UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Coast Survey
Silver Spring, Maryland 20910-3282

FINAL Project Instruction

Date Submitted: May 28, 2015

Platform: NOAA Ship *Rainier*

Project Number: OPR-S327-RA-15-02 (OMAO)

Project Title: Kotzebue Sound, AK

Project Dates: **June 11, 2015 to August 23, 2015**

Prepared by: _____ Dated: 3 June 2015
LCDR Michael Gonsalves, NOAA
Chief, Operations Branch
Hydrographic Surveys Division

Approved by: _____ Dated: 3 June 2015
Captain Eric W. Berkowitz, NOAA
Chief, Hydrographic Surveys Division
Office of Coast Survey

Approved by: _____ Dated: 04 June 2015
Captain Douglas D. Baird, Jr., NOAA
Commanding Officer
Marine Operations Center – Pacific

I. Overview

A. Brief Summary and Project Period

This survey is scheduled to begin in June 2015 and end in August 2015. This project is being conducted in support of NOAA's Office of Coast Survey to provide contemporary hydrographic data in order to update the nautical charting products and reduce survey backlog in the area.

B. Days at Sea (DAS)

Of the 59 DAS scheduled for this project, 0 DAS are funded by an OMAO allocation, 59 DAS are funded by a Line Office Allocation, 0 DAS are Program Funded, and 0 DAS are Other Agency funded.

C. Operating Area (include optional map/figure showing op area)

The project area is located in Kotzebue Sound, Alaska. A map of the project area can be found with the detailed project instructions appended to these instructions.

D. Summary of Objectives

This project will support the following primary mission:
To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.

E. Participating Institutions

Office of Coast Survey

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	Title	Date Aboard	Date Disembark	Gender	Affiliation	Nationality
Weller, Erin	PS	6/11/15	7/02/15	F	AHB	US
Pridgen, Katy	PS	6/11/15	7/23/15	F	AHB	US
Kurt Mueller	PS	8/17/15	9/04/15	M	PHB	US

CO has the authority to embark additional scientist and other personnel in order to accomplish the mission and other goals of the ship and NOAA.

G. Administrative

1. Points of Contacts:

Principal Investigator:
LCDR Michael Gonsalves, NOAA
Chief, Operations Branch
Hydrographic Surveys Division
1315 East West Hwy, #6854
Silver Spring, MD 20910

301-713-2702 x112
Michael.Gonsalves@noaa.gov

Project Manager:
Starla Robinson
Physical Scientist, Operations Branch
Hydrographic Surveys Division
Hydrographic Surveys Division
1315 East West Hwy, #6854
Silver Spring, MD 20910
301-713-2702 x125
Starla.Robinson@noaa.gov

Project Manager Back-up:
Megan Greenaway
Physical Scientist, Operations Branch
Hydrographic Surveys Division
Chase Ocean Engineering Lab
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Durham, NH 03824
603-862-2712
Megan.Greenaway@noaa.gov

Chief Scientist:
CDR Edward J. Van Den Ameele, NOAA
Commanding Officer, NOAA Ship *Rainier*
2002 SE Marine Science Drive
Newport, OR 97365-5229
(206) 660-8747
CO.Rainier@noaa.gov

2. Diplomatic Clearances

None Required.

3. Licenses and Permits

The Office of Coast Survey is sensitive to the potential effects of it operations on the physical, biological, and cultural marine environment. In accordance with the National Environmental Protection Act, Coast Survey prepared a Programmatic Environmental Assessment to gauge the environmental impacts resulting from surveying and other data-gathering activities. As a result, the National Ocean Service has published a Finding of No Significant Impact (FONSI) for the Office of Coast Survey program of conducting hydrographic surveys for the calendar years 2013 - 2018. For further information, please refer to:
http://www.nauticalcharts.noaa.gov/Legal/

II. Operations

The Commanding Officer is responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary:

DEP: 06/11/2015 ARR: 07/02/2015	Thur. Kodiak, AK Thur. Nome, AK	RA-15-02 Leg 1 OPR-S327-RA-15 Kotzebue Sound, AK
DEP: 07/06/2015 ARR: 07/23/2015	Mon. Nome, AK Thur. Dutch Harbor, AK	RA-15-02 Leg 2 OPR-S327-RA-15 Kotzebue Sound, AK
DEP: 07/27/2015 ARR: 08/13/2015	Mon. Dutch Harbor, AK Thur. Nome, AK	RA-15-02 Leg 3 OPR-S327-RA-15 Kotzebue Sound, AK
DEP: 08/17/2015 ARR: 09/04/2015	Mon. Nome, AK Fri. Kodiak, AK	RA-15-02 Leg 4 OPR-S327-RA-15 Kotzebue Sound, AK RA-15-03 Leg 1 Southwest AK Peninsula

B. Staging and Destaging:

Staging and destaging are not planned for this project.

C. Operations to be Conducted:

Hydrographic survey operations shall be conducted per the appended project instructions using four survey launches up to 10 hr/day for data acquisition and project field support. Alternatively, the Commanding Officer may elect to run concurrent 24 hr ship survey operations for short periods of time or for extended periods of time with reduced launch operations.

D. Dive Plan:

Dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal operations:
- Poor weather conditions
- Equipment failure
- Safety concerns
- Personnel shortages

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized)

- Fully outfitted and operational survey launches to support shallow water survey operations : hull mounted side scan sonar, multibeam, and vertical beam sonar systems.
- Fully outfitted hydrographic survey equipment to support multibeam survey operations.
- Personnel and staff to operate the ship's survey equipment for 24 hr/day operations and a minimum of 2 survey launches and equipment for up to 10 hr/day concurrently, at the discretion of the command to ensure the most efficient survey operations.
- Fully staffed survey department to efficiently manage the project's data processing requirements.

B. Equipment and Capabilities provided by the scientists (itemized)

Hydrographic Surveys Division may provide Physical Scientists for hydrographic data acquisition, processing, training, and data quality assurance support during project survey operations. Additionally, shore based technical support may be provided for survey systems and data acquisition and processing software.

IV. Hazardous Materials

A. Policy and Compliance

No Hazardous Materials are being brought aboard the ship for this project.

B. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

- OPR-S347-RA-15 Point Hope, AK

- OPR-R976-RA-15 Port Access Route Study (PARS) Alaska: Chukchi Sea, Bering Strait, and Bering Sea

B. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information.* To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management

Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

A. Data Classifications: *Under Development*

a. OMAO Data

b. Program Data

B. Responsibilities: *Under Development*

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Principal Investigator and the Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the in arranging this meeting.

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

C. Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Commanding Officer, and members of the scientific party and is normally arranged by the Operations Officer.

D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Commanding Officer. The form is available at http://www.omao.noaa.gov/fleeteval.html and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ships', specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the Commanding Officer by the Principal Investigator. The Commanding Officer will work on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Principal Investigator will ensure that all non NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Principal Investigator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 17, 2000 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, NF 57-10-01 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from http://www.corporateservices.noaa.gov/noaaforms/eforms/nf57-10-01.pdf.

All NHSQs submitted after March 1, 2014 must be accompanied by NOAA Form (NF) 57-10-02 - Tuberculosis Screening Document in compliance with OMAO Policy 1008 (Tuberculosis Protection Program).

The completed forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either

form. Ensure to fully complete each form and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is Accellion Secure File Transfer which requires the sender to setup an account. Accellion's Web Users Guide is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The 'Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Pacific
2002 SE Marine Science Dr.
Newport, OR 97365
Telephone 541-867-8822
Fax 541-867-8856
Email MOP.Health-Services@noaa.gov

Prior to departure, the Executive Officer will obtain an electronic listing of emergency contacts for all members of the scientific party, with the following information: contact name, address, relationship to member, and telephone number.

C. Shipboard Safety

Hard hats are required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Principal Investigator to ensure members of the scientific party report aboard with the proper attire.

D. Communications

A progress report on operations prepared by the Commanding Officer may be relayed to the program office. The ship's primary means of communication with the Marine Operations Center is via email and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged through the ship's Commanding Officer at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy* 1.1 (November 4, 2005) prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
(2) Installation of the latest critical operating system security patches.
(3) No external public Internet Service Provider (ISP) connections.

Completion of the above requirements prior to boarding the ship is required.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

Foreign National access to the NOAA ship or Federal Facilities is not required for this project.

VIII. Appendices

1. Primary Project Instructions: OPR-S327-RA-15 Kotzebue Sound, Alaska

Hydrographic Survey Project Instructions

Project Name:	Kotzebue Sound, AK
Project Number:	OPR-S327-RA-15
Assigned Field Unit:	NOAA Ship *Rainier*
Assigned Processing Branch:	Pacific Hydrographic Branch
Signed Date:	05/28/2015
Project Instructions Version:	Final
Planned Acquisition Time:	Start Date: 06/2015 End Date: 08/2015
Delivery Dates:	120 days from completion of data acquisition.

Purpose and Location:
The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. Information for survey priorities was collected and compiled from a number of users/customers in the region: Alaska Marine Pilots, USCG D17 & the buoy tender Hickory, Crowley Tug & Barge, as well as field reports from USCG and NOAA personnel. Assigned survey area will address 1408 square nautical miles all of which are Navigationally Significant in accordance with the National Hydrographic Survey Priorities Edition 2012.
Supporting Documents:
Hydrography shall consist of Navigable Area Surveys in accordance with the following support documents. Data from surveys is intended to supersede all prior survey data in the common area.
NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSD), May 2015
NOS Field Procedures Manual for Hydrographic Surveying (FPM), May 2015
Hydrographic Survey Technical Directive (HTD): HTD 2015-1 Configuration Management

PERSONNEL SAFETY AND DATA QUALITY SHALL ALWAYS BE EMPHASIZED OVER DATA QUANTITY! THE HYDROGRAPHER SHALL NEVER SUBJECT PERSONNEL OR BOATS TO UNDUE RISKS AND HAZARDS.

Registry Details:

General Locality: Kotzebue Sound, AK

Registry Number	*Priority*	*Sublocality*	*State or Territory*	*Scale*	*Estimated SNM*	*Instructions*
H12812	1	Entrance to Kotzebue Sound	Alaska	40000	49	Sheets 1-3 Fairweather.
H12813	2	Entrance to Good Hope Bay	Alaska	40000	41	Sheets 1-3 Fairweather
H12814	3	NE Portion of Good Hope Bay	Alaska	40000	24	Sheets 1-3 Fairweather
H12815	4	East Portion of Good Hope Bay	Alaska	40000	30	
H12816	5	SE Portion of Good Hope Bay	Alaska	40000	27	
H12817	6	2 Miles North of Cape Deceit	Alaska	40000	34	
H12818	7	Approaches to Deering	Alaska	40000	29	
H12819	8	NW Portion of Good Hope Bay	Alaska	40000	31	Sheets 8-10 Rainier
H12820	9	West Portion of Good Hope Bay	Alaska	40000	38	Sheets 8-10 Rainier
H12821	10	SW Portion of Good Hope Bay	Alaska	40000	31	Sheets 8-10 Rainier
H12822	11	Central Portion of Good Hope Bay	Alaska	40000	30	
H12823	12	8 Miles North of Rex Point	Alaska	40000	23	
H12824	13	South Portion of Good Hope Bay	Alaska	40000	21	
H12825	14	2 Miles North of Toawlevic Point	Alaska	40000	50	

Registry Number	*Priority*	*Sublocality*	*State or Territory*	*Scale*	*Estimated SNM*	*Instructions*
H12826	15	East Cape Espenberg	Alaska	40000	73	
H12827	16	NW Cape Espenberg	Alaska	40000	48	Break operations and commence survey when gauge 94BBBBB is operational. Coordinate with HSD-OPS.
H12828	17	2 Miles NE of Espenberg	Alaska	40000	27	Commence survey when gauge 94BBBBB is operational. Coordinate with HSD-OPS.
H12829	18	2 Miles NW of Epsenberg	Alaska	40000	28	Commence survey when gauge 94BBBBB is operational. Coordinate with HSD-OPS.
H12830	19	2 Miles North of NW Corner Light	Alaska	40000	26	Commence survey when gauge 94BBBBB is operational. Coordinate with HSD-OPS.
H12831	20	3 Miles NW of NW Corner Light	Alaska	40000	26	Commence survey when gauge 94BBBBB is operational. Coordinate with HSD-OPS.

Limits & Coverage:

Inshore Limit:The inshore limit of hydrography will be the farthest offshore of the following: (1) the 4-meter depth contour or (2) the line defined by the distance seaward from the MHW line which is equivalent to 0.8 millimeters at the scale of the largest scale nautical chart.

Coverage Type: None Specified

Coverage Water Depth	*Coverage Required*
Greater than 20 meters water depth	Complete MBES coverage with backscatter.
8 meters to 20 meters water depth	Either 1) 100% SSS with concurrent set line spacing SBES or MBES with backscatter, or 2) complete MBES with backscatter. Note: Complete MBES is sufficient for both

Limits & Coverage:	
Coverage Water Depth	*Coverage Required*
	determination of least depth identified with SSS and for disproving a feature - 100% SSS is insufficient to disprove a feature. Refer to Section 6.1.2 of the HSSD to confirm proper SSS acquisition parameters. Gaps in SSS coverage should be treated as gaps in MBES coverage and addressed accordingly.
Inshore limit to 8 meters water depth	300 meter spaced Set Line Spacing SBES or MBES with backscatter. Please ensure the following: 1) Indications of shoaling falling between set line spacing main scheme lines must be investigated 2) Set Line Spacing Line orientation should be approximately perpendicular to isobaths whenever possible.

Assigned Tasks

Acknowledgement:
Acknowledge receipt of these instructions and submit any comments or questions via email to Starla Robinson at Starla.Robinson@noaa.gov.

Aids to Navigation (ATONs):
There are no ATONs specifically assigned for this project. Any ATONs located within the survey area should be verified so that they serve their intended purpose in accordance with section 7.2 of the HSSD.

AWOIS Items:
There are no AWOIS items in the project area.

Maritime Boundary Points (MBPs):
There are no Maritime Boundary investigation requirements for this project.

Bottom Samples:
Obtain bottom samples in accordance with section 7.1 of the HSSD in areas designated by the feature object class springs (SPRING) in the Project Reference File (PRF). Review the recommended bottom sample locations with regards to the acquired survey data. Contact the project manager if it is determined that modifying the bottom sample plan would better differentiate the varying bottom characteristic within the survey area. Any modification to the bottom sample plan shall closely maintain the number and density of samples as originally assigned in the PRF.

Chart Comparison:

Use only the latest editions of the largest scale NOS charts covering the project area. Compare in accordance with section 4.5 of the FPM and section 8.1.4, D.1 of the HSSD. Resolve any discrepancies identified in the field and explain them in the Descriptive Report. The charts, listed below, were used in the preparation of these project instructions and accompanying project files.

Affected Raster Charts

Chart Number	*Scale*	*Edition Number*	*Edition Date*	*LNM Date*	*NM Date*
16005	700000	15	10/2014	03/10/2015	03/07/2015
16161	50000	1	04/2012	03/10/2015	03/07/2015
16200	400000	15	10/2014	03/10/2015	03/07/2015

Affected ENCs

ENC Name	*Scale*	*Edition*	*Update Application Date*	*Issue Date*	*Preliminary*
US1AK90M	1587870	9	05/02/2011	05/02/2011	NO
US2AK92M	700000	7	05/02/2011	11/13/2013	NO
US5AK97M	50000	1	06/06/2012	06/06/2012	NO
US3AK80M	400000	6	10/11/2013	08/01/2014	NO

Coast Pilot:

Review and make recommendations for changes to the Coast Pilot. Coast Pilot excerpts can be downloaded from the Coast Pilot website (http://www.nauticalcharts.noaa.gov/nsd/cpdownload.htm). In addition, address any directed questions found in the Coast Pilot Investigation Items document, included with the project files. Submit both documents, or a report stating no changes are recommended, via email to Coast.Pilot@noaa.gov and OCS.NDB@noaa.gov with a courtesy copy to the HSD OPS project planner. The report should be submitted as soon as possible following field work for the project.

Dangers to Navigation (DTONs):

Generate DTON reports in accordance with the HSSD, section 8.1.3. DTON reports should be sent to ocs.ndb@noaa.gov. It is of paramount importance that DTONs be reported as soon as possible.

Junctions:

Junction with data from the surveys listed below. Refer to sections 2.2.2.3 and 4.5.2 of the FPM.

Registry Number	*Scale*	*Year*	*Platform*	*Relative Location*
H12349	40000	2011	NOAA Ship *Fairweather*	NE
H12350	40000	2011	NOAA Ship *Fairweather*	NE
H12351	40000	2011	NOAA Ship *Fairweather*	NE
H12352	40000	2011	NOAA Ship *Fairweather*	NE

Progress Reports:

Submit a weekly acquisition progress report during field operations, no later than Monday (close-of-business), each week of field acquisition, to the assigned HSD Operations project manager with a brief narrative summarizing the past week's activities and the anticipated plans for the coming week. This narrative shall discuss such all activities related to mobilization/demobilization, control station installation, and data acquisition progress. Also, discuss any other major issues (e.g. significant weather delays, equipment failures, etc.) that may affect acquisition milestones should be discussed. In addition, provide a graphic shall be provided showing an up-to-date coverage map, the project sheet limits, an appropriate chart, and a simple title block indicating the project name and date of coverage.

Survey Outlines:

Generate a survey outline in accordance with the HSSD, section 8.1.2. Submit survey outlines to survey.outlines@noaa.gov.

Special Data Handling Requirements:

ATTENTION: RAINIER and FAIRWEATHER

Submit all Conductivity, Temperature, and Depth (CTD) data to the National Oceanographic Data Center (NODC) ensuring data are in an appropriate file format as outlined on the NODC website at http://www.nodc.noaa.gov/access/dataformats.html

Horizontal Control Requirements:

Comply with the horizontal control requirements in section 3 of the HSSD.

PPK

This project has a requirement to reference the survey data to the ellipse, which will require field-installed control stations, using a single base processing solution. At the commencement of survey operations, check lines should be run across the entirety of these sheets to confirm the operational status of the field-installed stations, and to measure the anticipated uncertainties of the single base solution. The results of these check lines should be reported back to HSD Operations. Refer to ERZT Section below.

PPP

HSD Operations is investigating the procurement of a real-time Precise Point Positioning satellite-based corrector service to be integrated into the Rainier's (S221) ship acquisition system. For the purposes of understanding how to address future positioning needs, the Rainier may be asked to assist in assessing this technology, particularly at high latitudes.

Vertical Control Requirements:

Comply with the vertical control requirements in section 4 of the HSSD.

TCARI

Comply with the requirements from CO-OPS which are included with the project data from the Operations Branch. Submit surveys with final approved water levels applied. Contact the Operations Branch if this causes the survey to miss a submission deadline. Note: Numerous bottom mounted pressure gauges (BMPG) will be deployed throughout this project for the purposes of defining refined tidal mode. As such, work on the model may not commence until the final BMPG is recovered on 3-October. Final tidal products may not be available till mid-November.

ERZT

All survey lines shall be delivered with SBET/RMS files applied and GPS tides computed. The field shall be required to test the Ellipsoid Referenced Zoned Tides (ERZT) model and provide feedback on the procedures. Should the ERZT method prove successful, then all delivered grids at chart datum shall be derived via the ellipse. Within 60 days of the completion of acquisition, the field unit shall prepare an ERS Capability Memorandum, submitted to HSD Operations, summarizing the degree to which ERS surveying campaign was successful. Should the field experience difficulty in realizing chart datum via the ellipse, then, after pursuing technical assistance, the field shall communicate with HSD Operations for guidance on how to proceed.

NWLON Gauges

Operating Water Level Station	*Station ID*
Red Dog Dock	9491094
Nome	9468756

Subordinate Gauges

Operating Water Level Station	*Station ID*	*Leveling Required*	*Installation Required*	*Pre-Existing Benchmarks*
Kotzebue	9490424	NO	NO	NO
Western Kotzebue	94AAAAA	NO	NO	NO
9 Miles W of Espenberg River	94BBBBB	NO	NO	NO
24 Miles SW of Cape Krusenstern	94CCCCC	NO	NO	NO
Central Kotzebue Sound	94DDDDD	NO	NO	NO

Orthometric Imagery:
No Orthometric Imagery has been provided for this project.

Shoreline and Nearshore Features:	
Conduct a limited shoreline verification using the composite source file (CSF). All features with attribute asgnmt populated with 'Assigned' shall be addressed even if they are inshore of NALL.	
GC Number	*Horizontal Position Accuracy*
GC10567	0.4 meters

Additional Task: *Communications with Contractors*
Note: The installation of subordinate stations will be handled by a contractor JOA Surveys, LLC. To avoid the perception of "implied authority" the field units should refrain from communicating with JOA directly; Instead coordinate through the Sheet Manager and COR Brian Johnson.

Additional Task: *Environmental Compliance and Marine Mammal Reporting*
Comply with the marine mammal observation and reporting requirements in section 7.6 of the HSSD.

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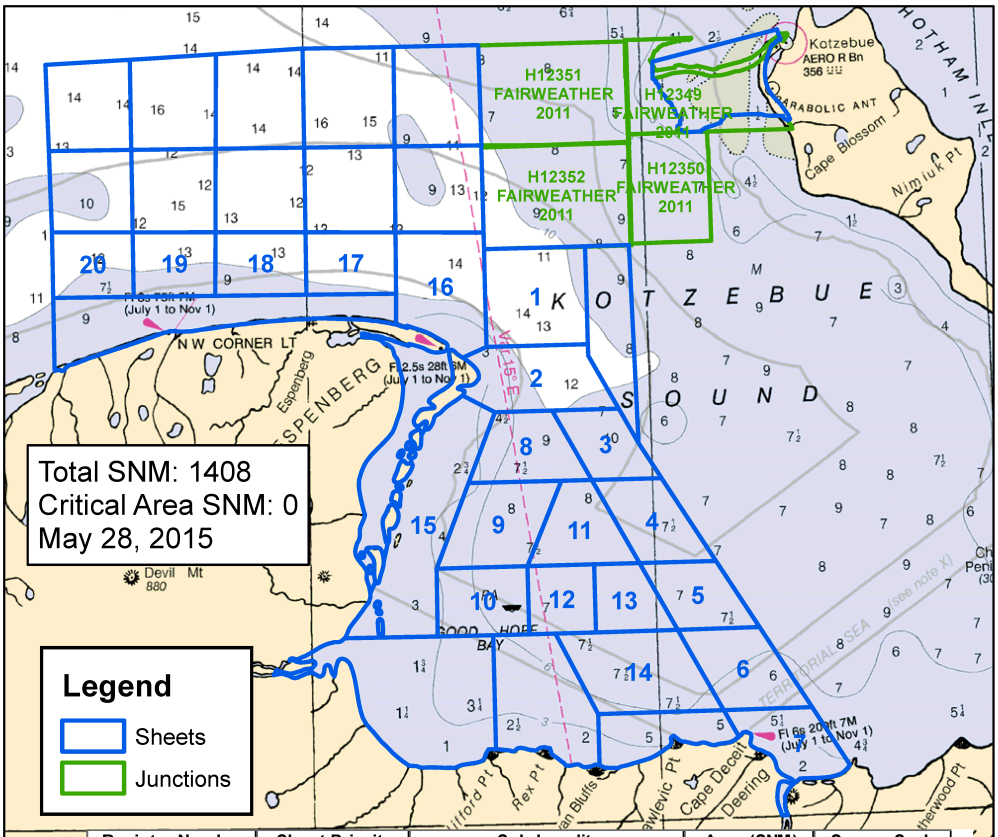


Registry Number	Sheet Priority	Sub-Locality	Area (SNM)	Survey Scale
H12812	1	Entrance to Kotzebue Sound	48.904448	40000
H12813	2	Entrance to Good Hope Bay	41.12909	40000
H12814	3	NE Portion of Good Hope Bay	23.571302	40000
H12815	4	East Portion of Good Hope Bay	30.573823	40000
H12816	5	SE Portion of Good Hope Bay	26.591908	40000
H12817	6	2 Miles North of Cape Deceit	34.443221	40000
H12818	7	Approaches to Deering	28.926329	40000
H12819	8	NW Portion of Good Hope Bay	31.369376	40000
H12820	9	West Portion of Good Hope Bay	38.4543	40000
H12821	10	SW Portion of Good Hope Bay	30.74536	40000
H12822	11	Central Portion of Good Hope Bay	29.74166	40000
H12823	12	8 Miles North of Rex Point	22.526981	40000
H12824	13	South Portion of Good Hope Bay	21.473147	40000
H12825	14	2 Miles North of Toaw levic Point	50.156196	40000
H12826	15	East Cape Espenberg	73.498177	40000
H12827	16	NW Cape Espenberg	47.739038	40000
H12828	17	2 Miles NE of Espenberg	27.437825	40000
H12829	18	2 Miles NW of Epsenberg	28.153709	40000
H12830	19	2 Miles North of NW Corner Light	26.023981	40000
H12831	20	3 Miles NW of NW Corner Light	25.87686	40000

Figure: Kotzebue Sheet Layout

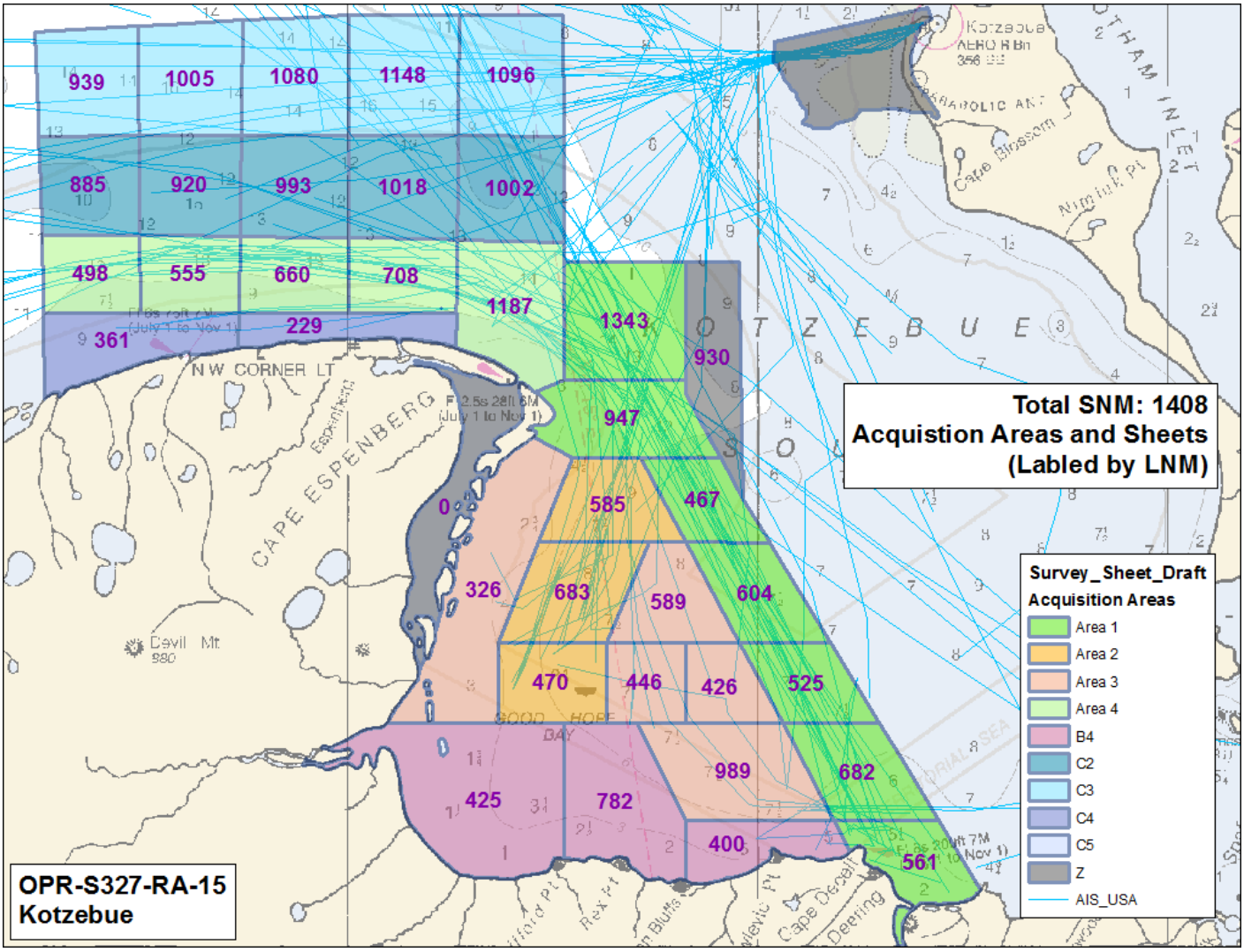


Figure: Kotzebue Sheet LNM.

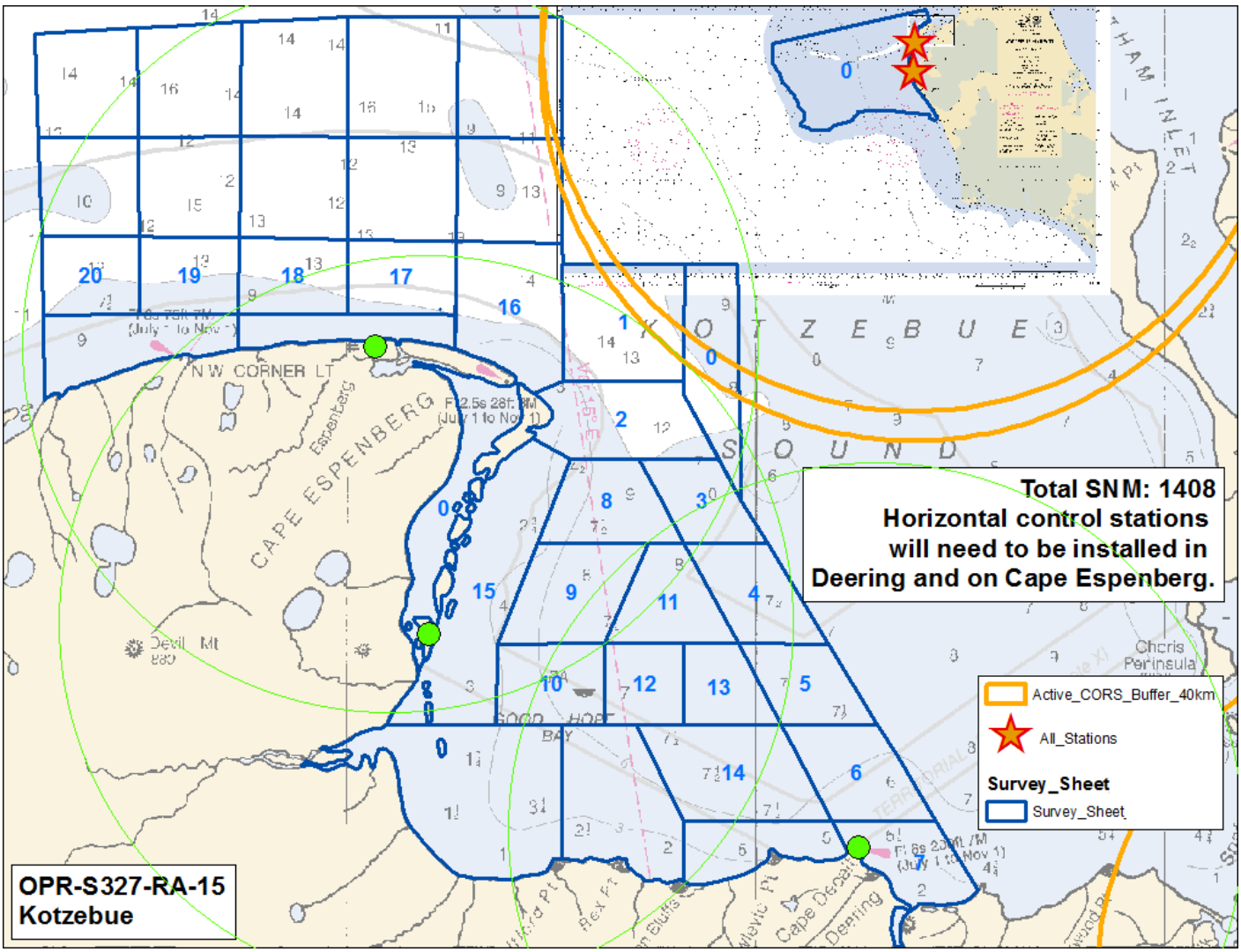


Figure: Kotzebue sheet HORCON location suggestions in green.

User Contacts

The following primary offices and persons shall be contacted at or near the beginning and end of the field operations to discuss survey objectives and accomplishment (Mandatory) or are listed for contact at the discretion of the Commanding Officer (Reference).

Primary Project Manager
Starla Robinson
NOAA
Phone: 301-713-7202 X125
Fax:
Email: Starla.Robinson@noaa.gov
Obligation: Mandatory

Project Manager Back-up
Megan Greenaway
NOAA
Phone: 603-862-2712
Fax:
Email: Megan.Greenaway@noaa.gov
Obligation: For Reference

NOAA Navigation Manager, Alaska Region
LT/NOAA Timothy Smith
NOAA
Phone: 907-271-3327
Fax: 907-231-7112(cell)
Email: Timoth.M.Smith@noaa.gov
Obligation: For Reference

WATER LEVEL INSTRUCTIONS
OPR-S327-RA-2015, Kotzebue Sound, AK
(04/15/2015 LL)

1.0. TIDES AND WATER LEVELS

1.1. Specifications

Tidal data acquisition, data processing, tidal datum computation and final tidal zoning shall be performed utilizing sound engineering and oceanographic practices as specified in National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables (HSSD), dated April 2014, and OCS Field Procedures Manual (FPM), dated April 2014. Specifically reference Chapter 4 of the HSSD and Sections 1.5.8, 1.5.9, 2.4.3, and 3.4.2 of the FPM.

1.2. Vertical Datums

The tidal datums for this project are referenced to Chart Datum, Mean Lower Low Water (MLLW) and Mean High Water (MHW). Soundings are referenced to MLLW and heights of overhead obstructions (bridges and cables) are referenced to MHW.

1.2.1. Water Level Data Acquisition Monitoring

The Commanding Officer (or Team Leader) and the Center for Operational Oceanographic Products and Services (CO-OPS) are jointly responsible for ensuring that valid water level data are collected during periods of hydrography. The Commanding Officer (or Team Leader) is required to monitor the pertinent water level data via the CO-OPS Web site at http://tidesandcurrents.noaa.gov/hydro.shtml, or through regular communications with CO-OPS/Oceanographic Division (OD) personnel before and during operations. During traditional non duty hours, the Commanding Officer/Team Leader may contact the Continuous Operational Real-Time Monitoring System (CORMS) watch stander who is available 24 hours/day - 7 days/week for assistance in assessing the status of applicable water level station operation. The CORMS watch stander may be contacted either by phone at 301-713-2540 or by email: CORMS@noaa.gov. Problems or concerns regarding the acquisition of valid water level data identified by the Commanding Officer/Team Leader shall be communicated with CO-OPS/OD (nos.coops.hpt@noaa.gov) to coordinate the appropriate course of action to be taken such as gauge repair and/or developing contingency plans for hydrographic survey operations. In addition, CO-OPS is required to coordinate with the Commanding Officer/Team Leader before interrupting the acquisition of water level data for the NWLON gauges mentioned above for any reason during periods of hydrography.

1.2.2. The Hydro Hot List (HHL)

Please contact CO-OPS/Hydrographic Planning Team (HPT) at nos.coops.hpt@noaa.gov and Operational Engineering Team (OET) at nos.coops.oetteam@noaa.gov at least three business days before survey operations begin, and within 1 business day after survey operations are completed so that the appropriate CO-OPS National Water Level Observation Network (NWLON) control water level stations, as well as any required subordinate stations, are added to or removed from the CO-OPS Hydro Hotlist (HHL) (http://tidesandcurrents.noaa.gov/hydro). Include start and end survey dates, full project number (e.g. OPR-H355-TJ-10), and control and subordinate station numbers. The notification must be sent to both teams as OET is responsible

for configuring the station in the CO-OPS data base and HPT manages the addition and removal of stations from the HHL.

Station	Station ID	Residual or Datum Control or Subordinate Installation	Type (NWLON, PORTS©, etc.)	Approximate Deployment Period
Red Dog Dock	9491094	Residual and Datum	NWLON	Permanent
Nome	9468756	Datum	NWLON	Permanent
Kotzebue	9490424	Residual	Subordinate	07/01/2015-09/30/2015
Western Kotzebue	94AAAAA	Residual	Subordinate	07/01/2015-09/30/2015
9 Miles W of Espenberg River	94BBBBB	Residual	Subordinate	07/01/2015-07/31/2015
24 Miles SW of Cape Krusenstern	94CCCCC	Residual	Subordinate	08/03/2015-09/01/2015
Central Kotzebue Sound	94DDDDD	Residual	Subordinate	09/04/2015-10/03/2015

Table 1: All stations that need to be added to the HHL in support of S327-RA-2015

Two subordinate stations, Kotzebue, AK (9490424) and Western Kotzebue, AK (94AAAAA), will be operating for the duration of the survey. The remaining three subordinate stations, 9 Miles W of Espenberg River (94BBBBB), 24 Miles SE of Cape Krusenstern (94CCCCC), and Central Kotzebue Sound (94DDDDD), will each only be operating for a portion of the survey. Table 1 indicates the dates for each of those installations. It is critical that hydrographic operations occur within the vicinity of an active subordinate station. Refer to the accompanying graphic to determine the preferred times and locations of hydrography with respect to each subordinate gauge deployments.

It is important to know that the addition of a water level station to the HHL ensures the station is monitored by CORMS and any problems are reported daily. However, platforms should view the HHL each morning of active survey operations and click on the "Plot" to double check that there are not problems with the required stations on that day. If a platform notices problems with data on their survey day of operation, please contact HPT at nos.coops.hpt@noaa.gov, CORMS at CORMS@noaa.gov, and their respective headquarters point of contact at HSD or NSD. Stations on the HHL are given priority for maintenance should a station cease normal operation during scheduled times of hydrography. CO-OPS will notify a field unit within 1 business day if a HHL water level station ceases operation during scheduled times of hydrography. This is in addition to the daily CORMS report that CORMS sends to NOAA field units, if the field unit's e-mail address is added to the CORM's daily e-mail list. To be added to the CORMS daily HHL report, the platform should contact CO-OPS' Data Monitoring and Analysis Team (DMAT) at nos.co-ops.dmat@noaa.gov and request to be added.

If the stations are listed on HHL, then weekly priority processing will occur and, for those water level stations, verified 6-minute water level data will be made available every week on Monday or Tuesday. If Monday happens to be a federal holiday, then the 6-minute verified water level data will be made available on the following Tuesday or Wednesday. In order to ensure that verified data is correctly downloaded please **select a date that is more than 7 days prior to the day of interest** in the 'From' field on the CO-OPS website.

1.3. Operating Tide Reducer and Datum Control Stations

1.3.1. CO-OPS Long Term Water Level Station Operation and Maintenance

The NWLON stations at Red Dog Dock, AK (9491094) and Nome, AK (9468756) will provide water level reducers for this project. Therefore it is critical that it remain in operation during the survey. See Sections 1.1. and 1.2. concerning responsibilities.

The operating NWLON stations at Red Dog Dock, AK (9491094) and Nome, AK (9468756) may serve as datum control /stations for the subordinate installations. Therefore, it is critical that they remain in operation during all periods of hydrography.

No leveling is required at Red Dog Dock, AK (9491094) and Nome, AK (9468756) by NOAA's Platform Rainier personnel.

CO-OPS/FOD is responsible for the operation and maintenance of all NWLON primary control stations. If a problem is identified at an NWLON primary control station, FOD shall make all reasonable efforts to repair the malfunctioning station. However, CO-OPS may request assistance from the NOAA ship or NRT personnel in the actual repair of the water level station to facilitate a rapid repair. CO-OPS/FOD and the Commanding Officer (or Team Leader) shall maintain the required communications until the repairs to the water level station have been completed.

1.3.2. Subordinate Station Requirements

For this project, it will be necessary to install and continuously operate water level measurement systems (tide gauges) at one or more approved subordinate station locations. These subordinate stations identified for hydrography are required to be installed to provide the tidal datums, water level reducers, refinement of final zoning, and harmonic constituents for predictions needed to meet NOS hydrographic specifications' accuracies as well as to support other NOAA objectives. The stations listed in the second paragraph of Section 1.3.1. will provide control for datum computations at subordinate stations by using the NOS method of comparison of simultaneous observations.

A 30-day minimum of continuous data acquisition is required for all required subordinate station installations. If the data is collected for less than 30 days at the required subordinate stations, then according to the operating guidelines and business rules, CO-OPS may not publish tidal datums and bench marks sheet. This means CO-OPS may not be able to provide final tides (tide reducers) for less than 30 days of valid and good data. Since all data including water level data collected for hydrographic or photogrammetry surveys is used to derive products that support various NOS multipurpose applications, collection of minimum of 30-days of data is a crucial requirement.

For all subordinate stations, data must be collected throughout the entire survey period in specified areas for which they are applicable, from 4 hours before to 4 hours after the period of hydrography and not less than 30 continuous days. If the subordinate tide gauges are required to support the TCARI process, then all the gauges are required to collect the data for the entire period of the survey (in addition to the 30 day requirement) because the TCARI tidal grid is developed based upon all the gauges. This is necessary not only to facilitate the computation of an accurate datum reference as per NOS hydro graphic specifications (http://www.nauticalcharts.noaa.gov/hsd/specs/specs.htm), but also to ensure a functional data set that meets CO-OPS' multi-purpose products use and dissemination standards. If the subordinate station has a currently published datum, every effort must be made to set the station datum for the new installation to the historic station datum, so that all newly collected observations are on the

same zero reference as the currently accepted datum. If the length of the new series of observations is shorter than that of the accepted datum time series, the newly submitted datum may be validated as acceptable for the hydrographic survey but may not supersede the longer already published datum.

Additionally, supplemental and/or back-up stations may also be necessary based upon the complexity of the hydrodynamics and/or the severity of environmental conditions at the project area. If the Commanding Officer (or Team Leader) determines that additional or alternative water level stations are necessary to those required by CO-OPS, then he or she must coordinate with CO-OPS to obtain CO-OPS' approval and to define the timing and location of the additional or alternative subordinate station(s). For all subordinate stations that are approved and installed, a minimum of 30 continuous days of data must be collected throughout the entire survey period for which they are applicable. If the minimum 30-day data collection requirement is not met, CO-OPS may not be able to provide the tide reducers for the survey.

Since NOS uses the data and products derived from the operational NOS Hydrographic Surveys Program, installation of training gauges is discouraged during the operations. Also for training purposes, only Temporary Bench Marks (TBM) shall be installed and permanent bench marks shall not be installed. CO-OPS will not publish water level datums on TBM and CO-OPS is not required to provide data processing for training gauges. Any gauges required for providing tide reducers either via TCARI or discrete tidal zoning shall not be considered training gauges.

All additions and modifications to the original subordinate gauge installation requirements shall be documented via an amendment to the Project Instructions. Delivery of the amended Project Instructions to OCS's Hydrographic Surveys Division Operations Branch will signify CO-OPS' approval of the additions and/or modifications to the gauge installations requirements.

The following subordinate stations are required:

Station Number	Station Name	Latitude (N)	Longitude (W)
9490424*	Kotzebue, AK	66° 54.1'	162° 34.9'
94AAAAA**	Western Kotzebue Sound, AK	66° 18.5'	163° 49.0'
94BBBBB**	9 Miles W of Espenberg River	66° 35.6'	164° 15.2'
94CCCCC**	24 M SW of Cape Krusenstern	66° 54.5'	164° 00.0'
94DDDDD**	Central Kotzebue Sound	66° 29.3'	163° 04.5'

* Historical water level station information has been provided for these stations.

** Conduct reconnaissance of the area to establish a suitable location for the placement of the water level gauge and provide the CO-OPS personnel listed in Section 1.2.1 with the proposed name and location. CO-OPS/Engineering Division (ED) will confirm this and then assign a station number. **Do not install these subordinate gauges prior to receiving assigned station numbers. If it is necessary to change the location of a gauge by more than ¼ mile from its assigned location and a station number has already been assigned, then contact CO-OPS/ED personnel at nos.coops.oetteam@noaa.gov prior to the installation of the gauge.**

1.3.3. Tide Component Error Estimation

This section is not applicable for this project. Tidal Constituent And Residual Interpolator (TCARI) automatically calculates the error associated with water level interpolation. This error is incorporated into the residual/harmonic solutions and included in the Total Propagated Error (TPE) for the survey. Uncertainty values input into TCARI model are 2-sigma. Pydro will automatically supply 1-sigma values to *CARIS* when computing uncertainty.

1.3.4. GOES Satellite Enabled Subordinate Stations

This section is not applicable to this project.

1.3.5. Benchmark Recovery and GPS Requirements

Recover all historical bench marks at each required subordinate water level station. If a total of five benchmarks cannot be found, install the number of benchmarks necessary for the subordinate station to have the total five benchmarks. In the event of a new station with no historical marks, installation of a minimum of five bench marks will be required. Third-order levels from the tide staff or sensor to a minimum of five bench marks (including the primary bench mark) are required at the beginning and end of the survey period. See Section 1.1. for clarification of requirements.

1.3.5.1. Hand held GPS latitude and longitude positions on all historical subordinate water level station bench marks are required. In addition, one of the subordinate water level station bench marks shall be selected for high accuracy static differential GPS observations to obtain ties between the tidal datums and GPS derived datums. Refer to Section 1.1 for further details on the GPS positioning requirements.

1.3.6. Residual Water Level Station(s) Data

The Tidal Constituent And Residual Interpolation (TCARI) method uses harmonic constituents and residuals from historical and operating water level stations to provide precise water level correction for bathymetric surveys. Download the Preliminary/Verified data at following water level stations for all periods of survey.

The operating stations at Red Dog Dock, AK (9491094), Nome, AK (9468756), Kotzebue, AK (9490424), Western Kotzebue Sound, AK (94AAAAA), 9 Miles W of Espenberg River (94BBBBB), 24 Miles SE of Cape Krusenstern (94CCCCC), and Central Kotzebue Sound (94DDDDD) will provide residuals for this project and must remain in operation during all periods of hydrography.

Station Number	Station Name	Latitude(N)	Longitude(W)
9491094	Red Dog Dock, AK	67° 34.6’	164° 3.9’
9468756	Nome, AK	64° 29.7’	165° 26.4’
9490424	Kotzebue, AK	66° 54.1'	162° 34.9'
94AAAAA	Western Kotzebue Sound, AK	66° 18.5'	163° 49.0'
94BBBBB	9 Miles W of Espenberg River	66° 35.6'	164° 15.2'
94CCCCC	24 M SW of Cape Krusenstern	66° 54.5'	164° 00.0'
94DDDDD	Central Kotzebue Sound	66° 29.3'	163° 04.5'

1.4. Tidal Constituent and Residual Interpolation (TCARI)

1.4.1. For hydrography in the area of Approaches to Fernandina Beach, apply the TCARI grid "S327RA2015.tc" supplied in conjunction with the water level data from Section 1.3.6 to produce a seamless tide correction. Refer to the TCARI Field SOP for detailed TCARI instructions.

1.4.2. This section is not applicable for this project.

1.4.3. TCARI Diagram(s)

A diagram created which includes the exported TCARI grid boundary, is provided in digital copy format to assist with the information provided in section 1.4.1.

1.4.4. TCARI Final Solutions

Upon completion of project, submit a Pydro generated request for smooth tides, with times of hydrography abstract and mid/mif tracklines attached. Forward this request to final.tides@noaa.gov. Provide the project number, as well as sheet number, in the subject line of the email.

CO-OPS will review the times of hydrography, final tracklines, and six-minute water level data from all applicable water level gauges. If there are any discrepancies, CO-OPS will make the appropriate adjustments and forward a revised TCARI grid and solutions to the field group and processing branch for final processing.

1.5. Fetchtides

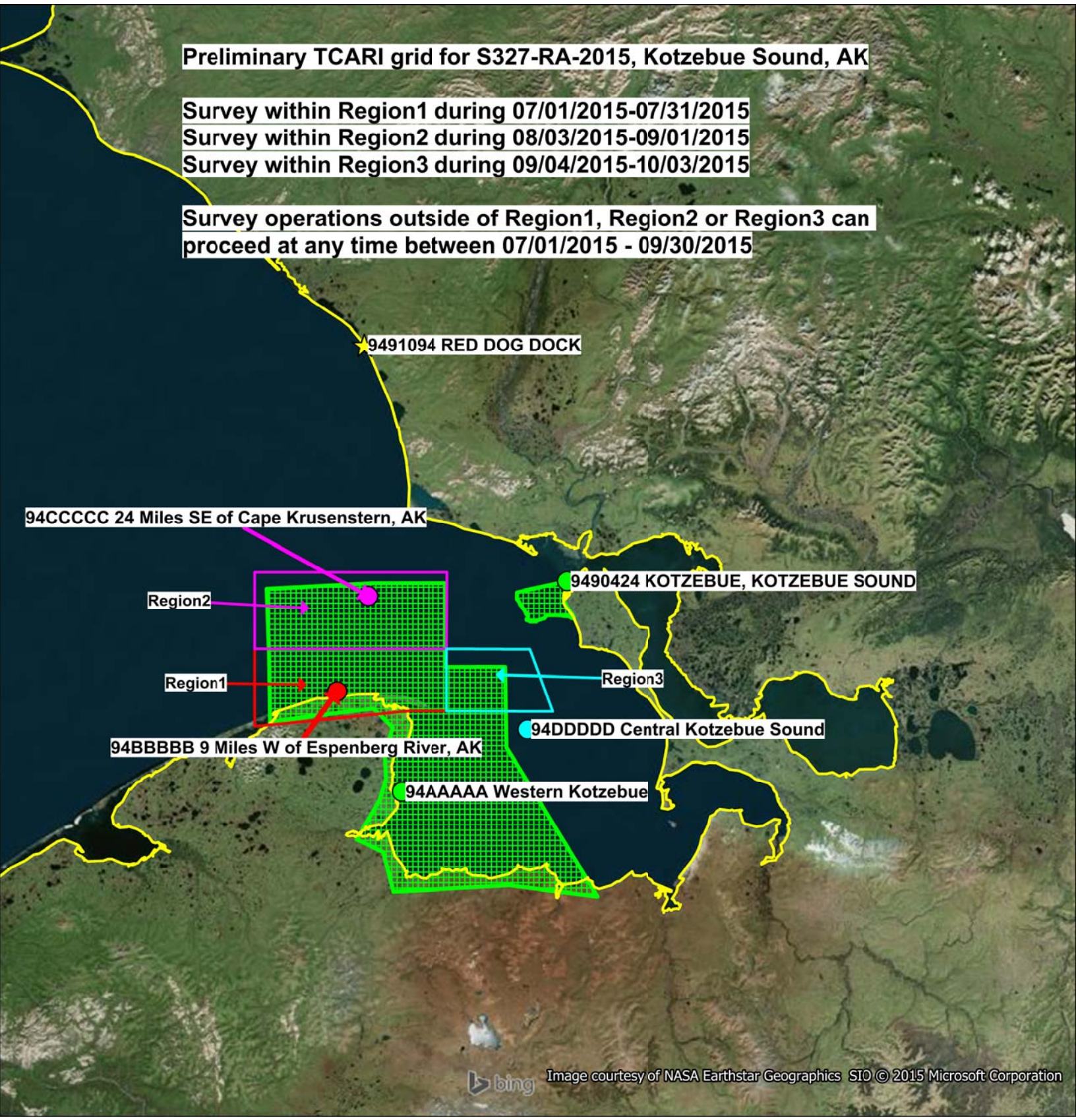
Preliminary and verified six minute water level time series data may be retrieved from the CO-OPS database via the Fetchtides application. Fetchtides provides a mechanism to store imported data locally and combines multiple days of data into one CARIS readable tide (.tid) file. Fetchtides is available for download at Hydrosoft Online (https://inside.nos.noaa.gov/hydrosoft/hydrosoftware.html. For more information, please see the Fetchtides User Manual in the FPM chapter 3 appendix.

1.6 Water Level Records

Submit water level data, such as leveling records, field reports, and any other relevant data/reports, including the data downloaded onto diskette/CD as specified in the latest version of the NOS Specifications and Deliverables document.

1.6.1 Water level records should be forwarded to the following address:

NOAA/National Ocean Service/CO-OPS
Chief, Engineering Division
N/OPS1 - SSMC4, Station 6531
1305 East-West Highway
Silver Spring, MD 20910


Preliminary TCARI grid for S327-RA-2015, Kotzebue Sound, AK
Survey within Region1 during 07/01/2015-07/31/2015
Survey within Region2 during 08/03/2015-09/01/2015
Survey within Region3 during 09/04/2015-10/03/2015
Survey operations outside of Region1, Region2 or Region3 can proceed at any time between 07/01/2015 - 09/30/2015
9491094 RED DOG DOCK
94CCCCC 24 Miles SE of Cape Krusenstern, AK
Region2
Region1
Region3
9490424 KOTZEBUE, KOTZEBUE SOUND
94DDDDD Central Kotzebue Sound
94BBBBB 9 Miles W of Espenberg River, AK
94AAAAA Western Kotzebue
bing
Image courtesy of NASA Earthstar Geographics SIO © 2015 Microsoft Corporation

Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>

Project Instructions for S327-RA-2015, Approaches to Kotzebue, AK

Louis Licate - NOAA Affiliate <louis.licate@noaa.gov> Fri, Apr 17, 2015 at 9:55 AM
To: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Lucy Hick - NOAA Federal <lucy.hick@noaa.gov>, HPT list <nos.coops.hpt@noaa.gov>

UNITED STATES DEPARMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

DATE: 04/16/2015

MEMORANDUM FOR: LCDR Michael Gonsalves
Chief, Operations Branch, N/CS31

FROM: Gerald Hovis
Chief, Products and Services Branch, N/OPS3

SUBJECT: Delivery of Tide Requirements for Hydrographic Surveys

Tide requirements for hydrographic survey project OPR-S327-RA-2015 Approaches to Kotzebue, AK are being provided at ftp://tidepool.nos.noaa.gov/pub/outgoing/HPT/Project_Instructions_TCARI/S327RA21015/. Six minute preliminary data for Red Dog Dock, AK (9491094) may be retrieved in one month increments over the internet from the CO-OPS SOAP web services at http://opendap.co-ops.nos.noaa.gov/axis/text.html by clicking on "Six Minute Data". A zip file containing the Project Instructions document and graphics is also posted to the SharePoint under the project name "OPR-S327-RA-15".

--
Louis Licate
Oceanographic Division
Center for Operational Oceanographic Products and Services
National Ocean Service
National Oceanic and Atmospheric Administration

1305 East-West Highway, 7129
Silver Spring, MD 20910
Office: 301-713-2877x113

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Coast Survey
Silver Spring, Maryland 20910-3282

FINAL Project Instructions

Date Submitted: May 28, 2015

Contractor: NOAA Ship *Rainier*

Project Number: OPR-R976-RA-15

Project Title: South Arctic Reconnaissance

Period of Performance: June, 2015 to September, 2015

Prepared by: _____ Dated: 29-May 2015
LCDR Michael O. Gonsalves, NOAA
Chief, Operations Branch
Hydrographic Surveys Division

Approved by: _____ Dated: 29-May 2015
CAPT Eric W. Berkowitz, NOAA
Chief, Hydrographic Surveys Division
Office of Coast Survey

Hydrographic Survey Project Instructions

Project Name:	South Arctic Reconnaissance
Project Number:	OPR-R976-RA-15
Assigned Field Unit:	NOAA Ship *Rainier*
Assigned Processing Branch:	Pacific Hydrographic Branch
Signed Date:	05/28/2015
Project Instructions Version:	Final
Planned Acquisition Time:	Start Date: 06/2015 End Date: 09/2015
Delivery Dates:	120 days from completion of data acquisition.

Purpose and Location:
To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations. The assigned tracklines are located within the USCG-proposed Arctic PARS Corridor, a corridor largely lacking in modern hydrographic data.
Supporting Documents:
Hydrography shall consist of Navigable Area Surveys in accordance with the following support documents. Data from surveys is intended to supersede all prior survey data in the common area.
NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSD), May 2015
NOS Field Procedures Manual for Hydrographic Surveying (FPM), May 2015
Hydrographic Survey Technical Directive (HTD) 2015-1: Configuration Management
Hydrographic Survey Technical Directive (HTD): 2013-5: DR Requirements for Non-Standard Surveys

PERSONNEL SAFETY AND DATA QUALITY SHALL ALWAYS BE EMPHASIZED OVER DATA QUANTITY! THE HYDROGRAPHER SHALL NEVER SUBJECT PERSONNEL OR BOATS TO UNDUE RISKS AND HAZARDS.

Registry Details:

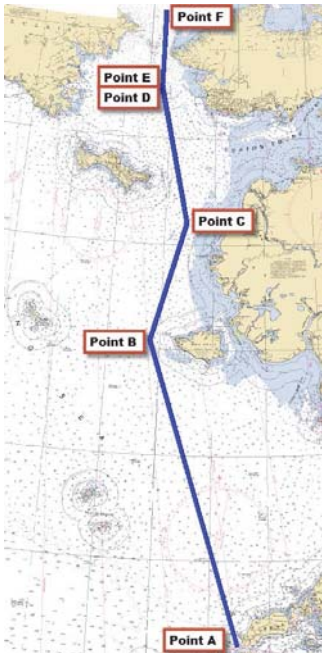
General Locality: Corridor between Aleutian Islands and Bering Strait

Registry Number	*Priority*	*Sublocality*	*State or Territory*	*Scale*	*Estimated SNM*	*Instructions*
D00198	1	USCG-Proposed PARS Corridor	Alaska	40000	150	Lines: RA1, RA2, RA3, RA4

Limits & Coverage:

Inshore Limit:There is no inshore limit defined for this survey.

Coverage Type: None Specified

Coverage Water Depth	*Waypoints*	*Coverage Required*
All waters in survey area		Trackline Specifications, see HSSD Section 5.2.2.4.2. The Descriptive Report shall follow the DR Summary description as defined in HTD 2013-5. The maximum time between sound speed profiles shall be one hour. Each of the assigned tracklines is ~750 linear nautical miles. It is not expected that NOAA Ship *Rainier* will acquire data for the entire trackline; these are tracklines of opportunity and partial acquisition is acceptable. It is expected, however, that the weekly progress report will include what parts of the assigned lines were acquired. For example, using the waypoints as indicated in the left image, NOAA Ship *Rainier* acquired trackline RA1A-RA1B, RA1B-RA1C and about half of RA1C-RA1D before heading into Nome, AK.

Assigned Tasks

Acknowledgement:

The project manager and associated contact information may be found in the User Contacts section of this document. The field unit shall acknowledge receipt of these instructions and submit any comments or questions via email to the project manager. Additionally, the project manager shall be included on all discussions or correspondence involving issues concerning this project.

Aids to Navigation (ATONs):
There are no ATONs specifically assigned for this project. Any ATONs located within the survey area should be verified so that they serve their intended purpose in accordance with section 7.2 of the HSSD.

AWOIS Items:
Not Assigned

Maritime Boundary Points (MBPs):
There are no Maritime Boundary investigation requirements for this project.

Bottom Samples:
There is no Bottom Sample requirement for this project.

Chart Comparison:

Use only the latest editions of the largest scale NOS charts covering the project area. Compare in accordance with section 4.5 of the FPM and section 8.1.4, D.1 of the HSSD. Resolve any discrepancies identified in the field and explain them in the DR Summary. The charts, listed below, were used in the preparation of these project instructions and accompanying project files.

Affected Raster Charts

Chart Number	*Scale*	*Edition Number*	*Edition Date*	*LNM Date*	*NM Date*
16005	700000	10	10/2007	04/25/2015	04/21/2015
16006	1534076	35	04/2008	04/25/2015	04/21/2015
16011	1023188	38	08/2012	04/25/2015	04/21/2015
16200	400000	15	10/2014	04/25/2015	04/21/2015
16220	315350	6	05/2013	04/25/2015	04/21/2015
16190	100000	1	05/2013	04/25/2015	04/21/2015
16520	300000	23	08/2008	04/25/2015	04/21/2015
16531	80000	7	02/2002	04/25/2015	04/21/2015

Affected ENCs

ENC Name	*Scale*	*Edition*	*Update Application Date*	*Issue Date*	*Preliminary*
US2AK5FM	1023188	10	11/30/2012	08/06/2014	NO
US2AK92M	700000	7	05/02/2015	11/13/2014	NO
US3AK80M	400000	6	10/11/2013	08/01/2014	NO
US3AK89M	315350	3	04/10/2014	08/04/2014	NO
US4AK8DM	100000	3	04/22/2015	04/22/2015	NO
US3AK61M	300000	17	11/20/2014	11/20/2014	NO
US4AK6FM	80000	8	04/28/2011	06/13/2014	NO

Coast Pilot:

There is no Coast Pilot requirement for this project.

Dangers to Navigation (DTONs):

Generate DTON reports in accordance with the HSSD, section 8.1.3. DTON reports should be sent to ocs.ndb@noaa.gov. It is of paramount importance that DTONs be reported as soon as possible.

Junctions:

No junctioning surveys have been provided for this project.

Progress Reports:
Submit a weekly acquisition progress report during field operations, no later than Monday (close of business), each week of field acquisition, to the assigned HSD Operations project manager with a brief narrative summarizing the past week's activities and the anticipated plans for the coming week. This narrative shall discuss all activities related to mobilization/demobilization, control station installation, and data acquisition progress. Also, discuss any other major issues (e.g. significant weather delays, equipment failures, etc.) that may affect acquisition milestones. In addition, provide a graphic shall be provided showing an up-to-date coverage map, the project sheet limits, an appropriate chart, and a simple title block indicating the project name and date of coverage.

Survey Outlines:
Generate a survey outline in accordance with the HSSD, section 8.1.2. Submit survey outlines to survey.outlines@noaa.gov.

Special Data Handling Requirements:
ATTENTION: Field Unit Submit all Conductivity, Temperature, and Depth (CTD) data to the National Oceanographic Data Center (NODC) ensuring data are in an appropriate file format as outlined on the NODC website at http://www.nodc.noaa.gov/access/dataformats.html

Horizontal Control Requirements:
Horizontal Control at a minimum shall be stand-alone GPS. The recommendation is DGPS or WAAS.

Vertical Control Requirements:

Comply with the vertical control requirements in section 4 of the HSSD.

TCARI

Comply with the requirements from CO-OPS which are included with the project data from the Operations Branch. Submit surveys with final approved water levels applied. Contact the Operations Branch if this causes the survey to miss a submission deadline.

NWLON Gauges

Operating Water Level Station	*Station ID*
Red Dog Dock, AK	9491094
Nome, AK	9468756
Village Cove, AK	9464212
Unalaska, AK	9462620
Port Moller, AK	9463502

Orthometric Imagery:

No Orthometric Imagery has been provided for this project.

Shoreline and Nearshore Features:

There is no Shoreline Verification requirement for this project.

User Contacts

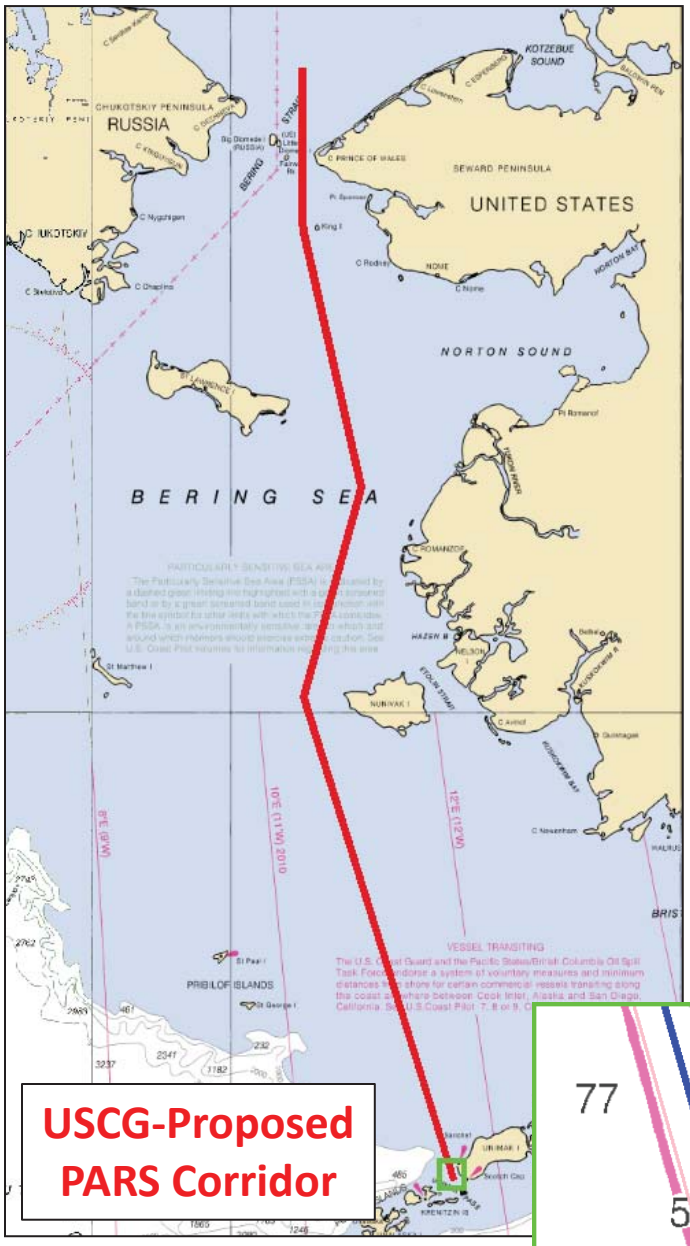
The following primary offices and persons shall be contacted at or near the beginning and end of the field operations to discuss survey objectives and accomplishment (Mandatory) or are listed for contact at the discretion of the Commanding Officer (Reference).

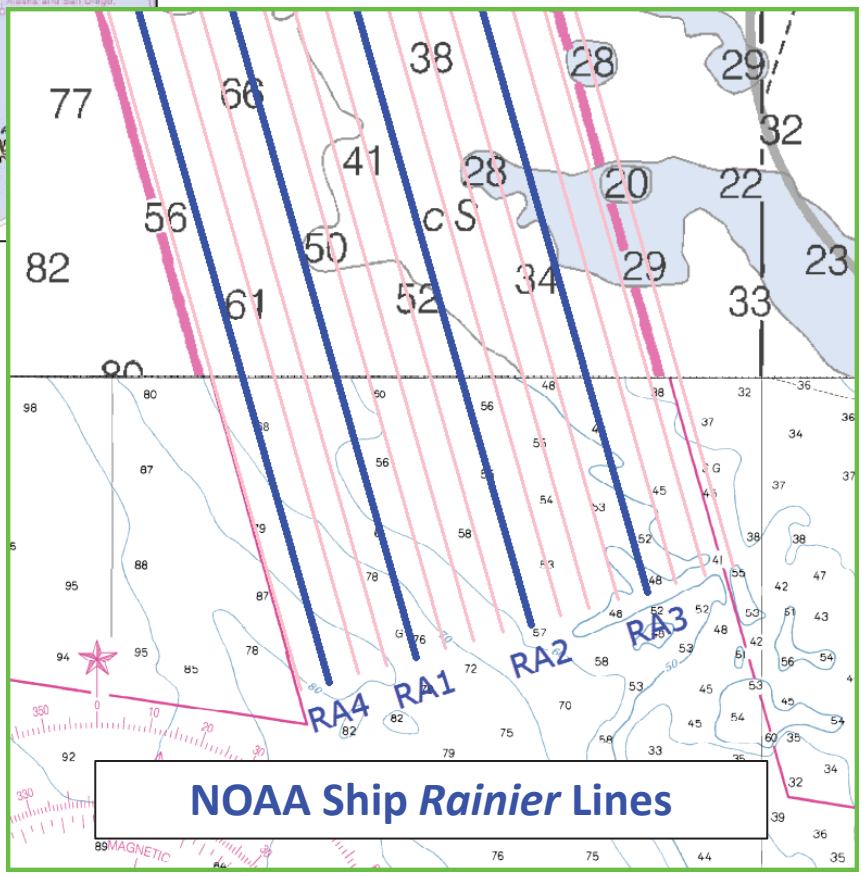
Project Manager
Katrina Wyllie
NOAA
Phone: 301-713-2700 x106
Fax:
Email: katrina.wyllie@noaa.gov
Obligation: Mandatory

Secondary Project Manager
Christina Fandel
NOAA
Phone: 301-713-2700 x133
Fax:
Email: christina.fandel@noaa.gov
Obligation: For Reference

NOAA Navigation Manager, Alaska Region
LT Timothy Smith
NOAA
Phone: 907-271-3327
Fax:
Email: timothy.smith@noaa.gov
Obligation: For Reference

OPR-R976-RA-15 South Arctic Reconnaissance





WATER LEVEL INSTRUCTIONS
M-R976-RAFA-2015 PARS Arctic Corridor, AK
(04/15/2015 LH)

1.0. TIDES AND WATER LEVELS

1.1. Specifications

Tidal data acquisition, data processing, tidal datum computation and final tidal zoning shall be performed utilizing sound engineering and oceanographic practices as specified in National Ocean Service (NOS) Hydrographic Surveys Specifications and Deliverables (HSSD), dated April 2014, and OCS Field Procedures Manual (FPM), dated April, 2014. Specifically reference Chapter 4 of the HSSD and Sections 1.5.8, 1.5.9, 2.4.3, and 3.4.2 of the FPM.

1.2. Vertical Datums

The tidal datums for this project are referenced to Chart Datum, Mean Lower Low Water (MLLW) and Mean High Water (MHW). Soundings are referenced to MLLW and heights of overhead obstructions (bridges and cables) are referenced to MHW.

1.2.1. Water Level Data Acquisition Monitoring

The Commanding Officer (or Team Leader) and the Center for Operational Oceanographic Products and Services (CO-OPS) are jointly responsible for ensuring that valid water level data are collected during periods of hydrography. The Commanding Officer (or Team Leader) is required to monitor the pertinent water level data via the CO-OPS Web site at http://tidesandcurrents.noaa.gov/hydro.shtml, or through regular communications with CO-OPS/Oceanographic Division (OD) personnel before and during operations. During traditional non duty hours, the Commanding Officer/Team Leader may contact the Continuous Operational Real-Time Monitoring System (CORMS) watch stander who is available 24 hours/day - 7 days/week for assistance in assessing the status of applicable water level station operation. The CORMS watch stander may be contacted either by phone at 301-713-2540 or by email: CORMS@noaa.gov. Problems or concerns regarding the acquisition of valid water level data identified by the Commanding Officer/Team Leader shall be communicated with CO-OPS/OD (nos.coops.hpt@noaa.gov) to coordinate the appropriate course of action to be taken such as gauge repair and/or developing contingency plans for hydrographic survey operations. In addition, CO-OPS is required to coordinate with the Commanding Officer (or Team Leader) before interrupting the acquisition of water level data for the NWLON stations mentioned above for any reason during periods of hydrography.

1.2.2. The Hydro Hot List (HHL)

Please contact the CO-OPS/Hydrographic Planning Team (HPT) at nos.coops.hpt@noaa.gov and the Operational Engineering Team (OET) at nos.coops.oetteam@noaa.gov at least three business days before survey operations begin, and within 1 business day after survey operations are completed so that the appropriate CO-OPS National Water Level Observation Network (NWLON) control water level stations are added to or removed from the CO-OPS Hydro Hotlist (HHL) (http://tidesandcurrents.noaa.gov/hydro). Include start and end survey dates, full project number (e.g. OPR-H355-TJ-10), and control station numbers. The notification must be sent to both teams as OET is responsible for configuring the stations in the CO-OPS data base and HPT manages the addition and removal of stations from the HHL.

Station	Station ID	Residual Control	Type (NWLON, PORTS©, etc.)	Comment
Unalaska, AK	9462620	Residual Control	NWLON	
Port Moller, AK	9463502	Residual Control	NWLON	
Village Cove, AK	9464212	Residual Control	NWLON	
Nome, AK	9468756	Residual Control	NWLON	
Red Dog Dock, AK	9491094	Residual Control	NWLON	

Table 1: All stations that need to be added to the HHL in support of R976RAFA2015

It is important to know that the addition of a water level station to the HHL ensures the station is monitored by CORMS and any problems are reported daily. However, platforms should view the HHL each morning of active survey operations and click on the "Plot" to double check that there are no problems with the required stations on that day. If a platform notices problems with data on their survey day of operation, please contact HPT at nos.coops.hpt@noaa.gov, CORMS at CORMS@noaa.gov, and their respective headquarters point of contact at HSD or NSD. Stations on the HHL are given priority for maintenance should a station cease normal operation during scheduled times of hydrography. CO-OPS will notify a field unit within 1 business day if a HHL water level station ceases operation during scheduled times of hydrography. This is in addition to the daily CORMS report that CORMS sends to NOAA field units, if the field unit's e-mail address is added to the CORM's daily e-mail list. To be added to the CORMS daily HHL report, the platform should contact CO-OPS' Data Monitoring and Analysis Team (DMAT) at nos.co-ops.dmat@noaa.gov and request to be added.

If the stations are listed on HHL, then weekly priority processing will occur and, for those water level stations, verified 6-minute water level data will be made available every week on Monday or Tuesday. If Monday happens to be a federal holiday, then the 6-minute verified water level data will be made available on the following Tuesday or Wednesday. In order to ensure that verified data is correctly downloaded please **select a date that is more than 7 days prior to the day of interest** in the 'From' field on the CO-OPS website.

1.3. Operating Tide Reducer Stations

1.3.1. CO-OPS Long Term Water Level Station Operation and Maintenance

The NWLON stations Unalaska, AK (9462620), Port Moller, AK (9463502), Village Cove, AK (9464212), Nome, AK (9468756) and Red Dog Dock (9491094), will provide water level reducers for this project. Therefore it is critical that they remain in operation during the survey. See Sections 1.1. and 1.2. concerning responsibilities.

No leveling is required at Unalaska, AK (9462620), Port Moller, AK (9463502), Village Cove, AK (9464212), Nome, AK (9468756) and Red Dog Dock (9491094) by NOAA's Fairweather/Rainier personnel.

CO-OPS/FOD is responsible for the operation and maintenance of all NWLON primary control stations. If a problem is identified at an NWLON primary control station, FOD shall make all reasonable efforts to repair the malfunctioning station. However, CO-OPS may request assistance from the NOAA ship or

NRT personnel in the actual repair of the water level station to facilitate a rapid repair. CO-OPS/FOD and the Commanding Officer (or Team Leader) shall maintain the required communications until the repairs to the water level station have been completed.

1.3.2. Subordinate Station Requirements

No subordinate water level stations are required for this project, however, supplemental and/or back-up water level stations may be necessary depending on the complexity of the hydrodynamics and/or the severity of the environmental conditions of the project area. The installation and continuous operation of water level measurement systems (tide gauges) at subordinate station locations is left to the discretion of the Commanding Officer (or Team Leader), subject to the approval of CO-OPS. If the Commanding Officer (or Team Leader) decides to install additional water level stations, then a 30-day minimum of continuous data acquisition is required. For all subordinate stations, data must be collected throughout the entire survey period for which they are applicable, and not less than 30 continuous days. This is necessary to facilitate the computation of an accurate datum reference as per NOS standards.

1.3.3. Tide Component Error Estimation

This section is not applicable for this project. Tidal Constituent And Residual Interpolator (TCARI) automatically calculates the error associated with water level interpolation. This error is incorporated into the residual/harmonic solutions and included in the Total Propagated Error (TPE) for the survey. Uncertainty values input into TCARI model are 2-sigma. Pydro will automatically supply 1-sigma values to CARIS when computing uncertainty.

1.3.4. GOES Satellite Enabled Subordinate Stations

This section is not applicable for this project.

1.3.5. Benchmark Recovery and GPS Requirements

This section is not applicable for this project.

1.3.6. Residual Water Level Station(s) Data

Tidal Constituent And Residual Interpolation (TCARI) method uses harmonic constituents and residuals from historical and operating water level stations to provide precise water level correction for bathymetric surveys. Download the Preliminary/Verified data at following water level station(s) data for all periods of survey.

The operating stations at Unalaska, AK (9462620), Port Moller, AK (9463502), Village Cove, AK (9464212), Nome, AK (9468756) and Red Dog Dock (9491094) will provide residuals for this project and must remain in operation during all periods of hydrography.

Station Number	Station Name	Latitude(N)	Longitude(W)
9462620	**Unalaska, AK**	**53° 52.8'**	**166° 32.2'**
9463502	**Port Moller, AK**	**55° 59.1'**	**160° 34.4'**
9464212	**Village Cove, AK**	**57° 07.5'**	**170° 17.1**
9468756	**Nome, AK**	**64° 29.7**	**165° 26.4**
9491094	**Red Dog Dock, AK**	**67° 34.6'**	**164° 03.9'**

1.4. Tidal Constituent and Residual Interpolation (TCARI)

1.4.1. For hydrography in the area of Bering Sea, apply the TCARI grid "R976FARA2015.tc" supplied in conjunction with the water level data from Section 1.3.6 to produce a seamless tide correction. Refer to the TCARI Field SOP for detailed TCARI instructions.

1.4.2. This section is not applicable for this project.

1.4.3. TCARI Graphic

A diagram which includes the exported TCARI grid boundary is provided in digital copy format to assist with the information provided in section 1.4.1.

1.4.4. TCARI Final Solutions

Upon completion of project, submit a Pydro generated request for smooth tides, with times of hydrography abstract and mid/mif tracklines attached. Forward this request to final.tides@noaa.gov. Provide the project number, as well as sheet number, in the subject line of the email.

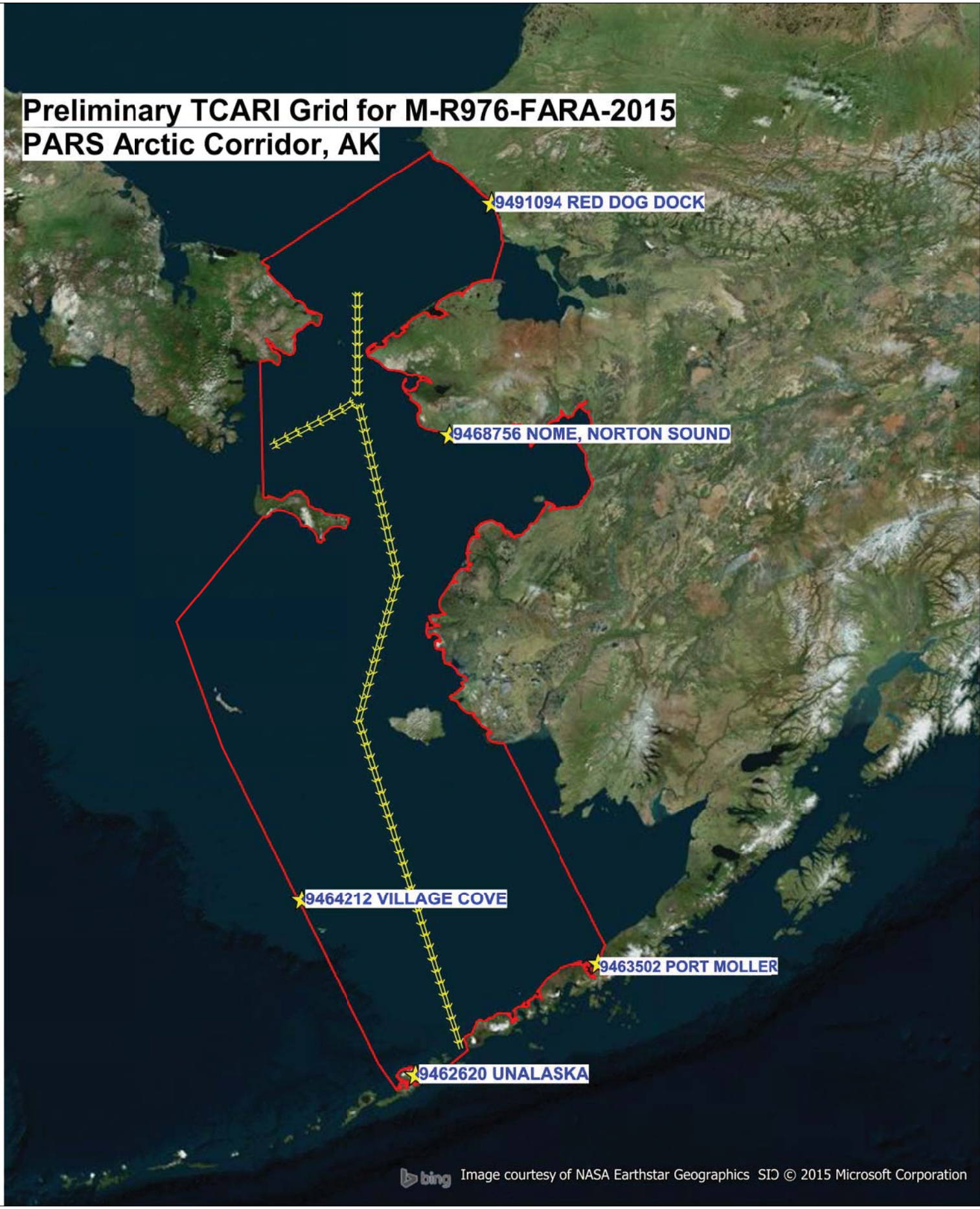
CO-OPS will review the times of hydrography, final tracklines, and six-minute water level data from all applicable water level gauges. If there are any discrepancies, CO-OPS will make the appropriate adjustments and forward a revised TCARI grid and solutions to the field group and processing branch for final processing.

1.5. Fetchtides

Preliminary and verified six minute water level time series data may be retrieved from the CO-OPS database via the Fetchtides application. Fetchtides provides a mechanism to store imported data locally and combines multiple days of data into one CARIS readable tide (.tid) file. Fetchtides is available for download at Hydrosoft Online (https://inside.nos.noaa.gov/hydrosoft/hydrosoftware.html. For more information, please see the Fetchtides User Manual in the FPM chapter 3 appendix.

1.6 Water Level Records

This section is not applicable for this project.


Preliminary TCARI Grid for M-R976-FARA-2015
PARS Arctic Corridor, AK
9491094 RED DOG DOCK
9468756 NOME, NORTON SOUND
9464212 VILLAGE COVE
9463502 PORT MOLLER
9462620 UNALASKA
bing
Image courtesy of NASA Earthstar Geographics SIO © 2015 Microsoft Corporation