**2013 NOAA Summer Internship Opportunities**

**1. HARMFUL ALGAL BLOOMS: SAMPLING AND DETECTION, WA**

Project description:   Harmful algal blooms have caused human illness, fish deaths, and the loss of economic gain in many coastal regions of the world. In particular, Puget Sound is the home to an array of toxic phytoplankton whose toxins can concentrate in shellfish and subsequently transferred to humans or can kill fish. You will join a collaborative group of scientists who study marine phytoplankton, particularly those known to produce toxins found in harmful algal blooms.  This summer, you will be part of a team of international collaborators who are studying the flagellate, *Heterosigma akashiwo*, known to kill net-penned salmon in Puget Sound, resulting in millions of dollars of loss per episode. Our study is focused on determining the environmental factors, including macronutrients, micronutrients and water properties, that promote toxicity in this organism. In July 2013 we will conduct a field study at Friday Harbor Labs (University of Washington) that will provide you with an opportunity to work in the lab doing microscopy, tissue culture, enzyme-linked immunosorbent assays for toxins and small boat work in the San Juan Islands. You will also participate in the set up and planning for this field study.

Skills Required:  Willingness to work outdoors, on small boats, as well as in the laboratory.  General laboratory skills are helpful.  You will have the ability to work as part of a research team, pay attention to details, yet have an interest in broad scale ecosystem effects and communicating knowledge to the general public and other scientists.

Location: NOAA Fisheries, Northwest Fisheries Science Center in Seattle, Washington and Friday Harbor Laboratory, San Juan Island, Washington. The field study is currently scheduled for July 2013.

Number of Intern Slots: One

Intern Supervisor:  Dr. Vera Trainer, [vera.l.trainer@noaa.gov](mailto:vera.l.trainer@noaa.gov), 206-860-6788

**2. Juvenile salmon food web and diet analysis (California)**

Project description:  You will participate in the ocean research cruise between Central Oregon and Central California to study and collect juvenile salmon and a part of the Salmon Ocean Ecology Team at NOAA’s SWFSC Fisheries Ecology Division in Santa Cruz California.  The first part of the summer will be spent preparing for the research cruise which is typically the last two weeks of June. Participation in additional surveys during the summer may be possible. After returning from the survey, you will be responsible for conducting stomach content analysis of juvenile salmon samples collected over the past several years and will work with researchers to design a project looking at how diet varies in one of several possible ways including between species, across years, or regional areas in the ocean. Work will involve a challenging 2 week trip on the ocean, followed by laboratory work including dissections and diet analysis with microscopes.

Skills Required: Willingness to work outdoors at sea, as well as at a microscope.  General laboratory skills are helpful.  Ability to work as part of a research team.  Ability to pay attention to details, yet have an interest in broad scale ecological processes.

Location: NOAA Fisheries, Southwest Fisheries Science Center Fisheries Ecology Division in Santa Cruz California

Number of Intern Slots: One

Intern Supervisor: Dr. Sean Hayes, [sean.hayes@noaa.gov](mailto:sean.hayes@noaa.gov) 831 420 3937

**3. Ecology and diversity of the marine pathogen Vibrio parahaemolyticus in the Pacific Northwest**

Project description: *Vibrio parahaemolyticus* isa halophilic, estuarine bacterium that persists and proliferates in marine environments and concentrates in shellfish by filter feeding. The bacterium is a human pathogen that can cause acute gastroenteritis, usually following consumption of raw or undercooked shellfish. The overall goal of the project is to gain a better understanding of the environmental as well as microbial genetic factors that promote proliferation by these bacteria in the environment. Such information can assist in the development of risk assessment strategies as well as mitigation tools for their control. We are presently working on characterizing a new biomarker that could be potentially used for identification of virulent strains of *V. parahaemolyticus*. The selected individual will assist other researchers in the laboratory with several molecular biology and/or genetic techniques.

Skills required: Basic knowledge of biological science and general laboratory skills. Some background in basic microbiology and/ or cellular molecular biology, and/or genetics, is preferred. Incumbent will generally carry out assignments independently, but will work in conjunction with other investigators.

Location: NOAA Fisheries, Northwest Fisheries Science Center, Seattle, WA.

Number of Intern slots: One.

Intern Supervisor: Dr. Rohinee Paranjpye, rohinee.paranjpye@noaa.gov. 206-860-3421.

## 4. SABLEFISH AQUACULTURE RESEARCH AT THE MANCHESTER RESEARCH STATION IN PORT ORCHARD, WASHINGTON

Project Description: Seafood is an important protein source for humans, but worldwide, fish populations are struggling to keep up with the demand. The United States currently imports 91% of its seafood from other countries; half of this is from overseas aquaculture. You will join a team of interdisciplinary scientists that conducts aquaculture research at the Manchester Research Station, located on the Puget Sound west of Seattle. We are partnering with and promoting the development of the aquaculture industry in the United States by conducting research on larval rearing, juvenile grow out, and adult spawning of sablefish. This research team consists of physiologists, geneticists, nutritionists, fish larviculturists, and behavioral ecologists. You will work with a behavioral ecologist and a larviculturist on a sablefish larvae project and help process samples in the lab. Depending on the studies that are ongoing during your time in the lab, your work may include:

* Experimental design
* Using video equipment to record larval sablefish behavior in the lab
* Collecting data from pre-recorded video of larval sablefish behavior
* Processing samples in the lab
* General husbandry of fish

There may also be opportunities to broaden your experience by spending up to 20% of your time gaining experience in other labs at the Manchester Research Station

This opportunity is suitable for an intern who would like to learn about the scientific process and gain experience in an aquaculture setting while contributing to a project that has implications for human nutrition, health of marine fish stocks, and the U.S. economy. Depending on data outcome, the intern may be a co-author on a scientific publication.

Skills Required: We are looking for an inquisitive, persistent, well-organized, responsible, hard-working intern who pays attention to detail and is able to follow detailed instructions. Previous experience with fish is a plus. Willingness to participate in a range of research tasks, from experimental design to general husbandry (e.g. tank siphoning or general cleanup). Ability to work well with other members of a research team.

Location: Northwest Fisheries Science Center, Manchester Research Station, Port Orchard, WA. On-site housing is not available.

Number of Intern Slots: One

Intern Supervisor: Dr. Jon Lee (jon.lee@noaa.gov; 360-871-8321) and Matt Cook (matt.cook@noaa.gov; 360-871-8324)

**5. POLICY SUPPORT AND COMMUNICATION FOR THE National System of Marine Protected Areas, Maryland**

Project Description: You’ll help us support policy initiatives and communicate the benefits of a National System of Marine Protected Areas (MPAs) and MPAs in general to the public and specific stakeholder groups. You’ll support the National MPA Center Director and staff in providing technical assistance and scientific information to federal and state MPA programs, drafting stories for the National MPA Center’s electronic newsletter and other external newsletters, creating stories for, and updating the MPA Center’s webpage, [www.mpa.gov](http://www.mpa.gov/) and Facebook page, drafting press releases and press advisories about MPA Center projects, assisting with multi-media communication projects (videos, podcasts, other social media, etc.), and assisting with external stakeholder engagement.

This internship provides an opportunity to participate in a national level conservation effort, and work with multiple partners and stakeholders, including world-renowned scientists and managers.

Skills Required: Strong writing skills, understanding of marine conservation issues, ability to work as part of an interdisciplinary team. Experience with social-media and multi-media communications is desired, but not required.

Location: NOAA’s National Marine Protected Areas Center, Silver Spring, Maryland

Number of Intern Slots: One

Intern Supervisor: Lauren Wenzel, Acting Director, MPA Center, lauren.wenzel@noaa.gov

**6. Benthic HAbitat mapping of U.S. Coral reefs**

Project description: You will join a collaborative group of scientists who investigate the delineation and condition of shallow to deep water coral reefs in the U.S. Caribbean. This summer we are developing map products of the Northeast Reserve Marine Protect Area in Puerto Rico. Work will involve image processing of satellite and acoustic imagery, ground-truthing video analysis, GIS, and advanced map making techniques (see<http://www.imagingnotes.com/go/articleJ.php?mp_id=309>). This project may involve field work to Puerto Rico.

Skills Required: GIS and/or remote sensing processing skills desired. Coursework background in geology, marine science, or environmental science. Attention to detail, ability to work independently through directed effort, innovative though process, strong writing skills.

Location: NOAA National Centers for Coastal Ocean Science, Silver Spring, MD

Number of Intern Slots: One

Intern Supervisor: Tim Battista,Tim.Battista@noaa.gov, 301-713-3028 x171

**7. Sea Turtle Nest Monitoring in Rookery Bay NERRs, Florida**

Project Description: Located at the northern end of the Ten Thousand Islands on the gulf coast of Florida, the Rookery Bay Reserve represents one of the few remaining undisturbed mangrove estuaries in North America. It is home to three species of sea turtle - Kemp’s ridley Lepidochelys kempii) and Atlantic green (Chelonia midas) turtles are both listed as Endangered species, and the loggerhead (Caretta caretta) is listed as a Threatened species. The loggerhead is the most common species of sea turtle seen along Reserve beaches. Rookery Bay Reserve resource management specialists work in cooperation with U.S. Fish & Wildlife Service Collier County Natural Resources and the Conservancy of SW Florida to preserve this threatened species. Reserve staff and volunteers patrol the beaches to locate and cage nests, protecting them from predation by raccoons. We then document the number of hatched eggs to get a better understanding of nesting success.

You will help us monitor nest establishment and hatch rate, contributing to a multi-year data set on sea turtle nesting and hatching. You will also conduct and present the results of a project related sea turtle nest monitoring in Rookery Bay NERR.

Skills Required: Must be competent in basic boating skills including: navigation in estuarine/ocean tidal setting, basic boat and engine maintenance, and boating safety. Must have a valid driver’s license, be able to swim, and have basic First-Aid skills. Good field observation and data gathering skills are required, as are good people skills. Physically able to work in summer outdoor conditions that include summer heat and humidity, biting insects, and rain. Finally, GIS and GPS skills are a plus but not required.

Location: Rookery Bay National Estuarine Research Reserve, Naples, FL

Number of Intern Openings: one

Intern Supervisor: Jeffrey Carter, NERRs Stewardship Coordinator and Aquatic Preserve Manager, 239-417-6310 ext. 212, jeffrey.a.carter@dep.state.fl.us,  [www.rookerybay.org](http://www.rookerybay.org/)

**8. Distribution, Abundance and Mortality of Marine Species in the Northern Gulf of Mexico**

Project description: You will join a collaborative group of research biologists and fisheries gear specialists who study marine and biological conditions as they relate to marine or aquatic ecosystems, associated fisheries issues, and associated environmental sampling techniques. Mississippi Laboratories offers biological and valuable hands-on experience in fisheries research, management, conservation and education.

A Mississippi Laboratory internship will allow students an opportunity to test-drive his/her profession, introduce them to professional work environments, and give them structured learning experiences where they apply knowledge gained in the classroom. Our internship will provide an opportunity to integrate career related experience into an undergraduate or graduate education by participating in planned, supervised work.

Duties: Responsibilities include surveying, photographing and identifying targeted marine life and gear integration and implementation. Duties may include at-sea or aerial support of surveys, environmental data collection, participation in the local marine mammal and sea turtle stranding network, gear testing and implementation, participation in the local outreach program to educational institutions including continuing the mentor program with local colleges and high school biology classes, and providing general support for all activities conducted by laboratory.

Skills Required: Willingness to work outdoors, as well as at a microscope. General laboratory skills are helpful. Ability to work as part of a research team. Ability to pay attention to details, yet have an interest in broad scale ecological processes.

Location: NOAA Fisheries, Southeast Fisheries Science Center, Mississippi Laboratories, Pascagoula, MS.

Number of Intern Slots: Two

Intern Supervisor: Andre’ J. DeBose, Andre.J.Debose@noaa.gov /(228)549-1669

**9. Estimating Abundance of bottlenose dolphins using photo-identification**

Project description: This project is part of the research conducted by the Protected Resources Branch. You will join a collaborative group of researchers on a project to collect data and photos to estimate abundance of bottlenose dolphins resident to Pamlico Sound, North Carolina. The project will begin mid-June and will include both field work and lab work. Field work will consist of searching for and then photographing dorsal fins of bottlenose dolphins, as well as collecting data on the dolphin, its group, and its environment. Back at the lab, we will be creating databases from the data collected, conducting data quality reviews, and cataloguing the dorsal-fin images. In addition to this primary project, there is a plethora of research conducted at the Beaufort Lab and in the surrounding area. Opportunity will be provided to participate in this other research, especially for attending necropsies of marine mammals and sea turtles conducted by researchers with NC Division of Marine Fisheries and NC Wildlife Resources Commission, respectively.

Skills Required: Willingness to work outdoors during long hot days on small boats, complemented by more days working on data in front of a computer. Ability to be a dependable, independent and a team worker. Ability to pay attention to details, be organized and have an interest in the broad scale context of the project. Proficiency in Microsoft Excel is needed; experience with ArcGIS and Microsoft Access is helpful.

Location: NOAA Fisheries, Southeast Fisheries Science Center field station at the Beaufort Laboratory, Beaufort, NC

Number of Intern Slots: Two

Intern Supervisor: Dr. Aleta Hohn, aleta.hohn@noaa.gov, 252-728-8797\*

\*note voicemail is down temporarily

**10. Predator-prey dynamics and trophic interactions of pelagic fish in the California Current**

Project description: You will join a collaborative group of scientists who study marine and estuarine physical and biological conditions as they relate to juvenile salmon survival and marine pelagic fish species distributions and food web structure. Particular focus will be on density-dependent feeding interactions between salmon and other more abundant pelagic fishes. Understanding feeding habits of pelagic nekton is important in understanding their trophic position within the northern California current food web and potential changes expected under climate change scenarios. Dietary overlap of pelagic nekton with commercially important fishes such as juvenile salmon could identify the potential of competition for resources during a critical period of survival for salmon. Research into the feeding habits of pelagic nekton could be incorporated into multispecies food-web models and would be of interest to resource managers as they undertake an integrated ecosystem assessment of the California Current. A project exists within the NOAA Estuarine and Ocean Ecology project to analyze the diets of several common nekton species collected this coming summer to look at diet overlap with salmon and compare to past studies done during different environmental conditions. Work will involve fish necropsies, examining stomach contents using microscopy, and could include stable isotope analysis for confirmation of trophic level and food utilization. Depending upon the project, work could also involve fish sampling off the coasts of Oregon and Washington.

Skills Required: Willingness to work outdoors, as well as at a microscope. General laboratory skills are helpful. Ability to work as part of a research team. Ability to pay attention to details, yet have an interest in broad scale ecological processes.

Location: NOAA Fisheries, Northwest Fisheries Science Center field station at the Hatfield Marine Science Center in Newport, Oregon

Number of Intern Slots: One

Intern Supervisor: Dr. Ric Brodeur, rick.brodeur@noaa.gov, 541-867-0336

**11. Marine Mammal Health & Toxicology, South Carolina**

Project Description**:** Our marine mammal toxicology research is focused on investigating environmental and anthropogenic factors that influence the health and diseases of marine mammals. Research focuses are: 1) determine impacts and toxicological effects of environmental contaminants on marine mammal health; 2) define molecular and cellular perturbations associated with environmentally-induced diseases and explore mechanisms on how marine mammals defend themselves against constant threat of pathogens, toxins, and contaminants, 2) detect, assess, and evaluate of the health effects of hazardous biological and chemical agents in concert with novel genomic and proteomic tools, 3) using *in vitro* systems, animal models, and gene expression systems for evaluating compounds and mixtures of chemicals at concentrations found in marine mammal tissues and in their environment. This research will further the development of models and risk assessments to assess potential detrimental anthropogenic and environmental impacts that affect marine mammals and to develop predictive models to evaluate management strategies for resource conservation.

Opportunity: We will be conducting a dolphin health assessment field study from May 14-28 in the estuarine waters of Charleston, SC and you will be able to participate in this research activity if your arrival is prior to this date. If arrival is after this date, there will be ample need for assisting after the field sampling with a host of activities involving samples, supplies, diagnostics and data. This summer’s health assessments will focus on evaluation of the toxicological effects of contaminants in the environment and their effects on marine mammals. We also plan on conducting *in vitro* toxicological and immunological studies and you will learn research techniques and skills involved with these methodologies. You’ll gain skills in cell culture and conduct experiments using *in vitro* cell exposure techniques and cytotoxicity assays. Training from this opportunity will provide valuable hands-on experience for marine mammal field research and laboratory-based protocols involved in assessing the toxicological effects of contaminants.

Skills Required: You should have an interest in health, disease and environmental effects on marine mammals and also some basic knowledge of cells and cellular processes, general biology, chemistry and toxicology; be creative, self-motivated, and able to work well with others. Field experience and basic laboratory and data collection experience is helpful. Good organizational and communication skills desired along with a working knowledge of Microsoft Word, Excel and PowerPoint. You’ll be taught lab and field methodologies and protocols.

# Location: NOAA/ National Ocean Service, Center for Coastal Environmental Health and Biomolecular Research, Charleston, South Carolina, http://www.chbr.noaa.gov

Number of Intern Slots: One

Intern Supervisor: Patricia Fair, Ph.D., Natasha Henry, Ph.D.

**12. Coastal Ecology Research supporting Ecosystem-Based Management, Maine**

Project descriptions: The Wells National Estuarine Research Reserve (Wells NERR) is part of the NOAA NERR system. We promote research, education and stewardship to support ecosystem-based restoration and management of estuarine and coastal environments. We are seeking interns (up to 5) to work as research team members during the 2012 field season. Interns may choose to focus on one or two projects, in consultation with Wells NERR Research staff prior to their arrival. They will have the opportunity to participate in other projects too, depending on their interests and project needs.

1) *Nekton Larval Community Dynamics* - ongoing monitoring of larval fish and macroinvertebrate species abundance in the Reserve’s Webhannet River estuary, with weekly large plankton collections, sample processing, and species identification.

2) *Wading Bird Salt Marsh Indicator Survey* – ongoing monitoring of top-predator wading birds as indicators of salt marsh ecological health; individual birds (herons, egrets, ibis) are identified and mapped at high tide throughout the Reserve’s salt marshes 2-4 times weekly.

3) *Trophic Transfer of Energy and Methyl mercury through a Marsh-Estuarine Food Web*  – experimental field (e.g. field enclosures) and lab work (e.g. environmental chamber), testing hypotheses regarding the effects of the invasive green crab on the movement of energy (using stable isotopes) and methyl mercury through benthic and epibenthic invertebrates and small fish.

4) *Habitat-Mediated Interactions between Native and Invasive Herbivores and Predators* – experimental field and lab work to compare the influence of salt marsh and rocky intertidal habitat structure on invasive – native species interactions (native and non-native snails, non-native green crab, small fish).

5) *Fisheries and Habitat Assessment of Select Southcoast Maine Estuaries* and *Watersheds* – We will be conducting post-restoration monitoring of fish and habitat on the Branch Brook watershed following improvements to a fish ladder, using standard stream survey techniques and electrofishing; fish usage of salt marsh habitat in the Saco River estuary to assess land use effects on ecological integrity, using fyke nets.

6) *Value of shoreland/riparian buffers for stream habitats –* we will be measuring nutrient runoff, fish and invertebrate abundance and stream habitat quality related to the presence/absence of riparian buffers in the Little River watershed.

Opportunity: Interns will become proficient in project-specific field and lab procedures, which may include: plant, bird, and invertebrate and fish surveys/ collection /identification; sediment and soil core collection and lab processing; construction of field enclosures; use of gps and survey station instrumentation; use of water level, salinity, temperature data-loggers; quantitative stereomicroscopy.

Skills required: Academic background should be in natural science (i.e. biology, chemistry or allied discipline). We expect earnest interest and basic scientific skills (independent thinking, following protocols, attention to detail, and ability to collect, document and manage data) but no specific training for these internships. Interns must be prepared for the modest physical challenges of field work in marsh-estuarine, rocky intertidal, and stream habitats.

Location: NOAA/Wells National Estuarine Research Reserve, Wells, Maine. We are located on the Southcoast of Maine (www.wellsreserve.org), not far from Portsmouth, NH and Portland, ME. Our 200-acre campus is located adjacent to 2000 acres of protected salt marsh and estuary, and 67 square miles of coastal watershed (Little, Webhannet, Ogunquit Rivers), that provide many of our study sites. Comfortable on-site accommodations with cooking, dining, common and study space are available free of charge as part of our interships.

Internships Available: up to 5

**12. SOCIO-ECONOMIC SUPPORT FOR THE OFFICE OF NATIONAL MARINE SANCTUARIES**

Project description: The mission of NOAA's National Marine Sanctuaries is to serve as the trustee for the nation's system of marine protected areas, to conserve, protect, and enhance their biodiversity, ecological integrity and cultural legacy. The National Marine Sanctuary System consists of 14 special places that encompass more than 150,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys, and from Lake Huron to American Samoa. Increasingly, the direct link between healthy ecosystems and economic sustainability of communities (especially through recreation and tourism) is being recognized. As such, the ONMS is expanding its commitment to understand and quantify these economic benefits.

The ONMS develops and implements socioeconomic research and monitoring to support assessments of management strategies and regulations affecting various stakeholder user groups. ONMS is seeking an economics or social science student to provide socioeconomic research support to the chief economist. As part of a comprehensive science team, your responsibilities will include: provide support to the socioeconomic and policy requirements of the ONMS, support socioeconomic activities throughout the NMS system, assist in the design and implementation of socioeconomic related planning/decision-making processes to support management plan review and new site designation for National Marine Sanctuaries, assist in the design and implementation of socioeconomic data collection surveys for NMSP sites.

We are currently involved in several projects and will work with you to create an experience that best matches your interests and skills. Some possibilities are:

* Analysis of the economic impact of commercial fishing in National Marine Sanctuaries.
* Assessing the impact of potential marine protected areas on ‘for hire’ diving and fishing operations.
* Socioeconomic assessment of tourism.
* Estimating the economic value of coral reef ecosystems for the recreation-tourism ecosystem service.
* Assist in the development of socioeconomic characterizations of National Marine Sanctuaries.

Skills Required: Ideally, you are well organized and have outstanding attention to detail. You can work as a part of a research team, but also have the ability to complete directed tasks independently. Proficiency with Microsoft MS Word and Excel is required. Familiarity with SAS, SPSS or ArcMap would be helpful, but is not necessary - we are willing to train the right candidate. However, an eagerness and ability to quickly learn new software and analytical techniques is required. A basic understanding of economic theories, quantitative social science research methods, and social statistics would be ideal.

Location: Silver Spring, MD in the headquarters office of the ONMS at the main NOAA Campus.

Number of Intern Slots: One

Intern Supervisor: Dr. Bob Leeworthy (Chief Economist, ONMS, bob.leeworthy@noaa.gov, 301-713-7261), Paul Orlando (Division Chief, ONMS,paul.orlando@noaa.gov, 301-713-7259) and Dr. Steve Sittings (National Science Coordinator, ONMS, steve.gittings@noaa.gov, 301-713-7274)

14. **Assessment of the Gulf of Mexico Harmful Algal Bloom Operational Forecast System**

**Project description:** Harmful algal blooms (also known as red tide) of the toxic algae, *Karenia brevis*,frequently impact the gulf coasts of Florida and Texas, resulting in contaminated shellfish, the deaths of marine animals, and human respiratory irritation. The Harmful Algal Bloom Operational Forecast System (HAB-OFS) issues forecasts for the potential of HAB formation, transport, intensification, and associated respiratory impacts in the Gulf of Mexico based on the integration of oceanographic, remote sensing, meteorological, and biological data. These forecasts are disseminated in weekly operational bulletins to support the decisions of coastal resource managers, academics and members of the public (for more information visit:<http://tidesandcurrents.noaa.gov/hab>).

In order to assess the level of success, verify the forecasts, and guide future improvements, forecast quality is evaluated regularly. You will join this collaborative group of scientists in assessing NOAA’s HAB-OFS. The participant will receive an introductory training on the HAB-OFS, statistical analysis and the interpretation of observational data, including satellite imagery and remote sensing data. He/she will work closely with members of the HAB-OFS team to review and validate entries in the forecast assessment database. The participant will assist with the statistical analysis of forecast reliability, accuracy and skill. There may be opportunities to assist with the preparation of a written report summarizing the results. If interested, the participant may also work to support other HAB-OFS project, including outreach efforts such as the NOAA HAB Facebook page,<https://www.facebook.com/Habredtidewatchnoaagov>.

**Skills required:** Ability to think critically and creatively with attention to detail. Good communication and analytical skills. A basic understanding of statistical concepts and MS Excel is also required. Prior knowledge of or experience with harmful algal blooms, marine science, or remote sensing data would be beneficial, but is not necessary.

**Location:** NOAA National Ocean Service, Center for Operational Products & Services in Silver Spring, Maryland.

**Number of Intern Slots:** One

**Intern Supervisor:** Karen Kavanaugh, HAB Product Coordinator, karen.kavanaugh@noaa.gov; Adria Schneck-Scott, Lead Oceanographer, adria.schneck-scott@noaa.gov

## 15. Eutrophication and Aquaculture in Long Island Sound and Great Bay/Piscataqua Estuary

## Project Description: We are integrating two tools commonly used to plan for and site aquaculture: the *Farm Aquaculture Resource Management* ([*FARM*](http://www.farmscale.org/)) *Model* and the [*Shellfisheries Mapping Atlas*](http://seagrant.uconn.edu/whatwedo/aquaculture/shellmap.php). For the first time, we’ll have a single tool that considers human uses, wild species, and habitat. This new tool will help identify the places where aquaculture is compatible with other human uses and where adverse effects on wild species and habitat are minimized.

The intern will be involved specifically with the development of the system-wide eutrophication assessment for Long Island Sound through the application of the Assessment of Estuarine Trophic Status model (ASSETS; http:www.eutro.org/register). Tasks include; retrieval and analysis of data, data synthesis for use in the ASSETS model, application of the model, development of graphics to describe results, write up of results for inclusion in progress and final project reports. Look online for dditional information on [the Long Island Sound part of the project](http://noaaoceanscience.wordpress.com/2012/11/29/coastal-economies-researching-aquaculture-for-nutrient-mitigation-in-long-island-sound/).

Skills Required: Ability to work as part of a research team and to work independently. Willingness to learn. Basic knowledge of biology, chemistry, and estuarine ecology is required. Interest in learning about eutrophication, aquaculture and socioeconomics of aquaculture and eutrophication is recommended. Ability to pay attention to details, yet have an interest in broad scale ecosystem effects. Computer experience with programs such as Microsoft Excel and Word, interest in learning about ecological modeling. Knowledge of Web page design and application, GIS, and statistical programs such as SAS would be helpful but is not required.

Location: NOAA National Centers for Coastal Ocean Science, Center for Coastal Monitoring and Assessment, Silver Spring, MD

Number of Intern Slots: One

Intern Supervisor: Suzanne Bricker Suzanne.bricker@noaa.gov ; 301-713-3020 x139

**16. ENVIRONMENTAL COMPLIANCE, MD**

Project description: You would assist the development of program to bring coastal science research program into compliance with environmental statues – National Environmental Protection Act (NEPA), Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), National Marine Sanctuaries Act (NMSA), and Essential Fish Habitat Act (EFH). The National Environmental Policy Act (NEPA) of 1969 ([**42 U.S.C. 4321 et seq.**](http://nepa.gov/nepa/regs/nepa/nepaeqia.htm)) is the foundation of modern American environmental protection in the United States and its commonwealths, territories, and possessions. NEPA requires that Federal agency decision-makers, in carrying out their duties, use all practicable means to create and maintain conditions under which people and nature can exist in productive harmony and fulfill the social, economic, and other needs of present and future generations of Americans. NEPA provides a mandate and a framework for Federal agencies to consider all reasonably foreseeable environmental effects of their proposed actions and to involve and inform the public in the decision-making process. The NEPA process results in Categorical Exclusions (CE), Environmental Assessments (EA), or Environmental Impact Statements (EIS). Specifically, you would track CEs for our grant program.

Federal agency actions must also be in compliance with MMPA, ESA, EFH, and NMSA. To do this, scientists must consult with NOAA policy staff on possible impacts of their research. You might take ownership of necessary consultations for an environmental statute and work with scientists and policy staff to determine and evaluate the possible impacts vis-à-vis the focus of that statute and what actions, if any, are needed to bring the research into compliance.

Skills Required: Interest in science, environmental law, and policy. Ability to work well with others. Ability to take ownership of a task and work relatively independently. Ability to pay attention to details, yet have an interest in broad scale processes. Possess good communication skills.

Location: NOAA Ocean Service, National Centers for Coastal Ocean Science in Silver Spring, MD.

Number of Intern Slots: One

Intern Supervisor: Dr. Susan Baker, susan.baker@noaa.gov, 301.713.3020 x131

**17. Engaging the Public on Sea Level Rise and Coastal Flooding Issues in the San Francisco Bay Area**, CA

Project description: The California King Tides Initiative (CKTI) is a collaboration of non-profit, state and federal entities working together to raise public awareness on sea level rise and coastal flooding issues. We do this through social media, photography and innovative public outreach and education. During the highest winter tides (called “king tides”) we invite participants across the state to photograph high tides and share them on a Flickr site. These images are then used to communicate about what our future shoreline might look like as a result of sea level rise. In addition, CKTI images are used to inform policy and planning across the state.

You will join this statewide collaborative to expand public outreach and education for the Initiative. During the summer, we will be hosting a number of outreach events. The intern will work with a team to plan and execute these events. Second, the intern will work with diverse media to find new and innovative ways to display king tides images on our website, social and print media outlets. This includes working to improve how images are curated on our website.

Skills required: Willingness to work as part of a team but also capable of working independently on projects. Familiarity with social media is ideal. Strong writing and public speaking skills. Passion and excitement for coastal management and public outreach.

Location: San Francisco Bay National Estuarine Research Reserve, with offices at the Romberg Tiburon Center, San Francisco State University in Tiburon, CA just north of San Francisco.

Number of Intern Slots: One

Intern Supervisor: Heidi Nutters, Coastal Training Program Coordinator, SF Bay NERR, [heidin@sfsu.edu](mailto:heidin@sfsu.edu)

**18. Measuring salt marsh response to sea level rise and Potential for C sequestration**

Project Description Salt marsh habitats are vulnerable to sea level rise, and our research addresses the factors that allow marshes to ‘keep up’ with SLR by accreting sediments or organic matter. The project is located in eastern NC, and includes bulkheaded shoreline sites in central and northern North Carolina, fringing marshes in Carteret County, and barrier island sites on Marine Corps Base Camp Lejeune.

We use 1) Surface Elevation Tables and horizon markers to measure sediment accretion and marsh surface elevation change, 2) RTK GPS, laser surveying and GIS to develop digital elevation models of shoreline habitats, 3) vegetation plots to monitor changes in plant biomass and species distribution and 4) laboratory analysis of sediment and plant chemistry to identify factors affecting marsh production. You’ll work with a team of scientists and technicians in the field and the lab, including some work from small boats. Fieldwork can be hot, wet, and muddy and provide moderate physical challenges, including walking on narrow boardwalks with sampling gear.

Opportunity: This project provides the opportunity to learn how to plan, stage, and conduct field research as part of a team. You’ll become familiar with coastal plant and animal species, and learn field survey and monitoring techniques and protocols. Laboratory protocols and instruments used include particle-size and organic matter analysis of plants and sediment, CN analysis of plant material with elemental analyzer, and chlorophyll analysis using spectrophotometers. You will be involved in the design of experiments to develop new protocols for measuring belowground plant biomass, and will have the opportunity to become familiar with the policy and scientific issues surrounding impacts of SLR on coastal habitats, and incorporating natural habitat into estuarine shoreline stabilization approaches. You may also be involved in entering data, GIS analysis, instrument calibrations and gear maintenance.

Skills required: No specific skills are required. The ability to work as part of a team and follow detailed instruction is important, as is the willingness to work outdoors and in the laboratory.

Location: NOAA Center for Coastal Fisheries and Habitat Research, Beaufort, NC.

Number of interns: 1 or 2

Intern Supervisor: Dr. Carolyn Currin Carolyn.currin@noaa.gov

**19. Fisheries Oceanography of the Northeast U.S. Shelf Ecosystem, Narragansett Rhode Island**

Project Description: The Oceanography Branch monitors the oceanographic conditions on the Northeast U.S. shelf and applies this information to regional fisheries and ecosystem assessments. In addition, the Branch conducts research into the relation between oceanography and fish population dynamics. The interns will participate in the activities and depending on the interns’ interest, there are numerous possible activities.

* Fisheries (mapping distributions and abundance of eggs, larvae and adults, age larvae, study relation between environment and fish growth, larval fish biochemistry)
* Physical Oceanography (studying ocean temperature and currents, comparing past conditions to current conditions)
* Oceanography 101 (participating in a cruise, learning a variety of oceanographic techniques; cruise dates are not set yet, but will likely be first 3 weeks of June and first 3 weeks of August; cruises are dependent on budget)
* Chemical Oceanography (work with ocean acidification monitoring, perform chemical analyses, contribute to analyses of ocean acidification)
* Biological Oceanography (study phytoplankton and zooplankton, use new underwater video technologies to understand plankton distribution and abundance)

Depending on the specific activity, the interns will work with organizing, analyzing, and making available oceanographic data collected by fisherman, research vessels and merchant vessels. There will also be laboratory opportunities to work with microscopes and analytical chemistry equipment. The intern(s) will gain experience with data analysis and the distribution of oceanographic data via the internet. The intern(s) will also receive mentoring on scientific writing and presenting. A scientific talk will be prepared and practiced and a scientific poster will be completed.

Skills Required: Ability to work as part of a research team. Interest to learn more about oceanography. Computer experience with programs like Microsoft Word and Excel. Web page, GIS, and computer programming experience helpful depending on interests.

Location: Northeast Fisheries Science Center, Narragansett Laboratory, Narragansett RI

Number of Intern Slots: Two

Intern Supervisor: Jon Hare; jon.hare@noaa.gov; 401-871-4705

**20. Marking live feeds for larval finfish nutrition research, Washington**

Project Description: Expansion of commercial marine finfish aquaculture in the US and abroad is restricted by production success at the larval stage (occurring after hatch and before metamorphosis). Complete or partial replacement of resource demanding live feeds (such as rotifers or *Artemia*) with more convenient, formulated microparticulate diets is desirable. However, there has been limited success with formulated diets due to poorly understood nutritional requirements and preferences of larvae. We are investigating a technique originally developed in our lab to indirectly measure larval fish consumption by marking diets with inert heavy metal oxides.

Opportunity: You will participate in the design and implementation of studies characterizing rotifer marker uptake and depletion under different experimental conditions in an effort to enhance precision of this technique. You will become proficient in the maintenance practices for a large-scale, semi-continuous rotifer culture system, including enumeration, harvest and enrichment procedures. You will receive training in sample collection, preparation and analysis via Inductively Coupled Plasma-Optical Emission Spectroscopy. Results will be used to optimize the marked feeds technique. Depending on larval availability, there may also be an opportunity to apply revised marking protocol in a larval feeding trial. On the conditions that internship duties are satisfactorily completed and that the student is motivated to contribute deliverables, there will be potential for co-authorship on any presentations or peer-reviewed scientific publications resulting from the student’s research involvement.

Skills Required: At least two years of college laboratory courses in biology, chemistry, or a similar subject are required. The applicant should be prepared to share unglamorous laboratory animal husbandry responsibilities. Competitive applicants should be detail oriented, be able to follow protocol closely, and communicate effectively in a team environment.

Location: NOAA Fisheries, Northwest Fisheries Science Center, 2725 Montlake Blvd E., Seattle, WA 98112

Number of Intern Slots: One

Mentors: Lisa Chandler, Lisa.Chandler@noaa.gov, 206-860-3388; Ron Johnson, Ph.D., Ronald.b.johnson@noaa.gov, 206-860-3458.

# 21. Pacific Salmon Ecology and Conservation, Washington

# Project description: We are seeking independent, motivated interns that will be key members of a research team including scientists from the Northwest Fisheries Science Center and the University of Washington as we continue our long-term study (started in 2000) quantifying the recolonization of the Cedar Rive, WA by Pacific salmon. The Cedar River is a protected watershed providing drinking water for Seattle and is about 90 km east of the City. Interns will assist us in field and laboratory work. Fieldwork includes habitat and fish surveys (using electrofishing and snorkel surveys); and water, algae, and invertebrate sampling. Laboratory work includes processing water, algae, and invertebrate samples and data entry.

# Opportunity: This internship provides a unique opportunity to collaborate in a large-scale, long-term ecological research project critical to the conservation of Pacific salmon. The interns will gain valuable experience in field techniques for surveying stream habitat, invertebrates and fish. Interns will gain valuable experience in conservation biology, ecology, fish ecology, stream ecology, and taxonomy.

Skills required: Interns must be willing to work under potentially physically demanding conditions and be comfortable working in streams and rivers. Experience with snorkeling a plus. We are also looking for someone that is positive and a good communicator; detail oriented; and works well as part of a research team. Coursework in ecology and zoology helpful as is basic experience in collecting field data and laboratory procedures.

# Location: NOAA/National Marine Fisheries Service, [Northwest Fisheries Science Center](http://www.nwfsc.noaa.gov) Cedar River, Washington (field work), Seattle, WA (laboratory work, field coordination),

# Intern supervisor: Peter Kiffney

Number of Intern Slots Available: 1-2

22. The growth and survival of Pacific salmon in streams of the Salmon River Basin, Idaho

Project Description: Thousands of rivers and streams dissecting the coastal lands surrounding the North Pacific Ocean once supported major populations of Pacific salmon and anadromous trout. Today, however, these once plentiful species are greatly reduced in both abundance and distribution. Recent work has highlighted that the importance of returning salmon goes far beyond the clear need for reproducing adults. Because more than 95% of the body mass of salmon is accumulated while fish are in the sea, the return of adults represents a transfer of nutrients from marine to freshwater and terrestrial habitats. The nutrients derived from adult salmon (marine-derived nutrients) are now recognized to play an important role in the ecology of the Pacific Northwest (Gresh et al. 2000).

The intern will participate in a study on the importance of returning adult salmon as sources of nutrients (i.e., fertilizer) to streams in the Salmon River Basin in Idaho. The project asks two questions: 1) Has the decline in the number of salmon returning to natal streams over the last 150 years changed the ability of streams to support healthy salmon populations? 2) How do the physical, chemical, and biological features of stream's habitat influence juvenile Chinook growth and survival? The intern will join our research team to assist with laboratory analyses and field research. Work will involve processing stable isotope and benthic invertebrate samples in Seattle and participation in summer field work in salmon streams of the Salmon River Basin in Idaho.

This internship offers an opportunity to participate in a large-scale ecological study designed to benefit endangered salmonids. Applicant will gain knowledge of Pacific salmon and their impacts on several aspects of stream ecology through field and laboratory work.

# Skills Required: We require a willingness to work in a laboratory setting and an ability to pay attention to detail. Also needed are flexibility and desire to work as part of a research team. Basic laboratory, field, and outdoor know-how experience are helpful but not required. Field work will likely involve tagging wild, juvenile Chinook in streams and camping in National Forest campgrounds.

Number of Intern Positions: One

# Location - 1st half of internship: Northwest Fisheries Science Center (Seattle, WA). 2nd half of internship: Field work in remote areas of Idaho for 3-4 weeks.

# Intern Supervisor: Feel free to contact me with questions. Dr. Beth Sanderson (\*), [Beth.Sanderson@noaa.gov](mailto:Beth.Sanderson@noaa.gov), 206-860-3410

**23. NOAA’S SENTINEL SITE PROGRAM, HAWAI‘I COOPERATIVE: SEA LEVEL CHANGE AND COASTAL INUNDATION - FROM OBSERVATION TO STEWARDSHIP**

**Project description:** The NOAA Sentinel Site Program, Hawaiian Islands Cooperative is working to coordinate NOAA offices and to build partnerships with other federal and local partners to address sea level change and coastal inundation. (<http://oceanservice.noaa.gov/sentinelsites/>)

The Hawaiian Islands Sentinel Site Cooperative is a compilation of sites that includes Midway and French Frigate Shoals in the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands, He‘eia on the island of O‘ahu, and a portion of the Kona Coast on the Big Island of Hawai‘i.

The Sentinel Sites Program is an innovative effort that covers NOAA’s entire expertise portfolio – from science to management to outreach – by determining what work is being done, where gaps exist, and what can be done to address those gaps. In furtherance of the goal of addressing the risk of sea level change and coastal inundation, the Cooperative is working with other federal, state, and local partners to bring to bear a wide range of expertise and resources on the issue.

The internship will entail helping to develop the Hawai‘i Cooperative and to make it a success. Specific work may include assisting with:

* Supporting meetings to gather gaps and document work taking place within the Cooperative.
* Updating the Cooperative Implementation Plan under the guidance of the Cooperative Coordinator;
* Developing a Cooperative website;
* Assisting Cooperative sites with identifying solutions through the development of screening level mapping products using GIS;

**Skills Required include:** Ability to multi-task and pay attention to details; good oral and written communication skills; working knowledge of ArcGIS; HTML experience a plus; be a team player.

**Location:** Pacific Services Center, Honolulu, HI.

**Number of Intern Slots:** One

**Intern Supervisor:** Doug Harper, Douglas.Harper@noaa.gov, 808.525.5353

**24. Microbiology and molecular biology for microbial water quality** assessments (MWQA)

Project description: The specific aim is to aid management of coastal water quality by investigating the sources and magnitude of microbial contamination to coastal waters and watersheds. Goals are to apply research results to the development of Quantitative Microbial Risk Assessments (QMRA), implementation of Total Maximum Daily Loads (TMDL), and assessment of non-fecal indicators and pathogens to support risk assessment. Activities may include assessment of fecal pollution from humans and animals (e.g., birds, dogs) and assessment of non-fecal contributions to the load of indicator bacteria (e.g., from environmental regrowth and persistence).

Location: This work is in collaboration with an environmental consulting company, Weston Solutions; therefore, the successful candidate would work in labs in both the Weston Carlsbad office as well as the NOAA SWFSC lab in La Jolla, CA.

Number of slots: one

Intern Supervisor: [Kelly.Goodwin@noaa.gov](mailto:Kelly.Goodwin@noaa.gov)

**25. A Safer Catch? The effects of catch share management on safety and risk taking in the Pacific Northwest fisheries**

Project description: Statistically, fishing is the most dangerous job in the United States. When fisherman have the incentive to “race for fish”, or fish as fast as possible to catch the maximum amount of fish before the seasonal catch limit is reached and the fishery is closed, a fishing season can be reduced to only a few days and involve around-the-clock fishing in life-threatening weather conditions. Overloaded vessels, ignoring maintenance problems on vessels, and fishing in dangerous conditions may be commonplace. However, fisheries management systems can reduce or eliminate the incentive to race for fish through an institution called “catch share management”, or the allocation of a portion of the catch limit to each vessel in the fishery. Because a portion of the catch limit, or “quota”, is allocated to each vessel, each can fish their quota however they see fit. One of the many results of catch share management has been a significant decrease in the speed and intensity of fishing and a lengthening of the fishing season. This is expected to increase safety in fisheries, as fishermen no longer need to work around the clock, they can return to port for repairs if something goes wrong with their vessel, and they do not need to fish in stormy or dangerous conditions. In 2010 the National Oceanic and Atmospheric Administration (NOAA), the body governing fisheries management in the United States, began advocating the implementation of catch shares in fisheries. Catch shares management programs have been implemented in many fisheries, and many more programs are under development.

This research project will involve analyzing the effect that catch share management has had on safety and risk taking in several Pacific Northwest fisheries. Data on safety incidents, deaths, and expenditures for vessel maintenance and repair will be collected and compared over time. More importantly, the risk-taking behavior of fishermen will be modeled by estimating the effect of various measures of stormy conditions (wind speed, wave height, and meteorological conditions) on the probability of fishing or beginning a fishing trip. It is expected that in fisheries managed with catch shares, the probability of fishing during dangerous conditions will be lower than in non-catch share fisheries (or before the implementation of catch shares), and that this will contribute to fewer safety incidents and deaths. This research will contribute to the evaluation of the benefits and costs of catch share programs, which are designed to promote viable, sustainable, and efficient fisheries.

Skills required: An understanding of statistics (and/or econometrics) is necessary as this project will involve the use of mathematical and statistical models to analyze and predict the behavior of fishermen. The ability to use ArcGIS (to collect and analyze climate data), assemble background research, and strong writing skills are also necessary.

Number of intern slots: One

Intern Supervisor: Dr. Lisa Pfeiffer, Economist, NWFCS, FRAM Division, lisa.pfeiffer@noaa.gov

**26. Climate change effects on fish early life processes**

Project Description: This project evaluates the potential effects of climate change on fish populations. Fishes are expected to exhibit increases in metabolic, ontogenetic, and ecological rates as water temperatures increase. Beyond this general expectation of a direct effect of temperature on rates of living, we must also refine details on relationships between water temperature and key processes in fish life cycles, and on indirect effects on the ecology of these species. In addition, the effects of an increased level of ocean acidification – which is rising as a consequence of CO2 emissions – on fish are largely unknown and represent a new and exciting research front. We are using a combination of field, laboratory, and experimental data to address these topics with respect to resource fish species of the northeastern USA. The student will be directly involved in field monitoring, laboratory experiments, and/or analyses of archived data in addressing a component of this larger research effort. Among other activities in 2013, we expect to be conducting laboratory experiments on the direct and interactive effects of water temperature and CO2 / acidity on embryos and larvae of fish species representative of our local fish fauna. As part of our research team, the intern’s duties and responsibilities will include: 1) Participate in lab-wide open house for public (June 9, 2013) at which the student will join the group in providing oral summaries to public about the group’s research and the student’s expected role in lab research; 2) Participate in weekly internship discussions on topics pertinent to research, graduate school, and careers in science among others; 3) Acquire spawning fish and/or fertilized fish eggs; 4) Implement and maintain laboratory experiments on the joint effects of water temperature and acidity on early life features of experimental fish including their growth, development, and survival; 5) Collect, reduce, and summarize data from direct observation and from digital images of embryonic and larval fish; and 6) Support role in ongoing laboratory experiments and analyses. The student will work among other undergraduate and graduate students, research associates, and career NOAA research scientists.

Skills required: The student must be willing to work outdoors, on small boat (including overnight cruises), and in the laboratory. He/she must be detail oriented, organized, and have a history of completing assignments on time; comfortable working with a team; and listen and communicate well. Working familiarity with MS Office (Word/Excel/PowerPoint) is expected.

Location: NOAA Fisheries Northeast Fisheries Science Center, Highlands, New Jersey

Number of Intern Slots: One

Intern Supervisor: Dr. Christopher Chambers, (732) 872-3075, [chris.chambers@noaa.gov](mailto:chris.chambers@noaa.gov)

**27. Preparing Future Scientists and Educators for Engaging the Public on Ocean Acidification**

Project Description: This project identifies, develops, and evaluates pedagogical tools for improving the understanding of students and the public in the causes and consequences of ocean acidification (OA). The work is predicated on the assumption that our nation’s pressing needs to wisely manage our living marine resources is best achieved through an informed public. Imparting information to people of all ages about marine ecosystem functions and OA in particular will serve to educate our citizenry and to cultivate future scientists. The focal theme for this project is OA within the larger context of environmental effects on marine fish species. Activities will include describing research on OA at our laboratory; defining, describing, and collecting the metadata that support this project; developing physical and virtual displays on OA; creating and improving mobile outreach packages; and refining our in-house means to educate other interns on the importance of OA. Each activity will be implemented during the course of the summer and evaluated through user surveys. The intern will play a key role in each activity under the tutelage of the mentor and his staff. As part of our research team, the intern’s duties and responsibilities will include: 1) Participate in lab-wide open house for public (June 9, 2013) at which the student will join the group in preparing visuals and providing oral summaries about our OA research and the role that student’s play in our laboratory’s research activities; 2) Develop visual summaries of lab’s research activities on OA. These summaries will be physical (e.g., posters suitable for in-house and traveling presentations) and virtual (e.g., webpage summaries); 3) Host in-house visitors for laboratory tours of OA activities; 4) Participate in community outreach about OA by visiting classrooms and community groups in our area; 5) Serve as the facilitator for an OA theme at our Sandy Hook Internship Program (SHIP) weekly discussions; 6) Develop, implement, and interpret evaluation methods for the efficacy of education and outreach activities on OA; and 7) Gain a working familiarity of ongoing laboratory experiments and analyses on OA; sufficiently so to write summaries for public distribution. The student will work among other undergraduate and graduate students, research associates, and career NOAA research scientists.

Skills required: The student must be detail oriented, organized, and have a history of completing assignments on time; comfortable working with a team; listens and communicates well orally and in writing. Working familiarity with MS Office (Word/Excel/PowerPoint) is expected. Prior experience with video recording, blogs, and web and/or app development is an asset.

Location: NOAA Fisheries Northeast Fisheries Science Center, Highlands, New Jersey

Number of Intern Slots: One

Intern Supervisor: Dr. Christopher Chambers, (732) 872-3075, chris.chambers@noaa.gov

**28. ECO-PHYSIOLOGY OF INVASIVE LIONFISH**

Project description: The tropical Indo-Pacific lionfish has now invaded the southeast U.S., Caribbean, and Gulf of Mexico. Lionfish pose a major threat to coral reef communities given their high densities, feeding habits, and rapid reproductive rate. Anecdotal observations suggest that invasive lionfish are much different than native lionfish, a possible result of the extreme bottleneck that occurred during the introduction. This project will investigate the physiological differences between invasive lionfish and native lionfish. A literature review will first be conducted to design physiological experiments followed by a series of preliminary lab experiments comparing basic physiological rates such as maximum consumption, temperature tolerance, and endurance or fitness. For more about invasive lionfish visit:<http://ccfhr.noaa.gov/stressors/lionfish.aspx> and<http://lionfish.gcfi.org/manual/>.

Skills Required: General laboratory skills are preferred but not required. Basic understanding of fish physiology is important (e.g., have taken an ichthyology or fish physiology class).The student must be comfortable working independently and as part of a team. Good writing skills and attention to detail are preferred.

Location: This internship will be conducted at the NOAA, Center for Coastal Fisheries and Habitat Research, Beaufort, North Carolina. For more about the NOAA Beaufort Lab visit [www.ccfhr.noaa.gov](http://www.ccfhr.noaa.gov/). For more about Beaufort, NC, the 2012 winner of [America’s Coolest Small Town](http://www.budgettravel.com/contest/americas-coolest-small-towns-2012,11/#candidate-detail911).

Number of Intern Slots: One

Intern Supervisor: Dr. James Morris, james.morris@noaa.gov; 252-728-8782. For more information about Dr. Morris visit: <http://www.externalaffairs.noaa.gov/communicator/noaacom_22.html>

<http://oceanservice.noaa.gov/profiles/oct11/morris.html>

**29. INVASIVE LIONFISH TISSUE REPOSITORY**

Project description: The tropical Indo-Pacific lionfish has now invaded the southeast U.S., Caribbean, and Gulf of Mexico. Lionfish pose a major threat to coral reef communities given their high densities, feeding habits, and rapid reproductive rate. This project will involve managing the NOAA Lionfish Tissue Repository, a repository of biological samples collected from the Atlantic since the beginning of the invasion. The intern will be in charge of processing biological samples (genetics tissue, otoliths, etc.), data entry into a database, report preparation, and sample acquisition of under-represented locations around the Caribbean. For more about invasive lionfish visit:<http://ccfhr.noaa.gov/stressors/lionfish.aspx> and<http://lionfish.gcfi.org/manual/>.

Skills Required: Priority will be given to students with proficiency in Microsoft Access. General laboratory skills are preferred but not required. The student must be comfortable working independently and as part of a team. Good communication skills and attention to detail is preferred.

Location: This internship will be conducted at the NOAA, Center for Coastal Fisheries and Habitat Research, Beaufort, North Carolina. For more about the NOAA Beaufort Lab visit [www.ccfhr.noaa.gov](http://www.ccfhr.noaa.gov/). For more about Beaufort, NC, the 2012 winner of [America’s Coolest Small Town](http://www.budgettravel.com/contest/americas-coolest-small-towns-2012,11/#candidate-detail911).

Number of Intern Slots: One

Intern Supervisor: Dr. James Morris, james.morris@noaa.gov; 252-728-8782. For more information about Dr. Morris visit: <http://www.externalaffairs.noaa.gov/communicator/noaacom_22.html>

<http://oceanservice.noaa.gov/profiles/oct11/morris.html>

**30. VERMILION SNAPPER AQUACULTURE**

Project description: The U.S. marine aquaculture industry is projected to increase significantly in the next decade to meet the increasing demand for seafood. NOAA is committed to assisting the marine aquaculture industry and coastal managers with developing environmentally sound aquaculture practices. The CCFHR Marine Aquaculture Environmental Effects Research program works to develop environmental models and monitoring methods for marine aquaculture in all regions of the U.S. This project will involve assisting CCFHR researchers with developing energetics parameters for vermilion snapper, a candidate species for aquaculture in the southeast U.S. and Gulf of Mexico. This data will be used in environmental model simulations for several candidate species for offshore cage culture. The intern will be responsible for collecting reproduction data on wild caught vermilion snapper, assisting with vermilion snapper broodstock husbandry and spawning, and assist with larval and juvenile rearing. Some fieldwork and interaction with the commercial and recreational fishmen will be required to collect reproduction data. To learn about how CCFHR is growing sustainable marine aquaculture practices visit: <http://coastalscience.noaa.gov/research/scem/marine_aquaculture>

Skills Required: Priority will be given to students with proficiency in Microsoft Access. General laboratory skills are preferred but not required. The student must be comfortable working independently and as part of a team. Good communication skills and attention to detail is preferred.

Location: This internship will be conducted at the NOAA, Center for Coastal Fisheries and Habitat Research, Beaufort, North Carolina. For more about the NOAA Beaufort Lab visit [www.ccfhr.noaa.gov](http://www.ccfhr.noaa.gov/). For more about Beaufort, NC, the 2012 winner of [America’s Coolest Small Town](http://www.budgettravel.com/contest/americas-coolest-small-towns-2012,11/#candidate-detail911).

Number of Intern Slots: One

Intern Supervisor: Dr. James Morris, james.morris@noaa.gov; 252-728-8782. For more information about Dr. Morris visit: <http://www.externalaffairs.noaa.gov/communicator/noaacom_22.html>

<http://oceanservice.noaa.gov/profiles/oct11/morris.html>

**31. DEVELOPMENT OF HIGH IMPACT OUTREACH PRODUCTS FOR NOAA INVASIVE SPECIES AND AQUACULTURE RESEARCH**

Project description: Outreach is vitally important to keep the American public informed on NOAA science missions and the impact on coastal communities. This project will work to develop high impact outreach products on invasive species and aquaculture for the general public and NOAA leadership. Examples of products include one pagers, brochures, posters, web content, blogs, and short videos. The intern will work with directly with scientists to develop messaging objectives and to develop a series of communications products. For more information about our invasive species research visit<http://ccfhr.noaa.gov/stressors/invasive_species.aspx>. To learn about how CCFHR is growing sustainable marine aquaculture practices visit: <http://coastalscience.noaa.gov/research/scem/marine_aquaculture>

Skills Required: Priority will be given to students that are proficient in Adobe Photoshop and Adobe InDesign. Some experience in graphics design is preferred. Good oral and written communication skills are required. The student must be comfortable working independently and as part of a team.

Location: This internship will be conducted at the NOAA, Center for Coastal Fisheries and Habitat Research, Beaufort, North Carolina. For more about the NOAA Beaufort Lab visit [www.ccfhr.noaa.gov](http://www.ccfhr.noaa.gov/). For more about Beaufort, NC, the 2012 winner of [America’s Coolest Small Town](http://www.budgettravel.com/contest/americas-coolest-small-towns-2012,11/#candidate-detail911).

Number of Intern Slots: One

Intern Supervisor: Dr. James Morris, james.morris@noaa.gov; 252-728-8782 For more information about Dr. Morris visit: <http://www.externalaffairs.noaa.gov/communicator/noaacom_22.html>

<http://oceanservice.noaa.gov/profiles/oct11/morris.html>

**32. REVIEWING THE STATUS OF PROTECTED MARINE SPECIES**

Project Description: You will work at the Office of Protected Resources in Silver Spring, where your primary responsibility will be to conduct literature searches on the status of a species listed under the Endangered Species Act, and write the first draft of a 5-year review of that species (most likely a marine mammal but you’ll have some say in that). Depending on your background and interest, you may also be asked to assist others in library research, work on listing of a sea turtle species, developing policy for recovery efforts by Federal agencies, developing outreach materials via researching and writing information for our website and other outreach documents, and any number of other opportunities as they arise. You’ll attend intra- and inter-agency meetings and conference calls. You won’t get your hands dirty, but you’ll see policy in the making and we’ll be sure you get broad exposure to a variety of issues that arise in implementation of the Endangered Species Act. You will end the summer with a basic understanding of the ESA and its provisions.

Skills Required: Strong library research and writing skills, and ability to provide critical review of written materials. Ability to work independently, as well as in a team environment.

Location: NOAA’s Office of Protected Resources, 1315 East-West Hwy, Silver Spring, MD

Number of Intern Slots: One

Intern Supervisor: Susan Pultz, susan.pultz@noaa.gov, 301-427-8472

# 33. Monitoring Climate Change Impacts to Freshwater Tidal Marshes in the Hudson River National Estuarine Research Reserve, NY

# Project Description: Freshwater tidal marshes are globally rare, yet productive and significant habitats. Along the Hudson River, these ecosystems have been impacted by climate change stressors, particularly the effects of increased storms, including Tropical Storms Irene and Lee in 2011 and Hurricane Sandy in 2012. The Hudson River National Estuarine Research Reserve (HRNERR) has established a series of permanent vegetation transects in the marshes to document storm surge impacts to vegetation density and marsh elevation. By participating in this internship, you will learn to identify and quantify emergent marsh and submerged aquatic vegetation (SAV) using techniques including the point intercept method, PONAR grab sampling, and snorkeling for underwater photo documentation. Other internship duties include sampling Surface Elevation Tables (SETs), deploying tide gauges, assisting with elevation surveys, river water sampling (from shore or boat), assisting with laboratory processing of samples (filtering and weighing), calibrating instruments, and acid washing sample bottles. As interests and time allow, opportunities exist to explore other programs at the Research Reserve, including Restoration (sustainability of shoreline structures, restoration of SAV) and Education (American eel surveys using electroshocking and fyke nets, public canoe programs).

# Skills Required: Prior course work in ecology and experience working outdoors, particularly from boats, is preferred. Applicants must be able to swim, must be able to lift up to 50 lbs, and must be willing to work in adverse field and weather conditions. The HRNERR field crew works as a team, and side projects and other creative contributions within the realm of the existing research are always welcome.

Number of Intern Positions: One

Location: Hudson River National Estuarine Research Reserve, located at the Norrie Point Environmental Center in Staatsburg, NY

Intern Supervisor: Sarah Fernald (shfernal@gw.dec.state.ny.us), Christopher Mitchell (cgmitche@gw.dec.state.ny.us)

34. **ESTUARINE CONSERVATION SCIENCE AT ELKHORN SLOUGH, CALIFORNIA**

Project description: You will get muddy while collaborating with our interactive team of interdisciplinary scientists at Elkhorn Slough, a small estuary in the Monterey Bay region. The two major focus areas for your internship will be:

* *Sea otter observations and tracking*: you will observe sea otters in the estuary, recording different activities (foraging, resting, grooming, etc.), noting which prey species are consumed, and tracking radio-tagged individuals. This study will document how otter needs, activities and daily routines in an estuarine environment differ from those of their ocean counterparts.
* *Oyster restoration science*: you will help to build and deploy artificial reefs to support threatened native oysters. You will also collect field data on oyster ecology and reproduction, and maintain field experiments examining oyster growth under different conditions. This study will help inform Olympia oyster restoration efforts in this and other estuaries.

Elkhorn Slough is a rich estuary, hosting large populations of threatened sea otters, providing an important stopover for migratory shorebirds, and teeming with diverse plant, invertebrate, and fish life. You will become intimately familiar with a diversity of landscapes and species in coastal California. By participating in a variety of on-going research projects and receiving mentoring from different members of our interdisciplinary team, you will gain experience with numerous techniques in experimental design and long-term monitoring, and in both field and laboratory protocols. The internship is thus an excellent opportunity for building your resume and for trying out different types of research that you might consider pursuing in graduate school. You will need to rent a room in a nearby town (Watsonville, Santa Cruz, Marina, Monterey) and will need your own or a leased car to drive to the Reserve each day. Given the high cost of living in the region, you will probably be spending your entire stipend on housing and transportation. This cost can be alleviated somewhat if two interns who know each other come together and sharing housing and transportation.

Skills Required: Willingness and sufficient physical fitness to wade through knee-deep, sticky mud and spend extended hours in the field using telescopes or binoculars. Curiosity and engagement – we are seeking someone who will ask good questions and will immerse themselves in the projects. Attention to detail and ability to follow field and lab protocols carefully. Careful data entry and basic Excel skills. Collaborative team player.

Location: Elkhorn Slough National Estuarine Research Reserve, central California. http://www.elkhornslough.org/science.htm

Number of Intern Slots: One or two (if they know each other and can share housing and transportation)

Intern Supervisors: Dr. Kerstin Wasson (coordinator); Mr. Ron Eby (sea otter tracking), Dr. Chela Zabin (oyster restoration science).

**35. CARBON SEQUESTRATION SCIENCE IN tidal freshwater wetlands, Chesapeake Bay**

Project Description: The Chesapeake Bay National Estuarine Research Reserve in Maryland (CBNERR-MD) is a multi-component Reserve that reflects the diversity of estuarine habitats found within the Chesapeake Bay. Jug Bay, one of three CBNERR-MD components, is located about 20 miles east from Washington D.C. and 18 miles south of Annapolis, within the Patuxent River watershed. Jug Bay includes one of the largest tidal freshwater wetlands on the East Coast. The marshes, swamps, and scrub shrub wetlands support more than 130 species of aquatic vascular plants which also provide habitat for a diverse population of birds, fish, reptiles, and mammals.

Since 2008 CBNERR-MD has worked towards the establishment of a network of observing systems (e.g. weather, water quality, marsh vegetation, underwater grasses, marsh sedimentation), that would support Jug Bay as a sentinel site for monitoring the impacts of climate change. To complement the sentinel site work we are already doing, we would like to measure plant biomass production that would also help us to estimate carbon sequestration rates for the Jug Bay marshes. We would like to invite you to become part of our enthusiastic team, join us in the field, and help us continue to build the sentinel site effort!!

As part of the internship you would learn:

(1) About tidal freshwater marsh plants

(2) How to plan, design and conduct a small research project

(3) About protocols to measure biomass production

(4) About carbon sequestration in marshes

(5) Data analysis, interpretation, and presentation

*In addition, you could have the opportunity to participate* *and be a guide, along with our staff, in a one-week teen paddle experience along the Patuxent River!!* By the end of the internship, you’ll have learned about Jug Bay marshes and the Chesapeake Bay, and equally importantly you will have a lot of fun!!

Skills Required: Willingness to learn and do field work in a marsh environment, which can often be a hot and muddy job. Flexibility for local travel by car and by small boat would be helpful.

Location: NOAA/NERR: Maryland Chesapeake Bay National Estuarine Research Reserve, Annapolis, Maryland (HQ). The field work will take place at Jug Bay, Patuxent River.

Number of Intern Slots: One (could accommodate two people)

Intern Supervisor: Dr. Patricia Delgado, pdelgado@dnr.state.md.us, 410-260-8983.

**36. Measuring effects of storms and sea level rise on coastal ecosystems, MA**

Project description: The Waquoit Bay Reserve is one of 28 National Estuarine Research Reserves around the US coast. The Reserves are federal (NOAA)- state (MA Department of Conservation and Recreation) partnerships that conduct and facilitate cutting edge research focusing on water quality, climate change, and habitats. In addition to our internal research and monitoring programs, over 50 projects led by outside researchers from Woods Hole institutions, area universities, etc. are currently being conducted at the Reserve.

We have been monitoring shoreline change along the Reserve’s 3-miles of barrier beach on Nantucket Sound for the past 12 years. We would like to upgrade this system to tie it more precisely to an important sea level database from nearby Woods Hole, which will require both field surveying and computer research. We also would like to carry out a summary analysis of the beach change data that we have collected over the last 13 years. Some of this summary analysis could be rendered in a visual format using GIS or other graphics programs, examining correlation with hurricanes and other storm events, and creating several education “products” such as a poster for our Visitor Center, a report, and/or a summary for our website.

This project is an excellent opportunity to learn about cutting edge techniques of measuring effects of storms and sea level rise on coastal ecosystems.

In addition to this project, the Reserve is working on several others that the student would be able to participate in as time and interest allow. These include: mapping habitat change over time (comparing aerial photo results from 2004 and 2012 and groundtruthing results), water quality monitoring and analysis, a collaborative project examining greenhouse gas exchange in salt marshes, etc.

Skills required**:** Student should have a least a basic understanding of coastal geology and ecology, be proficient in Microsoft Office, be willing and able to spend long hours in the field in sometimes adverse conditions and lift 40 pounds, and have an interest in creating educational products from science results. Familiarity with GIS a plus. Students should be able to work independently and as part of a team, and have a sense of humor.

Location: Waquoit Bay National Estuarine Research Reserve, Waquoit, MA 02536 (on Cape Cod near Woods Hole, MA). On-site housing may be available.

Number of Intern Slots: One

Intern Supervisor: Chris Weidman, Research Coordinator (chris.weidman@state.ma.us, 508-457-0495, ext 105) and Alison Leschen, Reserve Manager (alison.leschen@state.ma.us, ext. 103)

**37. Killer Whale and Pacific White-sided dolphin habitat use, movement patterns, and occurrence patterns Off monterey bay, california and review of mamMAL-eating killer whale predator strategies, Silver Spring, MD**

Project description: There are essential two separate but connected project assignments dealing with data entry/analysis and scientific literature review. Task 1: You will enter killer whale (*Orcinus orca*) and Pacific white-sided dolphin *(Lagenorhynchus obliquidens)* sightings, behavioral focal follows, and oceanographic data from opportunistic and dedicated field studies conducted off Monterey Bay, California. Very little is published about Pacific white-sided dolphins and killer whales off Monterey, and so there is much to learn and assimilate from recent and historic data. You will be responsible for data entry and data organization with the potential option of conducting some GIS and statistical analysis, time permitting. Task 2: Conduct a thorough review of killer whale journal articles dealing with the attack and potential consumption of marine mammal prey to better understand how social predators such as killer whales have evolved strategies to seek and hunt large prey similar to lions and wolves.

Skills Required: Use of MS Excel -data entry/ proofing and data analysis, Ability to review and understand scientific literature. Extract key data from papers or book chapters and analyze in a scientific manner.

Location: NOAA Fisheries, Office of Science and Technology, Silver Spring, MD. Option to telework.

Number of Intern Slots: One

Intern Supervisor: Dr. Mridula Srinivasan, mridula.srinivasan@noaa.gov,301.427.8179

**38. The Chesapeake Bay, Virginia National Estuarine Research Reserve Sentinel Site Program: Climate and Anthropogenic IMpacts on Reserve Critical habitats**

Project Description: The Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERRVA; www.vims.edu/cbnerr) is engaged in understanding the vulnerability of critical emergent wetland habitats and submerged aquatic vegetation within the York River estuary to anthropogenic and climate related stressors. These habitat types are stressed by a number of factors, including elevated summer temperatures, nutrients and suspended sediments in the case of SAV, and elevated sea level rise rates and salt intrusion in the case of meso-polyhaline emergent wetlands. The Reserve is also focused on critical “ecotones” (e.g., water-marsh edge and marsh-maritime forest interface) and the implications for either the loss or gain of ecosystem services in these transitional environments. Through implementation of a NERRS-approved Sentinel Site monitoring program combined with historical shoreline and wetland/SAV change analysis based on aerial imagery, CBNERRVA is attempting to understand the physical conditions driving changes in wetland/SAV habitat type and develop strategies to increase adaptive capacity of these vulnerable critical habitats. In this project, the observational infrastructure includes emergent marsh and underwater SAV transects to monitor changes in spatial distribution and community composition of vegetated habitats; Surface Elevation Tables (SETs) co-located with vegetation transects to monitor surface elevation changes over time; groundwater monitoring to evaluate salt intrusion and water table and flooding dynamics; multiple NERRS System-Wide Monitoring Program (SWMP) water quality stations, local geodetic control networks tied to the National Spatial Reference System (NSRS) and monitoring infrastructure so measurements are collected on the same vertical datum; multiple local meteorological stations; multi-decadal aerial image analysis of shoreline and vegetation community boundaries; and a locally derived sea level and salt intrusion model. The intern will assist in the various monitoring projects, working closely with faculty, scientists and graduate students.

Skills Required: Enthusiastic team-oriented worker with comfort conducting field work in a variety of challenging coastal habitats and confidence in the water (swimming competence but not diving experience required). Much of the field work will be conducted using small boats with relatively heavy field equipment. Although a marine science background is not required, applicant must be dependable, willing to learn, and at times show the ability to work independently.

Location: The Chesapeake Bay National Estuarine Research Reserve of Virginia is located at the Virginia Institute of Marine Science (VIMS) of the College of William and Mary at Gloucester Point, Virginia. The campus is directly on the York River estuary, a tributary of the Chesapeake Bay. The work will take place at all four components of our Reserve which are located along the York River and include: (1) Goodwin Islands which is approximately 22 km down the York River from VIMS in the region of highest salinity, (2) Catlett Islands located approximately 7 km upriver from VIMS, (3) Taskinas Creek which is approximately 24 km upriver from VIMS within the boundaries of York River State, and (4) Sweet Hall Marsh, which is located 65 km upriver from VIMS in the tidal freshwater-oligohaline transitional zone of the Pamunkey River, one of two major tributaries of the York River.

Number of Intern Slots: One.

Intern Supervisors: Dr. Kenneth Moore, moore@vims.edu, 804-684-7384; and Scott Lerberg, lerbergs@vims.edu, 804-684-7129.

**39. Climate: Long-Term Water Level Records Review, Maryland**

**Project description:** The Center for Operational Oceanographic Products and Services (CO-OPS) and its predecessors have gathered oceanographic data along our nation's coasts for over 200 years to protect life, property, and the environment. Serving both the public and other government agencies, CO-OPS is the authoritative source for accurate, reliable, and timely water-level and current measurements that support safe and efficient maritime commerce, sound coastal management, and recreation. You will join a collaborative group of scientists working to reconcile data discrepancies in historical water level records as they relate to climate change - specifically long-term sea level trends and sea level exceedance probabilities. CO-OPS currently oversees the National Water Level Observation Network (NWLON), 210 continuously operating real-time stations throughout U.S. Territorial waters. This work involves data display and analysis to ascertain the quality of various data discrepancies found in the long-term NWLON stations. You will work to identify and verify questionable data that resulted during data transition (for more information visit: http://tidesandcurrents.noaa.gov/index.shtml).

**Skills Required:** Ability to think critically and creatively with attention to detail, willingness to perform data mining, analysis, and occasional data entry. You should be a team player, able to multi-task, and comfortable working with MS Office programs, especially Excel. A successful candidate will be interested in physical oceanography as related to tides, tidal theory, and sea level variations and willing to work with large amounts of water level data; basic knowledge of time series analyses, statistical methods, and SQL is a plus.

**Location:** NOAA National Ocean Service, Center for Operational Products & Services in Silver Spring, Maryland.

**Number of Intern Slots:** One

**Intern Supervisor:** Adria Schneck-Scott, Lead Oceanographer, adria.schneck-scott@noaa.gov

**40. Climate: Development of Climatologies Using Long-Term Water Level Records**

**Project description:** The Center for Operational Oceanographic Products and Services (CO-OPS) and its predecessors have gathered oceanographic data along our nation's coasts for over 200 years to protect life, property, and the environment. Serving both the public and other government agencies, CO-OPS is the authoritative source for accurate, reliable, and timely water-level and current measurements that support safe and efficient maritime commerce, sound coastal management, and recreation. You will join a collaborative group of scientists who couple sound observation and monitoring capability with environmental predications to provide the quality data and information needed to support NOAA’s Navigation, Environmental Stewardship and Environmental Assessment and Predication Missions. Specifically, you will study long term water level records as they relate to climate change developing climatologies and standard anomalies at specific tide gauge stations resulting from winter storms and relate them to global climate indices such as El Niño.

**Skills Required:** Ability to think critically and creatively with attention to detail. Ability to work with long-term data records in MS Excel and Matlab. Applicant must have a basic understanding of statistics (correlations, standard deviations, distribution, etc.).

**Location:** NOAA National Ocean Service, Center for Operational Products & Services in Silver Spring, Maryland.

**Number of Intern Slots:** One

**Intern Supervisor:** Adria Schneck-Scott, Lead Oceanographer,, adria.schneck-scott@noaa.gov

**41. Land–based influences on the ecology of coastal freshwater and marine**

**ecosystems in Puget Sound, Washington**

Project description: As more and more people move to coastal environments, understanding how urban development affects natural ecosystems is among the most fundamental conservation and management challenges facing people in the US and worldwide. You will join a collaborative group of scientists who study how land development patterns surrounding a set of 10 watersheds in Puget Sound, WA, affect a suite of ecosystem properties (e.g. biodiversity, primary productivity, secondary productivity) in riverine and nearshore marine communities. We are particularly interested in understanding the link between urbanization of river systems and the coastal marine environment. We hope to involve students to help with collection of data in the field and with the quantification of a variety of ecosystem metrics in the lab. Understanding how ecosystem functioning changes with biodiversity across a gradient of rural to urban watersheds is a foremost priority. The specifics of the internship will depend on the interests of the student(s).

Skills required: Willingness to work outdoors, in streams and in the marine intertidal, as well as in the lab and at a microscope. General laboratory skills are helpful. Ability to work as part of a research team. Familiarity with Microsoft Office. Desire to change the world a plus.

Location: NOAA Fisheries, Northwest Fisheries Science Center in Seattle, WA

Number of intern slots: Two

Intern Supervisor: Dr. Jameal Samhouri, jameal.samhouri@noaa.gov, 206-302-1740

**42. Ecological Research on Dam Removal and steelhead trout in the Carmel River, California**

Project description: If you are interested in helping to figure out how to recover a threatened species and learning some useful field techniques in freshwater ecology, all while working in a beautiful and pleasant ecological setting, then we would like to have you for the summer. We are a collaborative group of fisheries scientists, ecologists, and physical scientists who are studying the dynamics of the Carmel River and its steelhead population (*Oncorhynchus mykiss*). The Carmel system is in the midst of a long-term effort to restore natural water and sediment dynamics to the river, including removal of a dam in the middle of the system two years from now. To learn about the river ecosystem conditions before dam removal, this summer we will be estimating the distribution of steelhead trout and other fish species across the stream network, above and below the dam, using standard fisheries techniques such as snorkel-surveys, electrofishing, and seining (We provide waders, dry-suits, etc.). We will also be collecting data on physical habitat condition, invertebrate communities, and various physical variables. Interns will receive training in field techniques and mentoring on study design and the analysis and interpretation of data. You will also learn about the episodic rivers of Central California and the fascinating ecology of steelhead trout; and gain first-hand exposure to environmental science in progress. The experience will help you develop marketable technical skills in hydrologic, ecologic, and fisheries science. Besides the Carmel Valley itself, the surrounding region encompasses many ecological treasures that interns could explore while off-duty. These include Monterey Bay, the Big Sur Coast, Ventana Wilderness and the redwood forests of the Santa Cruz Mountains.

Skills Required: Enthusiasm for working outdoors in creeks and small rivers. Careful observer. Interest in learning fish sampling- and handling-techniques. Ability to work as part of a team and carefully follow sampling protocols and record data. Good physical condition.

Location: NOAA Fisheries, Southwest Fisheries Science Center in Santa Cruz, California, with field work in nearby Carmel Valley including the UC Hastings Reserve.

Number of Intern Slots: 1 or 2

Intern Supervisor: Dr. David Boughton, David.Boughton@noaa.gov, 831-420-3920

**43. MONITORING OF EELGRASSES IN PADILLA BAY NATIONAL ESTUARINE RESEARCH RESERVE, WASHINGTON**

Project Description: Padilla Bay National Estuarine Research Reserve initiated a long-term eelgrass monitoring study during 2011. Padilla Bay contains one of the largest contiguous eelgrass (Zostera marina) meadows in the Pacific Northwest (more than 3000 hectares). You will participate in the long-term monitoring project and help with other field studies being conducted in Padilla Bay. Work will involve measurement of vegetative characteristics of eelgrass in the field, laboratory processing of eelgrass samples, data entry, assisting in annual rocky intertidal monitoring project, and assisting long term water quality monitoring in Padilla Bay.

The internship will provide you with field and laboratory experience collecting basic vegetative data on eelgrasses, familiarity with multiparameter water quality instrumentation and water quality sampling, and working with a small research and monitoring team.

Skills Required: Willingness to work in the field in sandy and muddy intertidal habitats, walking up to 4 km from shore. Ability to pay attention to detail under inclement conditions. Ability to work as part of a team. Basic knowledge of biology and some basic laboratory experience helpful.

Location: Padilla Bay National Estuarine Research Reserve near Mount Vernon, Washington. Padilla Bay National Estuarine Research Reserve is located in a rural setting, about 15 to 20 minutes from population centers where housing would be available. You would need to have some form of transportation to the Reserve. (We are also located 1 to 2 hours from backcountry hiking in the Cascade Mountains and an hour from ferry terminals to the San JuanIslands, Victoria, British Columbia, and the Olympic Peninsula.)

Number of Intern Slots: One

Intern Supervisor: Dr. Douglas Bulthuis, Research Coordinator, Padilla Bay National Estuarine Research Reserve, 360-428-1089; bulthuis@padillabay.gov

**44. ALTERNATIVE FEEDS RESEARCH IN THE PACIFIC NORTHWEST**

Project Description: Aquaculture is the fastest growing food-producing sector in the world today, and demand for feed ingredients, especially fishmeal and oil, has increased dramatically. World stocks of feed-grade pelagic species are currently managed at near-maximum levels of harvest, and supplies cannot increase in the future. Thus, alternative protein and oil sources are needed to supplement or replace fishmeal and oil in aquafeeds if further development of the aquaculture industry is to be sustained.

Opportunity: You will join a small research team focused on formulating novel marine fish feeds that contain alternative feed ingredients and yield comparable growth to traditional feeds. Duties will include nutritionally balancing feed formulations, conducting feeding trials, and chemically analyzing feeds and fish tissue samples from these trials. Research results generated during your stay will likely be presented at international aquaculture conferences as well as published in peer-reviewed scientific publications.

Skills Required: At least two full years of college laboratory courses in biochemistry, chemistry,

or biology are required. A willingness to work with fish and feed processing equipment, which can sometimes be dirty and produce unpleasant odors, is required. The successful candidate should additionally be reliable and prepared to assist in the routine care of laboratory animals.

Location: NOAA Fisheries, Northwest Fisheries Science Center, 2725 Montlake Blvd E.,

Seattle, WA 981112

Number of Intern Slots: One

Mentor: Ron Johnson, Ph.D., ronald.b.johnson@noaa.gov, 206-860-3458.

**45. IMPACTS OF STORAGE ON BACTERIAL LEVELS AND PRODUCT QUALITY OF FARM-RAISED MACROALGAE, WA**

Project description: You will join a small team evaluating the environmental impacts and product quality of farm-rearing macroalgae (seaweed) for human consumption. Macroalgae is rich in health promoting molecules, dietary fiber, omega-3 fatty acids, essential amino acids, and vitamins. While macroalgae can enhance human health, specific information is needed to ensure that these products are wholesome and safe to consume. This intern position will focus on documentation of bacterial levels of human concern (coliform, vibro, and listeria) in wild and farm-raised macroalgae. Other team members will determine (a) proximate composition, amino acids, fatty acids, and contaminates (DDT, PCBs, and mercury) of macroalgae, (b) nitrogen and phosphorus discharges from the farm, and (c) annual growth rates of the macroalgae.

Your specific project responsibilities will include:

1. Sampling and preparation of macroalgae samples for bacterial testing.
2. Development of expertise in the use of “3M Petrifilm Plate” for bacterial enumeration.
3. Determination of bacterial levels on fresh macroalgae samples.
4. Determination of changes in bacterial levels with time and storage conditions.
5. Documentation of changes in organoleptic properties of macroalgae with time and
6. storage conditions.

This internship provides a unique opportunity to collaborate with a diverse group of biologists, engineers, and chemists. You will gather valuable expertise in experimental design, bacterial analysis, statistical analysis, and preparation of scientific manuscripts. The results of your project will be a final written report and a seminar at the Northwest Fisheries Science Center. You will be included as an author on any scientific articles from the project and depending on funding, will be encouraged to present your work at a national aquaculture or food science conference.

Skills Required: Ability to work as part of a research team. Course work in microbiology and bacteriology would be helpful as well basic experience in collecting field data and laboratory procedures. Good organizational and communication skill are desired along with a working knowledge of Word, Excel, and PowerPoint.

Location: National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle. Our laboratory is located within walking distance of the University of Washington and a short bus ride to downtown Seattle. More information on the Northwest Science Center and things to do in Seattle can be found at: <http://www.nwfsc.noaa.gov/> and <https://www.seattle.gov/visiting/>

Number of Intern Positions: One

Intern Supervisors: Dr. John Colt, john.colt@noaa.gov, 206-860-3243; Dr. Ron Johnson, Ronald.b.johnson@noaa.gov, 206-860-3458

**46. Teachers on the Estuary: Education and Communications Internships at Waquoit Bay NERR**

Project description: Help plan, teach, and evaluate the Teachers on the Estuary (TOTE) program at Waquoit Bay National Estuarine Research Reserve on Cape Cod, Massachusetts. TOTE is a field-based program that introduces middle and high school teachers to coastal and watershed research and issues. Work with education staff and collaborate with research scientists to bring teachers into the field as well as train them on using on-line NOAA data and resources. Actual workshop is one week long. Interns will also help with preparation and follow up. In addition to working on the TOTE program, interns will have opportunities to assist researchers in the field on a variety of projects and help out on other education special events and programs.

Skills Required: Knowledge of estuaries and watersheds and the scientific research process. Willingness to work outdoors and get feet wet. Experience teaching in classroom and outdoor settings. Comfort with use of technology, social media, computer graphic design, and accessing on-line data. General laboratory skills are helpful.

Location: Waquoit Bay National Estuarine Research Reserve, Waquoit, MA 02536 (on Cape Cod near Woods Hole, MA)

Number of Intern Slots: One

Intern Supervisor: Joan Muller, 508-457-0495 x107 joan.muller@state.ma.us

**47. Research at the Reserve *r@r*: Multi-Media Researcher interview project**

Project description: Meet researchers working at Waquoit Bay Reserve, interview them, and create mini videos which will be posted on line and on interpretive signs with QR codes. Create matching one- pagers for community members and teachers to be used in a variety of ways. Brainstorm and develop other creative products or activities to introduce students, teachers, and community members to research at Waquoit Bay Reserve. In addition to working on the r@r program, interns will have opportunities to assist researchers in the field on a variety of projects and help out on other education special events and programs.

Skills Required: Writing and graphic skills, comfortable and knowledgeable with computer and hand held technologies including videography and photography, experience editing video, ability to work with people, willingness to work outside and get feet wet.

Location: Waquoit Bay National Estuarine Research Reserve, Waquoit, MA 02536 (on Cape Cod near Woods Hole, MA)

Number of Intern Slots: one

Intern Supervisor: Joan Muller, 508-457-0495 x107 joan.muller@state.ma.us

**48. CLEAN WATERS, HEALTHY SALMON, RESILIENT HABITATS, WA**

Project description:  You will work with a collaborative group of scientists who are studying ways to reduce the impacts of toxic land-based stormwater runoff on salmon and other aquatic species. The NOAA team is innovating green stormwater infrastructure technologies at a new, state-of-the-art stormwater research facility in partnership with Washington State University. Work will include screening assays with wild fish and invertebrates, focusing on survival, reproduction, and similar health indicators. Benchwork may also include novel molecular biomarkers for toxic exposure and injury in juvenile salmon and macroinvertebrates. Numerous stormwater treatment technologies are under investigation, including soil mesocosms, permeable pavement, and rain gardens.

Skills Required:  Willingness to work outdoors and at a laboratory bench.  General laboratory skills will be helpful, including basic microscopy, animal husbandry, and safe chemical handling.  Must be able to work as part of a dynamic research team (storm chasers).  Attention to detail a plus, as in an interest in the intersection between basic research, environmental policy, and outcome-oriented science to guide the NOAA conservation mission.

Location: NOAA Fisheries, Northwest Fisheries Science Center in Seattle, WA and Washington State University in Puyallup, WA. A car would be helpful, but not required.

Number of Intern Slots: One (additional slots possible depending on level of interest)

Intern Supervisor:  Dr. Nat Scholz, [nathaniel.scholz@noaa.gov](mailto:kym.jacobson@noaa.gov), 206-817-1338 (cell).

**49. Genetic analysis of connectedness of a marine species in Puget Sound, WA**

Project Description: The Genetics Program of the Northwest Fisheries Science Center uses molecular genetic techniques for a variety of conservation biology projects in the Pacific Northwest. You’ll join us in using molecular markers (microsatellite DNA) to understand the patterns of genetic connectedness between individuals and populations of a marine species in Puget Sound. You will learn how to isolate and handle DNA for genetic analysis; assist in basic population genetic analyses; and participate in field sampling trips. This information is crucial to accurate management and conservation of marine biodiversity—a key NOAA mission.

Skills Required: Familiarity with genetic laboratory techniques and analyses, including DNA amplification with PCR, liquid transfers, DNA sequencing, genetic trees and pedigrees, etc. is helpful but not required.

Location:NOAA’s Mukilteo Field Station, Mukilteo, WA (25 miles north of Seattle)

Number of Intern Slots: One

Intern Supervisor: Gary **A. Winans, Ph.D., Conservation Population Genetics**

**50. CLEAN WATERS, HEALTHY SALMON, RESILIENT HABITATS, WA**

Project description:  You will work with a collaborative group of scientists who are studying ways to reduce the impacts of toxic land-based stormwater runoff on salmon and other aquatic species. The NOAA team is innovating green stormwater infrastructure technologies at a new, state-of-the-art stormwater research facility in partnership with Washington State University. Work will include screening assays with wild fish and invertebrates, focusing on survival, reproduction, and similar health indicators. Benchwork may also include novel molecular biomarkers for toxic exposure and injury in juvenile salmon and macroinvertebrates. Numerous stormwater treatment technologies are under investigation, including soil mesocosms, permeable pavement, and rain gardens.

Skills Required:  Willingness to work outdoors and at a laboratory bench.  General laboratory skills will be helpful, including basic microscopy, animal husbandry, and safe chemical handling.  Must be able to work as part of a dynamic research team (storm chasers).  Attention to detail a plus, as in an interest in the intersection between basic research, environmental policy, and outcome-oriented science to guide the NOAA conservation mission.

Location: NOAA Fisheries, Northwest Fisheries Science Center in Seattle, WA and Washington State University in Puyallup, WA. A car would be helpful, but not required.

Number of Intern Slots: One (additional slots possible depending on level of interest)

Intern Supervisor:  Dr. Nat Scholz, [nathaniel.scholz@noaa.gov](mailto:kym.jacobson@noaa.gov), 206-817-1338 (cell).

**51. Genetic analysis of connectedness of a marine species in Puget Sound, WA**

Project Description: The Genetics Program of the Northwest Fisheries Science Center uses molecular genetic techniques for a variety of conservation biology projects in the Pacific Northwest. You’ll join us in using molecular markers (microsatellite DNA) to understand the patterns of genetic connectedness between individuals and populations of a marine species in Puget Sound. You will learn how to isolate and handle DNA for genetic analysis; assist in basic population genetic analyses; and participate in field sampling trips. This information is crucial to accurate management and conservation of marine biodiversity—a key NOAA mission.

Skills Required: Familiarity with genetic laboratory techniques and analyses, including DNA amplification with PCR, liquid transfers, DNA sequencing, genetic trees and pedigrees, etc. is helpful but not required.

Location:NOAA’s Mukilteo Field Station, Mukilteo, WA (25 miles north of Seattle)

Number of Intern Slots: One

Intern Supervisor: Gary A. Winans, Ph.D., Conservation Population Genetics