



# United States Department of the Interior

NATIONAL PARK SERVICE  
New Bedford Whaling National Historical Park  
33 William Street  
New Bedford, Massachusetts 02740

Superfund Records Center

SITE: New Bedford  
BREAK: 16.1  
OTHER: 498994

IN REPLY REFER TO:

A00(NPS/NEBE)

March 22, 2011

Kimberly White  
Project Manager, New Bedford Harbor Superfund Project  
U.S. Environmental Protection Agency  
5 Post Office Square, Suite 100  
OSRR07-4  
Boston, MA 02109-3912  
(via email)

Re: Comments on Scope of Work for 2011 New Bedford Harbor Archeological Survey

Ms. White:

Thank you for the opportunity to comment on the scope of work for the upcoming pre-dredging survey work. We understand the project is under a schedule and that work is projected to begin next week; however, in the future we anticipate such interagency reviews will be built into the schedule with sufficient time (minimum 30 days, as is consistent with the National Historic Preservation Act [NHPA]) to review the material and comment appropriately. In this case we have made every effort to return these to you within the requested three-day window, understanding that our comments are perhaps less thorough than they otherwise would be – which ultimately does not serve the greater good of this nationally important project.

Please respond in writing to let us know how our comments will be integrated into the work to be done. They are as follows:

1. Description of Services. "Survey track lines shall be selected to maximize survey coverage." Philosophically we differ with this as a guiding rationale. Rather, we expect that survey track lines would be selected to maximize the probability of detecting cultural resources and thereby minimizing the potential adverse effects of dredging on these resources.
2. Subcontractor requirements–Side scan sonar coverage: In the shallow water of the New Bedford Harbor (less than 5 meters) and with a sonar frequency of 500 kHz or greater, lane spacing will have to be much tighter than the National Ocean Survey (NOS)



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standards, which specify 200% coverage 75 meter range on the sonar fish with 60 meter line spacing. Given the shallow water, we would expect that the swath width would be approximately 50 meters (25 meters per side); thus to have 200% coverage, survey lane spacing would have to be 20-25 meters at the most.

3. For marine magnetometer surveys, NPS standards are 30 meters or less, depending upon historical documentation for the area and the specifics of the research or project design. These standards were developed to support the same goals and values outlined in the NHPA. Given the high level of significance of the resources that have already been encountered and the high probability that others may be within the project field, we request that you adhere to these same standards.

With a 30-meter lane spacing and the sensor 2 meters above the bottom, assuming half a gamma of sensor noise, a 500kg object (corresponding to a medium sized ship's anchor or a small colonial era canon) sitting exactly between lanes (and thus furthest from the sensor) would theoretically produce a magnetic anomaly of approximately 9 gammas and therefore would be observable if the data were contoured on a 5 gamma interval or less (Figure 1 below).

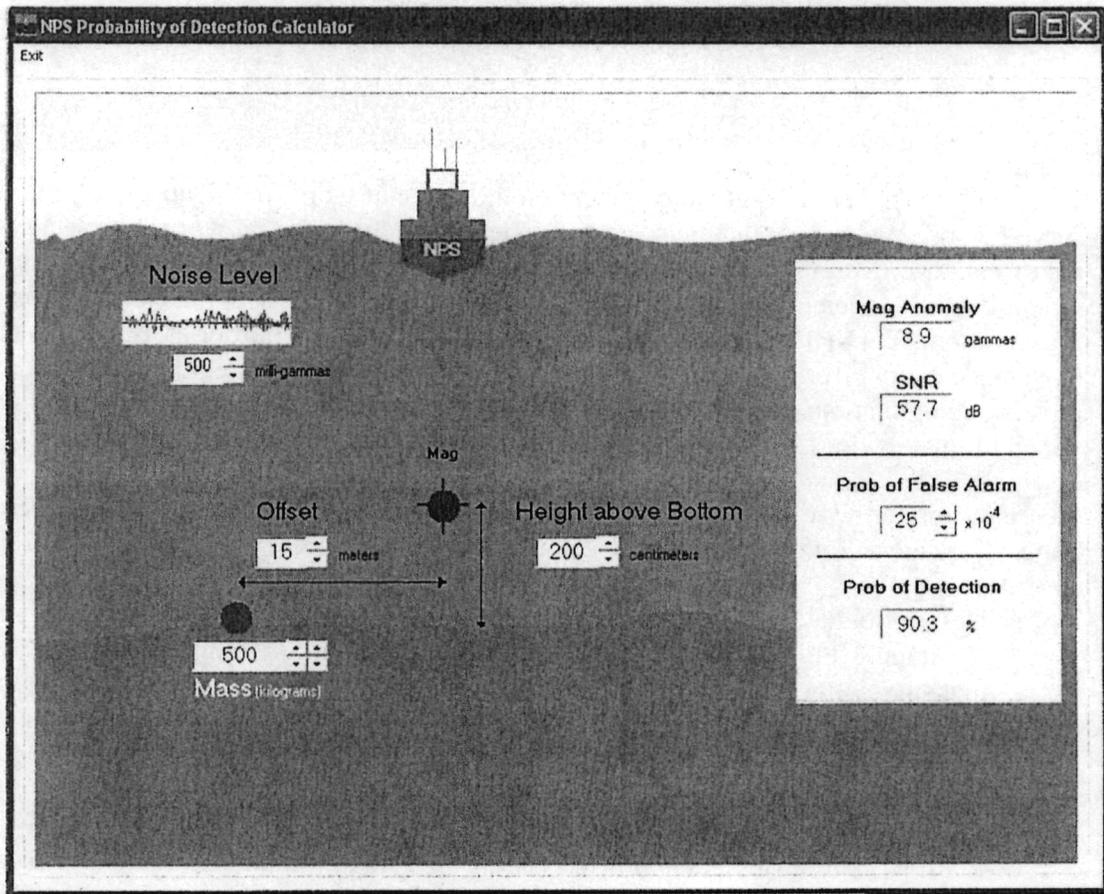


Figure 1

With a 60-meter lane spacing and the sensor 2 meters above the bottom, assuming half a gamma of sensor noise, the same 500kg object sitting exactly between lanes would theoretically produce a magnetic anomaly of just slightly more than 1 gamma and therefore would be very difficult or impossible to observe in data that had half a gamma of noise (Figure 2 below).

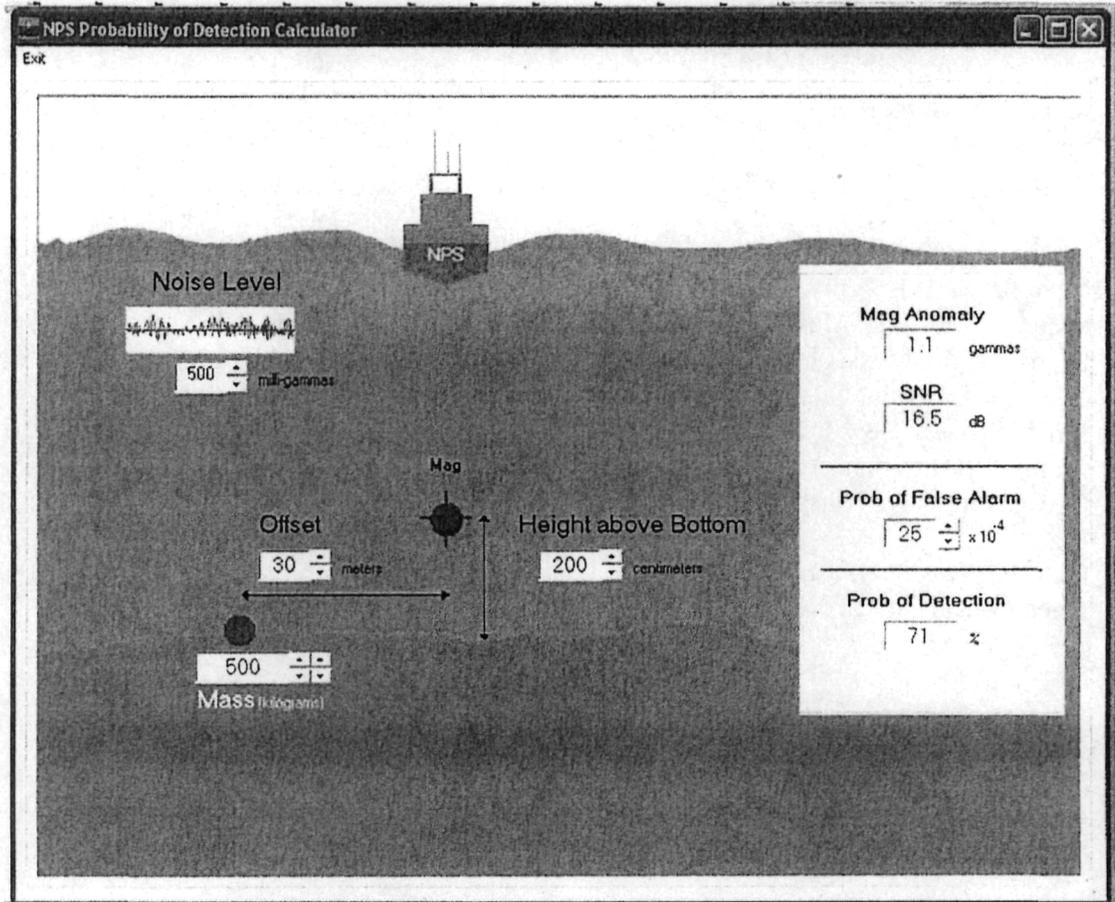


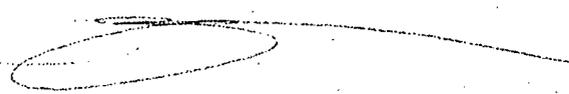
Figure 2

- Based on 2 and 3 above, our recommendation is that survey lane spacing be set at 20-25 meters to ensure adequate coverage by both magnetometer and side scan sonar, that sonar coverage be 200%, and that as one of the project deliverables, the contractor provide a mosaiced side scan sonar image or, minimally, to provide electronic documentation showing the areas of sonar swath coverage throughout the project area.

Thank you for your consideration of these comments. Should you need any further information or if we can answer any questions between now and April 12, please contact Janine da Silva of my staff, as I will be out of the office. She can be reached at 508-996-4095 x104 or [janine\\_da\\_silva@nps.gov](mailto:janine_da_silva@nps.gov). Likewise, please address your response to these comments to Ms. da

Silva. I will be available again as of April 12, as usual at 508-996-4095 x100 or jen\_nersesian@nps.gov. We look forward to your response.

Sincerely,



Jennifer T. Nersesian  
Superintendent

cc:

Marc Paiva, U.S Army Corps of Engineers  
Victor T. Mastone, Massachusetts Board of Underwater Archaeological Resources  
Brona Simon, Massachusetts Historical Commission  
Mayor Scott Lang, City of New Bedford  
James Russell, New Bedford Whaling Museum  
Bettina Washington, Aquinnah Wampanoag Tribe  
George Green Jr., Mashpee Wampanoag Tribe  
Elaine Stanley, EPA  
Lisa Bergson, WHALE  
Anne Louro, City of New Bedford



March 22, 2011

Mr. Steven W. Meshberger  
Jacobs Engineering Group Inc.  
125 Broadway Ave  
Oak Ridge, TN 37830

**RE: Proposal for 2011 Marine Archaeological Survey Upper New Bedford Harbor**

Dear Mr. Meshberger,

CR Environmental, Inc. (CR), a small Women Owned Business (WBE) based in Falmouth, Massachusetts, is pleased to provide a proposal to Jacobs Engineering for the 2011 Marine Archaeological Survey in Upper New Bedford Harbor at Dredge Areas N, O, K, and L.

**Qualifications**

CR specializes in shallow water surveys using customized aluminum survey vessels and a suite of survey equipment designed for shallow water operations. We have a 30 year history of working in New Bedford Harbor and have conducted numerous bathymetric, geophysical, and archaeological surveys throughout the harbor. CR has also worked very closely with Marine Archaeologist David Robinson, of Fathom Research at several sites throughout New England. We have expert equipment operators and technicians and vessel captains with extensive experience running survey lines. We also have experience with on-the-fly rapid data processing, delivery and GIS implementation.

**Vessel and Equipment**

CR will perform the operation using a 15 ft aluminum jon boat equipped with an equipment enclosure, over the side transducer mounts and antennae mounts, and 12 volt and 110 volt power supplies. The following equipment will be utilized:

- Trimble Ag132 GPS
- HYPACK Survey Software
- Marine Magnetics Explorer Magnetometer
- Edgetech 4100P Side Scan System with Model 272 100/500 kHz towfish
- Edgetech 3200 FS-SB Sub-Bottom Profiler with Model 216 Towfish

CR Environmental, Inc. 639 Boxberry Hill Rd., East Falmouth, MA 02536

Ph/fax 508-563-7970

[www.crenvironmental.com](http://www.crenvironmental.com)

CR will provide adequate spares of equipment and will perform and document daily calibration and QC checks on the GPS, magnetometer, side scan sonar and sub-bottom profiling equipment.

### **Survey Design**

CR has planned a 5 day operation that includes mob/demob, travel, and the survey operation. Survey line spacing will not exceed 25 ft and will depend on water depths and equipment limitations. Due to operational constraints, all the equipment can not be deployed at once from the 15 ft jonboat. An initial pass will be performed with the side scan sonar and magnetometer and then the survey lines will be reoccupied with the sub-bottom profiler. Operations will be based around high tide periods and may have to be suspended at low tide periods in certain dredge areas.

The side scan sonar track lines will be run to provide 100-200 % survey coverage. As specified in the RFP, any data gaps will be documented and survey progress will be reported to Jacobs on a daily basis.

### **Data Processing and Deliverables**

CR will provide electronic deliverables in GIS format and a methods report to Fathom Research within two weeks of the completion of the field work.

The deliverables for each of the dredge areas will include side scan sonar mosaics, detailed side scan imagery, magnetic contour maps, sub-bottom profiles, and side scan sonar, magnetic, and sub-bottom contact maps.

Fathom Research will provide the Draft 2011 Dredge Area Archaeological Survey Interpretation Summary to JACOBS within 3 weeks of survey completion. After a review and comment period, the Final Interpretation Summary will be provided within 5 weeks of the survey. The final deliverables will include a Data DVD with all raw and processed survey data.

### **Health & Safety**

CR will provide senior hydrographer, Mr. Chris Wright, licensed vessel captain/technician, Mr. Shipherd Densmore and will subcontract Marine Archaeologist, David Robinson for the field operation. The project will be managed by CR Project Manager, Mr. John Ryther.

All CR personnel are OSHA Health & Safety Trained, have current medical monitoring physicals, and active CPR and First Aid Certifications. We also have Marine Health and Safety Plans and Activity Analysis Plans on file that have been tailored for our work in New Bedford Harbor and are used to complete daily float plans.



FATHOM RESEARCH, LLC.

## **Scope of Services**

### **New Bedford Harbor Superfund Site**

### **2011 Upper Harbor Dredge Areas**

Acushnet and New Bedford, Massachusetts

*Supplemental Pre-Dredge Marine Archaeological Surveys*

March 20, 2011

*Submitted to:*

### **CR Environmental, Inc.**

639 Boxberry Hill Road  
East Falmouth, Massachusetts 02536

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In response to a request from CR Environmental, Inc. (CRE), Fathom Research, LLC (Fathom), is pleased to submit the following scope of services and cost estimate for performing supplemental marine archaeological survey of areas proposed for dredging in 2011 as part of the U.S. Environmental Protection Agency's (EPA's) and U.S. Army Corps of Engineers' (USACE's) remediation of the New Bedford Harbor Superfund Site, in Acushnet, Fairhaven, and New Bedford, Massachusetts. As the remediation of the New Bedford Superfund Site constitutes a federal undertaking by the EPA and USACE, compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA) (36 CFR 800), is required. Section 106 of the NHPA requires federal agencies take into account the effects of their undertakings on cultural resources listed or eligible for listing in the National Register of Historic Places (National Register) (36 CFR 60). The agency must also afford the Advisory Council on Historic Preservation the opportunity to comment on the undertaking. The Section 106 process is coordinated at the state level by the State Historic Preservation Office (SHPO), which in Massachusetts operate within the offices of the Massachusetts Historical Commission (MHC), working in consultation with the Massachusetts Board of Underwater Archaeological Resources (MBUAR).

In compliance with Section 106 of the NHPA, the marine portion of the New Bedford Harbor Superfund Site was subjected to a remote sensing archaeological identification survey in 1999 by Dolan Research, Inc. (Dolan), in association with John Milner Associates, Inc. (Milner), working under contract with Foster Wheeler Environmental Corporation (Foster Wheeler), to determine the presence/absence of submerged cultural resources (i.e.,

shipwrecks) within the remediation project's Area of Potential Effect (APE). Survey of the shallow upper New Bedford Harbor area was limited, however, by shallow water depths at the time of the survey, as well as technological limitations of both the survey equipment and data processing capabilities relative to what they are today, ten years later. These limitations are believed to have contributed to the unanticipated discovery and accidental destruction of a late eighteenth century shipwreck site within the surveyed Upper Harbor area in July 2009.

To further reduce the chance of a similar unanticipated discovery from occurring in areas proposed for debris removal and dredging operations in 2011, the EPA and USACE, in consultation with the MHC, MBUAR, the National Advisory Council on Historic Preservation, the National Park Service, the Mashpee Wampanoag Tribe, the Wampanoag Tribe of Gay Head (Aquinnah), local historical commissions, and other interested parties, are planning supplemental marine archaeological surveys of areas proposed for debris removal and dredging in 2011. The following tasks proposed by Fathom are designed to assist the EPA and USACE in completing these surveys.

## **PROPOSED PROJECT TASKS**

### **Task 1: Coordination/Consultation**

Fathom will coordinate and consult with CRE, project environmental engineers - Jacobs Engineering, Inc. (Jacobs), the EPA and the USACE, to assist compliance with Section 106 requirements and to ensure the successful and timely completion of all project tasks. David S. Robinson, M.A., R.P.A., Fathom's Executive Director of Marine Archaeological Services, will serve as Project Manager/Principal Investigator and be the primary Fathom Point-of-Contact for the project.

### **Task 2: MBUAR Permit Application**

Fathom will prepare and submit an application for a MBUAR Special Use Permit for the entire Upper Harbor area encompassing the areas proposed for remediation activities in 2011 for review and approval by the MBUAR for the proposed project, in accordance with 312 CMR 2.06(1)(c), prior to the initiation of marine archaeological fieldwork.

### **Task 3: Remote Sensing Survey**

Fathom will accompany and assist CRE in the field during their performance of the marine archaeological remote sensing survey of the proposed 2011 dredge areas. The survey will employ a trackline spacing dictated by water depth and determined as optimal by CRE and Fathom, and an instrument suite that includes:

- Trimble GPS AG-132 12-channel differential global positioning system (DGPS) capable of receiving U.S. Coast Guard (USCG) beacon differential corrections as well as OmniStar subscription-based satellite

### Fathom – Scope of Services – Supplemental Survey of NBHSS 2011 Dredge Areas - 3

differential corrections capable of producing sub-meter (i.e., less than 3.3 ft [1 m]) horizontal position accuracy;

- Laptop computer running HYPACK MAX hydrographic survey software. HYPACK continually records vessel position, DGPS satellite signal acquisition quality, and provides a steering display for the survey vessel's helmsman;
- Edgetech, Inc. Model 4100P side scan sonar system consisting of an Edgetech 272 TD towfish interfaced to a topside processor via an Analog Control Interface (ACI) circuit. The ACI allows adjustment of both port and starboard signal gains as judged necessary by the sonar operator. Control of the ACI and sonar signal settings will be accomplished using Chesapeake Technology, Inc.'s SonarWizMAP PRO acquisition software. Sonar data will be collected using the dual-frequency system's high frequency setting (nominally considered 500 kHz) and an optimal range scale for water depth. Digitized bottom features, such as wreckage or noteworthy anomalies, will be compiled into tabular and GIS shapefile databases by CRE. The approximate dimensions and height of each feature will be reported. Each target will be accompanied by a scaled high-resolution sonar image. Sonar data will be delivered in GeoTiff and/or georeferenced JPEG formats suitable for viewing and analysis using ArcView, ArcExplorer, AutoCAD and other CAD/GIS software. CRE will also deliver all side scan data (waterfall and projected imagery, navigation plots, file statistics) in an HTML "web-enabled" format. This web-enabled format allows evaluation of high-resolution data by those without access to GIS software using Microsoft Internet Explorer or other browsers;
- Marine Magnetics, Inc., MiniExplorer high-resolution marine magnetometer system, consisting of a towfish-mounted Overhauser magnetic sensor and a pressure/depth sensor, an onboard power supply and serial interface, and a data acquisition computer. The 1-Hz data stream from the magnetic sensor will be routed to the HYPACK navigation computer via a serial port. HYPACK records magnetic readings in gammas (1.0 gamma = 1 nanoTesla) as a separate field within the same raw data file containing navigation fixes. The position of the magnetometer towfish will be calculated in real-time using a HYPACK mobile device driver, which considers "cable out" relative to the DGPS antenna, the cable catenary, and the effects of vessel course corrections. The magnetometer towfish will be kept as close to the harbor floor as practical and deployed at a great enough distance from the survey vessel to preclude the potential for magnetic interference from its hull or electronics; and
- Edgetech, Inc. Model FS-SB s2-kW sub-bottom profiling system with 2-16 kHz towfish. The transmit signal will be a frequency-modulated swept Chirp from 2-16 kHz using a 10-20 millisecond pulse selected

based on observed sediment properties. Transmit power and signal gain will be dynamically adjusted to minimize clipping (signal saturation) of reflectors while maximizing penetration. Data will be recorded using proprietary SonarWizMAP PRO software running on a dedicated laptop computer. The computer will be interfaced to the Trimble DGPS through a serial port. Data will be recorded in industry-standard SEG-Y format and backed up to removable digital media at the end of each survey day. Sub-bottom profiler data will be processed using Chesapeake Technology's SonarWizMAP SBPro software. For each profile, the sediment surface will be digitized and used to calculate Contact (anomaly) depth relative to the sediment surface. The location of observed contacts will be digitized and compiled in GIS shapefile and Microsoft Excel formats. The approximate dimensions and depths (below the mudline) of each Contact will be included in the databases developed for each survey area. HTML navigable high-resolution JPEG images of each profile will be generated and digitally delivered, accompanied by GIS shapefiles for survey transects. Contact locations will be depicted on these profiles, as well. Additional processing and data visualization options may be appropriate for these data sets to aid geological and geotechnical characterizations of the survey areas. Although entrained natural gases have historically limited the usefulness of sub-bottom profiler data collected in these areas, we are hopeful that the early spring commencement of survey activities and disturbance of surficial sediments in recent years by dredging activities will minimize the extent of gases and allow meaningful interpretation of data.

#### **Task 4: Remote Sensing Data Analysis and Interpretation**

To the extent possible, Fathom will review raw data as it is acquired in the field by CRE. Upon completion of the field surveys and CRE's post-processing of the field data, Fathom will analyze and interpret the post-processed data with CRE's geophysicist to identify targets and anomalies of interest with potential to be submerged cultural resources within the surveyed areas.

Post-processed data for each instrument will be converted by CRE to formats suitable for detailed analysis using ESRI ArcGIS software. GIS data layers will include geo-referenced images of side scan data, the databases of side scan sonar and sub-bottom sonar Contact positions and descriptions, colorized rasters of grids which depict magnetic field strength, contours of magnetic field strength at a suitable interval (e.g., 1.0 nanoTesla) and navigation track lines for each instrument. Metadata files will accompany each data layer.

The GIS analysis will focus on synergistic characterization of identified (or suspected) Contacts of potential archaeological interest. To the extent to which data support advanced visualizations, CRE will prepare with Fathom's input interactive three-dimensional models that facilitate simultaneous exploration of surficial, subsurface and magnetic signatures of suitable anomalies. These visualizations will be prepared using both ArcGIS and CRE's

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licensed version of IVS3D Fledermaus software. Visualizations and associated data layers will be delivered digitally along with freely distributable viewing software.

### **Task 5: Supplemental Research**

Fathom will perform, as necessary, supplemental research to identify the possible sources of targets and anomalies inventoried during the survey as potential submerged cultural resources.

### **Task 6: Supplemental Report**

Fathom will prepare and submit a supplemental report (in a digital .pdf file format) on CD-ROM for distribution to CRE upon completion of Tasks 2 through 5. The report will include the following elements:

- Introduction;
- Survey (and Supplemental Research, if necessary) Methods;
- Results of the field survey, data analysis and interpretation, and supplemental research (as needed); and
- Recommendations regarding the need (or not) for avoidance or additional investigation of inventoried targets and anomalies.

The report's contents and format will follow the reporting guidelines established by the National Park Service in the *Recovery of Scientific, Prehistoric, Historic, and Archeological Data* (36 CFR Part 66 Appendix A), *MHC's Historic Properties Survey Manual: Guidelines for the Identification of Historic and Archaeological Resources in Massachusetts* (1992), and MBUAR Regulations (312 CMR 2).

## **PROJECT SCHEDULE**

Fathom is prepared to commence work on the project immediately after execution of a signed Work Order from CRE. It is anticipated that the field survey will be performed in April 2011 (following receipt of the MBUAR Special Use Permit and consulting party comments on the proposed survey's research design). The supplemental report will be completed and submitted to CRE within one calendar week of Fathom's receipt of CRE's post-processed data.

## **PROJECT PERSONNEL**

Fathom Executive Director of Marine Archaeological Services, David S. Robinson, M.A., R.P.A., will serve as the project manager/principal investigator for the project. He will perform and oversee all aspects of the marine archaeological investigation and the preparation of project deliverable. Mr. Robinson's professional qualifications meet standards established by the NPS (36 CFR Part 66, Appendix C), the MHC and MBUAR.