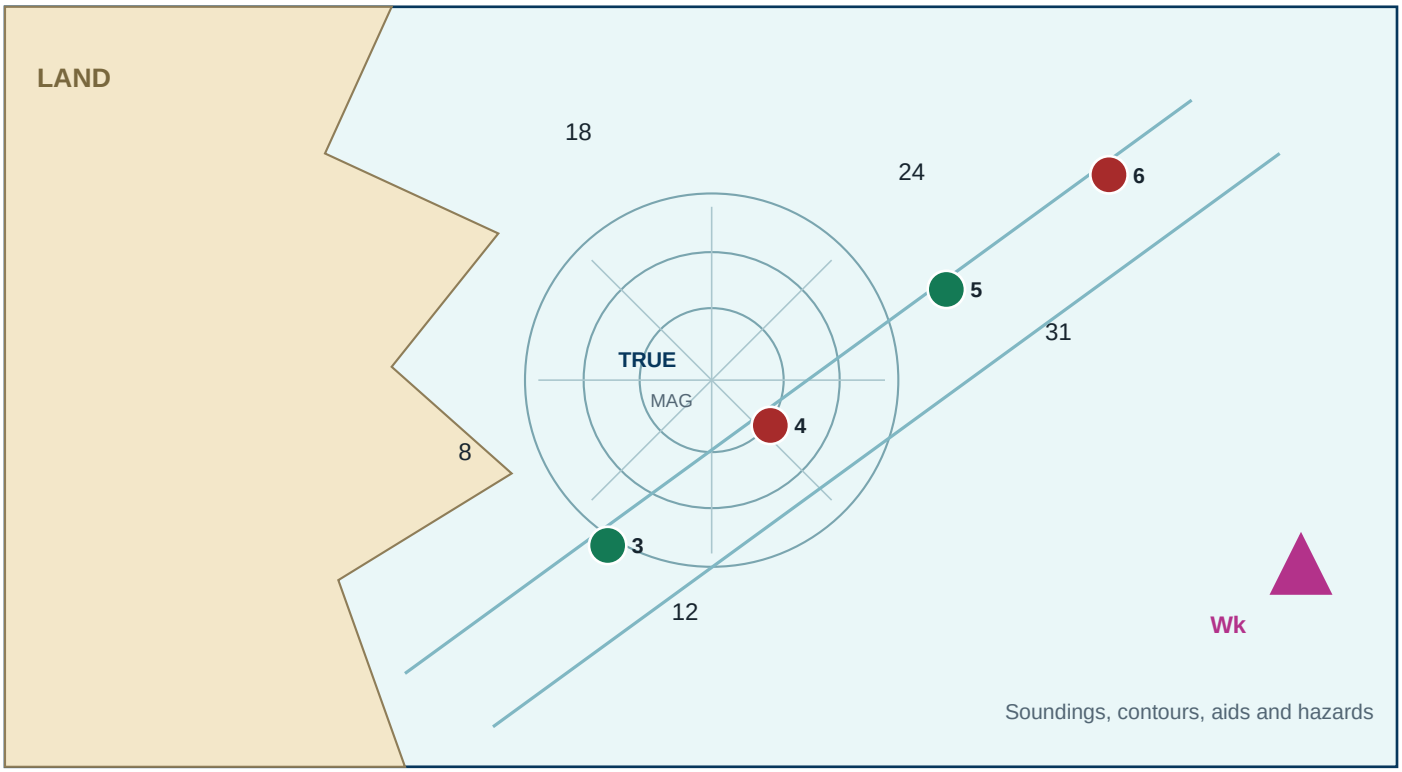
A MONTY'S ARK ADVENTURE GUIDE

How to Read a Nautical Chart

Turn chart symbols into safer, smarter days on the water.

A practical introduction to the information mariners use to orient, measure, identify hazards, and plan a route - grounded in official NOAA and U.S. Coast Guard resources.



THE FIRST RULE

Read the chart as a system: edition and notes, scale, depths, hazards, aids, position, and direction all work together.

Training guide only. It does not replace current official charts, navigation publications, local knowledge, or prudent seamanship.

Start with the chart's language

U.S. Chart No. 1 is the official symbol legend for U.S. nautical chart products. NOAA and the National Geospatial-Intelligence Agency produce it to explain the symbols, abbreviations, and terms used on paper-style charts and the portrayal of NOAA ENC data on ECDIS. It is a reference book - not a chart of a geographic area.

What it does

Use Chart No. 1 when a symbol, line style, abbreviation, light characteristic, seabed description, wreck, obstruction, boundary, or electronic-chart portrayal is unfamiliar. Its sections group related features so you can decode the chart consistently.

What it does not do

It does not tell you whether a specific route is safe today. Pair the current chart with the Coast Pilot, current Notices to Mariners, the USCG Light List, weather and tide information, and what you actually observe.

Orient the page before plotting

TITLE / COVERAGE	Names the geographic area and chart product.
EDITION / UPDATE STATUS	Confirm you are using current data and apply required corrections.
SCALE	A ratio such as 1:20,000. One unit on the chart equals 20,000 of the same units on Earth. A smaller denominator means a larger-scale chart with more detail.
DATUM / PROJECTION	Check the horizontal datum used for positions and the vertical datum used for depths and heights.
UNITS	Never assume. Soundings may be feet, fathoms, or meters; elevations and clearances may use other stated units.
NOTES / CAUTIONS	Read every note relevant to the route, including traffic, dredging, regulated areas, overhead clearances, and local hazards.

Rule of thumb: use the largest-scale chart available for close-quarters planning, then confirm that its coverage and update status fit the voyage.

Read the water before the route

A sounding is a charted depth at a surveyed position. A depth contour connects areas of equal depth and helps reveal the shape of the bottom. Neither is a promise of the depth you will have at a particular moment.

1. **CHECK THE SOUNDING UNIT**
   Find the chart's stated depth unit. A '6' means 6 of that unit - not automatically six feet.
2. **FIND THE VERTICAL DATUM**
   Charted depths are referred to a stated tidal datum. Actual water level may be above or below chart datum.
3. **TRACE THE CONTOURS**
   Work from your required safe depth toward deeper water and watch for isolated shoals.
4. **BUILD A CLEARANCE BUDGET**
   Compare water level and charted depth with vessel draft, dynamic effects, and a conservative safety margin.
5. **CHECK HEIGHTS SEPARATELY**
   Bridge and cable clearances may use a different vertical reference. Read the chart note.

A PLANNING CHECK	**Under-keel clearance = CD + WL - D - DE - SM**. CD = charted depth (chart); WL = water level relative to chart datum (NOAA Tides & Currents); D = loaded vessel draft (vessel data); DE = squat, heel and wave response (vessel guidance/conditions); SM = mariner-selected safety margin. Use one unit and datum.

MLLW	**Mean Lower Low Water**: the average lower low-water height of each tidal day over the National Tidal Datum Epoch. It is commonly the depth datum on U.S. coastal charts. Add the current water level above MLLW to the charted sounding when estimating actual depth.
MHHW	**Mean Higher High Water**: the average higher high-water height of each tidal day over the epoch. Overhead clearances are commonly referenced to MHHW. Water above MHHW reduces actual clearance; water below it increases clearance. Always verify the stated datum.

Colors are cues, not guarantees

BLUE / TINTED WATER	Often emphasizes shallow-water zones; exact meaning depends on the chart portrayal and depth settings.
WHITE WATER AREA	Generally deeper water in traditional paper-style portrayal, but still inspect soundings, contours, and hazards.
TAN / LAND	Drying or land areas are differentiated by fill and symbols. Shoreline detail can help visual orientation, but it is not a substitute for a plotted position.
MAGENTA	Commonly highlights special information, traffic features, cautions, or certain charted objects. Decode the exact feature with Chart No. 1.

Decode what is in the water

An aid to navigation helps you determine position or warns of a feature; it does not replace the chart, and floating aids can be off station. Match every aid by its full identity: color, shape, number or letter, light color and rhythm, and charted position.

PORT SIDE	STARBOARD SIDE	OTHER MARKS
Green; odd numbers; cans or square daymarks. In the conventional direction of buoyage, these mark the port side of the channel.	**Red**; even numbers; nuns or triangular daymarks. In the conventional direction of buoyage, these mark the starboard side of the channel.	Preferred-channel, safe-water, isolated-danger, special, information/regulatory, and ICW marks have distinct patterns. Decode them with Chart No. 1 and the USCG ATON guide.

Sound signals on buoys and fixed aids

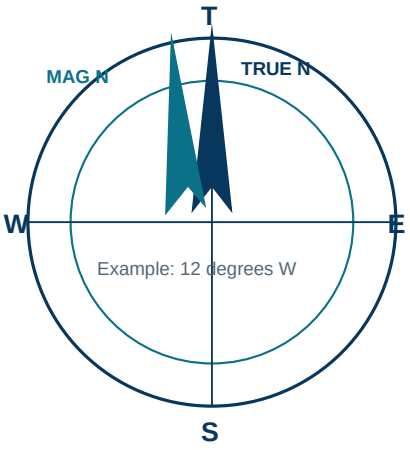
Chart abbreviations may identify a **bell, gong, whistle, horn**, or another sound signal. Some buoy sounds are wave-actuated and may be faint or silent in calm water; fog signals may have charted characteristics. Confirm the abbreviation in Chart No. 1 and the current USCG Light List entry. Never depend on sound alone.

Hazard-reading checklist

WRECKS	Distinguish a wreck dangerous to surface navigation from one shown with a least depth or surveyed clearance.
ROCKS / SHOALS	Determine whether the feature covers, uncovers, or is always submerged; inspect nearby least depths and contours.
OBSTRUCTIONS	Piles, stumps, foul ground, cables, pipelines, fish havens, and other objects each have specific symbols and cautions.
BREAKERS / OVERFALLS	These may signal shoal water, strong current, or turbulent conditions; evaluate weather, tide, and local guidance.
RESTRICTED / REGULATED AREAS	Boundaries alone do not tell the full rule. Read the accompanying note and the referenced regulation or Coast Pilot section.

NEVER NAVIGATE BY COLOR ALONE	Display palettes, scale, zoom, safety-contour settings, and day/night modes can change electronic-chart appearance. Verify the object and its attributes, keep the display at an appropriate scale, and cross-check the real world.

Plot position and direction



Compass rose: the circular direction scale. The outer ring is referenced to true north; the inner ring shows magnetic direction for the stated variation. Here, magnetic north lies west (left) of true north.

Latitude measures north or south; one minute equals one nautical mile. **Longitude** measures east or west.

For position transfer and line-drawing technique, see the **Monty's Ark Adventure Guide to Chart Plotting (coming soon)**.

True, variation, magnetic, deviation, compass: TVMDC

True is direction from true north. **V**ariation is the local angle between true and magnetic north, updated from the compass-rose year using its annual change. **M**agnetic is direction from magnetic north. **D**eviation is vessel-specific error caused by onboard magnetic influences and can change with heading. **C**ompass is the magnetic-compass reading.

TRUE	apply variation	**MAGNETIC**	apply deviation	**COMPASS**

T -> M -> C	Going from True to Magnetic to Compass: **add westerly variation/deviation and subtract easterly variation/deviation**. Example: T 090 + V 12W = M 102; M 102 - D 2E = C 100. Reverse the operations from C to T.

Compass error is the combined effect of variation and deviation for the heading and place, not a permanent correction. For detailed checks and conversions, see the **Monty's Ark Adventures Guide to Navigation (coming soon)**.

Measure distance correctly

Use the latitude scale beside the route

Measure nautical miles on the latitude scale near the area being measured. Do not lift a distance from another latitude or use the longitude scale as though it were constant. Confirm whether a charted distance is nautical miles, statute miles, yards, meters, or another stated unit.

FROM DOCKSIDE PLAN TO UNDERWAY CROSS-CHECK

A practical chart-reading workflow

1. **VERIFY**
   Use the correct, current chart/ENC; read title, edition/update status, scale, datum, units, notes, and cautions.
2. **ORIENT**
   Identify north, the compass rose, latitude/longitude scales, shoreline features, channels, and the direction of buoyage.
3. **SET LIMITS**
   Write down vessel draft, overhead height, safe-depth margin, relevant tide/water level, and weather constraints.
4. **SCAN HAZARDS**
   Trace depth contours; identify least depths, wrecks, rocks, obstructions, restricted areas, currents, bridges, and cables.
5. **BUILD THE ROUTE**
   Choose waypoints in safe water; measure course and distance; mark turn points, no-go areas, and alternatives.
6. **MATCH THE AIDS**
   List critical aids by color, shape, number/letter, and light characteristic. Use the current Light List and notices.
7. **BRIEF AND MONITOR**
   Share the plan and abort points. Underway, maintain a lookout, verify position by more than one means, and revise for conditions.

CHARTS SUPPORT JUDGMENT

A chart is a carefully compiled navigation picture, but conditions change and not every hazard is charted. Keep a proper lookout, compare charted information with sensors and visual cues, and slow down or stop when the picture does not agree.

Official sources and further reading

1. NOAA Office of Coast Survey, U.S. Chart No. 1 (chart symbols, abbreviations, and terms).
2. NOAA Office of Coast Survey, Nautical Charts FAQ (chart products, updates, and Chart No. 1).
3. NOAA Office of Coast Survey, Nautical Chart Challenge (introductory chart-reading activity).
4. U.S. Coast Guard Navigation Center, Light List Annual Publication and ATON reference material.
5. U.S. Coast Guard, Aids to Navigation Manual - Administration, COMDTINST M16500.7A.
6. NOAA Tides & Currents, official water-level and tide-prediction services.

Prepared August 2026 from publicly available U.S. government sources. Confirm current products and local conditions before every voyage.