



Proposal to Study

Biological Impacts Associated with Sediment Management and California Coastal Biota

Submitted to:

**Beach Erosion Authority
for Clean Oceans and Beaches**

Submitted by:

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Chambers Group, Inc.
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Science Applications International Corporation (SAIC) is pleased to submit this proposal in response to the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) Request for Proposal (RFP) dated July 16, 2004. The proposal is organized in the following sections according to the guidelines in the RFP:

- 1.0 Executive Summary
- 2.0 Technical Approach
- 3.0 Schedules
- 4.0 Management Plan
- 5.0 Qualifications
- 6.0 Similar Project Experience
- 7.0 Resource Requirements
- Appendix – Detailed Resumes

1.0 Executive Summary

BEACON, the California Coastal Sediment Management Workgroup (CSMW), and the California Department of Boating and Waterways (DBAW) require a consultant to conduct a biological impacts study that will provide information to assist with the development of the regional Sediment Management Master Plan (SMMP). The study is intended to compile and summarize in one easy-to-understand document, relevant information regarding potential impacts of sediment management activities on coastal biota, habitats, and ecosystems. The objectives of the study are to:

- (1) Serve as a reference document for future beach nourishment and related sediment management projects.
- (2) Provide an educational tool for regulators, project proponents, and interested public.
- (3) Identify additional research needs.

- (4) Provide a mechanism for dialog among stakeholders on potential impacts of sediment management activities on California’s natural resources.

Given the study objectives, it is important that the selected consultant have a comprehensive understanding of the California coastal environment, and expertise in evaluating the potential for impacts to coastal biota from sediment management



activities. The coastal environment is dynamic and subject to considerable natural environmental change associated with seasonal on- and offshore sand transport, winter storms and associated sediment influx from terrestrial sources, and large-scale oceanographic/climatic events such as El Niño and La Niña. Many coastal biota have natural tolerances associated with living in this dynamic environment. However, responses to natural and human-induced impacts, and time scales associated with recovery (if applicable), vary considerably among species and habitats. Because the study is intended as a tool for regulators, an experienced consultant is needed who understands the difference between short-term adverse effects versus long-term significant biological impacts in the context of environmental laws and regulations. This consultant must be able to distinguish real, scientifically documented impacts of beach nourishment from perceived but scientifically unlikely impacts. In addition, an experienced consultant is required who can compile and summarize the available known literature in an defensible, objective manner that resource and regulatory agencies can trust to assist them in making informed decisions regarding future sediment management plans and permits.

In order to fulfill these needs, SAIC has organized a respected consultant team, which is not only expert in the technical fields of coastal marine biology, oceanography, and sediment management methods, but also in their effective working relationships with agencies involved with permitting coastal projects that are protective of California resources. The SAIC Team consists of senior scientists and managers from our San Diego and Santa Barbara offices, Chambers Group, Inc. (Chambers), and Moffatt & Nichol Engineers (M&N). These team members have enjoyed long-term, professional relationships and have previously worked together to produce defensible, high-quality work products. In addition, the SAIC Team includes a scientific Quality Review Board (QRB), which consists of national experts from SAIC's Raleigh (NC) and Bothell (WA) offices, and Drs. Daniel Reed and Jenny Dugan from the University of California, Santa Barbara

SAIC Team personnel have worked on numerous projects involving beach nourishment and/or dredging and disposal in California as well as along the Pacific Northwest, and East and Gulf Coasts. Representative California projects have included:

- Regional beach nourishment programs (e.g., South Central Coast Beach Enhancement Program, SANDAG San Diego Regional Beach Sand Project).
- Regional sediment management plans (e.g., Long Term Management Strategy for Dredged Material Disposal in the San Francisco Bay Area EIS/EIR, SANDAG regional sand retention strategy).
- Local beach nourishment programs (e.g., BEACON, Goleta Beach Sand Replenishment Demonstration Project; Encinitas and Solana Beach Shoreline

Protection EIS/EIR; San Clemente Opportunistic Beach Replenishment Program).

- Numerous projects involving dredging and disposal (including beach nourishment) of coastal bays, harbors, and lagoons (e.g., Santa Barbara Harbor dredging and disposal, Oakland Harbor 50-foot Navigation Improvements EIS/EIR/FS, Morro Bay dredging/disposal, San Dieguito Lagoon Restoration EIR/EIS, and Bolsa Chica Lowlands Restoration EIR/EIS).

In addition, SAIC Team key personnel have been monitoring and inventorying California's coastal biological resources for over 25 years. This experience ranges from northern to southern California and has spanned coastal bays, harbors, lagoons, and nearshore habitats. The SAIC Team includes specialists in benthic biology, fisheries, marine mammals, birds, threatened and endangered species, rocky reefs, kelp and surfgrass restoration, and wetlands restoration.

SAIC's highly experienced team, under proven management, is the foundation of our technical approach, which is designed to efficiently answer all program needs with the appropriate technical accuracy, experience, and integrated insight. The SAIC technical approach includes the following key elements:

- ✓ Multi-focused strategy of document acquisition.
- ✓ Annotated Bibliography with a standardized checklist to facilitate screening of documents for study relevance.
- ✓ Overviews of sediment management methods, and natural coastal processes to provide relevant background understanding for the study.
- ✓ User-friendly report organization with ample tables to facilitate quick retrieval of information.

- ✓ Experienced and objective integration of scientific information to concisely answer technical questions regarding biological impacts associated with sediment management activities.
- ✓ Development of a geo-referenced database of references (documents and permits) to facilitate subsequent input to the project GIS.
- ✓ Coordination with other SMMP analysts.
- ✓ Built-in quality assurance/quality control.
- ✓ Strict project controls.

The first step of the technical approach will be to acquire and conduct a comprehensive review of relevant documents and information for the study. Project team members already have extensive in-house collections of relevant publications, permits, and reports. These resources will be augmented through a multi-focused strategy consisting of library and internet searches, contacting appropriate agencies and local governmental organizations and/or departments, and coordination with the SMMP's Policy, Procedures and Regulations (PPR) and GIS Analysts.

The document will be organized by major topic starting with an introduction to the study objectives and overviews of relevant background information to provide necessary context for the detailed evaluations that will follow. Tables and graphics will be used to summarize information to facilitate quick retrieval and/or understanding of the overview information. Information in the tables will include cross-references to geographic location, thereby facilitating quick identification of issues relevant to different areas of the State. Overview summaries will address:

- Applicable State Laws and Regulations;

- Locations beach nourishment has and/or is likely to occur;
- Types of sediment management activities and methods;
- Natural coastal processes contributing to dynamics of the beach and nearshore coastal environments, beach erosion, and natural on-, offshore, and alongshore movement of sands;
- Types of impacts that may affect the different types of habitats and species (e.g., burial, disturbance, removal, sedimentation, and turbidity); and
- Types of habitats and sensitive species occurring in the areas where sediment management is likely to occur.

Following these background sections, separate sections will summarize the detailed evaluations conducted to answer specific study questions. Each section will have a statement of the issue, concise review of the type(s) of available information, summary of findings, and identification of any limitations to the evaluation.

Separate evaluations will be conducted for relevant types of sedimentary habitats (sandy beach, nearshore sands, rocky intertidal, and subtidal rock reefs), vegetated habitats (kelp beds, surfgrass beds, and eelgrass beds), threatened/endangered species (e.g., California least tern, western snowy plover, and marine mammals), and species of commercial and/or recreational importance (e.g., California grunion, herring, salmonids, crabs, lobster, sea urchins). Included with the evaluations will be a description of the relative value and/or importance of each of the habitats and species types. A summary table will be used to facilitate quick reference of whether impacts associated with different

placement methods are generally considered short-term and transient or long-term for each of the evaluated habitats and species. The detailed evaluations of each habitat and species will address the following types of information, as applicable:

- Relative value and/or importance of the resource;
- Relationship to the beach environment (e.g., habitat, foraging, nesting, resting);
- Reported benefits to the resource associated with beach nourishment;
- Natural tolerance and/or bio-resilience to disturbance, sedimentation, and/or turbidity (including avoidance behaviors, burrowing depths, physical adaptations, and life history);
- Reported impact thresholds;
- Response to sediment management related impacts (including consideration of different placement methods, grain size characteristics of source sands, and sediment volumes). A qualitative statement regarding the relative amount of impact sediment management has (e.g., negligible to small, moderate to long-term) will be made where data exists.
- Natural recovery rates;
- Information limitations affecting the evaluation; and
- Answers to specific study questions.

A separate section will evaluate the effectiveness of regulatory methods to avoid and/or minimize impacts. CEQA/NEPA thresholds for significant biological impacts that have been used for beach nourishment projects will be summarized in a table according to geographic region. Geo-referenced tables also will be used to summarize permit conditions for beach nourishment projects that are relevant to

biological evaluations such as: schedule; placement methods; prohibition zones; and monitoring required before, during, and after construction. This section will include a summary of mitigation measures where effectiveness has been documented.

The document will also include a summary of any study limitations. These may include information gaps, sparse information, and/or conflicting differences in report findings that limited the ability to provide unequivocal answers to study questions.

The final section of the document will include recommendations, which will be formulated during a technical workshop, which would be attended by selected key SAIC staff and members of the QRB. Science-based recommendations will be made for filling identified data gaps, establishing standardized CEQA/NEPA thresholds, minimizing biological impacts with proven methods, and conducting realistic and appropriate monitoring to document significant changes and biological impacts from sediment management projects. Recommendations associated with the monitoring will include a balanced discussion of the merits of ecosystem versus species specific resource protection.

In summary, the SAIC Team consists of highly respected, experienced professionals who have developed a comprehensive work approach to meet the study objectives. The SAIC Team offers the following advantages:

- ✓ Over 20 years of experience evaluating biological impacts associated with dredging and disposal alternatives, including beach nourishment, nearshore and offshore placement, in-lagoon and in-harbor borrow site excavation and fill, and sediment capping.

- ✓ Over 25 years experience monitoring oceanographic conditions and biological resources in coastal environments throughout California.
- ✓ Over 20 years of experience compiling information, preparing CEQA/NEPA environmental documents, and communicating with agencies and the public on controversial and/or complex environmental projects.
- ✓ Specialized experience modeling fate and transport of sediment after placement in the coastal environment.
- ✓ Respected team members to ensure an authoritative technical product of the highest quality.
- ✓ A team of individuals and firms with a proven track record of commitment to project success and schedule, and who are committed to the success of the BEACON Biological Impacts Study.

2.0 Technical Approach

Task 1 Document Acquisition, Review, and Annotated Bibliography

The SAIC Team will use a multi-focused approach for acquiring relevant documents, reports, and literature pertinent to the biological impacts study. This approach will include:

- (1) Review of SAIC Team in-house references;
- (2) Focused library and internet key word searches (e.g., beach nourishment, dredging/disposal, sand transport, sedimentation, coastal turbidity);
- (3) Contact of CMSW participants, governmental organizations (e.g., BEACON, SANDAG), and appropriate cities and counties to obtain additional relevant documents; and

- (4) Coordination with the SMMP's PPR and GIS Analysts to obtain a list of available geo-referenced permits issued for beach nourishment and related sediment management projects and/or relevant references.

A checklist table will be developed to standardize the entry of information in the Annotated Bibliography and to screen documents for their relevance to the biological impacts study. The Annotated Bibliography checklist will include the following information:

- Document Reference;
- Document Type (e.g., permit, EIR/EIS/EA, monitoring report, published paper, research study, position paper, and scientific review);
- Sediment Issues (e.g., beach nourishment, dredging/disposal, shoreline protection, and natural terrestrial input);
- Impact Issues (e.g., burial, disturbance, removal, sand transport, sedimentation, and turbidity);
- Habitats (e.g., sandy beach, nearshore sands, rocky intertidal, rock reefs, kelp beds, surfgrass, eelgrass, bays/harbors, and lagoons);
- Sensitive and/or Commercially/Recreationally Important Species (e.g., birds, coastal fish/salmonids, crabs/lobsters/sea urchins, kelp/surfgrass/eelgrass).
- Geographic Location (southern California, central California, northern California, Pacific Northwest, East Coast, Gulf Coast, International, Not Applicable).
- Information Basis of Document (e.g., monitoring data, research data, survey data, published literature, subjective, and undocumented).

The Annotated Bibliography checklist will be prepared as an Excel database to facilitate organization/sorting and identification of relevant documents according to issue area. The bibliography will be separated into two sections with the references will be listed in alphabetical order in each section. The first section will list the references considered relevant to the biological impacts study, including those references based on data (monitoring, research, survey) and published literature and/or monitoring reports. The second section will list references that were considered, but were determined to not be relevant because the source information was undocumented and/or subjective in nature.

Task Assumptions

- Task 1 will be a coordinated, effort-limited task to maintain project schedule and resources for other tasks.
- Literature searches will focus on publications and reports written in the last 10 years; however, older documents will be obtained that are relevant and readily available.
- The format of the Annotated Bibliography and information categories associated with the checklist will be submitted to the CSMW Project Manager for review and comment within two (2) weeks of the Notice to Proceed.
- Document acquisition will commence immediately after the Notice to Proceed. However, document screening will proceed only after the format for the Annotated Bibliography checklist has been approved by the CSMW Project Manager. Up to one (1) month has been assumed for CSMW review and comment.

- It is assumed that no changes to the format of the Annotated Bibliography will be made after the format has been approved by the CSMW Project Manager.
- The draft Annotated Bibliography will be submitted to the CSMW Project Manager within three (3) months of the Notice to Proceed for distribution to members of the CSMW.
- The CSMW Project Manager will provide a compiled list of comments within one (1) month of receipt of the draft Annotated Bibliography.
- The Annotated Bibliography will be finalized based on received comments. Additional references that may be suggested by the CSMW will be acquired, screened with the checklist, and added to the appropriate section of the Annotated Bibliography according to the remaining budget for the task.
- The final Annotated Bibliography will be submitted as a technical appendix to the draft and final biological study Summary Report.
- The document acquisition, review, and Annotated Bibliography phase of the task will not exceed twenty percent (20%) of the project budget.
- The final Annotated Bibliography will not exceed five percent (5%) of the budget.

Task 2 Copies of References

Relevant references that include data collected from a specific geographic location (i.e., geo-referenced) will be submitted as digital files, when available, and/or hard copies.

Hard copies of all other references considered relevant to the study will be submitted in their entirety, or relevant sections of large documents will be submitted. The task will be effort-limited to maintain resources for other tasks.

Task Assumptions

- Copies of relevant documents will be made up to a total of 20,000 pages.
- Hard copies of additional documents (i.e., exceeding the total assumed effort) will be submitted on a cost reimbursable basis, or a list of locations where documents are available will be provided.

Task 3 List of Referenced Permits

A geo-referenced list of permits used or referenced during the course of the study will be prepared. SAIC will coordinate with the SSMP GIS and PPR Analysts at the onset of the project to obtain a list of available permits. In addition, Team member M&N has already compiled an inventory of permits related to beach nourishment throughout California, which will be considered for this task. M&N will identify which permits have a GIS component available, and will provide electronic copies of relevant shapefiles (Arc View 3.2 or ArcGIS 8.x), as available. Prior to submittal of any shapefiles, the SSMP GIS analyst will be contacted, and only available shapefiles not already acquired by the GIS analyst will be provided.

Task Assumptions

- A list of geo-referenced permits will be submitted to the CSMW Project Manager within three (3) months of the Notice to Proceed.

- The final list of permits will be submitted as an appendix to the draft and final biological study Summary Reports.

Task 4 Draft Summary Report

The biological study Summary Report will be organized in a systematic manner that specifies the study objectives, provides relevant background information, and presents technical evaluations that are objective, coherent, and concise.

The Summary Report will be prepared according to standard format guidelines developed to ensure consistency of technical evaluations, report organization, and efficiency of report production. The format guidelines and a draft Table of Contents will be prepared at the onset of the project. The guidelines will address font type and size, paragraph spacing, units of measurement, use of abbreviations, styles for figure and table captions, and formats for references.

The Summary Report will include an Executive Summary that provides an overview of study objectives, highlights major findings, identifies any key data gaps, and summarizes recommendations.

The report Introduction will describe the study purpose and need, objectives, and report organization. Relevant methods will be described, including a list of individuals and agencies contacted during performance of the study.

The body of the Summary Report will be organized by topic starting with overviews of relevant background information to provide context for the detailed evaluations that will follow. Separate sections will summarize the detailed evaluations

prepared to answer all the questions specified in the Study Scope of the RFP dated July 16, 2004 (i.e., items a.-z., and aa on pages 5-7 of the RFP). Each subsection will have a statement of the basis of concern, concise review of the type of available information, summary of findings, and identification of any limitations to the evaluation. A combination of tables and graphics will be used to summarize technical information for ease of reference. Information on the tables will include cross-reference to geographic location to facilitate quick identification of issues relevant to different areas of the State.

SAIC's proposed approach for addressing each technical question specified in the RFP is organized below according to topic. The topics are arranged below such that overviews, which will be used to support more detailed evaluations, are described first.

Overview of Applicable State Laws and Regulations

- A brief description will be prepared of state and federal laws applicable to sediment management activities in the coastal zone.

Overview of Locations Where Beach Nourishment is Likely to Occur in California

- A description of locations of prior beach nourishment or planned nourishment in northern, central, and southern California regions will be prepared. This information will be used to support subsequent sections of the document where evaluations may vary in emphasis according to geographic region.
- Sources of information that will be used to identify where beach nourishment is likely to occur include: (1)

the Task 2 geo-referenced list of permits, (2) locations where regional and/or opportunistic sand management programs have been or are in the process of being developed in the State (e.g., Carlsbad, San Clemente, and BEACON), and (3) information obtained through coordination with the SSMP GIS analyst and/or PPR analyst.

- A map will be included showing where beach nourishment has occurred and where it is being considered in the future for northern, central, and southern California regions.

Overview of Types of Sediment Management Activities and Methods

- A cursory description will be prepared of sediment management activities and different methods of sand placement on land, nearshore, and offshore. This information will provide context for the description of types of activities and effects that may impact biological resources.
- The various physical activities associated with beach nourishment using different placement methods will be described. Methods commonly include dredges, slurry lines, conveyors, earthmovers, trucks, and sluicing. The types of equipment specific to each placement method will be described.
- The description will include photographs and/or graphics (without copyright restrictions) that illustrate different methods and techniques, as available.

Overview of Types of Impacts Associated with Sediment Management

- An overview of the types of direct and indirect impacts associated with different sediment management activities and methods of sand placement will be described. These types of impacts may include burial, disturbance (e.g., noise and equipment traffic), removal, sedimentation, sedimentation associated with sand transport, and turbidity. A table will be prepared that cross-references the type of impact with sediment management activity and method. This information will provide context for the basis of concern for impacts to biological resources from placement of sands on land, in the nearshore, or offshore, and answer the “concern” part of question “h” of the RFP (*What are the general and specific concerns for placing beach nourishment materials in the nearshore?, offshore?, on land? What types of methods have been used to minimize impacts associated with these different placement methods?*).
- The nature of the impacts will be quantified, where feasible. Typical noise levels associated with equipment used for different placement methods will be summarized based on published sources of information.
- Turbidity levels associated with different placement methods will be summarized according to representative monitoring reports. Several factors affect turbidity levels during beach nourishment, including placement methods, rate of placement, grain size characteristics of source sands, water depth, and use of protective measures that can affect turbidity concentrations during project construction. A table will be prepared that identifies different placement method

factors and measured turbidity levels during construction monitoring, as available. Monitoring reports acquired and reviewed from the Regional Water Quality Control Boards, SAIC Team in-house libraries, and/or other sources will form the basis of information summarized in the table.

Overview of Natural Coastal Processes Affecting Beach and Nearshore Environments

- A cursory description will be prepared of coastal and oceanographic processes associated with terrestrial inputs of sediment to the coastal environment, seasonal beach erosion and build up, and movement of sands in the nearshore environment. The description will be general to southern, central, and northern California. The information will provide background on the dynamic nature of the coastal environment and physical processes naturally experienced by biological resources living in beach and coastal environments.
- Nearshore and offshore turbidity levels naturally vary according to water depth, wave height, and storm runoff. A general range of background and storm-associated turbidity levels will be summarized based on available reports.
- The depth of sand that seasonally moves on- and offshore within the beach profile varies along the coast. Typical sand depths associated with seasonal cross-shore transport of sand will be described based on monitoring reports of beach profiles for representative regions within the State.

- A cursory description will be prepared of the coastal processes associated with the fate and transport of sediment after placement on the beach, and the factors that affect sand erosion and retention (e.g., waves, currents, shoreline orientation and bathymetry, grain size characteristics, and location and dimensions of the sand placement (e.g., height above water, volume, location relative to the low tide line).

Overview of Types of Habitats and Species in Areas Where Beach Nourishment is Likely to Occur

- Types of habitats and sensitive species that occur in areas where beach nourishment has been conducted and/or is likely to occur will be identified. A table will be prepared that lists the relevant types of habitats and sensitive species within one (1) mile of locations where beach nourishment is likely to occur. The table will be cross-referenced according to county, where possible. This information will be used to answer question “a” of the RFP (*What are the types of species, threatened and/or endangered species, and sensitive habitats/ecosystems that are potentially impacted by sediment management activities, especially beach nourishment along the entire California coast?*).

Evaluation of Habitats Potentially Affected by Sediment Management

- Available literature, monitoring reports, documents, and other sources of information will be reviewed relative to the response of habitats to natural coastal process and sediment management activities. The types of habitats that may be evaluated include sandy beach, nearshore sands, rocky intertidal, subtidal rocky reefs, kelp beds,

surfgrass beds, eelgrass beds, and coastal lagoons/embayments.

- The relative value and/or importance of each of the relevant habitats will be summarized. Ecosystem, recreational, and commercial values associated with sand, rock, and muddy bottom habitats will be described. Other ways of evaluating the relative value of these habitats also will be considered such as whether habitats are vegetated by sensitive resources (e.g., kelp, surfgrass), relief height of rock reefs (low relief subject to seasonal burial versus persistent high relief), and the extent to which habitats support other relevant resources (e.g., surfgrass supporting lobster, high relief subtidal rocks supporting rockfishes). This evaluation will be used to answer question “f” of the RFP (*What are the relative ecosystem, recreational, and commercial values of rocky vs. sandy vs. muddy bottom habitats? Are there different ways to evaluate the relative value of these different habitats?*).
- For each of the habitats, where applicable, the description will identify indicator species physical adaptations, tolerances, recovery rates, and/or aspects of life history that contribute to the natural bio-resilience of the habitat. Each habitat description will address natural reported responses to burial, removal, sedimentation, and turbidity, as appropriate.
- Reported responses of vegetated habitats (kelp, surfgrass, eelgrass) to reduced light levels associated with turbidity will be reviewed, and reported critical impact thresholds will be identified, as appropriate. Reported responses of vegetated habitats to sedimentation and burial will be reviewed, and reported critical thickness and/or duration of burial will be

identified. These evaluations will be used to answer question “i” of the RFP (*How are kelp beds, eelgrass and other critical habitats affected by turbidity plumes and/or sedimentation? Is there a critical level of turbidity or thickness of sedimentation that causes an adverse impact to the kelp/eelgrass or biota living in the habitat?*).

- Evaluations of turbidity effects will consider studies investigating the effects of flocculation of clays on habitats and/or ecosystems, as specified in item “aa” of the RFP.
- Evaluation of soft-bottom habitats will consider reported responses of invertebrates to burial. Reports and literature associated with dredging/disposal and beach nourishment will be reviewed to answer question “q” of the RFP (*What types of species are vulnerable to burial, and what depth of sediment can the species of concern burrow through to avoid smothering?*).
- Evaluation of soft bottom habitats also will consider natural responses to burial, sedimentation, and sand transport associated with unstable physical environments, such as Portuguese Bend Landslide, as identified in item “z” of the RFP.
- Each habitat will include a summary of whether the basis of concern is determined from scientific data, uncertainty-based conservatism, or other information. This summary will be used to answer, for habitats, question “c” of the RFP (*Are documented concerns based on scientific data, uncertainty-based conservatism, or other information?*).
- A summary table will be prepared that lists the relevant habitats cross-referenced to potential direct and indirect impacts, which will be coded as to whether

they are generally considered short-term and transient (e.g., T) or long-term (e.g., L). Separate tables may be prepared for the different types of sediment placement methods, as appropriate. The habitat evaluations (described above) and the summary table will be used to answer, the habitat portion of, question “b” of the RFP (*What are the direct and indirect ways these species and habitats may be impacted? Is there a natural or bio-resilience that can be quantified? Are the impacts generally considered transient or long-term?*).

Evaluation of Species Potentially Affected by Sediment Management

- Available literature, monitoring reports, documents, and other sources of information will be reviewed relative to the response of relevant habitats to natural coastal process and sediment management activities. Threatened, endangered, and commercially and/or recreationally important species that will be addressed include birds (e.g., California brown pelican, California least tern, western snowy plover), fish/spawning habitat (e.g., herring eggs, salmon and steelhead trout runs, California grunion), and invertebrates (e.g., lobster, sea urchins, abalone). Marine mammals will be considered, but to a lesser degree, commensurate with the level of concern for potential impacts.
- For each of the evaluated species, where applicable, the description will identify behaviors, physical adaptations, migratory periods, and/or aspects of life history that contribute to natural bio-resilience of the species.

- For relevant group of relevant species (e.g., birds, fish, invertebrates), several evaluations related to turbidity impacts will be conducted. Published literature will be reviewed regarding the effects of turbidity on foraging capabilities of birds, fishes, and suspension feeding invertebrates. Reported critical thresholds will be identified. Published literature and monitoring reports will be reviewed for documentation of behavioral response of mobile fish and birds to turbidity plumes. In addition, the U.S. Army Corps of Engineers online database on dredging impacts will be reviewed for information on effects of dredging-induced turbidity on marine organisms. These evaluations will be used to answer question “k” of the RFP (*Can the effects of turbidity on the foraging capabilities of fish and birds be scientifically quantified? Are anecdotal observations indicating increased and concentrated fish (and subsequent bird) feeding along the edge of and within turbidity plumes scientifically supportable?*).
- Evaluations of fish will consider the effects of turbidity and sedimentation on nursery and/or spawning habitats. The evaluations will be used to answer question “n” of the RFP (*How do turbidity plumes and/or sedimentation affect herring eggs, salmon runs, and other similar critical species? Is there a critical volume, rate of sedimentation or seasonality that causes adverse impact?*).
- Evaluations of turbidity effects will consider studies investigating the effects of flocculation of clays on species, as specified in item “aa” of the RFP.
- Evaluations of bird species will consider types of prohibition zones that have been permit required, the bases for these zones, and whether they are scientifically defensible. These evaluations will be used to answer question “i” of the RFP (*What types of prohibition zones have been permit-required surrounding various sensitive bird nesting and nearshore foraging areas? What are the reported bases for these zones? Have the dimensions been based on scientific data, do they relate to potential foraging ranges or nesting territories, do they reflect measured impact ranges, are they based on professional judgment or uncertainty-based conservatism?*).
- Evaluations of birds will also consider prohibitions related to schedule. Whether the season limitations represent actual periods used for breeding and nesting will be summarized for each relevant species, as appropriate. Recommendations will be made relative to whether lengths of time could be safely revised. This information will be used to answer question “j” of the RFP (*Do typical bird breeding season limitations reflect the actual time that the area is used for breeding and nesting? Can historic lengths of time or areas under limitation be safely revised? What types of information and process are needed to objectively review and establish appropriate sediment management permit conditions associated with breeding season restrictions?*).
- Each species description will include a summary of whether the basis of concern is determined from scientific data, uncertainty-based conservatism, or other information. This summary will be used to answer, for species, question “c” of the RFP (*Are documented concerns based on scientific data, uncertainty-based conservatism, or other information?*).
- A summary table will be prepared that lists the species cross-referenced to potential direct and indirect impacts, which will be coded as to whether they are generally considered transient (e.g., T) or long-term (e.g., L). Separate tables may be prepared for the

different types of sediment placement methods, as appropriate. These text descriptions and summary table will be used to answer, the species portion of, question “b” of the RFP (*What are the direct and indirect ways these species and habitats may be impacted? Is there a natural or bio-resilience that can be quantified? Are the impacts generally considered transient or long-term?*).

Summary of Positive and Negative Effects of Sediment Management

A summary will be prepared based on the detailed evaluations of habitats and species reviewed in previous sections of the Summary Report.

- The summary will address reported benefits associated with beach nourishment, and answer the benefits portion of question “r” of the RFP (*What are the positive or beneficial [i.e., nutritive, beach profile structure, habitat value] and known negative effects of fine grained sediments?*).
- The summary will address habitats and species that benefit from beach nourishment, and answer question “s” of the RFP (*What are the positive or beneficial (i.e., nutritive value, habitat) effects of beach nourishment on species and/or ecosystems? What types of species benefit from beach restoration?*).
- The summary will address reported negative effects associated with beach nourishment, and answer the negative effects portion of question “r” (see above) and question “t” of the RFP (*What are the known negative effects of beach replenishment on species and/or ecosystems?*).

- The summary will address the relative quality of information that was evaluated for habitats and species regarding burial and sedimentation, and will answer question “p” of the RFP (*What evidence documents that burial, sediment scour or any other adverse impacts associated with movement of sediment occurred as a result of nourishment activities?*).
- The summary will address the relative quality of information that was evaluated for habitats and species regarding turbidity.
- The summary will address whether sediment management impacts are in general short-term and transient or long-term, and whether there is a difference in duration of impact relative to different types of sediment placement methods. This summary will be used to answer question “d” of the RFP (*Are sediment management impacts in general short-term and transient or are they long-term?*).
- The summary will address the scientific bases for key biological concerns. This will be used to provide an overview answer to question “c” of the RFP (*Are documented concerns based on scientific data, uncertainty-based conservatism, or other information?*).

Evaluation of Regulatory Methods to Avoid and/or Minimize Impacts

- CEQA/NEPA thresholds for significant biological impacts that have been established by various cities and counties as guidelines to identify when mitigation may be required will be summarized in a table with cross-reference to geographic region. This information will be used to answer the criteria part question “e” of

the RFP (*What are the biological thresholds of significance established by various cities and counties as guidelines to identify when mitigation under CEQA and NEPA may be required? Can an appropriate level of impact/mitigative measure be recommended for the species, habitat, ecosystem of concern?*).

- A table will be used to summarize mitigation measures required for permitted beach nourishment projects that will be cross-referenced to habitats and sensitive species. Measures may include restrictions to schedule, prohibition zones, protective placement methods, and monitoring before, during, and after construction. Documents, monitoring reports, and other information will be reviewed to evaluate whether the effectiveness of the mitigation measures has been demonstrated. The table will include a notation for those mitigation measures that have been documented to be effective. This evaluation will be used to answer question “u” of the RFP (*What mitigation measures have been implemented to avoid adverse impacts to biota during beach nourishment and related sediment management activities? Has the effectiveness of any of these mitigation measures ever been demonstrated?*).
- The types of methods that have been used to minimize impacts to biological resources will be described. These will include the most sensitive methods of placement on dry beach areas, in the nearshore zone, and offshore. In general, the most sensitive placement techniques to date involve controlling the rate and timing of placement to minimize undesired burial or turbidity. This information will be used to answer the method part of question “h” of the RFP (*What are the general and specific concerns for placing beach nourishment materials in the nearshore?, offshore?, on land? What types of methods have been used to minimize impacts associated*

with these different placement methods?). The information also will be used to answer the recommendation part of question “e” (*Can an appropriate level of impact/mitigative measure be recommended for the species, habitat, ecosystem of concern?*).

Identification of Information Gaps

Critical information gaps that limit the evaluations and/or conclusions of the Study will be summarized, and will be used to answer question “x” of the RFP (*What are the areas where information needed to make science-based decisions is sparse or unknown?*).

- Issue areas where little to no information is available to support science-based decisions will be summarized.
- Any key information gaps that limit conclusions regarding the significance of impacts from beach nourishment on habitat and/or species will be summarized.

Recommendations

Science-based recommendations will be developed to fill identified information gaps, provide guidance regarding standardization of appropriate permit conditions to avoid and minimize biological impacts, and appropriate types of monitoring to evaluate sand nourishment projects for significant changes. One technical workshop will be attended by selected key staff and QRB members to formulate the recommendations (see Task 6).

- A recommendation will address whether an ecosystem versus species specific approach should be taken to

enhance resource protection, and will answer question “g” of the RFP (*What are the pros and cons associated with ecosystem versus single-species approach for regulating the environment and sediment management activities in general? What recommendations can be made concerning the most appropriate approach and what steps and information is needed to pursue and implement such an approach, if appropriate*).

- A recommendation will be made regarding standardization of CEQA/NEPA thresholds to streamline future evaluations and review of sediment management projects.
- A recommendation will be made regarding measures to avoid and/or minimize impacts to coastal biological resources associated with sediment management activities in different geographic regions in order to streamline permitting, and will answer question “y” of the RFP (*How can potential impacts from sediment management activities to coastal biota and ecosystems be minimized in order to reduce the concerns of the regulatory community and streamline permitting of sediment management activities?*).
- A recommendation will address appropriate types of monitoring. The types and frequency of monitoring that have been permit-required will be reviewed in the context of the results of the detailed evaluations of habitats and species. The emphasis will be to recommend standardization of monitoring requirements, where possible, and to focus monitoring on measures of habitat and/or species that can be realistically, and effectively monitored to document change. The recommendation will consider science-based sampling design, but will not involve the use of

statistical power analysis or other statistical analyses in the development of the recommendation. This effort will address question “w” of the RFP (*What is the appropriate level and type of pre- and post-project sampling needed to evaluate the project for significant changes?*)

- A recommendation will address turbidity impacts, and appropriate monitoring. Similar to that described above, the types and frequency of monitoring that have been permit-required will be reviewed in the context of the results of the detailed evaluations of habitats and species. The emphasis will be to recommend standardization of monitoring requirements, where possible, and to focus monitoring on detection of changes in turbidity that have the potential to cause biological effects. The recommendation will consider science-based sampling design, but will not involve the use of statistical power analysis or other statistical analyses in the development of the recommendation. This effort will answer question “v” of the RFP (*What level and type of turbidity monitoring before, during, and after sediment management activities is appropriate in order to more directly relate turbidity levels to biological effects?*)

Task Assumptions

- The draft Table of Contents and format guidelines will be submitted within two (2) weeks of the Notice to Proceed to the CSMW Project Manager, who will distribute them to members of the CSMW for review and comment, as appropriate.
- The Table of Contents and format guidelines will be finalized based on a consolidated set of comments. Up to one (1) month has been assumed for CSMW review and comment.

- This task assumes no changes to the organization of the document after the Table of Contents has been approved.
- Draft example formats for technical evaluation tables will be submitted to the CSMW Project Manager within two (2) months of the Notice to Proceed. Up to one (1) month has been assumed for CSMW review and comment.
- A GIS base map or other readily available base map will be provided by the GIS analyst to facilitate the preparation of graphics in support of this task.
- The draft Summary Report will be completed within six (6) months of the Notice to Proceed.
- It is assumed that the draft Summary Report will be submitted electronically as an Adobe Acrobat (pdf) file to the CSMW Project Manager, who will distribute the document to the CSMW for review and comment.

Task 5 Final Report

The draft Summary Report will be finalized based on a consolidated set of comments. A total of two (2) hard copies and ten (10) compact discs with an electronic Adobe Acrobat (pdf) file will be submitted of the final Summary Report.

Task Assumptions

- The CSMW Project Manager will provide one set of consolidated comments on the draft Summary Report within one month of receipt of the draft Summary Report.
- The final Summary Report will be completed within one (1) month of receipt of comments on the draft report.

- The CSMW Project Manager will distribute the final document, as appropriate.

Task 6 Other Coordination

Meetings between the SAIC Project Manager and the CSMW Project Manager will be held to discuss the project, a technical workshop will be held with selected key staff, and coordination with other CSMW Analysts will be conducted during the performance of the project.

Task Assumptions

- The SAIC Project Manager and selected key staff will attend one kickoff meeting with the CSMW Project Manager
- The SAIC Project Manager will attend one meeting with the CSMW Project Manager to review comments on the draft Summary Report.
- The SAIC Project Manager and selected key staff and QRB members will attend one (1) technical workshop meeting to formulate technical recommendations for the draft Summary Report.
- Meetings will be held at SAIC's offices in La Jolla and/or Santa Barbara, California, according to the preference of the client.
- The SAIC Project Manager will reserve a total of 16 hours of effort for answering questions, and/or coordination with the PPR, GIS, and fate & transport analysts.

3.0 Schedules

The following table provides a proposed schedule for Tasks and Deliverables. A key element of the schedule is early coordination regarding the references and format of technical information in the Annotated Bibliography and Summary Report deliverables.

Deliverable (Task)	Sep 04	Oct 04	Nov 04	Dec 04	Jan 05	Feb 05	Mar 05	Apr 05	May 05
Notice to Proceed	14								
Task 1 (Document Acquisition, Review, and Annotated Bibliography)									
Draft Format	28								
CSMW Review Format & Comment	•	22							
Acquire and Screen Documents	•	•	•	•					
Draft Annotated Bibliography		•	•	13					
CSMW Review & Comment				•	17				
Obtain/Screen Additional Documents and Finalize Bibliography					•	•	14		31
Task 2 (Copies of References)									
Digital and/or Hard Copies of References	•	•	•	•	•	•	•	•	31
Task 3 (List of Referenced Permits)									
Coordinate with GIS and PPR Analysts	•								
List of Permits	•	•	•	13			14		31
Task 4 (Draft Summary Report)									
Draft Table of Contents and Format Style Guidelines	28								
CSMW Review & Comment	•	22							
Draft Table Formats		•	8						
CSMW Review & Comment			•	13					
Draft Report				•	•	•	14		
CSMW Review & Comment							•	15	
Task 5 (Final Summary Report)									
Final Report								•	31
Task 6 (Other Coordination)									
Kickoff Meeting	X								
Draft Report Review Meeting								15	
Technical Workshop						X			
Coordination with GIS Analyst					X				X
Coordination with Fate and Transport Analyst							X	X	X
Coordination with PPR Analyst							X	X	X

• = ongoing activity X = to be scheduled in month indicated

Note: The Final Annotated Bibliography and List of Permits will be submitted as appendices with both the Draft and Final Summary Reports



4.0 Management Plan

4.1 SAIC Team Organization

The SAIC Team has extensive experience performing multidisciplinary projects for coastal waters in California. The team is organized in functional roles according to technical requirements of the project (Figure 1).

4.2 Senior Key Staff Responsibilities

Karen Green, M.S. – Project Manager, Task Leader (SAIC)

Ms. Green will serve as the project manager and single point of contact to the CSMW Program Manager for the proposed study. She will develop the organization and format of the document, coordinate staff assignments, establish schedule milestones, and implement project controls for budget and schedule. She will serve as Task Leader responsible for coordination and preparation of evaluations of habitats, and will prepare evaluations related to invertebrate species. She will lead a technical workshop to formulate recommendations related to streamlining permitting, minimizing impacts, and monitoring. She will coordinate with the Quality Review Board, and project PPR, GIS, and Fate and Transport Analysts. Ms. Green will provide technical quality review of all submittals, and will coordinate the production of submittals with support staff.

Noel Davis, Ph.D. – Task Leader, Sensitive Species

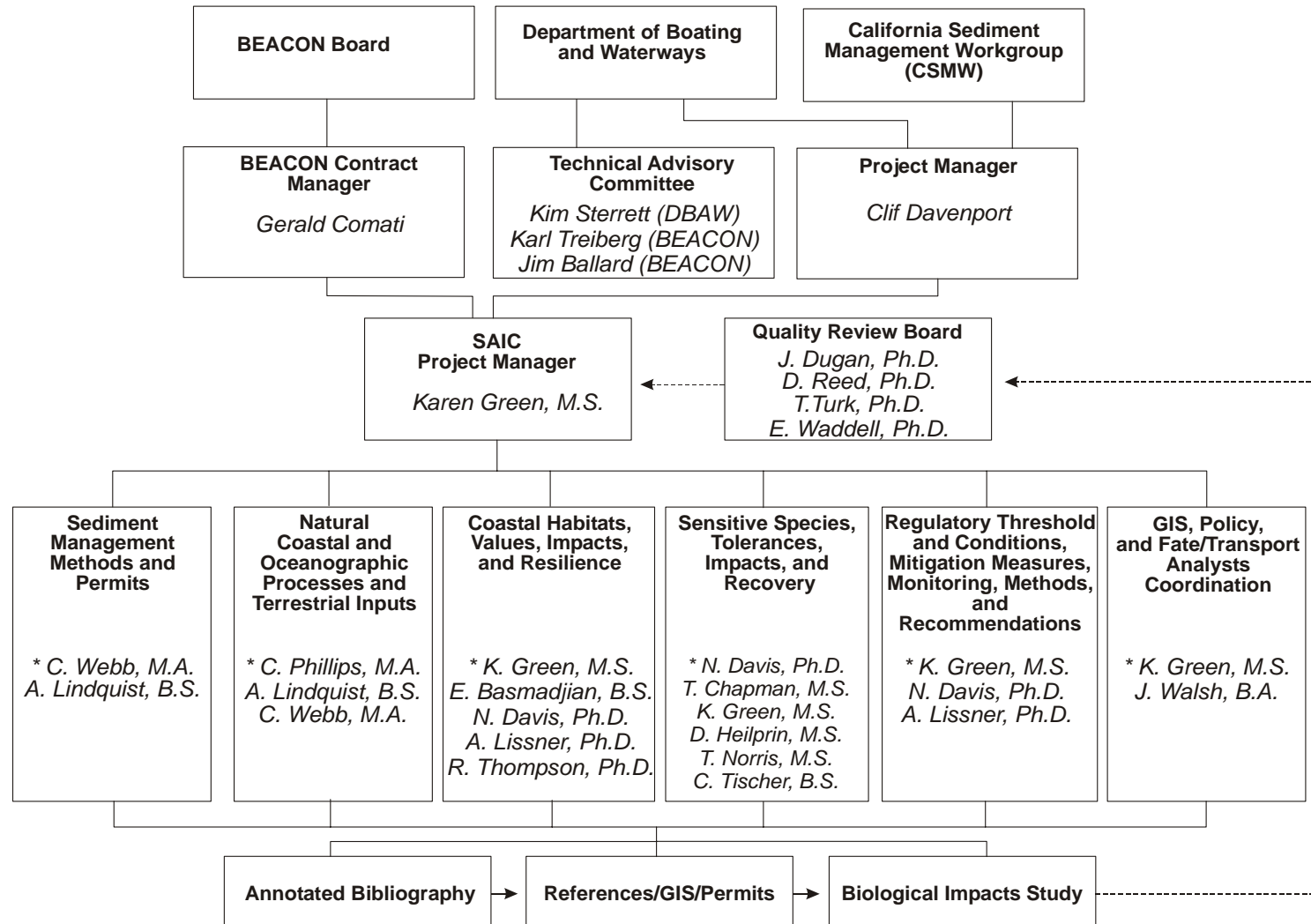
(Chambers) - Dr. Davis will serve as task leader responsible for coordination and preparation of evaluations of sensitive species. She will assist with valuation of habitats, and will participate in a technical workshop to formulate recommendations regarding an ecosystem versus species-

specific approach to regulation, methods to minimize impacts, monitoring, and streamlining permitting. Dr. Davis will provide technical quality review of the draft report.

Andrew Lissner, Ph.D –Habitats, Recommendations, Quality Review (SAIC) - Dr. Lissner will participate in technical evaluations of coastal habitats. He also will participate in a technical workshop to formulate recommendations regarding an ecosystem versus species specific approach to regulation, methods to minimize impacts, and monitoring. Dr. Lissner will provide technical quality review of the draft report.

Charles Phillips, M.S. – Task Leader, Coastal and Oceanographic Processes (SAIC) - Mr. Phillips will serve as task leader responsible for the preparation of a background section on natural coastal processes and oceanographic conditions. He will prepare general descriptions of natural migration of sand within the beach profile, typical seasonal ranges of turbidity, and prevailing current directions and speeds within nearshore and offshore environments.

Chris Webb, B.S. – Task Leader, Sediment Management Methods (M&N) - Mr. Webb will serve as task leader responsible for preparation of a background section describing types of sediment activities and placement methods on land, nearshore, and offshore. He will prepare a section describing where beach nourishment has and is likely to occur within the State. He also will contribute to the description of coastal processes affecting beach erosion and sand transport after beach nourishment. Mr. Webb will coordinate acquisition of copies of permits, and relevant documents associated with beach fill programs.



* Task Leader

Figure 1. Project Organization.

4.3 Support Staff

Edward Basmadjian, B.S. (SAIC)

Mr. Basmadjian will conduct literature searches and acquire relevant documents. He also will participate in the screening of acquired documents and preparation of the Annotated Bibliography.

Todd Chapman, M.S. (Chambers)

Mr. Chapman will conduct literature searches and acquire relevant documents. He will conduct technical evaluations related to sensitive fish species.

Daniel Heilprin, M.S. (SAIC)

Mr. Heilprin will manage the preparation of the Excel database associated with development of the Annotated Bibliography. He also will participate in literature searches and document acquisition. Mr. Heilprin will participate in technical evaluations related to fish species.

Tom Norris, M.S. (SAIC)

Mr. Norris will assist with technical evaluations that include consideration of marine mammals.

Rosie Thompson, Ph. D. (SAIC)

Dr. Thompson will participate in technical evaluations of coastal habitats. She also will review recommendations related to streamlining of permitting and monitoring.

Christine Tischer, B.S. (Chambers)

Ms. Tischer will assist with document acquisition. She also will participate in technical evaluations of sensitive bird species.

4.4 Quality Review Board

A quality review board will review the draft Annotated Bibliography for completeness, and the draft Summary Report for technical accuracy and clarity.

Jenny Dugan, Ph.D (UCSB)

Dr. Dugan will review the draft Annotated Bibliography and contribute relevant references. She also will provide technical review of evaluations associated with sandy beach habitat.

Daniel Reed, Ph.D (UCSB)

Dr. Reed will review the draft Annotated Bibliography and contribute relevant references. He will participate in a technical workshop to formulate recommendations. Dr. Reed will provide technical review of evaluations associated with kelp beds, surfgrass, and rock reef habitats. Relatively more resource allocation has been assigned to his role because of his expertise with these habitats, which are of particular concern to resource and regulatory agencies.

Ted Turk, Ph.D. (SAIC)

Dr. Turk will review the draft Annotated Bibliography and contribute relevant references. Dr. Turk will provide technical review of evaluations associated with habitats, sensitive species, and recommendations related to minimizing impacts and monitoring.

Evans Waddell, Ph.D. (SAIC)

Dr. Waddell will review the draft Annotated Bibliography and provide reference information and/or copies of any obviously

missing relevant references. Dr. Waddell will provide review of technical sections describing coastal processes.

4.5 Project Controls

Project Management

The approach taken by SAIC to assure successful project control and performance has been to assemble a team of experts under strong and responsive leadership. Karen Green, an experienced biologist and respected project manager, will direct the team's efforts. Ms. Green has earned the trust of numerous clients and other firms she has teamed with based on her management style and attention to technical accuracy and quality. She responsibly establishes schedules, proactively communicates with team members and clients, and ensures that work products adhere to work scope and technical quality standards. For over 10 years, Ms. Green has managed a range of small to large environmental projects with combined budgets on the order of \$ 1 million dollars per year. Projects have included monitoring during dredging, biological baseline studies, construction monitoring, preparation of Biological Assessments, restoration studies, and watershed management plans.

Ms. Green measures project success in terms of adherence to budget and schedule, technical quality, client and team satisfaction, and agency approval. Key aspects of Ms. Green's project management approach are described below.

Budget/Schedule

Critical to the overall success of the project is control of budget and schedule. A combination of effective project management and frequent review of accounting reports (labor, subcontracts, consultants, other direct charges) enables efficient, accurate

project management. Ms. Green controls costs by establishing work effort allocations with Task Leaders and support staff, bimonthly monitoring of labor and other direct charges to the project, and progress review of work products. Ms. Green meets schedule by establishing project milestones in coordination with staff, and monitors progress with verbal and written communication. Ms. Green is vigilant in her project review so that potential problems are avoided or minimized. Subcontract and Consultant Agreements will be used to control tasks, milestones, and deliverables that include SAIC's use of the subconsultants listed in this proposal.

Client Interaction and Progress Communication

Ms. Green will be the primary point-of-contact with the CSMW Program Manager, Mr. Clifton Davenport. Ms. Green employs a proactive approach to communication. She keeps clients and team members informed in advance of all scheduled activities, work progress, and immediately alerts them to potential problems and possible solutions. Ms. Green is accustomed to communicating progress by telephone, e-mail, and/or by monthly reports of planned activities and expended budget. Ms. Green will discuss communication with the CSMW Program Manager at the onset of the project, and follow his preference with regard to progress reporting.

Team Coordination and Integration

Ms. Green has enjoyed previous professional working relationships with all key team members. During this proposal phase, she established clear roles for all team members that will be followed through project implementation. Ms. Green will coordinate with team members using verbal and written communication, and is proposing two coordination meetings among SAIC Team members to ensure integrated work efforts within the tight schedule of performance. Those meetings

(kick off, technical workshop) are described under Task 6 of the Technical Approach.

Quality Assurance/Quality Control

SAIC takes pride in producing defensible and objective environmental documents for its clients, many of whom are federal, state, and local agencies. These attributes also will be of critical importance for the Biological Summary Report to enable its acceptance as an information tool to assist resource and regulatory agencies streamline sediment management along California beaches.

SAIC understands that quality starts with a clearly defined project plan, and appropriate staff assignments. SAIC has assembled a team of some of the most experienced and respected marine scientists working in California. All task leaders have over 15 years of work experience, as do the majority of staff assigned to the project (see Section 5). Over 80% of the staff have masters or doctoral degrees.

Work products produced by Ms. Green and SAIC Team members have received independent commendations. For example, Ms. Green received an award for her contribution to the Seven Oaks Dam project, which was awarded the U.S. Army Corps of Engineers, Chief of Engineers Design and Environmental Honor Award for 2002. Ms. Green led the preparation of the Biological Assessment for that project. In addition, Ms. Green led the preparation of the Dominguez Watershed Management Master Plan, which the Regional Water Quality Control Board of Los Angeles has communicated is the example they refer others to who are interested in how to prepare a watershed plan. Another recent example includes the EIR/EIS for the Bolsa Chica Lowlands Restoration Project, which was produced under the leadership

of Dr. Noel Davis (Chambers Group) with substantial contribution by Karen Green. This document was recognized as an Outstanding Environmental Analysis Document in 2001.

SAIC has established a multi-step quality control plan for the proposed project. Ms. Green will establish style and format guidelines for the report at the onset of the project in coordination with the CSMW Program Manager. Task Leaders will review the work products for consistency with the approved guidelines. In addition, Ms. Green will review the draft and final Biological Summary Reports in their entirety for technical accuracy, clarity, and grammar prior to submittal to the CSMW Program Manager.

Ms. Green has established a Quality Review Board (QRB) of technical experts to assist her in providing comprehensive control of technical quality of the Biological Summary Report. The draft report will be submitted to QRB members, who were selected for their expertise in coastal processes, understanding of biological response to sediment management methods (dredging, disposal, and beach nourishment), regulatory issues associated with sediment management, and sensitive marine habitats. This internal independent review will ensure that the SAIC Team prepared document will be of the highest technical quality, which should streamline any future independent reviews of the document.

4.6 Work Locations

The proposed project will be managed from SAIC's corporate offices located at 10260 Campus Point Drive, La Jolla, California, 92121. Work will be performed by SAIC Team members at offices located in southern and central California. SAIC will perform the majority of work from offices located in

La Jolla and Santa Barbara California. Work performed by Chambers Group will be performed from their corporate office in Irvine, California. M&N will perform work from their office in Long Beach, California. Quality Control Board members will conduct their reviews from their offices in Santa Barbara, California (Drs. Dan Reed, Jenny Dugan), Bothell, Washington (Dr. Ted Turk); and Raleigh, North Carolina (Dr. Van Waddell).

5.0 Qualifications

SAIC Team members have been performing studies of the California coastal environment since the early 1970s. All team members have performed technical studies associated with sediment management activities. This experience spans the following technical areas:



- ✓ Project planning;
- ✓ Design of sediment management projects;
- ✓ Documentation of existing environmental conditions;
- ✓ Characterization of sediment characteristics of donor materials and existing sediments;
- ✓ Preparation of CEQA/NEPA documentation, including mitigation recommendations;
- ✓ Project permitting;
- ✓ Compliance monitoring during project construction; and
- ✓ Documentation of post-project conditions and determination of compliance with mitigation measures.

SAIC Team members also have extensive experience conducting biological monitoring surveys of sandy and rocky intertidal and subtidal environments, vegetated habitats (kelp, surfgrass, and eelgrass beds), coastal lagoons and wetlands, and bays and harbors. A variety of methods have been used in these studies including SCUBA diving; submersible and ROV surveys; fish sampling using nets; invertebrate collection using sediment cores and nets; kelp, surfgrass, and eelgrass mapping; water quality and sediment sampling; and marine mammal, shorebird, and seabird surveys. This experience will assure that all recommendations made by the SAIC Team regarding monitoring will be science-based and well founded from a practical and logistical standpoint.

Commensurate with this breadth of experience, SAIC Team members have extensive in-house libraries concerning the California coastal environment and biological resources. In addition, Team members have already acquired substantial literature and permits relative to beach nourishment and sand placement activities.

In addition, SAIC Team members have performed habitat valuations associated with restoration design, mitigation planning, and determination of project success in meeting mitigation requirements. Habitat valuations have been performed using methods and formulae which have been tailored for specific projects in coordination with resource and regulatory agencies. SAIC Team members have expertise with both habitat and species based valuation methodology.

Relevant experience is organized in the following subsections according to the following topic areas:

- Profiles of Team Member Firms, and
- Experience of Key Personnel

5.1 Profiles of Team Member FirmsScience Applications International Corporation

SAIC is an employee-owned, high technology corporation founded in 1969 and headquartered in San Diego California. They have several offices on every coast of the United States. SAIC has over 3,000 scientists, engineers, and technicians who are dedicated to providing environmental services to government and commercial clients throughout the United States. For more than 25 years, SAIC has been conducting marine research, monitoring, and engineering off California and worldwide in support of an extensive variety of projects and studies for both government and industry clients. Marine environmental services and studies focus on biology, chemistry, geology, oceanography, air and water quality in support of compliance programs, planning, permitting, and associated environmental documentation (including CEQA and NEPA analyses). SAIC offers an extensive array of cutting edge technologies and solutions, such as full-service dredged material and contaminated sediment management, disposal barge tracking, and sediment profiling camera systems, in addition to more traditional sampling and study methods (e.g., corers, grabs, trawls, SCUBA diving, and remotely operated vehicles). This work has been performed for a broad range of clients such as port districts, shipyards, port tenant associations, sanitation districts, Minerals Management Service, U.S. Environmental Protection Agency, U.S. Navy, and U.S. Army Corps of Engineers. Locally, SAIC has conducted a comprehensive array of focused studies and long-term monitoring programs in all major ports and harbors, several lagoons, and throughout the coastal environment of southern California.

Chambers Group, Inc.

Chambers Group Inc., a certified Disabled Veteran Business Enterprise (DVBE), was established in 1978, and provides interdisciplinary environmental consulting services to private business, industry, and government agencies. The company of over 100 professionals is headquartered in Irvine, with regional offices in Redlands and in Reno, Nevada. They specialize in environmental impact assessment, natural and cultural resources management, planning, regulatory compliance, air quality, and GIS services.

Chambers Group staff includes wildlife biologists, botanists, marine biologists, wetland and restoration specialists, environmental analysts, cultural and scientific resources professionals, urban and regional planners, air quality specialists, GIS analysts, and an archaeological field crew. Chambers Group has prepared numerous environmental documents evaluating coastal development, beach nourishment, and wetlands and eelgrass restoration. In addition, they have conducted numerous that studies that include inventory of California marine and wetland resources.

Moffatt & Nichol

M&N is a multi-disciplinary planning and engineering firm that provides a full range of coastal engineering services. These services include conceptual planning (engineering, environmental review, and permitting), feasibility studies, preliminary and final design services, construction support activities, and monitoring for beach nourishment. They have been in business since 1945, and their corporate headquarters and main office are located in Long Beach, with other offices throughout coastal California, the northwest, and the Gulf and East Coasts.

Services include coastal and oceanographic engineering, wetlands and watershed restoration, port planning, harbor works, marinas and waterways, bridges, urban waterfronts, military installations, marinas, public works and management supervision, and construction inspection. Analysis tools include shoreline modeling using a variety of programs, use of Geographic Information Systems (GIS), AutoCAD, Intergraph, and others. The firm has designed beach nourishment for the San Diego Regional Beach Sand Project (Preliminary Engineering), Carlsbad Opportunistic Beach Fill Program, BEACON South Central Coast Beach Enhancement Program, San Clemente Opportunistic Beach Fill Program, Seal Beach Nourishment (3 times), South Carlsbad Beach Nourishment from Batiquitos Lagoon Dredging, Solana Beach Nourishment from Grade Separation Work, and Nourishment of world-famous Coney Island, NY beaches.

5.2 Experience of Key Personnel

Relevant experience for key personnel is summarized in Table 1. Brief profiles highlighting relevant experience of key personnel are given below. Detailed resumes are provided in Appendix A.

Project Manager





Karen Green, M.S. (SAIC) - Ms. Green has over 25 years of experience in project management, marine biology, wetland ecology, environmental restoration, CEQA/NEPA documentation, and permit compliance. She has managed projects related to biological assessments, restoration and mitigation, habitat evaluations, dredging/disposal, and beach nourishment. Several of her management projects have involved summary of baseline conditions for coastal nearshore

and lagoon habitats and sensitive resources throughout Los Angeles, Orange, and San Diego Counties. She is a published expert in the identification of marine worms and sponges, and is an experienced ecologist familiar with commonly observed species in marine and wetland environments.

Ms. Green has specialized experience with biological and water quality issues associated with coastal sedimentation, sediment transport, and sediment management relative to beach replenishment, coastal erosion, and lagoon and harbor dredging and disposal. Ms. Green was the senior biologist and coordinated with resource and regulatory agencies for the recent San Diego Regional Beach Sand Project. She was the senior biologist for the City of San Diego Coastal Erosion EIR, senior biologist for a project involving beach nourishment in Imperial Beach, and recently managed the preparation of a joint EIS/EIR regarding shoreline protection in the City of Encinitas and City of Solana Beach. Ms. Green also has managed sediment testing and biological monitoring studies associated with dredging lagoons and harbors and use of the materials for beach replenishment in southern California. In addition, Ms. Green recently conducted a biological study investigating biological beneficial use of beach nourishment in the City of Encinitas. In her role as senior biologist for these projects, Ms. Green has assisted project engineers to refine locations and dimensions of beach receiver sites to minimize impacts to marine resources; evaluated the potential for impacts to habitats and sensitive resources from disturbance, sedimentation, sand transport, and turbidity; and coordinated with resource and regulatory agencies regarding project permitting, including Section 7 Endangered Species Act consultations, mitigation measures, and pre- and post-project monitoring.

Table 1. Staff matrix of qualifications.

Personnel	Education Degree	Years Experience	Primary Discipline	Issue Areas							Habitats							Geographic Areas					Other		
				Beach Nourishment	Dredging/Disposal	Shoreline Protection	Sedimentation	Sediment Transport	Turbidity	T&E /Sensitive	Beaches	Bays/Harbors	Coastal Lagoons	Eelgrass/Surfgrass	Kelp Beds	Nearshore sands	Rocky Reefs	S. California	C. California	N. California	Pacific Northwest	Gulf Coast	East Coast	Literature Review	Permitting
Karen Green	M.S.	30	Marine Biology	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Edward Basmadjian	B.S.	19	Biology	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Danny Heilprin	M.S.	15	Fisheries	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Andrew Lissner	Ph.D.	30	Marine Biology	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tom Norris	M.S.	14	Mammals						•	•	•	•		•	•	•	•	•	•			•	•	•	
Charles Phillips	M.A.	20	Water/Sediment	•	•		•		•		•	•					•	•	•			•	•	•	
Rosemary Thompson	Ph.D.	25	Marine Biology	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
Ted Turk	Ph.D.	25	Biology/ Ecology	•	•	•	•	•	•	•	•	•	•	•	•	•				•			•	•	•
Evans Waddell	Ph.D.	30	Physical Processes	•	•	•	•	•	•		•	•	•			•	•	•	•	•	•	•		•	
J. Walsh	B.A.	11	GIS		•							•					•	•	•					•	
Noel Davis	Ph.D.	26	Marine Biology	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•
Todd Chapman	M.S.	12	Marine Biology	•	•	•	•		•	•	•	•	•	•	•	•	•	•				•	•	•	
Christine Tischer	B.S.	7	Ornithology		•				•	•	•	•					•	•	•				•	•	•
Anne-lise Lindquist	B.S.	8	Coastal Engineering	•	•	•	•	•	•		•	•	•			•	•	•				•	•	•	•
Chris Webb	M.A.	15	Coastal Geomorphology	•	•	•	•	•	•		•	•	•			•	•	•	•				•	•	
Jenny Dugan	Ph.D.	13	Marine Biology	•						•	•							•					•		
Dan Reed	Ph.D.	30	Marine Biology	•						•			•	•	•	•	•	•	•				•		

SAIC  Chambers Group  Moffatt & Nichol  Consultant 



Senior Key Staff and Task Leaders

Noel Davis, Ph.D. (Chambers) - Noel Davis has over 25 years' experience analyzing impacts to California coastal resources. She has managed numerous projects related to beach nourishment and the impacts of dredging and sediment disposal on the California coastal environment. She was project manager for the EIR/EA for the BEACON Beach Nourishment Demonstration Project, which analyzed several alternative methods and locations for beach nourishment in Santa Barbara County. The BEACON sand nourishment project was implemented at Goleta Beach and Dr. Davis currently is the principal scientist in charge of monitoring the impacts to kelp beds, surfgrass, and eelgrass of that project. Dr. Davis also was project manager for a study that analyzed the impacts to biological resources of BEACON's proposed opportunistic beach enhancement program, which proposed to place sand from various sources on six beaches in Santa Barbara County.

Dr. Davis was project manager for several major CEQA/NEPA documents that had dredging, sediment disposal and beach nourishments as major elements of the project. These documents include the EIR/EIS for the Bolsa Chica Lowlands Restoration Project, the EIS/EIR for the Ballona Creek Sediment Control Management Plan, the EIS/EIR for the Upper Newport Bay Restoration Project, and the Dredge Material Management Plan Draft Programmatic EIS/EIR for Harbors and Marinas in the Los Angeles Area. She also was project manager for an EA for Morro Bay Harbor Maintenance Dredging. Dr. Davis has also been involved in several field studies to monitor the effects of sedimentation on nearshore biological resources. She was a scientist/diver on a study to monitor the impacts of Caltrans disposal of sediment from bluff

erosion in Malibu on the nearshore subtidal environment. She also was project manager of a study to document the effects on intertidal and subtidal resources of the Palos Verdes landslide. She has been responsible for monitoring the impacts to marine resources from the Oceanside Experimental Sand By-pass Project, maintenance dredging and nearshore sediment disposal at Ventura Harbor, and excavation of sand for beach nourishment from a borrow pit at Sufside/Sunset Beaches in Orange County.

Andrew Lissner, Ph.D. (SAIC) - Dr. Lissner has over 25 years experience specializing in marine, estuarine, and wetlands biology and ecology, water quality, and marine chemistry of California and numerous other coastal and nearshore areas of the United States. Many of his projects have involved technical support and project management related to dredging/disposal and discharge-related programs for the U.S. Navy, Environmental Protection Agency, U.S. Army Corps of Engineers, State of California, Department of the Interior, National Oceanic and Atmospheric Administration, port districts, and public sanitation districts. He is an expert in the biology and ecology of coastal and nearshore biological communities, having conducted numerous studies and literature reviews documenting distribution and abundance and impacts from dredging/disposal and construction projects, combined with extensive permitting experience. Some of this experience includes program manager and/or senior scientist for the following programs: San Dieguito Lagoon Restoration EIR/EIS, involving evaluation of alternatives for dredging/excavation and disposal of up to 2 million cubic yards of material; beach nourishment alternatives and impact evaluations for Imperial Beach, CA; dredging/disposal and impact evaluations for restoration alternatives in Morro Bay Estuary and several San Diego County lagoons; characterization of coastal and

nearshore biological communities from San Francisco to San Diego as part of large, multi-year fiber optics cable route program; and disposal alternatives, including beneficial reuse from dredging of almost 1 million cubic yards of material for Navy nuclear aircraft carrier homeporting programs. This experience is in addition to numerous dredging and disposal programs conducted in the Pacific Northwest for the Navy, and at over twenty sites along the Gulf and East Coasts for EPA and the Corps of Engineers.

Charles Phillips, M.A. (SAIC) - Mr. Phillips has over 20 years of work experience in aquatic and environmental sciences, particularly within coastal California. His expertise includes aquatic and environmental chemistry, water quality, and environmental impact analysis. Mr. Phillips has evaluated water quality issues and prepared sections of EIS and EIR documents for numerous coastal development projects in California. He is experienced in permitting, compliance monitoring, and reporting requirements.

Chris Webb, M.A. (Moffatt & Nichol) - Mr. Webb has 13 years of professional experience in environmental impact analysis and securing permits. He is familiar with the environmental review procedures established under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Mr. Webb has expertise in overall project planning efforts including conceptual engineering and permitting. His environmental review experience includes preparing negative declarations, findings of no significant impact (FONSI), environmental impact reports (EIR), and sections of environmental impact statements (EIS).

Support staff

Edward Basmadjian, B.S. (SAIC) - Mr. Basmadjian has 19 years of experience in risk and impact assessments of coastal marine environments. He has coordinated field and research efforts in support of marine biology, estuarine environments, wetland ecology, CEQA/NEPA documentation, and permit compliance tasks. He has participated in numerous impact assessments related to potential habitat disruption and ecological damage associated with various development projects both locally and internationally. Specializing in nearshore marine environments, Mr. Basmadjian has been the lead researcher on a study design focusing on minimizing impacts to coastal marine resources. He has been involved in summarizing sediment baseline conditions for sensitive resources and wetland habitats throughout coastal California.

Todd Chapman, M.S. (Chambers) - Todd Chapman has over 12 years experience in marine biology studies in California. He has participated in a number of studies related to beach nourishment, dredging and sediment disposal. He was a scientist /diver for surveys of six beaches proposed for beach nourishment by the BEACON Opportunistic Beach Nourishment Program. He monitored the impacts to grunion and western snowy plovers during beach nourishment from maintenance dredging in Santa Barbara Harbor. He is part of the monitoring team to analyze the impacts to kelp beds, eelgrass, and surfgrass of the Goleta Beach Sand Replenishment Project. Mr. Chapman was senior marine biologist for a program to collect and test sediments in Long Beach Harbor to analyze disposal options for contaminated sediments. Mr. Chapman also worked on the EA for Maintenance Dredging in Morro Bay Harbor and participated in surveys of eelgrass beds and kelp beds in the harbor. Mr;

Chapman has an M.S. in Biology from California State University at Long Beach.

Anne-Lise Lindquist, B.S. (M&N) - Ms. Lindquist has more than 5 years of experience in coastal permitting, coastal processes, storm analysis, data acquisition, and report preparation. She has worked on a variety of coastal engineering projects including beach-fill modeling, hydraulic analysis, coastal impact studies, wave prediction, and environmental permitting. Prior to joining Moffatt & Nichol Engineers, Ms. Lindquist participated in a multi-year project on coastal processes in Brevard County, Florida, with the U.S. Army Engineer Coastal Engineering Research Center, Vicksburg, MS. and consulted on a sediment transport study in Carlsbad, California.

Tom Norris, M.S. (SAIC) - Tom Norris has over 10 years of experience in marine mammal acoustics, marine mammal population biology, and more recently development of new technologies to track, monitor and survey large marine animals. He is currently the project manager for several projects including a project to compare statistical models for predicting cetacean distribution abundance using data from collected from ships and satellites. He holds a federal permit to conduct research on a variety of federally protected and endangered species of marine mammals.

Christine Tischer, B.S. (Chambers) - Christine Tischer has 7 years experience in wildlife biology, specializing in studies of impacts to sensitive bird species including California least terns, American peregrine falcons, and western snowy plovers. She recently served as a contract wildlife biologist at the Camp Pendleton Marine Corps Base. California least terns and western snowy plovers both breed on the beach at

this base. In addition, Ms. Tischer was responsible for monitoring California least tern activity in Queensway Bay to determine whether turbidity from dredging would adversely affect tern foraging. Ms. Tischer has also monitored peregrine falcon predation of least tern colonies and surveyed for western snowy plovers to determine if repair of a railroad revetment would impact this species.

Rosemary Thompson, Ph.D. (SAIC) - Dr. Thompson has 32 years of experience in marine and freshwater biology (including wetlands), project management, threatened/endangered and sensitive species, environmental assessment and habitat restoration, CEQA/NEPA documentation, and permitting/permit compliance. Dr. Thompson has specialized training for wetland delineation and fish barrier assessment. Dr. Thompson has managed biological and water quality studies in support of permitting for dredging in Santa Barbara Harbor and beach nourishment, and will manage updates to those studies for renewal of the dredging permits. Dr. Thompson has designed and managed biological monitoring plans (including threatened or endangered species) for compliance with dredging permits. In addition, she has worked closely with regulatory agencies and project proponents to minimize environmental impacts of projects and to facilitate obtaining permits. She has extensive experience in surveying to locate, assessing impacts to, and developing mitigation measures for threatened/endangered and sensitive species.

Quality Review Board

Members of the QRB were selected that have a broad experience base, including relevant experience along other coasts of the United States, in the areas of coastal

processes, biological response to sediment dredging/disposal, regulatory issues, and sensitive marine habitats.

Jenny Dugan, Ph.D. (UCSB)- Dr. Dugan has been a research biologist and lecturer at the University of California, Santa Barbara for over 10 years. A major focus of her research has been the ecology of sandy beach habitats. Dr. Dugan has conducted numerous studies contributing to the understanding of sand crab and clam population biology, burrowing abilities, and distribution relative to environmental conditions. She has evaluated the response of beach habitats to beach grooming and other management activities using field surveys and experiments. Dr. Dugan also has investigated interactions between physical characteristics of beaches and invertebrate communities, the response of beach infauna to disturbance, and relationships between invertebrate prey and shorebird utilization (including the Western Snowy Plover) of sandy beaches.

Daniel Reed, Ph.D. (UCSB) - For the past 15 years, Dr. Reed has been employed at the Marine Science Institute of the University of California, Santa Barbara. Dr. Reed has conducted numerous studies associated with understanding life history, recruitment, persistence, and ecosystem dynamics associated with California kelp beds. In addition, Dr. Reed has monitored and conducted studies investigating the response of kelp beds to disturbance. Another area of research has been nearshore reefs, and population genetics, recolonization, and restoration of surfgrass.

Ted Turk, Ph.D. (SAIC) - Dr. Turk has over 24 years of experience performing a wide range of environmental studies.

He has managed many projects concerning the environmental effects of dredging and dredged material disposal, including beach nourishment, primarily in California. These projects addressed the biological effects of turbidity, physical and chemical effects of disposal on the benthic and fish communities, recolonization of both dredging and disposal (including beach nourishment sites) sites by the benthic community, transport of deposited sediment, and sedimentation of dredged sites over time. Much of Dr. Turk's experience has focused on animal-sediment interactions and the environmental effects of dredging, dredged material disposal, and sediment management in general. His post-doctoral research concerned the effects of induced sedimentation from tidal power development (installation of a tidal dam) on benthic infaunal communities in the Bay of Fundy, Canada. Subsequently, he was lead biologist on a project investigating various engineering options to counteract coastal erosion along the Nile River Delta in Egypt; he addressed the biological effects of coastal structure and sediment management options under consideration.

Evans Waddell, Ph.D. (SAIC) – Dr. Waddell has over 25 years of experience conducting marine studies focused on characterization of currents, waves, and physical/chemical oceanographic conditions of waters offshore California, Gulf of Mexico, and in the south Atlantic. Dr. Waddell has published numerous papers associated with the interaction of wave swash to beach profiles and its implications to beach response.

6.0 Similar Project Experience

The SAIC team has over 25 years experience conducting relevant coastal studies in California. A cross-section of relevant projects is summarized in Table 2. Selected representative projects are described in this section.



SAIC's Marine environmental Sciences Division has not had any contracts that have been terminated for convenience or default within the past three years.

Project Name: Global Photon Fiber Optics Cable EIR and Field Studies

Period of Performance (start – end): 1998-2002

Type of Services: Dredging/cable burial, horizontal directional drilling, turbidity, biological impacts, beaches, coastal/nearshore, California

Contract Value: \$2M+

Budget/Schedule Performance: Met budget and schedule

Subconsultants: Survey vessels, remotely operated vehicles

Client Contact: Lucy Demian (619) 742-0082
Global Photon (EcoPhoton)
lucydemian@ecophoton.com

Key Staff Involved with Project: Andrew Lissner, Danny Heilprin, Charlie Phillips, Edward Basmadjian

Study Description: SAIC prepared the environmental impact report (EIR) on the Global West fiber optic cable project. The project included a 932-km sea cable that was trenched 3 feet into the seafloor 3 to 12 miles offshore, paralleling the

California coast from Morro Bay to San Diego. The cable was originally scoped to come ashore at several locations from San Francisco to San Diego, CA, with eventual landings at Morro Bay, Santa Barbara, Manhattan Beach, and San Diego. At each landing area, horizontal directional drilling (HDD) was used to bring the cable ashore to a local "point of presence" (POP) representing a local telephone switching station.

SAIC prepared the application to the state lead agency, the State Lands Commission, in 1998, and the EIR in 1999-2000. The EIR addressed the potential impacts on marine and terrestrial resources from trenching/excavation and HDD. Key resources documented through a combination of literature surveys and field studies included: biological communities (beach, nearshore, kelp bed, rocky reef, and offshore); commercial and recreational fishing; water quality; land and water use; transportation and utilities; noise; cultural; air quality; and aesthetics. SAIC prepared the Administrative Draft EIR over a period of six weeks to meet the client's very accelerated schedule.

As part of the program, SAIC conducted remotely operated vehicle (ROV) surveys to identify sensitive habitats along the proposed sea route and coordinated marine archaeological surveys. SAIC also assisted the Applicant under separate contract to Michael Baker, Jr., Inc. (the engineering firm on the project) with the permitting for the project, including consultations with the California Coastal Commission and local jurisdictions, and preparation of documentation for route changes after certification of the FEIR for the California Public Utilities Commission. In addition, SAIC conducted field monitoring to assess cable installation impacts to marine organisms, and prepared the post-installation evaluation report.

Table 2. Summary of representative projects according to relevant issue areas.

Project Name <i>(Representative experience organized in the following order: beach nourishment projects, other sediment management related projects, coastal marine resource restoration and/or monitoring projects),</i>	Relevant Discipline Elements <i>(Biology, Coastal Engineering, Oceanography, Planning, Sediment, Water Quality)</i> (Team Member Firms)	Issue Areas								Habitats						Other						
		Beach Nourishment	Dredging/Disposal	Shoreline Protection	Sedimentation	Sediment Transport	Turbidity	T&E /Sensitive Species	Beaches	Bays/Harbors	Coastal Lagoons	Eelgrass/Surfgrass Beds	Kelp Beds	Nearshore sands	Rocky Reefs	S. California	C. California	N. California	Pacific Northwest	Literature Review	Permitting	GIS
BEACON Demonstration Project EIR/EA	Bio, Eng, Sed, WQ (Chambers)	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•			
BEACON Opportunistic Beach Nourishment Project - Biological Surveys and CEQA Compliance	Bio, Eng, Sed, WQ (Chambers)	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Monitoring of Goleta Beach Sand Replenishment Project	Bio (Chambers, Reed)	•	•	•	•	•	•		•	•	•	•	•	•	•							
South Central Coast Beach Enhancement Program	Eng, Plan (M&N)	•			•	•			•				•		•					•		
San Clemente Opportunistic Beach Replenishment Program	Eng, Plan (M&N)	•		•		•		•	•		•	•	•	•	•				•	•		
SANDAG San Diego Regional Beach Sand Project	Bio, Eng, Sed, WQ (M&N, SAIC*)	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•	
Encinitas and Solana Beach Shoreline Protection EIR/EIS	Bio, Eng, Plan, Sed, WQ (Chambers, SAIC*)	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•			•
SANDAG Sand Retention Strategy	Bio, Eng (M&N, SAIC*)	•		•		•		•	•	•	•	•		•	•				•			
City of Encinitas Coastal Biology Study after Beach Nourishment	Bio (SAIC*)	•							•						•							
Monitoring during Surfside/Sunset Beach Nourishment	Bio (Chambers, SAIC*)	•					•	•	•						•							

Note: * indicates project where Ms. Green was the senior biologist and/or project manager prior to joining SAIC

Project Name	Relevant Discipline Elements (Biology, Coastal Engineering, Oceanography, Planning, Sediment, Water Quality) (Team Member Firms)	Issue Areas							Habitats							Other					
		Beach Nourishment	Dredging/Disposal	Shoreline Protection	Sedimentation	Sediment Transport	Turbidity	T&E /Sensitive Species	Beaches	Bays/Harbors	Coastal Lagoons	Eelgrass/Surfgrass Beds	Kelp Beds	Nearshore sands	Rocky Reefs	S. California	C. California	N. California	Pacific Northwest	Literature Review	Permitting
Navy CVN Homeporting EIS	Bio, Sed, WQ (SAIC, SAIC*)	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•	•
Imperial Beach Shore Protection EIS/EIR	Bio, Eng, Sed, WQ (SAIC)	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•		•
EPA/USACE Palos Verdes Capping Program	Bio, Eng, Sed, WQ (SAIC)		•		•	•	•			•			•	•	•				•		•
Santa Barbara Harbor dredging/disposal	Bio (SAIC)	•	•		•		•	•	•	•			•		•				•		
Monitoring of Snowy Plovers and Grunions during Dredging Santa Barbara Harbor & Beach Disposal	Bio (Chambers)	•	•		•		•		•			•		•	•						
EA for Morro Bay Maintenance Dredging	Bio, Eng, WQ (Chambers)	•	•		•	•	•	•	•	•	•	•	•			•					
Pre and Post-Dredging Kelp Surveys at the Pt. Arguello Boathouse, Vandenberg Air Force Base	Bio (Chambers)		•		•		•				•	•		•		•					
Long Term Management Strategy for Dredged Material Disposal in the SF Bay Area EIS/EIR	Bio, Sed., WQ (SAIC)		•		•		•	•		•	•	•					•				
Oakland Harbor 50-foot Navigation Improvements EIS/EIR/FS	Bio, Sed., WQ (SAIC)		•				•	•		•		•					•				
Quillayute River Mouth Dredging Env. Studies	Bio, Sed, WQ (SAIC)	•	•	•		•	•	•	•		•	•		•				•			•

Note: * indicates projects where Ms. Green was the senior biologist and/or project manager prior to joining SAIC

Project Name	Relevant Discipline Elements (Biology, Coastal Engineering, Oceanography, Planning, Sediment, Water Quality) (Team Member Firms)	Issue Areas							Habitats						Other							
		Beach Nourishment	Dredging/Disposal	Shoreline Protection	Sedimentation	Sediment Transport	Turbidity	T&E /Sensitive Species	Beaches	Bays/Harbors	Coastal Lagoons	Eelgrass/Surfgrass Beds	Kelp Beds	Nearshore sands	Rocky Reefs	S. California	C. California	N. California	Pacific Northwest	Literature Review	Permitting	GIS
Ocean and Nearshore Disposal Site Studies, Mouth of Columbia River	Bio, Sed, WQ (SAIC)	•	•		•	•	•	•	•				•						•	•		•
San Dieguito Lagoon Restoration EIR/EIS	Bio, Eng, Plan, Sed, WQ (SAIC)	•	•	•	•	•	•	•	•		•	•		•						•	•	•
Buena Vista Lagoon Restoration Feasibility Analysis	Bio, Eng, Sed, WQ (SAIC)	•	•	•	•	•	•	•	•		•	•		•								•
Bolsa Chica Lowlands Restoration EIR/EIS	Bio, Eng, Plan, Sed, WQ (Chambers, SAIC*)	•	•		•		•	•	•		•			•						•		•
Upper Newport Bay Ecosystem Restoration Project EIS/EIR	Bio, Sed, WQ (Chambers, SAIC*)	•	•		•	•	•	•	•	•	•				•					•		
SANDAG Inventory and Evaluation of Coastal Habitats & Resources	Bio, Sed., WQ (SAIC)	•	•	•	•		•	•	•		•	•	•	•	•					•		•
Santa Barbara Coastal Long Term Ecological Research Project	Biol, Oceanog, WQ (Reed)						•	•	•				•	•	•	•						•
Santa Barbara County Evaluation of different methods of surfgrass restoration	Bio (Reed)				•			•			•			•	•							
Global Photon Fiber Optics Cable EIR and Field Studies	Eng, Sed, WQ (SAIC)				•	•	•	•	•			•	•	•	•					•		•
OCSD 301(h) Marine Monitoring	Bio, Ocean, WQ (SAIC)		•		•	•	•	•	•				•		•					•		•

Note: * indicates projects where Ms. Green was the senior biologist and/or project manager prior to joining SAIC

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Project Name: CVN Homeporting EIS in Support of the U.S. Pacific Fleet

Period of Performance (start – end): 1998-2001

Type of Services: Dredging/disposal impacts, beneficial reuse, permitting, natural and social resources, biology/ecology, bays, beaches, nearshore, southern California, Pacific Northwest

Contract Value: \$4M

Budget/Schedule Performance: Met budget and schedule

Subconsultants: AMEC, MEC, and specialty NEPA (e.g., traffic)

Client Contact: Patrick McCay (619) 532-2449
U.S. Navy, Southwest Division
1220 Pacific Highway
San Diego, CA 92132

Key Staff Involved with Project: Andrew Lissner, Danny Heilprin, Charlie Phillips, Edward Basmadjian, Karen Green (formerly of MEC)

Study Description: SAIC conducted a multi-disciplinary study for U.S. Navy to assess the potential impacts of infrastructure improvements, dredging, and bay fill associated with homeporting up to three nuclear powered aircraft carriers at three sites within the Pacific Operating Area – San Diego Bay, CA, Bremerton, WA, and Pearl Harbor, HI. Tasks performed included EIS preparation under NEPA, testing to evaluate suitability of dredged sediment for several different disposal alternatives, sampling and characterizations of soils and sediments at a proposed mitigation site on North Island, and coordination of public involvement/participation. Issue areas analyzed in detail included chemical and biological testing, sediment testing, permitting support, water quality analyses, and mitigation analysis. Sediment testing tasks consisted of a Tier III evaluation (Green Book bioassay and chemistry) for those areas near Pier J/K proposed for dredging. A key focus

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of siting a carrier in San Diego Bay was disposal alternatives for dredged material, including contaminated sediments, potential for beneficial reuse on receiver beaches, and mitigation measures associated with potential loss of intertidal and subtidal habitat.

Project Name: OCSD 301(h) Monitoring

Period of Performance (start – end): 1985-present

Type of Services: Marine biological and oceanographic monitoring, impact assessment, and compliance evaluations.

Contract Value: \$20M+

Budget/Schedule Performance: Within budget and schedule

Subconsultants: MEC Analytical Systems

Client Contact: George Robertson (714) 962-2411
Orange County Sanitation District (OCSD),
10844 Ellis Avenue
Fountain Valley, CA 92078

Key Staff Involved with Project: Andrew Lissner, Charles Phillips, Danny Heilprin, Edward Basmadjian, Karen Green

Study Description: SAIC is in its 17th year managing the 301(h) Ocean Monitoring Program for the Orange County Sanitation Districts. The objectives of the program are to determine compliance of the wastewater discharge with the Environmental Protection Agency and Regional Water Quality Control Board permit requirements, and to evaluate trends in the magnitude of effects on the receiving water environment. The program is conducted in conformance with 301(h) program guidelines to monitor the effects of treated wastewater discharges on demersal fish, benthic infauna, and epibenthic macroinvertebrate populations, physical and

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chemical parameters of sediments, and water quality at up to 64 stations.

Project Name: Palos Verdes Shelf Pilot Cap Monitoring Program

Period of Performance (start – end): 2000-2004

Type of Services: Dredged material disposal, capping, sediment erosion, biological impacts, turbidity, chemical contamination, coastal and nearshore biological resources, southern California

Contract Value: \$3M

Budget/Schedule Performance: Within budget/schedule

Subconsultants: Survey vessels, chemistry laboratories

Client Contact: Carmen White (415) 972-3010
U.S. Environmental Protection Agency,
75 Hawthorne Street
San Francisco, CA 94105
U.S. Army Corps of Engineers,
Larry Smith (213) 452-3846.

Key Staff Involved with Project: Andrew Lissner, Charles Phillips, Danny Heilprin, Edward Basmadjian, Karen Green

Study Description: SAIC have been performing technical studies at The Palos Verdes Shelf Superfund site, located off the coast of Los Angeles, CA. This coastal area contains large quantities of bottom sediments contaminated with the organochlorine pesticide DDT discharged through the sewer outfalls into the Pacific Ocean. The U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA) are conducting a pilot study to determine the constructability of a cap of clean sediments as a remediation option for managing contaminated sediments. The pilot study

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involved placement of approximately 135,000 cubic yards of capping sediments in three 45-acre capping cells situated at water depths between 40 and 70 meters. As part of this program, SAIC provided support to the USACE and EPA by conducting an extensive environmental monitoring program in stages before, during and after cap placement using state-of-the-bottom and the variation of current speed and direction at different water depths (which affect the spread of cap material as it falls through the water). For each phase of the project, SAIC prepared project work plans, consisting of data quality objectives, field sampling plans, quality assurance project plans, and health and safety plans. The QAPP documents were prepared according to EPA guidance. Ongoing studies are evaluating impacts to biological communities, including the potential for deep burrowing species to compromise the cap; sediment erosion potential; and sediment movement along the shelf.

Project Name: EIR/EA for BEACON Sand Replenishment

Period of Performance (start – end): 1991-1992

Type of Services: Analyzed Environmental Impacts of Alternatives

Contract Value: \$130,000

Budget and Schedule Performance: Satisfactory

Subconsultants: Noble Consultants

Client Contact: Jim Bailard, Ph.D. (805) 684-5747
BEACON
105 East Anapamu St., Room 201
Santa Barbara, CA 93101

Key Staff Involved with Project: Noel Davis

Study Description: This EIR/EA was prepared for the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) to analyze the environmental impacts of

alternatives to a demonstration program for managing the sand along the shoreline of Santa Barbara and Ventura Counties. The program was based on a detailed study prepared in 1989 by Noble Consultants that formulated a comprehensive sand management plan. The report analyzed several sand management and engineering strategies for shore protection, and recommended a program that would use beach renourishment as the principal mechanism for reaching project goals. Large deposits of beach quality sand lie just offshore Goleta, Santa Barbara, Carpinteria, and Oxnard.

Based on the Noble study, the proposed project involved use of a hopper dredge to remove sand from an offshore borrow site and place it in shallow water just outside the surf zone to form a nearshore berm of sand. The imported sand would then be monitored to determine its direction and rate of transport to the beach under natural wave conditions. Four sites were identified as potentially suitable receiver sites: Padaro Land Beach and Goleta Beach in Santa Barbara County, and Pierpont Bay Beach and Oxnard Shores Beach in Ventura County. Three sand borrow sites were identified as potentially suitable, including offshore Goleta Beach, offshore Santa Barbara Harbor, and offshore the Santa Clara River.

The environmental analysis focused on several key issues. Construction of a nearshore berm would bury sensitive biological features, including kelp, subtidal rocks, and surf grass beds. Other issues included seasonal impacts to great blue heron nesting and grunion spawning; turbidity at the borrow site would temporarily increase; sediment in some areas would have the potential to close river/slough inlets; exhaust emissions from dredge operations were found to exceed allowable Santa Barbara County levels; and temporary

visual and recreational impacts would be of concern during dredging and berm construction near sensitive beach areas.

In addition to the proposed project, five alternatives were analyzed in detail. These include: 1) the No Project Alternative, 2) implementing the proposed project on a smaller scale by using half the volume of sand, 3) renourishing a receiver beach by pumping sand directly from the offshore borrow area, 4) renourishing a receiver beach by dredging sand from an offshore borrow area and pumping it to the beach from nearshore, and 5) trucking sediments from a fluvial debris basin to a receiver beach.

Data collection involved not only literature review of existing biological and other resources, but biological field surveys and site visits to determine existing noise, visual resources, land uses, and recreational uses. Field surveys and/or discussions concerning levels of nearshore recreational fishing were conducted with local beach and recreational users, homeowners along the beach, and area harbor masters.

Project Name: Encinitas-Solana Beach Shoreline Protection and Restoration of San Elijo Lagoon EIR/EA

Period of Performance (start – end): 2003 to present

Type of Services: Evaluation of shoreline protection and wetland restoration alternatives

Contract Value: \$60,000

Budget/Schedule Performance:

Subconsultants: Noble Consultants

Client Contact: Everest International under contract to
Rey Favre (213) 452-3864
Los Angeles District Corps of Engineers,
911 Wilshire Blvd.

BEACON

Los Angeles, CA

Key Staff Involved with Project: Noel Davis, Karen Green (formerly of MEC)

Study Description: Chambers is under contract to prepare sections of an EIR/EA for shoreline protection and lagoon restoration in the Cities of Encinitas and Solana Beach. Chambers is part of an interagency panel to develop restoration alternatives, and valuation methodology that will be used to screen and evaluate alternatives.

Project Name: Environmental Assessment for Morro Bay Harbor Six-year Maintenance Dredging Program, San Luis Obispo County, California

Period of Performance (start – end): 2001

Type of Services: Analyzed Environmental Impacts of Alternatives

Contract Value: \$45,377

Budget and Schedule Performance: Satisfactory

Subconsultants: None

Client Contact: Hayley Lovan (213) 452-3863
U.S. Army Corps of Engineers Los Angeles District
911 Wilshire Blvd.
Los Angeles, CA

Key Staff Involved with Project: Noel Davis, Todd Chapman

Study Description: Chambers Group analyzed the impacts of dredging and sediment disposal of the Morro Bay Harbor Six-year Maintenance Dredging Program. Dredged sediments are either placed on the beach or in the nearshore zone. Sensitive species in the project area included southern sea otter, steel head, California brown pelican and western snowy plover. Sensitive habitats included eelgrass beds, kelp beds, and tidal wetlands.

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Project Name: Monitoring of Impacts to Biological Resources of the Goleta Beach Sand Nourishment Project

Period of Performance (start – end): 2003 - Present

Type of Services: Monitoring of Impacts of Beach Nourishment on Marine Resources

Contract Value: \$75,000

Budget and Schedule Performance: Satisfactory

Subconsultants: Dan Reed, Ph.D.

Client Contact: Kevin Ready (805) 662-6890
BEACON
105 East Anapamu St., Room 201
Santa Barbara, CA 93101

Key Staff Involved with Project: Noel Davis, Todd Chapman

Study Description: In October, 2003, BEACON placed sand on Goleta Beach to counteract severe beach erosion at the site. The project consisted of dredging 58,937 cubic yards of sand from the sandy shoal that developed in the West Beach area of Santa Barbara Harbor and placing it on Goleta Beach. Chambers Group monitored surfgrass, subtidal eelgrass, and kelp beds to determine whether the beach nourishment activities had any impacts on these resources. Permanent transects were established in each of these habitats and monitored by biologists before and at several intervals after beach nourishment activities to determine whether any changes related to beach nourishment could be discerned.

Project Name: Effects of the Palos Verdes Landslide on Marine Life

Period of Performance (start – end): 1995-1996

Type of Services: Marine biology field study

Contract Value: \$250,000

Budget/Schedule Performance: Satisfactory

BEACON

Subconsultants: Van Tuna Research Group
Client Contact: Rey Favre (213) 452-3864
Los Angeles District Corps of Engineers
911 Wilshire Blvd.
Los Angeles, CA

Key Staff Involved with Project: Noel Davis
Study Description: Chambers Group was responsible for an extensive marine sampling field program to document the effects of the Palos Verdes landslide on marine communities. The Van Tuna Research Group of Occidental College was a major subcontractor for this effort. Chambers Group was in charge of documenting the impact to intertidal communities and hard bottom subtidal communities. Occidental College was in charge of sediment studies and impacts to fishes. Impacts to kelp (*Macrocystis*, *Egrecia*, *Cystoseira* and *Eisenia*) and surfgrass were a major focus.

Project Name: South Central Coast Beach Enhancement Program
Period of Performance (start – end): 2001 to present
Type of Services: Planning, engineering, protocol development
Contract Value” \$233,000
Budget/Schedule Performance: Met budget and schedule (schedule shifted due to agency permitting delays)
Subconsultants: None
Client Contact: Gerald Comati, (805) 962-0488
BEACON
Key Staff Involved with Project: Chris Webb, Anne-Lise Lindquist
Study Description: BEACON is pursuing permits for establishment of the South Central Coast Beach Enhancement

Biological Impacts Associated with Sediment Management and California Coastal Biota

Program. The program is for general permits to place suitable surplus upland fill material on five beaches from Goleta to Port Hueneme. A set of guidelines were completed that are patterned after other such programs and specifies sand compatibility criteria, quantities, qualities, placement timing, and restrictions. A “cookbook” for nourishment operations is provided to instruct local agency staff on how to implement projects. Sand will be transported to the beach by train, truck, conveyor belt, and dredge. The CEQA document has been certified and permit applications submitted to all agencies. All local City permits (four) have been obtained. M&N is working with state agencies to secure permits and is preparing implementation guidelines for local agencies. Coastal Commission staff indicated that it could be included on their November meeting agenda. Coastal Frontiers works for BEACON performing field investigations and shares data with M&N to complete this effort.

Project Name: San Diego Regional Beach Sand Project (RBSP), San Diego, CA
Period of Performance (start – end): 2000-2001
Type of Services: Preliminary engineering.
Contract Value: \$100,000.
Budget/Schedule Performance: Met budget and schedule
Subconsultants: MEC Analytical Systems
Client Contact: Steve Sachs, Rob Rundle, (619) 699-1900
SANDAG,
Key Staff Involved with Project: Chris Webb, Anne-Lise Lindquist, Karen Green (formerly of MEC)
Study Description: M&N prepared the preliminary beach replenishment design for a region-wide project from Oceanside to Imperial Beach. The project included dredging two million cubic yards of sand from offshore sources and

placement at 12 different beaches. Environmental constraints were considered and the most sensitive plan crafted. Extensive sand compatibility analysis was performed by M&N. MEC analyzed all designs for effects to biology and helped to design monitoring plans. Coastal Frontiers shared data with the M&N/MEC team throughout the planning process to complete the project. Deliverables submitted by M&N included:

- A matrix and maps of possible sand source locations from research;
- Analyses of sand delivery methods;
- Analyses and specification of appropriate receiver beaches based on need and constraints (mainly biology);
- Placement material grain size analyses for compatibility with receiving beaches;
- Analyses of appropriate sand quantities for each site based on need, grain size, and constraints; and
- Preliminary designs of beach nourishment projects.

Project Name: San Clemente Opportunistic Beach Replenishment Program, San Clemente, CA

Period of Performance (start – end): 2003 to present

Type of Services: Protocol development, planning, and engineering

Contract Value: \$75,000

Budget/Schedule Performance: On budget and schedule

Subconsultants: None

Client Contact: Bill Humphreys, (949) 361-8260
City of San Clemente,

Key Staff Involved with Project: Chris Webb, Anne-Lise Lindquist

Study Description: M&N developed a Beach Replenishment Program to be implemented for the City of San Clemente funded by a private developer to actively pursue opportunities for obtaining suitable sand for placement on its beaches for erosion control and recreational benefits. A technical study was prepared specifying the characteristics of opportunistic material including sand compatibility analysis, grain size, chemistry, color, and placement locations and rates. The program proposed placing a total maximum of 300,000 cubic yards per year of sand on four designated placement sites within the City with the first project being linked to a coastal development application. M&N submitted permit applications to the U.S. Army Corps of Engineers, California Coastal Commission, State Lands Commission, and RWQCB. The developer rescinded the program from the development proposal and the project was suspended. The City reinitiated the program under a new and separate contract to M&N in the Fall 2003 and has since secured the RWQCB permit for the program. Coastal Commission staff indicates that the program could either be on their October hearing agenda. Coastal Frontiers works for the City performing beach profile monitoring since 2001 and works sharing data with M&N in the new effort.

7.0 Resource Requirements

Table 3 provides the effort and cost estimate associated with each of the proposed tasks associated with the biological impacts study. The table lists the name and classification of proposed staff and number of approximate person hours according to staff. Total costs associated with subconsultant firms (Chambers and M&N) are listed in the cost spreadsheet. Table 4 provides backup detail of estimated hours for these subconsultants. Table 5 provides SAIC's standard rate sheet.

The estimated effort associated with GIS and/or shapefile submittals was estimated at 14 hours. Those hours and cost estimate are split between Tasks 2 and Task 4. The estimated effort associated with answering questions and/or coordination with CSMW project PPR, GIS, and Fate and Transport analysts was estimated at 18 hours. Those hours are within Tasks 2 and 6.

The estimated effort and cost allocations were based on the following considerations. A moderate effort was assigned to the tasks for acquiring relevant documents and preparing the Annotated Bibliography (24%), obtaining permits (2%), and providing copies of documents and readily available GIS shapefiles (5%). The SAIC Team collectively has substantial relevant documents for the project, therefore, the proposed emphasis of Tasks 1 through 3 is to conduct focused searches to augment existing information in order to provide a comprehensive Annotated Bibliography deliverable.

The majority of the resource allocation is associated with technical evaluation and summary of relevant documents and information, and making recommendations to assist streamlining the permitting of sediment management activities that are protective of biological resources. The SAIC Team

includes built-in quality assurance with the addition of recognized technical experts (Drs. Dugan, Reed, Turk, Waddell) to serve in the role of a Quality Review Board. The level of effort associated with these experts is considered an effective resource allocation because their involvement will contribute to the efficiency of acquiring relevant documents for producing a comprehensive Annotated Bibliography, enable the formulation of recommendations that tap into a substantial breadth of technical expertise, and provide an additional level of quality control and credibility for the document, which will be independently peer-reviewed. Nevertheless, a modest, but reasonable amount of resources was reserved to address comments by independent reviewers to finalize the Summary Report.

We understand that successful completion of the project may require some modification in allocation of resources among tasks to better meet expectations of the CSMW Project Manager and BEACON. The SAIC Team remains open to those discussions, and the proposed effort allocation of resources is fully negotiable. SAIC has reviewed the language of the Standard Agreement for services, and does not take any exceptions.

SAIC Team staff are available to immediately begin work on this project. Ms. Green currently has over 50 percent of her time unallocated due to her recent hire at SAIC, and will be able to commit all proposed hours to the project within the proposed schedule. Other key and support staff at SAIC will be supporting the project with focused, yet limited hour commitments that do not pose any conflict with the proposed schedule. Task leaders from subconsultant firms have communicated that they and their support staff do not have any major commitments that would interfere with the proposed schedule.

Table 3. Proposed Effort and Cost Estimate.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Environmental Sciences & Infrastructure Business Unit

TITLE: **Biological Impacts Associated with Sediment Management**
CUSTOMER: **BEACON**
CONTRACT #: **01-0440-71-2005-805**
POP: **9/14/04 - 5/13/05**

	Fully Burdened	Task 1		Task 2		Task 3		Task 4		Task 5		Task 6		TOTAL PROGRAM			
		Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount	Hours	Amount		
SAIC DIRECT LABOR																	
Program Manager II	Project Manager	GREEN, KAREN	\$ 130.00	30	\$3,900	2	\$260	2	\$260	140	\$18,200	48	\$6,240	32	\$4,160	254	\$33,020
Sr. Program Manager II	Sr. Scientist	LISSNER, ANDREW	\$ 155.00	2	\$310	0	\$0	0	\$0	20	\$3,100	4	\$620	8	\$1,240	34	\$5,270
Sr. Engr./Consultant V	Scientist	HEILPRIN, DANNY	\$ 100.00	16	\$1,600	0	\$0	0	\$0	40	\$4,000	8	\$800	0	\$0	64	\$6,400
Associate Engr./Consultant II	Associate Scientist	BASMADJIAN, ED	\$ 60.00	58	\$3,480	16	\$960	0	\$0	0	\$0	0	\$0	0	\$0	74	\$4,440
Program Manager II	Sr. Scientist	THOMPSON, ROSIE	\$ 130.00	16	\$2,080	0	\$0	0	\$0	30	\$3,900	4	\$520	0	\$0	50	\$6,500
Program Manager I	Sr. Scientist	PHILLIPS, CHARLIE	\$ 140.00	6	\$840	0	\$0	0	\$0	18	\$2,520	2	\$280	0	\$0	26	\$3,640
Program Manager I	Sr. Scientist, QRB	WADDELL, VAN	\$ 140.00	0	\$0	0	\$0	0	\$0	8	\$1,120	0	\$0	0	\$0	8	\$1,120
Sr. Program Manager III	Sr. Scientist, QRB	TURK, TED	\$ 145.00	8	\$1,160	0	\$0	0	\$0	16	\$2,320	0	\$0	0	\$0	24	\$3,480
Sr. Project Administration II	Project Administration	KILPATRICK, D.	\$ 80.00	2	\$160	2	\$160	4	\$320	4	\$320	4	\$320	0	\$0	16	\$1,280
Project Administration I	Project Administration	ADDONA, S.	\$ 75.00	0	\$0	0	\$0	0	\$0	8	\$600	8	\$600	0	\$0	16	\$1,200
Engr./Staff Consultant IV	GIS Specialist	WALSH, JOE	\$ 75.00	0	\$0	0	\$0	0	\$0	6	\$450	2	\$150	0	\$0	8	\$600
Associate Engr./Consultant I	Associate Scientist	NORRIS, TOM	\$ 65.00	0	\$0	0	\$0	0	\$0	8	\$520	0	\$0	0	\$0	8	\$520
Sr. Engr./Consultant III	QRB	REED, DAN	\$ 115.00	8	\$920	4	\$460	0	\$0	40	\$4,600	0	\$0	8	\$920	60	\$6,900
Sr. Engr./Consultant III	QRB	DUGAN, JENNY	\$ 115.00	2	\$230	0	\$0	0	\$0	6	\$690	0	\$0	0	\$0	8	\$920
Total Direct Labor				148	\$14,680	24	\$1,840	6	\$580	344	\$42,340	80	\$9,530	48	\$6,320	650	\$75,290
MATERIAL & SUBCONTRACTS (M&S)																	
CHAMBERS GROUP, INC			\$1.00	0	\$11,765	0	\$1,700	0	\$0	0	\$27,160	0	\$4,490	0	\$2,160	0	\$47,275
MOFFAT & NICHOLS ENGINEERS			\$1.00	0	\$7,428	0	\$2,572	0	\$2,202	0	\$3,086	0	\$1,444	0	\$1,413	0	\$18,145
Total M&S				0	\$19,193	0	\$4,272	0	\$2,202	0	\$30,246	0	\$5,934	0	\$3,573	0	\$65,420
M&S Handling Charge	12%				\$2,303		\$513		\$264		\$3,630		\$712		\$429		\$7,850
Subtotal - M&S					\$21,496		\$4,785		\$2,466		\$33,876		\$6,646		\$4,002		\$73,270
OTHER DIRECT COSTS (ODC's)																	
Travel	Lot		\$0		\$0		\$0		\$0		\$0		\$0		\$0		\$0
Local Mileage	\$0.375	420	\$158		\$0		\$0		\$0		\$0		\$0		\$0	420	\$158
Reproduction	\$0.07	0	\$0	14,000	\$980		\$0		\$0	1,600	\$112	1,600	\$112		\$0	17,200	\$1,204
FedEx - Letter Size	\$6.05	3	\$18		\$0		\$0		\$0		\$0		\$0		\$0	3	\$18
FedEx - Box	\$15.00	0	\$0		\$0		\$0		\$0	1	\$15	1	\$15		\$0	2	\$30
Subtotal - ODC's			\$176		\$980		\$0		\$0		\$127		\$127		\$0		\$1,410
TOTAL ESTIMATED PRICE/ T&M NOT-TO-EXCEED					\$36,352		\$7,605		\$3,046		\$76,343		\$16,303		\$10,322		\$149,970

This cost spreadsheet is for exclusive review by the BEACON proposal evaluation committee, and should not be reproduced.



Table 4. Hour detail for subconsultant firms and consultants.

Staff	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Total
Chambers Group, Inc.							
Davis, N.	50	2		140	20	16	228
Chapman, T.	40			40	10		90
Tischer, C.	20			40	10		70
Clerical		10		20			
Moffatt & Nichol Engineers							
Webb, C.	18	6	6	8	4	8	50
Lindquist, A.	44	16	8	12	4		84
Data base			4	4	2		10
Clerical	4	1					5
Project Control				1	1		2
Consultants							
Jenny Dugan	2			6			8
Daniel Reed	8	4		40		8	60

Table 5. SAIC Standard Rate Sheet.

**SCIENCE APPLICATIONS INTERNATIONAL
CORPORATION**
*Environmental Sciences & Infrastructure
Business Unit*

SAIC DIRECT LABOR	Fully Burdened Hourly Rate
Sr. Principal Consultant	\$195.00
Principal Consultant I	\$185.00
Principal Consultant II	\$175.00
Sr. Program Manager I	\$165.00
Sr. Program Manager II	\$155.00
Sr. Program Manager III Program Manager I	\$145.00
Program Manager II	\$140.00
Program Manager III	\$130.00
Sr. Project Manager	\$120.00
Project Manager	\$115.00
Sr. Consultant I	\$105.00
Sr. Consultant II	\$135.00
Sr. Consultant III	\$125.00
Sr. Consultant IV	\$115.00
Sr. Consultant V	\$105.00
Staff Consultant I	\$100.00
Staff Consultant II	\$90.00
Staff Consultant III	\$85.00
Staff Consultant IV	\$80.00
Staff Consultant IV	\$75.00

SAIC DIRECT LABOR	Fully Burdened Hourly Rate
Staff Consultant V	\$70.00
Associate Consultant I	\$65.00
Associate Consultant II	\$60.00
Associate Consultant III	\$55.00
Associate Consultant IV	\$50.00
Associate Consultant V	\$45.00
Technician I	\$40.00
Technician II	\$35.00
Technician III	\$30.00
Technician IV	\$25.00
Sr. Project Administration I	\$85.00
Sr. Project Administration II	\$80.00
Project Administration I	\$75.00
Project Administration II	\$65.00
Project Administration III	\$55.00
Project Administration IV	\$45.00
Project Administration V	\$35.00

M&S Handling
Charge 12%

Lodging, meals, mileage and other out-of-pocket expenses billed at SAIC cost.

Rates Effective: January 2004 thru December 2004
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APPENDIX A – DETAILED RESUMES



KAREN GREEN, Project Manager, Task Leader Habitats and Recommendations

EDUCATION

- M.S. Biology, California State University, Long Beach – 1984
- B.S. Marine Biology, California State University, Long Beach – 1974

REGISTRATIONS, CERTIFICATIONS, AFFILIATIONS

Certified EIR Preparer, County of San Diego
NAUI SCUBA diver certification, 1976
Research Associate, Los Angeles County Museum
Southern California Association of Marine Invertebrate Taxonomists

SUMMARY OF EXPERIENCE

Ms. Green has more than 25 years of experience as an environmental consultant. She has managed multi-disciplinary teams and projects related to beach replenishment, wetlands restoration and mitigation, watershed management, flood control, harbor development, ocean wastewater outfalls, and nuclear and steam generating plants. Her experience includes study design and supervision of field monitoring to document biological resources, water and sediment quality; impact assessment; GIS analysis, preparation of reports; and presentation of monitoring results at meetings and conferences. Ms. Green is a certified EIR preparer and

ascribes to proactive coordination with resource and regulatory agencies to design studies and provide documentation in support of Clean Water Act (401, 404) permits, Section 1600 Streambed Alteration Agreements, NPDES permits, and Section 7 consultations under the Endangered Species Act.

Ms. Green has specialized experience with biological and water quality issues associated with coastal sedimentation, sediment transport, and sediment management relative to beach replenishment, coastal erosion, and lagoon and harbor dredging and disposal. Ms. Green was the senior biologist and coordinated with resource and regulatory agencies for the recent San Diego Regional Beach Sand Project. She was the senior biologist for the City of San Diego Coastal Erosion EIR, and recently managed the preparation of a joint EIS/EIR regarding shoreline protection in the City of Encinitas and City of Solana Beach. Ms. Green also has managed sediment testing and biological monitoring studies associated with dredging lagoons and harbors and use of the materials for beach replenishment in southern California. Recently, Ms. Green conducted a biological study investigating biological beneficial use of beach nourishment in the City of Encinitas.

Ms. Green also has special expertise in marine ecology. She is an internationally recognized expert with over 25 years experience in the taxonomy of marine worms and sponges. She also has experience in the identification of commonly collected fish, invertebrates, and plankton from southern California coastal waters. Ms. Green has evaluated impacts to marine resources using multi-variate statistical techniques and a community analysis technique she developed based upon trophic transfer through food webs. She also is experienced in habitat valuation and computation of resource value before and after mitigation projects.

Karen Green - 2

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Senior Project Biologist, Regional Beach Sand Retention Strategy. Client: Moffatt & Nichol under contract to SANDAG. Responsible for compilation, qualitative mapping, and

description of available information on the locations of sensitive marine habitats from Oceanside to Imperial Beach in support of sediment management planning for the San Diego region. Assisted project engineers with the development of sand retention alternatives with environmental resource benefits.

Project Manager, Biological and Water Quality Technical Appendix D in Support of San Diego Regional Beach Sand Project EIR/EIS. Client: KEA Environmental under contract to SANDAG. Senior biologist responsible for preparation of marine biology and water quality technical appendix to the EIR/EA for the San Diego Regional Beach Sand Project. Responsible for design and implementation of field studies of beaches and nearshore reefs to characterize existing conditions in the vicinity of thirteen proposed beach replenishment sites and at six offshore borrow sites. Reef studies included side-scan sonar mapping and diver reconnaissance surveys. Prepared biological and water quality impact evaluations associated with turbidity, sand placement, and sand transport. Responsible for presentations and/or discussions with resource and regulatory agencies, SANDAG, commercial fishermen, and the public associated with obtaining 404 and 401 permits, and assisted with Section 7 consultation regarding least tern foraging issues.

Project Manager, Coastal biology Study after Sand Nourishment. Client: City of Encinitas. Responsible for the

design and supervision of surveys to document biological resources at beaches that received sand nourishment in the City of Encinitas from the San Diego Regional Beach Sand Project. Survey elements included birds, invertebrates, and sand depths to examine the relative extent of sand habitat and its utilization by marine resources.

Project Manager, Ecological Assessment of Agua Hedionda Lagoon. Client: San Diego Gas & Electric. Responsible for field monitoring of sediments and biological resources in support of permit applications for dredging and beach disposal. Responsible for design of technical studies, data analysis, preparation of environmental documentation, and presentation of monitoring results at meetings with regulatory and resource agencies. Survey plans were developed in consultation with resource agency and regulatory personnel.

Project Manager, Encinitas/Solana Beach Shoreline Protection and San Elijo Lagoon Restoration EIS/EIR. Client: U.S. Army Corps of Engineers, Los Angeles District. Responsible for field surveys and documentation of existing conditions, development of a modified Habitat Evaluation Procedure (HEP) for lagoon restoration, and preparation of the NEPA/CEQA documentation. Participated in the development of the HEP and restoration alternatives in coordination with resource and regulatory agencies.

Project Manager, Dredge Material Testing and Pre- and Post-Dredging Eelgrass Mapping Surveys. Client: Cabrillo Power. Responsible for testing proposed dredged materials from the outer basin of Agua Hedionda Lagoon to determine suitability for beach replenishment. Also responsible for eelgrass mapping surveys prior to and after dredging, and reporting findings to the National Marine Fisheries Service. Successful management resulted in six separate contracts for this service.

Karen Green - 3

Project Manager, Marina Del Rey Dredge Materials Testing. Client: U.S. Army Corps of Engineers, Los Angeles District. The Corps required immediate testing for emergency dredging of the Marina Del Rey Harbor. Responsible for expedited sediment collection and testing. Assisted the Corps in their coordination with the EPA and California Coastal Commission to obtain concurrence to conduct the emergency dredging.

Senior Project Biologist, Palm and Carnation Streets Improvement Project EIR. Client: Mooney and Associates under contract to City of San Diego. Responsible for biological field surveys, evaluation of potential impacts, and development of mitigation measures relative to beach nourishment as part of street improvement projects in Imperial Beach.

Senior Project Biologist, Coastal Erosion EIR. Client: Project Design under contract to City of San Diego. Responsible for biological field surveys, evaluation of impacts, and proposing mitigation measures for marine resources associated with bluff erosion control at eleven sites in San Diego.

Project Biologist, Programmatic Environmental Impact Statement (PEIS) for Navy dredging and disposal projects in San Diego Bay. Client: U.S. Navy, Southwest Division. Analyzed potential impacts to marine resources and co-developed dredged material disposal alternatives, including beneficial reuse of dredged materials for island creation and beach nourishment. Prepared NEPA documentation.

EIS Coordinator, Ocean Dredge Material Disposal Sites. Clients: U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. Managed the preparation of four preliminary draft Environmental Impact Statements (EISs) in

support of site selection of ocean dredged material disposal sites off the East and Gulf coasts.

Least Tern Monitoring during Beach Nourishment at Surfside/Sunset Beaches. Client U.S. Army Corps of Engineers, Los Angeles District. Responsible for developing survey design to monitor turbidity plumes and foraging behavior of the endangered California least tern during beach nourishment activities. Survey results indicated I

Project Manager, Upper Newport Bay Biological Assessment. Client: US. Army Corps of Engineers, Los Angeles District. This project involved documenting the existing terrestrial and aquatic biological conditions for a restoration feasibility study, which considered different dredging alternatives to restore lagoon functions and beneficial reuse of materials for island creation. Project elements included field monitoring (vegetation, birds, amphibians, reptiles, mammals, insects, fish), preparation of habitat inventory maps, preparation of reports and technical documents, and presentation of monitoring results at meetings with resource and regulatory agencies. Additionally Ms. Green participated as a member of an interagency Technical Advisory Committee responsible for valuation of restoration alternatives using a modified Habitat Evaluation Procedure (HEP).

Senior Project Biologist, Bolsa Chica Lowlands Restoration EIR/EIS. Client: Chambers Group under contract to State Lands Commission. Responsible for preparation of marine biology and water quality sections of EIR/EIS, which evaluated seven wetland restoration alternatives. Participated in the development of the project alternatives and technical workshop meetings with regulatory and resource agencies. This project won an environmental award of excellence.



ANDREW LISSNER. Senior Scientist, Habitats, Quality Review

EDUCATION

University of Southern California: B.S., Biology (1973)
University of Southern California: Ph.D., Biology (1979)

SUMMARY OF EXPERIENCE

Dr. Lissner is a Regional Manager and Senior Scientist for the SAIC Marine and Environmental Sciences Division, with over twenty-five years experience specializing in marine, estuarine, and wetlands biology and ecology, water quality, and marine chemistry of California and numerous other coastal and nearshore areas of the United States. Many of his projects have involved technical support and project management related to dredging/disposal and discharge-related programs for the U.S. Navy, Environmental Protection Agency, U.S. Army Corps of Engineers, State of California, Department of the Interior, National Oceanic and Atmospheric Administration, port districts, and public sanitation districts.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Global Photon (telecommunications company). Senior scientist and program manager for preparation of California State Lands Commission permit and EIR, including extensive biological field surveys, under CEQA for fiber optic cable installations (Global West Project) in offshore, nearshore, and beach areas. The cable route extends from San Francisco to

San Diego with additional landing sites in Manhattan Beach, Santa Barbara, Morro Bay, and Monterey. Permit evaluations included biological resources, human resources, and physical/chemical conditions.

U.S. Navy. Regional coordinator and senior scientist for San Diego Bay, CA and Pearl Harbor, HI sites as part of a large-scale, comprehensive EIS under NEPA to identify home ports for three nuclear aircraft carriers within the U.S. Pacific Fleet. Also included were, public scoping, permitting, and surveys of project dredging, construction, and mitigation sites to evaluate potential environmental impacts. Key components involved evaluation of alternatives for dredged material disposal, including habitat restoration, ocean disposal, nearshore and beach nourishment.

San Dieguito River Valley Joint Powers Authority/U.S. Fish and Wildlife. Project manager and senior scientist for a complex CEQA/NEPA EIR/EIS and field studies evaluating restoration alternatives for wetland and upland areas associated with the lower San Dieguito river valley. Key issues include maintenance of the inlet to allow tidal exchange to this river-dominated system; creation of up to 150 acres of tidal basins including low through upper marsh and upland habitats; evaluation of dredging and disposal options and berm designs; and development and maintenance of functioning biological communities, including threatened and endangered species in a broad range of habitats.

U.S. Navy. Program Manager, Senior Marine Scientist, and task order management for multi-year, Navy SWDIV NEPA Planning Contract involving over 30 delivery orders, focusing on California in-water and coastal areas, but including the Pacific Northwest, East Coast, and Eglin Air Force Base operating area in the Gulf of Mexico. Project examples

Lissner - 2

include EISs, EAs, associated field studies, and permitting for dredging and disposal programs, including alternatives for beneficial reuse, pier upgrades/replacements, and master planning.

Aspen/Army Corps of Engineers, Los Angeles District. Task leader and senior scientist for aquatic components of NEPA evaluations addressing coastal beach nourishment alternatives for Imperial Beach, CA, and restoration alternatives and development of modified HEP approach for wetland areas of Upper Newport Bay, CA.

Everest/California Coastal Conservancy/Buena Vista Lagoon Foundation. Senior scientist for Buena Vista Lagoon (northern San Diego County) restoration alternatives analysis, including habitat evaluation analyses to assist in alternative selection. Alternatives include enhancement/restoration of the present freshwater ecosystem or conversion to brackish or seawater (full tidal influence) systems. Evaluations considered dredging and disposal options, such as shoreline, offshore, in-place, and upland.

Aspen/U.S. Army Corps of Engineers. Senior scientist and task manager for Morro Bay Estuary, CA, restoration EIS. Project focused on modeling and HEP analyses to evaluate alternatives for restoration and enhancement of the estuary, including the full range of marine, brackish, and freshwater habitats and considerations for dredging and disposal.

M&A/San Diego Association of Governments/California Coastal Conservancy. Senior scientist and quality assurance for a San Diego County program to develop a habitat and biological community classification system and data base

covering intertidal to about 40-m depths. Final products include an internet accessible system to aid environmental management decisions, such as related to sand replenishment of County beaches.

Department of the Interior/Minerals Management Service. Program manager and senior scientist for hard-bottom tasks on a biological reconnaissance study of soft-bottom and hard-bottom habitats off central and northern California. The study involved collection of soft-bottom cores for infauna and chemistry, hard-bottom photographs and video using an ROV, laboratory analyses, and biological community interpretation. Also included was a literature review on recolonization and recovery of deep-water, hard-bottom organisms.

Environmental Protection Agency /OWEC. EIS Coordinator and epifauna/fisheries scientist for ocean disposal site designation NEPA EIS addressing offshore (80-3000 m depths) disposal of dredged material from San Francisco Bay. Other study components included sediment chemistry, infauna, birds and mammals, and physical oceanography.

Port of Long Beach. Program Manager and senior scientist for fixed price baseline and monitoring study assessing dredging impacts to water quality, sediments, and fish and benthic communities and potential mitigation needs associated with Pier J development and several potential landfill projects. Other tasks included preparation of a sediment capping report that addressed needs for a confined aquatic disposal site, and modeling assessment of a permanent shallow-water habitat site for the Pier T Terminal Project.



CHARLES R. PHILLIPS, Task Leader, Coastal Processes/Oceanography

EDUCATION

San Francisco State University: M.A., Biology (1979)
University of California, Santa Barbara: B.A., Biology (1973)

SUMMARY OF EXPERIENCE

Mr. Phillips is a Senior Scientist at SAIC with over twenty years of work experience in aquatic and environmental sciences. His expertise includes water quality and environmental chemistry, environmental impact, and task/project management. Mr. Phillips has coordinated and contributed to environmental impact statements for wetlands restoration, designations of ocean waste disposal sites, dredging operations, offshore oil/gas and mining development/production projects, and other coastal development projects. He has analyzed and interpreted water quality and sediment contaminant data from studies of oil and gas drilling operations and wastewater discharges, ecological risk assessments, and contaminated sediment remedial investigations.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

301(h) Ocean Monitoring Program: Deputy program manager and principal investigator responsible for coordinating technical support that includes analysis and interpretation of sediment and tissue chemistry data; ecological and human health risk assessments; and data submittals and report

production for a long-term, Section 301(h) ocean monitoring program evaluating the effects of sewage discharges in coastal areas of the Southern California Bight (Orange County Sanitation District).

Imperial Beach Shore Protection Project EIS/EIR: Principal investigator for sediment and water quality issues, responsible for evaluating impacts and preparing sections of an EIS/EIR addressing a beach replenishment project in San Diego County (Aspen/U.S. Army Corps of Engineers)

Palos Verdes Pilot Capping Project: Senior scientist responsible for preparing Project Work Plans, and associated planning and quality assurance documents, collection and analyses of sediment cores, and analyses and interpretation of sediment contaminant (DDT) data, for a project to evaluate in-situ capping as a remedial option for managing contaminated sediments (U.S. Army Corps of Engineers).

Environmental Impact Report (EIR) for Amendment of the Abandonment Plan for the Removed Chevron 4H Platforms: Principal investigator responsible for analyzing impacts to marine water and sediment quality and preparing sections of an EIR addressing restoration alternatives, including dredging, for shell mounds associated with abandoned offshore oil and gas platform sites offshore of Santa Barbara County, California; coordinating preparation of sampling and analysis plans, collection and characterization of shell mound materials, and water quality studies using caged mussels and semipermeable membrane devices (California State Lands Commission/ ChevronTexaco).

Environmental Assessments Navy/Southwest Division Projects: Principal investigator and task leader for water quality and sediment quality issues, responsible for evaluating impacts and preparing sections of EAs and permit applications

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(401, 404, and CCD) associated with refurbishing the NOTS pier on San Clemente Island, installation of a modular hybrid pier test bed, upgrades to a public marina, and facilities upgrades to accommodate improved lighterage systems, and maintenance dredging in San Diego Bay (U.S. Navy).

NAVSTA/Pier 10/11 EIS: Principal investigator for water quality and sediment quality issues, responsible for evaluating impacts and preparing sections of an EIS associated with dredging and disposal alternatives for contaminated sediments in San Diego Bay (U.S. Navy).

Assessment of a Proposed Fiber Optic Cable Route: Senior scientist responsible for evaluating impacts to marine water quality, and preparing sections of an EIR, for a proposed fiber optic cable project off coastal California (Global Photon).

Tranquillon Ridge EIS/EIR: Principal investigator responsible for evaluating impacts to surface and groundwater quality resources and preparing environmental setting and impact sections of an EIS assessments for a proposed oil and gas development project in Santa Barbara County (A.D. Little, Inc./County of Santa Barbara).

San Dieguito Wetlands Restoration Project EIR/EIS: Principal investigator for water quality and sediment quality issues, responsible for evaluating impacts and preparing sections of an EIR/EIS associated with restoration of a coastal wetlands in San Diego County (Joint Powers Authority).

Naval Homeporting of Nuclear Carriers EIS: Principal investigator for water and sediment quality issues, responsible for evaluating impacts and preparing sections of an EIS addressing homeporting nuclear carriers in San Diego Bay (U.S. Navy).

Analyses of Water Quality Impacts from Dredging in Santa Barbara Harbor: Senior scientist responsible for evaluating potential impacts to marine water and sediment quality associated with a proposed dredging project in Santa Barbara Marina (City of Santa Barbara).

Baseline and Pier J Monitoring in Long Beach Harbor: Principal investigator, responsible for analysis and interpretation of sediment metal and organochlorine data for a two-year monitoring program; additionally, contributed to analyses of design and effectiveness of a proposed confined aquatic disposal site for contaminated dredged sediments in Long Beach Harbor (Port of Long Beach).

EIS/R for Exxon Santa Ynez Unit Development and Production Plan: Principal investigator responsible for preparation of technical EIS/R text and a technical appendix assessing impacts to marine water and sediment quality from OCS oil and gas production operations in Santa Barbara County (County of Santa Barbara).

Monitoring Water Quality Impacts from Fireworks Displays (2002-present): Program manager responsible for collecting and analyzing sediment and seawater samples for assessments of fireworks residues in Mission Bay (SeaWorld San Diego).



**EDWARD BASMADJIAN, Associate Scientist, Annotated
Bibliography**

EDUCATION

Bachelor of Science, Biology Major, Concordia University,
1985

Diplome Etudes Collegiales, Human Sciences Major, Vanier
College, 1979

SUMMARY OF EXPERIENCE

Nineteen years of experience in the environmental science field, focusing on aquatic biology and industrial science components. Conducted risk and impact assessments, toxicological evaluations, and habitat surveys in Californian, Canadian, Arctic, and African environments. Participated in numerous environmental impact assessments related to potential habitat disruption and ecological damage associated with large development projects. Environmental consulting experience includes the application of economic analyses to environmental projects, ecological modeling of potential impacts, and field study design. Proficient in aquatic and industrial survey techniques and analyses.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Coordinating a draft manuscript incorporating the results of a long-term fish histopathology survey within the vicinity of a

large southern California ocean outfall. Comparative interpretations of fish liver pathology studies of contaminated waters along the Pacific coastal zones of North America.

Multivariate analysis of short- and long-term impacts of the Orange County Sanitation Districts' wastewater outfall discharge on receiving waters, sediment, and biota. Investigating the effectiveness of a source control program (NPDES, Section 301(h)) on fish, macroinvertebrate, and infaunal communities of the San Pedro Shelf study area.

Field manager of a remotely operated vehicle (ROV) survey of a post-installation fiber optic cable route permit program evaluation for AT&T off Manchester and Morro Bay, California. Coordinated data analyses and reporting of habitat disruptions to the biological communities within the coastal study areas.

Involved in acute and chronic bioassay testing with marine and freshwater test species, using effluents, oils and petroleum products, chemical dispersants and sediments. Coordinated daily water quality/chemistry and QA/QC programs in the laboratory. Conducted field sampling at potentially contaminated sites, effluent and receiving water composite and grab sampling, stormwater and groundwater sampling, and bay and offshore sampling for water or sediments.

Minerals Management Service (MMS) study to determine impacts to subtidal hard-bottom communities from anchoring of mobile drilling rigs off the central California coast. Participated in the collection and analysis of video and photographic documentation of benthic organisms.



**DANIEL J. HEILPRIN, *Scientist, Annotated Bibliography,
Fisheries, Graphics***

EDUCATION

M.S., Marine Science. Moss Landing Marine Laboratories/San Jose State University (1992)
B.A., Aquatic Biology. University of California Santa Barbara (1988)

SUMMARY OF EXPERIENCE

Mr. Heilprin is a Senior Fisheries Scientist and Ichthyologist at SAIC with over 17 years experience focusing on biological characterizations, ecological monitoring, taxonomy, and environmental impact assessments of fishes and fisheries in coastal marine environments, bays, and tropical reef systems. His current project responsibilities include impact analyses for commercial and recreational fisheries related to telecommunication industry, Essential Fish Habitat (EFH) assessments, permitting, ecological characterization and assessment studies, and ecological data collection during field surveys. Field data collection has utilized a wide variety of sampling techniques and technologies, including collection and analysis of photoquadrat and video data with a Remotely Operated Vehicle (ROV), as well as Horizontal Directional Drilling (HDD) rhodamine dye studies. Other experience includes ecosystem modeling, biological impact data analyses and statistical analyses in support of environmental impact

statements (EISs) and impact reports (EIRs), and preparation of annual reports.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Orange County Sanitation District. Senior Fisheries Biologist for the Orange County Sanitation District 301(h) ocean monitoring program. Responsibilities on this NPDES project include field sampling of biological communities using trawls, benthic grabs, and rig fishing, as well as and assessment of water quality effects. Other responsibilities include data interpretation and analysis, production of graphics, literature searches, and writing of various sections for the annual report, water quality compliance and taxonomic QA analyses and was a task manager for a recent special study funded by the Districts. This special study addressed chemical contamination in the vicinity of the outfall with age in barred sand bass, a southern California sportfish. Responsibilities on this project included collection of some fish samples, fish age analysis and interpretation, as well as preparation of a manuscript for publication.

Port of Los Angeles/City of Carlsbad/Merkel and Associates. Task Leader/Senior Fisheries Biologist on wetlands monitoring project to document changes to estuarine and marine fisheries following an extensive wetlands mitigation program (Batiquitos Lagoon). Responsibilities include management of field sampling and data analysis tasks, as well as provide technical support during ecosystem modeling task using a modified habitat evaluation procedure (HEP). Field sampling techniques include otter and beam trawling, purse and beach seining, and square enclosures to characterize small cryptic fishes.

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Orange County Environmental Department. Responsible for data analysis, interpretation, graphics, and report preparation of water quality report for Baby Beach (Dana Point Harbor).

SANDAG/Merkel and Associates. Project Manager for development of a habitat classification system for San Diego County. Responsibilities include data interpretation and collation from library searches, preparation of ecotype descriptions.

Aspen Environmental. Task Manager for Environmental Assessment (EA) for a marina expansion and fishing pier construction at MCRD. In addition, provided technical support for updating of the Imperial Beach EIR for beach nourishment. Responsibilities include collection of field data, data synthesis, and report preparation.

MEC Analytical Systems, Inc./Port of Los Angeles/Port of Long Beach. Task Leader/Senior Fisheries Biologist on a baseline study characterizing fish communities in Los Angeles and Long Beach Harbors (southern California). Major responsibilities include field data collection using various sampling techniques, including lampara nets and purse seine, as well as data analysis and report preparation.

Joint Powers Authority, San Diego, California
Technical support for San Dieguito Wetlands Restoration Project EIR/EIS and responsible for evaluating impacts and preparing sections of an EIR/EIS associated with restoration of a coastal wetlands in San Diego County.

San Diego Port Tenants Association. Senior Scientist for preparation of a white paper on the state of San Diego Bay, including historical impacts, current environmental and economic conditions, and management strategies.

Port of Long Beach.. Fisheries Biologist on a baseline study characterizing fish communities in Long Beach Harbor (southern California). Major responsibilities included field data collection using various sampling techniques, including lampara nets and otter trawls, as well as data analysis and report preparation.

U.S. Army Corps of Engineers (USACE)/Aspen Environmental. Senior Fisheries Biologist to characterize fish and macroinvertebrate communities for preparation of the Imperial Beach Environmental Impact Statement. Responsibilities include summarization and interpretation of biological data and report preparation.

U.S. Army Corps of Engineers (USACE)/Aspen Environmental. Senior Fisheries Biologist to characterize fish and macroinvertebrate communities for preparation of the Upper Newport Bay Environmental Impact Statement/Report (EIS/EIR). Responsibilities include summarization and interpretation of biological data and report preparation.

Department of Interior (NBS, MMS, USFWS).
Fisheries Biologist for Santa Maria Basin Phase III monitoring program. Responsibilities included visual identification of fishes from ROV surveys, as well as providing technical support for sediment trap/sediment transport studies and deep-water larval settling experiments.



THOMAS F. NORRIS, Associate Scientist, Mammals

EDUCATION

Bachelor of Science - Zoology. University of California, Santa Barbara. 1987. (*Dean's Honors*).

Master's of Science - Marine Science. Moss Landing Marine Laboratories (SJSU). 1995.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Research consultant / Head bioacoustician. (*for NMFS Northwest Fisheries Science Center*) In charge of team using a passive acoustic system to detect, monitor, record and track killer whales.

Research consultant / Head bioacoustician. Oregon State University/Minerals Management Service SWSS research program - A MMS funded research program to investigate the effects of oil exploration on sperm whales in the northern Gulf of Mexico. In charge of team using passive acoustic system for detecting, monitoring, recording and tracking sperm whales acoustically.

Research biologist / bioacoustician. NMFS, Southwest Fisheries Science Center, La Jolla, CA. HICEAS - a survey of marine mammals in US EEZ waters of the Hawaiian Island chain. Part of team responsible for acoustically detecting, monitoring, surveying and recording cetaceans.

Mitigation Team Leader Alternate . USN DDG-81 Winston Churchill Shock Trials

Served as the alternate to the mitigation team leader for ship and aerial monitoring of marine mammals and turtles during at-sea shock trials of the USS Winston Churchill Navy warship. Participated in planning meetings, scientific review, and all aspects of field monitoring.

Project leader / team member. The Living Marine Resource Information System. A web-hosted geo-referenced database of marine mammal occurrence developed for the US Navy.

Research biologist / bioacoustician. NMFS, Southwest Fisheries Science Center, La Jolla CA. STAR - a survey of marine mammals and turtles in the Eastern Tropical Pacific. Part of team operating passive acoustic system for detecting, monitoring, surveying and recording cetaceans.

Research consultant. NMFS, Southwest Fisheries Science Center, La Jolla, CA. P.I. for a comparative analysis of humpback whale songs recorded across the central and eastern North to determine migration and distribution patterns of migrating humpback whales.

Head bioacoustician. NMFS, Southwest Fisheries Science Center, La Jolla, CA. An oceanographic survey of marine mammals and turtles in the Eastern Tropical Pacific. In charge of all aspects of passive bio-acoustic field operations for entire four month research cruise.

Research team member for the ATOC marine mammal research program, Kauai and the Big Island,



ROSMARY A. THOMPSON, Senior Scientist, Habitats

EDUCATION

Ph.D., Marine Biology, Scripps Institution of Oceanography, 1972

B.A., Zoology, University of Missouri, 1967

SUMMARY OF EXPERIENCE

Dr. Thompson has over 30 years of experience in studying aquatic (both marine and freshwater) ecology. She is certified as a scuba diver, with many hours logged in research projects at the offshore islands (Santa Catalina to San Miguel) and along the coastline from San Diego to Point Estero. She has completed training in wetlands delineation and is skilled in assessing barriers to fish passage in streams. She also has federal and state permits to sample for the tidewater goby, California red-legged frog, unarmored threespine stickleback, and California tiger salamander.

She has conducted environmental studies for a wide variety of projects throughout the United States. Coastal projects have included wastewater treatment plants/pipelines and discharges, artificial reef feasibility and design, harbor dredge and landfill, oil and gas developments, flood control maintenance in streams and sloughs, salt marsh restoration, stream bank repair or stabilization, harbor water quality surveys, and marina expansion. These studies have included

surveys for and analysis of impacts to species listed as threatened or endangered under the Endangered Species Act and other sensitive species.

Dr. Thompson has prepared environmental and monitoring reports for the above-mentioned projects complying with a wide range of regulatory requirements. These include joint federal/state environmental impact statements/reports (EIS/EIRs) and other documentation under the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), Endangered Species Act Section 7 biological assessments and Section 10 permits (including Habitat Conservation Plans), listed species protection plans, mitigation plans for biological resources, and a 208 area-wide waste treatment management plan. She has prepared environmental mitigation specifications and drawings for construction contract bid documents as well as revegetation plans and specifications. She has also obtained permits, including U.S. Army Corps of Engineers Sections 10 and 404 (individual and Nationwide), California Coastal Commission, California Department of Fish and Game Streambed Alteration Agreements, and Regional Water Quality Control Board Section 401 Certifications.

She has served as principal investigator for marine/freshwater biology and/or for all biological resources on numerous projects and has acted as project manager for many reports. As principal investigator, she has been responsible for field surveys, data collection and review, impact analyses (including mitigation and monitoring requirements), and report preparation. Management tasks included client liaison, regulatory agency coordination, planning, schedule and budget control, and quality review.

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REPRESENTATIVE PROFESSIONAL EXPERIENCE

Acted as principal investigator for biological and water quality/oceanographic resources for several Port of Long

Beach projects: Back Channel Safety Improvement EA, Initial Study, and EIR; Piers D/E/F Terminal Development Project; a subsequent EIR for the Pier S Terminal Development Project; and the Pier B Railyard Expansion Project EIR. Projects in the Port of Los Angeles included: SEIS/SEIR for the Channel Deepening Project; two EIRs to assess the impacts of developing Pier 300; West Basin EIR; and others. Sensitive species and essential fish habitat were key components of the analyses.

Prepared a Biological Resources Evaluation for the Santa Barbara Harbor 5-year harbor maintenance dredging program, with emphasis on threatened and endangered species, and managed preparation of a water quality evaluation for this project. Provided responses to public comments on the project.

Managed a biological evaluation of Basin 1 in Carpinteria Salt Marsh that included wetland delineations (Corps of Engineers and Coastal Commission methods), bird surveys, small mammal trapping, a butterfly survey, and recommendations for habitat restoration in the basin. Managed the biological portions of a salt marsh enhancement plan that included restoration of tidal flows, identification of areas for enhancement, development of a planting plan and construction specifications for planting, and development of a monitoring plan to ensure that enhancement is successful.

Acted as principal investigator for biological resources on a flood control dredging project involving five creeks and Goleta Slough in Santa Barbara County. Key issues included potential for impacts to sensitive species and wetlands, and discharge of dredged material on the beach. Prepared a supplement to that EIR addressing impacts to steelhead (after listed as endangered) and water quality.

Acted as principal investigator for the marine biology, commercial fishing, and aquatic biology sections of the San Miguel oil development project EIS/EIR. Investigated commercial and recreational fishing issues (including kelp harvesting, mariculture, and salmonids) as well as impacts on freshwater habitats for the Chevron/Texaco Point Arguello field oil development project. Prepared a negative declaration and initial study for the County of Santa Barbara on the Exxon El Capitan Marine Terminal removal. Work included underwater field surveys.

Managed a water quality sampling program for Santa Barbara Harbor that involved monthly sampling for bacteria, salinity, temperature, and dissolved oxygen at several locations. Managed air quality, water quality, and biological resources special studies for the Marina One and Marina Four expansion project in the Harbor. Conducted a field survey in harbor waters and prepared the biological resources study. Managed a monitoring program for the western snowy plover and California grunion during dredging activities and beach restoration at the Santa Barbara Harbor.

Participated in a marine mammal monitoring program for the installation of a Chevron pipeline near Casitas Pier in Carpinteria, California.



TED R. TURK, QRB, Habitats/Ecology

EDUCATION

Ph.D., 1978, Ecology, University of California, Riverside
and San Diego State University
B.A., 1970, Biology (with honors), Williams College,
Williamstown, MA

SUMMARY OF EXPERIENCE

Dr. Turk has over 24 years of experience performing a wide range of environmental studies, including environmental impact statements (EISs) under NEPA and various state laws, Endangered Species Act (ESA) compliance, marine and freshwater biology and water quality studies, sediment investigations, marine site monitoring studies, ecological risk assessments, watershed analysis, hazardous waste management, and regulatory review and compliance. He has served as project manager on many large, multidisciplinary environmental projects and is skilled in technical, schedule, and financial control. He has managed projects addressing the impacts of dredging, dredged material disposal, and wastewater discharges on biological communities and water quality; characterization and remediation of contaminated sites; habitat restoration; and threatened and endangered species assessments. He is also skilled in the design and

management of environmental field programs, and data statistical analysis.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

EIS and Biological Assessment, Aircraft Carrier Homeport Project, Puget Sound Naval Shipyard and Naval Station Everett - Managed portions of this NEPA and ESA project addressing the environmental impacts of home porting additional aircraft carriers at Puget Sound Naval Shipyard, Bremerton, and Naval Station Everett, for the U.S. Navy. Key marine issues include management of contaminated sediments (disposal site determination), habitat impacts at dredging and disposal sites and mitigation of those impacts, impacts of pier replacement, anadromous fish, and endangered species. Project includes characterization of proposed dredged material, benthic and fish surveys of proposed dredging and disposal sites, and studies of propwash-induced resuspension of contaminated sediments.

EIS/EIR, Oakland Harbor -50 ft. Deepening Project - Managed marine portions of this NEPA/CEQA document for a project involving dredging and disposal of approximately 14 million cubic yards of material from berths, navigation channels, and turning basins, as well as infrastructure improvements. The primary beneficial reuse of dredged material was for habitat enhancement in approximately 200 acres of the Middle Harbor. Other disposal/reuse options included upland fill in the port area, wetland enhancement at other sites, and ocean disposal. Key marine issues included effects on dredging and disposal of contaminated sediments on water quality and biota, loss and gain of marine habitat, and impacts on endangered species (primarily the least tern).

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included designated ocean and in-Bay sites, a new in-Bay site, wetland enhancement/creation, and levee maintenance/repair. Key aquatic issues were potentially increased seawater intrusion and resulting effects on wetlands and other resources of Suisun Bay and the Sacramento-San Joaquin Delta, and on public drinking water supplies. Potentially affected sensitive species included the winter run chinook salmon, longfin smelt, Pacific herring, California clapper rail, eelgrass, and others. The EIS/R addressed the full range of aquatic issues, including water quality, sediment quality, benthos, fish, plankton, mammals, birds, and endangered species.

PSDDA Disposal Site Monitoring – From 1995 to 2004, Dr. Turk has served as a senior reviewer for SAIC's physical, chemical and biological monitoring of the non-dispersive PSDDA dredged material disposal sites in Puget Sound. The purpose of this monitoring is to determine the fate of material disposed of at the sites, and whether disposal has resulted in site conditions exceeding any site management guidelines regarding chemical, toxicological or biological effects. Dr. Turk reviewed sampling and analysis plans, data analysis and findings, and project reports. He is very familiar with PSDDA/PSEP sampling & analysis protocols and the PSDDA monitoring framework, including the interpretative guidelines.

EIS, Dredged Material Disposal Site Designation, Southern California - Project Manager for field studies and EIS preparation for permanent designation of the LA-2 and LA-5 Ocean Dredged Material Disposal Sites. The EIS addressed alternatives for ocean disposal; alternative handling of contaminated dredged material; the relationship of the project to other plans and projects; the existing environment; and the

environmental impacts of the proposed action and alternatives. The project included a four-season sampling program of sediments and biota at alternative sites.

Eelgrass, Fish and Benthos Surveys, San Francisco Bay – Principal-in-Charge for baseline surveys to determine the impacts of dredging and pipeline construction in Richmond and Point San Pablo areas. Directed study design using acoustic and diver surveys of eelgrass beds, trawling for fish and epibenthic macroinvertebrates, and grab sampling for benthic infaunal analysis.

San Francisco Bay Plan Amendment - Managed marine portions of the environmental analysis and CEQA-Equivalent Document for a proposed amendment to allow the re-use of dredged material for habitat enhancement in San Francisco Bay. The analysis described existing habitats in the Bay, and the benefits and potential adverse impacts of using dredged material for converting various deep-water habitat types to various shallow-water habitats. The analysis addressed biological communities, threatened and endangered species, water quality, hydrodynamics, transportation, and recreation.

Sediment Characterization Study, Naval Station San Diego - Served as assistant project manager for collection and assessment of historical sediment studies, designing and carrying out a new sediment sampling and testing program, assessing suitability of sediments for open water disposal, and making recommendations for dredge project priority and disposal sites and methods.

EIS/EIR, Baldwin Ship Channel Navigation Improvements, San Francisco Bay, CA - Managed aquatic portions of the joint NEPA/CEQA document for deepening of 17 miles of the San Francisco to Stockton Ship Channel, and disposal of over 10 million cubic yards of dredged material. Disposal options



JOSEPH P. WALSH, III, GIS Specialist

EDUCATION

B.A., Physical Geography, University of California, Santa Barbara (1993)

SUMMARY OF EXPERIENCE

Mr. Walsh has 11 years of experience in all aspects of Geographic Information Science (GIS) technology and applications, ranging from digitizing to computer modeling and computer programming for a customized graphical user interface (GUI) for an integrated natural resources management plan (INRMP) for the U.S. Navy. He has managed development of a soil database for the Los Padres National Forest and has worked on developing databases for the U.S. Environmental Protection Agency, the Nature Conservancy, and the California Gap Analysis Project. For the latter, he also designed the GUI. He has frequently performed digitizing and related activities for analyses and documentation in compliance with NEPA, CEQA, and related regulatory guidelines. Mr. Walsh has provided GIS data and mapping support for such projects as CEQA documentation for the Metromedia Fiber Optic Cable Project (San Francisco Bay, Sacramento, Los Angeles, and San Diego areas) for the California Public Utilities Commission, the Global West Fiber Optic Cable Project EIR & CSLC Permitting Support, San

Dieguito Wetlands Restoration Project EIR/EIS, and a biological resources assessment for Sandia National Laboratories, Livermore, California.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

- Created 3 dimensional photo-realistic simulations and then created stand alone multi-media movies to meet client needs.
- Route analysis and map production for Metromedia Fiber Network Services, Inc.'s linear fiber optic cable project in major metropolitan areas in northern and southern California.
- Route analysis and map production of underwater telecommunications cable route for Global Photon Systems Incorporated.
- Provided GIS mapping and analysis as well as map production of underwater telecommunications cable route for AT&T.
- Developed customized INRMP GIS for the U.S. Navy, Engineering Field Activity (EFA) West for use by natural resources personnel at NAS Fallon, Nevada
- Provided mapping and GIS support for an environmental mitigation at San Dieguito wetlands in San Diego County for Joint Powers Authority.
- Produced a base map depicting the location and size of riparian restoration sites at Emma Wood State Park, Ventura, California, using differential global positioning system (DGPS) technology, aerial photography, and field work for the Ventura River Estuary Enhancement Plan. The map included vegetation, revegetation, and weed eradication areas.



EVANS WADDELL, QRB, Coastal Processes

EDUCATION

Ph.D., Marine Science (Physical Oceanography), Louisiana State University, 1973.

M.A., Geography, University of Virginia, 1969.

B.A., Geography, University of Virginia, 1967.

SUMMARY OF EXPERIENCE

As an Assistant Vice President, Dr. Waddell often serves as Program Manager (PM) on large oceanographic (PO) programs. As such, he is responsible for the technical, financial, contractual, and administrative performance of projects involving distributed groups of principal investigators. Dr. Waddell has also been a principal investigator on physical oceanographic programs in environments ranging from coral reefs across the shelf and in the Gulf Stream and Loop Currents. His primary activities are in the Atlantic, coastal Pacific and Gulf of Mexico.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

1977 - Present: Science Applications International Corporation
- As an Assistant Vice President, Dr. Waddell often serves as Program Manager (PM) on large oceanographic (PO) programs. As such, he is responsible for the technical, financial, contractual, and administrative performance of

projects involving distributed groups of principal investigators. Dr. Waddell has also been a principal investigator on physical oceanographic programs in environments ranging from coral reefs across the shelf and in the Gulf Stream and Loop Currents. His primary activities are in the Atlantic and Gulf of Mexico.

Dr. Waddell is the PM for the ongoing MMS-funded Exploratory Study of Deepwater Currents in the Gulf of Mexico as well the Survey of Deepwater Currents in the NW Gulf of Mexico, a position he also held in the recently completed DeSoto Canyon Eddy Intrusion Study and DeSoto Deep Currents Study.

Dr. Waddell was responsible for the overall management, analysis and characterization of multiyear current observations offshore of Orange County and from the LA-3/LA-5 site in southern California.

Dr. Waddell managed the physical oceanographic and modeling portions of the National Biological survey study of the impacts of drilling discharges on hard bottom communities near Point Conception California.

He managed a two-year field measurement and data synthesis study of circulation and transport processes in Mamala Bay, Oahu, Hawaii.

He was PM for the Minerals Management Service's (MMS) 2-year Straits of Florida PO Field Measurement Program and had a similar role on the recently completed Minerals Management Service Gulf of Mexico, Physical Oceanography Program. As PM of this latter seven-year \$7.6 million study, he was responsible for coordinating and supervising the

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technical and financial activities of principal investigators from academic and research institutions as well as from SAIC. From 1980-1984, he was PM on the BLM, South Atlantic, Physical Oceanography Study (SAPOS) that was also a major (\$5 million) multi-institution program in support of that agency's Environmental Studies Program. Activities were similar to those in the MMS Gulf Program.

SELECTED PUBLICATIONS AND REPORTS

Waddell, E., 1976. "Swash-Groundwater-Beach Profile Interactions," in Beach and Nearshore Processes, *SEPM Special Publication No. 24*.

Waddell, E., 1974. "Field Investigation of Swash," *Proceedings, Conf. on Coastal Engineering in Japan, 1973* (in Japanese), English version.

Sonu, C.J., S. P. Murray, S. A. Hsu, J. N. Suhayda, and Evans Waddell, 1973. "The Sea-Breeze and Coastal Processes," *EOS, Transactions, AGU, Vol. 54(9):820-833*.

Waddell, E., 1971. "Dynamics of Swash and Its Implications to Beach Response," *Coastal Studies Institute Tech. Rep. No. 139*.

Waddell, E. and C. J. Sonu, 1971. "High Frequency Interaction Between Swash and Beach Elevations," *Transactions, AGU (Abstract)*.

Waddell, E., 1971. "High Frequency Response of the Beach Systems to Swash," *Proceedings - Second Coastal and*

Shallow Water Research Conf. (Abstract).

Waddell, E., 1980. "Wave Forcing on Beach Groundwater," *Proceedings - 17th International Conference on Coastal Engineering, Sydney, Australia*.

Hamilton, P., S.E. McDowell, Evans Waddell, David Redford, and Douglas Pabst. 1996. Slope sea currents during the 1990-1991 106-Mile Site Investigations. *J. Mar. Environ. Eng.*, VOL. 2, pp.203-225.

Atkinson, L.P., T. J. Berger. Peter Hamilton, Evans Waddell, Kevin Leaman and T.N. Lee, 1995. Current Meter Observations in the Old Bahama Channel, *J. Geophys.Res.*, 100:8555-8560.

Leaman, K. D., P. S. Vertes, L. P. Atkinson, T. N. Lee, Peter Hamilton, and Evans Waddell, 1995. Transport, potential vorticity, and current/temperature structure across Northwest Providence and Santaren Channels and the Florida Current off Cay Sal Bank, *J. Geophys Res.*, 100:8561-8569.

Waddell, E., Joseph Karpen, and Paul Debrule, 1979. "Field Study of Pollutant Migration in the Vicinity of a Coastal Front," *Oceans '79*, Sept. 17-19, 1979, San Diego, CA, pp. 635-641.

Waddell, E. and Peter Hamilton, 1978. "Seasonal Variation in Currents on the Texas/Louisiana Continental Shelf," *EOS, Transactions, AGU, Vol. 59(12)*.

Waddell, E., 1984. Loop Current Temperature and Velocity Field, *EOS Trans. AGU 65(45)*, 968.



NOEL DAVIS, Task Leader Sensitive Species

EDUCATION

Ph.D., Biological Oceanography, Scripps Institution of Oceanography (Dissertation Topic: Studies of the Southern California Nearshore Sand Bottom Community)

B.A., Zoology (magna cum laude, Phi Beta Kappa, Highest Honors in Zoology, Special Undergraduate Research Award), University of California, Los Angeles

REGISTRATIONS, CERTIFICATIONS, AND AFFILIATIONS

Certified by the U.S. Fish and Wildlife Service in Habitat Evaluation Procedures (HEP) – 1989

Certified as a Wetlands Delineator by the U.S. Army Corps of Engineers in its Wetlands Delineator Certification Demonstration Project – 1994

Society of Wetland Scientists

Los Angeles County Environmental Review Board

Scientific Collecting Permit, SC-000625, expires March 7, 2005

SUMMARY OF EXPERIENCE

Dr. Davis has more than 26 years of experience in managing estuarine, freshwater, and oceanographic environmental studies. She is responsible for managing the aquatic and

marine portions of Environmental Impact Reports (EIRs), Environmental Impact Statements (EISs), and Environmental Assessments (EAs) for both onshore and offshore projects. She has more than 25 years of experience in conducting marine studies and is also responsible for wetlands and water quality assessments in conjunction with 404 Permit evaluations and environmental reports.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

EIR/EA for BEACON Sand Replenishment Project -- Beach Erosion Authority for Control Operations and Nourishment (BEACON – A Santa Barbara County Joint Powers Authority). Project Manager for the EIR/EA that analyzed the feasibility and environmental impact of various methods of sand replenishment, including trucking in sand, at several beaches in Santa Barbara County. Environmental impacts on local communities, marine resources, land use, recreation, and sediment transport on local areas from Goleta to Oxnard were evaluated.

Impacts of Caltrans Operations on Nearshore Marine Communities in Malibu -- Subconsultant to Coastal Resources Management Under Contract to Caltrans. Scientist/Diver on study to determine the impacts to marine life of sediment piled along the Pacific Coast Highway between Latigo Point and Temescal Canyon as a result of Caltrans operations. A series of underwater transects were established along the coast. Quantitative assessments were made of nearshore marine life to compare marine communities in areas where sediment entered the ocean to unaffected control areas. Marine Biology Study and Mitigated Negative Declaration for BEACON South Central Coast Beach Enhancement Program.

Davis - 2

Subcontractor to Moffatt & Nichol under Contract to BEACON. Project Manager for environmental documentation for BEACON's proposed beach enhancement program. BEACON proposes to use opportunistic sources of sand for beach nourishment in Santa Barbara and Ventura Counties. Biological resources were surveyed by SCUBA diving at six proposed beach receiver sites. A mitigated Negative Declaration was prepared that addressed all impacts of BEACON's proposed beach nourishment program.

Addendum to EIR for BEACON Beach Nourishment Demonstration Project -- BEACON. Project Manager for preparation of an addendum to the EIR for the BEACON Beach Nourishment Demonstration Project. The addendum focused on the current condition of marine biological resources near alternative receiver beaches at Goleta and Padaro Lane. The nearshore environment off these beaches was surveyed by SCUBA diving. The need for beach replenishment at alternative receiver beaches was also addressed in the addendum.

Monitoring of Impacts of a Beach Revetment on Goleta Beach on the Intertidal Fauna and Kelp Beds _ Santa Barbara County Parks Department - Responsible for monitoring response of the intertidal beach fauna to an emergency revetment on Goleta Beach and also for monitoring kelp beds downcoast from the revetment. The purpose of the monitoring was to determine whether the emergency revetment was having an adverse impact on coastal resources.

Underwater Survey of Kelp and Eelgrass off Goleta Beach, Santa Barbara County -- Moffatt & Nichol Engineers, under

Contract to BEACON. Project Manager of underwater surveys to map sensitive resources that might be affected by a proposed beach nourishment program on Goleta Beach. Kelp and eelgrass resources that might be affected by the proposed project were surveyed and mapped.

Effects of the Palos Verdes Landslide on Marine Life -- U.S. Army Corps of Engineers, Los Angeles District. Project Manager for an extensive marine sampling field program to document the effects of the Palos Verdes landslide on marine communities. The Van Tuna Research Group of Occidental College was a major subcontractor for this effort. Chambers Group was in charge of documenting the impact to intertidal communities and hard bottom subtidal communities. Occidental College was in charge of sediment studies and impacts to fishes. Impacts to kelp (*Macrocystis*, *Egrewia*, *Cystoseira* and *Eisenia*) and surfgrass were a major focus.

Preconstruction Baseline Report of Biological Monitoring Program for Oceanside Experimental Sand Bypass Program -- U.S. Army Corps of Engineers, Los Angeles District. Project Manager for program to sample fishes and invertebrates offshore Oceanside Harbor. This program was part of the baseline for the Corps' proposed sand bypass project. Fieldwork included core sampling for invertebrates, trawling and gill netting for fishes, and scuba surveys.

Marine Biological Sampling Off Surfside Sunset -- U.S. Army Corps of Engineers, Los Angeles District. Project Manager for an invertebrate and fish collection program offshore Sunset Beach. This program involved seasonal invertebrate collection, diver transects, other trawls and gill net samples to determine impacts of taking sand from an offshore borrow pit for sand replenishment at Sunset Beach.



TODD A. CHAPMAN, Scientist, Sensitive Species

Mr. Chapman is a biologist with 12 years experience participating in and conducting both marine and freshwater studies, focusing on both fishes and invertebrates.

EDUCATION

M.S., Biology (Richard B. Loomis award, Phi Kappa Phi), California State University, Long Beach

B.S., Marine Biology (Dean's honor roll), California State University, Long Beach

REGISTRATIONS, CERTIFICATIONS, AND AFFILIATIONS

Western Society of Naturalists

American Society of Ichthyologists and Herpetologists

Scientific Collector's Permit (CDFG)

Open Water I (PADI)

Small Boat Operation

CPR Certification

First Aid Certification

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Beach Replenishment Baseline Study Along Santa Barbara and Ventura Beaches -- BEACON. The nearshore habitat along these beaches was assessed via scuba transects. This assessment was undertaken to provide a baseline for

comparisons following a beach replenishment project which could potentially jeopardize this limited nearshore habitat with the addition of large amounts of sand.

Sediment Testing and Analysis of Dredging Best Management Practices for Los Angeles River Estuary -- U.S. Army Corps of Engineers, Los Angeles District. Senior marine biologist for a program to collect and test sediments from the Los Angeles River Estuary and the potential aquatic disposal site. Sediment were collected by vibracore and analyzed for a wide variety of chemical and physical parameters. The objective was to use the information to analyze several disposal options for contaminated sediments.

San Gabriel River Fish And Macroinvertebrate Collections, Los Angeles County -- Los Angeles County, Department of Public Works. Fish in the upper San Gabriel River, from Morris Dam downstream to Foothill Boulevard and Brown's Gulch, were collected by both seine and with an electrofisher. To determine the impacts of sediment releases from behind Morris dam, on downstream populations. Macroinvertebrates were also collected using a kick-net.

Biological Baseline Survey of LA-3 and LA-2 Dredge Material Ocean Dump Sites -- Noble Consultants/U.S. Army Corps of Engineers. Field supervisor for biological and chemical sampling at two dredge material disposal sites off southern California. Sediment from both of these sites was collected with a Vanveen grab for chemical and biological analysis. Benthic fish assemblages and invertebrate epifauna were assessed using an otter trawl. Data was compiled, analyzed and the report was written.

Chapman - 2

Monitoring of Grunion and Western Snowy Plover during Beach Nourishment in Santa Barbara Harbor -- U.S. Army Corps of Engineers, Los Angeles District. Responsible for monitoring grunion and western snowy plover activity during dredging of Santa Barbara Harbor and placement of dredged sediments on the beach. The purpose of the monitoring was to make sure that beach nourishment would not adversely affect grunion spawning or western snowy plover foraging.

The Effect Varying Photoperiod Regimes Have on the Initiation and Subsequent Timing of Daily Otolith Increment Production in the California Grunion *Leuresthes tenuis* -- California State University, Long Beach. Larval California grunion were reared from eggs, then exposed to one of three photoperiods to assess the effect photoperiod has on daily increment formation. Light and Electron microscopy were both used to assess any differences between photoperiods.

Marine Biological Study of a Harbor on Vandenberg AFB Space Shuttle Program, Santa Barbara County -- U.S. Air Force/SAMSO. Field technician and ichthyologist in a marine biological baseline study of the Point Arguello boathouse loading dock area. This study involved underwater scuba transects quantifying both algal percent cover and invertebrate densities. A quantification of fish populations was conducted with both scuba and snorkeling transects.

Annual Macroinvertebrate Sampling of the FPL Solar Electric Generating System (SEGS) Evaporation Ponds 8 and 9, Harper Lake, Santa Barbara County -- HSI Geotrans. Aquatic macroinvertebrates were sampled from three evaporation ponds, using a kick-net, and a cast plankton net. Adult forms

of these invertebrates were also captured with an aerial insect net. Once collected, all of the samples were sorted by taxon and a chain of custody was followed to determine selenium tissue concentrations.

Sampling of Nearshore Fish Assemblages Associated with Eelgrass Beds Within San Diego Bay -- Nearshore Marine Fisheries Research Project (CSUN)/U.S. Navy, Southwest Division. Assessed the effect of both dredging and increased war ship traffic on eelgrass beds as well as the associated fish assemblages.

California Department of Fish and Game (CDFG) Gill Net Recapture Study of Tagged White Seabass *Atractoscion nobilis*, Reared and Released by the Hubbs Sea World Fish Hatchery -- CDFG/Vantuna Research Group. Size selective gill nets were set at strategic locations within the southern California Bight, to determine the dispersal and success of hatchery reared white seabass released into wild populations.

Spine Regeneration Rate and Overall Growth Rate of Tagged, Released, and Recaptured Round Stingrays *Urolophus halleri* -- California State University, Long Beach. Round stingrays were captured in 100 meter beach seines conducted at the west end of the beach and river jetty. The rays were measured, weighed, tagged with duplicate disc tags, and their spines were clipped off at the cuticle prior to release. This study focused on the spine regeneration rate, as well as seasonal movement patterns along Seal Beach and the adjacent river channel.



CHRISTINE TISCHER, Scientist, Birds

EDUCATION

B.S., Animal Science, California State Polytechnic University, Pomona

REGISTRATIONS, CERTIFICATIONS, AND AFFILIATIONS

Federal Fish and Wildlife Permit (TE-053379-0) to take (survey by pursuit) the Quino checkerspot butterfly and take (harass by survey and locate and monitor nests) the coastal California gnatcatcher.

Federal Fish and Wildlife Permit (TE 781217-5 [Chambers Group permit]) to Survey for Quino Checkerspot Butterfly (Independent), California Gnatcatcher (Independent), and Least Bell's Vireo (Dependent)

USGS Bird Banding Laboratory Permit (22219-E) as Subpermittee to Band Tree Swallows and Western Bluebirds Surveying, Monitoring, and Handling Techniques Workshop – Desert Tortoise Council, 1999

Desert Birding By Ear – Sea and Sage Audubon Society, 1999
Visual Bird Identification – Sea and Sage Audubon Society, 1999

The Endangered Species Act and Habitat Conservation Planning Conference – CLE International, 1998

Basic Tracking and Wilderness Awareness Training – Earth Skills, 1998

Wetland Delineation Training – Wetland Training Institute, 1998

FERC Natural Gas Pipeline Environmental Compliance Seminar – 1998

Least Bell's Vireo/Southwestern Willow Flycatcher/Yellow-Billed Cuckoo Annual Meeting – 1997, 1998

Basic Birding By Ear Workshop – Sea and Sage Audubon Society, 1998

Southwestern Willow Flycatcher Workshop – Kern River Research Center, 1998

FERC Natural Gas Pipeline Environmental Compliance Seminar – 1998

Sea and Sage Audubon Society

Defenders of Wildlife

National Wildlife Federation

Golden Key National Honor Society

Gamma Sigma Delta Agricultural Honor Society

Licensed Member of the International Wildlife Rehabilitation Council (IWRC)

SUMMARY OF EXPERIENCE

Ms. Tischer has 7 years of experience conducting focused studies for California gnatcatchers, brown-headed cowbirds, least Bell's vireos, peregrine falcons, California least terns, and Quino checkerspot butterflies within southern California. She has participated in several studies monitoring nestlings, juveniles, and adult peregrine falcons in the southern California coastal area. She has also conducted numerous biological reconnaissance-level surveys, authored sections for various environmental documents, implemented mitigation programs, investigated biological impacts, and performed restoration inspections and data analysis for numerous environmental projects in California and throughout the United States.

Tischer - 2

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Least Tern Monitoring in Queensway Bay -- U.S. Army Corps of Engineers, Los Angeles District. Responsible for monitoring the foraging activity of the endangered California least tern in the Los Angeles River Estuary. The purpose of the monitoring was to determine whether proposed dredging of the estuary would have any potential effect on least tern foraging.

Monitoring of Peregrine Falcon Activity at a California Least Tern Colony -- Western Foundation of Vertebrate Zoology. Monitored the Terminal Island colony of the California least tern to determine if predation by peregrine falcons was occurring.

Survey for Western Snowy Plovers in Railroad Repair Area -- Southern California Regional Rail Authority. Responsible for a western snowy plover survey to insure that proposed railroad right-of-way construction did not affect federal threatened western snowy plovers.

Baseline Biological Surveys, Functional Analysis of Wildlife and Riparian Communities, Southwestern Pond Turtle Relocation, Water Quality and Sediment Analysis -- San Gabriel River. Conducted biological resource surveys for San Gabriel River sites in Los Angeles County. The project analyzed change in overall integrity of the riparian and aquatic aspects of the San Gabriel River system due to the sluicing of two upstream dams (San Gabriel and Morris). A functional analysis methodology was formulated based on the U.S. Army Corps of Engineer's, Los Angeles District Hydro Geomorphic

Analysis and Habitat Evaluation procedures to assess and compare the biological resources before and after the sluicing of the reservoirs. Data related to the biological, physical, and biogeochemical functions at each site were collected on transects in upland, riparian, and aquatic habitats to complete the functional analysis. Geographic Information System mapping techniques were used to create vegetation maps for use in the functional analysis. A Biological Assessment report included the methodology used for field survey and functional analysis techniques, a discussion of existing conditions, and the preluicing functional analysis. Responsibilities included morning avian counts, setting up and monitoring of mammal scent stations, amphibian night surveys, large mammal transects, assisting with the southwestern pond turtle relocation program, and compiling and analyzing survey results for the Functional Analysis document.

Wildlife Biologist/Ecologist, Marine Corps Base Camp Pendleton. Under Chambers Group's General Services Administration Contract, served for 13 months as a contract wildlife biologist and ecologist, supplementing the Natural Resources staff at Marine Corps Base, Camp Pendleton, in Oceanside. She has conducted numerous general biological surveys, sensitive species surveys, and biological monitoring of construction and mission-related activities and has reviewed and prepared monitoring reports, biological reports, and multiple documents related to base environmental permits and regulations.

Brown-Headed Cowbird Trapping, Sensitive Bird Surveys, and Biological Technical Support for Eastern Transportation Corridor (ETC) -- CH2M Hill. Field Project Manager for a trapping program focusing on the brown-headed cowbird as part of the mitigation for impacts to riparian habitat.



Anne-Lise Lindquist, PE, Coastal Processes, Permits

EDUCATION

BS / 1993 / Ocean Engineering / Florida Institute of Technology

SUMMARY OF EXPERIENCE

RegistrationS: 2003 / Civil Engineer / California / No. 64864
Since joining Moffatt & Nichol in 1999, Ms. Lindquist has worked on a variety of coastal engineering projects including beach-fill modeling, hydraulic analysis, coastal impact studies, wave prediction, and environmental permitting. Prior to joining Moffatt & Nichol Engineers, Ms. Lindquist was involved in a 2.5-year project on coastal processes in Brevard County, Florida, with the U.S. Army Engineer Coastal Engineering Research Center, Vicksburg, MS. and consulted on a sediment transport study in Carlsbad, California. Furthermore, Ms. Lindquist brings more than 5 years of experience in coastal permitting, coastal processes, storm analysis, data acquisition, and report preparation. Her representative projects include the following:

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Carlsbad Opportunistic Beach Fill Project, Carlsbad, CA. Coastal Engineer responsible for compiling and submitting the necessary information to the resource agencies to obtain permits for an opportunistic beach fill program. The program will enable the City of Carlsbad to place excess material from

upland construction projects on the beach at designated placement sites if the material meets specific requirements.

South Central Coast Beach Enhancement Program for BEACON, Santa Barbara and Ventura Counties, CA. Coastal Engineer providing coastal engineering support on the BEACON opportunistic beach fill program for both counties. The program is for general permits to place suitable surplus upland fill material on six beaches from Goleta to Port Hueneme. The program is patterned after other such programs, and specifies sand quantities, qualities, placement timing and restrictions. The programs will attempt to mimic nature in beach fill operations. Sand will be transported to the beach by train, truck, conveyor belt and dredge. Specific tasks include design of beach fills, modeling of sedimentation and longevity of sand, preparing permit applications, and preparing technical documentation.

San Clemente Beach Replenishment Program, San Clemente, CA. Coastal Engineer responsible for estimating offshore sediment deposition and longevity of beach fills. She assisted in design of the beach fills based on environmental review and design requirements. She is compiling the necessary information for the resource agencies to obtain permits for a beach replenishment program and has prepared technical documentation supporting calculations and design. The program will enable the City of San Clemente to place excess material from upland construction projects on the beach at designated placement sites if the material meets specific requirements. The project will obtain a 5 year permit from each permitting agency for future program beach fills, rather than applying for a new permit for each occurrence.

Lindquist - 2

SANDAG Regional Beach Sand Project, San Diego, CA. Ms. Lindquist is responsible for beach-fill diffusion analysis, profile modeling, and estimating the offshore sediment deposition for the environmental review process.

Buena Vista Lagoon Hydrology Study, Oceanside, CA. Coastal Engineer responsible for the evaluation of a new weir design, flood assessment, and design alternatives to protect the St. Malo community from a 100-year storm event. Ms. Lindquist performed the hydraulic analysis of the existing and proposed weir design to estimate the 100-year flood elevation. She assisted in flood-protection alternatives and prepared a letter report with the findings, recommendations, and cost estimates.

Consolidated Slip Restoration Project, Los Angeles, CA. Coastal Engineer responsible for the preparation of an alternatives analysis for restoring Consolidated Slip. Sediments at the site have been shown to contain elevated levels of metal and organic chemicals. This study outlines opportunities and constraints for removing or containing the Slip's contaminated sediments. Alternatives for a clean-up plan and opportunities to restore and rehabilitate the site are also addressed, and include in-situ capping, land reclamation, and dredging with offsite reuse, landfill disposal, or sediment treatment. The next phase of the study includes preparing a feasibility report.

Big Bear Lake East End Deepening Project, Big Bear, CA. Coastal Engineer assisted in preparing a feasibility study, preliminary, and final design for improvements to the East End of Big Bear Lake to improve navigation. She also assisted in

preparing the final plans, specifications, and cost estimates for the project. The feasibility study investigated alternatives for the project, identifying potential disposal sites for the removed sediments, and developing preliminary cost estimates. The design phase includes preparing plans and specifications for the selected project.

Big Bear Lake Marina and Peninsula Recontouring Project, Big Bear, CA. Coastal Engineer assisting in the preparation of final design and construction documents for the Big Bear Marina project. Tasks include calculating the quantities of excavated and fill material, designing shore protection for the project, and preparing cost estimates. The project goals are to repair and rehabilitate the marina facility, including the navigation channels and protection groin.

Floating Dock Study, Port of Long Beach, CA. Coastal Engineer responsible for analyzing directional wave data for a new floating dock in the Port of Long Beach. Tasks included analyzing 13 years of wave data from 1984 to 2001 to determine significant wave height and peak period.

Pier 400 Phase III Planning Studies, Los Angeles, CA. Coastal Engineer responsible for analyzing seven years of directional wave data from 1993 to 1999 to determine significant wave height, peak period, and peak direction. The data analysis was used for wave modeling to determine wave conditions at the proposed Pier 400 landfill configurations.

Peohe's Ferry Landing, Coronado, CA. Coastal Engineer responsible for forecasting deepwater waves based on historic wind records and potential ship-waves for the Ferry Landing dock system for incorporation into the project design specifications.



Chris Webb, Task Leader Sediment Management Techniques, Permits

EDUCATION

MA / 1986/Physical Geography / San Diego State University
BA / 1989, Geography / San Diego State University

SUMMARY OF EXPERIENCE

Preconstruction Baseline Report of Biological Monitoring Program for Oceanside Experimental Sand Bypass Program -- U.S. Army Corps of Engineers, Los Angeles District. Project Manager for program to sample fishes and invertebrates offshore Oceanside Harbor. This program was part of the baseline for the Corps' proposed sand bypass project. Fieldwork included core sampling for invertebrates, trawling and gill netting for fishes, and scuba surveys.

Marine Biological Sampling Off Surfside Sunset -- U.S. Army Corps of Engineers, Los Angeles District. Project Manager for an invertebrate and fish collection program offshore Sunset Beach. This program involved seasonal invertebrate collection, diver transects, other trawls and gill net samples to determine impacts of taking sand from an offshore borrow pit for sand replenishment at Sunset Beach.

Analysis of Impacts of Dredge Material Disposal Downcoast from Ventura Harbor -- U.S. Army Corps of Engineers, Los Angeles District. Project Manager for a program to determine the impacts to marine life of disposal of dredged material from maintenance dredging of Ventura Harbor. Benthic

invertebrates and fishes were sampled before and after the disposal of dredged material just downcoast from the harbor. Statistical analysis was performed to identify impacts on benthic communities.

Mr. Webb has 13 years of professional experience in environmental impact analysis and securing permits. He is familiar with the environmental review procedures established under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Mr. Webb has expertise in overall project planning efforts including conceptual engineering and permitting. His environmental review experience includes preparing negative declarations, findings of no significant impact (FONSI), environmental impact reports (EIR), and sections of environmental impact statements (EIS). In addition to his technical capabilities, Mr. Webb possesses strong communication skills which make him very effective at presenting technical information to audiences with mixed levels of understanding.

REPRESENTATIVE PROFESSIONAL EXPERIENCE

Opportunistic Beach Fill Program, Carlsbad, CA. Mr. Webb is assisting the City of Carlsbad in developing the Opportunistic Beach Fill Program including a permit program and technical support for use in capitalizing on any available beach compatible material in the County. The project envisions obtaining beach fill material and approvals quickly for placement of the material on City beaches. An Initial Study was prepared for the project. Permits are required from the USACE, Coastal Commission, Water Board, State Lands Commission, Department of Parks and Recreation, and City of Carlsbad. Applications are presently being considered.

Webb - 2

South Central Coast Beach Enhancement Program for BEACON, Ventura and Santa Barbara Counties, CA. Mr. Webb is assisting the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) to secure permits from the U.S. Army Corps of Engineers, California Coastal Commission, Regional Water Quality Control Board, State Lands Commission, and Cities of Port Hueneme, Ventura, Carpinteria, and County of Santa Barbara to construct beach fills in each jurisdiction. The program is to secure general permits ahead of projects to enable rapid approvals when any available beach compatible material is available in the region for beach renourishment. This effort requires preparation of an operations plan for actual implementation. This plan is referred to as the cookbook for beach nourishment.

San Clemente Opportunistic Beach Fill Program, San Clemente, CA. Project Manager of the San Clemente Opportunistic Beach Fill Program. The program proposes general permits for placing a maximum total of 300,000 cubic yards of sand on three of the City's beaches per year. The sand must meet certain criteria for grain size, chemistry and color. Placement must occur in a fashion that mimics nature to the greatest degree. Sand will be transported to the beach by train and truck.

Bolsa Chica Wetlands Restoration Project, Orange County, CA. Mr. Webb is permit coordinator for this significant wetland restoration project at Bolsa Chica. Permits are required from the U.S. Army Corps of Engineers (USACE), California Coastal Commission (CCC), Regional Water Quality Control Board (RWQCB), State Lands Commission, County of Orange and City of Huntington Beach to construct the project.

Conditional permits have been secured from the USACE, CCC and RWQCB, and Mr. Webb is working to meet conditions during final engineering design of the project being performed by M&N. The project is to be constructed from 2004 to 2007.

East Beach Replenishment Project, Seal Beach, CA. Mr. Webb managed the beach replenishment project at Seal Beach. Approximately 75,000 cubic yards of sand from the high desert was being shipped by train to Seal Beach. The project is complete. The project raised and widened a narrow beach to protect homes and public property. The project successfully protected the City through the El Nino winter of 1998.

San Diego Regional Beach Sand Project, San Diego, CA. Mr. Webb managed the preliminary engineering design of the regional beach sand project. The project included assessing sand sources, placement sites, sand retention, transport, permitting and design. Sand retention include submerged surfing reefs and other structures. Concept designs were prepared including plans, typical sections, costs and a schedule for future tasks. Mr. Webb also managed the coastal engineering technical assessment for the environmental review process. This work consists of numerical and analytical modeling of the fate and spreading of the beach fills to assess potential impacts due to increased sedimentation.

Encinitas Highway 101 Protection Project, Encinitas, CA. The City requested recommendations for beach nourishment and retention Citywide. Assisted the project team by providing the recommendations for beach fills and retention measures. Retention measures included submerged reefs offshore of Moonlight Beach and Cardiff to retain sand.

JENIFER ELAINE DUGAN, QRB, Beach Habitats

EDUCATION

1977 A. A. magna cum laude, Liberal Arts, De Anza Jr. College, Cupertino, CA
1980 B. A. with high honors, Aquatic Biology, Univ. of California, Santa Barbara
1990 Ph.D. Environmental and Evolutionary Biology, Univ. of Calif., Santa Barbara

RESEARCH APPOINTMENTS

2003- Associate Research Biologist, Marine Science Inst., Univ. of Calif, Santa Barbara
2002- Science and Outreach Coordinator- Santa Barbara Coastal LTER, Marine Science Inst., Univ. of California, Santa Barbara
2000- Deputy Director – Coastal Marine Inst., Univ. of California, Santa Barbara. 1995-Assistant Research Biologist, Marine Science Inst., Univ. of Calif., Santa Barbara
1996 Consulting Biologist, Unocal oil spill at Guadalupe, Ecometrics, Encinitas, CA.
1995 Postgraduate Research Biologist - Marine Science Inst., Univ. of Calif., Santa Barbara.
1994 Postdoctoral Fellow- Dept. of Marine Science, Univ. of Otago, Dunedin, New Zealand.
1993 Postdoctoral Fellow- Dept. of Zoology, Univ. of Port Elizabeth, Port Elizabeth, Republic of South Africa.
1991- Postgraduate Research Biologist- acting research coordinator for Channel Islands 1992National Marine Sanctuary. Marine Science Inst, Univ. of Calif., Santa Barbara

1988- Marine Biologist - Cooperative Park Science Unit, Univ. of Calif., Davis, CA and

1993 Channel Islands National Park, Ventura, CA.

UNIVERSITY OF CALIFORNIA

1991- Lecturer-Environmental Studies Prog., Univ of Calif, Santa Barbara, CA.

1995- Lecturer- Invertebrate Zoology, Dept. of Ecology, Evolution and Marine Biology,

2002 Univ. of Calif., Santa Barbara, CA 1991- Faculty advisor- independent undergraduate research projects and internships. Dept. of Ecology, Evolution and Marine Biology and the Environmental Studies Prog., Univ. of Calif., Santa Barbara, CA.

SELECTED PUBLICATIONS

2004 J. E. Dugan, D. M. Hubbard, E. Jaramillo, H. Contreras, and C. Duarte. Competitive interactions in macroinfaunal animals of exposed sandy beaches. *Oecologia*, 139: 630-640.

Dugan, J. E. and D. M. Hubbard. Southern New Zealand Beaches, Chapter 11 In: Natural History of Southern New Zealand. Darby, J, R. E. Fordyce, A. Mark, K. Probert, and C. Townsend (eds.) University of Otago Press Dunedin, New Zealand 400 pp.

2003 Dugan, J. E., D. M. Hubbard M. McCrary, and M. Pierson. The Response of macrofauna communities and shorebirds to macrophyte wrack subsidies on exposed sandy beaches of southern California Est. Coastal Shelf Sci. 58S: 133-148

2003 Hubbard D. M. and J. E. Dugan. Shorebird use of an exposed sandy beach in southern California. Est. Coastal Shelf Sci. 58S: 169-182.

Dugan - 2

Dugan, J. E., D. M. Hubbard, M. Lastra. Burrowing abilities and swash behavior of three decapods, *Emerita analoga* Stimpson, *Blepharipoda occidentalis* Randall and *Lepidopa californica* Efford (Anomura, Hippoidea), of exposed sandy beaches. J. Exp. Mar. Biol. Ecol. 255(2): 229-245.

Jaramillo, E., J. Dugan, and H. Contreras. Abundance, population structure, tidal movement and burrowing rate of *Emerita analoga* (Stimpson 1857) (Anomura, Hippidae) at a dissipative and a reflective beach in south central Chile. P.S. Z.N. Mar. Ecol. Napoli 21(2): 113-127.

Schoeman, D., A. McLachlan and J. E. Dugan. Lessons from a disturbance experiment in the intertidal zone of an exposed sandy beach. Est. Coastal Shelf Sci. 50: 869-884.

Dugan, J. E., Hubbard, D. M., Engle, J. M., Martin, D. L., Richards, D. M., Davis, G. E., Lafferty, K. D., and Ambrose, R. F. Macrofauna communities of exposed sandy beaches on the Southern California mainland and Channel Islands. Fifth California Islands Symposium, Santa Barbara Museum of Natural History.

Page, H. M., J. E. Dugan, D.S. Dugan, J. Richards and D. M. Hubbard. Effects of an offshore oil platform on the distribution and abundance of commercially important crab species. Mar. Ecol. Prog. Ser. 185: 47-57.

Dugan, J. E. and A. McLachlan. 1999. An assessment of longshore movement in *Donax serra*: Röding (Bivalvia:

Donacidae) on an exposed sandy beach. J. Exp. Mar. Biol. Ecol. 234 (1): 111-124.

1999 Barron, MG, T. Podrabsky, R. S. Ogle, J. E. Dugan, and R. W. Ricker. Sensitivity of the sand crab *Emerita analoga* to a weathered oil. Bull. Environ. Contam. Toxicol. 62(4): 469-475. Ser. 119(1-3): 311-314. 1994

Dugan, J. E., D. M. Hubbard and A. M. Wenner. Geographic variation in life history in populations of the sand crab, *Emerita analoga* Stimpson, on the California coast: relationships to environmental variables. J. Exp. Mar. Biol. Ecol. 181: 255-278.

1993 Dugan, J. E. and G. E. Davis. Applications of fishery refugia to coastal fishery management. Can. J. Fish. Aquat. Sci. 50: 2029-2042.

1993 Wenner, A. M., J. E. Dugan and D. Hubbard. Sand crab population biology on the California Islands and mainland. pp 335-348 In: F. G. Hochberg (ed.), Third California Islands Symposium, Recent Advances in Research on the California Islands. Santa Barbara Museum of Natural History, Santa Barbara, CA. 661 pp.

1992 Page, H. M., J. E. Dugan and D. M. Hubbard. Comparative effects of two infaunal bivalves on an epibenthic microalgal community. J. Exp. Mar. Biol. Ecol. 157: 247-262.

1991 Dugan, J. E., A. M. Wenner and D. M. Hubbard. Geographic variation in the reproductive biology of the sand crab, *Emerita analoga* (Stimpson), on the California coast. J. Exp. Mar. Biol. Ecol. 150: 63-81.

DANIEL C. REED, QRB, Kelp, Surfgrass, Reefs

EDUCATION

B.A. Moss Landing Marine Laboratories and San Francisco State University, 1978.

M.A. Moss Landing Marine Laboratories and San Francisco State University, 1981.

Ph.D. University of California, Santa Barbara, 1989.

ACADEMIC EMPLOYMENT

1989-1994, Assistant Research Biologist, Marine Science Institute, UC Santa Barbara.

1994-2000, Associate Research Biologist, Marine Science Institute, UC Santa Barbara.

2000-present Research Biologist, Marine Science Institute, UC Santa Barbara.

SELECTED GRANTS

1984. Experimental Studies of Competition in the Early Life-History Stages of Two Kelps, Macrocystis pyrifera and Pterygophora californica. Sigma Xi, Grants in Aid of Research. \$600.

1985. Field Studies on Dispersal and Recruitment in the kelps Macrocystis pyrifera and Pterygophora californica. Graduate Student Research Grant. Graduate Division, UC Santa Barbara. \$1,000.

1989. Assistance on the California Comprehensive Offshore Resource Study. California State Lands Commission, (Ambrose/Reed). \$24,000.

1989-1992. Continued Studies on the Mechanisms of Kelp Forest Regeneration. NSF Biological Oceanography, (Reed/Ebeling). \$250,000.

1991-1993. Potential biogenic habitat alteration by OCS activities: adverse effects to early life stages of giant kelp from chronic disturbance. Reed/Neushul/Ebeling). Southern California Educational Initiative, MMS. \$107,768.

1992-1995. Variation in propagule supply and its role in kelp-forest regeneration. NSF Biological Oceanography, (Reed/Ebeling/Brzezinski). \$288,334.

1994. San Onofre Nuclear Generating Station Mitigation Project Monitoring Program. California Coastal Commission, (Raimondi/Reed). \$127,518.

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