

Heidi J. Clark, Ph.D.

Senior Environmental Scientist

EXPERTISE

Heidi Clark works on coastal environmental research, technical writing and project management. She has expertise in study design, quality assurance project planning, data analysis, and technical reporting. Scientific specialties include coastal water quality, contaminated site assessments, and environmental impact analysis. Dr. Clark has worked on many aspects of dredged material management including sediment sampling, disposal alternatives analysis, and permitting offshore disposal projects. Current projects include an evaluation of stormwater control systems on Cape Cod, and an evaluation of PCB concentrations in edible seafood in New England. Prior work focused on shellfish aquaculture in both commercial and research settings.

QUALIFICATION SUMMARY

- 20+ years of research and consulting experience with industry, government, and scientific institutions
- Extensive field sampling and laboratory work on large and small projects in marine, estuarine, and terrestrial environments
- Contaminated sediment sampling and site assessment
- Biological tissue sampling
- Management plans for lakes and coastal waterbodies
- Monitoring plans for surface water and biological communities
- Environmental Impact Assessment
- Natural Resource Damage Assessment
- Dredged material management planning
- Long-term monitoring of sediments, marine biota and surface water
- Eelgrass restoration via transplanting and seeds
- Coastal dune construction, restoration and monitoring
- Native plant cultivation, plantings, and maintenance
- Collaboration with economists and statisticians on a variety of projects including environmental policy analysis, program evaluation, and compliance with International Performance Standards on Biodiversity

WORK EXPERIENCE

2009-Present	Environmental Scientist, Woods Hole Group
2005-2008	Associate, Industrial Economics Incorporated
2003-2005	Coastal Scientist, Woods Hole Group
2001-2003	Guest Scientist, WHOI
1995-2001	Self Employed Environmental Consultant
1996-1997	Aquaculture Technician, Marine Biological Lab
1995-2000	Guest Student, WHOI



Education

2000 - Ph.D.
Environmental Science
Yale University
1997 – M.F.S.
Forest Science
Yale University
1991 – M.S.
Exercise Science
University of Massachusetts
1987 – B.A.
Biology
University of California, Santa Cruz

Licenses and Registrations

N/A

Professional Affiliations

N/A

Publications & Presentations

17

KEY PROJECTS

Stormwater System Evaluation: Comparison of Rain Gardens and Catch Basins on Cape Cod – Quality Control Officer and Technical Lead

Evaluation of nutrient and coliform bacteria removal in rain garden bioswales and conventional catch basins. Work includes monitoring stormwater inflow, soil pore water, and groundwater to evaluate nitrogen and coliform retention by stormwater treatment systems. Tasks include Quality Assurance Project Plan (QAPP) preparation, field data collection, data analysis, database development, reporting and presentations.

Remedial Investigation: New Bedford Harbor Superfund Site; US Army Corps of Engineers – Project Manager and Environmental Scientist

Project management and technical work for the development of a Remediation Investigation (RI) for a 180-acre area within the New Bedford Harbor Superfund Site. Work includes field sampling design, Quality Assurance Project Plan (QAPP) preparation, field data collections (sediment, water, and biota), contaminant fate and transport analysis, and preparation of an RI report including ecological and health risk assessments.

Investigation of Upland, Beneficial Reuse, and Sediment Dewatering Sites for Dredged Materials Management in Long Island Sound; US Army Corps of Engineers – Project Manager and Environmental Scientist

Project management and technical work on an evaluation of upland disposal options for dredged material frp, Long Island Sound. Work included investigations at 100+ upland, beneficial reuse, and sediment dewatering sites in Connecticut, Rhode Island and New York. Work included evaluation of each site with respect to feasibility for dredged material disposal. Site visits and data collection at each site allowed for site summaries including physical site descriptions, capacity estimates, constraints and distance to dredge sites. A technical report describing each site individually, as well as the overall capacity of upland sites throughout the region, was prepared.

Evaluation of Potential Dredged Material Containment Sites, Long Island Sound Dredged Material Management Plan; US Army Corps of Engineers – Project Manager and Environmental Scientist

Project management and technical work on a dredged material containment project for Long Island Sound. Work included site by site descriptions of over 50 potential dredged material containment sites in Long Island Sound, and evaluation of potential impacts on environmental, cultural, physical, and infrastructure resources. Containment technologies included confined aquatic disposal (CAD), nearshore confined disposal, and island confined disposal. Nearshore berm sites were also evaluated as placement options for clean sand. Conceptual engineering designs were developed for containment sites; site capacities were determined; and potential impacts were described.

Literature Review and Database Development: Long Island Sound Dredged Materials Management Planning; US Army Corps of Engineers – Project Manager and Environmental Scientist

Project management and technical work on a review of literature on dredge materials management for Long Island Sound. This project included collection of all relevant publications and gray literature and development of

KEY PROJECTS (CONTINUED)

an ACCESS database containing a summary of information in each document. The database and information therein were summarized in a report describing available information and data gaps.

Dune Restoration and Construction

Coastal dune construction/restoration projects for private clients. Planting and maintenance of native vegetation for erosion control and aesthetic appeal. Project planning, sand placement and grading, species selection, plant propagation, and multi-year monitoring.

Eelgrass Restoration for Cape Cod: Evaluation of Potential Sites and Test Transplants; Nature Conservancy – Environmental Scientist

Project planning, field sampling, and technical reporting on eelgrass restoration projects on Cape Cod. Work included site selection and trial transplants of eelgrass (*Zostera marina*) at three sites. Test transplants were conducted in Fall 2010 and monitored through 2012. A thorough monitoring program was developed and applied at both the transplant sites and at a donor bed. A full report and a short blog post were prepared to describe the potential and the challenges of eelgrass restoration on Cape Cod.

Natural Resource Damage Assessment and Restoration Planning: Lead-Zinc Mining Sites in the Tri-State (Oklahoma, Missouri, Kansas) Area; US Fish and Wildlife Service - Environmental Scientist

Assessment of damages to riverine resources resulting from lead-zinc mining. Work included data collection and analysis; evaluation of contaminant fate and transport, technical reporting, and support for litigation. Restoration planning included riparian corridor development and in-stream habitat improvement projects.

Natural Resource Damage Assessment: Kuwait Oil Damage from 1991 Gulf War; SAFEGE Co, France – Project Manager/Environmental Scientist

Assessment of damages to coastal and marine resources resulting from oil released during the 1991 Iraqi invasion of Kuwait. Work included assessment of ecosystem services lost due to oil damage, estimates of recovery time, and development of appropriate restoration projects. Presented results to the United Nations Compensation Commission (UNCC) in Geneva.

Ecological Effects of Acid Deposition: Support for EPA's Retrospective Evaluation of the Clean Air Act and Amendments; USEPA - Environmental Scientist

Review of literature on environmental damage due to acid deposition in the United States. Work included compilation of extensive database and annotated bibliography, as well as a written report on the subject.

Liquid Natural Gas (LNG) Deepwater Port Environmental Impact Statement (EIS): Support for US Coast Guard's EIS Development - Project Manager and Environmental Scientist

Preparation of Marine Resources sections of an EIS for a deepwater LNG port. Work included evaluation of pre-project conditions, potential impacts on fish, benthic communities, and other marine resources. Also included consultation with resource agencies regarding time of year restrictions on project construction, endangered species impacts, and essential fish habitat assessment.

PUBLICATIONS AND PRESENTATIONS

Carmichael, RH, W Walton and H Clark. 2012. Bivalve-enhanced nitrogen removal from coastal estuaries. *Can J Fish Aquat Sci.* 69:1131-1149.

“Cape Cod’s Municipal Shellfish Propagation Program: 1999-2009”. Report to Barnstable County Cooperative Extension. 2012.

“Ecological Risk Assessment. Operable Unit 3, New Bedford Harbor Superfund Site”. Report to US Army Corps of Engineers. 2012.

“Eelgrass (*Zostera marina*) restoration on Cape Cod: Site Selection and Test Transplants” Report to The Nature Conservancy. 2012.

“PCB Flux Study: New Bedford Harbor Superfund Site”. Report to US Army Corps of Engineers. 2011.

“Carbon Trading and the Aquaculture Industry: Potential (or Lack Thereof) for Shellfish Farmers to Provide Carbon Credits on the Chicago Climate Exchange”. Report to Barnstable County Cooperative Extension. December, 2007.

“Bio-economic Model of Shellfish Aquaculture: Using Aquaculture as Part of a Comprehensive Nitrogen Management System for Coastal Watersheds on Cape Cod”. Report to NOAA/CICEET. 2007.

“Economic Value of Natural Resource Services Potentially Impacted by a Change in Cooling Water Regime at the Haynes and AES Alamitos Generating Stations”. Prepared for Los Angeles Department of Water and Power. May 2005.

“Monitoring and Assessment of the Environmental Consequences of the Iraqi Aggression in Kuwait: Damage Assessment Report”. Prepared for Safege, Nanterre, France. May 2004.

Clark, H. and J. Kremer. 2004. "Estimating direct and episodic atmospheric deposition to a coastal waterbody". *Marine Environmental Research.* June.

Clark, H., W. Clark, D. Murphy, W. Burt, and D. Leavitt. 2002. “A review of seagrass restoration programs and technologies with reference to application on Cape Cod”. *Environment Cape Cod* October.

Clark, H. 2002. “Seagrass Restoration on Cape Cod: Review of Appropriate Methods and an Eelgrass Planting Trial for Eastham Harbor”. Summer 2002.

Clark, H. 2000. “Ecological Risks Associated with Nutrient Loading in Coastal Waters: Reducing the Risks by Restoring Shellfish”. Ph.D. Dissertation, Yale University.

Clark, H. 1999. "Fate and ecological effects of nitrogen in coastal waters" in Industrial Economics, Inc. "Benefits Assessment of Decreased Nitrogen Deposition to Estuaries in the United States Attributable to the Clean Air Act

PUBLICATIONS AND PRESENTATIONS (CONTINUED)

Amendments, 1990-2010". Work Assignment 4-11, Task 7 for the US Environmental Protection Agency, Section 812 - Prospective Ecological Benefits Assessment of the CAAA.

Vogt, KJ. Gordon, J. Wargo, H. Clark and collaborators. 1997. Ecosystems: Balancing Science and Management Springer, New York.

Johnson, K., K.A. Vogt, H.J. Clark, O.J. Schmitz, D.J. Vogt. 1996. "Biodiversity, and the Productivity and Stability of Ecosystems" Trends in Ecology and Evolution 11(9):372-377.

Clark, H. and G. Wikfors. 1996. "Oysters as processors of particulate organic nitrogen: quantitative and qualitative relationships between inputs and outputs" Journal of Shellfish Research 15(2):457.