

Miller Marine Science & Consulting, Inc.

Statement of Qualifications

Miller Marine Science & Consulting, Inc. (MMSC) was founded in 2018 to provide environmental technical expertise for permitted entities. Environmental regulations can be extremely complex, especially in California. Compliance with these regulations for high-profile projects can be daunting but MMSC helps make it easier. We are technical experts who work in partnership with you, serving your project's needs diligently with the attention it deserves. This is the heart of our business and our guiding philosophy.

Your Project's Needs Are At The Heart of Our Business

Nearly all consultants can quote environmental regulations, read a permit, conduct sampling using routine methods and perform basic analyses. But what happens when routine and basic fail to answer more complex questions and issues? While others may be stopped dead in their tracks, this is where MMSC's creativity and demonstrated scientific expertise keep your project moving forward. Whether it is a novel approach to characterizing a discharge plume or negotiating a first-of-its-kind permit under newly-enacted regulations, MMSC ensures that it gets done. Because your project's needs are at the heart of our business.

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TECHNICAL EXPERTISE

Marine Fish Ecology

MMSC staff are renowned experts in marine fish ecology. We have published [peer-reviewed journal articles](#) and industry-leading technical reports documenting fish seasonality, growth, population dynamics, fisheries and habitat affinities.

Marine Fish Larvae (Ichthyoplankton) Taxonomy

The MMSC toolbox includes the rare skill of identifying and enumerating marine fish larvae and eggs. Likewise, we have extensive experience in the measurement of fish larvae and eggs using videomicroscopy and image analysis.

Marine Biology and Ecology

Expanding beyond our industry-leading expertise in marine fish ecology, MMSC staff are leaders in interpreting the complex biology and ecology of the marine environment. This applies to fish, whales, dolphins, invertebrates and algae, as well as their structure and interaction within marine habitats throughout California and beyond.

Water and Sediment Quality

MMSC staff have over a decade of experience monitoring and quantifying water quality and sediment quality metrics, including:

- Oceanographic water quality monitoring
 - dissolved oxygen
 - temperature
 - pH
 - salinity
 - chlorophyll-a
- Fecal indicator bacteria
 - sampling
 - microbial source tracking oversight
 - analysis oversight
- Sediment analysis
 - grain size
 - sediment contamination

We have incorporated these measurements in detailed analyses of human actions against the backdrop of an ever-changing ocean climate to inform regulated dischargers, project developers and the general public. MMSC staff excel at taking such complex measurements and presenting the results in easily digestible and defensible tables and graphics using geographic information system presentations to highlight spatial patterns relevant to the project.

Oceanography

MMSC's oceanographer is an expert in measuring and monitoring coastal oceanography through the use of complex modeling and data compiled from deployed acoustic doppler current profilers.

Technical Report Writing

MMSC is unique among the sea of consultants with over 80 [peer-reviewed journal publications](#) documenting studies of the biology, ecology, oceanography and long-term dynamics of California marine communities. In addition to our unparalleled peer-reviewed publication record, MMSC's experts have authored over 400 technical reports for commercial clients. These reports have supported clients during complex negotiations with regulators, advanced projects towards fully-permitted status and completion, helped clients comply with regulations, and investigated reasons for non-compliance.

Data Analysis

MMSC is comprised of leading data analysts capable of conducting both the routine and complex data analyses frequently needed in a world of increasing environmental awareness and regulation. Our staff have designed field studies and analyzed the resulting data to document client compliance with applicable permits and regulations. Similarly, we have led novel studies and analyses needed to comply with first-of-its-kind regulations. In fact, MMSC is one of a select few firms with detailed knowledge and demonstrable experience in evaluating the impacts of water withdrawals on the surrounding plankton community, known as entrainment. We have further distinguished ourselves as the industry-leading consultant firm in Empirical Transport Model and Area of Production Forgone (ETM/APF) analyses, in support of seawater desalination plants as required by the California Ocean Plan.

California Environmental Quality Act

MMSC staff have authored documents and document sections in support of California Environmental Quality Act (CEQA) compliance. These include detailed technical studies, initial studies, mitigated negative declarations and detailed sections within a larger Environmental Impact Report (EIR).

Client Representation

MMSC staff have represented clients in numerous arenas, such as regulatory workshops, regulatory policy development advisory committees, meetings with technical experts hired by regulatory agencies and negotiations with regulatory agency staff. In each of these instances, our breadth of knowledge and ability to communicate effectively advanced negotiations and supported the client's interests.

AREAS OF EXPERTISE

Seawater Desalination

Since passage of the Ocean Plan Desalination Amendment on May 6, 2015, MMSC has been on the leading edge of the development of seawater desalination in California. Backed by our unparalleled scientific and regulatory knowledge and experience, our firm was founded to advise clients and streamline the development of seawater desalination in drought-prone California. MMSC staff has had the privilege of being the only biological consultant supporting clients as they navigate the new regulations governing the use of

controversial surface water intake structures. This includes being the only entrainment impact analysis expert directly interfacing with the staffs of the State Water Resources Control Board, Regional Water Quality Control Boards, California Coastal Commission and California State Lands Commission, all on behalf of our seawater desalination clients

MMSC staff have developed an unparalleled reputation for providing cutting-edge scientific analysis, but also the ability to effectively communicate the results of complex scientific studies to clients, regulatory agencies and the general public. **Communication, above all, has become the critical factor in all interactions with regulatory staff during permitting deliberations.** Taking the complex science off the spreadsheet and bringing it alive for regulatory staff and clients alike helps all parties find common ground. To this end, MMSC has welcomed additional expertise to its team. As an expert in Californian coastal marine life, Dr. Larry Allen has joined our firm to help bring a better understanding of the complex ecology of coastal marine fish communities to average citizens. Similarly, Dr. Linda Rasmussen joined MMSC to assist with evaluating coastal oceanography as it relates to larval entrainment impacts caused by open water intakes and multiport diffusers.

In addition to agency staffs, MMSC has directly interacted with their preferred independent peer-reviewer, Dr. Peter Raimondi. During these interactions, our experts and Dr. Raimondi have jointly worked through the Desalination Amendment on behalf of our respective clients. The result is a more refined and scientifically defensible process to identify the best available site for a surface water intake. This effort also led to a more direct Empirical Transport Model and Area of Production Forgone (ETM/APF) analytical method to capture the influence of estuarine taxa at offshore intakes.

The MMSC team is uniquely qualified to design new pre-permitting environmental studies to provide the wide range of information needed to address regulatory agency information requests. We understand the written and unwritten information requirements regulators request in application of the Desalination Amendment. Building upon its collective expertise in coastal marine fish ecology, fish larvae dynamics, coastal oceanography and regulatory interactions, MMSC staff has the unparalleled ability to design required studies without a costly learning curve or wasted sampling effort. This results in the most cost-effective and scientifically complete study design for seawater desalination project developers. Leveraging our strong connections in the California marine science community enables us to create a sampling team that can deliver all necessary technical information – from design to final report – without any wasted effort or time, translating into further cost savings for California’s seawater desalination project developers.

Relevant Project History

Poseidon Water, Channelside

MMSC staff has supported Poseidon Water’s Carlsbad Desalination Plant permitting and operational compliance since 2015 when the Desalination Amendment was initially adopted. During this time, we have provided technical support evaluating plankton impacts using the ETM/APF and participated in meetings with regulatory agencies and

the California Coastal Commission's science advisory panel. Additional support was provided to review and comment on draft NPDES permit language.

Poseidon Water, Surfside

Since initial adoption of the Desalination Amendment, MMSC staff has supported Poseidon Water's Huntington Beach Desalination Plant permitting process, providing technical support in evaluating plankton impacts using the ETM/APF and other statistical methods, preparing detailed technical memoranda and reports on subjects ranging from coastal ecology to mitigation scaling, and participating in meetings with regulatory agencies and their independent peer-reviewer. This includes the design, execution and analysis of a novel study to support and reaffirm conclusions regarding the best intake site to minimize the loss of all forms of marine life. On behalf of Poseidon Water, we have attended numerous in-person meetings and countless conference calls with regulatory agency staff, including extensive discussions on ETM/APF implementation, intake site location analysis and mitigation calculations.

West Basin Municipal Water District

MMSC staff supported West Basin Municipal Water District's Environmental Impact Report preparation while at two separate companies. In each instance, we were charged with developing the estimated entrainment impact using the ETM/APF under the guidance of the Desalination Amendment. Additional support has been provided for other marine biology and ecology questions in the Environmental Impact Report.

Intake and Outfall Environmental Support

We have a rich history of supporting intake and outfall permitting and compliance monitoring. Our staff has over 13 years of experience supporting once-through-cooled power plant environmental monitoring. This experience includes annual compliance monitoring with existing discharge permits, supporting clients through National Pollutant Discharge Elimination System (NPDES) permit renewal, and conducting studies required under newly-enacted regulations, such as impingement and entrainment characterization studies in compliance with the Federal Clean Water Act Section 316(b).

With our robust power plant experience, MMSC staff became experts in designing, executing, analyzing and reporting the results of studies documenting demersal fish and macroinvertebrate assemblages in relation to the intake and outfall, sediment characterization and pollutant analysis, water quality monitoring, fecal indicator bacteria monitoring, and plankton sampling programs to characterize entrainment impacts.

In addition to performing compliance studies, MMSC possesses in-depth knowledge of power plant cooling water systems, ecological expertise, fish life history, and the mechanics of conventional analytical models such as adult equivalent loss and production foregone. This rare combination of experience and knowledge, without a current relationship to regulated entities, allow us to provide Section 316(b) clients with unparalleled peer-reviewed expertise as they complete Section 122.21(r) submittals in compliance with the Environmental Protection Agency's Section 316(b) rule.

Relevant Project History

AES Huntington Beach, LLC, AES Redondo Beach LLC, AES Alamitos LLC

MMSC staff supported all three AES facilities for nearly a decade. During this time, our team managed their NPDES compliance monitoring programs ensuring cost-effective, robust and scientifically-defensible data collection, analysis, and reporting. This included overseeing a variety of sampling methods including otter trawl, diver transect surveys, water quality profiler deployment, fecal indicator bacteria, sediment characterization and contaminant testing, benthic infaunal community assessment and more. In addition to the offshore sampling program, each facility had an in-plant monitoring program, including impingement monitoring for which MMSC led analysis and reporting.

Between 2014 and 2016, MMSC staff supported each facility as its NPDES permit was renewed. For the Redondo Beach and Alamitos facilities, this was the first renewal since 2001 and included substantial revisions as environmental regulations had changed considerably over the years. MMSC staff assisted AES in negotiations with the Los Angeles Regional Water Quality Control Board staff, helping to achieve acceptable compromises on several proposed new requirements.

Environmental Permitting and Documentation Support

MMSC staff have supported the development of comprehensive and detailed documents in compliance with the California Environmental Quality Act (CEQA). We have contributed our specialized analytical skills and scientific acumen to compile, analyze, present and interpret complex data as Technical Reports directly supporting CEQA documents. These data products support both setting the environmental baseline and the impact analysis. Extending from these data analysis products, MMSC has contributed to the development of marine biology-focused sections in Initial Studies (IS), Environmental Impact Reports (EIR) and Mitigated Negative Declarations (MND). Our wide array of clients included wastewater outfall operators, shipping tenants in major shipping ports, power plant owners and operators, and seawater desalination plant operators.

In addition to CEQA document support, MMSC has helped clients overcome other permitting necessities in the marine environment. These include preparing Essential Fish Habitat (EFH) assessments and marine life monitoring plans associated with any construction activities in the marine environment. We have advanced clients' projects by preparing and securing Coastal Development Permits (CDP) from the California Coastal Commission, Clean Water Act (CWA) Section 401 Water Quality Certification applications, CWA Section 404 dredge and fill permits through the United States Army Corps of Engineers, and Low-Energy Geophysical Survey permits through the State Lands Commission.

Relevant Project History

The Southern California Edison Company, San Onofre Nuclear Generating Station Units 2 and 3 Large Organism Exclusion Device

MMSC teamed with AECOM to prepare a [Mitigated Negative Declaration](#) in support of the proposed installation of a Large Organism Exclusion Device over the two primary offshore intake structures through which once-through-cooling water was withdrawn by each of the power generation units. In advance of the CEQA documentation, MMSC designed, managed, analyzed and documented in a Technical Report key environmental studies needed to facilitate a seamless and unassailable IS and MND in support of the project. The Technical Report also included a detailed EFH.

Cayucos Sustainable Water Project (CSWP): Subsequent Mitigated Negative Declaration for the Estero Marine Terminal Ocean Outfall Project Component

MMSC assisted the Cayucos Sanitary District and Firma Consultants with an initial study to investigate the environmental impacts of repurposing an existing oil delivery pipeline from an offshore terminal to an onshore processing facility. Building off existing documentation for a related project involving the pipeline, we developed a defensible and robust environmental analysis in the IS and MND.

NRG El Segundo Power Marine Mammal Exclusion Bars Installation

With the passage of California's Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling, all once-through-cooled power plant operators in California were required to have marine mammal exclusion devices on their operating intake structures with openings no larger than nine inches on center. MMSC coordinated with NRG El Segundo Power to prepare, secure and ensure compliance with a CDP, Section 401 water quality certification, and a Section 404 permit to install appropriate bars on their intake structure for generating units three and four. As the intake structure required cleaning to remove biofouling, we developed a monitoring plan in compliance with Section 401 water quality certification requirements. MMSC oversaw the implementation of the monitoring plan, reporting and interaction with both the client (NRG) and the commercial divers on site to complete the work. This process was repeated a second time to install marine mammal exclusion bars on the NRG El Segundo Power operating outfall for generating units three and four.

SPECIAL STUDIES

Frequently, owners and operators of commercial infrastructure interacting with the marine environment require assistance to answer novel or highly unexpected questions. Sometimes, these questions come from internal sources. Other times, they are posed by a regulatory agency. When the difficult, odd, unique or otherwise out-of-the-ordinary question arises, MMSC is ready, willing and able to help find the answer. Below is a list of some unique studies MMSC has conducted.

Electric Power Research Institute

The Electric Power Research Institute (EPRI) turned to MMSC to help collect all available information on the use and efficacy of a curtain wall to reduce larval entrainment mortality by once-through-cooled power plants. MMSC searched for studies regarding curtain wall applications on water movement to guide possible use of curtain walls at sites where they did not presently exist. From this analysis, an experimental study design was developed should a pilot study be conducted at a site where a curtain wall did not exist assuming a temporary wall could be installed. The resulting report was presented to EPRI membership via webcast and is available through [EPRI's website](#).

Southern California Edison Co. San Onofre Nuclear Generating Station

The Southern California Edison Co. (SCE) needed to install a large organism exclusion device over the primary offshore intake structures for its San Onofre Nuclear Generating Station (SONGS) in compliance with California's Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling. The SONGS intakes are positioned near giant kelp beds. This poses unique challenges as giant kelp can be dislodged from the seafloor by strong waves or fast currents. These dislodged giant kelps may become impinged on submerged structures or drawn into water intake structures such as those used by SONGS. MMSC was contracted by SCE to estimate the maximum biomass of giant kelp that might be impinged on the large organism exclusion device and possibly block intake water flow. The device's design needed to consider the maximum giant kelp biomass, ensuring SONGS would reliably operate during high energy waves when giant kelp can be dislodged. MMSC developed a study using advanced science and historic records to provide the information needed.

American Sugar Refining, Inc.

MMSC assisted American Sugar Refining, Inc. (ASR) in evaluating a fine-mesh, cylindrical wedge wire screen at its Hudson River facility. The goal was to reduce or eliminate larval entrainment caused by withdrawal of cooling water from the river. We conducted the analysis, report development and presentation to ASR. Additional questions about operational status during winter when the river could freeze were raised by ASR. Their concerns related to possible damage the ice could inflict on the wedge wire screen or otherwise reduced operationality. MMSC investigated the freezing pattern over time in the river to assess the potential for freezing. Supporting the use of different screens during winter. We also evaluated the potential winter larval entrainment that would coincide with use of the non-wedge wire screen. The result was a Proposed Suite

of Technologies or Operational Measures Report that was accepted by environmental regulators.

CONTACT INFORMATION

MMSC is ready to stand with you and your project. We are a certified (micro) small business (CA DGS Certification ID 2010194) on the Los Angeles Business Assistance Virtual Network, Planet Bids and The Network. Feel free to contact us and let us know how we can make your environmental compliance life easier.

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