

# Aids to Navigation (ATONs) Private Aids to Navigation (PATONs)



29 March 2021

- Cameras off
- Mute your mic unless you have a question
- Please stay between the red and green buoys with comments / questions!

ATONs, PATONs

and

Intro to Nautical Charts



Bodega Bay

# Chapter Objectives

- Aids to Navigation (AtoNs)
- Cautions in the use of AtoNs
- The meaning of chart symbols
- The availability of electronic AtoNs
- Reference materials that alert you to changes in AtoNs



# Coast Guard “Buoy Tender”



USCGC Aspen off of Santa Cruz

# Definitions

- Aid to Navigation (AtoN):
  - Any device external to a vessel intended to assist a navigator to determine their position, safe course, or to warn of dangers or obstructions to navigation.
- Short-Range Aids to Navigation:
  - Consist of Buoys & Beacons

# Definitions

- **Buoy:**

- An unmanned, floating aid to navigation moored to the seabed. They may be lighted or unlighted.

- **Beacon:**

- Any fixed aid to navigation located on shore or marine sites. Lighted beacons are called lights, unlighted beacons are called daymarks.





# There are six types of marks, or AtoN's

## 1. LATERAL MARKS

- Including Preferred Channel Marks

## NON-LATERAL MARKS

2. Safe water marks
3. Isolated danger marks
4. Range marks
5. Regulatory marks
6. Special marks

# Definitions

- **Daymark:**
  - The daytime identifier of an aid to navigation presenting one of several colors, shapes, numerals or letters.
    1. Square, triangle, rectangle, diamond or octagon
    2. Top marks on buoys, and the buoy's shape



# U.S. AIDS TO NAVIGATION SYSTEM

## on navigable waters except Western Rivers

### LATERAL SYSTEM AS SEEN ENTERING FROM SEAWARD

Located  
in Light  
List

<p><b>PORT SIDE ODD NUMBERED AIDS</b></p> <p>GREEN LIGHT ONLY</p> <p>FLASHING (2) </p> <p>FLASHING </p> <p>OCCULTING </p> <p>QUICK FLASHING </p> <p>ISO </p> <p><b>1</b> LIGHT <i>FI G 6s</i></p> <p><b>3</b> LIGHTED BUOY <i>G 9" FI G 4s</i></p> <p><b>5</b> LIGHT <i>G C 9"</i></p> <p><b>7</b> LIGHTED BUOY <i>G 9"</i></p> <p><b>9</b> CAN <i>G C 9"</i></p> <p><b>11</b> DAYBEACON <i>G 9"</i></p>	<p><b>PREFERRED CHANNEL NO NUMBERS - MAY BE LETTERED</b></p> <p>PREFERRED CHANNEL TO STARBOARD</p> <p>TOPMOST BAND GREEN</p> <p>GREEN LIGHT ONLY</p> <p>COMPOSITE GROUP FLASHING (2+1) </p> <p><b>A</b> LIGHTED BUOY <i>GR 1" FI (2+1) G 6s</i></p> <p><b>U</b> CAN <i>GR U"</i></p> <p><b>S</b> CAN <i>GR C 15"</i></p>	<p><b>PREFERRED CHANNEL NO NUMBERS - MAY BE LETTERED</b></p> <p>PREFERRED CHANNEL TO PORT</p> <p>TOPMOST BAND RED</p> <p>RED LIGHT ONLY</p> <p>COMPOSITE GROUP FLASHING (2+1) </p> <p><b>B</b> LIGHTED BUOY <i>RG 1" FI (2+1) R 6s</i></p> <p><b>C</b> NUN <i>RG N 10"</i></p> <p><b>G</b> NUN <i>RG 10"</i></p>	<p><b>STARBOARD SIDE EVEN NUMBERED AIDS</b></p> <p>RED LIGHT ONLY</p> <p>FLASHING (2) </p> <p>FLASHING </p> <p>OCCULTING </p> <p>QUICK FLASHING </p> <p>ISO </p> <p><b>2</b> LIGHT <i>FI R 6s</i></p> <p><b>4</b> LIGHTED BUOY <i>R 6" FI R 4s</i></p> <p><b>6</b> NUN <i>R N 10"</i></p> <p><b>8</b> DAYBEACON <i>R 2"</i></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><i>FI (2) 5s</i> </p> <p><b>A</b> LIGHTED <i>BR 1" FI (2) 5s</i></p> <p><b>C</b> UNLIGHTED <i>BR 10"</i></p>	<p><b>SAFE WATER NO NUMBERS - MAY BE LETTERED</b></p> <p>WHITE LIGHT ONLY MORSE CODE</p> <p><i>Mo (A)</i> </p> <p><b>A</b> MR <i>RW 1" A"</i></p> <p><b>B</b> SPHERICAL <i>RW SP 10"</i></p> <p><b>N</b> UNLIGHTED <i>RW N"</i></p>
<p><b>RANGE DAYBOARDS MAY BE LETTERED</b></p> <p>KGW KWG KWB KBW KWR KRW KRB KBR KGB KGBG KGR KRG</p>	
<p><b>DAYBOARDS - MAY BE LETTERED</b></p> <p>WHITE LIGHT ONLY</p> <p><b>NR</b> </p> <p><b>NG</b> </p> <p><b>NB</b> </p> <p><i>RW Bn</i> <i>GW Bn</i> <i>BW Bn</i></p>	<p><b>SPECIAL MARKS - MAY BE LETTERED</b></p> <p>YELLOW LIGHT ONLY</p> <p>FIXED FLASHING </p> <p><b>A</b> UNLIGHTED <i>Y 1" Bn</i></p> <p><b>C</b> UNLIGHTED <i>N 10"</i></p> <p><b>B</b> LIGHTED <i>Y 1" FI</i></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

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

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

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

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

BUOY USED TO DISPLAY REGULATORY MARKERS

MAY SHOW WHITE LIGHT MAY BE LETTERED

**DANGER**

PLATE 1

# International Buoyage can be much different!



# Lateral System

- Employs a simple arrangement of **colors, shapes, numbers** and **light characteristics** to show which side an aid should be passed on.
- **3-R's**
  - **Red Right Returning** from sea



Can



Red, Right, Returning

Nun

# Lateral System

LED Lighted can on Lake Tahoe  
“Watching Properly”



# Lateral System



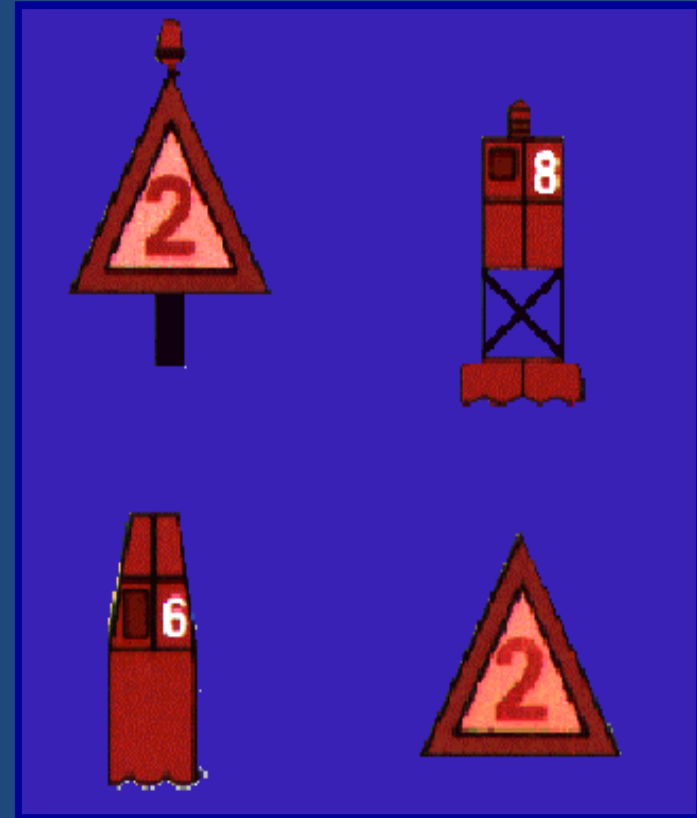
**Nun watching properly**





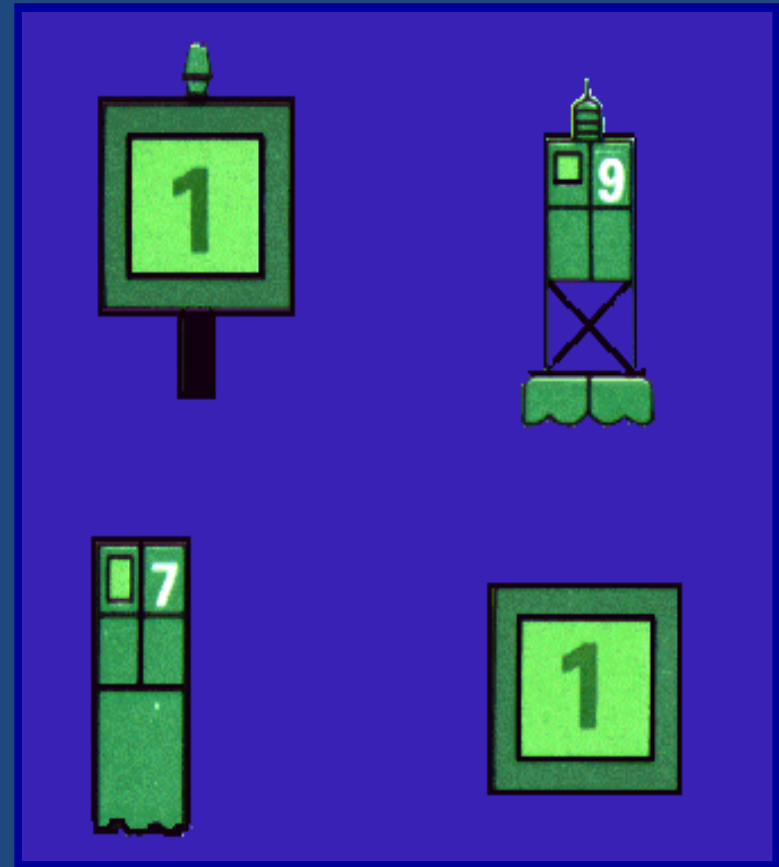
# Lateral System

- Starboard Lateral Marks
  - Color: **Red**
  - Shape: **Triangles and Nuns**
  - Character: **Even Numbers**
  - Light: **Red**



# Lateral System

- Port Lateral Marks
  - Color: Green
  - Shape: Squares and Cans
  - Character: Odd Numbers
  - Light: Green





**2 Red Lighted**

**4 Red Not Lighted**

**Green Lighted**

**1 Green Not Lighted**

# Lateral System



Image AMBAG

© 2009 Tele Atlas

© 2009 Google

# Buoys aren't always where they should be!



# Buoys aren't always where they should be!









# Lateral System

3

2

Red, Right, Returning

© 2009 Tele Atlas  
Image © 2009 DigitalGlobe

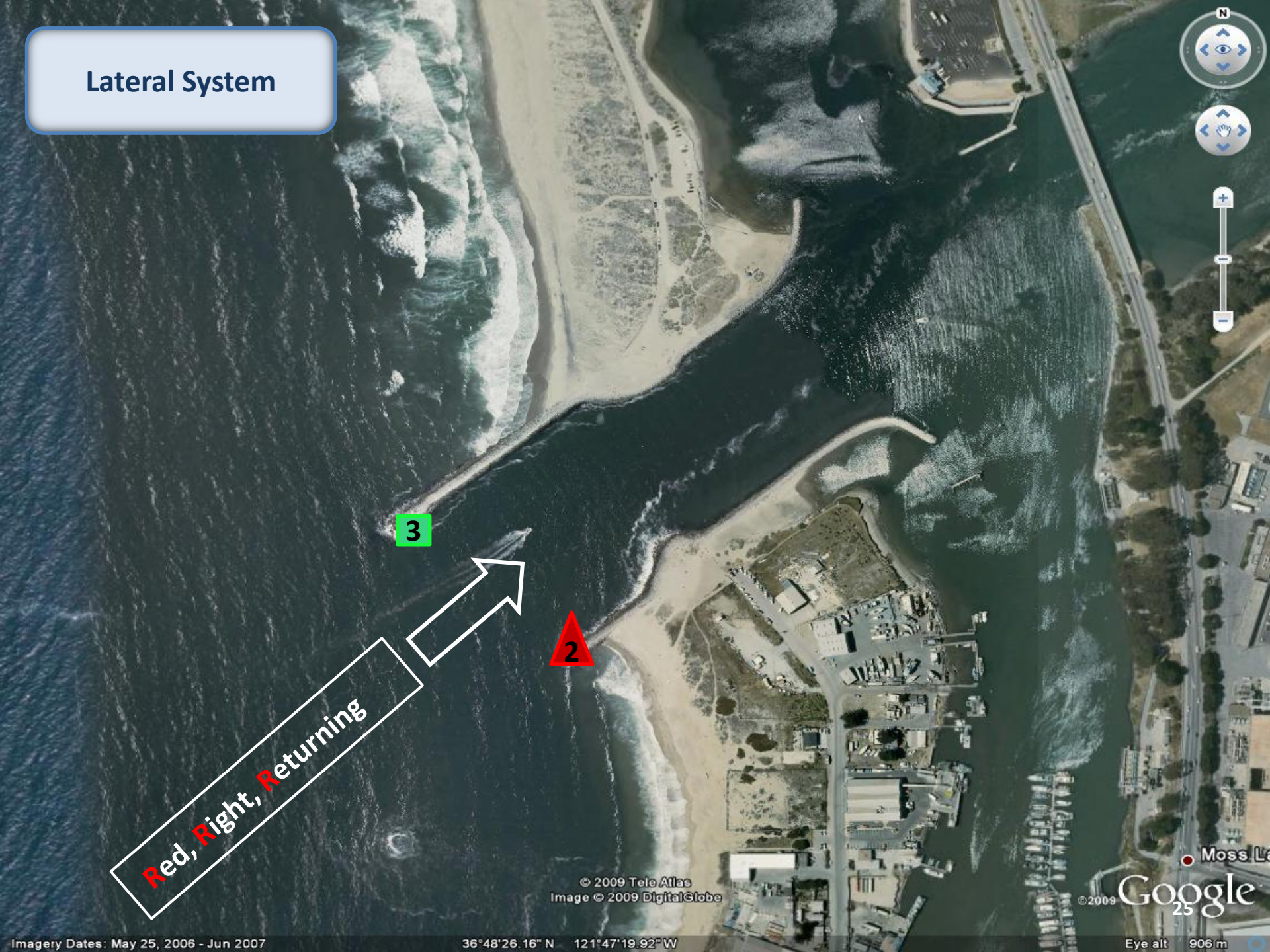
© 2009 Google  
25

Moss L

Eye alt 906 m

Imagery Dates: May 25, 2006 - Jun 2007

36°48'26.16" N 121°47'19.92" W





The name of the boat is “Temporary Insanity”

If you are  
unsure  
whether to  
pass on the  
port or  
starboard ... at  
least pick one  
or the other!

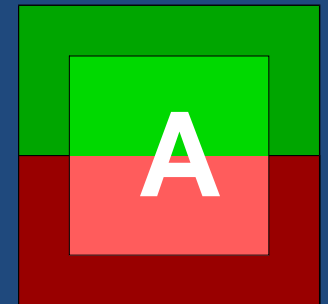
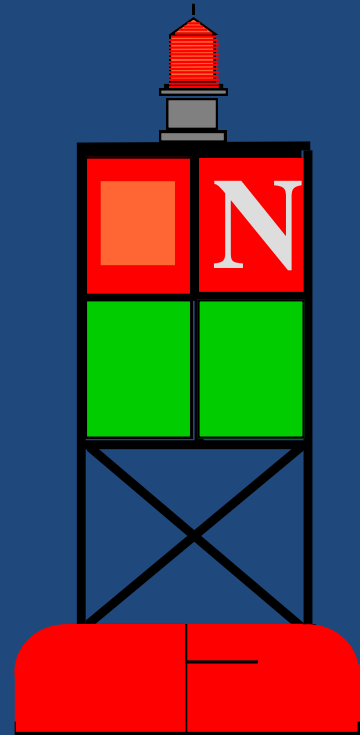




# Lateral System

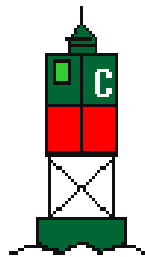
## Preferred Channel Marks

- Purpose: Marks junctions and bifurcations
- Description:
  - **Color:** Red & Green horizontally banded (uppermost band is preferred channel)
  - **Shape:** Same as preferred channel (uppermost band is preferred channel)
    - Daymark - uppermost color is preferred channel
  - **Letter identification – White**
  - **Light Color:** Same as uppermost band



# Review of Preferred Channel Marks

## Preferred Channel to Starboard Topmost Band Green

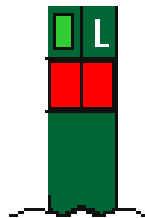


### Green Lighted Buoy

Chart Symbol



GR "C"  
Fl (2+1)G



### Can

Chart Symbol



GR  
C "L"



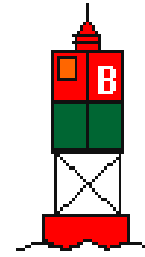
### JG

Chart Symbol



GR  
"A"

## Preferred Channel to Port Topmost Band Red

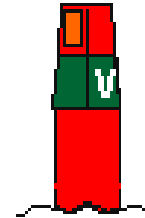


### Red Lighted Buoy

Chart Symbol



RG "B"  
Fl (2+1)R

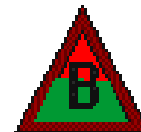


### Nun

Chart Symbol



RG  
N "V"

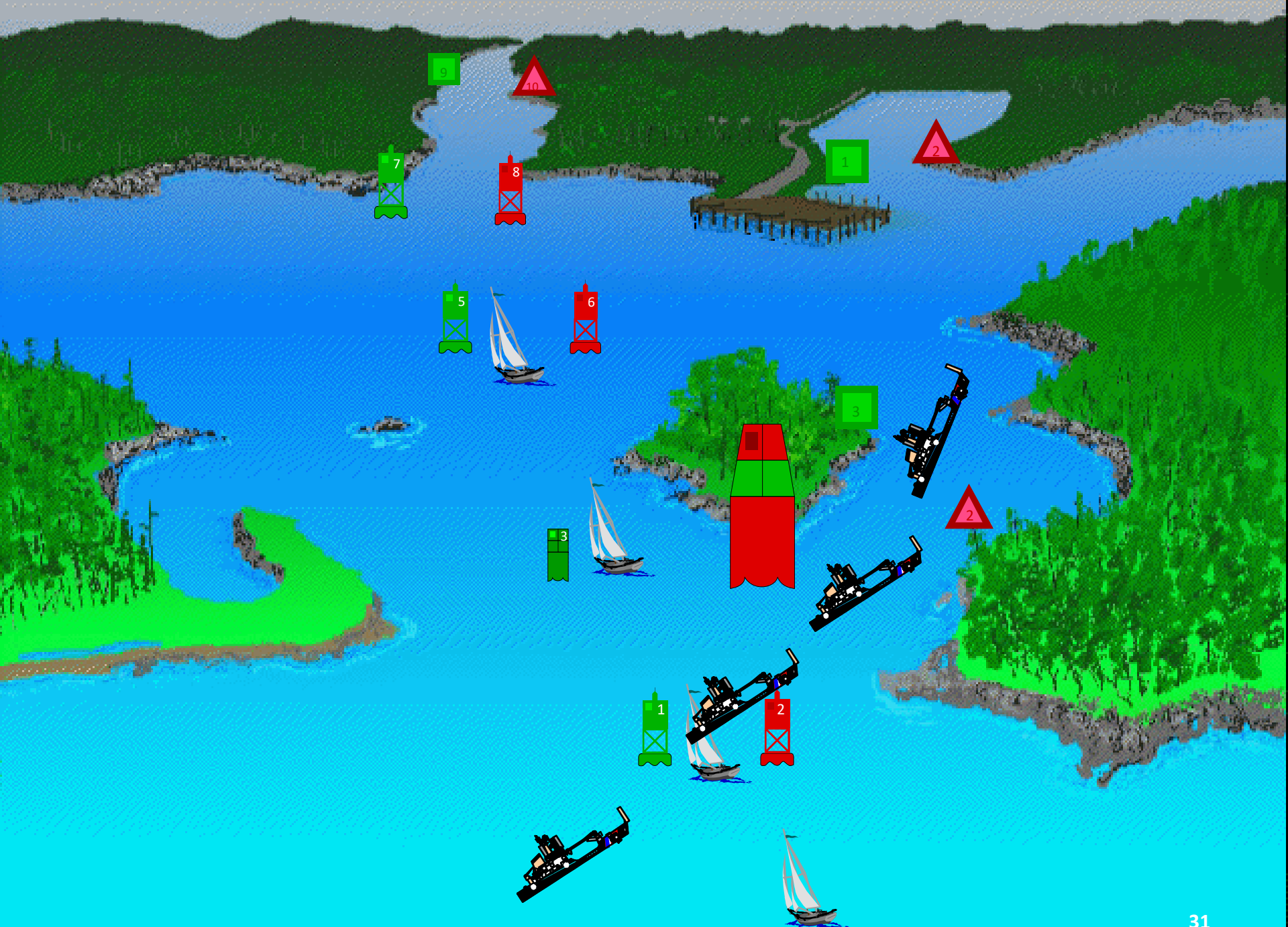


### JR

Chart Symbol



RG  
"B"



# Monterey Harbor – Preferred Channel Buoy







# Lateral System

What is it?



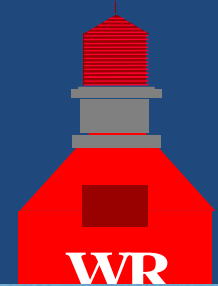
# Lateral System

What is it?



# Lateral System

- **WRECK MARKERS**
- **Purpose:** To alert the mariner to wrecks



# Non-Lateral System

- Having no lateral significance.
- Employs buoys and beacons with special colors, shapes, letters and minor lights.

# Non-Lateral System

- Types of non-lateral marks
  - Safe water marks
  - Isolated dangers marks
  - Range marks
    - Dayboards
    - Dual beacons
  - Special marks
  - Information and regulatory marks

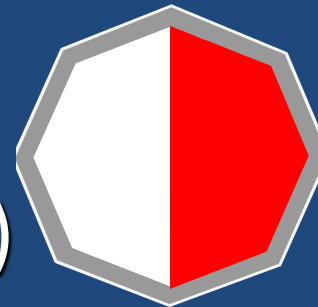
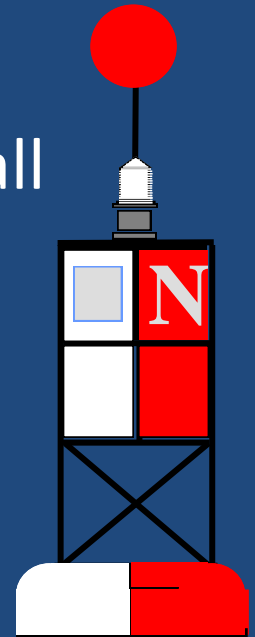
# Non-Lateral System

What is it?



# Non-Lateral System

- SAFE WATER MARKS
- Purpose: Indicates there is **navigable** water all around the mark.
- Description:
  - Color: **Red** and **White** vertically striped
  - Shape: Sphere or Buoy with **Red** Topmark
  - Character: Letters (**white**)  
(ex. “GB” Galveston Bay)
  - Light: White
    - Characteristic: Mo(A)
      - Dot Dash





# Santa Cruz Safe Water Mark a.k.a. “Mile Buoy”



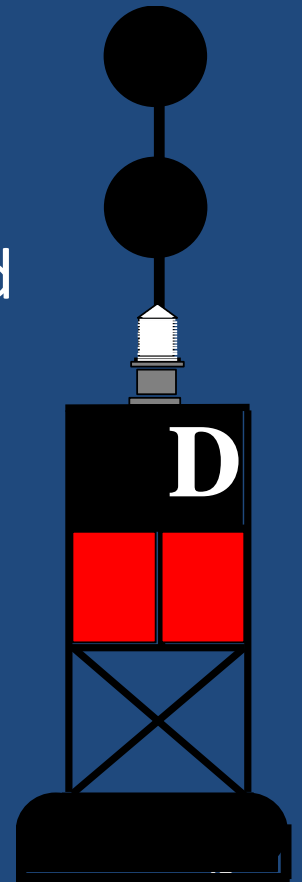
# Non-Lateral System

- What is it?



# Non-Lateral System

- ISOLATED DANGER MARKS
- Purpose: Marks isolated dangers or obstructions that can be passed on all sides.
- Description:
  - Color: **Black** and **Red** horizontally banded
  - Shape: Buoy with two **Black** Top marks
  - Character: Letters (**white**)
  - Light: **White**
    - Characteristic: Fl (2) 5 sec

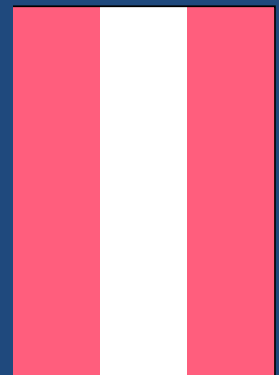
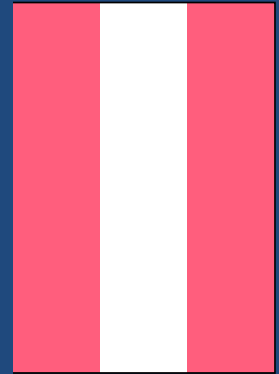


# Definitions

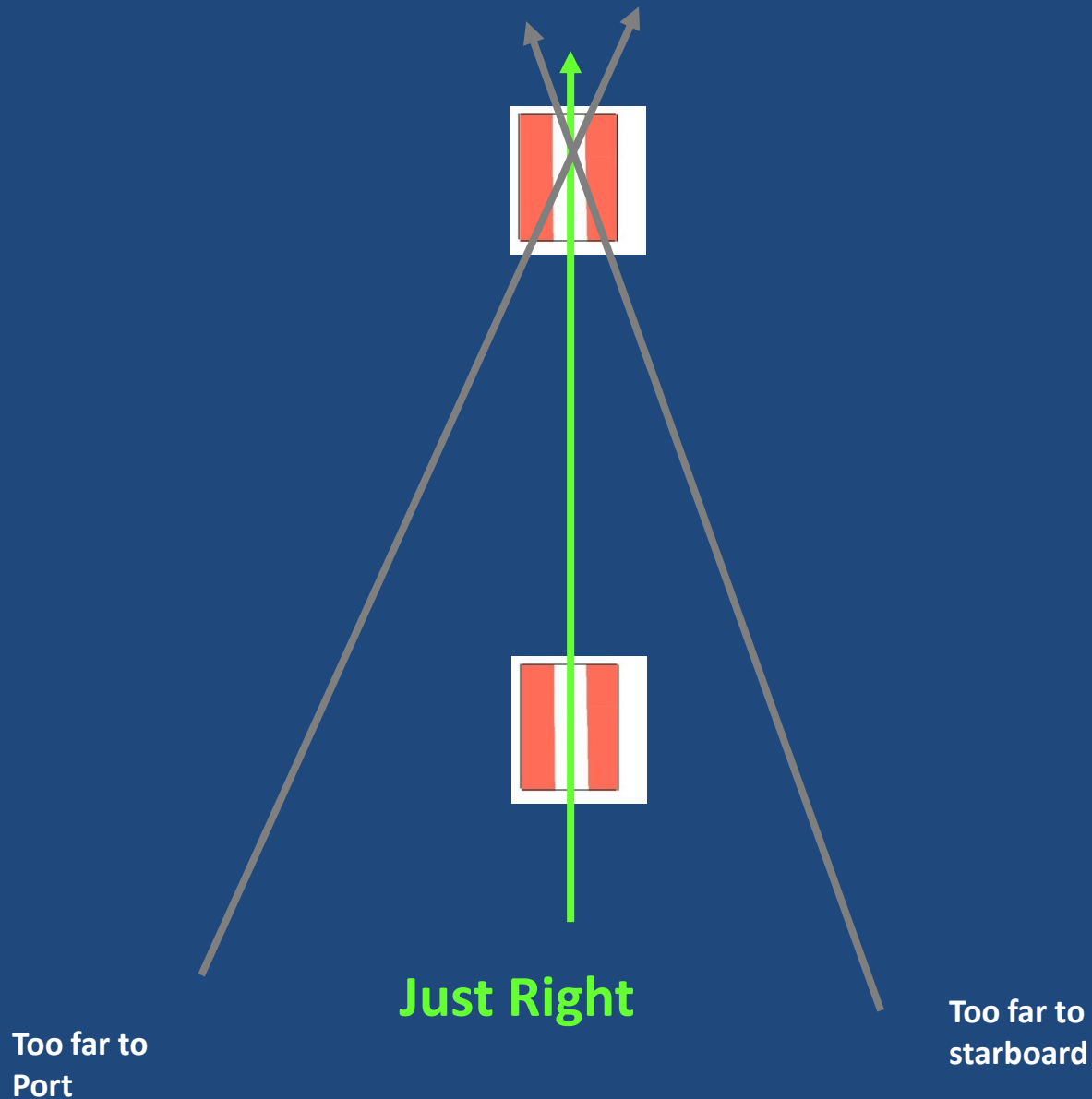
- **Range:**
  - **Pairs of beacons or daymarks** arranged so that when they are lined up, they indicate the **center of the channel.**

# Non-Lateral System

- RECTANGULAR RANGE DAYBOARDS
- Purpose: To mark center line of a channel
- Description:
  - Color: Appropriate color for channel
  - Shape: Appropriate to size for channel
  - Lights: Color: **W, R, G, Y**
    - Characteristic: F, Fl, Q, Oc, Iso



# Using Range Markings



# Moss Landing Harbor – Hwy 1 Bridge



# Non-Lateral System

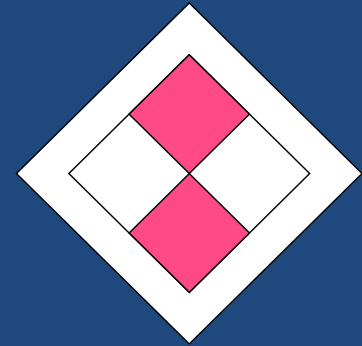
What is it?





# Non-Lateral System

- NON-LATERAL MARKS
- Diamond dayboards
- Purpose: Non-lateral Daytime identifier
- Description:
  - Color: NB, NR, NG
  - Shape: Diamond-shaped divided 4 sectors
  - Character: Side sectors **White**, Top & Bottom Sectors colored
  - Letters: **W, R & G**
  - Light: **White**
    - Characteristic: Anything not otherwise reserved



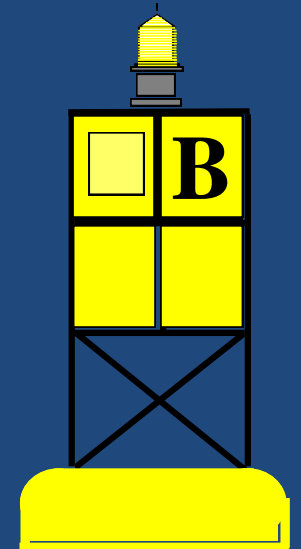
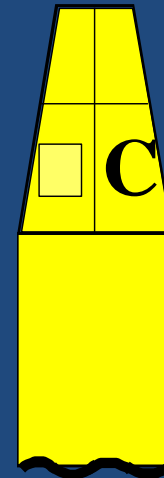
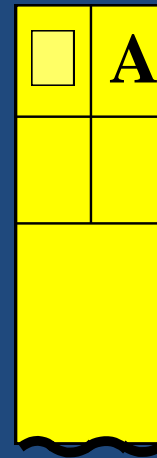
# Non-Lateral System

What is it?

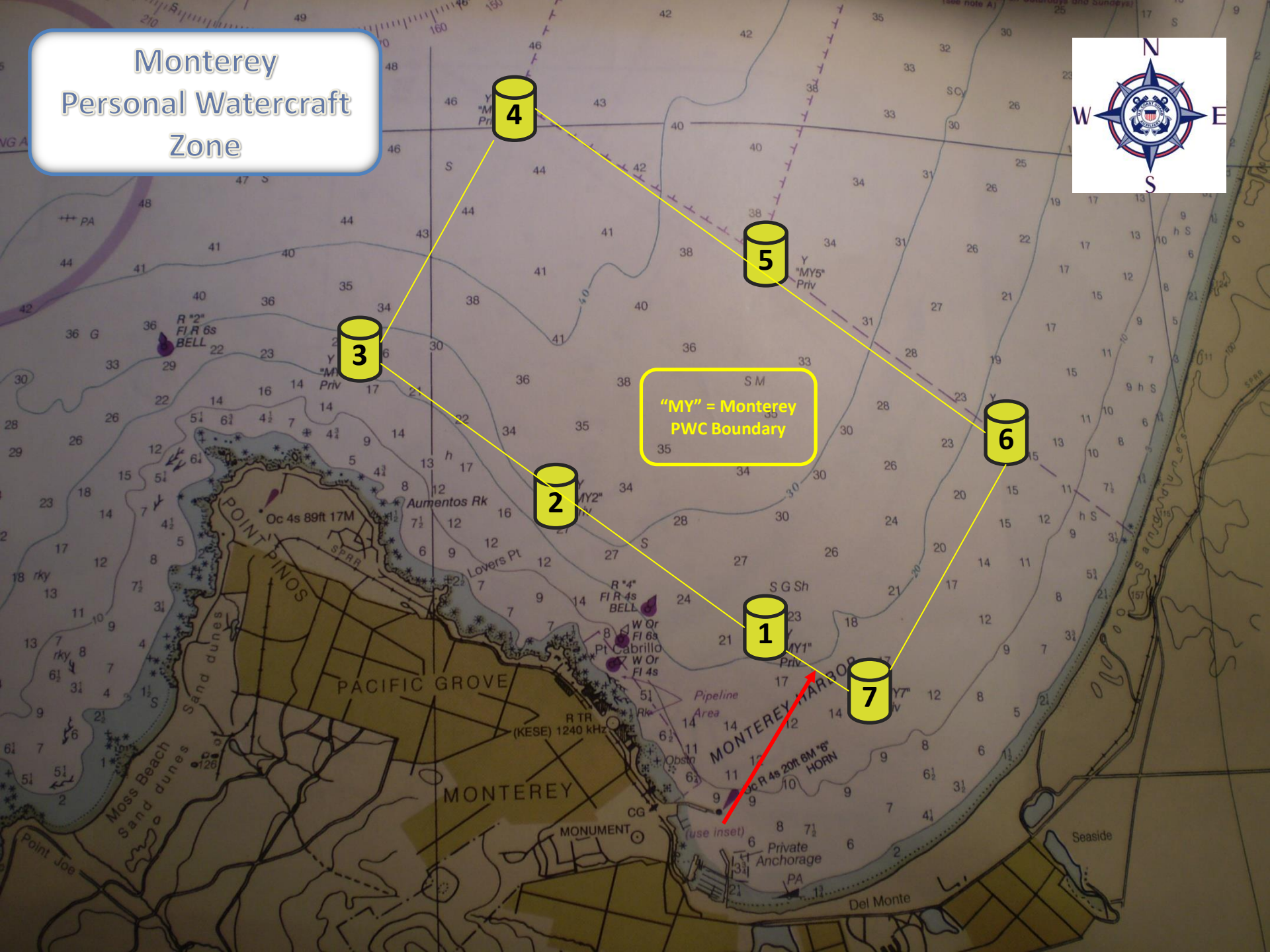
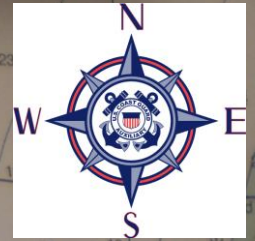


# Non-Lateral System

- SPECIAL MARK AIDS
- Purpose: Not intended to assist safe navigation but to indicate special areas marked on charts. (anchorage, traffic separation, data gathering, PWC operating boundaries)
- Description:
  - Color: **Yellow**
  - Shape: Various
  - Character: **Black** letters
  - Light: **Yellow**
    - Characteristic: Fixed or Flashing



# Monterey Personal Watercraft Zone



4

5

3

"MY" = Monterey  
PWC Boundary

2

6

1

7

# Non-Lateral System

- What is it?



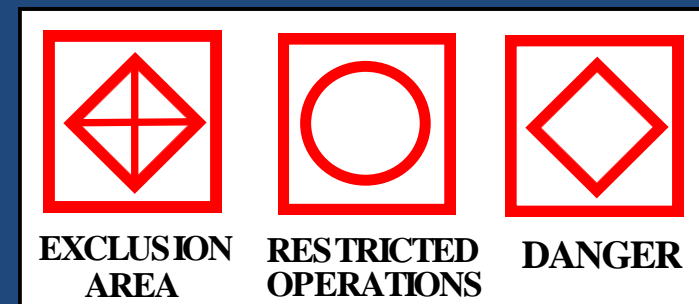
# Non-Lateral System

What is it?




# Non-Lateral System

- INFORMATION AND REGULATORY MARKS
- Purpose: Alert the mariner to such things as submerged pipes, no wake zones, etc.
- Description:
  - Color: **White**; **Orange** band or border
  - Shape: Square or Diamond
  - Character: Letters (**Black**, usually words)
  - Light: **White**
    - Characteristic: Anything not otherwise reserved




# Information & Regulatory Marks

 **UNIFORM STATE WATERWAY MARKING SYSTEM**

**STATE WATERS AND DESIGNATED STATE WATERS FOR PRIVATE AIDS TO NAVIGATION**


**REGULATORY MARKERS**



**BOAT EXCLUSION AREA**

SWIM AREA

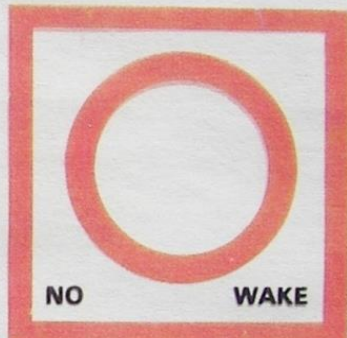
EXPLANATION MAY BE PLACED OUTSIDE THE CROSSED DIAMOND SHAPE, SUCH AS DAM, RAPIDS, SWIM AREA, ETC.



**DANGER**

ROCK

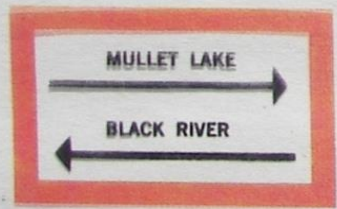
THE NATURE OF DANGER MAY BE INDICATED INSIDE THE DIAMOND SHAPE, SUCH AS ROCK, WRECK, SHOAL, DAM, ETC.



**CONTROLLED AREA**

NO WAKE

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

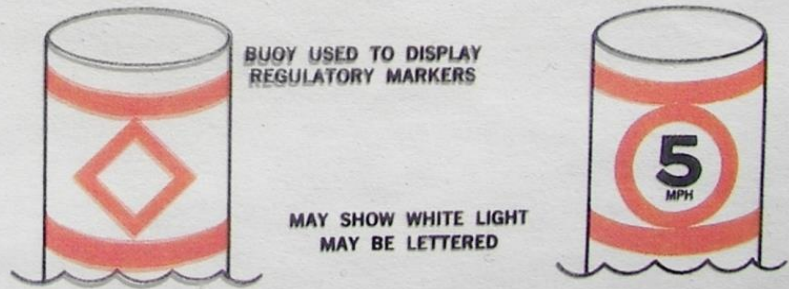


**INFORMATION**

MULLET LAKE

BLACK RIVER

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



**BUOY USED TO DISPLAY REGULATORY MARKERS**

MAY SHOW WHITE LIGHT  
MAY BE LETTERED

**AIDS TO NAVIGATION**



# Regulatory Marks may be used to create a “Boundary Line”



# WARNING!

**Give beacons and other fixed structures a wide berth.**

Boaters should not pass fixed ATONs close aboard due to the danger of collision with rip-rap or structure foundations, or with the obstruction or danger that is being marked.

WARNING!



WARNING!





# “Characteristics” of AToNs

- Light Characteristic (timing sequence) for a lighted aid to navigation.

# Light Characteristics

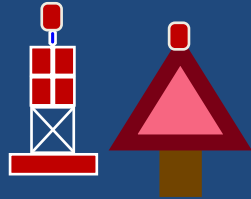
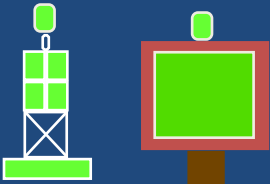
- Red ATON's, when lighted have **red lights**
- Green ATON's when lighted have **green lights**
- ATON's with **white lights** rarely have lateral significance
- Most lights on ATON's have flashing patterns. Some are "fixed"

# Light Characteristics

- A fixed light is on from dusk to dawn
- A flashing light flashes on while an occulting light blinks off.
  - In other words,
    - a flashing light is off more than on
    - an occulting light is on more than off
- An isophase, or iso, light is on for an interval equal to the time it is off



# LIGHT RHYTHMS



FIXED LIGHT



STAYS ON ALL THE TIME

FLASHING



LESS THAN

50

FLASHES / MINUTE

QUICK  
FLASHING

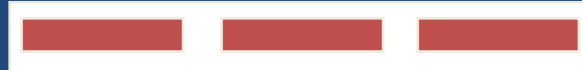


GREATER THAN 50

LESS THAN 80

FLASHES / MINUTE

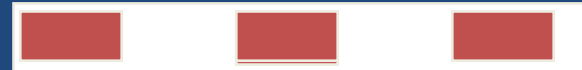
OCCULTING



STAYS ON LONGER

THAN OFF

ISO



STAYS ON AS LONG

AS IT IS OFF

GROUP FLASHING (2)



GROUP FLASHING (3)

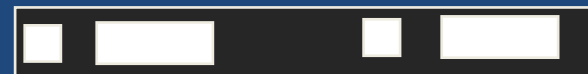


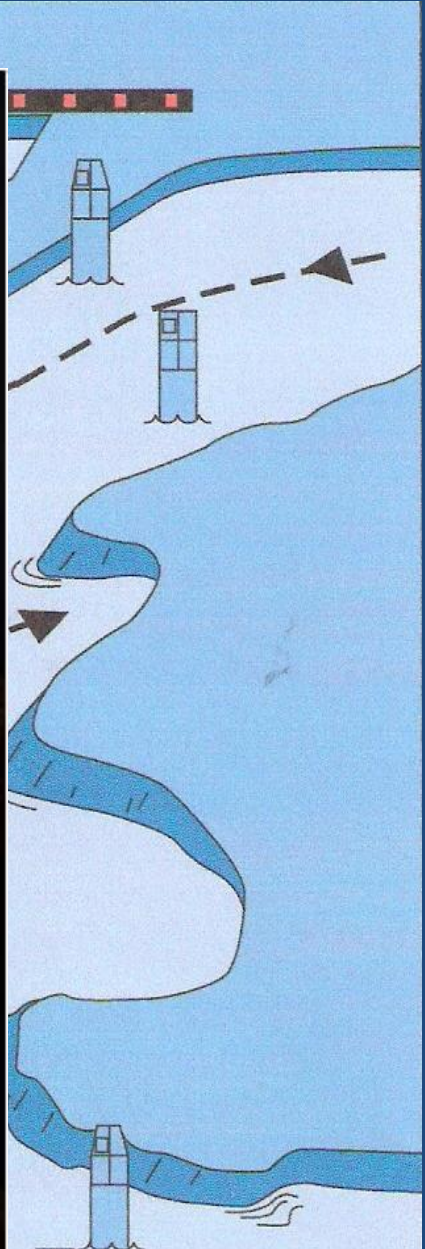
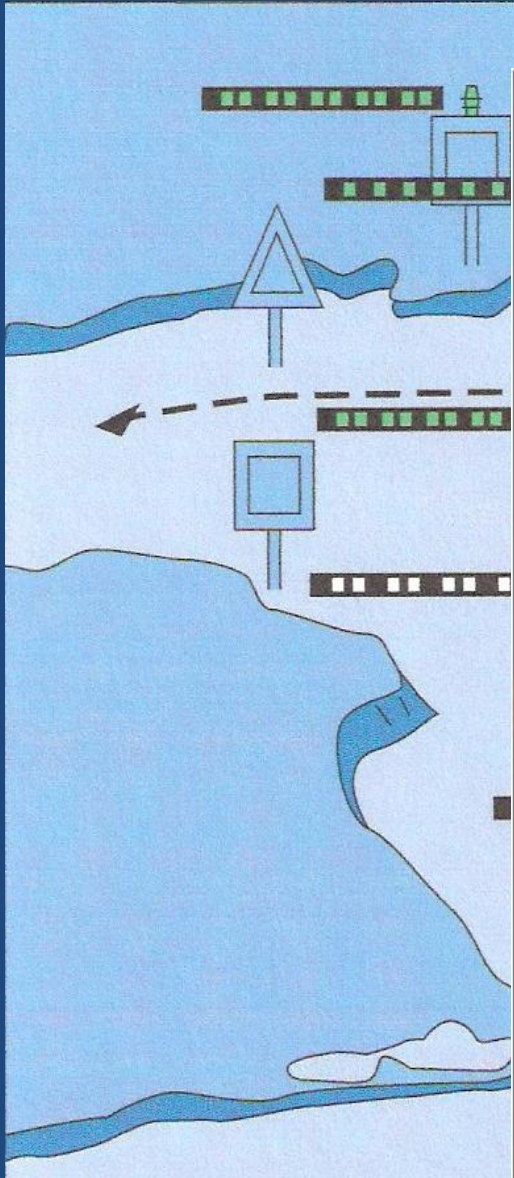
# LIGHT RHYTHMS

## PREERRED CHANNEL LIGHTED AIDS COMPOSITE GROUP FLASHING



## MID CHANNEL



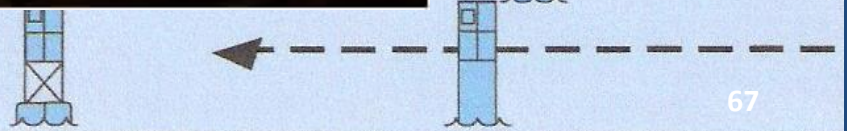


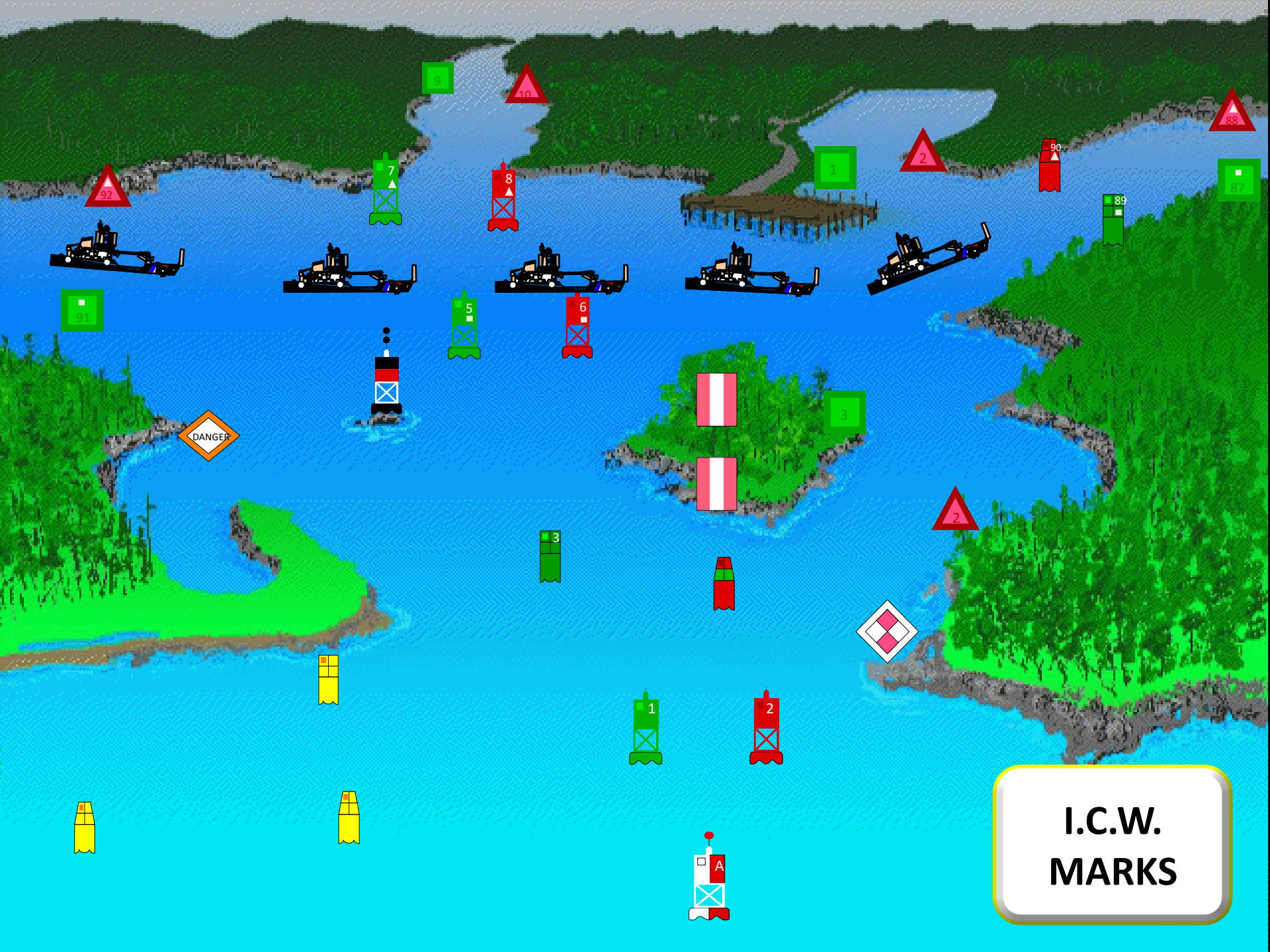
REGION-B - by night

Preferred Channel  
Secondary Channel



Santa Cruz "Walton" Light  
Christmas





I.C.W.  
MARKS

**PRIVATE AIDS TO**  
**NAVIGATION**

**PATONS**

# Private Aid to Navigation Definitions

- Short-Range Aids to Navigation:
  - Buoys
  - Beacons
- Why are there Private Aid to Navigation?:
  - Required by the Coast Guard
  - For the benefit of a person, group, organization.

# Definitions PATON CLASS I:

- Legally Obligated by Owner
- Shall have Light List Number (LLNR) assigned
- Shall be Charted
- Shall be Checked every year.

# TYPICAL CLASS 1 AID

## LIGHTHOUSES



All Navigation and Marine STRUCTURES owners are legally obligated to establish, maintain, and operated as prescribed by the Coast Guard



## OBSTRUCTIONS

HAZARDOUS SUNKEN VESSEL or WRECKS

or others prescribed by the District Commander



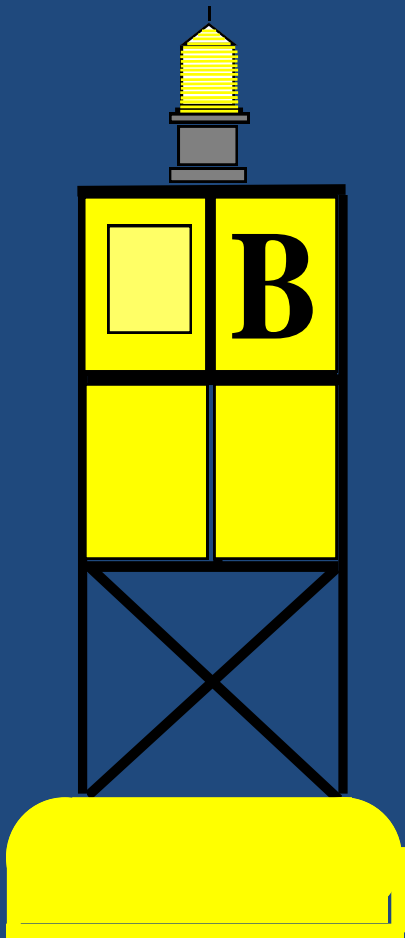


# Definitions PATON CLASS II

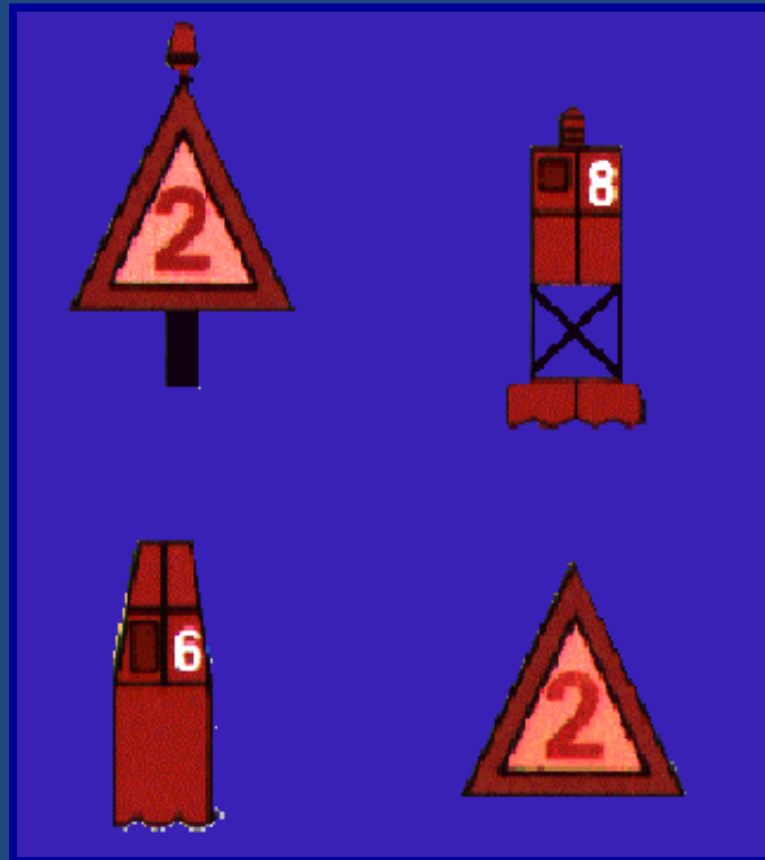
- **Owner's convenience**
- **LLNR assigned to most but not all**
- **Light listed are charted**
- **In or near commercial waterways**
- **Must be verified once every 3 years**

# TYPICAL CLASS II AID

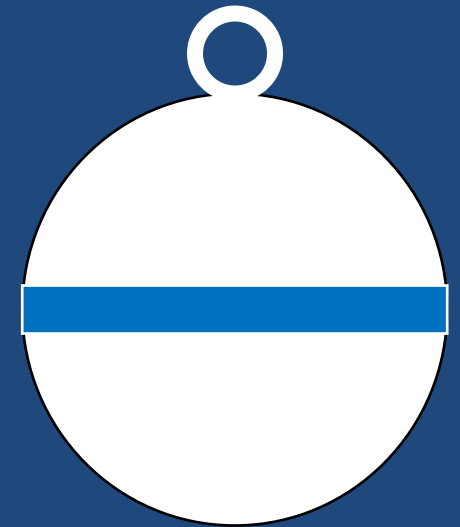
SPECIAL AIDS



PRIVATE LATERAL AIDS



Large  
MOORING  
BUOY





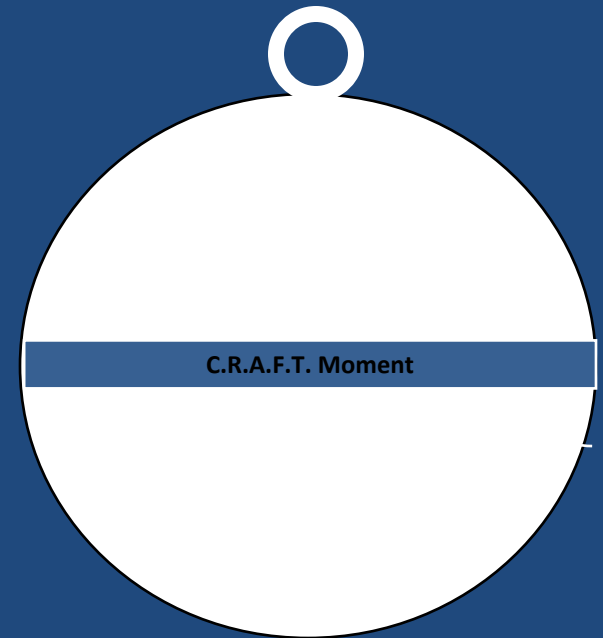
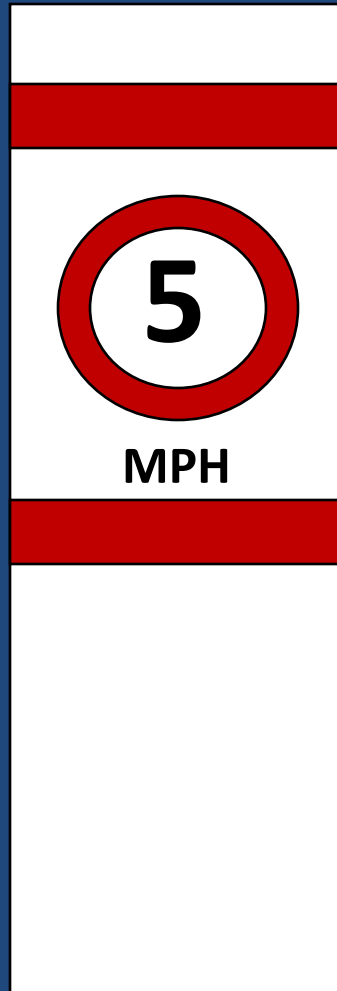
Note: "M" =  
"Motorized"

# Definitions PATON CLASS III

- **Owner's convenience**
- **NEVER Assigned a LLNR**
- **Should never be Charted**
- **Non-Commercial waterways**
  - **Recreational waterways**
  - **Outside of commercial waterways**
- **Must be verified once every 5 years**

# TYPICAL CLASS III AID

REGULATORY  
Or  
INFORMATIONAL  
BUOYS



SMALL MOORING BUOY

# Not all aids are regularly maintained or “Watching Properly”! They are “Discrepant”

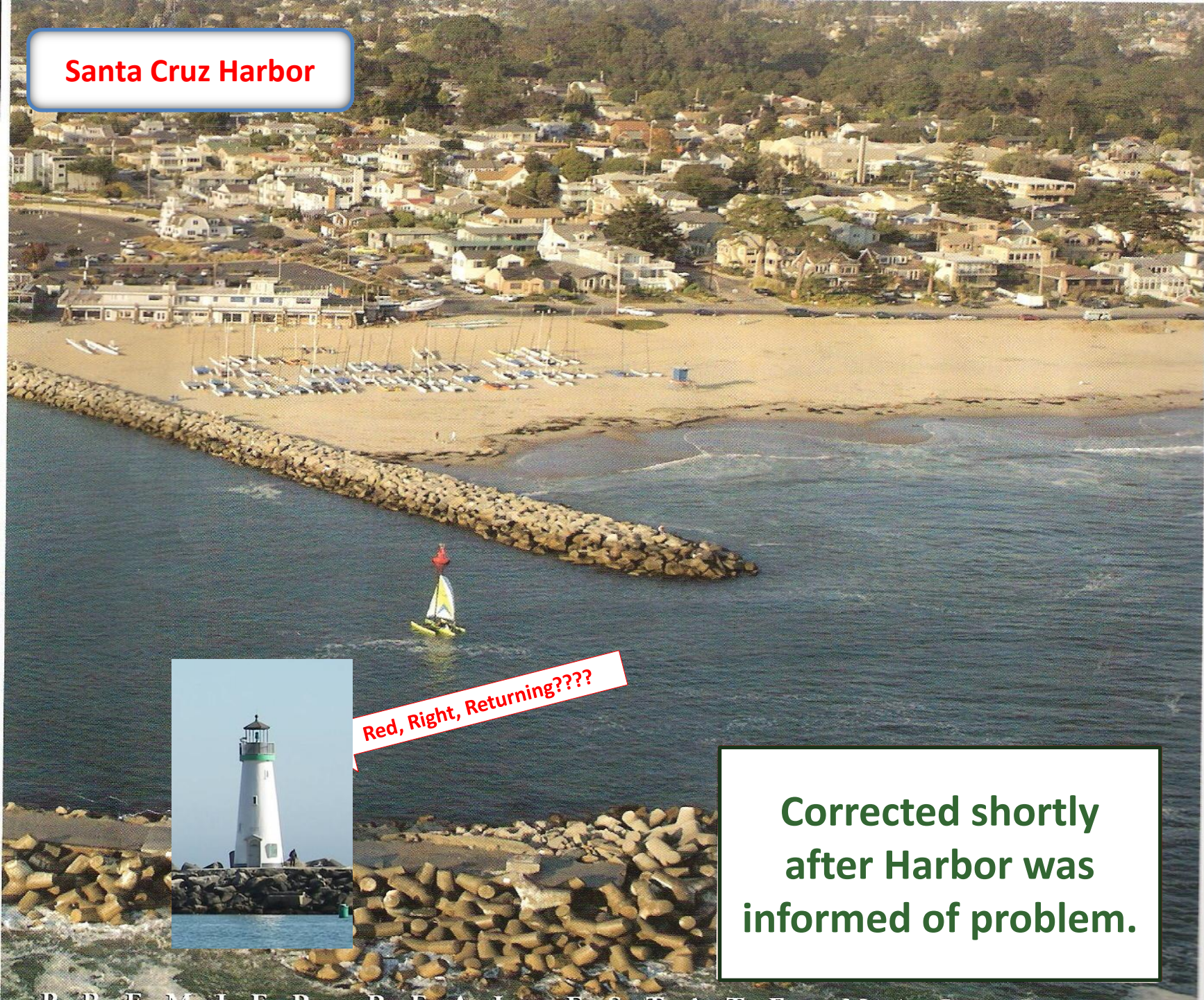


# Not all aids are regularly maintained or “Watching Properly”!





# Santa Cruz Harbor



Red, Right, Returning???

Corrected shortly  
after Harbor was  
informed of problem.



UNAUTHORIZED  
ESTABLISHMENTS

# Unauthorized PATON

Date & Time: Sat Jul 20 09:51:38 PDT 2013

Position: +036.9649° / -121.9431°

Altitude: -16ft

Azimuth/Bearing: 311° N49W 5529mils (True)

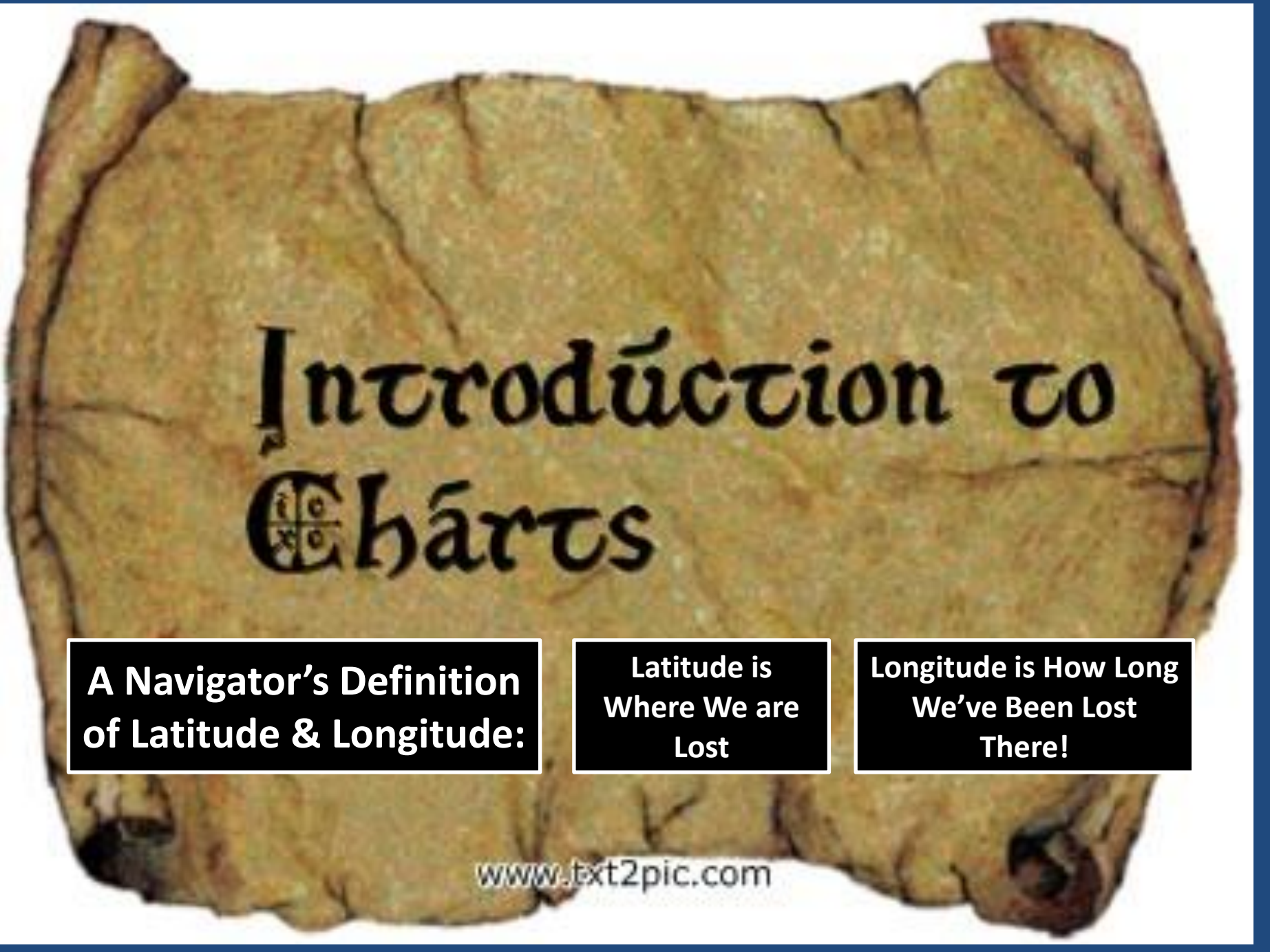
Elevation Angle: -10.7°

Horizon Angle: -02.4°

Zoom: 1X



**“Sponge Bob”  
Off of Capitola**



# Introduction to Charts

**A Navigator's Definition  
of Latitude & Longitude:**

**Latitude is  
Where We are  
Lost**

**Longitude is How Long  
We've Been Lost  
There!**

# CHART No. 1

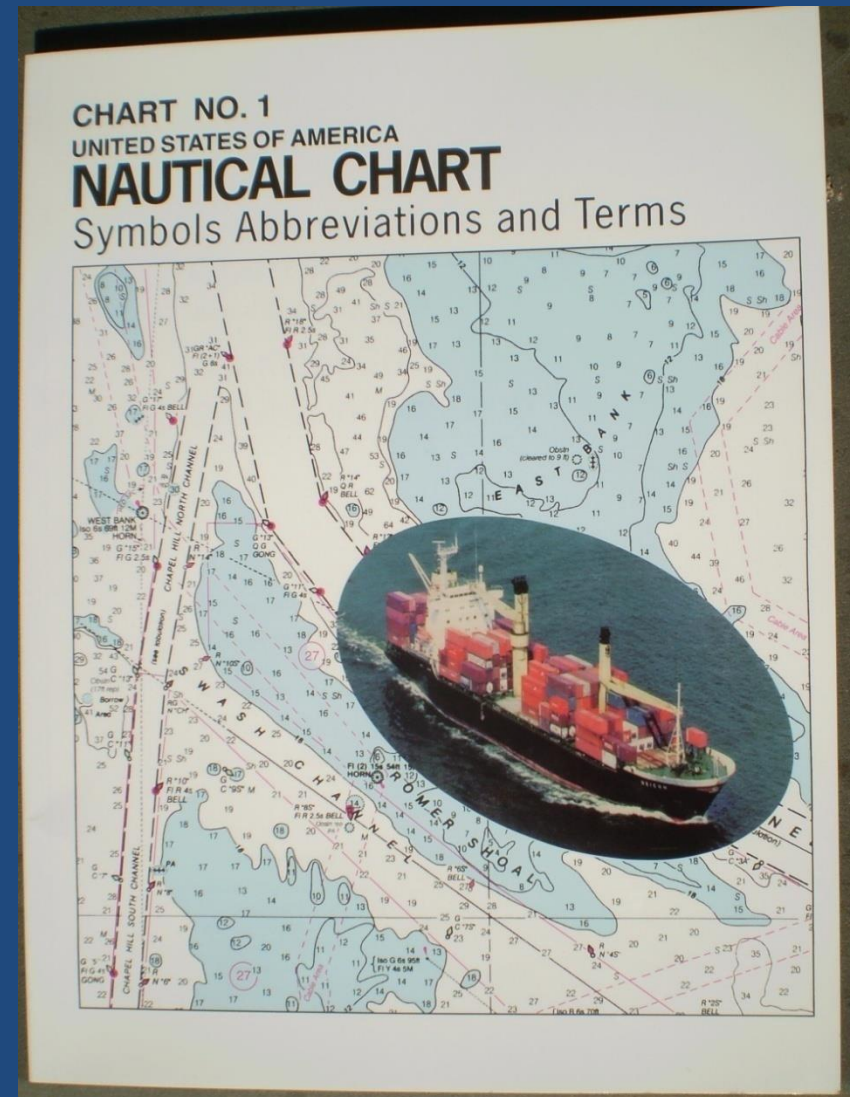
Complete Guide to Symbols,  
Abbreviations, and Terms

A “Must-Have” for all  
serious chart navigating

Available for under \$10

Available on-line from NOAA

<http://www.nauticalcharts.noaa.gov>



# I Buildings and Structures

65		Sch	School	74		Pyramid
(Iq)		HS	High school	75		Pillar
(Ih)		Univ	University	76		Oil derrick
66		Bldg	Building	(li)	Ltd	Limited
67		Pav	Pavilion	(Ii)	Apt	Apartment
68		Hut	Hut	(Ik)	Cap	Capitol
69		Stadium	Stadium	(Il)	Co	Company
70		T	Telephone	(Im)	Corp	Corporation
71			Gas tank; Gasometer	(In)		Landmark (position accurate)
72		GAB	Gable	(Io)		Landmark (position approximate)
73			Wall	(Ip)		Flare; Stack (on land)

# J Miscellaneous Stations

1		Sta	Any kind of station	15		Ice signal station
2		Sta	Station	16		Time signal station
3		C.G.	Coast Guard station (similar to Lifesaving station, J 6)	16a		Manned oceanographic station
(Ja)		R TR C.G. WALLIS SANDS	Coast Guard station (when landmark)	16b		Unmanned oceanographic station
4		LOOK TR	Lookout station; Watch tower	17		Time ball
5			Lifeboat station	18		Signal mast
6		L.S.S.	Lifesaving station	18a		Mast
7		Rkt Sta	Rocket station	19		Flagstaff; Flagpole
8		Pilots PIL STA	Pilot station/Pilots	19a		Flag tower
9		NS	Notice board	20		Signal
				21		Observatory
				22		Office
				(Jc)		Bell (on land)
				(Jd)		Harbor entrance control post
				(Je)		Marine police station
				(Jf)		Fireboat station
				(Jg)		Notice board

# K Lights

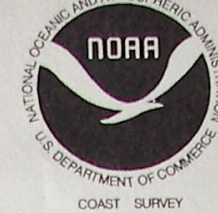
1			Position of light	25a		S Fl	Short Flashing
• 2		Lt	Light	(Kc)		VQ; V Qx FI	Continuous Very Quick Flashing (80 to 150 - usually either 100 or 120 per minute)
(Ka)			Riprap surrounding light			VQ (3)	Group Very Quick
3		Lt Ho	Lighthouse			IVQ	Interrupted Very Quick
4		AERO	Aeronautical light			UQ	Continuous Ultra Quick (160 or more - usually 240 to 300 flashes per minute)
4a			Marine and air navigation light			IUQ	Interrupted Ultra Quick
• 5		Bn	Light beacon	26		Alt; Alt	Alternating
6			Light vessel; Lightship	27		Oc (2); Gp Occ	Group - Occulting
8			Lantern			Oc(2+3)	Composite group occulting
9			Street lamp	28		Fl (2); Gp Fl	Group Flashing
10		REF	Reflector	28a		S-L Fl	Short - Long Flashing
11			Leading light	28b			Group - Short Flashing
11a		Lts in line 270°	Lighted range	29		F Fl	Fixed and Flashing
12			Sector light	30		F Gp Fl	Fixed and Group Flashing
13			Directional light	30a		Mo (A)	Morse Code light (with flashes grouped as in letter A)
14			Harbor light	31		Rot	Revolving or Rotating light
15			Fishing light	41			Period
16			Tidal light	42			Every
17		Priv maintd	Private light (maintained by private interests; to be used with caution)	43			With
21		F	Fixed (steady light)	44			Visible (range)
22		Oc; Occ	Occulting (total duration of light more than dark)	(Kd)		M; Mi; N Mi	Nautical mile
23		Fl	Single - Flashing (total duration of light less than dark)	(Ke)		m; min	Minutes
(Kb)		L Fl	Long - Flashing (2 sec or longer)	(Kf)		s; sec	Seconds
		Fl (2+1)	Composite group - flashing	45		Fl	Flash
				46		Oc; Occ	Occultation
				46a			Eclipse
				47		Gp	Group
				48		Oc; Occ	Intermittent light
				49		SEC	Sector
				50			Color of sector

All Chart Symbols are found in Chart #1

# Charts



- Floating Aids (Buoys) are denoted by *Italic type*
- Fixed Aids (Beacons) are denoted by **Block type**
- A **magenta disk** means that the aid is lighted ●
  - Lights are **WHITE** unless otherwise noted
- Landmarks that are shown on a chart must be visible to the boater from the water
- Lighthouse descriptions are in the LIGHT LIST
- COLREGS Demarcation Lines - - - - -
  - COLREGS = Collision Regulations (a.k.a. NAVRULES or Rules of the Road)
  - COLREGS Lines designate where “International Rules of the Road” separate from “U.S. Inland Rules”
    - The waters inside of the lines are governed by Inland Rules. The waters outside the lines are International waters
    - Chapters 6 & 7 will cover COLREGs more thoroughly



**Chart Number 18685**

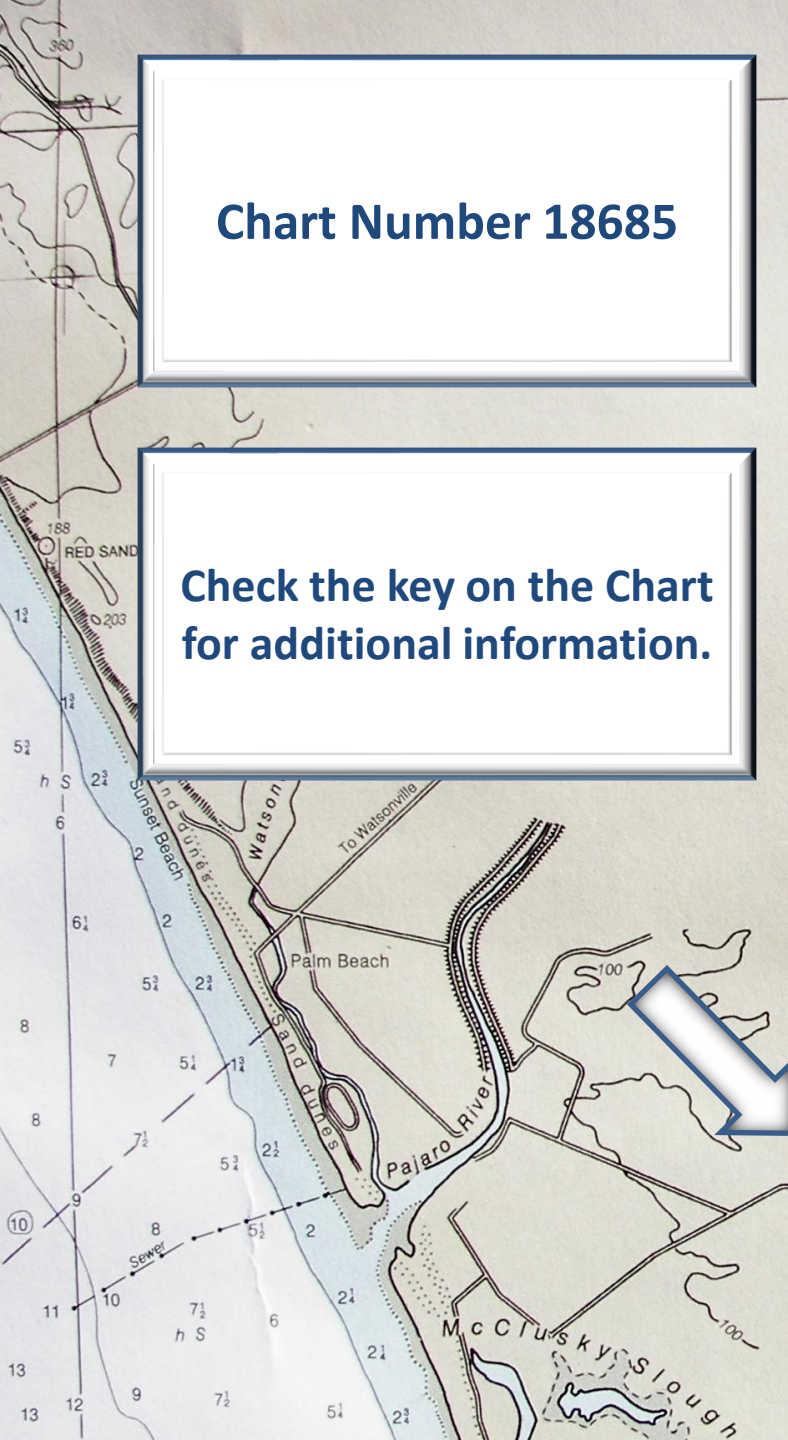
**Check the key on the Chart for additional information.**

UNITED STATES - WEST COAST  
CALIFORNIA

**MONTEREY BAY**

Mercator Projection  
Scale 1:50,000 at Lat 36°48'N  
North American Datum of 1983  
(World Geodetic System 1984)

SOUNDINGS IN FATHOMS  
AT MEAN LOWER LOW WATER



TIDAL INFORMATION

Name	Place (LAT/LONG)	Height referred to datum of soundings (MLLW)			
		Mean Higher High Water	Mean High Water	Mean Low Water	Extreme Low Water
Monterey	(36°36'N/121°53'W)	5.3	4.6	1.1	----
Moss Landing	(36°48'N/121°47'W)	5.2	4.5	1.0	-2.5
Santa Cruz	(36°58'N/122°01'W)	5.3	4.6	1.1	-3.5

(403)

ABBREVIATIONS (For complete list of Symbols and Abbreviations, see Chart No. 1.)

Aids to Navigation (lights are white unless otherwise indicated):

AERO aeronautical	G green	Mo morse code	R TR radio tower
Al alternating	IQ interrupted quick	N nun	Rot rotating
B black	Is isophase	OBSC obscured	s seconds
Bn beacon	LT HO lighthouse	Oc occulting	SEC sector
C can	M nautical mile	Or orange	St M statute miles
DIA diaphone	m minutes	Q quick	VQ very quick
F fixed	MICRO TR microwave tower	R red	W white
Fl flashing	Mkr marker	Ra Ref radar reflector	WHIS whistle
		R Bn radiobeacon	Y yellow

Bottom characteristics:

Blds boulders	Co coral	gy gray	Oys oysters	so soft
bk broken	G gravel	h hard	Rk rock	Sh shells
Cy clay	Grs grass	M mud	S sand	sy sticky

Miscellaneous:

AUTH authorized	Obstr obstruction	PD position doubtful	Subm submerged
ED existence doubtful	PA position approximate	Rep reported	

21 Wreck, rock, obstruction, or shoal swept clear to the depth indicated.

21 Sounding is in feet unless otherwise indicated.



San Francisco  
Outside of the  
Golden Gate Bridge

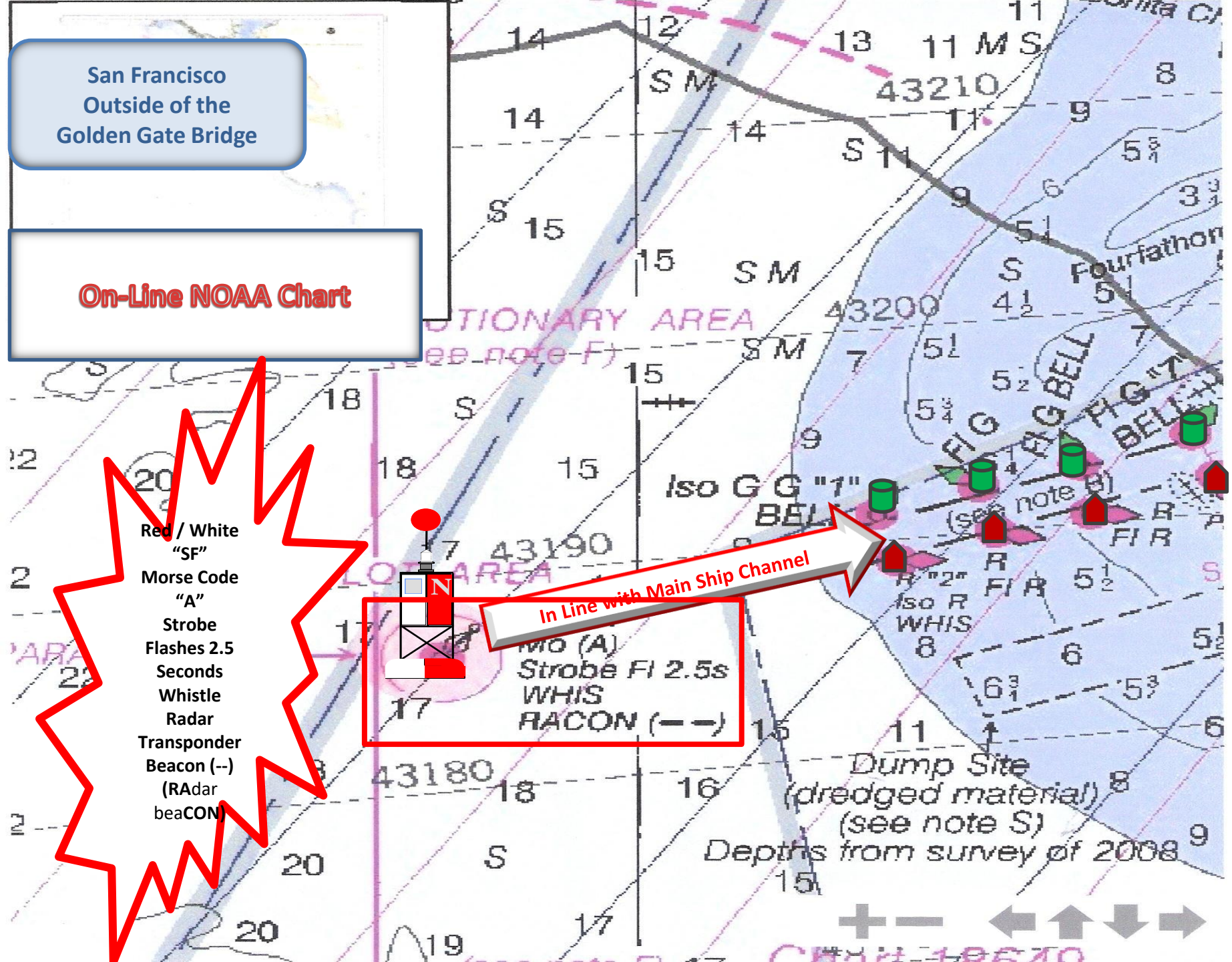
On-Line NOAA Chart

Red / White  
"SF"  
Morse Code  
"A"  
Strobe  
Flashes 2.5  
Seconds  
Whistle  
Radar  
Transponder  
Beacon (--)  
(RADar  
beacon)

In Line with Main Ship Channel

MORSE (A)  
Strobe Fl 2.5s  
WHIS  
RACON (---)

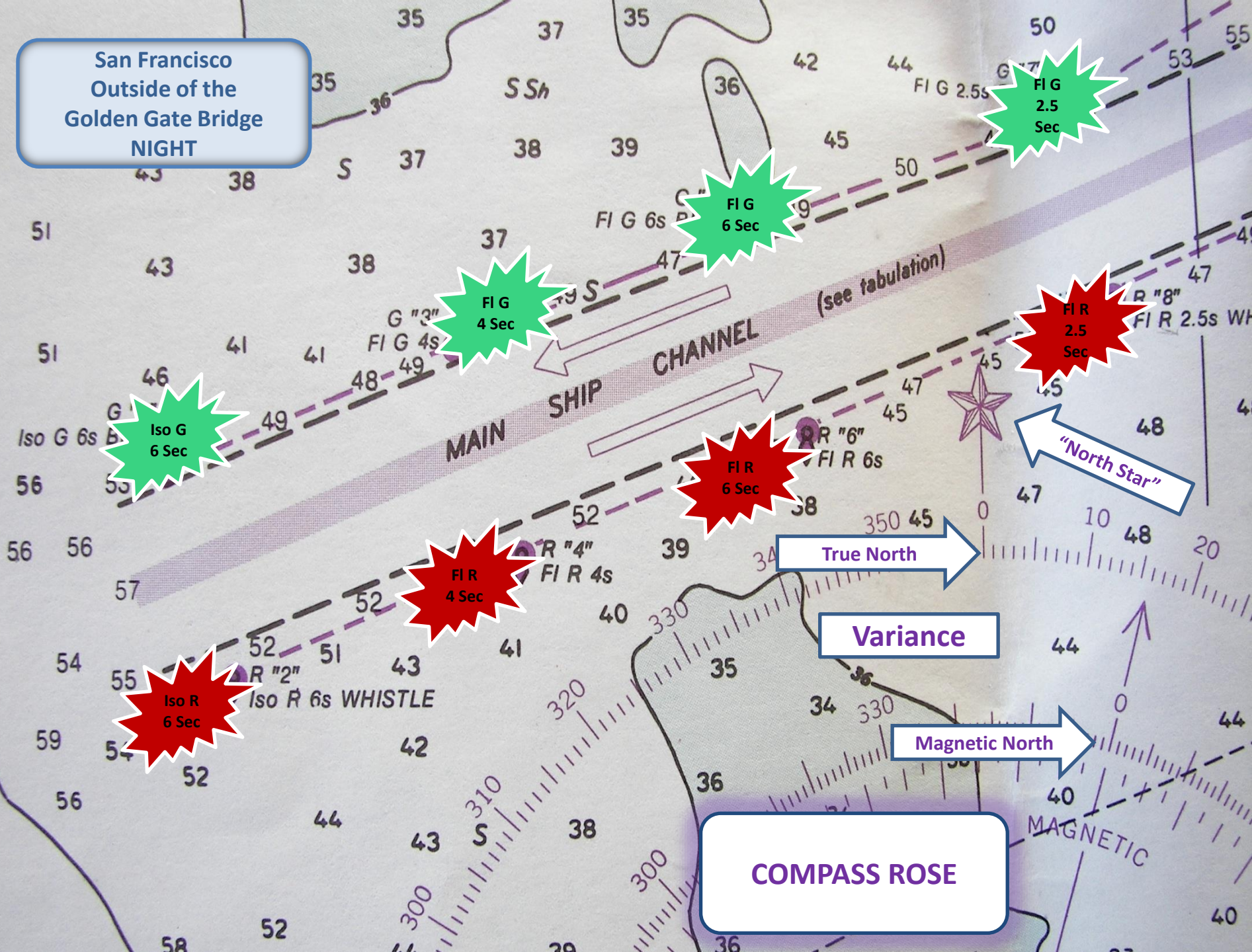
Dump Site  
(dredged material)  
(see note S)  
Depths from survey of 2008



San Francisco  
Outside of the  
Golden Gate Bridge



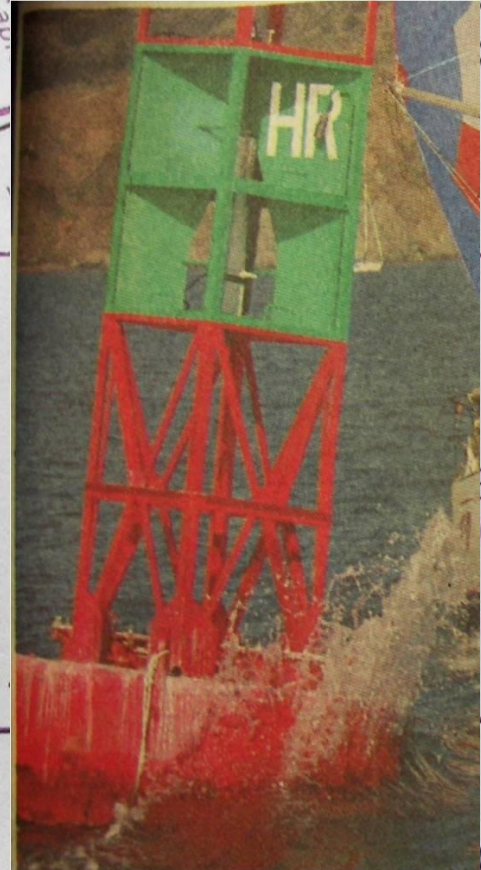
San Francisco  
Outside of the  
Golden Gate Bridge  
NIGHT



# San Francisco Bay

FIG  
4 Sec

FIR  
Pattern 2 + 1  
Repeats 6  
Sec



# Santa Cruz Harbor

Landmark

Landmark

Horn

"CG" Buoy

Lighthouse

Use Inset

Lighthouse

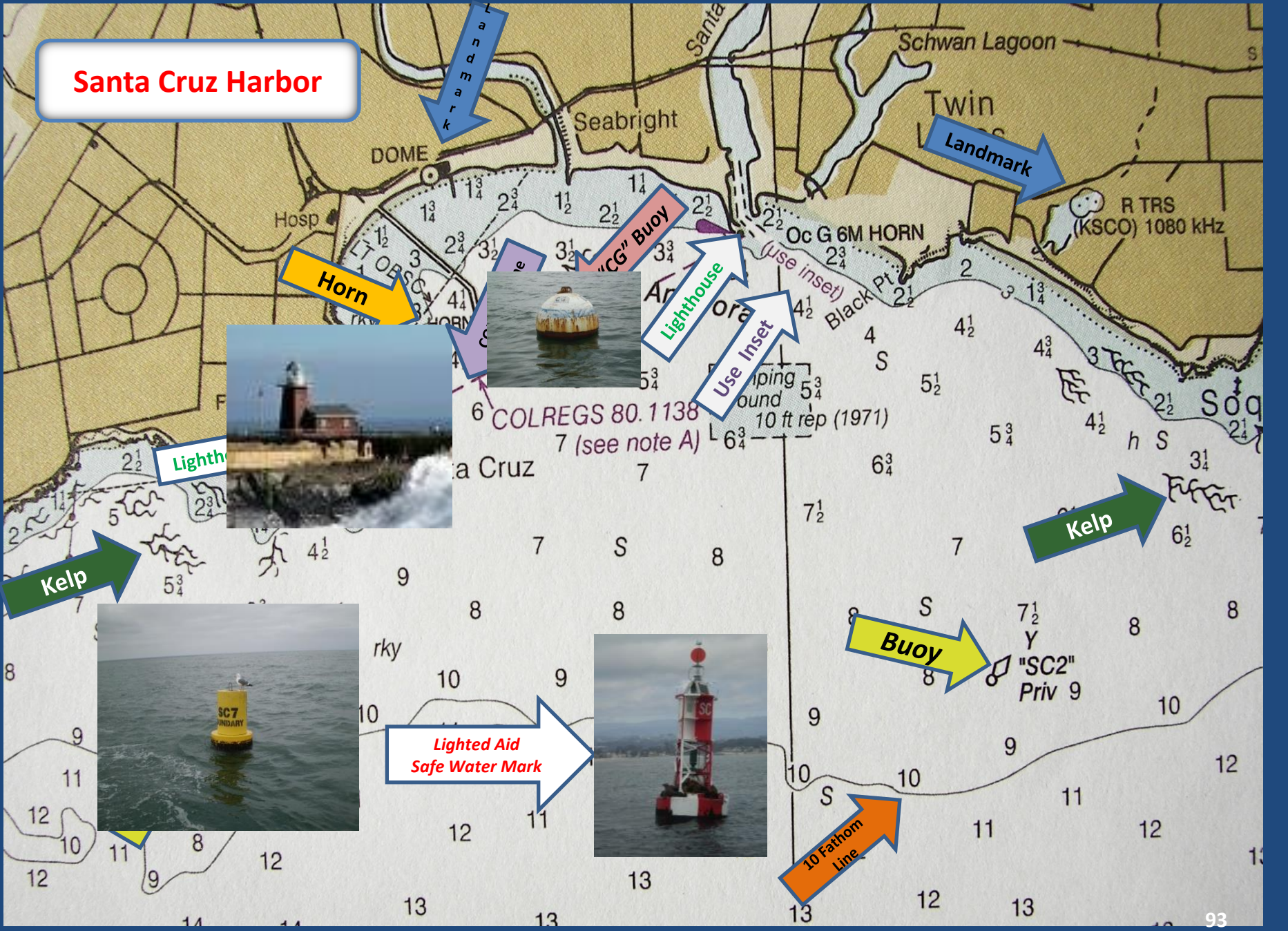
Kelp

Kelp

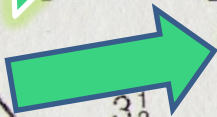
Buoy

Lighted Aid  
Safe Water Mark

10 Fathom  
Line



**Occulting Green  
4 Seconds  
36 ft. High  
Seen from 6  
Miles  
Horn**



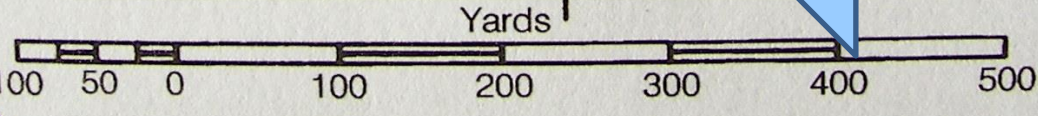
**Inset**

Note "Fathoms"

Note Scale

Depth shown  
at MLLW

Note Scale



**SANTA CRUZ  
SMALL CRAFT HARBOR**  
Scale 1:10,000  
SOUNDINGS IN FATHOMS  
AT MEAN LOWER LOW WATER

COLREGS 80.1138  
(see note A) S

Cable Area

(see note B)

May 2003

MAY 1986



# Santa Cruz Harbor Night



Light Obsc



Occulting Green  
Seen from 6 Miles

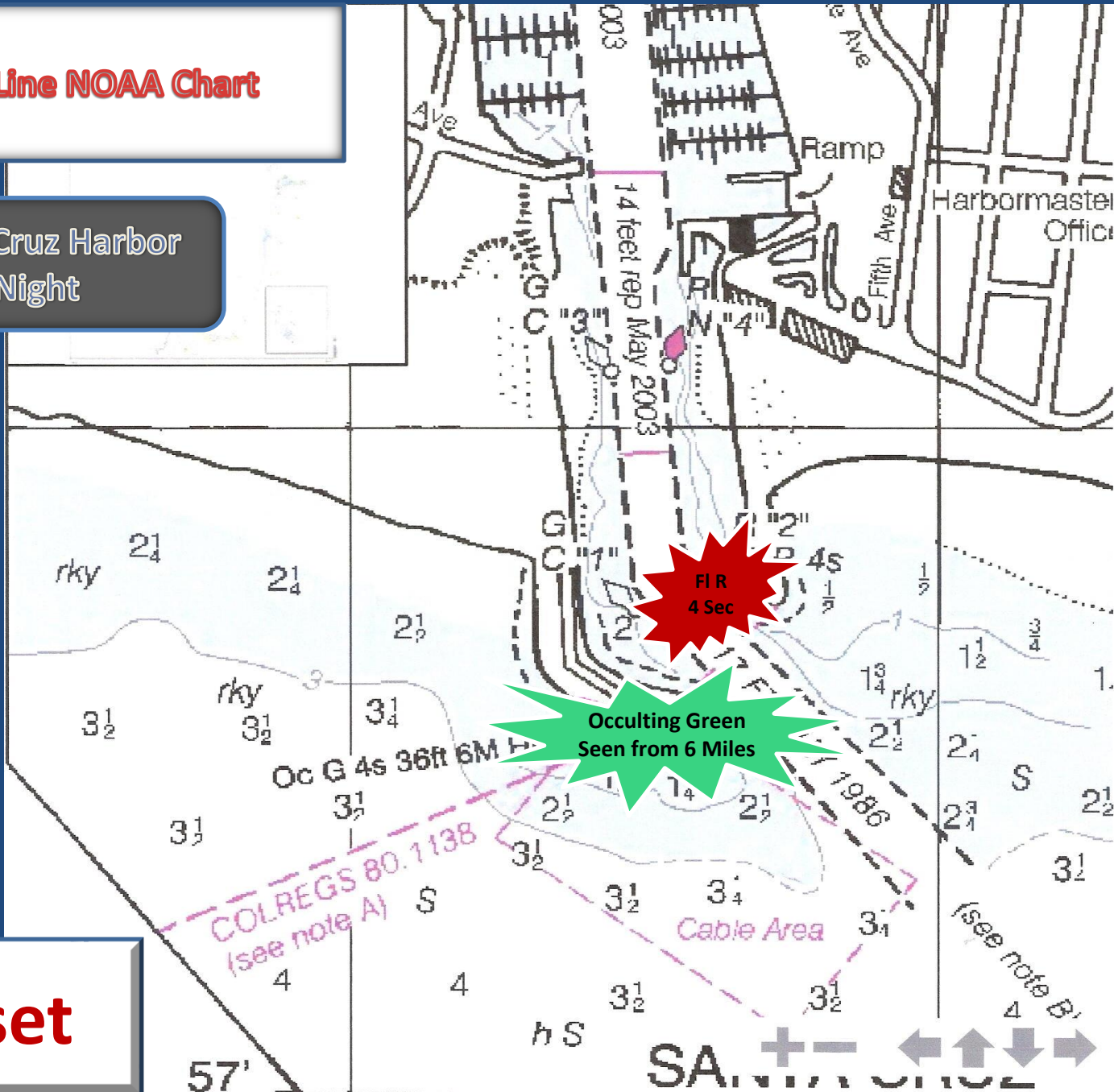
Flashes White  
5 Seconds  
60 ft. High  
Seen from 17  
Miles

Flashes White  
Mo (A)



On-Line NOAA Chart

Santa Cruz Harbor  
Night



Inset



# Thank you!



## Time for Questions?



### Production Credits:

Jim Duncan

District Staff Officer – Navigation Systems

Bruce Simpson

Division Staff Officer – Navigation Systems

COMO Wally Smith

District Staff Officer - Operations

Certified AToN Verifier

