

F00459

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. \_\_\_\_\_

Registry No. F00459

### LOCALITY

State Washington

General Locality Puget Sound

Sublocality San Juan Islands and Vicinity

2000

CHIEF OF PARTY  
Kathryn Simmons

### LIBRARY & ARCHIVES

DATE \_\_\_\_\_

NOAA FORM 77-28  
(11-72)

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

REGISTRY No

**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** \_\_\_\_\_

**General Locality** \_\_\_\_\_

**Sub-Locality** \_\_\_\_\_

**Scale** \_\_\_\_\_ **Date of Survey** \_\_\_\_\_

**Instructions dated** \_\_\_\_\_ **Project No.** \_\_\_\_\_

**Vessel** \_\_\_\_\_

**Chief of party** \_\_\_\_\_

**Surveyed by** \_\_\_\_\_

**Soundings by echo sounder, hand lead, pole** \_\_\_\_\_

**Graphic record scaled by** \_\_\_\_\_

**Graphic record checked by** \_\_\_\_\_ **Automated Plot** \_\_\_\_\_

**Verification by** \_\_\_\_\_

**Soundings in fathoms feet at MLW MLLW** \_\_\_\_\_

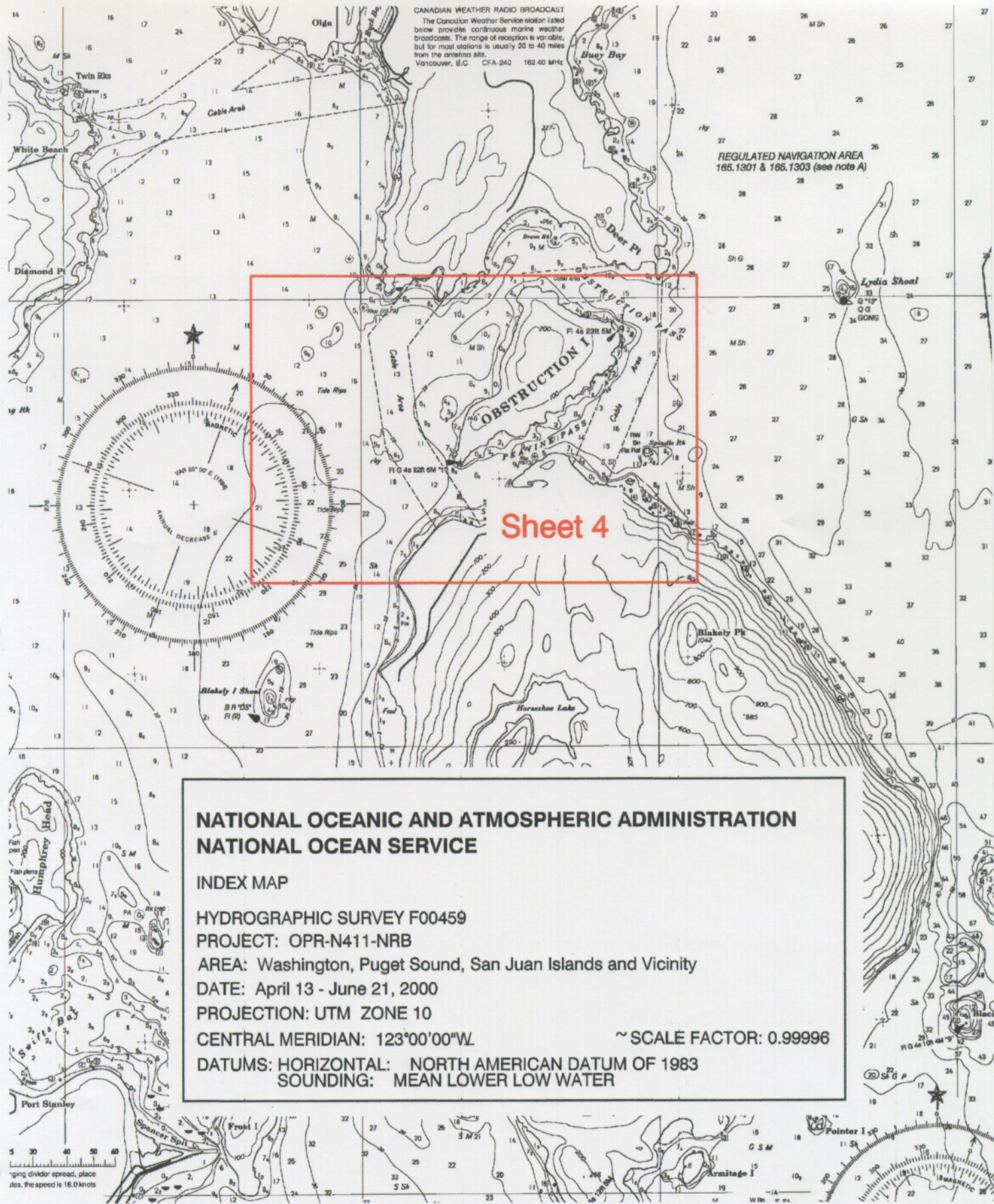
**REMARKS:** \_\_\_\_\_

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**CANADIAN WEATHER RADIO BROADCAST**

The Canadian Weather Service station listed below provides continuous marine weather broadcasts. The range of reception is variable, but for most stations is usually 20 to 40 miles from the antenna site.  
Vancouver, B.C. CFA-240 162.40 MHz

REGULATED NAVIGATION AREA  
165.1301 & 165.1303 (see note A)

Sheet 4

**NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE**

**INDEX MAP**

HYDROGRAPHIC SURVEY F00459

PROJECT: OPR-N411-NRB

AREA: Washington, Puget Sound, San Juan Islands and Vicinity

DATE: April 13 - June 21, 2000

PROJECTION: UTM ZONE 10

CENTRAL MERIDIAN: 123°00'00"W

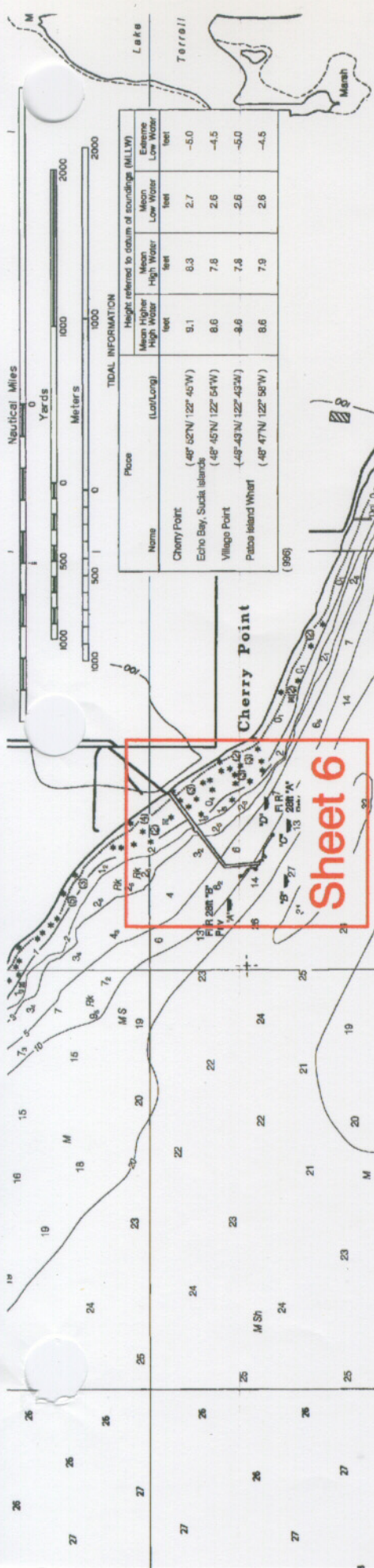
~ SCALE FACTOR: 0.99996

DATUMS: HORIZONTAL: NORTH AMERICAN DATUM OF 1983

SOUNDING: MEAN LOWER LOW WATER

Using divider spread, place  
dots, the speed is 16.0 knots





**TIDAL INFORMATION**

Name	Place (Lat/Long)	Height related to datum of soundings (MLLW)			
		Mean Higher High Water feet	Mean Low Water feet	Extreme Low Water feet	Extreme Low Water feet
Cherry Point	(48° 32'N 122° 45'W)	9.1	6.3	2.7	-8.0
Echo Bay, Sucka Islands	(48° 45'N 122° 54'W)	8.6	7.8	2.6	-4.5
Village Point	(48° 43'N 122° 43'W)	8.6	7.8	2.6	-5.0
Paisa Island Wharf	(48° 47'N 122° 58'W)	8.6	7.9	2.8	-4.5

**POLLUTION REPORTS**  
 Report all spills of oil and hazardous substances to the National Response Center via 800-424-5552 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 165).

# **NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION** **NATIONAL OCEAN SERVICE**

## **INDEX MAP**

HYDROGRAPHIC SURVEY F00459  
 PROJECT: OPR-N411-NRB  
 AREA: Washington, Puget Sound, San Juan Islands and Vicinity  
 DATE: April 13 - June 21, 2000  
 PROJECTION: UTM ZONE 10  
 CENTRAL MERIDIAN: 123°00'00"W  
 DATUMS: HORIZONTAL: NORTH AMERICAN DATUM OF 1983  
 SOUNDING: MEAN LOWER LOW WATER

~ SCALE FACTOR: 0.99996

**Sheet 7**

**Sheet 5a**

**Sheet 5b**

**Sheet 6**







**Descriptive Report to Accompany F00459**  
**OPR-N411-NRB**  
**2000**  
**Navigation Response Team 3**

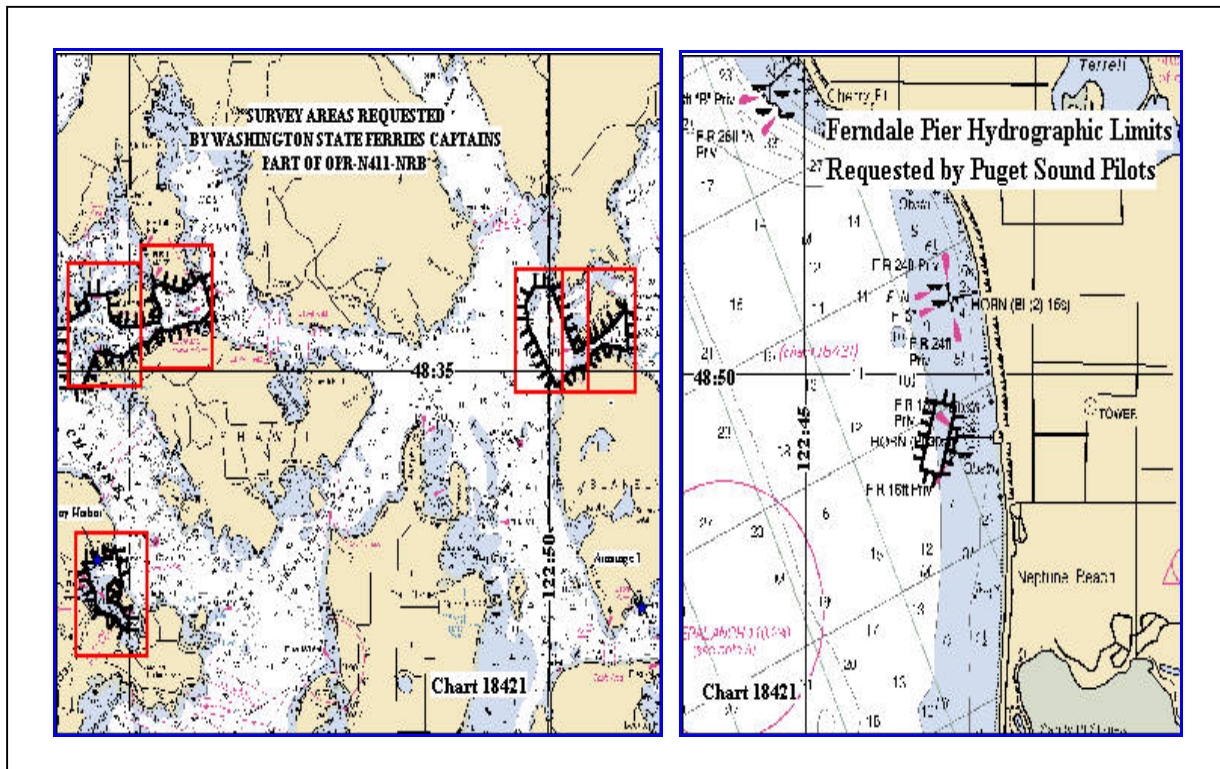
**A. PROJECT**

This survey was conducted in accordance with Port Instructions OPR-N411-NRB, Puget Sound, Washington, dated April 19, 2000.

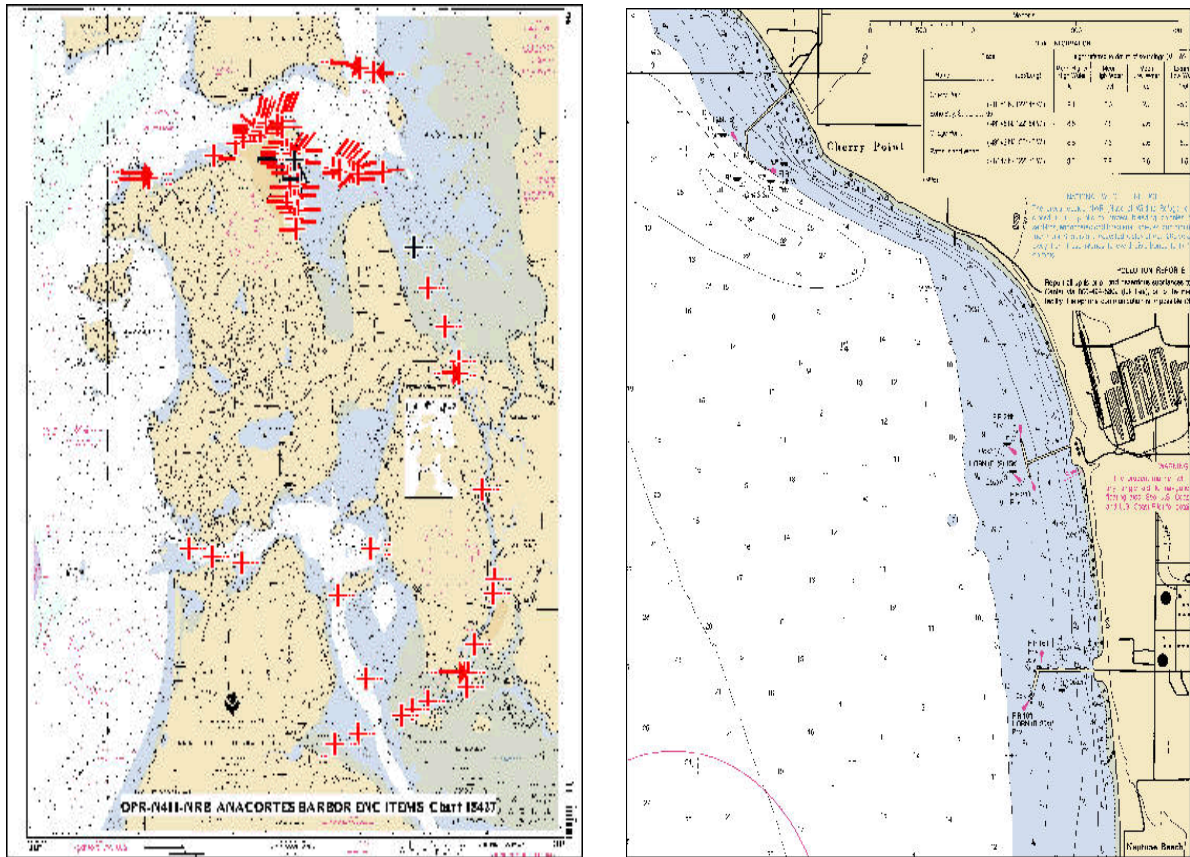
The hydrographic survey coverage in the San Juan Islands was requested by the Washington State Ferries; coverage at the Ferndale fuel pier was requested by the Puget Sound Pilots.

**B. AREA SURVEYED**

F00459 includes four separate survey areas as depicted on the chartlets below. Inshore sounding limit is the four-meter curve. Data acquisition was conducted from April 13, 2000 (DN 104) through June 21, 2000 (DN 173).<sup>1</sup>



The project also includes vector data collection for the points depicted on the chartlet below. At the request of the Puget Sound Pilots, vector data was also collected at the three refineries located on Chart 18431 (chartlet below).<sup>2</sup>



### C. SURVEY VESSELS

The following NOAA survey vessels were used throughout the project:

Vessel	EDP #	LOA	Beam	Draft	Tonnage	Power
1101 Jensen	0651	29 feet	10 feet	0.4m	5 tons	Jet Drive
1102 Sea Ark	0652	21 feet	8 feet	0.4m	2 tons	150hp outboard

Both launches were used for mainscheme hydrography. Launch 1101 was used for development hydrography, side scan sonar operations, velocity casts and dive investigations. Launch 1102 was used for development hydrography. No changes to the standard vessel sounding configuration were necessary for either launch.



## D. AUTOMATED DATA ACQUISITION AND PROCESSING

HYPACK Software produced by Coastal Oceanographics was used for all data acquisition. HPTOOLS, a program developed by Hydrographic Surveys Division(HSD), Systems Support Branch(SSB), N/CS32, was used to convert HYPACK data to HPS format. HPS Software, also developed by HSD/SSB, was used for hydrographic data processing. MapInfo Professional and Vertical Mapper were used in conjunction with HPS for survey planning and layout, data display, and as tools to evaluate data.

VELOCWIN was used to download conductivity, temperature and depth data from Seacat sound velocity probe and to process all cast data.<sup>3</sup>

Trimble TSC1 datalogger and Asset Surveyor software v. 5.00 were used for ENC vector data collection. Pathfinder Office 2.51 was used to for processing.

A list of software used to complete the survey is included in Appendix H<sup>4</sup> along with respective versions and issue dates.

## E. SIDE SCAN SONAR

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range correcting SSS recorder and an EG&G 272-T dual channel, single frequency towfish. The following sonar equipment was used throughout the survey:

Type	Serial Number
272-T Towfish	015598
260 Recorder	015602

The towfish was operated on the 100 kHz frequency and was configured with a 20° beam depression. It was deployed from the aft starboard quarter using a Kevlar cable, 55 meters long, passed through a block and powered by a Superwinch Model W115. Block and winch were mounted to a swing-arm davit. The Kevlar cable was connected to the EG&G recorder cabling with a slip-ring assembly within the winch assembly. A Dynapar Max Count 2 cable counter was used to measure deployed cable length, which was logged in real time in HYPACK. Tape markings at measured intervals provided visual confirmation of recorded cable length. Markings are at one-meter intervals up to 10 meters and at five-meter intervals thereafter. At the beginning of each survey day and as needed throughout the day, the cable counter was adjusted to reflect these tape markings.

SSS operations were conducted at a speed of 5 knots or slower when using range scales of 75 or 100 meters. At higher range scales the speed was maintained at 4 knots or slower. Range scales of 100 and 150 meters were used. The SSS towfish was maintained at a height off the bottom equivalent to 8 to 20 percent of the range scale except where quickly changing depths prohibited compensatory adjustments in cable length. In such cases, the hydrographer believes the sonargram trace is adequate for identification of any significant contacts. Two hundred percent side scan coverage was acquired from the 2-fathom/4-meter-curve (or the limit of safe hydrography) to the

25-meter/13.7-fathom curve.<sup>5</sup>

Two hundred percent coverage was acquired, plotted on two separate swath plots and reviewed to assure acquisition of adequate overlap and full coverage.

The SSS recorder gain was adjusted for the best return for the prevalent bottom material. Contacts or identifiable features (e.g., buoy anchors, change in bottom texture) visible on the outer edge of the sonargram assure acceptable SSS recorder tuning and served as confidence checks during operations.

A total of 357 contacts were labeled and entered into one HPS contact table. Where contacts appeared in a cluster on the sonargram, only the most significant was entered. Apparent significance was determined with the PHP-developed Contact-O-Meter, a scale proportioned for shadow length and fish height. Contact heights and raw depths were derived using the HPS Side Scan Utility Program and all recorded contacts were plotted.

The hydrographer employed various techniques for selecting contacts for development. (Many contacts were either shoals or parts of shoals that were fully developed.) All contacts with heights greater than or equal to ten percent of the recorded depth were selected for further review. A few of these were subsequently determined to be insignificant on the basis of (1) water depth at contact, (2) height exaggeration caused by proximity to the towfish and/or (3) steepness of the slope. The remainder were developed fully.

The HPS contact table is included in Appendix J<sup>6</sup>, Supplemental Correspondence.

## F. SOUNDING EQUIPMENT

The following echosounders were used throughout the survey:

Vessel	Model No.	Serial No.
0651	Knudsen 320M	K98577
0651	Knudsen 320M	K98576
0652	Innerspace	448239

Vessel No. 0651 For both Knudsen 320M echosounders the high-frequency beam was selected for plotting throughout the survey. The low-frequency depth was scanned and edited only when the high-frequency did not track the bottom or when a more significant depth was acquired with the low-frequency beam and further development was not justified for other reasons.

Vessel No. 0652 The Innerspace Model 448 (INN448) is a single-frequency echosounder.

Metric leadlines were used for depth comparisons with the echosounder. NRT3 fabricated the leadlines following Hydrographic Survey Guideline (HSG)69.

## G. CORRECTIONS TO SOUNDINGS

### Tides and Water Levels

Per Section 5.8 of Port Instructions, primary tide stations at Cherry Point, WA (944-9424), and Friday Harbor, WA (944-9880), serve as controls for datum determination at the subordinate station located at latitude 48°32'06"N, longitude 122°47'48"W on Armitage Island (944-9932). These primary stations will also provide reducers for this project.

Port Instructions define sixteen tide zones within project area. The tide corrector values referenced to the above control stations are provided in the zoning file "N411NRT32000CORP" which is included on the project CD.

Preliminary, six-minute, real tides recorded by the Friday Harbor and Cherry Point reference stations were downloaded from the NOAA, NOS, CO-OPS web site (<http://www.opsd.nos.noaa.gov/cgi-bin/prelimqry.pl>). With HPTools, the tides were imported into HPS Tide Tables 1 and 2. Zone Utilities computed the appropriate zone for each sounding; time and height adjustments were computed; and corrected tides were applied to sounding data. No tide station downtime was experienced during times of hydrography for this survey.<sup>7</sup>

### Velocity of Sound

Corrections for speed of sound through the water column were computed from data obtained with a Seacat conductivity, temperature and depth recorder. Sea-Bird Electronics Model SBE-19, S/N 1892, was used for all casts. The recorder was initialized using program VELOCWIN which was also used for processing. Below is a list of sound velocity casts for this survey.

HPS Table	DN	DN Range	Extrapolated Depth	Cast Latitude	Cast Longitude
1	104	104-109	57.0m	48°34'59"N	122°49'59"W
2	110	110-117	136.7m	48°32'48"N	122°00'12"W
3	122	122-136	73.7m	48°35'52"N	122°58'02"W
4	137	137-151	58.5m	48°35'18"N	122°50'24"W
5	145	145-165	35.4m	48°48'18"N	122°43'49"W
6	152	152-164	108.7m	48°34'54"N	123°01'24"W
7	165	165-173	71.8m	48°36'12"N	122°47'07"W

Appendix I<sup>8</sup> contains copies of all velocity cast data and HPS Velocity Corrector Tables.

SEACAT instrument S/N 1892 was calibrated on March 8, 1999. A copy of the calibration report, produced by SeaBird Electronics is included in Appendix E.<sup>9</sup>



## Leadline Comparisons

Periodic leadline comparisons, annotated on the echogram, confirm proper digitization of the echosounder depths. Leadline comparison forms are located in Appendix E.<sup>10</sup>

## Static Draft

Static draft for VN 0652 was determined on June 3, 1997, (DN 154) . First, the depth of the transducer face from a reference mark on the hull was measured. Next, with the launch in the water, fuel tanks half full and two persons aboard, the depth from this reference mark to the waterline was measured. Combining the two measurements, a static draft of 0.4 meters was calculated.

A static draft of 0.4 meters was determined for vessel 0651 on June 27, 1997, (DN 178) using a method similar to above.

## Dynamic Draft

Settlement and squat measurements were conducted for VN 0651 on February 9, 1998, (DN 040) and for VN 0652 on June 3, 1997 (DN 154). All measurements were performed in Guemes Channel, WA. Field records are included in Appendix E .<sup>11</sup>

Transducer and antenna offsets, static draft, and settlement and squat correctors were entered into offset tables: Table 1<sup>12</sup> for VN 0651 and Table 2<sup>13</sup> for VN 0652. Correctors were applied during processing in HPS using the Reapply Vertical Correctors Utility.

## Corrections to Echosoundings

Occasional problems with misdigitization or bottom tracking were encountered during this survey. Where the echogram trace was adequate and unambiguous, the digital record was corrected to reflect the paper trace. Where the echogram trace was discontinuous, the selected soundings were deselected or rejected unless the digital record indicated continuous and satisfactory bottom tracking. Gaps in the sounding interval greater than 6mm at the scale of the survey were resurveyed.

## H. HYDROGRAPHIC POSITION CONTROL

### Horizontal Datum

The horizontal control datum for this project is North American Datum of 1983 (NAD83).<sup>14</sup>

### Position Control

Differential GPS (DGPS) provided hydrographic position control throughout this survey. The U.S. Coast Guard beacon at Whidbey Island (302kHz) and the Canadian Coast Guard beacon in Richmond, BC (320kHz) were used.<sup>15</sup>

(Position control for vector data was obtained from Racal Landstar Differential Signal Provider.)

#### DGPS Performance Checks

DGPS performance check stations established for OPR-N368-PHP to Third Order, Class 1, standards were used for this project. All DGPS performance checks were successful and are included in Appendix F. <sup>16</sup>

#### Positioning Equipment

The following GPS equipment was used:

Equipment Location	Type Receiver/Antenna	Receiver Serial No.	Antenna Serial No.
VN 0651	Trimble DSM212L 27207	0220164491	0220166460
VN 0652	Starlink Receiver	865	4207
Backpack	Trimble TSC1	224011684	220187539

#### I. SHORELINE

Digital shoreline derived from photogrammetric source data was not available for this project. Since the objective of the hydrographic portion of the field exam was to satisfy the request of the Washington State Ferries and the Puget Sound Pilots for updating critical areas; therefore, the emphasis of the survey was focused on navigable waters and no shoreline verification was performed. <sup>17</sup>

ENC items were investigated and positioned with precedence given to items labeled Priority 1 and to items determined by the hydrographer to be critical to commercial vessel traffic.

#### J. CROSSLINES

Forty-two miles of side scan hydrography were acquired at angles greater than forty-five degrees to the mainscheme lines, representing crossline hydrography amounting to 58% of mainscheme. Agreement is excellent. <sup>18</sup>

#### K. JUNCTIONS

F00459\_4 joins contemporary survey H-10911, 1:10,000, 1999, to the east. The soundings and contours were compared and found to be in excellent agreement. <sup>19</sup>

## L. COMPARISON WITH PRIOR SURVEYS <sup>20</sup>

The survey area in the vicinity of the Ferndale fuel pier was compared with H-10608. No significant changes in depths or contours were observed. <sup>21</sup>

The Friday Harbor portion of the survey was compared with Field Exam 399. Current soundings are slightly shoaler - most likely due to increased density of soundings. Contours are in generally good agreement. <sup>22</sup>

## M. ITEM INVESTIGATION REPORTS

Eight AWOIS items are located within the North Puget Sound project area. Detailed reports are attached to this report <sup>23</sup>

## N. COMPARISON WITH THE CHART

The survey area is represented on the following charts:

Chart No.	Date	Edition	Scale
18400	March 30, 1996	39th	1:200,000
18421	March 6, 1999	42nd	1:80,000
18423sc	May 1, 1999	31st	1:80,000
18427	March 18, 2000	20th	1:25,000
18430	November 2, 1996	6th	1:25,000
18431	October 5, 1996	4th	1:25,000
18434	April 27, 1996	4th	1:25,000

The hydrographic portion of the project was compared with charts 18430, 18431 and 18434. <sup>24</sup>

Friday Harbor, Wasp Passage (Chart 18434): Minor changes in contours and some shoaler soundings were observed.. Although it is possible some scouring and accretion has occurred as a result of very heavy traffic transiting a narrow passage, the shoaler soundings are most likely due to the significantly higher density of soundings of the current survey. <sup>25</sup>

Peavine Pass (Chart 18430): Deepening and widening of the channel observed at the east entrance to the pass may be attributable to the strong currents which sometimes exceed five knots. <sup>26</sup> The three-fathom, three-foot sounding charted at latitude 48 35'22.8"N, longitude 122 48'50.3"W, was searched for but not found. <sup>27</sup>

Ferndale Pier (Chart 18431): Current soundings indicate a shift of the ten-fathom contour shoreward up to the pier face where powerful vessel traffic has scoured a relatively shallow trough along the length of the pier. <sup>28</sup>



## Dangers to Navigation

Two dangers to navigation were found during the course of the survey; copies of both reports are attached to this report.<sup>29</sup>

## Cables, Pipelines and Ferry Routes

Inter-island ferry routes are not charted outside the major shipping lanes. The waters of the San Juan Islands are marked by heavy, small boat traffic, including numerous kayakers. The passages are extremely narrow in places and the recreational mariner as well as the ferry system could benefit from charted ferry routes.<sup>30</sup>

Charted cable areas were not confirmed.<sup>31</sup>

## O. ADEQUACY OF SURVEY

This survey is complete and adequate to supercede prior surveys within their common areas.<sup>32</sup>

## P. AIDS TO NAVIGATION

Q. The following aids to navigation were positioned with the Trimble DGPS receiver to 1-meter accuracy:

Navigational Aid	LLN	Latitude	Longitude
Anacortes Ferry Breakwater Light <sup>33</sup>	18948	48°30'29.952"N	122°34'04.967"W
Anacortes Dock Light W	18985	48°31'19.630"N	122°36'32.793"W
Anacortes Dock Light E	18985	48°31'19.664"N	122°36'24.766"W
Cap Sante Waterway Daybeacon 1	18990	48°30'40.493"N	122°35'55.644"W
Cap Sante Waterway Light 2	18995	48°30'42.847"N	122°35'55.614"W
Cap Sante Waterway Daybeacon 3	19000	48°30'41.074"N	122°36'05.155"W
Cap Sante Waterway Daybeacon 4	19005	48°30'42.838"N	122°36'09.786"W
Cap Sante Waterway Light 5	19010	48°30'41.638"N	122°36'16.171"W
Cap Sante Waterway Light 6	19015	48°30'42.234"N	122°36'18.586"W
Anacortes Channel Light 4	19055	48°30'16.283"N	122°35'55.898"W
Anacortes Marina Entrance Light	19060	48°30'08.664"N	122°36'01.694"W
Fidalgo Marina Light 1	19061	48°29'55.443"N	122°36'01.079"W
Fidalgo Marina Light 2	19062	48°29'55.472"N	122°36'02.627"W
Fidalgo Marina Lights	19063	48°29'54.667"N	122°36'02.496"W
Fidalgo Marina Lights	19063	48°29'54.651"N	122°36'00.819"W
Equilon Oil Company Wharf Lights	19065	48°30'35.222"N	122°34'54.586"W
Equilon Oil Company Wharf Lights	19065	48°30'32.865"N	122°34'38.528"W
Tesoro Oil Company Wharf Light E	19070	48°30'29.952"N	122°34'04.967"W
Tesoro Oil Company Wharf Light W	19070	48°30'31.067"N	122°34'17.508"W

Navigational Aid	LLN	Latitude	Longitude
Tosco Northwest North Light	19890	48°49'37.545"N	122°43'10.404"W
Tosco Northwest South Light	19890	48°49'29.401"N	122°43'15.073"W
Intalco North Light N	19895	48°50'31.489"N	122°43'19.530"W
Intalco South Light S	19895	48°50'22.493"N	122°43'15.566"W
Atlantic Richfield Light A	19900	48°51'37.082"N	122°45'21.947"W
Atlantic Richfield Light B	19905	48°51'42.900"N	122°45'33.691"W

## Q. STATISTICS

Description	Quantities
Total Nautical Miles	191
Side Scan Sonar	42
SSS 100%	22
SSS 200%	20
MS Hydrography	60
Splits	12
Cross Lines (200% SSS)	42
Development	77
Square Nautical Miles	21.1
Square Nautical Miles SSS	3.0
Days of Acquisition	19
Total Number of Selected Soundings	11921
Detached Positions	6
Bottom Samples	0
ENC Items	57
Dives	2
Velocity Casts	7
Tide Stations Installed	0

## R. MISCELLANEOUS

The position of AWOIS 52553 was acquired with the Trimble vector data receiver and is included with the ENC data.<sup>34</sup>


## S. RECOMMENDATIONS

The shoreline in North Puget Sound has undergone significant cultural development as well as natural alterations.

The hydrographer strongly recommends that up-to-date photogrammetry or satellite imagery be acquired to facilitate examination and correction of the shoreline.<sup>35</sup>

#### T. REFERRAL TO REPORTS

Title	Date
Coast Pilot Report	to followfollow 7/27/00

Submitted by  
  
Kathryn Simmons

## REVISIONS COMPILED DURING OFFICE PROCESSING AND CERTIFICATION

1. PHB Revision - Fifteen page-size plots (11"x16" and 8.5"x11") have been generated during office processing.

F00459\_2a, 2b (sheets 1, 2 of 15) is centered at latitude 48/35/30N, longitude 123/00/00W, scale 1:10,000. Washington State Ferries requested investigations in this area. Basic hydrography to the four-meter depth curve and 200% side scan sonar was performed in the required area.

F00459\_3 (sheet 3 of 15) is centered at latitude 48/32/15N, longitude 123/00/45W, scale 1:10,000. Washington State Ferries requested investigations in this area. Basic hydrography to the four-meter depth curve and 200% side scan sonar was performed in the required area. This survey area also includes the investigation of three AWOIS items, 52558, 52559 and 52560.

F00459\_4 (sheet 4 of 15) is centered of latitude 48/35/30N, longitude 122/49/30W, scale 1:10,000. Washington State Ferries requested investigations in this area. Basic hydrography to the four-meter depth curve and 200% side scan sonar was performed in the required area. This survey area also includes the investigation of two AWOIS items, 52556, and 52557.

F00459\_5a, 5b (sheets 5, 6 of 15) is centered of latitude 48/49/22N, longitude 122/43/22W, scale 1:5,000. The Puget Sound Pilots requested hydrographic survey coverage adjacent to the BP fuel pier at Ferndale. Basic hydrography and 200% side scan sonar coverage was accomplished in this area

F00459\_6 (sheet 7 of 15) is centered of latitude 48/51/45N, longitude 122/45/25W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB.

F00459\_7 (sheet 8 of 15) is centered of latitude 48/50/27N, longitude 122/43/15W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB.

F00459\_8a, 8b, (sheets 9, 10, of 15) are centered of latitude 48/31/15N, longitude 122/37/00W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB. This survey area also includes the investigation of AWOIS item 52041.

F00459\_8c (sheet 11 of 15) is centered of latitude 48/30/45N, longitude 122/36/15W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB.

F00459\_9 (sheet 12 of 15) is centered of latitude 48/30/00N, longitude 122/36/07W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB.

F00459\_10a, 10b (sheets 13, 14 of 15) is centered of latitude 48/30/15N, longitude 122/34/00W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB.

F00459\_11 (sheet 15 of 15) is centered of latitude 48/27/22N, longitude 122/30/52W, scale 1:5,000. It is the investigation of ENC (Electronic Nautical Chart) items identified in the project instructions for OPR-N411-NRB. This survey area also includes the investigation of AWOIS item 52553.

The hydrographer has determined the inshore limits of safe navigation by defining a Navigable Area Limit Line (NALL) throughout the survey area. Charted features and soundings inshore of this limit line have not been specifically addressed during survey operations and should be retained as charted. Page-size plots of the charted areas depicts the specific limits of supersession accompanies this report as Attachment 1.

No bottom samples were taken during field operations. Depths range from 0.4 to 47 fathoms.

2. PHB Revision - In addition to the survey areas described by the hydrographer, there are nine areas that the Field party acquired ENC data. Due to time not all vector data was obtained. Refer to the graphic depicting the diagram of all the areas covered by this survey.

3. PHB Revision - Filed with the hydrographic data

4. PHB Revision - Filed with hydrographic data

5. PHB Revision - Concur

6. PHB Revision - Filed with the hydrographic data

7. PHB Revision - Soundings and elevations have been reduced to Mean Lower Low Water (MLLW) or Mean High Water (MHW) as appropriate with verified tide correctors obtained from CO-OPS. The correctors are zoned direct from stations Cherry Point, WA, gage number 944-9424, Friday Harbor, WA, gage number 944-9880 and Armitage Island, WA, gage number 944-9932. See attached tide note, dated August 21, 2000, for a list of approved tide gauges, zones and correctors.

Other sounding reducers include corrections for static draft, dynamic draft and sound velocity. These reducers have been reviewed and are consistent with NOS specifications.

8. PHB Revision - Filed with the hydrographic data

9. PHB Revision - Filed with the hydrographic data

10. PHB Revision - Filed with the hydrographic data

11. PHB Revision - Filed with the hydrographic data

12. PHB Revision - Filed with the hydrographic data

13. PHB Revision - Filed with the hydrographic data

14. PHB Revision - Concur

15. PHB Revision - A horizontal dilution of precision (HDOP) not to exceed 1.8 for the 1:5,000 smooth sheet and 3.75 for the 1:10,000 sheets was computed for survey operations. DGPS performance checks were conducted in the field and found adequate

16. PHB Revision - Filed with the hydrographic data

17. PHB Revision - MHW revisions have been shown shown in red and dashed red on the smooth sheets.

18. PHB Revision - Concur

19. PHB Revision - The junction with survey H-10911 is complete. A “Joins” note has been added to smooth sheet. F00459\_4.

20. PHB Revision - The following prior surveys were compared with F00459 and discussed as follows

<u>Survey</u>	<u>Year</u>	<u>Scale</u>	<u>Datum</u>
F00399	1994	1:5,000	NAD83
H-7080	1947	1:10,000	NAD27
H-7962	1953	1:10,000	NAD27
H-8087	1953	1:5,000	NAD27
H-8115	1954	1:10,000	NAD27
H-8333	1957	1:10,000	NAD27



H-8459	1958	1:10,000	NAD27
H10608	1996	1:10,000	NAD83

Prior surveys H-8115 and H-8459 cover the entire area of F00459\_2a and F00459\_2b. The present survey was compared to digital copies of H-8115 and H-8459. The registration of these prior surveys to the present survey was good. The legibility of the two digital copies were good. Numerous features and soundings were transfer to the present survey to help support the depth contours of the present survey. Bottom characteristics were also transferred because no samples were taken during survey operations.

Sounding agreement is excellent with the present survey generally shoaler by 1/2 fathoms. These differences may be attributed to natural accretion and erosion.

Prior survey H-8087 covers the entire area of F00459\_3. The present survey was compared to a digital copy of H-8087. The registration of this prior survey to the present survey was good. The legibility of the digital copy was good. Numerous soundings were transfer to the present survey to help support the depth contours of the present survey. Bottom characteristics were also transferred because no samplers were taken during survey operations.

Sounding agreement is excellent with the present survey shoaler by 1/2 fathoms. These differences may be attributed to natural accretion and erosion. Cultural features differ greatly between the two surveys, especially in Friday Harbor. New construction has occurred all along the western shoreline. A 2.3-fathom rocky feature at latitude 48/32/26N, longitude 123/00/42W was removed, the current least depth is 3.7 fathoms.

Prior surveys H-7080 and H-8333 cover the entire area of F00459\_4. The present survey was compared to digital copies of H-7080 and H-8333. The registration of these prior surveys to the present survey was good. The legibility of the two digital copies are good. Numerous soundings were transfer to the present survey to help support the depth contours of the present survey. Bottom characteristics were also transferred because no samplers were taken during survey operations.

Sounding agreement is excellent with the present survey shoaler by 1/2 fathoms. These differences may be attributed to natural accretion and erosion.

Prior survey H-7962 covers the entire area of F00459\_5a and F00459\_5b. The present survey was compared to a digital copy of H-7962. Sounding agreement is excellent with the present survey shoaler by 1/2 fathoms. These differences may be attributed to natural accretion and erosion.

Additional information regarding prior surveys can be found in Section L, Comparison with Prior Surveys.

With the transfer of prior soundings and features the present survey is adequate to supersede the prior surveys within the common area.

21. PHB Revision - Concur

22. PHB Revision - Concur

23. PHB Revision - Concur, 30 AWOIS items were noted in the Project Instructions. However, only eight items were addressed within the survey areas.

24. PHB Revision - and Chart 18427

25. PHB Revision - Concur

26. PHB Revision - A note was added to the smooth sheet, F00459\_4, *strong current*.

27. PHB Revision - Concur

28. PHB Revision - Concur

29. PHB Revision - Concur, Two additional dangers to navigation were found during office processing. These were reported to the USCG, NIMA and N/CS1 on August 11, 2000. Copies of these reports are attached

30. PHB Revision - Concur with clarification. The evaluator recommends that MCD consider showing ferry routes as recommended.

31. PHB Revision - Retain all charted cables routes within the common area of this survey.

32. PHB Revision - Concur

33. PHB Revision - Revise position for Anacortes Ferry Breakwater Light, latitude 48/31/10.867N, longitude 122/37/25.99W

34. PHB Revision - Concur

35. PHB Revision - Concur

RECRD 52553 VESSLTERMS OBSTRUCTION CHART 18427 AREA N  
CARTOCODE 0067 SENDINGCODE DEPTH

LAT83 48 27 19 LONG83 122 30 51.5 NATIVDATUM 31  
LATDEC: 48.455277777778 LONDEC: 122.51430555556 GPQUALITY Med  
GPSOURCE Scaled

PROJECT OPR-N411 ITEMSTATUS Assigned SEARCHTYPE Full  
RADIUS 40 INIT MCR ASSIGNED 3/23/2000  
TECNIQ VS,SD,DI,ES,S2  
Techniqnote SEARCH ONLY REQUIRED EAST OF THE CHANNEL

History HISTORY  
CL454/84--COE REPORT TO THE 13TH CGD, 7/29/83; A 25 FT SQUARE CEMENT OBSTRUCTION HAS BEEN REPORTED ON THE EAST SHORE OF THE SWINOMISH CHANNEL BETWEEN THE FIXED HIGHWAY BRIDGE AND THE RAILWAY SWING BRIDGE. THE OBSTRUCTION AND SEVERAL STEEL RODS MAY BE PARTIALLY AWASH AT LOW TIDE. HAND NOTE ON REPORT: " LIES IN -3.4FT, 30FT OFF THE RIGHT SIDE OF THE CHANNEL, COORDINATES: 535 368.47N, 159 2455.71W". ENETRED 3/00 MCR

Fieldnote INVESTIGATION  
DATE(S): 06/14/00 (DN: 166 )  
VN: NA TIME: 174800 UTC  
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) Visual Search  
OBSERVED POSITION: LAT. 48:27:19.17362 LON. 122:30:49.10554  
POSITION DETERMINED BY: DIFFERENTIAL GPS  
INVESTIGATION SUMMARY: The obstruction was observed near shore in shallow water, well outside the channel. See photos.  
CHARTING RECOMMENDATION (HYDROGRAPHER): The obstruction as charted appears to be in the middle of the channel. Remove the obstruction charted in the middle of the channel. Chart the obstruction at the surveyed position.  
EVALUATOR COMMENTS: Concur, also remove the "rep 1983"

Proprietary

YEARSUNK NIMANUM

Print Record

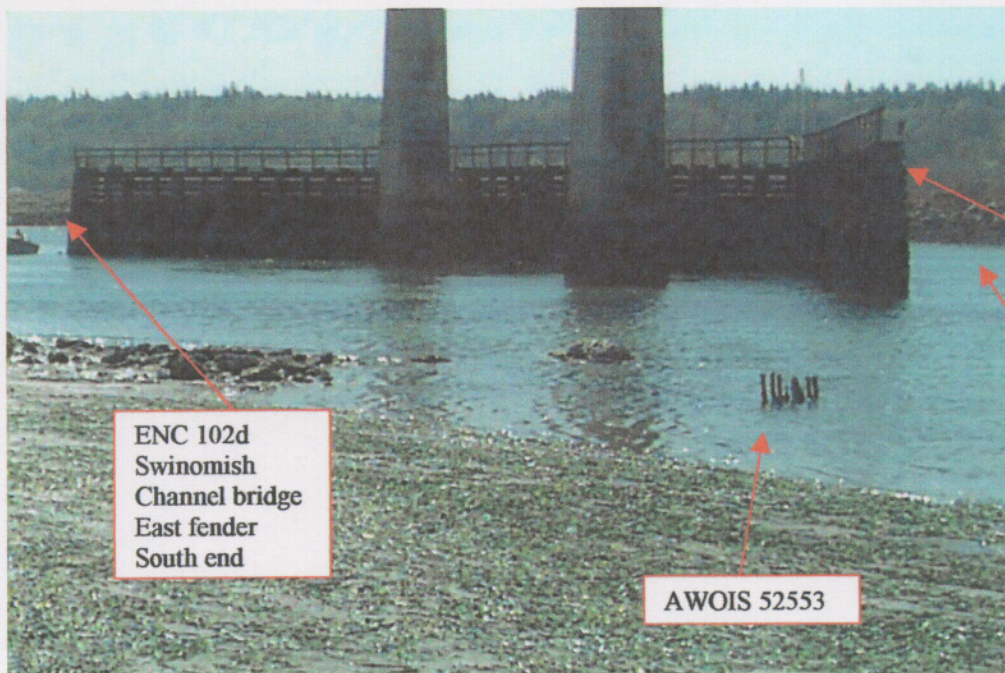
**AWOIS 52553 Obstruction reported 1983**

**ENC # 's 102d, h**

Photo : Taken 4/7/00, 21:00 UTC (14:00 PT) <sup>PDT</sup>

Predicted tide: minus 0.14 meters (-0.5 feet)

Bares: 0.3 meters (1.0 feet)





RECRD 52554 VESSLTERMS UNKNOWN CHART 18427 AREA N  
CARTOCODE 0098 SNDINGCODE DEPTH

LAT83 48 28 36.37 LONG83 122 31 46.6 NATIVDATUM O  
LATDEC: 48.476769444444 LONDEC: 122.52961111111 GPQUALITY Low  
GPSOURCE Scaled

PROJECT OPR-N411 ITEMSTATUS Assigned SEARCHTYPE Full  
RADIUS 100 INIT MCR ASSIGNED 3/23/00  
TECNIQ VS,SD,ES  
Techniqnote SEARCH ONLY REQUIRED IN PORTION OF RADIUS FALLING WEST OF THE CHANNEL

History HISTORY  
CL1656/69--USPS REPORT, 11/69; SUNKEN BOAT AT THE EDGE OF DREDGED CHANNEL IN SWINOMISH SLOUGH. AN UNKNOWN REFERENCE TO 200FT AND 50FT WEST IN ASSOCIATION WITH BUOY 18 GIVEN. POSITION SHOWN ON ATTACHED CHART SECTION. WRECK IS PARTIALLY SUBMERGED AT HIGH TIDE. USGC LOCATED THE DERELICT VESSEL AT POS. LAT.48 28 37N, LONG. 122 31 42W NAD 27. ENTERED 3/00 MCR

Fieldnote INVESTIGATION  
DATE(S): 06 /22 /00 (DN: 174)  
VN: 0651 TIME: 21:00:00  
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) Visual Search at zero tide level.  
OBSERVED POSITION: LAT. 48:28:35.86417 LON. 122:31:46.60322  
POSITION DETERMINED BY: DIFFERENTIAL GPS  
INVESTIGATION SUMMARY: No evidence of an exposed wreck was observed either on shore or in the water. Water visibility was adequate to locate a submerged obstruction.  
CHARTING RECOMMENDATION (HYDROGRAPHER): Delete the charted exposed wreck.  
EVALUATOR COMMENTS: Concur

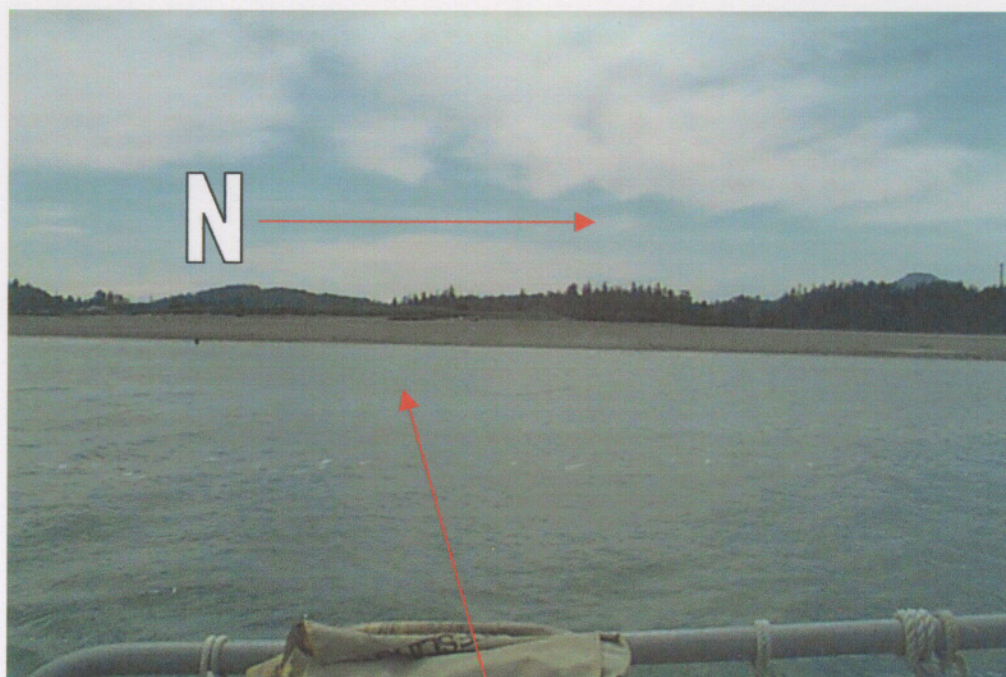
Proprietary

YEARSUNK NIMANUM

Print Record

# **AWOIS 52554 sunken boat at edge of channel**

Disproval photo taken 06/22/00 (DN174) 21:00 UTC ( 14:00 PDT)  
Predicted tide: 0.11 meters (0.4 ft)



Awois disproval  
position



RECRD 52555 VESSLTERMS OBSTRUCTION CHART 18427 AREA N  
CARTOCODE 0067 SNDINGCODE DEPTH

LAT83 48 29 45.4 LONG83 122 32 33.9 NATIVDATUM 31  
LATDEC: 48.495944444444 LONDEC: 122.54275 GPQUALITY Low  
GPSOURCE Scaled

PROJECT OPR-N411 ITEMSTATUS Assigned SEARCHTYPE Full  
RADIUS 0 INIT MCR ASSIGNED 3/23/00  
TECNIQ VS,ES,SD  
Techniqnote SEARCH 50M ABOUT THE POSITIONS GIVEN IN HISTORY BELOW

History HISTORY  
LNM97/59 (FILED AS CL869/59--13TH CGD, 7/31/59--TWO DEADHEADS HAVE BEEN REPORTED GROUNDED AND CLEAR OF CHANNEL, IN A POSITION ABOUT 50 YARDS AND 150 YARDS, RESPECTIVELY, EAST OF SWINOMISH CHANNEL NORTH ENTRANCE BUOY 7. NOW CHARTED AS OBSTRUCTIONS IN NAD 83 POSITIONS:  
48-29-45.4 N 122-32-33.9 W  
48-29-45.6 N 122-32-29.4 W  
ENETRED 3/00 MCR

Fieldnote INVESTIGATION  
DATE(S): 06/22/00 (DN: 174 )  
VN: 0651 TIME: 21:00 UTC  
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) Visual Search  
OBSERVED POSITION: LAT. LON.  
POSITION DETERMINED BY: DIFFERENTIAL GPS  
INVESTIGATION SUMMARY: The two charted deadheads were searched for but not found. Depths at the charted location were approximately 3 meters at predicted tide level zero. It is probable the deadheads have long since floated away or have been collected for salvage; however, a more intensive search would be required to disprove the obstruction definitively.  
CHARTING RECOMMENDATION (HYDROGRAPHER): Retain the charted obstructions.  
EVALUATOR COMMENTS: Concur

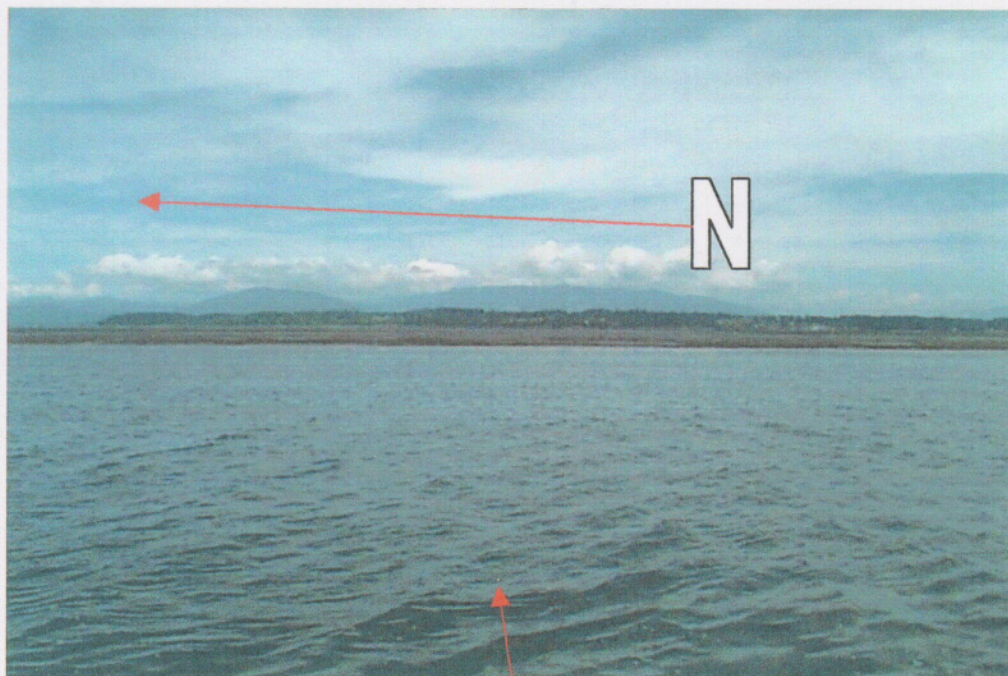
Proprietary

YEARSUNK NIMANUM

Print Record

## **AWOIS 52555 Deadheads**

Disproval photo taken 06/22/00 (DN 174), 21:00 UTC (14:00 PDT)  
Predicted tide: 0.11 meters (0.4 feet)



Awois disproval  
position



RECRD 52556 VESSLTERMS OBSTRUCTION CHART 18430 AREA N  
CARTOCODE 0104 SENDINGCODE DEPTH

LAT83 48 35 17.5 LONG83 122 48 49.95 NATIVDATUM 31  
LATDEC: 48.588194444444 LONDEC: 122.813875 GPQUALITY Low  
GPSOURCE Scaled

PROJECT OPR-N411 ITEMSTATUS Assigned SEARCHTYPE Full  
RADIUS 0 INIT MCR ASSIGNED 3/23/00  
TECNIQ S2,ES,VS

Techniqnote INVESTIGATE THE AREA SHOWN ON MAPINFO GRAPHIC, WHICH IS INCLUDES AN AREA FROM THE APPROX. 60 YARDS OFFSHORE TO SHORE

History HISTORY  
CL1304/73--REPORT TO CGD 13, 8/13/73-- OWNER OF A VESSEL WITH A 4FT KEEL STRUCK WHAT WAS BELIEVED TO BE TWO ROCKS AT THE NARROWEST PORTION OF PASS, APPROX. 50 YARDS FROM SHORE. POSITION OF INCIDENT IDENTIFIED ON MARKED CHART SECTION. IT IS BELIEVED BY NOS PERSONNEL THAT THE OBJECT MAY HAVE BEEN A DEADHEAD.  
NM58/73--REFERENCE TO CL1304/73  
CL1788/73--SP-PMC-12-MA-73; CHART INVESTIGATION USING WIRE DRAG METHODS DID NOT LOCATE REPORTED ROCKS. OFFICE INSPECTION OF RESULTS CONCLUDED THAT SINCE ORIGINAL REPORTED POSITION IS UNCERTAIN AND THAT THE EDGE OF THE WIRE SWEEP WAS 40 TO 55 YARDS FROM SHORE IN DEPTHS OF ABOUT 60FT, THE ROCK COULD EXIST CLOSER TO SHORE. RETAIN REPORTED ROCK. ENTERED 3/00 MCR

Fieldnote INVESTIGATION  
DATE(S): 04/18/00, DN 109; 05/18/00, DN 139; 06/13/00, DN 165; 06/21/00, DN 173  
VN: 0651 TIME:  
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) 200% SSS, Echosounder  
OBSERVED POSITION: LAT. 48:35:17.57847 LON. 122:48:49.90712 Fix No. 15005  
POSITION DETERMINED BY: DIFFERENTIAL GPS  
INVESTIGATION SUMMARY: Ten contacts in the vicinity of the charted rock were located with side scan sonar coverage. All were rigorously developed. None had a significantly shoal depth. Surveyed depths within the 50 meter radius of the charted rock symbol range from 5.2 fathoms near shore out to 10.3 fathoms seaward.  
CHARTING RECOMMENDATION (HYDROGRAPHER): Deleted the charted submerged rock. Chart the soundings from this survey.  
EVALUATOR COMMENTS: Concur with clarification, delete charted submerged rock and note rep 1973.

Proprietary

YEARSUNK NIMANUM

Print Record



RECRD  VESSLTERMS  CHART  AREA   
CARTOCODE  SNDINGCODE  DEPTH

LAT83  LONG83  NATIVDATUM   
LATDEC:  LONDEC:  GPQUALITY   
GPSOURCE

PROJECT  ITEMSTATUS  SEARCHTYPE   
RADIUS  INIT  ASSIGNED   
TECNIQ

Techniqnote

History

Fieldnote

Proprietary

YEARSUNK  NIMANUM

RECRD  VESSLTERMS  CHART  AREA   
CARTOCODE  SNDINGCODE  DEPTH

LAT83  LONG83  NATIVDATUM   
LATDEC:  LONDEC:  GPQUALITY   
GPSOURCE

PROJECT  ITEMSTATUS  SEARCHTYPE   
RADIUS  INIT  ASSIGNED   
TECNIQ

Techniqnote

History

Fieldnote

Proprietary

YEARSUNK  NIMANUM

Pacific Hydrographic Party  
Dive Plan/Investigation Form

AW015  
52558

Date: 6/9/00 DN: 161 Survey: F00459

Location: FRIDA HARBOUR, SAN JUAN ISLAND

Latitude: \_\_\_\_\_ Longitude: \_\_\_\_\_ Divemaster: \_\_\_\_\_

Diver in Charge: \_\_\_\_\_ Launch: 0651 0652 Coxswain: \_\_\_\_\_

Tenders: \_\_\_\_\_ Equipment Used: SCUBA

Dive Plan: DROP MARKER BOM AT SS TARGET DETERMINE NATURE ORIENTATION & LEAST DEPTH OF WRECK.

Weather: \_\_\_\_\_ Wind: 0 (Kts/dir)  
Seas: 0 (ft)  
Swell: 0 (ft)

Diver	Surface Interval	Rep Group	P <sub>in</sub>	T <sub>in</sub> GMT	P <sub>out</sub>	T <sub>out</sub> GMT	Bottom Time	Max Depth	Group
BROWN	—		2000	2005	1000	2015	10	32	—
WERNICKE	—		2500	2005	1500	2015	10	32	—

Current: 0 Visibility: 100' Bottom Type: mm

Description & Dimensions:

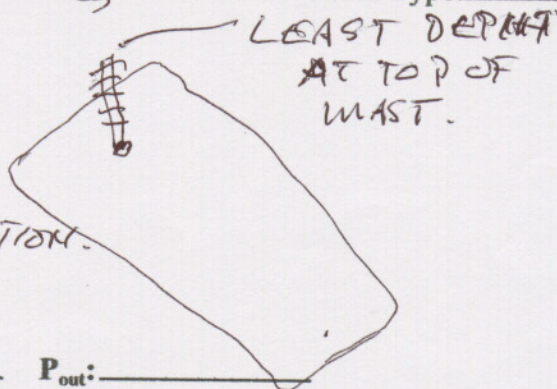
BARGE APPROX 30 X 60  
LYING NW TO SE  
MAST TOP APPROX 6m.

ABOVE DELTA. STABLE CONDITION.

Diver Gauge Information

P<sub>in</sub>: \_\_\_\_\_ P<sub>LD</sub>: \_\_\_\_\_ P<sub>out</sub>: \_\_\_\_\_

Time of Least Depth Measurement: 2.7 m. LEADLINE @ 2010 UTC





RECRD 52559 VESSLTERMS EL CAPTAIN CHART 18434 AREA N  
CARTOCODE 0098 SNDINGCODE DEPTH

LAT83 48 32 34 LONG83 123 00 56 NATIVDATUM 31  
LATDEC: 48.542777777778 LONDEC: 123.01555555556 GPQUALITY Low  
GPSOURCE Direct

PROJECT OPR-N411 ITEMSTATUS Assigned SEARCHTYPE Full  
RADIUS 100 INIT MCR ASSIGNED 3/23/00  
TECNIQ VS,ES,DI,SD

Techniqnote

History HISTORY  
CL225/96--USPS REPORT, MARCH 1995; A 50 FT U.S. NAVY MOTOR LAUNCH, CONVERTED TO A DIVERS BOAT, SUNK  
IN 7 FT OF WATER MLLW. A SMALL CORNER OF CABIN TOP APPEARS ABOVE THE WATER. POS. OF WRECK WAS  
CALCULATED BY VISUAL MEANS FROM U OF W PIER AND LIGHTS AND DETERMINED TO BE LAT.48 32 34, LONG.123 00  
56. ENTERED 3/00 MCR

Fieldnote INVESTIGATION  
DATE(S): 05/08/00 (DN: 129)  
VN: 0651 TIME: 222240 UTC  
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) visual  
OBSERVED POSITION: LAT. 48:32:33.3649N LON. 123:00:58.5092W  
POSITION DETERMINED BY: DIFFERENTIAL GPS  
INVESTIGATION SUMMARY: A portion of the wreck was visible baring 0.8 meters at tide level -0.5 meters. A detached position was  
recorded at this location (Fix 15000)  
CHARTING RECOMMENDATION (HYDROGRAPHER): Retain the charted wreck.  
EVALUATOR COMMENTS: Do not concur, remove charted wreck, chart wreck awash at datum at the above observed position.

Proprietary

YEARSUNK NIMANUM

Print Record

**Item: AWOIS 52559**

**Fix no. 15000**

**Photo:** taken on DN 129 (5/8/00) at 22:22:40 UTC, baring 0.6 meters  
Unverified real tide: minus 0.5 meters



RECRD 52560 VESSLTERMS OBSTRUCTION CHART 18434 AREA N  
CARTOCODE 0067 SNDINGCODE DEPTH

LAT83 48 32 44.2 LONG83 123 00 30.4 NATIVDATUM 31  
LATDEC: 48.545611111111 LONDEC: 123.00844444444 GPQUALITY Low  
GPSOURCE Scaled

PROJECT OPR-N411 ITEMSTATUS Assigned SEARCHTYPE Full  
RADIUS 100 INIT MCR ASSIGNED 3/23/00  
TECNIQ S2,ES,SD,VS

Techniqnote

History HISTORY  
\*\*\*\*SOURCE UNKNOWN; APPEARS AS SUBMERGED STRUCTURE PA ON 24TH ED, 10/11/75 , OF CHART 18421 IN  
POS.48-32-44.2 N 123-00-30.4 W (PRESENT NAD 83 POS.). ENTERED 3/00 MCR

Fieldnote INVESTIGATION  
DATE(S): 04/19/00 (DN 110), 05/08/00 (DN 129), 05/22/00 (DN 143). 06/09/00 (DN 161)  
VN: 0651 TIME:  
INVESTIGATION METHODS USED: (IE DI, 200% SIDE SCAN SONAR, ECHO SOUNDER) 200 SSS, Echosounder Dev  
OBSERVED POSITION: LAT. LON.  
POSITION DETERMINED BY: DIFFERENTIAL GPS  
INVESTIGATION SUMMARY: The search area is a steep slope near shore. No structure was observed on the sonargram . The area is along the shoreline of the University of Washington's Marine Laboratories where marine and aquaculture research is conducted. Craig Staude. Ph. D., Marine Technologist at the laboratories, (360-378-2165) reported that he is not aware of any submerged research structure at this location at this time. However, he stated that temporary experimental structures are frequently deployed in the area and he would prefer that the charted structure be retained to discourage anchoring in that location  
CHARTING RECOMMENDATION (HYDROGRAPHER): Retain the submerged structure as charted.  
EVALUATOR COMMENTS: Concur

Proprietary

YEARSUNK NIMANUM

Print Record





**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL OCEAN SERVICE

Navigation Response Team 3  
General Delivery  
Tacoma, WA 98421  
Phone: (253) 779-5325  
Fax: (253) 779-5327

July 17, 2000

**ADVANCE  
INFORMATION**

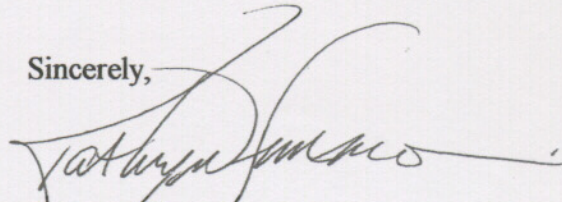
Commander  
Thirteenth Coast Guard District (OAN)  
Federal Building, Room 3410  
915 Second Avenue  
Seattle, WA 98174-1067

Dear Sir:

The NOAA Navigation Response Team 3 has discovered a potential danger to navigation while conducting survey operations in Northern Puget Sound. A Danger to Navigation Report is enclosed along with a chartlet showing the affected portion of Chart 18427, the largest-scale chart of the area..

I recommend this Danger to Navigation Report be included in the next Local Notice to Mariners.

Sincerely,



Kathryn Simmons

Enclosures

cc: NIMA  
N/CS26  
N/CS34



Printed on Recycled Paper





**DANGER TO NAVIGATION REPORT**  
**DGR-01-00-NRT3**

**SURVEY REGISTRY NUMBER:** F00459  
**STATE:** Washington  
**GENERAL LOCALITY:** Puget Sound  
**SUBLOCALITY:** Chart Evaluations for Puget Sound  
**PROJECT NUMBER:** OPR-N411-NRB

The following items which are potential dangers to navigation were discovered during hydrographic survey operations by the NOAA Navigation Response Team 3.

**Objects Discovered:**

1. Uncharted submerged wreck: wood fishing boat, approximately 50 feet long and 20 feet wide, tilted approximately 10-15° onto its starboard side with bow oriented toward north. The vessel was covered with kelp; no markings or other identification were found on the vessel. Using a leadline, divers measured a least depth of 2.9 meters/1.6 fathoms at the high point. The depth was corrected to 1.5 meters/0.8 fathoms at MLLW based on preliminary real tides. The wreck is marked by a "fender" buoy and its least depth is located at latitude 48°32'38.955"N, longitude 123°00'54.892"W.

2. Charted submerged wreck: Divers located a barge approximately 60 feet long and 30 feet wide, oriented NW to SE in stable condition. A mast extends approximately 6 meters above the deck; its least depth was measured by leadline at 2.7 meters/1.5 fathoms. The depth was corrected to 1.5 meters/0.8 fathoms at MLLW based on preliminary real tides. Least depth is located at latitude 48°31'44.138"N, longitude 123°00'04.530"W

**Charts Affected:** 18400, 18421, 18434

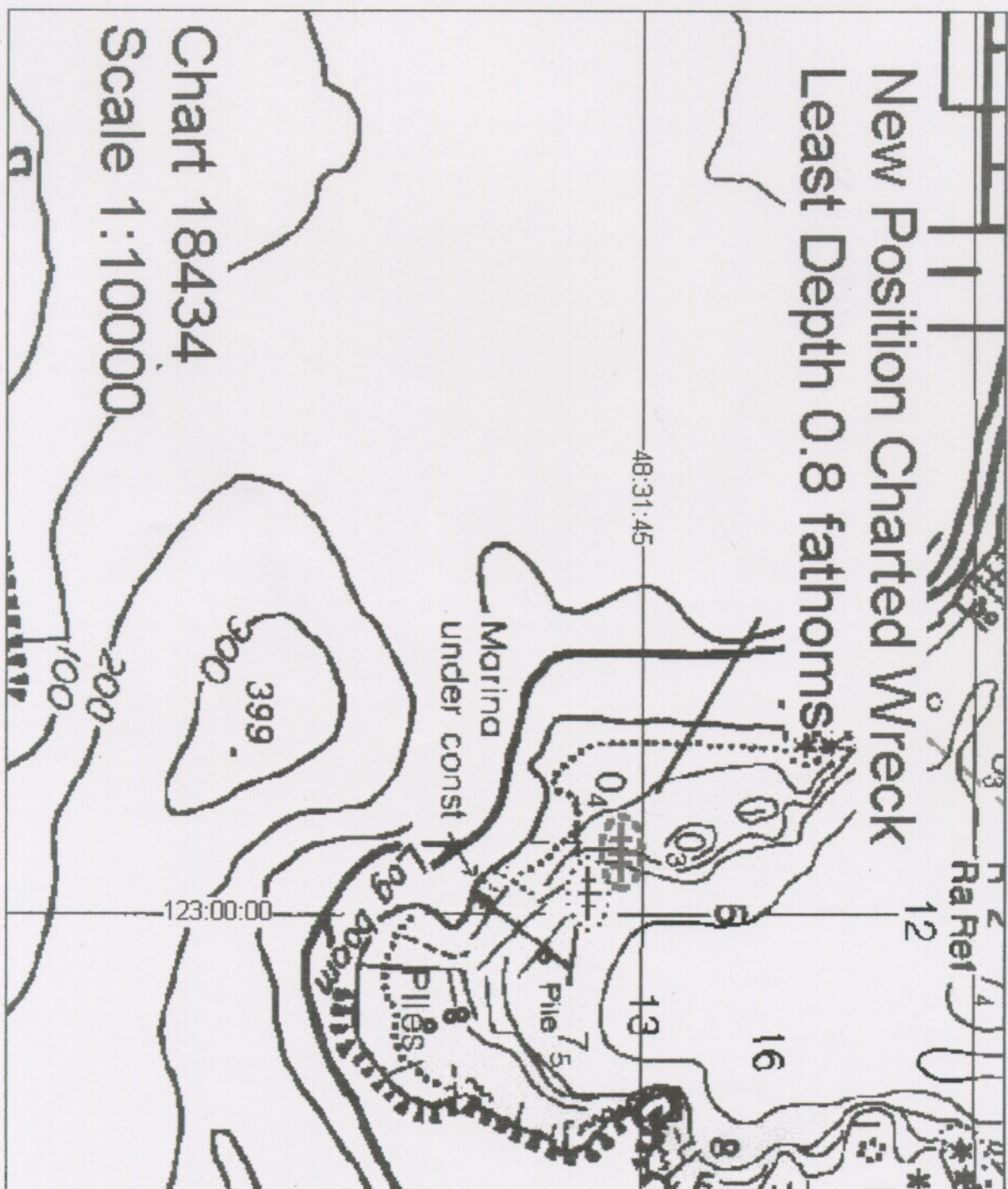
Questions concerning this report should be directed to NOAA, Pacific Hydrographic Branch, N/CS34, 7600 Sand Point Way NE, Bin C25700, Seattle, WA 98115-0070, telephone number (206) 526-6853.







ADVANCE  
INFORMATION





**Subject:** F00459 Danger to Navigation Letter

**Date:** Fri, 11 Aug 2000 11:08:33 -0500

**From:** Russ Davies <russ.davies@noaa.gov>

**Organization:** phb

**To:** Dennis Hill <Dennis.Hill@noaa.gov>

During office processing of hydrographic survey F00459 potential dangers to navigation were discovered. Detailed information is contained in the accompanying Danger to Navigation Report. It is recommended these dangers be considered for publication in the appropriate Local Notice to Mariners.



[F00459DTON.wpd](#)

**Name:** F00459DTON.wpd

**Type:** Corel WordPerfect 8 Document

(application/x-unknown-content-type-WP8Doc)

**Encoding:** base64



[russ.davies.vcf](#)

**Name:** russ.davies.vcf

**Type:** VCard (text/x-vcard)

**Encoding:** 7bit

**Description:** Card for Russ Davies



## REPORT OF DANGERS TO NAVIGATION

Hydrographic Survey Registry Number: **F00459**

Survey Title:      State: **WA**  
                         Locality: **Puget Sound**  
                         Sub-locality: **Various**

Project Number: **OPR-N411-NRB**

Survey Dates: **04/13/00 - 06/21/00**

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

### **CHARTS AFFECTED:**

CHART	EDITION	DATE	SCALE
18434	4 <sup>th</sup>	April 27, 1996	1:25,000
18430	6 <sup>th</sup>	November 2, 1996	1:25,000

### **DANGERS:**

FEATURE	DEPTH (Chart Units)	LATITUDE(N)	LONGITUDE(W)
5.2 fathom sounding	5 fathoms 1 foot	48/35/18.12	123/00/55.37
7.8 fathom sounding	7 fathoms 5 feet	48/35/55.91	122/50/17.28

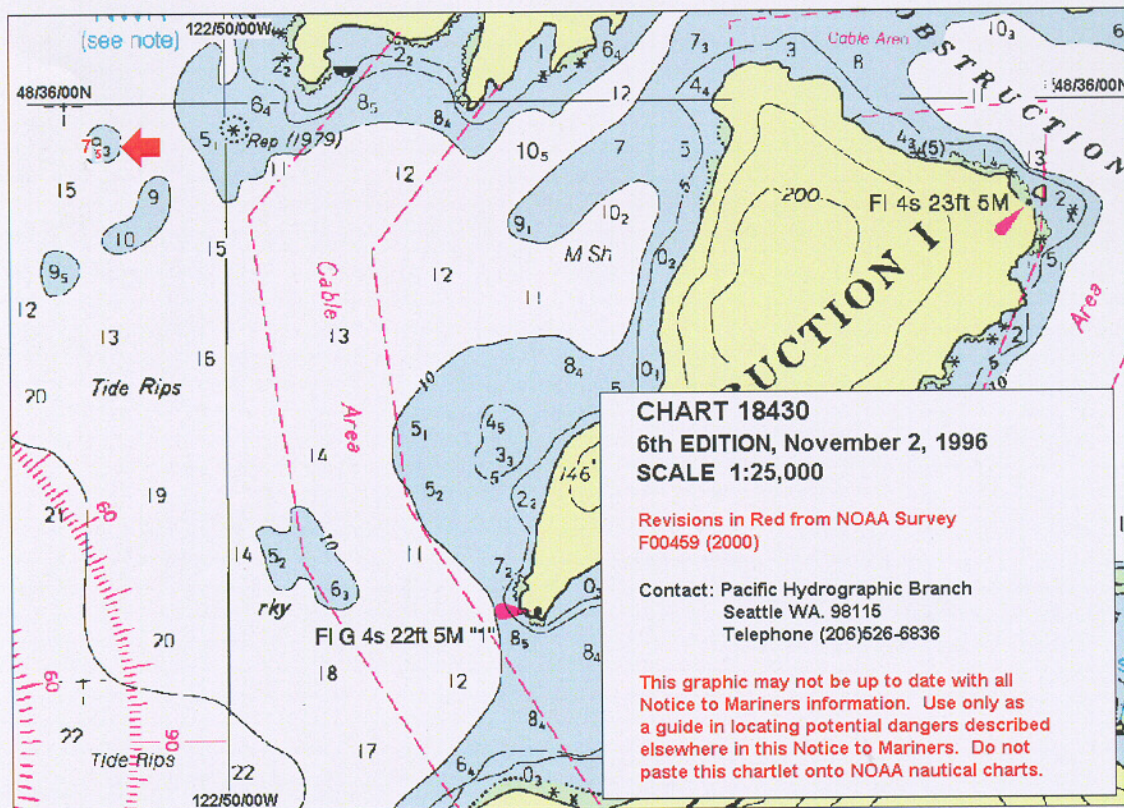
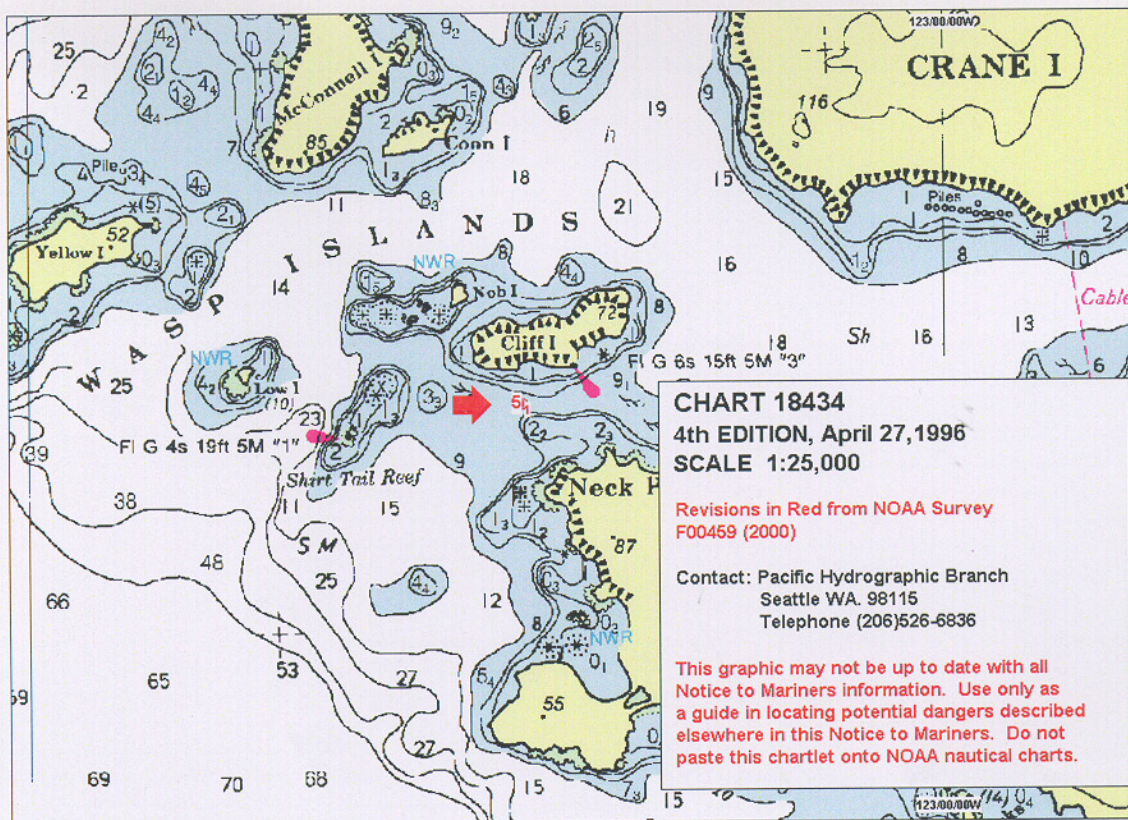
### **COMMENTS:**

N/A

See attached chartlets.

Questions concerning this report should be directed to the Pacific Hydrographic Branch (N/CS34) at (206) 526-6836.









UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Silver Spring, Maryland 20910

# TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: August 21, 2000

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR-N411-NRT3-2000

HYDROGRAPHIC SHEET: F00459

LOCALITY: Puget Sound, WA

TIME PERIOD: April 13 - June 21, 2000

TIDE STATION USED: 944-9424 Cherry Point, WA

Lat. 48° 51.8'N Lon. 122° 45.5'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.515 meters

TIDE STATION USED: 944-9880 Friday Harbor, WA

Lat. 48° 32.7'N Lon. 123° 0.8'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.150 meters

TIDE STATION USED: 944-9932 Armitage Island, WA

Lat. 48° 32.1'N Lon. 122° 47.8'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.189 meters

## REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: PS252, PS253, PS274, PS275, PS276, PS277, PS284, PS286, PS287, PS288, PS289 & PS304.

Refer to attachments for zoning information.

**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time.

For *[Signature]*

CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION



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Final tide zone node point locations for OPR-N411-NRT3-2000,  
Sheet F00459.

Format: Longitude in decimal degrees (negative value denotes  
Longitude West),  
Latitude in decimal degrees  
Tide Station (in recommended order of use)  
Average Time Correction (in minutes)  
Range Correction

	Tide Station Order	AVG Time Correction	Range Correction
Zone PS252			
-122.775261 48.557684	944-9932	+12	1.03
-122.810575 48.586315			
-122.810389 48.593792			
-122.804675 48.597911			
-122.799838 48.601796			
-122.767118 48.604224			
-122.722385 48.602606			
-122.714173 48.563109			
-122.775261 48.557684			
Zone PS253			
-122.722385 48.602606	944-9932	+24	1.04
-122.677626 48.628255			
-122.790731 48.644557			
-122.82723 48.625139			
-122.818602 48.608322			
-122.801097 48.603921			
-122.799838 48.601796			
-122.767118 48.604224			
-122.722385 48.602606			
Zone PS274			
-122.884474 48.57267	944-9932	+12	0.99
-122.866912 48.57662			
-122.847864 48.579188			
-122.82703 48.580175			
-122.82335 48.582646			
-122.822371 48.588361			
-122.816538 48.593675			
-122.824439 48.600622			



-122.818602 48.608322  
-122.82723 48.625139  
-122.841395 48.62062  
-122.865701 48.609546  
-122.88805 48.597787  
-122.884474 48.57267

Zone PS275

-122.799838 48.601796	944-9932	+18	1.01
-122.801097 48.603921			
-122.818602 48.608322			
-122.824439 48.600622			
-122.816538 48.593675			
-122.813222 48.597697			
-122.804675 48.597911			
-122.799838 48.601796			

Zone PS276

-122.810389 48.593792	944-9932	+12	1.01
-122.815851 48.59079			
-122.822371 48.588361			
-122.82335 48.582646			
-122.815161 48.581832			
-122.810575 48.586315			
-122.810389 48.593792			

Zone PS277

-122.816018 48.549951	944-9932	+6	0.98
-122.814552 48.552119			
-122.822915 48.566762			
-122.82703 48.580175			
-122.847864 48.579188			
-122.866912 48.57662			
-122.884474 48.57267			
-122.889426 48.553276			
-122.876884 48.537626			
-122.86133 48.540325			
-122.845427 48.542252			
-122.816018 48.549951			

Zone PS284

-122.91361 48.593	944-9880	+6	0.99
-122.942351 48.604027			
-122.979204 48.600428			
-122.975154 48.590005			



-122.944337 48.584028  
-122.942496 48.58586  
-122.929719 48.583633  
-122.920623 48.583058  
-122.91361 48.593

Zone PS286

-122.942351 48.604027	944-9880	+12	0.99
-122.951828 48.634099			
-122.984226 48.645264			
-122.998643 48.643224			
-122.997833 48.628838			
-122.979204 48.600428			
-122.942351 48.604027			

Zone PS287

-122.962942 48.553049	944-9880	0	1.00
-122.99206 48.584349			
-123.010848 48.582026			
-123.049269 48.567168			
-123.025971 48.536842			
-123.008822 48.525463			
-122.98251 48.515418			
-122.984356 48.534048			
-122.962942 48.553049			

Zone PS288

-123.010848 48.582026	944-9880	+6	1.02
-123.011755 48.584836			
-123.007518 48.596678			
-123.011448 48.615139			
-123.026431 48.621901			
-123.050214 48.617995			
-123.078578 48.617272			
-123.10661 48.619602			
-123.108795 48.596829			
-123.049269 48.567168			
-123.010848 48.582026			

Zone PS289

-122.997833 48.628838	944-9880	+6	1.00
-123.00739 48.632918			
-123.011448 48.615139			
-123.007518 48.596678			
-123.011755 48.584836			



-123.010848 48.582026  
-122.99206 48.584349  
-122.975154 48.590005  
-122.979204 48.600428  
-122.997833 48.628838

Zone PS304

-122.772005 48.892171  
-122.707285 48.857827  
-122.706849 48.817893  
-122.709609 48.803643  
-122.717992 48.811214  
-122.722296 48.8151  
-122.74534 48.832708  
-122.774937 48.845945  
-122.789698 48.849346  
-122.783919 48.858168  
-122.772005 48.892171

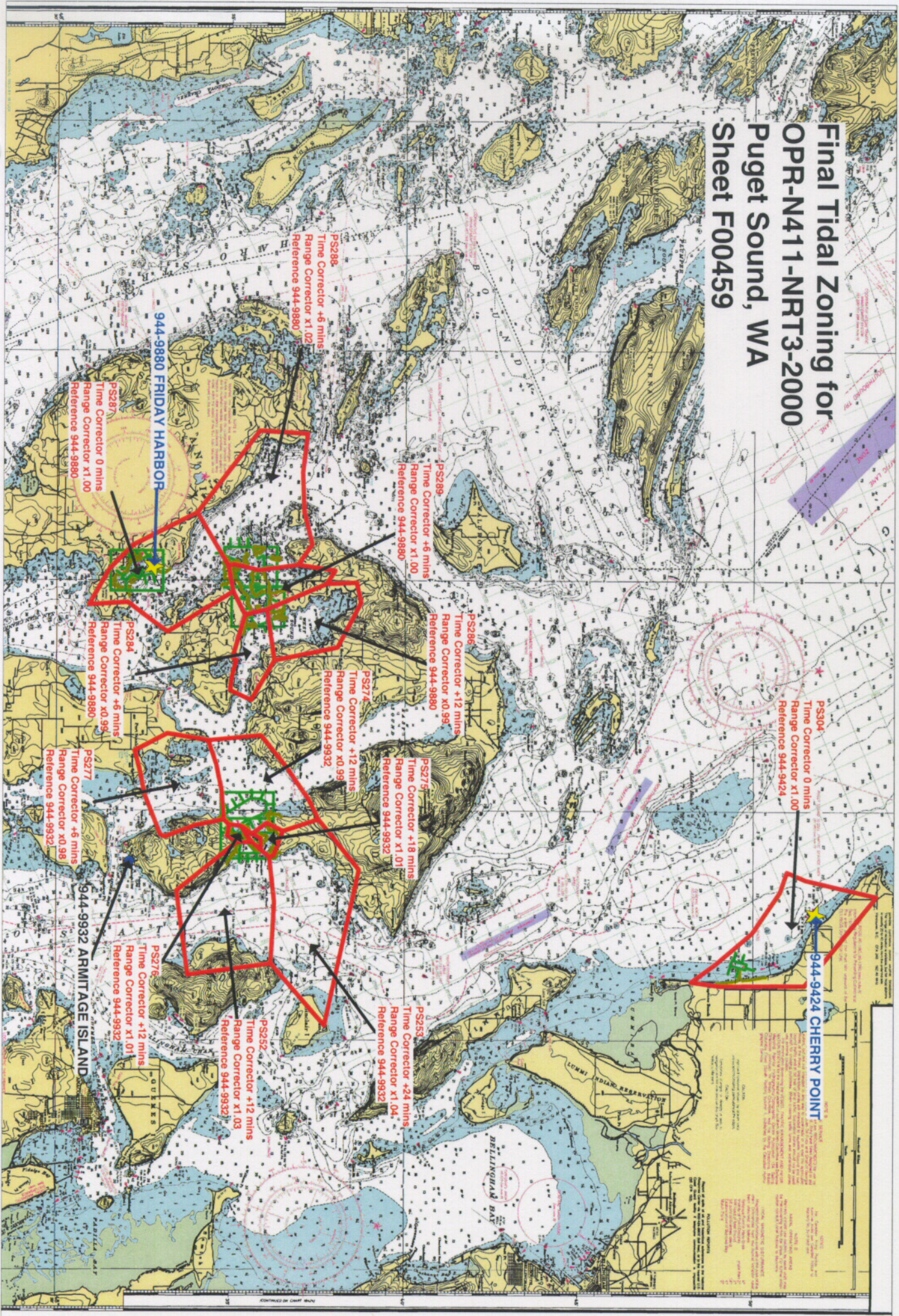
944-9424

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**Final Tidal Zoning for  
OPR-N411-NRT3-2000  
Puget Sound, WA  
Sheet F00459**





## HYDROGRAPHIC SURVEY STATISTICS

F00459

RECORDS ACCOMPANYING SURVEY: To be completed when survey is processed.

RECORD DESCRIPTION		AMOUNT		RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		2		SMOOTH OVERLAYS: POS., ARC, EXCESS			
DESCRIPTIVE REPORT		1		FIELD SHEETS AND OTHER OVERLAYS		17	
DESCRIP- TION	DEPTH/POS RECORDS	HORIZ. CONT. RECORDS	SONAR- GRAMS	PRINTOUTS	ABSTRACTS/ SOURCE DOCUMENTS		
ACCORDION FILES	1						
ENVELOPES							
VOLUMES							
CAHIERS							
BOXES							
SHORELINE DATA							
SHORELINE MAPS (List):							
PHOTOBATHYMETRIC MAPS (List):							
NOTES TO THE HYDROGRAPHER (List):							
SPECIAL REPORTS (List):							
NAUTICAL CHARTS (List):							
OFFICE PROCESSING ACTIVITIES							
The following statistics will be submitted with the cartographer's report on the survey							
PROCESSING ACTIVITY				AMOUNTS			
				VERIFICATION	EVALUATION	TOTALS	
POSITIONS ON SHEET							
POSITIONS REVISED							
SOUNDINGS REVISED							
CONTROL STATIONS REVISED							
				TIME-HOURS			
				VERIFICATION	EVALUATION	TOTALS	
PRE-PROCESSING EXAMINATION							
VERIFICATION OF CONTROL							
VERIFICATION OF POSITIONS							
VERIFICATION OF SOUNDINGS							
VERIFICATION OF JUNCTIONS							
APPLICATION OF PHOTOBATHYMETRY							
SHORELINE APPLICATION/VERIFICATION							
COMPILATION OF SMOOTH SHEET						266	
COMPARISON WITH PRIOR SURVEYS AND CHARTS							
EVALUATION OF SIDE SCAN SONAR RECORDS							
EVALUATION OF WIRE DRAGS AND SWEEPS							
EVALUATION REPORT						71	
GEOGRAPHIC NAMES							
OTHER (Chart Compilation)						113	
USE OTHER SIDE OF FORM FOR REMARKS			TOTALS			450	
Pre-processing Examination by				Beginning Date	08/14/2000		Ending Date
Evaluation of Field Data by R. Davies				Time (Hours)	266		Ending Date
Verification Check by				Time (Hours)			Ending Date
Evaluation and Analysis by R. Davies				Time (Hours)	71		Ending Date 04/21/2003
Inspection by B. Olmstead				Time (Hours)	31		Ending Date 04/21/2003



## APPROVAL SHEET

for

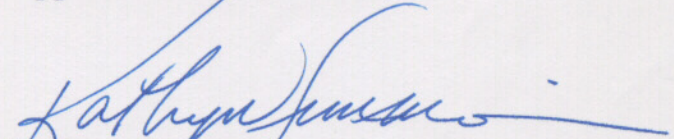
F00459

Chart Evaluation F0059

Standard field surveying and processing procedures were followed in producing this survey in accordance with the Hydrographic Manual, Fourth Edition; the Hydrographic Survey Guidelines; and the Field Procedures Manual, as updated for 1998. The data were reviewed daily during acquisition and processing.

The digital data and supporting records have been reviewed by me, are considered complete and adequate for charting purposes, and are approved. All records are forwarded for final review and processing to N/CS34, Pacific Hydrographic Branch.

Approved and forwarded,



Kathryn Simmons

Navigation Response Team 3



APPROVAL SHEET  
F00459

Initial Approvals:

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The survey records and digital data comply with NOS requirements except where noted in the Descriptive Report, and are adequate to supersede prior surveys and nautical charts in the common area.

Bruce A. Olmstead  
Bruce Olmstead  
Acting Chief, Cartographic Team  
Pacific Hydrographic Branch

Date: 4/22/2003

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

John E. Lowell, Jr.  
John E. Lowell, Jr.  
Commander, NOAA  
Chief, Pacific Hydrographic Branch

Date: 6/5/03

*AWOL check*



FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. F00459

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED