

**Amendment 001 to
MOA-2017-004**

A REIMBURSABLE AGREEMENT

PURSUANT TO

TITLE 33 U.S.C. § 883e

THROUGH WHICH THE

THE HOUSING TRUST FUND CORPORATION,

THROUGH THE GOVERNOR'S OFFICE OF STORM RECOVERY,

IS PURCHASING

GEOSPATIAL SERVICES AND DATA

FROM THE

**U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
OFFICE FOR COASTAL MANAGEMENT**

NOS Agreement Code: MOA-2017-004 (Amend 001)/11533

This Amendment revises the amount of funds that will be transferred from Housing Trust Fund Corporation to the Office for Coastal Management.

Therefore, in accordance with Section VII. DURATION OF AGREEMENT, AMENDMENTS, OR TERMINATION, the Parties hereby agree to amend NOS Agreement Code MOA-2017-004 ("Agreement"), by: 1) replacing "Attachment 1" with "Attachment 1A" dated 13 July, 2017, and attached hereto; 2) replacing the term "Attachment 1" with the term "Attachment 1A" throughout the Agreement; and 3) replacing the first sentence of Paragraph V, section A., of the Agreement as follows:

V. TRANSFER OF FUNDS

A. GOSR will transfer to OCM an amount of \$250,297 during the life of this Agreement.

The other terms and condition of the underlying Agreement, as amended, remain in full force and effect.

VIII. APPROVALS

This Agreement is entered into and made effective as of the date later in time indicated below.

ACCEPTED AND APPROVED FOR THE
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

ACCEPTED AND APPROVED FOR THE
Housing Trust Fund Corporation

BY: 
W. Russell Callender, Ph.D.
Assistant Administrator
NOAA National Ocean Service

BY: 
Daniel Greene
General Counsel
Governor's Office of Storm Recovery

DATE: 10/25/17

DATE: 11/21/18

Attachment 1A

**Office for Coastal Management
National Ocean Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce**

IMAGERY ACQUISITION

AND

OPTION 1:
BENTHIC HABITAT MAPPING

Long Island South Shore Estuaries, New York

STATEMENT OF WORK

26 December 2017

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List of Acronyms

CO	Contracting Officer
COR.....	Contracting Officer's Representative
CRS	Coastal Remote Sensing
CSC	Coastal Services Center
CSDGM	Content Standards for Digital Geospatial Metadata
FGDC.....	Federal Geographic Data Committee
GPS	Global Positioning Systems
MMU	Minimum Mapping Unit
NOAA.....	National Oceanic and Atmospheric Administration
QA.....	Quality Assurance
QC	Quality Control
SAV.....	Submerged Aquatic Vegetation
SOW	Statement of Work
NYDOS	New York Department of State
TOMIS	Task Order Management Information System

1 Overview

This document provides the Statement of Work (SOW) developed by the New York Department of State (NYDOS), Division of Coastal Resources and NOAA OCM, to collect digital multi-spectral imagery and create digital benthic habitat data (option item 1) from this imagery for the South Shore of Long Island, New York. The contractor shall submit a firm fixed price proposal detailing how the required products would be produced for the geographic area under consideration. The contractor shall provide electronic copies of their technical and cost proposals. NOAA OCM is paying for imagery and NYDOS is paying for benthic mapping products.

2 Background

This SOW details the image acquisition and data development requirements to produce benthic habitat data products for the designated coastal bays of Long Island, New York's south shore. The primary data source for this project is digital multi-spectral camera imagery. The government requires that the imagery and final benthic habitat products created under the terms of this task order adhere to the specified standards of consistency and accuracy as listed in section 4. These standards are important for ensuring that the data will support change analysis and facilitate habitat monitoring in both local and regional geographies.

The NYDOS and local partners will provide reference data and information on environmental conditions to support imagery acquisition fly/no fly decision-making. Local partners will also provide boat and field logistic support to the contractor's signature development/validation field work.

3 Study Area Location and Extent

Aerial multi-spectral imagery shall be collected so as to completely cover the study area shown in figure 1. The geographic extent of the South Shore area is estimated to be 1,289 km² (498 mi²). The government will provide digital vector layers in ESRI ArcGIS shapefile format consisting of the boundaries of the study area.

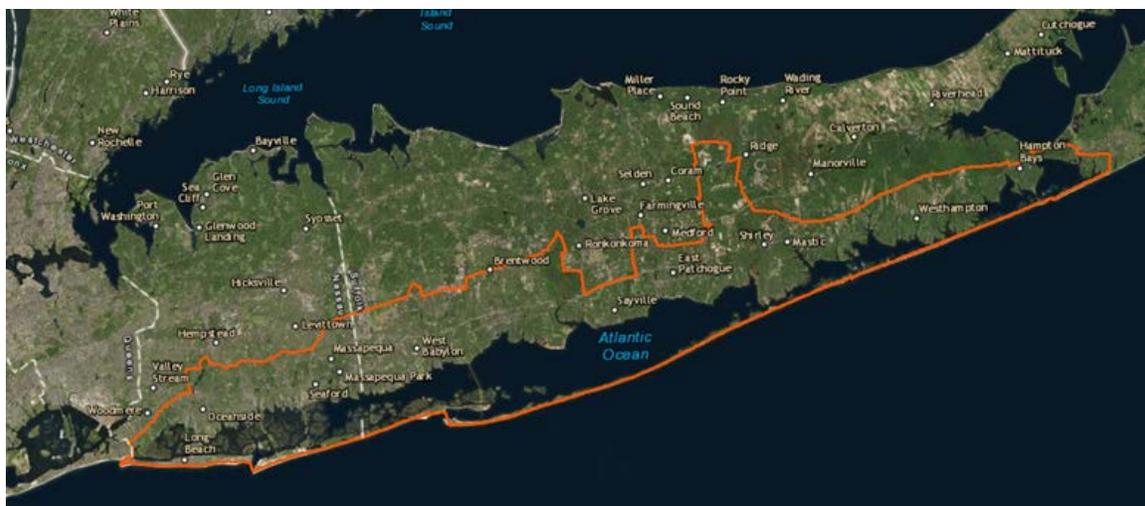


Figure 1. Long Island South Shore study area location and extent.

Benthic habitat and tidally-influenced emergent wetland data shall be produced for all estuarine lands below mean high water within the study area. No benthic data is required for the marine side of the barrier beaches or in riverine corridors.

4 Requirements

This SOW covers two main project elements, 1) acquisition of digital aerial multi-spectral imagery suitable for benthic mapping, 2) option 1: development of benthic habitat data and a change data set (2002-2018) from that imagery. The government requires aerial digital multi-spectral imagery suitable for benthic mapping be acquired for Long Island’s south shore image-derived benthic habitat data for areas within the study area below mean high water. Image acquisition, image processing, feature delineation, and identification shall be accomplished in accordance with the specifications detailed in this SOW.

4.1 Imagery Acquisition and Delivery

The delivered imagery shall meet the following specifications to facilitate development of the accurate and detailed benthic habitat data required by the New York State Department of State. A copy of the imagery shall be delivered on portable hard drives to OCM. Hard drives will become the property of the government. Additional copies shall be provided to NYDOS.

4.1.1 Environmental Conditions

- Season: Late spring/summer of 2018 – exact windows to be determined in conjunction with New York DOS project partners.
- Water Clarity: Imagery shall be acquired when turbidity is low, not immediately following heavy rains or persistent strong winds. No micro-algal blooms (brown tides) shall be present in the area during image acquisition. New York DOS partners will serve as the source of information for this determination.
- Tidal Stage: Imagery shall be collected within 2 hours of the lowest tide, extreme low tide is preferred.
- Wind and Surface Waves: No wind or waves is optimal. Low wind under 10 mph is acceptable. New York project partners will serve as the source of information for this determination.
- Sun Angle: A key requirement is to avoid sun angles that produce direct reflection back to the sensor from the water surface. The contractor shall ensure that there be sufficient solar illumination to identify benthic features while avoiding glint. Excessive glint over shallow areas shall be cause for rejecting the imagery.
- Clouds and Haze: Clouds, cloud shadows, and haze all hinder or obstruct the ability to distinguish benthic habitats. No clouds or shadows shall be present over submerged portions of the study area.

4.1.2 Imagery Specifications

- The horizontal spatial accuracy of the imagery will be based on a 3 pixel offset for absolute accuracy and a “compiled to” rather than a “tested to” accuracy will be acceptable for the methodology and final report. .
- The radiometric resolution of the imagery shall be at least 8-bit.
- The imagery shall be processed to remove atmospheric effects such as haze and to highlight the spectral response of submerged areas.

Accordingly, seamlines over water may be evident and land areas may exhibit over-exposed radiometry.

- The imagery shall have a minimal exposure variation between adjacent flight lines.
- Image sets shall be tiled according to the existing USGS digital ortho quarter-quarter quad boundaries. A small buffer (~100m) shall be produced with each tile to prevent gaps in coverage.
- The native spatial resolution (pixel size) of the multi-spectral imagery shall be 0.5m x 0.5m. Pan-sharpening to achieve a 0.5 x 0.5 meter pixel is not acceptable.
- The imagery shall be delivered in a Universal Transverse Mercator – Zone 18 projection using the NAD1983 datum.
- There shall be no spatial offsets between bands.
- The imagery shall be delivered in a 4-band GeoTiff format to facilitate analysis in a variety of software environments.

4.1.3 Spatial Accuracy

It shall be the responsibility of the contractor to ensure that the delivered imagery meets the spatial accuracy specifications described above in order to develop an acceptable change detection product. No checkpoint survey is necessary; however, a “compiled to” accuracy will be reported.

4.2 OPTION 1: Habitat Mapping

A comprehensive shallow benthic habitat data set is the primary product desired from this project. All visible habitats and bottom features below high water mark shall be delineated and included in this product. The primary resource of concern is (SAV) distribution and extent. The secondary concern is with the character of the SAV beds as manifested through bed patchiness and percent bottom cover. The final product shall be an ESRI file geodatabase containing multiple feature

layers. Table 1 illustrates the specific products requested

Table 1. Digital habitat products

Product	Data Type	Description
CMECS Biotic Feature Layer	Vector polygon	Polygons with CMECS biotic units and percent cover modifiers
CMECS Substrate Feature Layer	Vector polygon	Polygons with CMECS substrate units.
Field Points Feature Layer	Vector points	Signature development and validation points collected by contractor

4.2.1 Classification system

It is essential that the benthic habitat data produced under the terms of this contract be consistent with other NOAA benthic data developed nationwide. For this project, benthic features and habitats shall be assigned to habitat classes of the Coastal and Marine Ecological Classification Standard (CMECS) 2012. Those classes and subclasses anticipated to be found in the study area are identified in Table 2; however, all CMECS classes are to be mapped if encountered. The contractor is encouraged to apply other CMECS modifiers as needed to more fully describe the mapped polygons or field observations.

Table 2. Expected CMECS units for habitat mapping

These categories are the minimum classes likely to be encountered in the study area. The final map shall include any CMECS unit that can be reliably mapped.

Substrate Component Units

Rock Substrate
Unconsolidated Mineral Substrate
Organic Debris
Shell Substrate
Anthropogenic Substrate
 Anthropogenic Rock

Biotic Component Units

Mollusk Reef Biota
 Mussel Reef
 Oyster Reef
Benthic Macroalgae
Aquatic Vascular Vegetation
 Seagrass Bed
Emergent Tidal Marsh
Tidal Scrub-Shrub Wetland
Tidal Forest Wetland

Modifier Units

Percent Cover (for Seagrass Bed areas)

4.2.2 Data Development Methods

The Contractor shall document all procedures used to accomplish the benthic mapping. The selected process shall be capable of producing a complete ESRI

vector feature layers that meet the spatial and thematic accuracies and classification detail listed in this section and has a high level of delineation detail as specified below. The government does not require the Contractor to reveal details of proprietary algorithms or other trade secrets.

Habitat polygons shall be delineated with a high level of detail and the digitized vector polygon boundaries shall have the following specifications:

- Vertex Distance ≤ 1.0 m
- Node Snap Distance ≤ 4.0 m
- Arc Snap Distance ≤ 4.0 m

The government desires that the contractor use methods that permit maximum automation to reduce the time and effort associated with data development, while adhering to the thematic accuracy standards described in section 4.2.5.

4.2.3 Interpretation Guidelines

The following guidelines are provided as a means of standardizing the photo-interpretation for this task. These rules are intended to complement delineations derived through automated methods and rule sets developed in Phase I.

1. In cases where an area may have continuous or discontinuous SRV (seagrass) cover with macroalgae accumulations in the grass canopy, then the polygon shall be assigned to the appropriate SRV seagrass class and the presence of macroalgae shall be recorded as a Co-occurring element.
2. In other cases where an area may have multiple small habitat components, then the polygon label shall reflect the majority habitat within the area. The use of a Co-occurring element shall be used to document the other habitats present when they can be reliably detected.
3. Areas supporting attached vegetation (emergent wetlands, seagrass

bed where the substrate is visually obscured, can be assumed to have a substrate of *Unconsolidated Mineral Substrate* due to the nature of the vegetation present. These polygons should be included in the substrate feature layer.

4. Areas that are un-interpretable due to depth shall be assigned to unmapped benthic habitat

All habitat delineations shall be made with the highest precision possible, to best reflect actual habitat boundaries on the ground.

4.2.4 Minimum Mapping Unit

For this project the minimum mapping unit (MMU) shall be 0.01 hectares (nominally an area 10m x 10m in size). When deciding whether an area with patches of Submerged Aquatic Vegetation (SAV) is one polygon of patchy SAV or individual continuous SAV polygons, apply the minimum mapping unit of 0.01 hectares.

4.2.5 Thematic Accuracy

It will be the responsibility of the contractor to ensure that the delivered benthic habitat data set meets the thematic accuracy specifications described below. The contractor shall describe the methods they will take to ensure acceptable thematic accuracy as part of their Field Validation plan.

The contractor shall provide a report detailing how they achieved the above accuracies accompanying the Contractor Final Deliverable. This report shall contain the error matrices, individual field observation records, observation summaries etc. from the contractor's field validation effort in a format to be provided by the government. The contractor shall observe a sufficient number of field points to assure confidence in the reported accuracy, but is not required to perform an independent accuracy assessment using field work and 50 points-per-class.

In addition, the thematic accuracy of the benthic data will be verified by field observations conducted by the government prior to acceptance of the final data product. Sample points will be generated by the government and a representative subset of these will be observed in the field to determine the overall and categorical thematic accuracies.

The habitat polygons themselves will serve as the sample units. The thematic accuracy of the polygons shall be determined based on observations inside of polygon boundaries (> 5m or ½ the distance into a polygon, whichever is smaller) to avoid edge effects. Thematic accuracy of the final data will be determined by development of an error matrix and calculation of Kappa coefficients (Congalton and Meade, 1983; Hudson and Ramm, 1987) based on comparison of field observations to the Contractor-generated benthic habitat data for predetermined polygons.

The minimum acceptable field/map accuracy limits are 80% for each individual biotic habitat type, and 85% overall for baseline benthic habitat at the CMECS subclass level from a “users,” as well as a “producers” perspective as defined by Story and Congalton, 1986.

Data not meeting minimum quality assurance standards shall require additional processing by the contractor, at the contractor’s expense, and subsequent field checks prior to acceptance of the data by the government.

4.2.6 Change Detection

The contractor shall develop a separate temporal change product from the 2002 and 2018 benthic data sets. This product shall be in ESRI shapefile format with the same projection as the 2018 data. The change product is only required for the *Emergent Wetland* and *Seagrass Bed* polygons in the biotic feature layer. The change data set will have individual attributes reflecting the 2002 CMECS unit and the 2018 CMECS unit values. An *Area* attribute in square meters is also required for this data. There shall be no spatial filtering of this product or removal of sliver polygons. The change data set shall consist only of change polygons. No thematic accuracy of this product is required from the contractor.

4.3 Process Flow

The contractor shall perform the following tasks as a minimum:

1. Plan imagery acquisition for the project area and submit plan to NOAA and

NYDOS for acceptance.

2. Coordinate with local observers and collect multi-spectral imagery under acceptable environmental conditions. Ortho-rectify 4 band imagery.

Ortho-rectify 4-band image

4. Assess spatial accuracy of ortho-imagery.
5. Generate image tiles organized by USGS DOQQ boundaries.
6. Review and incorporate existing (2002) map and field data for image signature development.
7. Conduct field visit to the study area with DOS staff. During this visit, the contractor will collect points for signature development to guide their mapping as well as validation points to be used later for assessing the accuracy of their draft-final product.
8. Compile detailed draft benthic habitat vector polygon feature layers using the CMECS classification system (as detailed in Table 2).
9. Provide digital copy of Draft benthic data sets to the government for review. The government will provide comments to the contractor.
10. Incorporate government comments into the final benthic habitat data product (if necessary).
11. Deliver Contractor Final benthic habitat data sets and accuracy assessment report to the government for acceptance with FGDC compliant metadata.
12. Respond to any government comments on the Contractor Final deliverable or metadata and re-deliver Final products if necessary.
13. Compile and deliver separate Change data set.
14. Prepare and deliver final project report.

4.4 Quality Control

The contractor shall develop a Quality Control (QC) plan to ensure that the requirements of the task order are met as specified. The contractor shall provide a copy of the Plan to the COR within fourteen (14) days of contract award date. The contractor shall update the QC plan and provide an updated copy to the COR as applicable. At a minimum the QC plan shall include the following:

- Procedures to be used for ensuring acceptable performance.
- Methods for identifying, preventing, and correcting deficiencies in the quality of data and products delivered under this contract.
- Methods for ensuring consistent interpretations between analysts.

In addition to an internal QC plan the contractor shall develop a detailed Field Validation Plan. This plan shall describe the methods proposed for using field data to produce a final habitat map meeting the thematic accuracy requirements. The field validation plan shall include such elements as sample selection strategy, approaches and equipment for gathering field observations, methods for ensuring spatial precision in during field operations, and error reporting. The contractor shall provide a copy of the field validation plan to the COR within thirty (30) days of contract award.

Quality Control from image analysis, through final benthic habitat compilation, is the responsibility of the contractor. The Contractor shall maintain adequate staffing, equipment, and progress to complete the contract on time and as specified. Acceptance of the final benthic data is contingent upon demonstration to the government, and approval by the COR, that the project complies with the requirements stated in the SOW. The government will institute overall quality assurance (QA) measures that will include the following elements.

- Review of monthly reports to track progress.
- Review of planning and methods reports
- Review of interim benthic habitat data products to confirm schedule progress and quality
- Final field validation of benthic habitat data sets

4.5 IT Security

The Certification and Accreditation (C&A) or Assessment and Authentication (A&A) requirements of Clause 48 CFR 1352.239-72 do not apply, and a Security Accreditation Package is not required.

The contractor shall have completed OCM's IT Security Questionnaire within one year prior to this task order being awarded. OCM shall have evaluated the contractor's response to the questions and found the contractor to be an acceptable IT Security risk. The Authorizing Official's risk acceptance memo is available upon request.

For application/software product development, appropriate vulnerability planning needs to be included during the assessment of needs and requirements. This includes secure coding practices, code review, and code scanning for vulnerabilities, must perform mitigation of scanner identified vulnerabilities and provide contractor generated supporting documentation including vulnerability scanner reports.

The contractor must provide all supporting documentation or a reference to obtain the necessary material which describes the security capabilities, the design and development processes and the testing and evaluation procedures used by the product or services being provided for this acquisition.

The contractor must provide all supporting documentation or a reference to obtain the necessary material which describes all product or service updates and enhancements as they are implemented.

The product or service supporting documentation may include the user and system administrator guides, which documents the functional properties of the security controls employed to permit the analysis and testing of the security controls.

All media containing deliverables from the contractor shall be scanned by OCM prior to connecting to the network.

4.6 Records and Metadata

The contractor shall document all delivered data and data products (including options if exercised) according to Executive Order 12906 (http://www.fgdc.gov/policyandplanning/executive_order/) for the whole of the project in one metadata product. Specifically, the contractor shall deliver for all data and data products metadata records which detail datums, re-projections, re-sampling algorithms, processing steps, field records, and any other pertinent information. Project level metadata for each breakline feature class in XML format shall also be provided. The metadata records shall conform to the Content Standards for Digital Geospatial Metadata (FGDC-STD-001-1998) as published on May 1, 2000, by the Federal Geographic Data Committee (FGDC) or to any format that supersedes it as determined by the FGDC (<http://www.fgdc.gov/metadata/csdgm/>). Profiles and extensions to the standard that have been endorsed by the FGDC shall be used if they are applicable to the data or data products. The metadata records shall contain any and all elements, including those that are considered optional, wherever applicable to the data or data product. The metadata record shall contain sufficient detail to ensure the data or data product can be fully understood for future use and for posterity. The metadata records shall be delivered free of errors in both content and format as determined by the metadata parser (mp) program developed by the United States Geological Survey or an equivalent. The metadata records will be subject to review and approval prior to final acceptance by the Government.

5 Kickoff Meetings

The contractor shall attend a kickoff meeting within 30 days of task order award unless otherwise agreed upon by NOAA and the contractor. This meeting will serve as an information exchange and planning meeting for future activities such as delivery of government furnished information (GFI) and field trips. The Work/QC plan will be a point of discussion during this meeting. The contractor shall prepare an agenda for this meeting with input from NOAA and NYDOS. The contractor shall take minutes at the meeting and distribute those minutes for comment within 7 days of the kickoff meeting.

6 Contractor Coordination

Communication and coordination between both the contractor and the Government is considered vital to the satisfactory accomplishment of this task order. The Contractor shall expect periodic interaction with the Government to ensure clear understanding of the anticipated products and satisfactory progress in the delivery of products.

The contractor shall submit monthly progress reports to the Government via their Task Order Management and Information System (TOMIS) summarizing progress made and problems encountered. After submittal of each of these reports the contractor shall schedule a conference call with the government to discuss the progress of the project and any issues that need to be addressed. The contractor shall prepare and distribute an agenda for the call and shall distribute the meeting minutes within 5 days of the conclusion of the call.

7 Government-Furnished Property

The government will provide the following:

1. Digital geographic boundaries of the study areas.
2. Any available bathymetric data for the project area.
3. Templates for field data recording and accuracy reporting documents.
4. Field signature and validation points used during the 2002 project.
5. 2002 ortho-photography
6. 2002 benthic habitat data set
7. Independent Control Points (ICPs) used to validate 2002 ortho-photography

The contractor shall provide all other necessary staff, equipment, material, software, and supplies to satisfactorily complete the SOW.

8 Deliverables

The Contractor shall complete and provide the following items specified by the government upon contract award. All digital raster, vector, and field data produced by the contractor shall be delivered in a Universal Transverse Mercator (UTM) projection, zone 18 with a GRS 1980 spheroid and North American Datum 1983.

The contractor shall also complete the attached spreadsheet with a percentage of the overall task order that each deliverable represents and the proposed due date for each deliverable. This data will be used to track performance and for approval of invoices. The contractor may propose additional deliverables/milestones in their technical proposal if they determine they are required. All deliverables shall be submitted via TOMIS.

1. Project work plan
2. Quality control (QC) plan
3. Field validation plan
4. Written monthly progress reports, which shall include activities conducted for the month, problems encountered, activities planned for the coming month, and progress toward overall completion of the contract. These reports shall be produced using MS Word and delivered to the COR via TOMIS. These reports shall be followed by conference calls between the contractor and the government initiated by the contractor.
5. Multi-spectral imagery of the project area meeting the specifications in section 4 and organized by DOQQ-Q tiles.
6. Spatial accuracy report detailing methods and data sources used to confirm that the ortho-imagery complies with required positional accuracy. An NSSDA table listing individual points and resultant CE95 accuracy must be included in this report.
7. Draft Base digital benthic habitat data products. The draft products shall be provided as ESRI polygon feature layers
8. The vector data shall reflect the high digitizing precision required to accurately portray conditions on the ground. At a minimum these shapefiles shall have the characteristics described in section 4. The contractor may break this deliverable into sub-deliverables to assist with their invoicing process if desired.
9. Contractor Final digital benthic habitat products meeting government specified accuracies with associated metadata. These data sets shall include the results of the contractor's field validation. The final products (both raster and vector) shall be delivered in the same projection and media as the first draft data set.
10. Field thematic accuracy validation report and spatial field observation

database. This report shall describe in detail the methods used to conduct the validation, the individual sample site observations, and error matrices. The field observation database shall be designed according to the template provided by the government. The field report shall not exceed ten (10) pages in length and be provided in either MS Word or WordPerfect format.

11. Final (see section 5.0) digital benthic habitat products (Base and Optional) incorporating results of government's validation. The final products shall be delivered in the same projection and media as the first draft data set.
12. Change data set containing areas of gain or loss of vegetated CMECS biotic classes.
14. Final report including project narrative, complete processing documentation, and descriptive summary of results in MS Word format.

8.1 Product Delivery Schedule Guidance

The following product delivery sequence is provided to assist the contractor in the development of the timeline.

1. Image Acquisition Plan, Quality Control Plan, and Work Plan (within 14 days of task order award).
2. Kick off meeting (within 30 days of task order award)
3. Monthly progress reports (within 7 days of the end of each calendar month for the duration of the task order).
4. Multi-spectral imagery and metadata of the study area

OPTION 1:

5. Draft benthic habitat data products (2 weeks prior to contractor's validation field trip) and field validation plan.
6. Contractor Final benthic habitat data products (by July 31, 2018 to allow for

government's final validation). The government will have 30 days in which to conduct its field validation and report on the results back to the contractor.

7 Final benthic habitat data products (one month prior to the end of the task order completion period).

8 Contractor Final benthic habitat change data set

9 Project final report.

8.2 Product Delivery Addresses

The deliverables listed above shall be delivered to the COR at the following address. Technical questions shall be addressed to the technical POC.

NOAA COR

NOAA Office for Coastal Management
2234 South Hobson Avenue
Charleston, SC 29405
Attn: Dave Stein
(843) 740-1310
Dave.stein@noaa.gov

NOAA Technical POC

NOAA Office for Coastal Management
2234 South Hobson Avenue
Charleston, SC 29405
Attn: Mark Finkbeiner
(843) 740-1264
Mark.Finkbeiner@noaa.gov

9 Product Terminology/Glossary

DRAFT Data Sets - These are vector benthic habitat perimeter data (both line and polygon) that is logically complete, fully attributed, and ready for the contractor's

field accuracy assessment, as well as the thematic raster within the continuous and discontinuous classes. It represents the best that the analysts can produce, has been through all internal QA/QC processes, and is anticipated to meet the 80% categorical and 85% overall thematic accuracy requirements. It shall be provided to the government for general comments 2 weeks prior to the contractor's field assessment trip.

FINAL Data Sets – These are Contractor Final data that has been evaluated during the government's field validation and meets the contract accuracy requirements. Any errors detected during the government's final validation have been corrected by the contractor. This data set will consist of both a polygon vector coverage and a thematic raster.

10 References

Finkbeiner, M.A., B.R. Stevenson, R.A. Seaman, 2001 Guidance for Benthic Habitat Mapping: An Aerial Photographic Approach. NOAA Coastal Services Center (NOAA/CSC/20117-PUB).

Congalton, R. G., and R. A. Meade, 1983; A Quantitative Method to Test for Consistency and Correctness in Photointerpretation. *Photogrammetric Engineering and Remote Sensing*, Vol. 49, No. 1, pp. 69-74.

Hudson, W. D., and C. W. Ramm, 1987, Correct Formulation of the Kappa Coefficient of Agreement. *Photogrammetric Engineering and Remote Sensing*, Vol. 53, No. 4, pp. 421-422.

Story, M., and R. G. Congalton, 1986; Remote Sensing Brief - Accuracy Assessment: A User's Perspective. *Photogrammetric Engineering and Remote Sensing*, Vol. 52, No. 3, pp. 397-399.

Minnesota Planning Land Management Information Center, Positional Accuracy Handbook, October 1999

