

U.S. Aids To Navigation System

Information provided by: [United States Coast Guard, Office of Boating Safety](http://www.uscgboating.org/) (<http://www.uscgboating.org/>)



AIDS TO NAVIGATION... ARE THE ROAD SIGNS OF THE WATERWAYS

INTRODUCTION

This pamphlet is designed to help the recreational boater better understand the principle use and identification of the U.S. Aids to Navigation System. We hope you take the time to become familiar with this important pamphlet before you go boating. In fact, you should keep this pamphlet on your boat for future reference as needed.

U.S. AIDS TO NAVIGATION SYSTEM

The waters of the United States and its territories are marked to assist navigation by the U.S. Aids to Navigation System. This system employs a simple arrangement of colors, shapes, numbers and light characteristics to mark navigable channels, waterways and obstructions adjacent to these.

Aids to Navigation can provide a boater with the same type of information drivers get from street signs, stop signals, road barriers, detours and traffic lights. These aids may be anything from lighthouses, to minor lights, daybeacons, range lights, and sound signals, to lighted or unlighted buoys. Each has a purpose and helps in determining location, getting from one place to another or staying out of danger. The goal of the U.S. Aids to navigation System is to promote safe navigation on the waterway.

The U.S. Aids to Navigation System is intended for use with Nautical Charts. Charts are one of the most important tools used by boaters for planning trips and safely navigating waterways. Charts show the nature and shape of the coast, buoys and beacons, depths of water, land features, directional information, marine hazards and other pertinent information. This valuable information cannot be obtained from other sources, such as a road map or atlas.

The primary components of the U.S. Aids to Navigation System are *beacons and buoys*.

Beacons are aids to navigation structures that are permanently fixed to the earth's surface. They range from 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. Beacons exhibit a daymark to make them readily visible and easily identifiable against

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background conditions. Generally, the daymark conveys to the boater, during daylight hours, the same significance, as does the aid's light or reflector at night. Buoys are floating aids that come in many shapes and sizes. They are moored to the seabed by concrete sinkers with chain or synthetic rope moorings of various lengths connected to the buoy's body. They are intended to convey information to the boater by their shape or color, by the characteristics of a visible or audible signal, or a combination of two or more such features.

PRIVATE AIDS TO NAVIGATION

A Private Aid to Navigation is a buoy, light or daybeacon owned and maintained by any individual or organization other than the U.S. Coast Guard. These aids are designed to allow individuals or organizations to mark privately maintained channels, privately owned marine obstructions, or other similar hazards to navigation. For further information, contact your local Coast Guard District Aids to Navigation Office.

The U.S. Army Corps of Engineers regulates the placement of mooring buoys in all navigable U.S. waters. Those wishing to establish mooring buoys need to contact their local Army Corps of Engineers.

SAFETY TIPS

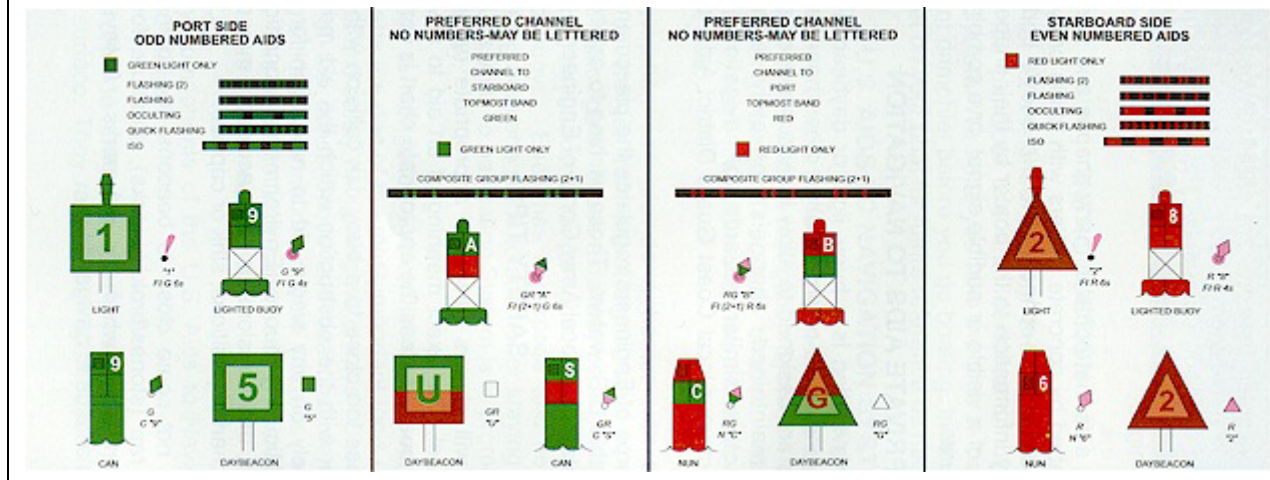
- A safe boater will always have the appropriate nautical chart(s) onboard their vessel. The exact meaning of an aid to navigation may not be clear to the boater unless the appropriate chart is consulted.
- Boaters who pass too close to a buoy risk collision with a buoy, the buoy's mooring, or with the obstruction which the aid marks. Boaters must not rely solely on any single aid to navigation for determining their position, particularly buoys. Environmental conditions, seabed slope, composition, and collisions or other accidents may cause buoys to shift from their charted positions, sink or capsize.
- Boaters should not come close to beacons due to the danger of collision with rip rap (stones/broken rocks), structure foundation, or with the obstruction/danger that the aid marks. Always maintain a safe distance from all aids to navigation.

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U.S. AIDS TO NAVIGATION SYSTEM

On navigable waters and some waters marked by States

LATERAL SYSTEM (As Seen Entering From Seaward)

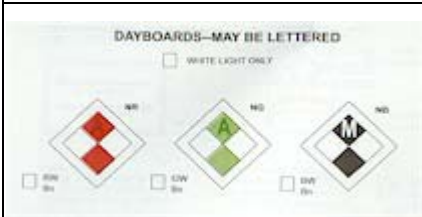


Lateral Aids to Navigation generally indicate which side of an aid to navigation a vessel should pass when channels are entered from seaward. In the absence of a route leading from seaward, the conventional direction of buoyage generally follows a clockwise direction around landmasses. The most important characteristic of an aid is the color. The “3R” rule “Red Right Returning” is the essential rule of thumb for using the lateral system. This means that when entering one body of water from a larger body of water (i.e. returning to a harbor from a bay or sound); keep the red aids to starboard (right) side and green aids to port (left) side. In addition, each aid is numbered, and these numbers increase as entering from seaward.

Preferred Channel Marks are found at junctions of navigable channels and often mark wrecks or obstructions. A vessel may normally pass this aid on either side, but the top color band indicates the preferred channel. If the top band of the aid is red, it is treated as a red mark and kept to starboard as the vessel passes it while returning from sea. Caution: It may not always be possible to pass on either side of preferred channel aids to navigation. The appropriate nautical chart should always be consulted.

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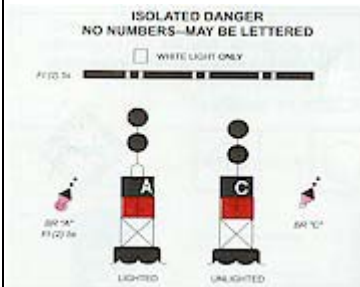
NON-LATERAL AIDS TO NAVIGATION



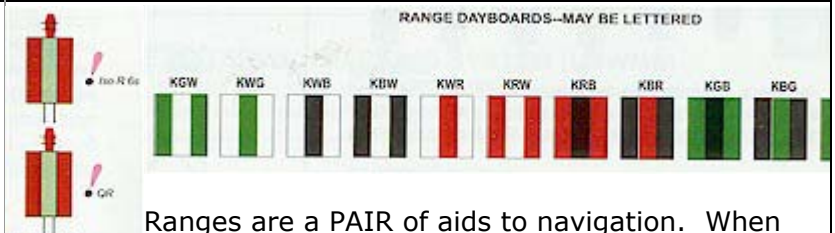
These diamond shaped dayboards can be used to help the vessel operator determine his/her location. They are like the "X's" on shopping mall maps "You Are Here." An appropriate nautical chart must be consulted to determine location.



These aids are used to mark fairways, mid-channels, and offshore points, and have unobstructed water on all sides. They can also be used by the vessel operator transiting offshore waters to identify the proximity of intended landfall. Lighted/unlighted buoy may show a red topmark.



These aids indicate an isolated danger, which may be passed on all sides. They are erected on or moored on or near dangers; they should not be approached closely without special caution.



Ranges are a PAIR of aids to navigation. When the dayboards and/or lights appear to be in line with each other (Figure "A"), it assists the vessel operator in maintaining a safe course within the navigable channel. The appropriate nautical chart must be consulted when using ranges to determine whether the range may be safely traversed. Ranges are generally, but not always, lighted, and display rectangular dayboards of various colors. Ranges, which are lit 24 hours a day, may not have dayboards.

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TYPICAL INFORMATION AND REGULATORY MARKS

When lighted, may display any light rhythm except quick flashing and flashing (2)

NW □ WHITE LIGHT ONLY



Information and Regulatory Marks are used to alert vessel operators to various warnings or regulatory matters.

Examples:

	<p><u>Boat Exclusion Area</u> explanation may be placed outside the crossed diamond shape, such as Dam, Rapids, Swim Area, etc.</p>
	<p><u>DANGER</u> the nature of danger may be indicated inside the diamond shape, such as Rock, Wreck, Shoal, Dam, etc.</p>
	<p><u>CONTROLLED AREA</u> type of control is indicated in the circle, such as slow, no wake, anchoring, etc.</p>
	<p><u>INFORMATION</u> for displaying information such as directions, distances, locations, etc.</p>
	<p>Buoy used to display regulatory markers</p>
	<p>May show white light may be lettered.</p>

INTRACOASTAL WATERWAY (ICW) MARKS

The ICW runs parallel to the Atlantic and gulf coasts from Manasquan Inlet, New Jersey to the Mexican boarder. Aids to navigation marking the 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) side of the vessel. Yellow squares indicate aids should be passed by keeping them on the port (left) side of the vessel. A yellow horizontal band provides no lateral information, but simply identifies aids to navigation as marking the ICW.

Note: When following the ICW from New Jersey thru Texas, keep yellow triangles on your starboard, yellow squares on your port **regardless** of the color navigation aid they appear on.

Examples:



MOORING BUOY

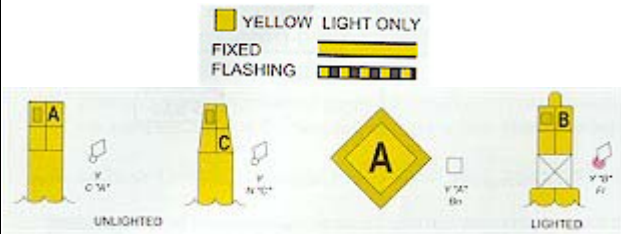
may show white reflector or light



Mooring Buoys are white with a blue horizontal band. This distinctive color scheme is used to facilitate identification and to avoid confusion with aids to navigation.

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SPECIAL MARKS - MAY BE LETTERED



These aids are not intended to assist in navigation, but rather to alert the vessel operator to a special feature or area (anchoring, traffic separation, fish net area, cable or pipeline, military exercise areas, jetties, etc.)




INLAND (STATE) WATERS OBSTRUCTION MARK

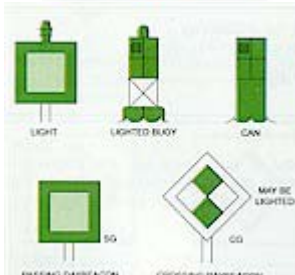
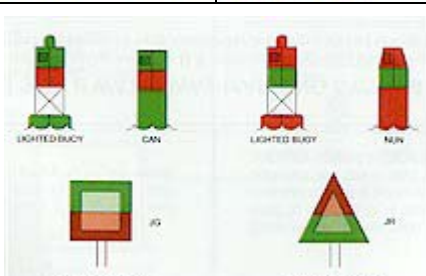
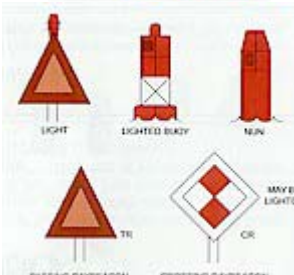
may show white reflector or quick flashing white light



State Water Obstruction Mark is a black/white vertically striped buoy used to indicate to a vessel operator that an obstruction to navigation extends from the nearest shore to the buoy. This means, "do not pass between the buoy and the shore." This is replacing red/white vertically striped buoy within the USWMS (see below)

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UNIFORM STATE WATERWAY MARKING SYSTEM (USWMS)										
Note: The USWMS is presently merging with the U.S. Aids to Navigation System and will be discontinued on December 31, 2003. Vessel operators may encounter both types of systems during this transitional period.										
LATERAL SYSTEM		CARDINAL SYSTEM								
<p>May show green reflector or light</p>  <p>SOLID BLACK BUOY</p> <p>(BEING REPLACED BY GREEN CAN BUOY)</p>	<p>Usually found in pairs</p> <p>Pass between these buoys</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Port Side</td> <td>Starboard Side</td> </tr> <tr> <td colspan="2">Looking upstream</td> </tr> </table>	Port Side	Starboard Side	Looking upstream		<p>May show red reflector or light</p>  <p>SOLID RED BUOY</p> <p>(BEING REPLACED BY RED NUN BUOY)</p>	<p>may show white reflector or light</p>  <table border="1" style="width: 100%;"> <tr> <td style="vertical-align: top;"> <p>Red-Striped White Buoy</p> <p>"Do not pass between buoy and nearest shore"</p> </td> <td style="vertical-align: top;"> <p>Black-Topped White Buoy</p> <p>"Pass to north or east of buoy"</p> </td> <td style="vertical-align: top;"> <p>Red-Topped White Buoy</p> <p>"Pass to south or west of buoy"</p> </td> </tr> </table>	<p>Red-Striped White Buoy</p> <p>"Do not pass between buoy and nearest shore"</p>	<p>Black-Topped White Buoy</p> <p>"Pass to north or east of buoy"</p>	<p>Red-Topped White Buoy</p> <p>"Pass to south or west of buoy"</p>
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WESTERN RIVERS MARKING SYSTEM (As Seen Entering From Seaward)						
<p style="text-align: center;">PORT SIDE or Right Descending Bank</p> <p style="text-align: center;">GREEN OR WHITE LIGHTS FLASHING ISO</p>  <p style="text-align: center;">176.9 MILE BOARD (MARKER)</p>	<p style="text-align: center;">PREFERRED CHANNEL mark junctions and obstructions composite group flashing (2+1)</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th style="width: 50%;">PREFERRED CHANNEL TO STARBOARD</th> <th style="width: 50%;">PREFERRED CHANNEL TO PORT</th> </tr> <tr> <td>Topmost band green FI(2+1)G</td> <td>Topmost band red FI(2+1)R</td> </tr> </table> 	PREFERRED CHANNEL TO STARBOARD	PREFERRED CHANNEL TO PORT	Topmost band green FI(2+1)G	Topmost band red FI(2+1)R	<p style="text-align: center;">STARBOARD SIDE or Left Descending Bank</p> <p style="text-align: center;">RED OR WHITE LIGHTS FLASHING (2) ISO</p>  <p style="text-align: center;">123.5 MILE BOARD (MARKER)</p>
PREFERRED CHANNEL TO STARBOARD	PREFERRED CHANNEL TO PORT					
Topmost band green FI(2+1)G	Topmost band red FI(2+1)R					

Western Rivers Marking System is a variation of the standard U.S. Aids to Navigation System and is found on the Mississippi River and tributaries above Baton Rouge, and on certain other rivers that flow toward the Gulf of Mexico. Red daybeacons, lights, and buoys mark the starboard banks and limits of channels as vessels "return from sea" or proceed upstream. Green daybeacons, lights, and buoys mark the port banks and limits of navigable channels while going upstream. The Western River System varies of the standard U.S. system as follows:

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- 1) Buoys are not numbered.
- 2) Beacons are not numbered but normally have an attached 'Mile Marker board that indicates the distance in statute miles from a fixed point (normally the river mouth).
- 3) Diamond-shaped non-lateral dayboards checkered red-and-white or green-and-white, similar to those used in the U.S. Aids to Navigation System, are used as Crossing Daybeacons where the river channel crosses from one bank to the other.
- 4) Lights on green buoys and on beacons with green daymarks show a single flash, which may be green or white.
- 5) Lights on red buoys and on beacons with red daymarks show a double flash [Group Flashing (2)], which may be red or white.
- 6) Isolated danger marks and Safe water marks are not used.

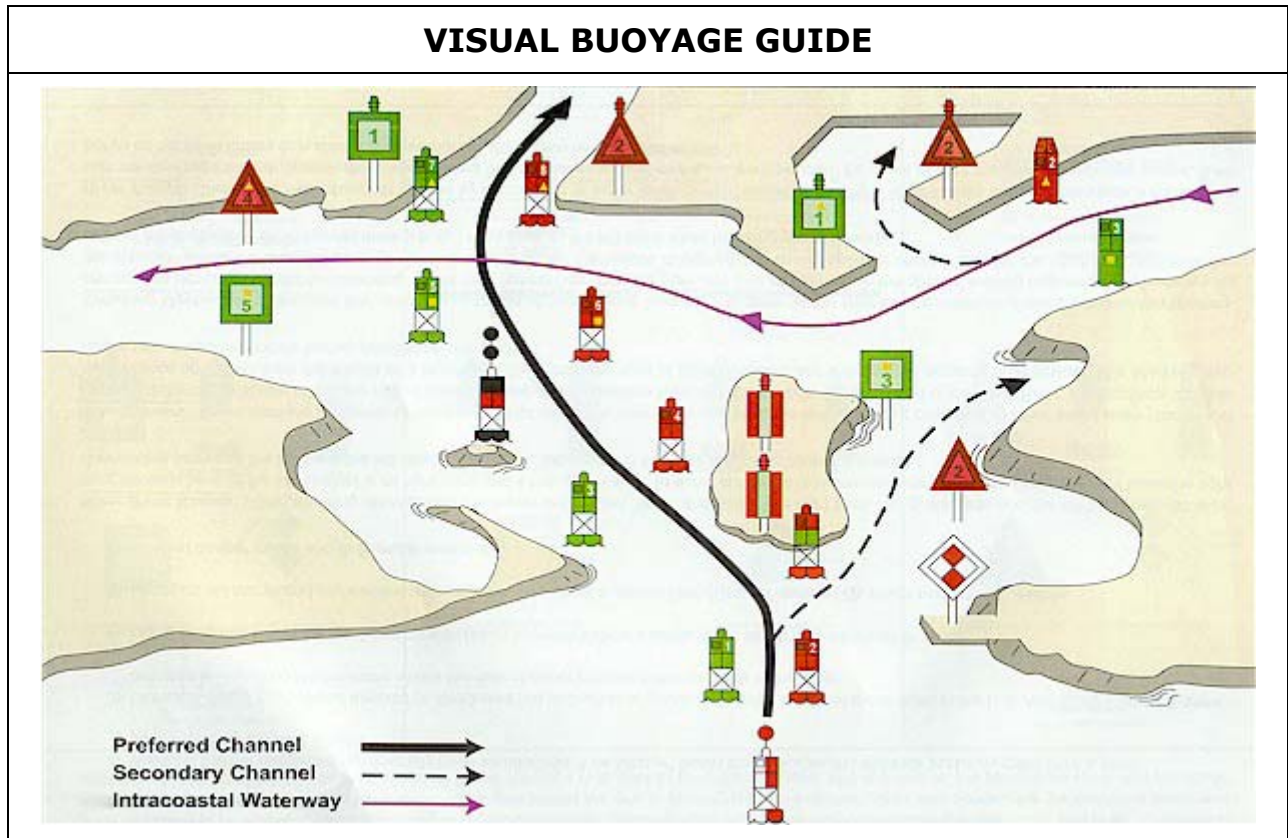
River Bank Names: When traveling downstream the banks are named "right" and "left". The right bank has green aids and the left bank has red aids, thus the west bank of the Mississippi is its right bank and it has green aids. To avoid confusion, commercial river traffic often calls the right bank the right descending bank and the left bank the left descending bank, expressed in this way, leaves no room for doubt.

Mile Markers: These markers are some of the most useful aids on a river. They are attached to beacons or displayed in other easily seen places and indicate distances in statute miles, the unit of measurement on the Western Rivers System. With the exception of the Ohio River, mile markers indicate the distance up stream from the mouth of a river. Ohio River markers start at its headwaters and indicate the distance downstream. Mile Markers also help a vessel operator locate his/her position on a river chart.

Crossing Daybeacons: Because the navigable channels of rivers swing from bank to bank as the river bends, diamond-shaped crossing daybeacons are used to assist river traffic by indicating where the channel has changed from one side of the river to the other. Crossing daybeacons are always on the opposite side of the river. When a diamond-shaped crossing daybeacon is sighted, the vessel operator should head for the "diamond", and treat the color of the daybeacon as a channel mark (i.e. red mark keep to the left bank when traveling downstream).

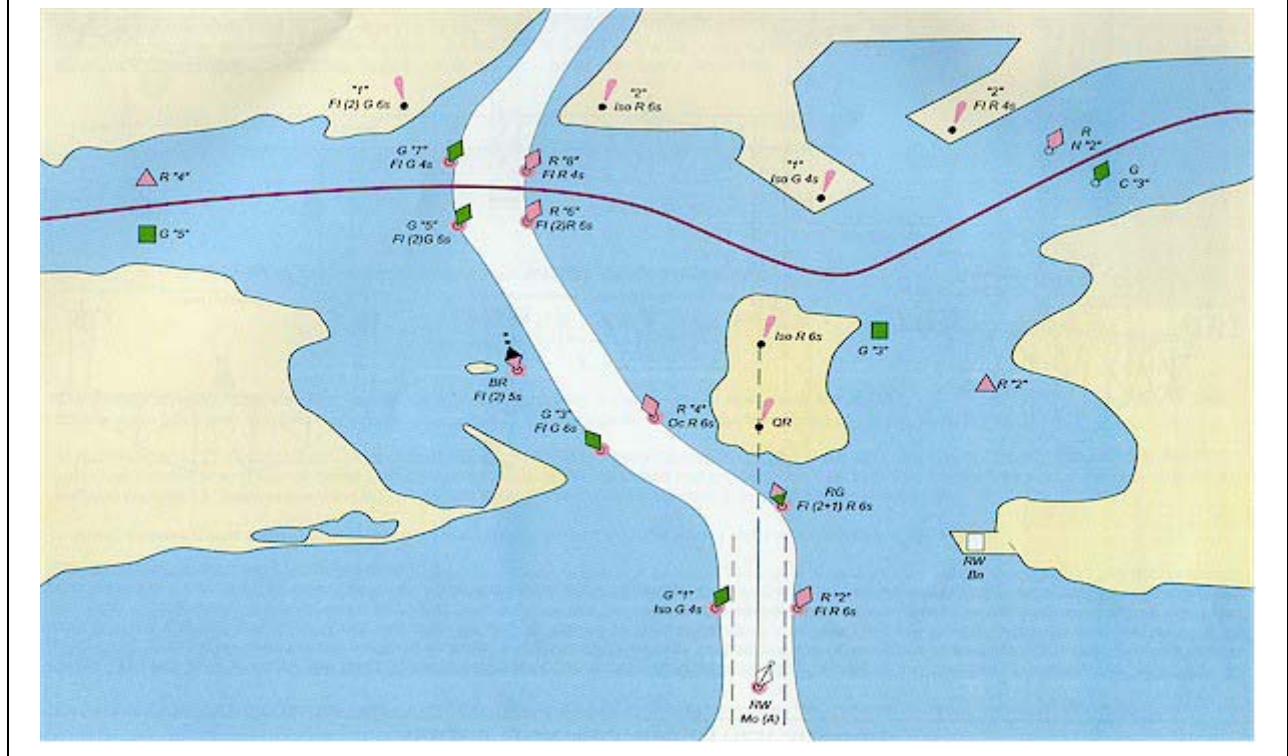
River Buoys: Changes in river channels caused by fluctuations in water level, current speed and shifting shoals make buoy maintenance a continuous task for the Coast Guard. In wintertime where rivers freeze, buoys are lost or moved from position. Because of their somewhat temporary nature, river buoys do not have letters or numbers and are not usually shown on river charts.

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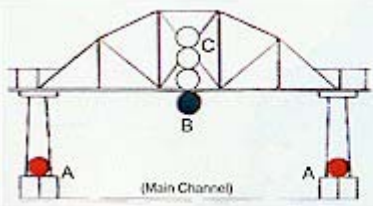
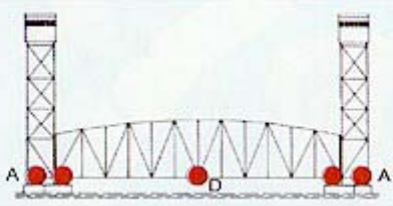
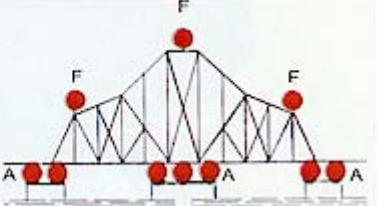
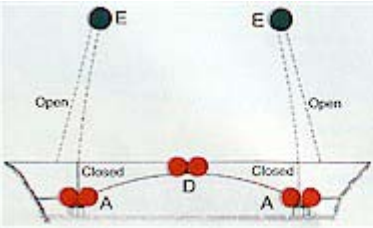
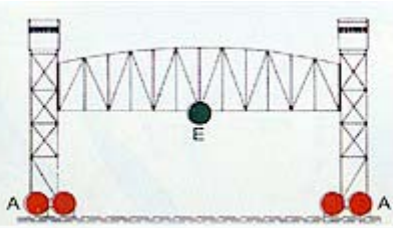
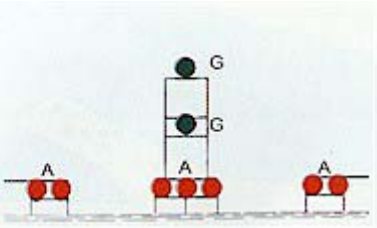
NAUTICAL CHART (FICTITIOUS)



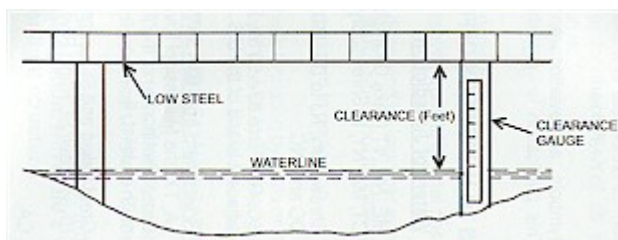
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BRIDGE LIGHTING AND OTHER SIGNALS

Bridge Lighting: In U.S. waters, the Coast Guard prescribes certain combinations of fixed lights for bridges and structures extending over waterways. In general, red lights (A) are used to mark piers and supports, and green lights (B) mark the centerline of the navigable channel through a fixed bridge. If there is more than one channel through the bridge, the preferred route is marked by three white lights (C) placed vertically. Red lights (O) are also used on some lift bridges to indicate the lift is closed, and green lights (E) to indicate that the lift is open to vessel traffic. Double-opening swing bridges are lighted with three lights on top of the span structure so that when viewed from an approaching vessel the swing span when closed will display three red lights (F), and when open for navigation will display two green lights (G).

 <p style="text-align: center;">(Main Channel)</p>		
Fixed Bridge	Vertical Lift Span Bridge (Closed)	Double-Opening Swing Bridge (Closed)
 <p style="text-align: center;">Open</p>		
Double Leaf (lift) Bascule Bridge	Vertical Lift Span Bridge (Open)	Double Opening Swing Bridge (Open)

Clearance Gauges are extremely valuable to vessel operators because they indicate the vertical distance (clearance) between the "low steel" of the bridge channel span and the waterline (They do not indicate the depth of water under the bridge). These gauges are permanently fixed to the bridge pier or structure and located on the right side of the channel facing approaching vessels. Each gauge is marked by black numbers and foot marks (lines) on a white background board. The picture to the right illustrates a clearance of approximately 7 feet 9 inches, since the 8-foot mark line is not visible.



Clearance Gauge

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Drawbridge Opening Signals: The operator of a vessel requesting a drawbridge to open shall signal the bridge tender, and the bridge tender shall acknowledge that signal. The following are the most common types of signals a vessel operator should use to request an opening:

1) *Radiotelephone Communications* - Most bridges monitor VHF-FM channels 13 and 16 with the exception of bridges in Florida. In June 1996, the FCC published a notice stating that all boaters throughout the State of Florida should hail bridge tenders on VHF-FM channel 9 to reduce the high amount of traffic on channel 13. Boaters operating in Georgia and South Carolina are encouraged to follow the same procedures.









Note: Boaters should always use "low power (1 watt) output" on their VHF-FM marine radio when hailing a bridge tender.

2) *Sound Signals* - These signals shall be made by whistle, horn, megaphone, or hailer. To request an opening, the vessel operator shall give the "opening signal" consisting of one prolonged blast (4 to 6 seconds duration) followed by one short blast (about 1 second duration). The draw tender shall reply with the same sound signal (one prolonged followed by one short) acknowledging that the draw can be opened immediately. When a vessel approaches a drawbridge with the draw in the open position, the vessel shall give the opening signal. If no acknowledgment is received within 30 seconds, the vessel may proceed, with caution, through the open draw. When a draw cannot be opened immediately, or is open and must be closed promptly, the draw tender shall give five short blasts sounded in rapid succession after the vessel's opening signal request.

Further information on drawbridge regulations and opening signals for bridges over the Navigable Waterway can be found in the U.S. Coast Pilots.

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AIDS TO NAVIGATION ABBREVIATIONS

B - Black	M - Safer Water (Octagonal)
Bn - Beacon	MO (A) - Morse Code 
C - Can Buoy	N - Nun Buoy
F - Fixed 	Oc - Occulting 
FI - Flashing 	Pri - Private
FI (2) - Group Flashing 	Q - Quick (Flashing) 
FI (2+1) - Composite Group Flashing 	R - Red
G - Green	S - Square Dayboard
Iso - Isophase 	s - seconds
J - Junction (S or T Dayboard)	T - Triangle Dayboard
K - Range (Rectangular Dayboard)	W - White
	Y - Yellow
A Complete listing of Nautical Chart symbols, abbreviations and terms is contained in Chart No. 1 publication. This publication is available at most marine stores.	

COAST GUARD DISTRICT AIDS TO NAVIGATION OFFICES

District	Phone #	Waters of Jurisdiction
First	616-223-8338	ME, NH, VT (Lake Champlain), RI, CT, MA, NY, to Shrewsbury River, NJ.
Fifth	757-398-6486	Shrewsbury, NJ to DE, MD, PA, VA, DC and NC.
Seventh	305-415-6730	SC, GA, FL to 8300 50' W, PR and adjacent island of the U.S.
Eighth	504-589-6277	Fl westward from 8300 SOW, AL, MS, LA, TX, the Mississippi River System except that portion of the Illinois River north of Joliet, IL.
Ninth	216-902-6060	Great Lakes and St. Lawrence River above St. Regis River.
Eleventh	510-437-2976	CA.
Thirteenth	206-220-7270	OR, WA, ID and MT.
Fourteenth	804-541-2315	HI, American Samoa, Marshall, Marianas, and Caroline Islands
Seventeenth	907-463-2262	AK.

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TAKE TIME TO REFLECT ON SAFETY...**SAFE BOATING BEGINS WITH YOU!****REPORT AIDS TO NAVIGATION DEFECTS
TO THE COAST GUARD**

Boaters need to realize the Coast Guard cannot keep the thousands of aids to navigation comprising the U.S. Aids to Navigation System under continual observation. It is impossible to maintain every aid to navigation at all times. Therefore, for the safety of all boaters, if you discover that an Aid to Navigation is:

- missing
- damaged
- moved from its original position
- displaying an improper signal (light color or timing incorrect, sound signal not functioning)
- a hazard to navigation

Report this information by radio or phone to the nearest Coast Guard Unit or Coast Guard District Aids To Navigation Office.

ALL AIDS TO NAVIGATION ARE PROTECTED BY LAW

It's a criminal offense to cause any damage or hindrance to the proper operation of any aid.

Do not alter, deface, move or destroy any aid to navigation. Never tie a vessel to a buoy, daybeacon or light structure.

Avoid anchoring so close to an aid that the aid is obstructed (hidden) from sight of another vessel.

Report all intentional or unintentional collisions with navigation aids to the U.S. Coast Guard.

Coast Guard Info-line**1-800-368-5647**Office of Aids to Navigation - (202) 267-0980 - www.navcen.uscg.milOffice of Boating Safety - (202) 267-1060 - www.uscgboating.org**BOAT SMART: Take a Boating Safety Course**U.S. Coast Guard Auxiliary - www.cgaux.orgU.S. Power Squadrons - www.usps.orgBoat U.S. Foundation Course line - (800) 366-2628 - www.boatus.com/onlinecourse

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