



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center - Pacific
2002 SE Marine Science Drive
Newport, OR 97365

October 19, 2016

MEMORANDUM FOR: Commander Brian W. Parker, NOAA
Commanding Officer, Marine Operations Center - Pacific

FROM: Lieutenant Junior Grade David Wang, NOAA
Acting Chief of Operations, Marine Operations Center - Pacific

SUBJECT: Amendment 4 to final project instructions, *Rainier*
RA-16-02 North Coast of Kodiak Island (OPR-P136-RA-16 North
Kodiak Island)

This amendment provides no changes in *Rainier's* sailing schedule or changes to the DAS funded for *Rainier*.

Rainier is projected to complete RA-16-02 (North Coast of Kodiak Island) ahead of schedule. This amendment adds the goals of the attached Hydrographic Survey Project Instructions for George and Carroll Inlet (OPR-0303-RA-16). This project was originally intended to be completed by *Fairweather* but a long term mechanical repair prevents the ship from completing.

APPROVED

DISAPPROVED

LET'S DISCUSS



Hydrographic Survey Project Instructions

Project Name:	George and Carroll Inlet
Project Number:	OPR-O303-RA-16
Assigned Field Unit:	NOAA Ship <i>Rainier</i>
Assigned Processing Branch:	Pacific Hydrographic Branch
Signed Date:	10/12/2016
Project Instructions Version:	Final
Planned Acquisition Time:	Start Date: 10/2016 End Date: 11/2016
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 nautical charting products in a high traffic area. This project will cover approximately 32 square nautical miles (SNM), of which 30 SNM is Priority 3 area, as identified in the 2012 NOAA Hydrographic Survey Priorities.
Supporting Documents:
Hydrography shall consist of Navigable Area Surveys in accordance with the following support documents.
NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSD), March 2016
NOS Field Procedures Manual for Hydrographic Surveying (FPM), April, 2014
Hydrographic Survey Technical Directive (HTD): HTD 2016-2 Configuration Management
Hydrographic Survey Technical Directive (HTD): HTD 2016-3 Horizontal Datums

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: George and Carroll Inlet						
<i>Registry Number</i>	<i>Sheet Number</i>	<i>Sublocality</i>	<i>State or Territory</i>	<i>Scale</i>	<i>Estimated SNM</i>	<i>Instructions</i>
H12969	1	George Inlet	Alaska	20000	8	
H12968	2	Approaches to George and Carroll Inlets	Alaska	20000	11	
H12970	3	Carroll Inlet	Alaska	20000	13	

Limits & Coverage:	
Inshore Limit: The inshore limit is the navigable area limit (Refer to HSSD 1.2.2)	
Coverage Requirements:	
<i>Coverage Water Depth</i>	<i>Coverage Required</i>
All waters in survey area	Complete Coverage. Refer to HSSD Section 5.2.2.3 (Option A).

Assigned Tasks

Acknowledgement:
The project manager for this project is Christina Fandel. Contact information for the project manager 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 the project.

Environmental Compliance Requirements
Comply with the marine mammal observation and reporting requirements in Section 1.4 of the HSSD and all Best Management Practices (BMPs) listed at the end of these Project Instructions.

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 7.3.5 of the HSSD.

Maritime Boundary Points (MBPs):

There are no Maritime Boundary investigation requirements for this project.

Bottom Samples:

Obtain bottom samples in accordance with Section 7.2 and 7.2.2 of the HSSD.

Chart Comparison:

Perform a chart comparison in accordance with Sections 8.1.4 --D.1 of the HSSD. Use only the latest editions of the largest scale NOS charts covering the project area. Resolve any discrepancies identified in the field and explain them in the Descriptive Report. The charts, listed below, were used in preparation of these project instructions and accompanying project files; however, the list is for reference only and not exhaustive. Some charts listed may have larger scale sections to which survey data must be compared.

Affected Raster Charts

<i>Chart Number</i>	<i>Scale</i>	<i>Edition Number</i>	<i>Edition Date</i>	<i>Kapp Number</i>	<i>LNМ Date</i>	<i>NM Date</i>
17428	40000	12	06/2015	2745	07/19/2016	07/23/2016

Affected ENCѕ

<i>ENC Name</i>	<i>Scale</i>	<i>Edition</i>	<i>Update Application Date</i>	<i>Issue Date</i>	<i>Preliminary</i>
US5AK47M	40000	7	09/18/2015	09/18/2015	NO

Coast Pilot:

Submit a Coast Pilot Review Report in accordance with section 8.1.3 of the HSSD.

Dangers to Navigation (DTONs):

Generate DTON reports in accordance with Section 1.5 of the HSSD. DTON reports should be sent to ocs.ndb@noaa.gov with a courtesy copy to the project manager. It is of paramount importance that DTONs be reported as soon as possible.

Junctions:

Perform a junction analysis with the surveys listed below and between current project sheets. Refer to HSSD Section 8.1.4 Junction guidance.

<i>Registry Number</i>	<i>Scale</i>	<i>Year</i>	<i>Platform</i>	<i>Relative Location</i>
H12224	20000	2010	NOAA Ship <i>Fairweather</i>	S
H11009	10000	2000	KR	S

Progress Reports:

Submit weekly (refer to HSSD 8.1.1.1) and monthly (refer to HSSD 8.1.1.2) progress reports.

Survey Outlines:

Generate and submit a survey outline that shows the extent of hydrography for each survey in accordance with the HSSD, Section 8.1.2.

Horizontal Control Requirements:

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

PPK

This project has a requirement to acquire survey data vertically-referenced to the ellipse. 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 positioning solution. The results of these check lines should be reported back to HSD Operations. Refer to ERS Section below.

CORS Base Stations

<i>Station</i>	<i>Name</i>	<i>Position</i>	<i>Ellipsoid Height</i>	<i>Rate</i>	<i>Owner/Agency</i>	<i>Requirement</i>
AIS5	Annette Island, AK	55.069072 N 131.599535 W	32.346 meters	15 hertz	USCG	Recommended

User-Installed Base Stations

<i>Station</i>	<i>Name</i>	<i>Position</i>	<i>Ellipsoid Height</i>	<i>Rate</i>	<i>Owner/Agency</i>	<i>Requirement</i>
TBD	TBD	55.3420 N 131.6458 W*	TBD meters	TBD hertz	NOAA	Recommended

* Approximate location

Vertical Control Requirements:

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

Discrete Zoning

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: The field unit may deliver surveys without final approved water levels only if they demonstrated in the ERS Capability Memo that the data is free of ERS-related bias and only if the final product is derived via the ellipse using the HSD-provided PMVD separation model. If the field unit recommends deriving chart datum via the ellipse using a field-generated ERZT model, final approved water levels must be applied before submission.

Ellipsoidally-Referenced Zoned Tides (ERZT) and Poor Man's VDATUM (PMVD)

This project has a requirement to acquire survey data vertically-referenced to the ellipse. Based on analysis of existing infrastructure, this will most likely be achieved through an existing PBO station using a PPK processing solution and use of either a PMVD or ERZT separation model as determined by the results of the following ERS analysis.

At the commencement of survey operations, check lines should be acquired across the entirety of the survey to identify any systematic procedural, hardware, or configuration errors prior to the bulk of data acquisition. To determine the quality of the 3D trajectory, the checkline crossline analysis shall be performed between the ERZT separation model and the PMVD separation model. If the field's recommendation on the method of acquiring 3D trajectories and the method of reducing the ellipse-referenced data to chart datum is accepted, all survey lines shall be delivered with 3D trajectory and associated uncertainty files applied (i.e. SBETs and RMS) and GPS tides computed. All delivered grids shall be derived via the ellipse. If at any point the field unit experiences difficulty in realizing chart datum via the ellipse, the field shall communicate with the HSD Project Manager for guidance on how to proceed. Within 60 days of the completion of acquisition, the field unit shall prepare an ERS Capability Memorandum, summarizing the degree to which ERS surveying campaign was successful.

ERS Deliverable

The ERS Checkline and ERS Capability Memo requirements are detailed in the ERS Capability Requirements document. The ERS deliverables shall be submitted to the HSD Project Manager with a CC to ERS.Deliverables@noaa.gov. Project specific data quality issues or departures from standard processing approaches shall be captured in the DAPR or DR.

NWLON Gauges

<i>Operating Water Level Station</i>	<i>Station ID</i>
Ketchikan, AK	9450460

Orthometric Imagery:

No Orthometric Imagery has been provided for this project.

Shoreline and Nearshore Features:

Submit a Final Feature File in accordance with Section 7 of the HSSD. In the case of unassigned, offshore oil platforms within the survey area, should the field unit observe that the feature is not visible, then a formal disproof is required. For the purposes of feature disproof, features labeled with "PA" have a search radius of 80 m and charted features without a label of "PA" have a search radius of 50 m.

Contact the HSD Project Manager if there are any questions regarding feature assignments and feature management.

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).

HSD Project Manager

Christina Fandel

NOAA

Phone: 301-713-2702 x 133

Fax:

Email: christina.fandel@noaa.gov

Obligation: Mandatory

Backup POC

Jacklyn James

NOAA

Phone: 301-713-2702 x 120

Fax:

Email: jacklyn.c.james@noaa.gov

Obligation: For Reference

NOAA Navigation Manager: Alaska

LT Timothy Smith

NOAA

Phone: 907-271-3327

Fax:

Email: timothy.m.smith@noaa.gov

Obligation: For Reference

OPR-O303-RA-16

George and Carroll Inlets

Sheet Layout

Total Area: 32 SNM
Priority 3 Area: 30 SNM

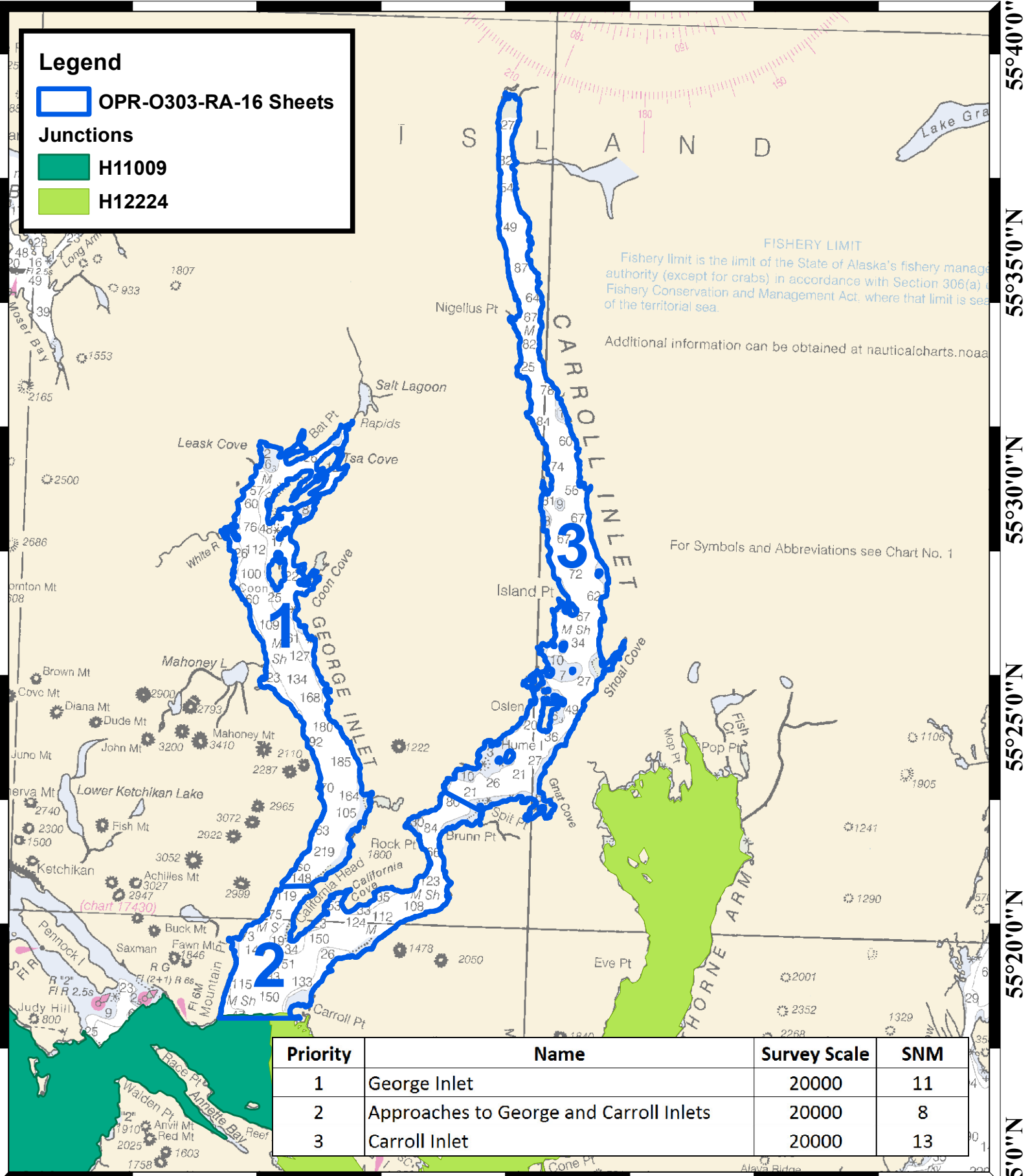
Legend

 OPR-O303-RA-16 Sheets

Junctions

 H11009

 H12224



FISHERY LIMIT
Fishery limit is the limit of the State of Alaska's fishery management authority (except for crabs) in accordance with Section 306(a) of the Fishery Conservation and Management Act, where that limit is set by the territorial sea.

Additional information can be obtained at nauticalcharts.noaa.gov

For Symbols and Abbreviations see Chart No. 1

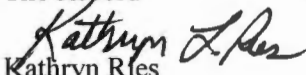
Priority	Name	Survey Scale	SNM
1	George Inlet	20000	11
2	Approaches to George and Carroll Inlets	20000	8
3	Carroll Inlet	20000	13

131°35'0"W 131°25'0"W 131°15'0"W 131°5'0"W

55°40'0"N
55°35'0"N
55°30'0"N
55°25'0"N
55°20'0"N
55°15'0"N



OCT 11 2016

MEMORANDUM FOR: The Record
FROM: 
Kathryn Ries
Deputy Director
REFERENCE: Environmental Review of the Hydrographic Survey of George and
Carroll Inlet, Alaska, October and November 2016 (OPR-O303-RA-16)

Sections 1 and 2 of this memorandum summarize a proposed hydrographic survey of George and Carroll Inlet on board the NOAA Ship *Rainier*, and serve as the "EA/EIS inclusion memorandum"¹ for the proposed survey. The purpose of these sections is to determine if the proposed survey falls within the scope of the Coast Survey Programmatic Environmental Assessment (PEA),² which was prepared pursuant to the National Environmental Policy Act (NEPA).

Section 3 of this memorandum documents the compliance steps that the Office of Coast Survey (OCS) has taken with regard to the Endangered Species Act (ESA), the Migratory Bird Treaty Act (MBTA), the Marine Mammal Protection Act (MMPA), Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the National Historic Preservation Act (NHPA), and the Coastal Zone Management Act (CZMA).

1.0 Description of the Proposed Survey

The NOAA Office of Marine and Aviation Operations (OMAO) and OCS propose to survey a 32 square nautical mile area located in George and Carroll Inlet, in southeastern Alaska. The survey would begin on or about October 24, 2016. As with all activities at sea, the date of the proposed survey could be affected by poor weather, equipment difficulties, or other unforeseen circumstances.

The *Rainier* will leave port from Seward, Alaska, and proceed to the survey location located in southeastern Alaska as shown in Appendix A.

During the proposed survey, OCS would not operate echo sounders at frequencies lower than 50 kHz. The listed equipment will be used along with sound speed measurements via a Conductivity, Temperature, and Depth instrument for profiling the water column. Bottom samples would be collected regularly to verify bottom sediment type. The ship may anchor during the survey, in an area with a known bottom type that is free from any known obstructions.

¹ as defined in Section 4.02 of NOS Policy 0300-01, *Environmental Compliance Program Policy*

² *Final Programmatic Environmental Assessment for The Office of Coast Survey Hydrographic Survey Projects*, May 2013



As specified in the Coast Survey PEA, the proposed survey would include vessel operation, echo sounder use, sound speed data collection, and anchoring. No benchmarks, tide gauges, or GPS tide buoys would be installed.

In the course of the proposed survey, OCS would adhere to the Best Management Practices (BMPs) resulting from the Endangered Species Act section 7 consultation that concluded in April 2013 (see Appendix B).

2.0 Environmental Impacts of the Proposed Survey

2.1 Impacts to Marine Mammals

Marine mammals in the survey areas could be affected by vessel interactions (i.e., vessel strike) or by echo sounder operation. The Coast Survey PEA addressed the potential impacts to marine mammals from all aspects of a hydrographic survey, including the operation of multi beam echo sounders operating at frequencies between 50 and 500 kHz. The proposed survey would not require echo sounder use outside of this range.

OCS would observe the BMPs specified in Appendix B to further reduce the potential impacts to marine mammals.

2.2 Impacts to Threatened or Endangered Species

2.2.1 ESA-Listed Species Administered by NMFS

In a Biological Opinion dated April 30, 2013,³ the NMFS Office of Protected Resources indicated that the following threatened and endangered species and critical habitat could be adversely affected by OCS hydrographic surveys:

- Cook Inlet beluga whale (and its critical habitat)
- Southern Resident killer whale (and its critical habitat)
- Steller sea lion, western DPS (and its critical habitat)
- Guadalupe fur seal
- Ringed seal (Arctic DPS)
- Bearded seal (Beringia DPS)
- Johnson's seagrass (and its critical habitat)

Following a review of the ranges of the listed species,⁴ the proposed survey area does not overlap with the known range of any of these species. Therefore, the proposed survey is considered unlikely to adversely affect threatened or endangered species administered by NMFS.

³ Biological and Conference Opinion, Nationwide Hydrographic Survey of Coastal Waters, PCTS# FPR-2013-9029

⁴ At <http://www.nmfs.noaa.gov/pr/species/esa/listed.htm>

OCS would observe the BMPs specified in Appendix B to further reduce the potential impacts to any threatened or endangered species.

2.2.2 ESA-Listed Species Administered by FWS

OCS reviewed a species list produced from the FWS Information for Planning and Conservation website⁵ to determine if the proposed survey could have an impact on ESA species administered by FWS.

No ESA-listed species or critical habitat administered by FWS were located in the proposed survey area. Based on this information, OCS has determined that the proposed survey would have no effect on threatened or endangered species administered by FWS.

2.3 Impacts to Essential Fish Habitat

The proposed survey would take place within the geographic area covered in the Coast Survey PEA, and would involve the operation of the vessels and equipment addressed in the PEA. All applicable BMPs in the Coast Survey PEA would be followed. Therefore, OCS concludes that there would be no significant effect on essential fish habitat from the proposed survey.

2.4 Impacts to Cultural Resources

The proposed survey would take place within the geographic area covered in the Coast Survey PEA, and would involve the operation of the vessels and equipment addressed in the PEA. All applicable BMPs in the Coast Survey PEA would be followed. Therefore, OCS concludes that there would be no significant effect on cultural resources from the proposed survey.

2.5 Conclusion on the Applicability of the Coast Survey PEA

Based on the information in Sections 2.1 – 2.4 of this memorandum, OCS has determined that the proposed survey falls within the scope of the Coast Survey PEA and its Finding of No Significant Impact. Therefore, no additional NEPA analysis for the proposed survey is required.

3.0 Compliance with Other Environmental Laws

3.1 Endangered Species Act

OCS completed a formal ESA section 7 consultation in 2013 for our survey operations, as documented in the April 30, 2013 Biological Opinion issued by NMFS. The Biological Opinion mandated the BMPs listed in Appendix B of this memorandum, which will be adhered to during the course of the survey. This concludes the ESA process for those species administered by NMFS.

No ESA-listed species or critical habitat were located in the proposed survey area. Based on this information, OCS has made a “no effect” determination, concluding the ESA process for those species administered by FWS.

⁵ <https://ecos.fws.gov/ipac/>

3.2 Migratory Bird Treaty Act

Marbled murrelet (*Brachyramphus marmoratus*) seabirds could be located on the water in George and Carroll Inlet at the time of the proposed survey, as it occurs during their molting season. In order to reduce the potential for impacts to this species, the U.S. Fish and Wildlife Service, Region 7 (Alaska) recommended that all vessels maintain a distance of at least 15 meters from any seabird that is on the water, and that the vessel should slow down if a seabird moves within 15 meters of the vessel.

Although the safe operation of the *Rainier* does not allow for OCS to require course corrections or speed changes on the scale that FWS has requested, OCS will follow these recommendations to the extent that safety allows.

3.3 Marine Mammal Protection Act

OCS is currently preparing an application for a Letter of Authorization under the Marine Mammal Protection Act. As an interim measure, OCS is following the BMPs listed in Appendix B of this document, which are broadly protective of marine mammals.

3.4 Essential Fish Habitat Provisions of the Magnuson-Stevens Act

The Coast Survey PEA functions as an EFH assessment and consultation for all OCS surveys through 2018. No additional requirements apply to the proposed survey under Section 305(b) of the MSA.

3.5 National Historic Preservation Act

Based on the negligible level of interaction with the seafloor during a hydrographic survey, and on the presence of OCS protocols designed to eliminate the potential for an impact to submerged historic properties (such as shipwrecks), OCS has made a “no historic properties affected” determination for the proposed survey.

OCS informed the Alaska State Historic Preservation Officer of this determination in writing on August 15, 2016 (see Appendix C). Because OCS did not receive an objection to this determination from the State Historic Preservation Officer within 30 calendar days, OCS has fulfilled its responsibilities under the NHPA, per 36 CFR 800.4(d)(1)(i).

3.6 Coastal Zone Management Act

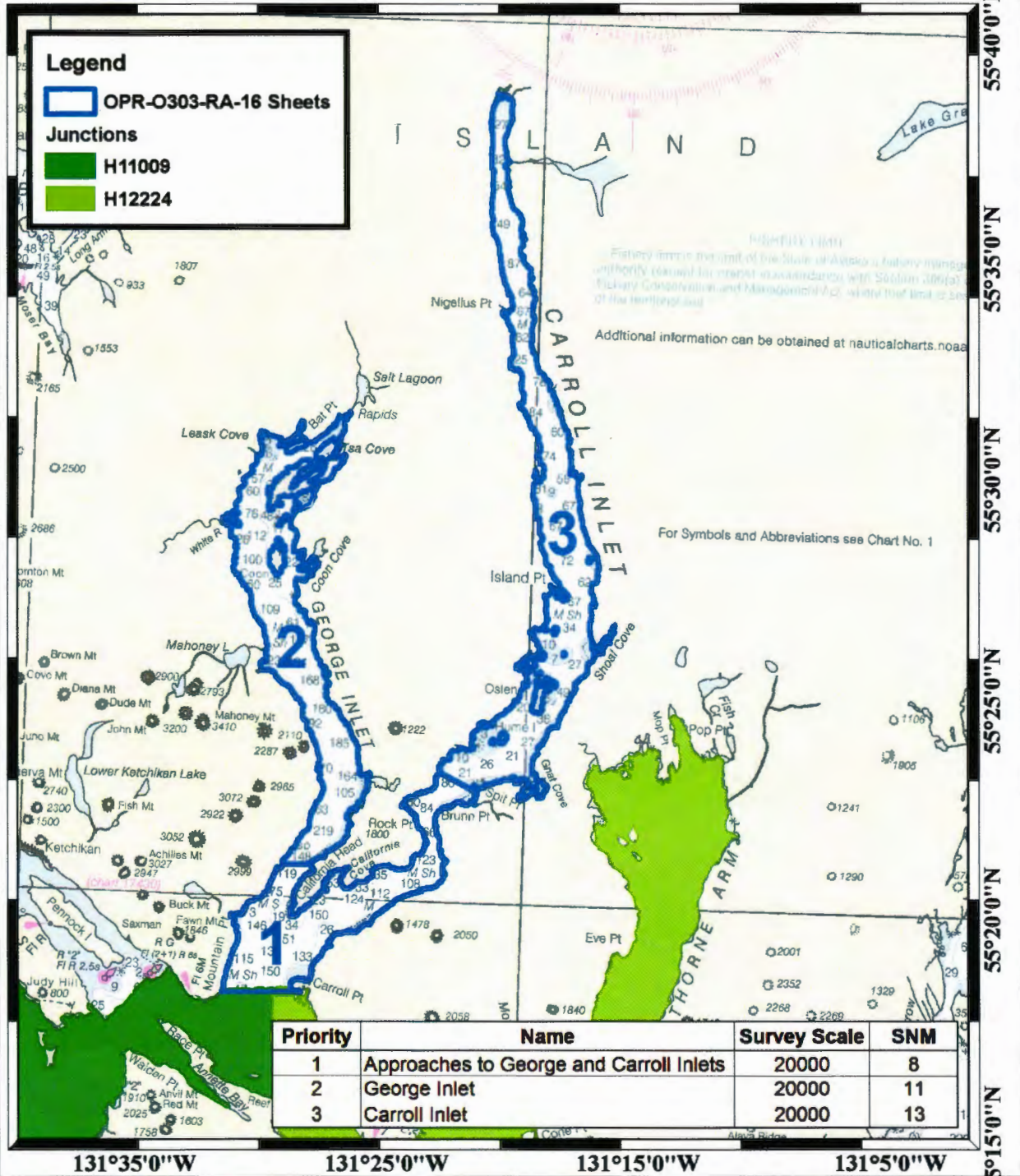
Alaska withdrew from the voluntary National Coastal Zone Management Program on July 1, 2011. Therefore, OCS has not prepared a Federal Consistency Determination for the proposed survey. OCS does not anticipate any adverse impacts to Alaskan coastal resources from the proposed survey.

Appendix A:

Map of the Proposed Survey Area

OPR-O303-RA-16 George and Carroll Inlets Sheet Layout

Total Area: 32 SNM
Priority 3 Area: 30 SNM



Appendix B:

***Best Management Practices for Marine Mammals and ESA
Species for the Project***

Vessel Speed Limits

- Slow speeds (4 – 8 knots) when mapping
- Reduced speeds (<13 knots) when transiting outside of the Great Lakes

Echosounder Restrictions

- Avoid using sonar frequencies < 180 kHz when possible
 - If **multibeam** sonar frequencies < 180 kHz must be employed, use echosounders at ≥ 50 kHz frequencies, with the lowest possible power and ping-rate
 - If **single beam** sonar frequencies < 180 kHz must be employed, use echo sounders at ≥ 30 kHz frequencies, with the lowest possible power and ping-rate and a 12° beam angle.
 - If **single beam** sonar frequencies < 30 kHz must be employed, suspend transmissions of 30 kHz or lower when ESA-listed cetacean species (whales, dolphins, and porpoises) are within hearing range (i.e., the 4.2 meter beam width).

Vessel Maintenance Requirements

- Meet all EPA Vessel General Permits and Coast Guard requirements
- Use anti-fouling coatings
- Clean hull regularly to remove aquatic nuisance species
- Avoid cleaners with nonylphenols
- Rinse anchor with high-powered hose after retrieval

Anchoring Restrictions

- Use designated anchorage area when available
- Use mapping data to anchor in mud or sand, to avoid anchoring on corals
- Minimize anchor drag

Visual Monitoring Requirements

- Maintain trained observers aboard all vessels; 100% observer coverage
- Make species identification keys (for marine mammals, sea turtles, corals, abalone, and seagrasses) available on all vessels

Animal Approach Restrictions

- Avoid approaching within 200 yards of cetaceans (whales, dolphins, and porpoises), 500 yards for right whales
- Suspend single beam sonar transmissions of 30 kHz when ESA-listed cetaceans (whales, dolphins, and porpoises) are within hearing range (i.e., within the 4.2 meter beam width).
- Avoid approaching within 100 yards of in-water seals and walrus

- When possible, suspend single beam sonar transmissions when ESA-listed seals and walrus are within hearing range (i.e., within the 4.2 meter beam width).
- Avoid approaching within 50 yards of sea turtles
- Maintain a distance of at least 15 meters from any seabird that is at rest on the water. Should a seabird move within 15 meters of the vessel, the vessel should slow down.

Survey-specific BMPs (those to be included in project instructions only when the project meets the conditions listed after each restriction):

Echosounder Restrictions

- Suspend multibeam sonar transmissions of < 125 kHz, when Southern Resident killer whales or Cook Inlet beluga whale are within hearing range (750 yards)

Animal Approach Restrictions

- Avoid cetacean (whales, dolphins, and porpoises) critical habitat, when possible
- When possible, maintain a vessel distance of at least 3 nautical miles (5.5 km) and a landbased distance of 0.5 miles (0.8 km) of Steller sea lion rookeries listed in 50 CFR 223.202 or Marmot Island.

“1. Minimize transit distance through the identified critical habitat.

2. When mapping in critical habitat is required, use the highest echo sounder frequencies appropriate for the area conditions.

3. If mapping areas within 3 nm of a rookery is required, use binoculars (“big eyes”) to observe rookeries from a distance. If sea lions are observed on land, the ship is to remain far offshore, and no near-shore surveys may be conducted on that day. If sea lions are not observed, near-shore surveys may be conducted. During such surveys, maintain a 100 yard distance sea lions at sea. If a sea lion approached the vessel during single beam sonar operations, cease transmission”

Appendix C:

***National Historic Preservation Act Section 106 Concurrence
Request Letter***

August 15, 2016

MEMORANDUM FOR: Ms. Judith Bittner
State Historic Preservation Officer
Alaska DNR, Office of History & Archaeology
550 West 7th Avenue
Suite 1310
Anchorage, AK 99501-3565
907-269-8721
judy.bittner@alaska.gov

FROM: Paul Turner
Physical Scientist
NOAA Office of Coast Survey

SUBJECT: National Historic Preservation Act Section 106 Consultation Request and
SHPO Survey Notice for Historic Resources

Ms. Bittner:

The National Oceanic and Atmospheric Administration's Office of Coast Survey (OCS) plans to conduct two hydrographic surveys in SE Alaska in the vicinity of Revillagigedo Island beginning on or about October 1, 2016¹ – November, 2016. The first is a 32 square nautical mile area located in George and Carroll Inlets and the second is a 185 square nautical mile area located in Behm Canal. The NOAA Ship *Fairweather* will leave port from Kodiak, Alaska and proceed to the survey location shown in Appendix A. It is possible that the limits of the survey area could change slightly, but such changes would not affect the nature of the work or the findings of this Section 106 determination.

The purpose of this notice is to request any information your office may have on the location and nature of any historic properties located in or near the survey area before operations begin. As stated in Section 5.0 of this letter, OCS believes that our operational protocols will prevent any impacts to any historical properties, should they be present.

1.0 Echo Sounder Use

Coast Survey conducts hydrographic survey operations with high-frequency side scan sonar, single beam and multibeam echo sounders, which use sound waves to identify objects on the seafloor and to determine water depth. During a survey, a vessel equipped with one or more echo sounders operates within a given area to ensonify (or visualize) the seafloor and ensure full data coverage of the seafloor within each project area (Figure 1). Single beam and multibeam echo sounders are mounted either underneath the vessel or on a pole to the side of the vessel, while side scan sonars are either mounted underneath or towed via cable behind the vessel. Towed acoustic equipment is in no case allowed to make contact with the seafloor.

¹ As with all activities at sea, the date of the proposed survey could be affected by poor weather, equipment difficulties, or other unforeseen circumstances.



Figure 1: Multibeam swath sonifying the seafloor

1.1 NHPA Section 106 Determination for Echo Sounder Use

Because the use of echo sounders for hydrographic mapping does not include any interactions with the seafloor, OCS finds that this portion of our undertaking has no potential to cause effects to historic properties. This is in accordance with a determination by the Advisory Council on Historic Preservation (ACHP) that the use of acoustic sources in the course of a hydrographic survey is not an activity with the potential to affect historic properties.

2.0 Anchoring

When survey ships are not performing survey operations, the vessels may anchor either within the project area or a protected nearby area. NOAA's survey launches (smaller boats that are carried to the survey grounds aboard the survey ship) return to the ship each day and do not require anchoring.

Ships usually anchor within the survey area to reduce the transit time to the working grounds and to save on fuel consumption. Vessel operators select the anchor location based on depth, protection from seas and wind, and bottom type. Preferred bottom types are sticky mud or sand, as those characteristics allow the flukes of the anchor to dig into the bottom and hold the chain in place. When working in an unsurveyed area or in an area that has not been surveyed in many years, the ship will try to anchor in bays where data has already been collected, providing the ship with better information on where to drop the anchor. Vessels will not anchor on coral reefs, shipwrecks, and hard bottom areas as part of their protocol. However, the protocol would permit the use of mooring buoys in such area or anchorage sites identified on NOAA charts. OCS will consult the Automated Wreck and Obstruction Index to ensure that anchors are not used near any potential historic properties.

2.1 NHPA Section 106 Determination for Anchoring

Because the survey ship will anchor in surveyed areas or in bays where data has already been collected, OCS will have the required data to prevent the placement of an anchor on any historic properties such as shipwrecks. OCS vessels do not anchor on coral reefs, shipwrecks, obstructions, or hard bottom areas.

For these reasons, OCS has made a determination of "no historic properties affected" for the anchoring portion of the undertaking.

3.0 Bottom Sample Collection

Coast Survey collects grab samples of seafloor sediment during survey operations by lowering a grab sampler through the water column. During survey operations, bottom samples are characterized and charted primarily so mariners can better select their anchorages. Typically, surveyors use a clamshell bottom snapper (Figure 2) or similar type of grab sampler to obtain samples of the surface sediment layer (approximately the first two inches of sediment). As the sampler is lowered, two hinged upper lids swing open to let water pass through. When the sampler reaches the bottom, the overlapping spring-loaded scoops are tripped on the line, and the lids close to contain the sediment and prevent sample washout. The line is lowered and raised, at a rate of about one meter per second. After the sediment is collected, analyzed, and photographed, the crew releases it from the sampler underwater. Samples are characterized by color and type of bottom material. For example, a sample of mud with fine sand would be charted as *M f S* (Figure 3).

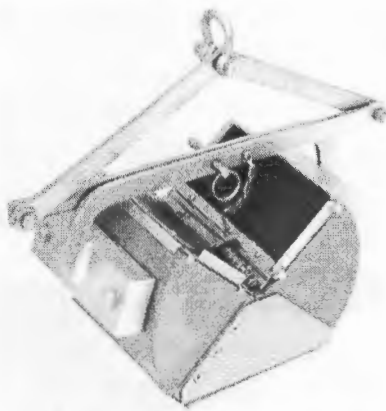


Figure 2: 6" x 6" grab sampler

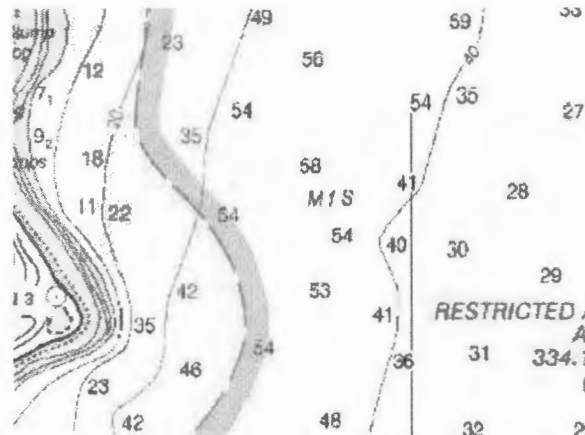


Figure 3: Bottom sediment characteristics *M f S* portrayed on a nautical chart

Field units have a bottom sample plan as a guideline of sampling density, although surveyors are given discretion on the exact location of sampling. They do not collect samples in waters deeper than 80 meters. Additionally, in areas surveyed within the last 30 years, the surveyor might not need to collect samples at all. In some cases, the surveyor can use backscatter or side scan data acquired during the survey operation to determine the best place to sample. OCS protocol is to not collect samples on coral reefs, shipwrecks, obstructions or hard bottom areas. OCS will consult the Automated Wreck and Obstruction Index to ensure that bottom samples are not collected near any potential historic properties.

3.1 NHPA Section 106 Determination for Bottom Sample Collection

Based on OCS protocols and the small size of the sampler, there should be no effect on historic properties. If the sample results in the collection of an object that may be eligible for listing, the coordinates will be noted and provided to the SHPO along with photographs of the sample and, if practicable, the recovered object itself. The sample is recovered from the top few inches of sediment and there is likely a significant overburden on any objects. Therefore the potential effect on any potential historic properties such as shipwrecks appears unlikely and negligible. OCS has made a determination of "no historic properties affected" for the bottom sample collection portion of the undertaking.

4.0 Sound Speed Data Collection

Surveyors must collect sound speed data throughout the survey, to determine the speed of sound in the water column at a given location and time, and to correct for refraction errors in the echo sounder data. Taken together, the two-way travel time of the acoustic pulse from a single beam or multibeam echo sounder and the speed of sound in water determine seafloor depths.

Sound speed data is collected periodically in one of two ways. In the first scenario, every one to four hours, a survey technician slowly lowers a sound speed profiler – known as a “conductivity, temperature and depth” instrument (Figure 4) – from a stationary vessel, down to the seafloor and back. The second method involves a moving vessel profiler (Figure 5), which is automatically lowered and raised through the water column at regular intervals while the vessel is in motion. OCS protocol is to not have any contact with coral reefs, shipwrecks, obstructions or hard bottom areas.

In either case, the profiler makes only minimal impact to the seafloor (a “touch”) at the bottom of its route to the seafloor and back.



Figure 4: Conductivity, temperature and depth instrument inside cage



Figure 5: Moving vessel profiler mounted on fantail

4.1 NHPA Section 106 Determination for Sound Speed Data Collection

Based on the protocol to avoid known historic properties and obstructions, the minimal impact to the seafloor, and the fact that any unknown objects are likely located several inches beneath overburden, OCS has made a determination of “no historic properties affected” for the sound speed data collection portion of the undertaking.

5.0 Conclusion on Effects to Historic Properties from the Undertaking and Request for Concurrence

Based on the protocols developed to prevent harm to natural and cultural heritage, the negligible interactions with the seafloor from survey operations, OCS has made a determination of “no historic properties affected” for the undertaking and seeks concurrence on this determination from your office.

6.0 Advance Notice for Discovery of Potentially Historic Resources

Except for dangers to navigation, which are made known to the public immediately, it is OCS policy to make information regarding possible historic resources available for SHPO review before public dissemination. If the upcoming survey finds information on features that may be historic, OCS will contact your office when this information is available for your review.

Additional questions regarding historic and archeological resources should be directed to the National Ocean Service's Chief Historian:

Bruce Terrell
Archeologist, NOAA / Maritime Heritage Program
1305 East West Highway
Silver Spring, MD 20910
301-713-7255
bruce.terrell@noaa.gov

Please do not hesitate to contact me at paul.turner@noaa.gov with any questions.

Sincerely,

Paul Turner
Physical Scientist
NOAA Office of Coast Survey

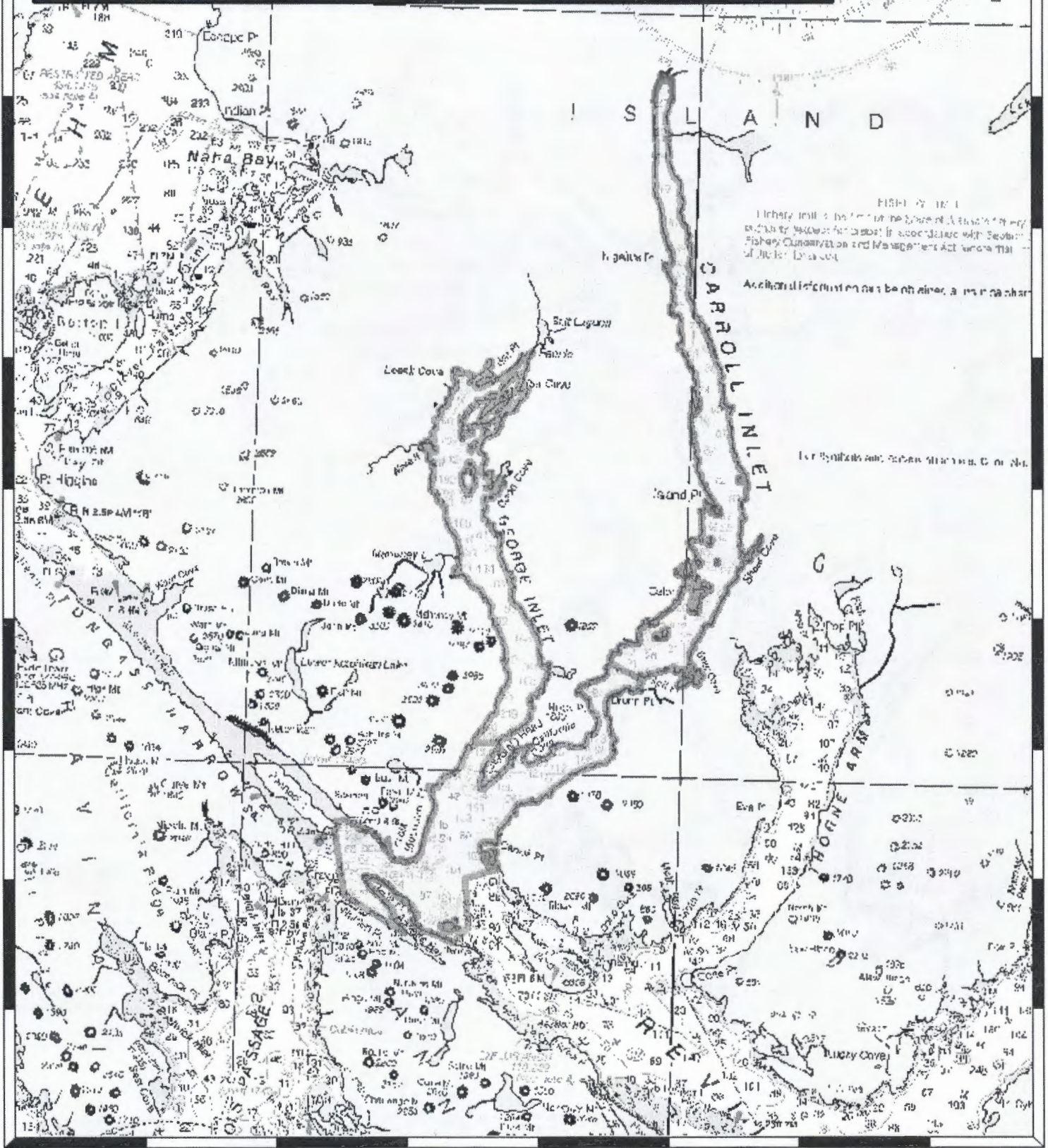
cc: Bruce Terrell, NOAA Maritime Heritage Program

Attachment A
Map of the Survey Area

OPR-O303-FA-16

George and Carroll Inlets, AK

Planned Acquisition Dates: Oct 1 - Nov 27, 2016



55°40'0"N

55°30'0"N

55°20'0"N

131°40'0"W

131°30'0"W

131°20'0"W

131°10'0"W

OPR-O393-FA-16 NOAA Ship Fairweather Behm Canal, Ak Project Layout



WATER LEVEL INSTRUCTIONS

**OPR-O303-RA-2016 George and Carroll Inlets, AK
(02/05/2016 HY)**

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 May 2015, 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 the 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.)	Comment
Ketchikan, AK	9450460	Residual and Datum	NWLON	

Table 1: All stations that need to be added to the HHL in support of O303-RA-2016

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 the 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 station Ketchikan, AK (9450460) will provide water level reducers for this project. Therefore it is critical that it remains in operation during the survey. See Sections 1.1. and 1.2. concerning responsibilities.

The operating NWLON station at Ketchikan, AK (9450460) may serve as datum control station for the subordinate installation. Therefore, it is critical that it remains in operation during all periods of hydrography.

No leveling is required at Ketchikan, AK (9450460) by NOAA’s ship 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

This project requires the collection of data by tide gauge or GPS buoy in upper Carroll Inlet in order to provide an estimate of the tides error. Data collection of at least 7 days should allow for the quantification of tides error. If sufficient data is collected to compute a tidal datum, the station 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.

Continuous data acquisition of a minimum of 7 days (30-day preferred) is required for the subordinate station installation to estimate the tide propagation error. If the continuous 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. 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).

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 discreet 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 GPS buoy as a subordinate station is recommended:

<u>Station Number</u>	<u>Station Name</u>	<u>Approximate Latitude (N)</u>	<u>Approximate Longitude (W)</u>
945AAAA**	Northern Carroll Inlet GPS Buoy, AK	55° 37.01'	131° 21.81'

** 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.

1.3.3. Tide Component Error Estimation

Although the tide error in the vicinity of George and Carroll Inlets, AK will probably within tolerance, the exact estimation of the tidal error contribution to the total survey error budget in the survey area cannot be computed due to a lack of available water level time series data. The recommended GPS buoy deployment (945AAAA Northern Carroll Inlet GPS Buoy) should facilitate the computation the tide error.

1.3.4. This section is not applicable for this project

1.3.5. This section is not applicable for this project

1.3.6. This section is not applicable for this project.

1.4. Discrete Tidal Zoning

1.4.1. The water level station at Ketchikan, AK (9450460) is the reference station for preliminary tides for hydrography in George and Carroll Inlets, AK. The time and height correctors listed below for applicable zones should be applied to the preliminary data at Ketchikan during the acquisition and preliminary processing phases of this project. Preliminary data 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>**. The Commanding Officer (or Team Leader) must notify CO-OPS/ED personnel immediately of any problems concerning the preliminary tides. Preliminary data are six-minute time series data relative to MLLW in metric units on Greenwich Mean Time. For the time corrections, a negative (-) time correction indicates that the time of tide in that zone is earlier than (before) the preliminary tides at the reference station. A positive (+) time correction indicates that the time of tide in that zone is later than (after) the predicted tides at the reference station. For height corrections, the water level heights **relative to MLLW** at the reference station are multiplied by the range ratio to estimate the water level heights relative to MLLW in the applicable zone.

<u>Zone</u>	<u>Time Corrector(mins)</u>	<u>Range Ratio</u>	<u>Predicted Reference Station</u>
SA98	0	0.99	9450460

1.4.2. Polygon nodes and water level corrections referencing Ketchikan, AK (9450460) are provided in CARIS[®] format denoted by a *.zdf extension file name.

NOTE: The tide corrector values referenced to Ketchikan, AK (9450460) are provided in the zoning file “O303RA2016CORP” for this project and are in the fourth set of correctors designated as TS4. Longitude and latitude coordinates are in decimal degrees. Negative (-) longitude is a representation of West longitude.

“Preliminary” data for the control water level station, Ketchikan, AK (9450460), are available in near real-time and verified data will be available on a weekly basis for the previous week. **These water level data may be obtained from the CO-OPS SOAP web services at <http://opendap.co-ops.nos.noaa.gov/axis/text.html>.**

1.4.3 Zoning Diagram(s)

Zoning diagrams are provided in digital format to assist with the zoning in section 1.4.1.

1.4.4 Final Zoning

Upon completion of project OPR-O303-RA-2016, submit a Pydro generated request for final 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 a 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. After review, CO-OPS will send a notice indicating that the tidal zoning scheme sent with the project instructions has been approved for final zoning. If there are any discrepancies, CO-OPS will make the appropriate adjustments and forward a revised tidal zoning scheme 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

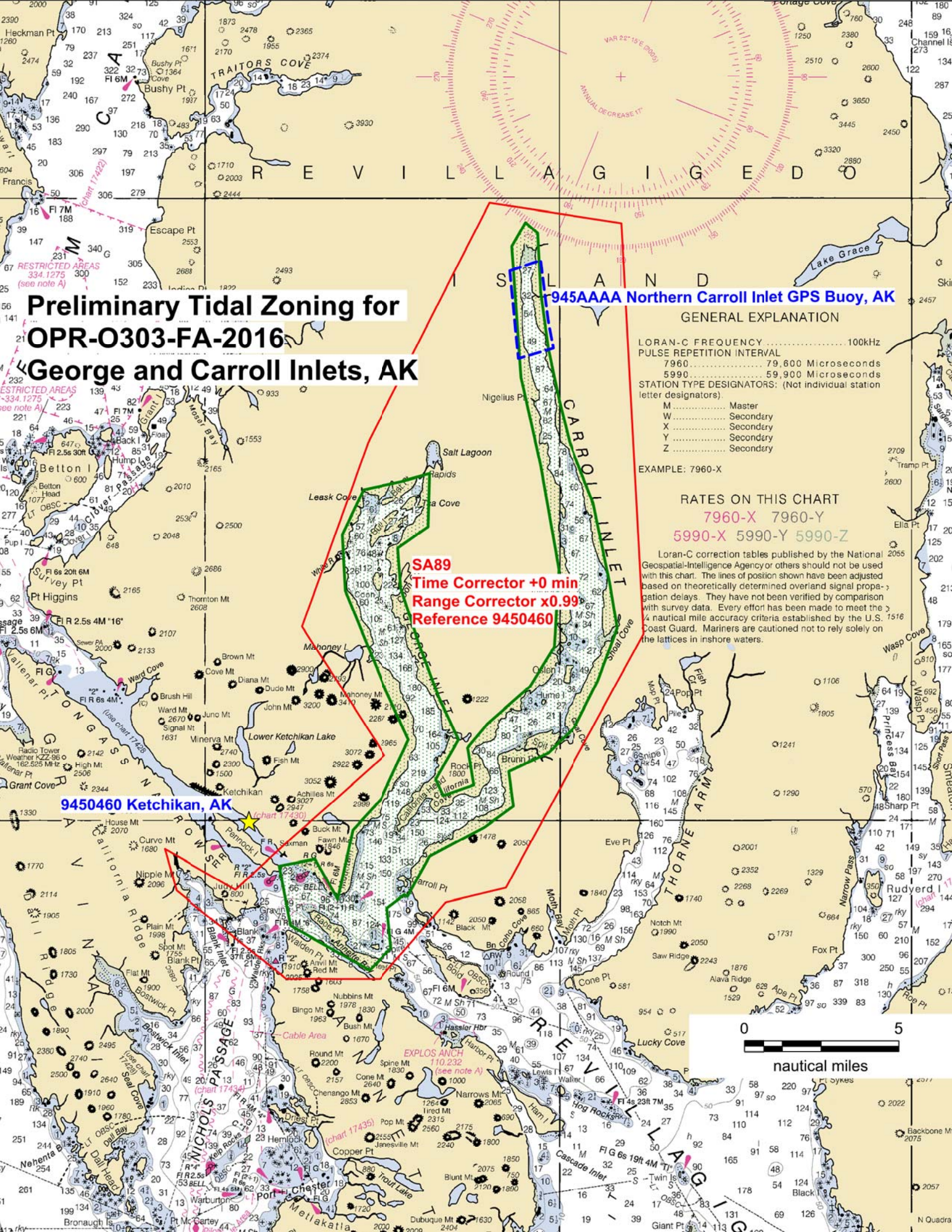
(<https://inside.nos.noaa.gov/hydrosoft/hydrosoftware.html>). For more information, please see the Fetchtides User Manual in the FPM chapter 3 appendix.

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 Tidal Zoning for
OPR-O303-FA-2016
George and Carroll Inlets, AK**

945AAA Northern Carroll Inlet GPS Buoy, AK

**SA89
Time Corrector +0 min
Range Corrector x0.99
Reference 9450460**

9450460 Ketchikan, AK

GENERAL EXPLANATION

LORAN-C FREQUENCY 100kHz
 PULSE REPETITION INTERVAL
 7960 79,600 Microseconds
 5990 59,900 Microseconds
 STATION TYPE DESIGNATORS: (Not individual station letter designators).
 M Master
 W Secondary
 X Secondary
 Y Secondary
 Z Secondary

EXAMPLE: 7960-X

RATES ON THIS CHART

7960-X 7960-Y
 5990-X 5990-Y 5990-Z

Loran-C correction tables published by the National Geospatial-Intelligence Agency or others should not be used with this chart. The lines of position shown have been adjusted based on theoretically determined overland signal propagation delays. They have not been verified by comparison with survey data. Every effort has been made to meet the 1/4 nautical mile accuracy criteria established by the U.S. Coast Guard. Mariners are cautioned not to rely solely on the lattices in inshore waters.

