D00228

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	D00228

LOCALITY

State(s):	California
General Locality:	Channel Islands National Marine Sanctuary
Sub-locality:	Santa Cruz Basin to Santa Cruz Canyon and Vicinity

2017

CHIEF OF PARTY
Benjamin K. Evans, CDR/NOAA

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

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

D00228

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:	**Channel Islands National Marine Sanctuary**
Sub-Locality:	**Santa Cruz Basin to Santa Cruz Canyon and Vicinity**
Scale:	**20000**
Dates of Survey:	**10/08/2017 to 10/22/2017**
Instructions Dated:	**08/25/2017**
Project Number:	**OPR-L397-RA-17**
Field Unit:	**NOAA Ship *Rainier***
Chief of Party:	**Benjamin K. Evans, CDR/NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

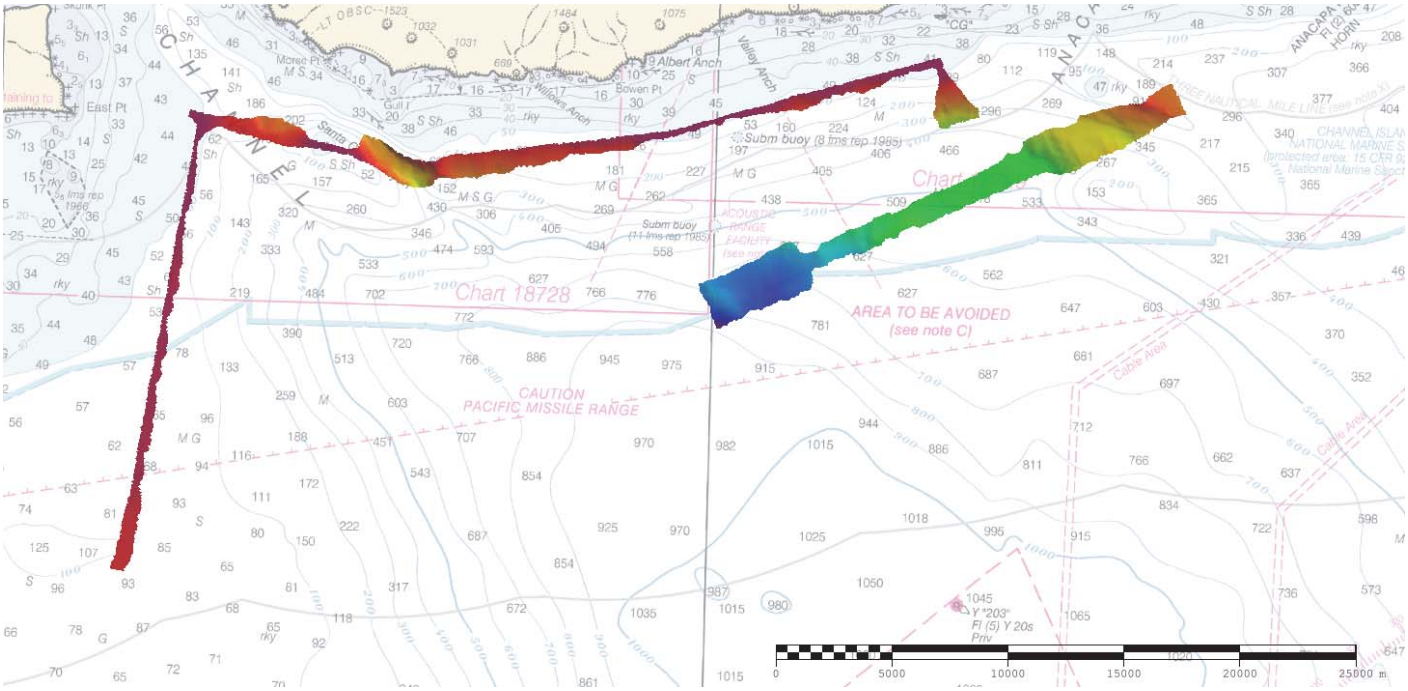
Descriptive Report Summary D00228	
Project	OPR-L397-RA-17
Survey	D00228
State	California
Locality	Channel Islands and Vicinity, CA
Sub Locality	Santa Crus Basin to Santa Cruz Canyon and Vinicinty
Scale of Survey	1:20000
Sonars Used	Kongsberg EM710 (ICE)
Horizontal Datum	North American Datum of 1983 (NAD83)
Vertical Datum	Mean Lower Low Water
Vertical Datum Correction	VDatum
Projection	UTM Zone 11N
Field Unit	NOAA Ship Rainier
Survey Dates	10/08/2017 - 10/22/2017
Chief of Party	Benjamin K. Evans, CDR/NOAA

A. Area Surveyed

The survey area is referred to as D00228, "Santa Cruz Basin to Santa Cruz Canyon and vicinity" (Sheet 1) within the project instructions. The area encompasses approximately 19 square nautical miles south of Santa Cruz Island within the Channel Island National Marine Sanctuary (CINMS). This hydrographic survey was acquired in accordance with the requirements defined in the Project Instructions, "RA-17-05 CINMS Project Instructions_Final: Channel Islands and Vicinity, CA".

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
33° 56' 44.47" N 119° 54' 47.03" W	33° 46' 14.81" N 119° 25' 51.76" W



Area surveyed south of Santa Cruz Island within CINMS for D00228 (Chart 18720)

B. Survey Purpose

The purpose of this survey is to provide quality assessment and comparison source data for the complete multibeam echocounder (MBES) coverage completed by NOAA Ship Bell M. Shimada and E/V Nautilus that was collected in partnership with the NOAA CINMS and the Ocean Exploration Trust. The data collected from D00228 will assist in the further evaluation of previously acquired outside source data and determine if adequate for nautical chart application.

D00228 multibeam data will serve to enhance marine navigational safety, and is recommended to update the applicable nautical charts.

C. Intended Use of Survey

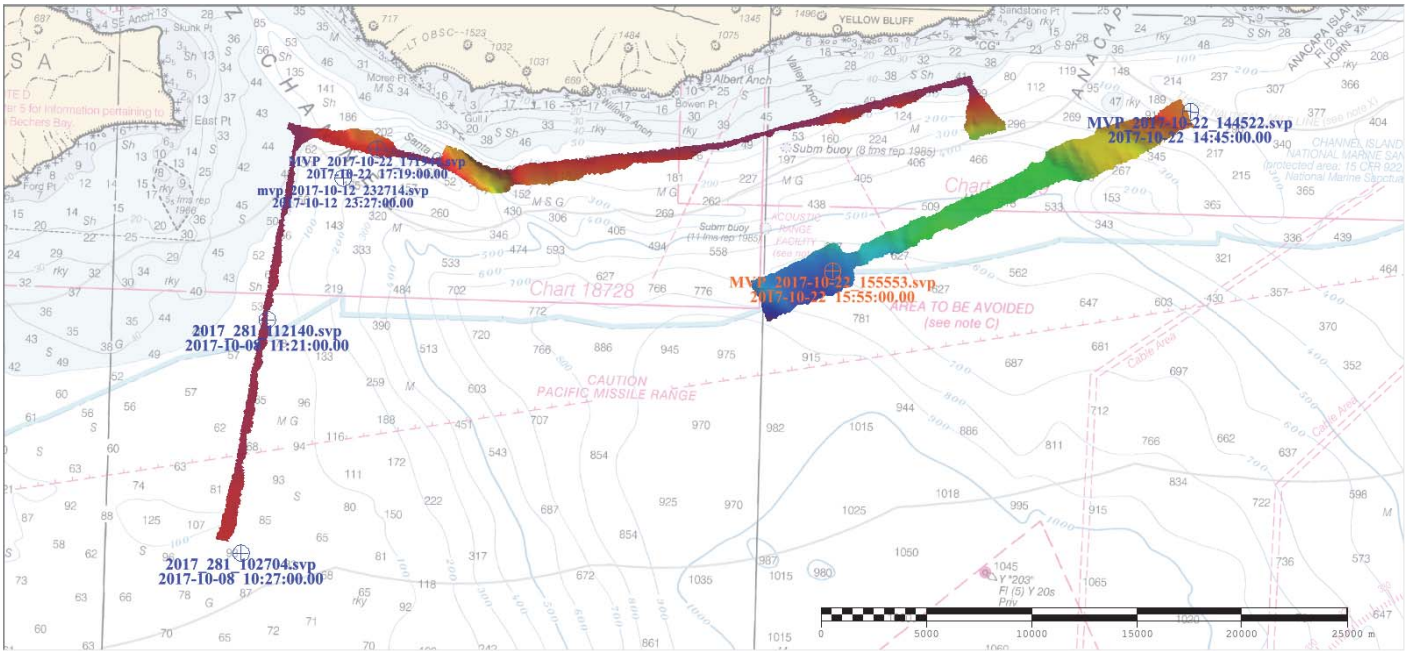
The entire survey is adequate to supersede previous data.

Survey data acquired within survey limits is accordance with the requirements in the Project Instructions and the Hydrographic Surveys Specifications and Deliverables (HSSD). This survey is recommended for comparison and further evaluation of previously acquired data by NOAA Ship Bell M. Shimada and E/V Nautilus to determine the adequacy of bathymetry collected by these two platforms for charting.

D. Data Acquisition and Processing

Please reference Data Acquisition and Processing Report (DAPR), 2017 DAPR, for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement survey data are discussed below.

Sound Speed Methods:
Sound speed profiles were acquired using both the Rolls Royce MVP200 and Sea-Bird Electronics SBE19plus SEACAT Profiler at discrete locations within the survey area at least once every four hours, when significant changes in surface sound speed were observed, or when starting a new day of surveying. A total of six casts were acquired and applied to D00228 MBES using the "Nearest in distance within 4 hours" profile selection method found in Caris HIPS and SIPS.



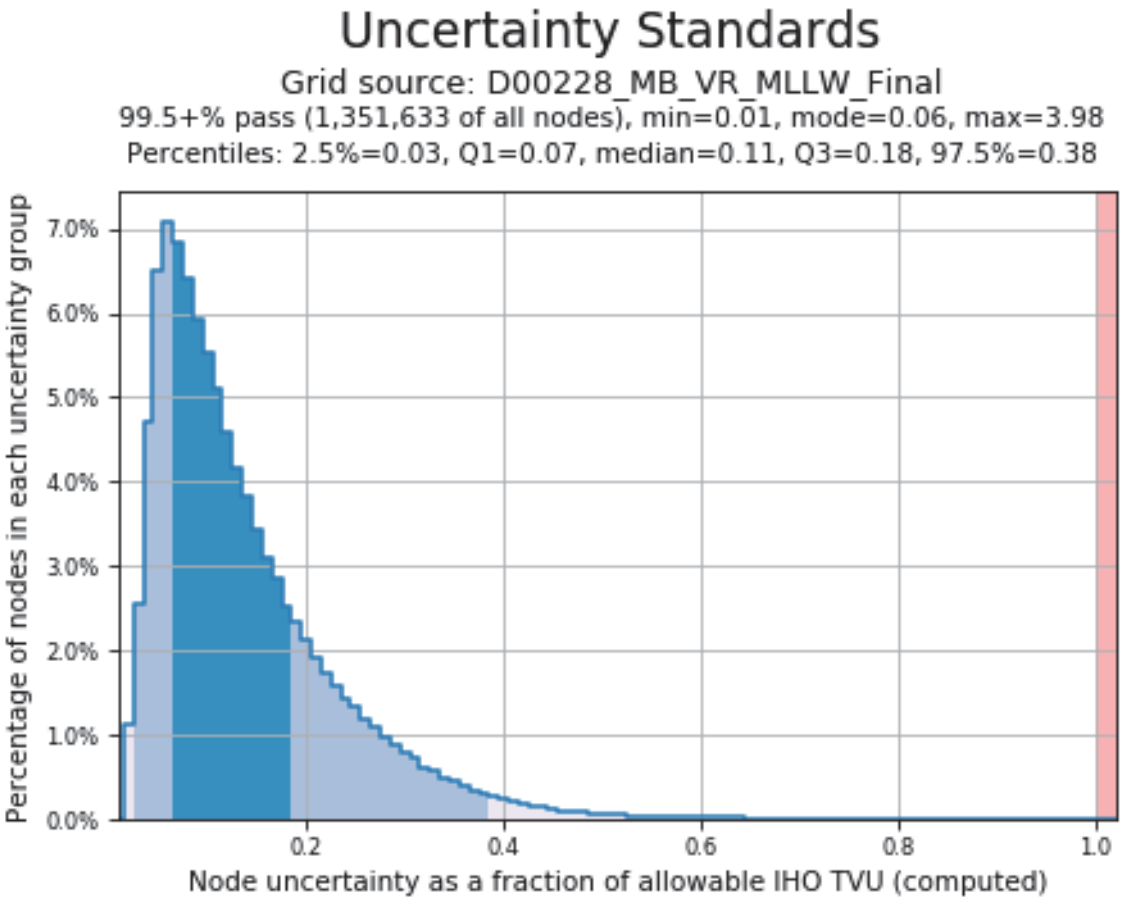
D00228 Sound speed cast locations.

E. Uncertainty

Uncertainty values were measured and applied in accordance withe Section B.4 of the DAPR.

The Total Propagated Uncertainty (TPU) values for survey D00228 were derived from a combination of fixed values for equipment and vessel characteristics, as well as field assigned values for sound spreed uncertainties. Tidal uncertainty was provided in the metadata accompanying the NOAA vertical datum transformation model used for this survey. The local VDATUM model uncertainty of 0.082867 meters was entered as the tide zoning value for TPU calculation.

Uncertainty values of the submitted finalized Variable Resolution grid were calculated using the "Greater of the Two" uncertainty and standard deviation (scaled to 95%). Pydro QC tools 2 were used to analyze D00228 TVU compliance; a histogram plot of the results are shown below.



Pydro derived histogram plot showing TVU compliance on D00228 multi-resolution MBES data.

F. Results and Recommendations

The following are the largest scale RNC and ENC, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US3CA69M	1:232188	19	02/01/2017	02/22/2017	NO
US5CA66M	1:40000	3	10/06/2016	10/06/2016	NO
US5CA67M	1:40000	3	09/22/2016	09/22/2016	NO

A comparison was made between D00228 survey data and Electronic Navigation Charts (ENC) US3CA69M, US5CA66M, and US5CA67M using the CUBE VR surface, selected soundings and contours created in Caris HIPS and SIPS.

US5CA66M:
ENC US5CA66M covers the north western portion of D00228 data. Depth curves on ENC US5CA66M that apply to D00228 survey area are 100, 200, 400, 500/550, and 700 fathoms. The depth curves derived from D00228 generally followed the contours depicted in ENC US5CA66M.

A positional offset between ENCs US5CA66M and US5CA67M of approximately 20 to 90 meters was identified at the junction of these charts; relatively in the center of the northern most survey line of D00228.

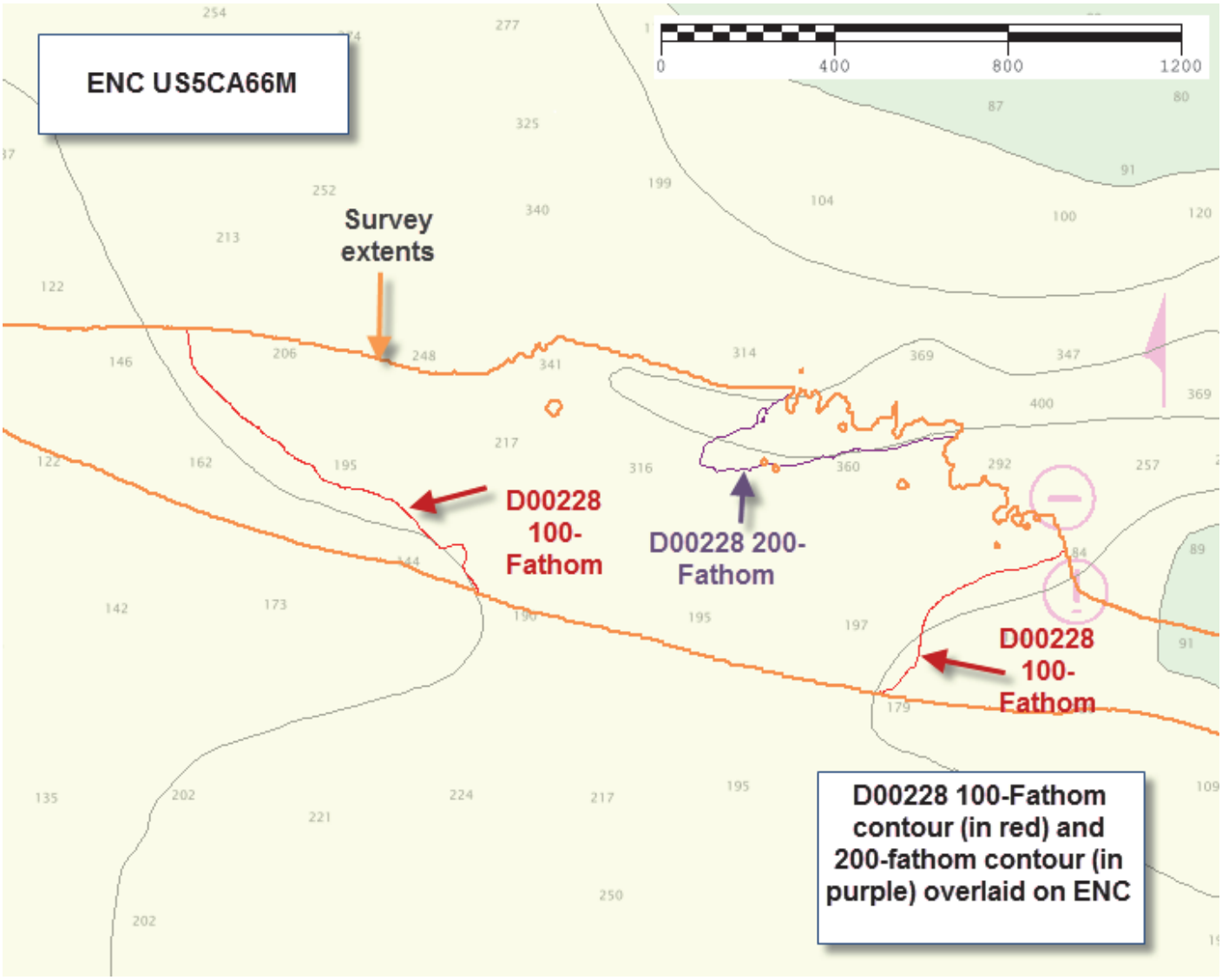
Soundings derived from D00228 typically agreed with charted depths on ENC US5CA66M within 5-10 fathoms.

US5CA67M:
ENC US5CA67M covers the north eastern portion of D00228 data. Depth curves on ENC US5CA67M that apply to D00228 survey area are 100, 200, and 400 fathoms. The depth curves derived from D00228 typically followed the contours depicted in ENC US5CA67M.

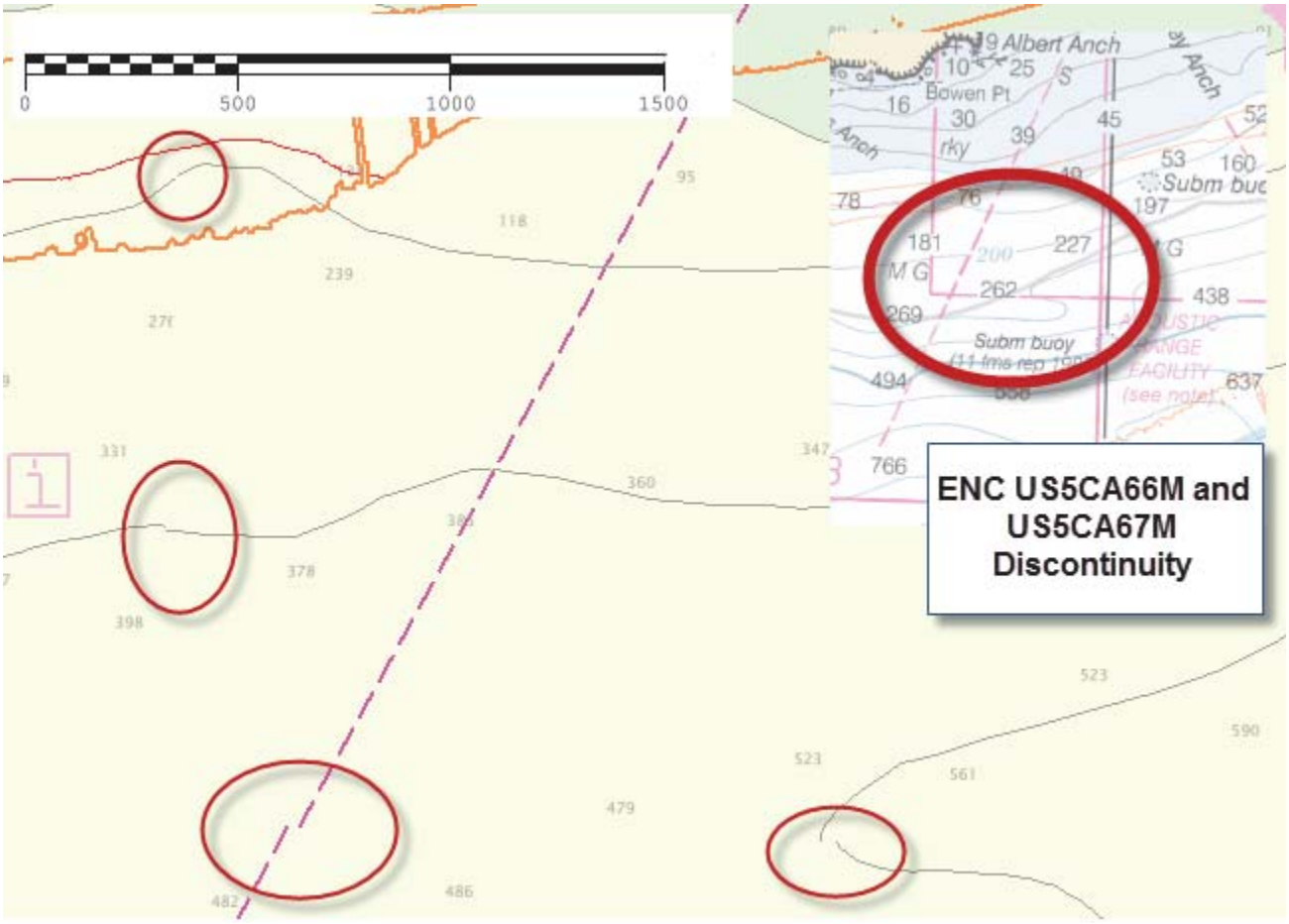
Soundings derived from D00228 typically agreed with depths charted on ENC US5CA67M; though the contour lines were off anywhere from 10-50 meters. Though disagreements, there are no dangers to navigation.

US3CA69M:
ENC US3CA69M is a small scale overview of the entire D00228 survey area. Depth curves on ENC US3CA69M that apply to D00228 survey area are 100, 200, 400, 500/550, 800, and 1000 fathoms. The contours depicted on the ENC generally agree with the contours derived from D00228, with the exception of missing 700 and 900 fathom contour presentation which is present on the RNC.

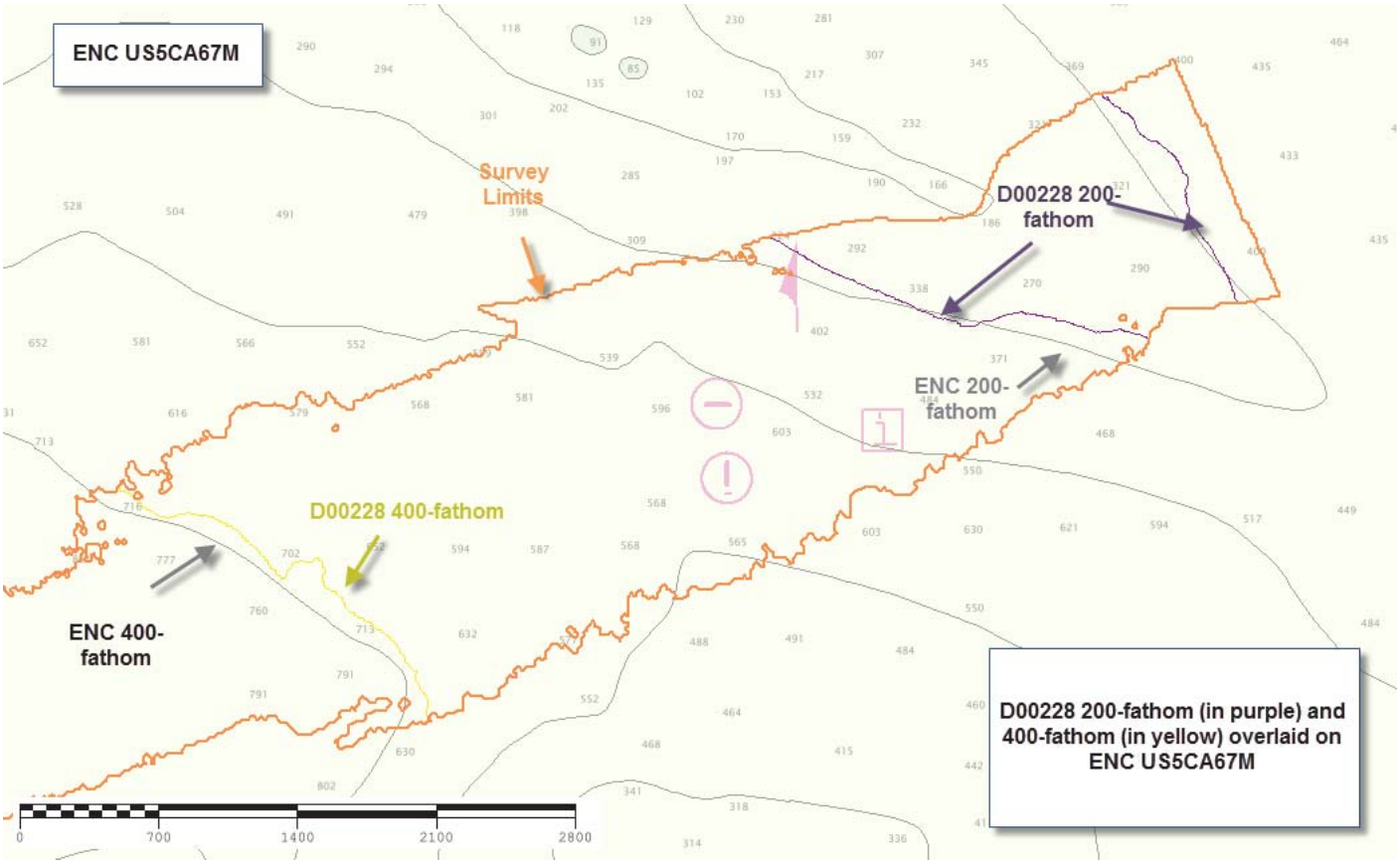
Soundings derived from D00228 agreed with depths charted on ENC US3CA69M.



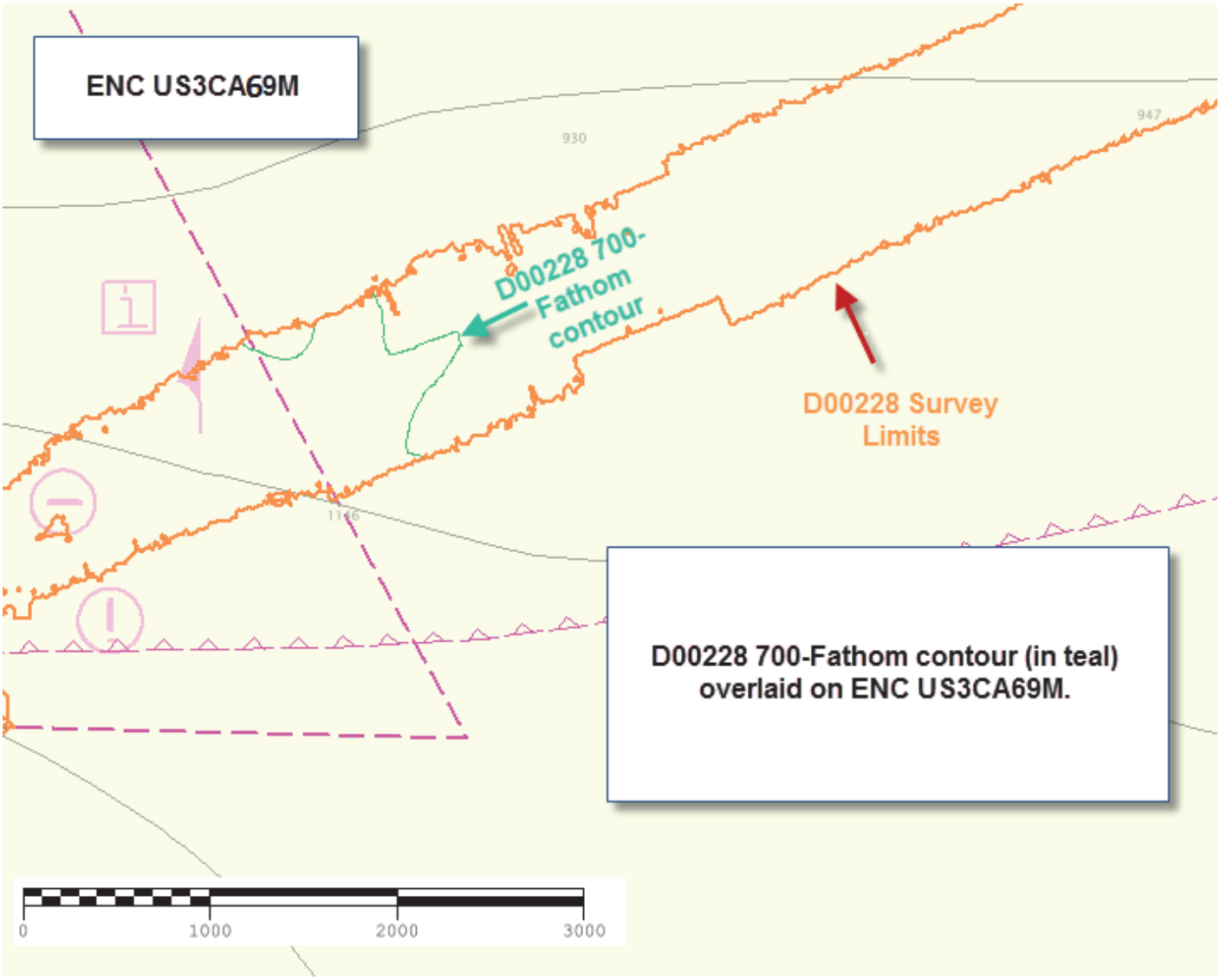
D00228 100-fathom (in red) and 200-fathom (in purple) overlaid on ENC US5CA66M showing slight discrepancies between survey data and ENC charted data.



ENC Discontinuity. Red circles identify areas with positional offsets between ENCs of approximately 20 to 90 meters outside and within the D00228 survey area.



D00228 200-fathom (in purple) and 400-fathom (in yellow) overlaid on ENC US5CA67M showing slight discrepancies between survey data and ENC charted data.



D00228 700-fathom (in teal) contour overalid on ENC US3CA69M showing a misrepresentation of the 1000-fathom contour boundary.

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
D00228_MB_VR_MLLW	CUBE	Variable m	42.2 fathoms - 895.3 fathoms	VR	Complete MBES
D00228_MB_VR_MLLW_Final	CUBE	Variable m	42.2 fathoms - 895.3 fathoms	VR	Complete MBES

G. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower Low Water.

The vertical control method used for this survey was VDatum.

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Santa Monica, CA	9410840
Santa Barbara, CA	9411340
Port San Luis, CA	9412110
Monterey, CA	9413450
Oil Platform Harvest, CA	9411406

A request for final approved tides was to N/OPS1 on 11/4/2017; the final tide note was received on 11/17/2017.

Ellipsoid to Chart Datum Separation File: OPR-L397-RA-17_VDatumArea_xyNAD83-MLLW_geoid12b.csar

Sounding elevations relative to the ellipsoid were collected through Elipsoidal Referenced Survey (ERS) with post-processing of the daily logged POSPac data to create a statistical best estimate of trajectory (SBET) file, as detailed in the DAPR. All D00228 data meets HSSD vertical accuracy requirements.

The horizontal datum for this project is North American Datum of 1983 (NAD83). The projection used for this survey is UTM Zone 11N.

The following DGPS Stations were used for horizontal control:

DGPS Stations

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control for this survey. DGPS was not used for D00228.

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this survey is UTM Zone 11N.

Precise Positioning-Real Time Extended (PP-RTX) processing methods were used in Applanix POSPac MMS 8.1 software to produce SBETs for post-processing horizontal correction. All D00228 data meets HSSD horizontal accuracy requirements.

H. Additional Results

There are no additional results for discussion.

I. Approval

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Survey Summary Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables, Field Procedures Manual, Standing and Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Survey Summary Report.

Approver Name	Title	Date	Signature
Benjamin K. Evans, CDR/NOAA	Commanding Officer, NOAA Ship RAINIER	03/09/2018	Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2018.04.08 18:58:17 -07'00'
Scott E. Broo, LT/NOAA	Field Operations Officer, NOAA Ship RAINIER	03/09/2018	Digitally signed by BROO.SCOTT.EDWARD.1396599976 Date: 2018.04.08 09:56:08 -07'00'
James B. Jacobson	Chief Survey Technician, NOAA Ship RAINIER	03/09/2018	JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2018.04.08 13:41:20 -07'00'
Michelle M. Levano, ENS/ NOAA	Junior Officer, NOAA Ship RAINIER	03/09/2018	Digitally signed by LEVANO.MICHELLE.MARIE.1516645888 Date: 2018.04.08 19:11:35 -07'00'

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

PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : November 17, 2017

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-L397-RA-2017
HYDROGRAPHIC SHEET: D00228

LOCALITY: Santa Cruz Basin to Santa Cruz Canyon and Vicinity,
Channel Islands National Marine Sanctuary

TIME PERIOD: October 8 - 22, 2017

TIDE STATION USED: Los Angeles, CA 9410660
Lat.33° 43.2' N Long. 118° 16.4' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.448 meters

TIDE STATION USED: Santa Monica, CA 9410840
Lat. 34° 0.5' N Long. 118° 30' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.428 meters

TIDE STATION USED: Santa Barbara, CA 9411340
Lat. 34° 24.2' N Long. 119° 41.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.415 meters

TIDE STATION USED: Oil Platform Harvest, CA 9411406
Lat. 34° 28.1' N Long. 120° 40.9' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.373 meters

TIDE STATION USED: Port San Luis, CA 9412110
Lat. 35° 10.1' N Long. 120° 45.2' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.408 meters

TIDE STATION USED: Monterey, CA 9413450
Lat. 36° 36.3' N Long. 121° 53.3' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.412 meters

REMARKS: RECOMMENDED Grid

Please use the TCARI grid "L397RA2017Rev.tc" as the final grid for project OPR-L397-RA-2017, D00228, during the time period between October 8 - 22, 2017.

Refer to attachments for grid information.

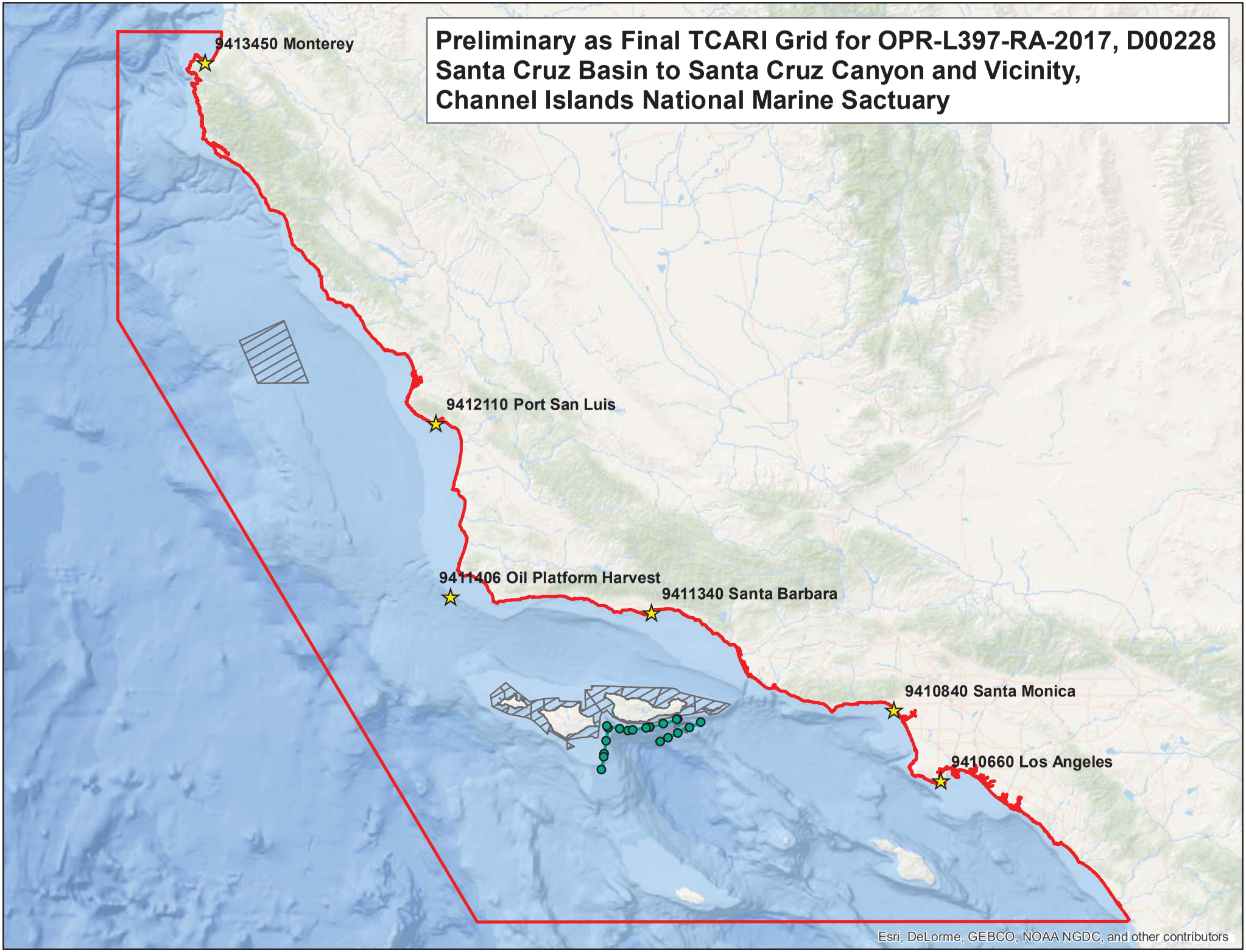
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Note 2: Annual leveling for Los Angeles (9410660) and Port San Luis (9412110) was not completed in FY17. A review of the verified leveling records from October 2007 - March 2016 shows the tide station benchmark networks to be stable within an allowable 0.009 m tolerance. This Tide Note may be used as final stability verification for survey OPR-L397-RA-2017, D00228. CO-OPS will immediately provide a revised Tide Note should subsequent leveling records indicate any benchmark network stability movement beyond the allowable 0.009 m tolerance.

BURKE.PATRICK.B.1365830335

Digitally signed by BURKE.PATRICK.B.1365830335
Date: 2017.11.17 12:35:13 -05'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary as Final TCARI Grid for OPR-L397-RA-2017, D00228
Santa Cruz Basin to Santa Cruz Canyon and Vicinity,
Channel Islands National Marine Sactuary
9413450 Monterey
9412110 Port San Luis
9411406 Oil Platform Harvest
9411340 Santa Barbara
9410840 Santa Monica
9410660 Los Angeles
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors

APPROVAL PAGE

D00228

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey product

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: HAUSER.OLIVIA.A.1275636009 2019.07.02 15:35:36 -07'00'

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch