

VOYAGE STRATEGY AND RACING PILOTING

CAPT RICHARD A. MORIN, MSC, USN (RET)

17FEB2004



YOUR MISSION...

To assist in the sail training of midshipmen



**Naval Academy Sailing is a
MIDSHIPMEN TRAINING PROGRAM**



A WORD FROM DNAS

“It’s real easy to forget on a 10,000-ton destroyer what the wind and current can do to you. However, it is on a sailboat that you begin to understand what wind and current do.”

*— CAPT Harold J. Flammang, USN (RET)
Former Director of Naval Academy Sailing
15JAN2002*



A WORD FROM A PROGRAM DIRECTOR

“Knowing the effects of the wind and current is a primary reason for training midshipmen on sailboats.”

*— LCDR Neil Covington, USN
27JAN2004*



PRESENTATION REFERENCES

United States Coast Pilot 1, Atlantic Coast: Eastport to Cape Cod

United States Coast Pilot 2, Atlantic Coast: Cape Cod to Sandy Hook

United States Coast Pilot 3, Atlantic Coast: Sandy Hook to Cape Henry

Reed's Nautical Almanac *[current year]*

Standard Operating Procedures and Regulations Manual

– DNAS INST.3120.1D (SOP)

Coastal Navigation – U.S. Sailing

Passage Making – U.S. Sailing

Eldridge Tide and Pilot Book *[current year]*

Gulf Stream Companion

→ *should be on board STC*



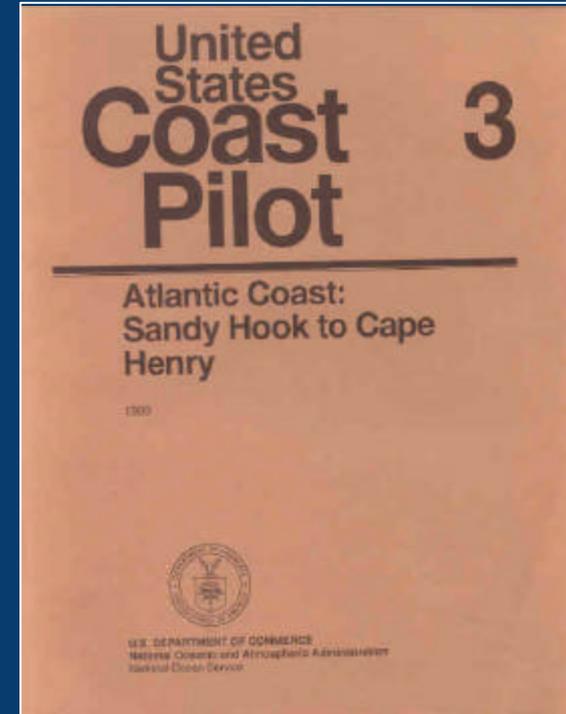
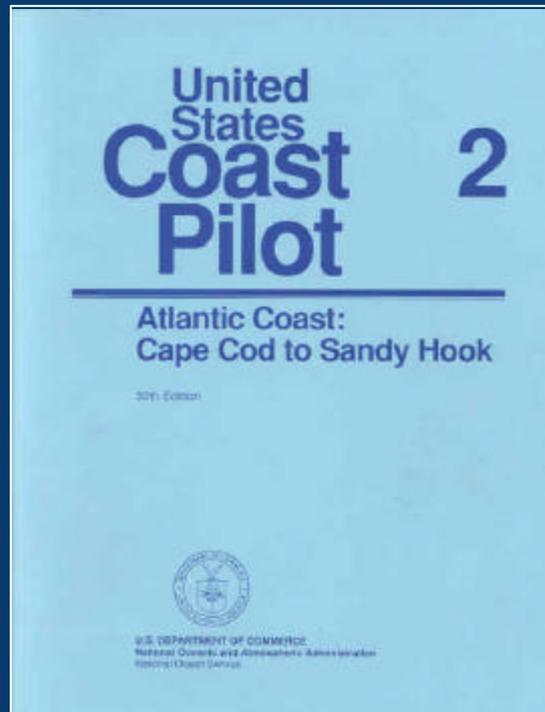
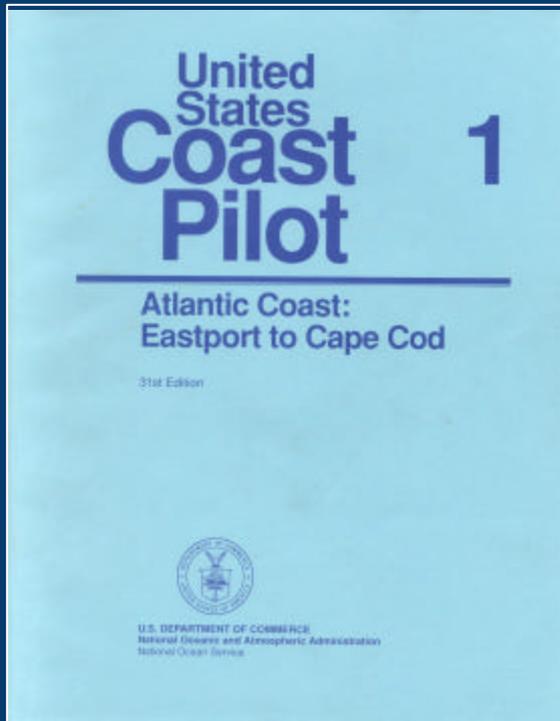
PRESENTATION REFERENCES

UNITED STATES COAST PILOT

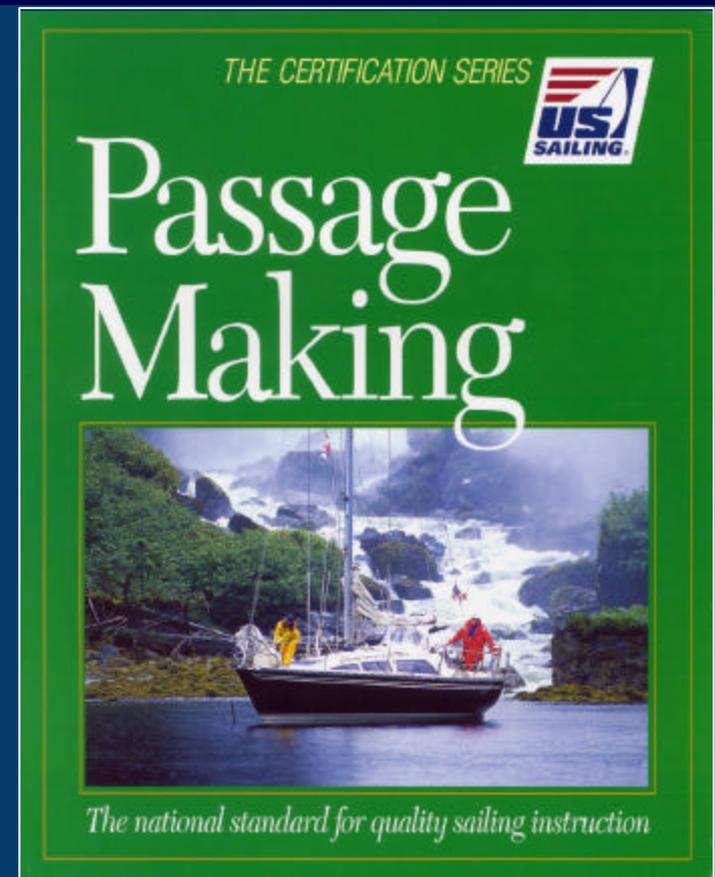
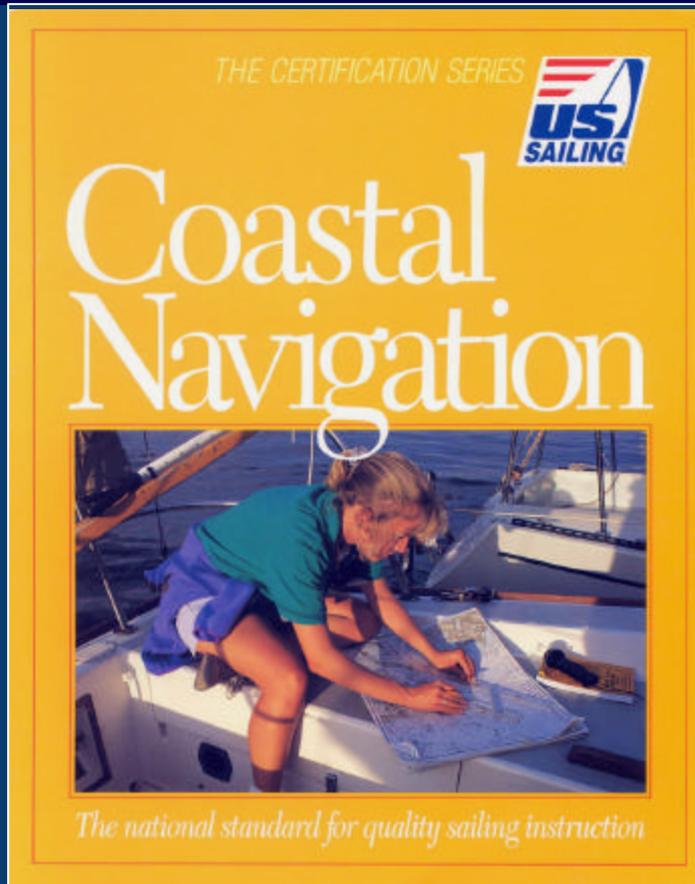
- Wide variety of detailed information about harbors and coastal areas of U.S.
- Dangers and aids to navigation
- Details of all restricted areas and local regulations
- Information on weather and suggested tracks
- Photographs of many harbors
- In 9 regional volumes



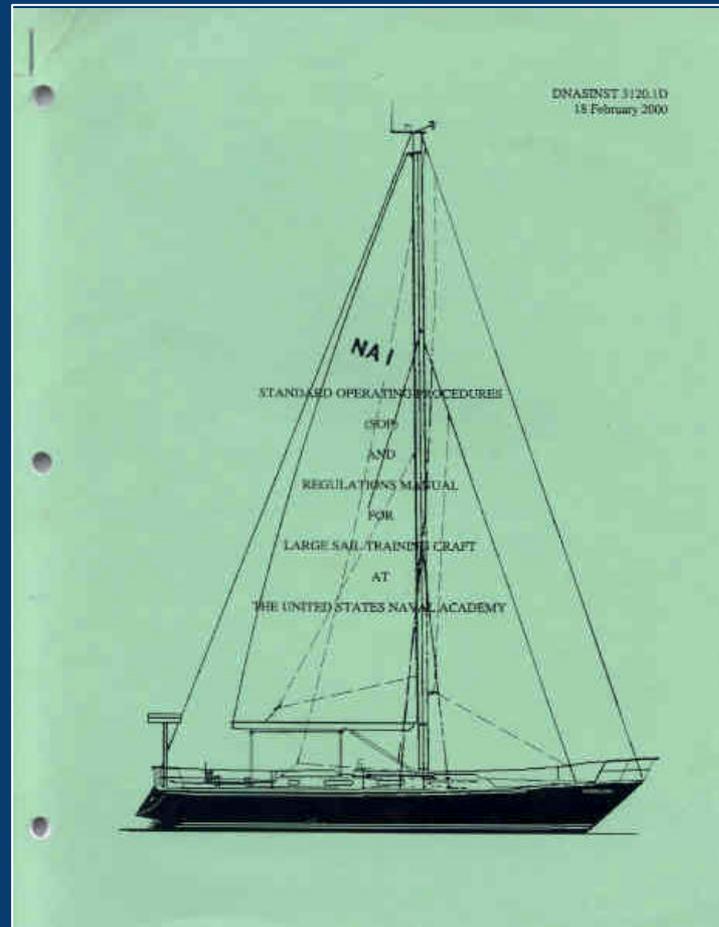
PRESENTATION REFERENCES



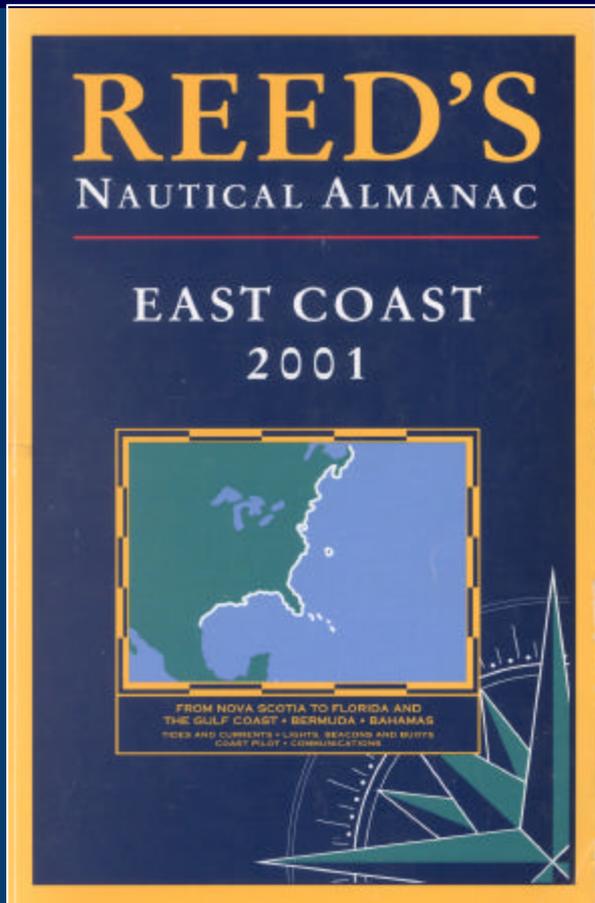
PRESENTATION REFERENCES



PRESENTATION REFERENCES



PRESENTATION REFERENCES



Tide and Current Tables in Summer Daylight Time

ONE HUNDRED AND TWENTY-EIGHTH YEAR

ELDRIDGE TIDE AND PILOT BOOK 2002

TIDES AND CURRENTS

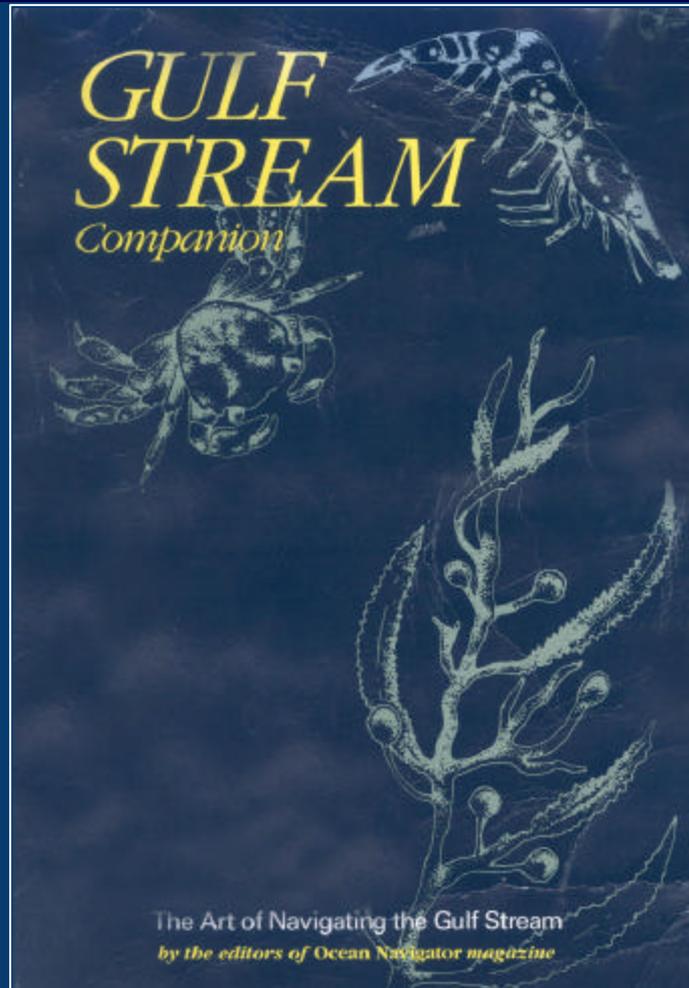
Daily High and Low Water at BOSTON	pages	12 - 17
Total Differences, High and Low Water, Porto from NOVA SCOTIA to KEY WEST	pages	18 - 26
Charts of Currents, BUZZARDS BAY, VINEYARD and NANTUCKET SOUNDS	pages	30 - 41
Daily Current Tables, CAPE COD CANAL, WOODS HOLE and POLLOCK RIP	pages	30 - 49
Daily High and Low Water at NEWPORT	pages	64 - 69
Daily Current Table, THE RACE	pages	70 - 75
Charts of Currents, BLOCK I, LONG I. Sounds	pages	78 - 83
Daily High and Low Water at BRIDGEPORT	pages	84 - 89
Daily High and Low Water at WILLETTS POINT	pages	90 - 95
Daily HELL GATE, THE NARROWS Current Table	pages	96 - 107
Daily High and Low Water at THE BATTERY	pages	108 - 113
NEW YORK BAY Current Charts	pages	114 - 119
Daily High and Low Water at SANDY HOOK	pages	120 - 125
Daily DELAWARE BAY ENTR. and CHESAPEAKE & DELAWARE CANAL Current Tables	pages	126 - 139
Daily High Water at BALTIMORE	pages	140 - 143
Daily High Water at MIAMI HARBOR ENTR.	pages	144 - 149
Current Differences from MAINE to FLORIDA	pages	150 - 157
LIGHTS & FOG SIGNALS - COURSES & DISTANCES	pages	160 - 196
DISTRESS CALLS	page	230
RADIOTELEPHONE INFORMATION	pages	242, 243
RADIOBEACON STATIONS - RACONS	pages	235, 237
SEE DETAILED LIST OF ASTRONOMICAL, WEATHER AND OTHER NAVIGATIONAL DATA	page	1

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PRESENTATION REFERENCES

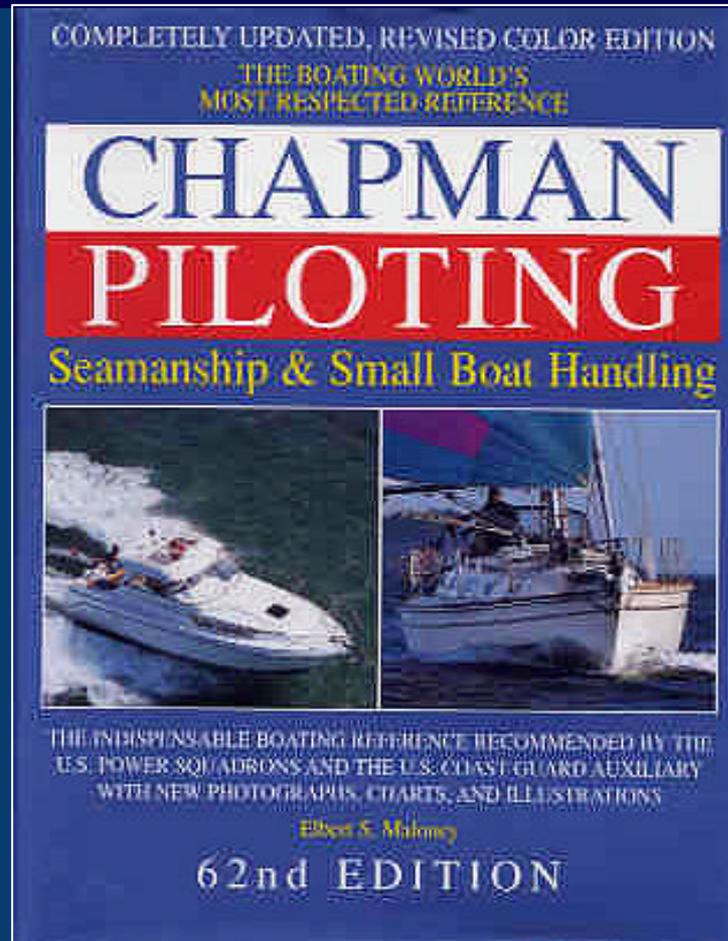


ADDITIONAL ON-BOARD PUBLICATIONS

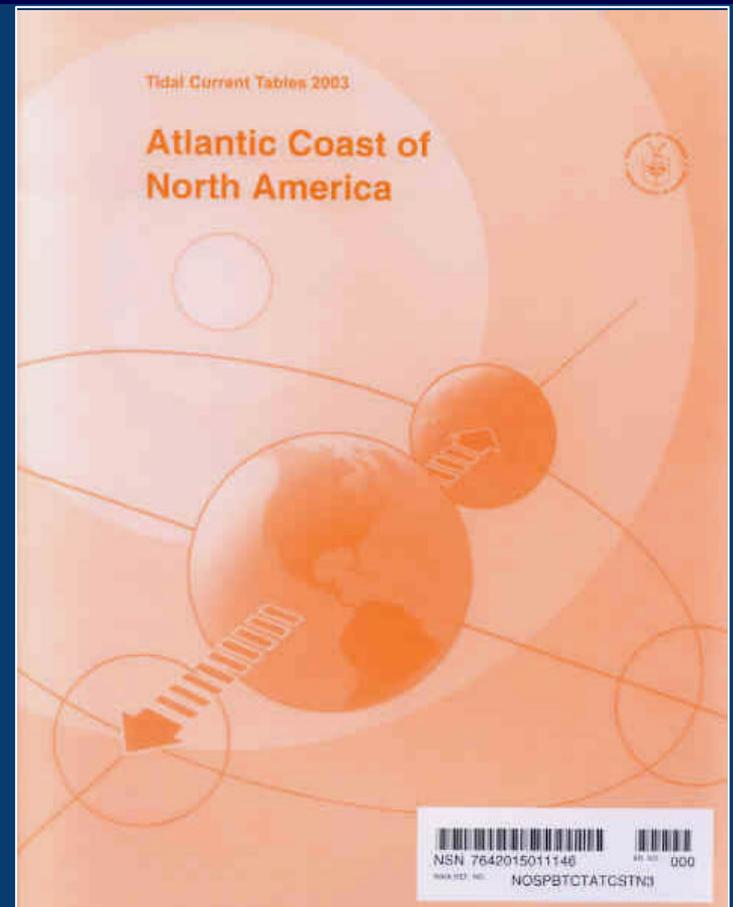
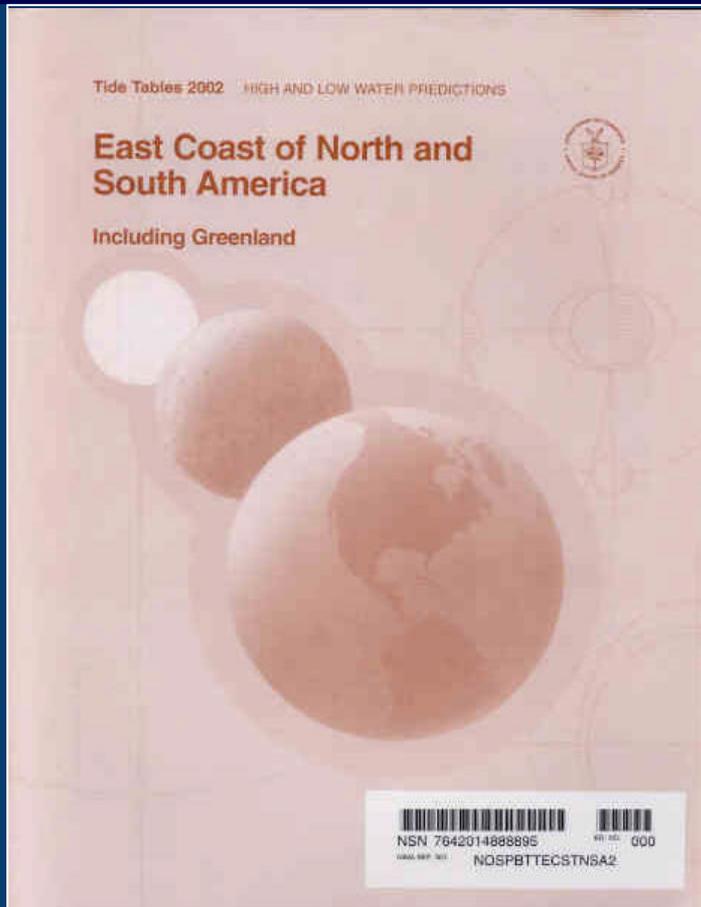
Chapman's Piloting: Seamanship & Small Boat Handling
Tide Tables, Atlantic Coast of North America *[current year]*
Tidal Current Tables, Atlantic Coast of North America *[current year]*
Updated charts (per chart list)
Light List *[applicable operating areas]* – for U.S. coastal waters
List of Lights *[applicable operating areas]* – for non-U.S. waters
United States Coast Pilot *[applicable volumes]*
Fleet Guide – Atlantic *[applicable chapters]*
Sailing Directions (as applicable)
Reed's Nautical Almanac *[current year]*
Rules of the Road



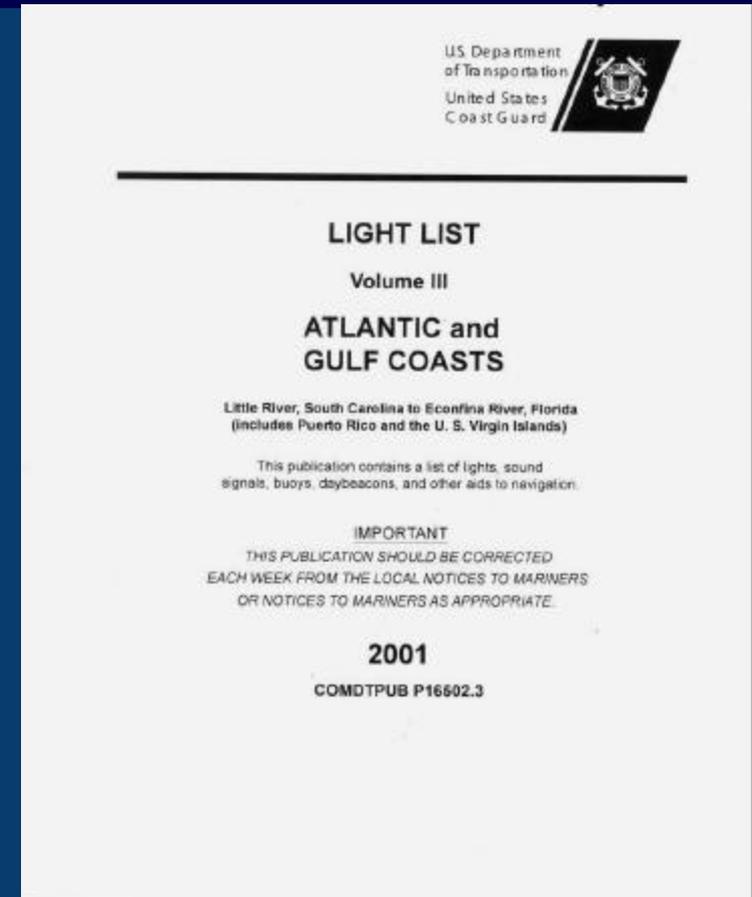
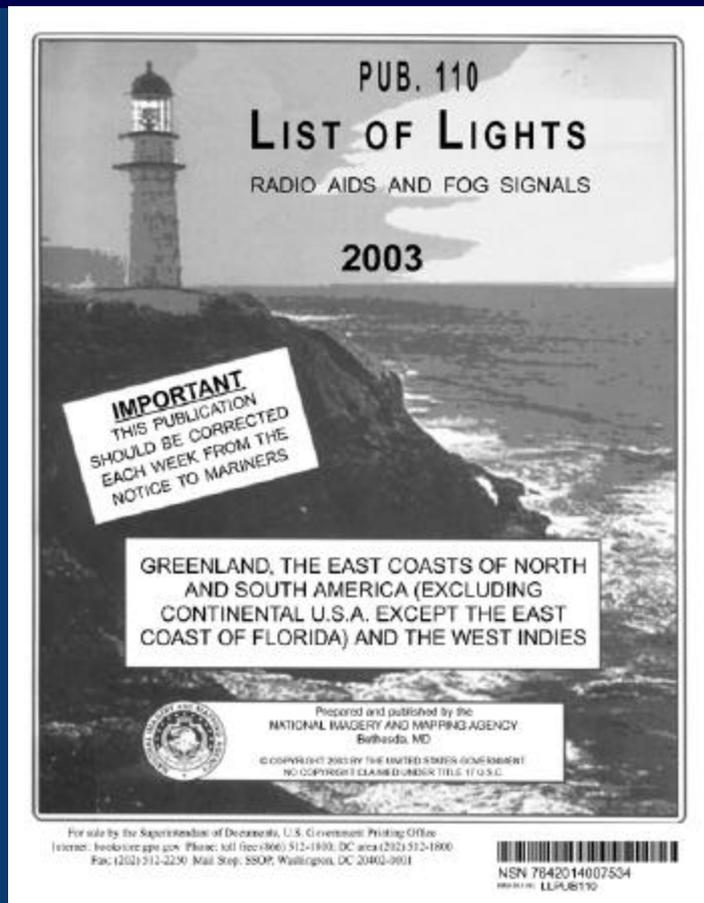
ON-BOARD PUBLICATIONS



ON-BOARD PUBLICATIONS



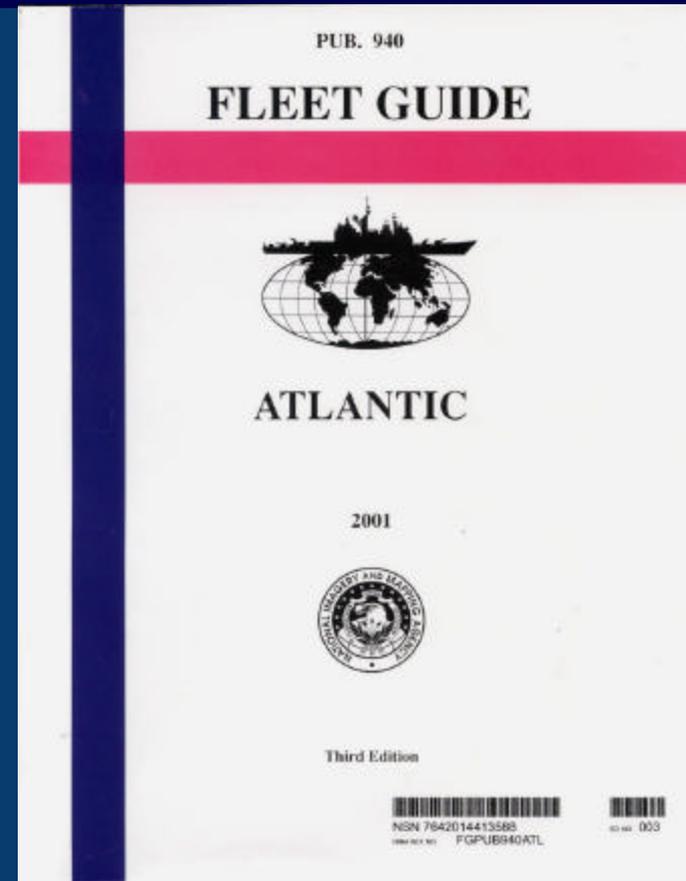
ON-BOARD PUBLICATIONS



ON-BOARD PUBLICATIONS

FLEET GUIDE – ATLANTIC (PUB. 940)

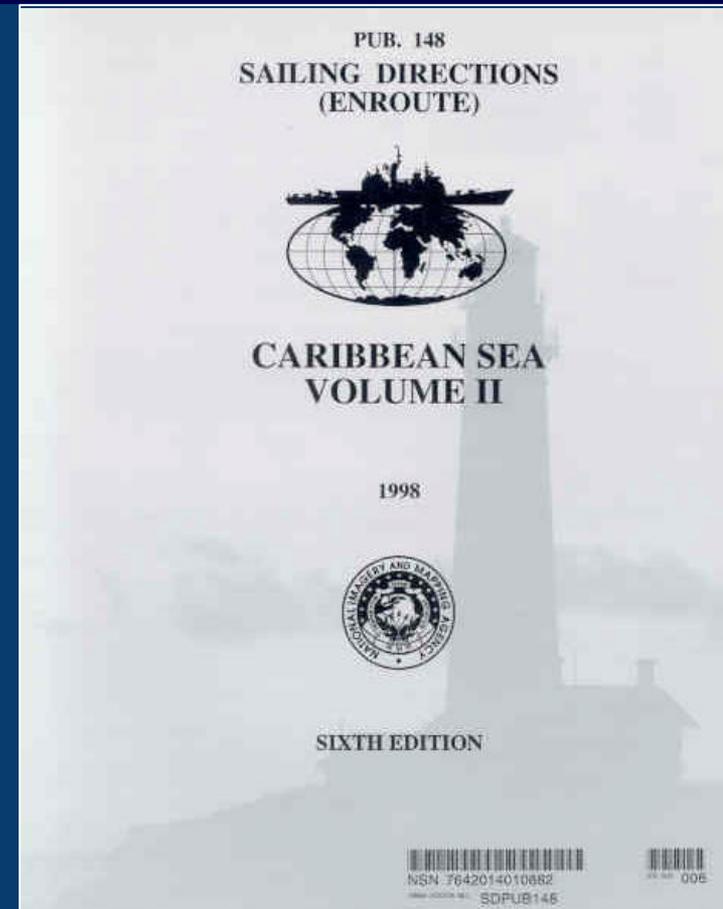
- ❑ Available only for ports with major naval facilities
- ❑ Designed to acquaint incoming naval ships with pertinent command, navigational, operational, repair, and logistics information



ON-BOARD PUBLICATIONS

SAILING DIRECTIONS (PUB. 148)

- ❑ Provides much of the same information as the Coast Pilot, but for *non-U.S.* waters
- ❑ Also has similar information to the Pilot Charts

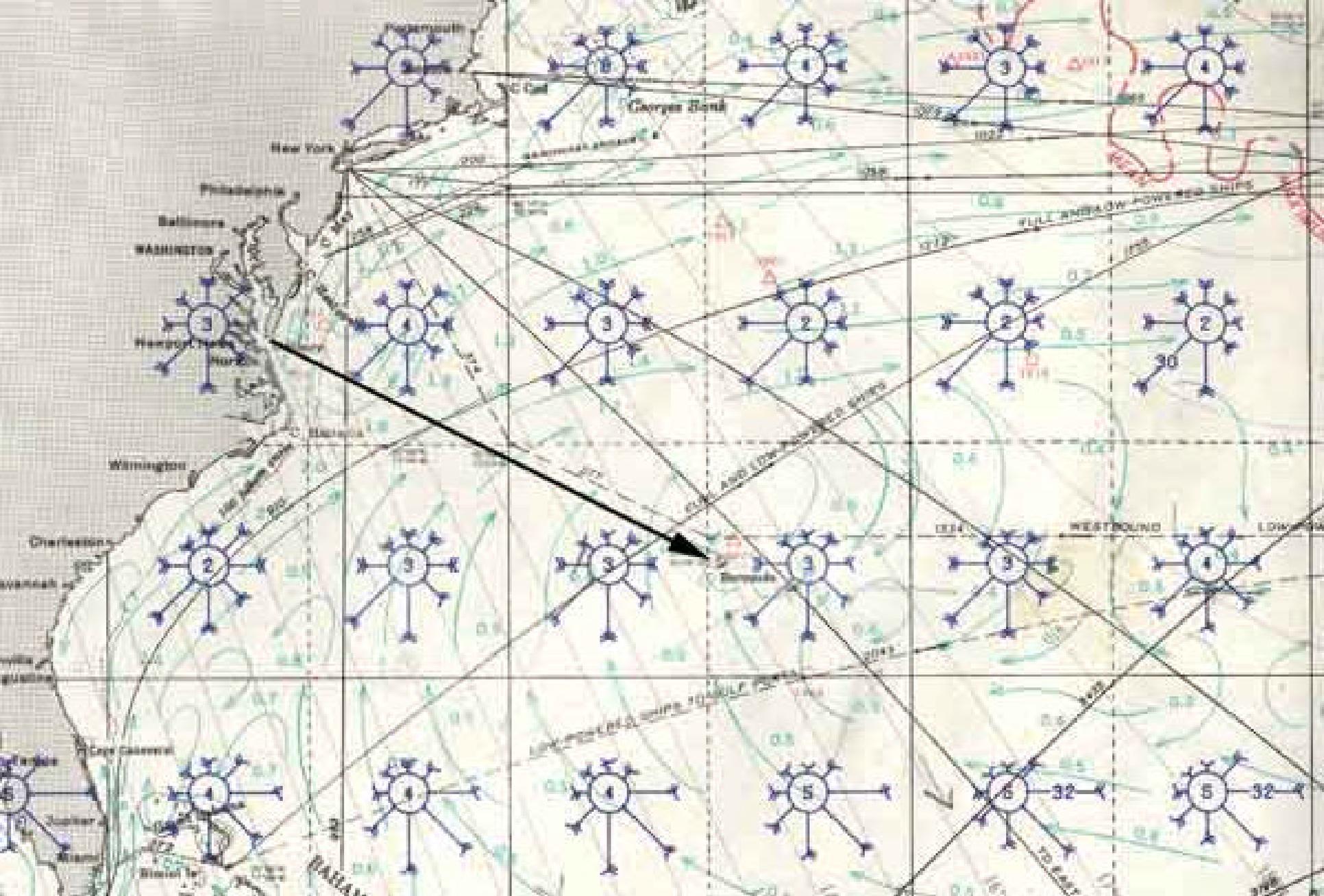


ADDITIONAL PUBLICATIONS

PILOT CHARTS

- Small-scale charts of ocean areas
- Provides complete forecasts of hydrographic, navigational, and meteorological conditions to be expected in a given area
- Includes average tides, currents, barometric pressure, temperature, storms, fog, wind, iceberg migration, and isogonic lines of variation

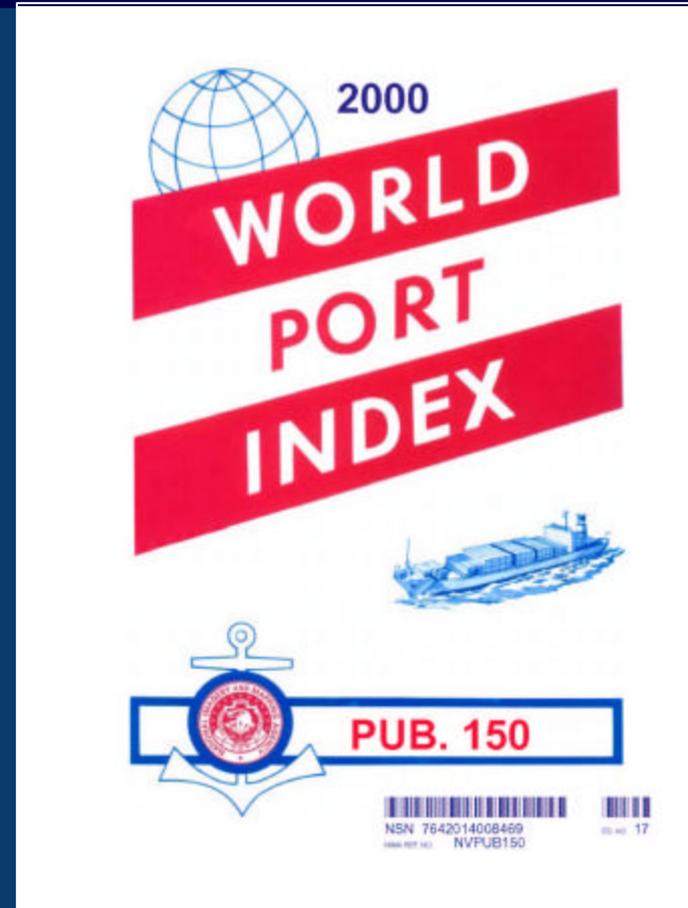




ADDITIONAL PUBLICATIONS

WORLD PORT INDEX (PUB. 150)

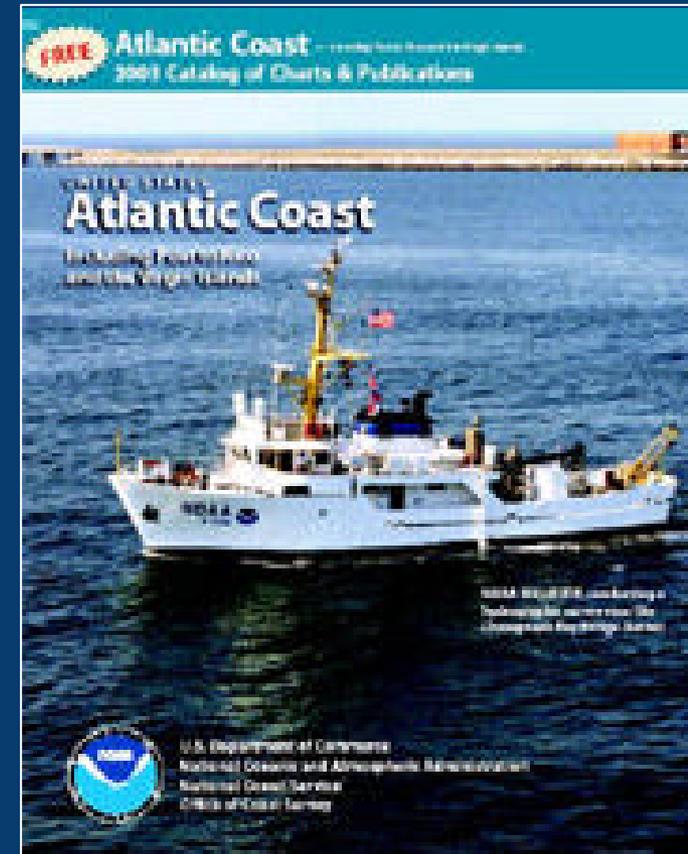
- ❑ Provides information on services available at ports throughout the world



ADDITIONAL PUBLICATIONS

CATALOG OF NAUTICAL CHARTS

- ❑ Contains a complete numerical listing of all unclassified charts and publications by portfolio number
- ❑ Navigator should consult this pub to determine what charts are required for the voyage



ADDITIONAL PUBLICATIONS

U.S. SAILING PUBLICATION



SOME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY
2. NAVIGATION PLANNING
3. WEATHER PLANNING
4. TIDES AND CURRENTS
5. DANGERS AND OBSTACLES



SOME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY

- PROGRAM HISTORY

- REVIEW OF THE SOP



ACCOUNTABILITY

PROGRAM HISTORY

- “Informal watchstanding has ended and there is now a requirement to know the SOP and the OPORDER.”*
 - CAPT Harold J. Flammang, USN (RET)*
Former Director of Naval Academy Sailing
15JAN2002
- Navigation Training emphasis initiated in 2002**
- Increased mandatory requirements initiated in 2003**



ACCOUNTABILITY

WHAT MAKES YOUR ROLE SO IMPORTANT?

“The coach is the Officer in Charge, under Navy Regulations. He and he alone is responsible for the safe operation of the boat. The midshipman skipper is in training to be an officer in charge.”

– *CAPT J.B. Bonds, USN (RET)*

*Former Director of Naval Academy Sailing
JUL 1984*



ACCOUNTABILITY

FLAG OFFICER NEWSGRAM-186 (6MAR1986)

Quoting a CO (Commanding Officer) who was relieved of his command for a grounding incident... *“Our ship went aground. I was the captain and I am responsible.”*

The Navy’s view on accountability is

“...the person in charge is the one who is accountable”

“...accountability and responsibility are the foundations of our profession; our task is to instill these values in our subordinates”



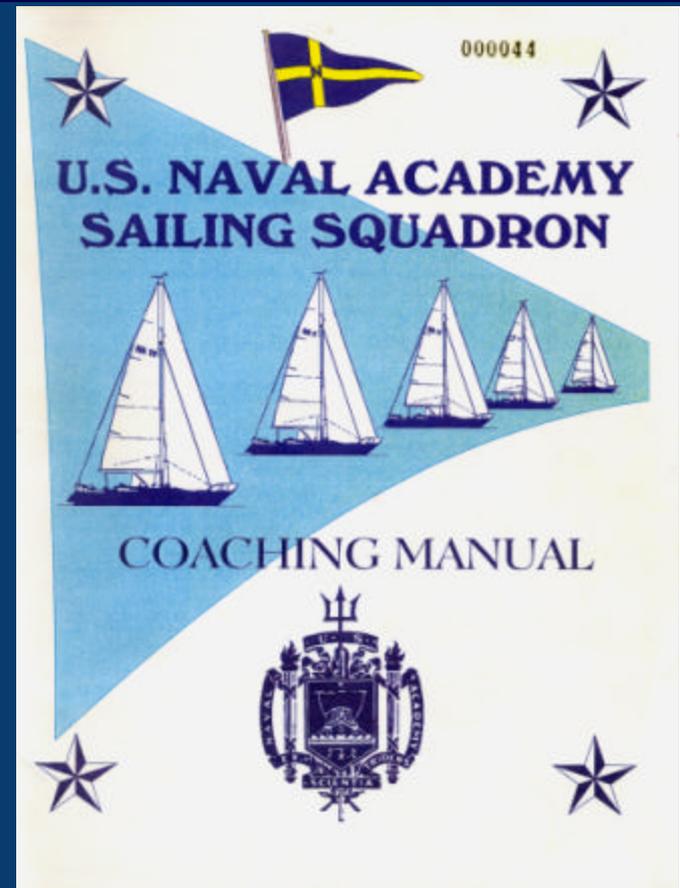
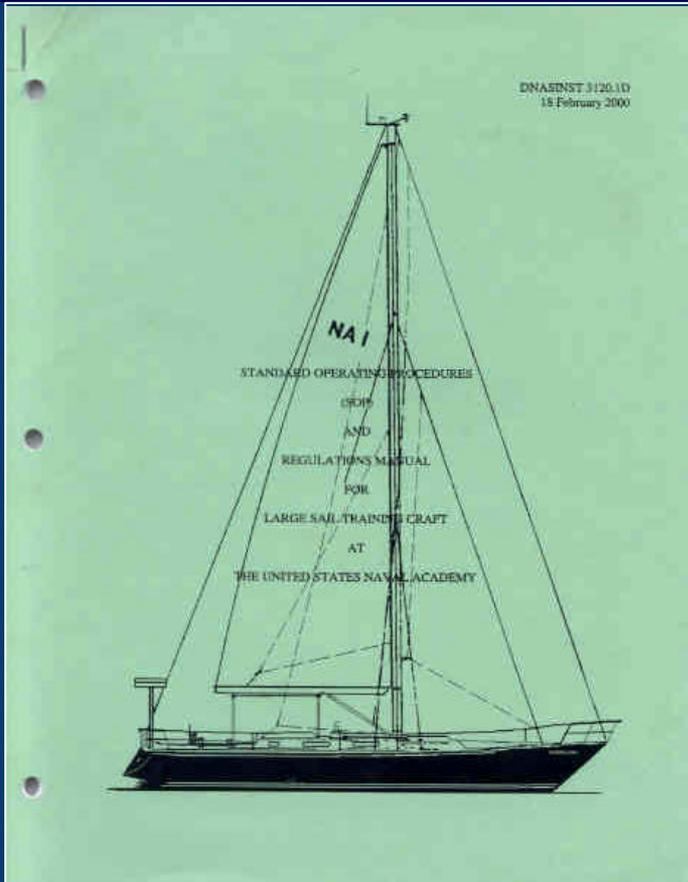
ACCOUNTABILITY

WHEN EXACTLY ARE YOU IN CHARGE?

Every U.S. Navy official document...



ACCOUNTABILITY



ACCOUNTABILITY

**...and even Attachments to Sailing
Instructions (SIs) for VOST Races,
all state the same thing...**



ACCOUNTABILITY

the OIC is ALWAYS in charge



SOME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY

– PROGRAM HISTORY

– REVIEW OF THE SOP



ACCOUNTABILITY

SOP 203. OFFICER-IN-CHARGE/COACH

“Only one individual on board can have ultimate command responsibility. For STC this individual is designated the Officer-in-Charge (OIC) or Coach. Officers-in-Charge or Coaches shall notify all crewmembers that they have assumed this responsibility before the STC gets underway.”



ACCOUNTABILITY

Do you see who is in charge?

YOU ARE

and when you are in charge,

you are...

... **ACCOUNTABLE**



ACCOUNTABILITY

YOU are responsible for avoiding collisions

SOP CHAPTER 5

POLICY REGARDING INCIDENTS WHILE UNDERWAY

- Cites U.S. Navy Regs, COLREGS, International Yacht Racing Rules, and DVOST Sailing Instructions

All make it clear that collision avoidance is a must.



ACCOUNTABILITY

The SOP further defines

☐ **Minor Incident** as “touching bottom” (*i.e.*, a **soft** grounding where progress is **not** stopped)

versus

☐ **Admiralty Incident** as a collision with another vessel, bridge, pier, buoy, *etc.* or a collision which results in personnel injury (*i.e.*, a **hard** grounding where forward progress **is** stopped) → report **immediately** by fastest means and collect information for **complete** investigation



ACCOUNTABILITY

When you get to the part on the Admiralty Incident report that asks “Who is accountable?”, start with yourself.

– IT IS CLEAR NOT ONLY WHO WILL BE HELD ACCOUNTABLE BUT ALSO WHEN



ACCOUNTABILITY

COLLISION AVOIDANCE REDUX

Every time the Director of Naval Academy Sailing talks to a group, he stresses that **COLLISIONS** are to be avoided.

SOP – 2.10 COLLISION AVOIDANCE

*“The basic fundamental policy regarding collisions of Naval Academy STC in any situation whether racing or cruising is that **COLLISIONS ARE TO BE AVOIDED.**”*



ACCOUNTABILITY

SO, THE BOTTOM LINE IS THAT--

You are always in charge

and

YOU WILL BE HELD ACCOUNTABLE



ACCOUNTABILITY

NAVIGATION-RELATED INCIDENT SUMMARY

SUMMER 2002

- ❑ 7 Groundings (Bermuda, Coast of Maine, Coaster's Harbor, Delaware River, Exit of C&D Canal, Eastern Bay, Greenbury Point)
- ❑ 2 Allisions (bridge in Newport, buoy in Delaware River while motoring)

SUMMER 2003

- ❑ 2 Groundings (Southport, NC; Tolly Point)
- ❑ 1 Allision (Chesapeake Bay Bridge Tunnel)

→ *incident occurred in local ops area*



ACCOUNTABILITY

POST-CRITIQUE...ACTUAL ROOT CAUSES

- OIC not setting the right standard*
- OIC focused on the wrong set of priorities*
- Nav Party not manned when required
- Post-mission let-down
- Midshipman steering errors



ACCOUNTABILITY

SO, THE BOTTOM LINE IS THAT--

You are always in charge

and

YOU WILL BE HELD ACCOUNTABLE



ACCOUNTABILITY

REMINDER

“The prudent mariner knows the situation, knows the limitations and capabilities of his craft and crew and always leaves an escape route”
– SOP

ADVISORY

“Let the skipper do everything he is capable of, and push him into things he isn’t yet competent in – but back him up so he doesn’t ruin his career and yours by a mistake. Our mission is to train these youngsters to the limit of our ability – safely.”

– CAPT J.B. Bonds, USN (RET)

Former Director of Naval Academy Sailing
1984



SOME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY

2. NAVIGATION PLANNING

3. WEATHER PLANNING

4. TIDES AND CURRENTS

5. DANGERS AND OBSTACLES



SOME FACTORS IMPORTANT TO THE OIC

2. NAVIGATION PLANNING

- CHARTS** – relevant for transit and/or race, safe havens
 - Read the charts, Know the charts, Require chart “maintenance”
- TIMELINE PLAN** – adjusted for expected weather and crew experience
- ALTERNATIVE ROUTE PLAN** – especially transits (e.g., Bermuda-Annapolis via Chesapeake Bay or Delaware Bay)
- WAYPOINTS** – relevant for transit and/or race



NAVIGATION PLANNING

SOP CHAPTER 3

303. REQUIREMENTS FOR LOCAL OPS –

a. “...A navigation brief...”

1. Charts 12270, 12282, 12283
2. Tide Table, Current Table, Light List
3. VHF Weather broadcast

b. ADDITIONAL REQUIREMENTS –

For all RACES

– Logbook entries

For VOST Practices, CSNTS Practices, P-100, and Rec. Sailing, the OIC/Coach, a brief, including wind & weather conditions/forecast, anticipated training evolutions & safety considerations



NAVIGATION PLANNING

NAVIGATION TOOLS

Reed's Nautical Almanac, Eldridge Tide and Pilot Book, and applicable Coast Pilots can assist in navigation planning and race strategy during VOST Races and/or transits to/from northern and southern waters.



NAVIGATION PLANNING

NAVIGATION TOOLS

Important steps for either an offshore race or a transit

- read the applicable portions of publications before departing
- ensure Navigator briefs Skipper and crew frequently (e.g., before entering Newport Bay, Bay of Fundy, Long Island Sound)



NAVIGATION PLANNING

WHY BRIEFINGS?

REED'S NAUTICAL ALMANAC

Delaware Bay

“...can be one of the nastiest pieces of water on the East Coast. The combination of strong currents and few good harbors requires advance planning. The winds against tide here creates rough waters, as do any winds over 20 knots.”



NAVIGATION PLANNING

WHY BRIEFINGS?

REED'S NAUTICAL ALMANAC

Chesapeake Bay

“The southern end of the bay is home to one of the largest naval bases in the world and one of the busiest ports. In Norfolk, you share the channel with aircraft carriers and ore carriers. Tune to VHF Channel 13 to keep abreast of the commercial traffic or to ask for channel clarification.”



NAVIGATION PLANNING

U.S. COAST PILOT 2

Section 3 starts at description of prominent features listing applicable charts and significant areas (e.g., Martha's Vineyard)

Newport Area – Paragraph 24 describes fog and weather conditions that relate to fog clearing, days of fog per month



NAVIGATION PLANNING

REED'S NAUTICAL ALMANAC

SECTION P (PILOTING) AND SECTION T (TIDES)

- ❑ Coastal Passage Notes and large area chartlets
- ❑ Marblehead, MA – lights & buoys & warnings
- ❑ New York – “the Race” and Eastern Entrance to Long Island Sound
- ❑ Delaware Bay markers
- ❑ Chesapeake Bay – Page P-224 describes the bridge tunnel as a “Hazard” (so, it’s not just another waypoint)
 - ❑ incident in 2003
- ❑ Bermuda – Pages P-429 and T-165
- ❑ Halifax – Pages P-32 and T-12
- ❑ “cutting corners” (e.g., at Cape May)



This is a tremendously busy port. Both commercial fishing and pleasure fishing boats blast in and out at all times of the day. Be very careful when approaching the opening bridges, as the currents are swift and the bridges slow to open. Be prepared to anchor if necessary. The Point Pleasant Canal leads to the New Jersey section of the intracoastal Waterway. The current flows swiftly through the canal, which is crossed by two opening bridges. Sailboats are advised to enter the canal at slack current or with a slight adverse tide. There is very little maneuvering room inside. Manasquan is the last good harbor of refuge before Atlantic City when headed south.

BARNEGAT INLET

Hazards: Barnegat Inlet Channel is subject to continual change due to severe shoaling. The buoys marking the channel are shifted frequently to mark the best water and therefore are not charted. Breakers make across the inlet with an ebb tide and an easterly wind. Strangers should not attempt to transit the inlet under any but ideal conditions. Boatmen needing assistance should lay outside the inlet and contact the local Coast Guard station.

NOTE: Positions of buoys frequently shifted with changing conditions.

Barnegat Lighted Buoy B, 39 45.8N, 73 46.1W, Fl Y 6s, 7M. Yellow. **RACON B** (- - -).

Barnegat Offshore Lighted Gong Buoy 2, 39 45.5N, 73 59.5W. Fl R 6s, 5M. Red.

Barnegat Inlet Wreck Buoy, 39 46.4N, 74 05.0W. Red nun.

Barnegat Inlet Outer Lighted Whistle Buoy BI, 39 44.6N, 74 03.5W. Mo (A) W, 6M. Red and white stripes with red spherical topmark.

North Jetty Danger Buoy, white and orange can.

Lighted Buoy 1, Fl G 2.5s, 4M. Green.

Buoy 2, red nun.

Buoy 3, green can.

South Jetty Danger Buoy, white and orange can.

Lighted Buoy 4, Fl R 6s. Red nun.

Buoy 4A, red nun.

Buoy 5A, green can.

NORTH BREAKWATER LIGHT 6, 39 45.6N, 74 05.5W. Fl R 4s, 37ft, 5M. TR on skeleton tower.

SOUTH BREAKWATER LIGHT 7, 39 45.5N, 74 05.6W. Q G, 37ft, 5M. SG on tower. Horn: 1 blast every 30s.

Lighted Buoy 8, Fl R 4s, 4M. Red.

Lighted Buoy 9, Fl G 2.5s. Green.

Lighted Buoy 11, Q G, 4M. Green.

Lighted Buoy 12, Fl R 2.5s, 3M. Red.

Barnegat Harbor Channel Lighted Buoy 14, Fl R 2.5s, 3M. Red. Replaced by nun when endangered by ice.

Barnegat Harbor Channel Junction Buoy, green and red banded can.

LITTLE EGG INLET

NOTE: Positions of buoys frequently shifted with changing conditions.

Little Egg Inlet Outer Lighted Whistle Buoy LE, 39 27.7N, 74 16.6W. Mo (A) W, 5M. Red and white stripes with red spherical topmark.

Buoy A, red and white stripes, spherical buoy.

Buoy B, red and white stripes, spherical buoy.

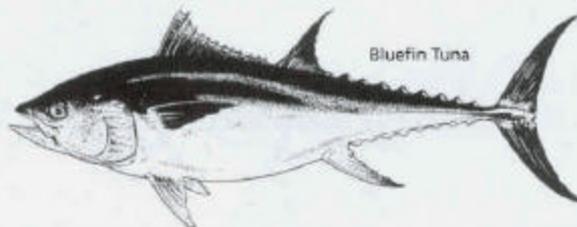
Buoy C, red and white stripes, spherical buoy.

Lighted Buoy D, Mo (A) W, 5M. Red and white stripes.

Buoy E, red and white stripes, nun.

Lighted Buoy F, Mo (A) W, 5M. Red and white stripes.

Buoy G, 39 30.1N, 74 18.3W. Red and white stripes, nun.



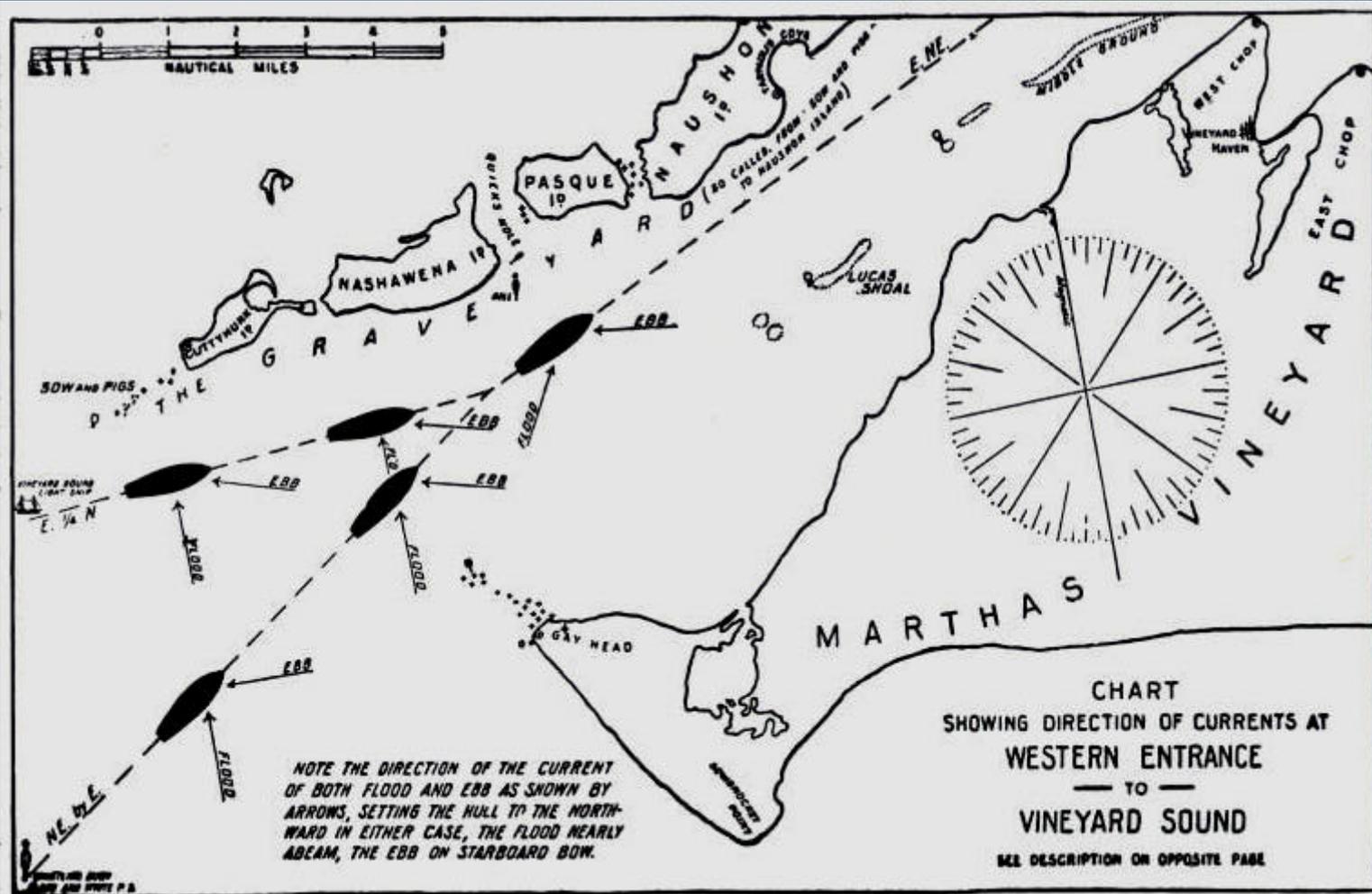
NAVIGATION PLANNING

REED'S NAUTICAL ALMANAC



NAVIGATION PLANNING

ELDRIDGE TIDE AND PILOT BOOK



NAVIGATION PLANNING

U.S. COAST PILOT

- ❑ Review narrative sections (e.g., description of Nantucket Shoals in CP-2, Page 109)
- ❑ Find lists of Lats and Longs for areas *“to be avoided... because of the great danger of stranding and for reasons of environmental protection.”*

There is in every Coast Pilot detailed Navigation information – charts, land features, NavAids, etc. – in a large section on **Navigation**. This information is applicable to races, such as Annapolis-Newport, Around Martha’s Vineyard, and Around Long Island.



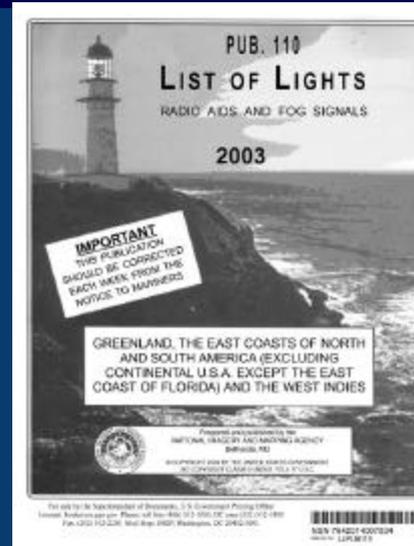
NAVIGATION PLANNING

LIST OF LIGHTS

Contains descriptions of lighted aids to navigation and unlighted buoys, day beacons, fog signals, radiobeacons, and Differential GPS coverage in *non-U.S.* waters.

LIGHT LIST

Contains descriptions of lighted aids to navigation and unlighted buoys, day beacons, fog signals, radiobeacons, Differential GPS coverage, *and LORAN-C* in *U.S. coastal* waters.



SOME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY

2. NAVIGATION PLANNING

3. WEATHER PLANNING

4. TIDES AND CURRENTS

5. DANGERS AND OBSTACLES



2001 SYDNEY-HOBART RACE

Pictures taken from Volvo 60, Team News Corp, before being overtaken by waterspout. Encountering 58-knot winds and golfball-size hail, she doused all sail, except for small jib, suffering only broken battens and blocks but no injuries.



SOME FACTORS IMPORTANT TO THE OIC

3. WEATHER PLANNING

- Local conditions
- Planning ahead by looking early
- Heavy weather considerations



WEATHER PLANNING

Advanced Weather Presentation was given last week by CDR Sengelaub.

This section on **Weather Planning** lists information available within the previously mentioned references of this presentation.



WEATHER PLANNING

“The ability to deal with heavy weather is as much a function of the crew’s experience and stamina as it is of the sturdiness of the boat.”

*– Ralph Naranjo (DEC2002)
Naval Academy Sailing Vanderstar Chair*



WEATHER PLANNING

PLANNING FOR WEATHER

While tides can be predicted for years ahead, the weather cannot. Weather reports and models are presented daily. But, to use the weather information effectively, you must have a feeling for the conditions you might encounter. You must both understand what you are seeing in reports and, more importantly, you must also begin looking early.



WEATHER PLANNING

COAST PILOT 2 (ATLANTIC COAST: CAPE COD TO SANDY HOOK)

WEATHER – Newport and vicinity – The prevailing winds are southwesterly in the summer and northwesterly in the winter. The heaviest gales are usually from the northwest and the northeast.

So,



WEATHER PLANNING

...if you look at a weather fax and see winds developing from the **NW** or **NE**, would you reconsider your plans?



WEATHER PLANNING

As a general rule of thumb –

– for a daysail or a day race, start looking ahead at least
4 to 5 days

– for a transit to Newport, start looking ahead at least
2 weeks



WEATHER PLANNING

For actual sea and weather conditions, use NOAA's Dial-A-Buoy Service (228-688-1948) and enter appropriate codes (e.g., code for Delaware Bay is 44009).

Check web site at

<http://www.ndbc.noaa.gov/dial.shtml>



WEATHER PLANNING

CLIMATOLOGICAL TABLES

U.S. COAST PILOT 2

Newport Fog – Coast Pilot Table lists a visibility row “Mean number of days with fog”

For Newport, it’s 10 days in June, 12 days in July, and 9 days in August.

So, June, July, and August are the 3 months with the most days for fog.

The prudent OIC prepares both a transit plan and a training exercise for these expected conditions.



CLIMATOLOGICAL TABLE

These tables were prepared by the National Climatic Data Center (NCDC), National Environmental Satellite, Data & Information Service (NESDIS), NOAA.

† means trace (not measurable) of precipitation. Miss or <blank> is a missing value.

Sea level pressure is Station pressure reduced to sea level.

ROCHESTER, NY (43°07'N,077°40'W) Elevation 547 feet (166.7 m)

Table with columns for months (JAN to DEC) and years (1916-19, 1920-23, 1924-27, 1928-31, 1932-35, 1936-39, 1940-43, 1944-47, 1948-51, 1952-55, 1956-59, 1960-63, 1964-67, 1968-71, 1972-75, 1976-79, 1980-83, 1984-87, 1988-91, 1992-95, 1996-99, 2000-03, 2004-07, 2008-11, 2012-15, 2016-19). Rows include: SEA LEVEL PRESSURE, MEAN CHILLING HOURS, TEMPERATURE (MEAN, MAX, MIN), RELATIVE HUMIDITY, CLOUD COVER, PRECIPITATION, WIND, DIRECTION, and VISIBILITY.

WEATHER PLANNING

CLIMATOLOGICAL TABLE

- Sea Level Pressure
- Temperature
- Relative Humidity
- Cloud Cover
- Precipitation
- Wind
- Visibility

For Specific Location
By Month
Total for Year



WEATHER PLANNING

There is also information on the “prevailing weather”
in Coast Pilot, Reed’s, Eldridge, Gulf Stream
Companion, etc.



WEATHER PLANNING

Coast Pilot volumes have meteorological information

Weather elements – monthly tables, wind, wave heights, *etc.*



WEATHER PLANNING

U.S. SAILING PUBLICATION *PASSAGE MAKING*

- Coastal Weather in Chapter 5, including information on how to interpret a Weather Fax on Pages 33, 34, and 35

“[Preparing for] heavy weather is a relative term, one that is tempered by the soundness of the vessel and the ability of the crew.”

– Ralph Naranjo (DEC2002)

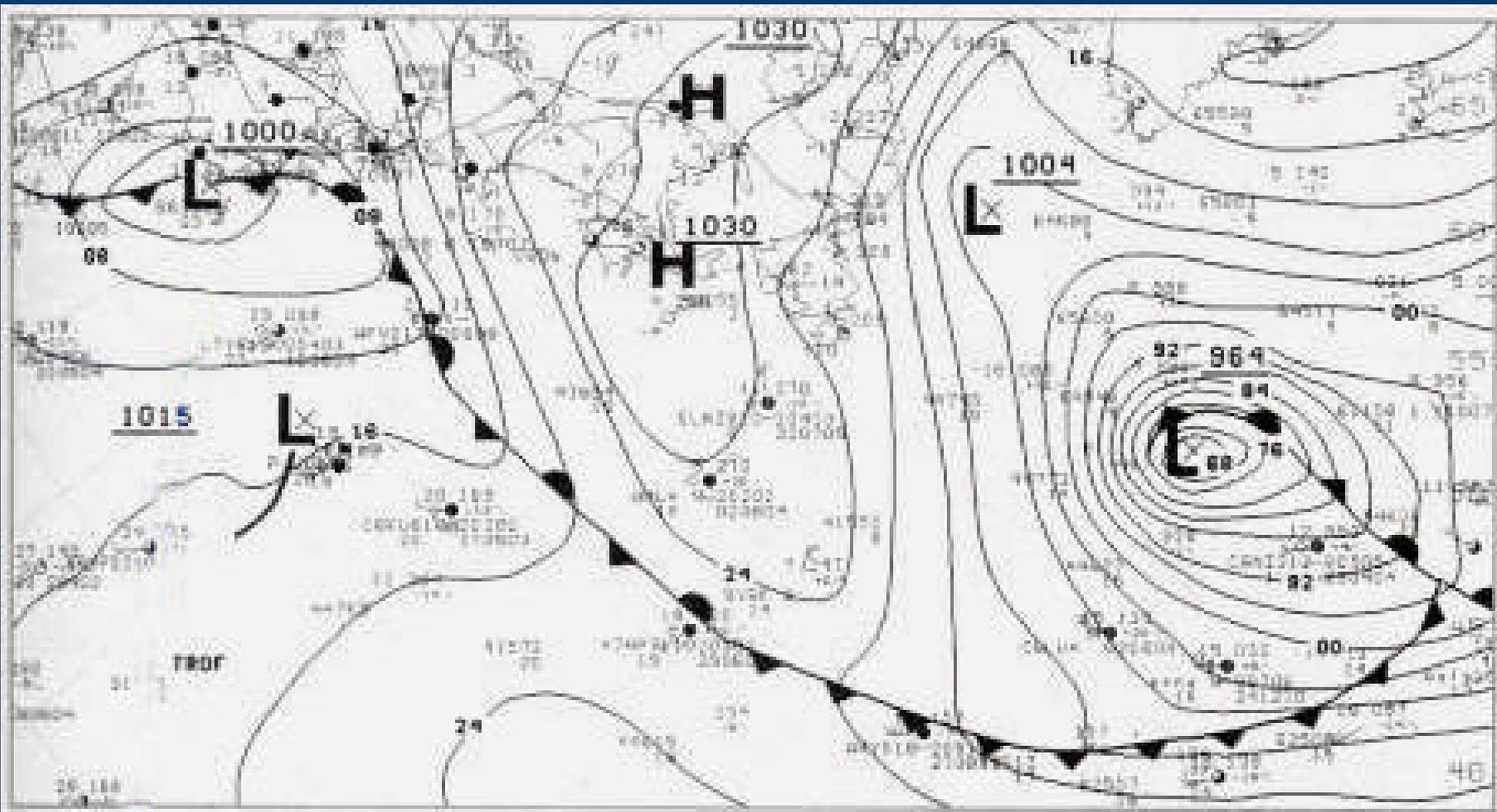
Naval Academy Sailing Vanderstar Chair

- Coastal Heavy Weather in Chapter 11



WEATHER PLANNING

WEATHER FAX



WEATHER PLANNING

POINTS WORTH REMEMBERING...

Sailing involves two different environments – air and water. Don't overlook important features of getting the boat to “go fast” through the water (e.g., in heavy weather).

“Don't attempt to bash straight into the waves. Crack off – Sail fast enough to prevent loss to leeway but not so fast you” shake yourself to pieces.

Don't take the strength of your crew for granted. Being able to somehow offer hot food – soup, noodles – does wonders for the crew's morale and strength.



WEATHER PLANNING

U.S. SAILING PUBLICATION *PASSAGE MAKING*

– Ocean Weather in Chapter 18

Tropical Storms – You need more than to know that they exist. You need to understand their nature, how they begin, and what is their likely behavior should one be coming your way.

– Heavy Weather Offshore in Chapter 23

Watch Sections – Most people cannot handle a 3-hour watch in 40-50 knots of wind, so watch cycles must be considered in light of the positions that must be manned, individual crew strength, stamina, and severity of the weather.



SOME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY

2. NAVIGATION PLANNING

3. WEATHER PLANNING

4. TIDES AND CURRENTS

5. DANGERS AND OBSTACLES



SOME FACTORS IMPORTANT TO THE OIC

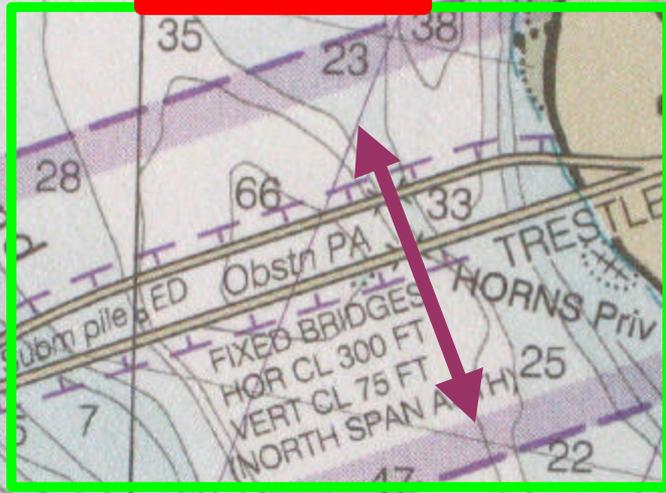
4. TIDES AND CURRENTS

- ❑ **Reed's, Eldridge, Coast Pilots – special emphasis on “choke points”**
- ❑ **Annapolis-Newport Race – don't “cut the corner” at Chesapeake Bay Bridge Tunnel**
- ❑ **Gulf Stream trends strategy 3-4 weeks prior**





(chart 12222)



12221



CAUTION
(see note H)

12222

TIDES AND CURRENTS

- Reed's Nautical Almanac**
- Eldridge Tide and Pilot Book
- U.S. Coast Pilot
- Gulf Stream Companion



TIDES AND CURRENTS

REED'S NAUTICAL ALMANAC (NORTH AMERICAN EAST COAST)

- ❑ High Tide & Low Tide – daily (also, sunrise and sunset)
- ❑ Contains a caveat: predictions based on average weather for the area (beware of Neap & Spring tides)
- ❑ Currents
- ❑ Slack Time & Max Time – Flood & Ebb in knots



TIDES AND CURRENTS

REED'S NAUTICAL ALMANAC (NORTH AMERICAN EAST COAST)

C & D CANAL

- Monitor VHF 13 when in the C & D Canal. Canal dispatcher, located at Chesapeake City, should be informed immediately in case of engine failure. Sailboats and low-powered vessels will do well to wait a favorable current; 2- to 3-knot currents may be encountered.



TIDES AND CURRENTS



TIDES AND CURRENTS



REEDY POINT, DE

HIGH & LOW WATER 2001				U.S. Datum				39°33.4'N 75°34.4'W			
Eastern Time (75°W)				Corrected for Daylight Saving Time: April 1 - October 27							
MAY		JUNE		JULY		AUGUST					
Time	ft	Time	ft	Time	ft	Time	ft	Time	ft	Time	ft
1 0035 0.8	16 0045 1.1	1 0230 0.5	16 0205 1.0	1 0309 0.4	16 0228 1.0	1 0434 0.3	16 0405 0.6	1 0035 0.8	16 0045 1.1	1 0230 0.5	16 0205 1.0
Tu 1329 0.5	W 1329 0.8	F 1457 0.1	Sa 1418 0.7	Su 1521 0.2	M 1424 0.6	W 1633 0.5	Th 1603 0.5	Tu 1329 0.5	W 1329 0.8	F 1457 0.1	Sa 1418 0.7
1905 5.5	1928 5.3	2045 6.3	2019 5.8	2114 6.4	2024 6.1	2227 6.4	2147 6.5	1905 5.5	1928 5.3	2045 6.3	2019 5.8
2 0142 0.7	17 0144 1.0	2 0329 0.3	17 0302 0.9	2 0405 0.3	17 0330 0.8	2 0529 0.3	17 0502 0.3	2 0142 0.7	17 0144 1.0	2 0329 0.3	17 0302 0.9
W 0722 5.9	Th 0742 5.6	2 0905 5.9	17 0841 5.4	2 0937 5.6	17 0857 5.2	2 1055 5.5	17 1025 5.5	W 0722 5.9	Th 0742 5.6	2 0905 5.9	17 0841 5.4
2008 5.8	2018 5.6	Sa 1549 0.1	Su 1509 0.6	M 1611 0.2	Tu 1523 6.5	Th 1720 0.6	F 1701 0.3	2008 5.8	2018 5.6	Sa 1549 0.1	Su 1509 0.6
3 0247 0.5	18 0242 0.9	3 0425 0.2	18 0400 0.7	3 0488 0.2	18 0430 0.6	3 0608 0.3	18 0557 0.1	3 0247 0.5	18 0242 0.9	3 0425 0.2	18 0400 0.7
Th 1524 0.1	F 1508 0.7	Su 1639 0.1	M 1600 0.5	Tu 1700 0.3	W 1622 0.4	F 1804 0.5	Sa 1799 0.1	Th 1524 0.1	F 1508 0.7	Su 1639 0.1	M 1600 0.5
2105 6.1	2105 5.8	2225 6.6	2153 6.3	2249 6.5	2210 6.5	2355 6.3	2337 6.6	2105 6.1	2105 5.8	2225 6.6	2153 6.3
4 0347 0.2	19 0338 0.7	4 0519 0.1	19 0456 0.5	4 0547 0.2	19 0526 0.4	4 0651 0.3	19 0648 -0.1	4 0347 0.2	19 0338 0.7	4 0519 0.1	19 0456 0.5
F 0925 6.1	19 0924 5.6	F 1049 5.8	19 1023 5.4	F 1118 5.5	19 1047 5.4	F 1223 5.4	19 1212 6.0	F 0925 6.1	19 0924 5.6	F 1049 5.8	19 1023 5.4
2156 6.4	2149 6.0	M 1727 0.2	Tu 1652 0.5	W 1746 0.4	Th 1720 0.3	Sa 1847 0.6	Su 1855 0.0	2156 6.4	2149 6.0	M 1727 0.2	Tu 1652 0.5
5 0444 0.0	20 0431 0.6	5 0609 0.0	20 0549 0.4	5 0634 0.2	20 0620 0.1	5 0730 0.5	20 0738 -0.3	5 0444 0.0	20 0431 0.6	5 0609 0.0	20 0549 0.4
Sa 1019 6.1	1011 5.6	5 1137 5.7	20 1112 5.4	5 1203 5.4	20 1140 5.5	Su 1303 5.4	M 1304 6.1	Sa 1019 6.1	1011 5.6	5 1137 5.7	20 1112 5.4
Sa 1707 -0.1	Su 1642 0.5	Tu 1812 0.3	W 1743 0.4	Th 1830 0.5	F 1816 0.2	1927 0.6	1949 -0.1	Sa 1707 -0.1	Su 1642 0.5	Tu 1812 0.3	W 1743 0.4
2247 6.6	2231 6.2	2356 6.6	2324 6.0	2406 6.4	2354 6.8	0112 6.2	0122 6.7	2247 6.6	2231 6.2	2356 6.6	2324 6.0
6 0538 -0.1	21 0523 0.4	6 0655 0.1	21 0642 0.2	6 0718 0.3	21 0732 5.6	6 0807 0.4	21 0826 -0.3	6 0538 -0.1	21 0523 0.4	6 0655 0.1	21 0642 0.2
Su 1754 -0.1	M 1727 0.5	W 1856 0.5	Th 1835 0.4	F 1947 0.8	Sa 1911 0.1	M 1341 5.4	Tu 1356 6.2	Su 1754 -0.1	M 1727 0.5	W 1856 0.5	Th 1835 0.4
2334 6.7	2311 6.3	2406 6.4	2354 6.8	2507 6.9	2454 6.2	2006 0.7	2042 0.6	2334 6.7	2311 6.3	2406 6.4	2354 6.8
7 0629 -0.1	22 0613 0.3	7 0742 0.2	22 0733 0.1	7 0857 6.3	22 0848 6.8	7 0948 6.1	22 0914 6.6	7 0629 -0.1	22 0613 0.3	7 0742 0.2	22 0733 0.1
M 1840 0.1	Tu 1812 0.5	Th 1908 6.5	F 1250 5.5	Sa 1929 5.3	Su 1925 5.7	Tu 1415 5.4	W 1447 6.3	M 1840 0.1	Tu 1812 0.5	Th 1908 6.5	F 1250 5.5
2350 6.5	2350 6.5	1937 0.6	1927 0.4	1951 0.7	2005 0.1	2043 0.8	2136 0.1	2350 6.5	2350 6.5	1937 0.6	1927 0.4
8 0019 6.7	23 0702 0.3	8 0120 6.4	23 0100 6.7	8 0136 6.2	23 0138 6.7	8 0222 6.0	23 0306 6.3	8 0019 6.7	23 0702 0.3	8 0120 6.4	23 0100 6.7
8 0717 -0.1	23 1223 5.5	8 0825 0.3	23 0823 0.0	8 0838 0.4	23 0852 -0.2	8 0914 0.6	23 1001 -0.1	8 0717 -0.1	23 1223 5.5	8 0825 0.3	23 0823 0.0
Tu 1248 5.9	W 1857 0.5	F 1353 5.4	Sa 1341 5.5	Su 1409 5.3	M 1417 5.9	W 1448 5.5	Th 1540 6.3	Tu 1248 5.9	W 1857 0.5	F 1353 5.4	Sa 1341 5.5
1924 0.3	1924 0.3	2017 0.8	2020 0.4	2029 0.8	2100 0.1	2121 0.8	2230 0.3	1924 0.3	1924 0.3	2017 0.8	2020 0.4
9 0103 6.6	24 0031 6.6	9 0200 6.3	24 0151 6.7	9 0214 6.1	24 0231 6.6	9 0256 5.8	24 0401 6.0	9 0103 6.6	24 0031 6.6	9 0200 6.3	24 0151 6.7
W 0934 0.0	Th 0751 0.3	9 0906 0.5	24 0913 0.0	9 0915 0.5	24 0941 -0.2	9 0945 0.6	24 1050 0.1	W 0934 0.0	Th 0751 0.3	9 0906 0.5	24 0913 0.0
2005 9.5	1944 5.5	Sa 1437 5.3	Su 1434 5.6	M 1449 5.2	Tu 1511 5.9	Th 1521 5.8	F 1635 6.2	2005 9.5	1944 5.5	Sa 1437 5.3	Su 1434 5.6
2056 0.9	2114 0.4	2056 0.9	2114 0.4	2107 0.9	2154 0.2	2202 0.9	2325 0.5	2056 0.9	2114 0.4	2056 0.9	2114 0.4
10 0145 6.5	25 0113 6.6	10 0241 6.1	25 0244 6.5	10 0251 6.0	25 0328 6.3	10 0333 5.7	25 0459 5.7	10 0145 6.5	25 0113 6.6	10 0241 6.1	25 0244 6.5
Th 0849 0.2	0840 0.3	10 0946 0.8	10 1003 0.3	10 0950 0.6	25 1030 -0.2	10 1018 0.6	25 1140 0.3	Th 0849 0.2	0840 0.3	10 0946 0.8	10 1003 0.3
2046 8.7	2032 0.4	Su 1521 5.2	M 1530 5.6	Tu 1528 5.3	W 1607 6.0	F 1508 5.7	Sa 1731 6.1	2046 8.7	2032 0.4	Su 1521 5.2	M 1530 5.6
2147 0.9	2251 0.3	2135 1.0	2210 0.4	2147 0.9	2251 0.3	2249 1.0	2249 1.0	2147 0.9	2251 0.3	2135 1.0	2210 0.4
11 0227 6.3	26 0200 6.6	11 0323 6.0	26 0341 6.3	11 0330 5.9	26 0429 6.1	11 0417 5.5	26 0523 6.6	11 0227 6.3	26 0200 6.6	11 0323 6.0	26 0341 6.3
F 0933 0.4	0929 0.3	11 1026 0.7	26 1055 0.0	11 1026 0.6	26 1120 -0.1	11 1026 0.6	26 1120 -0.1	F 0933 0.4	0929 0.3	11 1026 0.7	26 1055 0.0
F 1504 5.4	Sa 1446 5.4	M 1606 5.2	Tu 1628 5.7	W 1608 5.3	Th 1704 6.0	Sa 1644 5.8	Su 1233 0.5	F 1504 5.4	Sa 1446 5.4	M 1606 5.2	Tu 1628 5.7
2127 0.9	2124 0.6	2218 1.0	2306 0.5	2231 1.0	2348 0.4	2345 1.1	1830 6.1	2127 0.9	2124 0.6	2218 1.0	2306 0.5
12 0311 6.1	27 0251 6.5	12 0409 5.8	27 0441 6.1	12 0413 6.7	27 0523 6.8	12 0512 5.3	27 0621 0.7	12 0311 6.1	27 0251 6.5	12 0409 5.8	27 0441 6.1
Sa 1017 0.9	1021 0.3	12 1107 0.8	27 1147 0.0	12 1103 0.7	27 1212 0.1	12 1143 0.7	27 0656 5.4	Sa 1017 0.9	1021 0.3	12 1107 0.8	27 1147 0.0
Sa 1553 5.2	Su 1542 5.4	Tu 1654 5.2	W 1728 5.8	Th 1852 5.4	F 1802 6.1	Su 1739 5.6	M 1327 0.6	Sa 1553 5.2	Su 1542 5.4	Tu 1654 5.2	W 1728 5.8
2209 1.0	2220 0.7	2307 1.1	2307 1.1	2322 1.0	2322 1.0	2322 1.0	1927 6.1	2209 1.0	2220 0.7	2307 1.1	2307 1.1
13 0358 5.9	28 0349 6.3	13 0459 5.7	28 0508 0.6	13 0502 5.5	28 0548 0.5	13 0551 1.1	28 0619 0.7	13 0358 5.9	28 0349 6.3	13 0459 5.7	28 0508 0.6
1102 0.7	1115 0.3	13 1151 0.8	28 0544 5.9	13 1145 0.7	28 0624 5.8	13 1145 0.7	28 0757 5.3	1102 0.7	1115 0.3	13 1151 0.8	28 0544 5.9
Su 1644 5.1	M 1643 5.4	W 1745 5.2	Th 1241 0.1	F 1740 5.5	Sa 1305 0.2	M 1241 0.7	Tu 1422 0.2	Su 1644 5.1	M 1643 5.4	W 1745 5.2	Th 1241 0.1
2255 1.1	2321 0.7	1828 6.0	1828 6.0	1900 6.1	1900 6.1	1842 6.0	2023 6.1	2255 1.1	2321 0.7	1828 6.0	1828 6.0
14 0460 5.8	29 0453 6.1	14 0502 1.1	29 0509 0.6	14 0502 1.1	29 0547 0.5	14 0519 1.1	29 0314 0.8	14 0460 5.8	29 0453 6.1	14 0502 1.1	29 0509 0.6
M 1149 0.9	1210 0.3	14 0555 5.3	29 0648 5.8	14 0559 5.3	29 0724 5.1	14 0724 5.1	29 0852 5.4	M 1149 0.9	1210 0.3	14 0555 5.3	29 0648 5.8
M 1737 5.1	Tu 1746 5.5	Th 1238 0.8	F 1335 6.1	Sa 1233 0.7	Su 1359 0.3	Tu 1347 0.7	W 1515 0.8	M 1737 5.1	Tu 1746 5.5	Th 1238 0.8	F 1335 6.1
2348 1.1	2348 1.1	1837 5.4	1927 6.1	1834 5.7	1958 6.2	1947 6.1	2115 6.2	2348 1.1	2348 1.1	1837 5.4	1927 6.1
15 0547 5.6	30 0524 0.7	15 0602 1.1	30 0610 0.5	15 0612 1.1	30 0646 0.5	15 0604 0.9	30 0405 0.5	15 0547 5.6	30 0524 0.7	15 0602 1.1	30 0610 0.5
Tu 1238 0.9	1230 0.3	15 0652 5.4	30 0747 5.7	15 0700 5.2	30 0821 5.4	15 0828 5.2	30 0943 5.8	Tu 1238 0.9	1230 0.3	15 0652 5.4	30 0747 5.7
Tu 1892 5.2	W 1307 0.3	F 1327 0.7	Sa 1428 0.3	Su 1326 0.7	M 1452 0.4	W 1455 0.6	Th 1605 0.6	Tu 1892 5.2	W 1307 0.3	F 1327 0.7	Sa 1428 0.3
1849 5.8	1849 5.8	1929 5.8	2022 6.3	1929 5.8	2050 6.3	2049 6.3	2203 6.3	1849 5.8	1849 5.8	1929 5.8	2022 6.3
15 0548 2010	31 0706 5.9	15 0534 2032	31 0706 5.9	15 0548 2010	31 0706 5.9	15 0548 2010	31 0706 5.9	15 0548 2010	31 0706 5.9	15 0534 2032	31 0706 5.9
31 0637 2023	Th 1403 0.2	30 0538 2034	1949 6.0	31 0637 2023	Th 1403 0.2	30 0538 2034	1949 6.0	31 0637 2023	Th 1403 0.2	30 0538 2034	1949 6.0
15 0601 2016	31 0342 0.4	15 0615 1958	F 1633 0.5	15 0601 2016	31 0342 0.4	15 0615 1958	F 1633 0.5	15 0601 2016	31 0342 0.4	15 0615 1958	F 1633 0.5
2140 6.4	15 0514 0.4	15 0514 0.4	2248 6.3	2140 6.4	15 0514 0.4	15 0514 0.4	2248 6.3	2140 6.4	15 0514 0.4	15 0514 0.4	2248 6.3

TIDES AND CURRENTS

REED'S NAUTICAL ALMANAC (NORTH AMERICAN EAST COAST)

LONG ISLAND SOUND AND NEW YORK HARBOR



TIDES AND CURRENTS

“Check timing against the
tide and current tables.
Distance between
Throgs Neck Bridge...



TIDES AND CURRENTS

...and Sandy Hook is about 30 nautical miles. Currents at Hell Gate...



TIDES AND CURRENTS

...run up to 5 or 6 knots and great whirlpools develop in the East River. New York Harbor is jammed with freighters, tankers, container ships, ferries, and tugboats...



TIDES AND CURRENTS

....Waters are full of flotsam, ranging from old fruit to sections of floating dock. An extra vigilant watch is needed in the harbor.”



TIDES AND CURRENTS

REED'S NAUTICAL ALMANAC (NORTH AMERICAN EAST COAST)



TIDES AND CURRENTS

TIDES (Section T)

- ☐ High and low water
- ☐ Sunrise and sunset
- ☐ Spring tides

THE RACE, LONG ISLAND SOUND

CURRENT TABLE 2001 41°14.0'N 72°03.6'W Flood 302° Ebb 112°
 Eastern Time (75°W) Corrected for Daylight Saving Time: April 1 - October 27

MAY						JUNE									
Slack time	Max time	Fld knots	Ebb knots	Slack time	Max time	Fld knots	Ebb knots	Slack time	Max time	Fld knots	Ebb knots	Slack time	Max time	Fld knots	Ebb knots
1 0023	0316	2.5		16 0102	0342	1.8		1 0224	0514	2.7		16 0209	0449	2.0	
Tu 0634	0945	3.0		W 0704	1007	2.3		F 0928	1126	3.1		Sa 0807	1107	2.4	
1305	1556	2.6		W 1328	1615	2.0		F 1440	1738	3.0		Sa 1414	1709	2.4	
1920	2220	2.8		1943	2240	2.2		2057				2031	2339	2.2	
2 0134	0425	2.6		17 0200	0441	1.9		2 0323	0615	2.8		17 0300	0542	2.2	
0744	1049	3.1		0801	1101	2.3		Sa 0927	1222	3.1		Su 0900	1158	2.5	
W 1407	1701	2.8		Th 1418	1708	2.1		Sa 1533	1833	3.1		Su 1502	1758	2.6	
2022	2323	3.1		2032	2331	2.5		2149				2117			
3 0240	0531	2.8		18 0252	0535	2.0		3 0416	0653	3.6		18 0349	0632	2.4	
0847	1149	3.3		0853	1151	2.5		Su 1020	1314	3.1		M 0950	1246	2.7	
Th 1505	1801	3.0		F 1504	1755	2.4		Su 1623	1922	3.1		M 1548	1846	2.8	
2119				2117				2237				2202			
4 0339	0632	3.0		19 0339	0623	2.3		4 0506	0756	2.9		19 0435	0720	2.7	
F 0945	1244	3.4		Sa 0941	1238	2.6		M 1110	1402	3.1		Tu 1037	1334	2.8	
1557	1855	3.3		1547	1839	2.6		1710	2008	3.1		1634	1933	3.0	
2211				2159				2323				2247			
5 0433	0726	3.2		20 0423	0708	2.5		5 0552	0843	2.9		20 0521	0808	2.9	
Sa 1039	1336	3.5		Su 1025	1322	2.8		Tu 1157	1448	3.0		W 1124	1421	3.0	
1647	1944	3.4		1628	1921	2.8		○ 1755	2050	3.0		W 1720	2020	3.2	
2259				2238								2333			
6 0522	0815	3.3		21 0505	0751	2.7		6 0606	0312	3.6		21 0607	0855	3.1	
Su 1128	1423	3.5		M 1108	1405	2.9		W 1241	1531	2.9		Th 1211	1509	3.2	
1733	2029	3.5		1707	2003	3.0		1838	2131	2.9		● 1808	2108	3.4	
2344				2317											
7 0609	0900	3.3		22 0546	0834	2.9		7 0647	0354	3.5		22 0620	0335	3.9	
M 1215	1509	3.4		Tu 1150	1447	3.0		Th 0718	1004	2.7		F 0654	0943	3.2	
○ 1817	2112	3.4		● 1747	2045	3.2		Th 1323	1614	2.8		F 1259	1558	3.3	
				2357				1920	2211	2.7		1856	2157	3.4	
8 0628	0333	3.9		23 0628	0917	3.0		8 0128	0436	3.3		23 0109	0424	4.0	
0654	0943	3.2		W 1232	1531	3.1		0759	1044	2.6		0742	1033	3.3	
Tu 1300	1553	3.3		1829	2129	3.2		F 1406	1657	2.6		Sa 1349	1649	3.3	
1901	2154	3.2						2002	2252	2.5		1950	2249	3.4	
9 0738	1025	3.0		24 0639	0355	3.8		9 0208	0518	3.1		24 0201	0515	3.9	
W 1344	1637	3.0		0712	1002	3.1		0841	1125	2.4		0832	1124	3.3	
1943	2236	3.0		Th 1316	1616	3.1		Sa 1448	1741	2.4		Su 1442	1742	3.3	
				1914	2215	3.2		2046	2335	2.4		2046	2342	3.3	
10 0822	1107	2.7		25 0712	0442	3.8		10 0250	0602	2.9		25 0255	0608	3.8	
Th 1428	1721	2.8		0758	1049	3.1		0923	1208	2.3		0924	1217	3.2	
2027	2318	2.7		F 1404	1705	3.1		Su 1533	1827	2.3		M 1537	1836	3.3	
				2003	2304	3.2		2133				2146			
11 0907	1151	2.5		26 0813	0531	3.7		11 0335	0648	2.7		26 0353	0703	3.5	
F 1514	1807	2.5		0848	1139	3.0		M 1008	1254	2.2		Tu 1019	1313	3.1	
2113				Sa 1455	1757	3.0		1620	1916	2.2		1635	1936	3.2	
				2057	2356	3.0		2224				2249			
12 0321	0631	2.4		27 0307	0624	3.5		12 0424	0737	2.5		27 0454	0801	2.8	
Sa 0954	1238	2.2		0941	1233	2.9		Tu 1055	1343	2.1		W 1117	1412	3.0	
1603	1857	2.3		Su 1552	1853	2.9		1710	2008	2.2		⊕ 1736	2037	3.2	
2204				2157				2319				2355			
13 0410	0722	2.6		28 0406	0722	3.3		13 0517	0829	2.3		28 0559	0901	3.1	
Su 1045	1328	2.0		M 1039	1331	2.8		W 1144	1434	2.1		Th 1216	1512	2.9	
1656	1950	2.1		1653	1954	2.9		⊕ 1801	2101	2.2		1837	2139	3.2	
2300				2303											
14 0505	0815	1.9		29 0511	0822	3.2		14 0614	0922	2.3		29 0704	1002	2.9	
M 1139	1422	1.9		Tu 1140	1433	2.8		Th 1235	1526	2.1		F 1316	1614	2.9	
1753	2046	2.0		⊕ 1757	2057	2.9		1853	2155	2.3		1936	2240	3.2	
15 0604	0911	2.3		30 0618	0925	3.1		15 0711	1015	2.3		30 0205	0454	2.5	
Tu 1234	1519	1.9		W 1242	1536	2.8		F 1325	1618	2.2		Sa 1414	1715	2.8	
⊕ 1850	2144	2.1		1900	2201	3.0		1943	2248	2.5		2034	2338	3.3	
				31 0120	0408	2.6									
				0725	1027	3.1									
				Th 1342	1639	2.9									
				2001	2303	3.2									

TIDES AND CURRENTS

CURRENT (Section C)

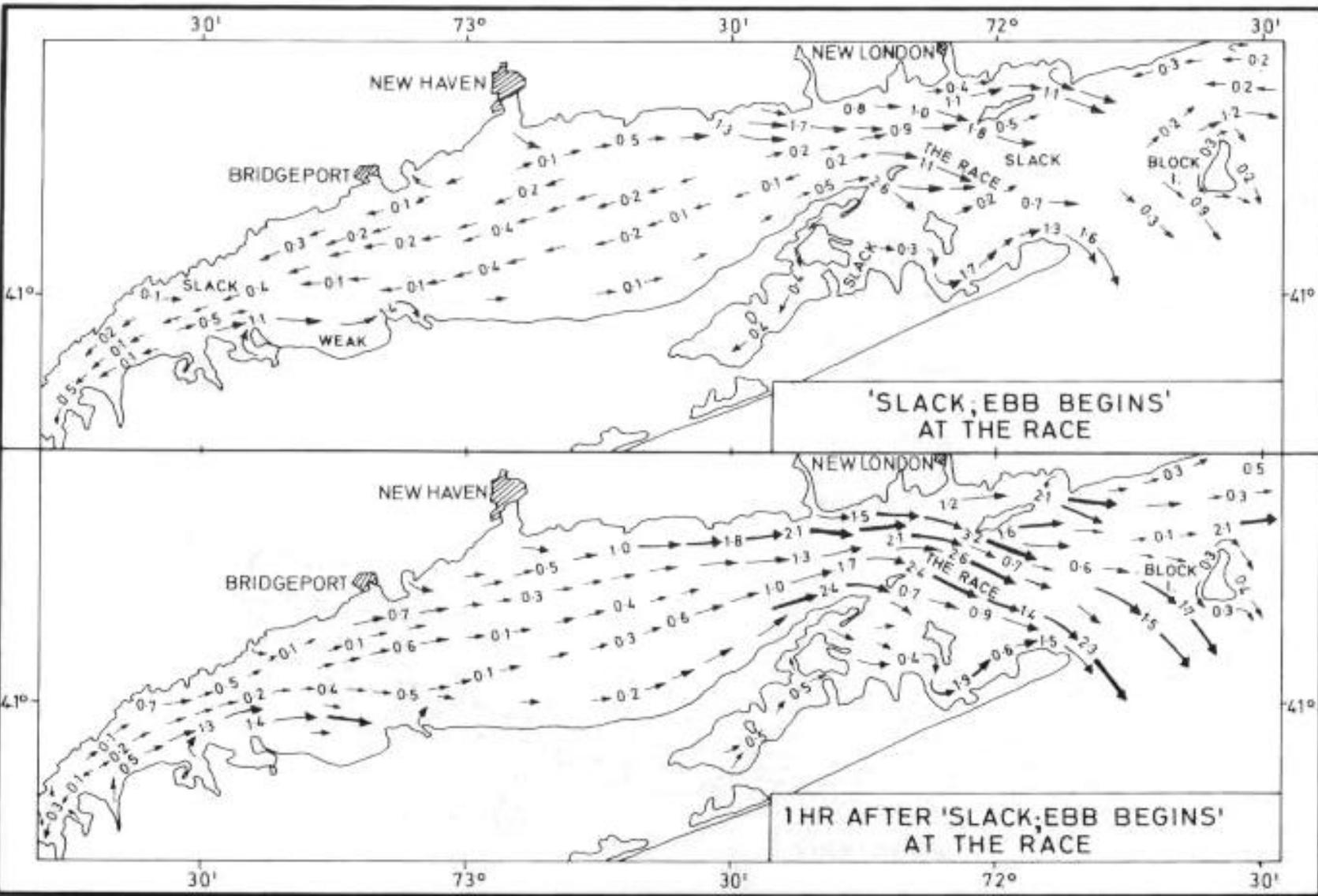
“Prudent mariners understand that all tide and time current predictions are approximations and are subject to weather influences that cannot be predicted in the long term...”



TIDES AND CURRENTS

TIDAL CURRENTS

LONG ISLAND SOUND
BLOCK ISLAND SOUND



TIDES AND CURRENTS

ELDRIDGE TIDE AND PILOT BOOK

LISTS – TIDES AND CURRENTS

- Current change at various points, such as
 - Long Island Sound, Delaware Bay, and Chesapeake Bay



TIDES AND CURRENTS

ELDRIDGE TIDE AND PILOT BOOK

2002 HIGH & LOW WATER NEWPORT, R.I.

41-30N x 71-20W

Daylight Time

Daylight Time

DAY OF MONTH	DAY OF WEEK	JULY						DAY OF MONTH	DAY OF WEEK	AUGUST					
		HIGH			LOW					HIGH			LOW		
		a.m.	Ht.	p.m.	Ht.	a.m.	p.m.			a.m.	Ht.	p.m.	Ht.	a.m.	p.m.
1	M	1 06	3.2	1 34	3.3	6 29	6 58	1	T	1 46	2.9	2 09	3.3	7 13	8 24
2	T	1 51	3.0	2 19	3.3	7 18	8 12	2	F	2 34	2.8	2 58	3.3	8 08	9 40
3	W	2 35	2.8	3 04	3.3	8 12	9 27	3	S	3 28	2.8	3 53	3.4	9 07	10 41
4	T	3 24	2.8	3 53	3.4	9 06	10 24	4	S	4 29	2.9	4 53	3.6	10 03	11 33
5	F	4 18	2.8	4 44	3.5	9 56	11 13	5	M	5 30	3.0	5 52	3.9	10 56	...
6	S	5 13	2.9	5 35	3.7	10 43	11 59	6	T	6 25	3.3	6 45	4.2	12 21	-A-
7	S	6 05	3.0	6 24	3.9	11 28	...	7	W	7 16	3.6	7 35	4.5	1 08	12 39
8	T	7 00	3.1	7 17	4.1	12 07	...	8	T	8 09	3.7	8 24	4.6	1 54	12 57
9	T	7 41	3.4	7 56	4.3	1 32	12 59	9	F	8 53	4.2	9 12	4.7	2 37	2 23
10	W	8 27	3.6	8 42	4.5	2 18	1 46	10	S	9 42	4.4	10 02	4.7	3 19	3 16
11	T	9 14	3.7	9 30	4.5	3 02	2 35	11	S	10 33	4.5	10 54	4.5	3 59	4 08
12	F	10 04	3.8	10 20	4.5	3 44	3 25	12	M	11 26	4.5	11 46	4.2	4 39	5 00
13	S	10 55	4.0	11 12	4.5	4 23	4 18	13	T	...	...	12 19	4.2	5 21	5 57
14	S	11 48	4.1	...	...	5 06	5 09	14	W	12 41	4.0	1 15	4.4	6 07	7 06
15	M	12 06	4.2	12 42	4.1	5 50	6 08	15	T	1 37	3.7	2 13	4.3	7 00	8 48
16	T	1 00	3.9	1 37	4.2	6 39	7 19	16	F	2 35	3.4	3 14	4.1	8 05	10 14
17	W	1 56	3.7	2 33	4.2	7 35	8 52	17	S	3 38	3.3	4 19	4.0	9 19	11 16
18	T	2 55	3.5	3 33	4.2	8 38	10 13	18	S	4 44	3.2	5 23	4.0	10 25	11 59
19	F	3 57	3.4	4 36	4.3	9 39	11 15	19	M	5 46	3.3	6 21	4.1	11 19	...
20	S	5 00	3.3	5 37	4.3	10 33	11 59	20	T	6 41	3.5	7 11	4.1	12 49	12 06
21	S	6 01	3.4	6 34	4.4	11 23	...	21	W	7 29	3.6	7 55	4.1	1 23	12 50
22	M	6 56	3.5	7 25	4.4	12 56	12 11	22	T	8 12	3.8	8 36	4.1	1 51	1 34
23	T	7 46	3.6	8 12	4.4	1 39	12 58	23	F	8 52	3.9	9 15	4.0	2 18	2 17
24	W	8 32	3.7	8 57	4.3	2 18	1 45	24	S	9 31	3.9	9 52	3.8	2 49	2 58
25	T	9 17	3.7	9 40	4.1	2 52	2 32	25	S	10 09	3.8	10 28	3.6	3 21	3 38
26	F	10 01	3.7	10 22	3.9	3 24	3 17	26	M	10 45	3.8	11 05	3.4	3 54	4 17
27	S	10 44	3.6	11 04	3.7	3 57	4 00	27	T	11 22	3.7	11 43	3.3	4 28	4 56
28	S	11 26	3.6	11 44	3.4	4 31	4 43	28	W	11 59	3.5	...	...	5 02	5 36
29	M	...	...	12 07	3.5	5 06	5 27	29	T	12 22	3.1	12 39	3.4	5 40	6 22
30	T	12 23	3.2	12 46	3.4	5 44	6 15	30	F	1 06	2.9	1 23	3.4	6 22	7 22
31	W	1 03	3.0	1 27	3.4	6 25	7 12	31	S	1 55	2.9	2 14	3.4	7 14	8 50

A also at 11:47 a.m.

Dates when Ht. of Low Water is below Mean Low with Ht. of lowest given for each period and Date of lowest in ():

9th - 12th: -0.3'

Average Rise and Fall 3.5 ft.

When a high tide exceeds av. ht., the following low tide will be lower than av.

TIDES AND CURRENTS

ELDRIDGE TIDE AND PILOT BOOK

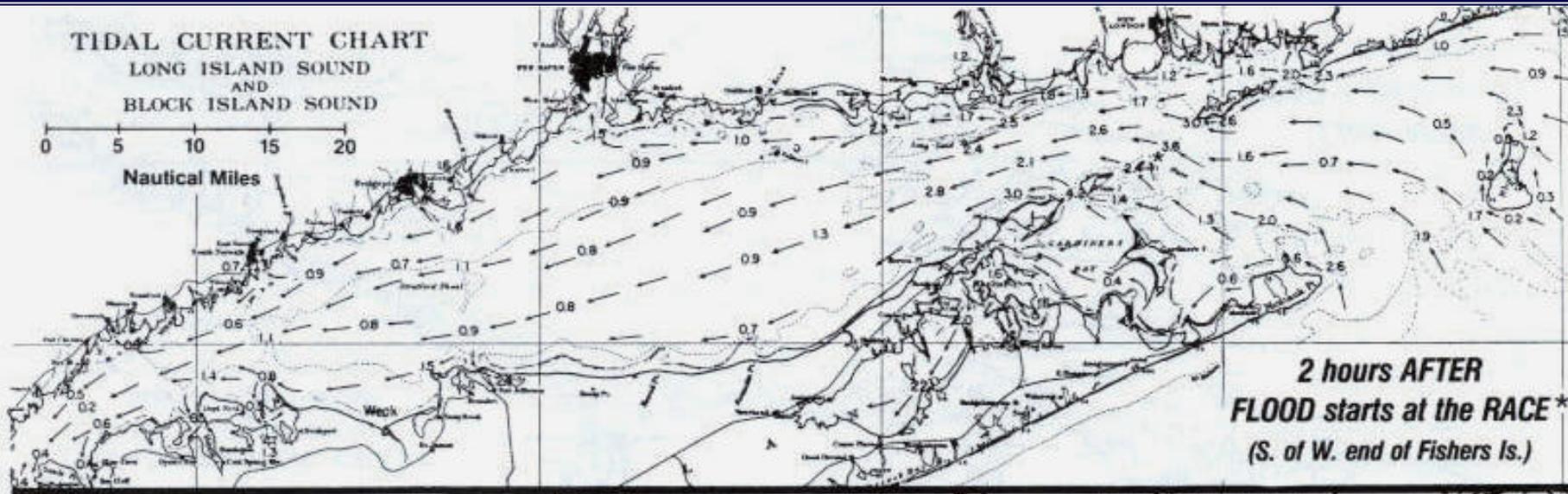
☐ LISTS – TIDES AND CURRENTS

☐ Current Charts & Diagrams

- For example, chart of Long Island Sound after flood



TIDES AND CURRENTS



TIDES AND CURRENTS

ELDRIDGE TIDE AND PILOT BOOK

- LISTS – TIDES AND CURRENTS

- Current Charts and Diagrams

- Tidal current charts similar to those in Reed's



TIDES AND CURRENTS

ELDRIDGE TIDE AND PILOT BOOK

- ❑ LISTS – TIDES AND CURRENTS
 - ❑ Current Charts and Diagrams
 - Notes on Tides and Currents

- ❑ LIGHTS AND FOG SIGNALS



TIDES AND CURRENTS

U.S. COAST PILOT

Discusses Tides and Currents

COAST PILOT 2

Nantucket Shoals – Lists Lat & Long of area to be avoided, then states *“currents are strong and erratic, reaching a velocity of 3-5 knots around the edges in some cases deflected to such an extent as to cause the direction to change 180 degrees.”*



TIDES AND CURRENTS

RACING TO HALIFAX

2003 MARBLEHEAD-TO-HALIFAX RACE PRELIMINARY NOTICE OF RACE

“The race itself is often won by those who best deal with the tides that sweep around Brazil Rock from the Bay of Fundy. The vagaries of those tides provide either the good fortune of a boost along the final leg up the coast of Nova Scotia or the penalty for an unintended detour into the Gulf of Maine.”



TIDES AND CURRENTS

RACING TO HALIFAX

REED'S NAUTICAL ALMANAC (NORTH AMERICAN EAST COAST)

NORTH HEAD LIGHT, on Fisherman's Wharf, 44 45.8N, 66 45.1W. Fl R 6s, 23ft, 7M. Skeleton tower, white enclosed lower portion, 20ft.

FARMER LEDGE LIGHT, 44 43.4N, 66 43.6W. Fl R 4s, 13ft. Red skeleton tower, 12ft.

GREAT DUCK ISLAND LIGHT, S end of island, 44 41.1N, 66 41.6W. Fl W 10s, 50ft, 18M. White square tower on white dwelling, 29ft. Horn: 1 blast every 60s; horn points 120°. Emergency light.

EDMUNDS ROCK LIGHT, 44 40.4N, 66 43.2W. Fl G 4s, 19ft. Small green skeleton tower.

HALF TIDE ROCK LIGHT, middle of Cheney Passage between Cheney and Ross islands, 44 39.3N, 66 43.7W. Fl G 4s, 11ft, 5M. Skeleton structure, black, white, and green daymarks, 10ft. Horn: 1 blast every 15s.

Prangle Point Bell Buoy XP3, NE of the point, 44 38.5N, 66 40.7W. Fl G. Green, marked XP3. Radar reflector.

WHITEHEAD HARBOUR, 44 37.8N, 66 43.7W. Fl R 4s, 14ft, 5M. Framework tower on dolphin.

LONG POINT LIGHT, S extremity of White Head Island, 44 36.8N, 66 42.6W. Iso W 12s, 51ft, 11M. Square tower. Horn: 1 blast every 20s, horn points 270°. Emergency light.

Brazil Shoal Bell Buoy, 44 35.3N, 66 41.3W. Mo (A) W. Safe water mark, red and white vertical stripes, marked XK.

White Head Light, 44 37.8N, 66 43.7W. Fl R 4s, 14ft, 5M. Framework tower on dolphin. Horn: 1 blast every 20s, horn points 270°. Emergency light.

GANNET ROCK LIGHT, S of Grand Manan, 44 30.6N, 66 46.9W. Fl W 6s, 92ft, 19M. Black and white striped octagonal tower, 76ft. Horn: 3 blasts every 60s, horn points 162°. **RACON G** (---), 120s, 10M.

WHITE HORSE ISLET LIGHT, 44 36.2N, 66 48.5W. Fl G 4s, 44ft. Mast, red and white rectangular daymark with black square in center, 20ft. Radar reflector.

INGALLS HEAD BREAKWATER LIGHT, 44 39.7N, 66 45.3W. F G, 26ft. Skeleton tower, 20ft.

SEAL COVE OUTER BREAKWATER LIGHT, 44 38.8N, 66 50.3W. Iso G 4s, 25ft, 7M. Triangular aluminum skeleton tower, 22ft.

SEAL COVE WEST BREAKWATER LIGHT, head of breakwater, 44 39.0N, 66 50.3W. F R, 26ft. Skeleton tower.

SOUTHWEST HEAD LIGHT, on Gull Cliff, 44 36.0N, 66 54.3W. Fl W 10s, 156ft, 14M. White tower on white square building, 30ft. Horn: 1 blast every 60s, horn points 240°. Emergency light.

SOUTHWEST OF GRAND MANAN

Bull Rock Whistle Buoy XA1, E side of rock, 44 30.3N, 66 56.4W. Fl G. Green, marked XA1.

MACHIAS SEAL ISLAND LIGHT, summit, 44 30.1N, 67 06.1W. Fl W 3s, 82ft, 17M. White octagonal tower, red top, 60ft. Horn: 2 blasts every 60s, horn points 270°. Emergency light.

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*They do not meet the requirements of the Charts and Publication
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Contact the Canadian Hydrographic Service to obtain information on local dealers and available charts and publications or to order charts and publications directly.

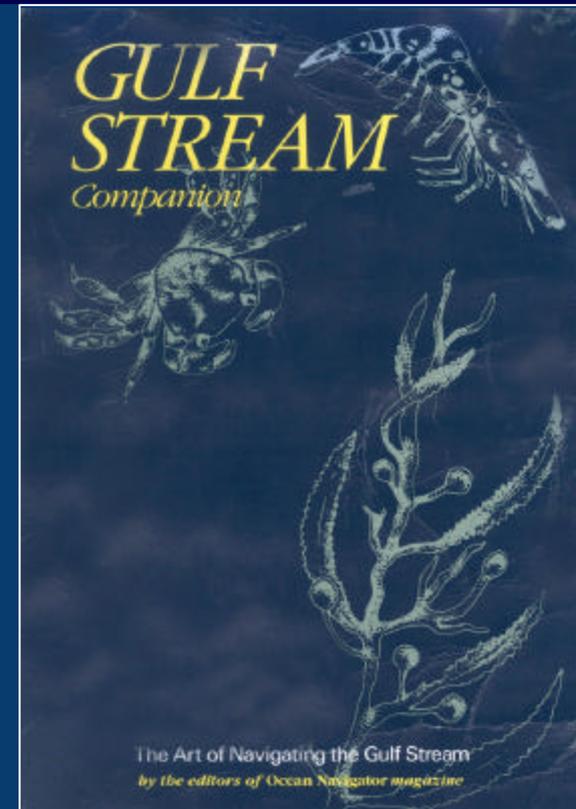
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TIDES AND CURRENTS

GULF STREAM COMPANION

“The first challenge for the navigator is to hit the ‘knuckle’ where the loop starts to turn south. After that, it's a matter of knowing how to stay in the fastest part of a southbound meander...”

Of course, the other challenge is not hitting an eddy – either cold or warm – on the northbound side.



TIDES AND CURRENTS

GULF STREAM SATELLITE PHOTO



TIDES AND CURRENTS

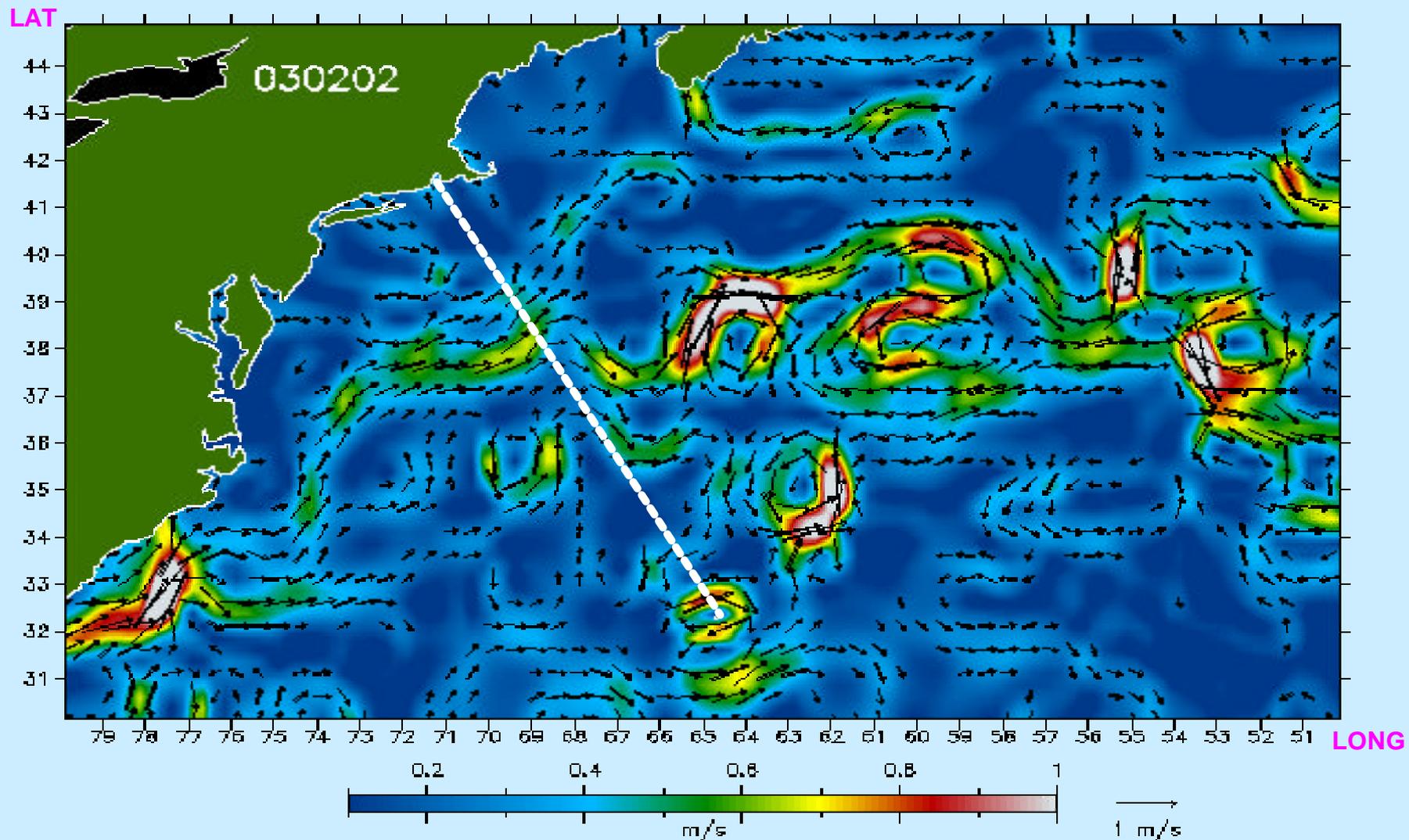
THE GULF STREAM IS A SPECIAL CASE.

For navigation, it is the **direction** and its **condition** that is significant. The Gulf Stream is more like weather than it is like other currents, since it changes constantly. These changes must be observed, “plotted”, and interpreted. There are web sites available to provide baseline information. To successfully race, observations and plots should begin 3 to 4 weeks prior to the race. Before the actual race, develop your strategy, based on this information.

Check web site <<http://www.deos.tudelft.nl/altim/gulfstream/>> for current velocities.



TIDES AND CURRENTS



TIDES AND CURRENTS

THE RETURN TRANSIT FROM BERMUDA

- Weather and seas determine routing via Chesapeake Bay or Delaware Bay
- Tides and currents will effect “timeline”



SME FACTORS IMPORTANT TO THE OIC

1. ACCOUNTABILITY

2. NAVIGATION PLANNING

3. WEATHER PLANNING

4. TIDES AND CURRENTS

5. DANGERS AND OBSTACLES



SOME FACTORS IMPORTANT TO THE OIC

5. DANGERS AND OBSTACLES

☐ "CUTTING CORNERS"

- ☐ Chesapeake Bay Bridge Tunnel and Cape May



SOME FACTORS IMPORTANT TO THE OIC

5. DANGERS AND OBSTACLES

- ❑ “Cutting corners”
 - ❑ Cape May and Chesapeake Bay Bridge Tunnel
- ❑ Gulf Stream eddies
- ❑ NE terminal moraine in Long Island Sound
- ❑ Brazil Rock and Bay of Fundy tides



DANGERS AND OBSTACLES

Situational awareness!



DANGERS AND OBSTACLES

Remember what charts don't tell you...

Depth is related to wind and tides...

...which are also relative to **times and currents**...

...and the **moon!**



DANGERS AND OBSTACLES

THE RISK FACTOR

Bouncing off the soft ground during a tack in the Chesapeake Bay may be an acceptable risk during a race.

Taking the same risk – a “tack bounce” – in the waters around the islands of Nova Scotia, Cape Cod, Nantucket, Martha’s Vineyard, Elizabeth, Block, and Fisher may not be an acceptable risk.



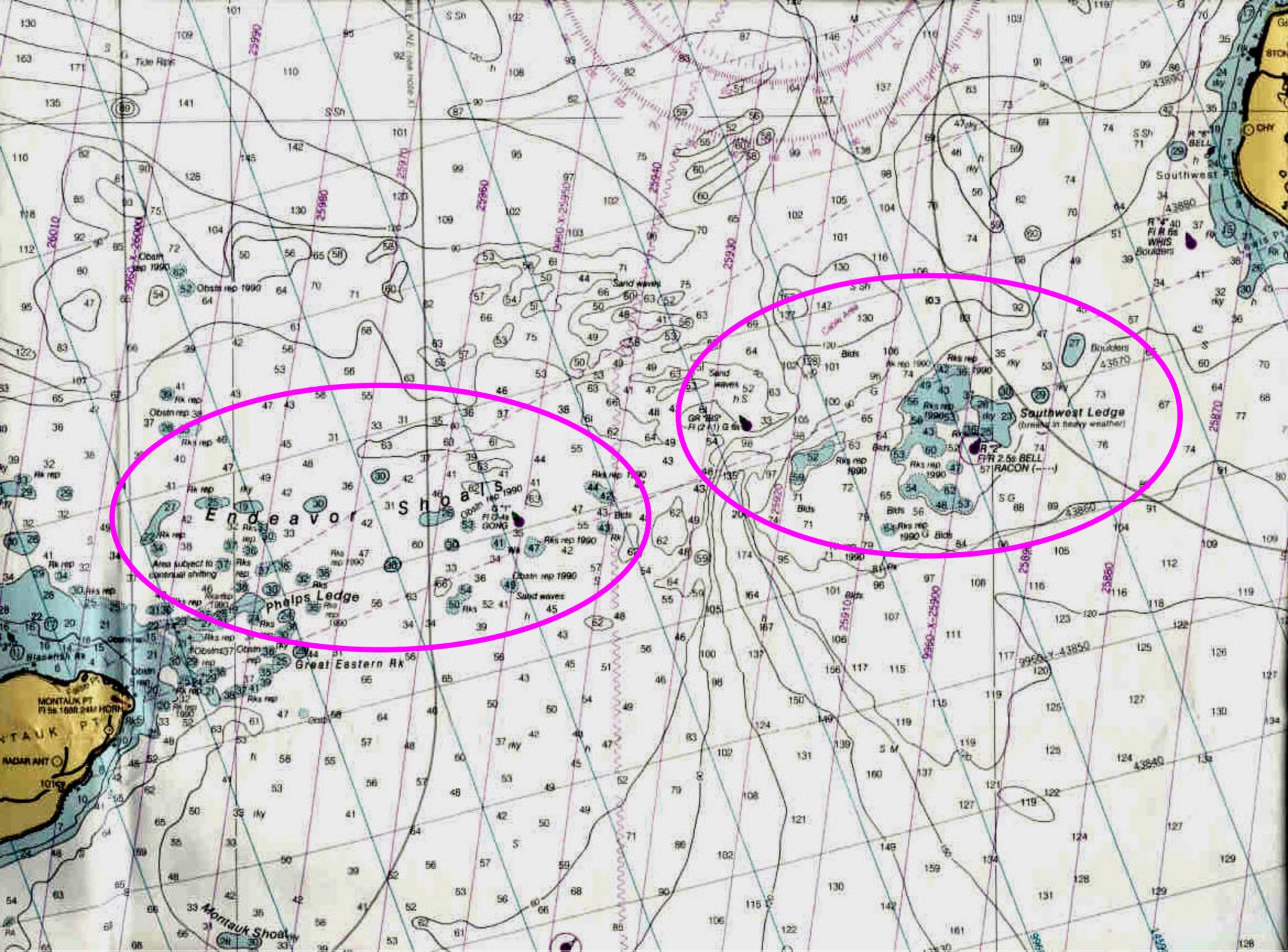
DANGERS AND OBSTACLES

“The areas around Cape Cod, Long Island, as well as the islands of Martha’s Vineyard and Block, were all originally the terminal moraines of the ice sheet in the last ice age. The mainland is rock and, although there are large stretches of sand, there are also many boulders –some boulders, the size of a 2-story building .”

“There are also sand shoals in these areas, especially in Nantucket and Vineyard Sound. Shoals that shift from year to year. It is, therefore, prudent to take the chart with a grain of salt and watch the Fathometer closely.”

– Henry Morgan





DANGERS AND OBSTACLES

Nantucket Shoals is *“the general name of the numerous broken shoals southeastward of Nantucket Island – and one of the most dangerous parts of the Coast of the United States for the navigator”*

– Coast Pilot 2



DANGERS AND OBSTACLES

CURRENTS

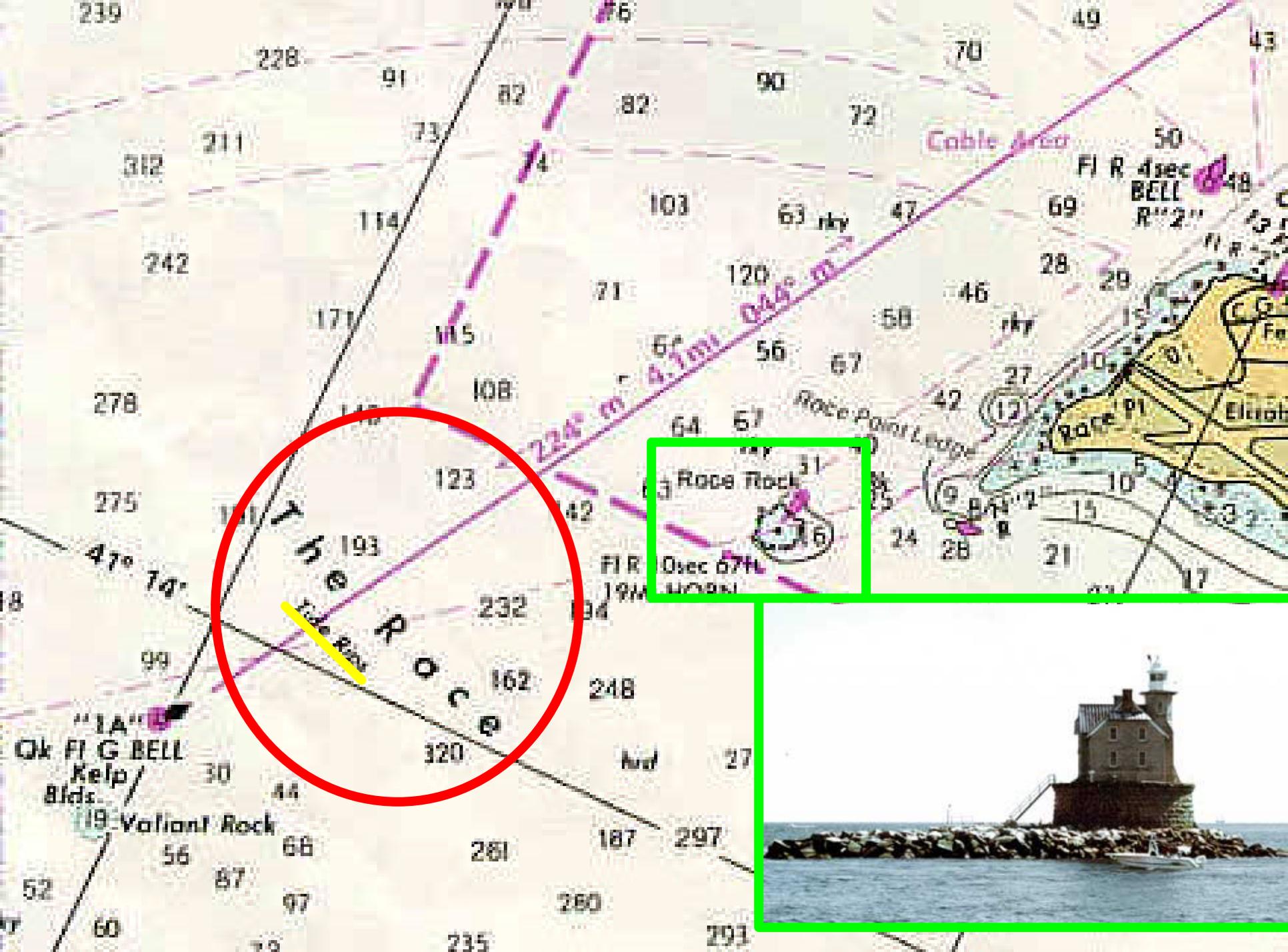
Range of tide (9 feet in western sound, 6 feet in Cape Cod)
“it’s more like a sluice compared to the Chesapeake”

“Tidal current charts absolutely essential”

“Timing of tide and current absolutely determine the decision of Plum Gut versus the Race”

– Henry Morgan





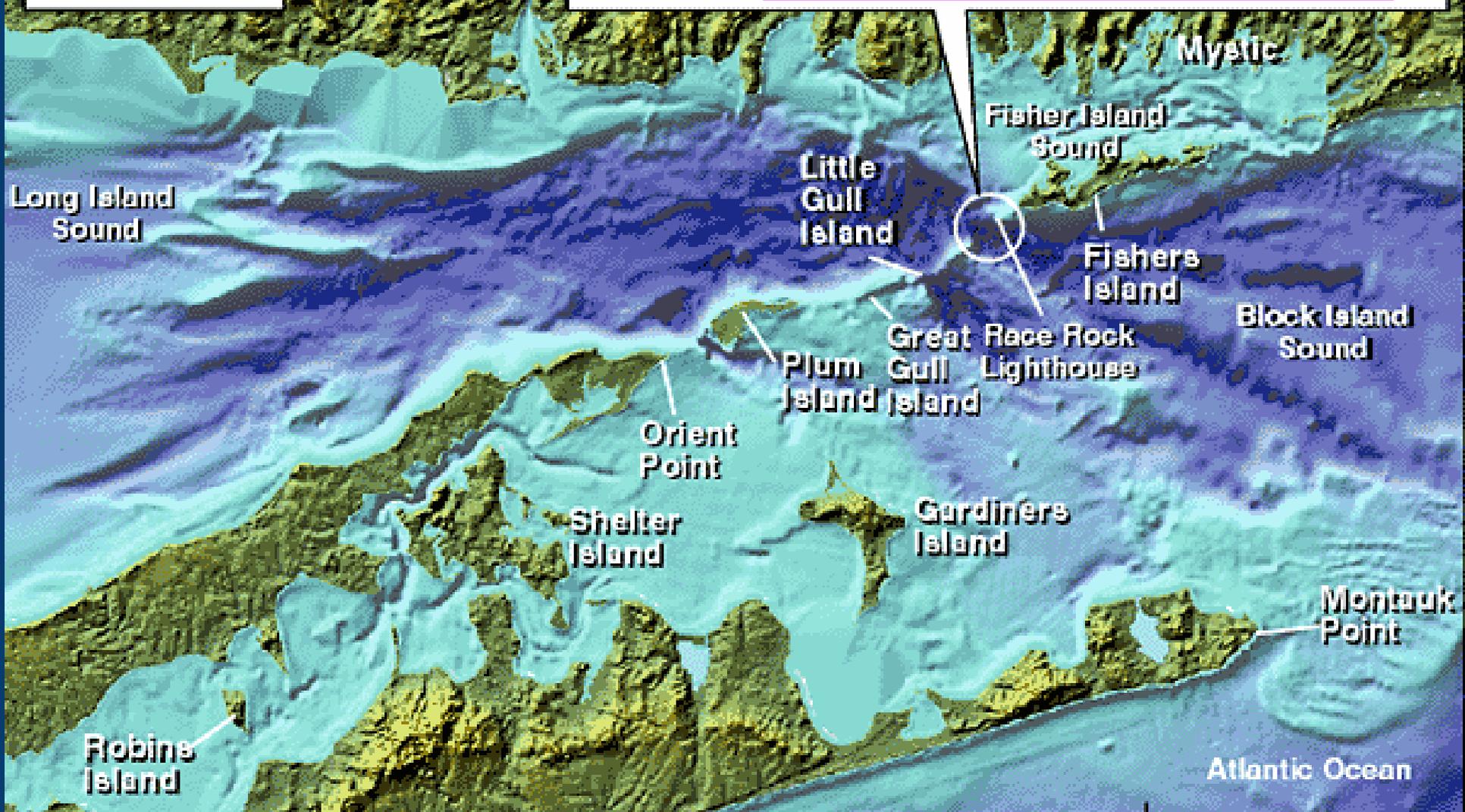
Depth in Feet

- 0 - 66
- 66 - 131
- 131 - 328

Connecticut

Turbulent Corridor

The Race is a 4-mile-wide passage between Long Island Sound and Block Island Sound. Known for treacherously turbulent waters, areas near the Race plunge to below 300 feet, the deepest in the Sound.



0

MILES

20

DANGERS AND OBSTACLES

AROUND LONG ISLAND RACE (ALIR)

Constant attention to your position and estimated location at current changes are key.

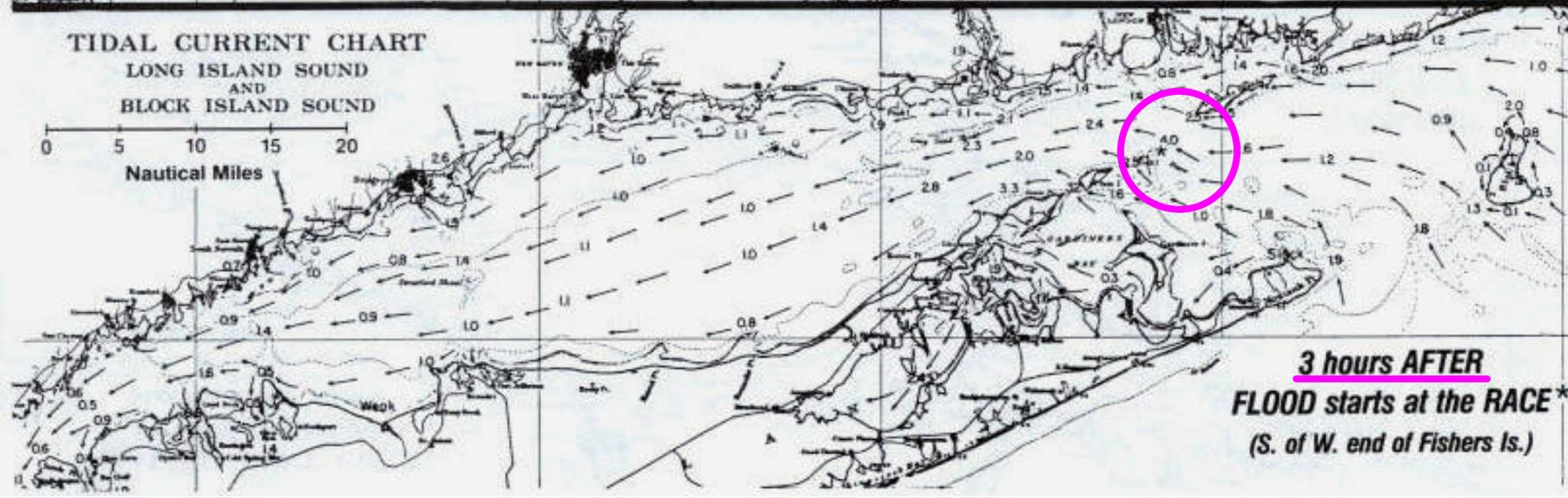
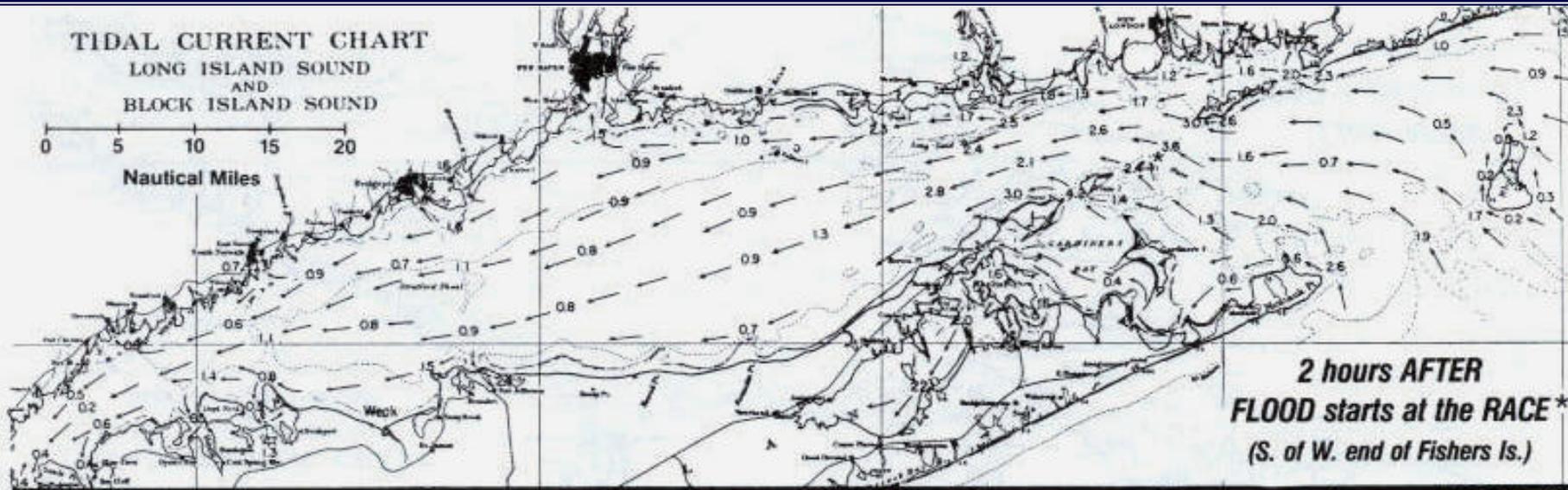
Current changes first close to shores of Long Island; ebb starts at “the Race”.

Current close to CT and NY shores starts East while mid-sound current still West.

— Alan Frank, Ernie Messer



DANGERS AND OBSTACLES



DANGERS AND OBSTACLES

- ❑ A strong current can “set” you on a rock or buoy.
- ❑ In a long-distance race, a **1/10-knot** difference due to current can be the difference between winning and losing.



DANGERS AND OBSTACLES

- ❑ **2001 ANNAPOLIS-NEWPORT RACE (473 nm)**
NA 9 Flirt won her class on corrected time by **56 seconds** over second-place boat
– approximately 0.12 sec/nm.
- ❑ **2002 CORINTHIAN 200 RACE (187 nm)**
NA 12 Vigilant took Second place on corrected time by **1 second** over third-place boat
– approximately 0.005 sec/nm.



DANGERS AND OBSTACLES

REMINDERS

DEPTH AND BOULDERS

- ❑ NE area is a terminal moraine – in 1940, a 15-foot boulder was found 1 mile outside the location of an outer buoy (that outer buoy has since been moved further outside)
- ❑ 11 years ago, the QE-2, with supposedly 15 feet under her keel, hit a boulder in Vineyard Sound



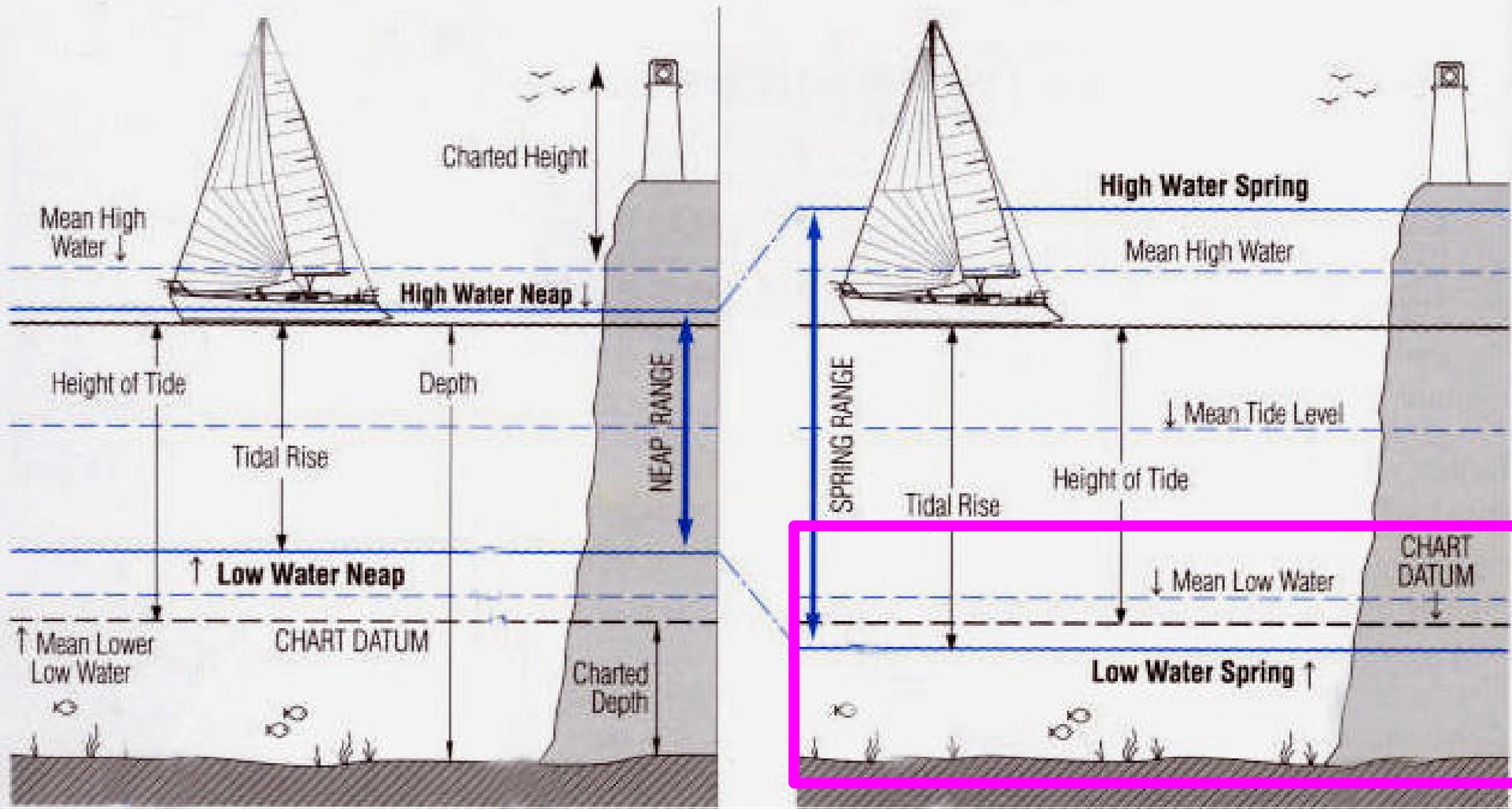
DANGERS AND OBSTACLES

SITUATIONAL AWARENESS

- ❑ Be aware of **Spring Tides** – In a lunar month, highest tides occur at time of **new** moon and **full** moon (when gravitational forces of sun and moon are in line). These “spring” tides generally occur 1-2 days after the new and full moon (or, roughly, every 14 days).
- ❑ Highest of these “spring” tides occur during winter months of December, January, and February as well as summer months of June, July, and August.
- ❑ So, tidal ranges are usually **greater** than those noted in tide tables; consequently, there may be considerably **less** water than indicated.



DANGERS AND OBSTACLES



DANGERS AND OBSTACLES

A PRUDENT MARINER...

- ❑ will check for Spring Tides, occurring in June, July, and August.
- ❑ doesn't "just follow the leader".



SUMMARY

As the OIC or Coach or Safety Officer, you are always

- ❑ responsible for the navigation, safety, and security of the STC and crew
- ❑ and, as the one responsible for navigation, you are the one who must be situationally aware of the

SHIP'S POSITION
and **WHERE SHE IS HEADED**

WIND AND WEATHER CONDITIONS

TIDES AND CURRENTS

DANGERS AND OBSTACLES



ADVICE FROM DNAS

Be sure the Midshipmen

“Plan the sail...

...and

sail the plan.”

— *CAPT Harold J. Flammang, USN (RET)*
Former Director of Naval Academy Sailing

2002



The Navy Comes Ashore At Wasque



1990

the sleek Eagerloo from the Naval Academy at Annapolis



Photo by A. David