



U.S. Coast Guard Auxiliary

District 11 Northern Region
Serving Northern California, Nevada, Utah

District Navigation Systems

Covering Aids to Navigation, Bridges, & Chart Updating Activities

Accuracy - Credibility - Professionalism - Service to the Coast Guard & NOAA-NOS

DSO-NS Northern Region Report No. 2016-06

Date: July 5, 2016
From: DSO-NS 11(NR)
To: DCAPT-RBS & All D11 Auxiliary Members for Immediate Action
Info: EXCOM, Board & Staff, SO-NS, FSO-NS & Aid Verifiers, D11 (dpw) & D11 (dpa-n)
Subject: DSO-NS Monthly Report & Bulletin

SO-NS please contact each FSO-NS to see that they receive a copy of this bulletin.

Additional copies can be downloaded at: <http://ns.d11nuscgaux.info/ns.html>

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1. NOAA COAST SURVEY ASK HOW ACCURATE ARE NAUTICAL CHARTS?

Charts will provide more information on “zone of confidence”

It is a major challenge – some might say an impossibility – to keep all thousand U.S. nautical charts up to date. But exactly how out of date is the chart data? Chart users will get a better idea now that Coast Survey is gradually rolling out a new chart feature called the **zone of confidence**, or “ZOC” box. It will replace the source diagram that is currently on large-scale charts. Source diagrams, and now the improved ZOC, help mariners assess hydrographic survey data and the associated level of risk to navigate in a particular area.

The first charts to show the new ZOC box (2 in D11 NR) are [18622](#), [18682](#), [18754](#), and [11328](#). They were released on April 7. Both source diagrams and ZOC diagrams consist of a graphic representation of the extents of hydrographic surveys within the chart and accompanying table of related survey quality categories. Where the old source diagrams were based on inexact and sometimes subjective parameters, however, the new ZOC classifications are derived more consistently, using a combination of survey date, position accuracy, depth accuracy, and sea floor coverage (the survey’s ability to detect objects on the seafloor).

To see the zones of confidence on charts, look for the chart markings (A1, A2, B, C, and D) on the chart itself. Check the ZOC box (located on non-water portions of the chart) for the date of the data acquisition, the position accuracy, the depth accuracy, and characterization of the seafloor for each particular zone.

<p style="text-align: center;">ZOC CATEGORIES (Refer to Chapter 1, United States Coast Pilot)</p>				
ZOC	DATE	POSITION ACCURACY	DEPTH ACCURACY	SEAFLOOR COVERAGE
A1	2008–2009	± 16 ft	= 1.6 ft + 1% depth	All significant seafloor features detected
B	1949	± 160 ft	= 3.2 ft + 2% depth	Uncharted features hazardous to surface navigation are not expected but may exist
C	1949	± 1600 ft	= 6.5 ft + 2% depth	Depth anomalies may be expected
D	–	Worse than ZOC C	Worse than ZOC C	Large depth anomalies may be expected

Why do users need a “zone of confidence?”

The age and accuracy of data on nautical charts can vary. Depth information on nautical charts, paper or digital, is based on data from the latest available hydrographic survey, which in many cases may be quite old. In too many cases, the data is more than 150 years old. Sometimes, particularly in Alaska, the depth measurements are so old that they may have originated from Captain Cook in 1778.

Mariners need to know if data is old. They need to understand the capabilities and the limitations of the chart. In particular, the mariner should understand that nautical chart data, especially when it is displayed on navigation systems and mobile apps, possess inherent accuracy limitations.

Before the advent of GPS, the position accuracy of features on a paper chart was more than adequate to serve the mariner’s needs. Twenty years ago, mariners were typically obtaining position fixes using radar ranges, visual bearings, or Loran C. Generally, these positioning methods were an order of magnitude less accurate than the horizontal accuracy of the survey information portrayed on the chart. Back then, Coast Survey cartographers were satisfied when we plotted a fix with three lines of position that resulted in an equilateral triangle whose sides were two millimeters in length at a chart scale of 1:20,000. In real world coordinates, the triangle would have 40-meter sides. Close enough!

Now, with GPS, charted locations that are off by 10 or 15 meters are not nearly close enough. Mariners now expect, just as they did 30 years ago, that the horizontal accuracy of their charts will be at least as accurate as the positioning system available to them. Unfortunately, charts based on data acquired with old survey technologies will never meet that expectation.

Source data is deficient by today's standards

The overall accuracy of data portrayed on paper charts is a combination of the accuracy of the underlying source data and the accuracy of the chart compilation process. Most nautical charts are made up of survey data collected by various sources over a long time. A given chart might encompass one area that is based on a lead line and sextant hydrographic survey conducted in 1890, while another area of the same chart might have been surveyed in the year 2000 with a full-coverage shallow-water multibeam echo sounder.

In general, federal hydrographic surveys have used the highest standards, with the most accurate hydrographic survey instrumentation available at the time. On a 1:20,000-scale chart, for example, the survey data was required to be accurate to 15 meters. Features whose positions originate in the local notice to mariners, reported by unknown source, are usually charted with qualifying notations like position approximate (PA) or position doubtful (PD). The charted positions of these features, if they do exist, may be in error by miles.

Similarly, the shoreline found on most NOAA charts is based on photogrammetric or plane table surveys that are more than 30 years old.

Another component of chart accuracy involves the chart compilation process. Before NOAA's suite of charts was scanned into raster format in 1994, all chart compilation was performed manually. Cartographers drew projection lines by hand and plotted features relative to these lines. They graphically reduced large-scale (high-detail) surveys or engineering drawings to chart scale. Very often, they referenced these drawings to state or local coordinate systems. The data would then be converted to the horizontal datum of the chart, e.g., the North American 1927 (NAD27) or the North American Datum 1983 (NAD83). In the late 1980s and early 1990s, NOAA converted all of its charts to NAD83, using averaging techniques and re-drawing all of the projection lines manually.

When NOAA scanned its charts and moved its cartographic production into a computer environment, cartographers noted variations between manually constructed projection lines and those that were computer-generated. They adjusted all of the raster charts so that the manual projection lines conformed to the computer-generated projection.

Many electronic chart positional discrepancies that are observed today originate from the past graphical chart compilation techniques. The manual application of survey data of varying scales to the fixed chart scale was a source of error that often introduced biases. Unfortunately, on any given chart, the magnitude and the direction of these discrepancies will vary in different areas of the chart. Therefore, no systematic adjustment can automatically improve chart accuracy.

Coast Survey is addressing the accuracy problem

NOAA's suite of over a thousand nautical charts covers 95,000 miles of U.S. coastline, and includes 3.4 million square nautical miles of U.S. jurisdiction within the Exclusive Economic Zone (which is an area that extends 200 nautical miles from shore.) About half of the depth information found on NOAA charts is based on hydrographic surveys conducted before 1940. Surveys conducted with lead lines or single-beam echo sounders sampled a small percentage of the ocean bottom. Due to technological constraints, hydrographers were unable to see between the sounding lines. Depending on the water depth, these lines may have been spaced at 50, 100, 200, or 400 meters. Today, as NOAA and its contractors re-survey areas and obtain full-bottom coverage, we routinely discover previously uncharted features (some that are dangers to

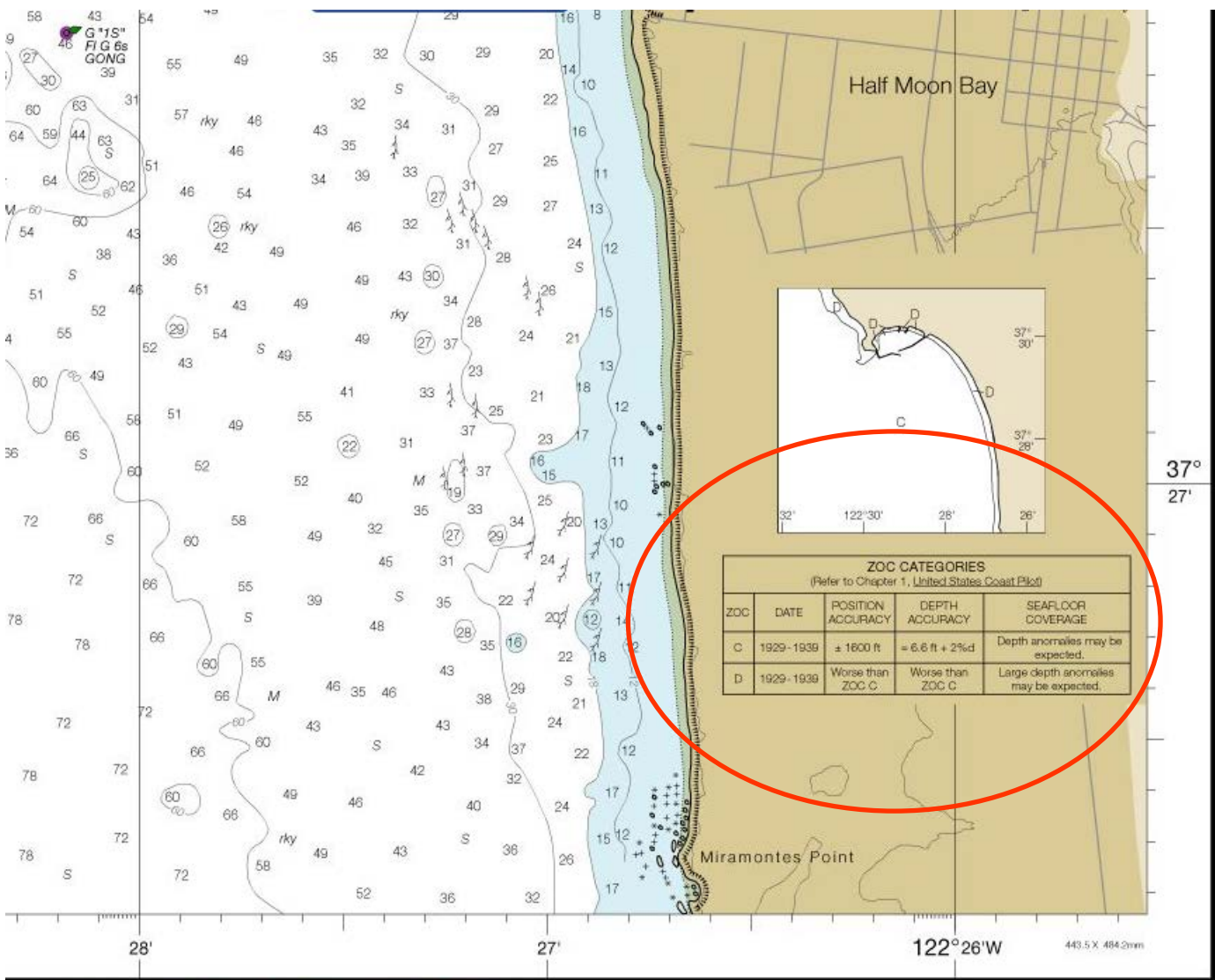
navigation). These features were either: 1) not detected on prior surveys; 2) man-made objects, like wrecks and obstructions, that have appeared on the ocean bottom since the prior survey; or 3) the result of natural changes that have occurred since the prior survey.

Coast Survey is also improving our chart production system. As NOAA developed its charts over the centuries, cartographers relied on separate sets of data: one set for traditional paper charts, and another for the modern electronic navigational charts. We are currently integrating a new charting system that will use one central database to produce all NOAA chart products. The new chart system slims down the system while it beefs up performance, speeding new data and updates to all chart versions of the same charted areas and removing inconsistencies.

As always, NOAA asks chart users to let us know when you find an error on a NOAA chart. Just go to the [discrepancy reporting system](http://ocsdata.ncd.noaa.gov/idrs/discrepancy.aspx), give us your observation, and we will take it from there.

<http://ocsdata.ncd.noaa.gov/idrs/discrepancy.aspx?AspxAutoDetectCookieSupport=1>

Share this:



SOUNDINGS IN FEET

Half Moon Bay
SOUNDINGS IN FEET - SCALE 1:20,000

18682

The above information is from the NOAA Office of Coast Survey.

2. Have you updated your charts? 2016 – NEW CHARTS for D11NR: We have 2 new Chart Editions in 2016. See “Dates of Chart Latest Edition Table” for all D11 Northern Region latest editions on page 8. These charts are always available by Charts-on-Demand and downloading [NOAA RNCs Raster Navigational Charts](#) and [NOAA ENC's Electronic Navigation Charts](#) from the NOAA-NOS website at

<http://www.nauticalcharts.noaa.gov/staff/chartspubs.html>. The most up to date charts.

These 2 new Charts now have the “zone of confidence or ZOC Box” as noted above in Item 1.

District 11 Northern Regions New Chart Editions.

Chart Information					Charts-on-Demand, RNC/ENC	
NUMBER	TITLE	Edition	Traditional Paper Chart Edition Date	Scale	Latest Edition Date from LNM Update for NOAA On-Line-Viewer & RNC & ENC Navigational Charts updates	
18622	HUMBOLDT BAY	56	04/1/26	1:25,000	LNM 13/16	03/29/2016
18682	HALF MOON BAY	15	04/1/16	1:20,000	LNM 13/16	03/29/2016

Charts with edition dates prior to those listed in the table on page 8 are obsolete for use in operational navigation, private aids verification and chart updating activities. The date of a chart is of vital importance to patrol operations, aid verification, chart updating and general cruising activities. When charted information becomes obsolete, further use of the chart for navigation may be dangerous. Natural and artificial changes, many of them critical, are occurring constantly; and it is important that we in the Auxiliary use the most up-to-date charts.

LATEST EDITIONS IS FROM THE NOAA’S “ON LINE CHART VIEWER & CHART- ON - DEMAND”. The web address below is an excellent free source for the most up to date charts. Attach chart section to your Chart Updating reports, ATON discrepancy reports, and unpermitted PATON’s found reports & for your electronic charting software because these Charts have all been updated. <http://www.nauticalcharts.noaa.gov/mcd/NOAChartViewer.html>

3. PAST COMMANDERS ASSOCIATION TRAINING FAIR: I will be conducting **Auxiliary Aids to Navigation (ATON) Verifier PQS Training Course** and **Chart Updating ICS Course** at the Past Commanders Training Fair on September 17 & 18 2016. If you have not signed up yet, you can get the “Past Commanders Association Training Fair” flyer is on the

District web site in the Calendar page.

<http://ops.d11nuscgaux.info/calendar/district.html>

(1) Chart Updating CSI & NOAA’s Nautical Discrepancy Report System: Again any Auxiliary member can do chart updating.

This class will be held on Saturday, September 17, 2016. This course is for any Auxiliary Member who would like to learn all about Chart, & Coast Pilot Updating. How to submit your chart updated or Coast Pilot reports via. the Office of Coast Survey - NOAA’s Nautical Discrepancy Report System to assist the NOAA-National Ocean Service and the U. S. Coast Guard in keeping our charts and waterways information correct. The focus for the Auxiliary Chart Updating program is on [prevention](#), [accuracy](#), [credibility](#), and [professionalism](#), and is directed toward raising your competence in the eyes of NOAA-NOS. There are specific guidelines for taking fixes and depths that require pre-underway validation of all equipment that is used to perform measurements, and for reporting quality control evidence for each on-scene observation and instrument reading. Also required are

explanations of the technique(s) used to acquire any reported data. Observers are directed to define each chart update task, list their on-scene observations, develop a conclusion from the collected evidence and make a final recommendation to NOS. A fresh scientific approach is encouraged. Evidence can take the form of a fix taken with a GPS set using WAAS, depths corrected to the charted vertical datum, physical measurements, photographs, drawings, marked up chart, Google Earth data and other printouts from the Internet can also supply great supporting data. Any official document that supports your contention is great supporting evidence. In effect, you are pleading your case for acceptance of your premise as a chart update or coast pilot update to NOAA-NOS. This class we also take you step by step on how to submit a report to NOS through the online Office of Coast Survey - NOAA's Nautical Discrepancy Report System.

Again any Auxiliary member can do chart updating. Any Auxiliary Member who would like to update or improve their charting skills can also sign up. You can also find out about downloading excellent Chart Updating information, guides, training power points, all the new excel field reporting forms and worksheets and the WebEx Training Topics Schedule from the best two District Navigation Systems web sites in the auxiliary.

1) D11NR Navigation Systems web site

<http://wow.uscgaux.info/content.php?unit=113&category=navigation-systems>

2) D1NR Navigation Systems web site <http://www.uscgaan.com>

These two web sites can just about answer any and all of your questions about chart updating. Take a good look at both by navigating through these two excellent web sites.

(2). Auxiliary Aids to Navigation (ATON) Verifier PQS Training Course: On Sunday September 18, 2016. This course is for those members who would like to become an Auxiliary Aids to Navigation (ATON) Verifier and assist the Coast Guard with their Aids to Navigation & Bridges. We are in great need of trained Aid Verifier-PQS members. As of January 1, 2017 all Aid Verifiers must be National AV-PQS certified. Any pass or present District Aid Verifiers who would like to update to the AV-PQS qualification or update their skills are also welcome.

The training Prerequisites to completing the course: 1) A BQ or AX member, 2) A current or past Aid Verifier, 3) Completion of the 4 or 8 hour TCT, 4) Completing ICS 100 and ICS 700 and 5) You are required to have a copy of the Auxiliary Aids to Navigation (ATON) Verifier PQS sign off booklet, 6) The sign off booklet and training material can be downloaded from the National Navigation Systems web site:

<http://wow.uscgaux.info/content.php?unit=P-DEPT&category=navigation-systems> and District Navigation Systems web site:

<http://wow.uscgaux.info/content.php?unit=113&category=navigation-systems>.

Please download a copy of the **“Auxiliary Aids to Navigation (ATON) Verifier” PQS** sign off Booklet. Use this booklet as your study guide while attending the AV training course. Just sign up.

4. 2016 NAVIGATION SYSTEMS REPORT:

This report activity table covers all ATON, PATON, Bridge, & Chart Updating activities & reports received by D11 (dpw), NOAA-NOS & AUXINFO through **July 5, 2016**.

2016 DIVISIONAL, BRIDGE, ATON, & CHART UPDATING ACTIVITY SUMMARY REPORT

Div.	AIDS TO NAVIGATION ACTIVITY							Bridges Assigned				PATON's Assigned				2016	
	Bridge	Bridge AUX Data	ATON	ATON AUX DATA	PATON	PATON NO Permit	PATON AUX DATA	AOR	Check	% Done	Still to Do	AOR	Check	% Done	Still to Do	A V 's	P Q S
1	4		1	1	12	1	7	4	4	100%	0	104	12	12%	92	3	5
3	20	4	2		8	3		15	15	100%	0	41	8	20%	37	2	3
4	2				6	1		2	2	100%	0	68		0%	68	1	1
5	13	7			53		47	11	11	100%	0	103	53	51%	50	2	3
6	2	2			29	1	27	2	2	100%	0	67	26	39%	41	1	2
8	1	1			5		5	1	1	100%	0	5	5	100%	0	1	0
10	12				1				9	100%	0	58	1	2%	57	0	2
11			1					0		NA	0	139		0%	139	2	3
12	8				57		43	8	8	100%	0	149	57	38%	92	1	4
Total	62	14	4	1	171	6	129	52	52	100%	0	734	162	22%	572	13	23

Div.	2016 D11NR Chart Updating Year Jan 1, 2016 to Mar 31, 2016			2016 D11NR Chart Updating Year April 1, 2016 to Dec 31, 2016			2016-2017 NOAA-NOS Chart Updating Year Apr 1, 2016 to Mar 31, 2017			
	CU Reports	2nd Ob	CUC (25)	CU Reports	2nd Ob	CUC (25)	CU Reports	2nd Ob	CUC (25)	
1										
3	5	1	112.5	5	1	112.5	5	1	112.5	
4										
5	1		12.5	1		12.5	1		12.5	
6										
8										
10										
11										
12										
Total	6	1	125	6	1	125	6	1	125	
Total D11 CU Reports 1/1/16 through 12/31/16 →			6	Total D11-NOAA CU & CUC 4/1/16 through 3/31/17 →			6	125		

Total Aids to Navigation Reports	243	Total Members Submitting ATON & CU Reports in 2016 →	25
Total Aids to Navigation in AUXDATA*	129	129 out of 243 reports showing up in AUXDATA →	53%
Total Chart Updating Reports	6	A= ATON, P= PATON, B= Bridges, U= Unauthorized, CU=Chart Updates	
Total ATON & Chart Updating	249	CUP = Chart Update Points (Stop Gap) -26 CUP awarded by D11NR DSO-NS for each confirmation of a Report you recently submitted via NOAA's Nautical Discrepancy Report System.	

- **Note: *Red numbers above is the information from AUXINFO as of July 3, 2016 update.**
- **NOAA-NOS Chart Updating Year is from - April 1 through Mach 31 each year????**
- **D11NR Chart Updating Year is from - January 1 through December 31 each year.**
- **Note: The Green number under "2nd Ob" indicates secondary Chart Updating Observers.**
- ✓ **Note: "ALWAYS submit a 7030 for all ATON, PATON, Bridge, & Chart Updating Activity. Your work is not completed until your 7030 is in your FSO-IS hands."**
- ✓ **"Always check AUXINFO for your ATON, Bridge, & Chart Updating activity. If you don't find your activity recorded and you have submitted the proper ANSC 7030, check with your FSO-IS or SO-IS for help."**

“All auxiliary vessels when underway should be checking all Aids to Navigations for any type of Discrepancy and also should be checking the Charts, Coast Pilot & Shoreline for any type of Charting Errors as well as providing update reports on Charts, Small Crafts Facilities & Coast Pilot in your AOR”

DATES OF CHART LATEST EDITION TABLE
In D11 Northern Region July 5, 2016

Chart No.	Chart Scale	Edition No.	Traditional Paper Chart Edition Date	Latest Edition Date from LNM Update for NOAA On-Line-Viewer & RNC & ENC Navigational Charts updates	
18600	196,948	15	Mar 2011	LNM 26/16	6/28/2016
18020	1,444,000	39	Jan 2012	LNM 26/16	6/28/2016
18010	811,980	22	Sep, 2012	LNM 26/16	6/28/2016
18022	868,003	36	Jun 2012	LNM 26/16	6/28/2016
18601	40,000	14	Feb 2007	LNM 26/16	6/28/2016
18602	40,000	13	Feb 2012	LNM 26/16	6/28/2016
18603	40,000	17	Mar 2012	LNM 26/16	6/28/2016
18605	15,000	13	Dec 2010	LNM 26/16	6/28/2016
18620	200,000	24	Feb 2012	LNM 26/16	6/28/2016
18622	25,000	56	APR 2016	LNM 26/16	6/28/2016
18623	40,000	12	Jan 2012	LNM 26/16	6/28/2016
18626	40,000	16	Dec 2012	LNM 26/16	6/28/2016
18628	10,000	9	Oct 2012	LNM 26/16	6/28/2016
18640	207,840	27	Oct 2015	LNM 26/16	6/28/2016
18643	30,000	18	Dec 2009	LNM 26/16	6/28/2016
18645	100,000	28	May 2013	LNM 26/16	6/28/2016
18647	40,000	16	Mar 2009	LNM 26/16	6/28/2016
18649	40,000	68	Jun 2013	LNM 26/16	6/28/2016
18650	20,000	57	Dec 2013	LNM 26/16	6/28/2016
18651	40,000	45	Dec 2013	LNM 26/16	6/28/2016
18652 SC	40,000:80,000	36	Feb 2012	LNM 26/16	6/28/2016
18653	20,000	12	Oct 2012	LNM 26/16	6/28/2016
18654	40,000	45	Jan 2012	LNM 26/16	6/28/2016
18655	10,000	59	Oct 2006	LNM 26/16	6/28/2016
18656	40,000	56	Aug 2010	LNM 26/16	6/28/2016
18657	10,000	19	Nov 2005	LNM 26/16	6/28/2016
18658	10,000	31	Sep 2007	LNM 26/16	6/28/2016
18659	10,000	16	Jan 2012	LNM 26/16	6/28/2016
18660	20,000	3	Sep 2005	LNM 26/16	6/28/2016
18661 SC	40,000	30	Mar 2009	LNM 26/16	6/28/2016
18662 SC	40,000	22	May 2009	LNM 26/16	6/28/2016
18663	20,000	6	Apr 2006	LNM 26/16	6/28/2016
18664	20,000	12	Aug 26, 2000	LNM 26/16	6/28/2016
18665	40,000	11	Aug 2004	LNM 26/16	6/28/2016
18666	10,000	1	Nov 24, 2001	LNM 26/16	6/28/2016
18667	20,000	12	Aug 26, 2000	LNM 26/16	6/28/2016
18680	210,668	32	May 2013	LNM 26/16	6/28/2016
18682	20,000	15	APR 2016	LNM 26/16	6/28/2016
18685	50,000	34	Sep 2012	LNM 26/16	6/28/2016
18686	40,000	13	Jul 17, 1999	LNM 26/16	6/28/2016
18700	216,116	22	Jul 2003	LNM 26/16	6/28/2016
Coast Pilot	Volume 7	48	Updated weekly	Last Corrected through 07/03/2016	
CG Light List Weekly Updates	Volume 6	2016	Updated weekly	Last Corrected though LNM 26/16 – Dated 06/29/2016	