



**CHRISTOPHER F. WRIGHT**

**CR Environmental, Inc. August 1999 to present**  
**Years with Other Firms: 7**  
**Citizenship: U.S.A.**  
**Current Security Clearance: TWIC card**

**CERTIFIED HYDROGRAPHER**  
**FAA CERTIFIED UAS PILOT**  
**ECOLOGIST/ AQUATIC BIOLOGIST**  
**ENVIRONMENTAL RISK ASSESSOR**  
**GIS MAPPING / NAVIGATION**  
**BIOLOGICAL STATISTICIAN**

**AREAS OF SPECIALIZATION**

- Hydrographic Survey and Data Interpretation/QC, Sub-bottom, Side-scan and Magnetometer surveys
- Aerial and ground-based photogrammetry. Photogrammetric modeling.
- Freshwater Macroinvertebrate Taxonomy and Ecology
- Ecological Risk Assessment
- GIS Mapping of Geophysical Data and Development of Bottom Classification Maps
- Eutrophication Evaluations

**EDUCATION**

2019-2023 U.S. Department of Transportation Federal Aviation Administration UAS Pilot Certification  
 2011 NSPS/ACSM Hydrographer Certification (April 25, 2011)  
 2010 Quester Tangent training Oct 26th URI School of Oceanography - Jon Preston primary developer QTC  
 2010 HYPACK Certification and HYSWEEP Multibeam Bathymetric System Certification October 13, 2010  
 2007 Univ. of New Hampshire CCOM-JHC/UNB OMG 43<sup>rd</sup> Shallow Water Multibeam Training Course (NOAA & The Hydrographic Society of America), Norfolk, VA  
 1994-98 Post-baccalaureate Limnology, Soil Mapping & Morphology, Wetlands Ecology, Environmental Microbiology  
 1995-present OSHA 40-Hour HAZWOPER Training (per 29 CFR 1910.120), Supervisor's Training and yearly 8-hr refresher courses. CPR and First Aid with AED  
 1994 UMASS at Lowell, B.A., cum Laude in Environmental Science (Conc. Biology), Award for Outstanding Achievement in Environmental Science, Sigma Gamma Epsilon Honor Society (Earth Science)

**INSTRUMENTATION & SOFTWARE EXPERIENCE**

Multibeam bathymetric systems (All)  
 Single beam systems & side-scan sonar systems (Edgetech, SyQwest, ODOM, Reson, Kongsberg, Marine Sonics, Klein)  
 Sub-bottom profiling systems (Edgetech systems, Benthos CHIRP and SyQwest profilers)  
 Swath bathymetry systems (GeoAcoustics)  
 Magnetometers (Marine Magnetics, Geometrics)  
 Acoustic Doppler Current Profilers (Sontek, TSS RDI)  
 Side scan & Sub-Bottom sonar software (Chesapeake, HYPACK/Geocoder)  
 GPS Systems and Software  
 HYPACK, HYSweep Certified, Surfer, IVS3D Fledermaus, certified ESRI ArcView (GIS)

**PROFESSIONAL AFFILIATIONS**

Hydrographic Society of America                      Massachusetts LSP Association

**WORK HISTORY**

CR Environmental, Inc., EastFalmouth, MA	Aug 1999 - present
GZA GeoEnvironmental, Inc., Newton Upper Falls, MA	Nov 1994 - Dec. 2000
Veryfine Corporation (U. Mass. Lowell Research Foundation), Westford, MA	May 1993 - Nov. 1993
Mass. Department of Environmental Protection, Water Supply Division	June 1992 - Oct. 1992

**SUMMARY OF PROFESSIONAL EXPERIENCE**

Mr. Wright is an environmental scientist with over twenty years of technical experience in hydrography and aquatic geophysical surveys, ecological risk assessments, water quality investigations, macroinvertebrate diversity studies/taxonomy, and eutrophication investigations. He works on aquatic mapping and remote sensing projects and ecological risk assessments.

Mr. Wright has designed, planned and conducted hundreds of freshwater and marine hydrographic and geophysical surveys, mostly with engineering, ecological or archaeological components. These projects include major waterways on both U.S. coasts as well as scores of reservoirs, lakes and wetlands. His primary professional interest is the integration of marine remote sensing technologies to shallow-water ecological investigations.

Recent activities include: multibeam surveys of Army Corps of Engineers DAMOS sites in Connecticut, Rhode Island, Maine and Massachusetts; geophysical survey data processing for multiple Eversource cables in Vineyard Sound, multibeam and multi-parameter geophysical surveys of several coastal remediation sites in Massachusetts, including the New Bedford Harbor CERCLA Site; multibeam and geophysical surveys of a nearshore landing sites for wind energy projects. Mr. Wright is responsible for quality control in the production of CR's environmental/oceanographic maps and GIS/CAD/WWW deliverables.

## **REPRESENTATIVE PROJECT EXPERIENCE**

### **Certified Hydrographer, New Bedford Harbor Superfund Site Cap Monitoring, Confirmatory Bathymetry/Marine Archaeological Surveys (2009-present)**

Currently responsible for QA/QC and oversight of cap monitoring at the New Bedford Harbor Superfund Site. Formerly responsible for oversight of biweekly confirmatory bathymetry surveys for dredge volume calculations by Jacobs Engineering the ACOE NAE contractor. Has conducted side-scan sonar, magnetometry and sub-bottom profiling for archaeological investigations for CR working with Fathom LLC and DSRA, and multibeam surveys of the Harbor.

### **Certified Hydrographer, U.S. Army Corps of Engineers New England District, DAMOS Program (2007-present)**

Supported DAMOSVision LLC of which CR Environmental was a partner, ENSR/AECOM, Battelle and Inspire contracts with the NED U.S. Army Corps of Engineers under the DAMOS and Environmental Services Program. Since 2003, hydrographer in charge of ACOE NAE Disposal Area Monitoring System (DAMOS) inspections of offshore disposal sites and inshore CAD cells from Connecticut to Maine.

### **Lead Hydrographer, GIS Modeler, New York City Jamaica Bay Estuarine Intertidal Monitoring Program (2017-2020)**

As a sub-contractor to HDR, Inc., conducted high resolution multibeam bathymetric/backscatter surveys to aid flushing and mass-balance nutrient calculations for this large urban estuary. Developed methods for normalization and quantitative statistical comparisons of multi-agency topographic and topobathymetric LiDAR elevation and land-cover data to assess large-scale changes of intertidal habitat and marsh grass distribution.

### **Certified Hydrographer, Governors Island Shoreline Bathymetry and Side Scan Sonar Survey, New York City (2020)**

Conducted data processing of nearshore multibeam bathymetric and high-resolution side scan sonar data of Governors Island collected by CR Environmental to assist with Jacobs Civil Consultants in developing a digital elevation model of the island's shoreline. The bathymetric deliverables included processed ASCII-delimited "xyz" data files with fields for northing, easting, and elevation. Processed side scan sonar data included a database of identified hazards to navigation (Contacts) and imagery of submerged obstructions, debris, and shipwrecks that could be used to help guide diving inspections.

### **Certified Hydrographer, Field Manager, U. S. Army Corps of Engineers, NY District, Historic Area Remediation Site (HARS) Monitoring (2010-2020)**

From 2013, hydrographer in charge of annual multibeam monitoring surveys of the 23 square mile Historic Area Remediation Site in NY Bight. Remediation of the site mandates placement of one meter of Remediation Material over contaminated portions of the Site. Assessment of cap thickness was accomplished using multibeam bathymetry and backscatter. Data for each of these >800 line mile surveys was processed, interpreted and delivered within 30 days of survey completion. In 2017 Mr. Wright conducted a thorough analysis of 20 years of HARS survey data to document the progress of the capping effort. The analysis required normalization of bathymetric and backscatter data collected since 1998 with more accurate contemporary data and modeling of time-series of depth and sediment roughness changes. In 2019, Mr. Wright processed archived EPA side scan sonar data and collected multibeam side scan to aid assessment of the stability of wreck exclusion zones and the nature of placed hard-bottom habitats.

### **Certified Hydrographer, New London State Pier and Long Dock Geophysical Surveys (August 2018)**

Under contract with AECOM performed multibeam bathymetric, side-scan sonar, and sub-bottom acoustic surveys surrounding the State Pier and Long Dock in the Thames River, New London, Connecticut. Responsible for data processing and reporting. The site is currently being developed as a wind turbine terminal facility.

**Lead Hydrographer, NSTAR/HEEC Cable Route Replacement, Boston Harbor, MA (2017-2019)**

Designed, executed, processed and reported upon multiple geophysical and hydrographic surveys between 2017 - 2019 for a 115kV cable route replacement in Boston Harbor. Use of this multi-instrument suite resulted in the acquisition of overlapping high-resolution digital side scan sonar data, high-resolution CHIRP sub-bottom profiler data, and multibeam bathymetric and backscatter data. When coupled with underwater video, SPI and vibracore data, remote sensing data allowed quantitative assessment (pre- vs. post) of impacts to eelgrass and flounder habitats and allowed selection of stations for detailed archaeological inspections of paleosols.

**Lead Hydrographer, Comcast/NSTAR Martha's Vineyard Hybrid Cable Project (2017-2019)**

Designed and executed surveys for the first submarine cable project reviewed under the Massachusetts Ocean Management Plan. Conducted comprehensive marine surveys and sampling consisting of multi-beam bathymetry, multi-beam side-scan sonar, sub-bottom seismic, magnetometer, underwater video, and sediment sampling. At key milestones in the project development and permitting, made presentations to the local, state, and federal regulatory agencies.

**Lead Hydrographer, Deepwater Wind - Block Island Wind Farm (2015-2018)**

Conducted high resolution multibeam sonar surveys during planning, construction and completion phases of the wind farm to accurately map impacts to sensitive hard-bottom habitats. Documented impacts in near real-time to guide subsequent video and still camera inspections.

**Certified Hydrographer, DSNY Southwest Brooklyn MTS, NYC (2014)**

Conducted side scan sonar, sub-bottom and underwater video confirmation to identify the limits of cobble/riprap at the DSNY southwest Brooklyn Marine Transfer Station for HDR.

**Certified Hydrographer, Blackburn & Union Privileges Superfund Site, Walpole, MA (2011-2013)**

Responsible for bathymetry and current measurements that were used along with CR sediment depth characterizations in the Lewis Pond reach of the Neponset River for use in planning dredge operations and site remediation by Woodard & Curran.

**Certified Hydrographer, Newtown Creek Superfund Site, NYC, NY (2011-2012)**

Performed hydrographic and geophysical surveys of the Newtown Creek Phase I Remedial Investigation Study Area in Brooklyn and Queens, New York. Bathymetric surveys included multibeam, single beam, side scan, and sub bottom sonar. The collected data were processed and results delivered as GIS and CAD compatible products. The data provided Anchor QEA information needed to plan and more safely conduct upcoming sampling investigations. The most recent post-Sandy data suggested widespread distribution of anthropogenic debris in the Newtown Creek Study Area much of which may pose a hazard to navigation or sampling. Many submerged structures and obstructions were detected in previously dredged navigation channels.

**Lead Hydrographer, Ocean Renewable Power Company, LLC Bay of Fundy Tide Turbine Generation Projects (2010-2012)**

Designed and executed clearance and engineering surveys of Cobscook Bay and the Western Passage using multibeam and single-beam bathymetry, side scan sonar, marine magnetics and sub-bottom profiling systems. Surveys were designed to address engineering, ecological and archaeological data requirements.

**Hydrographer/Data Specialist, Neptune LNG Pipeline Monitoring Surveys, Massachusetts Bay, MA (2008-2011)**

The project objectives were to document potential impacts to benthic habitats and diversity associated with the installation of a thirteen-mile long pipeline. Backscatter extracted from side scan sonar was modeled and correlated with sediment texture from grab samples, allowing quantitative comparison of backscatter time series. Combined with data from benthic biological samples, video observations and SPI imagery, the analysis demonstrated negligible impacts to benthic habitats.

**Field Manager/Senior Hydrographer, Susquehanna River / Conowingo Reservoir FERC Re-Licensing Investigations (2010)**

Under contract to Gomez & Sullivan, Inc. and directed by URS, Mr. Wright designed and implemented bathymetric and side scan sonar surveys to support re-licencing of the Conowingo Dam Hydroelectric Plant. Survey objectives included mapping bathymetry, sediment type and the distribution of aquatic vegetation along near shore portions of this 11-mile long impoundment. Data acquisition is complete and final data analysis is underway.

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**Field Manager / Senior Hydrographer, Bathymetric, Geophysical and Current Surveys of the Connecticut River near Holyoke, MA (2008-2009)**

CR performed repeated surveys of a 3.5 mile long reach of the Connecticut River potentially impacted by historical coal tar releases for AECOM. Survey components included bathymetry, side scan sonar, sub bottom sonar, and acoustic Doppler current profiling. High-resolution surface models, mosaics and maps of acoustic backscatter have been used to characterize benthic habitat structure and to identify the presence of coal tar on the riverbed. Advanced statistical analyses of sonar backscatter data were conducted using GeoCoder and QTC Sideview software to produce quantitative maps of habitat class distribution in potentially impacted reaches of the riverbed.

**Field Manager / Senior Hydrographer, Penobscot River Restoration Project Studies: Great Works and Veazie Dam Removal; Howland Bypass Channel (2007)**

Under contract to Kleinschmidt Associates and the Penobscot River Restoration Trust's, CR and Mr. Wright supported FERC license transfer applications and NEPA analyses by documenting riverbed morphology and substrate composition in four river reaches which would be effected by removal or bypass of three dams. Project challenges included limited access, navigation in swift currents and acquisition of defensible data in very shallow water. Mr. Wright designed and implemented all aspects of the surveys and data analysis, which included 200-kHz bathymetric data, 500-kHz side scan sonar data, and 10-kHz sub-bottom sonar data. Extensive underwater video recordings were used to verify observations and to aid selection of appropriate sediment sample locations. Analysis of survey data required documentation of river gradients at each reach, and detailed analysis of tidal influence on river gradients below Veazie Dam. Hydrographic, geophysical and video data were analyzed using GIS. Maps classifying substrate composition were produced and provided in GIS format. Side scan sonar mosaics were created using a resolution of 10-cm. Models and maps representing bathymetry at 1.0 foot contour intervals were produced and delivered in CAD and GIS formats

**Field Manager / Senior Hydrographer, Quinnipiac River Hydrographic & Geophysical Surveys (2006)**

Under contract to URS, Inc., Mr. Wright led a survey team charged with measuring scour beneath an I-95 overpass in support of bridge design efforts, locating sub-sediment utilities, and exploration of the sub-surface along a proposed large utility alignment. Detailed bathymetric maps, side scan sonar mosaics and maps of magnetic anomalies were provided to project engineers shortly after completion of the field work.

**Field Manager / Senior Hydrographer, "The Lake" at Central Park, NYC Hydrographic & Geophysical Surveys (2006)**

As part of the New York City Central Park Conservancy's effort to restore The Lake, Mr. Wright lead a CR team which mapped the water depth and sediment thickness of this shallow urban pond.

**Field Manager / Senior Hydrographer, NOAA/NMFS Essential Fish Habitat Hydrographic & Geophysical Surveys (2006)**

The objective of this project was to locate areas known by the fishing industry to support high fish productivity and then evaluate the physical and biological attributes of these sites to gain some insight as to why the areas might be considered essential fish habitat. Two sites were chosen based on the recommendations of fishermen and geophysical characteristics. These sites were surveyed using swath bathymetry, towed side scan sonar, sub-bottom profiling sonar, and CR's video sled. Mr. Wright was responsible for survey design, data acquisition & processing, and integration of all data into a coherent GIS database.

**Field Manager / Senior Hydrographer, Lower Fox River Side Scan Sonar Archaeological Survey, De Pere, Wisconsin (2006)**

Under contract to Shaw Environmental, Inc., CR & Mr. Wright performed a pre-dredge side scan sonar survey of a very shallow Operable Unit in the Lower Fox River. Although water depths rarely exceeded two feet, an unconventional deployment of the towfish allowed reliable target identification and substrate characterization to about 10m range.

**Field Manager / Senior Hydrographer, Hydrographic & Geophysical Surveys Supporting the East River Tide-Energy Project (2005-2006)**

Mr. Wright has led CR teams conducting bathymetric, side scan sonar and sub-bottom sonar surveys of the East River, NYC in support of the siting and installation of generation turbines for the initial pilot demonstration phase of this project. Other work is currently scheduled for expansion of the survey area in 2007.

**Field Manager / Senior Hydrographer, Colorado River/Hoover Dam Bathymetric Surveys (2005-2006)**

Under contract to Ladd Construction, Inc., CR was charged with conducting pre- and post-construction bathymetric surveys of a reach of the Colorado River immediately downstream of the Hoover Dam, beneath the alignment of the new Hoover Dam Bypass Bridge which spans the Black Canyon between Arizona and Nevada. The goal of the surveys, conducted in 2005 and 2006, was to model the volume of material deposited in the river during blasting of the canyon walls for construction of anchoring structures. Project challenges included navigation to the Site from a launching point about 14 miles downstream, overcoming positioning uncertainty associated with work deep in the Canyon, and acquisition of reliable soundings in the highly irregular currents and variable depths below the Hoover Dam. Mr. Wright designed and executed a precision single-beam bathymetric survey which met the Project's needs and presented volume calculations which documented the relatively small volume of construction-related debris deposition. All work was approved by Project Engineers, the U.S. FHA and the BLM.

**Project Manager, Evaluation of Nutrient Budget & Eutrophication Potential Long Sought for Pond, Westford, MA (2004-2005)**

Conducted a two-year water quality evaluation of a glacial pond, including in situ measurements of several biological and chemical parameters, deep-core sediment sampling, historical analysis of lake conditions using diatom remains in sediment, and in-depth hydrological analysis. The aim of the project was to evaluate the potential for adverse impacts due to non-point source phosphorus inputs. The mass balance calculations presented in the report demonstrated potential risk of eutrophication due to phosphorus inputs. In a follow up investigation, he evaluated the phosphorus loading for LSFP and expected water quality improvements following upgrade of wastewater treatment in the watershed.

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**Project Ecologist, Former Rutland State Hospital MCP Site, Rutland, Massachusetts (2003-2004)** Designed and implemented a comprehensive Stage II Ecological Risk Characterization (per Massachusetts MCP) to address potential impacts to a stream and wetland exposed to several heavy metals. Using a triad approach to sediment quality assessment (bulk toxicity testing, AVS/SEM analysis & macroinvertebrate bioassessments), the ERC conclusively demonstrated that metals were unlikely to harm receptor organisms.

**Hydrographer, New York City DEP Reservoir Dredge Feasibility Studies (1999)**

Conducted high precision bathymetric surveys, side-scan and low-frequency sub-bottom sonar surveys, and magnetometer surveys of portions of the Ashokan and Schoharie Reservoirs to map sediment accumulation and identify underwater structures of interest to project engineers. Responsible for all data processing, map production, and report preparation. Later conducted bathymetric, ADCP measurements, and sub-bottom on the Kensico Reservoir for an alum investigation

**Data Processing, Trinidad, Caribbean British Commonwealth**

CR developed benthic habitat and bathymetric maps in the Gulf of Paria and off the eastern and southern coasts of Trinidad, of more than 1,000 square kilometers of the seafloor. The mapping effort was conducted to assist with avoidance and mitigation of disturbance to reef complexes associated with energy exploration and production. CR's approach to processing and analyzing was a multifaceted in that it utilized data collected with QTC-V single-beam based backscatter system, high-frequency side scan sonar, video sled recordings, and bottom grabs.

**Field Manager/Lead Hydrographer, Bathymetric/sub-bottom Surveys, Benthic Flux and Sediment Evaluation, New York City DEP Reservoirs, Catskill and Delaware Watersheds GIS/MAPS Contract. (Ashokan, Schoharie, Cannonsville, Pepacton, Neversink, Rondout, and West Branch Reservoirs)**

Worked for GZA and then CR Environmental, Inc. on an EPA mandated ~\$620K eutrophication and hydrological study of seven large NYC reservoirs in the Catskill/Delaware range. Utilized state-of-the-science sampling methods, high-precision bathymetry and geophysical sub-bottom mapping to characterize nutrient dynamics and storage loss. Managed a field/lab staff of seven technicians and subcontractors during this five-month field effort, which was completed under budget and ahead of schedule. Directed the collection and analysis of ~1,000 sediment box core and grab samples, field-laboratory sediment oxygen demand and phosphorus-flux microcosm cores, generation of bathymetric and sediment isopach maps, and development of GIS DEMs for client.

## POSTERS, PRESENTATIONS

PIANC USA/COPRI Dredging Conference, San Diego, CA. October 2012. *"Integrated Interpretation of Dredged Material Placement Site Survey Data and Pre-dredge Clearance Survey Data using Multibeam Backscatter, Towed Side Scan, AUV Side Scan, and Sub-bottom Sonar"* C. Wright, et al.

PIANC USA/COPRI Dredging Conference, San Diego, CA. October 2012. *"How the Oldest Capped Mound Survived the Ages: Integrating Multibeam Acoustic Imaging with Optical Imaging to Read the Record of Brenton Reef Disposal Site."* D. Carey, et al.

PIANC USA/COPRI Dredging Conference, San Diego, CA. October 2012. *"Aquatic Placement: Successful Dredged Material Management in Long Island Sound."* D. Carey, et al.

Non-Destructive Bridge Inspection Techniques, Technical Exchange Conference, June 2007. Newington, CT. *"Integration of Aquatic Geophysical Survey Data with GIS"* C. Wright and J.H. Ryther, Jr. Conference hosted by ConnDOT, FHWA, and the Association for Bridge Construction and Design, NE Division.

USGS, NOAA, ASF and ESA Symposium on the Effects of Fishing Activities on Benthic Habitats: Tampa, FL 2002 Poster *"Effects of Smooth Bottom Trawl Gear on Soft Bottom Habitat"* Cogswell, C., B. Hecker, A. Michael, F. Mirarchi, J. Ryther, Jr., D. Stevenson, R. Valente, and C. Wright

## PUBLICATIONS

Valente, Raymond M., Carey, Drew A.; Read, Lorraine B.; Wright, Christopher. 2007. Postdisposal Monitoring of Lobster Abundance at the Rhode Island Sound Disposal Site in 2005 Compared to the 1999 Predisposal Survey. DAMOS Contribution No. 174. U.S. Army Corps of Engineers, New England District, Concord, MA, 52 pp.

Wright, C; Carey, D.A. 2006. Monitoring Survey at the Buzzards Bay Disposal Site at Cleveland East Ledge, June 2005. DAMOS Contribution No. 170. U.S. Army Corps of Engineers, New England District, Concord, MA, 17 pp.

Ryther, J.H. Jr., S.G. Harris, and C.F. Wright. 1998. *New York Catskill Reservoir Surveys – Applications of Marine Technology to Freshwater Reservoirs; Surveys of and Bottom Samples from Seven Reservoirs Obtained. Inland Water Feature*. Sea Technology, Vol. 39, No. 5. pp. 23-29.

Schaffner, I.R., C.F. Wright, J.M. Wieck, and S.R. Lamb. 1998. *Enhanced Reductive Dehalogenation of CAHs: A Remedial Pilot Study*. In proceedings: The Fifth International Symposium on In-Situ and On-Site Bioremediation, Battelle Memorial Institute. (peer reviewed).

Schaffner, I.R., C.F. Wright. 1998. *Internet Resources for Bioremediation and Engineering*. In proceedings, 13<sup>th</sup> Annual Conference on Contaminated Soils, University of Massachusetts at Amherst.

Schaffner, I.R., J.M. Wieck, S.R. Lamb, C.F. Wright, and E.W. Pickering. 1997. *Microbial enumeration screening method for evaluating intrinsic bioremediation*, in proceedings, The Fourth International Symposium on In-Situ and On-Site Bioremediation, Battelle Memorial Institute, v. 2, p. 393-398. (peer reviewed).

Schaffner, I.R., J.M. Wieck, C.F. Wright, M.D. Katz, and E.W. Pickering. 1996. *Microbial enumeration and laboratory-scale microcosm studies in assessing enhanced bioremediation potential of petroleum hydrocarbons*, in proceedings, 11<sup>th</sup> Annual Conference on Contaminated Soils, University of Massachusetts at Amherst (Paper in peer review for Journal of Soil Contamination).