U.S. Department of Commerce National Oceanic and Atmospheric Administration National Ocean Service			
DESCRIPTIVE REPORT			
Type of Survey:	Habitat Mapping		
Registry Number:	W00614		
	LOCALITY		
State(s):	California		
General Locality:	California		
Sub-locality:	CBNMS, GFNMS, and MBNMS		
	2018		
	CHIEF OF PARTY CAPT Keith W. Roberts		
	LIBRARY & ARCHIVES		
Date:			

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		W00614
INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.		
State(s):	California	
General Locality:	California	
Sub-Locality:	CBNMS, GFNMS, and MBNMS	
Scale:	10000	
Dates of Survey:	07/31/2018 to 08/10/2018	
Instructions Dated:	07/24/2018	
Project Number:	ESD-PHB-22	
Field Unit:	NOAA Ship Bell M. Shimada	
Chief of Party:	CAPT Keith W. Roberts	
Soundings by:	Kongsberg Maritime ME70 (MBES)	
Imagery by:	N/A	
Verification by:	Pacific Hydrographic Branch	
Soundings Acquired in:	meters at Mean Lower Low Water	

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/. Products created during office processing were generated in NAD83 UTM 10N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

DESCRIPTIVE REPORT MEMO

July 27, 2020

MEMORANDUM FOR:	Pacific Hydrographic Branch
THROUGH:	Joseph Allman Sheet Manager, NOAA Ship <i>Fairweather</i>
FROM:	Simon Swart Sheet Manager, NOAA Ship <i>Fairweather</i>
SUBJECT:	Submission of Survey W00614

Purpose

Fairweather was tasked with processing and comparing data collected by the Bell M. Shimada in 2018 to junctioning Fairweather surveys in 2019 in order to assess the viability of using the Shimadas' data for charting purposes. This survey was originally identified as Cruise SH-18-09. The data was collected within Cordell Bank National Marine Sanctuary (CBNMS), Greater Farallones National Marine Sanctuary (GFNMS), and Monterey Bay National Marine Sanctuary (MBNMS).

Products

Products include unprocessed backscatter data, processed Simrad ME-70 multibeam data, two surfaces including W00614_MB_VR_MLLW.csar and W00614_MB_VR_MLLW_Final.csar, junction analyses with Fairweather surveys, and chart comparisons. These products are provided to PHB.

The vertical datum for this project is Mean Lower Low Water. The horizontal datum for this project is North American Datum of 1983 (NAD 83). The projection used for this project is Universal Transverse Mercator (UTM) Zone 10.

Vertical and Horizontal Control

Soundings were reduced to MLLW using a verified tide file. The horizontal datum for this project is NAD83. The projection used for this project is Universal Transverse Mercator (UTM) zone 10N.

Data Acquisition and Processing

Caris HIPS and SIPS 11.1.3 and POSPac MMS 8.4 were used for data processing per the Fairweathers' standard processing practices. GPS Height was not recorded for any of the lines therefore they were not able to be ellipsoidally referenced, instead a verified tide file in the water levels folder was used. The maximum uncertainty values were used with Tide Measured - 0.05, Tide Zone - 0.4, SV Measured - 4, and SV Surface - 0.5.

Lines SH2018S_2121547_1 and SH2018S_2121619_2 do not have a delayed heave file due to insufficient data from the POS MV. These same two lines are also outside of the 4 hour window for casts and were georeferenced with the cast profile selection method set as nearest in time (instead of nearest in distance within time).

All data were reviewed for DTONs and none were identified in this survey.

Results and Recommendations

In the multibeam data, accepted soundings were present throughout the entire water column and extensive cleaning was required of the more than 8,000 fliers identified by flier finder (Figure 1). Most of the fliers were present inside Bodega Canyon, where depths increase from 270 to 500 meters.

Uncertainty

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Overall, 73% of nodes within the surface meet NOAA HSSD Allowable Uncertainty specifications (Figure 2) and 92% of nodes within the surface meet CATZOC A2/B specifications (Figure 3).

Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for W00614 were achieved with at least 97.70% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3 (Figure 4).

Junctions

W00614 junctions with two adjacent surveys from prior Fairweather projects, W00478 and W00477 as shown in Figure 5. Data overlap between W00614 and each adjacent survey was significant enough to provide a comparison. These areas of overlap between surveys were reviewed in CARIS HIPS and SIPS by surface differencing (at equal resolutions) to assess surface agreement. The multibeam data were also examined in CARIS Subset Editor for consistency and agreement. The junctions with W00614 are generally within the NOAA allowable uncertainty in their areas of overlap. For all junctions with W00614, a negative difference indicates W00614 was shoaler and a positive difference indicates W00614 was deeper.

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from W00614 and the surface from W00478 (Figures 6 and 7). The statistical analysis of the difference surface shows a mean of -0.54 meters with 95% of the nodes having a maximum deviation of \pm -2.15 meters, as seen in Figure 8. It was found that 95.33% of nodes are within NOAA allowable uncertainty.

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from W00614 and the surface from W00477 (Figures 9 and 10). The statistical analysis

of the difference surface shows a mean of 0.69 meters with 95% of the nodes having a maximum deviation of +/-1.44 meters, as seen in Figure 11. It was found that 94.41% of nodes are within NOAA allowable uncertainty.

ENC Comparison

A comparison was performed between survey W00614 and ENC US3CA14M and ENC US3CA52M using CARIS HIPS and SIPS. The ENCs were compared to the surface by extracting all soundings from the charts and creating an interpolated TIN surface which could be differenced with the surface from W00614 as shown in Figures 12 and 14. Statistical analyses of the difference surfaces are shown in Figures 13 and 15. The greatest differences were present in Bodega Canyon where difference range up to 85 meters as shown in Figure 12.



Figure 1: Example of noise captured throughout water column in sonar data



Figure 2: W00614 Uncertainty Statistics NOAA HSSD



Figure 3: W00614 Uncertainty Statistics CATZOC A2/B



Figure 4: W00614 Density Statistics



Figure 5: Overview of W00614 junction surveys



Figure 6: Difference surface between W00614 (gray) and junctioning survey W00478 (green)



Figure 7: Difference surface between W00614 (gray) and junctioning survey W00478 (green)



Figure 8: Difference surface statistics between W00614 and W00478 (VR surface)



Figure 9: Difference surface between W00614 (gray) and junctioning survey W00477 (purple)



Figure 10: Difference surface between W00614 (gray) and junctioning survey W00477 (purple)



Figure 11: Difference surface statistics between W00614 and W00477 (VR surface)



Figure 12: Difference surface between W00614 and interpolated TIN surface from US3CA14M (in meters)



W00614 - US3CA14M Difference 32m ean: 2.02 | Mode: 0.67 | One Standard Deviation: 7.47 | Bin size: 0.4

Figure 13: Difference surface statistics between W00614 and interpolated TIN surface from US3CA14M



Figure 14: Difference surface between W00614 and interpolated TIN surface from US3CA52M (in meters)



Figure 15: Difference surface statistics between W00614 and interpolated TIN surface from US3CA52M

This survey does meet charting specifications and is adequate to supersede prior data.