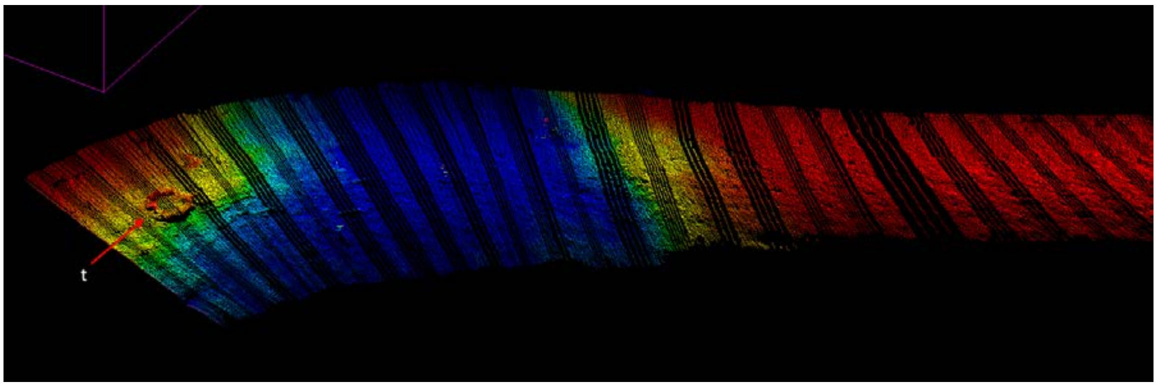
2015 LITTLE BEAR CREEK MULTIBEAM BATHYMETRY SURVEY

FIELD NOTES AND DATA PROCESSING METHODOLOGY



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Prepared for:
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L7S1A1

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1.0 INTRODUCTION

Little Bear Creek (LBC) is a small tributary that flows into the St. Clair River estuary approximately 10 km south of the town of Wallaceburg, Ontario. The lower reaches of LBC have been identified as an area where dredging and channel maintenance may be required to increase drainage and minimize the risk of upstream flooding.

The proposed dredging operation within LBC, and its potential impact on fish and fish habitat, is subject to approval by the Department of Fisheries and Oceans (DFO). As a result, DFO requires further knowledge about the pre-dredge status of the drainage channel including bathymetry, existing fish habitat and hydrology, to which the post-dredging condition of LBC can be compared.

DFO contracted Milne Technologies to provide multibeam bathymetry data collection and map production services in support of the Little Bear Creek fish habitat project.

The purpose of this report is to provide a detailed description of the 2015 Little Bear Creek multibeam sonar bathymetry survey data collection methodologies and data analyses.

2.0 DATA COLLECTION AND ANALYSIS METHODOLOGY

2.1 DATA COLLECTION METHODS

2.1.1 STANDARDIZED DEPTH AND SURVEY ELEVATION

Observed and modelled bathymetry measurements are expressed as negative depths relative to the water surface. All bottom depth measurements were standardized to the observed water surface height on June 2, 2015 at 10:00 am as measured by Onset Level-loggers placed at the 3 most downstream locations of Little Bear Creek ("Mouth", "Baldoon" and "Hwy40") (figure 1).

The Onset level-loggers were programmed to report a time integrated depth at 30 minute intervals. We calculated the average change in the logger reported depth (relative to June 2 at 10:00 am) for those time periods and logger locations that best matched the survey times and locations (table 1). For example, the average change in water surface elevation (relative to June 2 at 10:00 am), while surveying the reach between Electric Line and Baldoon Road, was -0.02 m as reported by the "Baldoon" logger. Therefore, we applied a +2cm offset to the sonar transducer depth to increase the observed bottom depth by 2 cm.

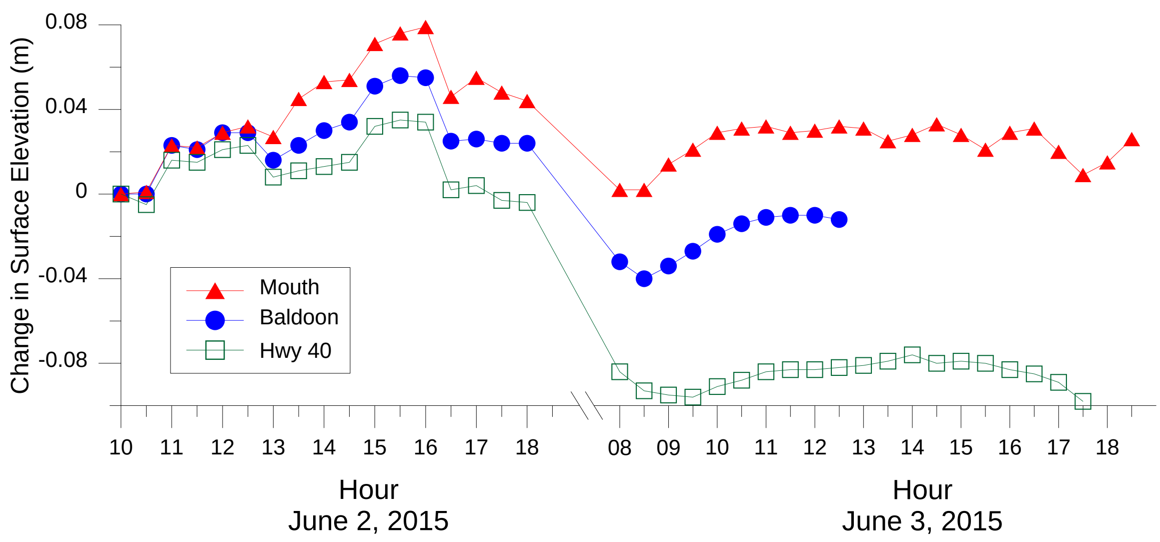

Figure 1. Observed change in water surface elevation (relative to June 2, 2015 at 10:00am) as recorded by Onset Level-loggers placed at three locations within the survey area of Little Bear Creek.

Table 1. The observed change in pressure sensor depth from three Onset Level-loggers deployed at the mouth of Little Bear Creek, near the Baldoon Road bridge and the Highway 40 bridge. The average change in the logger reported depth is relative to June 2 at 10:00 am. Values highlighted in green indicate those values averaged together and applied to the bathymetry survey segments shown in the "Survey Section" field.

	Change in Logger Reported Depth (m)			
DateTime	Mouth	Baldoon	Hwy40	Survey Section (km's from mouth)
20150602 10:00:00	0.00	0.00	0.00	
20150602 10:30:00	0.00	0.00	-0.01	0 (MOUTH) to 0.987
20150602 11:00:00	0.02	0.02	0.02	0 (MOUTH) to 0.987
20150602 11:30:00	0.02	0.02	0.01	0 (MOUTH) to 0.987
20150602 12:00:00	0.03	0.03	0.02	0 (MOUTH) to 0.987
20150602 12:30:00	0.03	0.03	0.02	0.987 to 3.231 (MCLEOD)
20150602 13:00:00	0.03	0.02	0.01	0.987 to 3.231 (MCLEOD)
20150602 13:30:00	0.04	0.02	0.01	0.987 to 3.231 (MCLEOD)
20150602 14:00:00	0.05	0.03	0.01	0.987 to 3.231 (MCLEOD)
20150602 14:30:00	0.05	0.03	0.01	0.987 to 3.231 (MCLEOD)
20150602 15:00:00	0.07	0.05	0.03	0.987 to 3.231 (MCLEOD)
20150602 15:30:00	0.08	0.06	0.03	0.987 to 3.231 (MCLEOD)
20150602 16:00:00	0.08	0.05	0.03	0.987 to 3.231 (MCLEOD)
20150602 16:30:00	0.05	0.02	0.00	3.232 (MCLEOD) to 4.735 (ELECTRIC)
20150602 17:00:00	0.05	0.03	0.00	3.232 (MCLEOD) to 4.735 (ELECTRIC)
20150602 17:30:00	0.05	0.02	0.00	3.232 (MCLEOD) to 4.735 (ELECTRIC)
20150602 18:00:00	0.04	0.02	0.00	3.232 (MCLEOD) to 4.735 (ELECTRIC)
20150603 08:00:00	0.00	-0.03	-0.08	
20150603 08:30:00	0.00	-0.04	-0.09	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 09:00:00	0.01	-0.03	-0.10	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 09:30:00	0.02	-0.03	-0.10	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 10:00:00	0.03	-0.02	-0.09	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 10:30:00	0.03	-0.01	-0.09	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 11:00:00	0.03	-0.01	-0.08	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 11:30:00	0.03	-0.01	-0.08	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 12:00:00	0.03	-0.01	-0.08	4.736 (ELECTRIC) to 7.097 (BALDOON)

20150603 12:30:00	0.03	-0.01	-0.08	4.736 (ELECTRIC) to 7.097 (BALDOON)
20150603 13:00:00	0.03	Sensor Removed	-0.08	
20150603 13:30:00	0.02		-0.08	7.098 (BALDOON) to 8.4145 (BUSH LINE)
20150603 14:00:00	0.03		-0.08	7.098 (BALDOON) to 8.4145 (BUSH LINE)
20150603 14:30:00	0.03		-0.08	7.098 (BALDOON) to 8.4145 (BUSH LINE)
20150603 15:00:00	0.03		-0.08	7.098 (BALDOON) to 8.4145 (BUSH LINE)
20150603 15:30:00	0.02		-0.08	7.098 (BALDOON) to 8.4145 (BUSH LINE)
20150603 16:00:00	0.03		-0.08	8.4146 (BUSH LINE) to 10.870 (HWY40)
20150603 16:30:00	0.03		-0.09	8.4146 (BUSH LINE) to 10.870 (HWY40)
20150603 17:00:00	0.02		-0.09	8.4146 (BUSH LINE) to 10.870 (HWY40)
20150603 17:30:00	0.01		-0.10	8.4146 (BUSH LINE) to 10.870 (HWY40)
20150603 18:00:00	0.02		Sensor Removed	
20150603 18:30:00	0.03			
Average Change in Water Surface Elevation (m)	**0.04**	**-0.02**	**-0.08**	
Std. Dev. Change in Water Surface Elevation (m)	0.02	0.01	0.01	
n	17.00	9.00	9.00	
Minimum Value (m)	0.00	-0.04	-0.10	
Maximum Value (m)	0.08	-0.01	-0.08	
Range (m)	0.08	0.03	0.02	

VERTICAL REFERENCE

For future reference, we measured the water surface height relative to the McLeod Bridge (220.5 cm from top of bridge step on June 3, 2015 at 20:15, see figure 2). Creek bed elevation (or altitude above mean sea-level) can be estimated from the bottom depth data provided by these surveys, however, the elevation of the McLeod Bridge will need to be surveyed in from local surveyor bench-marks.

Figure 2. The water surface height relative to the McLeod Bridge was measured on June 3, 2015 at 20:15. The observed distance from the top of the concrete step (beside rubber expansion gap) was 220.5 cm.

2.1.2 KONGSBERG M^3 MULTIBEAM SONAR SYSTEM HARDWARE

Bathymetric profiling and imaging was completed using a Kongsberg-Mesotech Ltd. M^3 multi-mode multibeam sonar system.

The M^3 sonar system has a nominal operating frequency of 500 kHz with 100 kHz bandwidth. The M^3 sonar system was operated in “profiling” mode to obtain high resolution vertical bathymetry points.

In the sonar “profiling mode”, pulses are generated and received on two independent transducer elements, consisting of a single channel transmitter and a 64 element receiver. The associated signal processing software forms a 120^o swath image (in the athwartship plane) of the water column formed by 256 receive beams, each with an apparent beam-width of <0.5^o x 3^o. At a maximum survey depth of 5.3 m, the range (or depth) resolution is better than 2.0 cm. Therefore, at a bottom depth of ~3.5 m, the horizontal resolution (at the nadir beams) is < 2 cm. The M^3 host software provides a sophisticated bottom detection algorithm to generate 256 bottom points per acoustic transmission (or ping).

Raw beamformed data, collected in “fast-profiling” mode, were recorded in the Kongsberg *.mmb file format. Operating at pings rates of 11 to 14 pings per second, the software builds a 3-dimensional point cloud of the bottom in real-time (figure 3). In post-processing, all raw *.mmb data were replayed in the M3 Host software (version MUM 1.6.1 A5) using the beamforming over-ride batch processing method (using standard profiling beamforming) and Kongsberg *.all export files were generated for HyPack 2015 HySWEEP (HYPACK, Inc., Middletown CT.) processing. ALL files are available within “..\DFO\LBC\Data\Bathymetry\M3\REPLAY_ALL\”.

The Kongsberg M^3 multibeam sonar transducer head was mounted on a pole affixed to the port-side gunwale of a 4.9 m aluminum boat. The face of the transducer was deployed approximately 0.4 m below the water surface. The primary GPS antenna was positioned 1.22 m starboard of the sonar head and was raised up approximately 31 cm from the boat gunwale cross-mount (or 0.75 m from water surface) (figure 4).

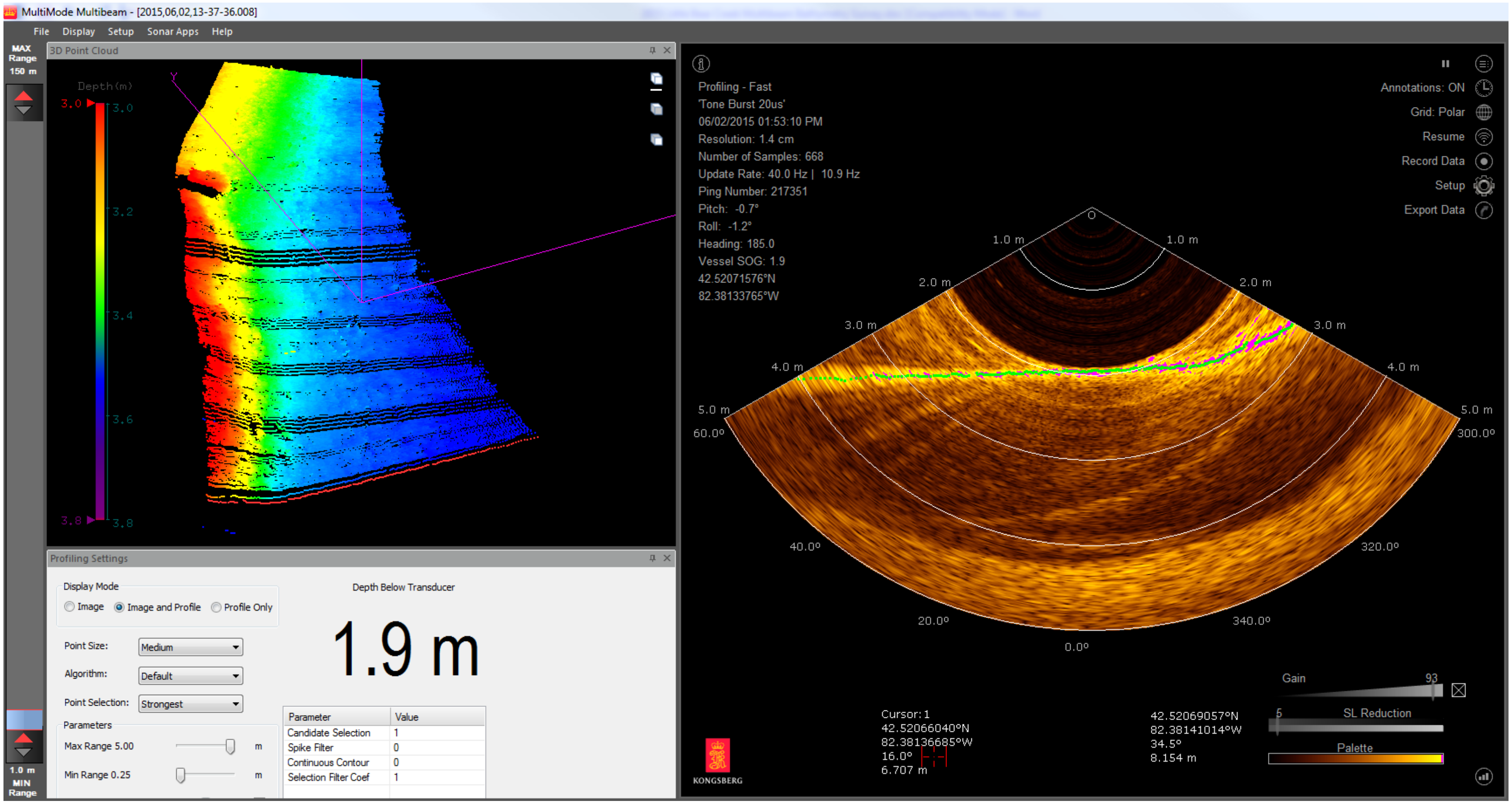

Figure 3. Screenshot from the Kongsberg M³ host software. The multibeam echogram (with bottom detection points) is shown in the right panel. The 3D point cloud is shown in the left panel. Segment shown is just downstream from the McLeod Bridge.

PATCH TESTS (PITCH, ROLL, HEADING AND SENSOR LATENCY CALIBRATIONS)

The Patch Test corrects for residual mounting angle errors that remain after the static calibration (physical measurements of sensor mounting locations) is defined. The method utilizes the repeatability of lakebed features when viewed from different geometries (i.e. transect offsets, opposing transect directions and varying survey speeds) in order to determine the residual mounting angles between the sonar transducer, inertial navigation system and DGPS. Patch tests are most successful over deep water where angle measurement errors are lowest. Therefore, patch test data were collected off-site on June 18, 2015 on Little Lake in Peterborough, Ontario using the identical survey set-up (figure 5). Post-processing of the patch-test data followed the recommendations in the Kongsberg Mesotech "Collecting and processing bathymetry data: User Manual" (2014). Patch tests data were processed in HyPack 2015 HySWEEP hydrographic processing software (HYPACK, Inc., Middletown CT.). All Hysweep *.HS2X file parameters are summarized in Appendix I.

SOUND VELOCITY

We estimated the sound velocity from the observed surface water temperature at the beginning of each survey day. The observed water temperature on June 2, 2015 was 14.5^{o} C and 15.8^{o} C on June 3, 2015. We used the Echoview Sonar Calculator to estimate the speed of sound at 500 kHz as 1464.17 m/s and 1468.7 m/s, respectively. These values were entered within the Kongsberg M3 Host Software survey parameters.

2.1.3 REAL-TIME KINEMATIC (RTK) GPS CORRECTIONS AND HEAVE-PITCH-ROLL

Horizontal spatial accuracy was typically better than 12 cm with the deployment of the on-site Hemisphere GPS R120 DGPS receiver RTK base-station that provided real-time GPS corrections to the survey data stream. RTK corrections were provided to the survey vessel using a pair of Microhard VIP 2.4 GHz radios and L-Comm 8 dB antennas. The rover GPS system was a Hemisphere VS110 DGPS with true-heading capabilities. Fine-scale pitch, roll and vessel heave corrections were measured at the sonar pole mount using an SBG Systems Ellipse-E Inertial Navigation System (INS).

Within some segments of the LBC bathymetry surveys, GPS data were compromised by poor satellite reception and/or weak RTK base-station correction communication. This was most commonly was observed when the survey boat past close to, or beneath, large trees along the river bank. The problem was observed to be most severe along the most upstream reach between Bush Line and Greenvalley Line where over-hanging tree density was very high and the river banks are steep. Horizontal spatial accuracy may vary 1.5 m to 2.5 m within this site although some manual corrections of the swath bathymetry data were completed in post-processing (i.e. registering common targets of interest between overlapping swaths).

Maps of the GPS mode (or GPS data quality) are available in the LBC GIS ("..\LittleBearCreek\GIS\GPGGA_From_RAWFile.lyr", see figure 6 for example). GPS modes 4 (RTK Fix) and 5 (RTK Float) are considered suitable GPS quality for these surveys. GPS modes 2 (WAAS only) and 1 (Stand-alone) are considered poor quality and survey results are to be considered with caution.

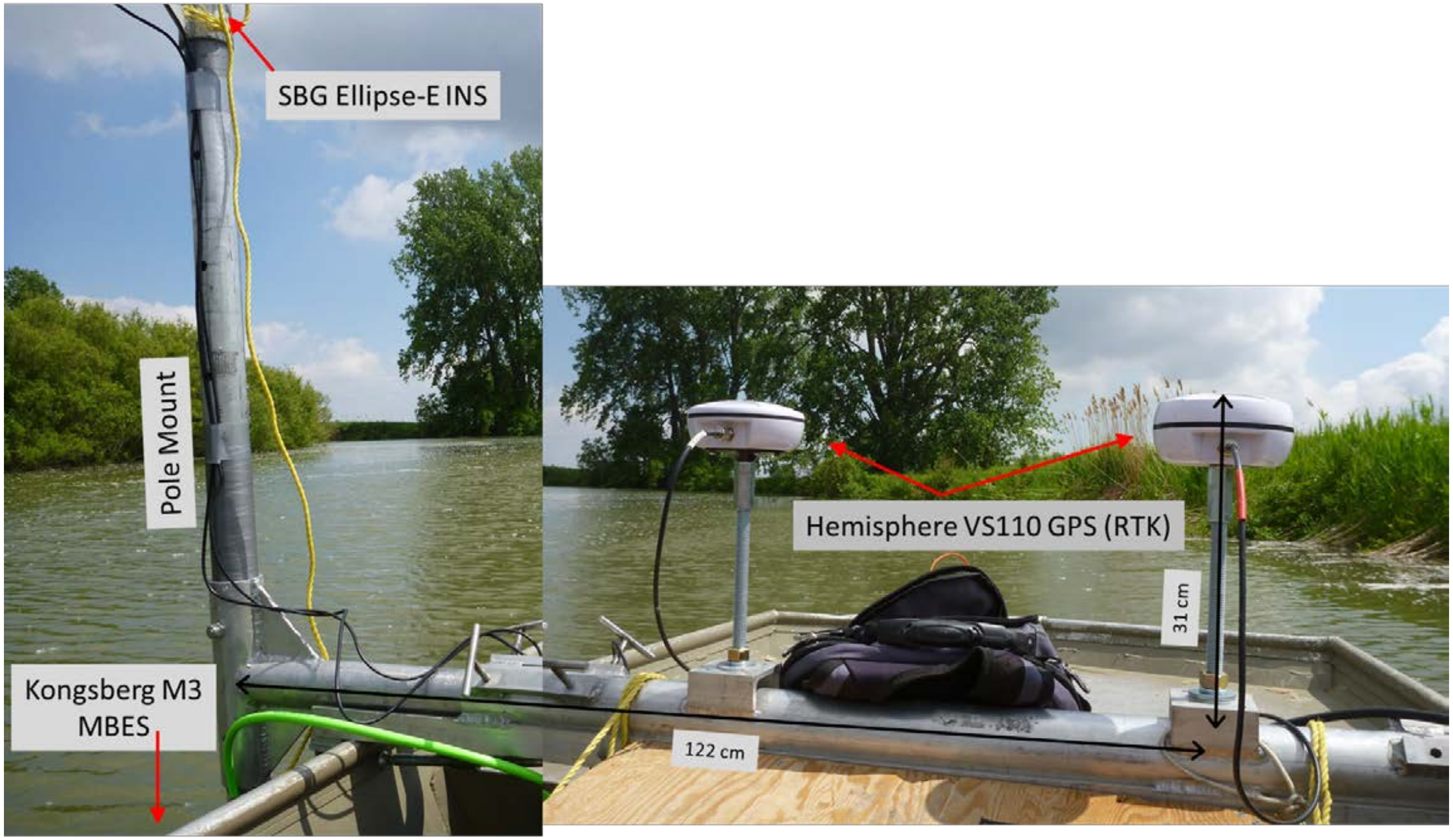

Figure 4. The Kongsberg M^3 sonar system was deployed on a gunwale pole mount on the forward port-side of the aluminum boat. All M^3 multibeam sonar data were recorded on a laptop. RTK corrected DGPS data (with true heading) were recorded using a Hemisphere VS110 GPS system set-up in the roll configuration. RTK base station corrections were provided to the rover GPS system from a Microhard Systems VIP 2.4 GHz radio modem.

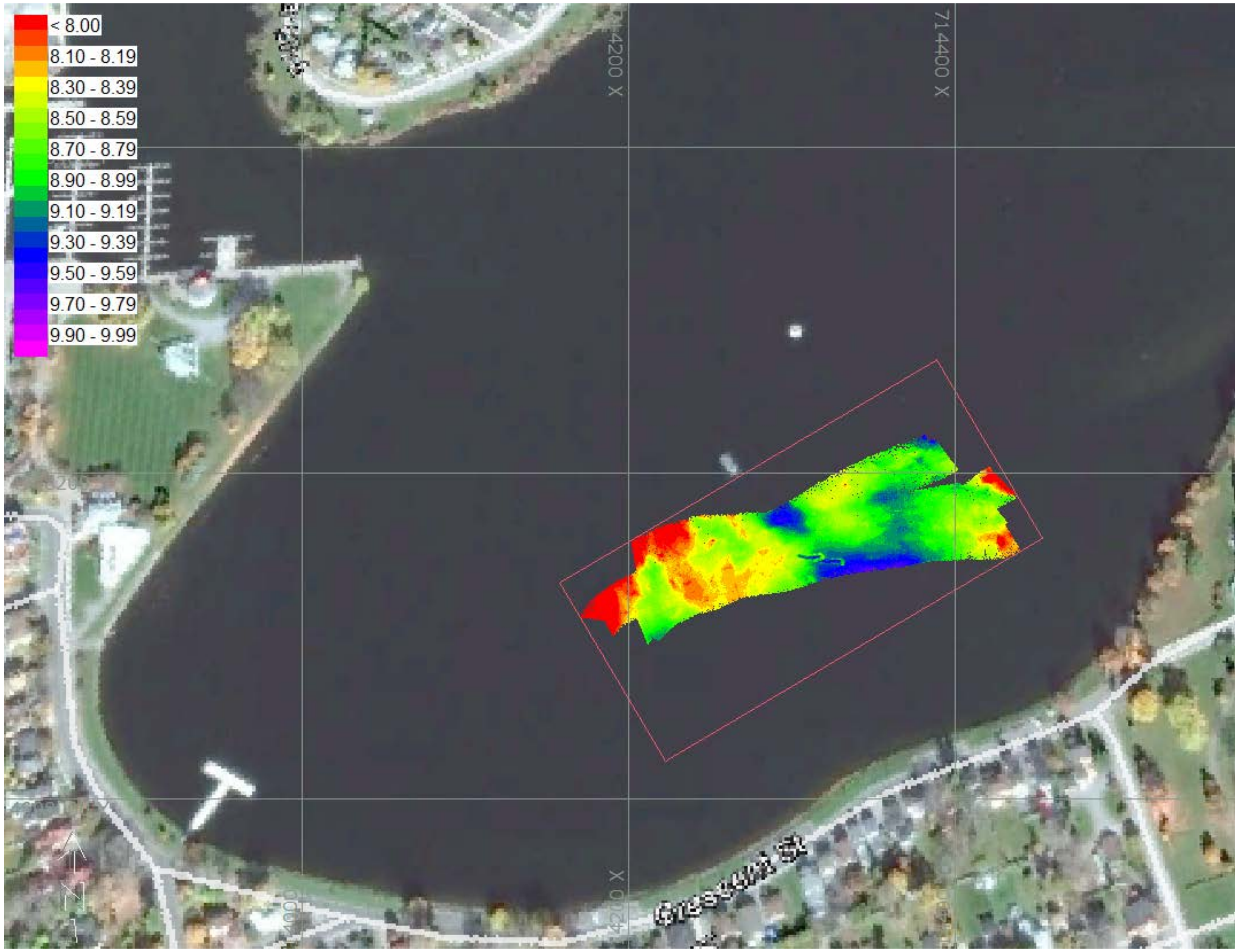

Figure 5. Multibeam bathymetry static and dynamic ("Patch Tests") survey calibrations were completed on June 18, 2015 on Little Lake in Peterborough, Ontario. Latency, Pitch and Yaw tests were referenced to the position of grooves within the lake bottom (at center of patch) created by the movement of large barge anchors.

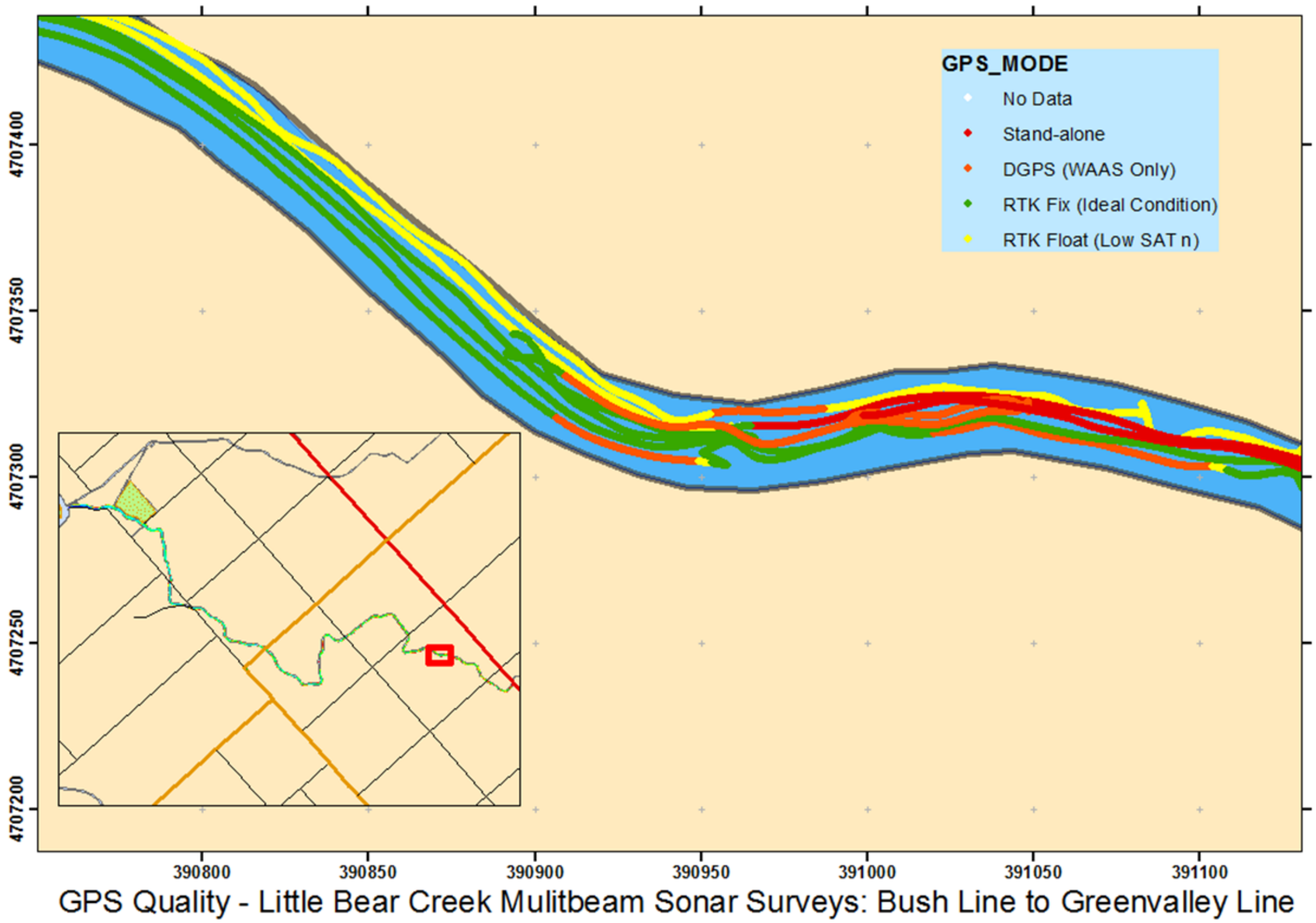

Figure 6. Observed GPS quality. Data shown are from survey segments between Bush Line and Greenvalley Line where poor GPS quality was most commonly observed. This area has a high density of large trees over-hanging the river and the riverbanks are steep.

2.2 MULTIBEAM SONAR PROCESSING METHODS

2.2.1 MULTIBEAM SONAR BATHYMETRY PROFILING

Kongsberg M^3 sonar echograms for all surveys were logged to the laptop in the native *.mmb format. All files were replayed in the M^3 host software and the 3D point cloud was exported to the Kongsberg *.all data format. Within HyPack hydrographic software, *.hsx multibeam data files were generated and imported into the HySWEEP Editor - 64 multibeam processing module within HyPack. Within HySWEEP, wiggle plots of the bathymetry files were generated to identify and remove outliers, fish detections, air bubbles and submerged macrophytes. File segments where GPS problems were observed (i.e. under trees near shoreline, sections between river kilometer 8.4146 (BUSH LINE) to 10.320 (GREENVALLEY LINE)) were removed or manually adjusted (see Appendix I). Patch Test data were processed to determine roll (-0.6 ^{o}), pitch (-0.8^o), yaw (176^o) and sensor latency (0.25 s or 0.33 s) offsets. Scrubbed *.hs2x files (..\HYPACK 2015\Projects\LittleBearCreek_Bathy\Edit) were then compiled onto a 0.15m x 0.15m grid and the average (AVG) and minimum (MIN) depths were assigned to each cell from all observed bathymetry points that fell within the grid cell. Each 0.15 m x 0.15 m cell was exported as an *.xyz text file (*_AVG_xyz.txt and *_MIN_xyz.txt) for importing into ESRI ArcGIS (ESRI). XYZ files are available in "..\HYPACK 2015\Projects\LittleBearCreek_Bathy\Sort\".

2.2.2 BATHYMETRY SURFACE CREATION IN ARCGIS

To delineate the shoreline boundaries of the bathymetry survey area, a river bank depth of "0 m" must be added to the bathymetry model. Typically, the shoreline position is measured directly using a laser range-finder system that can accept RTK corrected DGPS NMEA strings. Systems such as the LTI TruPulse 360 R or the Laser Atlanta Advantage R are capable of "shooting" the shoreline as the boat travels well out from shore where GPS reception is not compromised.

Given that the measured shoreline positions are not available for these surveys, we used an ArcGIS layer of the Little Bear Creek river outline (National Hydro Network 02GGB00 - Sydenham - St. Clair Lake, Ontario) waterbody polygon shapefile available from the GeoGratis website (http://geogratis.gc.ca/api/en/nrcan-rncan/ess-sst/96249efb-a5e1-4243-9bba-919ff7c6519f.html). Layering the LBC river outline polygon over the multibeam bathymetry XYZ points showed that some depth points fell well outside the polygon “shoreline” (figure 7a and 7b). For these areas, we manually modified and expanded the LBC outline polygon layer to ensure that all bathymetry points fell inside the polygon bounds. It is important to note that where the observed bathymetry points fell within the existing polygon edges, no modifications (i.e. trimming) were performed.

Note: We DO NOT recommend using the NHN shoreline polygon OR the modified shoreline polygon for calculating channel widths.

The modified shoreline polygon was then converted to a polyline and we used the “Create Station Points” tool in ETGeoWizards to generate points every 1 m along the shoreline. All points were assigned a depth of “0 m”. Those points located at the creek mouth or across side-channels were deleted.

Within the GIS, we used the 3D Analyst ArcGIS extension to generate a triangulated irregular network (TIN) surface from the XYZ bathymetry grid points with the shoreline points. The TIN surface was clipped using the modified river outline polygon to only include the spatial extent of the main channel. We used the Convert TIN to Raster tool to present the bathymetry model as an ArcGIS GRID with a 0.25m x 0.25 m cell size.

RELEVANT GIS LAYERS

.. \DFO\2014\LittleBearCreek\GIS

GPGGA_From_RAWFile.shp – Provides a summary of GPS quality.

LBC_Area_Roads.shp – Road layer for the LBC area.

LBC_Channel_Modified.shp – The NHN LBC shoreline polygon that was modified to enclose available bathymetry points.

LBC_RTK_BaseStation_Points.shp – Approximate position of RTK base stations.

..\DFO\2014\LittleBearCreek\GIS\Hydro

NHN_02GGB00_1_0_HD_WATERBODY_2.shp – Original NHN LBC waterbody polygon available from the GeoGratis website.

..\DFO\2014\LittleBearCreek\GIS\Bathy\RASTERS

BATHYAVG.LYR – ArcGIS GRID layer (0.25 m x 0.25 m cell) that provides the **average** depth of all available multibeam depth points that fall within a grid cell.

BATHYMIN.LYR – ArcGIS GRID layer (0.25 m x 0.25 m cell) that provides the **minimum** depth of all available multibeam depth points that fall within a grid cell.

..\DFO\2014\LittleBearCreek\GIS\Bathy\TIN

lbc_bathy_avg_TIN.lyr – The triangulated irregular network (TIN) surface generated from the **average** XYZ bathymetry grid (0.15m x 0.15m) points. Also includes the modified shoreline layer assigned a “0 m” depth.

lbc_bathy_min_TIN.lyr– The triangulated irregular network (TIN) surface generated from the **minimum** XYZ bathymetry grid (0.15m x 0.15m) points. Also includes the modified shoreline layer assigned a “0 m” depth.

..\DFO\2014\LittleBearCreek\GIS\Bathy\XYZ

2015_LBCBathy_Final_Section01_Avg_xyz_Layer.lyr
2015_LBCBathy_Final_Section01_Min_xyz_Layer.lyr
2015_LBCBathy_Final_Section02_Avg_xyz_Layer.lyr
2015_LBCBathy_Final_Section02_Min_xyz_Layer.lyr
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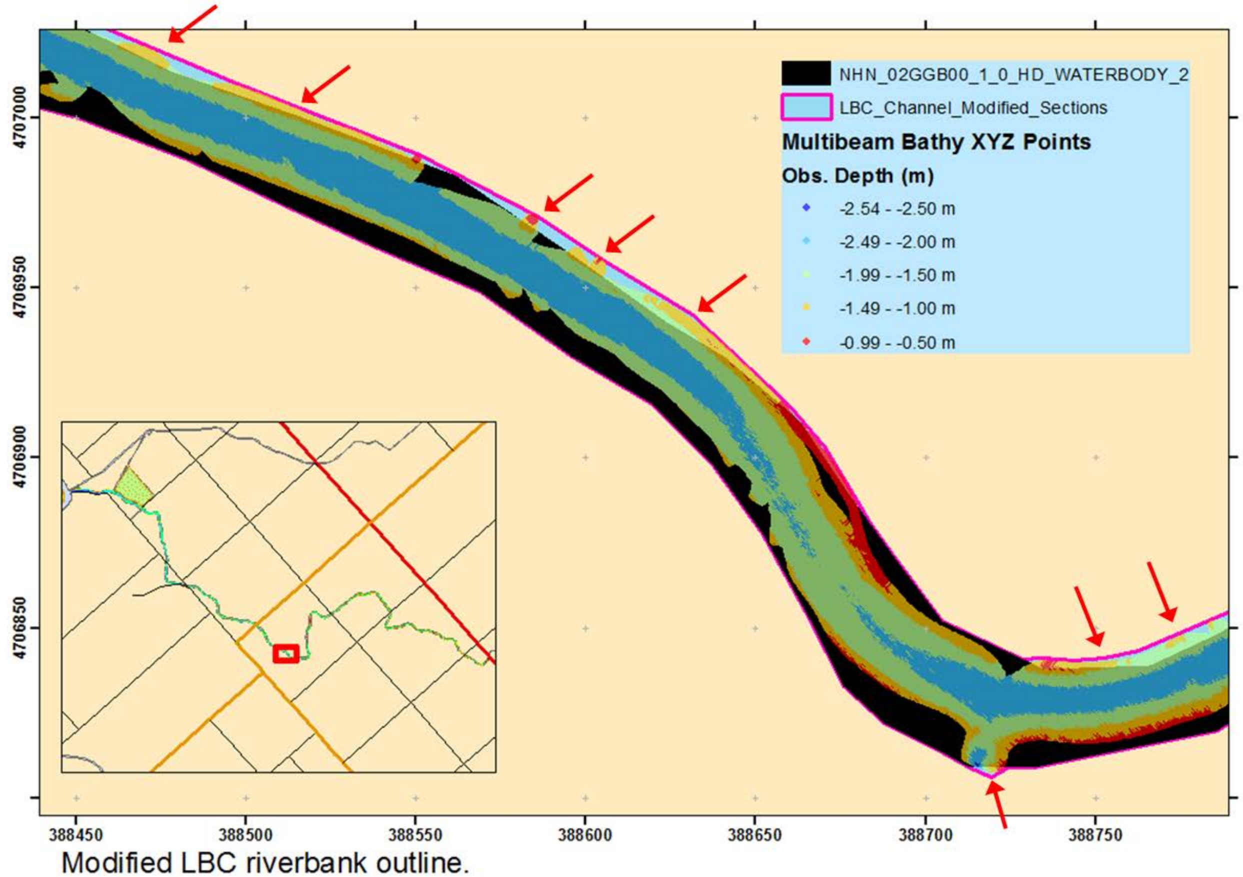

Figure 7a. Shown is a segment of the Little Bear Creek multibeam bathymetry survey between Electric Line (Hwy 43) and Baldoon Road as plotted within the GIS. The black polygon in the background is the original river shoreline polygon available from the National Hydro Network (NHN_02GGB00). The red-yellow-blue shaded points are the observed 0.15 cm x 0.15cm bathymetry grid depth points. Note that the depth points fall outside of the NHN polygon along the north shoreline. The NHN polygon boundaries were manually modified to enclose all observed bathymetry points (pink outline, LBC_Channel_Modified_Sections). The modified shoreline was assigned a "0 m" depth and was included in the final bathymetry model (TIN).

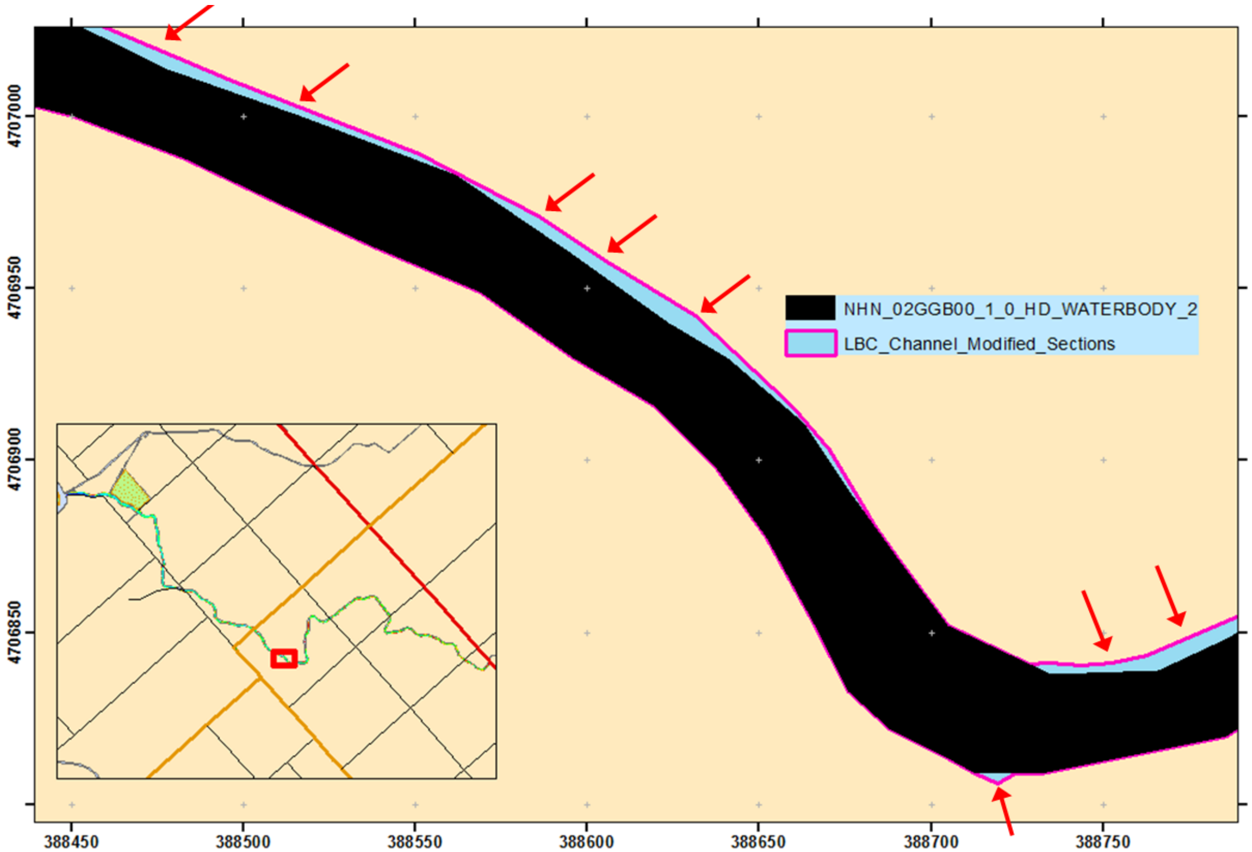

Figure 7b. Shown is a segment of the Little Bear Creek multibeam bathymetry survey between Electric Line (Hwy 43) and Baldoon Road as plotted within the GIS. The black polygon in the background is the original river shoreline polygon available from the National Hydro Network (NHN_02GGB00). The NHN polygon boundaries were manually modified to enclose all observed bathymetry points (pink outline, LBC_Channel_Modified_Sections). The modified shoreline was assigned a "0 m" depth and was included in the final bathymetry model (TIN).

7.0 APPENDICES

7.1 APPENDIX I

\\..\DFO\LBC\Data\Bathymetry\HSX_Parameters.pdf

7.2 GIS PROJECTS, SHAPEFILES AND LAYERS

Project File: \\..\DFO\2014\LittleBearCreek\GIS\LBC_Bathy.mxd

7.3 TECHNICAL SPECIFICATION DATA SHEETS

See further information in \\..\DFO\2014\LittleBearCreek\SpecSheets\

1. Kongsberg-Mesotech M3 Multibeam Sonar System
2. Hemisphere VS110 DGPS with True heading
3. Hemisphere GPS R120 DGPS receiver RTK base-station
4. Microhard VIP 2.4 GHz radio modem
5. SBG Systems Ellipse-E INS

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,02,10-08-41_Part01.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.4	176	-1	-0.6
2015,06,02,10-08-41_Part02.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.44	176	-1	-0.6
2015,06,02,10-29-23_Part01.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.4	176	-1	-0.6
2015,06,02,10-29-23_Part02.HS2x	0 (MOUTH) to 0.987	0.22	0	0.25	0	0	0.4	176	-1	-0.6
2015,06,02,10-29-23_Part03.HS2x	0 (MOUTH) to 0.987	2.48	0	0.25	0	0	0.4	176	-1	-0.6
2015,06,02,10-29-23_Part04.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.4	176	-1	-0.6
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2015,06,02,10-29-23_Part06.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.4	176	-1	-0.6
2015,06,02,10-48-52_Part01.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.39	176	-1	-0.6
2015,06,02,10-48-52_Part02.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.4	176	-1	-0.6
2015,06,02,11-04-30.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-05-02.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-15-59.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-27-10.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-36-27.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-38-18.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-39-52.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-51-22.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.38	176	-1	-0.6
2015,06,02,11-57-24.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.37	176	-1	-0.6
2015,06,02,12-01-50.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.37	176	-1	-0.6
2015,06,02,12-04-38.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.37	176	-1	-0.6
2015,06,02,12-07-08.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.37	176	-1	-0.6
2015,06,02,12-08-54.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.37	176	-1	-0.6
2015,06,02,12-23-44_Part01.HS2x	0 (MOUTH) to 0.987	1.22	0	0.25	0	0	0.41	176	-1	-0.6
2015,06,02,12-23-44_Part02.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,12-35-40.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,12-40-34.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,12-45-06.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,12-51-58.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,12-58-06.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-07-38.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.373	176	-1	-0.6
2015,06,02,13-08-09_Part01.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.386	176	-1	-0.6
2015,06,02,13-08-09_Part02.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.446	176	-1	-0.6
2015,06,02,13-08-09_Part03.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-14-06.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-23-02.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-27-07.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-29-24.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-34-16.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-35-45.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,02,13-37-36_Part01.HS2x	0.987 to 1.622	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-37-36_Part02.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-53-15.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,13-54-13.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-03-48.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-05-25.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-14-04.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-23-21.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-25-32.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-26-27.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-27-09.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-33-30.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-41-52.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-45-36.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-49-27.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-50-52.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,14-56-00.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-04-42.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-05-35.HS2x	1.623 to 2.510 (BEAR_LINE)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-11-16.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-21-11.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-29-17.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-37-44.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-44-53.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-52-32.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,15-59-51.HS2x	2.510 (BEAR_LINE) to 3.230 (MCLEOD)	1.22	0	0.25	0	0	0.346	176	-1	-0.6
2015,06,02,16-02-48.HS2x	OMIT									
2015,06,02,16-18-10.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-18-41.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-22-58.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-27-23.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-29-46.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-34-19.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-38-37.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-46-30.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,16-53-00.HS2x	2.511 (BEAR_LINE) to 3.600 (CABLE BRIDGE)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,17-08-22.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,17-23-01.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,17-36-46.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,17-39-14.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,02,17-41-48.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,17-52-36.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,02,18-02-26.HS2x	3.601 (CABLE BRIDGE) to 4.735 (ELECTRIC)	1.22	0	0.25	0	0	0.352	176	-1	-0.6
2015,06,03,13-30-40.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,13-32-08.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,13-34-21.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,13-57-56.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-02-57.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-06-59.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-13-32.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-14-41.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-16-03.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-19-17.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-20-50.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-23-17.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-24-08.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-32-09.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-33-40_Part01.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	0.26	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-33-40_Part02.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-33-40_Part03.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-44-59.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,14-56-02.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,15-07-00.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,15-17-04.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,15-24-22.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,15-25-41.HS2x	7.098 (BALDOON) to 8.4145 (BUSH LINE)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,06,03,16-03-38.HS2x	OMIT									
2015,06,03,16-03-38_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-03-38_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-03-38_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-03-38_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-03-38_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-10-59.HS2x	OMIT									
2015,06,03,16-10-59_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-10-59_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-10-59_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-10-59_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-10-59_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-13-33.HS2x	OMIT									
2015,06,03,16-13-33_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,03,16-13-33_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-13-33_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-13-33_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-13-33_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-16-33.HS2x	OMIT									
2015,06,03,16-16-33_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-16-33_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-16-33_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-16-33_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-16-33_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-17-42.HS2x	OMIT									
2015,06,03,16-17-42_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-17-42_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-17-42_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-17-42_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-17-42_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-00.HS2x	OMIT									
2015,06,03,16-20-00_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-00_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-00_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-00_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-00_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-09.HS2x	OMIT									
2015,06,03,16-20-09_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-09_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-09_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-09_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-20-09_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-24-35.HS2x	OMIT									
2015,06,03,16-24-35_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-24-35_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-24-35_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-24-35_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-24-35_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-39.HS2x	OMIT									
2015,06,03,16-28-39_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-39_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-39_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-39_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-39_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,03,16-28-58.HS2x	OMIT									
2015,06,03,16-28-58_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-58_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-58_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-58_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-28-58_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-29-26.HS2x	OMIT									
2015,06,03,16-29-26_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-29-26_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-29-26_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-29-26_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-29-26_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-31-07.HS2x	OMIT									
2015,06,03,16-31-07_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-31-07_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-31-07_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-31-07_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-31-07_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-32-21.HS2x	OMIT									
2015,06,03,16-32-21_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-32-21_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-32-21_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-32-21_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-32-21_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-17.HS2x	OMIT									
2015,06,03,16-33-17_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-17_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-17_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-17_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-17_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-42.HS2x	OMIT									
2015,06,03,16-33-42_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-42_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-42_Part03a.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	2.89	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-42_Part03b.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	2.89	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-42_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-33-42_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-40-19.HS2x	OMIT									
2015,06,03,16-40-19_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-40-19_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.72	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,03,16-40-19_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-40-19_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-40-19_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-51-38.HS2x	OMIT									
2015,06,03,16-51-38_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-51-38_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-51-38_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-51-38_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,16-51-38_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	3.53	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-06-24.HS2x	OMIT									
2015,06,03,17-06-24_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-06-24_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-06-24_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-06-24_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-06-24_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	-0.78	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-08-13.HS2x	OMIT									
2015,06,03,17-08-13_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-08-13_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-08-13_Part03a.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.62	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-08-13_Part03b.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.62	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-08-13_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-08-13_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	-1.08	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-20-40.HS2x	OMIT									
2015,06,03,17-20-40_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-20-40_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-20-40_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-20-40_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-20-40_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-24-34.HS2x	OMIT									
2015,06,03,17-24-34_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-24-34_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-24-34_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-24-34_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-24-34_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-25-48.HS2x	OMIT									
2015,06,03,17-25-48_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-25-48_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-25-48_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-25-48_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-25-48_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,06,03,17-30-21.HS2x	OMIT									
2015,06,03,17-30-21_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-30-21_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-30-21_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-30-21_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-30-21_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-31-41.HS2x	OMIT									
2015,06,03,17-31-41_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-31-41_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-31-41_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-31-41_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-31-41_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-35-05.HS2x	OMIT									
2015,06,03,17-35-05_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-35-05_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-35-05_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	2.51	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-35-05_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-35-05_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-40-30.HS2x	OMIT									
2015,06,03,17-40-30_Part01.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-40-30_Part02.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-40-30_Part03.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-40-30_Part04.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-40-30_Part05.HS2x	8.4146 (BUSH LINE) to 10.320 (GRNVALLEY LINE)	4.46	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,17-53-53.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-00-12.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-01-40.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-03-47.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-06-18.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-06-54.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-11-15.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,06,03,18-16-10.HS2x	10.321 (GRNVALLEY LINE) to 10.870 (HWY40)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,21-35-04.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,21-38-46.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.519	176	-1	-0.6
2015,Jun,10,21-57-58.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-01-30.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,22-06-10.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-07-36.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-08-55.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,22-12-39.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.469	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,Jun,10,22-14-29.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.479	176	-1	-0.6
2015,Jun,10,22-16-14.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,22-20-42.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-22-59.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-24-05.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-24-57.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-28-25.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-29-30.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-31-16.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,22-33-56.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,22-36-07.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-38-05.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.489	176	-1	-0.6
2015,Jun,10,22-39-55.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-41-13.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.509	176	-1	-0.6
2015,Jun,10,22-48-35.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-50-11.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-51-45.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,22-52-58.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.499	176	-1	-0.6
2015,Jun,10,22-56-25.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.499	176	-1	-0.6
2015,Jun,10,23-12-46.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,10,23-14-41.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.469	176	-1	-0.6
2015,Jun,11,08-38-46.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.459	176	-1	-0.6
2015,Jun,11,08-59-50.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,09-06-55.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,09-08-18.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,09-12-46.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,09-24-30.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,09-45-48.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,09-50-59.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,11-04-46.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,12-01-15.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,12-37-44.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,12-51-13.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,13-37-26.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,13-38-40.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,13-39-36.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,13-40-32.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,13-43-49.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,14-19-56.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,14-58-11.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6

HySweep HS2X Filename	LBC_SECTION	NAV_X	NAV_Y	NAV_LATE	SONAR_X	SONAR_Y	SONAR_Z	PATCH_YAW	PATCH_PITCH	PATCH_ROLL
2015,Jun,11,15-02-00.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,15-24-01.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,17-30-25.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,20-18-10.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,20-29-20.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,20-41-20.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,20-57-35.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,21-11-20.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,21-17-39.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,21-25-16.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,21-58-06.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,22-09-38.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,22-16-40.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,22-21-19.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,22-37-00.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,11,22-45-09.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,12,08-29-09.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,12,08-29-53.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,12,08-33-04.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,12,08-41-38.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,12,09-15-16.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6
2015,Jun,12,13-05-26.HS2x	4.736 (ELECTRIC) to 7.097 (BALDOON)	1.22	0.16	0.33	-1.22	-0.16	0.419	176	-1	-0.6