

U.S. Department of  
Homeland Security

United States  
Coast Guard



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# LIGHT LIST

Volume II

## ATLANTIC COAST

Shrewsbury River, New Jersey to Little River, South Carolina

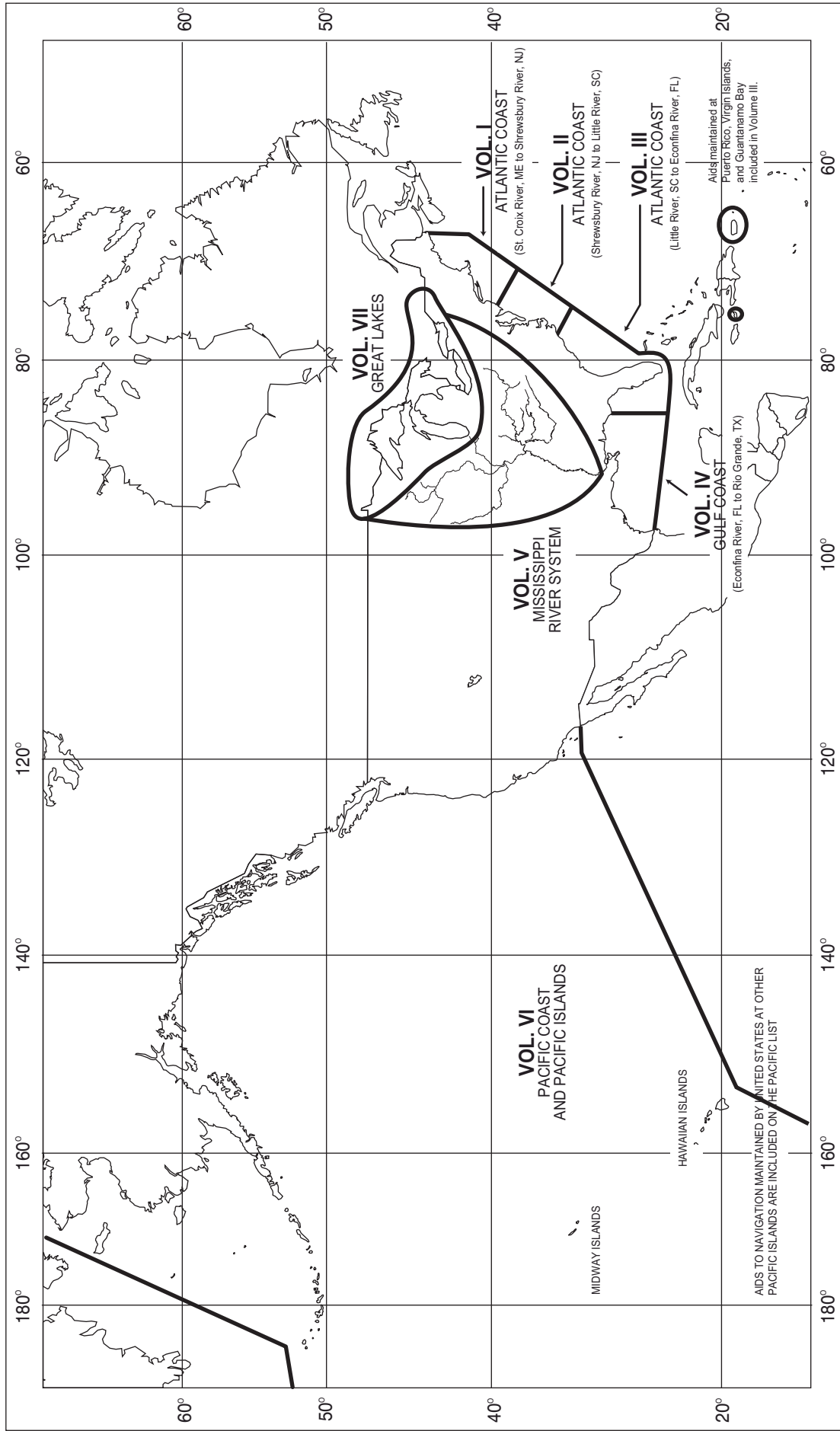
This Light List contains a list of lights, sound signals, buoys, daybeacons, and other aids to navigation.

**IMPORTANT**  
**THIS LIGHT LIST SHOULD BE CORRECTED**  
**EACH WEEK FROM THE LOCAL NOTICES TO MARINERS**  
**OR NOTICES TO MARINERS AS APPROPRIATE.**

2018

COMDTPUB P16502.2

LIMITS OF LIGHT LISTS PUBLISHED BY  
**U.S. COAST GUARD**





# U.S. AIDS TO NAVIGATION SYSTEM

## on navigable waters except Western Rivers

### LATERAL SYSTEM AS SEEN ENTERING FROM SEAWARD

<p><b>PORT SIDE ODD NUMBERED AIDS</b></p> <p>GREEN LIGHT ONLY FLASHING (2) FLASHING OCCULTING QUICK FLASHING ISO</p> <p>1" FI G 6s G "9" FI G 4s G "9" C "9" G "5" DAYBEACON</p>	<p><b>PREFERRED CHANNEL NO NUMBERS - MAY BE LETTERED</b></p> <p>PREFERRED CHANNEL TO STARBOARD TOPMOST BAND GREEN</p> <p>GREEN LIGHT ONLY</p> <p>COMPOSITE GROUP FLASHING (2+1)</p> <p>GR "A" FI (2+1) G 6s GR "U" GR C "S"</p>	<p><b>PREFERRED CHANNEL NO NUMBERS - MAY BE LETTERED</b></p> <p>PREFERRED CHANNEL TO PORT TOPMOST BAND RED</p> <p>RED LIGHT ONLY</p> <p>COMPOSITE GROUP FLASHING (2+1)</p> <p>RG "B" FI (2+1) R 6s RG N "C" RG "G"</p>	<p><b>STARBOARD SIDE EVEN NUMBERED AIDS</b></p> <p>RED LIGHT ONLY FLASHING (2) FLASHING OCCULTING QUICK FLASHING ISO</p> <p>"2" FI R 6s R "8" FI R 4s R N "6" R "2"</p>
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### AIDS TO NAVIGATION HAVING NO LATERAL SIGNIFICANCE

<p><b>ISOLATED DANGER NO NUMBERS - MAY BE LETTERED</b></p> <p>WHITE LIGHT ONLY</p> <p>FI (2) 5s</p> <p>BR "A" FI (2) 5s BR "C"</p>	<p><b>SAFE WATER NO NUMBERS - MAY BE LETTERED</b></p> <p>WHITE LIGHT ONLY MORSE CODE</p> <p>Mo (A)</p> <p>RW "N" Mo (A) MR "A" RW SP "B" RW "N"</p>
<p><b>RANGE DAYBOARDS MAY BE LETTERED</b></p>	
<p><b>DAYBOARDS - MAY BE LETTERED</b></p> <p>WHITE LIGHT ONLY</p> <p>RW Bn GW Bn BW Bn</p>	<p><b>SPECIAL MARKS - MAY BE LETTERED</b></p> <p>YELLOW LIGHT ONLY FIXED FLASHING</p> <p>C "A" N "C" Y "A" Bn Y "B" FI</p> <p>SHAPE OPTIONAL—BUT SELECTED TO BE APPROPRIATE FOR THE POSITION OF THE MARK IN RELATION TO THE NAVIGABLE WATERWAY AND THE DIRECTION OF BUOYAGE.</p>

Aids to Navigation marking the Intracoastal Waterway (ICW) display unique yellow symbols to distinguish them from aids marking other waters. Yellow triangles indicate aids should be passed by keeping them on the starboard (right) hand of the vessel. Yellow squares indicate aids should be passed by keeping them on the port (left) hand of the vessel. A yellow horizontal band provides no lateral information, but simply identifies aids as marking the ICW.

**TYPICAL INFORMATION AND REGULATORY MARKS**

INFORMATION AND REGULATORY MARKERS

WHEN LIGHTED, INFORMATION AND REGULATORY MARKS MAY DISPLAY ANY WHITE LIGHT RHYTHM EXCEPT QUICK FLASHING, Mo(A), AND FLASHING (2)

MOORING BUOY  
WHITE WITH BLUE BAND  
MAY SHOW WHITE REFLECTOR OR LIGHT

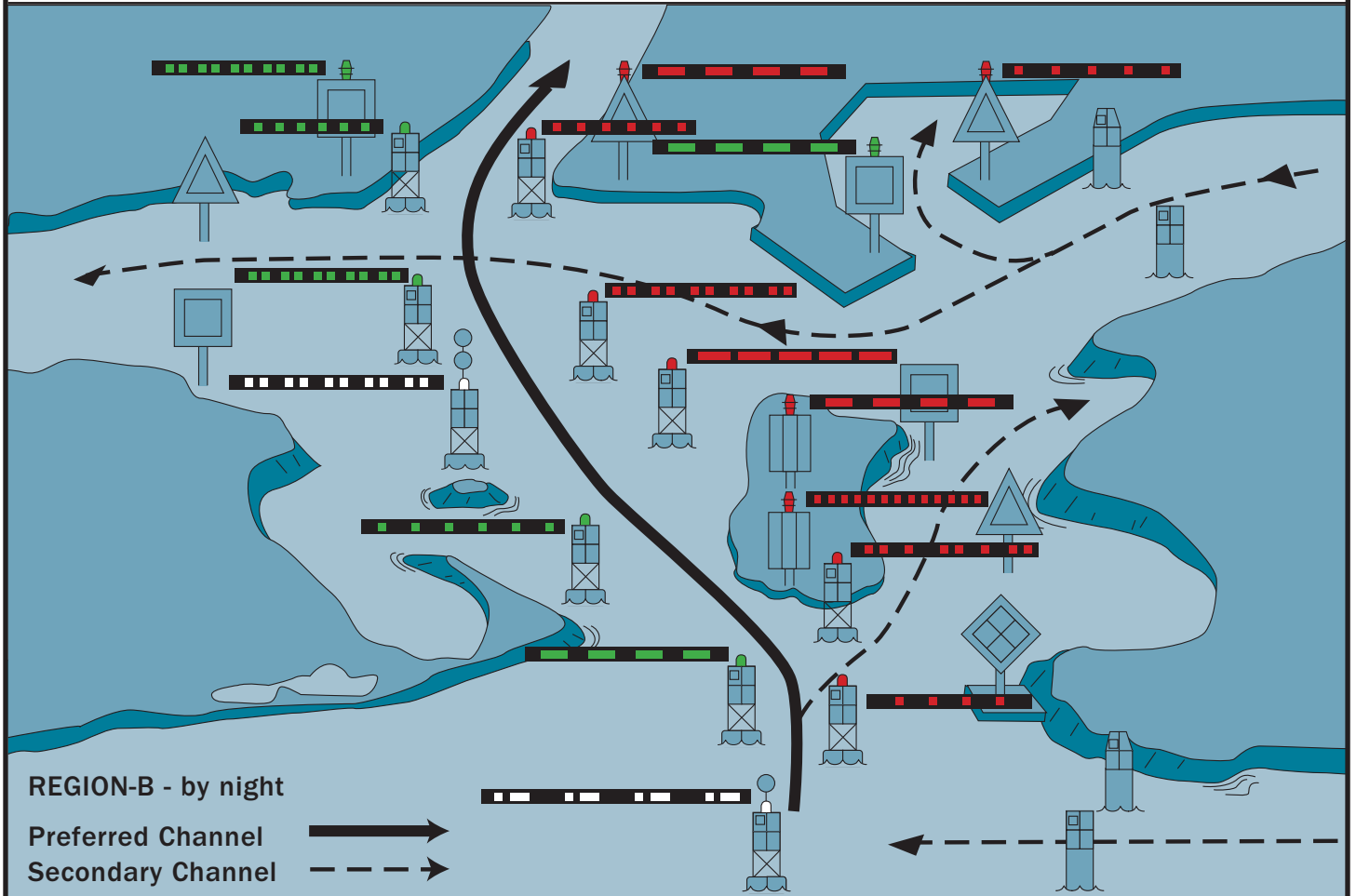
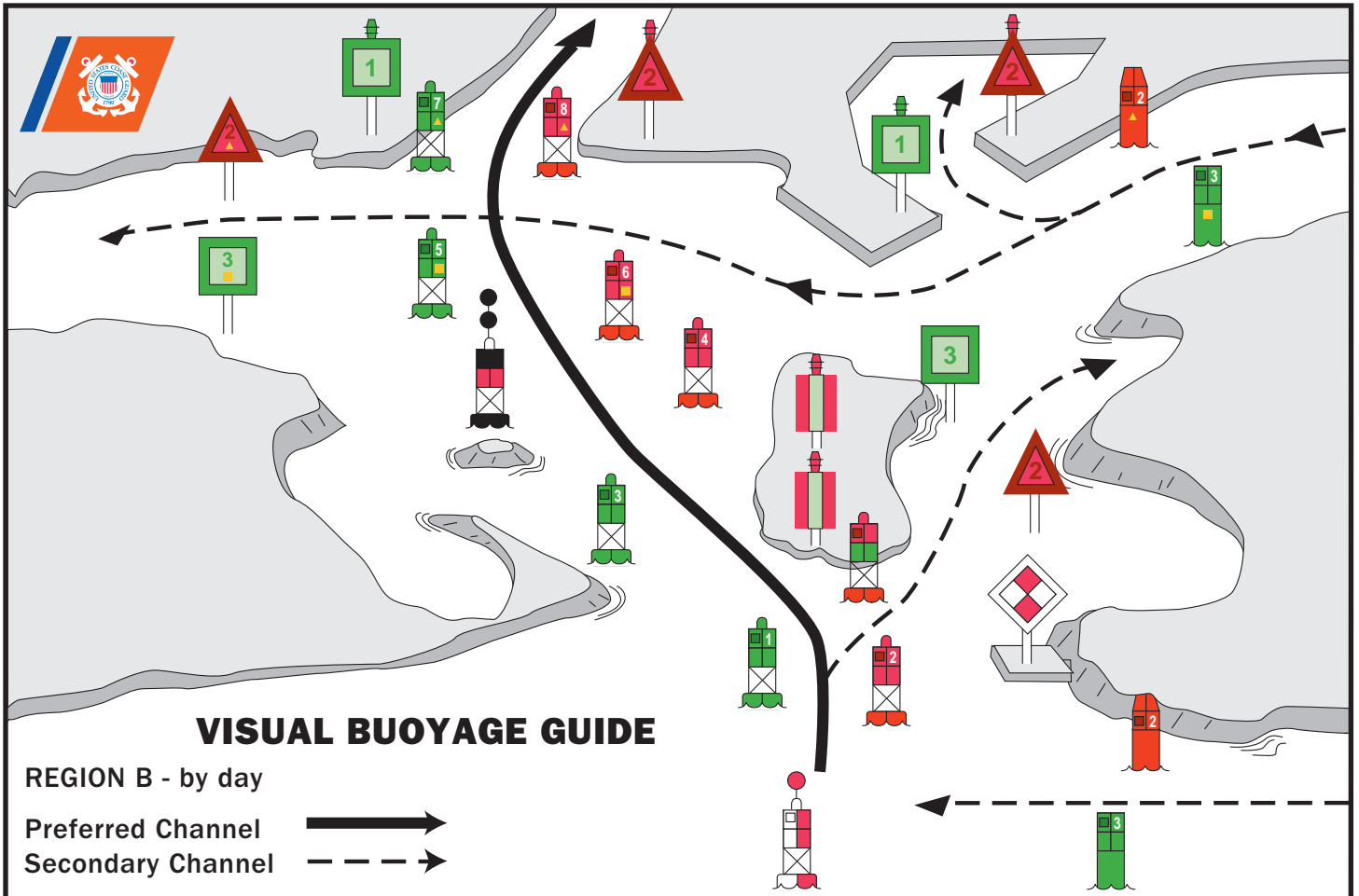
INFORMATION  
FOR DISPLAYING INFORMATION SUCH AS DIRECTIONS, DISTANCES, LOCATIONS, ETC.

BOAT EXCLUSION AREA

ROCK  
DANGER

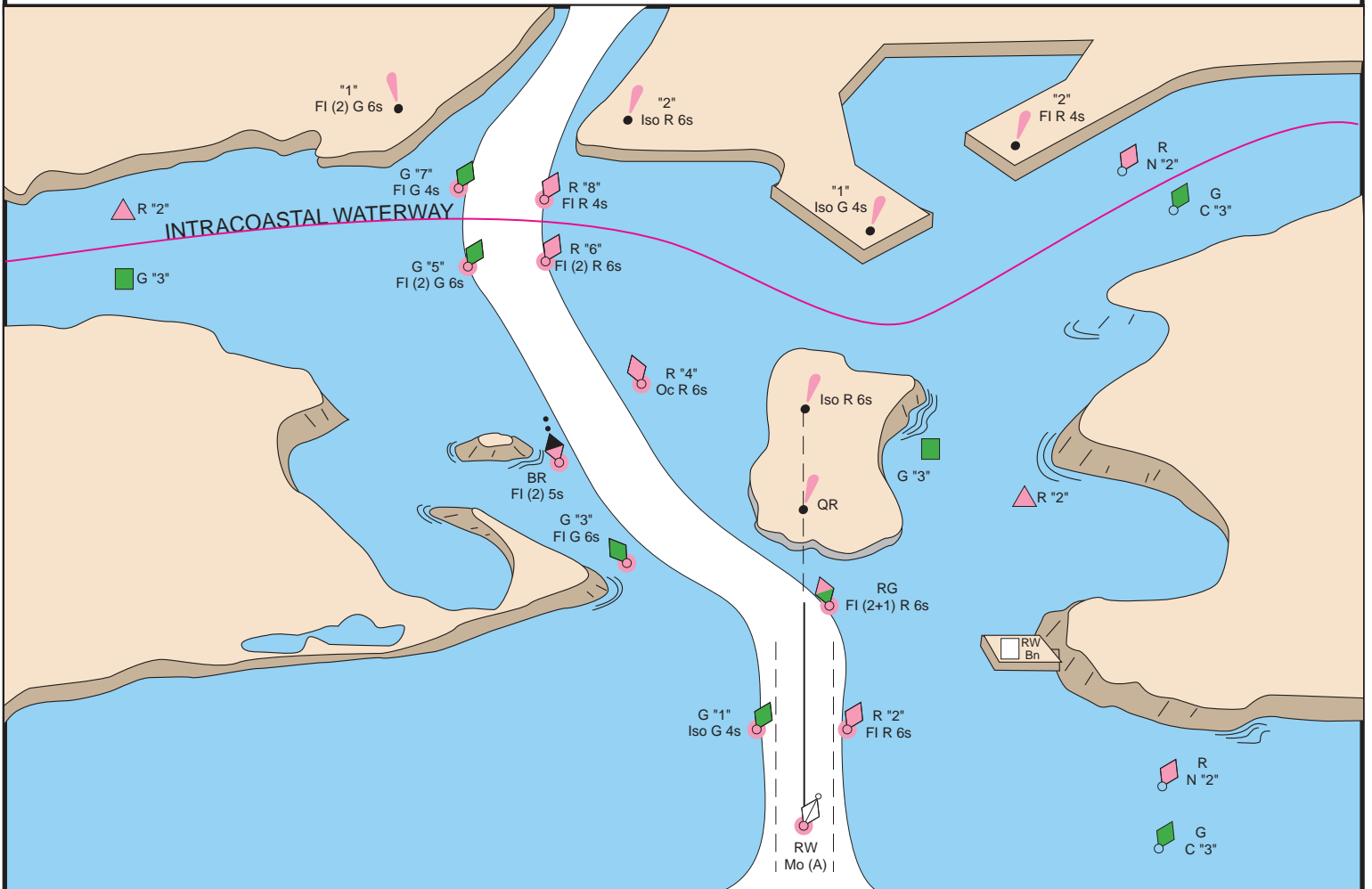
CONTROLLED AREA  
SLOW NO WAKE  
TYPE OF CONTROL IS INDICATED IN THE CIRCLE, SUCH AS SLOW, NO WAKE, ANCHORING, ETC.

BUOY USED TO DISPLAY REGULATORY MARKERS  
MAY SHOW WHITE LIGHT MAY BE LETTERED





# FICTITIOUS NAUTICAL CHART





# U.S. AIDS TO NAVIGATION SYSTEM

## on the Western River System

### AS SEEN ENTERING FROM SEAWARD

<p><b>PORT SIDE</b> OR RIGHT DESCENDING BANK</p> <p>GREEN OR WHITE LIGHTS</p> <p>FLASHING ISO</p> <p>LIGHT    LIGHTED BUOY    CAN</p> <p>SG    CNG</p> <p>PASSING DAYBEACON    CROSSING DAYBEACON</p> <p>176.9 MILE BOARD</p>	<p><b>PREFERRED CHANNEL</b> MARK JUNCTIONS AND OBSTRUCTIONS COMPOSITE GROUP FLASHING (2+1)</p> <p>PREFERRED CHANNEL TO STARBOARD TOPMOST BAND GREEN FI (2+1) G</p> <p>PREFERRED CHANNEL TO PORT TOPMOST BAND RED FI (2+1) R</p> <p><b>DAYBOARDS HAVING NO LATERAL SIGNIFICANCE</b></p> <p>MAY BE LETTERED    WHITE LIGHT ONLY</p> <p>NB</p>	<p><b>STARBOARD SIDE</b> OR LEFT DESCENDING BANK</p> <p>RED OR WHITE LIGHTS</p> <p>FLASHING (2) ISO</p> <p>LIGHT    LIGHTED BUOY    NUN</p> <p>MAY BE LIGHTED    TR    CNR</p> <p>PASSING DAYBEACON    CROSSING DAYBEACON</p> <p>123.5 MILE BOARD</p>
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**SPECIAL MARKS--MAY BE LETTERED**

SHAPE: OPTIONAL--BUT SELECTED TO BE APPROPRIATE FOR THE POSITION OF THE MARK IN RELATION TO THE NAVIGABLE WATERWAY AND THE DIRECTION OF BUOYAGE.

YELLOW LIGHT ONLY  
FIXED FLASHING

MOORING BUOY  
WHITE WITH BLUE BAND  
MAY SHOW WHITE REFLECTOR OR LIGHT

**TYPICAL INFORMATION AND REGULATORY MARKS**  
INFORMATION AND REGULATORY MARKERS

WHEN LIGHTED, INFORMATION AND REGULATORY MARKS MAY DISPLAY ANY LIGHT RHYTHM EXCEPT QUICK FLASHING, Mo(a) AND FLASHING (2)

NW WHITE LIGHT ONLY

BOAT EXCLUSION AREA

DANGER

CONTROLLED AREA

INFORMATION

BUOY USED TO DISPLAY REGULATORY MARKERS

MAY SHOW WHITE LIGHT  
MAY BE LETTERED

EXPLANATION MAY BE PLACED OUTSIDE THE CROSSED DIAMOND SHAPE, SUCH AS DAM, RAPIDS, SWIM AREA, ETC.

THE NATURE OF DANGER MAY BE INDICATED INSIDE THE DIAMOND SHAPE, SUCH AS ROCK, WRECK, SHOAL, DAM, ETC.

TYPE OF CONTROL IS INDICATED IN THE CIRCLE, SUCH AS SLOW, NO WAKE, ANCHORING, ETC.

**STATE WATERS**

INLAND (STATE) WATERS OBSTRUCTION MARK  
MAY SHOW WHITE REFLECTOR OR QUICK FLASHING WHITE LIGHT

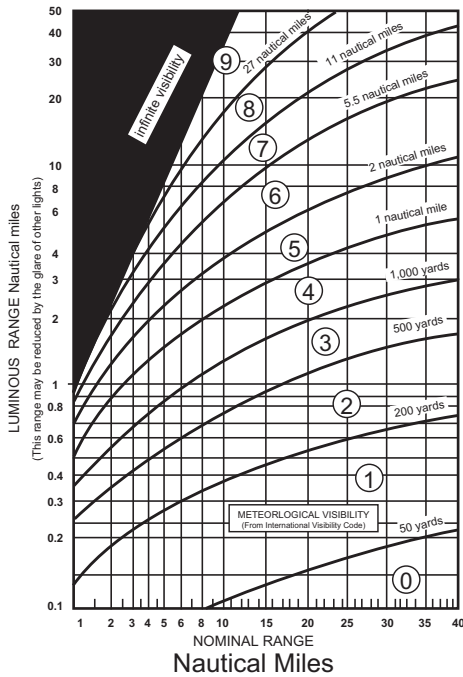
BLACK-STRIPED WHITE BUOY

Used to indicate an obstruction to navigation, extends from the nearest shore to the buoy. This means "do not pass between the buoy and the nearest shore." This aid is replacing the red and white striped buoy within the USWMS, but cannot be used until all red and white striped buoys on a waterway have been replaced.

# LUMINOUS RANGE DIAGRAM

The nominal range given in this Light List is the maximum distance a given light can be seen when the meteorological visibility is 10 nautical miles. If the existing visibility is less than 10 NM, the range at which the light can be seen will be reduced below its nominal range. And, if the visibility is greater than 10 NM, the light can be seen at greater distances. The distance at which a light may be expected to be seen in the prevailing visibility is called its luminous range.

This diagram enables the mariner to determine the approximate luminous range of a light when the nominal range and the prevailing meteorological visibility are known. The diagram is entered from the bottom border using the nominal range listed in column 6 of this book. The intersection of the nominal range with the appropriate visibility curve (or, more often, a point between two curves) yields, by moving horizontally to the left border, the luminous range.



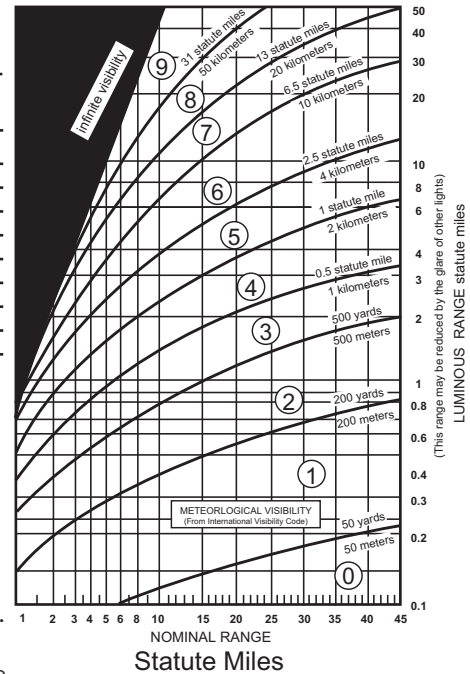
## METEOROLOGICAL VISIBILITY (From International Visibility Code)

Code	Metric	Nautical (approximate)
0	less than 50 meters	less than 50 yards
1	50-200 meters	50-200 yards
2	200-500 meters	200-500 yards
3	500-1,000 meters	500-1,000 yards
4	1-2 kilometers	1,000-2,000 yards
5	2-4 kilometers	1-2 nautical miles
6	4-10 kilometers	2-5.5 nautical miles
7	10-20 kilometers	5.5-11 nautical miles
8	20-50 kilometers	11-27 nautical miles
9	greater than 50 km	greater than 27 nm

### CAUTION

When using this diagram it must be remembered that:

1. The ranges obtained are approximate.
2. The transparency of the atmosphere may vary between observer and light.
3. Glare from background lighting will reduce the range that lights are sighted.
4. The rolling motion of a vessel and/or of a lighted aid may reduce the distance that lights can be detected or identified.



# GEOGRAPHIC RANGE TABLE

The following table gives the approximate geographic range of visibility for an object which may be seen by an observer at sea level. It is necessary to add to the distance for the height of any object the distance corresponding to the height of the observer's eye above sea level.

Height Feet / Meters	Distance Nautical Miles (NM)	Height Feet / Meters	Distance Nautical Miles (NM)	Height Feet / Meters	Distance Nautical Miles (NM)
5/1.5	2.6	70/21.3	9.8	250/76.2	18.5
10/3.1	3.7	75/22.9	10.1	300/91.4	20.3
15/4.6	4.5	80/24.4	10.5	350/106.7	21.9
20/6.1	5.2	85/25.9	10.8	400/121.9	23.4
25/7.6	5.9	90/27.4	11.1	450/137.2	24.8
30/9.1	6.4	95/29.0	11.4	500/152.4	26.2
35/10.7	6.9	100/30.5	11.7	550/167.6	27.4
40/12.2	7.4	110/33.5	12.3	600/182.9	28.7
45/13.7	7.8	120/36.6	12.8	650/198.1	29.8
50/15.2	8.3	130/39.6	13.3	700/213.4	31.0
55/16.8	8.7	140/42.7	13.8	800/243.8	33.1
60/18.3	9.1	150/45.7	14.3	900/274.3	35.1
65/19.8	9.4	200/61.0	16.5	1000/304.8	37.0

Example: Determine the geographic visibility of an object, with a height above water of 65 feet, for an observer with a height of eye of 35 feet.

Enter above table;

Height of object 65 feet= 9.4 NM  
 Height of observer 35 feet= 6.9 NM  
 Computed geographic visibility= 16.3 NM

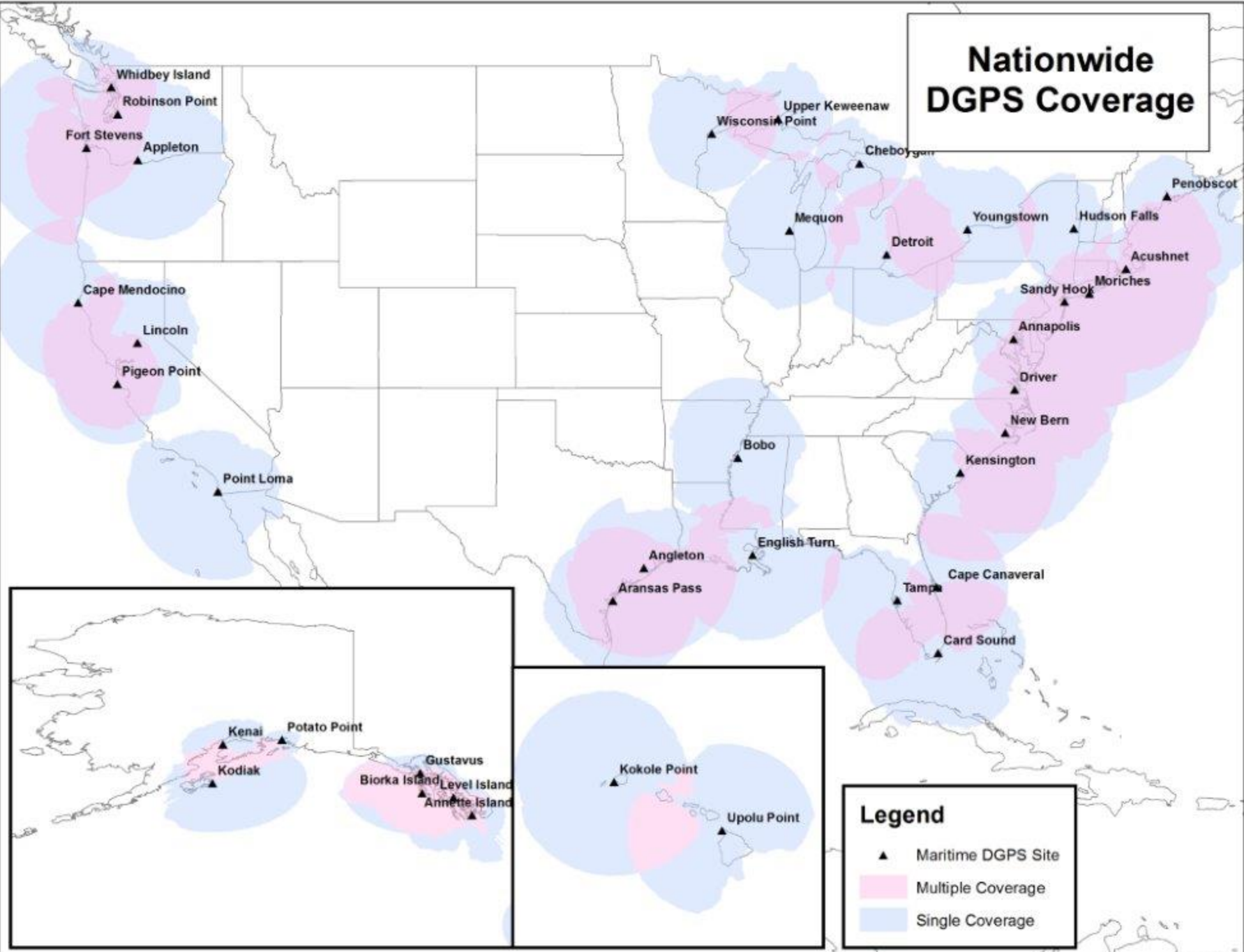
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# TABLE OF CONTENTS

Light List Regions .....	Inside Front Cover
U.S. DGPS Sites .....	i
USCG Contact Information.....	ii
Preface .....	v
Introduction .....	vi
<b>SEACOAST</b>	
Atlantic Ocean .....	1
New Jersey .....	1
Delaware.....	2
Maryland .....	2
Virginia .....	2
North Carolina.....	5
<b>BAYS, RIVERS, AND HARBORS</b>	
Cape May Harbor .....	12
Delaware Bay and River.....	13
Philadelphia.....	31
Chincoteague Bay.....	51
Chesapeake Bay Entrance .....	60
Upper Chesapeake Channel .....	73
Hampton Roads.....	84
James River .....	102
York River .....	120
Rappahannock River.....	129
Potomac River.....	143
Annapolis Harbor.....	167
Baltimore Harbor .....	177
Tangier Sound.....	185
Head of Chesapeake Bay.....	222
Oregon Inlet .....	227
Cape Hatteras .....	232
New River.....	241
Cape Fear River .....	248
Pamlico Sound .....	270
Intracoastal Waterway – New Jersey.....	300
Intracoastal Waterway – Virginia .....	315
Intracoastal Waterway – North Carolina .....	318
INDEX .....	Index 1
CROSS REFERENCE .....	Cross Reference 1

# Nationwide DGPS Coverage



**Legend**

- ▲ Maritime DGPS Site
- Multiple Coverage
- Single Coverage

## COAST GUARD DISTRICT COMMANDERS

<b>DISTRICT</b>	<b>ADDRESS</b>	<b>WATERS OF JURISDICTION</b>
FIRST	408 Atlantic Avenue Boston, MA 02110-3350 Tel: (617) 223-8351 <a href="http://www.uscg.mil/d1">http://www.uscg.mil/d1</a>	Maine, New Hampshire, Massachusetts, Vermont (Lake Champlain), Rhode Island, Connecticut, New York, to Shrewsbury River, New Jersey.
FIFTH	Federal Building 431 Crawford Street Portsmouth, VA 23704-5004 Tel: (757) 398-6229 (757) 398-6552 <a href="http://www.uscg.mil/d5">http://www.uscg.mil/d5</a>	Shrewsbury River, New Jersey to Delaware, Maryland, Virginia, District of Columbia, and North Carolina.
SEVENTH	Brickell Plaza Federal Building 909 SE 1st Avenue; Rm:406 Miami, FL 33131-3050 Tel: (305) 415-6752 (305) 415-6800 <a href="http://www.uscg.mil/d7">http://www.uscg.mil/d7</a>	South Carolina, Georgia, Florida to 83°50'W, and Puerto Rico and adjacent islands of the United States.
EIGHTH	Hale Boggs Federal Building 500 Poydras Street New Orleans, LA 70130-3310 Tel: (504) 671-2327 (504) 671-2137 <a href="http://www.uscg.mil/d8">http://www.uscg.mil/d8</a>	Florida westward from 83°50'W, Alabama, Mississippi, Louisiana, Texas, the Mississippi River System except that portion of the Illinois River north of Joliet, Illinois.
NINTH	1240 East 9th Street Cleveland, OH 44199-2060 Tel: (216) 902-6060 (216) 902-6117 <a href="http://www.uscg.mil/d9">http://www.uscg.mil/d9</a>	Great Lakes and St. Lawrence River above St. Regis River.
ELEVENTH	Coast Guard Island Building 50-2 Alameda, CA 94501-5100 Tel: (510) 437-2975 <a href="http://www.uscg.mil/d11">http://www.uscg.mil/d11</a>	California, Nevada, Utah, Arizona.
THIRTEENTH	Federal Building 915 Second Avenue 35th Floor, Rm 3510 Seattle, WA 98174-1067 Tel: (206) 220-7270 (206) 220-7004 <a href="http://www.uscg.mil/d13">http://www.uscg.mil/d13</a>	Oregon, Washington, Idaho, and Montana.
FOURTEENTH	Prince Kalaniana'ole Federal Bldg. 300 Ala Moana Blvd 9th Floor, Room 9-220 Honolulu, HI 96850-4982 Tel: (808) 535-3409 (808) 535-3414 <a href="http://www.uscg.mil/d14">http://www.uscg.mil/d14</a>	Hawaiian, American Samoa, Marshall, Marianas, and Caroline Islands.
SEVENTEENTH	PO Box 25517 Juneau, AK 99802-5517 Tel: (907) 463-2029 (907) 463-2269 <a href="http://www.uscg.mil/d17">http://www.uscg.mil/d17</a>	Alaska.

## U. S. COAST GUARD FIFTH DISTRICT ATON UNIT LISTING

### AIDS TO NAVIGATION TEAMS

**ANT Baltimore**  
2401 Hawkins Point Rd.  
Baltimore, MD 21226  
Tel: (410) 576-2646

**ANT Crisfield**  
810 Norris Harbor Drive  
Crisfield, MD 21817  
Tel: (410) 968-0971

**ANT Milford Haven**  
59 Mill Point Rd.  
Hudgins, VA 23076  
Tel: (804) 725-5932

**ANT Potomac**  
PO Box 8  
St Inigoes, MD 20684  
Tel: (301) 872-4036

**ANT Cape May**  
C/O Training Center  
1 Munro Ave.  
Cape May, NJ 08204  
Tel: (609) 898-6427

**ANT Fort Macon**  
2301 E. Fort Macon Rd.  
Atlantic Beach, NC 28512  
Tel: (252) 240-8440

**ANT Oak Island**  
300-B Caswell Beach Road  
Oak Island, NC 28465-8443  
Tel: (910) 278-6247

**ANT Wanchese**  
PO Box 908 Harbor Rd.  
Wanchese, NC 27959  
Tel: (252) 473-1531

**ANT Chincoteague**  
3823 Main Street  
Chincoteague, VA 23333  
Tel: (757) 336-2872

**ANT Hampton Roads**  
4000 Coast Guard Blvd.  
Portsmouth, VA 23703  
Tel: (757) 483-8520

**ANT Philadelphia**  
1 Washington Ave.  
Philadelphia, PA 19147  
Tel: (215) 271-4847/4913

### BUOY TENDERS

**USCGC BAYBERRY (WLI 65400)**  
300-B Caswell Beach Road  
Oak Island, NC 28465-8443  
Tel: (910) 278-6933

**USCGC JAMES RANKIN (WLM 555)**  
2401 Hawkins Point Rd.  
Baltimore, MD 21226  
Tel: (410) 576-2640

**USCGC SMILAX (WLIC 315)**  
2301 E. Fort Macon Rd.  
Atlantic Beach, NC 28512  
Tel: (252) 247-4596

**USCGC ELM (WLB 204)**  
2301 E. Fort Macon Rd.  
Atlantic Beach, NC 28512  
Tel: (252) 240-8360

**USCGC KENNEBEC (WLIC 802)**  
4000 Coast Guard Blvd.  
Portsmouth, VA 23703  
Tel: (757) 483-8775

**USCGC WILLIAM TATE (WLM 560)**  
1 Washington Ave.  
Philadelphia, PA 19147  
Tel: (215) 271-4954/4955/4956

**USCGC FRANK DREW (WLM 557)**  
4000 Coast Guard Blvd.  
Portsmouth, VA 23703  
Tel: (757) 483-8760/8761/8762

**USCGC SLEDGE (WLIC 75303)**  
2401 Hawkins Point Rd.  
Baltimore, MD 21226  
Tel: (410) 576-2635

## USCG NAVIGATION CENTER Navigation Information Service (NIS)

The U.S. Coast Guard Navigation Center (NAVCEN) is the official government source of information for civil users of the Global Positioning System (GPS). The Navigation Information Service (NIS) is available 24 hours a day, seven days a week, for all Radio Navigation and maritime related needs via phone, fax or e-mail. The NIS provides users the ability to access real time or archived GPS, NDGPS, DGPS, and LNM information at <http://www.navcen.uscg.gov>, as well as subscribe to an automated list service which enables users to receive GPS status messages and Notice to NAVSTAR User (NANU) messages via direct Internet e-mail.

The NAVCEN also disseminates GPS and DGPS safety advisory broadcast messages through USCG broadcast stations utilizing VHF-FM voice, HF-SSB voice, and NAVTEX broadcasts. The broadcasts provide the GPS and DGPS user in the marine environment with the current status of the navigation systems, as well as any planned/unplanned system outages that could affect GPS and DGPS navigational accuracy.

To comment on any of these services or ask questions about the service offered, contact the NAVCEN at:

**Commanding Officer**  
**U.S. Coast Guard NAVCEN (NIS)**  
**MS 7310**  
**7323 Telegraph Road**  
**Alexandria, VA 20598-7310**  
Phone: (703) 313-5900  
FAX: (703) 313-5920  
Internet: <http://www.navcen.uscg.gov>

This Light List is corrected through [Fifth Coast Guard District Local Notice to Mariners](#) No. 01/18

and through [National Geospatial-Intelligence Agency \(NGA\) Notice to Mariners](#) No. 01/18

The 2018 edition supersedes the 2017 print edition.

### RECORD OF CORRECTIONS

#### YEAR 2018

1.....	2.....	3.....	4.....	5.....
6.....	7.....	8.....	9.....	10.....
11.....	12.....	13.....	14.....	15.....
16.....	17.....	18.....	19.....	20.....
21.....	22.....	23.....	24.....	25.....
26.....	27.....	28.....	29.....	30.....
31.....	32.....	33.....	34.....	35.....
36.....	37.....	38.....	39.....	40.....
41.....	42.....	43.....	44.....	45.....
46.....	47.....	48.....	49.....	50.....
51.....	52.....			

#### YEAR 2019

1.....	2.....	3.....	4.....	5.....
6.....	7.....	8.....	9.....	10.....
11.....	12.....	13.....	14.....	15.....
16.....	17.....	18.....	19.....	20.....
21.....	22.....	23.....	24.....	25.....
26.....	27.....	28.....	29.....	30.....
31.....	32.....	33.....	34.....	35.....
36.....	37.....	38.....	39.....	40.....
41.....	42.....	43.....	44.....	45.....
46.....	47.....	48.....	49.....	50.....
51.....	52.....			

## PREFACE

Lights and other marine aids to navigation, maintained by or under authority of the U.S. Coast Guard and located on waters used by general navigation, are described in the Light List. This volume includes aids located between Shrewsbury River, New Jersey and Little River South Carolina.

Included are all Coast Guard aids to navigation used for general navigation such as lights, sound signals, buoys, daybeacons, and other aids to navigation. Not included are some buoys having no lateral significance, such as special purpose, anchorage, fish net, and dredging.

**Aids to Navigation Link:** <http://www.uscgboating.org>

CAUTION: Mariners attempting to pass a buoy close aboard risk collision with a yawing buoy or with the obstruction, which the buoy marks. Mariners must not rely on buoys alone for determining their positions due to factors limiting buoy reliability.

### PRIVATE AIDS TO NAVIGATION

Included: Class I aids to navigation on marine structures or other works which the owners are legally obligated to establish, maintain, and operate as prescribed by the Coast Guard.

Included: Class II aids to navigation exclusive of Class I, located in waters used by general navigation.

Not included: Class III aids to navigation exclusive of Class I and Class II, located in waters not ordinarily used by general navigation.

### LIGHT LIST AVAILABILITY

This Light List is published electronically annually and is intended to furnish more complete information concerning aids to navigation than can be conveniently shown on charts. This Light List is not intended to be used in place of charts or Coast Pilots. Charts should be consulted for the location of all aids to navigation. It may be dangerous to use aids to navigation without reference to charts.

This list is corrected to the date of the notices to mariners shown on the title page. Changes to aids to navigation during the year are advertised in U.S. Coast Guard Local Notices to Mariners and National Geospatial-Intelligence Agency (NGA) Notices to Mariners. Important changes to aids to navigation are also broadcast through Coast Guard or Naval radio stations and NAVTEX. Mariners should keep their Light Lists, charts and other nautical publications corrected from these notices and should consult all notices issued after the date of publication of this Light List.

The electronic version of this publication is available at: <http://www.navcen.uscg.gov/index.php?pageName=lightLists>

A weekly-updated electronic copy of this publication is also available at:  
<http://www.navcen.uscg.gov/index.php?pageName=lightListWeeklyUpdates>

**IMPORTANT:** A summary of corrections for this publication, which includes corrections from the dates shown on the title page to the date of availability, is advertised in the Local Notice to Mariners and the Notice to Mariners. These corrections must be applied in order to bring the Light List up-to-date. Additionally, this publication should be corrected weekly from the Local Notices to Mariners or the Notices to Mariners, as appropriate.

Mariners and others are requested to bring any apparent errors or omissions in these lists to the attention of:

**COMMANDER**  
**FIFTH COAST GUARD DISTRICT (dpw)**  
431 Crawford Street  
Portsmouth, Virginia 23704  
or for correspondence and article requests:  
[CGD5Waterways@uscg.mil](mailto:CGD5Waterways@uscg.mil)

or  
**USCG Navigation Center**  
**Charting Branch**  
**MS 7310**  
7323 Telegraph Road  
Alexandria, VA 20598-7310 Email:  
[TIS-PF-NISWS@USCG.MIL](mailto:TIS-PF-NISWS@USCG.MIL)

# INTRODUCTION

## Light List Arrangement

In the context of the Light List, aids to navigation on the coasts are arranged in geographic order clockwise from north to south along to Atlantic coast, east to west along the Gulf of Mexico, and south to north along the Pacific coast. On the Great Lakes, aids to navigation are arranged from east to west and from south to north, except on Lake Michigan, which is arranged from north to south. Seacoast aids to navigation are listed first, followed by entrance and harbor aids to navigation, arranged from seaward to the head of navigation.

Names of aids to navigation are printed as follows to help distinguish at a glance the type of aid to navigation.

**Seacoast/Lake coast Lights and Secondary Lights**  
**RACONS**  
**Sound Signals**  
RIVER, HARBOR, OTHER LIGHTS, AND VIRTUAL AIS  
*Lighted Buoys*  
Daybeacons, Unlighted Buoys, and Virtual Automatic Identification System (V-AIS) ATON

Light List numbers are assigned to all Federal aids to navigation and many private aids to navigation for reference in the Light List. Aids to navigation are numbered by fives in accordance with their order of appearance in each volume of the Light List. Other numbers and decimal fractions are assigned where newly established aids to navigation are listed between previously numbered aids to navigation. The Light Lists are renumbered periodically to assign whole numbers to all aids to navigation.

International numbers are assigned to certain aids to navigation in cooperation with the International Hydrographic Organization. They consist of an alphabetic character followed by three or four numeric characters. A cross reference listing appears after the index.

## Description of Columns

Column (1): Light List Number.

Column (2): Name and location of the aid to navigation.

Note: A dash (-) is used to indicate the bold heading is part of the name of the aid to navigation. When reporting discrepancies or making references to such an aid to navigation in correspondence, the full name of the aid including the geographic heading, should be given.

Bearings are in degrees true, read clockwise from 000° through 359°.

Bearings on range lines are given in degrees and tenths or hundredths where applicable.

(C) indicates Canadian aid to navigation.

Column (3): Geographic position of the aid to navigation in latitude and longitude.

Column (4): Light characteristic for lighted aids to navigation.

Column (5): Height above water from the focal plane of the fixed light to mean high water, listed in feet.

For Volume 7 (Great Lakes), height above water from the focal plane of the fixed light to low water datum, listed in feet and meters.

Column (6): Nominal range of lighted aids to navigation, in nautical miles, listed by color for sector and passing lights. Not listed for ranges, directional lights, or private aids to navigation.

Column (7): The structural characteristic of the aid to navigation, including: dayboard (if any), description of fixed structure, color and type of buoy, height of structure above ground for major lights.

Column (8): Aid remarks, sound signal characteristics, including: VHF-FM channel if remotely activated, RACON characteristic, light sector arc of visibility, radar reflector, emergency lights, seasonal remarks, and private aid to navigation identification. AIS specific information may include its unique Maritime Mobile Service Identity (MMSI), the MMSI(s) of its source AIS transmission, and the application identifier of any Application Specific Messages (ASM) it may also be transmitting.

## **U.S. Coast Guard Light List Distribution**

U.S. regulations require that most commercial vessels maintain on board a currently corrected, copy or pertinent extract, of the U.S. Coast Guard Light Lists which are available for free and are updated weekly on the Coast Guard Navigation Center's website at <https://www.navcen.uscg.gov/?pageName=lightLists>. Commercially printed versions are also available, but the Coast Guard does not attest to their veracity or sanction such publications.

## **CHARTS & PUBLICATIONS**

### **Nautical Charts & Publications**

Nautical charts covering the coastal waters of the United States and its territories are published by the National Ocean Service (NOS). Up-to-date paper copies of NOS charts are available from NOS Certified Agents. A list of agents can be found at:

<https://www.nauticalcharts.noaa.gov/charts/noaa-raster-charts.html#paper-nautical-charts>.

NOS also produces Raster Navigational Charts (RNC) and Electronic Navigational Charts (ENC). RNCs can be found at <https://www.nauticalcharts.noaa.gov/charts/noaa-raster-charts.html#rnc-charts>.

ENCs can be found at <https://www.nauticalcharts.noaa.gov/charts/noaa-enc.html>.

Inland Electronic Navigational Charts (IENC) and chart books are published by the U.S. Army Corps of Engineers and are available online at <http://www.agc.army.mil/Missions/Echarts.aspx>. Tide Tables and Tidal Current Tables are no longer printed or distributed by NOS. NOS Tide and Tidal Current predictions are available online at [http://tidesandcurrents.noaa.gov/tide\\_predictions.html](http://tidesandcurrents.noaa.gov/tide_predictions.html). Commercially printed versions, using data provided by NOS, are also available. These products may be obtained from local stores that carry marine publications.



## Notices to Mariners

**Broadcast Notices to Mariners** are made by the Coast Guard through Coast Guard radio stations. These notices, which are broadcast on VHF-FM, NAVTEX, and other maritime frequencies, are warnings that contain important navigational safety information. Included are reports of discrepancies and changes to aids to navigation, the positions of ice and derelicts, and other important hydrographic information.

Radio stations broadcasting Notices to Mariners are listed in the National Ocean Service United States Coast Pilot and in the National Geospatial-Intelligence Agency publication Radio Navigational Aids (Publication No. 117). VHF-FM voice broadcast times can be found online at <http://www.nws.noaa.gov/om/marine/vhfvoice.htm>.

**Local Notices to Mariners** (U.S. regional coverage) are another means which the Coast Guard disseminates navigational information for the United States, its territories, and possessions. A Local Notice to Mariners is issued by each Coast Guard district and is used to report changes and discrepancies to aids to navigation maintained by and under the authority of the Coast Guard. The Local Notice to Mariners also contain chart and Light List corrections, proposed aids to navigation projects open for public comment, ongoing waterway projects, bridge regulation changes, marine event information, and other concerns pertinent to the mariner.

Local Notices to Mariners are essential to all navigators for the purposes of keeping charts, Light Lists, Coast Pilots, and other nautical publications up-to-date. These notices are published weekly and can be found online at <http://www.navcen.uscg.gov/index.php?pageName=lnmMain>. Mariners may register with the Coast Guard Navigation Center to receive automatic notifications via email when new editions of the Local Notice to Mariners are available. Register at <http://www.navcen.uscg.gov/?pageName=listServerForm>. Vessels operating in ports and waterways in several districts will have to obtain the Local Notice to Mariners for each district.

**Notice to Mariners** are prepared jointly by the National Geospatial-Intelligence Agency (NGA), the U.S. Coast Guard, and the National Ocean Service, and are published weekly by the NGA. The weekly Notice to Mariners advises mariners of important matters affecting navigational safety including new hydrographic discoveries, changes to aids to navigation, and foreign marine information. Also included are corrections to Light Lists, Coast Pilots, and Sailing Directions. This notice is intended for mariners and others who have a need for information related to oceangoing operations. Because it is intended for use by oceangoing vessels, many corrections that affect small craft navigation and associated waters are not included. Information concerning small craft is contained in the Coast Guard Local Notice to Mariners only. The weekly Notices to Mariners may be found online at <http://msi.nga.mil/NGAPortal/MSI.portal>.

## ATON DISCREPANCIES

The Coast Guard does not keep the tens of thousands of aids to navigation comprising the U.S. Aids to Navigation System under simultaneous and continuous observation. For the safety of all mariners, anyone who discovers an aid to navigation that is either off station, missing or exhibiting characteristics other than those listed in the Light Lists should promptly notify the nearest Coast Guard unit via VHF-FM radio or phone. Discrepancies may be reported online at: <http://www.navcen.uscg.gov/?pageName=atonOutageReport>.

# U.S. AIDS TO NAVIGATION SYSTEM

## GENERAL

The navigable waters of the United States are marked to assist navigation using the U.S. Aids to Navigation System, a system consistent with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Maritime Buoyage System. The IALA Maritime Buoyage System is followed by most of the world's maritime nations and improves maritime safety by encouraging conformity in buoyage systems worldwide. IALA buoyage is divided into two regions made up of Region A and Region B. All navigable waters of the United States follow IALA Region B, except U.S. possessions west of the International Date Line and south of 10° north latitude, which follow Region A. Lateral aids to navigation in Region A vary from those located within Region B. Non-lateral aids to navigation in Region A are the same as those used in Region B. Appropriate nautical charts and publications should be consulted to determine whether the Region A or Region B marking schemes are in effect for a given area.

Aids to navigation are developed, established, operated, and maintained by the U.S. Coast Guard to accomplish the following:

1. Assist navigators in determining their position,
2. Assist the navigator in determining a safe course,
3. Warn the navigator of dangers and obstructions,
4. Promote the safe and economic movement of commercial vessel traffic, and
5. Promote the safe and efficient movement of military vessel traffic, and cargo of strategic military importance.

The U.S. Aids to Navigation System is designed for use with nautical charts. Nautical charts portray the physical features of the marine environment, which include: soundings, landmarks, hazards to navigation, and aids to navigation. To best understand the purpose of a specific aid to navigation, mariners should consult the associated nautical chart, which illustrates the relationship of the aid to navigation to channel limits, obstructions, hazards to navigation, and to the aids to navigation system as a whole. Seasonal aids to navigation are placed into service, withdrawn, or changed at specified times of the year. The dates shown in the Light Lists are approximate and may vary due to adverse weather or other conditions. These aids will be changed on Electronic Navigational Charts (ENC) based on Light List dates and electronic navigation system settings.

Mariners should maintain and consult suitable publications and navigation equipment depending on the vessel's requirements. This shipboard navigation equipment is separate from the aids to navigation system, but is often essential to its use.

The U.S. Aids to Navigation System is primarily a lateral system, which employs a simple arrangement of colors, shapes, numbers, and light characteristics to mark the limits of navigable routes. This lateral system is supplemented with non-lateral aids to navigation where appropriate.

Federal aids to navigation consist of Coast Guard operated aids to navigation. The Coast Guard establishes, maintains, and operates a system of aids to navigation consisting of visual, audible, and electronic signals designed to assist the prudent mariner in the process of navigation.

The U.S. Aids to Navigation System contains the following subsystems:

1. **Intracoastal Waterway:** The aids to navigation marking the Intracoastal Waterway are arranged geographically from north to south on the Atlantic Coast and generally east to west on the coast of the Gulf of Mexico. Red lights (if so equipped), even numbers, and red buoys or triangle shaped daymarks are located on the southbound/westbound starboard waterway boundary. Green lights (if so equipped), odd numbers, and green buoys or square shaped daymarks are on the southbound/westbound port waterway boundary.
  
2. **Western Rivers:** The Western Rivers System is employed on the Mississippi River System, in addition to the Tennessee-Tombigbee Waterway and the Alabama, Atchafalaya, and Apalachicola-Chattahoochee-Flint River Systems. The Western Rivers System consists of the following characteristics:
  - a. Buoys are not numbered.
  
  - b. Numbers on beacons do not have lateral significance, but rather indicate mileage from a fixed point (normally the river mouth).
  
  - c. Diamond shaped non-lateral dayboards, red and white or green and white as appropriate, are used to indicate where the river channel crosses from one bank to the other.
  
  - d. Lights on green aids to navigation show a single-flash characteristic, which may be green or white.
  
  - e. Lights on red aids to navigation show a group-flash characteristic, which may be red or white.
  
  - f. Isolated danger marks are not used.
  
3. **Bridge Markings:** Bridges across navigable waters are marked with red, green and/or white lights for nighttime navigation. Red lights mark piers and other parts of the bridge. Red lights are also placed on drawbridges to show when they are in the closed position. Green lights are placed on drawbridges to show when they are in the open position. The location of these lights will vary according to the bridge structure. Green lights are also used to mark the centerline of navigable channels through fixed bridges. If there are two or more channels through the bridge, the preferred channel is also marked by three white lights in a vertical line above the green light.

Red and green retro-reflective panels may be used to mark bridge piers and may also be used on bridges not required to display lights. Lateral red and green lights and dayboards may mark main channels through bridges. Adjacent piers are marked with fixed yellow lights when the main channel is marked with lateral aids to navigation.

Centerlines of channels through fixed bridges may be marked with a safe water mark and an occulting white light when lateral marks are used to mark main channels. The centerline of the navigable channel through the draw span of floating bridges may be marked with a special mark. The mark will be a yellow diamond with yellow retro-reflective panels and may exhibit a yellow light that displays a Morse code "B" (a long flash followed by three short flashes). AIS-ATON and RACONs may be placed on the bridge structure to mark the centerline of the navigable channel through the bridge.

Vertical clearance gauges may be installed to enhance navigation safety. The gauges are located on the right channel pier or pier protective structure facing approaching vessels. Clearance gauges indicate the vertical distance between "low steel" of the bridge channel span (in the closed to navigation position for drawbridges) and the level of the water, measured to the bottom of the foot marks, read from top to bottom.

Drawbridges equipped with radiotelephones display a blue and white sign which indicates what VHF radiotelephone channels should be used to request bridge openings.

**Private** aids to navigation include aids to navigation that are either operated by private persons and organizations, or that are operated by states. Private aids to navigation are classified into three categories:

1. **Class I:** Aids to navigation on marine structures or other works which the owners are legally obligated to establish, maintain, and operate as prescribed by the U.S. Coast Guard.
2. **Class II:** Aids to navigation that, exclusive of Class I aids, are located in waters used by general navigation.
3. **Class III:** Aids to navigation that, exclusive of Class I and Class II aids, are located in waters not ordinarily used by general navigation.

Authorization for the establishment of a Class II or Class III private aid to navigation by the U.S. Coast Guard imposes no legal obligation that the aid actually be established and operated. It only specifies the location and operational characteristics of the aid for which the authorization was requested. Once the aid is established, however, the owner is legally obligated to maintain it in good working order and properly painted.

**Lights and sound signals on oil wells or other offshore structures** in navigable waters are private aids to navigation and are generally not listed in the Light List unless they are equipped with a RACON. Where space allows, the structures are shown on the appropriate nautical charts. Information concerning the location and characteristics of those structures which display lights and sound signals not located in obstruction areas are published in Local and/or weekly Notices to Mariners.

In general, during the nighttime, a series of white lights are displayed extending from the platform to the top of the derrick when drilling operations are in progress. At other times, structures are usually marked with one or more quick flashing white, red, or yellow lights, visible for at least one nautical mile during clear weather. Obstructions, which are a part of the appurtenances to the main structure, such as mooring piles, anchors, and mooring buoys, etc.,

are not normally lighted. In addition, some structures are equipped with a sound signal that produces a single two-second blast every 20 seconds.

## **BUOYS, BEACONS, AND AIS-ATON**

The primary components of the U.S. Aids to Navigation System are buoys, beacons, and AIS-ATON.

Buoys are floating aids to navigation used extensively throughout U.S. waters. They are moored to sinkers by varying lengths of chain and may shift due to sea conditions and other causes. Buoys may also be carried away, capsized, or sunk. Prudent mariners will not rely solely on any single aid to navigation, particularly floating aids.

Buoy positions represented on nautical charts are approximate position only, due to the practical limitations of positioning and maintaining buoys and their sinkers in precise geographical locations. The position of buoys and beacons are indicated with a circle on the chart. The center of the symbol corresponds with the position of the aid.

Positions of Federal aids to navigation are verified during periodic maintenance visits. Between visits, environmental conditions, including atmospheric and sea conditions, seabed slope and composition, may shift buoys off their charted positions. Buoys may also be dragged off station, sunk, or capsized by a collision with a vessel.

Beacons are aids to navigation which are permanently fixed to the earth's surface. They range from large lighthouses to small single-pile structures and may be located on land or in the water. Lighted beacons are called lights; unlighted beacons are called daybeacons. Lighthouses are placed on shore or on marine sites and most often do not indicate lateral significance. Lighthouses with no lateral significance exhibit a white light.

Beacons exhibit a daymark. For small structures, these are colored geometric shapes that make an aid to navigation readily visible and easily identifiable against background conditions. Generally, the daymark conveys to the mariner, during daylight hours, the same significance as the aid's light or reflector does at night. The daymark of towers, however, consists of the structure itself. As a result, these daymarks do not infer lateral significance.

Ranges are non-lateral aids to navigation composed of two beacons, which when the structures appear to be in line, assist the mariner in maintaining a safe course. The appropriate nautical chart must be consulted when using ranges to determine whether the range marks the centerline of the navigable channel and also what section of the range may be safely traversed. Ranges typically display rectangular dayboards of various colors and are generally, but not always lighted. Ranges may display lights during daylight and at night. When lighted, ranges may display lights of any color.

Vessels should not pass fixed aids to navigation close aboard due to the danger of collision with rip-rap or structure foundations, or with the obstruction or danger being marked.

Aids to Navigation (ATON) may be enhanced by the use of an automatic identification system (AIS). AIS is a maritime navigation safety communications protocol standardized by the International Telecommunication Union and adopted by the International Maritime Organization for the broadcast or exchange of navigation information between vessels, aircraft, and shore

stations. AIS ATON can autonomously and at fixed intervals broadcast the name, position, dimensions, type, characteristics, and status from or concerning an aid to navigation. AIS ATON can be either real (physically fitted to an aid to navigation), synthetic (physically fitted somewhere other than to an aid to navigation) or virtual (physically nonexistent, but capable of being portrayed on AIS-capable displays).

**Note:** Physical AIS ATON can actively monitor and report the health and position status of its host; while Synthetic AIS ATON broadcasted from ashore (i.e. NAIS) can be used to electronically augment the range or portrayal (i.e., on radar and ECDIS) of an existing aid to navigation.

Although all existing AIS mobile devices can receive AIS ATON Reports and ASM messages, they may not readily appear on an AIS Minimal Keyboard Display or other shipboard navigational display systems (i.e., radar, ECDIS, ECS), which would require software updates to make these systems compliant with international navigation presentation standards (i.e., IEC 62288 (Ed. 2), IHO S-52 (Ed. 4.4.0)).

AIS ATON can also be used to broadcast both laterally (e.g., Port Hand Mark) and non-laterally significant marine safety information (e.g., environmental data, tidal information, and navigation warnings).

**Note:** AIS ATON stations broadcast their presence, identity (9-digit Marine Mobile Service Identity (MMSI) number), position, type, and status at least every three minutes or less via an AIS (ITU-R M.1371) message 21–AIS ATON Report. In addition to its AIS ATON Report, AIS ATON can broadcast significant marine safety information via Application Specific Messages (ASM), which are customized messages that can be used to broadcast additional aid information or other marine safety information (i.e., environmental conditions, wind speed and direction, tidal/current data, bridge air clearances, area notices, etc. They are identified by their: AIS message number (i.e. 6, 8, 25 or 26), Designated Area Code (DAC), Function Identifier (FI), and Version Number, e.g. U.S. Geographic Notice message: Msg# = 8, DAC = 367, FI = 22, Version = 2, and, denoted as 8/367.22.2.

## TYPES OF SIGNALS

**Lighted** aids to navigation are, for the most part, equipped with daylight controls which automatically cause the light to operate during darkness and to be extinguished during daylight. These devices are not of equal sensitivity; therefore, all lights do not come on or go off at the same time. Mariners should ensure correct identification of aids to navigation during twilight periods when some lighted aids to navigation are lit while others are not.

The lighting apparatus is serviced at periodic intervals to assure reliable operation, but there is always the possibility of a light being extinguished or operating improperly. The condition of the atmosphere has a considerable effect upon the distance at which lights can be seen. Sometimes lights are obscured by fog, haze, dust, smoke, or precipitation which may be present at the light, or between the light and the observer, and which is possibly unknown by the observer. Atmospheric refraction may cause a light to be seen farther than under ordinary circumstances.

A light of low intensity will be easily obscured by unfavorable conditions of the atmosphere and little dependence can be placed on it being seen. For this reason, the intensity of a light should always be considered when expecting to sight it in reduced visibility. Haze and distance may

reduce the apparent duration of the flash of a light. In some atmospheric conditions, white lights may have a reddish hue. Lights placed at high elevations are more frequently obscured by clouds, mist, and fog than those lights located at or near sea level.

In regions where ice conditions prevail in the winter, the lantern panes of lights may become covered with ice or snow, which will greatly reduce the visibility of the lights and may also cause colored lights to appear white.

The increasing use of brilliant shore lights for advertising, illuminating bridges, and other purposes, may cause marine navigational lights, particularly those in densely inhabited areas, to be outshone and difficult to distinguish from the background lighting. Mariners are requested to report such cases in order that steps may be taken to improve the conditions.

The "loom" (glow) of a powerful light is often seen beyond the limit of visibility of the actual rays of the light. The loom may sometimes appear sufficiently sharp enough to obtain a bearing. At short distances, some flashing lights may show a faint continuous light between flashes.

The distance of an observer from a light cannot be estimated by its apparent intensity. Always check the characteristics of lights in order to avoid mistaking powerful lights, visible in the distance, for nearby lights (such as those on lighted buoys) showing similar characteristics of low intensity. If lights are not sighted within a reasonable time after prediction, a dangerous situation may exist, requiring prompt resolution or action in order to ensure the safety of the vessel.

The apparent characteristic of a complex light may change with the distance of the observer. For example, a light which actually displays a characteristic of fixed white varied by flashes of alternating white and red (the rhythms having a decreasing range of visibility in the order: flashing white, flashing red, fixed white) may, when first sighted in clear weather, show as a simple flashing white light. As the vessel draws nearer, the red flash will become visible and the characteristics will appear as alternating flashing white and red. Later, the fixed white light will be seen between the flashes and the true characteristic of the light will finally be recognized as fixed white, alternating flashing white and red (F W AI WR).

If a vessel has considerable vertical motion due to pitching in heavy seas, a light sighted on the horizon may alternatively appear and disappear. This may lead the unwary to assign a false characteristic and hence, to error in its identification. The true characteristic will be evident after the distance has been sufficiently decreased or by increasing the height of eye of the observer.

Similarly, the effect of wave motion on lighted buoys may produce the appearance of incorrect light phase characteristics when certain flashes occur, but are not viewed by the mariner. In addition, buoy motion can reduce the distance at which buoy lights are detected.

Sectors of colored glass are placed in the lanterns of some lights in order to produce a system of light sectors of different colors. In general, red sectors are used to mark shoals or to warn the mariner of other obstructions to navigation or of nearby land. Such lights provide approximate bearing information, since observers may note the change of color as they cross the boundary between sectors. These boundaries are indicated in the Light List (Col. 8) and by dotted lines on charts. These bearings, as all bearings referring to lights, are given in true degrees from 000° to 359°, as observed from a vessel toward the light.

Altering course on the changing sectors of a light or using the boundaries between light sectors to determine the bearing for any purpose is not recommended. Be guided instead by the correct compass bearing to the light and do not rely on being able to accurately observe the point at which the color changes. This is difficult to determine because the edges of a colored sector cannot be cut off sharply. On either side of the line of demarcation between white, red, or green sectors, there is always a small arc of uncertain color. Moreover, when haze or smoke is present in the intervening atmosphere, a white sector might have a reddish hue.

The area in which a light can be observed is normally an arc with the light as the center and the range of visibility as the radius. However, on some bearings, the range may be reduced by obstructions. In such cases, the obstructed arc might differ with height of eye and distance. When adjoining land cuts off a light and the arc of visibility is given, the bearing on which the light disappears may vary with the distance of the vessel from which observed and with the height of eye. When the light is cut off by a sloping hill or point of land, the light may be seen over a wider arc by a vessel farther away than by one closer to the light.

The arc drawn on charts around a light is not intended to give information as to the distance at which it can be seen. The arc indicates the bearings between which the variation of visibility or obstruction of the light occurs.

Only aids to navigation with green or red lights have lateral significance and exhibit either flashing, quick flashing, group flashing, occulting, or isophase light rhythms. When proceeding in the conventional direction of buoyage, the mariner in IALA Region B, may see the following lighted aids to navigation:

Green lights on aids to navigation mark port sides of channels and locations of wrecks or obstructions that must be passed by keeping these lighted aids to navigation on the port hand of a vessel. Green lights are also used on preferred channel marks where the preferred channel is to starboard (i.e., aid to navigation left to port when proceeding in the conventional direction of buoyage). Red lights on aids to navigation mark starboard sides of channels and locations of wrecks or obstructions that must be passed by keeping these lighted aids to navigation on the starboard hand of a vessel. Red lights are also used on preferred channel marks where the preferred channel is to port (i.e., aid to navigation left to starboard when proceeding in the conventional direction of buoyage).

White and yellow lights have no lateral significance. The shapes, colors, letters, and light rhythms may determine the purpose of aids to navigation exhibiting white or yellow lights.

Most aids to navigation are fitted with retro reflective material to increase their visibility in darkness. Colored reflective material is used on aids to navigation that, if lighted, will display lights of the same color.

Preferred channel marks exhibit a composite group-flashing light rhythm of two flashes followed by a single flash.

Safe water marks exhibit a white Morse code "A" rhythm (a short flash followed by a long flash).

Isolated danger marks exhibit a white flashing (2) rhythm (two flashes repeated regularly).

Special marks exhibit yellow lights and exhibit a flashing or fixed rhythm.



Information and regulatory marks exhibit a white light with any light rhythm except quick flashing, flashing (2) and Morse code “A.”

For situations where lights require a distinct cautionary significance, as at sharp turns, sudden channel constrictions, wrecks, or obstructions, a quick flashing light rhythm will be used.

**Shapes** are used to provide easy identification on certain unlighted buoys and dayboards on beacons. These shapes are laterally significant only when associated with laterally significant colors.

In IALA Region B, cylindrical buoys (referred to as “can buoys”) and square dayboards mark the port side of a channel when proceeding from seaward. These aids to navigation are associated with solid green or green and red-banded marks where the topmost band is green.

Conical buoys (referred to as “nun buoys”) and triangular dayboards mark the starboard side of the channel when proceeding from seaward. These aids to navigation are associated with solid red or red and green-banded marks where the topmost band is red.

Unless fitted with topmarks; lighted, sound, pillar, and spar buoys have no shape significance. Their numbers, colors, and light characteristics convey their meanings.

**Dayboards** throughout the U.S. Aids to Navigation System are described using standard designations that describe the appearance of each dayboard. A brief explanation of the designations and of the purpose of each type of dayboard in the system is given below, followed by a verbal description of the appearance of each dayboard type.

Designations:

1. First Letter – Shape or Purpose

C: Crossing (Western Rivers only) diamond-shaped, used to indicate the points at which the channel crosses the river.

J: Junction (square or triangle) used to mark (preferred channel) junctions or bifurcations in the channel, or wrecks or obstructions which may be passed on either side; color of top band has lateral significance for the preferred channel.

K: Range (rectangular) when both the front and rear range dayboards are aligned on the same bearing, the observer is on the azimuth of the range, usually used to mark the center of the channel.

M: Safe Water (octagonal) used to mark the fairway or middle of the channel.

N: No lateral significance (diamond or rectangular) used for special purpose, warning, distance, or location markers.

S: Square used to mark the port side of channels when proceeding from seaward.

T: Triangle used to mark the starboard side of channels when proceeding from seaward.

2. Second Letter – Key Color

B – Black      G – Green      R – Red      W – White      Y – Yellow

3. Third Letter – Color of Center Stripe (Range Dayboards Only)

4. Additional Information after a (-)

-I: Intracoastal Waterway; a yellow reflective horizontal band on a dayboard; indicates the aid to navigation marks the Intracoastal Waterway.

-SY: Intracoastal Waterway; a yellow reflective square on a dayboard; indicates the aid to navigation is a port hand mark for vessels traversing the Intracoastal Waterway. May appear on a triangular daymark where the Intracoastal Waterway coincides with a waterway having opposite conventional direction of buoyage.

-TY: Intracoastal Waterway; a yellow reflective triangle on a dayboard; indicates the aid to navigation is a starboard hand mark for vessels traversing the Intracoastal Waterway. May appear on a square daymark where the Intracoastal Waterway coincides with a waterway having opposite conventional direction of buoyage.

### **Descriptions:**

CNG: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners green, with green reflective diamonds at the top and bottom corners and white reflective diamonds in the side corners (Western Rivers only).

CNR: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners red, with red reflective diamonds at the top and bottom corners and white reflective diamonds in the side corners (Western Rivers only).

JG: Dayboard bearing horizontal bands of green and red, green band topmost, with corresponding reflective borders.

JG-I: Square dayboard bearing horizontal bands of green and red, green band topmost, with corresponding reflective borders and a yellow reflective horizontal band.

JG-SY: Square dayboard bearing horizontal bands of green and red, green band topmost, with corresponding reflective borders and a yellow reflective square.

JG-TY: Square dayboard bearing horizontal bands of green and red, green band topmost, with corresponding reflective borders and a yellow reflective triangle.

JR: Dayboard bearing horizontal bands of red and green, red band topmost, with corresponding reflective borders.

JR-I: Triangular dayboard bearing horizontal bands of red and green, red band topmost, with corresponding reflective borders and a yellow reflective horizontal band.

JR-SY: Triangular dayboard bearing horizontal bands of red and green, red band topmost, with corresponding reflective borders and a yellow reflective square.

JR-TY: Triangular dayboard bearing horizontal bands of red and green, red band topmost, with corresponding reflective borders and a yellow reflective triangle.

KBG: Rectangular black dayboard bearing a central green stripe.

KBG-I: Rectangular black dayboard bearing a central green stripe and a yellow reflective horizontal band.

KBR: Rectangular black dayboard bearing a central red stripe.

KBR-I: Rectangular black dayboard bearing a central red stripe and a yellow reflective horizontal band.

KBW: Rectangular black dayboard bearing a central white stripe.

KBW-I: Rectangular black dayboard bearing a central white stripe and a yellow reflective horizontal band.

KGB: Rectangular green dayboard bearing a central black stripe.

KGB-I: Rectangular green dayboard bearing a central black stripe and a yellow reflective horizontal band.

KGR: Rectangular green dayboard bearing a central red stripe.

KGR-I: Rectangular green dayboard bearing a central red stripe and a yellow reflective horizontal band.

KGW: Rectangular green dayboard bearing a central white stripe.

KGW-I: Rectangular green dayboard bearing a central white stripe and a yellow reflective horizontal band.

KRB: Rectangular red dayboard bearing a central black stripe.

KRB-I: Rectangular red dayboard bearing a central black stripe and a yellow reflective horizontal band.

KRG: Rectangular red dayboard bearing a central green stripe.

KRG-I: Rectangular red dayboard bearing a central green stripe and a yellow reflective horizontal band.

KRW: Rectangular red dayboard bearing a central white stripe.

KRW-I: Rectangular red dayboard bearing a central white stripe and a yellow reflective horizontal band.

KWB: Rectangular white dayboard bearing a central black stripe.

KWB-I: Rectangular white dayboard bearing a central black stripe and a yellow reflective horizontal band.

KWG: Rectangular white dayboard bearing a central green stripe.

KWG-I: Rectangular white dayboard bearing a central green stripe and a yellow reflective horizontal band.

KWR: Rectangular white dayboard bearing a central red stripe.

KWR-I: Rectangular white dayboard bearing a central red stripe and a yellow reflective horizontal band.

MR: Octagonal dayboard bearing stripes of white and red, with a white reflective border.

MR-I: Octagonal dayboard bearing stripes of white and red, with a white reflective border and a yellow reflective horizontal band.

NB: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners black, with a white reflective border.

ND: Rectangular white mileage marker with black numerals indicating the mile number (Western Rivers only).

NG: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners green, with a white reflective border.

NL: Rectangular white location marker with an orange reflective border and black letters indicating the location.

NR: Diamond-shaped dayboard divided into four diamond-shaped colored sectors with the sectors at the side corners white and the sectors at the top and bottom corners red, with a white reflective border.

NW: Diamond-shaped white dayboard with an orange reflective border and black letters describing the information or regulatory nature of the mark.

NY: Diamond-shaped yellow dayboard with yellow reflective border.

SG: Square green dayboard with a green reflective border.

SG-I: Square green dayboard with a green reflective border and a yellow reflective horizontal band.

SG-SY: Square green dayboard with a green reflective border and a yellow reflective square.

SG-TY: Square green dayboard with a green reflective border and a yellow reflective triangle.

SR: Square red dayboard with a red reflective border. (IALA Region “A”)

TG: Triangular green dayboard with a green reflective border. (IALA Region “A”)

TR: Triangular red dayboard with a red reflective border.

TR-I: Triangular red dayboard with a red reflective border and a yellow reflective horizontal band.

TR-SY: Triangular red dayboard with a red reflective border and a yellow reflective square.

TR-TY: Triangular red dayboard with a red reflective border and a yellow reflective triangle. These abbreviated descriptions are used in column (7) and may also be found on the illustrations of the U.S. Aids to Navigation System.

**Numbers** are used to provide easy identification of aids to navigation. In IALA Region B, all solid red and solid green aids are numbered, with the exception of buoys located on the Western Rivers. Red aids to navigation have even numbers and green aids to navigation have odd numbers. The numbers for each increase from seaward when proceeding in the conventional direction of buoyage. Numbers are kept in approximate sequence on both sides of the channel by omitting numbers where necessary.

Letters may be used to augment numbers when lateral aids to navigation are added to channels with previously completed numerical sequences. Letters will increase in alphabetical order from seaward, proceeding in the conventional direction of buoyage and are added to numbers as suffixes. Letters are not used for buoys on the Western Rivers.

No other aids to navigation are numbered. Preferred channel, safe water, isolated danger, special marks, and information and regulatory aids to navigation may be lettered, but not numbered.

**Sound signal** is a generic term used to describe aids to navigation that produce an audible signal designed to assist the mariner in periods of reduced visibility. These aids to navigation can be activated by several means (e.g., manually, remotely, or fog detector). The Coast Guard is replacing many fog detectors with mariner radio activated sound signals (MRASS). To activate, mariners key their VHF-FM radio a designated number of times on a designated VHF-FM channel. The sound signal is activated for a period of 15, 30, 45, or 60 minutes after which the activated assistance automatically turns off. In cases where a fog detector is in use, there may be a delay in the automatic activation of the signal. Additionally, fog detectors may not be capable of detecting patchy fog conditions.

Sound signals are distinguished by their tone and phase characteristics. The devices producing the sound, e.g., diaphones, diaphragm horns, sirens, whistles, bells, or gongs determine tones.

Phase characteristics are defined by the signal's sound pattern, i.e., the number of blasts and silent periods per minute and their durations. Sound signals sounded from fixed structures generally produce a specific number of blasts and silent periods each minute when operating. Sound signals installed on buoys are generally activated by the motion of the sea and therefore do not emit a regular signal characteristic. It is common, in fact, for a buoy to produce no sound signal when seas are calm.

The characteristic of a sound signal is listed in column (8) of the Light List. If the sound signal is remotely activated, column (8) will contain the VHF-FM channel and number of times the VHF-FM radio should be keyed. All waterway users equipped with a VHF-FM radio may activate the sound signal, but they are not required to do so. Unless it is specifically stated that a sound signal "Operates continuously," or the signal is a bell, gong, or whistle on a buoy, it can be assumed that the sound signal only operates during times of fog, reduced visibility, or adverse weather.

**Caution:** *Mariners should not rely on sound signals to determine their position. Distance cannot be accurately determined by sound intensity. Occasionally, sound signals may not be heard in areas close to their location. Signals may not sound in cases where fog exists close to, but not at, the location of the sound signal.*

**Radar Beacons (RACONS)** are radar transponders that when triggered by an X-band radar produce a coded response from its location, which is portrayed radially as a series of dots and dashes on the triggering radar. Although RACONS may be used on both laterally significant and non-laterally significant aids to navigation, their signal should just be used for identification purposes only.

RACONS have a typical output of 600 milliwatts and are considered a short range aid to navigation. Reception varies from a nominal range of 6 to 8 nautical miles when mounted on a buoy to as much as 17 nautical miles for a RACON mounted on a fixed structure. It must be understood that these nominal ranges are dependent upon many factors.

The beginning of the RACON presentation occurs about 50 yards beyond the RACON position and will persist for a number of revolutions of the radar antenna (depending on its rotation rate). Distance to the RACON can be measured to the point at which the RACON flash begins, but the figure obtained will be greater than the vessel's distance from the RACON. This is due to the slight response delay in the RACON apparatus.

Radar operators may notice some broadening or spoking of the RACON presentation when their vessel approaches closely to the source of the RACON. This effect can be minimized by adjusting the IF gain or sweep gain control of the radar. If desired, the RACON presentation can be virtually eliminated by operation of the FTC (fast time constant) controls of the radar.

**Radar Reflectors** are special fixtures, incorporated into both lighted and unlighted aids to navigation, to enhance the reflection of radar energy. These fixtures help radar-equipped vessels to detect buoys and beacons, which are so equipped. However, they do not positively identify a radar target as an aid to navigation.

## NAVIGATION SERVICES

### GLOBAL POSITIONING SYSTEM (GPS), DIFFERENTIAL GPS (DGPS), AND NATION-WIDE AUTOMATIC IDENTIFICATION SYSTEM (NAIS)

**Global Positioning System (GPS)** is a satellite based navigation system, operated and controlled by the Department of Defense (DOD) under U.S. Air Force management, which provides precise, worldwide, three-dimensional navigation capabilities. The system was originally designed for military application; however, it is now available to all and used almost ubiquitously. The United States is committed to maintaining the availability of at least 24

operational GPS satellites, in six precise orbital planes, each of which complete a circular 10,900 nautical mile orbit of the earth once every 12 hours. Ideally, a minimum of four satellites will be visible from any position on the earth and will provide positions with a global horizontal accuracy within 3 meters, 95% percent of the time. Whenever possible, advance notice of when GPS satellites should not be used will be provided by the DOD and made available by the US Coast Guard through GPS status messages.

The Navigation Center coordinates and manages the Civil GPS Service Interface Committee (CGSIC), which comprises members from U.S. and international private, government, and industry user groups. The CGSIC is the recognized worldwide forum for effective interaction between all civil GPS users and the U.S. GPS authorities.

At least three satellites are required for a two-dimensional solution, however, GPS does not provide integrity information and mariners should exercise extreme caution when using GPS in restricted waterways.

**Differential GPS (DGPS)** is an augmentation to the GPS signals. Each site corrects for small variations in the signals from each satellite that is in view at that time. Satellite signals can vary due to small changes in the satellite's circuitry and orbit and from changes caused by local weather conditions. Satellite corrections are transmitted to users via radio signals in the medium frequency band (285-325 kHz) previously used for marine radiobeacons. DGPS corrections and integrity information are transmitted using Minimum Shift Keying (MSK) modulation. The modulation data rate is usually 100 or 200 bits per second (bps), but can also be 50 bps. The range of DGPS transmissions is from 40 to 300 nautical miles.

DGPS was the first Federal radionavigation system capable of providing the 10-meter navigation service required for the Harbor Entrance and Approach phase of maritime navigation. DGPS provides integrity messages for signals from the GPS satellites, as well as DGPS position corrections, and typically provides position accuracy of 1-3 meters.

Each DGPS site has two reference stations (which calculate the differential corrections), two integrity monitors (which ensure the differential corrections are accurate), a transmitter, and equipment to communicate status information to and receive commands from the control station. Each transmitter and reference station has a unique identification number that permits users to determine which site/equipment is providing their differential corrections. As distance from the transmitting site increases, the small error in the differential corrections increases. The best accuracy is achieved when using the DGPS site closest to the user.

Information regarding the location of DGPS transmitters is given on the map labeled U.S. DGPS Sites & Identification Numbers on page i. Users can access additional information and DGPS statuses, submit questions, and provide comments via the Navigation Information Service's website or by calling the Coast Guard Navigation Center DGPS watchstander at (703) 313-5902.

**Navigation Information Service (NIS):** The Coast Guard is the government interface for civil users of GPS and has established a Navigation Information Service (NIS) to meet the information needs of the civil user. The NIS is a Coast Guard entity that is manned 24 hours a day, 7 days a week, and is located at the Navigation Center (NAVCEN) in Alexandria, VA. It provides data broadcasts and on-line computer-based information services which are available 24 hours a day. The information provided includes present or future satellite outages, constellation changes, user instructions and tutorials, lists of service and receiver provides/users, and other GPS and DGPS related information.

**Navigation Center Internet Service (www)** website also offers an e-mail subscription service for GPS status messages, Notice Advisory to NAVSTAR Users (NANU) messages, Local Notice to Mariners, and Coast Guard Light List.

The NAVCEN disseminates GPS and DGPS safety advisory broadcast messages through USCG broadcast stations utilizing VHF-FM voice, HF-SSB voice, and NAVTEX broadcasts. The broadcasts provide the GPS and DGPS user in the marine environment with the current status of the navigation systems, as well as any planned/unplanned system outages that could affect GPS and DGPS navigational accuracy.

**Nationwide Automatic Identification System (NAIS)** consists of approximately 200 VHF receiver sites located throughout the coastal continental United States, inland rivers, Alaska, Hawaii, Puerto Rico, and Guam. NAIS couples AIS technology with a comprehensive network infrastructure to achieve ship-to-shore and shore-to-ship data transmission throughout the navigable waters of the United States. The system enables AIS-equipped vessels to receive important marine information such as safety and security messages, weather alerts, and electronic aids to navigation.

NAIS is designed to collect safety and security data from AIS-equipped vessels in navigable waters of the United States and share that data with Coast Guard operators and other government and port partners. The primary goal of NAIS is to increase situational awareness through data dissemination via a network infrastructure, particularly focusing on improving maritime security, marine and navigational safety, search and rescue, and environmental protection services. Collected AIS data improves the safety of vessels and ports through collision avoidance and the safety of the nation through detection, identification, and classification of vessels. NAIS broadcasts navigation enhancing safety related messages such as Synthetic AIS ATON Reports and Application Specific Messages.

For more information see:

- AIS messages at [www.navcen.uscg.gov/?pageName=AIMessages](http://www.navcen.uscg.gov/?pageName=AIMessages),
- IMO Safety of Navigation Circular 289 and 290 regarding ASM's at [www.navcen.uscg.gov/?pageName=AISReferences](http://www.navcen.uscg.gov/?pageName=AISReferences),
- IALA AIS ASM Catalog at [www.e-navigation.nl/asm](http://www.e-navigation.nl/asm), and
- USCG Special Notice 14-02 regarding eATON at [www.navcen.uscg.gov/?pageName=AISFAQ#21](http://www.navcen.uscg.gov/?pageName=AISFAQ#21).

To comment on any of these services or ask questions about the service offered, contact the NAVCEN at:

Commanding Officer  
U.S. Coast Guard Navigation Center  
7323 Telegraph Road STOP 7310  
Alexandria, VA 20598-7310  
Phone: (703) 313-5900  
Internet: <https://www.navcen.uscg.gov>



## ABBREVIATIONS

Various abbreviations are utilized in Broadcast Notices to Mariners, Local Notices to Mariners, on charts, and in the Light Lists. Refer to the following list.

### Light Characteristics

Alternating	AL
Characteristic	CHAR
Composite Group-Flashing	FL (2+1)
Composite Group-Occulting	OC (2+1)
Continuous Quick-Flashing	Q
Eclipse	EC
Fixed and Flashing	FFL
Fixed	F
Group-Flashing	FL (3)
Group-Occulting	OC (2)
Interrupted Quick-Flashing	IQ
Isophase	ISO
Morse Code	MO (A)
Occulting	OC
Single-Flashing	FL

### Sound Signal Characteristics

Blast	BL
Every	EV
Seconds	S
Silent	SI

### Colors\*

Black	B
Blue	BU
Green	G
Orange	OR
Red	R
White	W
Yellow	Y

\*NOTE: Color refers to characteristics of aids to navigation only.

### Aids to Navigation

Aeronautical Radiobeacon	AERO RBN
Automatic Identification System	AIS
Daybeacon	DBN
Destroyed	DESTR
Differential GPS	DGPS
Discontinued	DISCONTD
Established	ESTAB
Exposed Location Buoy	ELB
Extinguished	EXT
Fog Signal Station	FOG SIG
Light List Number	LLNR

Light	LT
Lighted Bell Buoy	LBB
Lighted Buoy	LB
Lighted Gong Buoy	LGB
Lighted Horn Buoy	LHB
Lighted Whistle Buoy	LWB
Mariner Radio Activated	
Sound Signal	MRASS
Ocean Data Acquisition System	ODAS
Privately Maintained	PRIV MAINTD
Radar Reflector	RA REF
Radar Responder Beacon	RACON
Remote Radio Activated	
Sound Signal	RRASS
Single Point Mooring Buoy	SPM
Sound Signal	SS
Temporarily Replaced by	
Lighted Buoy	TRLB
Temporarily Replaced by	
Unlighted Buoy	TRUB
Topmark	TMK
Virtual AIS Aid to Navigation	V-AIS
Whistle	WHIS

### Organizations

Commander, Coast Guard District CCGD (#)	
Coast Guard	CG
Corps of Engineers	USACE
National Geospatial-Intelligence Agency	NGA
National Ocean Service	NOS
National Weather Service	NWS

### Vessels

Aircraft	A/C
Fishing Vessel	F/V
Liquefied Natural Gas Carrier	LNG
Motor Vessel (includes Steam Ship, Container Ship, Cargo Vessel, Tanker etc)	M/V
Pleasure Craft	P/C
Research Vessel	R/V
Sailing Vessel	S/V

### Compass Directions

North	N
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South	S	Explosive Anchorage	EXPLOS ANCH
East	E	Fathom(s)	FM(S)
West	W	Foot/Feet	FT
Northeast	NE	Harbor	HBR
Northwest	NW	Height	HT
Southeast	SE	Hertz	HZ
Southwest	SW	Horizontal Clearance	HOR CL
		Hour	HR
<b><u>Months</u></b>		International Regulations for	
January	JAN	Preventing Collisions at Sea	COLREGS
February	FEB	Kilohertz	KHZ
March	MAR	Kilometer	KM
April	APR	Knot(s)	KT(S)
May	MAY	Minute (time, geo, pos)	MIN
June	JUN	Megahertz	MHZ
July	JUL	Moderate	MOD
August	AUG	Mountain, Mount	MT
September	SEP	Nautical Mile(s)	NM
October	OCT	Notice to Mariners	NTM
November	NOV	Obstruction	OBSTR
December	DEC	Occasion/Occasionally	OCCASION
		Operating Area	OPAREA
<b><u>Days of the Week</u></b>		Pacific	PAC
Monday	MON	Point(s)	PT(S)
Tuesday	TUE	Position	POS
Wednesday	WED	Position Approximate	PA
Thursday	THU	Pressure	PRES
Friday	FRI	Private, Privately	PRIV
Saturday	SAT	Prohibited	PROHIB
Sunday	SUN	Publication	PUB
		Range	RGE
<b><u>Various</u></b>		Reported	REP
Anchorage	ANCH	Restricted	RESTR
Anchorage Prohibited	ANCH PROHIB	River	RIV
Approximate	APPROX	Rock	RK
Atlantic	ATL	Saint	ST
Authorized	AUTH	Second (time, geo, pos)	SEC
Average	AVG	Signal Station	SIG STA
Bearing	BRG	Station	STA
Breakwater	BKW	Statute Mile(s)	SM
Broadcast Notice to Mariners	BNM	Storm Signal Station	S SIG STA
Canadian Aid	(C)	Temporary	TEMP
Captain of the Port	COTP	Thunderstorm	TSTORM
Channel	CHAN	Through	THRU
Code of Federal Regulations	CFR	True	T
Continue	CONT	Uncovers, Dries	UNCOV
Degrees (temp, geo, pos)	DEG	Universal Coordinate Time	UTC
Diameter	DIA	Urgent Marine Information Broadcast	UMIB
Edition	ED	Velocity	VEL
Effect/Effective	EFF	Vertical Clearance	VERT CL
Entrance	ENTR	Vessel Traffic Service	VTS

Visibility	VIS	Missouri	MO
Yard(s)	YD	Mississippi	MS
Warning	WARN	Mexico	MX
Weather	WX	Michigan	MI
Wreck	WK	Minnesota	MN
		Montana	MT
		Nebraska	NE
		Nevada	NV
		New Hampshire	NH
		New Jersey	NJ
		New Mexico	NM
		New York	NY
		North Carolina	NC
		North Dakota	ND
		Northern Marianas	MP
		Ohio	OH
		Oklahoma	OK
		Oregon	OR
		Pennsylvania	PA
		Puerto Rico	PR
		Rhode Island	RI
		South Carolina	SC
		South Dakota	SD
		Tennessee	TN
		Texas	TX
		United States	US
		Utah	UT
		Vermont	VT
		Virgin Islands	VI
		Washington	WA
		West Virginia	WV
		Wisconsin	WI
		Wyoming	WY
<b><u>Countries and States</u></b>			
Alabama	AL		
Alaska	AK		
American Samoa	AS		
Arizona	AZ		
Arkansas	AR		
California	CA		
Canada	CN		
Colorado	CO		
Connecticut	CT		
Delaware	DE		
District of Columbia	DC		
Florida	FL		
Georgia	GA		
Guam	GU		
Hawaii	HI		
Idaho	ID		
Illinois	IL		
Indiana	IN		
Iowa	IA		
Kansas	KS		
Kentucky	KY		
Louisiana	LA		
Maine	ME		
Maryland	MD		
Marshall Islands	MH		
Massachusetts	MA		

## GLOSSARY OF AIDS TO NAVIGATION TERMS

**Adrift:** Afloat and unattached in any way to the shore or seabed.

**Aid to Navigation:** Any device external to a vessel or aircraft specifically intended to assist navigators in determining their position or safe course, or to warn them of dangers or obstructions to navigation.

**Alternating Lights:** A rhythmic light showing light of alternating colors.

**Arc of Visibility:** The portion of the horizon over which a lighted aid to navigation is visible from seaward.

**Articulated Beacon:** A beacon-like buoyant structure, tethered directly to the seabed and having no watch circle. Called articulated light or articulated daybeacon, as appropriate.

**Assigned Position:** The latitude and longitude position for an aid to navigation.

**Beacon:** A lighted or unlighted fixed aid to navigation attached directly to the earth's surface. (Lights and daybeacons both constitute beacons.

**Bearing:** The horizontal direction of a line of sight between two objects on the surface of the earth.

**Bell:** A sound signal producing bell tones by means of a hammer actuated by electricity on fixed aids and by sea motion on buoys.

**Bifurcation:** The point where a channel divides when proceeding from seaward. The place where two tributaries meet.

**Broadcast Notice to Mariners:** A radio broadcast designed to provide important marine information.

**Buoy:** A floating object of defined shape and color, which is anchored at a given position and serves as an aid to navigation.

**Characteristic:** The audible, visual, or electronic signal displayed by an aid to navigation to assist in the identification of an aid to navigation. Characteristic refers to lights, sound signals, RACONS, and daybeacons.

**Commissioned:** The action of placing a previously discontinued aid to navigation back in service.

**Composite Group Flashing Light:** A group flashing light in which the flashes are combined in successive groups of different numbers of flashes.

**Composite Group-Occulting Light:** A light similar to a group occulting light except that the successive groups in a period have different numbers of eclipses.

**Conventional Direction of Buoyage:** Some reference direction for defining the lateral and numbering significance of an aid system. In U.S. waters, the direction of flood current provides the most common indication. For coastal marking, the conventional direction of buoyage is southerly along the East coast, northerly and westerly along the Gulf coast and northerly along the West coast.

**Daybeacon:** An unlighted fixed structure which is equipped with a dayboard for daytime identification.

**Dayboard:** The daytime identifier of an aid to navigation presenting one of several standard shapes (square, triangle, rectangle) and colors (red, green, white, orange, yellow, or black).

**Daymark:** The daytime identifier of an aid to navigation. (See column 7 of the Light List)

**Diaphone:** A sound signal which produces sound by means of a slotted piston moved back and forth by compressed air. A "two-

tone” diaphone produces two sequential tones with a second tone of lower pitch.

**Directional Light:** A light illuminating a sector or very narrow angle and intended to mark a direction to be followed.

**Discontinued:** To remove from operation (permanently or temporarily) a previously authorized aid to navigation.

**Discrepancy:** Failure of an aid to navigation to maintain its position or function as prescribed in the Light List.

**Discrepancy Buoy:** An easily transportable buoy used to temporarily replace an aid to navigation not watching properly.

**Dolphin:** A minor aid to navigation structure consisting of a number of piles driven into the seabed or riverbed in a circular pattern and drawn together with rope.

**Eclipse:** An interval of darkness between appearances of a light.

**Emergency Light:** A light of reduced intensity displayed by certain aids to navigation when the main light is extinguished.

**Establish:** To place an authorized aid to navigation in operation for the first time.

**Extinguished:** A lighted aid to navigation which fails to show a light characteristic.

**Fixed Light:** A light showing continuously and steady, as opposed to a rhythmic light. (Do not confuse with “fixed” as used to differentiate from “floating”.)

**Flash:** A relatively brief appearance of a light, in comparison with the longest interval of darkness in the same characteristic.

**Flash tube:** An electronically controlled high-intensity discharge lamp with a very brief flash duration.

**Flashing Light:** A light in which the total duration of the light in each period is clearly shorter than the total duration of the darkness and in which the flashes of light are all of equal duration. (Commonly used for a single-flashing light which exhibits only single flashes which are repeated at regular intervals.)

**Floating Aid to Navigation:** A buoy, secured in its assigned position by a mooring.

**Fog Detector:** An electronic device used to automatically determine conditions of visibility which warrant the activation of a sound signal or additional light signals.

**Fog Signal:** See sound signal.

**Geographic Range:** The greatest distance the curvature of the earth permits an object of a given height to be seen from a particular height of eye without regard to luminous intensity or visibility conditions.

**Global Positioning System (GPS):** A satellite based radio-navigation system providing continuous worldwide coverage. It provides navigation, position, and timing information to air, marine, and land users.

**Gong:** A wave actuated sound signal on buoys which uses a group of saucer-shaped bells to produce different tones.

**Group Flashing Light:** A flashing light in which a group of flashes, specified in number, is regularly repeated.

**Group Occulting Light:** An occulting light in which a group of eclipses, specified in number, regularly repeated.

**Horn:** A sound signal which uses electricity or compressed air to vibrate a disc diaphragm.

**Inoperative:** Sound signal or electronic aid to navigation out of service due to a malfunction.

**Interrupted Quick Flash:** A quick flashing light in which the rapid alternations are interrupted at regular intervals by eclipses of long duration.

**Isolated Danger Mark:** A mark erected on, or moored above or very near, an isolated danger which has navigable water all around it.

**Isophase Light:** A rhythmic light in which all durations of light and darkness are equal.

**Junction:** The point where a channel divides when proceeding seaward. The place where a distributary departs from the main stream.

**Lateral System:** A system of aids to navigation in which characteristics of buoys and beacons indicate the sides of a channel or route relative to a Conventional Direction of Buoyage (usually upstream).

**Light:** The signal emitted by a lighted aid to navigation. The illuminating apparatus used to emit the light signal. A lighted aid to navigation on a fixed structure.

**Light Sector:** The arc over which a light is visible, described in degrees true, as observed from seaward towards the light. May be used to define distinctive color difference of two adjoining sectors, or an obscured sector.

**Lighted Ice Buoy (LIB):** A lighted buoy without a sound signal, and designed to withstand the forces of shifting and flowing ice. Used to replace a conventional buoy when that aid to navigation is endangered by ice.

**Lighthouse:** A lighted beacon of major importance.

**Local Notice to Mariners:** A written document issued by each U.S. Coast Guard district to disseminate important information affecting aids to navigation, dredging, marine construction, special marine activities, and

bridge construction on waterways within that district.

**Luminous Range:** The greatest distance a light can be expected to be seen given its nominal range and the prevailing meteorological visibility.

**Mark:** A visual aid to navigation. Often called navigational mark, including floating marks (buoys) and fixed marks (beacons).

**Meteorological Visibility:** The greatest distance at which a black object of suitable dimension could be seen and recognized against the horizon sky by day, or in case of night observations, could be seen and recognized if the general illumination were raised to the daylight level.

**Mileage Number:** A number assigned to aids to navigation which gives the distance in sailing miles along the river from a reference point to the aid to navigation. The number is used principally in the Mississippi River System.

**Nominal Range:** The maximum distance a light can be seen in clear weather (meteorological visibility of 10 nautical miles). Listed for all lighted aids to navigation except range lights, directional lights, and private aids to navigation.

**Occulting Light:** A light in which the total duration of light in each period is clearly longer than the total duration of the darkness and in which the intervals of darkness (occultations) are all of equal duration. Commonly used for single occulting light which exhibits only single occultations which are repeated at regular intervals.

**Ocean Data Acquisition System (ODAS):** Certain very large buoys in deep water for the collection of oceanographic and meteorological information. All ODAS buoys are yellow in color and display a yellow light.

**Off Shore Tower:** Monitored light stations built on exposed marine sites to replace lightships.

**Off Station:** A floating aid to navigation that is not on its assigned position.

**Passing Light:** A low intensity light which may be mounted on the structure of another light to enable the mariner to keep the latter light in sight when passing out of its beam during transit.

**Period:** The interval of time between the commencement of two identical successive cycles of the characteristic of the light or sound signal.

**Pile:** A long, heavy steel, concrete or timber driven into the seabed or riverbed to serve as a support for an aid to navigation.

**Port Hand Mark:** A buoy or beacon which is left to the port hand when proceeding in the "Conventional Direction of Buoyage".

**Preferred Channel Mark:** A lateral mark indicating a channel junction or bifurcation, or a wreck or other obstruction which after consulting a chart, may be passed on either side.

**Primary Aid to Navigation:** An aid to navigation established for the purpose of making landfalls and coastwise passages from headland to headland.

**Quick Light:** A light exhibiting very rapid regular alternations of light and darkness, normally 60 flashes per minute.

**RACON:** A radar beacon which produces a coded response or radar paint, when triggered by a radar signal.

**Radar:** An electronic system designed to transmit radio signals and receive reflected images of those signals from a "target" in order to determine the bearing and distance to the "target".

**Radar Reflector:** A special fixture fitted to or incorporated into the design of certain aids to navigation to enhance their ability to reflect radar energy. In general, these fixtures will materially improve the aid to navigation for use by vessels with radar.

**Range:** A line formed by the extension of a line connecting two charted points.

**Range lights:** Two lights associated to form a range which often, but not necessarily, indicates the channel centerline. The front range light is the lower of the two, and nearer to the mariner using the range. The rear light is higher and further from the mariner.

**Rebuilt:** A fixed aid to navigation, previously destroyed, which has been restored as an aid to navigation.

**Regulatory Marks:** A white and orange aid to navigation with no lateral significance. Used to indicate a special meaning to the mariner, such as danger, restricted operations, or exclusion area.

**Relighted:** An extinguished aid to navigation returned to its advertised light characteristics.

**Replaced:** An aid to navigation previously off station, adrift, or missing, restored by another aid to navigation of the same type and characteristics.

**Replaced (temporarily):** An aid to navigation previously off station, adrift, or missing restored by another aid to navigation of a different type and/or characteristic.

**Reset:** A floating aid to navigation previously off station, adrift or missing, returned to its assigned position (station).

**Rhythmic Light:** A light showing intermittently with a regular periodicity.

**Sector:** See light sector.

**Setting a Buoy:** The act of placing a buoy on assigned position in the water.

**Siren:** A sound signal which uses electricity or compressed air to actuate either a disc or a cup shaped rotor.

**Skeleton Tower:** A tower, usually of steel, constructed of heavy corner members and various horizontal and diagonal bracing members.

**Sound Signal:** A device which transmits sound, intended to provide information to mariners during periods of restricted visibility and foul weather.

**Starboard Hand Mark:** A buoy or beacon which is right to the starboard hand when proceeding in the Conventional Direction of Buoyage.

**Topmark:** One or more relatively small objects of characteristic shape and color placed on aid to identify its purpose.

**Traffic Separation Scheme:** Shipping corridors marked by buoys which separate incoming from outgoing vessels. Improperly called SEA LANES.

**Watching Properly:** An aid to navigation on its assigned position exhibiting the advertised characteristics in all respects.

**Whistle:** A wave actuated sound signal on buoys which produces sound by emitting compressed air through a circumferential slot into a cylindrical bell chamber.

**Winter Marker:** An unlighted buoy without a sound signal, used to replace a conventional buoy when an aid to navigation is endangered by ice.

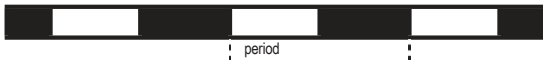
**Winter Light:** A light which is maintained during those winter months when the regular light is extinguished. It is of lower candlepower than the regular light, but usually the same characteristic.

**Withdrawn:** The discontinuance of an aid to navigation or equipment on an aid to navigation during severe ice conditions or for the winter season.



# CHARACTERISTICS OF LIGHTS

## Illustration



## Type Description

1.

**F**

A light showing continuously and steadily.

2. OCCULTING.

A light in which the total duration of light in a period is longer than the total duration of darkness and the intervals of darkness (eclipses) are usually of equal duration

2.1 Single-occulting.

An occulting light in which an eclipse is regularly repeated.

2.2 Group-occulting.

An occulting light in which a group of eclipses, specified in numbers, is regularly repeated.

2.3 Composite group-occulting.

A light, similar to a group-occulting light, except that successive groups in a period have different numbers of eclipses.

3. ISOPHASE.

A light in which all durations of light and darkness are equal.

4. FLASHING.

A light in which the total duration of light in a period is shorter than the total duration of darkness and the appearances of light (flashes) are usually of equal duration.

4.1 Single-flashing.

A flashing light in which a flash is regularly repeated (frequency not exceeding 30 flashes per minute).

4.2 Group-flashing.

A flashing light in which a group of flashes, specified in number, is regularly repeated.

4.3 Composite group-flashing.

A light similar to a group flashing light except that successive groups in the period have different numbers of

5. QUICK.

A light in which flashes are produced at a rate of 60 flashes per minute.

5.1 Continuous quick.

A quick light in which a flash is regularly repeated.

5.2 Interrupted quick.

A quick light in which the sequence of flashes is interrupted by regularly repeated eclipses of constant and long duration.

6. MORSE CODE.

A light in which appearances of light of two clearly different durations (dots and dashes) are grouped to represent a character or characters in the Morse code.

7. FIXED AND FLASHING.

A light in which a fixed light is combined with a flashing light of higher luminous intensity.

8. ALTERNATING.

A light showing different colors alternately

## Abbreviation

FIXED.

**Oc**

**Oc (2)**

**Oc (2+1)**

**Iso**

**FI**

**FI (2)**

**FI (2+1)**

**Q**

**I Q**

**Mo (A)**

**F FI**

**AI RW**

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# INDEX

## A

Aberdeen Proving Ground Channel . . . . .	27520
Aberdeen Restricted Area . . . . .	8705, 27290
Absecon Inlet . . . . .	1175
Adams Creek . . . . .	38295
Albemarle Plantation Marina . . . . .	31545
Albemarle Sound . . . . .	31350
Alexandria Channel . . . . .	18605
Alligator River - Pungo River . . . . .	38005
Alligator River . . . . .	37835
Anacostia River . . . . .	18720
Annapolis Harbor Channel . . . . .	19690
Antipoison Creek . . . . .	16005
Appomattox River . . . . .	12535
Aquia Creek . . . . .	17970
Assateague Light . . . . .	275
Avon Channel . . . . .	32250

## B

Baber Point . . . . .	17680
Back Creek . . . . .	19010
Back Creek Channel . . . . .	9180
Back River . . . . .	12910
Back Sound . . . . .	29315
Balls Creek . . . . .	25540
Banks Channel . . . . .	30050
Barden Inlet . . . . .	29140
Barnegat Inlet . . . . .	880
Barnegat Light . . . . .	958
Bay Bridge Marina . . . . .	7840
Bay River . . . . .	33395, 38255
Bay Shore Channel . . . . .	1685
Beach Cove . . . . .	4685
Bear Creek . . . . .	20670
Beaufort Harbor Channel . . . . .	34805
Beaufort Inlet . . . . .	29329
Belhaven Channel . . . . .	32930
Belle Isle State Park . . . . .	15303
Bennett Creek - Poquoson River . . . . .	13260
Bennett Creek . . . . .	11045
Big Annemessex River . . . . .	23280
Big Foot Slough Channel . . . . .	29025
Big Thorofare . . . . .	23012
Big Thorofare West . . . . .	23190
Bivalve Channel . . . . .	24045
Blackwalnut Harbor . . . . .	25815
Bodie Island Light . . . . .	590
Bodkin Creek . . . . .	20300
Bogue Inlet . . . . .	29495
Bogue Sound - New River . . . . .	39085
Bogue Sound . . . . .	38530
Bonum Creek . . . . .	16880
Bradley Creek . . . . .	39621.1
Brandywine Shoal Light . . . . .	1555
Brant Island . . . . .	32500
Breton Bay . . . . .	17055
Brewerton Channel . . . . .	8145
Brewerton Channel Eastern Extension . . . . .	8385
Broad Bay . . . . .	10395
Broad Creek . . . . .	14960

Broad Creek . . . . .	22665
Broad Creek Northern Branch . . . . .	15005
Broad Creek Southern Branch . . . . .	15003
Browns Bay . . . . .	14230
Bulkhead Bar Range . . . . .	2875
Bulkhead Shoal Channel . . . . .	2765
Bull Bay . . . . .	31575
Burwell Bay . . . . .	11600
Bush River . . . . .	27305
Buxton Harbor . . . . .	32195
Buzzs Marina Channel . . . . .	18840

## C

Calabash Creek . . . . .	31115
Calico Creek . . . . .	34910
Cambridge Channel . . . . .	25020
Camp Lejeune Danger Zone . . . . .	740
Cape Charles City . . . . .	21440
Cape Charles Light . . . . .	350
Cape Fear River - Little River . . . . .	40045
Cape Fear River . . . . .	30310
Cape Hatteras Light . . . . .	625
Cape Henry Light . . . . .	370
Cape Lookout Light . . . . .	670
Cape May Canal West Entrance . . . . .	1650
Cape May Harbor . . . . .	36730
Cape May Inlet . . . . .	1440
Cape May Light . . . . .	155
Cape May Village . . . . .	36777
Cape Windsor Channel . . . . .	4950
Carolina Beach Harbor . . . . .	39760
Carolina Beach Inlet (Chart 11534) . . . . .	30265
Carter Creek . . . . .	15120
Carthagenia Creek . . . . .	16780
Castle Harbor Marina . . . . .	26525
Causeway Channel . . . . .	38720
Cedar Island Bay Channel . . . . .	34400
Chalk Point Cable Crossing . . . . .	19260
Cherry Island Flats . . . . .	3050
Chesapeake Bay . . . . .	12820
Chesapeake Bay Southern Approach . . . . .	410
Chesapeake Beach . . . . .	19285
Chesapeake Channel . . . . .	7030
Chesapeake Harbor . . . . .	19840
Chesapeake and Delaware Canal . . . . .	2745
Chesconessex Creek . . . . .	22120
Chester River . . . . .	26500
Chicamacomico Channel . . . . .	32045
Chickahominy River . . . . .	12141
Chimney Island Slough . . . . .	34907.1
Chincoteague Bay . . . . .	5150
Chincoteague Bay State Boundary Line . . . . .	5180
Chincoteague Channel . . . . .	5305
Chincoteague Inlet . . . . .	5270
Chopawamsic Creek . . . . .	18060

Choptank River . . . . .	24775
Chowan River . . . . .	31785
Christina River . . . . .	3000
Chuckatuck Creek . . . . .	11205
Claiborne Channel . . . . .	26015
Clam Creek . . . . .	1240
Clubfoot Creek . . . . .	33805
Coan River . . . . .	16575
Cohansey . . . . .	1990
Core Creek . . . . .	38385
Core Sound . . . . .	34320
Corrotoman River . . . . .	15155
Courthouse Bay . . . . .	29765
Cove Point . . . . .	7640
Cove Point Light . . . . .	7630
Cow Creek Channel . . . . .	39125
Cox Creek . . . . .	26265
Crab Alley - Little Creek . . . . .	26310
Crab Alley Bay . . . . .	26280
Crab Creek . . . . .	10156
Craighill Channel . . . . .	7995
Craney Island Creek . . . . .	9665
Craney Island Disposal Area . . . . .	9575
Croaker Landing . . . . .	13960
Croatan Sound . . . . .	31900
Cuckold Creek . . . . .	17620
Cumtuck Beach Light . . . . .	555
Cumtuck Sound . . . . .	31160
Curtis Bay . . . . .	20860

## D

Dames Quarter Creek . . . . .	23705
Dandy Haven Marina Entrance . . . . .	12964
Daugherty Creek . . . . .	23360
Davis Creek . . . . .	14125
Deep Creek (Via Dismal Swamp Canal) . . . . .	36935
Deep Creek . . . . .	20160
Deep Creek Channel . . . . .	11470
Delaware Bay (East Side) . . . . .	1945
Delaware Bay (West Side) . . . . .	2213
Delaware Bay . . . . .	1475
Delaware Bay Main Channel . . . . .	1535
Delaware Bay South Approach . . . . .	1495
Delaware River (Main Channel) . . . . .	2830
Delaware River . . . . .	3520
Dividing Creek . . . . .	16120
Dredge Harbor . . . . .	3779
Dukeharts Channel . . . . .	17195
Dundalk Terminal East Channel . . . . .	21000
Durant Point . . . . .	32320
Dymer Creek . . . . .	16030

## E

Eagle Point . . . . .	3490
-----------------------	------

# INDEX

East River . . . . .	14165
Eastern Bay . . . . .	26000
Eastham Creek . . . . .	33070
Eastport Harbor . . . . .	19880
Edenton Bay . . . . .	31740
Edge Creek . . . . .	25725
Eight and One Half Marina . .	38680
Elbow of Cross Ledge Light . .	1600
Elizabeth River . . . . .	9445
Elizabeth River Southern Branch . . . . .	9955, 36805
Elk River Channel . . . . .	8925
Ellyson Creek . . . . .	16430

## F

Fairfield Channel . . . . .	21190
Fairfield Piers . . . . .	21110
Fairlee Creek . . . . .	27410
Far Creek Channel . . . . .	32105
Fam Creek . . . . .	24425
Feny Bar Channel . . . . .	21205
Fishing Bay . . . . .	24375
Fishing Creek . . . . .	19670
Fort McHenry Channel . . . . .	8215
Fountain Powerboats Factory . .	33367.1
Four Mile Run . . . . .	18665
Fourteen Foot Bank Light . . . .	1575
Frying Pan Shoals . . . . .	820

## G

George Island . . . . .	5245
Georgetown Channel . . . . .	18770
Gemantown Bay . . . . .	32750
Gibson Island . . . . .	20130
Glebe Creek . . . . .	16971
Goose Creek . . . . .	38145
Goose Creek Channel . . . . .	23395
Grace Creek . . . . .	25675
Grays Creek . . . . .	20135
Great Bridge to Albemarle Sound . . . . .	37150
Great Egg Harbor Inlet . . . . .	1270
Great Machipongo Channel . . . .	6890
Great Machipongo Inlet . . . . .	6805
Great Wicomico River . . . . .	16180
Greenbackville . . . . .	5455
Greens Creek . . . . .	33740
Greenwood Creek . . . . .	26343
Guilford Creek . . . . .	22305
Gunpowder River . . . . .	27175

## H

HAW Generating Plant Channel . . . . .	20730
---	-------

HAW Generating Plant North Channel . . . . .	20775
Hampton Bar . . . . .	9380
Hampton Flats Bar Channel . . . .	9425
Hampton River . . . . .	10895
Hancock Creek . . . . .	33900
Harbor View . . . . .	17495
Harbor of Refuge . . . . .	2030
Harbor of Refuge Light . . . . .	1530
Harkers Island East Channel . . .	29272
Harris Creek . . . . .	25870
Harris River Approach . . . . .	13045
Harts Island Channel . . . . .	27000
Hatteras Inlet . . . . .	28640
Hatteras Inlet Light . . . . .	645, 28625
Havre De Grace Yacht Basin . . . .	27675
Hawkins Point Pier . . . . .	20788
Hereford Inlet Light . . . . .	90
Heron Island Bar Channel . . . . .	17175
Heming Bay . . . . .	19320
Heming Creek . . . . .	2119.01
Hodges Reef . . . . .	32395
Hog Island Cutoff . . . . .	11875
Honga River . . . . .	24450
Hooper Strait . . . . .	23605
Hom Harbor . . . . .	14445
Hoskins Creek . . . . .	15600
Hungar Creek . . . . .	21605
Hunting Creek . . . . .	22260
Huntington Park Channel . . . . .	11325

## I

Indian Creek . . . . .	16070
Indian River Channel . . . . .	4490
Indian River Inlet . . . . .	4365
Ingram Bay Marina . . . . .	16225
Inlet Watch Yacht club Harbor . .	39733
Island Creek Channel . . . . .	16695
Isle of Wight Bay . . . . .	4765

## J

Jackson Creek . . . . .	14700
James River . . . . .	11240
James River . . . . .	12120
Jamestown Island . . . . .	12000
Jarvis Creek . . . . .	16145
Jenkins Creek . . . . .	22860
Jones Bay . . . . .	33380
Jones Creek- Big Annemessex River . . . . .	23305
Jones Creek-Patapsco River . . . .	20505

## K

Kedges Straits . . . . .	23460
--------------------------	-------

Kent Island Narrows North Approach . . . . .	26413
Kent Island Narrows South Approach . . . . .	26345
Kings Creek . . . . .	21531
Kiptopeke Beach . . . . .	21420
Kitty Hawk Bay . . . . .	31330
Knapps Narrows West Channel . . .	25920

## L

Lafayette River Channel . . . . .	10660
Lake Conoy . . . . .	16540
Lake Ogleton . . . . .	19837
Lake Ogleton Entrance . . . . .	19815
Langford Creek . . . . .	26665
Leesylvania Park . . . . .	18165
Leeward Marina Channel . . . . .	11350
Linkhorn Bay . . . . .	10435
Liston Range . . . . .	2445
Little Annemessex River . . . . .	22820
Little Assawoman Bay . . . . .	4990.5
Little Choptank River . . . . .	24630
Little Creek Cove . . . . .	10550
Little Creek Harbor . . . . .	10468
Little Egg Inlet . . . . .	1105
Little Hunting Creek . . . . .	18420
Little Hunting Creek Northern Extension . . . . .	18511.1
Little Magothy River . . . . .	20092
Little Round Bay . . . . .	19970
Little Wicomico River . . . . .	16350
Locklies Creek . . . . .	15095
Lockwoods Folly Inlet . . . . .	31010
Lockwoods Folly River . . . . .	40135
Locust Point East Channel . . . . .	21225
Locust Point West Channel . . . . .	21240
Long Creek Channel . . . . .	10160
Long Creek East Channel . . . . .	10337
Lookout Bight . . . . .	29130
Lower Machodoc Creek . . . . .	16965
Lower Thorofare . . . . .	23495
Lowes Wharf . . . . .	25990
Lynnhaven Inlet . . . . .	10125
Lynnhaven River . . . . .	10186
Lynnhaven River Eastern Branch . . . . .	10332
Lynnhaven River Western Branch . . . . .	10188

## M

Madison Bay . . . . .	24735
Magothy River . . . . .	20095
Manasquan Inlet . . . . .	34931
Manasquan River . . . . .	34935
Manokin River . . . . .	23375
Manteo Channel . . . . .	28535
Mantua Creek . . . . .	3340
Marbury Point . . . . .	18655
Marine Pier Channel . . . . .	20641

# INDEX

## O

Marshallberg . . . . .	34655
Marshelder Channel . . . . .	1140
Masonboro Inlet . . . . .	30150
Mattawoman Creek . . . . .	18125
Mattox Creek . . . . .	17475
Maurice River . . . . .	1700
Miah Maull Shoal Light . . . . .	1585
Middle River . . . . .	27110
Mifflin Range . . . . .	3370
Mile Hammock Bay . . . . .	39250
Miles River . . . . .	26165
Milford Haven . . . . .	14765
Minnesott Beach Yacht Basin . . . . .	33870
Mispillion . . . . .	2260
Mobjack Bay . . . . .	14050
Money Island Channel . . . . .	38635
Monroe Creek . . . . .	17515
Moonlight Boat Access Channel . . . . .	38775
Morattico River . . . . .	15390
Morehead City Channel . . . . .	29420
Morehead City Harbor Channel . . . . .	38600
Mount Vernon Cut . . . . .	18400
Mulberry Island . . . . .	11729
Murderkill River . . . . .	2300

## N

Nandua Creek . . . . .	21765
Nanjemoy Creek . . . . .	17830
Nansemond River . . . . .	11017
Nanticoke River . . . . .	23965
Nassawadox Creek . . . . .	21630
Naval Boat Channel . . . . .	10615
Neabsco Creek . . . . .	18231
Neale Sound . . . . .	17400
Neuse River . . . . .	33580, 38260
New Jersey Intracoastal Waterway . . . . .	34980
New Point Comfort Shoal . . . . .	14415
New River - Cape Fear River . . . . .	39315
New River . . . . .	29735
New River Inlet . . . . .	29655
New Topsail Inlet . . . . .	29975
Newport Marshes . . . . .	38490
Newport News Channel . . . . .	10840
Newport News Middle Ground . . . . .	10765
Nine Foot Shoal Channel . . . . .	29105
Nomini Creek . . . . .	17010
Norfolk International Terminal . . . . .	9550
North Carolina Power . . . . .	31180
North Channel . . . . .	21366
North River . . . . .	14360
Northeast Cape Fear River . . . . .	30970
Northeast River . . . . .	27835
Northwest Harbor . . . . .	21330

Oak Creek . . . . .	26205
Oak Island Channel . . . . .	30415
Oak Island Light . . . . .	810
Occohannock Creek . . . . .	21695
Occoquan River . . . . .	18265
Ocean City Inlet . . . . .	4735
Ocracoke Inlet . . . . .	28900
Ocracoke Light . . . . .	660
Old House Channel . . . . .	28233
Old Point Comfort Light . . . . .	9380
Old Road Bay . . . . .	20495
Old Topsail Creek . . . . .	30140.02
Onancock Creek . . . . .	21925
Orchard Creek Channel . . . . .	33647.01
Oregon Inlet . . . . .	600, 27970
Otter Point Creek . . . . .	27373
Oyster Creek . . . . .	32820
Oyster Creek Channel . . . . .	1073
Oyster Creek Channel . . . . .	7010

## P

Pagan River . . . . .	11375
Pamlico River . . . . .	32810
Pamlico River Approach . . . . .	32415
Pamlico Sound . . . . .	31979
Parish Creek . . . . .	19475
Parkers Creek . . . . .	21970
Parrotts Creek . . . . .	15345
Pasquotank River . . . . .	31390, 37045
Pasquotank River . . . . .	31455, 36980
Pasquotank River Entrance Light PR . . . . .	31390, 37045
Patapsco River . . . . .	20370
Patuxent River . . . . .	18870
Pea Patch Island . . . . .	2840
Peletier Creek Entrance Channel . . . . .	38820
Pembroke Creek . . . . .	31765
Pennwood Channel . . . . .	20430
Pepper Creek . . . . .	4440
Perquimans River . . . . .	31510
Perin River . . . . .	13510
Phoebus Channel . . . . .	10995
Piankatank River . . . . .	14670
Pier Street Marina . . . . .	25330
Pierce Creek . . . . .	33690
Piney Point Oil Pier . . . . .	16860
Piscataway Creek . . . . .	18515
Pocomoke River . . . . .	22505
Pocomoke Sound . . . . .	22100
Pooles Island - West Channel . . . . .	27285
Pooles Island Flats Channel . . . . .	8645
Poplar Island Narrows . . . . .	25960
Poquoson Flats . . . . .	13145
Poquoson River . . . . .	13165
Port Mahon . . . . .	2345
Port Tobacco River . . . . .	17770
Portsmouth Marine Terminal . . . . .	9800
Potomac Creek . . . . .	17915
Potomac River . . . . .	16490
Price Creek . . . . .	30495, 39985
Prospect Bay . . . . .	26335

Pungo River . . . . .	32855, 38140
Pungoteague Creek . . . . .	21845

## Q

Queen Creek . . . . .	13785
Queens Creek . . . . .	14815
Queenstown Harbor . . . . .	26600
Quinby Channel . . . . .	6730
Quinby Channel . . . . .	6747

## R

Rappahannock River . . . . .	14905
Reedy Island Dike . . . . .	2525
Rehoboth Bay . . . . .	2095
Rhode River . . . . .	19515
Rhodes Point Gut Channel . . . . .	22990
Roanoke River . . . . .	31670
Roanoke Sound . . . . .	28365
Rock Creek . . . . .	20375
Rock Hall Harbor . . . . .	26890
Rockhold Creek . . . . .	19395
Rollinson Channel . . . . .	28815
Roosevelt Inlet . . . . .	2065
Rose Bay . . . . .	32735
Roy Creek . . . . .	4975
Russell Slough . . . . .	34855

## S

Salem River Entrance . . . . .	2645
Salt Ponds . . . . .	12845
San Domingo Creek . . . . .	25795
Sand Shoal Channel . . . . .	6990
Sandy Point State Park . . . . .	7905
Sandy Point State Park North Beach . . . . .	7957.1
Sarah Creek . . . . .	13710
Sassafras River . . . . .	27435
Schuylkill River . . . . .	3410
Scotland Wharf Ferry . . . . .	12115
Scott Creek Channel . . . . .	9860
Scuppernon River . . . . .	31585
Seagirt Marine Terminal East Channel . . . . .	21045
Seagirt Marine Terminal West Channel . . . . .	21135
Second Cove . . . . .	19065
Selby Bay . . . . .	19585
Seneca Creek . . . . .	27170
Sevenfoot Knoll Light . . . . .	8120
Severn River . . . . .	14250
Severn River . . . . .	19935
Shallotte Inlet . . . . .	31055
Shallow Creek . . . . .	26950
Shallowbag Bay . . . . .	28552
Sheep Pen Gut . . . . .	23175
Ship Channel . . . . .	1325

# INDEX

Ship John Shoal Light . . . . .	1640
Silver Lake . . . . .	28985
Sinepuxent Bay . . . . .	4995
Skiffes Creek Channel . . . . .	11825
Slaughter Creek . . . . .	24645
Slocum Creek . . . . .	33920
Slough Creek . . . . .	16380
Smith Creek . . . . .	9890
Smith Creek Channel . . . . .	33755
Smith Point Light . . . . .	7480
Sollers Point Channel . . . . .	20705
Solomons Island . . . . .	18900
South Creek . . . . .	33110
South Herrington Harbor . . . . .	19345
South River . . . . .	33655
South River . . . . .	19560
Southern Shores . . . . .	31270
Southwest Branch . . . . .	14275
Spa Creek . . . . .	19905
Sparrows Point Channel . . . . .	20545
Spencer Creek . . . . .	31946
Spooner Creek . . . . .	38855
St. Catherine Sound Lower Entrance . . . . .	17215
St. Catherine Sound Upper Entrance . . . . .	17270
St. Clements Bay . . . . .	17155
St. George Creek . . . . .	16735
St. Jerome Creek . . . . .	18795
St. Marys River . . . . .	16660
St. Patrick Creek . . . . .	17115
St. Peters Creek . . . . .	23435
Starling Creek . . . . .	22455
Stillpond Creek . . . . .	8805
Stony Creek . . . . .	20400
Stumpy Point . . . . .	32000
Stumpy Point Bay . . . . .	31985
Stumpy Point Harbor . . . . .	32015
Stutts Creek . . . . .	14630
Sunny Point Terminal Central Channel . . . . .	30603
Sunny Point Terminal South Entrance . . . . .	30562
Suny Power Station . . . . .	11800
Susquehanna River . . . . .	27585
Swan Creek . . . . .	26850
Swanquarter Bay . . . . .	32670
Swansboro Coast Guard Channel . . . . .	29600
Swansboro Harbor . . . . .	29590
Swash . . . . .	18925
Swash Channel . . . . .	29090

## T

Tangier Island East Channel . . . . .	22740
Tangier Island West Channel . . . . .	22725
Tangier Sound . . . . .	22705
Tangier Sound Light . . . . .	7435, 22715
Tanker Anchorage . . . . .	2180
Tar Bay . . . . .	24577
Taylor Creek . . . . .	34085
Teaches Hole Channel . . . . .	28953

Tedious Creek . . . . .	24380
The Haven Channel . . . . .	26886
Thimble Shoal Channel . . . . .	9205
Thimble Shoal Light . . . . .	9310
Thomas Point Shoal Light . . . . .	7760
Thorofare Channel . . . . .	4875
Tilghman Island . . . . .	25840
Torresdale . . . . .	3740
Totuskey Creek . . . . .	15455
Town Creek . . . . .	25375
Townsend's Inlet . . . . .	1405
Tred Avon River . . . . .	25320
Trent River . . . . .	34240
Triple S. Marina . . . . .	38535
Tumagain Bay . . . . .	33627
Tyler Creek . . . . .	23125
Tylers Beach Channel . . . . .	11705

## U

Upper Chesapeake Channel . . . . .	8320
Upper Choptank River . . . . .	25316.01
Upper Delaware River . . . . .	3650
Upper Edge Creek . . . . .	25745
Upper Elk River . . . . .	27900
Upper Gunpowder River . . . . .	27230
Upper Machodoc Creek Dahlgren Channel . . . . .	17640
Upper Pocomoke River . . . . .	22605
Upper Potomac River . . . . .	17750
Upper Thorofare . . . . .	23550
Upper York River . . . . .	13745
Urbanna Creek . . . . .	15240

## V

Virginia Inside Passage . . . . .	5520
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## W

Wachapreague Channel . . . . .	6640
Wachapreague Inlet . . . . .	6605
Wallace Creek . . . . .	24560
Walter Slough . . . . .	28305
Wanchese Channel . . . . .	28440
Ward Creek . . . . .	22945
Ware River . . . . .	14310
Warehouse Creek . . . . .	16336.01
Warwick River . . . . .	11530
Webster Cove . . . . .	23795
Wells Cove . . . . .	26395
West Bay . . . . .	33495
West Branch Channel . . . . .	13585
West Neck Creek . . . . .	37215
West River . . . . .	19450
Westem Branch . . . . .	11180
Westem Branch . . . . .	9745
Whays Creek . . . . .	16305

White Creek . . . . .	4645
Whitehall Creek . . . . .	20065
Whitehall Shores . . . . .	31416
Whittaker Creek . . . . .	33718
Wicomico Creek . . . . .	23865
Willoughby Bay . . . . .	10575
Wilmington Marine Center . . . . .	30880
Windmill Point Marina . . . . .	14935
Womley Creek Marina . . . . .	13635
Worton Creek . . . . .	27390
Wright Creek . . . . .	32865
Wrightsville Channel . . . . .	30200
Wye River . . . . .	26110
Wysocking Bay . . . . .	32150
	23675

## Y

Yeocomico River . . . . .	16805
York River . . . . .	13395
York Spit Swash Channel . . . . .	14100

CROSS REFERENCE - INTERNATIONAL VS. U.S. LIGHT NUMBER

Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.
J1244.00	.....	90	J1298.10	.....	2510	J1322.30	.....	3425	J1333.49	.....	4105
J1250.00	.....	1440	J1299.00	.....	2580	J1323.00	.....	3495	J1333.50	.....	4100
J1252.00	.....	1445	J1299.10	.....	2585	J1323.10	.....	3500	J1333.51	.....	4115
J1253.00	.....	1455	J1299.40	.....	2635	J1323.40	.....	3540	J1335.00	.....	4125
J1253.10	.....	1460	J1300.00	.....	2655	J1323.50	.....	3530	J1335.10	.....	4130
J1254.00	.....	36780	J1301.00	.....	2730	J1323.51	.....	3535	J1336	.....	4145
J1256.00	.....	155	J1301.10	.....	2735	J1324.40	.....	3625	J1336.10	.....	4150
J1258.00	.....	1670	J1303.20	.....	2755	J1324.41	.....	3630	J1338.00	.....	4185
J1260.00	.....	1675	J1303.30	.....	2760	J1325.00	.....	3650	J1340.00	.....	4255
J1261.00	.....	1680	J1304.00	.....	2765	J1325.10	.....	3655	J1340.10	.....	4260
J1262.00	.....	1535	J1304.10	.....	2770	J1325.40	.....	3705	J1341.00	.....	4280
J1264.00	.....	1555	J1305.00	.....	2830	J1325.60	.....	3715	J1341.10	.....	4285
J1266.00	.....	1575	J1305.60	.....	2860	J1326.00	.....	3720	J1348.00	.....	2085
J1268.00	.....	1585	J1305.70	.....	2845	J1326.10	.....	3725	J1353.20	.....	4375
J1270.00	.....	1600	J1306.00	.....	2880	J1327.00	.....	3740	J1354.00	.....	205
J1272.00	.....	1640	J1306.10	.....	2885	J1327.10	.....	3745	J1364.00	.....	275
J1273.00	.....	1645	J1308.00	.....	2895	J1328.00	.....	3750	J1388.00	.....	6735
J1273.60	.....	1695	J1308.10	.....	2910	J1328.10	.....	3755	J1393.00	.....	6990
J1274.00	.....	1945	J1308.40	.....	2872	J1328.30	.....	3765	J1403.00	.....	360
J1280.00	.....	1530	J1308.60	.....	2874	J1328.31	.....	3770	J1404.00	.....	350
J1280.20	.....	2050	J1309.00	.....	2975	J1328.40	.....	3795	J1408.00	.....	370
J1281.20	.....	2030	J1309.10	.....	2980	J1328.41	.....	3800	J1408.40	.....	9245
J1281.60	.....	2035	J1311.00	.....	3000	J1328.60	.....	3820	J1408.42	.....	9250
J1281.62	.....	2040	J1312.00	.....	3005	J1328.70	.....	3825	J1410.00	.....	10125
J1281.64	.....	2045	J1312.10	.....	3010	J1329.00	.....	3840	J1411.00	.....	10150
J1282.00	.....	2055	J1313.00	.....	3080	J1329.10	.....	3845	J1411.20	.....	10155
J1282.20	.....	2060	J1313.10	.....	3085	J1329.40	.....	3865	J1411.30	.....	10165
J1283.00	.....	2070	J1313.60	.....	3090	J1329.41	.....	3870	J1411.40	.....	10385
J1283.20	.....	2065	J1314.00	.....	3135	J1329.60	.....	3880	J1411.42	.....	10400
J1284.00	.....	2075	J1314.10	.....	3140	J1329.61	.....	3885	J1411.44	.....	10405
J1284.10	.....	2080	J1314.20	.....	3125	J1329.80	.....	3890	J1411.46	.....	10415
J1285.20	.....	2260	J1314.30	.....	3170	J1329.81	.....	3895	J1411.48	.....	10430
J1285.40	.....	2275	J1314.60	.....	3201	J1330.00	.....	3905	J1411.60	.....	10440
J1285.80	.....	2300	J1314.70	.....	3220	J1330.10	.....	3910	J1411.80	.....	10450
J1286.00	.....	2305	J1314.80	.....	3225	J1330.25	.....	3915	J1413.00	.....	10495
J1286.10	.....	2310	J1315.00	.....	3230	J1330.30	.....	3935	J1413.10	.....	10500
J1288.00	.....	2345	J1315.10	.....	3235	J1330.31	.....	3940	J1414.00	.....	10505
J1290.00	.....	2420	J1315.40	.....	3250	J1330.60	.....	3945	J1415.00	.....	10510
J1292.00	.....	2445	J1315.70	.....	3275	J1330.70	.....	3950	J1416.00	.....	9310
J1292.10	.....	2450	J1315.71	.....	3280	J1331.00	.....	3965	J1420.00	.....	9380
J1293.00	.....	1990	J1316.00	.....	3370	J1331.10	.....	3970	J1425.00	.....	10895
J1294.00	.....	1995	J1316.10	.....	3375	J1331.20	.....	3975	J1426.00	.....	10905
J1296.50	.....	2475	J1317.00	.....	3305	J1331.30	.....	3980	J1427.00	.....	10925
J1296.70	.....	2490	J1319.00	.....	3320	J1331.60	.....	3995	J1428.00	.....	10945
J1297.00	.....	2500	J1319.10	.....	3325	J1331.70	.....	4000	J1429.00	.....	10965
J1297.20	.....	2565	J1320.60	.....	3340	J1332.40	.....	4045	J1430.00	.....	10995
J1297.40	.....	2605	J1322.00	.....	3415	J1332.50	.....	4050	J1430.20	.....	11000
J1298.00	.....	2505	J1322.10	.....	3420	J1333.00	.....	4080	J1431.00	.....	10580

CROSS REFERENCE - INTERNATIONAL VS. U.S. LIGHT NUMBER

Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.
J1433.00		10595	J1470.00		11215	J1478.05		12705	J1974.00		7560
J1433.40		10600	J1472.00		11225	J1478.10		12710	J1974.70		18795
J1433.60		10605	J1474.00		11230	J1478.15		12720	J1975.40		18820
J1434.00		10615	J1475.00		11380	J1478.25		12735	J1978.00		7545
J1434.15		10625	J1475.05		11400	J1478.30		12745	J1979.00		23460
J1434.20		10635	J1475.20		11470	J1478.35		12750	J1980.00		23475
J1434.40		10645	J1475.25		11475	J1478.40		12755	J1982.00		23280
J1434.60		10650	J1475.30		11490	J1478.45		12760	J1984.00		23300
J1434.80		10655	J1475.40		11515	J1478.50		12765	J1986.00		23360
J1435.00		9480	J1475.45		11645	J1478.60		12780	J1986.20		23365
J1436.00		9495	J1475.60		11700	J1478.65		12785	J1986.40		23370
J1439.00		9585	J1475.65		11705	J1478.70		12790	J1987.00		23380
J1439.10		9590	J1475.70		11720	J1478.75		12795	J1987.60		23390
J1440.00		9635	J1475.90		11780	J1478.80		12815	J1987.70		23395
J1440.05		9640	J1476.20		12055	J1489.50		12870	J1988.00		23405
J1440.10		9645	J1476.25		12060	J1490.00		12905	J1988.4		23435
J1440.15		9650	J1476.30		12065	J1500.00		13265	J1988.60		23445
J1440.20		10660	J1476.31		12070	J1500.60		13285	J1992.00		23495
J1440.40		10675	J1476.55		12130	J1501.00		13190	J1992.20		23500
J1440.60		10700	J1476.56		12135	J1502.20		13220	J1992.40		23510
J1440.80		10735	J1476.60		12235	J1502.40		13235	J1994.00		23550
J1440.94		10745	J1476.61		12240	J1504.00		13455	J1995.00		23560
J1441.60		9665	J1476.70		12285	J1506.00		14110	J2000.00		23700
J1441.70		9675	J1476.75		12295	J1508.00		13550	J2000.20		23750
J1441.80		9695	J1476.80		12300	J1508.10		13555	J2000.25		23760
J1442.60		9655	J1476.85		12305	J1509.00		13570	J2000.40		23780
J1443.00		9725	J1476.90		12335	J1509.20		13575	J2000.60		23785
J1443.20		9730	J1476.95		12340	J1916.00		17995	J2000.80		23820
J1443.40		9740	J1477.00		12390	J1916.40		18005	J2002.00		23965
J1446.00		9800	J1477.05		12395	J1917.00		18010	J2003.00		23975
J1446.10		9805	J1477.10		12415	J1918.00		18030	J2004.00		23980
J1448.60		9940	J1477.11		12420	J1930.20		18145	J2007.00		23990
J1449.40		36825	J1477.15		12490	J1930.40		18150	J2007.40		23995
J1449.50		36830	J1477.20		12505	J1931.00		18130	J2008.00		24005
J1450.20		36880	J1477.25		12510	J1931.20		18135	J2008.60		24020
J1450.30		36885	J1477.30		12535	J1932.00		18265	J2009.00		24025
J1454.00		9400	J1477.35		12625	J1934.00		18275	J2010.00		24045
J1456.00		9430	J1477.45		12635	J1934.20		18290	J2012.00		24060
J1458.00		10815	J1477.50		12640	J1934.40		18295	J2014.00		24065
J1461.60		10790	J1477.55		12645	J1934.60		18300	J2015.00		24075
J1467.00		11260	J1477.60		12650	J1938.00		18330	J2016.00		24080
J1467.20		11265	J1477.65		12655	J1944.00		18375	J2017.00		24095
J1467.30		11275	J1477.70		12665	J1950.00		18515	J2018.00		24375
J1467.50		11295	J1477.75		12675	J1952.00		18560	J2020.00		24425
J1468.00		11305	J1477.80		12680	J1954.00		18570	J2022.00		24400
J1468.20		11310	J1477.85		12685	J1956.00		18595	J2022.40		24410
J1469.00		11315	J1477.90		12690	J1960.00		18605	J2022.60		24415
J1469.20		11320	J1477.95		12695	J1970.00		18745	J2024.00		24380



CROSS REFERENCE - INTERNATIONAL VS. U.S. LIGHT NUMBER

Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.
J2025.00		24385	J2100.00		19210	J2171.00		19345	J2212.40		7815
J2028.00		23590	J2100.50		19235	J2171.10		19350	J2213.00		7890
J2030.00		23615	J2100.60		19240	J2171.40		19335	J2213.20		7975
J2032.00		23605	J2102.00		19260	J2174.00		19325	J2214.00		7990
J2034.00		24450	J2102.20		19265	J2176.00		19395	J2218.00		8340
J2036.00		24455	J2102.40		19270	J2177.00		19400	J2222.00		26590
J2037.00		24465	J2102.60		19275	J2179.00		19415	J2223.00		26595
J2037.20		24470	J2104.00		7630	J2184.40		25995	J2224.00		26600
J2037.40		24475	J2106.00		24630	J2186.00		7750	J2227.00		26750
J2038.00		24495	J2107.00		24635	J2190.00		26015	J2227.20		26765
J2039.00		24480	J2108.00		24640	J2192.00		26055	J2227.40		26790
J2040.00		24505	J2109.00		24645	J2192.50		26120	J2227.60		26810
J2044.00		24515	J2110.00		24660	J2193.00		26165	J2228.80		20095
J2045.00		24520	J2110.40		24730	J2194.00		26185	J2229.00		20100
J2046.00		24525	J2110.60		24735	J2194.20		26200	J2229.20		20115
J2060.00		24580	J2114.00		24840	J2195.00		26265	J2229.40		20120
J2061.00		24585	J2115.00		24915	J2195.40		26270	J2229.60		20125
J2062.00		24590	J2116.00		25320	J2196.00		26345	J2229.70		20130
J2064.00		24595	J2118.00		25375	J2196.80		26460	J2230.00		20160
J2068.00		24600	J2124.00		24920	J2197.00		19450	J2230.10		20185
J2070.00		24605	J2128.00		24935	J2197.40		19470	J2230.80		20250
J2072.00		24610	J2130.00		24955	J2198.00		19475	J2230.90		20270
J2076.00		24615	J2134.00		24975	J2199.00		19480	J2230.94		20275
J2080.00		7590	J2136.00		24995	J2200.00		19500	J2231.00		20300
J2082.00		18860	J2138.00		25010	J2201.00		19510	J2246.00		8040
J2082.20		18865	J2139.00		25015	J2202.00		19515	J2246.10		8050
J2085.00		18880	J2140.00		25020	J2203.00		19545	J2246.50		27000
J2086.00		7605	J2140.10		25025	J2204.00		7760	J2246.60		27020
J2086.20		18890	J2141.00		25055	J2206.30		19670	J2246.70		27035
J2086.40		18895	J2142.00		25125	J2206.40		19675	J2248.00		8120
J2087.00		18900	J2142.20		25130	J2206.80		19570	J2250.00		8390
J2087.20		18910	J2142.60		25170	J2206.90		19580	J2250.10		8395
J2087.40		18920	J2146.00		25980	J2207.00		19585	J2251.00		8150
J2087.60		18945	J2148.00		25540	J2207.10		19595	J2251.10		8155
J2087.70		18950	J2149.00		25670	J2207.30		19590	J2252.00		8090
J2087.80		18960	J2150.00		25830	J2207.40		19605	J2252.10		8095
J2088.00		18990	J2150.40		25835	J2207.80		19625	J2254.00		20315
J2088.40		19010	J2151.00		25840	J2208.00		19630	J2254.60		20330
J2088.50		19020	J2156.00		25870	J2208.40		19645	J2256.00		20370
J2089.00		19030	J2157.00		25880	J2210.00		19780	J2257.00		20385
J2089.20		19035	J2158.00		25915	J2210.40		19785	J2258.00		20410
J2090.00		19055	J2159.00		25815	J2210.50		19745	J2260.00		20430
J2092.00		19065	J2160.00		25820	J2210.60		19815	J2260.80		20495
J2093.00		19090	J2161.00		25825	J2210.80		19835	J2261.00		20510
J2093.80		19115	J2165.00		19285	J2211.00		19880	J2263.00		20535
J2094.00		19135	J2168.00		19300	J2211.10		19890	J2264.00		20545
J2096.00		19160	J2170.00		19305	J2211.20		19895	J2264.10		20550
J2098.00		19165	J2170.60		19320	J2212.20		20030	J2264.20		20580

CROSS REFERENCE - INTERNATIONAL VS. U.S. LIGHT NUMBER

Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.	Inter.	-	U.S.
J2264.22		20600	J2353.00		9065	J2430.00		670	J2501.4		30670
J2264.24		20605	J2353.10		9070	J2434.20		29140	J2502.00		30675
J2264.26		20610	J2356.00		9105	J2436.00		29335	J2502.10		30680
J2266.00		20625	J2356.10		9110	J2436.10		29340	J2506.00		39880
J2266.20		20630	J2371.00		27860	J2437.00		29395	J2514.00		30735
J2270.00		8220	J2371.40		27875	J2437.10		29400	J2514.10		30740
J2270.10		8225	J2373.00		27880	J2437.40		29410	J2516.00		30705
J2271.00		20680	J2374.00		27895	J2437.60		29415	J2518.00		30730
J2271.20		20685	J2384.00		555	J2438.00		29430	J2524.00		30710
J2274.00		20705	J2385.00		570	J2438.10		29435	J2524.10		30715
J2280.00		20870	J2385.20		575	J2438.40		29450	J2526.00		30770
J2280.10		20875	J2385.40		580	J2439.00		34810	J2531.90		30760
J2282.40		20975	J2385.60		585	J2445.00		29470	J2532.00		30755
J2282.42		20980	J2386.00		590	J2446.00		38630	J2532.00		30800
J2282.50		20985	J2388.60		28180	J2446.2		38635	J2532.10		30805
J2284.00		20990	J2389.20		28240	J2446.40		38670	J2538.00		30785
J2284.20		20995	J2389.40		28260	J2447.00		38600	J2540.00		30790
J2284.40		21000	J2389.60		28280	J2450.00		38515	J2541.00		30795
J2284.41		21005	J2389.70		28295	J2450.20		38500	J2542.00		30815
J2284.50		21040	J2389.80		28300	J2450.40		38495	J2542.50		30830
J2284.60		21080	J2390.00		31905	J2452.20		34865	J2542.70		30835
J2284.70		21090	J2390.20		31920	J2454.00		29565	J2544.00		30775
J2285.00		21110	J2390.40		31915	J2466.00		835	J2544.10		30780
J2287.00		21120	J2390.50		31925	J2470.00		810	J2550.00		30820
J2288.00		21300	J2390.60		31930	J2472.00		30330	J2550.10		30825
J2291.40		21307	J2390.64		31935	J2472.10		30335	J2552.00		30860
J2298.00		8663	J2390.90		31950	J2473.00		30375	J2554.00		30845
J2299.10		8695	J2391.40		31960	J2473.10		30380	J2554.10		30850
J2311.00		27130	J2391.60		31965	J2474.00		30385	J2556.00		30855
J2313.00		27145	J2396.00		625	J2474.10		30390	J2560.00		30925
J2320.00		27360	J2400.00		640	J2476.00		30405	J2560.10		30930
J2322.00		8760	J2401.00		645	J2476.1		30410	J2564.00		30935
J2325.00		8820	J2404		32340	J2477.00		30420	J2565.00		30945
J2328.00		8880	J2408.00		660	J2478.00		30445	J2566		30940
J2330.00		27460	J2410.00		28970	J2480.00		30455	J2567.00		30950
J2331.00		27470	J2414.00		28985	J2484.00		30460	J2569.00		30955
J2332.00		27495	J2416.00		29015	J2484.10		30465	J2570		30960
J2338.00		8885	J2416.20		29020	J2488.00		30540	J2571.00		30970
J2338.10		8890	J2417.00		29045	J2494.00		30485			
J2340.00		8935	J2417.20		29055	J2494.10		30490			
J2340.10		8940	J2419.00		29080	J2494.80		30575			
J2342.00		8975	J2420.00		29100	J2495.00		30580			
J2346.00		9000	J2421.00		29110	J2496.20		30605			
J2348.10		8995	J2421.20		29120	J2496.4		30610			
J2351.00		9025	J2423.00		32365	J2496.6		30615			
J2351.10		9030	J2424		32370	J2500.00		30640			
J2352.00		9055	J2425.00		32375	J2500.10		30645			
J2352.10		9060	J2426.00		32360	J2501.00		30665			