

H12030

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE

## DESCRIPTIVE REPORT

*Type of Survey* ..... HYDROGRAPHIC

*Field No.* ..... RA-20-05-09

*Registry No.* ..... H12030

### LOCALITY

*State* ..... Alaska

*General Locality* ..... West of Prince of Wales Island

*Sublocality* ..... Vicinity San Juan Bautista Island

2009

### CHIEF OF PARTY

..... Captain Donald W. Haines, NOAA

### LIBRARY & ARCHIVES

DATE .....

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTRY No  <b>H12030</b>
<b>HYDROGRAPHIC TITLE SHEET</b>		
<b>INSTRUCTIONS</b> – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.		FIELD No: <b>RA-20-05-09</b>
State <u>Alaska</u>		
General Locality <u>West of Prince of Wales Island</u>		
Sub-Locality <u>Vicinity San Juan Bautista Island</u>		
Scale <u>1:20,000</u> Date of Survey <u>May 6, 2009 - June 8, 2009</u>		
Instructions dated <u>4/8/2009</u> Project No. <u>OPR-O190-RA-09</u>		
Vessel(s) <u>RA1 (1101), RA4 (2801), RA5 (2802), RA3 (2803), RA6 (2804), RAINIER (S221)</u>		
Chief of party <u>Captain Donald W. Haines, NOAA</u>		
Surveyed by <u>RAINIER Personnel</u>		
Soundings by <u>Reson SeaBat 7125, Tilted Reson SeaBat 8125</u>		
SAR by <u>Grant Froelich</u> Compilation by <u>Katie Reser</u>		
Soundings compiled in <u>Fathoms</u>		
REMARKS: <u>All times are UTC. UTM Zone 8N.</u>		
<u>The purpose of this survey is to provide contemporary surveys to update</u>		
<u>National Ocean Service (NOS) nautical charts.</u>		
<u>Revisions and end notes in red were generated during office processing.</u>		
<u>Page numbering may be interrupted or non sequential.</u>		
<u>All pertinent records for this survey, including the Descriptive Report, are archived at the</u>		
<u>National Geophysical Data Center (NGDC) and can be retrieved via <a href="http://www.ngdc.noaa.gov/">http://www.ngdc.noaa.gov/</a>.</u>		

# Descriptive Report to Accompany Hydrographic Survey H12030

Project OPR-O190-RA-09  
West of Prince of Wales Island, Alaska  
Vicinity of San Juan Bautista Island  
Scale 1:20,000  
May – June 2009  
**NOAA Ship *Rainier* (s221)**  
Chief of Party: Captain Donald W. Haines, NOAA

## A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-O190-RA-09 dated April 8, 2009 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area is approximately 3 nautical miles southwest of Craig, AK in Ursua Channel and Bucarelli Bay surrounding San Juan Bautista Island. This survey corresponds to sheet “E” in the sheet layout provided with the Project Instructions. The purpose of survey OPR-O190-RA-09 is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.

Complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 8 meters and deeper. In depths less than 8 meters additional MBES coverage was acquired to identify least depths over significant features or shoals, as appropriate for this survey. Additional multibeam coverage was achieved in water depths between 8 m and 4 m that meet or exceed the project instruction requirements. Total mileage acquired by each vessel and system is reference in Table 1.

Data Acquisition Type	Hull Number with Mileage (nm)							Total
	S221	1101	1103	2801	2802	2803	2804	
VBES (main scheme)	-	-	-	-	-	-	-	0
MBES (main scheme)	-	24.64	-	114.48	83.09	89.67	60.23	372.11
SSS (main scheme)	-	-	-	-	-	-	-	0
Crosslines	-	-	-	11.71	-	-	19.34	31.05
Developments	-	-	-	-	-	-	-	0
Shoreline	-	-	0.20	-	-	-	-	0.20
Bottom Samples	18	-	-	-	-	-	-	18
Total Number of Items Investigated	-	-	6	-	-	-	-	6
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	-	27.37

*Table 1: Statistics for survey H12030*

Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12030, as per section 3.5.5 of the Field Procedures Manual April,

<sup>1</sup> NOS Hydrographic Surveys Specifications and Deliverables (April 2009), OCS Field Procedures Manual for Hydrographic Surveying (April 2009), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

2009 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook .hob files.

Data acquisition was conducted from May 6 to June 8, 2009 (DN 126 to 159).

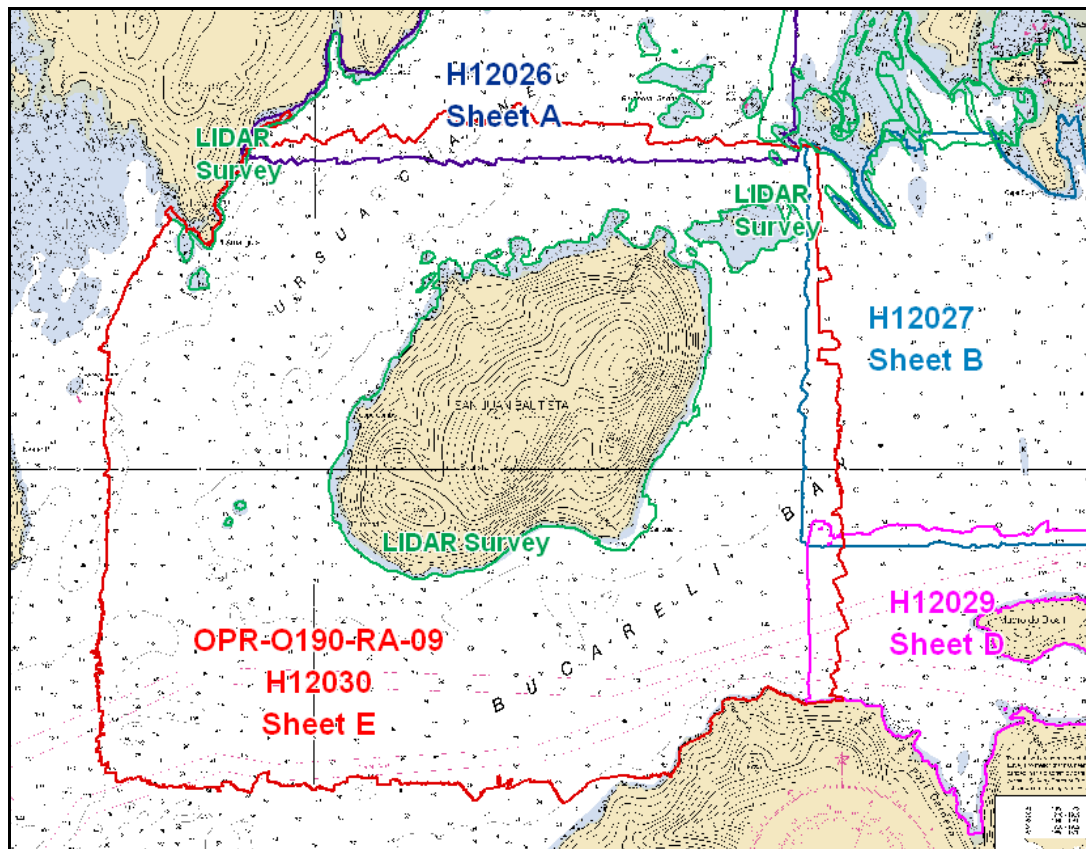


Figure 1: H12030 Survey Outline and Junctions

## B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *OPR-O190-RA-09 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

Final Approved Water Levels have been applied to this survey. See Section C. for additional information.

**B.1. Equipment and Vessels**

Data for this survey were acquired by the following vessels:

Hull Number	Name	Length (ft)	Draft (ft)	Acquisition Type
S221	<i>Rainier</i>	231	14	Bottom Samples
1101	RA-1	29	2	Reson 8125 Multibeam Echosounder
1103	RA-2	29	2	Knudsen 320M Vertical Beam Echosounder Detached Positions
2803	RA-3	29	3.5	Reson 7125 Multibeam Echosounder
2801	RA-4	29	3.5	Reson 7125 Multibeam Echosounder
2802	RA-5	29	3.5	Reson 7125 Multibeam Echosounder
2804	RA-6	29	3.5	Reson 7125 Multibeam Echosounder

*Table 2: Data acquisition vessels and systems for H12030*

Sound speed profiles were measured in accordance with the Specifications and Deliverables using SEACAT 19+ profilers and a Brooke Ocean Technology Moving Vessel Profiler.

Multibeam vessel navigation and attitude data were measured and recorded using Applanix POS/MV 320 systems, version 4. Vertical beam echosounder navigation and attitude data were measured using a TSS MAHRS system.

A complete description of survey vessels, hardware, and software systems is included in the *OPR-O190-RA-09 DAPR*.

No unusual vessel configurations were used for data acquisition.

**B.2. Quality Control****B.2.a. Crosslines**

Multibeam Echosounder (MBES) crosslines totaled 31.05 nautical miles, comprising 8.34% of main scheme MBES hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in Caris subset mode. Comparison yielded excellent agreement with no discernable offsets.<sup>1</sup>

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2009 *Rainier* Hydrographic System Readiness Review package submitted with this survey.

**B.2.b. Final Uncertainty**

Uncertainty values of submitted, finalized grids are calculated in Caris HIPS using the “Greater of the Two” of total propagated uncertainty and standard deviation (scaled to 95%). The Uncertainty of all finalized grids was computed as an “IHOness” layer for each surface in Caris and was found to fall below the IHO levels as described in the NOS Specifications and Deliverables except along the steep sloping terrain that is prevalent throughout the survey, and in depths greater than 100 meters.<sup>2</sup>

**B.2.c. Junctions**

Survey H12030 junctions with surveys H12026, H12027, and H12029, which are sheets A, B, and D of the same project, respectively.<sup>3</sup> Survey H12030 also junctions with H11659, H11660, H11661, H11662, and H11663, Tenix LADS LIDAR surveys from project OPR-O190-KRL-07.<sup>4</sup> The sheet limits and area of overlap for multibeam and LIDAR surveys are shown in Figure 1.

<b>Junction Survey</b>	<b>Survey Scale</b>	<b>Date of Survey</b>	<b>Survey Location</b>
H11659	1:10,000	2007	San Christoval Channel
H11660	1:10,000	2007	San Alberto Bay
H11661	1:10,000	2007	East of San Alberto Bay
H11662	1:10,000	2007	San Juan Bautista Island
H11663	1:10,000	2007	Vicinity of Coronados Islands
H12026	1:20,000	2009	Western Portion of San Alberto Bay
H12027	1:20,000	2009	Cape Suspiro to Doyle Bay
H12029	1:20,000	2009	Vicinity of Madre de Dios Island

*Table 3: Junction Surveys*

Surveys H12026, H12027, and H12029 were completed concurrently with survey H12030 during project OPR-O190-RA-09. Soundings from H12030 were compared with sounding data from surveys H12026, H12027, and H12029 in Caris HIPS Subset Editor. The area of overlap between these sheets was examined and found to have excellent agreement with no discernable offsets.<sup>5</sup>

Caris LIDAR BAGs for H11659, H11660, H11661, H11662, and H11663 were provided by Pacific Hydrographic Branch for junction comparison. H12030 BASE surfaces were compared to this junction surface in Caris Notebook. All surfaces were found to be in good general agreement within one meter.<sup>6</sup>

**B.2.d. Quality Control Checks**

MBES quality control checks were conducted as discussed in the quality control section B of the DAPR.

### B.2.e. Data Quality Factors

#### Sound Speed Artifacts from Malfunctioning Surface Sound Velocimeter

Multibeam echosounder data acquired with 1101 (RA-1) tilted Reson 8125 displayed several momentary sound velocity ‘blowouts’ where the vessel’s Digibar surface sound velocimeter was not reading the proper surface sound speed. Because this sonar uses surface sound speed input for beam forming, it was impossible to correct this data. To compensate, the Hydrographer, where possible, rejected soundings obviously in error on the outer beams.<sup>7</sup> See Figures 2 and 3 below.

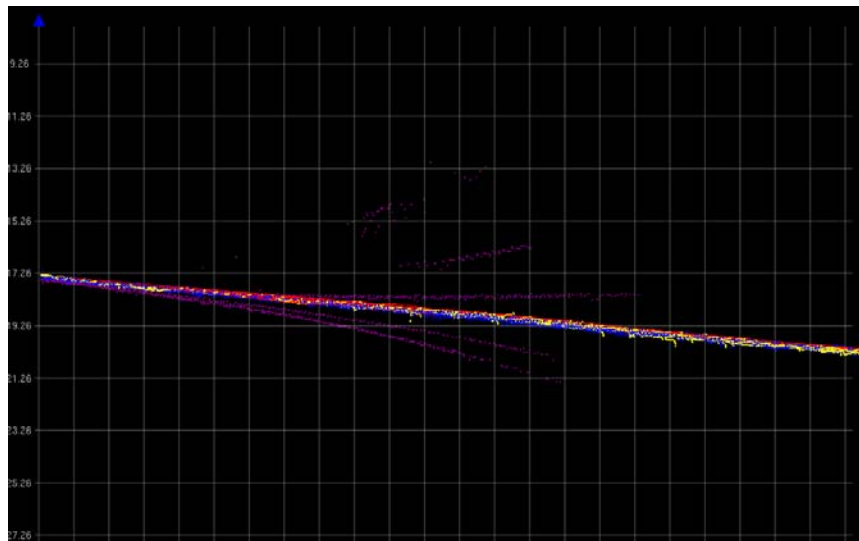


Figure 2: Sound velocity artifact resulting from a malfunctioning surface sound velocimeter viewed in Caris HIPS subset mode

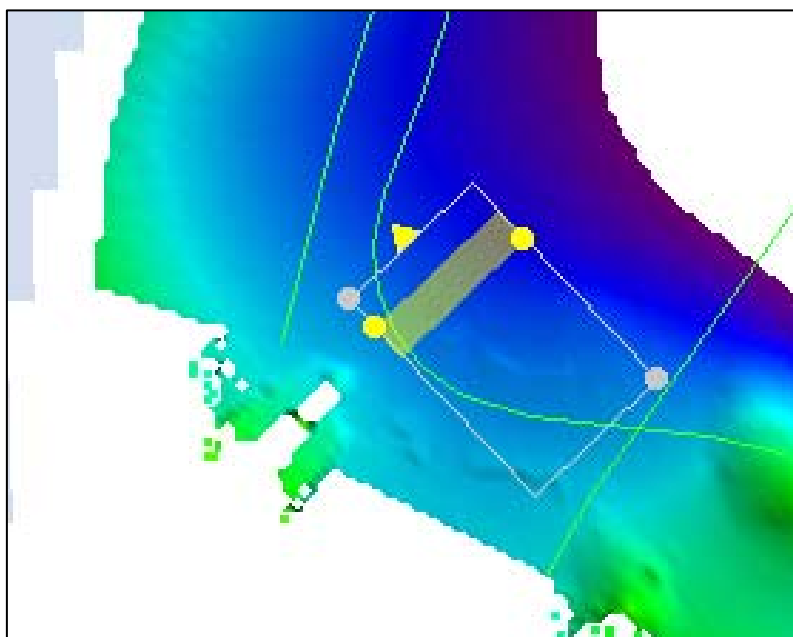
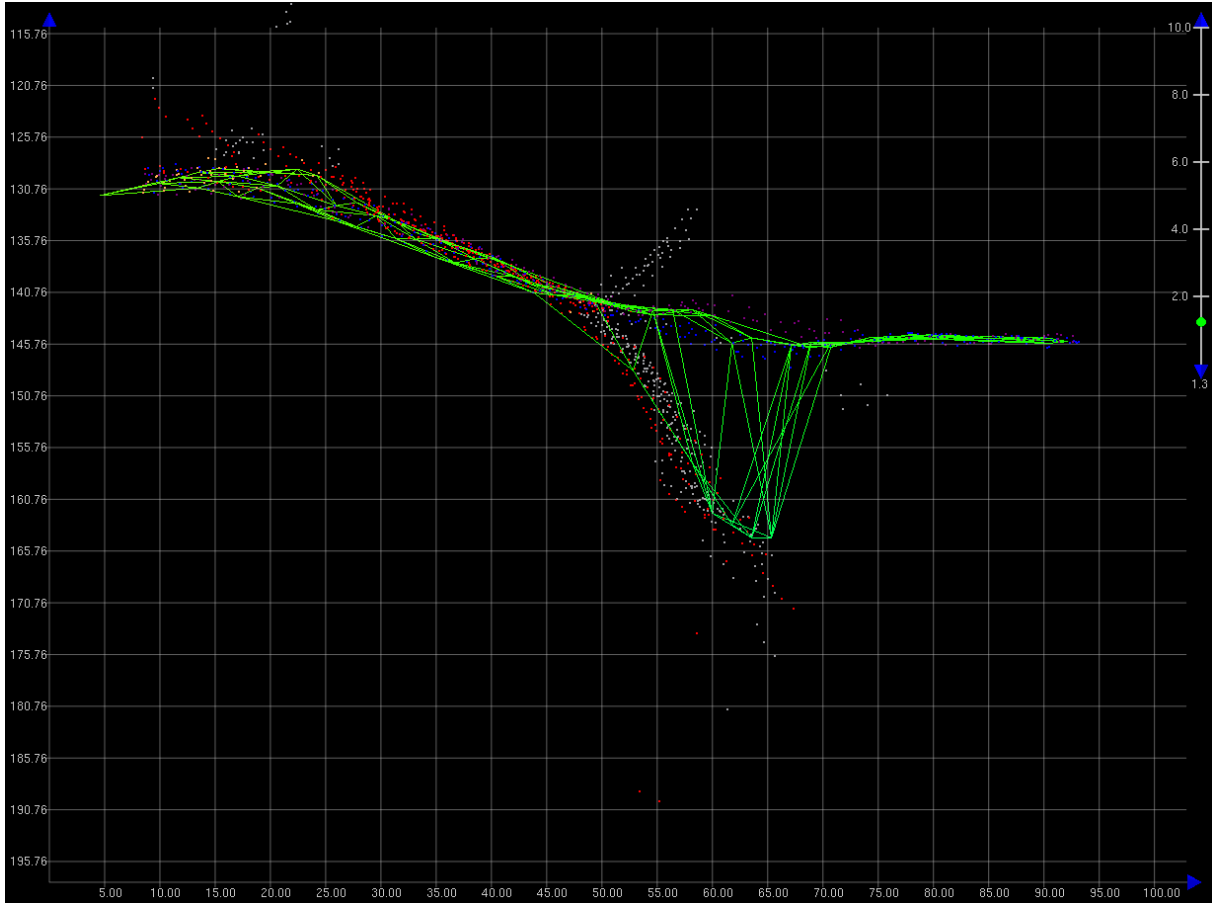


Figure 3: Subset and resulting artifact in BASE surface associated with malfunctioning surface sound velocimeter

### Mud Bottom Penetration by Outer Beams

The bottom type found in the vicinity of San Juan Bautista contained areas of drastically-varying bottom type. There were many instances seen where soft mud was found adjacent to and on top of a harder, rocky bottom type. In these cases, the Reson 7125 appeared to penetrate the mud bottom and returned the rock substrate beneath. This was especially common when running in low frequency in deeper waters. The CUBE surface often chose the sub-bottom return, causing a trough at the rock-mud interface. Multiple lines were run in these areas in an effort to capture the true seafloor. To further compensate, the Hydrographer, where possible, rejected soundings obviously below the surface.<sup>8</sup> See Figure 4 below.



*Figure 4: The BASE surface reflected the sub-bottom characteristics of the survey area (viewed in Caris HIPS subset mode)*



**B.2.f. Object Detection and Coverage Assessment**

For holidays larger than 3 nodes across, the corresponding multibeam backscatter side scan was examined and no navigationally significant items were found; additionally, the least depths were represented.<sup>9</sup> Holidays of this magnitude were found in the following locations:

1. Southern edge of field sheet D in approximate position 55° 22'N, 133° 21'W where the sonar penetrated the muddy bottom and returned hard rock.
2. Southern edge of field sheet D in approximate position 55° 22'N, 133° 02'W as the result of down-slope noise being rejected.
3. Western edge of field sheet D in approximate position 55° 24'N, 133° 23'W as a result of outer beam loss in deep water.
4. Southern portion of field sheet C in approximate position 55° 22'N, 133° 17'W where the sonar penetrated the muddy bottom and returned hard rock.
5. Near the southern shore of San Juan Bautista Island in approximate position 55° 24'N, 133° 17'W as a result of shadowing on a steep slope.

Density specifications were not met in depths greater than 100 meters for survey H12030. These requirements were waived in depths greater than 100 meters after consultation with HSD Operations Branch and Pacific Hydrographic Branch (see email correspondence in Appendix V).<sup>10</sup>

**B.2.g. Unusual Conditions**

No unusual conditions were encountered during the survey that affected the expected accuracy and quality of survey data.

**B.3. Corrections to Echo soundings**

Data reduction procedures for survey H12030 conform to those detailed in the *OPR-O190-RA-09 DAPR*.

**B.4. Data Processing**

Data processing procedures for survey H12030 conform to those detailed in the DAPR. Data were processed initially using Caris HIPS & SIPS v6.1, Service Pack 2, and Hotfix 8. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

**TPU VALUES:**

The survey specific parameters used to compute Caris TPU for H12030 are listed in Table 4.

<b>Tide values:</b>	Measured	0.01 m	Zoning	0.12 m
<b>Sound Speed Values:</b>	Measured	0.50 m/s	Surface	As per DAPR

*Table 4: Survey Specific Caris TPU Parameters*

Many BASE surfaces were used in processing H12030. Final BASE surface resolutions and depth ranges were set according to Table 5 below, with field sheets smaller than  $25 \times 10^6$  nodes. CUBE surfaces were processed with a parameter set corresponding to each resolution as per HTD 2009-2. The CUBE parameter XML file is included with the data deliverables. The submission Field Sheet and BASE Surface structure are shown in Figure 5 and 6.

<b>Depth Range (m)</b>	<b>Resolution (m)</b>
0-23	1
20-52	2
46-115	4
103-350	8

*Table 5: Depth range and surface resolutions for H12030*

Soundings were generated in Caris HIPS from the final combined BASE surface for field unit review purposes. They are included for reference only and are not intended as a deliverable.

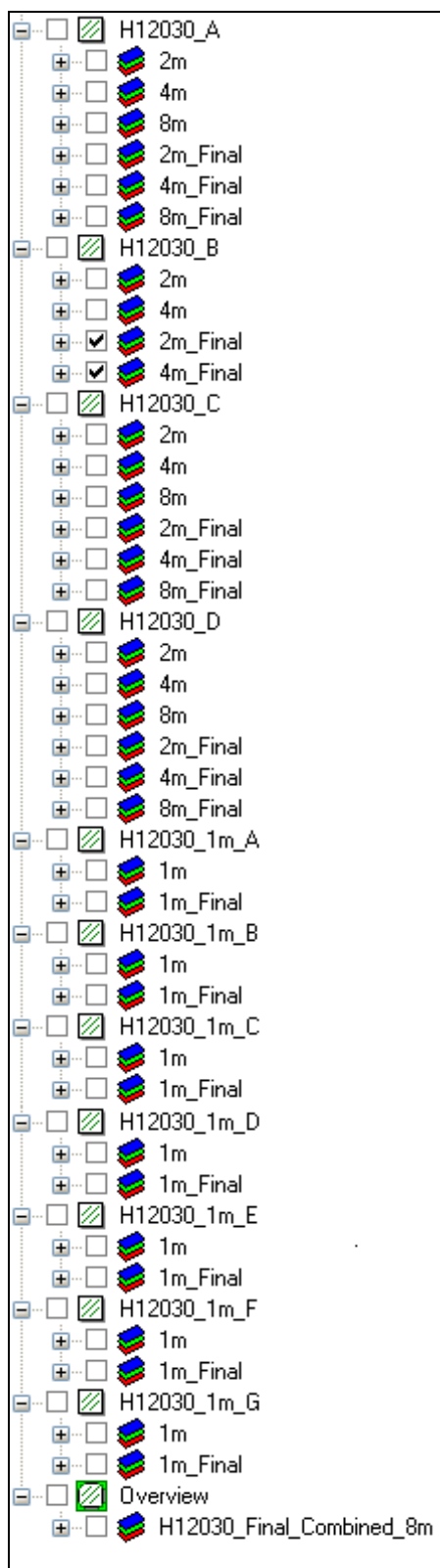


Figure 5: Field sheets and BASE surfaces submitted with H12030

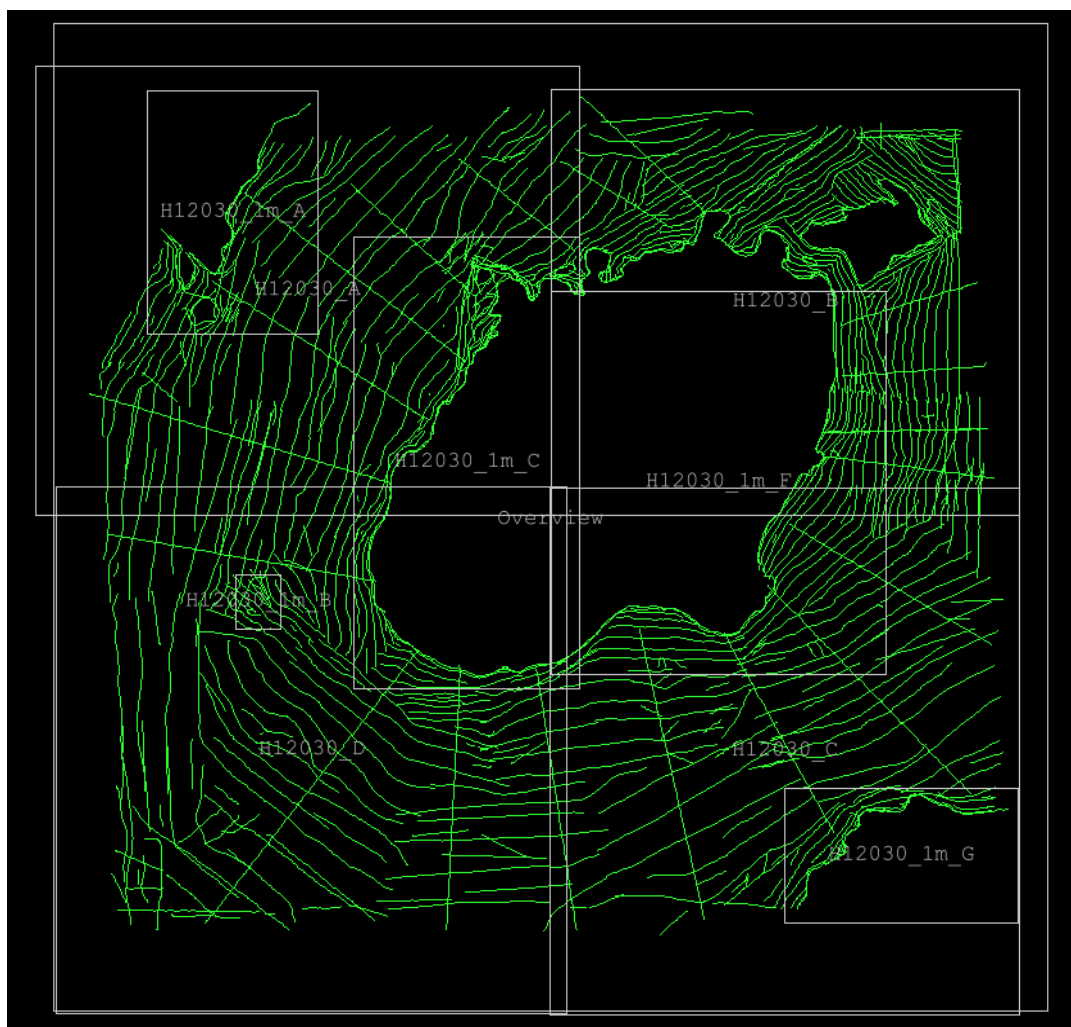


Figure 6: H12030 Field Sheet Layout

## C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H12030 can be found in the *OPR-O190-RA-09 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

### C.1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacons utilized for this survey are given in Table 6.

Location	Frequency	Operator	Priority
Level Island	295 kHz	USCG	Primary
Annette Island	323 kHz	USCG	Secondary

Table 6: Differential Corrector Sources for H12030

## C.2. Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Ketchikan, AK (945-0460) served as control for datum determination and as the primary source for water level reducers for survey H12030.

*Rainier* personnel installed a Sutron 8210 “bubbler” tide gauge at the following subordinate station in accordance with the Project Instructions. The gauges were installed in order to provide information to the Center for Operational Oceanographic Products and Services (CO-OPS N/OPS1) for the determination of time and height correctors. This station is described in detail in the *OPR-0190-RA-09 Horizontal and Vertical Control Report*.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Trocadero Bay	945-0463	30-day	April 26, 2009	June 9, 2009

*Table 7: Tide Stations installed by Rainier personnel for H12030*

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels from the Trocadero Bay station (954-0463) by applying tide file 9450463.tid and time and height correctors through the zone corrector file H12030CORF.zdf. **It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during final processing.**

The request for Final Approved Water Levels for H12030 was submitted to CO-OPS on June 8, 2009 in accordance with the Field Procedures Manual (FPM), dated April 2009. The Final Tide Note was received on August 28, 2009. This documentation is included in Appendix IV.<sup>11</sup>

## D. RESULTS AND RECOMMENDATIONS

### D.1. Chart Comparison

#### D.1.a. Survey Agreement with Chart

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.3-D.1 of the HSSDM, utilizing Caris HIPS software program.

Survey H12030 was compared with the following charts:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17405	1:40,000	16 <sup>th</sup> Ed, Oct 2008	8/22/2009
17406	1:40,000	7 <sup>th</sup> Ed; Feb 2004	8/22/2009

*Table 8: Charts compared with H12030*

### Contour Comparison

Contours generally agreed between chart 17405, chart 17406, and survey H12030; no notable contour shifts were seen between chart 17406 and survey soundings.<sup>12</sup> On chart 17405 the 100-fathom depth contour in the southwestern corner of the survey is depicted well, but an area of survey soundings deeper than 100 fathoms were missed in the southeastern corner of the survey. The 50-fathom curve is mostly charted correctly, with only minor discrepancies throughout the sheet, most likely due to the sparseness of data from the previous surveys. The two 50-fathom contours in the southeastern portion of the sheet near San Juanito Island and Tranquil Point are incomplete; the contour lines end abruptly and do not close around an area (Figure 7). The Hydrographer recommends updating the depth contours and completing the 50-fathom contours from the digital data acquired on sheet H12030.<sup>13</sup>

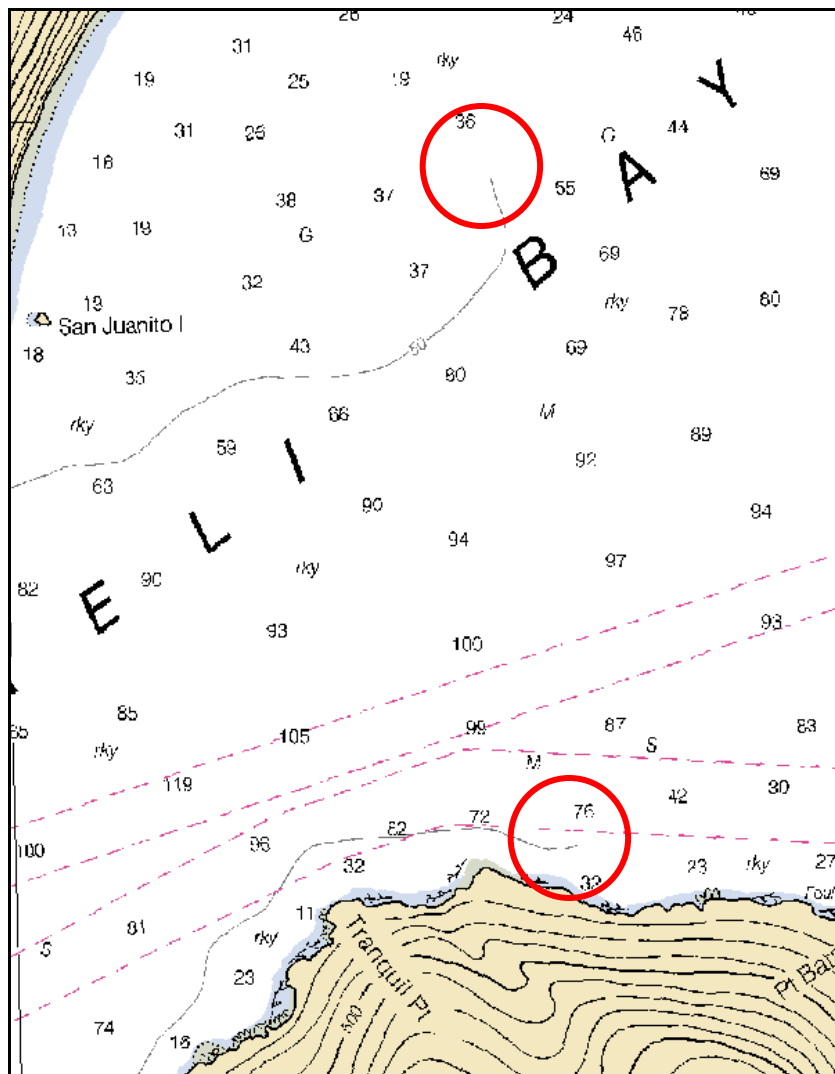


Figure 7: Incomplete contour lines, highlighted with red circles, in the southeastern portion of survey H12030 on chart 17405

### Sounding Comparison

Due to the age, survey techniques, and positioning techniques of previous surveys, there were many discrepancies between the charted depths and survey soundings without a distinct pattern or correlation.<sup>14</sup> A graphic comparison between survey soundings and charted depths can be seen in Figures 8, 9, 10, and 11 below. Each red dot overlaid on the charted depth indicates the survey sounding was shoaler by approximately 1 ftn. A blue dot indicates the survey sounding was found to be deeper than the charted sounding. A green dot indicates general agreement between the charted depth and survey sounding within 1 ftn.

Significant instances of discrepancies include: The two shoal areas in the vicinity of position 55° 24.6'N 133° 21.3' W were both found to be 0.5 ftn deeper than charted. The 33 ftn charted depth at approximate position 55° 26.1'N 133° 13.5'W was found to be much shoaler than with survey soundings ranging from 11 to 18 ftns.<sup>15</sup>

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.<sup>16</sup>

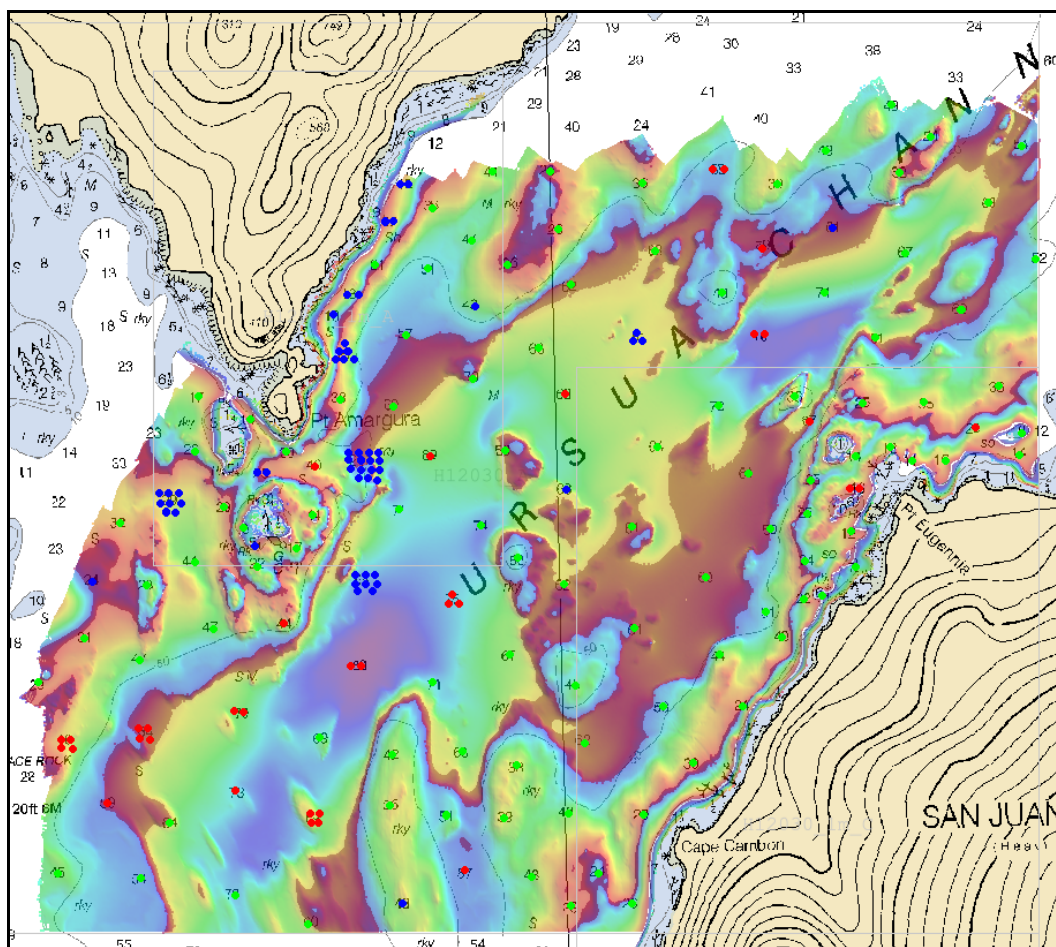


Figure 8: Comparison of survey soundings with charted depths from chart 17405 for field sheet H12030\_A of survey H12030. Red dots indicate shoaling, blue indicate soundings deeper than charted, and green indicate chart-survey agreement



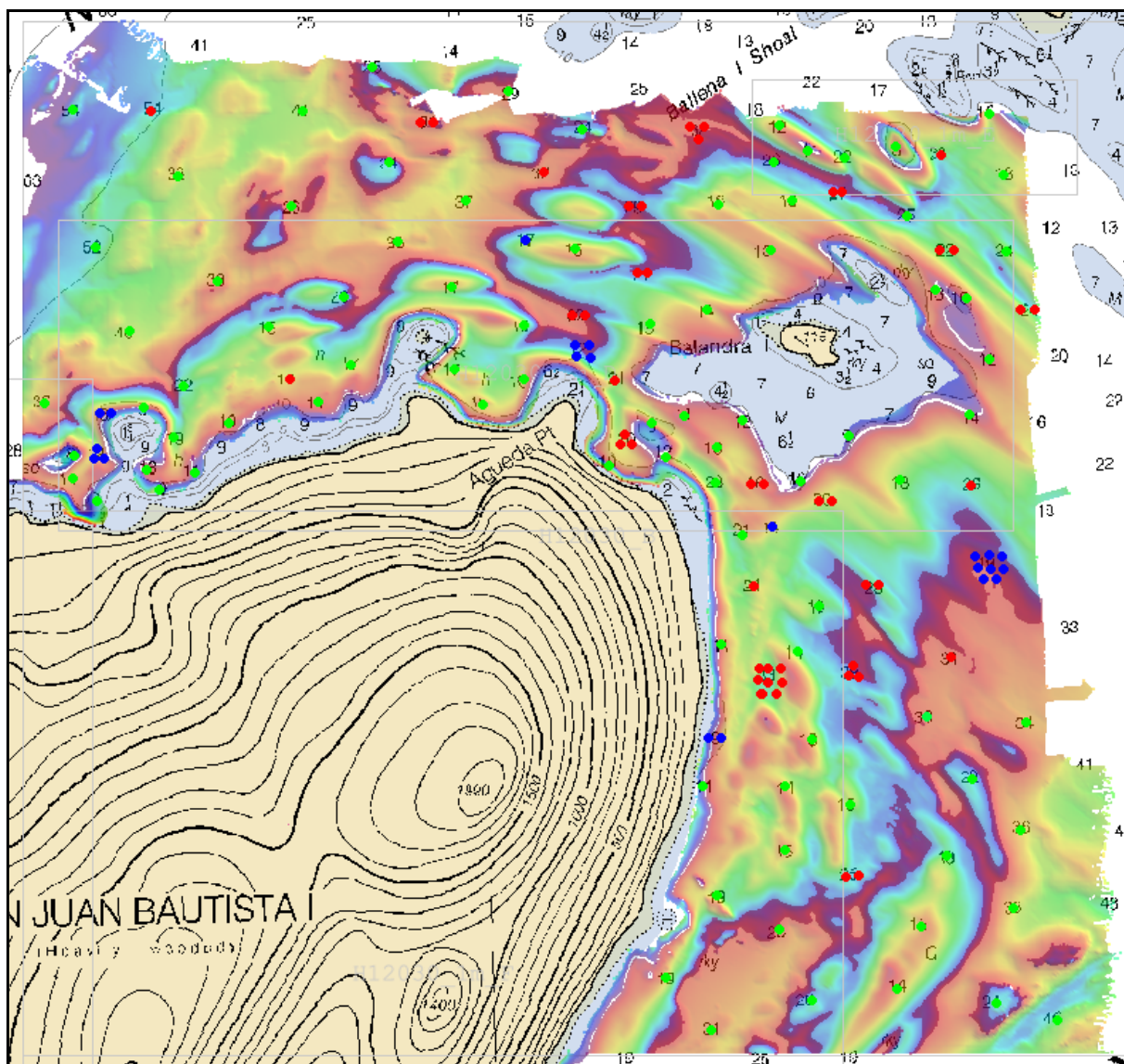


Figure 9: Comparison of survey soundings with charted depths from chart 17405 for field sheet H12030\_B of survey H12030. Red dots indicate shoaling, blue indicate soundings deeper than charted, and green indicate chart-survey agreement



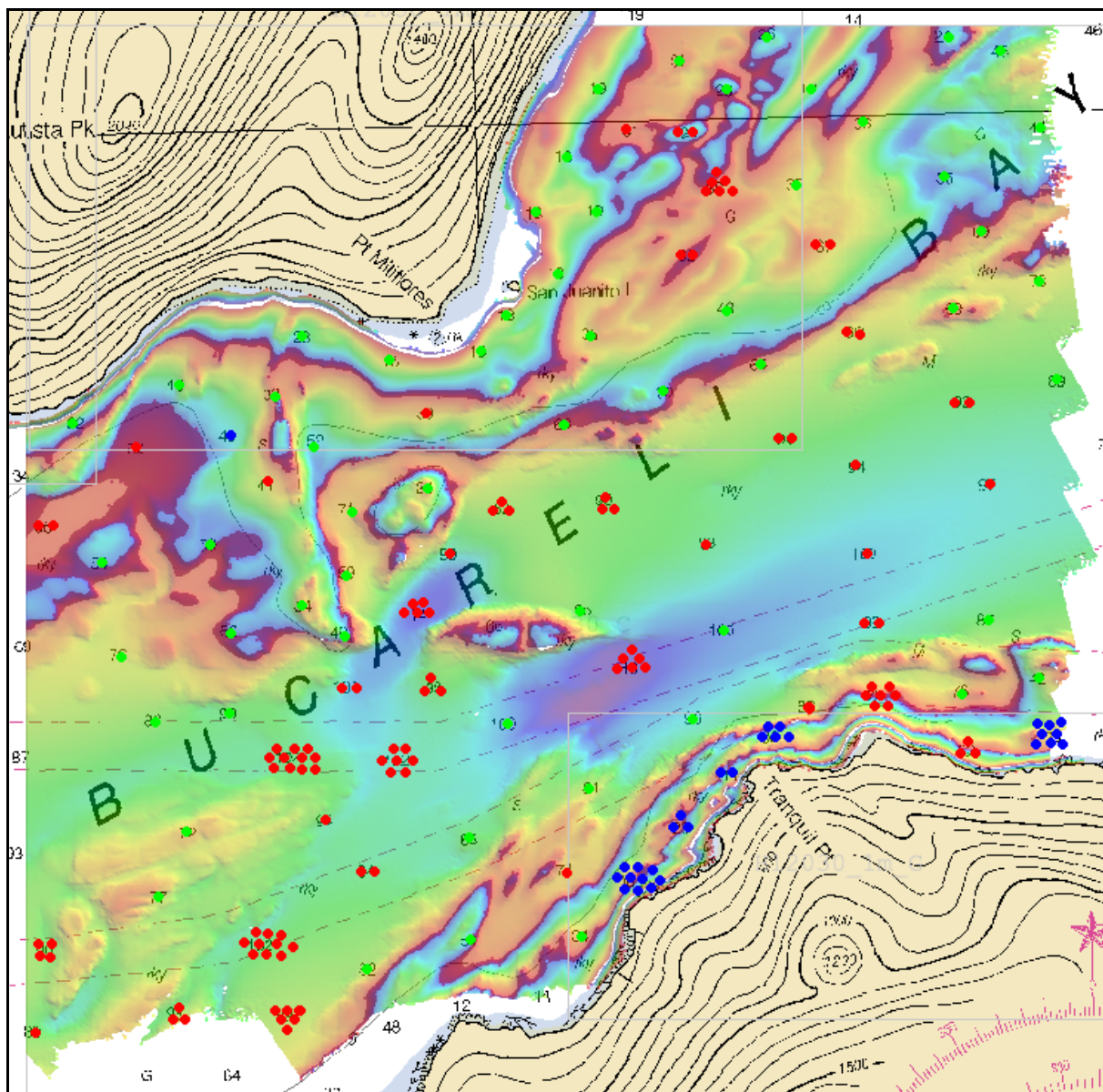


Figure 10: Comparison of survey soundings with charted depths from chart 17405 for field sheet H12030\_C of survey H12030. Red dots indicate shoaling, blue indicate soundings deeper than charted, and green indicate chart-survey agreement

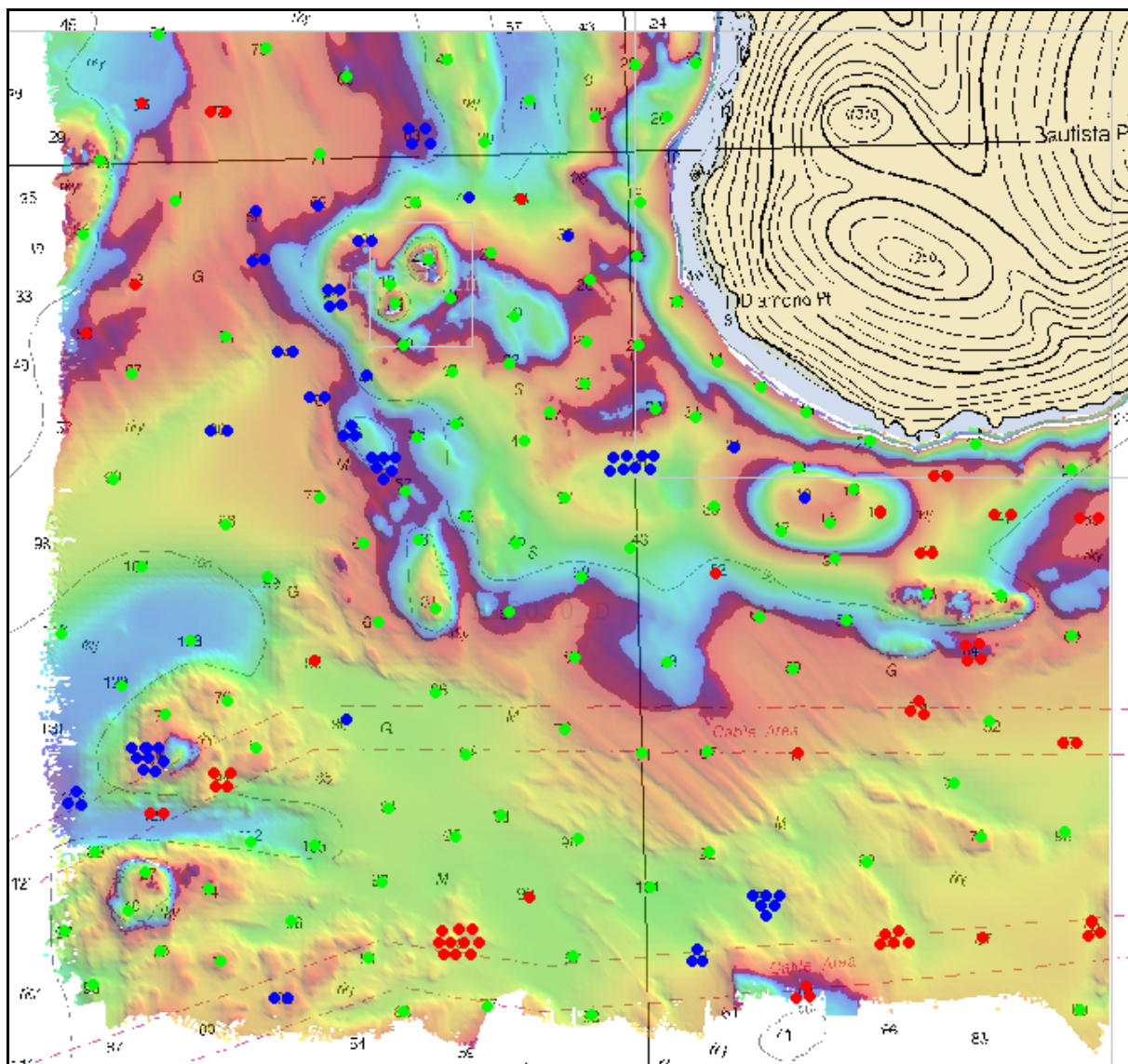


Figure 11: Comparison of survey soundings with charted depths from chart 17405 for field sheet H12030\_C of survey H12030. Red dots indicate shoaling, blue indicate soundings deeper than charted, and green indicate chart-survey agreement.

#### D.1.b. Automated Wreck and Obstruction Information System (AWOIS) Items

No AWOIS items were located within the survey limits of H12030.<sup>17</sup>

#### D.1.c. Other Investigated Features

No additional charted items were investigated and no other features were located on survey H12030.

**D.1.d. Dangers to Navigation**

One (1) Danger to Navigation (DTONs) was found on survey H12030, and reported to the Marine Chart Division via email on 20 October, 2009.<sup>18</sup> The original DTON submission package is included in Appendix I.<sup>19</sup>

**D.2. Additional Results****D.2.a. Shoreline Verification**Shoreline Source

Shoreline verification was accomplished using a combination of the composite source file (CSF) and project reference file (PRF) provided with the project instructions. The CSF has been created using the latest ENC's, most recent aerial photogrammetry, prior hydrographic surveys, and accepted LIDAR survey features. Prior survey and LIDAR features in the CSF are for reference. Several charted features included in the CSF did not have 'SORIND' and/or 'SORDAT' attributions. Their unique feature IDs, acronyms, and positions are given in the following table:

<b>Feature ID</b>	<b>Acronym</b>	<b>Latitude</b>	<b>Longitude</b>
1C 0000003586 00001	LNDARE	55°24.08' N	133° 18.05' W
1C 0000003587 00001	LNDARE	55°26.63' N	133° 17.95' W
1C 0000003588 00001	LNDARE	55°26.82' N	133° 17.97' W
1C 0000003589 00001	LNDARE	55°26.83' N	133° 17.98' W
1C 0000003590 00001	LNDARE	55°26.84' N	133° 17.95' W
1C 0000003591 00001	LNDARE	55°26.84' N	133° 17.98' W
1C 0000004067 00001	COALNE	(approx) 55° 26.6' N	(approx) 133° 17.9' W

*Table 9: Feature IDs, acronyms, and positions of CSF features without SORIND and/or SORDAT attribution*

LIDAR items assigned to the ship for further investigation were provided in the PRF as features with S-57 feature acronym BUAARE. The composite source along with LIDAR items for further investigation were printed on paper "boat sheets" and displayed in Caris Notebook and/or Hypack for field verification.<sup>20</sup>

Shoreline Verification

Traditional "limited shoreline verification" was not required for this survey, since much of the near-shore area was covered by junction LIDAR surveys and thus outside the limits of H12030. The following field procedures were followed:

- LIDAR items selected for further investigation and provided in the PRF were addressed by visual, Detached Position (DP), VBES, or MBES techniques as appropriate and feasible, near predicted low water. Note that some of these features were located in areas unsafe to approach and/or were considered insignificant to navigation, and were not further investigated.
- All new and charted items within the limits of H12030 (i.e., offshore of the limits prescribed in the Project Instructions and discussed in Section A.) were addressed.

Detached positions (DPs) were recorded and S-57 attributed in Caris Notebook. These DPs indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline, and transferred to the “remrks” attribute on the corresponding features in Notebook.

All shoreline data is submitted in Caris Notebook .hob files. The session H12030\_Notebook.hsf contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H12030_Comp_Source.hob	Original Source Data as provided for project OPR-O190-RA-09 and filtered to the limits of survey H12030
H12030_Lidar_Goodline.hob	Extents of Lidar junction survey H12030
H12030_Reference.hob	Survey outline and limit lines, and AWOIS item positions and radii.
H12030_Final_Feature_File.hob	Composite source data modified by the field to best represent the shoreline at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey. This file contains “Lidar Investigation Features” that were confirmed to exist or were unable to be investigated.
H12030_Disprovals.hob	Composite source items that were deleted or modified in position or geographic type. This file contains Lidar investigation items that were found in the field to not exist.

*Table 10: List and Description of Notebook HOB files*

### Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the composite source file and charts as described above.<sup>21</sup>

### **D.2.b. Prior Survey Comparison**

Prior survey comparison was not performed.

### **D.2.c. Aids to Navigation**

There was one (1) aid to navigation (ATON) within the limits of survey H12030. The position of green can-shaped buoy G C “1” was visually checked in the field against the digital raster charts. This ATON was found to be correctly charted on charts 17406 and 17406 and serves its intended purpose. The ATON is not present on chart 17000. The Hydrographer recommends retaining this ATON as charted on 17405 and 17406, and adding the ATON to chart 17400.<sup>22</sup>



### D.2.d. Overhead Features

There are no overhead features within the limits of survey H12030.<sup>23</sup>

### D.2.e. Submarine Cables and Pipelines

Survey H12030 contains two charted cable areas south of San Juan Bautista Island, as shown in Figure 12. No visible indication of cables was evident in the MBES data in the cable area depicted on chart 17405 or 17406. The Hydrographer recommends retaining the cable areas as charted.<sup>24</sup>

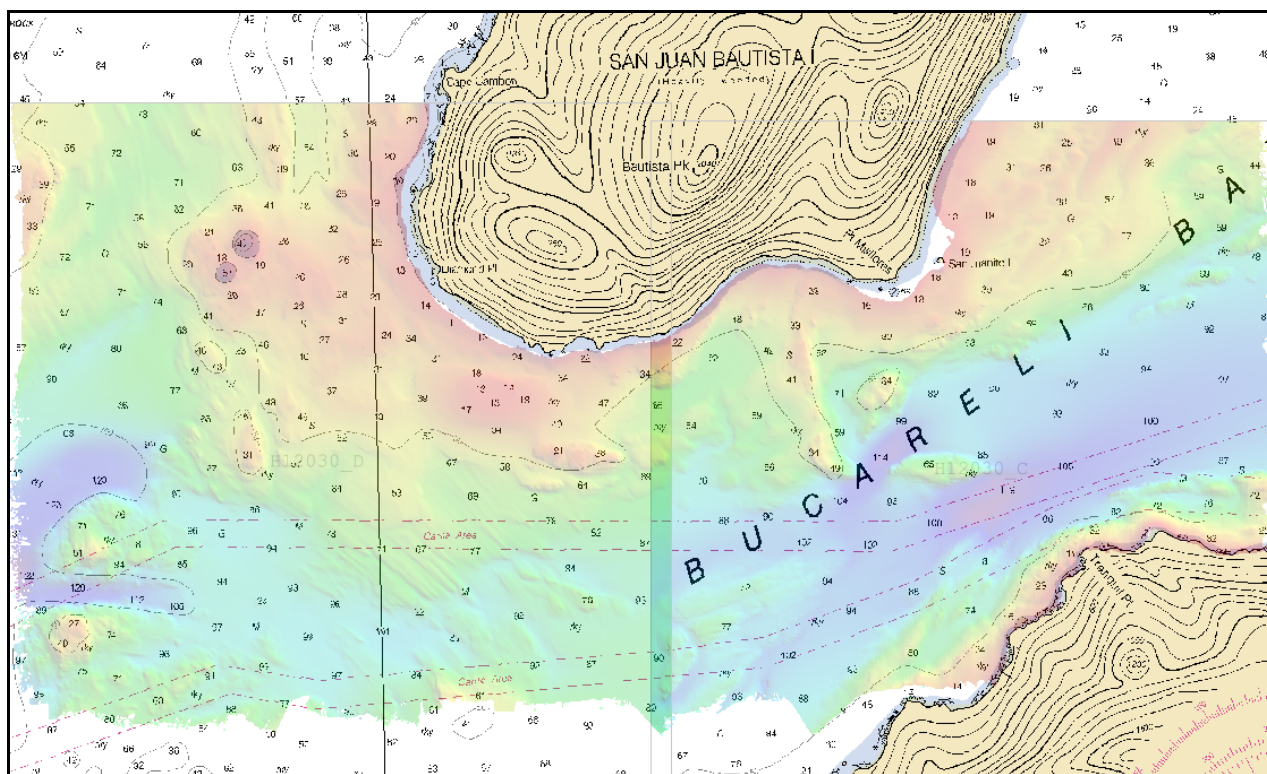


Figure 12: H12030 Cable areas

### D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H12030 and none were observed to be operating in the area.<sup>25</sup>

**D.2.g. Bottom Samples**

There were 18 bottom samples collected for survey H12030.<sup>26</sup> Due to the topography and depths seen during the survey, it is not likely a ship would choose to anchor in the survey area. As such, the bottom sample sites were chosen mainly for historic significance, not for possible anchorage information. Of the nine historic bottom samples collected, four did not agree with the charted characteristics.<sup>27</sup> The four discrepancies are displayed below in Table 11. All bottom samples have been included in the H12030\_Final\_Feature\_File.hob in the Caris Notebook session.

Historic S-57 Attribution	H12030 S-57 Attribution	Latitude	Longitude
Gravel	Hard Shells	55° 25.39' N	133° 25.39' W
Rock	Green Clay	55° 22.63' N	133° 18.22' W
Sand	Green Sticky Mud/ Coarse Pebbles	55° 24.24' N	133° 20.65' W
Sand	Green Sticky Mud/ Medium Pebbles	55° 25.23' N	133° 20.22' W

*Table 11: Differences between historic and H12030 bottom samples*

**D.2.h. Other Findings**

None.

**E. APPROVAL**

As Chief of Party, Field operations for hydrographic survey H12030 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2009 edition), Field Procedures Manual (April 2009 edition), Standing and Project Instructions, and all HSD Technical Directives issued through June 2009. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Hydrographic Systems Readiness Review Package	<i>Under separate cover</i>	N/CS34
Data Acquisition and Processing Report for OPR-O190-RA-09	27-Oct-2009	N/CS34
Coast Pilot Report for OPR-O190-RA-09	<i>To be submitted</i>	N/CS26
Horizontal and Vertical Control Report for OPR-O190-RA-09	27-Oct-2009	N/CS34
Tides and Water Levels Package for OPR-O190-RA-09	20-Jun-2009	N/OPS1

Approved and Forwarded:



Donald W. Haines, CAPT/NOAA  
I am approving this document  
2009.10.27 15:33:40 -07'00'

Captain Donald W. Haines, NOAA  
Commanding Officer, NOAA Ship *Rainier*

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

Survey Sheet Manager:



Christine L. Schultz  
I am the author of this document  
2009.10.27 14:38:54 -07'00'

Lieutenant (junior grade) Christine L. Schultz, NOAA  
Junior Officer, NOAA Ship *Rainier*

Chief Survey Technician:



James B. Jacobson  
I have reviewed this document  
2009.10.27 21:31:35 Z

James B. Jacobson  
Chief Survey Technician, NOAA Ship *Rainier*

Field Operations Officer:



Brent Pounds  
I have reviewed this document  
2009.10.27 13:33:41 -08'00'

Lieutenant Brent J. Pounds, NOAA  
Field Operations Officer, NOAA Ship *Rainier*

**Revisions and Corrections Compiled During Office Processing and Certification**

<sup>1</sup> Concur.

<sup>2</sup> Concur. The data is adequate to supersede charted data in the common area.

<sup>3</sup> Concur with clarification. There is a very small area in the northeast corner of H12030 that junctions with H12000. A common junction was made with H12026, H12027 and H12029, all of which have already been compiled. A partial junction was made with H12000 which is being concurrently compiled.

<sup>4</sup> Do not concur. H12030 only shares a common junction with LIDAR survey H11662. H12030 also shares a junction with a part of LIDAR survey H11867, which was collected a year after H12030 was completed. Portions of LIDAR surveys H11662 and H11867 were compiled concurrently with H12030 and are included in the HCell.

<sup>5</sup> Concur.

<sup>6</sup> Concur with clarification. The junctioning data from H11662 was found to be in good agreement within 1 meter. The junction with H11867 was evaluated during compilation and it was found to be in good agreement with both H12030 and H11662, however it was slightly shoaler than H11662. In areas where LIDAR surveys H11662 and H11867 overlap, H11867 was used for compilation.

<sup>7</sup> After rejecting the data resulting from the surface sound speed dropouts, the remaining data meets specification and is adequate for charting.

<sup>8</sup> After rejecting the sub-surface data, the remaining data represents the true characteristic of the seafloor within specification and is adequate for charting.

<sup>9</sup> Concur. The data is adequate to supersede charted data in the common area despite the insignificant holidays.

<sup>10</sup> Concur. These data are adequate to supersede charted data in the common area.

<sup>11</sup> See attached Tide Note dated August 27, 2009.

<sup>12</sup> Concur.

<sup>13</sup> Concur.

<sup>14</sup> Concur.

<sup>15</sup> Compiler concurs with the field comparison results.

<sup>16</sup> Concur.

<sup>17</sup> Concur.

<sup>18</sup> The reported DTON has been applied to the charts and is included in the HCell.

<sup>19</sup> See attached DTON Report.

<sup>20</sup> No data from LIDAR included in HCell H12030 supersedes shoaler charted depths or has been used to disprove charted features.

<sup>21</sup> Concur with clarification. The submitted hob files were used in the compilation of HCell H12030. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.

<sup>22</sup> Concur with clarification. Chart per latest ATONIS information.

<sup>23</sup> Concur.

<sup>24</sup> Concur. The cable areas have been blue noted to be retained in the HCell.

<sup>25</sup> Concur.

<sup>26</sup> Eleven of the 18 bottom samples collected during H12030 are included in the HCell. The remaining 7 bottom samples are not included because the fall within rocky seabed areas delineated during compilation. Four charted bottom samples were blue noted to be retained and the rest were blue noted to be removed because the fall within the limits of the rocky seabed areas delineated during compilation.

<sup>27</sup> During compilation, it was determined that the general characteristic of the area is rocky and rocky seabed areas were delineated in the HCell. Therefore, the new bottom samples indicating a different bottom type at the historic position are not be included in the HCell.



# H12030 DTON Report

**Registry Number:** H12030  
**State:** Alaska  
**Locality:** West of Prince of Wales Island  
**Sub-locality:** Vicinity of San Juan Bautista Island  
**Project Number:** OPR-O190-RA-09  
**Survey Date:** 06/08/2009

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	16th	10/01/2008	1:40,000 (17405_1)	[L]NTM: ?
17406	7th	02/01/2004	1:40,000 (17406_1)	[L]NTM: ?
17400	17th	03/01/2007	1:229,376 (17400_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

\* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
1.1	Rock	13.81 m	55° 26' 40.2" N	133° 21' 30.5" W

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 127/483 from h12030\_phb / 2801\_reson7125\_hf\_512 / 2009-159 / 000\_2005

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 26' 40.2" N, 133° 21' 30.5" W  
**Least Depth:** 13.81 m (= 45.32 ft = 7.553 fm = 7 fm 3.32 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.972$  m ; TVU (TPEv)  $\pm 0.285$  m  
**Timestamp:** 2009-159.20:06:21.628 (06/08/2009)  
**Survey Line:** h12030\_phb / 2801\_reson7125\_hf\_512 / 2009-159 / 000\_2005  
**Profile/Beam:** 127/483  
**Charts Affected:** 17405\_1, 17406\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

DtoN: survey sounding approx. 7 fm shoaler than charted.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12030_phb/2801_reson7125_hf_512/2009-159/000_2005	127/483	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart designated shoal sounding as per digital data.

#### Cartographically-Rounded Depth (Affected Charts):

7 ½fm (17405\_1, 17406\_1, 17400\_1, 16016\_1, 530\_1)

7fm 3ft (531\_1)

13.8m (500\_1, 501\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20090608  
 SORIND - us,us,nsurf,H12030  
 VALSOU - 13.813 m

WATLEV - 3:always under water/submerged

## Feature Images

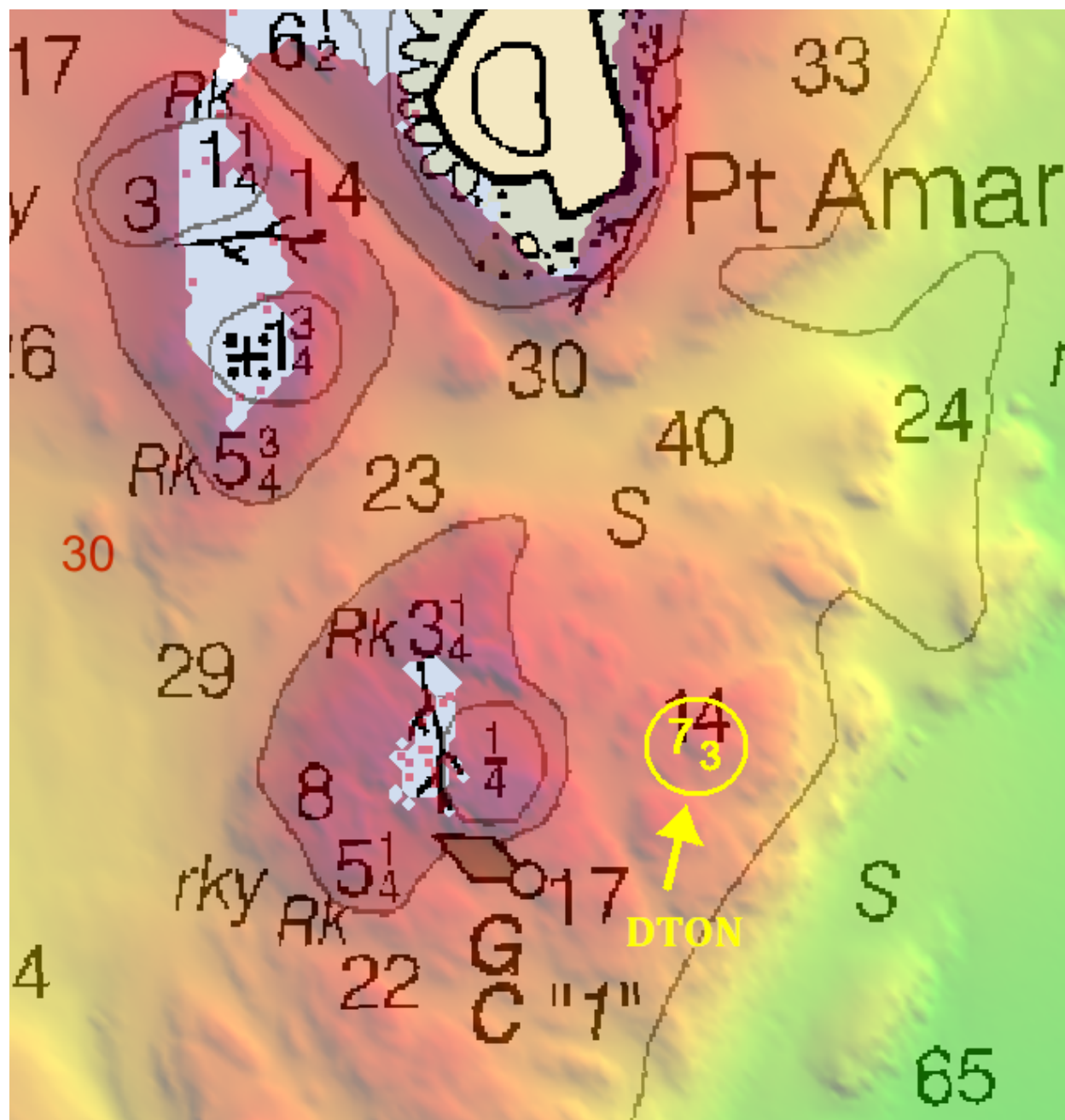


Figure 1.1.1



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** August 27, 2009

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-O190-RA-2009  
**HYDROGRAPHIC SHEET:** H12030

**LOCALITY:** W of Prince of Wales Island Vicinity San Juan Bautista  
**TIME PERIOD:** May 6 - June 8, 2009

**TIDE STATION USED:** 945-0463 Trocadero Bay  
Lat. 55° 21.1'N Long. 132° 56.3' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.825 meters

**REMARKS: RECOMMENDED ZONING**  
Use zone(s) identified as: SA250

Refer to attachments for zoning information.

**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

**Peter J. Stone**

Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/  
NOS, email=peter.stone@noaa.gov, c=US  
Date: 2009.08.27 16:02:46 -04'00'

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CHIEF, OCEANOGRAPHIC DIVISION





**DIXON ENTRANCE  
TO  
CHATHAM STREET**

Mercator Projection  
Scale 1:224,376 at Lat. 56°  
North American Datum of 1983  
(World Geodetic System 1984)

For Symbols and Abbreviations see Chart No. 1

**HIGHLIGHTS**

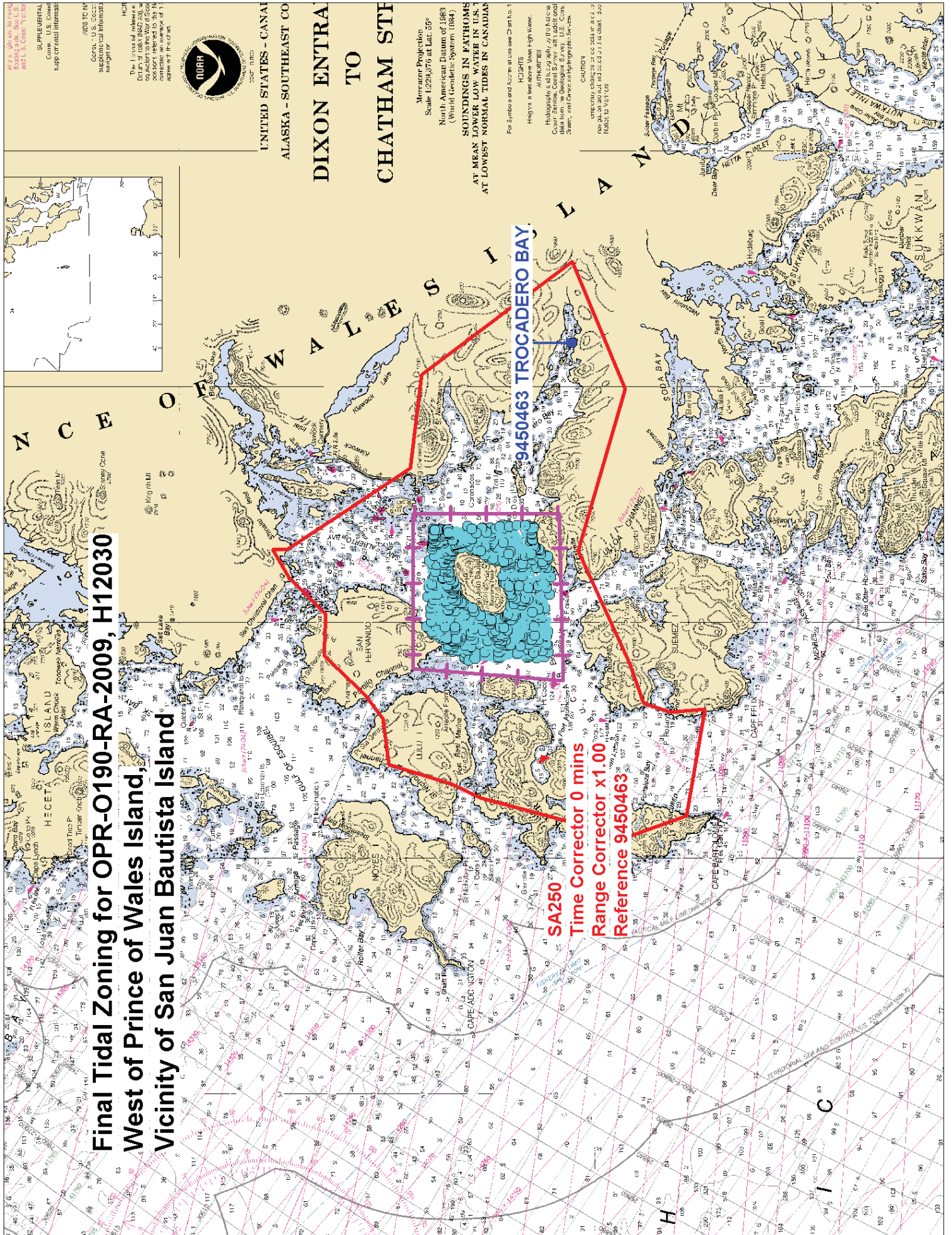
Highlights listed above: Mean High Water.

**AUTHORITIES**

Hydrographic and local surveys by the National Ocean Service, Coast Survey, with additional data from the Geological Survey, U.S. Coast, and Geodetic Survey, and Chart and Hydrographic Services.

**CAUTION**

Important changes in water depths and in navigational aids noted and explained in this chart. See Notes to Mariners.





**H12030 HCell Report**  
Katie Reser, Physical Scientist  
Pacific Hydrographic Branch

**1. Specifications, Standards and Guidance Used in HCell Compilation**

HCell compilation of survey H12030 used:

Office of Coast Survey HCell Specifications: Draft, Version: 4.0, 17 March, 2010.  
HCell Reference Guide: Version 2.0, 22 February, 2010.

**2. Compilation Scale**

Depths and features for HCell H12030 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17405	1:40,000	16 <sup>th</sup>	10/01/2008	11/27/2010
17406	1:40,000	7 <sup>th</sup>	02/01/2004	01/29/2011

The following ENC's were also used during compilation:

Chart	Scale
US5AK4BM	1:40,000
US5AK4CM	1:40,000

**3. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from a 8-meter multibeam combined surface and two 3-meter finalized LIDAR surfaces in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-5	10	3
10	20	4
20	50	4.5
50	500	5

In CARIS BASE Editor soundings were manually selected from the high density sounding layer (SS) and imported into a new layer (CS) created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology. In areas where there was an overlap between multibeam and LIDAR data, multibeam data was honored over LIDAR data except in cases where the LIDAR data was shoaler.



#### 4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the \*\_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H12030_SS.000
0	0.0000	0.2286	0.125	0
3	5.4864	5.715	3.125	3
5	9.144	9.373	5.125	5
10	18.288	18.517	10.125	10
50	91.44	92.8116	50.750	50
100	182.88	184.2516	100.750	100

With the exception of zero contours included in the \*\_CS file, contours have not been de-conflicted against shoreline features, soundings and hydrography, as all other features in the \*\_CS file and soundings in the \*\_SS have been. This may result in conflicts between the \*\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_QUAL, COALNE, DEPCNT and SBDARE objects should be expected. HCell features should be honored over \*\_SS.000 file contours in all cases where conflicts are found.

#### 5. Meta Areas

The following Meta object areas are included in HCell H12030:

M\_QUAL

The Meta area objects were constructed on the basis of the limits of the hydrography.

#### 6. Features

Features addressed by the field units are delivered to PHB where they are de-conflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base Surface, are included in the HCell. The geometry of these features may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

## 7. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue notes
COALNE	GC and charted coastline
DEPCNT	Zero contours
LNDARE	Islands and islets
M_QUAL	Data quality meta object
SBDARE	Rocky seabed areas, ledges, reefs and bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WEDKLP	Kelp

The \*\_SS HCell contains the following Objects:

DEPCNT	Generalized contours at chart scale intervals
SOUNDG	Soundings at the survey scale density

## 8. Spatial Framework

### 8.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

### 8.2 Horizontal and Vertical Units

DUNI, HUNI and PUNI are used to define units for depth, height and horizontal position in the chart units HCell, as shown below.

Chart Unit Base Cell Units:

Depth Units (DUNI):	Fathoms and feet
Height Units (HUNI):	Feet
Positional Units (PUNI):	Meters

During creation of the HCell in CARIS BASE Editor and CARIS S-57 Composer, all soundings and features are maintained in metric units with as high precision as possible. Depth units for soundings measured with sonar maintain millimeter precision. Depths on rocks above MLLW and heights on islets above MHW are typically measured with range finder, so precision is less. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest decimeter

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

## **9. Data Processing Notes**

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

## **10. QA/QC and ENC Validation Checks**

H12030 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

## **11. Products**

### **11.1 HSD, MCD and CGTP Deliverables**

H12030_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H12030_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H12030_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12030_Outline.gml	Survey outline
H12030_Outline.xsd	Survey outline

## 11.2 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, meta area objects, and blue notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Northport Systems, Inc., Fugawi Marine ENC Ver.3.1.0.435	Independent inspection of final HCells using a COTS viewer.

## 12. Contacts

Inquiries regarding this HCell content or construction should be directed to:

Katie Reser  
Physical Scientist  
Pacific Hydrographic Branch  
Seattle, WA  
206-526-6864  
[katie.reser@noaa.gov](mailto:katie.reser@noaa.gov)

APPROVAL SHEET  
H12030

The survey evaluation and verification has been conducted according to branch processing procedures and the HCell compiled per the latest OCS HCell Specifications.

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproof of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

I have reviewed the HCell, accompanying data, and reports. This survey and accompanying digital data meet or exceed OCS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.