



MARLENE MEADERS

Senior Marine Biologist

Marlene has specialized in marine and freshwater biology since 2000. She manages and implements a variety of fisheries projects, with a focus on shellfish aquaculture. Marlene is a certified senior author for biological assessments, and has written numerous consultations for the Endangered Species Act (ESA), Marine Mammal Protection Act, and Magnuson-Stevens Fishery Conservation and Management Act. She has coordinated with federal, state, and local agencies to complete environmental permitting of marine projects under Sections 404 and 401 and the Shoreline Management Act. Marlene regularly works with both models and field data to produce technical studies that aid in the consultation process. She has conducted over 20 baseline surveys that directly relate to geoduck aquaculture, and is well versed at describing the direct impacts/benefits that an operation or project might have on the environment.

Representative Projects

Burley Lagoon Cumulative Impacts Review, Taylor Shellfish Farms, Purdy, WA. *Senior Marine Biologist.* Prepared a cumulative impacts review associated with a change in shellfish aquaculture practices in Burley Lagoon, Pierce County, WA. Although neither the Shoreline Management Act nor Pierce County Shoreline Master Program requires cumulative impacts to be analyzed for activities that do not result in a significant impact to the environment, there has been an interest in providing a cumulative impacts review to understand whether a general threshold of impact is being reached within specific areas of Puget Sound associated with shellfish aquaculture. The purpose of the cumulative impacts review is to analyze the likely ecological (e.g., water quality, sediment dynamics, fish) and social (e.g., aesthetics, recreation, noise, light) impacts of the proposed action in the context of, and in conjunction with, other uses and development over time within Burley Lagoon and the surrounding environment (i.e., project region). The review will address the major contributing factors to environmental processes within Burley Lagoon using conceptual models informed by existing literature and data. The cumulative impacts review will be discussed and approved by the Shellfish Interagency Permitting team, which is a multi-agency team funded through the Washington Shellfish Initiative.

Comparative Habitat Use of Estuarine Habitats with and Without Cultch-on-Longline Gear Present, NOAA Saltonstall-Kennedy Grant

NA16NMF4270254, Humboldt County, CA. *Senior Marine Biologist.* Providing project management support to characterize associations of fish and invertebrates with and without aquaculture in eelgrass and mudflat habitat in Humboldt Bay, California. Providing support on permitting, study design, data collection, and outreach. Field data collection includes the deployment of large scale enclosures to isolate fish in habitats with and without aquaculture gear. Presented at one annual conference on initial results, and will be co-presenting with the Wiyot Tribe at another annual conference in 2018. Quantification of fish and invertebrate resources is illustrating the diversity and abundance of aquatic resources associated with aquaculture gear and habitat type.



EDUCATION

M.S., Fisheries Biology, Humboldt State University, Arcata, CA, 2008

B.S., Biological Oceanography, University of Washington, Seattle, 2000

CERTIFICATIONS

Open Water Diver, PADI, 2014

Senior Author for Biological Assessments, WSDOT, 2011-Present

EXPERTISE

Marine and Freshwater Biology

Shellfish Ecology

ESA Consultation

Environmental Permitting

Habitat Surveys

ADDITIONAL TRAINING

Eelgrass Delineation Guidance

Workshop, U.S. Army Corps of Engineers, June 2017

AFFILIATIONS

American Fisheries Society, Member, Since 2001

American Society of Parasitologists, Member, 2009



North Mercer Island Interceptor and Enatai Interceptor Upgrade Project, King County Wastewater Treatment Division, King County, WA. *Senior Lead.* Working with the project engineering team on environmental planning and permitting for a 14,000-foot sewer line replacement. Evaluating potential impacts to sensitive resources along Lake Washington's shoreline and the Mercer Slough Wetland Complex in relation to ESA-listed species, critical habitat, and essential fish habitat. The work, to date, has included conducting preliminary assessment of environmental conditions throughout the project corridor; developing permitting documents for federal, state, and local land use permits; and preparing for meetings with resource agencies to discuss the potential impacts and mitigation options for the project. Senior lead for preparing the following permitting documents: biological assessment, SEPA checklist, critical areas report, and draft mitigation plans. Work on the final permitting documents will continue through 2018.

Gateway Pacific Terminal NEPA/SEPA Third-Party Environmental Impact Statement (EIS), U.S. Army Corps of Engineers, Washington Department of Ecology, Whatcom County, Bellingham, WA. *Marine Technical Lead.* Conducted research for marine issues related to construction and operation of a deepwater terminal facility exporting various dry goods, including coal. Assessed potential impacts to water quality, herring migration and spawning, fish and wildlife, and nearshore benthic biota from proposed project actions such as pile driving, vessel operations, increased overwater structures, and stormwater management.

Dungeness Bay Biological Evaluation, Taylor Shellfish Farms, Sequim, WA. *Project Manager.* Conducted eelgrass delineation and site characterization, as well as a detailed literature review, to identify potential impacts of proposed geoduck aquaculture to tidelands of outer Dungeness Bay in Clallam County, WA. Analysis focused on the influence of direct and indirect effects from geoduck aquaculture, and the avoidance of eelgrass and kelp beds. Issues addressed included invertebrate community distribution, salmonid and forage fish utilization, migration of turbidity plumes, nutrient availability, temperature differences, and other water quality parameters. The significance of this high-profile project is due to the employment of a new approach for permitting geoduck aquaculture operations involving siting geoduck plots with real-time eelgrass monitoring data, a strategy known as adaptive management. This strategy results in mutual benefit to both aquaculture operations and eelgrass/kelp sustainability. The project has thus resulted in a unique partnership among stakeholders to achieve these mutually beneficial goals of maintaining eelgrass sustainability and water quality while ensuring viable geoduck operations.

DNR Habitat Conservation Plan for Shellfish Aquaculture, Pacific Coast Shellfish Growers Association (PCSGA), Washington State. *Technical Lead.* Provided technical assistance for the Washington Department of Natural Resources (DNR) Aquatic Resources Habitat Conservation Plan (HCP) and EIS. Tasks included planning and conservation of threatened, endangered, and other species of concern that can be affected by activities on state-owned aquatic lands. Focus of work was freshwater and anadromous fish. Also provided comments on the shellfish aquaculture sections of the draft HCP to DNR. Provided minor support to PCSGA as they addressed comments from DNR on the draft HCP.

Hearing Examiner and Shoreline Hearings Board Expert Witness Testimony for Proposed Geoduck Farm, Haley Beach Property Trust, Taylor Shellfish Farms, and Seattle Shellfish LLC, Pierce County, WA. *Expert Witness.* Provided testimony in front of the Pierce County Hearing Examiner and Shoreline Hearings Board in support of proposed geoduck aquaculture operations in on the Key Peninsula, in Case Inlet. The testimony identified the potential adverse and beneficial effects of geoduck aquaculture. Presented information on the potential effects to eelgrass, water quality, sediment quality, forage fish, benthic invertebrates, and ESA-listed species and critical habitat, Magnuson-Stevens Fishery Act habitat, and Marine Mammal Protection Act species. The Final Decision from the Office of the Hearing Examiner stated: "The Deputy Hearing Examiner finds that all experts, whether testifying on behalf of the Coalition or Applicants were professional, forthright, sincere, conscientious and credible in their testimony. However, Appellants' witnesses, while expert in geomorphology and nearshore ecology, were overshadowed by Applicants' witnesses pertaining to specific field experience, knowledge, and expertise in geoduck aquaculture; and were thus more persuasive."