CALIFORNIA COASTAL COMMISSION
45 FREMONT STREET, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904- 5200
FAX (415) 904-5400
TDD (415) 597-5885
WWW.COASTAL.CA.GOV

W6f

October 3, 2019

TO: Commissioners and Interested Parties

FROM: John Ainsworth, Executive Director
Susan M. Hansch, Chief Deputy Director
Alison Dettmer, Deputy Director
Dr. Kate Huckelbridge, Senior Environmental Scientist, Energy, Ocean Resources, and Federal Consistency Division

SUBJECT: Review of and Possible Commission Action on 2020 and 2021 Two-Year Work Program and Budget for the San Onofre Nuclear Generating Station (SONGS) Mitigation Independent Monitoring Program

SUMMARY OF STAFF RECOMMENDATION

The staff is recommending Commission approval of a two-year work program and $6,788,584 two-year budget paid by Southern California Edison for the independent monitoring and technical oversight of the San Onofre Nuclear Generating Station (SONGS) mitigation projects. The mitigation projects and the permittee-funded independent monitoring are required under Southern California Edison Company's coastal development permit (No. 6-81-330-A, formerly 183-73). The staff is also recommending Commission approval of a $269,551 contingency fund to be used for the independent monitoring, in consultation with SCE, if needed.

The permit conditions were originally adopted by the Commission in 1991 to mitigate the adverse impacts of the operation of SONGS Units 2 and 3 on the marine environment. The conditions require SCE and its partners to: (1) create or substantially restore a minimum of 150 acres of southern California wetlands (Condition A), (2) install fish barrier devices to reduce the biomass of fish killed inside the power plant (Condition B), and (3) construct an artificial reef large enough to sustain 150 acres of medium to high density kelp bed community together with funding for a mariculture/marine fish hatchery (Condition C). The conditions also require SCE to provide the funds necessary for technical oversight and independent monitoring of the mitigation projects, to be carried out by independent contract scientists under the direction of the Executive Director (Condition D). Implementation of the mitigation projects is the responsibility of SCE, whereas the Commission is responsible for overseeing the independent monitoring and technical

oversight. The independent monitoring and oversight also includes periodic public review of the performance of the mitigation projects.

The independent field monitoring program is carried out through a contract with the University of California, Santa Barbara. Under this contract monitoring data are collected by university contract biologists under the direction of three Principal Scientists that serve as project managers for the monitoring effort (collectively known as "contract scientists"). Southern California Edison also provides funds for a science advisory panel to provide independent scientific expertise to the Commission and to the Principal Scientists.

Work Program for 2020 and 2021

The two principal components of the mitigation project, the wetland and the reef, are progressing on slightly different timelines. The Commission approved the CDP for the San Dieguito wetland restoration project on October 12, 2005 (CDP #6-04-88). Construction began in August 2006 and was completed in fall 2011 with inlet dredging. During the 2018-2019 work period, the contract scientists implemented the seventh and eighth year of independent performance monitoring to evaluate whether the wetland restoration met the standards set forth in the SONGS permit. Wetland tasks for the 2020-2021 work period will continue with the ninth and tenth years of post-construction monitoring.

After construction and monitoring of an experimental reef, the Commission approved the coastal development permit and final reef mitigation plan on February 6, 2008 (CDP #E-07-010). Construction of the artificial reef was completed in September 2008, and on January 27, 2009, the Executive Director determined that the constructed reef met the Final Design Plan specifications in the SONGS permit. In March 2019, the Commission approved SCE's CDP 9-19-0025 (https://www.coastal.ca.gov/meetings/agenda/#/2019/3) for the construction of a Phase III, 210 acre low relief remediation reef to address low fish standing stock at Wheeler North Reef (see Section C.2 for additional details).

During the 2018-2019 work period, contract scientists implemented the tenth and eleventh years of independent performance monitoring to evaluate whether the mitigation reef met the standards set forth in the SONGS permit. The SONGS monitoring team also implemented construction monitoring for the first of two construction periods for installation of the Phase III remediation reef. Reef tasks for the 2020-2021 work period will continue with the twelfth and thirteenth years of post-construction performance monitoring, as well as construction monitoring for the second of two construction periods for installation of the Phase III remediation reef.

Budget for 2020 and 2021

The proposed budget for calendar years 2020 and 2021 covers the independent monitoring and technical oversight program costs for the independent contract scientists, science advisory panel, consultants, administrative support, and operating expenses. The proposed staff is the minimum needed to meet the goals specified by the permit under Condition D and to complete the tasks identified in the 2020-2021 work program. The proposed funding totals $6,788,584 for the two years. Coastal Commission staff is also proposing pre-approved contingency funds in the amount of $269,551 specifically for potential additional costs for: (1) the Scientific Advisory Panel, (2) early office lease termination, and (3) unexpected repair and/or replacement of field vehicles and boats.

SCE has indicated its agreement with the proposed Commission oversight and independent monitoring work plan and budget for wetland and reef mitigation for 2020-2021. Staff recommends that the Commission approve the 2020-2021 Work Program and Budget for the independent monitoring and technical oversight of the San Onofre Nuclear Generating Station (SONGS) mitigation projects.

The Commission staff recommends that the Commission **approve** the 2020-2021 SONGS Mitigation Monitoring Work Plan and budget. The motion to approve with conditions is on page 5.

TABLE OF CONTENTS

APPENDICES

EXHIBITS

I. MOTION AND RESOLUTION

Commission approval of the 2020 and 2021 two-year Work Program and Budget requires the following motion:

> *I hereby move that the Commission **approve** the 2020 and 2021 two-year SONGS Work Program and Budget and contingency fund as recommended by the staff.*

The staff recommends a **"YES"** vote on the foregoing motion, which will result in the adoption by the Commission of the following resolution:

> *The Commission hereby determines that the 2020 and 2021 two-year SONGS Work Program and Budget and contingency fund that is set forth in the staff recommendation, dated October 3, 2019, carries out the intent of Condition D of Permit 6-81-330-A (formerly 183-73) by requiring the permittee to provide reasonable and necessary funding for the Commission contract scientists' technical oversight and independent monitoring responsibilities pursuant to the mitigation and lost resource compensation conditions (A through C).*

II. FINDINGS AND DECLARATIONS

A. SONGS PERMIT BACKGROUND

In 1974, the California Coastal Zone Conservation Commission (i.e., the predecessor Commission) issued a permit (No. 6-81-330- A, formerly 183-73) to Southern California Edison Company for Units 2 and 3 of the San Onofre Nuclear Generating Station (SONGS). A condition of the permit required study of the impacts of the operation of Units 2 and 3 on the marine environment offshore from San Onofre, and mitigation of any adverse impacts. As a result of the impact studies, in 1991 the Commission added new conditions to mitigate the adverse impacts of the power plant on the marine environment which require the permittee to: (1) create or substantially restore at least 150 acres of southern California wetlands (Condition A), (2) install fish barrier devices to reduce the biomass of fish killed inside the power plant (Condition B), and (3) construct a 300-acre kelp reef (Condition C). The conditions specify both physical and biological performance standards for the wetland restoration and kelp reef, and require continuing monitoring of the effectiveness of the fish barriers. The 1991 conditions also require SCE to provide the funds necessary for Commission contract scientific staff technical oversight and independent monitoring of the mitigation projects (Condition D). In 1993, the Commission added a requirement for the permittee to partially fund construction of an experimental white sea bass hatchery. Due to its experimental nature, the Commission did not assign mitigation credit to the hatchery requirement.

After extensive review of new kelp impact studies, in April 1997 the Commission approved amended conditions which: (1) reaffirm the Commission's prior decision that San Dieguito is the site that best meets the permit's standards and objectives for wetland restoration, (2) allow up to 35 acres credit for enhancement of wetland habitat at San Dieguito Lagoon by keeping the river mouth permanently open, and (3) revise the kelp mitigation requirements in Condition C. Specifically, the revised Condition C requires construction of an artificial reef large enough to sustain 150 acres of medium to high density kelp bed community that supports 28 tons of reef associated fish (which could result in a reef larger than 150 acres) together with funding for a

mariculture/marine fish hatchery as compensation for the loss of 179 acres of medium to high density kelp bed community resulting from the operation of SONGS Units 2 and 3. The artificial reef is to consist of an experimental reef of at least 16.8 acres and a larger mitigation reef to meet the 150-acre kelp bed and 28 ton fish standing stock requirements. 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.

The Commission also stressed in April 1997 the need to continue the independent monitoring and technical oversight required in Condition D to ensure full mitigation under the permit. Monitoring, management and remediation are required to be conducted over a period of time equivalent to the "full operating life" of SONGS, defined as past and future years of operation of SONGS Units 2 and 3, including the decommissioning period to the extent that there are continuing discharges. Operation of Units 2 and 3 began in 1982 and 1983, respectively. Both reactors were shut down in January 2012 due to excessive wear in the cooling tubes of the steam generators, and permanently retired in June 2013. Although Units 2 and 3 have been permanently shut down, SONGS still circulates ocean water within the plant to cool the spent fuel, and thus continues to discharge cooling water. The cooling water flow, however, is a small fraction of the total flow used by SONGS during operation of the reactors. At normal operations, the volume of seawater used to cool SONGS Units 2 and 3 was over 2500 million gallons per day (MGD). After Units 2 and 3 were shut down, the flow was reduced to approximately 41 MGD, a reduction of approximately 98%, resulting in a significantly reduced turbidity plume extending from the discharge pipes. This turbidity plume was the source of impacts to the San Onofre kelp bed as determined by the Marine Review Committee in the initial SONGS impact studies. In March 2019, the Commission determined that the magnitude of the reduction in discharge makes it unlikely that this level of flow contributes to significant adverse ecological impacts, and based on this determination, it defined the end of the operating life of SONGS as the end of 2013, and set the full operating life of SONGS at 32 years.

B. COMMISSION OVERSIGHT AND INDEPENDENT MONITORING

Condition D of the permit establishes the administrative structure to fund the independent monitoring and technical oversight of the mitigation projects. It specifically: (1) enables the Commission to retain contract scientists and technical staff to assist the Commission in carrying out its oversight and monitoring functions, (2) provides for a scientific advisory panel to advise the Commission on the design, implementation, monitoring, and remediation of the mitigation projects, (3) assigns financial responsibility for the Commission's oversight and monitoring functions to the permittee and sets forth associated administrative guidelines, and (4) provides for periodic public review of the performance of the mitigation projects.

Condition D requires SCE to fund the Commission's oversight of the mitigation and independent monitoring functions identified in and required by Conditions A through C. The permittee is required to provide "reasonable and necessary costs" for the Commission to retain personnel with appropriate scientific or technical training and skills, as well as reasonable funding for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel convened by the Executive Director to provide advice on the design, implementation, monitoring and remediation of the mitigation projects.

Pursuant to this condition, the Commission has operated under approved work programs and budgets since 1993. The funds for the oversight and monitoring program are managed by an independent accounting firm. The Commission retains a science advisory panel under contract to provide scientific expertise to the Commission, contract staff scientists to manage and operate the monitoring program, and administrative support personnel to manage administrative tasks. In addition, independent consultants and contractors are called upon when specific expertise or assistance is needed for specific tasks. The Commission's permanent staff also spends a portion of its time on this program, but except for direct travel reimbursements, their costs are paid by the Commission and are not included in the monitoring program budget.

In approving the work programs and budgets for the monitoring and oversight program, the Commission has authorized an implementation structure through a contract with the University of California, Santa Barbara that utilizes the existing contract scientists as project managers at no additional cost, with data collection done by university contract staff biologists under their direction. The Commission found, based on a comparison of estimated costs from UCSB, other universities, and private consultants, that this implementation structure is the most efficient, cost-effective, scientifically rigorous, and timely method of achieving the goals of the independent monitoring required by the permit. This implementation structure will continue during the two-year period of the 2020 and 2021 work program.

C. STATUS OF MITIGATION PROGRAM

1. Status of Wetland Restoration Mitigation

Mitigation Requirement

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 Units 2 and 3. In April 1997, the Commission revised Condition A to allow the permittee to meet its 150-acre requirement by receiving up to 35 acres enhancement credit for the permittee's permanent, continuous tidal maintenance at San Dieguito Lagoon.

Wetland Restoration Planning and Environmental Review

In June 1992, following an evaluation of eight sites, the Commission approved SCE's selected restoration site, the San Dieguito River Valley. In April 1997, the Commission reaffirmed its prior decision that San Dieguito River Valley is the restoration site that meets the minimum standards and best meets the objectives set forth in Condition A.

In November 1997, the Commission approved SCE's preliminary wetland restoration plan as largely conforming with the minimum standards and objectives stated in the permit. 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 environmental review were the San Dieguito River Valley Regional Open Space Park Joint Powers Authority (JPA) and the U.S. Fish and Wildlife Service, respectively.

Following the review period on the January 2000 Draft EIR/EIS, the JPA certified the Final EIR/EIS on September 15, 2000, after public hearing. The EIR/EIS designated the Mixed Habitat plan as the environmentally preferred alternative.

Lawsuits challenging the adequacy of the Final EIR/EIS were filed in 2001; however the courts ultimately ruled in 2003 that the EIR/EIS was sufficient. Following the conclusion of the litigation, the USFWS issued its final Record of Decision on the Final EIR/EIS on November 28, 2003.

Steps in Implementing Wetland Restoration

Upon completion of the wetland restoration project design and engineering plans, SCE and JPA submitted their Coastal Development Permit Application (#6-04-88) in August 2004 to receive authority to carry out the restoration project. On October 12, 2005, the Commission approved the Final Restoration Plan and CDP #6-04-88, as conditioned, for the San Dieguito Wetland Restoration Project (See Exhibits 1 and 2). At the same time, the Commission also approved an amendment to SONGS CDP #6-81-330-A4 to revise Standard 1.3.h of Condition A to allow the minimal loss of existing wetlands as "specifically authorized by the Coastal Commission in Coastal Development Permit No. 6-04-88 for the San Dieguito Wetland Restoration Project Final Restoration Plan." The loss of existing wetlands was mitigated as part of the Final Restoration Plan. See Appendix A for a complete list of specific condition compliance dates and approved CDP amendments.

At the same time, the long-standing obligation of the 22nd Agricultural District to provide for Least Tern nesting habitat as a requirement of its Coastal Development Permit No. 6-84-525 was resolved with the inclusion of four new nesting sites in the Final Restoration Plan. On October 12, 2005, the Commission approved an amendment to CDP #6-84-525 to require the provision, maintenance and monitoring of the new Least Tern nesting habitat to be constructed as part of the San Dieguito Wetland Restoration Project.

Wetland Restoration Construction

Construction of the wetland restoration project at San Dieguito Lagoon (Exhibit 2) commenced in August 2006 and was completed on September 29, 2011, with the completion of the inlet opening. The restoration project included excavation and grading to create the intertidal salt marsh, mudflat, and subtidal basin habitats provided in the Final Restoration Plan for the San Dieguito Wetlands Restoration Project (SCE 2005, http://marinemitigation.msi.ucsb.edu/documents/wetland/sce_reports/san_dieguito-lagoon-final-restoration-plan_112005.pdf). Modifications were made to lengthen the originally constructed linear channels in Modules W2, W2a, and W3 in November 2010. This area was re-graded again in March 2014 to lower the elevation of the marsh plain and improve drainage to facilitate the development of marsh vegetation. The construction of additional wetland acreage ("Grand Avenue") was completed in February 2011.

Material excavated from the construction site was deposited in upland disposal sites within the project area. Berms designed to constrain storm runoff were completed in February 2009 along the boundary of the effective flow area of the San Dieguito River. Maintenance dredging of the inlet was conducted in November 2015 and November-December 2017. Performance monitoring began in January 2012, following the initial September 2011 dredging.

Vegetation. Following excavation and grading, portions of the restoration project were planted with salt marsh plants. Pacific cordgrass, a native low marsh plant that provides habitat for the endangered Ridgeway's Rail (formerly Light-footed Clapper Rail) and other bird species was planted (1200 individuals) in November 2008 and April 2009 with a larger planting (19,450 individuals) in November 2011. Cordgrass was sparsely distributed during the first two years following planting, but subsequently spread along the margins of the restored basin (W1) and throughout lower elevation areas of modules W4/W16 and modules W5/W10. By 2018 the area covered by cordgrass in the restored wetland had increased to approximately 6.8 acres.

Vegetation development at higher elevations has been more problematic. To facilitate the development of plant cover at higher tidal elevations, selected species were planted in high marsh habitat in January/February 2009 and again in 2016, 2017, and 2018. The performance of the 2009 plantings varied among modules with the best survival and growth occurring in W4/W16, whereas plantings failed to survive in W2/W3. Discussions between Commission staff, contract scientists, and SCE regarding the failure of these plantings and the patchiness of natural plant establishment at these elevations lead to the construction of tidal creek networks and re-grading of some areas of W2/W3 in November 2010 to better deliver tidal waters throughout these modules. Plant establishment improved in areas adjacent to the tidal creeks, but remained sparse at higher elevations that received infrequent tidal inundation. Further discussions between Commission staff, contract scientists, and SCE lead to the re-grading of portions of W2/W3 in March 2014 to lower tidal elevations with more slope to improve the drainage of tidal waters. Natural colonization of pickleweed was observed in the re-graded areas in spring 2015 and 2016 and approximately 40% of W2/3 or 8.2 acres of this module had achieved at least 30% cover in 2018. However, as of 2018, large areas of the overall restoration project remained sparsely vegetated with cover less than the 30% minimum cover required for salt marsh habitat. Evaluation of the success of plantings in 2017 and 2018 is ongoing.

Wetland Acreage and Topography. The SONGS permit required independent monitoring by Commission contract scientists to ensure that the restoration work was conducted according to approved plans. CCC contract scientist surveys indicated that SCE has met the acreage requirement of 150 acres of tidally influenced habitat in 2012 through 2019. Surveys in 2017 and 2018 resulted in a total acreage of 150.05 acres and 149.71 acres of tidally influenced habitat, respectively. The values encompass the required 150-acre requirement within the estimated measurement error of ±0.75 acres over the entire site.

Monitoring Plan

Condition A of the SONGS permit requires that monitoring of the wetland restoration be done for a period of time equivalent to the full operating life of SONGS Units 2 and 3. This monitoring is done to measure compliance of the mitigation project with the performance standards specified in the SONGS permit. In accordance with Condition D (Administrative Structure) of the permit, contract scientists retained by the Executive Director developed the Monitoring Plan to guide the monitoring work and are overseeing the monitoring studies outlined in the Plan. The SONGS permit provides a description of the performance standards and monitoring required for the wetland mitigation project. A Draft Monitoring Plan for the SONGS Wetland Mitigation Program was reviewed by State and Federal agencies and SCE in May 2005. A revised Monitoring Plan was part of the coastal development permit (No. 6-04-88) for the wetland restoration project and was considered and approved by the Commission on October 12,

2005. The Monitoring Plan is a dynamic document that is updated periodically and was most recently updated in August 2018 (http://marinemitigation.msi.ucsb.edu/documents/wetland/ucsb_mm_reports/wetland_mitigation_monitoring_plan_august2018.pdf).

The Monitoring Plan for the SONGS Wetland Mitigation Program closely adheres to the monitoring requirements of the SONGS permit and includes a description of each performance standard and the methods that will be used to determine whether the various performance standards have been met. The performance standards that are being used to measure the success of the wetland restoration project fall into two broad categories. Absolute standards are evaluated only in San Dieguito Wetlands and pertain to topography, tidal prism, habitat areas, reproductive success of salt marsh plants, and exotic species. Relative standards require that the value of the variable of interest be similar to that measured in reference wetlands in the region. The relative standards pertain to water quality (i.e., dissolved oxygen concentration), biological communities (i.e., fish, invertebrates, and birds), salt marsh vegetation, *Spartina* canopy architecture, and food chain support functions. The successful achievement of the relative performance standards is measured in comparison to three reference wetlands, which are specified in the SONGS permit to be: (1) relatively undisturbed, (2) natural tidal wetlands, and (3) within the Southern Bight. The wetlands that best met these three criteria and that were selected as reference sites are Tijuana River Estuary, Mugu Lagoon, and Carpinteria Salt Marsh.

Management issues relevant to the SONGS wetland mitigation requirement are also discussed in the Monitoring Plan. These issues include inlet maintenance, excessive changes in topography, and exotic species. Although the Commission's contract scientists are not responsible for managing the wetland restoration, their monitoring will measure several parameters that can be used in adaptive management to ensure the success of the restoration project.

The SONGS permit requires SCE to develop and implement a plan for managing the inlet in perpetuity to ensure uninterrupted tidal flushing of the restored wetland. This plan, initially submitted to CCC staff on March 30, 2006, revised and finally accepted by the Executive Director on January 27, 2011, provides conditions that would indicate the need for additional maintenance dredging at the inlet. Commission contract scientists are measuring water elevation, tidal exchange, salinity, and dissolved oxygen concentration in the wetland during their evaluation of the water quality performance standard. These variables change dramatically with a reduction in tidal flushing and provide a useful trigger for inlet maintenance.

Results of Wetland Performance Monitoring through 2018

Construction of the wetland habitats in San Dieguito Lagoon was completed in 2011 and annual post-construction monitoring to evaluate whether the restoration meets the performance criteria identified in Condition A of the SONGS permit began in January 2012. The success of the San Dieguito Wetlands in meeting the mitigation requirement for a given year is based on its ability to meet the absolute and relative performance standards contained in the SONGS Permit. In 2013 through 2018, the San Dieguito Wetlands Restoration Project satisfied four of the five absolute standards that pertain to topography, tidal prism, plant reproductive success, and exotic species. The project has yet to meet the habitat areas standard. This standard requires that habitat areas in the Restoration be within 10% of the areas provided in the Final Plan. As of 2018, the restoration project is approximately 33 acres short of the required minimum of 83.3 acres of salt marsh

habitat. The project has also failed to meet the relative standard requirement in 6 out of 7 years. In order for the San Dieguito Wetlands to satisfy the relative standard requirement for a given year, it must meet the same proportion of relative standards as the lowest performing reference wetland. Annual assessment of the relative standards from 2012 through 2018 shows that the restoration project has consistently satisfied performance criteria for standards pertaining to water quality, bird species density and richness, and fish density and species richness in main channel habitat, algal cover, and *Spartina* canopy architecture. The project has consistently failed to meet the performance criteria for relative standards pertaining to vegetation cover and invertebrate density in main channel and tidal creek habitat.

The goal of the restoration project is to achieve not only a minimum of 83.3 acres of salt marsh habitat, but also a high percent cover of vegetation within this habitat similar to the reference wetlands, where vegetation cover is typically greater than 85%. The trajectory of increase in percent cover of vegetation over the past 7 years has been very shallow, with the attainment of only approximately 18 acres of 85% cover as of 2018. Performance monitoring has revealed that as of 2018 there are extensive areas of the project site where the cover of vegetation is sparse and could benefit from intervention to facilitate plant development, including approximately 30 acres in modules W4/16. Approximately 8 acres in modules W2/3 had achieved at least 30% cover in 2018 but 12 acres of sparse vegetation remain, particularly in the middle and eastern end. Without vigorous intervention to increase the cover of vegetation, it is unlikely that the restoration project will meet the habitat areas standard or the relative standard for vegetation cover for many years.

The low densities of invertebrates in tidal creek and main channel habitats relative to the reference sites are of concern. The relative performance standards for invertebrates require that the total densities and number of species (species richness) of invertebrates be similar to the densities and number of species in similar habitats in the reference wetlands. The standard for invertebrate species richness in tidal creeks has been met every year and in main channels every year except 2014. However, the densities of invertebrates in tidal creeks have never been similar to the reference sites, and in main channels, densities have not been similar to the reference wetlands except in 2012. The deficit of invertebrates in San Dieguito Wetlands has contributed to the failure of the restoration project to meet the relative standards for the past five years. Data from performance monitoring have not shown a trajectory of increase in invertebrate density to suggest that this performance standard would be met in the foreseeable future. The reasons for the low densities of invertebrates in tidal creeks and main channels have yet to be identified, but may involve differences between San Dieguito Wetlands and the reference wetlands in sediment properties or tidal creek and channel topography.

As of 2018, the San Dieguito Wetlands Restoration has not earned any mitigation credit for resources lost due to SONGS operations. The slow development of vegetation is responsible for the failure of the restored wetland to meet both the habitat areas standard and the vegetation standard. In an effort to identify why the vegetation has been slow to develop, SCE is collaborating with CCC contract scientists, in consultation with the SAP, to conduct soil and planting experiments that will inform a large scale remediation effort that is likely to be necessary in the future. Results from monitoring in 2017 and 2018 were presented at annual public review workshops held on May 7, 2018 and May 6, 2019 in the City of Del Mar and are

posted on UCSB's SONGS mitigation monitoring website (http://marinemitigation.msi.ucsb.edu/documents/annual_review_workshops/wetland/index.html).

2. Status of Kelp Reef Mitigation

Mitigation Requirement

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 with a standing stock of reef fish that is at least 28 US tons. 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 is 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 mariculture/ marine fish hatchery to provide compensation for resources not replaced by the artificial mitigation reef. The Commission had earlier (in 1993) required SCE to contribute $1.2 million toward construction of an experimental white sea bass fish hatchery. SCE has fully satisfied these requirements; thus, there are no fish hatchery tasks conducted by Commission contract scientists or funded through the Commission's monitoring and oversight program. Permanent Commission staff provides oversight of the California Department of Fish and Wildlife's continuing fish hatchery program.

Planning and Construction of Experimental Reef

Following the Commission's approval of the SONGS permit amendments in April 1997, the permittee submitted a preliminary conceptual plan for the experimental reef in June 1997, which was approved by the Executive Director and forwarded to state and federal agencies for review. As lead agency, the State Lands Commission (SLC) certified the final Programmatic EIR and issued the offshore lease for the experimental reef on June 14, 1999.

The Coastal Commission approved the coastal development permit for the experimental reef on July 15, 1999. The final plan approved by the Commission was for an experimental artificial reef located off San Clemente, which tested eight different reef designs that varied in substrate composition (quarry rock or recycled concrete), substrate coverage (low, medium, and high), and presence of transplanted kelp. All eight reef designs were represented as individual 40 m x 40 m modules that were replicated in seven areas (i.e., blocks) for a total of 56 artificial reef modules totaling 22.4 acres. The U.S. Army Corps of Engineers issued its permit on August 13, 1999, and SCE completed construction of the experimental reef on September 30, 1999.

Monitoring of Experimental Reef

The Commission contract scientists produced a proposed monitoring plan for the experimental reef that was reviewed by SCE, various resource agencies and other technical specialists, and also was included in the draft PEIR for general public review. The Commission approved the proposed monitoring plan for the experimental reef on July 15, 1999.

Five years of post-construction monitoring of the experimental reef were completed in December 2004. Results from the five-year experimental phase of the artificial reef mitigation project were

quite promising in that all six artificial reef designs and all seven locations (i.e., blocks) tested showed a high tendency to meet many of the performance standards established for the mitigation reef. The independent reviewers concluded from these findings that a low relief concrete rubble or quarry rock reef constructed off the coast of San Clemente had a good chance of providing adequate in-kind compensation for the loss of kelp forest biota caused by the operation of SONGS Units 2 and 3.

A final report on all the findings and recommendations gleaned from the experimental phase of the artificial reef project was prepared by contract scientists and submitted to the Executive Director of the Commission on August 1, 2005. These findings and recommendations formed the basis of the Executive Director's determination that: (1) the mitigation reef shall be built of quarry rock or rubble concrete having dimensions and specific gravities that are within the range of the rock and concrete boulders used to construct the SONGS experimental artificial reef; and (2) the percent of the bottom covered by quarry rock or rubble concrete on the mitigation reef should average at least 42%, but no more than 86% (the range of low to high coverage on the experimental reef modules as surveyed by the contract scientists). The Commission concurred with the Executive Director's determination for the type and percent cover of hard substrate on October 12, 2005.

Mitigation Reef Planning and Permitting

On August 8, 2006, the Commission concurred with the Executive Director's determination that SCE's preliminary Phase 2 mitigation reef plan met the requirements of the SONGS permit. The plan called for the addition of 127.6 acres of reef construction to the existing 22.4 acres built in September 1999 for the Phase 1 experimental reef. The project area is located offshore of San Clemente, on a parcel leased from the SLC (SCE has modified its original 862-acre lease to 174.4 acres of mitigation reef). The preliminary design created a low-profile, single-layer reef constructed of quarried boulders and distributed in quantities similar to those of the lowest substrate coverage used for the experimental reef project. The design consisted of 11 polygons that varied in area from 2.4 to 37.5 acres. The reef design achieved the following: (1) locates the final construction site in close proximity to the San Mateo Kelp Bed, (2) avoids hard substrate areas, (3) maintains the integrity of the experimental reef modules, (4) provides for navigation channels, and (5) avoids areas of historical kelp growth as well as areas of special interest to local fisheries. On April 17, 2006 the SLC, acting on a request from SCE, adopted a resolution declaring that the SONGS Mitigation Reef be named in honor of Dr. Wheeler North, a world expert on the biology and ecology of giant kelp forests.

The Commission approved CDP #E-07-010 for the Phase 2 mitigation reef on February 12, 2008 (See Exhibits 3 and 4). See Appendix B for a complete list of specific condition compliance dates.

Reef Construction and Construction Monitoring

Construction of the Phase 2 mitigation reef began on June 9, 2008 and was completed on September 11, 2008. The Phase 2 reef was designed as 18 polygons ranging in area from 1.35 to 38.88 acres for a total reef area of 153 acres. Approximately 126,000 tons of boulder-size quarry material was used to construct the reef. Quarry boulders obtained from the Pebbly Beach and Empire quarries on Catalina Island and the La Piedra quarry in Ensenada, Mexico were the exclusive construction material. Boulder dimensions averaged 2.3 ft in length, 1.8 ft in width,

and 1.4 ft in height. The boulders were hauled to the construction site by barge and precisely cast upon the seafloor within the described boundaries of each polygon in roughly a single-layer. The variation of boulder deposition per polygon ranged from 743 to 987 tons per acre with an average of 829 tons per acre.

The siting of each polygon within the lease site was based on avoiding the historical distributions of giant kelp as determined from aerial surveys and the existing distribution of hard substrate (which included natural rock and the Phase 1 modules) as determined from multi-beam sonar surveys and sub-bottom profiling. The distribution of hard substrate detected by the acoustical surveys was verified by dive surveys. Additionally, the dive surveys evaluated the biological diversity of the lease area. The design also considered the historical, physical, and biological data collected during previous studies in the area and the results of the monitoring of the Phase1 Experimental Reef between 1999 and 2004.

The Phase 2 reef construction achieved the following desired objectives: (1) all polygons were built in close proximity to the San Mateo Kelp Bed; (2) all polygons avoided existing hard substrate areas that had historical presence of kelp; (3) the integrity of the Phase 1 Experimental Reef modules was maintained; (4) navigation channels were provided in response to concerns raised by fisherman; and (5) all constructed reef polygons avoided areas of historical kelp growth, existing areas of hard substrate, and areas of special interest to local fisheries.

Assessment of Substrate Coverage. The SONGS permit (CDP No. 6-81-330) requires that the coverage of quarry rock in the Phase 2 reef be between 42% and 86%. Commission contract scientists were charged with measuring the percentage of the seafloor covered by quarry rock in each polygon. Survey results showed that percent cover of the seafloor covered by quarry boulders ranged from 33.7% to 65.5% on the 18 polygons with an overall average of 40.8% for the entire 152-acre Phase 2 reef, which was below the required range of 42% to 86%. However, the combined area of the Phase 1 and Phase 2 reefs (which collectively is officially known as the Wheeler North Reef) totaled 176 acres, which exceeds the minimum 150-acre requirement in the SONGS CDP. Therefore, when the portions of the Phase 2 reef that did not meet the hard substrate coverage requirement (polygon 5 and the north-western section of polygon 7) were excluded from being counted toward the overall acreage requirement, the Phase 2 reef totaled 130 acres with a mean rock coverage of 42.3%. The combined total of the 130 acres of the Phase 2 reef and the 22.4-acre Phase 1 experimental reef met the minimum requirements for area (150 acres) and coverage (42%).

Monitoring Plan

The SONGS permit requires the Wheeler North Reef to be monitored, managed, and, if necessary, remediated upon the completion of its construction. The purpose of the mitigation monitoring program, conducted by independent contract scientists working for the Commission, is to: (1) determine whether the performance standards established for the mitigation reef are met, (2) determine, if necessary, the reasons why any performance standard has not been met, and (3) develop recommendations for appropriate remedial measures. The SONGS coastal development permit requires the Commission's contract scientists to develop a monitoring plan for the reef mitigation project that describes the sampling methodology, analytical techniques and methods for measuring performance of the mitigation reef relative to the performance standards identified in the SONGS coastal development permit. UCSB scientists working under contract for the Commission submitted a monitoring plan for the SONGS' reef mitigation project

to the Commission on September 27, 2007. The monitoring plan contains: (1) a description of the process used to evaluate condition compliance, including a list of the performance standards by which the Wheeler North Reef will be judged and the general approach that will be used to judge the overall success of the mitigation project, (2) descriptions of the specific sampling methods and analyses used to evaluate each of the performance standards, (3) an explanation of how project data will be managed and archived for future use, and (4) a description of how the results from the monitoring program will be disseminated to the Commission, the applicant, and all other interested parties. The Monitoring Plan for the SONGS' Reef Mitigation Project is a dynamic document that is modified as needed to ensure and maintain rigorous monitoring and evaluation of Condition C in the most cost-effective manner possible. The reef monitoring plan was most recently updated in April 2017 to include general modifications to how the performance standards are evaluated (http://marinemitigation.msi.ucsb.edu/documents/artificial_reef/ucsb_%20mm_reports/mitigation_phase/monitoring_plan4reef-mitigation_project_rev_apr2017.pdf).

Results of Reef Performance Monitoring through 2018

Concurrent monitoring of physical and biological attributes of the Wheeler North Reef and two reference reefs (San Mateo and Barn) is conducted annually to evaluate whether the Wheeler North Reef meets the performance criteria identified in Condition C. To date, Commission contract scientists have completed annual quantitative underwater surveys of all three reefs for 2009 -2018. Results from the 2018 surveys were reported at the annual public review workshops held in Dana Point, CA in April 2019 and are available at http://marinemitigation.msi.ucsb.edu/documents/annual_review_workshops/artificial_reef/index.html.

Monitoring results obtained thus far have been mixed, with Wheeler North Reef consistently meeting many of its objectives, but failing to meet others. Notably, the biological community on the Wheeler North Reef has consistently met as many or more of the relative performance standards pertaining to the kelp forest community as the reference reefs implying that the Wheeler North Reef is functioning like a natural reef. However, the success of the Wheeler North Reef is also assessed on its ability to meet all four absolute performance standards. From 2016-2018 the Wheeler North Reef failed to meet the absolute performance standard requiring it to sustain 150 acres of adult giant kelp, though it consistently met this standard from 2010 - 2015. The recent failure of the Wheeler North Reef to meet the standard for giant kelp coincided with a sustained period of anomalously warm water that adversely affected the growth, recruitment and survivorship of giant kelp throughout southern California. Of greater concern is the consistent failure of the Wheeler North Reef to meet the absolute standard that requires it to support a fish standing stock of at least 28 tons. As of 2018 the Wheeler North Reef had not earned any mitigation credit for compensating the kelp forest resources lost due to SONGS operations, largely because it has never supported a fish standing stock of 28 tons. More complete information on monitoring results pertaining to fish standing stock and the other performance standards can be found in the annual reports on SONGS kelp reef mitigation available at: http://marinemitigation.msi.ucsb.edu/documents/artificial_reef/index.html.

As required by the permit, the UCSB contract scientists, in consultation with Commission staff and the SAP, conducted additional analyses using longer-term data collected from the reference sites and the experimental Phase 1 modules to determine why the Wheeler North Reef was not meeting the fish standing stock standard and what remediation was necessary to bring the reef

into compliance. The results of these analyses showed that at the current coverage of rock (an average of 48%), the 174-acre reef is too small to support the required 28 tons of fish. Based on these results on May 24, 2016, the Commission's Executive Director informed SCE that to comply with the requirements of CDP 6-81-330-A, they must remediate Wheeler North Reef by building new reef acreage that meets minimum size, relief and rock cover requirements (described in detail in the letter).

Commission staff, the contract scientists and SAP worked with SCE to develop a reef remediation project that enables the Wheeler North Reef to consistently meet all the requirements of the SONGS permit. The contract scientists and SAP modeled existing data to develop combinations of reef area and rock coverage, that when added to the existing 174-acre Wheeler North Reef, would have a 95% probability of supporting 28 tons of fish and 150 acres of kelp in any given year. In March 2019 the Commission approved SCE's CDP application for the construction of a Phase III remediation reef having a design based on these modeling results. The Commission also approved the staff's recommendation to assign mitigation credit for the fish standing stock and kelp area performance standards on a cumulative basis rather than an annual basis. This decision was based on the high level of confidence that the approved remediation reef will consistently meet these performance standards.

The remediation approved for the SONGS reef mitigation project involves expanding the existing Wheeler North Reef by creating up to 210.6 additional acres of low-relief kelp reef using up to 175,000 tons of quarried rock in 22 new polygons. Quarry rock will be placed in sandy habitat devoid of rock at water depths ranging from 28 to 49 feet to achieve a reef with low rock coverage (42 percent at 790 tons per acres) and low relief (< 3 feet in height). The thickness of the sand layer covering the bottom within each the polygons is less than 2.3 feet (±20 percent) to minimize the potential that newly placed rock will sink below the surface of the sand. All rock used for the reef expansion meets the California Department of Fish and Wildlife Material Specification Guidelines for artificial reefs, which include specifications for the physical and chemical properties of the reef material. Construction is planned for the summers of 2019 and 2020 using methods similar to those used for the construction of Phase II of Wheeler North Reef.

3. Status of Fish Behavioral Mitigation

Mitigation Requirement

Condition B of the SONGS permit requires SCE to install and maintain behavioral barrier devices at SONGS Units 2 and 3 to reduce fish impingement losses.

Fish Behavioral Mitigation Compliance

The impact studies for the operation of SONGS Units 2 and 3 conducted between 1983 and 1991 found that annual losses of juvenile and adult fish in the cooling water systems under normal operations averaged about 20 metric tons. Although the SONGS permit does not specify any criteria for evaluating the effectiveness of these devices, the Commission accepted the studies' recommendation that "the techniques" (behavioral barrier devices) "be tested on an experimental basis, and implemented if they reduce impingement by at least 2 metric tons (MT) per year", which is equivalent to at least 10% of the average loss due to impingement (Section IV– Proposed Findings and Declarations in the SONGS 1991 permit). 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 of the cooling water intake systems of Units 2 and 3 (called the fish chase procedure), which can result in a considerable reduction in fish impingement.

In October 2000, the Commission reviewed the results of the experiments and concluded that no further testing of alternative behavioral barriers should be required at that time, provided that: (1) SCE continues to adhere to the operating, monitoring, and reporting procedures for the 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. (See staff report entitled *Executive Director's Determination that Fish Behavioral Barriers Tested at SONGS are Ineffective,* dated September 22, 2000.)

The contract scientists and staff reviewed the annual data and analyses on the fish chase procedure at SONGS against two key standards discussed in the staff report:

(1) The **Fish Return Standard**: This standard is a measure of the effectiveness of the Fish Chase procedure used during heat treatments. This procedure can lead to a reduction in impingement by causing fish that would be impinged to be returned to the ocean by means of the fish return system. The standard is that the return should be at least 10% of the overall impingement biomass for the year.

(2) The **Mortality Standard**: There should not be higher than normal mortality. Higher than normal mortality is defined as: (1) a sequence of three or more heat treatments where the mortality rate exceeds 50%, (2) more than 50% of heat treatments in a given year have more than a 50% mortality rate, or (3) mortality rate for the year exceeds 50%.

Between 2000 and 2011, the fish chase Procedure effectiveness relative to impingement (Fish Return Standard) was 10% or greater in only 7 of the 12 years, and the Mortality was met in only 5 of those years (2000-2011). There were only 4 years in which both standards were met.

In January 2012, normal operations of SONGS Units 2 and 3 were shut down, one unit due to routine maintenance, the other due to the discovery of a leak inside its steam generator. With the units shutdown and thus, not generating heat, SCE was unable to implement the fish chase procedure. However, shutting down SONGS Units 2 and 3 led to a significant decrease in both the intake flow rate (~96%) and velocity (~94%). In 2013, this reduction translated into reductions in the total abundance (~69%) and biomass (~94%) of fish impinged at SONGS that were significantly larger than the 10% reduction required by the Fish Return Standard in the Executive Director's 2000 determination.

With SCE's June 2013 announcement that SONGS would be permanently decommissioned, the reduction in intake volume and velocity reported in 2013 is expected to be a permanent project feature, until such time as SONGS is fully decommissioned and seawater is no longer needed. Thus, as long as these intake reductions remain in place, the abundance and biomass of fish impinged by SONGS is expected to continue to be significantly lower than the long-term average measured between 1983 and 2011. Based on this information, Commission staff notified SCE in a letter dated March 27, 2015 that with the shutdown of Units 2 and 3 and the resulting decreases in intake flow and velocity and fish impingement, SCE had met the intent and requirements of

Special Condition B and the Executive Director's determination regarding behavioral barriers at SONGS. As long as the reductions in intake flows are maintained, SCE is no longer required to conduct heat treatments or monitor and report on the efficacy of the Fish Chase Procedure. However, if the total intake flow increases above a monthly average of 50 MGD and/or the instantaneous flow velocity increases above 0.5 feet per second[1], SCE is required to consult with Commission staff to determine if impingement monitoring and reporting should resume.

4. Status of Hatchery Program

Permit Requirement

In two separate permit actions in 1993 and 1997, the Commission required the permittee to contribute to the California Department of Fish and Wildlife's (CDFW) (formerly, Dept. Fish & Game) Ocean Resources Enhancement and Hatchery Program (OREHP) for a total required mitigation fee of $4.8 million to be used toward the construction of an experimental white seabass fish hatchery and an evaluation program to determine if the hatchery is effective at increasing the stock of white seabass. SCE has fulfilled all of its obligations for funding the fish hatchery requirements of the SONGS permit. Permanent Commission staff provides oversight of the CDFW's continuing fish hatchery program.

California Department of Fish and Wildlife Hatchery Program

The marine fish hatchery program is operated by Hubbs Sea World Research Institute and the State of California through the Ocean Resources Enhancement and Hatchery Program (OREHP), which is administered by the CDFW. Although the SONGS' mitigation funds were exhausted at the end of the 2004-2005 fiscal year, the OREHP program is ongoing and funded primarily through the sale of recreational fishing licenses in southern California. White seabass are spawned at a hatchery in Carlsbad operated by the Hubbs-Sea World Research Institute and then tagged and transferred to grow-out facilities operated jointly by the CDFW and volunteer fishermen. After the fish attain a minimum length, they are released. The OREHP is currently authorized to release up to 350,000 fish annually, based on the active broodstock population at the hatchery. The OREHP operates under the terms and conditions of numerous state, local, and federal permits and authorizations. These include a Memorandum of Agreement among the CDFW, Commission, and OREHP's Scientific Advisory Panel.

Review of the hatchery program is conducted by permanent Coastal Commission staff thus, there are no tasks funded through the SONGS work program.

5. Audit of the SONGS Mitigation Monitoring Data Management System (DMS)

When the SONGS Mitigation Monitoring Project first began, the data management consisted of a handful of spreadsheets stored on a personal computer. Quality Assurance and Quality Control (QA/QC) procedures were completely manual, and data was shared by copying spreadsheets onto a removable media disk and delivering it to the end-user. Since then, the system has evolved into a customized transaction-capable Relational Database Management System (RDBMS) environment with a web based interface that allows multiple project members to enter, store, and

[1] These thresholds align with thresholds developed by the State Water Resources Control Board under the 2014 Once-Through Cooling Water Policy that allow an existing power plant to demonstrate compliance with the policy under Track 1, indicating that flow reductions in place are sufficient and additional monitoring is not required.

analyze data in a centralized system capable of running a multitude of QA/QC procedures. Although the RDBMS and associated Information Technology (IT) infrastructure offers many benefits, including reliability and redundancy, it is also complex and its full architecture is not well understood by the majority of the project staff scientists, most of whom are trained in field biology, but not IT or software development.

To determine if adequate documentation for the SONGS Mitigation Monitoring Project's RDBMS and data processing pipeline and IT infrastructure is sufficient to allow a third-party individual or individuals with comprehensive knowledge of relational databases, statistical programming and IT services to efficiently execute and support the RDBMS and data processing tasks required for the SONGS Mitigation Project, two database audits were conducted in 2018 and 2019. The first audit, conducted by Daren Eiri in November 2018, focused on the DMS and included: (1) locating and accessing project resources including source code repositories, network file shares, and application, web, and database servers, (2) retrieving digital assets from the system including media files, reports, backups, and source code, (3) generating annual values used to evaluate the SONGS mitigation performance standards utilizing the project's statistical analysis pipeline software, (4) executing QA/QC batch jobs, and (5) executing ad-hoc statistical summaries. Upon completion of his review, Mr. Eiri submitted a report on November 23, 2018 that recommended a few major changes and some minor changes to the DMS Manual. Mr Eiri found that provided his recommendations were implemented, the DMS Manual would be "sufficient in detail for a third-party individual to continue supporting the needs of the SONGS mitigation project". Mr. David Huang, the SONGS project's Director of Computing has implemented both the major and minor changes to the DMS Manual that Mr. Eiri recommended.

The second audit, conducted in June 2019 by James Woods focused on the IT infrastructure itself. Specifically, Mr. Woods evaluated documentation for the following network devices and services: (1) physical and virtual servers, (2) network storage including Storage Area Network (SAN) and Network Attached Storage (NAS), (3) infrastructure devices including switches, gateways, and routers, (4) Relational Database Management System (RDBMS) services, (5) web services, and (6) network services including Domain Name System (DNS) resolution and Dynamic Host Configuration Protocol Daemon (DHCPD). Like Mr. Eiri, Mr. Woods recommended a handful of major changes and some additional minor changes to the ITS Data Center Manual. Mr. Woods also concluded that once the changes were implemented, the ITS Data Center documentation would be sufficiently detailed for a third-party individual to continue supporting the needs of the SONGS mitigation monitoring project. Mr. Huang has implemented both the major and minor changes to the ITS Data Center Manual that Mr. Woods recommended.

D. WORK PROGRAM: 2020 AND 2021

Condition D requires the permittee to fund scientific and support staff retained by the Commission to oversee the site assessments, project design and implementation, and monitoring activities for the mitigation projects.

Implementation Structure

Scientific expertise is provided to the Commission by a small technical oversight team hired under contract. The technical oversight team members include three Principal Scientists from UC

Santa Barbara: Stephen Schroeter, Ph.D., marine ecologist, Mark Page, Ph.D., wetlands ecologist (50%), and Daniel Reed, Ph.D., kelp forest ecologist (43%). A part-time senior administrator (Lane Yee) completes the technical oversight team. In addition, a science advisory panel advises the Commission on the design, implementation, monitoring, and remediation of the mitigation projects. Current science advisory panel members include Richard Ambrose, Ph.D., Professor, UCLA, Peter Raimondi, Ph.D., Professor, UC Santa Cruz, and Russell Schmitt, Ph.D., Professor, UC Santa Barbara.

To meet the goals specified in the permit under Condition D and to complete the tasks identified in the 2020-2021 work program, the technical oversight team is aided by contract staff biologists who are responsible for collecting and assembling the monitoring data. The technical oversight team is also assisted on occasion by independent consultants and subcontractors when expertise for specific tasks is needed or when additional field assistance is needed for monitoring tasks. The Commission's permanent staff also spends a portion of their time on this program, but except for direct travel reimbursements, their costs are paid by the Commission and are not included in the SONGS budget.

The staff implements the Commission's technical oversight and independent monitoring program through a contract with the University of California, Santa Barbara. UCSB has an international reputation for excellence in ecology and marine biology and is well equipped to support extramural contracts and grants in these areas. The UCSB contract uses the existing Principal Scientists as project managers for both the wetland restoration and reef mitigation oversight and independent monitoring, with data collection done by the university contract staff biologists under their direction. The Principal Scientists are responsible for supervising the contract staff biologists, subcontractors and consultants, authorizing purchases, interacting with UC administrative staff on issues pertaining to personnel, budget, and UC policies (e.g., boating and diving safety regulations) relevant to the project, and interacting with Commission staff assigned to the mitigation efforts. Monitoring of these projects is being adaptively managed in order to streamline effort and minimize costs without compromising the integrity of the data and their value in decision making with regards to the performance of the mitigation projects. Continuous interaction between the Principal Scientists and contract staff biologists is crucial to fulfilling the monitoring tasks for both the wetland restoration and mitigation reef.

Before starting the five-year Phase I Experimental Reef monitoring program in 1999, Commission staff conducted a cost comparison among UCSB, other universities, and private consultants and concluded that use of a qualified university would save SCE a substantial sum over the use of private consultants. Based on 1995 real cost data from private consultants for work that included the same physical and biological variables used in the SONGS reef monitoring program, costs for private consultants were nearly three times higher than the cost of implementing the monitoring program through UCSB.

The Commission concurred with staff at the start of the monitoring program and continues to find that implementing the field monitoring programs through a contract with UCSB is the most efficient, cost-effective, scientifically rigorous, and timely method of achieving the goals of the independent monitoring required by the SONGS permit.

Staffing Levels for Wetland Performance Monitoring

Staff has determined the staffing levels for the wetland monitoring tasks based on a consideration of the effort (time) involved to complete each task, location of the task (field sites, laboratory), the number of contract staff biologists required to complete each task in a timely and efficient manner, the frequency with which each task will be performed, and the expertise required to complete the task. Much of the information used to determine staffing level was developed during pre-restoration monitoring at San Dieguito Lagoon and the reference wetlands (Tijuana Estuary, Mugu Lagoon, Carpinteria Salt Marsh) and during pre-construction and construction monitoring.

During 2020-2021 the Principal Scientists will be assisted in performance monitoring of the wetland by a UCSB team of seven field biologists, one data scientist and one database programmer/systems analyst. Four of the field biologists will work 100% time on the wetland, three of the field biologists and the data scientist will split their time and work 50% on the wetland and 50% on the reef, and the database programmer/systems analyst will devote 30% time to the wetland. One of the full time field biologists will work with the data scientist in managing and analyzing the data and the database programmer to develop the web based wetland database. This person will also assist the Principal Scientists with the supervision of project staff, and with the scheduling of monitoring activities. The six other wetland field biologists will be responsible for: (1) performance monitoring at the San Dieguito Lagoon and the three reference wetlands including the fabrication and maintenance of sampling devices and equipment, (2) setting up and monitoring experiments and other studies described in Section C.1, (3) data entry, (4) assisting in the development of data entry schemes, quality assurance and quality control procedures and (5) assembling field sampling protocols, documenting metadata, and creating database user guides

Temporary employees are used to provide cost-effective assistance with the labor-intensive sampling surveys of fish and macro-invertebrates in the restored and reference wetlands. These are lower level field assistants, some may be university students who provide logistical support with transporting gear in the wetlands, deploying and retrieving nets during sampling, collecting invertebrate samples, and recording data. Based on monitoring completed to date, the Principal Scientists have determined that a total of six temporary field assistants are the optimal number needed to sample fish and invertebrates concurrently in the restored wetland at San Dieguito and the three reference wetlands.

The staffing plan described above has been carefully thought out using information obtained from prior monitoring, and vetted through the Science Advisory Panel and Coastal Commission staff, as the minimum level needed to meet the monitoring requirements for the wetland mitigation as specified in the SONGS CDP. It is designed to minimize the time between sample collection, sample processing, and data analysis and preservation, so that the monitoring results can be completed and reported in a timely manner. Importantly, the wetland staff are highly qualified scientists who collectively are capable of performing all the technical and scientific aspects of the monitoring program.

Staffing Levels for Reef Performance Monitoring

A team of marine biologists employed by UCSB assists the Principal Scientists in monitoring the performance of the Wheeler North Reef. Staff has determined that 8 university-certified scientific divers are required to complete the reef monitoring tasks. This determination is based on a number of considerations. First, university and industry accepted standards require that diving be done in pairs. Because most kelp forest organisms show substantial seasonal variation in recruitment, growth and overall abundance, data need to be collected at the mitigation reef and the two reference reefs contemporaneously during June through October each year. This, coupled with the often-marginal diving conditions typical of the project site, prevents using fewer divers over a longer period of time. Second, safe diving practices limit the amount of time divers are able to spend underwater on a given day and the number of days diving in any given week. Third, university-trained research divers can more cost-effectively accommodate the inevitable unforeseen contingencies caused by weather or logistical constraints that arise during the course of the monitoring work than can part time employees. Fourth, completion of the field work requires a substantial level of expertise and training. UCSB's project staff biologists are trained in identifying over 200 species of benthic algae and invertebrates and some 45 species of kelp forest fishes, which is needed to properly evaluate the performance standards for the artificial reef.

The monitoring team of eight scientific divers consists of five permanent staff and three temporary employees. The team is led by Mr. David Huang who will devote 40% of his time supervising the diving field work; he spends the other 60 % of his time serving as the database programmer/systems analyst for the wetland and reef projects. One of the permanent staff will work 100% time on the reef mitigation while the other three permanent staff will split their time working 50% on the reef and 50% on the wetland. In addition to being experts in scientific diving and data collection, the project's research divers are trained in a number of other tasks necessary for completing the monitoring requirements of the mitigation projects. These tasks include: (1) data entry, (2) assisting in the development of data entry schemes, quality assurance and quality control procedures, (3) developing field sampling protocols, documenting metadata, and creating database user guides, (4) equipment repair and maintenance, and (5) other assorted tasks needed to maintain a functional working environment. The temporary employees serve as scientific divers during the 5-month field season. These are lower level field biologists who are certified by the UCSB to dive and drive the boats, which is especially critical during the fish surveys as the diving teams complete multiple short dives without having to anchor the boat at each location. A data scientist devoting 50% on their time managing and analyzing reef data rounds out the staffing for the reef in 2020-2021.

The staffing for reef performance monitoring described above is predicated on meeting the monitoring requirements specified in the SONGS CDP and is based on considerable experience gained from monitoring the 5-year Phase I experimental reef and monitoring the first 11 years of of the Phase II mitigation reef. It represents a carefully thought out minimum staffing model to accomplish the performance monitoring tasks for Condition C for 2020 and 2021.

Consultation with Permittee

Pursuant to the permit conditions, Commission staff has consulted with SCE on the proposed work program and budget for 2020 and 2021. Following consultation on the work tasks, SCE indicated its agreement with the proposed Commission oversight and independent monitoring

work plan and budget for the wetland, reef and fish behavioral mitigation for 2020-2021. SCE's letter of support is attached.

1. Wetlands Tasks

The SONGS permit requires independent monitoring by Commission contract scientists to determine whether the physical and biological performance standards of Condition A are met. To accomplish this task, the Principal Scientists will continue to interact closely with SCE and others involved with implementation of the Final Plan.

The following wetland tasks will be completed during the 2020-2021 work period.

1.1 Performance Monitoring of the Restored Wetland

The SONGS permit requires the Commission's independent contract scientists to design and conduct monitoring of the restored wetland to: (1) evaluate compliance of the wetland with the physical and biological performance standards set forth in Condition A, (2) determine, if necessary, the reasons why any performance standard has not been met, and (3) develop recommendations for appropriate remedial measures. The primary monitoring activities planned for 2020-21 entail collecting data that will be used to evaluate the performance of the restored wetland. The particular monitoring activities needed to accomplish this task are specified in the Monitoring Plan for the SONGS Wetland Mitigation Program (http://marinemitigation.msi.ucsb.edu/documents/wetland/ucsb_mm_reports/wetland_mitigation_monitoring_plan_august2018.pdf). Wetland construction was completed upon the opening of the inlet on September 29, 2011 and performance monitoring of the wetland began in January 2012. Wetland performance monitoring for 2020-2021 includes the following:

a. Conduct field surveys and use aerial photographs to assess the performance standards pertaining to topography and habitat areas.

Observations by the Principal Scientists during construction monitoring indicate that noticeable sediment erosion and deposition can occur within a period of a few months. Therefore, field observational surveys will be done monthly throughout the restored San Dieguito wetland to monitor for any sign of substantial erosion or sediment deposition that could impede tidal flow within the wetland. Additional surveys will be done following extreme weather events. Annual ground surveys using RTK GPS and low level aerial photographs taken in the spring will be used to determine whether the areas of planned wetland habitats (subtidal, intertidal mudflat, vegetated marsh) have changed from areas specified in the Final Plan. Commission staff has defined 4.5' NGVD as the upper limit of tidally influenced habitat for the calculation of acreage credit for this restoration project. Because of this, the upper edge of the 4.5' contour is of special interest and will be checked annually to evaluate compliance with the acreage requirement and performance standard on habitat areas. Professional surveyors will be engaged as needed to assist in this evaluation.

b. Conduct field sampling and use environmental data loggers to assess the performance standards pertaining to water quality and tidal prism.

Because of its documented importance to wetland health, the concentration of dissolved oxygen will be used to evaluate water quality within the restored wetland. Measurements of dissolved oxygen will be made using continuously recording environmental data loggers deployed in the restored and reference wetlands at sites that encompass average conditions. A reduction in the tidal prism of the restored wetland can have detrimental effects on water quality and alter the area of inundated habitat. Tidal prism will be calculated by integrating measurements of tidal flow taken near the inlet using a portable Acoustic Doppler Current Profiler/discharge measurement system over a range of predicted tides twice monthly.

c. Survey fish, macroinvertebrates, and birds to assess the performance standards pertaining to biological communities and food chain support.

During pre-restoration monitoring, the Principal Scientists developed and refined methods to sample fish and macroinvertebrates. These methods were published in the scientific literature and are being used to evaluate the performance standards pertaining to biological communities. Sampling fish in the restored and reference wetlands, in particular, is a labor intensive task that requires the employment of temporary field assistants to help with enclosure trap and seine sampling during the summer. The methods developed for fish sampling employ the minimum number of personnel for completing the task and a sampling design that balances the conflicting goals of adequate spatial and temporal sample replication to evaluate wetland performance with the time, cost and impacts of sampling in the restored and reference wetlands. The performance standard pertaining to food chain support will be evaluated by measuring bird feeding activity during the same period that bird densities are measured, and using bird species that are present in both restored and reference wetlands.

d. Use aerial photographs and ground surveys to assess the performance standards pertaining to the cover of wetland vegetation and open space and the coverage of algal mats.

The use of low-level multi-spectral aerial photography provides a means of obtaining a whole wetland estimate of the cover of vegetation, bare space and macroalgae in the restored and reference wetlands. Multi-spectral photographs also allow the identification of plant species assemblages throughout the wetlands, which is useful in locating the presence of exotic species. Aerial photographs will be taken in the restored and reference wetlands in late spring to early summer, which is the period of maximum growth of marsh plants and algae. Ground surveys for the presence of unusually thick algal mats, which typically indicates poor tidal flushing or excessive nutrient enrichment, will also be made during routine water quality monitoring.

e. Assess the performance standard pertaining to Spartina *canopy architecture.*

This task will be accomplished through the measurement of the height of cordgrass (*Spartina foliosa*) stems in sampling quadrats located in stands of cordgrass. Sampling

of cordgrass will be done in late spring to early summer concurrently with the monitoring of wetland vegetation.

f. Sample seeds of salt marsh plants to evaluate the performance standard pertaining to the reproductive success of these plants.

The reproductive success of salt marsh plants will be evaluated by measuring seed set in seven plant species in the restored wetland. Sampling will be done annually in late summer-fall when seed set is expected to be greatest.

g. Examine monitoring data and conduct a survey to assess the performance standard pertaining to exotic species.

Monitoring data collected for fish, invertebrates, birds, and plants will be used to evaluate this standard. In addition, a special survey of exotic species that covers as much of the restored wetland as possible will be conducted once a year during the summer to adaptively manage for exotic species. This special survey will focus on plants and visible invertebrates and incorporate a diver survey of the subtidal portion of the main basin (W1, Exhibit 2).

1. 2 Monitoring of Mitigation for Construction Impacts

a. Conduct surveys to determine the acreage of transition habitat that may be used to mitigate for impacts to seasonal salt marsh caused by construction

Areas between elevations of greater than 4.5’ to 5.0’ NGVD are defined in the Final Restoration Plan (SCE 2005) as a transitional habitat between tidal wetlands and non-tidal or seasonal wetland habitats. In accordance with CDP 6-04-088 data on native vegetation type and cover will be collected in transitional habitat areas annually and compared to reference site data to determine, how much of the transitional habitat acreage can be used to offset impacts to seasonal salt marsh that occurred during wetland construction.

1.3 Studies to Inform the Remediation of Vegetation Cover and Invertebrate Density

a. Vegetation cover

Large areas of the restoration project remain sparsely vegetated with cover less than 30%, the minimum cover classified as salt marsh habitat. Furthermore, the goal of the restoration project is not only to achieve the minimum acres of salt marsh habitat, but to attain a high cover of vegetation similar to the reference wetlands. A number of planting efforts have been undertaken, but with generally poor outcomes.

Studies will be undertaken to determine the reasons behind the poor performance of planted vegetation. These studies will include experiments to evaluate the necessity of irrigation at lower elevations that receive greater tidal inundation, the effects of irrigation on natural recruitment, the effects of withdrawal of irrigation following plant establishment, planting at higher densities to increase the rate of plant cover, and the analysis of soil properties considered important in affecting plant establishment. The

effects of experimental treatments on plant performance will be monitored using photography and aerial imagery collected using a drone. Contract scientists will be assisted in this task by a subcontractor from UCLA with expertise in the acquisition and analysis of drone imagery.

b. Invertebrate density

The density of invertebrates in tidal creeks in San Dieguito Wetlands has never been similar to the reference sites, and in main channels, densities have not been similar to the reference wetlands except in 2012. Small invertebrates are an important food of wetland fish and birds and play an important role in biogeochemical processes in wetlands including sediment aeration and the mineralization of organic matter. The deficit of invertebrates in San Dieguito Wetlands has contributed to the failure of the restoration project to meet the relative standards for the past five years. Data from performance monitoring have not shown a trajectory of increase in invertebrate density to suggest that this performance standard would be met in the foreseeable future. Studies will be undertaken to explore the reasons for the low densities of invertebrates in San Dieguito Wetlands relative to the reference wetlands, which may involve differences between these wetlands in sediment properties, or tidal creek and channel topography, including tidal elevation.

2. Reef Tasks

The permit requires the Commission's contract scientists to monitor the mitigation reef to determine whether: (1) the performance standards of Condition C are met, (2) if necessary, determine the reasons why any performance standard has not been met, and (3) develop recommendations for appropriate remedial measures. Thus the primary monitoring activities planned for 2020 and 2021 entail collecting data that will be used to evaluate the performance of the mitigation reef. The particular monitoring activities needed to accomplish this task are specified in the Monitoring Plan for the SONGS Reef Mitigation Project (http://marinemitigation.msi.ucsb.edu/documents/artificial_reef/ucsb_%20mm_reports/mitigation_phase/monitoring_plan4reef-mitigation_project_rev_apr2017.pdf) . Data management, analysis and reporting, network administration, equipment repair and maintenance, planning and preparation for the annual workshop required by the SONGS permit, and other assorted tasks needed to maintain a functional working environment are the primary staff activities during the non-field season.

The following tasks pertaining to the mitigation reef will be completed during the 2020-2021 work period.

2.1 Performance Monitoring of the Wheeler North Reef

a. Conduct diver surveys of the Wheeler North Reef and the two reference reefs in late spring through summer of 2020 and 2021 to assess the performance standards pertaining to substrate coverage, kelp area and the benthic community of algae and invertebrates.

Extensive analyses of data collected during the experimental phase of the reef mitigation project showed that a minimum of 82 sampling stations at the two reference reefs was needed to adequately assess whether the Wheeler North Reef was performing similarly to them with respect to the performance standards identified in Condition C. A slightly higher number of sampling stations (92) are needed to sufficiently characterize the physical and biological characteristics of the 174 acre Wheeler North Reef in order to compare it to the reference reefs. Each sampling station requires a team of 2 to 3 divers who can sample at most 2 stations per day.

b. *Conduct diver surveys of the Wheeler North Reef and the two reference reefs in summer and autumn 2020 and 2021 to assess the performance standards pertaining to the standing stock, density, species richness, and recruitment of kelp bed fishes.*

Unlike kelp and benthic invertebrates, fish are highly mobile visual predators and their abundances as estimated by divers typically vary dramatically in space and time. Diver sampling of mobile fishes is also complicated by the fact that it requires greater underwater visibility than does the sampling of sessile bottom-dwelling algae and invertebrates. Consequently, it is not always possible to collect data on fish during the diver surveys of the kelp forest community (described in 2.1.a above). Past experience has shown that the combination of these factors requires additional fish surveys be done in summer and autumn to obtain sufficient data to properly evaluate the performance standards for fish standing stock, density, species richness, and recruitment.

c. *Collect fish specimens during the spawning seasons (May-October) of 2020 and 2021 for use in evaluating the performance standards for fish production, fish reproductive rates, and benthic food chain support.*

Unlike the performance standards pertaining to the abundance and number of species of algae, invertebrates and fish, which can be assessed visually by divers, those pertaining to fish production, reproductive rates and food chain support require fish to be collected for processing and analyses in the laboratory. Five key indicator species were selected to evaluate these standards to minimize impacts to the fish assemblages. Data collected during previous work plans determined that 75-150 individuals of each species collected from each reef are needed to properly evaluate these standards. These collections will have little impact on fish populations as they represent < 1% of the standing stock of these species on each of the reference reefs and ~ 0.5% of the standing stock requirement for the Wheeler North Reef. The Principal Scientists will be assisted by subcontractors from California State University, Northridge (CSUN) with expertise in fish production and reproduction.

d. *Process samples used to evaluate the performance standards for fish production, fish reproductive rates, and benthic food chain support.*

Collected specimens must be carefully processed in the laboratory shortly after collection to obtain viable samples for evaluating the performance standards pertaining

to fish production, reproductive rates and benthic food chain support. The Principal Scientists will be assisted by subcontractors from CSUN with expertise in fish production and reproduction.

e. Analyze prepared samples for fish growth, fecundity, and gut fullness.

Estimates of fish growth will be used to evaluate the fish production standard. These estimates will be obtained using standard methods of analyzing annular rings in fish ear bones (otoliths). Histological analyses of female gonads will be used to evaluate the performance standard pertaining to reproductive rates, and data on gut fullness in two species that feed on the bottom will be used to assess the performance standard pertaining to benthic food chain support. The Principal Scientists will be assisted by subcontractors from CSUN with expertise in fish production and reproduction.

f. Examine the recruitment and growth of the sea fan Muricea *in long-term monitoring plots.*

The sea fan *Muricea* has been known to colonize artificial reefs in high densities to the exclusion of other reef biota, including giant kelp. Data collected from permanently located sampling plots provide valuable information on patterns of *Muricea* colonization and growth. Project scientists will continue to monitor these plots in 2020 and 2021 for colonization by *Muricea*, and to determine whether there is evidence for density dependent changes in *Muricea* growth and survivorship that might minimize (or at least stabilize) the potential adverse effects of *Muricea* on giant kelp and other components of the benthic community.

g. Review multi-beam survey report of Wheeler North Reef

The performance standards used to evaluate the success of the Wheeler North Reef require that its total area be no less than 150 acres and that at least 90% of its rock remain available for attachment of reef biota. These standards are evaluated annually using data of rock coverage collected by divers annually and data on footprint area obtained from multi-beam sonar surveys conducted once every five years. A multi-beam survey of the Wheeler North Reef is scheduled for autumn 2019. The work will be completed by an outside contractor who will submit a written report to the Commission by December 31, 2019. UCSB's Principal Scientists will review this report in early 2020 and communicate their findings to the Commission staff.

h. Monitor fish standing stock and kelp area of the Phase III remediation reef in summer and autumn of 2021.

The fish standing stock and area of adult kelp of the Phase III remediation reef will be surveyed by divers in the summer and autumn of 2021 following the completion of construction.

2.2 Construction Monitoring of the Phase III Remediation Reef

a. Monitor the percent cover of rock of the Phase III remediation reef in summer and autumn 2020.

Construction of the Phase III remediation reef will take place during the summers of 2019 and 2020. Construction monitoring in 2019 is being done during the current workplan. Diver surveys of the percent cover of deployed rock in the Phase III polygons will be conducted in summer and autumn of 2020 to determine whether the reef was built according to the plan specified in SCE's approved CDP. Survey data will be rapidly analyzed and results communicated with SCE to enable them to make adjustments in construction if needed.

b. Consult and coordinate with SCE and their contractors on construction of the Phase III remediation reef

Construction of the Phase III remediation reef coincides with the period of intensive mitigation monitoring of the Phase I and II reefs. Previous experience gained during the construction of the first two phase of Wheeler North Reef shows that the logistical operations of construction and mitigation monitoring are greatly facilitated by close communication between UCSB contract scientists and SCE and their contractors. Routine communication on ocean conditions, daily activities and up to date results of construction monitoring enables both entities to plan their work in the most efficient and safe manner possible.

c. *Review SCE's frequent construction progress reports and their final construction report for the Phase III remediation reef.*

The contractors responsible for construction the artificial reef prepare biweekly progress reports and a final construction report to SCE which is shared with Commission staff. UCSB's Principal Scientists will review these reports for adherence to SCE's CDP for the Phase III reef and provide verbal and written comments to the Commission staff, SCE and their contractors.

3. Data Management, Analysis and Reporting

3.1 Enter, organize, and manage data collected during the monitoring studies

Data management and quality assurance are critically important tasks that require a substantial amount of effort by the team of contract scientists. All monitoring data for the wetland and reef mitigation projects are entered and stored in electronic databases. The SONGS reef mitigation monitoring project's data entry procedures have been designed to facilitate rapid data entry while continuing to ensure the quality and integrity of the data as they are transformed from physical to electronic form. The project employs a highly redundant, multi-server system to ensure maximum data integrity, preservation, and access. The system consists of a central data server, and multiple mirror and backup servers located at UCSB's Carlsbad office, and at the Marine

Science Institute on UCSB's main campus in Santa Barbara, CA. The operation, maintenance, and security of this system require a dedicated system administrator in Carlsbad who works closely with the scientific staff on the project and with system administrators on UCSB's main campus.

3.2. Data Analysis

Analyzing monitoring data is necessary for critically evaluating the performance of the wetland and reef mitigation projects. Project data are analyzed to determine: (1) whether the wetland and reef mitigation projects are in compliance with the biological and physical performance standards specified in the SONGS CDP and (2) to determine reasons for any failures to meet the performance standards.

3.3 Reporting

The monitoring results of the wetland and reef mitigation projects are reported in several different ways. Condition D of the SONGS CDP requires that a duly noticed public workshop be convened each year to review the status of the mitigation projects. Separate workshops for the wetland and reef are led by the UCSB Principal Scientists who together with Commission staff give presentations on the previous year's activities, overall status of the mitigation projects, identify problems and make recommendations for solving them, and review the next year's program. The workshops are attended by the UCSB team of contract scientists, the Commission staff, the Scientific Advisory Panel, representatives of resource agencies, SCE and their contractors, and the public.

UCSB Principal Scientists prepare annual reports for the wetland and reef mitigation projects detailing the results of performance monitoring and other project related studies, a status of the compliance of each project with respect to the mitigation requirements detailed in the SONGS CDP, and a summary of activities planned for the next year. Reports are submitted to the Commission staff with copies distributed to SCE.

The Principal Scientists develop and maintain a public website that provides information on the history, current status, and other relevant information pertaining to the monitoring of the SONGS wetland and reef mitigation projects (http://marinemitigation.msi.ucsb.edu/). The website serves as a repository for annual reports, workshop proceedings and other project related documents, and thus helps facilitate the transfer of information between the UCSB contract scientists and the Commission, SCE, other agencies and the general public.

3.4. Develop a SONGS mitigation monitoring data catalog and manual

As required by CDP 6-81-330-A, SONGS mitigation monitoring data is available to the public upon request, and appears in post data processing format in annual monitoring reports. To date, UCSB has also responded to individual requests from SCE and other parties for data and for guidance regarding sampling and analytical methods. To facilitate future requests and to make the data more readily available and usable to the public, UCSB contract scientists and data managers will develop a data catalog and an explanatory manual that is publically accessible

from the project's website. The data catalog and manual will allow interested parties to download fully documented project data and metadata, as well as descriptions of the computational routines and detailed methods used to process the raw environmental data and analyze it for compliance with the permit requirements. Further, if future updates to data processing methods are necessary, the SONGS team will develop a system to revise the explanatory manual and post an online notification of any changes.

4. Project Management

4.1. Direct the field and analytical studies described in the 2020-2021 Work Plan.

The Principal Scientists manage a team of university research wetland and reef biologists responsible for conducting the rigorous field work and extensive data management. They also collect data at the mitigation and reference sites as needed to resolve issues that arise in the monitoring, and conduct site visits to inspect routine and unexpected changes in the physical and biological properties of the restored mitigation and natural reference sites.

4.2. Maintain functional IT infrastructure

The headquarters for the project is based at an off-campus site in Carlsbad California. Project staff are responsible for maintaining database software, hardware, and network services and working with IT services at UCSB to leverage their infrastructure and backup services. Routine duties involve troubleshooting and remedying any problems that arise and consulting with computer consultants as needed to maintain reliability and security of network and desktop operations.

4.3 Complete assorted tasks

In addition to data collection and management numerous assorted tasks must be completed to ensure the project is successful. Annual courses in *in CPR, First-Aid, Nitrox, O_2 administration* along with the submission of dive logs, inspection and service of diving equipment and medical examinations are required to maintain University of California research diver certification. Project staff spend time maintaining boats, vehicles and other equipment and sampling gear in proper working condition and perform an assortment of chores at the project's off campus facility to maintain a functional working environment.

4.4. Perform required administrative duties

The Principal Scientists work with University of California administrative staff on project issues pertaining to contracts, budgets, payroll, purchasing, and personnel to ensure the project adheres to university's policies and procedures. Their time is also required to prepare reports to Commission staff and the biannual Work Plan and Budget.

4.5. Consult with involved entities

The Principal Scientists routinely consult with members of the Science Advisory Panel, Coastal Commission staff, other resource agencies, and the permittee and its contractors on the status, planning and findings of the monitoring studies and inform them of any unexpected changes or concerns that might arise.

E. BUDGET: 2020 AND 2021

Condition D of the permit requires SCE to fund the Commission's oversight of the mitigation and independent monitoring functions identified in and required by Conditions A through C. The permittee is required to provide "reasonable and necessary costs" for the Commission to retain personnel with appropriate scientific or technical training and skills, as well as reasonable funding for necessary support personnel, equipment, overhead, consultants, the retention of contractors needed to conduct identified studies, and to defray the costs of members of any scientific advisory panel convened by the Executive Director to provide advice on the design, implementation, monitoring and remediation of the mitigation projects. The Commission has operated under approved work programs and budgets since 1993. The funds for the oversight and monitoring program are managed by an independent accounting firm.

The budgets for the Commission's monitoring and oversight program are "zero-based budgets," that is, each budget period begins anew, based on the proposed activities, with no funds from the previous budget carried forward to the new budget period. The total budget to implement the work program is intended as a "not-to-exceed" amount. The permittee provides funds periodically throughout the budget period rather than as a lump sum to minimize the advance outlay of cash. Any funds not expended at the end of the budget period are returned to the permittee.

History of Expenditures for Independent Monitoring

The Commission began its oversight and independent monitoring program in November 1991 following adoption in July 1991 of the SONGS mitigation requirements. This start-up period was funded directly by SCE and covered the work necessary to establish the implementing structure and the initial administration of the program. The next year the Commission operated under an interim work program and budget, during which time the first contract scientists were hired and the Scientific Advisory Panel convened to begin working with SCE on project planning. The Commission approved annual work programs and budgets for calendar years 1994 through 1997, and then, in accordance with the provisions of the permit, adopted two-year work programs and budgets beginning with the 1998-1999 period. These work programs have included planning, environmental analyses, permit compliance issues, five years of experimental reef monitoring, construction monitoring and the first seven years of performance monitoring of the Phase 2 mitigation reef, pre-restoration and construction monitoring for the wetland project, development of performance monitoring plans, and six years of performance monitoring at the wetland. The status section of this report (see Section C) summarizes the accomplishments of the Commission's program.

The budgets and expenditures for the SONGS oversight and monitoring program since its inception are summarized below. As a normal practice, the Commission requires an independent financial audit of its expenditures for each budget period. To date, those audits have disclosed no discrepancies or deficiencies in the financial systems.

Period	Total Budget	Actual Expenditures
Nov 1991-Dec 1992	$ 57,654	$ 57,654
Oct 1992-Dec 1993	610,646	334,632
1994	1,173,105	387,096
1995	849,084	467,888
1996	440,139	397,631
1997	423,035	379,571
1998-1999	1,039,072	970,118
2000-2001	2,293,162	2,151,820
2002-2003	2,423,045	2,174,706
2004-2005	2,338,957	2,256,543
2006-2007	2,266,141	2,162,750
2008-2009	3,055,170	2,776,632
2010-2011	3,953,014	3,559,266
2012-2013	4,738,886	4,634,500
2014-2015	5,214,283	5,019,255
2016-2017	5,844,930	5,586,043
2018-2019	6,261,650	5,938,003 (projected)
28-YEAR TOTAL	$42,981,436	$39,116,423

The oversight and independent monitoring program has consistently come in under budget, and in some years substantially so. The early work programs and budgets were marked by considerable uncertainty in the timing of the planning process for the two major projects (wetland restoration and experimental kelp reef) as well as significant discussions with SCE regarding the Commission staff's interpretation of the permit conditions. In more recent years, the staff has been able to better predict the funding necessary to carry out the program. As performance monitoring for the mitigation projects is implemented, the staff, in consultation with SCE, has made its best predictions for the required tasks, timing, and funding necessary to support those tasks in the 2020 and 2021 work program and budget.

Proposed Budget for 2020 and 2021

The proposed budget for calendar years 2020 and 2021 covers the monitoring and oversight program costs for the Commission's contract scientists, contract field biologists and subcontractors to monitor the wetlands and mitigation reef, science advisory panel, consultants, contract administrative support, and operating expense during the two-year budget period. All of the current and proposed contract program staff, except for the part-time administrator, are hired under contract with the UCSB, while subcontractors are retained through separate contracts. Costs associated with the implementation of the SONGS permit and attributable to permanent Commission staff work are not paid by the permittee and thus are not included in this budget.

The funding proposed to cover the monitoring and oversight program costs during the two-year budget period (calendar years 2020 and 2021) is $6,788,584 as shown below. This budget is based on the minimum scientific staff required to accomplish the goals of the SONGS permit and carry out the proposed tasks (see discussion above). The wetland project will continue with its ninth and tenth year of performance monitoring in 2020-2021. The twelfth and thirteenth years of performance monitoring will be the primary work for the reef. Personnel rates are set by U.C.

Systemwide Administration. Narrative budget notes explaining each budget category are contained in Appendix A.

SONGS PROGRAM BUDGET 2020

	2020 Wetland	2020 Reef	2020 Admin/Mgt	2020 Total
SALARIES				
Core Program Staff				
Principal Scientist (0.43 PY)	6,474	86,316		92,789
Principal Scientist (1.0 PY)	89,219	89,219		178,437
Principal Scientist (0.5 PY)	66,280	7,364		73,645
Sr. Administrator (CCC)			21,726	21,726
Field Biologists				
Info System Analyst III (1.0 PY)	39,322	91,752		131,074
Bioinformatice Program Associate (1.0 PY)	42,209	42,209		84,418
Staff Research Associate II (1.0 PY)	24,455	24,455		48,910
Staff Research Associate II (1.0 PY)	0	51,903		51,903
Staff Research Associate II (1.0 PY)	24,455	24,455		48,910
Field Research Supervisor I (1.0 PY)	76,645	0		76,645
Staff Research Associate II (1.0 PY)	60,782	0		60,782
Staff Research Associate II (1.0 PY)	51,903	0		51,903
Staff Research Associate I (1.0 PY)	44,934	0		44,934
Staff Research Associate I (1.0 PY)	22,467	22,467		44,934
Lab Assistant III (3 @ 6 mos, 1.5 PY)	0	66,663		66,663
Lab Assistant I (3 @ 6 mos; 1.5 PY)	177,769	0		177,769
SUBTOTAL SALARIES	726,914	506,803	21,726	1,255,442
UCSB Indirect Cost @ 26% (excluding SrAdmin)	331,775	263,537		320,766
TOTAL SALARIES	**915,911**	**638,571**	**21,726**	**1,576,208**
BENEFITS				
Core Program Staff				
Principal Scientist	278	3,712		3,990
Principal Scientist	46,197	46,197		92,395
Principal Scientist	34,320	3,813		38,133
Field Biologists				
Info System Analyst III (1.0 PY)	21,698	50,629		72,327
Bioinformatice Program Associate (1.0 PY)	23,291	23,291		46,582
Staff Research Associate II (1.0 PY)	16,845	16,845		33,689
Staff Research Associate II (1.0 PY)	0	28,640		28,640
Staff Research Associate II (1.0 PY)	16,845	16,845		33,689
Field Research Supervisor I (1.0 PY)	42,293	0		42,293
Staff Research Associate II (1.0 PY)	33,539	0		33,539
Staff Research Associate II (1.0 PY)	28,640	0		28,640
Staff Research Associate I (1.0 PY)	30,951	0		30,951
Staff Research Associate I (1.0 PY)	15,475	15,475		30,951
Lab Assistant III (3 @ 6 mos, 1.5 PY)	0	14,139		14,139
Lab Assistant I (3 @ 6 mos; 1.5 PY)	37,705	0		37,705
SUBTOTAL BENEFITS	348,077	219,586		567,662
UCSB Indirect Cost @ 26%	90,500	57,092		147,592
TOTAL BENEFITS	**438,577**	**276,678**		**715,255**

2020 Budget continued.

	2020 Wetland	2020 Reef	2020 Admin/Mgt	2020 Total
SCIENTIFIC ADVISORY PANEL	**61,759**	**61,759**		**123,518**
CONSULTANTS AND CONTRACTORS				
Wetlands				
Task 1.3a- drone surveys (UCLA)	27,535	0		27,535
Aerial Imagery Surveys	54,000	0		54,000
Wetland Engineering habitat delineation	26,650	0		26,650
Sediment analysis related to deficit in invertebrate density	17,720	0		17,720
Plant remediation studies (e.g., potential soil analysis)	32,870	0		32,870
Greenhouse experiment	1,300	0		1,300
Reef				
Task 2.1c-d-e - fish reproductive rates, food chain, fish production (CSUN)	0	367,626		367,626
UCSB Indirect Cost @ 26%	34,460	6,500		40,960
TOTAL CONSULTANTS & CONTRACTORS	**194,535**	**374,126**		**568,661**
TRAVEL				
Reimbursement for permanent CCC staff	5,200	5,200		10,400
UCSB Principal Scientists, Field Biologists	26,650	23,350		50,000
UCSB indirect cost (excl. CCC staff)	6,929	6,071		13,000
TOTAL TRAVEL	**38,779**	**34,621**		**73,400**
OPERATING EXPENSE				
General expense (SF office)			32,000	32,000
General expense (UCSB contract, incl. indirect cost)	41,067	76,224		117,291
Facilities operations (Carlsbad office) & Marina storage/offsite facilities (UCSB contract)	62,925	66,899		129,824
Computer technical support, repair & maintenance			1,500	1,500
Review workshop			1,700	1,700
Administrative/financial processing services			12,000	12,000
TOTAL OPERATING EXPENSE	**103,992**	**143,123**	**47,200**	**294,315**
EQUIPMENT				
Two 250 hp outboard engines (UCSB)		15,800		15,800
TOTAL EQUIPMENT		**15,800**		**15,800**
TOTAL EXPENSE 2020	**1,753,553**	**1,544,678**	**68,926**	**3,367,157**

SONGS PROGRAM BUDGET 2021

	2021 Wetland	2021 Reef	2021 Admin/Mgt	2021 Total
SALARIES				
Core Program Staff				
Principal Scientist (0.43 PY)	6,668	88,905		95,573
Principal Scientist (1.0 PY)	91,895	91,895		183,790
Principal Scientist (0.5 PY)	70,650	7,850		78,500
Sr. Administrator (CCC)			23,028	23,028
Field Biologists				
Info System Analyst III (1.0 PY)	40,502	94,504		135,006
Bioinformatice Program Associate (1.0 PY)	43,475	43,475		86,951
Staff Research Associate II (1.0 PY)	25,189	25,189		50,377
Staff Research Associate II (1.0 PY)	0	53,460		53,460
Staff Research Associate II (1.0 PY)	25,189	25,189		50,377
Field Research Supervisor I (1.0 PY)	78,945	0		78,945
Staff Research Associate II (1.0 PY)	62,605	0		62,605
Staff Research Associate II (1.0 PY)	53,460	0		53,460
Staff Research Associate I (1.0 PY)	46,282	0		46,282
Staff Research Associate I (1.0 PY)	23,141	23,141		46,282
Lab Assistant III (3 @ 6 mos, 1.5 PY)	0	68,663		68,663
Lab Assistant I (3 @ 6 mos; 1.5 PY)	183,102	0		183,102
SUBTOTAL SALARIES	751,102	522,271	23,028	1,296,401
UCSB Indirect Cost @ 26% (excluding SrAdmin)	195,287	135,791		331,077
TOTAL SALARIES	**946,388**	**658,062**	**23,028**	**1,627,478**
BENEFITS				
Core Program Staff				
Principal Scientist	287	3,823		4,110
Principal Scientist	47,583	47,583		95,167
Principal Scientist	36,582	4,065		40,647
Field Biologists				
Info System Analyst III (1.0 PY)	22,349	52,147		74,496
Bioinformatice Program Associate (1.0 PY)	23,990	23,990		47,979
Staff Research Associate II (1.0 PY)	17,350	17,350		34,700
Staff Research Associate II (1.0 PY)	0	29,499		29,499
Staff Research Associate II (1.0 PY)	17,350	17,350		34,700
Field Research Supervisor I (1.0 PY)	43,562	0		43,562
Staff Research Associate II (1.0 PY)	34,545	0		34,545
Staff Research Associate II (1.0 PY)	29,499	0		29,499
Staff Research Associate I (1.0 PY)	31,879	0		31,879
Staff Research Associate I (1.0 PY)	15,940	15,940		31,879
Lab Assistant III (3 @ 6 mos, 1.5 PY)	0	14,563		14,563
Lab Assistant I (3 @ 6 mos; 1.5 PY)	38,836	0		38,836
SUBTOTAL BENEFITS	359,752	226,310		586,062
UCSB Indirect Cost @ 26%	93,536	58,841		152,376
TOTAL BENEFITS	**453,287**	**285,151**		**738,438**

2021 Budget continued.

	2021 Wetland	2021 Reef	2021 Admin/Mgt	2021 Total
SCIENTIFIC ADVISORY PANEL	**65,404**	**65,404**		**130,809**
CONSULTANTS AND CONTRACTORS				
Wetlands				
Task 1.3a- drone surveys (UCLA)	28,400	0		28,400
Aerial Imagery Surveys	54,000	0		54,000
Wetland Engineering habitat delineation	26,650	0		26,650
Sediment analysis related to deficit in invertebrate density	0	0		0
Plant remediation studies (e.g., potential soil analysis)	0	0		0
Greenhouse experiment	0	0		0
Reef				
Task 2.1c-d-e - fish reproductive rates, food chain, fish production (CSUN)	0	376,525		376,525
UCSB Indirect Cost @ 26%	20,969	0		20,969
TOTAL CONSULTANTS & CONTRACTORS	**130,019**	**376,525**		**506,544**
TRAVEL				
Reimbursement for permanent CCC staff	5,512	5,512		11,024
UCSB Principal Scientists, Field Biologists	28,249	24,751		53,000
UCSB indirect cost (excl. CCC staff)	7,345	6,435		13,780
TOTAL TRAVEL	**41,106**	**36,698**		**77,804**
OPERATING EXPENSE				
General expense (SF office)			33,920	33,920
General expense (UCSB contract, incl. indirect cost)	55,582	80,797		136,379
Facilities operations (Carlsbad office) & Marina storage/offsite facilities (UCSB contract)	65,366	69,586		134,952
Computer technical support, repair & maintenance			1,500	1,500
Review workshop			1,802	1,802
Audit			4,000	4,000
Administrative/financial processing services			12,000	12,000
TOTAL OPERATING EXPENSE	**120,948**	**150,383**	**53.222**	**324,553**
EQUIPMENT				
Two 250 hp outboard engines (UCSB)		15,800		15,800
TOTAL EQUIPMENT		**15,800**		**15,800**
TOTAL EXPENSE 2021	**1,757,153**	**1,588,024**	**76,250**	**3,421,427**

TWO-YEAR TOTAL EXPENSE FOR 2020 and 2021 $6,788,584

F. PRE-APPROVED CONTINGENCY FUND FOR 2020 AND 2021

Staff is proposing pre-approved contingency funds in the amount of $269,551, specifically for potential additional costs for: (1) the Scientific Advisory Panel, (2) early office lease termination, (3) severance pay for the longest term UCSB employees if mitigation program not continued in 2022-2023, and (4) unexpected repair and/or replacement of vehicles, boats and other major equipment. Staff proposes these pre-approved contingency funds as a way of reducing the overall budget, but still providing the necessary Commission authorization for certain specified activities that may become necessary during the two-year work period. Staff has used this approach since the 2002-2003 work program. To date, staff has not had to use the contingency funds.

A contingency amount is proposed for the Scientific Advisory Panel as that effort may increase over past years' expenditures for advice to the Commission on the performance monitoring for the wetland restoration and mitigation reef projects, as well as potential compliance issues with the performance standards contained in the SONGS permit. Although the permit authorizes the Scientific Advisory Panel to be funded up to $100,000 *per year*, plus annual adjustments due to increases in the consumer price index applicable to California[2], staff proposes less total funding for the Scientific Advisory Panel for the two budget years ($123,518 for 2020 plus $130,809 for 2021 for a two-year total of $254,327) based on current rates of expenditure. However, the overall budget does not provide any cushion for any increased effort that may be required; thus, the staff proposes a two-year pre-approved contingency fund amount of $178,788 to be earmarked for the Scientific Advisory Panel to allow the timely response to changing circumstances. This amount is derived from the total authorized amount for the two years as adjusted ($433,115, see footnote) less the budgeted amount ($254,327).

In addition, staff proposes funds for early lease termination for the Carlsbad office. The need for early lease termination is unlikely; however, should circumstances arise that necessitate canceling the lease, the contingency fund amount of $40,288 would be available to satisfy the lease obligations. Similarly, the contingency fund includes $35,475 for severance pay for the longest term UCSB employees in the unexpected event that the mitigation program is not continued for the 2022-2023 work period. Finally, the contingency fund also includes $15,000 for unexpected repairs of high mileage field vehicles, boats and other equipment.

Any expenditure from the pre-approved contingency fund would be made in consultation with SCE. If a dispute arises, the staff would bring the issue to the Commission for resolution.

[2] Based on the average percent change in the Consumer Price Index-All Urban Consumers for the San Francisco and San Diego areas from the original 1991 permit to mid-year 2019, the adjusted amount for 2020 is $210,250. A 6.0% escalator is used for estimating adjustments for 2021, resulting in an adjusted amount for 2021 of $222,865. Thus, the total adjusted amount authorized for the two budget years 2020 and 2021 is $433,115.

Appendix A

Detailed list of condition compliance dates for the wetland

- On August 22, 2006, Commission staff issued the Notice of Acceptance for condition compliance required prior to issuance of the permit and issued CDP #6-04-88.
- On September 13, 2006, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction; however, the Notice of Acceptance excluded authority to construct certain plan elements that require compliance with additional site-specific conditions (i.e., least tern nesting habitat, public trails, freshwater runoff treatment ponds, inlet dredging, use of North Beach staging area and beach restoration activities, river bend revetment, a disposal site, and a mitigation site).
- On October 2, 2006, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction of segments 1 through 3 of the Coast-to-Crest public trail (from Jimmy Durante Boulevard along the northern edge of the river to I-5).
- On November 20, 2006, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction on disposal site DS32.
- On November 29, 2006, Commission staff issued the Notice of Acceptance for condition compliance on a revised design and alignment for the temporary construction haul road under Interstate Highway 5.
- On January 29, 2007, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction of the Least Tern nesting sites.
- On February 20, 2007, Commission staff issued the Notice of Acceptance for condition compliance on a revised construction haul road route to Disposal Site 36.
- On November 21, 2007, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction of the Freshwater Runoff Treatment Ponds and Segments 4 through 8 of the Coast to Crest Trail.
- On June 3, 2010, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction of the North Beach access improvements.
- On September 15, 2010, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction of the riverbank revetment.
- On November 30, 2010, Commission staff issued the Notice of Acceptance for condition compliance required for the 29th Street South Beach access improvements.
- On January 27, 2011, Commission staff issued the Notice of Acceptance for condition compliance required for the inlet channel excavation and dredging.
- On April 6, 2011, Commission staff issued the Notice of Acceptance for condition compliance required for dredge disposal.

- On August 10, 2011, Commission staff issued the Notice of Acceptance for condition compliance required for Least Tern nesting sites and beach nourishment/dredge disposal.
- On August 29, 2011, Commission staff issued the Notice of Acceptance for condition compliance required for the North Beach Staging Area plan.
- On December 20, 2011, Commission staff issued the Notice of Acceptance for condition compliance required for the JPA Mitigation Program for Trail and Treatment Pond Impacts. The potential to restore additional acreage within the San Dieguito restoration site as proposed by other parties had delayed a portion of the JPA's mitigation program and required consideration of alternative mitigation sites. A material amendment was approved in September 2011 to address these changes (see Amendment 10).
- On January 26, 2012, Commission staff issued the Notice of Acceptance for condition compliance required for final construction information for Least Tern Nesting Sites.
- On September 26, 2014, Commission staff issued a Notice of Acceptance for the San Dieguito Lagoon October 2014 maintenance dredging plans. Dredging of the inlet has been delayed until winter 2015.
- SCE continues to submit quarterly beach survey reports in accordance with Special Condition 25 of CDP #6-04-88 reports posted at http://www.coastalenvironments.com/presentations, see section on City of Del Mar beach profile reports). This condition requires SCE to implement a beach monitoring program, consisting of beach profiles and inlet channel cross-sections, data analysis and reporting. The purpose of this program is to guide and direct placement of dredged beach quality sand and to identify unanticipated changes to the shoreline condition. To date the monitoring has not reached any triggers and review by the Coastal Processes Technical Panel, as required under the permit, has raised no issues of concern.

Detailed List of Wetland CDP Amendments

The following permit amendments have been approved:

1. On August 24, 2006, the Commission issued an immaterial amendment to modify the language of special condition #4 with regard to the timing of submittal of final plans for berm and slope protection. Originally, the condition required such plans be submitted "prior to issuance of the coastal development permit." This immaterial amendment changed the timing of the submittal to "prior to commencement of construction of the revetment located on the south side of the river east of Jimmy Durante Boulevard."
2. On July 10, 2007, the Commission approved an amendment to include in the wetland restoration project the removal of the berm north/northeast of the Grand Avenue Bridge.
3. On August 14, 2007, SCE submitted an amendment request to address several changes in the Final Restoration Plan, including changes to restoration module W45, exclusion of the riverbank revetment, and an alternative South Beach access plan. This amendment was revised in September 2009, and on June 9, 2010, the Commission approved an amendment to replace restoration module W45 with module W16, modify the timing of

construction of public beach accessways, and modify the riverbend revetment requirements in Special Condition #4.

4. On October 25, 2007, the Commission issued an immaterial amendment to modify special condition #8 regarding the mitigation plan for impacts from construction of the trail and wetland treatment ponds.
5. On February 28, 2008, the Commission issued an immaterial amendment to modify the trail crossing under Interstate 5 from open bottom box culverts to bridges.
6. On October 13, 2009, the Commission issued an immaterial amendment to modify segment 8 of the Coast to Crest trail to designate a pedestrian-only path along an existing erosion-control stability bench on the slope of disposal site 32. The pedestrian-only segment would be in addition to and would connect with segment 8 to form a loop trail.
7. On November 19, 2010, the Commission issued an immaterial amendment to modify designated mitigation sites for creation of coastal sage scrub as required by Special Condition #8 regarding trail and treatment ponds.
8. On July 20, 2011, the Commission issued an immaterial amendment to modify the timing restriction on the staging area at North Beach to allow staging of construction equipment associated with dredging activities to begin immediately after Labor Day.
9. On September 21, 2011, the Commission issued a material amendment to: (1) add the Mesa Loop Trail to the project, and (2) modify Special Condition #8 to allow integration of 2.736 acres tidal or seasonal salt marsh mitigation into the SANDAG proposed restoration, with a back-up plan for restoration of 2.736 acres of seasonal high marsh adjacent to El Camino Real on JPA property.
10. On September 12, 2012, the Commission issued an immaterial amendment to modify the permanent access roads within the lagoon system by: (1) eliminating a maintenance access point from the end of Race Track Drive, (2) converting an internal construction road from temporary to permanent, and (3) converting access to the maintenance road system from El Camino from temporary to permanent.

Appendix B: Detailed list of condition compliance dates for the reef

- On March 25, 2008, Commission staff accepted the additional GIS data and files requested for the experimental reef modules and the phase 2 mitigation reef polygons.
- On April 14, 2008, Commission staff issued the Notice of Acceptance for condition compliance required prior to issuance of the permit and issued CDP #E-07-010.
- On May 16, 2008, Commission staff issued the Notice of Acceptance for condition compliance required prior to commencement of construction.
- On August 22, 2008, Commission staff issued the Notice of Acceptance for condition compliance requiring an initial construction audit.
- On January 27, 2009, Commission staff issued the Notice of Acceptance for condition compliance requiring a final construction report. Acreage from the experimental reef modules (22.4 acres) and "as-built" primary reef polygons (130.3 acres) shown on Exhibit 4 meet the SONGS permit and SCE *Final Design Plan* specifications required by CDP #E-07-010.
- On May 9, 2013, Commission staff issued a Notice of Acceptance for condition compliance requiring Kelp Wrack and Rock Hazard Monitoring under Special Condition #12.
- On May 24, 2016, the Commission's Executive Director informed SCE that to comply with the requirements of CDP 6-81-330-A, SCE would be required to remediate Wheeler North Reef by building new reef acreage that meets minimum size, relief and cover requirements (described in detail in the letter).
- On March 7, 2019, the Commission approved CDP 9-19-0025 authorizing construction of a Phase III 210 acre low relief remediation reef to address low fish standing stock at Wheeler North Reef.

Appendix C: Budget Notes

SALARIES. Includes salaries and wages for the contract program staff, which includes two scientist positions, administrative support, and field biologists. All of the current and proposed contract program staff except a part-time administrator are hired under contract with the University of California, Santa Barbara; costs include the University's indirect costs.[3] The part-time administrator is hired under contract with Simpson & Simpson CPAs, the firm that provides financial services for the program. The costs for the Commission's permanent staff that spend a portion of their time on this program are not included here; they are paid by the Commission.

BENEFITS. Includes benefits and employer-paid payroll taxes for contract program staff. Includes the indirect costs for personnel hired under contract to UCSB.

SCIENTIFIC ADVISORY PANEL. The Scientific Advisory Panel is a panel of experts established by the Commission pursuant to the permit conditions to provide scientific and technical advice. Expenses cover members' time and travel and are authorized in the permit at $100,000 per year adjusted annually in accordance with the consumer price index (CPI) applicable to California. CPI adjustments have been made in previous budgets. Based on previous years' expenditures, staff budgeted less than the authorized amount. However, staff proposes additional funds in a pre-approved contingency fund up to the adjusted yearly authorized amount to be expended as needed, in consultation with SCE.

CONSULTANTS AND CONTRACTORS. Includes estimated costs for consultants and contractors to provide the technical and expert advice identified in individual tasks of the work program to assist the contract scientists in completing the tasks. Estimated costs are based on previous experience with similar consultants, at rates ranging from $50 to $210 per hour.

TRAVEL. Covers travel for meetings with SCE, Commission staff, consultants and contractors, field monitoring work, attendance at agency and public workshops and meetings, site visits, and attendance at conferences related to wetland and kelp forest community restoration issues. Total travel costs are based on previous years' expenditures plus anticipated increases in airline fares. A 6.0% escalator is applied for 2021.

GENERAL EXPENSE (SF). Covers operating expense for contract program staff working out of the Commission's San Francisco office (part-time administrator). Annual costs are based on the Commission's operating expense per PY for general expense, printing, communications, postage, training and facilities operations.

GENERAL EXPENSE (UCSB CONTRACT). Covers annual costs for reef surveys (NITROX for SCUBA), miscellaneous office, laboratory and field supplies, annual boat operating expense, annual insurance, registration and license fees for boats and vehicles, annual dive physicals required of each diver, and on-campus communications services for contract staff located at UCSB. A 6.0% escalator is applied for 2021.

FACILITIES OPERATIONS (UCSB CONTRACT). Rented office space in Carlsbad houses one full time contract scientific staff and contract field biologists for the reef and wetland monitoring programs. Annual costs cover space rental, utilities, security, office services and supplies, and communications (including telephone, cell phone service, and DSL service). A 6.0% escalator is used for 2021 where anticipated increases are not yet known.

OFFSITE STORAGE/FACILITIES (UCSB CONTRACT). Covers costs for storage and launch fees for the reef dive boats. A 6.0% escalator is applied for 2021.

COMPUTER TECHNICAL SUPPORT. Covers costs for maintaining the computers used by contract program staff and field biologists, including regular maintenance, repairs, and technical support needed for troubleshooting problems.

REVIEW WORKSHOP. Covers costs for conducting an annual review workshop, excluding costs for consultants who may be requested to attend the workshop. The intent of the workshop is to review whether performance

[3] The indirect cost rate of 26% of direct costs is the U.S. Department of Health and Human Services negotiated, pre-determined off-campus rate for research projects. For these costs, the project receives: office space at UCSB for two 0.5 PY contract scientists (even though the on-campus overhead rate is normally 46%), utilities, internet services, laboratory facilities and equipment, administrative services associated with payroll, employee benefits, liability insurance, dive and boat safety programs, and purchasing for both on-campus staff and staff located in the Carlsbad office, library services, UC subsidized pricing on goods and services, site licenses for software, and access to faculty and staff expertise on a wide variety of issues.

standards have been met, whether revisions to the standards are necessary, and whether remedial measures are required. A 6.0% escalator is applied for 2021.

AUDIT. Covers costs for an independent audit of the contract reimbursements and service fees for the Commission's oversight and monitoring program. Independent audits have been conducted since 1994; no deficiencies in the financial systems have been discovered. Costs are estimated for a 2-year audit.

ADMINISTRATIVE/FINANCIAL PROCESSING SERVICES. Covers the annual cost of administrative and financial processing services provided by Simpson & Simpson CPAs.

EQUIPMENT. Covers durable equipment for the reef and wetland monitoring programs, including replacement of two outboard engines for two dive boats.