

Learn to Sail

UNIT 6: THE SAILING ENVIRONMENT



THE SAILING ENVIRONMENT

By the end of this unit, you will understand:

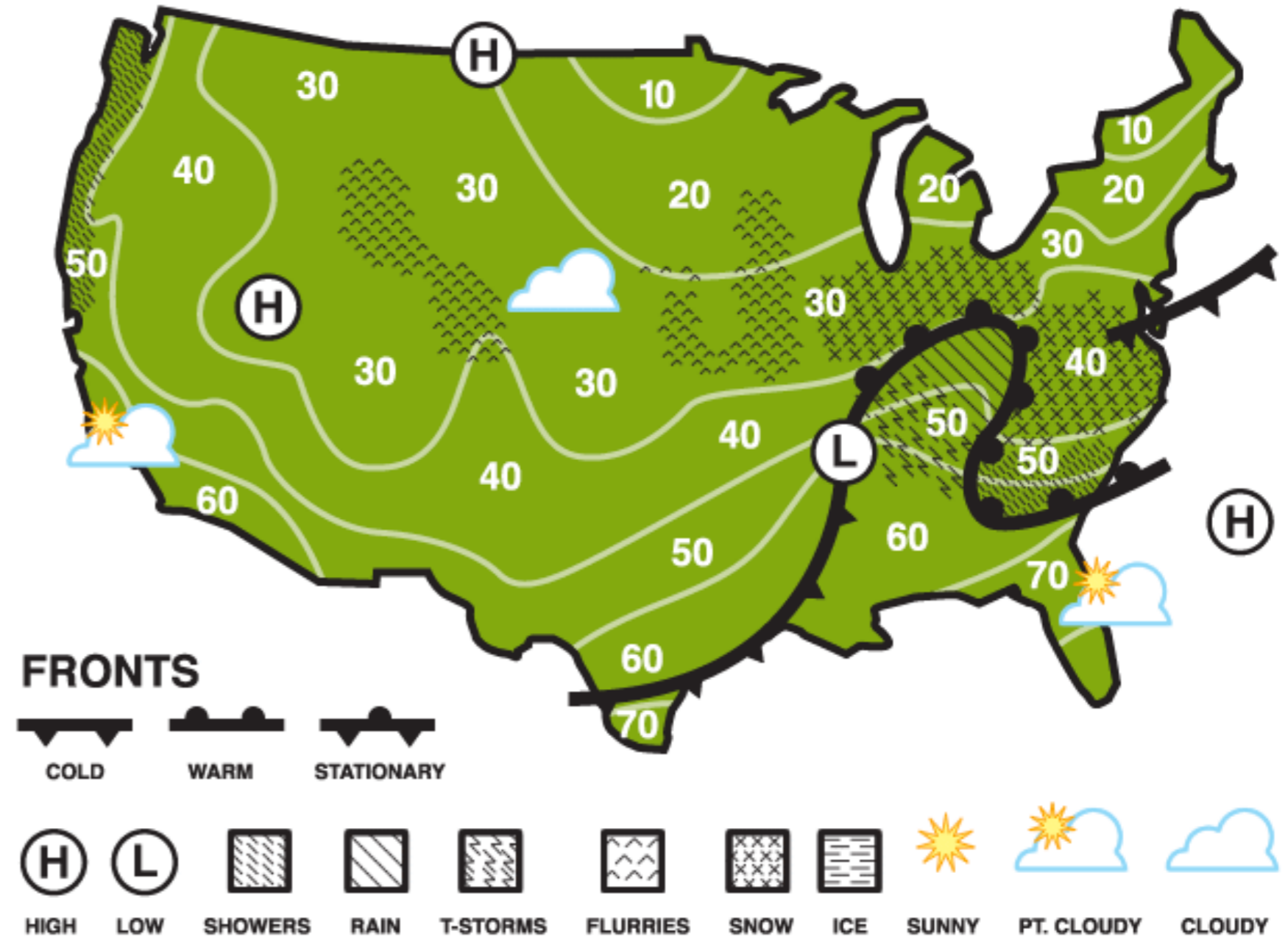
- Reading the weather
- Land effects and thermal winds
- Tides and currents
- Navigation rules
- Navigation aids
- How to read nautical charts



REACHING THE WEATHER

High Pressure systems (H) indicate milder weather.

Low pressure systems (L) typically represent a warm or cold front, a sign of inclement weather.



CUMULUS CLOUDS

Large, white and fluffy. They are often an indicator of good weather.





CIRRUS CLOUDS

Wispy and thin. They usually mean good weather for the day, but they may suggest a change in weather is on the way.

CUMULONIMBUS CLOUDS

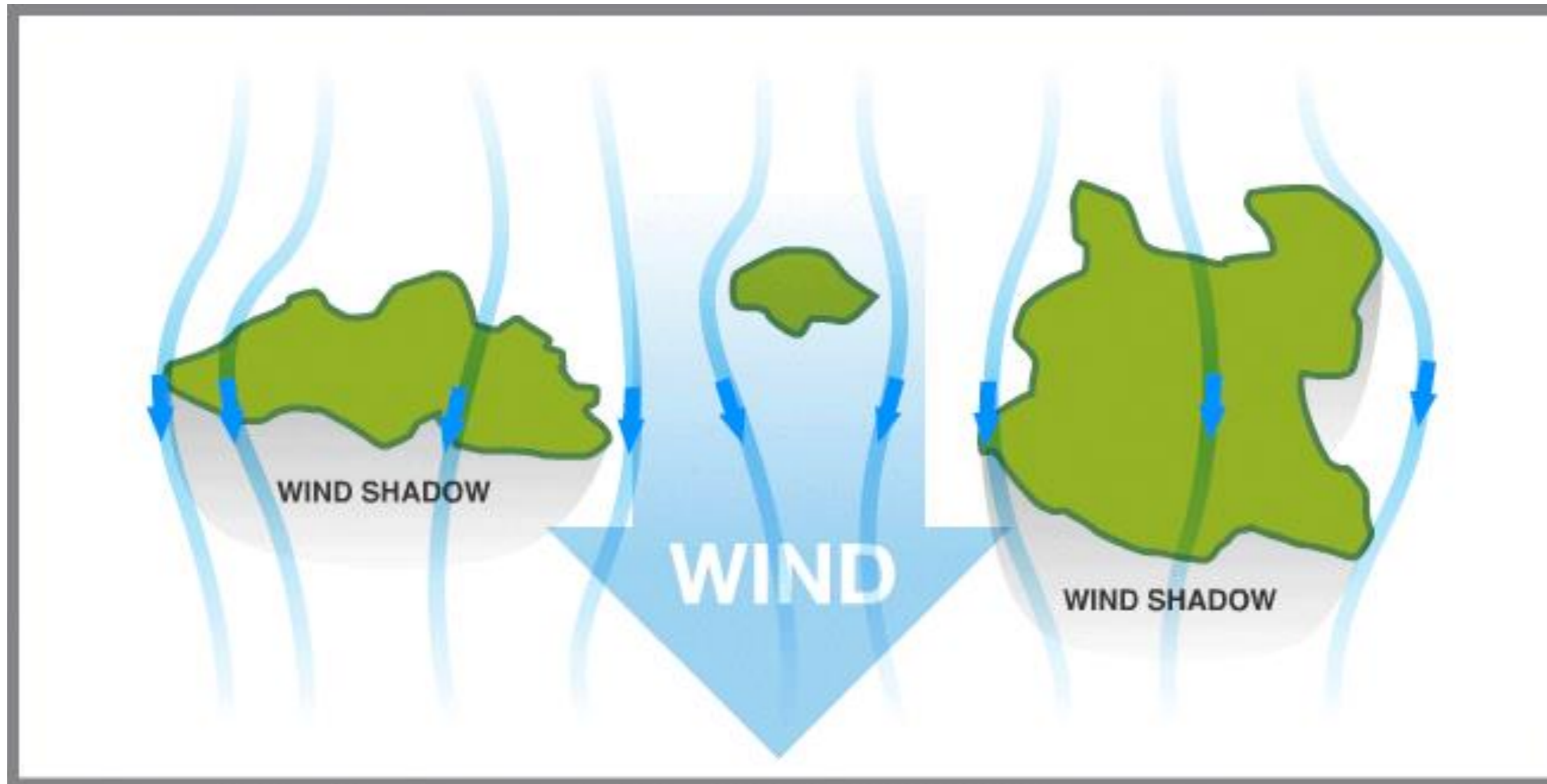
Towering clouds. Often called “thunderheads” they are accompanied by severe conditions, including heavy rain and lightning.



STRATUS CLOUDS



Layered and low-lying. They are often a sign for steady rain.



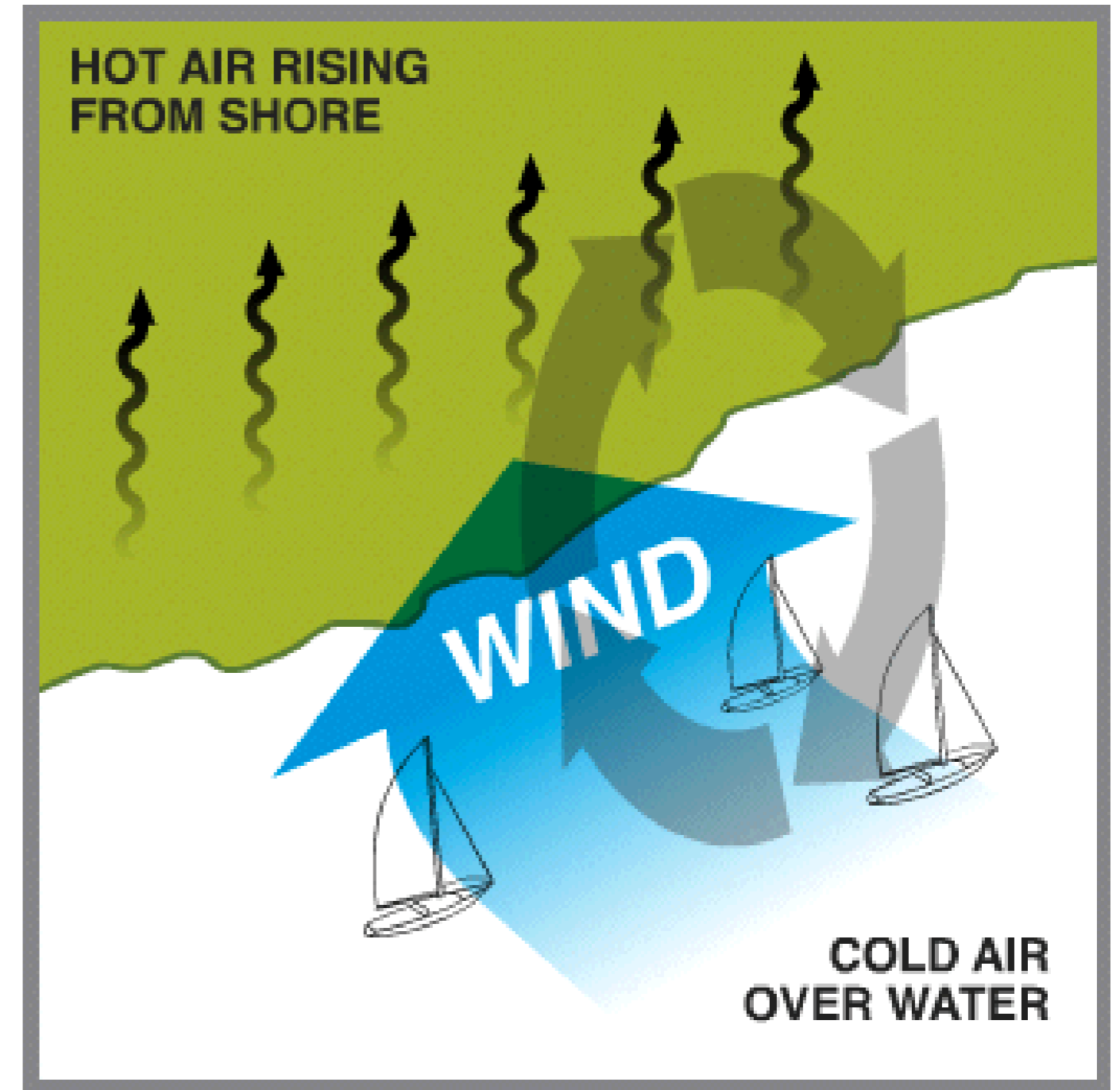
LAND EFFECTS

Islands, tall buildings and even other ships cast “wind shadows”— areas with less wind —on their leeward sides.

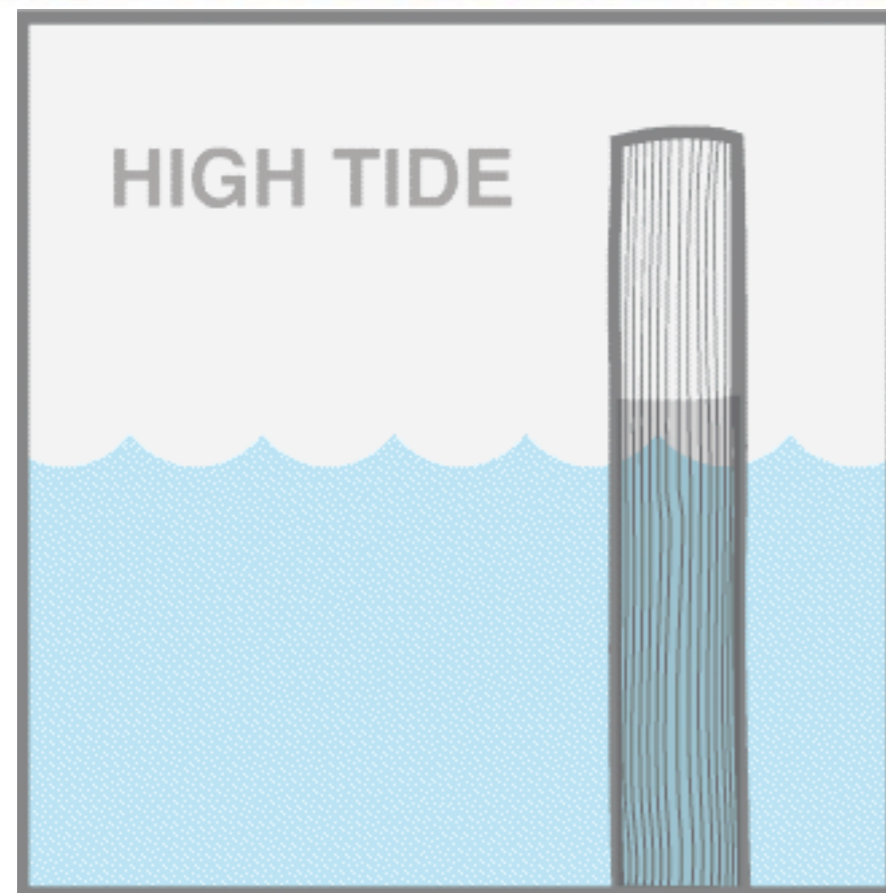
THERMAL WINDS

Thermal winds are localized winds created by differences between the temperature on the shore and the temperature of neighboring waters.

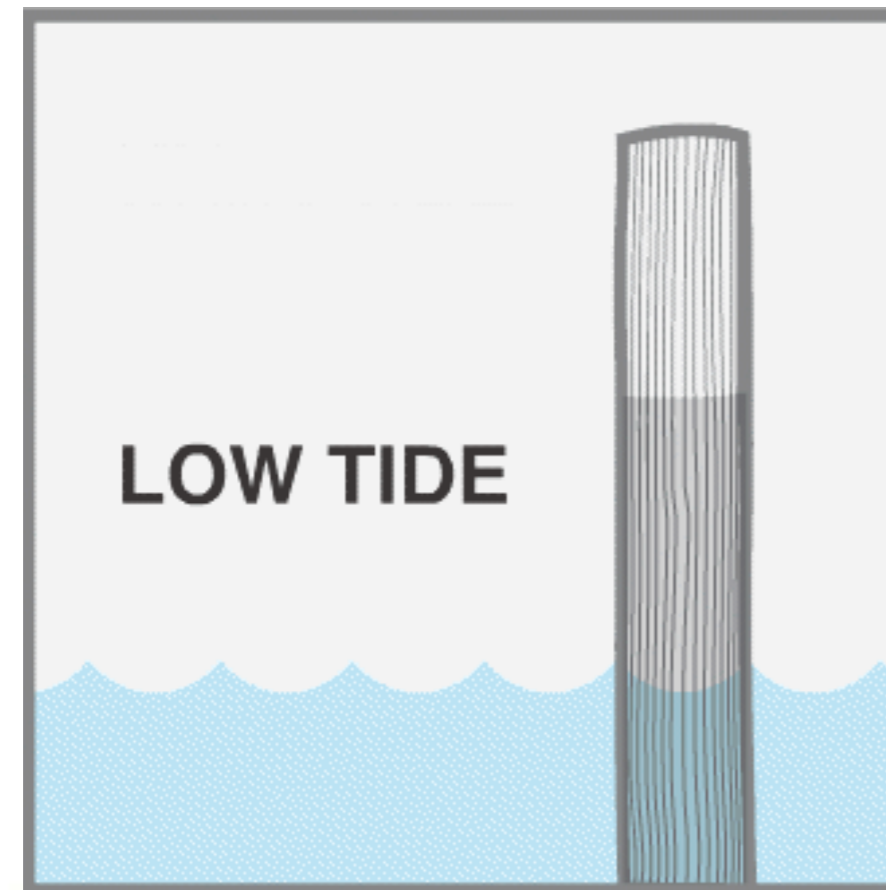
As the warm air from land rises, it draws the denser, cool air from the water towards it, a process that creates thermal wind.



TIDES



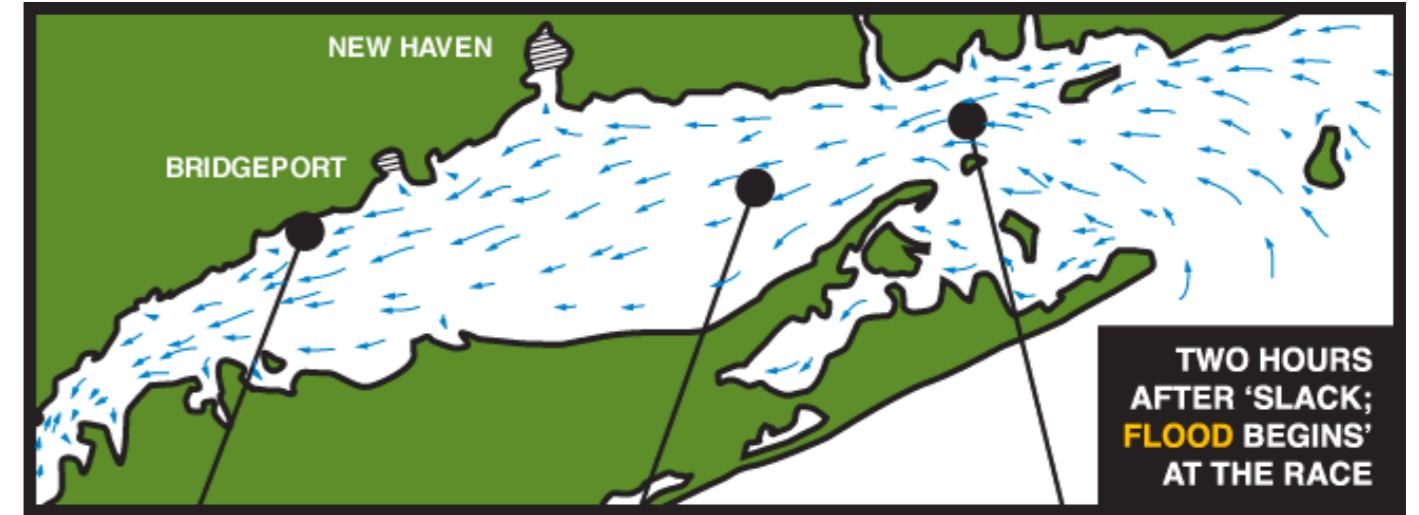
A tide is a periodic change in the vertical water level at a specific locale.



Tides are primarily caused by the gravitational pull of the moon on the earth.

CURRENTS

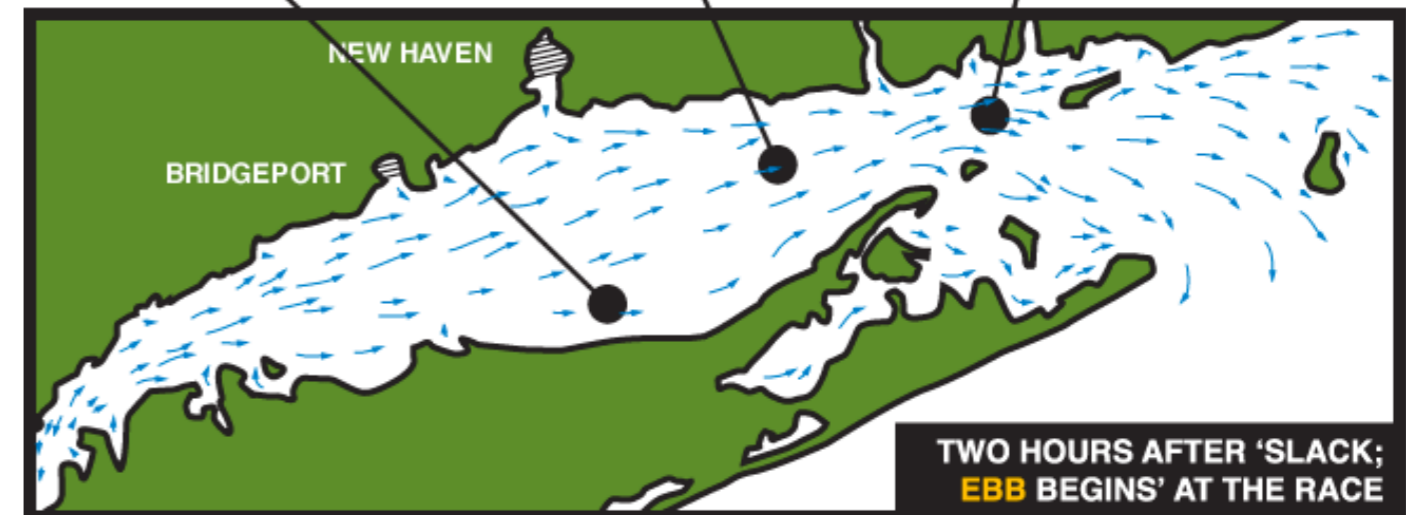
Currents are horizontal movements of water, primarily caused by river flows, wind and ocean movements.



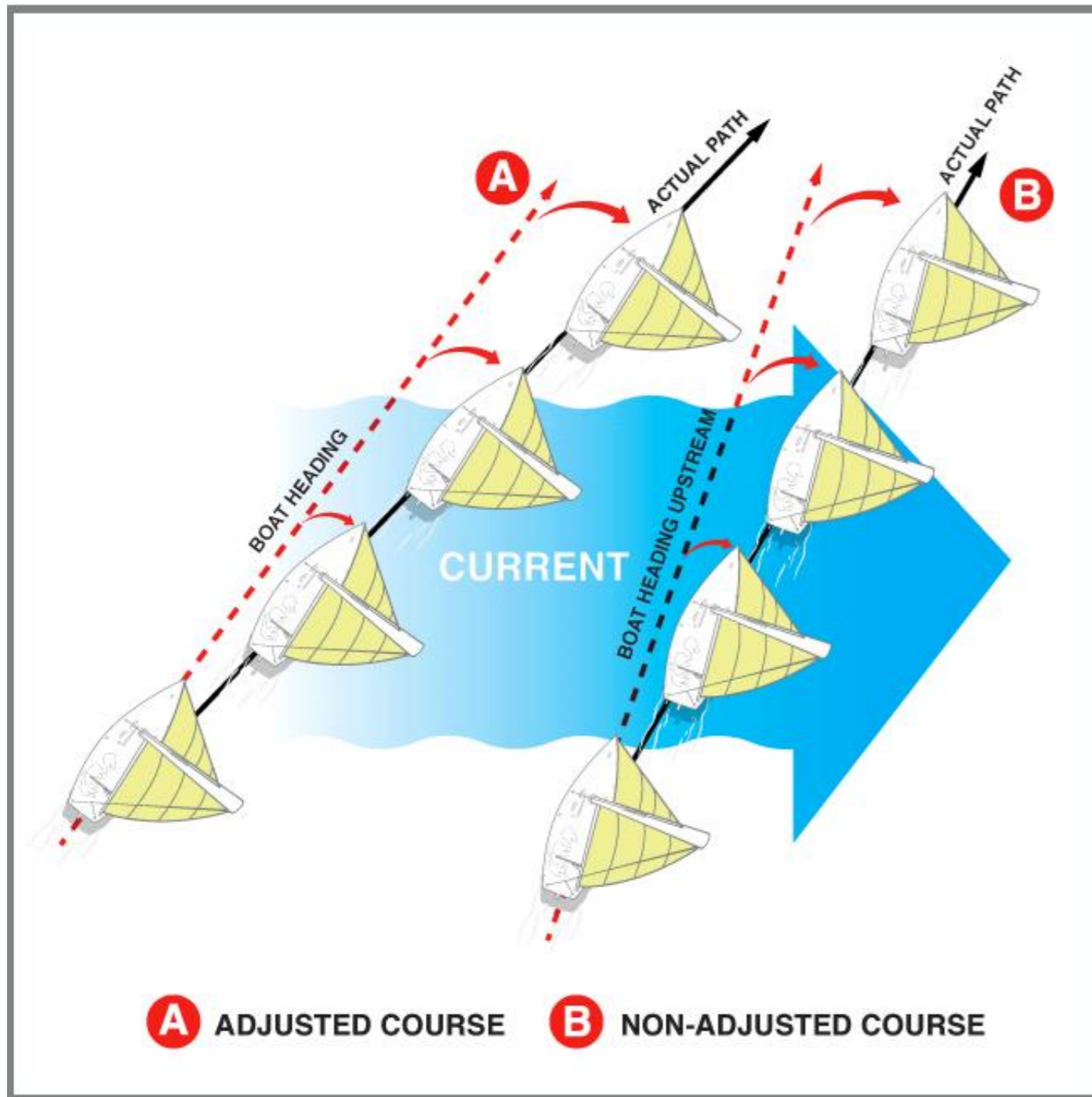
CURRENT IS USUALLY WEAKER IN SHALLOW WATER

CURRENT IS USUALLY STRONGER IN DEEPER WATER

CURRENTS USUALLY RUN FASTER IN NARROW OPENINGS



COMPENSATING FOR CURRENT



Currents can slow your progress, but you can also work with them to get to your destination faster.

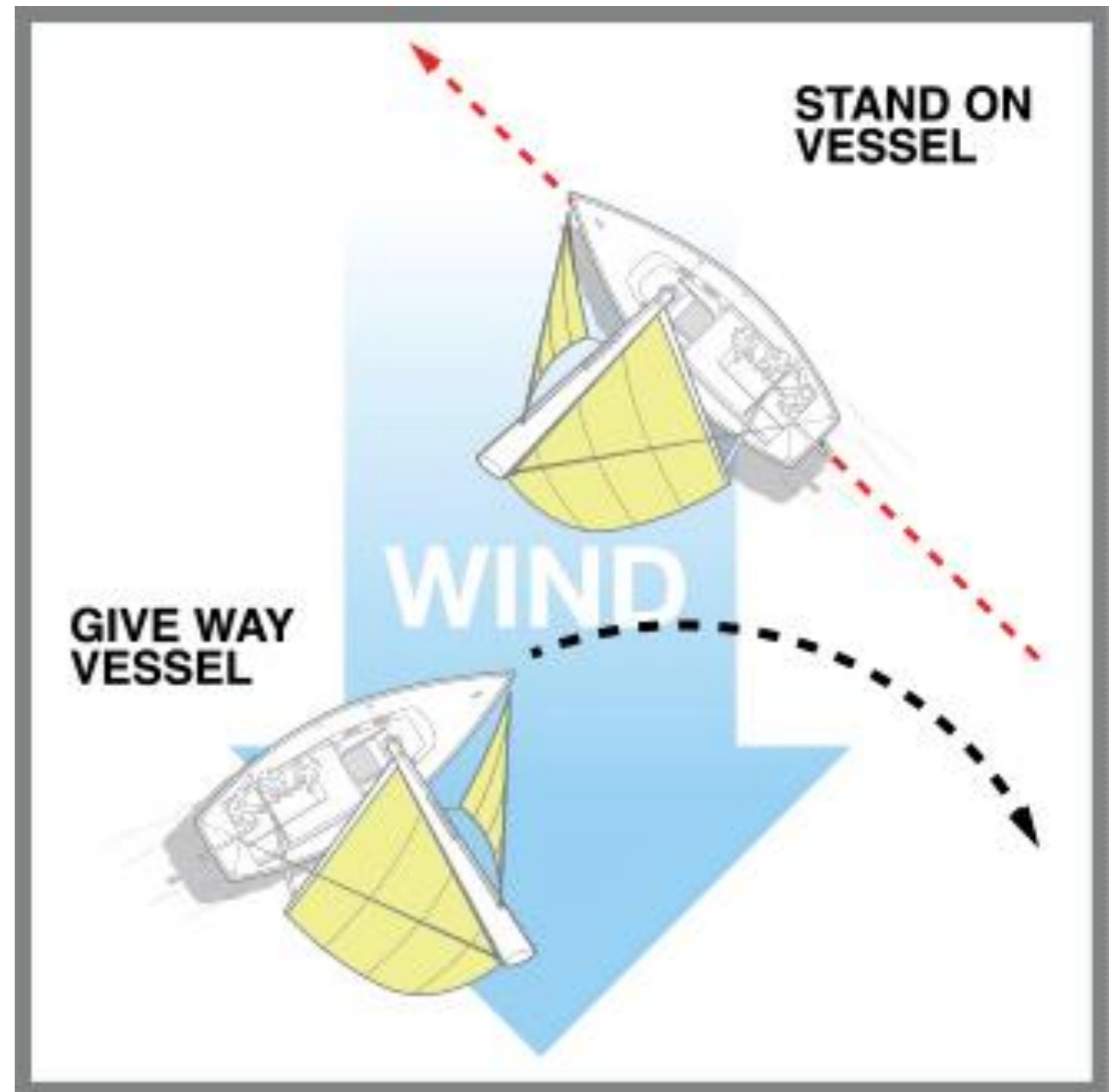
Instead of steering directly toward your goal, steer for a point upstream (the direction the current is coming from) and let it pull you back to your desired course.

BASIC NAVIGATION RULES

Right-of-way boat = stand-on vessel

Give-way vessel = give-way vessel

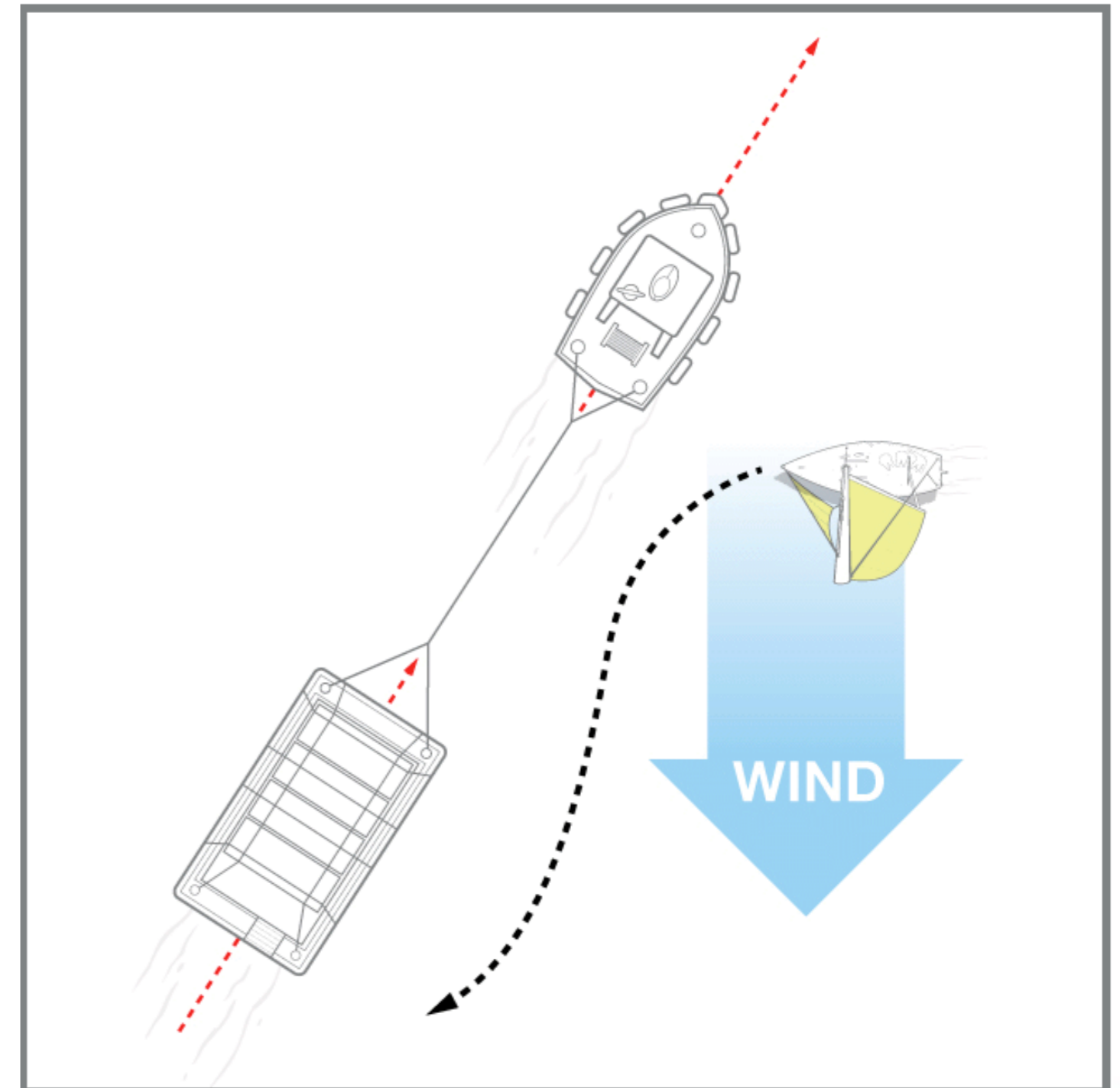
Stand-on vessel should maintain course and speed, while the give-way vessel should take early and clear action to keep out of the way.



NAVIGATION RULES – STAND-ON PRIORITY

The priority for stand-on vessels, from highest to lowest, is

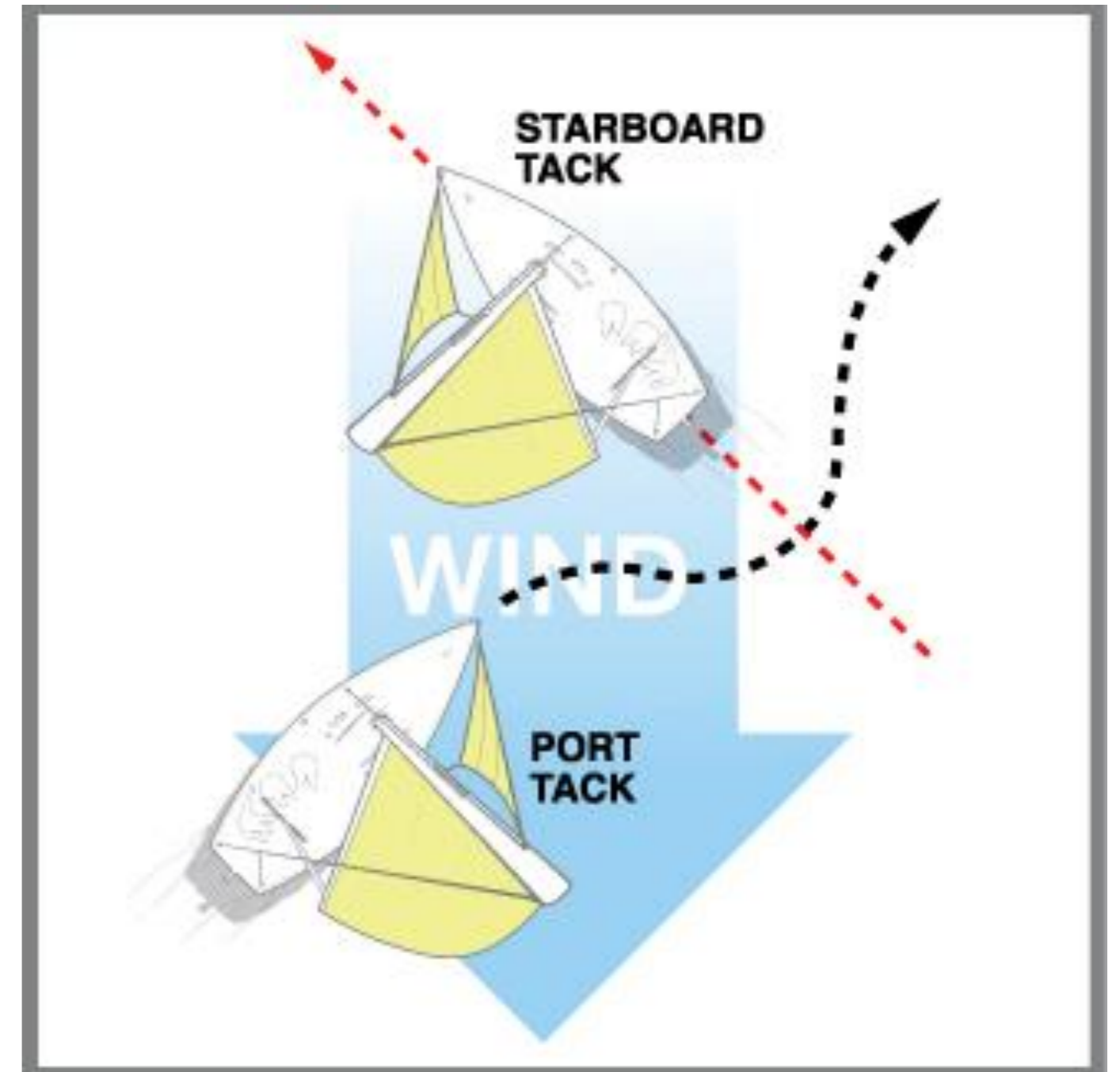
- a disabled vessel,
- a vessel that is difficult to maneuver, such as a dredge or tug towing a vessel,
- a vessel restricted by draft, such as a tanker in a channel,
- a vessel engaged in commercial fishing,
- a sailboat, and
- a powerboat.



STARBOARD TACK OVER PORT TACK

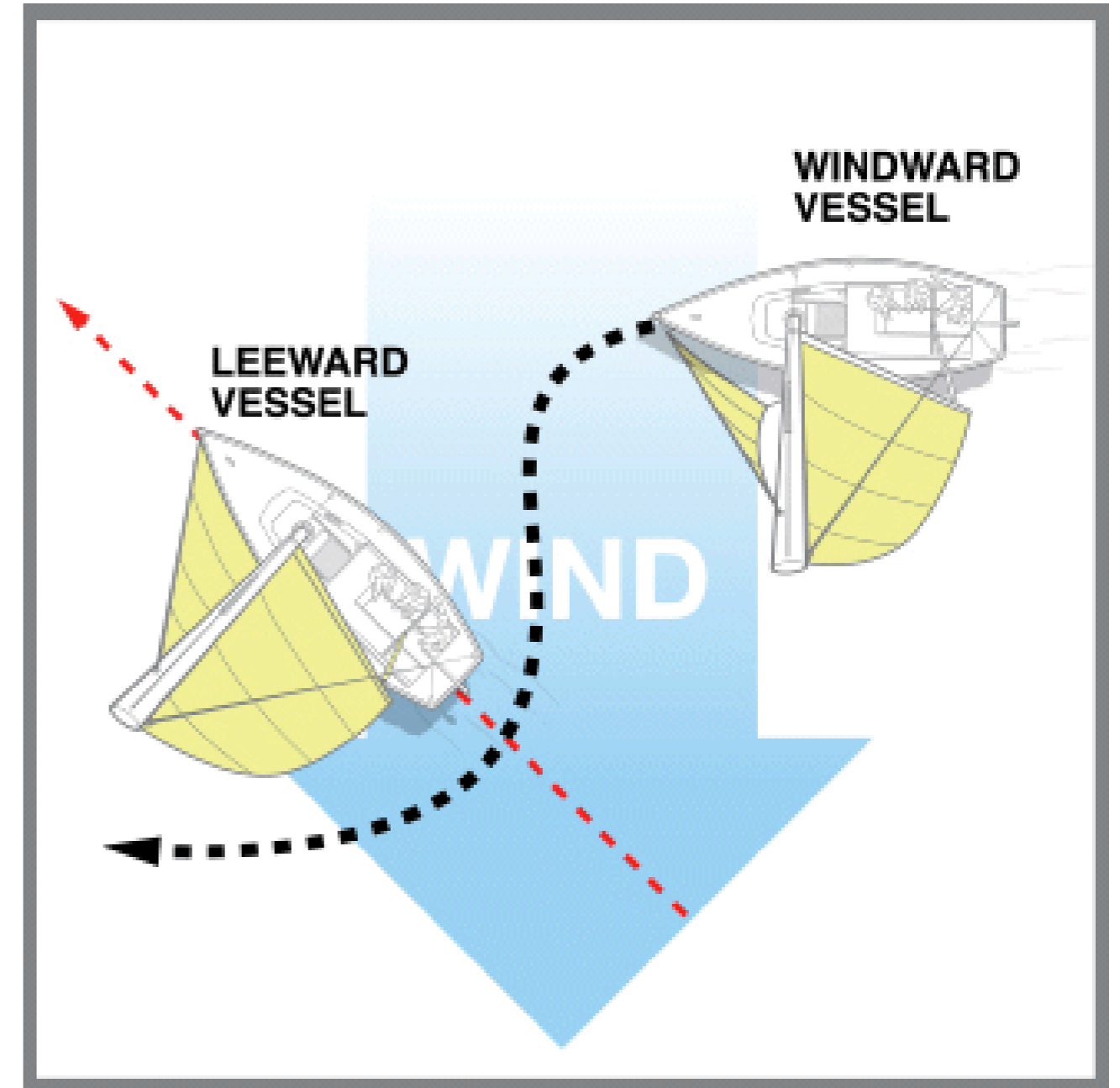
Starboard tack = Stand-on vessel

Port tack = Give-way vessel



LEEWARD VESSEL OVER WINDWARD VESSEL

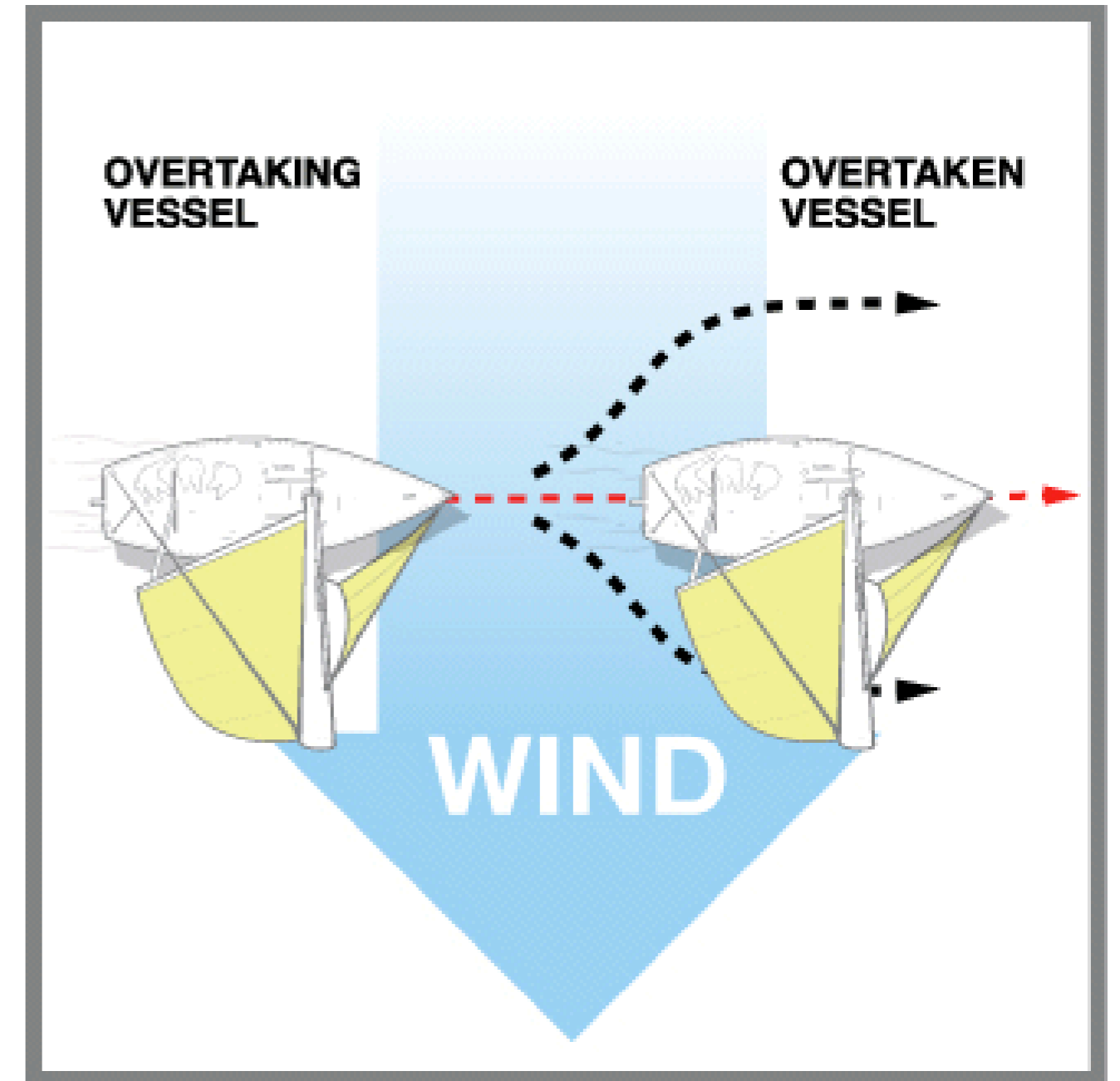
Leeward vessel = Stand-on vessel
Windward vessel = Give-way vessel



OVERTAKEN VESSEL OVER OVERTAKING VESSEL

Overtaken boat = Stand-on vessel

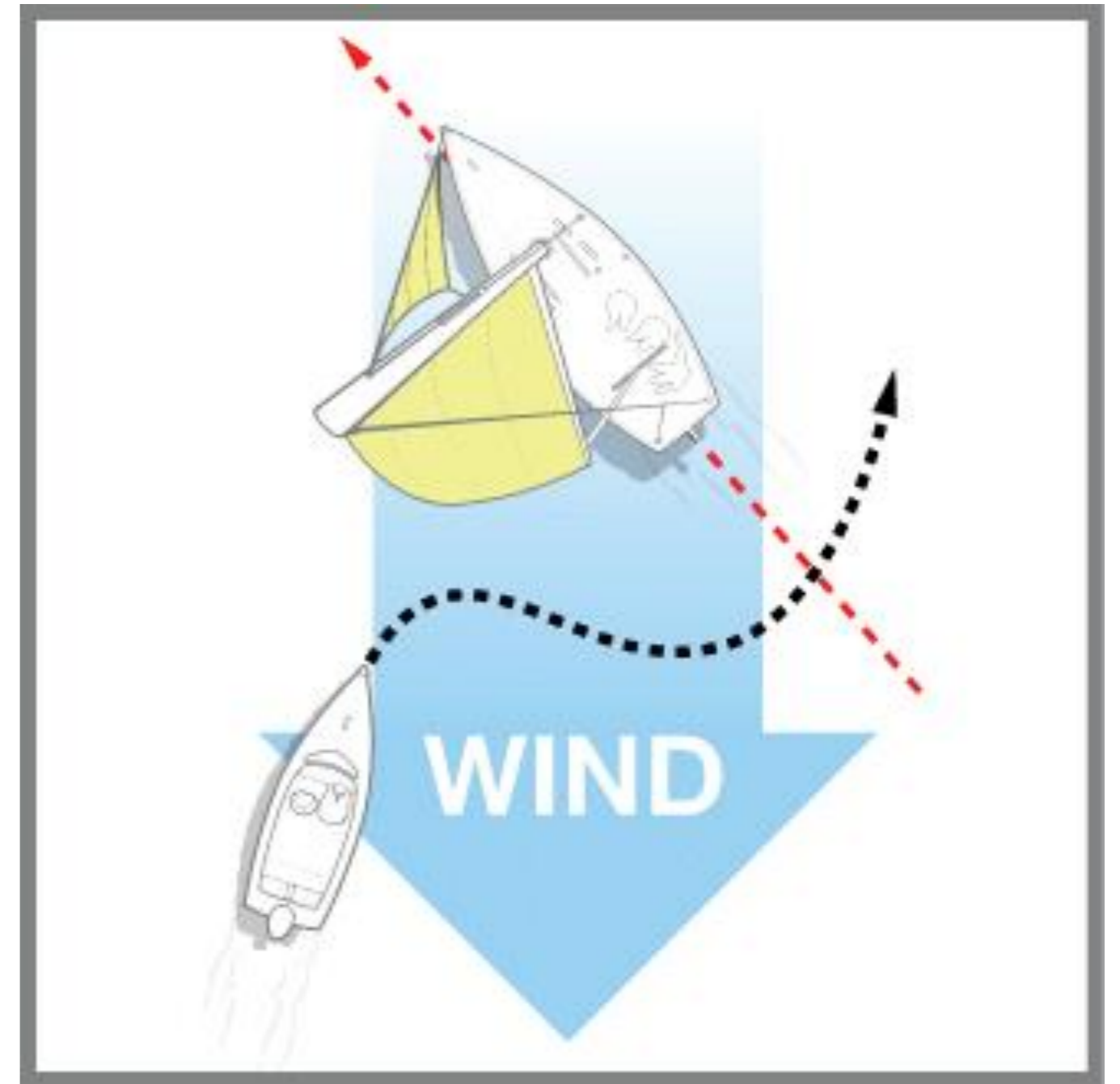
Overtaking boat = Give-way vessel



SAILBOATS AND POWERBOATS

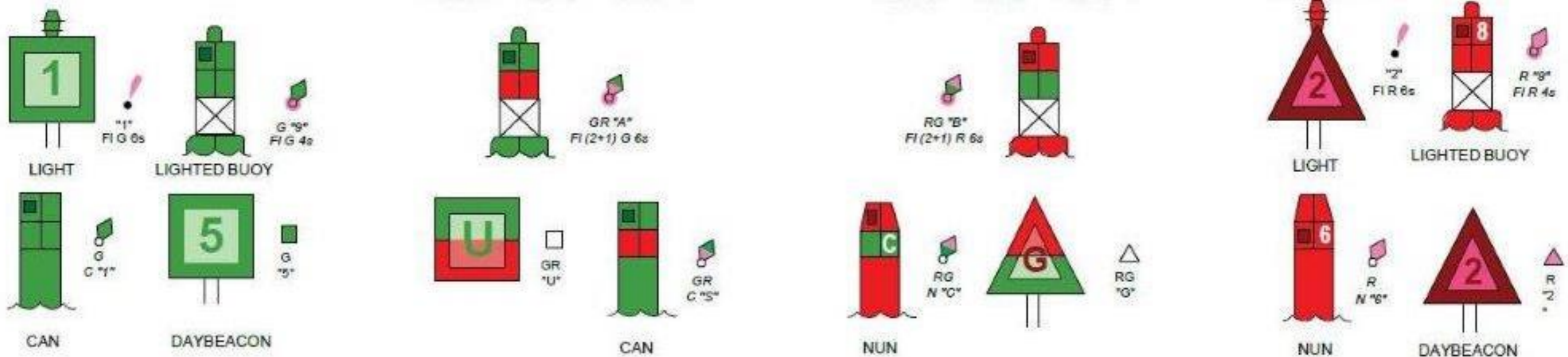
Sailboat = Stand-on vessel

Powerboat = Give-way vessel




















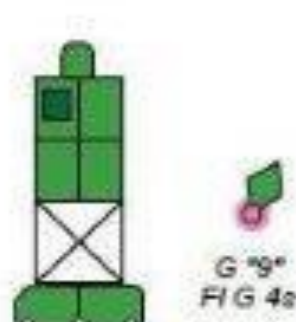
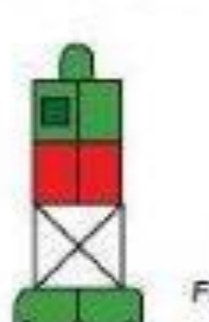
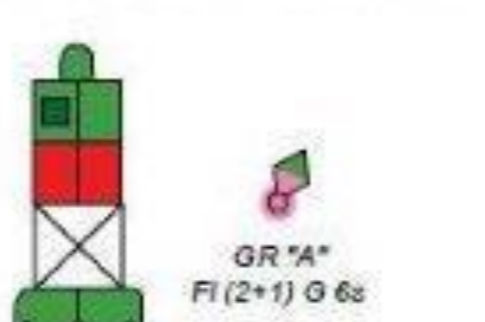
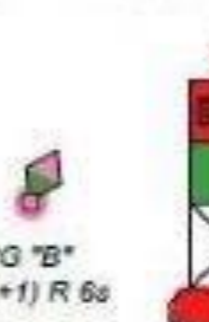
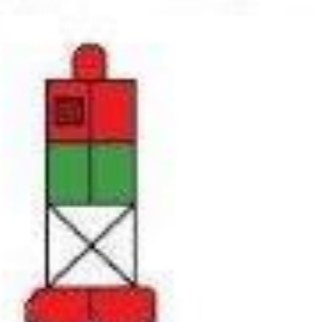


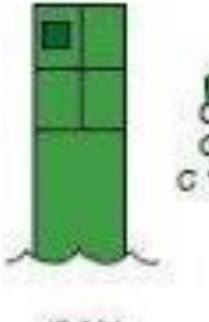


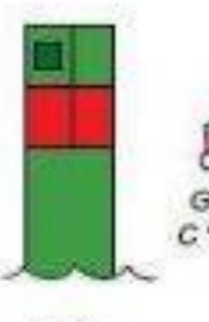
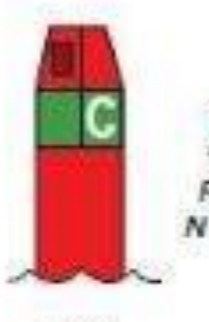

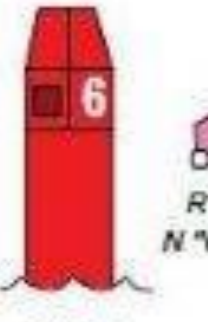

NAVIGATION AIDS

Think of buoys and channel markers as the road signs of the water. Each type has a distinct shape and color to help you safely sail your boat in and out of harbors, and to avoid shallow waters.



Lateral System As Seen Entering From Seaward

on navigable waters except Western Rivers

PORT SIDE ODD NUMBERED AIDS	PREFERRED CHANNEL NO NUMBERS – MAY BE LETTERED	PREFERRED CHANNEL NO NUMBERS – MAY BE LETTERED	STARBOARD SIDE EVEN NUMBERED AIDS
<ul style="list-style-type: none">  GREEN LIGHT ONLY  FLASHING (2)  FLASHING  OCCULTING  QUICK FLASHING  ISO 	<ul style="list-style-type: none">  GREEN LIGHT ONLY  COMPOSITE GROUP FLASHING (2+1) 	<ul style="list-style-type: none">  RED LIGHT ONLY  COMPOSITE GROUP FLASHING (2+1) 	<ul style="list-style-type: none">  RED LIGHT ONLY  FLASHING (2)  FLASHING  OCCULTING  QUICK FLASHING  ISO
 <p>"1" Fl G 6s</p>  <p>G "9" Fl G 4s</p> <p>LIGHT LIGHTED BUOY</p>	 <p>GR "A" Fl (2+1) G 6s</p>  <p>Lighted buoy</p>	 <p>RG "B" Fl (2+1) R 6s</p>  <p>Lighted buoy</p>	 <p>"2" Fl R 6s</p>  <p>R "8" Fl R 4s</p> <p>LIGHT LIGHTED BUOY</p>
 <p>G C "Y"</p>  <p>G "5"</p> <p>CAN DAYBEACON</p>	 <p>GR "U"</p>  <p>GR C "S"</p> <p>CAN</p>	 <p>RG N "C"</p>  <p>RG "G"</p> <p>NUN</p>	 <p>R N "6"</p>  <p>R "2"</p> <p>NUN DAYBEACON</p>

For more information on aids to navigation, including those on Western Rivers, please consult the latest USCG Light List for your area. These volumes are available online at <http://www.navcen.uscg.gov>

GREEN AND RED LIGHTED BUOYS

These buoys are located near the entrances of harbors to mark a safe area for navigation – red mark the right side when returning and green the left.

Each has a distinct flashing pattern (indicated on charts) to help identify them for navigation at night.



NUN BUOYS



Shaped with a pointed top, nun buoys are red in color and marked with even numbers.

Nuns are used to mark the right side of a channel for boats returning to harbor (or left if leaving).

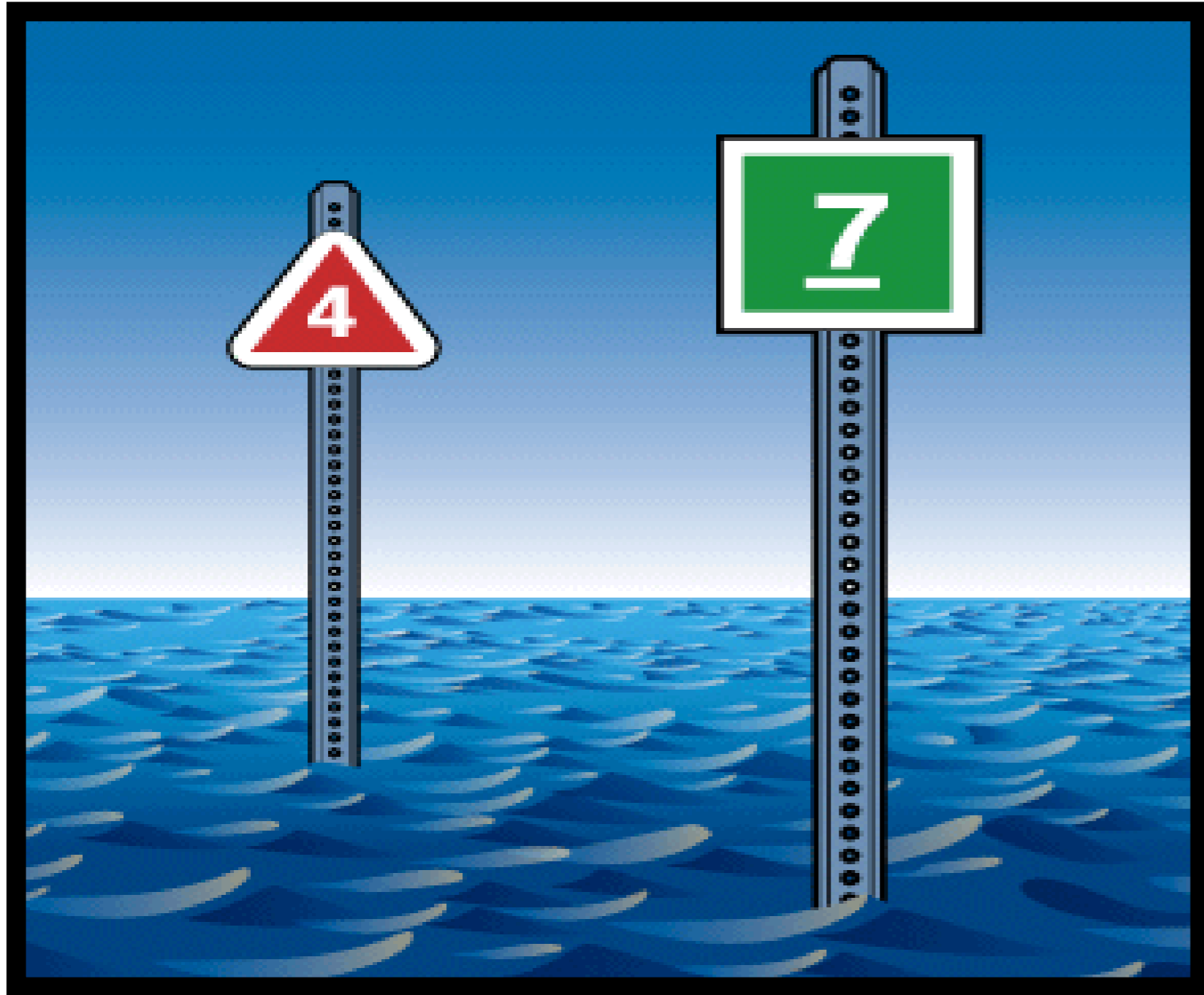
CAN BUOYS

Shaped with a flat top, can buoys are green in color and are marked with odd numbers.

Cans are used to mark the left side of a channel when returning to harbor (or right if leaving).



GREEN AND RED DAY MARKS



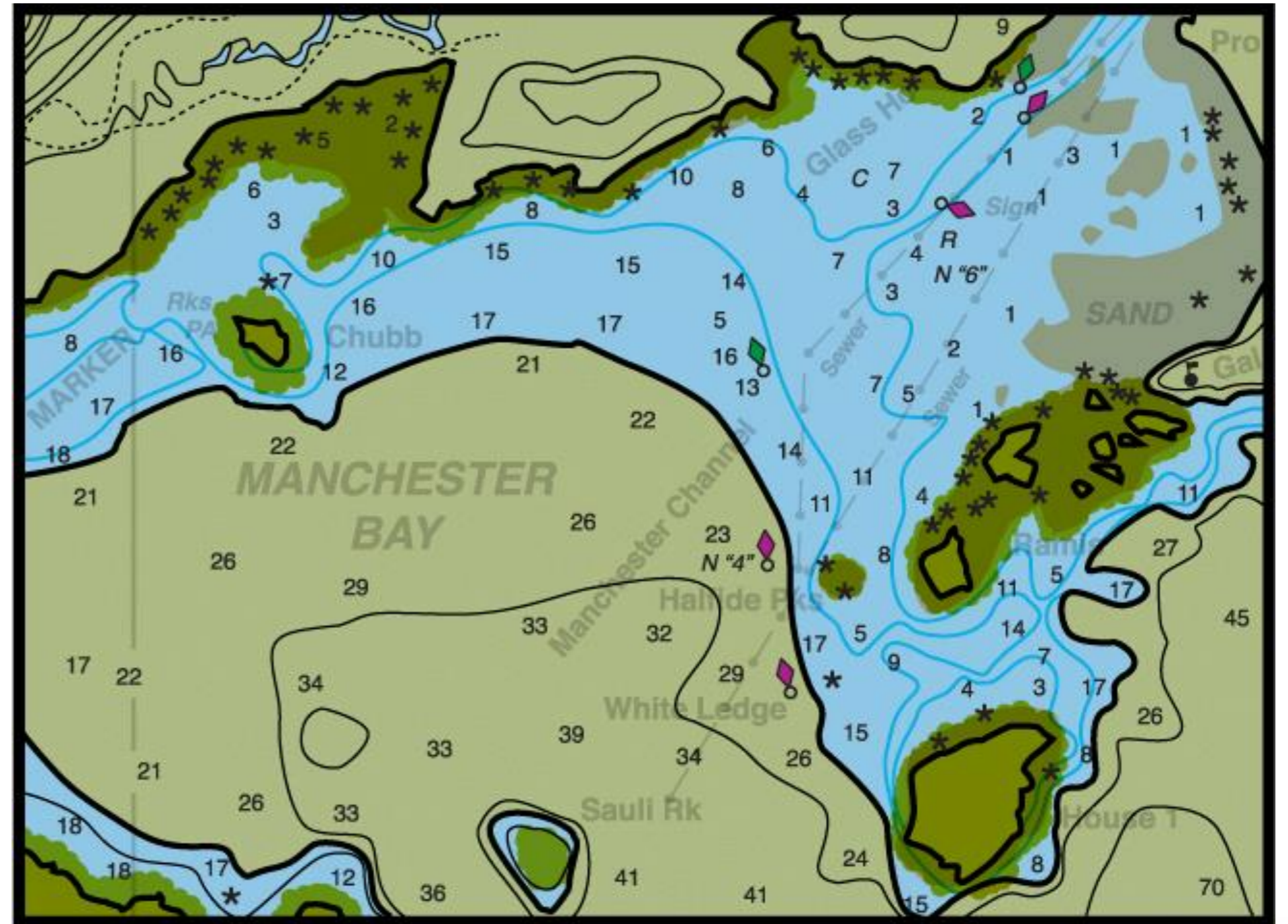
Daymarks are used to mark the right and left side of channels and should be treated just like nun and can buoys.

Keep the red daymarks on your right when returning to harbor and green daymarks on your left.

Red daymarks = Triangular with even numbers
Green daymarks = Square with odd numbers

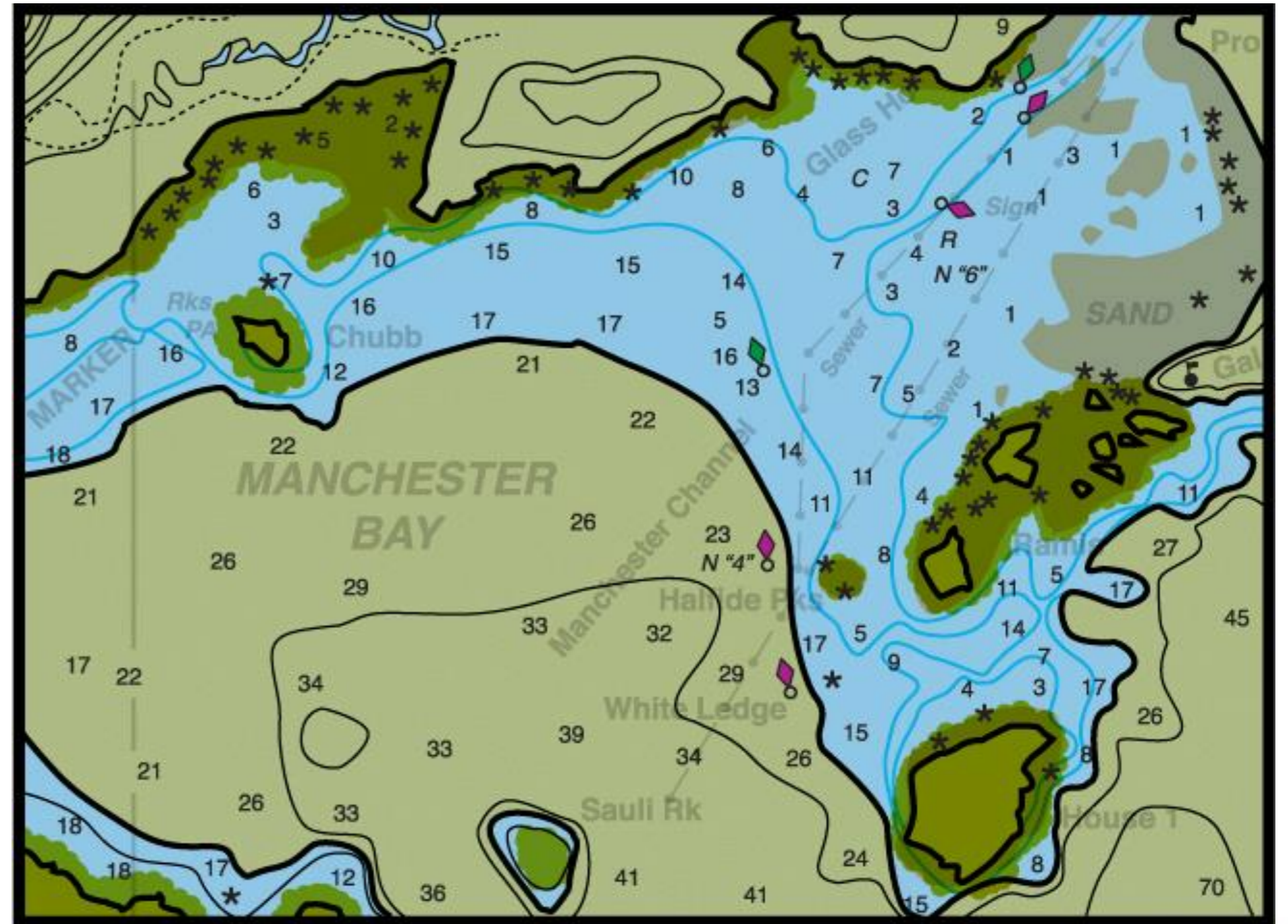
READING A NAUTICAL CHART

- Diamonds represent channel buoys, colored to represent a nun (red) or can (green).
- Contour lines follow an area of consistent water depth.
- On most charts, areas of shallow waters are indicated by light blue.



READING A NAUTICAL CHART

- The small numbers written on top of the water are soundings, which indicate the depth of the water at low tide at those particular points.
- The dark green areas marked with asterisks show areas with noteworthy bottom topography such as hazardous rocks, sunken ships and other hidden dangers.



ADD LOCAL CHARTS

ADD LOCAL CHARTS

TIPS AND TRICKS

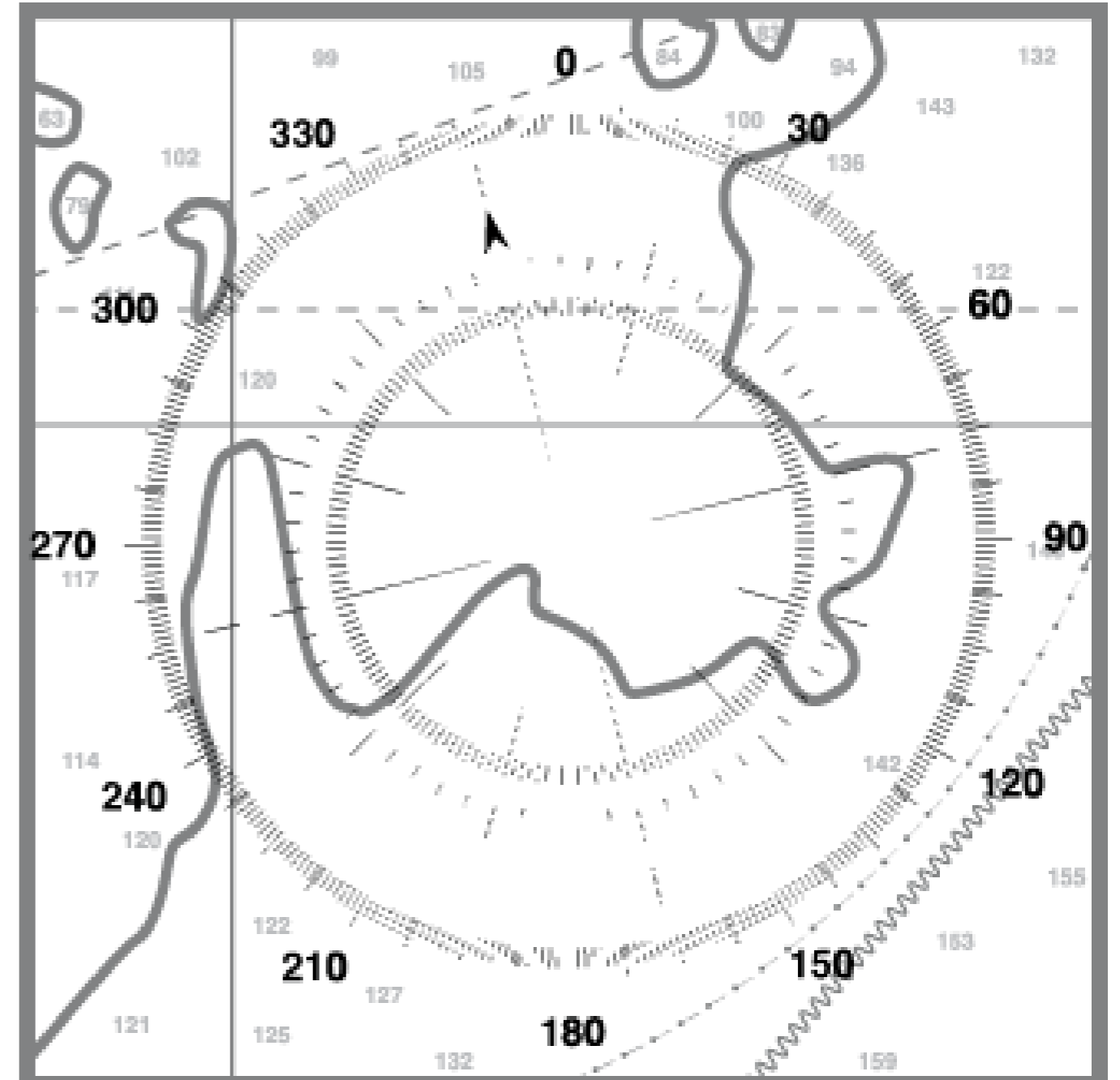
On the edge of every nautical chart is an important note indicating “Soundings in Feet,” “Soundings in Meters,” or “Soundings in Fathoms.” This tells you how water depth is measured on the chart. A meter is a little over three feet, while a fathom is precisely six feet. Be sure to check which measurement is used to indicate water depths (soundings) on your chart.

COMPASS ROSE

Use the compass rose on your chart to relate your boat's compass heading (direction) to the chart - and vice versa.

The outer circle indicates the degrees of the compass relative to the Geographic North Pole, while the inner circle shows compass degrees relative to the Magnetic North Pole.

Your boat's compass relates to the inner circle (Magnetic North).



REVIEW



UNIT SUMMARY

TOPICS COVERED

- Where you can find weather forecasts
- What types of clouds indicate good or stormy weather
- What are tides and currents and how to tell if a tide is high or low
- The rules for right of way
- Some of the most important navigation aids
- How to read a nautical chart.

