum sample size for each gear type to minimize impacts on fish populations and the effort per sample. Work will then proceed on determining the appropriate spacing and number of samples for each of these gear types.

Water quality. Water quality is one of the long-term physical standards that will be used to measure the performance of the restored wetland. The contract scientists monitor salinity and oxygen concentration, which are important to the health, abundance, and richness of estuarine biota. The contract scientists continued collecting baseline data on water quality and tidal height from continuously recording instruments placed in San Dieguito Lagoon and Carpinteria Salt Marsh (a prospective reference wetland).

Vegetation monitoring. Wetland-wide monitoring of various habitats, including vegetated and un-vegetated intertidal habitat will be necessary to insure that conditions of the SONGS permit are met. Contract scientists are exploring the use of aerial photography in combination with ground-truthing to monitor changes both in restored habitats and in existing wetland.

KELP REEF MITIGATION

The Project

Condition C of the permit requires construction of an artificial reef that consists of an experimental reef and a larger mitigation reef. The experimental reef must be a minimum of 16.8 acres and the mitigation reef must be of sufficient size to sustain 150 acres of medium to high density kelp bed community. The purpose of the experimental reef is to determine which combinations of substrate type and substrate coverage will most likely achieve the performance standards specified in the permit. The design of the mitigation reef will be contingent on the results of the experimental reef.

In April 1997, the Commission added the requirement for a payment of \$3.6 million to the State's Ocean Resource Enhancement and Hatchery Program (OREHP) to fund a maricul-

ture/marine fish hatchery to provide compensation for resources not replaced by the artificial mitigation reef. SCE has fully satisfied this portion of the kelp mitigation requirement.

Progress Report

Following completion of the environmental review and permitting process, construction of the experimental reef located off San Clemente was completed in September 1999. The experimental reef tests eight different reef designs that vary in substrate composition (quarry rock or recycled concrete), substrate coverage (actual coverages are higher than the intended nominal coverages of 17%, 34% and 67%, at approximately 54%, 65%, and 84%, respectively), and presence of transplanted kelp. All eight reef designs are represented as individual 40 m x 40 m modules that are replicated in seven areas (i.e., blocks) for a total of 56 artificial reef modules totaling 22.4 acres.

Experimental Reef Monitoring. The monitoring plan approved by the Commission specifies that the abundance of giant kelp, macro invertebrates, understory algae, and kelp bed fish, and the area and coverage of hard substrate on the artificial reef modules be surveyed each year for five years.

The fourth year of these studies will be completed at the end of 2003. Results of the experimental reef monitoring and process studies undertaken during 2003 will be reviewed at an annual public workshop *tentatively* scheduled for March 22, 2004, in San Clemente. Following the workshop in 2004, contract scientists will be summarizing the results of the five-year monitoring program and making recommendations to the Executive Director on the design for the full mitigation reef.

With the exception of fish, the level of monitoring done on the artificial reef and nearby reference reefs in 2003 was the same as that done in 2002. In 2003 kelp bed fish were monitored using the original sampling protocol employed in 2000 and 2001, which consists of two surveys of all reef designs and reference sites in the fall. One of the surveys was completed and another (December 2003) only partially completed due to unsuitable weather conditions. A second winter survey will be attempted during January and February 2004. A different protocol that involved high frequency sampling of a single reef design was employed in 2002 to obtain more complete information on temporal variability in fish abundance. Results from the 2002 fish surveys indicated that a substantial increase in effort would be needed to determine whether the various reef designs differ significantly from each other with respect to the abundance and species number of kelp bed fish. The contract scientists, in consultation with SCE's science and management team, agreed that substantially increasing the effort in this area was not cost effective because all artificial reef designs have performed at least as well as the natural reefs with regard to fish abundance and diversity.

Kelp, benthic invertebrate and algae surveys. During 2003, the fourth year of the experimental reef monitoring program, the annual winter/spring survey of giant kelp adults was completed in May. Database entry and quality control of the 2003 kelp survey data was completed in June. The benthic invertebrates and algae surveys began in late June and were completed in August 2003.

Experimental Reef Process Studies. Focused process studies were identified as a means of reducing uncertainties in decision-making that stem from (1) the short length of the experiment

(5 years), and (2) the small size of the experimental modules compared to the size of the mitigation reef. The following process studies are underway.

Study of colonization, growth and survival of the invasive sea fan. During the spring 2002 survey of giant kelp, dense colonization of the invasive sea fan *Muricea californica* was observed on many of the experimental reef modules. During the subsequent survey of benthic invertebrates, the effects of different artificial reef designs on the colonization, growth and survival of the *Muricea* recruits were evaluated by following changes in the density and size structure of *Muricea* in the 12 permanently marked 1 m² quadrats located on each experimental reef module as well as in permanently marked 1 m² quadrats at each of the two reference sites. Concurrent data collected on the physical and biological characteristics of each quadrat will be used to determine whether the survivorship and growth of *Muricea* is related to other variables. In June 2003 contract scientists began additional studies aimed at predicting future sea fan abundance and size distributions in order to predict whether certain reef designs might support sea fan populations that would inhibit kelp populations sufficiently to prevent meeting the permit requirements (sustained densities of 4 adult giant kelp per 100 m²). As part of these studies contract scientists are following the growth and survivorship of approximately 200 individually marked *Muricea* over the next several years. These data will help corroborate the more spatially comprehensive estimates of *Muricea* growth and mortality that are being obtained from the benthic monitoring surveys.

Effects of reef design. An experiment to determine the effects of reef material (artificial vs. natural) and location (artificial reef vs. reference reef) on the species composition and abundance of colonizing reef biota was set up in March 2002, and sampled during early June 2002. At this early stage of the experiment, there was scant colonization of biota (mainly hydroids, diatoms and microscopic algal turf) and no apparent effects of substrate type or location on colonization rates. This experiment was re-sampled during March/April 2003.

Performance of reef designs relative to fish production. Studies on the resident blackeye goby began in June 2002 to compare reproductive rates on the artificial reef to those at the two reference reefs. This work is being done in collaboration with Professor Todd Anderson of San Diego State University. Fish production was also examined by analyzing the number of recruits per adult for two species of surf perch. Surf perch are useful for such analyses because the adults are live-bearers and parochial. Thus the number of young per adult can be assumed to provide a measure of reproductive output for a particular module and hence allows comparisons among reef design, which vary from module to module.

FISH BEHAVIORAL MITIGATION

The Project

Condition B requires the permittee to install and maintain behavioral barrier devices at SONGS to reduce fish impingement losses.

Progress Report

SCE is currently in compliance with Condition B of the SONGS permit.

SCE conducted a number of laboratory and in-plant experiments testing the behavioral response of fish to lights and sound devices from 1992 through 1999. None of the experiments showed evidence that these devices would reduce fish impingement losses as required by Condition B. At the same time, SCE continued its modified heat cleaning treatments at the plant (called the Fish Chase procedure), which result in a considerable reduction in fish impingement

In October 2000, the Commission reviewed the results and concluded that no further testing of alternative behavioral barriers should be required at this time, provided that (1) SCE continues to adhere to the operating, monitoring, and reporting procedures for the modified heat cleaning treatments and (2) SCE makes every effort to test and install, if feasible, future technologies or techniques for fish protection if such techniques become accepted industry standards or are required by the Commission in other power plant regulatory actions.

The contract scientists reviewed data and analyses on the fish chase procedure at SONGS that were contained in SCE's 2002 *Annual Marine Environmental Analysis* report, which indicates that the fish chase procedure is consistent with the Commission's requirements and that SCE continues in compliance with Condition B.