H11429

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic/Lidar

Field No.

Registry No. H11429

LOCALITY

State Alaska

General Locality Approaches to Sitka

Sublocality Northwest of Kanga Bay

2005

HYDROGRAPHER MARK SINCLAIR

CHIEF OF PARTY DARREN STEPHENSON

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NOAA FORM 77-28 (11-72)

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

REGISTER NO.

H11429

HYDROGRAPHIC TITLE SHEET

INSTRUCTIONS - 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.

State: Alaska

General Locality: Approaches to Sitka

Sublocality: Northwest of Kanga Bay

Scale: 1:10,000

Date of Survey: April 29 to August 12, 2005

Instructions Date: April 18, 2005

Project No.: OPR-O112-KRL-05

Vessel: Tenix LADS Aircraft, VH – LCL

Hydrographer: M.J. Sinclair

Chief of Party: D.J. Stephenson

Surveyed by: S.R. Ramsay, M.S. Hawkins, T.M. Farrow, J.K. Young, B.C. McWilliam, S.G. Denton, A.P. Reed, J. Weick

Soundings taken by echo sounder: Laser Airborne Depth Sounder

Graphic record scaled by: L.R.Chamberlain and B. Weidman

Graphic record checked by: S.R. Ramsay and J.G. Guilford

Evaluation by: T. Wozumi, NOAA, PHB

Automated plot by: HP Design Jet 800PS

Verification by: T. Wozumi, NOAA, PHB

Soundings in: Fathoms and tenths at MLLW

REMARKS: Contract # NC-NJ3000-4-00010 01

Contractor: Tenix LADS Incorporated, 925 Tommy Munro Dr., Suite J, Biloxi, MS 39532

Sub contractor: John Oswald and Associates, 12001 Audubon Dr, Anchorage, AK 99516

Times: All times are recorded in UTC

Purpose: The purpose of this survey is to provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area.

Projection is UTM Zone 8.

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SURVEY H11429

SCALE 1:10,000, SURVEYED IN 2005

TENIX LADS AIRCRAFT, VH-LCL

TENIX LADS, INC. (TLI)

MARK SINCLAIR, HYDROGRAPHER

PROJECT [1]
Project Number: OPR-O112-KRL-05 **Original:** DG 133C-03-CQ-0011
Date of Instructions: April 18, 2005 **Task Order:** T0007

Date of Supplemental Instructions: May 7, 2003 email regarding meeting with PHB, NOAA and November 24, 2004 e-mail regarding SOW revision.
Secchi disk report

Sheet Number: V
Registry Number: H11429

PURPOSE

To provide NOAA with modern, accurate hydrographic survey data with which to update the nautical charts of the assigned area.

A. AREA SURVEYED

Between the dates April 29 to August 12, 2005 the LADS Mk II aircraft forward deployed to Sitka from the project OPR-P183-KRL-05 operating base of Sand Point on five occasions. During this period fourteen survey sorties were flown under Task Order 7 OPR-O112-KRL-05 Approaches to Sitka – Sitka Sound. Survey operations covered three smooth sheets. This Descriptive Report describes Sheet V, which covers the Northwest of Kanga Bay area (see Figure 1).

Environmental factors such as wind strength and direction, cloud cover, high ground and water clarity influenced the area of data acquisition on a daily basis. See section B.2 Quality.

The planned and actual linear miles sounded for the areas are provided at Appendix III. The sheet limits are as follows for Sheet V:

	Latitude (NAD 83)	Longitude (NAD 83)
NW corner	56°.94747886 N	135°.46716797 W
SE corner	56°.87371658 N	135°.28665539 W

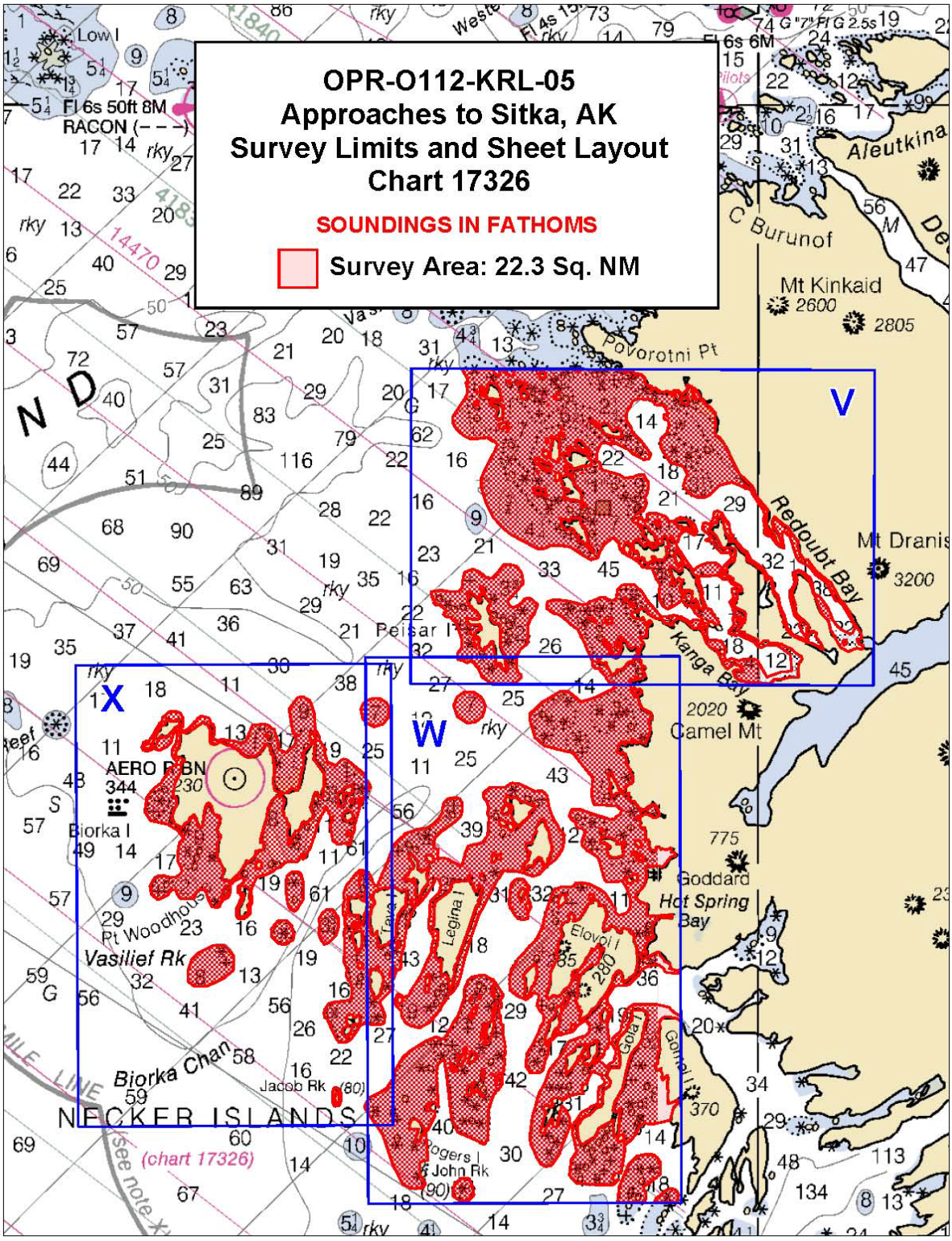


Figure 1 - Task Order 7

B. ACQUISITION AND PROCESSING

Refer to the Data Acquisition and Processing Report for a detailed description of the equipment, processing and quality control procedures. A general description and items specific to this survey are discussed in the following sections.

B.1 EQUIPMENT

Data collection was conducted using the LADS Mk II Airborne System, data processing using the LADS Mk II Ground System and data visualization, quality control and final products using Caris HIPS 5.3, GMT/VTK, Terramodel and MicroStation version 8.

A prototype Digital Imagery Capture system was installed at the commencement of this survey, which allowed digital images from the downward looking video to be captured.

B.1.1 Airborne System

The LADS Mk II Airborne System (AS) consists of a Dash 8-200 series aircraft, which has a transit speed of 250 knots at altitudes of up to 25,000 feet and an endurance of up to eight hours. Survey operations are conducted from heights between 1,200 and 2,200 feet at ground speeds between 140 and 175 knots. The aircraft is fitted with a Nd: YAG laser which is eye safe in accordance with ANSI Z136.1-2000, American National Standard for Safe Use of Lasers. The laser operates at 900 Hertz from a stabilized platform to provide 5x5 or 4x4 meter laser spot spacing in the main line sounding mode of operation. These two modes of data capture resolution require an over ground aircraft speed of 175 and 140 knots respectively. The electro-mechanical scanner also provides examination modes of sounding with laser spot spacing of 3x3 and 2x2 meters and swath widths of 100 and 50 meters respectively.

Green laser pulses are scanned beneath the aircraft in a rectilinear pattern. The pulses are reflected from the land, sea surface, within the water column and from the seabed. The green returned laser energy is captured by the green receiver and then digitized and logged onto digital linear tape. An infra-red beam is also directed vertically beneath the aircraft. The height of the aircraft is determined by the infra-red laser return, which is supplemented by the inertial height from the Attitude and Heading Reference System and GPS height. The LADS Mk II system can operate by day and night. The depth penetration of the system may be improved at night by removing the daylight filter from the receiving optics. Survey operations may be restricted at night by elevations in or near the survey area, which may invoke civil aviation lowest safe altitude rules. Real-time positioning is obtained by an Ashtech GG24 GPS receiver providing autonomous GPS. Ashtech Z12 GPS receivers are also provided as part of the Airborne System and Ground Systems to log KGPS data on the aircraft and at a locally established GPS base station.

B.1.2 Ground System

The LADS Mk II Ground System (GS) ‘Forrest’ was used to conduct data processing in the field. Forrest consists of a portable Compaq Alpha ES40 Series 3 processor server with 1 GB

EEC RAM, 764 GB disk space, digital linear tape (DLT) drives and magazines, digital audio tape (DAT) drive, CD ROM drive and is networked to up to 12 Compaq 1.5 GHz PCs and a HP 800ps Design Jet Plotter, printers and QC workstations. Forrest was transported to the deployment site. Quality control checks and editing of the data were conducted on GS 'Forrest'. GS 'Forrest' was destroyed by hurricane Katrina on August 29, 2005 and was replaced by GS 'Katrina'.

The GS supports survey planning, data processing, quality control and data export. The GS component also includes a KGPS base station, which provides independent post-processed position and height data. A comprehensive description of the GS is provided in the Data Acquisition and Processing Report.

B.2 QUALITY

B.2.1 Data Density

The survey area was sounded at 4x4 meter laser spot spacing with main lines of sounding spaced at 80 meters, which provided the required 200% coverage.

At the sea surface the footprint of the laser beam is approximately 2.5 meters in diameter. As the beam passes through the water column it slowly diverges due to scattering. It should be noted that at 4x4 meter laser spot spacing there is a gap of between 1 to 1.5 meters between the illuminated area of adjacent soundings at the sea surface. There is a possibility that small objects in shallow water along the coastline may fall between consecutive 4x4 meter soundings and not be detected.

B.2.2 Water Clarity

The water clarity in the survey area varied significantly during the period of data collection and this required careful management to achieve the best possible results. During the first forward deployment on May 7 and May 9 2005 survey lines were flown through the survey area and the data obtained was of very poor quality due to the clarity of the water. This was not anticipated, as reconnaissance survey lines flown through the survey area the previous summer were of good quality.

On the morning of May 11 a local boat from EZC Water Taxi was chartered in order to take secchi disk readings throughout the survey area and the results from this were consistent with data obtained during the first survey flight. A copy of the secchi disk report is presented in Appendix V.

Consultation with local members of the Fish and Game office about the water clarity indicated that the water temperature for this time of year was higher than normal and the amount of pollen in the air was at the highest level for 20 years. The plankton bloom, which happens every summer, occurred early this year due to the higher water temperatures.

Professors from Sheldon Jackson College who specialize in marine science were also contacted for their opinion, which correlated with that of the comments made by the members of the Fish and Game office.

EZC Water Taxi is often hired by the FAA to transport personnel to and from Biorka Island so a secchi disk was left with EZC Water Taxi. An agreement was made for EZC Water Taxi to conduct secchi disk measurements when going to Biorka Island. The secchi disk measurements were taken at the dock in Symonds Bay on average every two to three days.

On May 16, a four-meter secchi disk reading was reported at Biorka Island. Then on May 23 it was reported that the secchi disk measurements at Biorka Island had been getting better and a reading of 16 meters was taken. On May 25, the secchi disk measurements were repeated throughout the survey area, which confirmed that the water clarity had improved significantly to justify the second forward deployment to Sitka. During this deployment four flights were conducted with very good data collected to water depths of 35 meters.

Throughout the survey the water clarity was monitored twice a week by EZC Water Taxi and decisions about forward deployments to Sitka were based not only on the weather, but water clarity and also low water spring tides.

B.2.3 Data Management

The database is identified as follows:

Database Name	General Locality	Sheets
biorka	Northwest of Kanga Bay	V

A detailed table of survey line numbers is presented in the Data Acquisition and Processing Report.

B.2.4 Data Acquisition

Survey operations were planned when suitable weather conditions prevailed, water clarity was good and when adverse weather conditions prevented survey operations for project P183. After the first two forward deployments consideration was also given to planning forward deployments at spring tides to obtain better coverage on exposed off-lying rocks. The first survey sortie was flown on May 07, 2005.

The second forward deployment was conducted during the period of May 26 – 29 when four survey sorties were flown and very good data collected.

The third forward deployment was conducted during the period of June 06 – 08 when three survey sorties were flown. The data was not as good as the previous forward deployment but adequate data was still collected.

The fourth forward deployment was conducted during the period of July 19 – 24 when there was spring tides to obtain coverage over off lying rocks. Four survey sorties were flown, however no data was collected on the second sortie due to low cloud and there was no flight on two days because of low cloud.

The final forward deployment to Sitka was conducted on August 05 when a final survey sortie was conducted containing additional coverage lines and re-flies.

In general, the aircraft departed at 1400 hours local time.

B.2.5 Sea Conditions - Sea State, Waves, Swell, White Water

The sea state ranged from one to three throughout the survey and was generally between states one and two. This did not affect data quality except where significant white water occurred around rocks in exposed areas in the south west of the smooth sheet such as Rogers Island. In the exposed areas streaks of white foam was present at times. White water creates saturated surface pulses; gaps were kept to a minimum by collecting data in the exposed areas in calm conditions.

Calm seas were experienced on occasions in the sheltered areas in the north east of the smooth sheet such as Hot Springs Bay. Under such calm conditions the sea may become glassy which degrades the sea surface model. Long period swell was not significant during the survey, however an allowance has been made in the assessment of accuracy.

B.2.6 Kelp

Kelp is one of the factors that increases the complexity of a particular survey area. It is one of the reasons why 200% coverage is recommended in these areas. Kelp reduces the survey coverage achieved by lidar. Kelp also increases the amount of data processing, which is required and the amount of boatwork which is recommended in section D.1.3, Additional Boatwork Inside Lidar Area and D.1.4, Chart Comparison Spreadsheet. Large areas of kelp exist in the survey area.

Kelp areas can be recognized in the data by the following indications:

- Mid water column pulses, frequently with low amplitude and poorly defined leading edges.
- Returns from the seabed are highly attenuated.
- Soundings in shallow water are very sparse.
- Soundings do not correlate with overlapping data from adjacent lines.

The effect of kelp is to limit the penetration of the laser. This reduces the laser coverage of the seabed in kelp areas. Data processing takes much longer in these areas, as more points need to be assessed and reviewed by the surveyors validating, checking, conducting quality control and approving the data.

Kelp areas appear as gaps in the data on the coverage plot. In such areas of partial coverage kelp symbols have been inserted on the smooth sheet.

Rocks detected by the system in kelp areas may be difficult to discriminate as rock or kelp returns. When it is doubtful whether the return is from rock or kelp, a recommendation for additional boatwork is given in section D.1.4, Chart Comparison Spreadsheet.

B.2.7 Features in the data

During the validation of the data features and kelp areas were tabulated in an excel spreadsheet. This spreadsheet was reviewed during the checking and approval stages of the data processing. Gaps in the data were identified as kelp areas and this file was imported into MicroStation during the production of the smooth sheet. The features were tabulated and are presented in section D.1.5. These are features, which require further investigation and are potential hazards for survey vessels.

During the later stages of data processing a new version of software allowed the operators to assign S-57 compliant tags or validation comments to the data. This will allow for the following improvements in data processing to be made in future surveys:

- Gaps in the data due to kelp will assign the S-57 object acronym 'WEDKLP'.
- Soundings requiring investigation by surface vessel will be assigned a user defined tag of 'RKFEN'; Rock Further Examination Necessary.

B.2.8 Nature of the Seabed

The H11429 lidar survey extends along a portion of the west coast of Baranof Island consisting of many bays and inlets. Many islands and islets exist throughout the smooth sheet with major islands being Peisar Island, Taigud Islands and Kita Island. Heavy kelp exists around these islands. In general, the seabed is undulating, rocky and has pinnacles strewn throughout the smooth sheet and the lidar coverage achieved is described in more detail in Section D. The coastlines are rocky and kelp covered, with a number of small islets and drying rocks close inshore in some areas. Along the coast of Baranof Island including sheltered bays such as Redoubt Bay and Kanga Bay the seabed rises steeply out of the sea.

B.2.9 Topography

The LADS Mk II system can measure topographic heights up to 50-meters elevation, subject to the depth / topographic logging window selected. For this survey, a 20-meter topographic height logging window was selected. As a result, the coastline was surveyed and elevations up to 20 meters were measured. Above 20 meters elevation, no coverage has been achieved. On the smooth sheet the height of islets is shown in ( ) and provided in feet above MHW. Maximum heights up to approximately 80 feet are shown as a result of the 20-meter topographic logging window. Large spruce trees were found along most of the coastline and on some of the small islands. It was evident that many of the topographic returns were from foliage in these areas, and in many cases no laser penetrated to the ground. Returns from foliage were deleted from the data where they were identified. In general, this was achieved by deleting returns greater than 10 meters above the water line. Where returns from foliage were recognized in the data, these heights have been omitted from the smooth sheet.

The maximum topographic heights achieved in this area are limited by the topographic logging window and by spruce tree foliage. This can be seen on the coverage plot as white space indicating areas of no coverage in the center of some of the larger islands. This is documented in section D. As a result, some islands may extend higher than the data range.

B.2.10 Datums

Upon the completion of each flight the GPS data logged on the aircraft and at the base station was processed to determine the post-processed KGPS position and height of the aircraft. This data is used in the calculation of the sea surface datum.

A bay located at 56°53.69, 135°19.88 was charted as "Entrance closed". In fact, this was surveyed to be a bay, however, the bay suffers from impounding and the tidal characteristics of the bay are different to that directly outside the bay. The data within the bay suffered from datum shifts because of this and was deleted from the data set.

B.2.11 Wind

Survey operations were conducted in wind strengths of up to 20 knots during the survey. In general the wind strength during the time of survey was around 10 knots from the southwest.

B.2.12 Cloud

Low cloud was a significant factor towards the end of the survey when early morning survey flights were planned during low water spring tides and sea fog would be present until mid morning. The wind direction affected the cloud base in the survey area. For example, in southerly or easterly conditions a low cloud base was experienced. The effects of low cloud were managed as follows:

a. Limited weather forecasts were available for the survey area. Weather conditions were interpolated by looking at conditions at Sitka and Ketchican, as well as discussions with the National Weather Service in Juneau. The actual weather was confirmed by contacting the control tower at Sitka.
b. Two Internet sites proved to be invaluable for forecasting the weather. An aviation site, http://adds.aviationweather.gov provided METAR data, actual wind speed and direction, cloud base and satellite cloud data. The observations were updated every twenty minutes. A NOAA weather site, http://pafc.arh.noaa.gov provided aviation and general weather.

B.2.13 Effects of High Ground

For this survey the high ground was not an issue for the majority of the smooth sheet and the majority of the survey lines were flown at 1,800 feet.

High ground prevented 350m of coastline in the upper reaches of Redoubt Bay to be surveyed from 56° 53.35N, 135° 19.24W to 56° 53.17N, 135° 19.24N.

B.2.14 Receiver Gain

Changes in gain levels in the Airborne System automatically accommodate for changes in the sea surface, water column and seabed conditions. In some areas, after long over land passages, low gain levels were initially set on passing back over the water. Where this has been identified in the data these lines were re-flown from the opposite direction to improve the coverage.

B.2.15 Raw Laser Waveforms

The raw laser waveform returns from the areas, which were covered with kelp are considerably attenuated. In order to detect the seabed in such areas, the threshold in the GS was lowered to detect pulses with low signal-to-noise ratios. This enabled the seabed to be detected but also resulted in increased data validation times.

B.2.16 Data Processing

The data was copied at the operation site in Sitka after each sortie and the data was processed at the operating site in Sand Point on return from each forward deployment. Final validation and checking were conducted at this site and Biloxi, MS. The Biloxi office was destroyed by hurricane Katrina on August 29, 2005, and a temporary office was established in Hattiesburg, MS from September 2005 until January 2006. A new office in Biloxi, MS was opened in January 2006 and the quality control and final approval were conducted at Hattiesburg, MS or Biloxi, MS. Production of the smooth sheet and reports were conducted in Biloxi, MS.

B.2.17 Progress Sketches

Progress sketches were provided to NOAA on a bi-weekly basis, copies of which can be found in Appendix III.

B.3 DATA FORMATS

Data is provided in the following formats:

- Hard copy preliminary smooth sheet. Depths in decimal fathoms and heights in feet.
- Digital preliminary smooth sheet. Produced in MicroStation version 8 and saved as MicroStation version 7 .dgn file. Note contour B-splines have been re-parameterized for compatibility with MicroStation 95 used by NOAA.
- Edited data set. An ASCII file of 3 meter clashed data, which is a subset of all accepted data. Depths are in meters.
- Preliminary smooth sheet data. An ASCII file of all soundings on the smooth sheet. Depths are in meters.
- Caris compatible data. LADS soundings and waveforms, which can be imported into Caris HIPS.
- Accepted mission runs plot for each sheet.

- Coverage plots and sun illuminated images. Provided in GEOTIFF format.
- Tidal Data provided in ASCII, xls and CSV formats.
- Digital georeferenced image in JPEG, TIFF and ECW formats.

Refer to the Data Acquisition and Processing Report for specific details.

B.4 BENCHMARKS

The depth benchmark area from the 2003 lidar survey in Chatham and Sumner Straits was used to check the performance of the LADS Mk II system for the H11429 survey. These benchmarks were surveyed to check the LADS Mk II system accuracy.

Center coordinates for the benchmark areas are as follows:

South Kruzof Island Benchmark Line

Benchmark Name	Nominal Depth	Easting (NAD 83)	Northing (NAD 83)
BM_1	10 m	459 200	6 318 725

Table 1 – Benchmarks

This benchmark line was attempted to be flown during each sortie. The total number of benchmarks compared during the survey was nine. The tidal model in use for the comparison of the south Kruzof Island benchmark was the same as the tidal model used to reduce the benchmarks during the 2003 survey. Benchmark comparisons were conducted after the application of verified tides. Comparison summaries are provided in the Separates.

The LADS data is compared against the gridded benchmark surface in the GS and statistics are generated which include the number of points compared, the mean depth difference (MDD) and the standard deviation (SD) between the data sets. The benchmark comparison function compares the data against the benchmark surface, and as this data is unedited it may contain noise normally removed during the validation process which is flagged as the shoalest and deepest differences.

B.4.1 Mean Depth Differences (MDD) and Standard Deviation (SD)

The averages of the mean depth differences and standard deviation for each benchmark run are as follows:

South Kruzof Island Benchmarks

GS ID	BM Name	Nominal Depth	MDD	SD
1	BM_1	10 m	-0.03 +/- 0.08	0.14 +/- 0.04

Table 2 – Benchmark Results

These results are within expected tolerances and show that the LADS Mk II depth performance was within specifications. These results indicate that the LADS Mk II system operated correctly during the survey.

B.5 CROSSLINES

No specific crosslines were planned due to the number of additional lines flown to achieve better coverage around off-lying rocks, these lines were used for the crossline comparisons. Areas were selected where common data existed and ideally where the seabed was reasonably flat. This minimizes the apparent differences in depths due to minor positional differences in steeper areas of seabed.

Two crosslines were sounded at 4x4 meter laser spot spacing throughout the survey area as follows:

Line 562.0.1	17 crossline intersections.	North of Ilput I. through Taigud Is. and into Redoubt Bay.
Line 586.0.1	10 crossline intersections.	Across the north of the smoothsheet, North of Kita I. and Kamennol I.

B.5.1 Mean Depth Differences (MDD) and Standard Deviation (SD)

The averages of the mean depth differences and standard deviation for each crossline are as follows:

Run No.	Comparisons	Mean Confidence	*Average MDD*	*Average SD*
562.0.1	17042	1.8	0.17 +/- 0.14	0.30 +/- 0.14
586.0.1	12618	5.2	-0.10 +/- 0.15	0.30 +/- 0.10

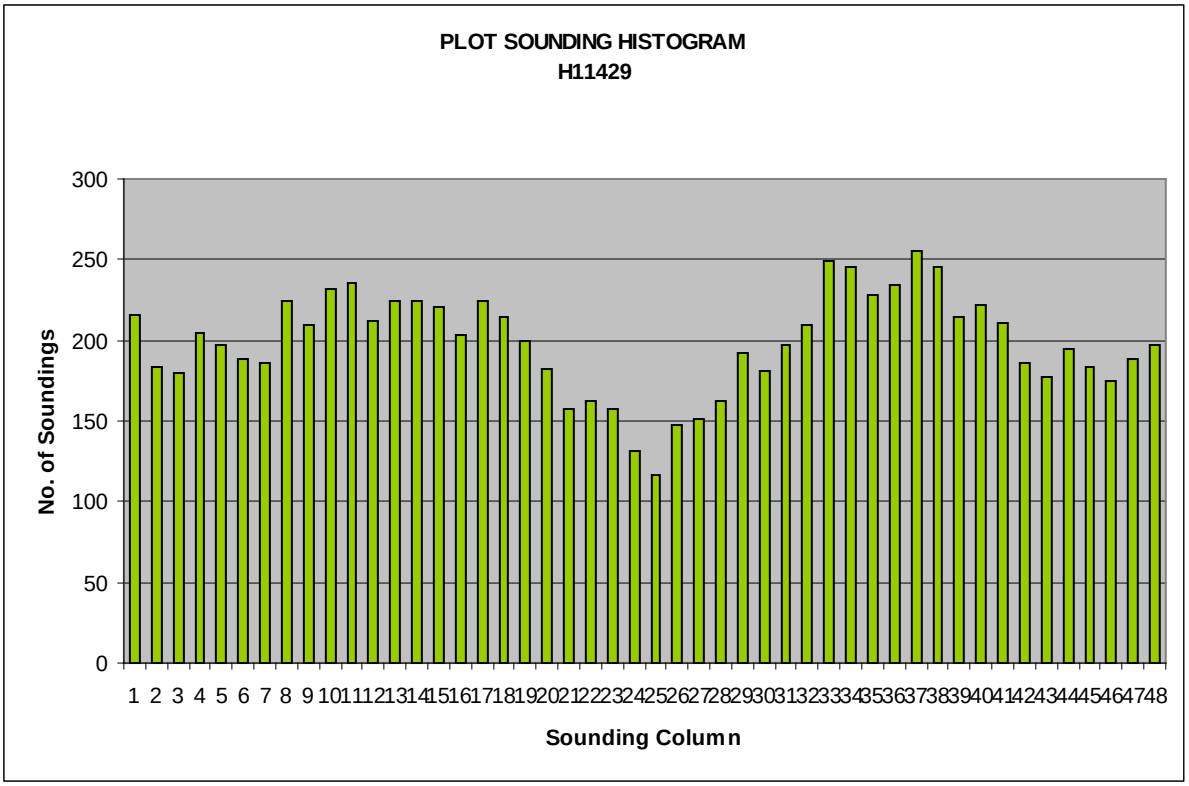
Table 3 – Crossline Comparison Results

Crossline comparison details are provided in Appendix V of the Separates. The results show that the comparisons are consistent with a sloping seabed in which is indicated by a high standard deviation in the order of 0.3 meter. The sparse data over the comparison area for all the lines has lead to a higher MDD.

All results are consistent with IHO Order-1 depth accuracy.

B.6 ANALYSIS OF RESULTS

A sounding histogram has been produced of the column and occurrence of each sounding shown on the smooth sheet. The graph shows that there is no evident scan angle bias in the data.



Graph 1 – Sounding Histogram of Smooth Sheet H11429

B.7 POSITION CHECKS

Two independent positioning systems were used during the survey. Real-time positions were determined by autonomous GPS. A post-processed KGPS position was also determined relative to a local GPS base station that was established on the rooftop of the AERO Services building at the Sitka Airport. The post-processed KGPS position were applied to each sounding during post-processing and the height used in the datum filter.

Position checks were conducted prior to, during and following data collection as follows:

a. DGPS Site Confirmation. A 24-hour certification was conducted of the local GPS base station established on the roof of AERO Services building at the Sitka Airport. The results reveal that the local GPS base station is free from site specific problems such as multi-path and obstructions.

b. Static Position Check. Prior to commencing data collection the coordinates of the aircraft GPS antenna were determined relative to three marks which were surveyed on the tarmac at Sitka Airport. Data was then logged by each LADS Mk II positioning system enabling the positions to be checked against the known surveyed points. The accuracy of the post processed KGPS solution during the static position check was 0.183 meters (95% confidence). The results and details of the static position check are enclosed in the Vertical and Horizontal Control Report.

c. Dynamic Position Check. During each sortie GPS data was logged on the aircraft and at the local GPS base station. This provided a check between the real-time GPS and post-processed positions. The mean difference between the real-time and post-processed position was 2.255 meters, with an average standard deviation of 0.299. Details are provided in the Vertical and Horizontal Control Report.

d. Navigation Position Check. Navigation checks were also conducted over a coordinated point on the roof the Butler building at Sitka Airport. This enabled the known position of the structure to be checked against the image on the downward looking video. This provided a gross error check of position. The mean error was 2.83 meters with a standard deviation of 3.72 meters. Details are provided in the Separates Report.

e. Position Confidence. The position quality was also monitored by checking a post-processed position confidence (C3), which is determined from the AS platform error, GPS error and residual errors between the actual GPS positions and aircraft position as determined from the line of best fit. No position anomalies were detected.

The position checks were within the expected tolerances and showed that the positioning systems were functioning correctly.

B.8 CORRECTIONS TO SOUNDINGS

Refer to the Data Acquisition and Processing Report for a description of corrections to soundings, which demonstrates that corrections to the soundings were being applied correctly.

There were no deviations from the corrections described therein.

C. VERTICAL AND HORIZONTAL CONTROL

Refer to the Vertical and Horizontal Control Report for a detailed description of the vertical and horizontal control used during this survey. A summary of vertical and horizontal control for the survey follows.

C.1 VERTICAL CONTROL

Vertical control for the survey was based on the Mean Lower Low Water tidal datum (MLLW). The operating National Water Level Observation Network (NWLON) station at Sitka, AK (9451600) served as vertical control for the LADS depth benchmark areas and for the survey area.

Station details are as follows:

		WGS84	
Gauge	**Location**	**Latitude**	**Longitude**
9451600	Sitka Sound Seafood Dock	57° 03.1' N	135° 20.5' W

Table 4 – Sitka Tide Gauge

C.2 ZONING

NOAA supplied tide zones that cover the extent of the survey area, with time and range correctors relative to the Sitka tide station. These are as follows:

Tide Zone	GS Identifier	Time Corrector	Range Corrector	Reference Station
SEA200	TA1	+0 minutes	*1.00	9451600
PAC295A	TA2	+0 minutes	*0.99	9451600
PAC294	TA3	+0 minutes	*1.00	9451600

Table 5 – Tide Zones

An analysis of crosslines and overlaps of the mainlines of soundings concluded that preliminary tide zoning was adequate and therefore the preliminary tide zoning correctors have been considered to be the final zoning correctors for the survey.

The verified tides supplied by NOAA were independently checked by John Oswald and Associates. Once the data was checked a fifth degree polynomial was applied to the tidal data and this data was then supplied to Tenix LADS Inc. for the application of tides.

For final processing, the time and amplitude correctors were applied to the tidal data delivered by John Oswald and Associates. Soundings were then reduced to MLLW using these corrected tides.

C.3 HORIZONTAL CONTROL

Data collection and processing were conducted on the Airborne and Ground Systems in World Geodetic System (WGS 84) on Universal Transverse Mercator (Northern Hemisphere) projection UTM (N) in Zone 8, Central Meridian 135° West. All units are in meters. This data was post-processed and all soundings are relative to the North American Datum 1983 (NAD 83).

C.3.1 LADS Local GPS Base Station – Sitka

Real-time positions were determined using an Ashtech GG24 GPS receiver. A local GPS base station was coordinated by John Oswald and Associates on the roof of AERO Services at Sitka Airport on April 24, 2004.

The derived NAD83 coordinates for the local GPS base station, are:

NAD 83		**UTM (N) Zone 4**		
Latitude (N)	Longitude (W)	Easting (m)	Northing (m)	Ellipsoidal Height (m)
57° 03’ 11.870”	135° 22’ 00.393”	477 751.069	6 323 378.511	16.210

Table 6 – GPS Base Station

Post-processed KGPS positions were determined off-line using data logged at the local GPS base station and on the aircraft. This data was processed through Ashtech PNAV software to calculate both a DGPS and KGPS position solution. The post processed KGPS positions were then imported into the GS and applied to all soundings. This provided increased sounding position accuracy and horizontal redundancy.

The local GPS base station site was checked for obstructions and multi-path over a 24-hour period on May 07 and May 08, 2005. The results outlined in the Vertical and Horizontal Control Report reveal that the local GPS base station site is free from site specific problems such as multi-path and obstructions.

On May 06, 2005 static position checks of the LADS Mk II positioning systems were undertaken using a three-point control network established at the Sitka Airport. The results outlined in the Vertical and Horizontal Control Report revealed no gross errors and that all positioning systems functioned correctly.

During each sortie, GPS data was logged both on the aircraft and at the local GPS base station, which enabled a post-processed KGPS position solution to be determined. These positions were then compared to the position determined by the real-time positioning system. This dynamic positioning check provided quality control of the positioning systems and the positional differences were within tolerance for the survey. These differences are tabulated in the Vertical and Horizontal Control Report.

Navigation position checks were attempted over the Butler building during each sortie when suitable weather conditions prevailed. Following each sortie the logged aircraft position was processed against the downward looking video record to determine the difference in position at the time of overflight. This provided a gross error check on the aircraft positioning.

The tabulated results are presented in the Vertical and Horizontal Control Report and revealed that the positioning systems functioned to within expectations.

D. RESULTS AND RECOMMENDATIONS

Recommendations for charting action for smooth sheet H11429 is provided in sections D.1 to D.9 below.

In the vicinity of steep coastline some contours on the smooth sheet appear unsupported by the smooth sheet soundings. Particularly around the MLLW depth curve, additional soundings were added from a 15m clashed dataset. The 15m clashed dataset was imported into MicroStation Layers "15m_DPT" and "15m_DRY". Where an additional sounding was deemed necessary for the smooth sheet, one would be selected from either the 15m_DPT or 15m_DRY MicroStation Layer and placed on the "ADD_DPT" or "ADD_DRY" MicroStation Layer respectively. The "ADD_DPT" and "ADD_DRY" MicroStation Layers were created in order to track soundings that were added to the smooth sheet from the 15m clash dataset. These are provided in an additional file found with the smooth sheet plot scale clashed data.

On the smooth sheet the MHW line where accurately determined by lidar has been depicted by a solid red line. In places where the spruce trees exist to the water line and over hang the land/sea interface the MHW has not been accurately defined and is represented on the smooth sheet by a dashed red line. This dashed line has been approximated using the lidar data in combination with the mosaiced digital image. A valid MHW line has been defined where a lidar return has occurred from the bare earth inshore of MHW contour.

D.1 CHART COMPARISON - SMOOTH SHEET H11429

H11429 was compared to:

Preliminary Chart 17326 14th Edition June 2005, at scale 1:40,000. Corrected through NM June 4, 2005. Corrected through LNM May 24, 2005.

This chart was downloaded from the NOAA Office of Coast Survey – NOAA Raster Navigational Charts download website on February 10, 2006: (http://chartmaker.ncd.noaa.gov/mcd/Raster/Index.htm)

This chart has been updated including Dangers to Navigation reported to PHB during data collection.

Recommendations for charting action are described in section D.1.1 charted depths and features and in the Chart Comparison Spreadsheet under section D.1.4.

D.1.1 Charted Depths and Features

Smooth sheet H11429 covers part of NOAA chart 17326 including a portion of the west coast of Baranof Island, Peisar Island, Taigud Islands and Kita Island. Many other islands, islets and drying rocks exist within the smooth sheet. From the Source Diagram the area covered by the majority of smooth sheet H11429 was covered by NOS surveys between 1900 and 1939 by leadline. Partial bottom coverage was achieved. The chart in this area is generally unsurveyed with only the coastline and a number of rocks and islets along the coast

portrayed. The area surveyed is represented on the smooth sheet in considerably more detail than is currently shown on the chart.

The following general recommendations are relevant:

a. Coastline. The charted coastline agrees well with the surveyed coastline for the larger islands and islets existing offshore in the western portion of the smooth sheet. In these areas the surveyed coastline differs from the charted position by up to 20 meters in some places. Spruce trees hand over the waterline in many areas. In these areas the MHW line has been interpreted from both the lidar data and the digital orthophoto mosaic. This MHW line was interpolated predominantly in the inshore sheltered waters and has been depicted by a dashed red line on the smooth sheet. It is recommended that the coastline on the chart be amended to match the smooth sheet.
b. Inshore Islets. A large number of islets have been surveyed close to the coastline. Many of these are not shown on the chart, as the charted coastline is highly generalized. It is recommended that the chart be amended to match the smooth sheet. Where significant these islets are detailed in the Chart Comparison Spreadsheet (D.1.4).
c. Rocks. A number of rocks and drying rocks have been surveyed along the coastline that are not shown on the chart due to the unsurveyed nature of the area. It is recommended that the chart be amended to match the smooth sheet. Where significant, these rocks are detailed in the Chart Comparison Spreadsheet D.1.4.

In addition to the general recommendations above, some 415 significant differences between the chart and the smooth sheet have also been identified. Specific recommendations for these differences are described in the Chart Comparison Spreadsheet. An expanded version of the spreadsheet is included digitally on the survey report CD. The digital .xls version contains information that may be useful for planning of boat sounding and is easy to download into other survey packages (H11429_V1_chartcomp.xls).

The chart comparison was conducted by reviewing the chart, the lidar coverage plot, the lidar smooth sheet and the digital mosaiced image. For each item identified, screen dumps of the Local Area Display and Raw Waveform Display were extracted from the LADS Mk II Ground System. These have been reviewed in order to make the following assessments:

a. Type of Feature
b. Kelp Area
c. Further Examination Recommended
d. Charting Recommendation
e. Remarks

Each chart comparison was categorized as follows:

1. New shoal found

2. Charted shoal disproved / not found

The fields in the Chart Comparison Spreadsheet have been developed from experience learned and feedback received from previous lidar surveys in Alaska, witnessing survey operations in NOAA ship Rainier and from meetings at PHB and UNH. They have been designed for ease of use and to minimize double handling of data and transcription. Continued feedback is welcomed in order to develop these formats in order to achieve further efficiencies in data handling.

D.1.2 AWOIS

No AWOIS were assigned to this Task Order.

D.1.3 Additional Boatwork Inside Lidar Area

A number of significant soundings have been reviewed that were uncertain. For example, some isolated rocks in kelp were detected that were difficult to correctly classify as either rock or kelp. Rocks were also detected in areas that were permanently covered with white water. In circumstances where it was difficult to correctly classify a particular sounding, a recommendation for investigation by boat for 127 uncertain soundings has been made in the Chart Comparison Spreadsheet. An expanded version of the spreadsheet is included digitally on the survey report CD. The digital .xls version contains information that may be useful for planning of boat sounding and is readily downloaded into other survey packages.

In section D.1.5 there are 135 features in which additional boat work will be required. Some of these features have been correlated with a chart comparison.

Sparse data within the polylines in section D.1.7 have been identified. In most cases these are kelp areas and have been listed as possible hazards during shoreline verification and survey junctioning.

D.1.4 Chart Comparision

In position 56° 53.88N, 135° 19.79W there is an entrance to a bay, which is labeled “Entrance closed”. This was surveyed to show that it was open and was tidal.

Chart Comparison Spreadsheet

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
1	V1	2	14	56° 52' 32"	135° 27' 1"	22.53	12.3	56° 52' 32.3185"	135° 27' 3.7425"	Rk	N	N	Replace	
2	V2	2	10	56° 52' 31"	135° 25' 41"	16.19	8.8	56° 52' 29.8143"	135° 25' 44.3628"	Rk	N	N	Replace	Note: 8.2 Rk 290m NE.
3	V4	2	Drying Rk	56° 52' 43"	135° 25' 58"	4.02	2.2	56° 52' 41.5543"	135° 25' 59.0901"	Rk	Y	Y	N/A	Possible drying rock observed in downward looking video at charted position. Note: Charted islet 95m E confirmed, charted islet 120m NE surveyed as coastline.
4	V5	1				10.26	5.6	56° 52' 48.5799"	135° 25' 45.3515"	Rk	N	N	Insert	Note: Charted drying feature 150m SW observed in downward looking video, -5 drying rock 130m WSW, 1.9 Rk 180m SSW.
5	V6	2	Islet	56° 52' 53"	135° 25' 54"	-3.26	-11	56° 52' 53.625"	135° 25' 54.7395"	Drying Rk	Y	N	Replace	Note: Charted cov 1 ft drying rock 100m SE confirmed, -4 drying rock 60m SSE.
6	V7	1				4.13	2.2	56° 52' 57.5258"	135° 25' 51.1388"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -2 drying rock 95m WNW confirmed, islet 120m WNW.
7	V8	2	Islet	56° 53' 4"	135° 25' 53"	-2.73	-9	56° 53' 4.1901"	135° 25' 52.9229"	Drying Rk	Y	N	Replace	Note: Charted -10 drying rock 140m WSW confirmed, islet 155m WSW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
8	V9	2	Drying Rk	56° 53' 7"	135° 25' 54"	2.80	1.5	56° 53' 7.0621"	135° 25' 54.6545"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -4 drying rock 115m WNW confirmed.
9	V10	1				5.35	2.9	56° 53' 4.7692"	135° 25' 45.944"	Rk	Y	Y	N/A	Possible Rk in kelp.
10	V11	2	$2^1/_2$	56° 53' 9"	135° 25' 42"	0.49	cov 1 ft	56° 53' 8.8903"	135° 25' 41.5819"	Drying Rk	Y	Y	N/A	Note: 6.7 Rk 85m ESE.See Danger to Navigation Report. Item 22
11	V12	1				14.16	7.7	56° 53' 12.938"	135° 25' 31.0262"	Rk	N	N	Insert	
12	V13	2	$2^1/_2$	56° 53' 17"	135° 25' 35"	3.45	1.9	56° 53' 16.2565"	135° 25' 34.445"	Rk	Y	Y	N/A	Possible Rk in kelp. Note:0.7 Rk 130m WSW, 3.9 Rk 55m N.
13	V14	1				3.34	1.8	56° 53' 12.077"	135° 25' 51.4594"	Rk	Y	Y	N/A	Possible Rk in kelp.
14	V15	1				-0.50	-2	56° 53' 14.9511"	135° 25' 50.1246"	Drying Rk	Y	N	Insert	Note: Charted islet and 2 drying rocks to N confirmed.
15	V16	1				-3.65	(3)	56° 53' 15.0894"	135° 26' 1.3926"	Islet	Y	N	Insert	
16	V17	2	Islet	56° 53' 20"	135° 25' 44"	-1.12	-4	56° 53' 20.4282"	135° 25' 44.2922"	Drying Rk	Y	N	Replace	Note: 2 charted islets to W confirmed, charted islet 100m N confirmed, -1 drying rock 40m E, -5 drying rock 25m W, -0 drying rock 75m WNW.
17	V18	2	Islet	56° 53' 23"	135° 25' 55"	0.39	cov 1 ft	56° 53' 23.2472"	135° 25' 55.6345"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted -5 drying rock 70m ESE confirmed, -1 drying rock 75m SSE.
18	V19	1	Drying Shelf	56° 53' 21"	135° 26' 2"	-6.47	(12)	56° 53' 19.8716"	135° 26' 2.1373"	Islet	N	N	Insert	

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
19	V20	1	Drying Shelf	56° 53' 25"	135° 26' 5"	-3.66	(3)	56° 53' 24.438"	135° 26' 4.4887"	Islet	Y	N	Insert	Note: Charted islet 25m SSE confirmed, charted -6 drying rock 60m NNE confirmed, many charted islets to W surveyed as drying rocks or drying shelf.
20	V21	2	$^{3}/_{4}$	56° 53' 25"	135° 25' 54"	0.55	cov 2 ft	56° 53' 25.773"	135° 25' 53.0416"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.
21	V22	1				12.51	6.8	56° 53' 35.6857"	135° 25' 27.4839"	Rk	N	N	Insert	Note: 2 charted drying rocks to SW confirmed, 7.9 Rk 110m W, 8.0 Rk 80m ESE, 4.3 Rk 105m S.
22	V23	1				13.07	7.1	56° 53' 29.1147"	135° 25' 19.2197"	Rk	N	N	Insert	Note: 3.7 Rk 105m WNW.
23	V24	1				3.00	1.6	56° 53' 29.1326"	135° 25' 58.0655"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 0.9 Rk 55m WSW, 2.2 Rk 100m ESE.
24	V25	1				15.54	8.5	56° 53' 26.7597"	135° 25' 34.6266"	Rk	N	N	Insert	Note: 9.4 Rk 160m SE.
25	V26	2	$3^{1}/_{4}$	56° 53' 33"	135° 26' 5"	3.24	1.7	56° 53' 33.2191"	135° 26' 5.0532"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Islet 190m W.
26	V27	1				1.74	0.9	56° 53' 37.6294"	135° 26' 5.2746"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -4 drying rock 35m WNW.
27	V28	2	$3^{1}/_{2}$	56° 53' 42"	135° 26' 14"	-0.06	-0	56° 53' 40.5964"	135° 26' 14.2142"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted -6 drying rock 30m S confirmed.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
28	V29	2	$6^1/_4$	56° 53' 47"	135° 26' 7"	6.63	3.6	56° 53' 46.5213"	135° 26' 6.6677"	Rk	N	N	Replace	See Danger to Navigation Report Item 4. This item has been amended on the chart at a location S of surveyed position.
29	V30	2	15	56° 53' 50"	135° 26' 18"	10.72	5.8	56° 53' 49.5741"	135° 26' 13.1423"	Rk	N	N	Replace	See Danger to Navigation Report. Item 23
30	V31	1				-5.24	(8)	56° 53' 43.592"	135° 26' 25.1218"	Islet	Y	N	Insert	Note: Charted islet 115m W confirmed, charted -5 drying rock 90m N confirmed, islet 90m W.
31	V32	1				13.30	7.2	56° 53' 56.0493"	135° 26' 35.5329"	Rk	N	N	Insert	Note: 7.3 Rk 70m SE.See Danger to Navigation Report Item 4 and 24.
32	V33	2	Rk	56° 53' 53"	135° 26' 38"	0.78	cov 2 ft	56° 53' 53.1394"	135° 26' 37.8021"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.
33	V34	1				11.95	6.5	56° 53' 50.1684"	135° 26' 39.3702"	Rk	N	N	Insert	Note: Charted islet 100m E confirmed, charted -1 drying rock 135m SE confirmed.
34	V35	2	Islet	56° 53' 39"	135° 26' 49"	-2.84	-10	56° 53' 39.876"	135° 26' 48.8271"	Drying Rk	Y	N	Replace	Note: Islet 120m W.
35	V36	1				-5.36	(9)	56° 53' 37.0471"	135° 26' 53.7043"	Islet	N	N	Insert	Note: Many charted islets in vicinity confirmed, many new islets surveyed in vicinity.
36	V37	1				-0.60	-2	56° 53' 34.6901"	135° 27' 0.0086"	Drying Rk	N	N	Insert	Note: Many charted islets to SE confirmed, -1 drying rock 90m E.
37	V38	1				0.86	0.4	56° 53' 36.1765"	135° 27' 5.8321"	Rk	Y	Y	N/A	Possible Rk in kelp.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
38	V39	2	15	56° 53' 47"	135° 27' 14"	20.13	11.0	56° 53' 49.212"	135° 27' 15.9162"	Rk	N	N	Replace	Note: 11.2 Rk 115m NW.
39	V40	1				0.11	-0	56° 53' 40.0617"	135° 27' 23.4834"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 2.3 Rk 120m ESE, 8.4 Rk 160m NW, 10.7 Rk 220m SW.
40	V41	1				9.72	5.3	56° 53' 33.9992"	135° 27' 20.5593"	Rk	N	N	Insert	Note: Charted cov 1 ft drying rock 70m ENE confirmed, 1.4 Rk 100m SE.
41	V42	2	DryingRk	56° 53' 31"	135° 27' 12"	-5.87	(10)	56° 53' 31.2547"	135° 27' 12.4825"	Islet	N	N	Replace	
42	V43	1				-0.31	-1	56° 53' 25.1082"	135° 27' 11.0215"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 2 charted islets to NE confirmed, 2 charted drying rocks to E confirmed, 2 islets NNE, -8 drying rock 90m NE, 5.7 Rk 115m WNW.
43	V44	2	Drying Rk	56° 53' 24"	135° 27' 8"	-3.91	(4)	56° 53' 24.243"	135° 27' 8.6185"	Islet	Y	N	Replace	Note: -6 drying rock 35m E, 0.6 Rk 95m E
44	V45	2	11	56° 53' 14"	135° 26' 56"	17.33	9.5	56° 53' 15.6161"	135° 26' 57.9074"	Rk	N	N	Replace	Note: Charted -4 drying rock 160m NNW confirmed.
45	V46	2	Islet	56° 53' 30"	135° 26' 54"	-2.23	-8	56° 53' 30.4153"	135° 26' 54.3275"	Drying Rk	Y	N	Replace	Note: Charted islet 30m W confirmed, charted islet 140m NE surveyed as coastline.
46	V47	1				-4.19	(5)	56° 53' 27.349"	135° 26' 50.5047"	Islet	Y	N	Insert	Note: Islet 30m SSE, -6 drying rock 25m N, -6 drying rock 70m SSW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
47	V48	2	Islet	56° 53' 27"	135° 26' 46"	-4.38	-11	56° 53' 28.1297"	135° 26' 43.5326"	Drying Rk	Y	N	Replace	Note: 4 charted islets to N and E confirmed, charted islet and drying rock 160m ESE surveyed as drying shelf, islet 60m E, islet 85m SE.
48	V49	1				-0.92	-3	56° 53' 18.8104"	135° 26' 48.908"	Drying Rk	Y	N	Insert	Note: Charted islet 65m ESE confirmed, charted -2 drying rock 35m SSE confirmed, charted -7 drying rock 115m NW confirmed.
49	V50	2	Drying Rk	56° 53' 16"	135° 26' 47"	1.52	0.8	56° 53' 15.4526"	135° 26' 48.9494"	Rk	Y	Y	N/A	Note: -6 drying rock 110m ENE, 0.8 Rk 75m E.
50	V51	1				-1.18	-4	56° 53' 13.525"	135° 26' 40.8949"	Drying Rk	Y	N	Insert	Note: Charted islet 30m SW confirmed, charted -0 drying rock 35m N confirmed, charted islet 145m NE surved as coastline, charted drying rock 105m NE surveyed as a drying shelf.
51	V52	1				-0.92	-3	56° 53' 7.3081"	135° 26' 36.9475"	Drying Rk	Y	N	Insert	Note: 3 charted islets in vicinity confirmed, charted -1 drying rock 55m E confirmed, charted -0 drying rock 170m W confirmed, charted islet 40m NNW surveyed as coastline, islet 75m SE.
52	V53	2	8	56° 52' 51"	135° 26' 59"	15.74	8.6	56° 52' 51.3396"	135° 26' 59.137"	Rk	N	N	Inserted	See Danger to Navigation Report Item 2.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
53	V54	2	$2^1/_2$	56° 52' 53"	135° 26' 43"	4.60	2.5	56° 52' 53.6489"	135° 26' 43.0118"	Rk	N	N	Inserted	Note: 7.7 Rk 75m W, 7.0 Rk 85m E. See Danger to Navigation Report Item 1.
54	V55	1				-0.36	-1	56° 52' 58.0203"	135° 26' 20.9528"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: 2 charted islets to N confirmed and 1 surveyed as a -7 drying rock, charted -5 drying rock 135m SSW confirmed, 1.3 Rk 150m WSW, 5.2 Rk 205m WSW.
55	V56	1				-4.28	(5)	56° 53' 1.5377"	135° 26' 12.5584"	Islet	Y	N	Insert	
56	V57	1				13.31	7.3	56° 52' 41.6094"	135° 26' 31.933"	Rk	N	N	Insert	Note: 6.4 Rk 90m NW.
57	V58	2	Islet	56° 52' 49"	135° 26' 20"	-2.75	-9	56° 52' 48.9186"	135° 26' 20.8662"	Drying Rk	Y	N	Replace	Note: Charted islet 60m E confirmed, charted -5 drying rock 160m NNW confirmed, charted islet 40m E surveyed as -12 drying rock, islet 180m ENE, -5 drying rock 110m E.
58	V59	1				-2.14	-7	56° 52' 46.248"	135° 26' 22.6216"	Drying Rk	Y	N	Insert	Note: 2 charted islets to SE confirmed, charted drying rock 80m E surveyed as drying shelf.
59	V60	1				2.99	1.6	56° 52' 41.1422"	135° 26' 20.2962"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -4 drying rock 75m NE, 8.5 Rk 145m E.
60	V61	2	13	56° 53' 18"	135° 24' 47"	19.64	10.7	56° 53' 19.8657"	135° 24' 45.2791"	Rk	N	N	Replace	

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
61	V62	2	$6^1/_4$	56° 53' 32"	135° 24' 57"	11.44	6.2	56° 53' 32.1551"	135° 24' 57.6127"	Rk	N	N	Inserted	Note: 7.0 Rk 55m E. See Danger to Navigation Report Item 6.
62	V63	2	10	56° 53' 48"	135° 25' 33"	15.42	8.4	56° 53' 48.3096"	135° 25' 34.8312"	Rk	N	N	Replace	See Danger to Navigation Report Item 5.
63	V64	1				21.28	11.6	56° 53' 43.39"	135° 25' 31.1619"	Rk	N	Y	N/A	Sparse lidar coverage in deep water.Note: 9.3 Rk 135m E.
64	V65	1				12.99	7.1	56° 53' 50.8922"	135° 25' 40.552"	Rk	N	N	Insert	Note: 7.3 Rk 100m SW.
65	V66	1				12.94	7.1	56° 53' 52.3486"	135° 25' 48.2716"	Rk	N	N	Insert	Note: 4.5 Rk 110m SSW, 8.0 Rk 95m WNW.
66	V67	2	9	56° 53' 59"	135° 25' 52"	15.27	8.3	56° 53' 58.3011"	135° 25' 50.0529"	Rk	N	N	Replace	Note: 8.9 Rk 115m NNW.
67	V68	1				16.54	9.0	56° 52' 32.6671"	135° 23' 42.4878"	Rk	N	N	Insert	See Danger to Navigation Report Item 7.
68	V69	2	7	56° 52' 29"	135° 23' 27"	4.92	2.7	56° 52' 30.5702"	135° 23' 24.8064"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 7.4 Rk 260m E. See Danger to Navigation Report. Item 25
69	V70	1				18.04	9.8	56° 52' 34.6768"	135° 23' 23.8117"	Rk	N	N	Insert	Note: 6.0 Rk 105m NW.
70	V71	1				-3.20	-11	56° 52' 40.6138"	135° 22' 58.6723"	Drying Rk	N	N	Insert	Note: Charted islet 30m NW confirmed, charted -10 drying rock 45m WSW confirmed, charted -8 drying rock 85m SW confirmed, charted islet 20m S surveyed as 3 separate islets.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
71	V72	2	Islet	56° 52' 38"	135° 22' 49"					Drying Shelf	N	N	Remove	Not detected by lidar, not observed in downward looking video.
72	V73	2	$2^1/_2$	56° 52' 41"	135° 22' 48"	2.51	1.3	56° 52' 40.631"	135° 22' 49.1797"	Rk	N	N	Replace	Note: Charted islet 100m NNE confirmed, charted -1 drying rock 120m N confirmed, charted -3 drying rock 90m ENE confirmed, 2 charted islets 120m ESE surveyed as drying shelf, cov 1 ft drying rock 95m SE.
73	V74	2	$3^1/_2$	56° 52' 48"	135° 22' 49"	4.51	2.4	56° 52' 46.4799"	135° 22' 50.7736"	Rk	N	N	Replace	Note: 3 charted islets to N confirmed, charted -11 drying rock confirmed, 4 charted drying rocks to W confirmed, charted drying rock 100m N surveyed as drying shelf.
74	V75	2	Drying Rk	56° 52' 43"	135° 23' 16"	-4.12	(5)	56° 52' 44.086"	135° 23' 14.5016"	Islet	Y	N	Replace	Note: 2 charted drying rocks to SW confirmed, 7.4 Rk 125m SE.
75	V76	1				0.86	0.4	56° 52' 58.1561"	135° 23' 45.6128"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 2 charted drying rocks to E confirmed, 2 islets to E, -6 drying rock 165m E.
76	V77	2	$6^1/_2$	56° 53' 1"	135° 23' 43"	7.36	4.0	56° 53' 1.6803"	135° 23' 40.5222"	Rk	N	N	Replace	Note: 3 charted drying rocks to E confirmed, 5.4 Rk 105m WNW. See Danger to Navigation Report. Item 26

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
77	V78	1				5.19	2.8	56° 53' 4.3385"	135° 23' 42.5571"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: Charted islet 80m N confirmed, charted islet 50m NNW surveyed as -8 drying rock, 2 charted islets 140m NE surveyed as 1 large islet, 2 charted islets 200m E surveyed as 1 large islet, charted drying rock 55m N surveyed as drying shelf.
78	V79	1				0.76	cov 2 ft	56° 53' 9.2187"	135° 23' 46.0401"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted drying rock 95m E surveyed as drying shelf.
79	V80	1				8.36	4.5	56° 53' 9.6946"	135° 23' 58.5101"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 2.9 Rk 65m E.
80	V81	2	Islet	56° 53' 12"	135° 23' 42"	-1.68	-6	56° 53' 12.2044"	135° 23' 41.0379"	Drying Rk	Y	N	Replace	Note: Many charted islets in vicinity confirmed.
81	V82	1				-4.73	(7)	56° 53' 15.2148"	135° 23' 44.3308"	Islet	N	N	Insert	Note: 2 charted islets to NW confirmed, 2 charted to N surveyed as 1 large islet, charted drying rock to W surveyed as drying shelf, islet 80m NW.
82	V83	1				8.90	4.8	56° 53' 15.9616"	135° 23' 55.1306"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -8 drying rock 65m ESE.
83	V84	2	Drying Rk	56° 53' 17"	135° 23' 40"						Y	Y	N/A	White water observed in downward looking video.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
84	V85	1				-0.18	-1	56° 53' 17.9514"	135° 23' 42.2525"	Drying Rk	Y	N	Insert	Note: Charted -0 drying rock 30m N confirmed, charted -11 drying rock 70m W confirmed.
85	V86	2	$3^3/_4$	56° 53' 19"	135° 23' 57"	0.93	0.5	56° 53' 18.3246"	135° 23' 57.1284"	Rk	Y	Y	N/A	Possible Rk in kelp. See Danger to Navigation Report. Item 27
86	V87	2	Drying Rk	56° 53' 22"	135° 24' 3"						Y	Y	N/A	White water observed in downward looking video.
87	V88	1				7.52	4.1	56° 53' 19.5748"	135° 24' 12.1644"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 3 charted rocks to NE confirmed, 6.3 Rk 55m SSE, 5.6 Rk 50m W, 5.4 Rk 80m E.
88	V89	1				13.10	7.1	56° 53' 20.5735"	135° 24' 19.7651"	Rk	N	N	Insert	
89	V90	2	Islet	56° 53' 24"	135° 24' 19"	-3.45	-12	56° 53' 24.9356"	135° 24' 19.5664"	Drying Rk	Y	N	Replace	Note: 5.6 Rk 85m ENE, 8.9 Rk 180m W.
90	V91	1				-3.54	(3)	56° 53' 30.2415"	135° 24' 26.0907"	Islet	Y	N	Insert	Chart displays a *(4)* islet height, but no islet symbol is present. Note: Charted -4 drying rock 120m ESE confirmed, charted -4 drying rock 65m N confirmed, many drying rocks in vicinity.
91	V92	2	$6^1/_2$	56° 53' 35"	135° 24' 32"	10.56	5.7	56° 53' 37.2671"	135° 24' 30.344"	Rk	N	N	Replace	Note: 7.4 Rk 80m SW, 11.0 Rk 100m WNW. See Danger to Navigation Report. Item 28

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
92	V93	1				12.63	6.9	56° 53' 31.4582"	135° 24' 13.8858"	Rk	N	N	Insert	Note: 8.3 Rk 60m S.
93	V94	1				12.85	7.0	56° 53' 28.6221"	135° 24' 5.3807"	Rk	N	N	Insert	Note: Charted -4 drying rock 65m E confirmed.
94	V95	1				-4.72	(7)	56° 53' 22.3574"	135° 23' 50.2737"	Islet	Y	N	Insert	Note: 3 charted islets to NW confirmed, charted -2 drying rock 60m S confirmed, 2 islets to W, -12 drying rock 150m NW.
95	V96	1				15.60	8.5	56° 53' 30.6298"	135° 23' 46.7638"	Rk	N	N	Insert	Note: 1.0 Rk 140m ENE, 8.4 Rk 245m NE. See Danger to Navigation Report Item 8.
96	V97	2	Drying Rk	56° 53' 29"	135° 23' 36"						N	N	Remove	This charted drying rock and charted drying rock 80m SE not detected by lidar, not observed in downward looking video.
97	V98	1				-2.65	-9	56° 53' 26.0668"	135° 23' 32.5232"	Drying Rk	N	N	Insert	Note: Charted islet 25m SSE confirmed, 3 charted drying rocks to N confirmed, 4.0 Rk 80m ESE, 9.3 Rk 160m E.
98	V99	1				15.43	8.4	56° 53' 23.4717"	135° 23' 37.5881"	Rk	N	N	Insert	
99	V100	2	$4^1/_2$	56° 53' 18"	135° 23' 29"	6.97	3.8	56° 53' 18.8458"	135° 23' 29.3012"	Rk	N	N	Replace	Note: 5.5 Rk 95m SE.
100	V101	1				-0.28	-1	56° 53' 4.5733"	135° 23' 28.2129"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted -2 drying rock 70m N.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
101	V102	2	Islet	56° 52' 58"	135° 23' 15"	-3.45	-12	56° 52' 58.2315"	135° 23' 15.9738"	Drying Rk	N	N	Replace	Note: Charted islet 75m SW confirmed, 2 charted drying rocks to W confirmed, charted drying rock 115m SW surveyed as drying shelf.
102	V103	2	DryingRk	56° 53' 7"	135° 23' 14"					Drying Shelf	N	N	Remove	
103	V104	1				2.96	1.6	56° 53' 5.0688"	135° 22' 57.9336"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -4 drying rock 50m W confirmed, charted -2 drying rock 205m ESE confirmed, 1.1 Rk 70m SSE.
104	V105	1				-0.78	-3	56° 53' 31.9794"	135° 22' 52.87"	Drying Rk	N	N	Insert	Note: Charted islets to N and S confirmed, charted -11 drying rock 80m NNE confirmed, -10 drying rock 95m NNW.
105	V106	1				11.24	6.1	56° 53' 34.281"	135° 23' 5.202"	Rk	N	N	Insert	Note: 7.3 Rk 130m WSW.
106	V107	1				13.69	7.5	56° 53' 35.965"	135° 23' 16.4696"	Rk	N	N	Insert	Note: 2.3 Rk 60m S, 7.1 Rk 90m ESE.
107	V108	2	Drying Rk	56° 53' 36"	135° 22' 60"	-4.21	(5)	56° 53' 35.8322"	135° 22' 59.9144"	Islet	Y	N	Replace	Note: Charted islets to E and WNW confirmed, charted -6 drying rock 45m N confirmed, charted drying rock 45m W surveyed as drying shelf, -8 drying rock 95m NW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
108	V109	2	Drying Rk	56° 53' 39"	135° 23' 10"						Y	Y	N/A	Large area of white water observed in downward looking video.
109	V110	2	10	56° 53' 43"	135° 23' 15"	15.63	8.5	56° 53' 43.8844"	135° 23' 11.2656"	Rk	N	N	Replace	Note: 9.2 Rk 120m WSW. See Danger to Navigation Report Item 9.
110	V111	1				-0.08	-0	56° 53' 40.4533"	135° 22' 54.2645"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: Charted -9 drying rock 45m NW confirmed.
111	V112	2	$5^1/_2$	56° 53' 37"	135° 22' 52"	1.38	0.7	56° 53' 36.3043"	135° 22' 51.7895"	Rk	Y	Y	N/A	Possible Rk in kelp.
112	V113	1				-1.35	-5	56° 53' 24.7154"	135° 22' 15.7366"	Drying Rk	N	N	Insert	Note: cov 1 ft drying rock 75m ESE, 3.6 Rk 135m NW.
113	V114	1				5.11	2.8	56° 53' 25.8304"	135° 22' 3.1102"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -4 drying rock 100m SSE confirmed. See Danger to Navigation Report. Item 29
114	V115	2	Islet	56° 53' 16"	135° 21' 20"					Drying Shelf	N	N	Remove	Not detected by lidar, not observed in downward looking video.
115	V116	1				2.23	1.2	56° 53' 19.6236"	135° 20' 53.9008"	Rk	N	N	Insert	Note: 2 charted islets to W confirmed.
116	V117	1				9.38	5.1	56° 53' 4.0835"	135° 20' 58.5837"	Rk	Y	Y	N/A	Possible Rk in kelp.
117	V118	1				-2.47	-8	56° 53' 0.0464"	135° 20' 50.7015"	Drying Rk	N	N	Insert	Note: 2 charted islets to SE confirmed, -10 drying rock 60m S.
118	V119	2	7	56° 52' 49"	135° 20' 44"	1.80	1.0	56° 52' 50.6627"	135° 20' 41.5702"	Rk	N	N	Replace	See Danger to Navigation Report.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
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119	V120	2	$4^1/_2$	56° 52' 40"	135° 20' 16"	3.05	1.6	56° 52' 39.4246"	135° 20' 19.6313"	Rk	N	N	Replace	Note: 2.0 Rk 60m NW.
120	V121	2	4	56° 52' 53"	135° 19' 7"	4.98	2.7	56° 52' 52.0415"	135° 19' 5.7024"	Rk	N	N	Replace	
121	V122	1				1.50	0.8	56° 53' 13.3781"	135° 20' 33.1821"	Rk	N	N	Insert	Note: Charted islet 40m NW confirmed, 2 charted drying rocks to NNE confirmed.
122	V123	1				4.00	2.2	56° 53' 19.0199"	135° 20' 30.7213"	Rk	N	N	Insert	Note: 0.2 Rk 65m S.
123	V124	1				2.20	1.2	56° 53' 25.6287"	135° 20' 26.9537"	Rk	N	N	Insert	Note: Charted -2 drying rock 60m ENE confirmed, charted -2 drying rock 135m NNW confirmed, 1.8 Rk 60m NW.
124	V125	2	1	56° 53' 45"	135° 20' 34"	1.76	0.9	56° 53' 44.7922"	135° 20' 34.5789"	Rk	N	N	Inserted	Note: -7 drying rock 155m E. See Danger to Navigation Report Item 10.
125	V126	1				7.69	4.2	56° 53' 23.2104"	135° 24' 1.2513"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 4.8 Rk 50m NW.
126	V127	1				2.65	1.4	56° 53' 20.5285"	135° 23' 58.0675"	Rk	Y	Y	N/A	Possible Rk in kelp.
127	V128	2	Drying Rk	56° 53' 3"	135° 22' 50"					Drying Shelf	N	N	Remove	
128	V129	1				-3.04	-10	56° 53' 11.616"	135° 20' 21.4335"	Drying Rk	N	N	Insert	

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
129	V130	2	Islet	56° 53' 56"	135° 21' 14"						N	N	Remove	Not detected by lidar, not observed in downward looking video. Note: 2 charted islets to W surveyed as drying rocks.
130	V131	1				4.80	2.6	56° 53' 54.731"	135° 21' 11.6091"	Rk	N	N	Insert	Note: 1.7 Rk 65m N.
131	V132	1				13.03	7.1	56° 53' 59.211"	135° 21' 10.1569"	Rk	N	N	Insert	Note: 7.8 Rk 75m N.
132	V133	2	Islet	56° 54' 20"	135° 20' 54"	-2.62	-9	56° 54' 19.6004"	135° 20' 55.1493"	Drying Rk	N	N	Replace	
133	V134	2	$2^1/_4$	56° 54' 24"	135° 21' 4"	4.30	2.3	56° 54' 23.62"	135° 21' 3.1283"	Rk	N	N	Inserted	Note: Charted Islet 90m ESE confirmed, charted -1 drying rock 70m SE confirmed, 8.0 Rk 140m WNW.See Danger to Navigation Report Item 11.
134	V135	2	Islet	56° 54' 33"	135° 21' 13"	-2.40	-8	56° 54' 33.4214"	135° 21' 12.8573"	Drying Rk	N	N	Replace	Note: Charted -5 drying rock 40m NW confirmed.
135	V136	2	Islet	56° 54' 33"	135° 21' 32"					Coast	N	N	Remove	Charted islet surveyed as coastline. Note: Many charted islets and drying rocks confirmed in area.
136	V137	1				0.99	0.5	56° 54' 38.9073"	135° 21' 57.7061"	Rk	N	N	Insert	Note: Charted -4 drying rock 45m NW confirmed.
137	V138	2	$7^1/_2$	56° 54' 45"	135° 21' 58"	11.21	6.1	56° 54' 45.8224"	135° 21' 59.6614"	Rk	N	N	Replace	Note: 8.4 Rk 155m NNW, 7.3 Rk 60m S. See Danger to Navigation Report Item 12.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
138	V139	1				4.75	2.6	56° 54' 43.3519"	135° 21' 0.8733"	Rk	N	N	Insert	Note: Charted islet 170m SE surveyed as coastline, 9.1 Rk 190m N. See Danger to Navigation Report. Item 31
139	V140	2	$^{3}/_{4}$	56° 54' 35"	135° 20' 42"	0.77	cov 2 ft	56° 54' 34.9043"	135° 20' 43.5772"	Drying Rk	N	N	Replace	Note: -8 drying rock 190m S, 4.2 Rk 80m SSE.
140	V141	2	$4^{1}/_{2}$	56° 54' 26"	135° 20' 35"	0.74	cov 2 ft	56° 54' 26.0932"	135° 20' 35.806"	Drying Rk	N	N	Replace	Note: Charted -1 drying rock 65m W confirmed. See Danger to Navigation Report. Item 32
141	V142	1				15.88	8.7	56° 54' 20.8656"	135° 20' 24.7729"	Rk	N	Y	N/A	Sparse lidar coverage in deep water.
142	V143	1				10.25	5.6	56° 53' 13.7199"	135° 18' 2.8193"	Rk	N	N	Insert	Note: 6.3 Rk 45m NW.
143	V144	2	Islet	56° 54' 1"	135° 19' 55"					Coast	N	N	Remove	
144	V145	2	$3^{1}/_{2}$	56° 53' 7"	135° 18' 48"	6.65	3.6	56° 53' 7.3473"	135° 18' 49.2357"	Rk	N	N	Inserted	Note: -4 drying rock 95m SE. See Danger to Navigation Report Item 13.
145	V146	2	Islet	56° 53' 7"	135° 18' 37"	-0.63	-2	56° 53' 6.7255"	135° 18' 38.3158"	Drying Rk	N	N	Replace	Note: cov 2 ft drying rock 125m SSE.
146	V147	1				0.86	0.4	56° 52' 56.2558"	135° 18' 14.1453"	Rk	N	N	Insert	Note: Charted -8 drying rock 50m NE confirmed.
147	V148	2	7	56° 53' 21"	135° 18' 57"	8.71	4.7	56° 53' 20.2442"	135° 18' 57.5037"	Slope	N	N	Remove	Note: Charted -1 drying rock 145m SE confirmed. See Danger to Navigation Report. Item 33

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
148	V149	1				2.49	1.3	56° 53' 59.1413"	135° 19' 7.2846"	Rk	N	N	Insert	See Danger to Navigation Report. Item 34
149	V150	2	Drying Rk	56° 53' 21"	135° 18' 14"	-3.61	(3)	56° 53' 20.2954"	135° 18' 14.0196"	Islet	N	N	Replace	
150	V151	2	7	56° 53' 15"	135° 18' 11"	9.83	5.4	56° 53' 17.3825"	135° 18' 11.0641"	Rk	N	N	Replace	Note: -3 drying rock 120m SW.
151	V152	2	Islet	56° 53' 9"	135° 17' 55"	-3.36	-11	56° 53' 8.5905"	135° 17' 54.6168"	Drying Rk	N	N	Replace	Note: Charted islet 80m NW confirmed.
152	V153	1				-1.13	-4	56° 53' 8.9205"	135° 17' 38.4458"	Drying Rk	N	N	Insert	Note: Charted -1 drying rock 140m WSW confirmed.
153	V154	2	4	56° 54' 16"	135° 19' 5"	-0.50	-0.3	56° 54' 16.4861"	135° 19' 4.947"	Slope	N	N	Remove	
154	V155	1				-1.76	-6	56° 54' 27.7217"	135° 19' 38.748"	Drying Rk	N	N	Insert	Note: Charted drying rock 80m NNW surveyed as drying shelf, 2.3 Rk 175m ENE.
155	V156	2	$3^3/_4$	56° 55' 11"	135° 20' 30"	5.15	2.8	56° 55' 11.1918"	135° 20' 31.2063"	Rk	N	N	Replace	
156	V157	2	Rk	56° 55' 53"	135° 21' 5"	-3.06	-10	56° 55' 53.5745"	135° 21' 2.9835"	Drying Rk	N	N	Replace	Note: Charted -6 drying rock 125m N confirmed, charted drying rock 80m N surveyed as drying shelf.
157	V158	2	Islet	56° 56' 2"	135° 21' 7"	-3.03	-10	56° 56' 1.5364"	135° 21' 7.6718"	Drying Rk	N	N	Replace	Note: Charted islet 50m S surveyed as -5 drying rock, 1.4 Rk 140m WNW.
158	V159	1				8.91	4.8	56° 55' 7.1979"	135° 21' 27.9576"	Rk	N	N	Insert	Note: 4.1 Rk 100m SE.
159	V160	1				11.14	6.1	56° 55' 26.4867"	135° 21' 23.4944"	Rk	N	N	Insert	Note: Charted -0 drying rock 220m WNW confirmed, 1.4 Rk 115m S.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
160	V161	2	Drying Rk	56° 55' 34"	135° 21' 60"	1.27	0.7	56° 55' 34.4679"	135° 21' 58.6916"	Rk	N	N	Replace	Note: 5.2 Rk 140m E, 7.6 Rk 200m ENE.
161	V162	2	6	56° 55' 42"	135° 21' 44"	8.64	4.7	56° 55' 43.3777"	135° 21' 45.624"	Rk	N	N	Replace	See Danger to Navigation Report. Item 35
162	V163	2	$2^1/_4$	56° 55' 52"	135° 21' 55"	1.36	0.7	56° 55' 52.8732"	135° 21' 56.7977"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted Islet 135m SE confirmed, 1.0 Rk 50m SE, 1.2 Rk 100m SSE, 6.0 Rk 140m SSW, 5.5 Rk 110m NW. See Danger to Navigation Report. Item 36
163	V164	1				-3.87	(4)	56° 56' 8.0986"	135° 21' 40.1993"	Islet	N	N	Insert	Note: Many charted islets and drying rocks N and NE confirmed, islet 250m N, -10 drying rock 55m E, 2.7 RK 150m SW.
164	V165	2	Drying Rk	56° 56' 12"	135° 22' 3"	-3.82	(4)	56° 56' 12.3731"	135° 22' 3.0261"	Islet	N	N	Replace	Note: Many charted islets and drying rocks in area confirmed, many new islets and drying rocks to N and NE, charted islet 80m N surveyed as -11 drying rock. .
165	V166	1				1.99	1.1	56° 56' 9.5524"	135° 21' 56.7399"	Rk	N	N	Insert	
166	V167	2	Islet	56° 56' 17"	135° 22' 30"	-2.01	-7	56° 56' 17.2454"	135° 22' 30.2856"	Drying Rk	N	N	Replace	Note: Charted islet 30m ENE confirmed, 2 islets N, many charted drying rocks NW and E confirmed, -0 drying rock 55m W.
167	V168	2	7	56° 56' 12"	135° 22' 25"	6.94	3.8	56° 56' 12.5172"	135° 22' 23.9283"	Rk	N	N	Replace	Note: 5.3 Rk 90m SE.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
168	V169	2	Islet	56° 56' 22"	135° 22' 35"	-3.01	-10	56° 56' 21.3878"	135° 22' 34.6386"	Drying Rk	N	N	Replace	Note: Charted islets 200m NW and 75m ESE surveyed as drying rocks, many charted drying rocks confirmed and new drying rocks surveyed to W and NW.
169	V170	2	$4^{1}/_{4}$	56° 56' 24"	135° 22' 55"	3.48	1.9	56° 56' 24.8944"	135° 22' 54.9192"	Rk	N	N	Replace	See Danger to Navigation Report Item 19.
170	V171	1				-1.10	-4	56° 56' 29.4612"	135° 22' 55.4931"	Drying Rk	N	N	Insert	Note: Many charted islets and drying rocks in area confirmed, a number of charted islets to E surveyed as drying rocks, 1.9 Rk 100m SSW.
171	V172	1				6.70	3.6	56° 56' 23.4787"	135° 23' 15.3713"	Rk	N	N	Insert	Note: 1.9 Rk 150m WNW.
172	V173	1				7.33	4.0	56° 56' 18.3391"	135° 23' 8.0189"	Rk	N	N	Insert	Note: 3.5 Rk 120m N, 4.8 Rk 120m W.
173	V174	1				11.81	6.4	56° 56' 18.746"	135° 23' 22.534"	Rk	N	N	Insert	Note: 3.4 Rk 110m NW, 8.6 Rk 80m SW.
174	V175	2	9	56° 56' 15"	135° 23' 28"	13.08	7.1	56° 56' 14.8593"	135° 23' 28.1803"	Rk	N	N	Replace	Note: 8.1 Rk 90m WNW. See Danger to Navigation Report Item 20.
175	V176	2	7	56° 56' 19"	135° 23' 37"	9.29	5.1	56° 56' 19.3257"	135° 23' 38.4795"	Rk	N	N	Replace	Note: Charted -2 drying rock 100 NW confirmed, 6.0 Rk 55m WSW, 7.5 Rk 170m WSW, 5.6 Rk 165m W, 3.2 Rk 130m WNW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
176	V177	2	Rk	56° 56' 24"	135° 23' 35"	0.45	cov 1 ft	56° 56' 24.3716"	135° 23' 33.7229"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: Charted Islet 95m W confirmed, -0 drying rock 140m W confirmed, many drying rocks in area, 1.3 Rk 105m NW, 1.7 Rk 85m ESE.
177	V178	1				1.89	1.0	56° 56' 24.1784"	135° 23' 47.8297"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 4.3 Rk 80m WSW, 1.6 Rk 50m NE.
178	V179	2	$6^1/_2$	56° 56' 19"	135° 24' 10"	1.69	0.9	56° 56' 18.0523"	135° 24' 8.2635"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 7.5 Rk 125m NNE, 6.9 Rk 200m NE, 9.5 Rk 120m E. See Danger to Navigation Report. Item 37
179	V180	1				13.36	7.3	56° 56' 21.9042"	135° 24' 17.7137"	Rk	N	N	Insert	Note: 8.3 Rk 130m ENE. See Danger to Navigation Report Item 21.
180	V181	2	$6^1/_4$	56° 56' 29"	135° 24' 19"	7.38	4.0	56° 56' 28.0931"	135° 24' 21.1206"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 8.0 Rk 130m WNW.
181	V182	1				10.20	5.6	56° 56' 30.6754"	135° 24' 13.9671"	Rk	N	N	Insert	Possible Rk in kelp. Note 7.5 Rk 65m ESE.
182	V183	1				11.64	6.3	56° 56' 28.2973"	135° 23' 59.0391"	Rk	N	N	Insert	Note: 4.9 Rk 100m WNW.
183	V184	2	$2^1/_2$	56° 56' 35"	135° 24' 0"	-0.74	-3	56° 56' 33.0165"	135° 24' 2.1542"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 3.3 Rk 95m NW. See Danger to Navigation Report. Item 38

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
184	V185	1				-3.20	-11	56° 56' 34.5466"	135° 23' 52.1849"	Drying Rk	Y	N	Insert	Note: Many charted islets and drying rocks in area confirmed, charted 0.5 Rk 80m SSW confirmed.
185	V186	2	Rk	56° 56' 33"	135° 23' 33"	0.39	cov 1 ft	56° 56' 34.1382"	135° 23' 33.3162"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 2 charted drying rocks SW and W confirmed, charted 0.9 Rk 70m S confirmed, 1.4 Rk 50m N, 5.1 Rk 90m ESE.
186	V187	2	Rk	56° 56' 31"	135° 23' 19"	-0.84	-3	56° 56' 33.4575"	135° 23' 19.4887"	Drying Rk	N	N	Replace	Note: Charted -1 drying rock 110m NW confirmed, 0.8 Rk 110m SE, 5.7 Rk 145m SSW, 5.6 Rk 110m WSW.
187	V188	1				0.91	0.5	56° 56' 38.2082"	135° 23' 29.3161"	Rk	N	N	Insert	Note: Many charted islets N and E confirmed, islet 170m N.
188	V189	1				-2.03	-7	56° 56' 41.4099"	135° 23' 40.0892"	Drying Rk	N	N	Insert	Note: Charted islet 125m N confirmed, many charted islets 100m N and E surveyed as drying shelf, 2 islets 130m NE, charted -6 drying rock 70m NW confirmed, many drying rocks in area.
189	V190	1				7.99	4.3	56° 56' 43.0005"	135° 23' 56.0072"	Rk	N	N	Insert	Note: Charted islet and many drying rocks N and NE confirmed, -11 drying rock 130m N, 4.8 Rk 120m WSW.
190	V191	2	10	56° 56' 45"	135° 24' 11"	12.03	6.6	56° 56' 45.0873"	135° 24' 8.3572"	Rk	N	N	Replace	Note: 3 drying rocks 160m NE, 5.5 Rk 130m S, 6.7 Rk 95m SW.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
191	V192	1				13.05	7.1	56° 56' 48.86"	135° 24' 20.9097"	Rk	N	N	Insert	Note: 6.7 Rk 120m SW.
192	V193	1				8.92	4.9	56° 56' 47.5111"	135° 24' 35.3387"	Rk	N	N	Insert	Note: 4.6 Rk 65m NE, 7.5 Rk 145m NE, 7.2 Rk 120m E.
193	V194	1				7.51	4.1	56° 56' 41.2432"	135° 24' 31.4287"	Rk	N	N	Insert	Note: 5.1 Rk 110m NNE, 3.7 Rk 170m W.
194	V195	2	Rk	56° 56' 38"	135° 24' 20"	-5.31	(9)	56° 56' 37.8146"	135° 24' 19.4908"	Islet	Y	N	Replace	Note: Many charted drying rocks in area confirmed, -0 drying rock 80m N.
195	V196	1				8.29	4.5	56° 56' 33.1638"	135° 24' 17.7858"	Rk	N	N	Insert	Note: 4.4 Rk 50m NW, 4.4 Rk 110m NE.
196	V198	1				-3.57	(3)	56° 56' 37.3702"	135° 24' 30.8308"	Islet	N	N	Insert	Note: Charted islet 20m S confirmed, charted -3 drying rock 90m S confirmed,charted 1.3 Rk 120m SSE confirmed, charted 0.7 Rk 100m W confirmed, 0.9 Rk 75m SW, 6.0 Rk 135m SW.
197	V199	2	$5^1/_4$	56° 56' 34"	135° 24' 45"	0.82	cov 2 ft	56° 56' 33.4814"	135° 24' 49.1071"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 4.6 Rk 100m ENE, 5.4 Rk 85m NW, 5.3 Rk 80m N, 3.8 Rk 70m SE. See Danger to Navigation Report. Item 39
198	V200	2	10	56° 56' 39"	135° 24' 54"	11.77	6.4	56° 56' 38.4073"	135° 24' 56.4448"	Rk	N	N	Replace	Note: 4.3 Rk 100m W, 8.5 Rk 130m ENE, 8.9 Rk 150m E.

			CHARTED			SURVEYED								
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199	V201	1				3.01	1.6	56° 56' 45.7031"	135° 24' 50.2308"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 5.4 Rk 110m NW. See Danger to Navigation Report. Item 40
200	V202	1				12.53	6.8	56° 56' 48.2199"	135° 24' 44.8887"	Rk	N	N	Insert	Note: 7.1 Rk 120m WNW.
201	V203	1	$4^1/_4$	56° 56' 43"	135° 24' 55"	5.61	3.0	56° 56' 43.2794"	135° 24' 56.5916"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: 2.9 Rk 95m N, 2.1 Rk 70m WSW, 3.3 Rk 170m WSW.
202	V204	1				8.63	4.7	56° 56' 48.1079"	135° 25' 2.7463"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 4.5 Rk 150m SW, 3.7 Rk 85m SW.
203	V205	1				10.52	5.7	56° 56' 49.8073"	135° 25' 19.1044"	Rk	N	N	Insert	Note: 4.6 Rk 100m ESE, 3.7 Rk 165m SSE, 5.6 Rk 75m S, 6.1 Rk 110m SW.
204	V206	1				4.81	2.6	56° 56' 44.6363"	135° 25' 28.976"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Many charted islets and drying rocks to SW confirmed, charted drying rock 125m S surveyed as drying shelf, 4.8 Rk 85m ESE.
205	V207	2	Rk	56° 56' 45"	135° 25' 38"	0.61	cov 2 ft	56° 56' 43.9065"	135° 25' 39.4767"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted islet and drying rock to S confirmed, 2 charted drying rocks 120m W confirmed, 2 new islets to S, 1.2 Rk 50m NNW, 7.0 Rk 135m N.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
206	V208	1				13.38	7.3	56° 56' 47.502"	135° 25' 53.2148"	Rk	N	N	Insert	Note: 8.1 Rk 80m N, 8.2 Rk 110m S, 9.7 Rk 170m SW.
207	V209	1				-1.47	-5	56° 56' 36.4723"	135° 25' 33.0586"	Drying Rk	N	N	Insert	Note: 5.3 Rk 105m SSE, 4.3 Rk 170m SW.
208	V210	1				3.10	1.7	56° 56' 37.776"	135° 25' 8.7885"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -1 drying rock 70m SE.
209	V211	2	Islet	56° 56' 33"	135° 25' 15"	-2.91	-10	56° 56' 33.9814"	135° 25' 16.402"	Drying Rk	Y	N	Replace	Note: Many charted islets N and E confirmed, charted islet 165m SE surveyed as 3 separate islets, -11 drying rock 80m E, 4.3 Rk 85m W.
210	V212	2	Rk	56° 56' 32"	135° 25' 15"						N	N	Remove	Not detcted by lidar.
211	V213	1				-2.04	-7	56° 56' 27.862"	135° 24' 52.552"	Drying Rk	Y	N	Insert	Note: Many charted drying rocks in vicinity confirmed, islet 130m WNW, many drying rocks in vicinity.
212	V214	1				0.78	cov 2 ft	56° 56' 20.384"	135° 25' 4.4977"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Many charted drying rocks in vicinity confirmed, many new drying rocks in area, 3.3 Rk 120m NNW, 2.6 Rk 60m S.
213	V215	2	Islet	56° 56' 17"	135° 24' 59"	-2.13	-7	56° 56' 17.9092"	135° 24' 58.2856"	Drying Rk	N	N	Replace	Note: 3.7 Rk 95m SSW.

			CHARTED			SURVEYED								
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214	V216	1				-1.78	-6	56° 56' 18.9275"	135° 24' 45.7065"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Many charted islets S, SE and E confirmed, many drying rocks in vicinity, 2 charted rocks SW and SSW in kelp areas not detected by lidar.
215	V217	1				-2.69	-9	56° 56' 16.7507"	135° 24' 33.6375"	Drying Rk	Y	N	Insert	Note: Many charted islets in area confirmed, charted rock 60m NE not detected by lidar, -7 drying rock 40m SW.
216	V218	1				-4.42	(6)	56° 56' 12.3791"	135° 24' 24.2465"	Islet	N	N	Insert	Note: Charted -8 drying rock 90m SSW confirmed, 8.8 Rk 180m E, 5.3 Rk 85m SE, 4.4 Rk 180m SW.
217	V219	2	8	56° 56' 17"	135° 24' 24"	11.79	6.4	56° 56' 16.314"	135° 24' 23.8401"	Slope	N	N	Remove	
218	V220	1				6.85	3.7	56° 56' 5.0478"	135° 24' 23.7093"	Rk	N	N	Insert	Note: 5.1 Rk 110m N, 6.2 Rk 150m SE, 5.3 Rk 150m SSW, 8.9 Rk 240m SW, 4.6 Rk 100m W. See Danger to Navigation Report. Item 41
219	V221	1				10.55	5.7	56° 55' 58.8178"	135° 24' 15.3"	Rk	N	N	Insert	Note: 5.5 Rk 150m ENE, 6.7 Rk 55m SE, 8.1 Rk 50m S.
220	V222	1				7.22	3.2	56° 56' 0.9258"	135° 23' 49.7087"	Rk	N	N	Insert	Note: Charted -3 drying rock 200m W confirmed.
221	V223	2	$5^1/_2$	56° 56' 3"	135° 23' 51"	8.52	4.6	56° 56' 3.7714"	135° 23' 46.8722"	Rk	N	N	Insert	Note: 8.0 Rk 185m NE, 9.5 Rk 245m N.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
222	V224	2	$1^1/_4$	56° 55' 60"	135° 23' 44"	-0.90	-3	56° 55' 59.6991"	135° 23' 43.8858"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted drying rocks to S and SE confirmed, 2 drying rocks 50m SE. See Danger to Navigation Report. Item 42
223	V225	2	7	56° 56' 1"	135° 23' 30"	9.62	5.2	56° 56' 2.713"	135° 23' 30.9303"	Rk	N	N	Replace	Note: 4.2 Rk 110m N, 2.9 Rk 90m NE.
224	V226	1				9.35	5.0	56° 56' 6.9027"	135° 23' 21.7578"	Rk	N	N	Insert	Note: 4.8 Rk 60m S.
225	V227	2	Islet	56° 55' 52"	135° 23' 18"	-2.87	-10	56° 55' 52.1122"	135° 23' 17.4273"	Drying Rk	N	N	Replace	Note: 2 charted islets in area confirmed, many drying rocks to the W and SE..
226	V228	1				6.81	3.7	56° 55' 55.6109"	135° 23' 13.3534"	Rk	N	N	Insert	Note: 4.1 Rk 75m NW, 4.5 Rk 75m ENE.
227	V229	2	$7^1/_2$	56° 55' 52"	135° 23' 4"	11.00	6.0	56° 55' 52.3258"	135° 23' 2.945"	Rk	N	N	Replace	Note: -3 drying rock 155m SW.
228	V230	1				-4.24	(5)	56° 55' 45.5044"	135° 23' 6.8354"	Islet	N	N	Insert	Note: Charted islet 180m SW confirmed, many charted drying rocks in area confirmed, islet 30m W, -5 drying rock 55m NNW.
229	V231	2	$2^1/_2$	56° 55' 39"	135° 23' 2"	2.27	1.2	56° 55' 38.8744"	135° 23' 0.5036"	Rk	N	N	Replace	Note: 2.4 Rk 60m SSE, 2.8 Rk 60m W, 5.7 Rk 145m WSW.
230	V232	2	$7^1/_2$	56° 55' 40"	135° 22' 50"	3.08	1.7	56° 55' 39.006"	135° 22' 49.8352"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted islet and drying rock to S confirmed, 1.8 Rk 90m W. See Danger to Navigation Report.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
														Item 43
231	V233	1				1.92	1.0	56° 55' 31.669"	135° 22' 45.8408"	Rk	N	N	Insert	Note: Charted -4 drying rock 70m E confirmed.
232	V234	2	9	56° 55' 29"	135° 22' 35"	8.94	4.9	56° 55' 29.35"	135° 22' 34.6977"	Slope	N	N	Remove	Note: 0.8 Rk 90m WNW, 1.8 Rk 55m NNW. See Danger to Navigation Report. Item 44
233	V235	1				11.91	6.5	56° 55' 26.2972"	135° 22' 39.4718"	Rk	N	N	Insert	Note: 9.9 Rk 140m WSW.
234	V236	1				-2.63	-9	56° 55' 45.5402"	135° 23' 36.9044"	Drying Rk	N	N	Insert	Note: Charted -1 drying rock 45m ENE confirmed.
235	V237	1				3.19	1.7	56° 55' 51.2994"	135° 23' 52.3158"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -1 drying rock 70m N.
236	V238	1				0.10	-0	56° 56' 8.8877"	135° 24' 46.0946"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: 6.6 Rk 105m S, 2.6 Rk 75m SW, 2.1 Rk 60m NW.See Danger to Navigation Report. Item 45
237	V239	1				11.05	6.0	56° 56' 4.0093"	135° 24' 53.9909"	Rk	N	N	Insert	Note: 6.8 Rk 50m N, 6.0 Rk 110m ESE.
238	V240	2	Drying Rk	56° 56' 12"	135° 25' 8"	-6.25	(12)	56° 56' 11.8936"	135° 25' 7.8663"	Islet	Y	N	Replace	Note: Charted -3 drying rock 60m N confirmed, 2.1 Rk 110m NE, 6.8 Rk 90m S.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
239	V241	2	Drying Rk	56° 56' 17"	135° 25' 16"	-6.80	(13)	56° 56' 17.7807"	135° 25' 16.5292"	Islet	N	N	Replace	Note: Many charted islets and drying rocks in area confirmed, 2 islets 160m W, -4 drying rock 70m NW.
240	V242	1				2.73	1.5	56° 56' 26.4674"	135° 25' 25.9253"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Many charted islets to S confirmed, 2 drying rocks 125m W, 1.9 Rk 115m E, 4.8 Rk 145m N.
241	V243	2	$1^1/_4$	56° 56' 27"	135° 25' 45"	-1.51	-5	56° 56' 26.5534"	135° 25' 46.4765"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp Note: Islet 125m E, -10 drying rock 100m E, 6.7 Rk 135m SE.
242	V244	1				-1.48	-5	56° 56' 29.3549"	135° 25' 54.6803"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Many charted islets and drying rocks in area confirmed, charted islet 100m SE surveyed as drying shelf, -10 drying rock 55m SE.
243	V245	2	Rk	56° 56' 26"	135° 25' 56"	-1.49	-5	56° 56' 24.8752"	135° 25' 56.1847"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: 2 islets to E confirmed, charted -5 drying rock 70m W confirmed, -4 drying rock 60m N.
244	V246	1				4.86	2.6	56° 56' 30.2411"	135° 25' 58.6214"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 6.5 Rk 95m N, 6.6 Rk 80m WSW, 9.9 Rk 165m NW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
245	V247	2	$7^1/_2$	56° 56' 28"	135° 26' 6"	10.52	5.7	56° 56' 27.0326"	135° 26' 5.3078"	Rk	N	N	Replace	Note: 2 charted islets 130m SW confirmed, 2 charted islets 200m WSW surveyed as coastline, 2 drying rocks to SW.
246	V248	1				0.06	-0	56° 56' 31.3585"	135° 26' 18.3142"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Many charted drying rocks in area confirmed, charted islet 80m S surveyed as -8 drying rock.
247	V249	1				-4.38	(5)	56° 56' 30.9683"	135° 26' 28.63"	Islet	Y	N	Insert	Note: Charted islet 40m SE confirmed, -10 drying rock 40m N, -11 drying rock 25m S, 1.4 Rk 95m N, 3.9 Rk 200m N, 3.4 Rk 150m NW.
248	V250	2	$1^1/_2$	56° 56' 41"	135° 26' 34"	0.92	0.5	56° 56' 40.37"	135° 26' 36.8488"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 1.5 Rk 100m E, 2.2 Rk 75m NE, 5.6 Rk 100m NNW, 6.7 Rk 140m NNW.
249	V251	1				12.62	6.9	56° 56' 40.4509"	135° 26' 59.3979"	Rk	N	N	Insert	Note: 6.1 Rk 100m E, 11.0 Rk 170m NW.
250	V252	1				6.70	3.6	56° 56' 36.7654"	135° 26' 45.1683"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: Charted -3 drying rock 95m E confirmed, 5.1 Rk 50m N, 2.5 Rk 150m ESE.
251	V253	2	8	56° 56' 33"	135° 26' 44"	12.17	6.6	56° 56' 31.6865"	135° 26' 46.0582"	Rk	N	N	Replace	Note: 5.8 Rk 100m E, 9.6 Rk 105m SW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
252	V254	2	7	56° 56' 22"	135° 26' 45"	10.65	5.8	56° 56' 21.7725"	135° 26' 45.3616"	Rk	N	N	Replace	Note: Charted -4 drying rock 190m ESE confirmed, 7.9 Rk 220m NE, 5.2 Rk 210m ENE, 6.1 Rk 55m SE, 9.3 Rk 135m NW.
253	V255	1				12.80	7.0	56° 56' 12.444"	135° 26' 46.0254"	Rk	N	N	Insert	Note: 3 charted islets 125m SE confirmed, 8.7 Rk 90m E.
254	V256	1				12.30	6.7	56° 56' 6.8825"	135° 26' 49.048"	Rk	N	N	Insert	Note: 9.6 Rk 160m W, 9.9 Rk 90m WNW, 7.9 Rk 60m NE. See Danger to Navigation Report Item 17.
255	V257	2	7	56° 56' 8"	135° 26' 44"	5.17	2.8	56° 56' 7.8779"	135° 26' 42.5818"	Slope	Y	N	Remove	Note: -10 drying rock 75m ESE, 6.5 Rk 125m SE.
256	V258	1				14.74	8.0	56° 56' 2.863"	135° 27' 3.4827"	Rk	N	Y	N/A	Sparse lidar coverage in deep water. Note: 6.2 Rk 85m ESE.
257	V259	2	$1^1/_2$	56° 56' 1"	135° 26' 44"	1.21	0.6	56° 56' 0.3906"	135° 26' 43.4042"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted islet 105m E confirmed, -1 drying rock 70m E, 6.7 Rk 110m NE, 0.6 Rk 160m ESE.
258	V260	2	$3^1/_2$	56° 56' 3"	135° 26' 30"	5.04	2.7	56° 56' 1.1565"	135° 26' 26.9529"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: Charted -4 drying rock 100m E confirmed.
259	V261	2	Islet	56° 56' 7"	135° 26' 18"	-2.73	-9	56° 56' 6.7602"	135° 26' 18.8649"	Drying Rk	N	N	Replace	Note: Many charted islets in area confirmed, many drying rocks in area.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
260	V262	1				11.74	6.4	56° 56' 12.9959"	135° 26' 29.7355"	Rk	N	N	Insert	Note: Charted drying rock 95m NE surveyed as drying shelf, 2 charted drying rocks to SSW confirmed, charted drying shelf 95m S surveyed as a kelp area.
261	V263	1				-2.42	-8	56° 56' 11.1018"	135° 26' 3.2367"	Drying Rk	N	N	Insert	
262	V264	1				7.44	4.0	56° 56' 15.1583"	135° 25' 44.3797"	Rk	N	N	Insert	Note: 3.2 Rk 60m NNE, 7.5 Rk 150m NNE, 6.7 Rk 100m SSE.
263	V265	2	$4^1/_2$	56° 56' 8"	135° 25' 40"	5.80	3.1	56° 56' 7.1569"	135° 25' 42.3459"	Rk	Y	Y	N/A	Possible Rk in kelp.
264	V266	1				5.26	2.9	56° 56' 7.2771"	135° 25' 32.3971"	Rk	Y	Y	N/A	Possible Rk in kelp. See Danger to Navigation Report. Item 46
265	V267	1				8.70	4.7	56° 56' 7.2882"	135° 25' 28.3875"	Rk	N	N	Insert	Note: 4.7 Rk 175m ENE.
266	V268	2	5	56° 56' 2"	135° 25' 26"	7.57	4.1	56° 56' 1.134"	135° 25' 26.1474"	Rk	N	N	Replace	Note: 4.3 Rk 60m W, 8.0 Rk 80m WSW, 3.5 Rk 150m E.
267	V269	1				9.85	5.4	56° 56' 0.8007"	135° 25' 6.1657"	Rk	N	N	Insert	Note: Charted 1.8 Rk 65m SW confirmed, 6.9 Rk 130m W.
268	V270	1				9.99	5.4	56° 55' 53.4314"	135° 25' 17.9656"	Rk	N	N	Insert	See Danger to Navigation Report Item 18.
269	V271	2	7	56° 55' 48"	135° 25' 21"	9.50	5.2	56° 55' 48.1109"	135° 25' 22.3994"	Rk	N	N	Replace	Note: 9.0 Rk 120m NW, 11.4 Rk 205m E.See Danger to Navigation Report. Item 47

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
270	V272	1				-0.45	-2	56° 56' 2.5769"	135° 25' 52.0068"	Drying Rk	Y	N	Insert	Note: Charted islet 95m W confirmed, charted -10 drying rock 110m N confirmed, -2 drying rock 40m S.
271	V273	2	Drying Shelf	56° 55' 57"	135° 25' 48"	3.11	1.7	56° 55' 56.7696"	135° 25' 48.9036"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -9 drying rock 150m WNW.
272	V274	1				-5.82	(10)	56° 55' 52.6319"	135° 26' 6.0621"	Islet	N	N	Insert	Note: 2 charted islets to S confirmed, islet 150m NNE, -8 drying rock 110m NE, cov 1 ft drying rock 65m NW.
273	V275	1				-3.70	(3)	56° 55' 49.6278"	135° 26' 11.221"	Islet	Y	N	Insert	Note: Charted -6 drying rock 45m E confirmed, many charted drying rocks to NW confirmed.
274	V276	2	Islet	56° 55' 48"	135° 26' 3"						Y	N	Remove	Not detected by lidar, not observed in downward looking video.
275	V277	1				9.53	5.2	56° 55' 47.4028"	135° 26' 16.0896"	Rk	N	N	Insert	Note: 6.2 Rk 100m W.
276	V278	2	Islet	56° 55' 47"	135° 26' 28"	-1.72	-6	56° 55' 46.1587"	135° 26' 27.9744"	Drying Rk	N	N	Replace	Note: 2 charted islets 90m NW confirmed, 2 islets to N and NW surveyed as drying rocks, -1 drying rock 45m N, 3.2 Rk 65m ENE.
277	V279	2	$7^1/_2$	56° 55' 44"	135° 26' 32"	8.91	4.8	56° 55' 44.1424"	135° 26' 33.5334"	Rk	N	N	Replace	Note: 6.1 Rk 60m ESE, 6.1 Rk 110m NNW. See Danger to Navigation Report. Item 48

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
278	V280	1				16.42	9.0	56° 55' 36.5285"	135° 26' 33.7288"	Rk	N	N	Insert	Note: 10.6 Rk 180m SW.See Danger to Navigation Report. Item 49
279	V281	1				3.58	1.9	56° 55' 50.5658"	135° 26' 37.2711"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 4.1 Rk 50m SW, 2.9 Rk 50m S. See Danger to Navigation Report. Item 50
280	V282	1				2.34	1.3	56° 55' 52.2473"	135° 26' 28.2452"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -4 drying rock 75m ESE confirmed, charted drying rock 100m SE surveyed as drying shelf, 5.0 Rk 120m N, 4.2 Rk 115m NE, 6.6 Rk 75m W.
281	V283	2	$5^1/_4$	56° 55' 57"	135° 26' 16"	2.04	1.1	56° 55' 58.9385"	135° 26' 17.6695"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -3 drying rock 100m E confirmed, 1.2 Rk 140m SE, 5.8 Rk 60m W.
282	V284	2	$4^3/_4$	56° 55' 55"	135° 26' 34"	6.50	3.5	56° 55' 54.4938"	135° 26' 34.0975"	Rk	N	N	Replace	Note: 2.6 Rk 60m N.
283	V285	1				11.68	6.4	56° 55' 51.7518"	135° 26' 53.429"	Rk	N	N	Insert	Note: 6.4 Rk 70m SSW, 8.3 Rk 100m E, 9.0 Rk 90m N.
284	V286	2	$5^1/_2$	56° 55' 56"	135° 27' 5"	10.39	5.7	56° 55' 56.5043"	135° 27' 7.101"	Rk	N	N	Inserted	Note: 7.4 Rk 65m SE, 6.3 Rk 30m W. See Danger to Navigation Report Item 16.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
285	V287	1				13.25	7.2	56° 55' 41.7188"	135° 26' 16.3751"	Rk	N	N	Insert	Note: 4.3 Rk 90m E, 9.4 Rk 65m SE, 6.0 Rk 150m ESE.
286	V288	2	$5^3/_4$	56° 55' 37"	135° 25' 56"	7.50	4.1	56° 55' 38.2722"	135° 25' 57.8545"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 4.7 Rk 95m NE, 7.2 Rk 145m WSW.
287	V289	2	Rk	56° 55' 36"	135° 25' 47"	0.45	cov 1 ft	56° 55' 37.2621"	135° 25' 48.2938"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: Charted islet 55m N confirmed, charted -6 drying rock 155m E confirmed,-9 drying rock 50m NE,1.2 Rk 70m SSW.
288	V290	1				4.42	2.4	56° 55' 32.9087"	135° 25' 48.4424"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 2.7 Rk 55m SE, 7.1 Rk 110m WNW, 7.7 Rk 100m E.
289	V291	1				1.44	0.8	56° 55' 27.5785"	135° 25' 48.8183"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -4 drying rock 40m SW confirmed, 1.2 Rk 60m N, 8.4 Rk 140m WNW.
290	V292	2	9	56° 55' 19"	135° 26' 5"	12.80	7.0	56° 55' 18.4545"	135° 26' 7.1233"	Rk	N	N	Replace	Note: 10.4 Rk 180m NE, 11.2 Rk 250m N. See Danger to Navigation Report. Item 51
291	V293	2	15	56° 55' 18"	135° 26' 39"	19.79	10.8	56° 55' 16.571"	135° 26' 35.9713"	Rk	N	N	Replace	Note: 10.8 Rk 70m S, 10.5 Rk 125m SE.
292	V294	2	13	56° 55' 6"	135° 26' 37"	20.06	10.9	56° 55' 7.0563"	135° 26' 34.8532"	Rk	N	N	Replace	

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
293	V295	1				14.33	7.8	56° 55' 9.2789"	135° 26' 19.2051"	Rk	N	Y	N/A	Sparse lidar coverage in deep water. Note: 6.0 Rk 85m SE, 9.0 Rk 155m SE.
294	V296	1				-1.21	-4	56° 55' 18.6815"	135° 25' 49.032"	Drying Rk	Y	N	Insert	Note: Charted islet and drying rocks in area confirmed, 8.7 Rk 240m E, 9.4 Rk 160m E, 9.1 Rk 160m SE.
295	V297	2	6	56° 55' 14"	135° 25' 33"	9.97	5.4	56° 55' 14.6692"	135° 25' 32.9883"	Rk	N	N	Replace	Note: 7.7 Rk 170m W, 8.2 Rk 70m SSW. See Danger to Navigation Report Item 14.
296	V298	1				11.42	6.2	56° 55' 13.0774"	135° 25' 28.7139"	Rk	N	N	Insert	Note: Charted -4 drying rock 110m S confirmed, 1.9 Rk 60m S, 5.3 Rk 100m SE, 6.9 Rk 150m SW.
297	V299	2	9	56° 55' 7"	135° 25' 34"	11.65	6.3	56° 55' 6.794"	135° 25' 36.3833"	Rk	N	N	Replace	Note: 0.9 Rk 130m ENE, 5.0 Rk 110m ESE. See Danger to Navigation Report. Item 52
298	V300	2	3	56° 54' 59"	135° 25' 29"	5.10	2.8	56° 54' 59.2453"	135° 25' 29.7212"	Rk	N	N	Inserted	Note: 7.9 Rk 90m NW, 6.5 Rk 85m NNW.
299	V301					3.19	1.7	56° 55' 3.672"	135° 25' 23.5789"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Many charted islets and drying rocks to NE and SE confirmed, -6 drying rock 145m NE, 4.9 Rk 75m S, 6.6 Rk 55m W.
300	V302	1				11.55	6.3	56° 55' 14.1994"	135° 25' 19.416"	Rk	N	N	Insert	

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
301	V303	1				6.09	3.3	56° 55' 13.5729"	135° 25' 13.8036"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -1 drying rock 90m SE, -8 drying rock 130m SE.
302	V304	1				5.00	2.7	56° 55' 7.9113"	135° 25' 3.2448"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 2 charted islets 100m to SW confirmed, charted -10 drying rock 150m WSW confirmed, -2 drying rock 90m S, 3.2 Rk 120m ENE.
303	V305	2	Islet	56° 55' 4"	135° 24' 58"	-2.62	-9	56° 55' 4.1521"	135° 24' 58.846"	Drying Rk	Y	N	Replace	Note: 3.0 Rk 75m N.
304	V306	2	DryingRk	56° 54' 57"	135° 24' 43"	-6.91	(14)	56° 54' 57.7112"	135° 24' 43.2315"	Islet	Y	N	Replace	Note: Charted drying rock 55m S surveyed as an islet, charted islet 45m WNW surveyed as -11 drying rock, many charted islets and drying rocks to W confirmed, islet 220m W.
305	V307	2	7	56° 54' 53"	135° 25' 3"	8.48	4.6	56° 54' 51.6326"	135° 25' 3.2898"	Rk	N	N	Replace	Note: Charted -5 drying rock 160m ESE confirmed, islet 215m N, 3.7 Rk 90m SW.
306	V308	1				13.82	7.5	56° 54' 51.4636"	135° 25' 17.833"	Rk	N	N	Insert	
307	V309	2	Drying Rk	56° 54' 58"	135° 25' 8"						Y	Y	N/A	Large area of white water observed in downward looking video.
308	V310	2	9	56° 54' 54"	135° 25' 50"	13.86	7.6	56° 54' 54.3545"	135° 25' 50.6222"	Rk	N	N	Replace	Note: 10.8 Rk 110m NNE, 10.1 Rk 410m W.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
309	V311	1				11.06	6.0	56° 54' 43.4189"	135° 25' 54.8539"	Rk	N	N	Insert	Note: 1.0 Rk 85m NE, 6.1 Rk 70m SE, 8.8 Rk 140m SSW.
310	V312	2	$4^1/_4$	56° 54' 33"	135° 25' 15"	5.57	3.0	56° 54' 32.3075"	135° 25' 16.4738"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 8.7 Rk 260m ESE, 5.9 Rk 80m SW. See Danger to Navigation Report. Item 53
311	V313	1				13.33	7.3	56° 54' 22.8598"	135° 25' 0.2761"	Rk	N	N	Insert	Note: 5.3 Rk 170m W, 9.4 Rk 160m S.
312	V314	1				-3.50	(3)	56° 54' 19.4735"	135° 24' 0.6908"	Islet	Y	N	Insert	Note: Many charted drying rocks in area confirmed, islet 30m NE, 3.9 Rk 215m NE.
313	V315	2	Rk	56° 54' 19"	135° 24' 6"						Y	Y	N/A	Large area of white water observed in downward looking video.
314	V316	1				5.43	2.9	56° 54' 27.4762"	135° 24' 21.6"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: Charted islet 150m E confirmed, many charted islets to N and NW confirmed, 4.6 Rk 110m SE, 5.4 Rk 110m SW.
315	V317	1				15.43	8.4	56° 54' 24.6533"	135° 24' 39.0177"	Rk	N	N	Insert	Note: 7.7 Rk 135m NE.
316	V318	2	$6^1/_2$	56° 54' 33"	135° 24' 42"	9.80	5.3	56° 54' 34.5752"	135° 24' 46.1514"	Rk	N	N	Replace	Note: Charted -1 drying rock 180m NE confirmed, 4.4 Rk 180m N, 4.8 Rk 120m N.
317	V319	1				9.36	5.1	56° 54' 39.3087"	135° 24' 58.653"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 5.8 Rk 125m ESE, 8.0 Rk 95m NW.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
318	V320	2	$6^1/_2$	56° 54' 48"	135° 24' 43"	7.55	4.1	56° 54' 47.4934"	135° 24' 41.844"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 3.7 Rk 130m SE, 5.4 Rk 130m W. See Danger to Navigation Report. Item 54
319	V321	1				4.04	2.2	56° 54' 50.6322"	135° 24' 42.8927"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -9 drying rock 95m ENE, 2.7 Rk 50m WNW.
320	V322	2	Drying Rk	56° 54' 54"	135° 24' 40"	1.51	0.8	56° 54' 54.0586"	135° 24' 38.9571"	Rk	Y	Y	N/A	Area of white water observed in downward looking video. Note: Many charted islets NE and E confirmed, islet 130m ENE, -10 drying rock 85m SE.
321	V323	2	Drying Rk	56° 54' 55"	135° 24' 38"			0° 0' 0"	0° 0' 0"		Y	Y	N/A	Not detected by lidar, area of white water observed in downward looking video.
322	V324	2	Islet	56° 54' 54"	135° 24' 18"	-3.30	-11	56° 54' 53.7232"	135° 24' 17.4258"	Drying Rk	Y	N	Replace	Note: Many charted islets and drying rocks W and SW confirmed, charted islet 190m ESE confirmed.
323	V325	2	Drying Rk	56° 54' 52"	135° 24' 13"						Y	Y	N/A	Not detected by lidar, possible object observed in downward looking video.
324	V326	1				-1.91	-6	56° 54' 42.3942"	135° 24' 14.3275"	Drying Rk	Y	N	Insert	Note: Charted islets and drying rocks in area confirmed.

			CHARTED			SURVEYED								
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325	V327	1				-0.02	-0	56° 54' 31.6343"	135° 23' 50.3985"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 2 charted islets to SW confirmed, charted drying rock 120m SW surveyed as drying shelf, -1 drying rock 35m SE, 2.2 Rk 110m S.
326	V328	2	Drying Rk	56° 54' 33"	135° 23' 57"	1.62	0.9	56° 54' 32.1639"	135° 23' 54.9832"	Rk	N	N	Replace	Not detected by lidar, observed in downward looking video.
327	V329	2	$5^1/_2$	56° 54' 25"	135° 23' 40"	7.80	4.2	56° 54' 25.5356"	135° 23' 36.3737"	Rk	N	N	Replace	Note: 9.6 Rk 255m S. See Danger to Navigation Report. Item 55
328	V330	1				11.30	6.2	56° 54' 28.5435"	135° 23' 30.5779"	Rk	N	N	Insert	Note: 6.5 Rk 130m NW, 9.3 Rk 100m E.
329	V331	2	$2^3/_4$	56° 54' 43"	135° 23' 57"	2.54	1.4	56° 54' 44.8764"	135° 23' 57.3192"	Rk	N	Y	N/A	Possible small object on seabed. Note: Charted islet 90m N confirmed, charted -2 drying rock 145m SSE confirmed.
330	V332	2	Rk	56° 54' 48"	135° 23' 54"	-0.60	-2	56° 54' 47.688"	135° 23' 53.8506"	Drying Rk	N	N	Replace	Possible Rk in kelp.Note: 2 charted islets 100m ENE confirmed, -6 drying rock 140m E confirmed, cov 1 ft drying rock 45 m E, -0 drying rock 45 m N.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
331	V333	2	Beacon	56° 54' 49"	135° 23' 40"	-1.63	-6	56° 54' 49.2542"	135° 23' 39.6523"	Drying Rk	N	Y	N/A	Single drying return from feature - difficult to discern if hit on beacon or drying rock visible in downward looking video. Note: Charted cov 1 ft drying rock 50m W confirmed.
332	V334	2	2	56° 54' 53"	135° 23' 41"	2.03	1.1	56° 54' 54.8299"	135° 23' 40.0397"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 1.5 Rk 50m S, 7.3 Rk 135m WNW. See Danger to Navigation Report. Item 56
333	V335	2	$2^1/_4$	56° 54' 55"	135° 24' 0"	0.99	0.5	56° 54' 54.1398"	135° 24' 0.5516"	Slope	N	N	Remove	
334	V336	2	Drying Rk	56° 55' 0"	135° 23' 60"	1.04	0.5	56° 55' 0.6959"	135° 24' 1.0759"	Rk	N	N	Replace	Note: Charted islet 120m SW confirmed, 1.8 Rk 135m NW.
335	V337	1				0.65	cov 2 ft	56° 55' 8.2178"	135° 24' 10.8838"	Drying Rk	N	N	Insert	Note: Islet 100m W, -11 drying rock 180m NW, 2.4 Rk 120m N. See Danger to Navigation Report. Item 57
336	V338	1				-3.16	-11	56° 55' 17.9101"	135° 24' 14.3252"	Drying Rk	N	N	Insert	Note: Many charted islets 150m SW confirmed, -5 charted drying rock 70m S confirmed.
337	V339	2	Islet	56° 55' 19"	135° 24' 25"	-2.71	-9	56° 55' 19.2993"	135° 24' 25.0693"	Drying Rk	N	N	Replace	Note: 2 charted islets to W confirmed, charted islet 25m N surveyed as -11 drying rock, -10 drying rock 100m SW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
338	V340	1				0.95	0.5	56° 55' 22.0581"	135° 24' 32.7808"	Rk	N	N	Insert	Note: Many charted drying rocks to SW and W confirmed, charted drying rock 155m SSW surveyed as drying shelf, cov 1 ft drying rock 175m W.
339	V342	1				-1.43	-5	56° 55' 6.1404"	135° 24' 45.0037"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted islet 115m NW confirmed, 2 charted drying rocks to E confirmed, -6 drying rock 220m NNE, -6 drying rock 130m E.
340	V343	1				0.63	cov 2 ft	56° 55' 9.1732"	135° 24' 42.3346"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: cov 2 ft drying rock 50m S.
341	V344	1				13.66	7.4	56° 55' 18.6795"	135° 25' 12.0934"	Rk	N	N	Insert	Note: Charted -7 drying rock 200m E confirmed, 3.9 Rk 50m NE.
342	V345	2	$3^1/_4$	56° 55' 36"	135° 25' 9"	3.08	1.7	56° 55' 34.4896"	135° 25' 11.2724"	Rk	Y	Y	N/A	Possible Rk in kelp Note: Many charted islets and drying rocks in area confirmed, -8 drying rock 205m S, 4.0 Rk 110m W, 8.8 Rk 230m SW.
343	V346	2	Drying Rk	56° 55' 39"	135° 24' 54"						Y	Y	N/A	Not detected by lidar, possible object observed in downward looking video.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
344	V347	1				0.83	cov 2 ft	56° 55' 43.1514"	135° 25' 1.2284"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: Many charted drying rocks in area confirmed, 11.4 Rk 200m NW.See Danger to Navigation Report. Item 58
345	V348	2	$2^{3}/_{4}$	56° 55' 49"	135° 24' 58"	1.94	1.0	56° 55' 51.4755"	135° 25' 0.0489"	Rk	Y	Y	N/A	Possible rock in kelp Note: 1.6 Rk 55m S, 2.5 Rk 110m S, 6.2 Rk 130m N. See Danger to Navigation Report. Item 59
346	V349	2	$5^{1}/_{2}$	56° 55' 54"	135° 24' 46"	8.28	4.5	56° 55' 53.2266"	135° 24' 43.9375"	Rk	N	N	Replace	Note: 4.5 Rk 110m WNW, 7.7 Rk 160m NW, 7.7 Rk 95m N. See Danger to Navigation Report. Item 60
347	V350	2	16	56° 55' 56"	135° 24' 40"	16.05	8.8	56° 55' 53.734"	135° 24' 37.5848"	Slope	N	N	Remove	
348	V351	1				2.94	1.6	56° 55' 45.5873"	135° 24' 46.2046"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 2 charted islets 155m E confirmed, charted -5 drying rock 140m SE confirmed, charted -4 drying rock 240m SE confirmed, islet 130m ESE, 4.3 Rk 105m NW, 4.5 Rk 75m NE.
349	V352	2	Islet	56° 55' 32"	135° 24' 28"	-1.82	-6	56° 55' 32.9087"	135° 24' 29.751"	Drying Rk	N	N	Replace	Note: Many charted islets and drying rocks confirmed in area, charted drying rock 25m NW surveyed as drying shelf, -6 drying rock 160m ENE, 1.4 Rk 150m N.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
350	V353	1				6.91	3.8	56° 55' 46.3958"	135° 24' 26.9981"	Rk	N	N	Insert	Note: 3.9 Rk 60m E, 3.7 Rk 170m SSE, 1.7 Rk 100m S.
351	V354	2	$5^1/_2$	56° 55' 50"	135° 24' 24"	7.36	4.0	56° 55' 50.1878"	135° 24' 22.9705"	Rk	N	N	Replace	Note: 7.7 Rk 80m WNW. See Danger to Navigation Report. Item 61
352	V355	1				11.25	6.1	56° 55' 48.2653"	135° 24' 13.4276"	Rk	N	N	Insert	Note: 4.9 Rk 80m SE.
353	V356	1				-1.54	-5	56° 55' 39.9661"	135° 24' 8.1251"	Drying Rk	N	N	Insert	Note: -8 drying rock 130m ESE, 3.5 Rk 95m N.
354	V357	1				-1.95	-7	56° 55' 34.7526"	135° 23' 56.0804"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.
355	V358	2	14	56° 55' 50"	135° 24' 7"	20.66	11.3	56° 55' 52.0155"	135° 24' 5.7993"	Rk	N	N	Replace	Note: 11.2 Rk 100m WNW.
356	V359	2	15	56° 55' 55"	135° 24' 22"	21.76	11.9	56° 55' 56.4835"	135° 24' 28.5622"	Rk	N	N	Replace	
357	V360	2	Drying Rk	56° 55' 28"	135° 23' 52"	0.98	0.5	56° 55' 28.1733"	135° 23' 51.5665"	Rk	N	N	Replace	Note: 4.3 Rk 75m NE, 1.5 Rk 60m SE, 3.9 Rk 130m SE, 3.0 Rk 220m SE.
358	V361	1				9.24	5.0	56° 55' 14.8091"	135° 23' 52.2766"	Rk	N	N	Insert	Note: 3.8 Rk 130m NW.
359	V362	2	$6^1/_2$	56° 55' 14"	135° 23' 38"	9.89	5.4	56° 55' 13.6535"	135° 23' 36.5352"	Rk	N	N	Replace	Note: 7.8 Rk 155m NW, 5.3 Rk 120m E, 3.1 Rk 190m ESE..
360	V363	2	7	56° 55' 9"	135° 23' 35"	10.46	5.7	56° 55' 8.9075"	135° 23' 35.5665"	Rk	N	N	Replace	Note: Charted islet and drying rocks to E confirmed, 11.4 Rk 245m WSW.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
361	V364	2	$1^3/_4$	56° 55' 4"	135° 23' 13"	0.42	cov 1 ft	56° 55' 4.9547"	135° 23' 14.5082"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: -7 drying rock 140m NW, -0 drying rock 30m NNW, cov 1 ft drying rock 70m SE. See Danger to Navigation Report. Item 62
362	V365	1				6.92	3.8	56° 55' 1.6868"	135° 23' 21.445"	Rk	N	N	Insert	
363	V366	1				8.55	4.7	56° 55' 5.1366"	135° 23' 8.9639"	Rk	N	N	Insert	
364	V367	1				6.85	3.7	56° 55' 1.6779"	135° 23' 3.7687"	Rk	N	N	Insert	See Danger to Navigation Report. Item 63
365	V368	2	Islet	56° 54' 59"	135° 23' 9"	-3.15	-11	56° 54' 58.9422"	135° 23' 8.2326"	Drying Rk	N	N	Replace	Note: Charted -7 drying rock 35m S confirmed, charted drying rock 55m N surveyed as drying shelf, islet 80m NW, -1 drying rock 80m S.
366	V369	2	9	56° 55' 5"	135° 22' 41"	14.54	7.9	56° 55' 4.8206"	135° 22' 39.8468"	Rk	N	N	Replace	
367	V370	1				-4.29	(5)	56° 54' 50.3113"	135° 22' 43.0913"	Islet	N	N	Insert	Note: Charted islets and drying rock in area confirmed, charted 0.8 Rk 170m SW confirmed, islet 25m N, -0 drying rock 130m SW.
368	V371	2	Rk	56° 54' 48"	135° 22' 44"	0.50	cov 1 ft	56° 54' 48.3549"	135° 22' 44.842"	Drying Rk	N	N	Replace	Note: Charted islet 140m SW surveyed as coastline, 1.5 Rk 290m SW.
369	V372	1				-8.52	(19)	56° 54' 19.5074"	135° 22' 39.4316"	Islet	N	N	Insert	Note: Charted islet 90m N confirmed, Islet 260m E.
370	V373	2	18	56° 54' 22"	135° 23' 18"	19.49	10.6	56° 54' 25.157"	135° 23' 16.3569"	Rk	N	N	Replace	Note: 7.5 Rk 120m E, 10.8 Rk 260m

			CHARTED			SURVEYED								
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														ENE.
371	V374	1				8.81	4.8	56° 54' 8.7171"	135° 22' 51.1596"	Rk	N	N	Insert	Note: 5.8 Rk 65m NW.
372	V375	1				0.68	cov 2 ft	56° 54' 5.1589"	135° 22' 36.2552"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 10.5 Rk 110m SE.
373	V376	2	Islet	56° 54' 4"	135° 22' 14"	-2.36	-8	56° 54' 4.1359"	135° 22' 14.6216"	Drying Rk	N	N	Replace	Note: 2 charted islets to E confirmed, -6 drying rock 40m N, -3 drying rock 150m ENE, 4.0 Rk 60m W, 3.4 Rk 170m WNW.
374	V377	2	$7^1/_2$	56° 54' 10"	135° 22' 3"	6.77	3.7	56° 54' 8.9357"	135° 22' 5.9017"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: 5.9 Rk 110m ENE.
375	V378	2	Islet	56° 54' 15"	135° 22' 1"	-0.73	-3	56° 54' 15.2828"	135° 22' 1.817"	Drying Rk	N	N	Replace	Note: Many charted islets and drying rocks in area confirmed.
376	V379	2	Islet	56° 54' 21"	135° 21' 58"	-2.61	-9	56° 54' 21.1778"	135° 21' 58.206"	Drying Rk	N	N	Replace	Note: Charted islet 120m SW confirmed, charted -3 drying rock 60m S confirmed, -1 drying rock 35m NW.
377	V380	1				3.47	1.9	56° 54' 8.0018"	135° 21' 43.6665"	Rk	N	N	Insert	Note: 3 charted islets to S surveyed as drying rocks.
378	V381	2	3	56° 54' 4"	135° 21' 53"	-2.00	-7	56° 54' 4.1077"	135° 21' 51.8979"	Drying Rk	N	N	Replace	
379	V382	2	Islet	56° 53' 36"	135° 21' 35"						Y	N	Remove	Not detected by lidar, not observed in downward looking video.
380	V383	2	Drying Rk	56° 53' 38"	135° 21' 44"	0.98	0.5	56° 53' 38.0742"	135° 21' 43.9516"	Rk	Y	Y	N/A	Note: Charted islet 30m NE confirmed, charted -6 drying rock 145m ESE confirmed.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
381	V384	1				8.74	4.8	56° 54' 49.773"	135° 19' 54.9772"	Rk	N	N	Insert	
382	V385	1				11.39	6.2	56° 56' 4.2932"	135° 21' 57.4665"	Rk	N	N	Insert	Note: 6.9 Rk 115m WSW.
383	V386	1				4.21	2.3	56° 55' 47.2095"	135° 21' 44.7351"	Rk	N	N	Insert	Note: 2.0 Rk 55m NNW.
384	V387	2	Drying Rk	56° 56' 29"	135° 23' 48"	1.70	0.9	56° 56' 29.0161"	135° 23' 50.2654"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted islet 75m E confirmed, -10 drying rock 90m ENE.
385	V388	1				5.93	3.2	56° 56' 29.116"	135° 23' 8.3444"	Rk	N	N	Insert	Note: 5 islets to NNE.
386	V389	1				5.65	3.1	56° 56' 40.6536"	135° 23' 48.6636"	Rk	Y	Y	N/A	Possible Rk in kelp.Note: 3.3 Rk 90m SW.
387	V390	1				12.34	6.7	56° 56' 50.2049"	135° 25' 48.0767"	Rk	Y	Y	N/A	Possible Rk in kelp. See Danger to Navigation Report. Item 64
388	V391	2	9	56° 56' 48"	135° 26' 2"	15.05	8.2	56° 56' 47.8301"	135° 26' 4.3258"	Rk	N	N	Replace	
389	V392	1				-0.76	-3	56° 56' 37.5721"	135° 25' 21.3367"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted -2 drying rock 60m SSW, charted -5 drying rock 105m E confirmed, many drying rocks to W and E.
390	V393	2	6	56° 56' 26"	135° 24' 38"	2.99	1.6	56° 56' 26.2986"	135° 24' 41.0377"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: -3 drying rock 85m WNW. See Danger to Navigation Report. Item 65
391	V394	1				-1.51	-5	56° 56' 20.2039"	135° 24' 32.991"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted -5 drying rock 35m S.

Shoal Categories
1-New Shoal Found
2-Charted Shoal Disproved / Not Found

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
392	V395	1				2.66	1.4	56° 55' 57.0665"	135° 23' 31.0974"	Rk	N	N	Insert	Note: Charted cov 1 ft drying rock 95m SE confirmed, 0.2 Rk 70m W.
393	V396	1				7.72	4.2	56° 56' 1.2074"	135° 23' 16.3679"	Rk	N	N	Insert	
394	V397	1				-0.24	-1	56° 55' 43.3803"	135° 22' 57.9314"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: 1.6 Rk 70m SSE.
395	V398	1				4.25	2.3	56° 56' 11.3759"	135° 25' 3.313"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: 6.9 Rk 95m SE.
396	V399	1				-0.79	-3	56° 56' 12.0183"	135° 25' 32.0877"	Drying Rk	Y	N	Insert	Note: Charted -0 drying rock 130m ENE confirmed, charted 0.7 Rk 45m ESE confirmed, islet 25m NNW.
397	V400	1				0.18	-0	56° 56' 21.2443"	135° 25' 10.8901"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted -9 drying rock 55m S confirmed, charted -5 drying rock 125m WNW confirmed, cov 2 ft drying rock 130m W.
398	V401	1				13.71	7.5	56° 56' 44.9271"	135° 26' 50.0672"	Rk	N	N	Insert	Note: 4.9 Rk 90m SSW, 5.3 Rk 85m SE.
399	V402	1				9.90	5.4	56° 56' 0.5726"	135° 25' 37.1933"	Rk	N	N	Insert	
400	V403	1				10.34	5.6	56° 55' 59.3252"	135° 24' 57.1676"	Rk	Y	Y	N/A	Possible Rk in kelp.
401	V404	2	$4^1/_4$	56° 56' 01"	135° 25' 17"	6.36	3.5	56° 56' 0.719"	135° 25' 17.1132"	Rk	Y	Y	N/A	Note: 2.9 Rk 100m E.
402	V405	2	Drying Rk	56° 55' 55"	135° 25' 51"						Y	Y	N/A	Possible drying rock observed in downward looking video not detected by lidar.

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
403	V406	1				-0.10	-1	56° 55' 53.8402"	135° 25' 47.6745"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted cov 1 ft drying rock 175m SW confirmed, -1 dring rock 30m SSW, 8.1 Rk 75m ESE.
404	V407	1				12.16	6.6	56° 55' 34.5759"	135° 25' 59.4747"	Rk	N	N	Insert	Note: 4.8 Rk 65m NW, 5.9 Rk 105m S.
405	V408	1				13.72	7.5	56° 55' 24.249"	135° 25' 55.8862"	Rk	N	N	Insert	Note: 6.2 Rk 75m SE, 6.7 Rk 130m ESE, 6.7 Rk 65m E.
406	V409	1				0.59	-2	56° 54' 58.4464"	135° 25' 17.4049"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp.Note: 2 charted islets to E confirmed, charted -7 drying rock 85m SE confirmed.
407	V410	2	5	56° 54' 54"	135° 24' 50"	4.97	2.7	56° 54' 52.3205"	135° 24' 48.924"	Rk	Y	Y	N/A	Possible Rk in kelp.
408	V411	1				6.52	3.5	56° 54' 43.1874"	135° 24' 57.9426"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -9 drying rock 90m N, 4.5 Rk 115m E.
409	V412	1				-0.78	-3	56° 54' 54.0161"	135° 25' 14.2393"	Drying Rk	Y	Y	N/A	Possible drying rock in kelp. Note: Charted islet 50m NE confirmed, cov 2 ft drying rock 35m E.
410	V413	2	11	56° 54' 51"	135° 25' 28"	17.22	9.4	56° 54' 51.9138"	135° 25' 29.8882"	Rk	N	N	Replace	
411	V414	1				17.63	9.6	56° 54' 40.9467"	135° 26' 2.1784"	Rk	N	N	Insert	
412	V415	1				15.81	8.6	56° 54' 49.9434"	135° 25' 57.6423"	Rk	N	N	Insert	
413	V416	2	17	56° 54' 34"	135° 25' 25"	16.79	9.2	56° 54' 32.2644"	135° 25' 23.3961"	Rk	N	N	Replace	
414	V417	2	15	56° 54' 42"	135° 25' 12"	18.20	9.9	56° 54' 44.4419"	135° 25' 9.5777"	Rk	N	N	Replace	

			CHARTED			SURVEYED								
Sequence No	**Shoal No**	**Category**	**Charted Depth** (fms)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Surveyed Depth** (meters)	**Surveyed Depth** (decimal fms / whole feet / (feet) above MHW)	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Type of Feature**	**Kelp Area**	**Further Examination Recommended**	**Charting Recommendation**	**Remarks** **All items covered by 4x4m laser spot spacing at 200% lidar coverage.**
415	V418	2	$2^{1}/_{4}$	56° 54' 36"	135° 22' 14"	2.54	1.4	56° 54' 35.6783"	135° 22' 12.7548"	Rk	Y	Y	N/A	Possible Rk in kelp. Note: Charted -3 drying rock 45m SW confirmed, 4.3 Rk 70m SE.

D.1.5 Features Requiring Investigation

During the validation, checking and approving stages of the data processing a spreadsheet of the features was compiled. The list from this spreadsheet was then compared to the chart comparisons and DtoNs reported and their significance evaluated. Some 135 additional soundings were identified for further investigation and are presented in the following table. The full spreadsheet is also provided in Excel format with the digital data (H11429_V1_Features_Inv.xls). Where these areas correlate with a feature listed in the Chart Comparison Spreadsheet, a reference has been made to the shoal number. The kelp areas are described under five general sections:

1. Kelp area observed in video, no detection by system – deep water.
2. Kelp area observed in video, no detection by system within data coverage.
3. Kelp area, some detections, least depth found.
4. Kelp area, some detections, least depth NOT found.
5. No evidence of kelp but poor coverage – least depth NOT found.

All reported features are considered significant for further investigation during boat work and are reported as possible hazards when conducting survey work by boat.

Sequence No.	**Feature No.**	**Kelp Decsription Category**	**NAD 83 Latitude N** (DMS)	**NAD 83 Longitude W** (DMS)	**Dimension (m)**	**Significance and Chart Comparison Relationship**
1	FV1	4	56° 54' 40.67"	135° 22' 55.98"	35x25	150m SSW of Round I.
2	FV2	4	56° 55' 43.02"	135° 24' 08.78"	25x35	80m off NE edge of Taigud Is., 100m N of drying rock.
3	FV3	4	56° 56' 42.15"	135° 25' 05.81"	90x80	800m NE of Glagohm I., 100m NE of islets and drying rocks.
4	FV4	4	56° 56' 46.65"	135° 25' 13.38"	60x80	950m NE of Glagohm I., 250m NE of islets and drying rocks
5	FV5	4	56° 56' 39.50"	135° 25' 05.78"	50x50	800m NE of Glagohm I., 100m NE of islets and drying rocks.
6	FV6	4	56° 55' 59.04"	135° 24' 04.93"	15x25	80m W off NW tip of Ulinoi I., 75m SE of drying rock.
7	FV7	4	56° 56' 22.08"	135° 24' 50.2"	25x35	350m NW of Kamennoi I., 50m SW of drying rocks.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
8	FV8	4	56° 56' 16.13"	135° 24' 50.61"	30x25	50m W of Sosnovoi I.
9	FV9	4	56° 56' 33.73"	135° 24' 00.33"	30x30	700m NE of Kemennoi I., 100m W if drying rocks, 30m NE of drying rock.
10	FV10	4	56° 56' 51.31"	135° 24' 14.43"	40x40	560m S of Povorotni Pt, 110m E of drying rock. At N extent smooth sheet
11	FV11	4	56° 53' 39.91"	135° 27' 23.47"	30x40	550m NW of Peisar I., 40m E of islet See V40
12	FV12	4	56° 55' 42.74"	135° 26' 12.22"	20x30	920m S of Kita I, 210m S of islets and drying rocks.
13	FV13	4	56° 52' 52.85"	135° 26' 20.46"	100x125	120m SW of Peisar I.
14	FV14	4	56° 56' 25.64"	135° 25' 19.94"	50x35	280m NE of Glagohm I., 130m NE of islets and 100m N of drying rock.
15	FV15	4	56° 53' 28.20"	135° 25' 51.80"	200x50	300m E of Peisar I.
16	FV16	4	56° 55' 09.29"	135° 24' 56.85"	50x45	350m W of centrepoint of Taigud Is.group, 100m WNW of islet.
17	FV17	4	56° 52' 56.12"	135° 26' 29.30"	15x15	100m SW of Peisar I.
18	FV18	4	56° 54' 02.52"	135° 22' 18.89"	15x15	150m S of Ilput I., 70m SW of drying rock.
19	FV19	4	56° 54' 08.90"	135° 22' 06.12"	35x35	In channel between Ilput I. and Sosnovoi I. In vicinity of V377
20	FV20	4	56° 56' 09.03"	135° 24' 46.98"	50x40	300m WSW of Kamennol I., 140m S of islets and drying rocks.n vicinity of V238
21	FV21	4	56° 54' 50.65"	135° 24' 42.92"	15x15	300m NNW off NW tip of southern most island in Taigud Is., 80m W of islets and drying rocks. See V321

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
22	FV22	4	56° 54' 53.92"	135° 24' 39.35"	50x40	380m N of NW tip of southern most island in Taigud Is., within 80m of islets and drying rocks. See V322
23	FV23	4	56° 56' 46.48"	135° 25' 05.56"	25x45	950m NE of Glagohm I., 250m NE of islets and drying rocks. Close to N extent of smooth sheet
24	FV24	4	56° 56' 15.06"	135° 25' 00.48"	30x25	400m E of Glagohm I., within 100m of islets and drying rocks.
25	FV25	4	56° 55' 48.45"	135° 24' 58.41"	60x80	160m NW off NW tip of Taigud Is., 150m N of islets and drying rocks.
26	FV26	4	56° 56' 33.38"	135° 24' 17.72"	20x20	580m NNE of Kamennoi I., 120m S of drying rocks. Note: V196 20m S.
27	FV27	4	56° 56' 35.85"	135° 24' 12.9"	15x15	670m NNE of Kamennoi I., 100m SE of drying rocks.
28	FV28	4	56° 53' 19.67"	135° 24' 12.44"	25x30	Frosty Reef See V88
29	FV29	4	56° 54' 53.3"	135° 23' 40.45"	10x10	620m NE off NE tip of southern most island in Taigud Is., 130m N of Daybeacon.
30	FV30	4	56° 52' 30.37"	135° 23' 24.77"	20x15	300m S of islet at southern extent of smooth sheet In vicinity of V69
31	FV31	4	56° 54' 10.47"	135° 22' 00.41"	15x 15	90m W of Sosnovoi Island.
32	FV32	4	56° 56' 36.98"	135° 26' 38.47"	20x20	500m NW of Kita I., 280m NW of islet.
33	FV33	4	56° 56' 02.18"	135° 26' 29.19"	20x20	380m SSW off SW corner of Kita I., within 150m of islets and drying rocks. In vicinity of large kelp areas. Note: V260 50m SE

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
34	FV34	4	56° 55' 58.85"	135° 26' 18.62"	40x30	445m S of Kita I., within 120m of islets and drying rocks. In vicinity of V283
35	FV35	4	56° 55' 58.68"	135° 26' 21.34"	20x20	445m S of Kita I., within 150m of islets and drying rocks. Note: V283 50m E
36	FV36	4	56° 53' 28.95"	135° 25' 58.72"	10x10	250m E of Peisar I. Note large kelp area W. In vicinity of V24
37	FV37	4	56° 53' 11.80"	135° 25' 51.61"	10x10	200m E of Peisar I. In vicinity of V14
38	FV38	4	56° 53' 00.68"	135° 25' 51.78"	10x10	120m E of Peisar I.
39	FV39	4	56° 53' 29.53"	135° 25' 51.64"	20x50	350m E of Peisar I.
40	FV40	4	56° 53' 49.23"	135° 25' 51.16"	40x30	500m NE of Peisar I.
41	FV41	4	56° 53' 28.27"	135° 25' 45.06"	20x20	415m NE of Kita I., 115m NE of islet.
42	FV42	4	56° 56' 18.05"	135° 25' 44.53"	10x10	160m NW of Glagohm I., 230m S of islets and drying rocks. Note: 90 N of V264
43	FV43	4	56° 56' 07.02"	135° 25' 43.87"	20x20	280m SW of Glagohm I. In vicinity of V265
44	FV44	4	56° 56' 19.28"	135° 25' 43.77"	20x20	160m NW of Glagohm I., 200m S of islets and drying rocks.
45	FV45	4	56° 56' 30.87"	135° 25' 40.95"	15x15	400m NNW of Glagohm I., 150m N of islets.
46	FV46	4	56° 56' 32.07"	135° 25' 40.31"	20x20	430m NNW of Glagohm I., 170m N of islets.
47	FV47	4	56° 56' 07.19"	135° 25' 33.22"	20x20	180m S of Glagohm I. In vicinity of V266
48	FV48	5	56° 53' 16.76"	135° 25' 39.97"	10x10	380m E of Peisar I., 150m E of islets and drying rocks.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
49	FV49	4	56° 53' 16.13"	135° 25' 34.53"	20x30	470m E of Peisar I., 250m E of islet. See V13
50	FV50	4	56° 56' 31.02"	135° 25' 26.16"	20x20	400m N of Glagohm I., 150m SW of islets and drying rocks.
51	FV51	4	56° 56' 33.78"	135° 25' 21.87"	20x20	500m NNE of Glagohm I., 80m W of islets and drying rocks.
52	FV52	4	56° 56' 44.91"	135° 25' 29.04"	30x30	750m N of Glagohm I., 80m NE of islets and drying rocks. See V206
53	FV53	4	56° 55' 13.44"	135° 25' 13.75"	10x10	350m NNW off W tip of Taigud Is., 80 N of many islets and drying rocks. In vicinity of V303
54	FV54	4	56° 55' 19.86"	135° 25' 10.15"	10x10	560m N off W tip of Taigud Is.
55	FV55	4	56° 55' 33.65"	135° 25' 13.62"	20x20	140m off NW edge of Taigud Is., 200m N of islet. Note: V345 50m NE
56	FV56	4	56° 55' 29.92"	135° 25' 14.55"	15x15	400m NE of Glagohm I., 70m SW of islets and drying rocks.
57	FV57	4	56° 54' 51.98"	135° 25' 08.48"	10x10	400m SSE off W tip of Taigud Is., 90m SE of islet and drying rocks.
58	FV58	4	56° 54' 50.08"	135° 25' 08.16"	40x30	480m SSE off W tip of Taigud Is., 140m SE of islet and drying rocks.
59	FV59	4	56° 55' 58.99"	135° 25' 08.76"	20x20	540m SE of Glagohm I., amoungst many rocks.
60	FV60	4	56° 56' 44.14"	135° 25' 00.21"	20x20	800m NE of Glagohm I., 250m NE of islets and drying rocks.
61	FV61	4	56° 56' 37.89"	135° 25' 02.51"	20x20	750m NE of Glagohm I., 80m NE of islets and drying rocks
62	FV62	4	56° 56' 08.91"	135° 25' 03.60"	10x10	400m ESE of Glagohm I., 100m S of Islet and drying rocks.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
63	FV63	4	56° 55' 51.26"	135° 25' 00.39"	20x20	250m NW off NW tip of Taigud Is., 240m N of islet and drying rocks. In vicinity of V348
64	FV64	4	56° 55' 47.16"	135° 24' 58.63"	20x20	130m WNW off NW tip of Taigud Is., 110m N of islet and drying rocks.
65	FV65	4	56° 56' 45.63"	135° 24' 48.63"	60x60	1100m NE of Glagohm I., 350m NE of islets and drying rocks. Close to N extent of smooth sheet See V201
66	FV66	4	56° 55' 54.72"	135° 24' 49.90"	10x10	300m N off NW tip of Taigud Is., 310m NW of islet.
67	FV67	4	56° 54' 43.21"	135° 24' 51.18"	10x30	230m WNW off NW tip of southern most island in Taigud Is., 150 SE of drying rock.
68	FV68	4	56° 54' 40.40"	135° 24' 51.62"	20x20	230m W off NW tip of southern most island in Taigud Is., 210 SE of drying rock.
69	FV69	4	56° 54' 39.95"	135° 24' 48.48"	20x20	180m W off NW tip of southern most island in Taigud Is., 250 SE of drying rock.
70	FV70	4	56° 54' 31.76"	135° 24' 46.52"	20x20	550m NW of Kamennoi I., 100m NE of drying rocks
71	FV71	4	56° 55' 53.48"	135° 24' 43.73"	20x20	290m NNE off NW tip of Taigud Is., 230m NNW of islet.In vicinity of V349
72	FV72	4	56° 54' 51.64"	135° 24' 45.06"	20x20	340m NNW off NW tip of southern most island in Taigud Is., 125m W of islets and drying rocks.
73	FV73	4	56° 56' 44.79"	135° 24' 30.33"	10x10	850m SW of Povorotni Pt, 230m N of islet.
74	FV74	4	56° 54' 44.87"	135° 24' 29.62"	10x10	180m NE of NW tip of southern most island in Taigud Is., 140m N of islet.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
75	FV75	4	56° 56' 27.57"	135° 24' 25.00"	15x15	365m N of Kamennoi I., 240m SSE of islets and drying rocks. Note: V181 50m ENE
76	FV76	4	56° 56' 28.16"	135° 24' 21.45"	20x20	400m NNE of kamennoi I., 240m SSE if islets and drying rocks. See V181
77	FV77	4	56° 56' 40.49"	135° 23' 59.46"	10x10	350m SW of Povorotni Pt.
78	FV78		56° 53' 01.79"	135° 23' 40.58"	10x10	Frosty Reef, 100m W of islets and drying rocks In vicinity of V77
79	FV79	4	56° 56' 05.91"	135° 23' 30.04"	10x10	360m N of Korga I.
80	FV80	4	56° 56' 04.47"	135° 23' 26.24"	20x20	330m N of Korga I.
81	FV81	4	56° 52' 41.14"	135° 26' 19.91"	20x20	250m SW of S tip of Peisar I., 70m S of islet See V60
82	FV82	4	56° 56' 18.11"	135° 24' 08.45"	20x20	345m ENE of Kamennoi I., 320m SE of islet. See V179
83	FV83	4	56° 53' 17.33"	135° 25' 33.65"	30x20	500m E of Peisar I., 250m E of islet.
84	FV84	4	56° 53' 22.56"	135° 24' 08.57"	60x135	Frosty Reef
85	FV85	4	56° 55' 59.31"	135° 23' 42.57"	100x100	150m N off S tip of Ulinoi I., amoungst drying rocks. See V224
86	FV86	4	56° 53' 07.47"	135° 26' 47.57"	15x15	150m SW of Peisar I.
87	FV87	4	56° 53' 06.37"	135° 26' 46.91"	10x10	150m SW of Peisar I.
88	FV88	4	56° 52' 48.02"	135° 26' 22.94"	10x10	200m SW of S tip of Peisar I., In between islets. Note large kelp area SE.
89	FV89	4	56° 55' 51.98"	135° 26' 32.62"	10x10	690m SSW off SW corner of Kita I., within 150m of islet and drying rocks.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
90	FV90	4	56° 56' 42.67"	135° 24' 55.05"	30x30	950m NE of Glagohm I., 250m NE of islets and drying rocks. In vicinity of V203
91	FV91	5	56° 55' 47.96"	135° 25' 00.65"	30x30	165m NW off NW tip of Taigud Is., 140m N of islet and drying rocks.
92	FV92	4	56° 55' 43.33"	135° 25' 01.78"	30x30	190m WSW off NW tip of Taigud Is., within 60m of islet and drying rocks. In vicinity of V347
93	FV93	4	56° 56' 40.38"	135° 26' 36.68"	10x10	540m NW of Kita I., 340m NW of islet. See V250
94	FV94	2	56° 56' 26.04"	135° 25' 25.39"	40x40	250m N of Glagohm I., 50m NE of islet. In vicinity of V242
95	FV95	4	56° 56' 21.02"	135° 25' 18.53"	25x25	185m NE of Glagohm I., amoungst many islets and drying rocks.
96	FV96	4	56° 56' 21.39"	135° 25' 14.51"	25x25	220m NE of Glagohm I., amoungst many islets and drying rocks.
97	FV97	2	56° 55' 38.81"	135° 23' 59.74"	20x30	70m off NE edge of Taigud Is., 40m NE of drying rock.
98	FV98	4	56° 56' 13.93"	135° 24' 50.47"	60x50	280m W of Kamennol I., amoungst many drying rocks and rocks.
99	FV99	2	56° 54' 08.91"	135° 22' 01.4"	30x25	In channel between Ilput I. and Sosnovoi I.
100	FV100	4	56° 56' 42.71"	135° 24' 32.2"	15x15	850m N of Kamennoi I., 170m N of islet.
101	FV101	4	56° 53' 39.34"	135° 26' 33.71"	30x20	In bay N of Peisar I.
102	FV102	2	56° 56' 05.67"	135° 26' 28.70"	30x20	260m SSW off SW corner of Kita I., within 150m of Islets and drying rocks.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
103	FV103	2	56° 56' 12.02"	135° 26' 27.59"	30x20	115m off SW corner of Kita I., amoungst many islets and drying rocks. Note: V262 50m NW
104	FV104	4	56° 53' 04.08"	135° 23' 42.55"	50x30	Frosty Reef, 100m W of islets and drying rocks In vicinity of V78
105	FV105	4	56° 53' 08.90"	135° 25' 40.71"	15x15	300m E of Peisar I., 240m NE of drying rock. See V11
106	FV106	4	56°56'30.17"	135°26'13.44"	15x15	150m N of Kita I., amoungst many drying rocks.
107	FV107	4	56°55'54.35"	135°26'09.68"	30x30	550m S of Kita I., amoungst many islets and drying rocks.
108	FV108	4	56°56'19.65"	135°25'17.95"	20x20	135m NE of Glagohm I., amoungst many drying rocks.
109	FV109	4	56°56'23.01"	135°25'17.61"	30x30	235m NE of Glagohm I., amoungst many drying rocks.
110	FV110	4	56°55'26.38"	135°24'57.28"	20x20	80m N of a main island in Taigud Is., 30m N of islet.
111	FV111	4	56°56'09.31"	135°24'26.80"	20x20	90m SE of Kamennol I., 45m S of drying rock.
112	FV112	4	56°54'47.33"	135°24'08.59"	20x20	230m N off NE tip of southern most island in Taigud Is., 60m N of islets.
113	FV113	4	56°54'49.42"	135°24'00.25"	20x20	325m NNE off NE tip of southern most island in Taigud Is., amoungst many islets.
114	FV114	4	56°55'51.04"	135°23'53.04"	20x20	50m off the SW coast of Ulinoi I.See V237
115	FV115	4	56°56'36.68"	135°23'47.51"	10x10	900m SSE of Povorotni Pt., 50m NE of islets and drying rocks.

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
116	FV116	4	56°56'23.40"	135°23'47.24"	15x15	550m off the west coast of Baranof I., 50m W of islets and drying rocks. Note: V178 30m N.
117	FV117	4	56°56'21.30"	135°23'41.19"	20x20	550m off the west coast of Baranof I., Note islets and drying rocks N.
118	FV118	4	56°53'19.56"	135°23'39.32"	20x20	Frosty Reef, 50m E of islets and drying rocks.
119	FV119	4	56°56'32.51"	135°23'37.25"	10x10	250m SW of the west coast of Baranof., 120m E of islets and drying rocks.
120	FV120	4	56°52'44.57"	135°23'02.43"	20x20	100m offshore islet SE of Frosty Reef.
121	FV121	4	56°53'40.16"	135°23'02.64"	15x15	At S headland approachaing Kanga Bay, between islets.
122	FV122	4	56°55'43.41"	135°22'57.04"	15x15	200m SE of Korga I. See V397
123	FV123	4	56°53'40.70"	135°22'55.73"	40x40	900m SW of Kanga I., At the S headland of Kanga Bay In vicinity of V111
124	FV124	4	56°55'34.31"	135°24'57.11"	15x15	50m offshore from islets
125	FV125	4	56°56'12.08"	135°25'15.87"	40x40	170m ESE of Glagohm I., amoungst many islets and drying rocks.
126	FV126	4	56°56'31.19"	135°26'20.52"	50X50	180m N of Kita I., amoungst many drying rocks. Note: V248 50m E
127	FV127	4	56°56'27.26"	135°25'27.86"	15x15	275m N of Glagohm I., 70m N of islet.Note: 40m NW OF v242

Sequence No.	Feature No.	Kelp Decsription Category	NAD 83 Latitude N (DMS)	NAD 83 Longitude W (DMS)	Dimension (m)	Significance and Chart Comparison Relationship
128	FV128	4	56°56'25.85"	135°24'41.05"	15x15	350m NW of Kamennoi I., 50m NE of drying rocks. See V393
129	FV129	4	56°56'28.22"	135°23'42.82"	10x10	850m NE of Kamennoi I., 400m SW of west coast of Baranof I., 50m SE of islet.
130	FV130	4	56°56'36.86"	135°25'13.95"	50X50	550m N of Glagohm I., amoungst islets and drying rocks.
131	FV131	4	56°56'34.39"	135°24'27.12"	50X50	570m N of Kamennoi I., 50m E of drying rock.
132	FV132	4	56°56'31.58"	135°23'13.55"	10x10	80m off the west coast of Baranof I.
133	FV133	4	56°56'31.60"	135°23'04.09"	10x10	50m off the west coast of Baranof I.
134	FV134	5	56°56'14.13"	135°22'36.62"	N/A	800m W of Caution I., 150m SW of the west coast of Baranof I.
135	FV135	5	56°56'37.23"	135°26'33.96"	15x15	450m NW of Kita I., 230m NW of islet.

D.1.6 Aid To Navigation

During the survey one navigation aid was detected in the data for smooth sheet H11429. This has been identified as a day beacon from the chart. The position from the light list is:

Number	Name	Latitude N	Longitude W
24905	Koka Island Passage Daybeacon 1	56° 54’ 49”	135° 23’ 40”

It appears that the rocks to which the day beacon is highlighting detected on three lines and the beacon itself was not detected so it has not been depicted on the smooth sheet.

A table of the detected positions is provided below.

Nav Aid No.	**NAD 83 Latitude** (decimal degrees)	**NAD 83 Longitude** (decimal degrees)	**Eastings**	**Northings**	**Year**	**JD**	**Run No**	**Frame**	**Row**	**Column**	**Remarks**
NA1	56.91368333	-135.3943444	475989	6307847	2005	201	259.1.1	70	10	44	Rocks in Koka Island Passage.
NA2	56.9136935	-135.3943947	475986	6307848	2005	158	261.0.1	69	15	2	
NA3	56.91370264	-135.3943455	475989	6307849	2005	205	504.0.1	269	9	15	

D.1.7 Recommended Overlap With Lidar Data

The smooth sheet H11429 consists of a large number of islands, islets and many kelp covered submerged rocks close to the coast. Heavy kelp is present throughout the smooth sheet especially around Kita I., Taigud Is. and Kamennoi I. in the west of the smooth sheet. In general the 10 fathom isobath is defined throughout the majority of smooth sheet and data to 15 –18 fathoms exist in places. Along the west coast of Baranof Island the seabed is quite steep and in some place dtat to 5 fathoms was achieved. Heavy kelp and the undulating nature of seabed resulted in sparse data in a number of areas along the coast. The recommended overlap by surface vessel is described below. A polygon is also included in the MicroStation file to illustrate the following recommendation and should be consulted when reading the following notes. This polygon is provided as a .dgn file (H11429_v1_Overlap.pzip) and is provided with the digital data in MicroStation version 7 format.

Note: all positions quoted are in NAD 83.

The recommended overlap by surface vessels for smooth sheet H11429 is to seaward of the poly-lines /polygons described as follows:

a. Poly-line H11429_1

This poly-line covers an area surrounding Kita, Kamennoi, Korga Islands and then follows a portion of the west coast of Baranof Island including Redoubt and Kanga Bays. The recommended overlap is depicted by the poly-line. In general there is good data to 10 fathoms was achieved surrounding Kita, Kamenoi, Korga Islands however, heavy kelp exists around these islands, and islets. Along the northwest coast of Baranof Island, limited data was acquired around Redoubt and Kanga Bays. This was a result of the depth and steep dropoff of the bays. Trees overhanging the coastline in these areas resulted in limited capture of the mean high water line. In addition, local areas of sparse coverage exist as follows:

- Within 3fm curve around islet and drying rocks at 56°56.65' N, 135°24.3'' W
- Kelp area at 56°56.75' N, 135°24.5'' W
- Kelp area at 56°56.7' N, 135°24.7'' W
- Around 1.6 Rk and kelp at 56°56.8' N, 135°24.8'' W
- Within 2fm curve around Kamennoi Island and numerous islets and drying rocks at 56°56.25' N, 135°24.5'' W
- Kelp area at 56°56.2' N, 135°24.8'' W
- Within 2fm curve around drying rocks at 56°56.4' N, 135°25.0'' W
- Within 5fm curve many kelp areas exist at 56°56.75' N, 135°25.1'' W
- Kelp area at 56°56.8' N, 135°25.25'' W
- Kelp area around drying rocks at 56°56.6' N, 135°25.25'' W
- Within 5fm curve around islets at 56°56.7' N, 135°25.6'' W
- Within 3fm curve around islets and drying rocks at 56°56.4' N, 135°25.9' W
- Within 3fm curve around islets and drying rocks at 56°56.4' N, 135°25.9' W
- Around islets and drying rocks at 56°56.4' N, 135°25.5' W
- Around drying rocks at 56°56.2' N, 135°25.3' W
- Around islet at 56°56.2' N, 135°25.1' W
- Deep area at 56°56.1' N, 135°25.3' W
- Kelp area at 56°56.6' N, 135°26.5' W
- Kelp area at 56°56.7' N, 135°26.6' W
- Within 3fm curve around drying rock at 56°56.7' N, 135°26.7' W
- Kelp area at 56°56.4' N, 135°26.5' W
- Kelp area between two islets at 56°56.3' N, 135°26.5' W
- Within 5fm curve around 2.7 Rk at 56°56.0' N, 135°26.5' W
- Kelp area at 56°55.9' N, 135°26.5' W
- Kelp area at 56°55.75' N, 135°26.1' W
- Within 5fm curve around islet at 56°55.65' N, 135°25.8' W extending S to drying rocks at 56°55.45' N, 135°25.8' W
- Kelp area around 4.7 Rk at 56°55.7' N, 135°26.9' W
- Deep area at 56°56.05' N, 135°23.6' W
- Drying shelf area at 56°56.2' N, 135°21.3' W
- Kelp area at 56°56.1' N, 135°21.75' W
- Kelp area at 56°55.7' N, 135°21.0' W

- Shallowest limit of hydrography from 56°55.4' N, 135°20.6' W to 56°55.2' N, 135°20.4' W
- Shallowest limit of hydrography from 56°54.6' N, 135°19.8' W to 56°54.5' N, 135°19.5' W
- Shallowest limit of hydrography from 56°54.2' N, 135°18.75' W to 56°53.25' N, 135°17.6' W
- Shallowest limit of hydrography from 56°53.35' N, 135°18.3' W to 56°53.4' N, 135°18.9' W
- Kelp area at 56°52.95' N, 135°18.3' W
- Shallowest limit of hydrography from 56°53.15' N, 135°19.1' W to 56°53.9' N, 135°19.7' W
- Bay at 56°53.8' N, 135°19.8' W is an open bay that displays different tidal characteristics from the rest of the area outside the bay.
- Shallowest limit of hydrography from 56°53.6' N, 135°20.6' W to 56°53.5' N, 135°20.5' W
- Shallowest limit of hydrography from 56°53.2' N, 135°20.4' W to 56°53.15' N, 135°20.2' W
- Shallowest limit of hydrography from 56°52.65' N, 135°19.1' W to 56°52.6' N, 135°19.7' W
- Shallowest limit of hydrography from 56°53.7' N, 135°20.3' W to 56°53.85' N, 135°20.6' W
- Shallowest limit of hydrography from 56°53.05' N, 135°21.1' W to 56°53.15' N, 135°21.25' W
- Shallowest limit of hydrography at 56°53.35' N, 135°21.7' W
- Kelp area at 56°53.4' N, 135°22.05' W
- Within 5fm curve around islets and drying rocks at 56°53.65' N, 135°23.0' W
- Within 5fm curve around drying rocks at 56°53.5' N, 135°23.5' W
- Within 3fm curve around islets at 56°53.4' N, 135°23.85' W
- Within 3fm curve around drying rocks at 56°53.35' N, 135°24.1' W
- Within 5fm curve around –12 drying rock at 56°53.4' N, 135°24.3' W
- Within 3fm curve around islet and drying rocks at 56°53.5' N, 135°24.4' W
- Kelp area at 56°53.15' N, 135°23.9' W
- Kelp area at 56°52.75' N, 135°23.1' W

MHW line has been estimated from the lidar data and the digital mosaiced orthophoto from

- 56°54.2' N, 135°18.75' W to 56°52.6' N, 135°19.9' W
- 56°52.7' N, 135°20.5' W

b. Poly-line H11429_2

This poly-line covers the Taigid Island group. This area is similar to the island and slets to the north where heavy kelp exists. In general good coverage exists to 10 fathoms with good coverage extending to 12 fathoms in places and sparse coverage to 13-15 fathoms to seaward of the ploy-line. In addition, local areas of sparse coverage exists as follows:

- Within 5fm curve around islet and drying rock at 56°55.3' N, 135°25.8' W
- Within 3fm curve around islet at 56°55.0' N, 135°25.1' W. In particular on the NE coast.
- Around 3.7 Rk at 56°54.85' N, 135°25.1' W
- Around 2 islets at 56°54.95' N, 135°24.75' W
- Around –5 drying rock at 56°54.8' N, 135°24.9' W
- Within 5fm curve around –9 drying rock and kelp at 56°54.75' N, 135°24.95' W
- Kelp areas at 56° 54.7' N, 135° 24.9' W
- Within 3fm curve south of 56°54.7' N, 135°24.5' W along the N coast of islet.
- Kelp area at 56°54.45' N, 135°24.45' W
- Kelp area at 56°54.35' N, 135°23.8' W
- Kelp area at 56°54.4' N, 135°23.8' W
- Kelp area at 56°54.8' N, 135°24.2' W
- Within 3fm curve around islet at 56°54.85' N, 135°24.4' W
- Kelp area at 56°55.15' N, 135°24.8' W
- Kelp area at 56°55.05' N, 135°24.7' W
- Kelp area at 56°55.6' N, 135°24.0' W
- Kelp area at 56°55.7' N, 135°24.15' W
- Deep area at 56°55.75' N, 135°24.3' W
- Within 5fm curve around 1.6 Rk at 56°55.8' N, 135°25.0' W
- Within 3fm curve around islet at 56°55.7' N, 135°24.95' W
- Within 3fm curve around 1.7 Rk at 56°55.6' N, 135°25.2' W
- Kelp area at 56°55.5' N, 135°25.3' W

c. Poly-line H11429_3

This poly-line covers an islet and surrounding area at 56° 55.85 N, 135° 21.8 W. Good data and coverage was achieved to 8 fathoms with sparse data to 10 fathoms. The overlap is depicted by the poly-line. In addition, local areas of sparse coverage exists seaward of the poly-line.

d. Poly-line H11429_4

This poly-line covers a drying rock and surrounding area at 56° 55.35' N, 135° 21.6' W. The recommended overlap is depicted by the poly-line. In general good data to 8 fathoms was achieved with sparse data to 10 fathoms. In addition, local areas of sparse coverage exists seaward of the poly-line.

e. Poly-line H11429_5

This poly-line covers Round I. The recommended overlap is depicted by the poly-line. In general good data to 8 fathoms was achieved with sparse data to 10-12 fathoms. In addition, local areas of sparse coverage exists as follows:

- Kelp area at 56° 54.65' N, 135° 22.95' W

f. Poly-line H11429_6

This poly-line covers a shoal area at 56° 55.1' N, 135° 21.4' W. The recommended overlap is depicted by the poly-line. In general good data to 5 fathoms was achieved with sparse data to 7 fathoms.

g. Poly-line H11429_7

This poly-line covers Frankuda It. at 56° 54.6' N, 135° 21.7' W Good coverage exists with data to 8 fathoms and some sparse data to 10 fathoms. The recommended overlap is depicted by the poly-line. In addition, local areas of sparse coverage exists as follows:

- Shallowest limit of hydrography at 56° 54.5' N, 135° 21.8' W

h. Poly-line H11429_8

This poly-line covers Kanga I., Ilput I. and Unishka I. In general good coverage exists to 8 fathoms with sparse data to 10 fathoms. Coverage to 3 or 4 fathoms exist in places along the NE coast of Kanga I. The recommended overlap is depicted by the poly-line. In addition, local areas of sparse coverage exists as follows:

- Kelp area at 56°54.35' N, 135°23.0' W
- At 56°54.5' N, 135°22.3' W
- Kelp area at 56°54.15' N, 135°22.0' W
- Shallowest limit of hydrography at 56°53.5' N, 135°21.5' W
- Within 3fm curve around islet at 56°53.65' N, 135°21.7' W
- Shallowest limit of hydrography at 56°53.75' N, 135°21.85' W
- Shallowest limit of hydrography at 56°53.85' N, 135°22.05' W
- Shallowest limit of hydrography at 56°54.1' N, 135°22.7' W
- Shallowest limit of hydrography at 56°54.25' N, 135°23.15' W

i. Poly-line H11429_9

This poly-line covers drying rocks and surrounding area at 56°53.95' N, 135°21.25' W. I general good coverage to 8 fathoms exists with sparse coverage to 10 fathoms. Sparse coverage exists immediately around the drying rocks. coverage exists in places. The recommended overlap is depicted by the poly-line. The recommended overlap is depicted by the poly-line.

j. Poly-line H11429_10

This poly-line covers two islets at 56°53.3' N, 135°21.0' W. It is recommended that the hydrographic overlap be to the shallowest limit of hydrography around the islets due to the sparse nature of the lidar coverage. The recommended overlap is indicated by the poly-line.

k. Poly-line H11429_11

This poly-line covers a shoal area at 56° 54.75' N, 135° 25.9' W. Good coverage exists to 6 fathoms with sparse data to 8 fathoms. The recommended overlap is depicted by the poly-line. In addition, local areas of sparse coverage exists as follows:

- Kelp area at 56°54.65' N, 135°22.95' W

Shoal and sparse data exists 0.5 miles to the west of this feature.

l. Poly-line H11429_12

This poly-line covers a shoal area at 56° 54.55' N, 135° 24.9' W. Good coverage exists to 8 fathoms with sparse data to 10 fathoms. The recommended overlap is depicted by the poly-line.

m. Poly-line H11429_13

This poly-line covers a shoal area at 56° 54.35' N, 135° 25.1' W. Good coverage exists to 8 fathoms with sparse data to 10 fathoms. The recommended overlap is depicted by the poly-line.

n. Poly-line H11429_14

This poly-line covers Peisar I. In general good coverage exists to 12 fathoms with sparse data to 14 fathoms. The recommended overlap is depicted by the poly-line. In addition, local areas of sparse coverage exists as follows:

- Within 3fm curve around islets and drying rocks at 56°52.7' N, 135°26.3' W
- Large kelp area at 56°52.85' N, 135°26.3' W
- Kelp area at 56°52.95' N, 135°26.3' W
- Within 3fm curve around –0 drying rock at 56°53.1' N, 135°26.8' W
- Deep area at 56°53.25' N, 135°26.8' W
- Within 3fm curve around –4 drying rock at 56°53.35' N, 135°27.05' W
- Around drying rocks at 56°53.4' N, 135°27.2' W
- Within 3fm curve around cov 1 ft drying rock at 56°53.6' N, 135°27.4' W
- Within 5fm curve around islet at 56°53.7' N, 135°27.5' W
- Shallowest limit of hydrography at 56°53.7' N, 135°26.9' W
- Shallowest limit of hydrography around islets at 56°53.85' N, 135°26.55' W
- Kelp area at 56°53.6' N, 135°26.05' W
- Kelp area at 56°53.55' N, 135°26.0' W
- Kelp area at 56°53.5' N, 135°26.0' W
- Kelp area at 56°53.5' N, 135°25.8' W
- Within 3fm curve around drying rocks at 56°53.5' N, 135°25.55' W
- Around 3.7 Rk at 56°53.5' N, 135°25.4' W
- Within 3fm curve around islet at 56°53.4' N, 135°25.75' W
- Around islet at 56°53.3' N, 135°25.8' W
- Around 1.9 Rk at 56°53.3' N, 135°25.6' W
- Around 1.5 Rk at 56°53.1' N, 135°25.9' W
- Around –9 drying rock at 56°53.05' N, 135°25.9' W

Shoals with good coverage exist to seaward of the poly-line, these shoals are either already charted or have been identified in the Chart Comparison Spreadsheet in section D.1.4.

o. Poly-line H11429_15

This poly-line covers a shoal area NE of Peisar I. at 56°53.8' N, 135°25.8' W In general good coverage exists to 8 fathoms with sparse data to 10 fathoms. The recommended overlap is depicted by the poly-line. In addition, local areas of sparse coverage exists as follows:

- Kelp area at 56°53.8' N, 135°25.8' W

Shoals with good coverage exist to seaward of the poly-line, these shoals are either already charted or have been identified in the Chart Comparison Spreadsheet in section D.1.4.

p. Poly-line H11429_16

This poly-line covers a shoal area E of Peisar I. at 56°53.55' N, 135°24.9' W In general good coverage exists to 8 fathoms with sparse data to 10 fathoms. The recommended overlap is depicted by the poly-line.

E. APPROVAL SHEETS

LETTER OF APPROVAL – OPR-O112-KRL-05

This report and the accompanying smooth sheets are respectfully submitted.

Field operations contributing to the accomplishment of this survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and the accompanying smooth sheets have been closely reviewed and are considered complete and adequate as per the Statement of Work.

Report	Submission Date
Descriptive Report – H11429	June 05, 2006

D. J. Sinclair
For

Mark Sinclair
Hydrographer
Tenix LADS Incorporated

Date June 05, 2006

[1] The LIDAR survey referenced in this Descriptive Report has been applied to the multibeam surveys it junctions with. No stand-alone LIDAR information was compiled to either an HCell or an Hdrawing. For information concerning the compilation of LIDAR features and soundings see the Descriptive Reports for multibeam surveys H11126, H11127 and H11128. LIDAR does not meet IHO object detection requirements. LIDAR was not used to supersede shoaler charted soundings or to disprove charted features.

The Data Acquisition and Processing Report and Horizontal and Vertical Control Report have been filed with the project records.

APPENDIX I – DANGERS TO NAVIGATION – SUBMITTED TO PHB DURING DATA ACQUISITION

Danger to Navigation Report

Hydrographic Survey Registry Number: H11429

State: Alaska

General Locality: Approaches to Sitka

Sublocality: Northwest of Kanga Bay

Project Number: OPR-O112-KRL-05

Survey Date: May – August 2005

Charts Affected: 17326 14th Edition, 06/01/05

Features are in meters reduced to Mean Lower Low Water using preliminary tides and are positioned on NAD 83 horizontal datum.

The following items were found during hydrographic survey operations:

No	Feature	Depth (m)	Latitude (N)	Longitude (W)	Remarks
1	Rk in kelp	4.6	56° 52' 53.6"	135° 26' 43.0"	
2	Shoal	15.9	56° 52' 51.2"	135° 26' 59.6"	
3	Shoal	13.3	56° 53' 56.1"	135° 26' 35.6"	
4	Rock in kelp	7.4	56° 53' 46.5"	135° 26' 06.7"	
5	Shoal	15.9	56° 53' 48.3"	135° 25' 34.5"	
6	Shoal	11.4	56° 53' 32.2”	135° 24' 57.6"	
7	Shoal	17.0	56° 52' 32.8"	135° 23' 42.6"	
8	Shoal	15.7	56° 53' 30.6"	135° 23' 47.0"	
9	Shoal	15.6	56° 53' 43.9"	135° 23' 11.2"	
10	Shoal	1.9	56° 53' 44.7"	135° 20' 34.6"	
11	Shoal	4.3	56° 54' 23.6"	135° 21' 03.1"	
12	Rock in kelp	11.3	56° 54' 46.0"	135° 21' 59.6"	
13	Shoal	6.7	56° 53' 07.2"	135° 18' 49.2"	
14	Shoal	11.1	56° 55' 14.5"	135° 25' 33.3"	
15	Rock in kelp	5.5	56° 54' 59.1"	135° 25' 29.3"	
16	Shoal	10.4	56° 55' 56.5"	135° 27' 07.1"	
17	Shoal	12.3	56° 56' 06.9"	135° 26' 49.1"	
18	Shoal	10.0	56° 55' 53.4"	135° 25' 18.0"	
19	Shoal	4.2	56° 56' 24.9"	135° 22' 54.6"	

20	Shoal	13.7	56° 56' 14.8"	135° 23' 28.4"	
21	Shoal	13.4	56° 56' 21.9"	135° 24' 18.0"	

COMMENTS: Preliminary tides have been applied from the Sitka tide gauge and final tides will be applied at a later date.

Questions concerning this report should be directed to the Survey Manager, Tenix LADS Incorporated at (228) 594-6800.

DANGERS TO NAVIGATION – ADDITIONAL DTONS IDENTIFIED DURING FINAL DATA PROCESSING

Danger to Navigation Report

Hydrographic Survey Registry Number: H11429

State: Alaska

General Locality: Approaches to Sitka

Sublocality: Northwest of Kanga Bay

Project Number: OPR-O112-KRL-05

Survey Date: May – August 2005

Charts Affected: 17326 14th Edition, 06/01/05

Depths are in decimal fathoms and reduced to Mean Lower Low Water using final verified tides. Drying heights are in whole feet with a –ve sign indicating that the height is relative to MLLW and a ( ) indicating that the height is relative to MHW. Positions are based on the NAD83 horizontal datum.

The following items were identified during final data processing:

No	Feature	Depth	Latitude (N)	Longitude (W)	Remarks
22	Drying Rk in kelp	Cov 1ft	56° 53' 08.90"	135° 25' 41.59	Recommended further investigation by boat
23	Rk on ridge	5.8	56° 53' 49.57"	135° 26' 13.14"	
24	Rk on ridge	7.2	56° 53' 56.06"	135° 26' 35.56”	reported previously as no.4
25	Rk in kelp	2.7	56° 52' 30.57"	135° 23' 24.83"	Recommended further investigation by boat
26	Rk on shoal	4.0	56° 53' 01.69"	135° 23' 40.52"	
27	Rk in kelp	0.5	56° 53' 18.33"	135° 23' 57.12"	Recommended further investigation by boat
28	Rk on shoal	5.7	56° 53' 37.27"	135° 24' 30.36"	
29	Rk in kelp	2.8	56° 53' 25.83”	135° 22' 03.10"	Recommended further investigation by boat
30	Rk	1.0	56° 52' 50.68”	135° 20' 41.59"	
31	Rk	2.6	56° 54' 43.37”	135° 21' 00.90"	
32	Drying Rk	Cov 2ft	56° 54' 26.10”	135° 20' 35.79"	
33	Rk	4.7	56° 53' 20.25”	135° 18' 57.52"	
34	Rk	1.3	56° 53' 59.14”	135° 19' 07.30"	
35	Rk	4.7	56° 55' 43.39”	135° 21' 45.64"	

No	Feature	Depth	Latitude (N)	Longitude (W)	Remarks
36	Rk in kelp	0.7	56° 55' 52.87"	135° 21' 56.80"	Recommended further investigation by boat
37	Rk in kelp	0.9	56° 56' 18.05"	135° 24' 08.27"	Recommended further investigation by boat
38	Drying Rk in kelp	-3	56° 56' 33.01"	135° 24' 02.16"	Recommended further investigation by boat
39	Drying Rk in kelp	Cov 2ft	56° 56' 33.47"	135° 24' 49.09"	Recommended further investigation by boat
40	Rk in kelp	1.6	56° 56' 45.69"	135° 24' 50.23"	Recommended further investigation by boat
41	Rk on shoal	3.7	56° 56' 05.06"	135° 24' 23.69"	
42	Drying Rk in kelp	-3	56° 55' 59.69"	135° 23' 43.88"	Recommended further investigation by boat
43	Rk in kelp	1.7	56° 55' 39.00"	135° 22' 49.83"	Recommended further investigation by boat
44	Rk	4.9	56° 55' 29.34"	135° 22' 34.71"	
45	Drying Rk in kelp	-0	56° 56' 08.90"	135° 24' 46.09"	
46	Rk in kelp	2.9	56° 56' 07.29"	135° 25' 32.40"	Recommended further investigation by boat
47	Rk	5.2	56° 55' 48.11"	135° 25' 22.42"	
48	Rk	4.8	56° 55' 44.15"	135° 26' 33.53"	
49	Rk	9.0	56° 55' 36.51"	135° 26' 33.73"	
50	Rk in kelp	1.9	56° 55' 50.57"	135° 26' 37.27"	Recommended further investigation by boat
51	Rk	7.0	56° 55' 18.46"	135° 26' 07.15"	
52	Rk	6.3	56° 55' 06.80"	135° 25' 36.38"	
53	Rk in kelp	3.0	56° 54' 32.29"	135° 25' 16.48"	Recommended further investigation by boat
54	Rk in kelp	4.1	56° 54' 47.48"	135° 24' 41.82"	Recommended further investigation by boat
55	Rk	4.2	56° 54' 25.54"	135° 23' 36.38"	
56	Rk in kelp	1.1	56° 54' 54.83"	135° 23' 40.06"	Recommended further investigation by boat
57	Drying Rk	Cov 2ft	56° 55' 08.21"	135° 24' 10.89"	
58	Drying Rk in kelp	Cov 2ft	56° 55' 43.14"	135° 25' 01.25"	Recommended further investigation by boat
59	Rk in kelp	1.0	56° 55' 51.49"	135° 25' 00.04"	Recommended further investigation by boat
60	Rk on shoal	4.5	56° 55' 53.22"	135° 24' 43.97"	
61	Rk	4.0	56° 55' 50.19"	135° 24' 22.99"	

No	Feature	Depth	Latitude (N)	Longitude (W)	Remarks
62	Drying Rk in kelp	cov 1ft	56° 55' 04.96”	135° 23' 14.50"	Recommended further investigation by boat
63	Rk	3.7	56° 55' 01.67”	135° 23' 03.76"	
64	Rk in kelp	6.7	56° 56' 50.22”	135° 25' 48.09"	Recommended further investigation by boat
65	Rk in kelp	1.6	56° 56' 26.28”	135° 24' 41.02"	Recommended further investigation by boat

COMMENTS: Verified tides have been applied from the Sitka tide gauge.

Questions concerning this report should be directed to the Survey Manager, Tenix LADS Incorporated at (228) 594-6800.

DANGERS TO NAVIGATION – SUBMITTED TO MCD DURING DATA ACQUISITION

H11429 Danger to Navigation

Registry Number: H11429

State: Alaska

Locality: Approaches to Sitka

Sub-locality: Northwest of Kanga Bay

Project Number: OPR-O112-KRL-05

Survey Date: May – August 2005

Charts Affected

Number	Version	Date	Scale
17326	13th Ed.	08/05/2000	1:40000
17320	16th Ed.	12/01/2003	1:217828
16016	20th Ed.	11/01/2003	1:969756
531	22nd Ed.	03/01/2004	1:2100000
500	8th Ed.	06/01/2003	1:3500000
530	30th Ed.	03/23/2002	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
1.1	Rock	4.60 m	056° 52' 53.600" N	135° 26' 43.000" W
1.2	Shoal	15.90 m	056° 52' 51.200" N	135° 26' 59.600" W
1.3	Rock	7.40 m	056° 53' 45.500" N	135° 26' 06.700" W
1.4	Shoal	11.40 m	056° 53' 32.200" N	135° 24' 57.600" W
1.5	Shoal	1.90 m	056° 53' 44.700" N	135° 20' 34.600" W
1.6	Shoal	4.30 m	056° 54' 23.600" N	135° 21' 03.100" W
1.7	Shoal	6.70 m	056° 53' 07.200" N	135° 18' 49.200" W
1.8	Shoal	11.10 m	056° 55' 14.500" N	135° 25' 33.300" W
1.9	Rock	5.50 m	056° 54' 59.100" N	135° 25' 29.300" W
1.10	Shoal	10.40 m	056° 55' 56.500" N	135° 27' 07.100" W

1 - Danger To Navigation

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 52' 53.600" N, 135° 26' 43.000" W

Least Depth: 4.60 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 1

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Rk in kelp

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	1	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2 ½fm (17326_1, 17320_1, 16016_1, 530_1)

2fm 3ft (531_1)

4.6m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: INFORM - Rk in kelp

VALSOU - 4.6 m

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 52' 51.200" N, 135° 26' 59.600" W

Least Depth: 15.90 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 2

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	2	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

8 ¾fm (17326_1, 17320_1, 16016_1, 530_1)

8fm 4ft (531_1)

15.9m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 53' 45.500" N, 135° 26' 06.700" W

Least Depth: 7.40 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 4

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Rk in kelp

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	4	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

4fm (17326_1, 17320_1, 16016_1, 530_1)

4fm 0ft (531_1)

7.4m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: INFORM - Rk in kelp

VALSOU - 7.4 m

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 53' 32.200" N, 135° 24' 57.600" W

Least Depth: 11.40 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 6

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	6	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

6 ¼fm (17326_1, 17320_1, 16016_1, 530_1)

6fm 1ft (531_1)

11.4m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 53' 44.700" N, 135° 20' 34.600" W

Least Depth: 1.90 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 10

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	10	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1fm (17326_1, 17320_1, 16016_1, 530_1)

1fm 0ft (531_1)

1.9m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 54' 23.600" N, 135° 21' 03.100" W

Least Depth: 4.30 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 11

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	11	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2 ¼fm (17326_1, 17320_1, 16016_1, 530_1)

2fm 2ft (531_1)

4.3m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 53' 07.200" N, 135° 18' 49.200" W

Least Depth: 6.70 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 13

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	13	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3 ½fm (17326_1, 17320_1, 16016_1, 530_1)

3fm 4ft (531_1)

6.7m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 55' 14.500" N, 135° 25' 33.300" W

Least Depth: 11.10 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 14

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	14	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

6fm (17326_1, 17320_1, 16016_1, 530_1)

6fm 0ft (531_1)

11.1m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 54' 59.100" N, 135° 25' 29.300" W

Least Depth: 5.50 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 15

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Rk in kelp, 12.5m feature 90m NW

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	15	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3fm (17326_1, 17320_1, 16016_1, 530_1)

3fm 0ft (531_1)

5.5m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: INFORM - Rk in kelp, 12.5m feature 90m NW

VALSOU - 5.5 m

DANGER TO NAVIGATION

Survey Summary

Survey Position: 056° 55' 56.500" N, 135° 27' 07.100" W

Least Depth: 10.40 m

Timestamp: 1990-001.11:60:00.000 (01/01/1990)

GP Dataset: H11429_Dtons.xls

GP No.: 16

Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks: Shoal

Feature Correlation

Address	Feature	Range	Azimuth	Status
H11429_Dtons.xls	16	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

5 ½fm (17326_1, 17320_1, 16016_1, 530_1)

5fm 4ft (531_1)

10.4m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: INFORM - Shoal

DANGERS TO NAVIGATION – SUBMITTED TO MCD DURING FINAL DATA PROCESSING

H11429 Danger to Navigation

Hydrographic Survey Registry Number: **H11429**

Survey Title: **State:** **Alaska**
Locality: **Approaches to Sitka**
Sub-locality: Northwest of Kanga Bay

Project Number: OPR-O112-KRL-05

Survey Dates: MAY-SEPT 2005

Depths are reduced to Mean Lower Low Water using verified tides. Positions are based on the NAD83 horizontal datum.

CHARTS AFFECTED:

Chart	Scale	Edition	Date
17326	1:40,000	14th	06/01/05
17320	1:217,828	17th	11/01/05
16016	1:969,756	20th	11/01/03

DANGERS:

Feature	Depth(ft or fms)	Latitude (N)	Longitude (W)
Rock	covered 1 ft	56/53/08.9	135/25/40.8
Rock	5 fms 5 ft	56/53/49.6	135/26/13.2
Rock	7 fms 1 ft	56/53/56.0	135/26/34.8
Rock	2 fms 4 ft	56/52/30.7	135/23/24.0
Rock	4 fms 0 ft	56/53/01.7	135/23/42.0
Rock	0 fms 3 ft	56/53/18.2	135/23/56.4
Rock	5 fms 4 ft	56/53/37.3	135/24/28.8
Rock	2 fms 5 ft	56/53/25.8	135/22/04.8
Rock	1 fm 5 ft	56/52/50.5	135/20/42.0
Rock	2 fms 3 ft	56/54/43.2	135/21/00.0
Rock	covered 2 ft	56/54/25.9	135/20/34.8
Rock	4 fms 4 ft	56/53/20.4	135/18/57.6

Rock	1 fm 2 ft	56/53/59.3	135/19/08.4
Rock	4 fms 4 ft	56/55/43.3	135/21/46.8
Rock	0 fms 4 ft	56/55/53.0	135/21/57.6
Rock	0 fms 5 ft	56/56/17.9	135/24/07.2
Rock	uncovers 3 ft	56/56/33.0	135/24/03.6
Rock	covered 2 ft	56/56/33.4	135/24/50.4
Rock	1 fm 3 ft	56/56/45.6	135/24/50.4
Rock	3 fms 4 ft	56/56/04.9	135/24/25.2
Rock	3 fms 0 ft	56/55/59.5	135/23/45.6
Rock	1 fm 4 ft	56/55/39.0	135/22/51.6
Rock	4 fms 5 ft	56/55/29.3	135/22/33.6
Rock	awash	56/56/08.9	135/24/46.8
Rock	2 fms 5 ft	56/56/07.4	135/25/33.6
Rock	5 fms 1 ft	56/55/48.0	135/25/22.8
Rock	4 fms 5 ft	56/55/44.0	135/26/34.8
Rock	9 fms 0 ft	56/55/36.5	135/26/34.8
Rock	1 fm 5 ft	56/55/50.5	135/26/38.4
Rock	7 fms 0 ft	56/55/18.5	135/26/06.0
Rock	6 fms 2 ft	56/55/07.0	135/25/37.2
Rock	3 fms 0 ft	56/54/32.4	135/25/15.6
Rock	4 fms 0 ft	56/54/47.5	135/24/43.2
Rock	4 fms 1 ft	56/54/25.6	135/23/34.8
Rock	1 fm 0 ft	56/54/54.7	135/23/38.4
Rock	covered 2 ft	56/55/08.0	135/24/10.8
Rock	1 fm 4 ft	56/55/34.3	135/25/12.0
Rock	covered 2 ft	56/55/43.3	135/25/01.2
Rock	1 fm 0 ft	56/55/51.6	135/25/01.2
Rock	4 fms 3 ft	56/55/53.4	135/24/43.2
Rock	4 fms 0 ft	56/55/50.2	135/24/21.6
Rock	covered 1 ft	56/55/04.8	135/23/13.2
Rock	3 fms 4 ft	56/55/01.6	135/23/02.4
Rock	6 fms 4 ft	56/56/50.3	135/25/48.0
Rock	1 fm 3 ft	56/56/26.2	135/24/39.6

COMMENTS: All features were found using LIDAR. It is recommended that the following statement be charted: "During the recent survey of the northwest Kanga Bay area, numerous uncharted rocks were located within the 10 fm contour. Please be advised that these rocks are not necessary reflected on the current chart."

Submitted by TENIX/LADS (LIDAR) reviewed by PHB

Submit Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch at *(206) 526-6835.*

APPENDIX IV – TIDES AND WATER LEVELS

Abstract of Times of Hydrography

Start and End times refer to tidal applications requirement.

Time on Task indicates actual time of task in the survey area. All times and dates are in UTC.

05_6biorka

Date Flown	JD	Sortie No	Start time	End Time	Time On Task
May-07-05	127	2	18:30	01:30	03:10
May-09-05	129	3	13:30	17:00	00:55
May-26-05	146	4	22:00	03:00	03:20
May-27-05	147	5	00:00	06:30	05:45
May-28-05	148	6	16:00	23:30	02:30
May-29-05	149	7	16:00	22:30	03:40
Jun-06-05	157	14	00:00	05:00	04:45
Jun-07-05	158	15	15:30	00:00	04:43
Jun-08-05	159	16	21:00	01:30	03:10
July-19-05	200	26	01:00	07:00	05:35
July-23-05	204	27	20:00	04:00	05:35
July-24-05	205	28	15:00	22:00	05:35
July-25-05	206	29	18:00	22:30	03:00
Aug-06-05	218	30	20:30	03:00	04:00

T I D A L D A T U M S

Tidal datums at SITKA, BARONOF ISLAND, SITKA SOUND based on:

LENGTH OF SERIES:	19 Years
TIME PERIOD:	January 1983 - December 2001
TIDAL EPOCH:	1983-2001
CONTROL TIDE STATION:	

Elevations of tidal datums referred to Mean Lower Low Water (MLLW), in METERS:

HIGHEST OBSERVED WATER LEVEL (11/02/1948)	= 4.534
MEAN HIGHER HIGH WATER (MHHW)	= 3.029
MEAN HIGH WATER (MHW)	= 2.791
MEAN TIDE LEVEL (MTL)	= 1.618
MEAN SEA LEVEL (MSL)	= 1.610
MEAN LOW WATER (MLW)	= 0.445
MEAN LOWER LOW WATER (MLLW)	= 0.000
LOWEST OBSERVED WATER LEVEL (01/01/1991)	= -1.224

APPROVAL SHEET
H-11429

Initial Approvals:

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

Digitally signed by Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2009.09.25 10:37:44 -07'00'

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 disproval 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.

Katie Reser
2009.09.25 11:18:30
-07'00'

I have reviewed the H-Cell, 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.

Gary C. Nelson
2009.09.25
13:47:44 -07'00'

Digitally signed by David Scharff
DN: cn=David Scharff, o=OCS, ou=NOAA, email=david.scharff@noaa.gov, c=US
Reason: AWOIS and Surf Check complete
Date: 2009.10.14 09:42:07 -04'00'