

# **Bareboat Necessities Checklist**

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https://bareboat-necessities.github.io

https://github.com/bareboat-necessities/my-bareboat

https://github.com/bareboat-necessities/my-bareboat/issues

https://bareboat-necessities.wixsite.com/my-bareboat

PDF version:

https://bareboat-necessities.github.io/my-bareboat/bareboat-equipment-checklist.pdf

This is the check list for a small sailboat (28-feet) and coastal cruising in warm weather.

# Chapter 1. US Coast Guard Requirements

- 1. **Personal Flotation Devices.** One Type I, II, II, or V per person plus one Type IV throwable device. PFD's must be CG Approved, wearable by the intended user and readily accessible. The Type IV throwable device must be located such that it is immediately available
- 2. Fire Extinguishers. One B-II or two B-I. Non-expired.
- 3. **Visual Distress Signals on Coastal Waters.** Minimum of three day-use and three night-use or three day/night combination pyrotechnic devices. Non-pyrotechnic substitutes: 1 orange flag (day-use) and 1 electric S-O-S signal light (night-use). Flares checked for expiration.
- 4. **Sound Producing Devices.** Horn or whistle recommended to signal intentions or position. Under Rule 33 of the Navigation Rules, boats under 20m MUST have aboard a means of making an efficient sound.
- 5. Navigation Lights. Working sidelights, stern light, masthead light, running light.
- 6. **Pollution Regulations.** 5" X 8" Oil Discharge placard and 4" X 9" MARPOL Trash placards.
- 7. **For Gasoline Engines: Ventilation, Backflame Control.** Backfire Flame Arrestors, CG regulated ventilation.
- 8. **Marine Sanitation Devices.** Vessels with installed head facilities must have an operable CG-Certified Type I, II, or III Marine Sanitation Device (MSD). Any "Y" value for discharge overboard must be located in such a manner or affixed to prevent accidental discharge of untreated waste into water.
- 9. **Navigation Rules.** Boaters should be familiar with the "Rules of the Road". It's recommended to have navigation rules book on-board.
- 10. Float plan forms.

# Chapter 2. Legal / Paperwork

- 1. IDs, driver licenses and copies stored in dry places (in separate places)
- 2. Vessel current registration
- 3. Vessel insured for the area of sailing, liability coverage, insurance ID
- 4. Towing services subscription (Ex: SeaTow, BoatUS)
- 5. Medical insurance IDs for the crew
- 6. Vaccination records, vaccinations for the travel area
- 7. Proof of onward travel if travelling internationally
- 8. For VHF with DSC vessel MMSI must be properly registered
- 9. EPIRB properly registered
- 10. Passports and copies if sailing internationally
- 11. Sailor resumes, logs, boating certifications, memberships, and licenses
- 12. SSB operator license
- 13. Some areas require VHF operator license
- 14. Credit cards (stored in separate places)
- 15. Boating safety certificate
- 16. US Coast Guard Courtesy Vessel Safety Check (recommended)
- 17. CPR licenses
- 18. Scuba licenses
- 19. Ship's Log / Maintenance Log
- 20. Float plan forms https://newcontent.westmarine.com/content/documents/pdfs/WestAdvisor/USCG-Float-Plan.pdf
- 21. Emergency contacts
- 22. Parameters of the boat printed on a separate paper:
  - · Make, Model, Year, Call Sign, MMSI, Name, Home Port, Hull ID
  - · Length, Draft, Beam, Bridge Clearance, Displacement, Keel Weight, Mast / Boom Lengths
  - Tanks Capacity (Water / Fuel / Holding Tank)
  - Engine Make, Model, Year, Oil Type, Oil Capacity
  - Propeller Shaft Size, Blades Type, Transmission Parameters
  - Sails Parameters, Area
  - Rig Maker, Winches Models, Anchor Types
  - Bilge Pump Throughput Capacity

- Dinghy Hull #
- 23. Dinghy registration if it has an outboard motor
- 24. Student ID cards
- 25. Paper charts for the sailing area (updated)
- 26. Tide / current charts (up-to-date)
- 27. Navigation rules book
- 28. Sail trim quick ref card
- 29. Navigation rules quick ref card
- 30. Quick ref card for weather forecasting
- 31. Sailboat electric book
- 32. Cards that can give you discounts
- 33. Chart No. 1
- 34. Nautical almanac
- 35. Coast pilot book
- 36. The Annapolis Book of Seamanship
- 37. Knots quick ref

# Chapter 3. Safety

#### 3.1. Good

- 1. All US Coast Guard safety requirements, PFDs, fire safety, distress signaling, navigation signals (See Chapter 1)
- 2. Hull (inspected properly)
- 3. Seacocks / thru hulls checked, hoses checked
- 4. Compliance with ABYC standards
- 5. Deck leaks caulked
- 6. No deck hazards
- 7. Stuffing box checked for leaks
- 8. At least two boat batteries (marine grade)
- 9. Reliably working inboard diesel engine
- 10. Reliably working steering system
- 11. Solar panel and solar charger
- 12. Rigging checked / inspected, tensioned properly
- 13. Battery charger from shore power
- 14. Shore power chord
- 15. Fenders
- 16. Dock Lines
- 17. Fuses in proper places
- 18. Spare fuses
- 19. Spare bulbs for each navigation light
- 20. Proper grounding wire of the boat
- 21. Proper marine wiring (wire grades for amps, proper insulation, good connectors, no loose connections generating heat, no hanging open wires, etc)
- 22. Sacrificial anodes installed in good shape
- 23. Emergency tiller
- 24. Built-in manual bilge pump and handle
- 25. Automatic bilge pump with proper vented loop and anti-siphon valve
- 26. Spare 12v bilge pump (easily deployable)
- 27. Boat hook (telescoping floating)

- 28. VHF with GPS and DSC (registered with MMSI for the vessel)
- 29. GPS Chartplotter, NMEA sensors connected
- 30. Binnacle mounted compass + handheld compass
- 31. Paper charts of the sailing area, dividers, protractor, etc
- 32. Radar reflector
- 33. Tide/current tables
- 34. Anchoring day shape ball
- 35. Two anchors with rode and length marking (mount for securing anchor outside of locker or anchor roller)
- 36. Coastal medical emergency kit
- 37. Sunscreen
- 38. Bimini
- 39. Marine binoculars (floating)
- 40. Flashlights / spare batteries
- 41. Wood plugs strategically placed in compartments with seacocks, know where all seacocks located, know where hammer is
- 42. Hammer
- 43. Signalling mirror
- 44. Boom stop with proper rope (Ex: Capt Dan's boom brake)
- 45. Dinghy with oars, PFDs for the dinghy, dinghy bailer / scoop, dinghy foot pump, dock line / painter, floating flash light. Make sure the dinghy doesn't obstruct the stern light
- 46. Dinghy davits (dinghy rings in my case)
- 47. Fire blankets
- 48. Covid-19 masks
- 49. Lightning strike detector
- 50. Sailing gloves
- 51. Sun glasses with lanyard
- 52. Sunhat with lanyard
- 53. Rain ponchos
- 54. Two winch handles
- 55. EPIRB (properly registered, know activation procedure)
- 56. AIS integrated with chartplotter
- 57. Jacklines + tether

- 58. Portable water tanks
- 59. Depth sounder
- 60. Funnel, fuel strainer
- 61. Spare engine oil (know how to check oil level)
- 62. 4G/LTE internet router with on-board WiFi and SIM card for the sailing area
- 63. Anemometer / wind speed, direction sensors
- 64. Barometer
- 65. Boom tent
- 66. Swim ladder
- 67. Self-tailing winches
- 68. Heaving line with a float
- 69. Walkie-talkie for a dinghy-to-boat communication, anchoring communication
- 70. Dinghy bailer
- 71. Lifelines
- 72. Hand rails
- 73. Loose nuts / bolts tightened
- 74. Sharp rigging elements covered with rigging tape
- 75. Spare halyards (installed and ready)
- 76. Dry comfortable bunk with a fan and ways to secure yourself from falling
- 77. Engine key with a float
- 78. Companion way key with a float
- 79. Spare foldable swim ladder (my Dingy Rings block the swim ladder when the dinghy is mounted)
- 80. Couple nylon rail mountable cleats
- 81. Child PFDs
- 82. Spreader halyard for signals and flags

#### 3.2. Better

- 1. Search light
- 2. Sextant
- 3. Bow thrusters, joystick for control
- 4. Water maker
- 5. Rain water catcher

- 6. Radar
- 7. Means to periodically report your location via internet
- 8. Autopilot
- 9. Windlass, windlass battery, anchor roller
- 10. Anchor chain, anchor bridle/snubber
- 11. Whisker pole
- 12. Bilge alarm
- 13. MOB retrieval and recovery gear (Ex: MobMat)
- 14. Marine ventilation plug (to close ventilation in rough weather)
- 15. Lee cloth
- 16. Storm shutters
- 17. Carbon monoxide alarm
- 18. Smoke detector
- 19. Various gas alarm sensors
- 20. Means to set up anchor alarm
- 21. Lifeline netting
- 22. Lightning strike arrester for the antenna
- 23. Lazy jacks
- 24. SSB radio
- 25. Satellite phone (Ex: Iridium Go)
- 26. Liferaft + ditch bag
- 27. Sonar / fish Finder
- 28. Inmarsat Fleet receiver
- 29. NavTex receiver
- 30. Means to receive weather fax
- 31. Weather routing software
- 32. PACTOR modem for messaging off-shore
- 33. Sea anchor, slowing drogue
- 34. Dodger
- 35. Wind generator
- 36. Self-steering gear, wind vane
- 37. Spare rudder / spare steering

- 38. Gasoline electric generator
- 39. Means to climb the mast (bosun chair, steps, etc)
- 40. Anchoring gloves
- 41. Clinometer
- 42. Spreader deck lights
- 43. Diver-down flag and buoy
- 44. Dinghy outboard
- 45. Pushpit outboard mount for dinghy outboard motor
- 46. Android tablet with spare GPS navigation software and charts
- 47. Bilge air blower
- 48. Color night vision camera

## 3.3. Crew Drills / Instructions

- 1. Sailboat parts / marine lingo
- 2. MOB drills with the crew
- 3. Captain overboard drills and instruction
- 4. Boom safety instruction, moving around the boat instructions
- 5. Marine head usage instruction
- 6. Environment protection instruction
- 7. Fire safety
- 8. Use of life jackets, PFDs
- 9. Docking, anchoring, mooring, boarding, dinghy use, rafting up
- 10. VHF, DSC, Mayday, EPIRB
- 11. Distress signals, bilge pump operation
- 12. Engine start/stop/check
- 13. Tacking, gybing, reefing, heaving-to, hoisting sails, steering, use of swim ladder
- 14. Night sailing, docking
- 15. Abandon ship, rig loss, fire, flooding, steering malfunction, accidental gybe, injured crew member, storm / squall procedures, grounding

# Chapter 4. On-Board Living

- 1. Comfortable head, convenient to clean and flush
- 2. Comfortable dry bunk
- 3. Convenient dish washing set up
- 4. Convenient hand wash set up
- 5. Energy saving lights (all)
- 6. Solar cockpit lights
- 7. Companionway rain cover (clear UV treated marine vinyl)
- 8. 12-volt vacuum
- 9. Fans in sleeping areas
- 10. Waterproof bags
- 11. A/C (Ex: ZeroBreeze)
- 12. Cooler (cooler bags)
- 13. Sun Shower (with a foot pump, shower head, hose, adaptors)
- 14. Portable smartphone chargers
- 15. Boom tent, ties
- 16. Bimini
- 17. Dodger
- 18. Cockpit table
- 19. Cabin table
- 20. Swim suits
- 21. Towels
- 22. Beach towels
- 23. Bed sheets
- 24. Pillows (comfortable)
- 25. Snorkeling mask, tube, fins, mesh bag
- 26. Rain coat/jacket/ponchos
- 27. Windproof jackets
- 28. Blue tooth speakers
- 29. Folding electric bicycle
- 30. Lights in each cabin

- 31. Tree hammock
- 32. Marine toilet paper
- 33. Mobile phone chargers / cables
- 34. Mesh bags
- 35. Cargo net
- 36. Pen / pencils / erasers
- 37. Trash bins for the galley and head
- 38. Rubber bands
- 39. Cup holders
- 40. Fender holders
- 41. Dust pan, brush
- 42. 12-volt pluggable 3-way adaptor (cigarette lighter type plug)
- 43. 12-volt extension chord (cigarette lighter type plug)
- 44. Envelopes, postal stamps
- 45. Flag pole
- 46. Flags
- 47. Daily-wear clothes
- 48. Small reading light
- 49. Binnacle cover
- 50. Sail cover
- 51. Head mounted flashlight



Store items in plastic transparent zip lock bags (Easy to see). Expect everything to get wet, corrode, leak, spill, tip over (and damage other items). Remove all packaging and stickers. Do not use carton boxes.

# **Chapter 5. Spare Parts**

- 1. Spare bilge pump (12-volt powered, pluggable)
- 2. Spare batteries
- 3. Spare cabin lights
- 4. Spare alternator belt
- 5. Spare oil filters
- 6. Spare fuel filters
- 7. Spare impeller
- 8. Fuses (variety)
- 9. Some wires
- 10. Butt connectors / heat shrink tubing
- 11. Spare stainless nuts/bolts/screws/washers
- 12. Spare wood / marine starboard
- 13. Rigging parts, cotter pins
- 14. Spare swim ladder legs
- 15. Spare engine key
- 16. Spare companion way lock
- 17. Utility wire

## Chapter 6. Tools

- 1. Basic mechanical toolkit (wrenches, pliers, screwdrivers, hex keys, etc)
- 2. Basic electrical toolkit (wire cutter, voltmeter, crimping tool, butt connectors, electrical tape, heat shrink tubing)
- 3. Basic carpenter toolkit, hacksaw
- 4. Basic plumbing toolkit
- 5. Basic sewing toolkit
- 6. Hose
- 7. Broom (floating)
- 8. Shore power chord
- 9. Crowbar tool
- 10. Voltmeter
- 11. Inspection mirror
- 12. Magnetic pick-up tool (telescoping or snake-type)
- 13. Wire crimping tool
- 14. Lighters, matches (windproof)
- 15. Bottle opener / corkscrew
- 16. Key to open tank caps
- 17. Inflatable dingy pump
- 18. Shower pump
- 19. Liquid transfer pump
- 20. Waterproof computer keyboard, mouse
- 21. Smart phone mount
- 22. Engine key attached to a float
- 23. Companion way lock with a float
- 24. Drill
- 25. Drill bits
- 26. Screwdriver bit set
- 27. Bar Clamp
- 28. Vise-grips
- 29. Rotary tool (Ex: Dremel)
- 30. Drain cleaning stick

- 31. Plunger
- 32. Marine engine oil changer / extractor (Marinas usually take the extracted oil for proper disposal)
- 33. Diesel fuel stabilizer
- 34. Laundry bags

# Chapter 7. Supplies

- 1. Cargo straps 1-inch width (+ clam buckles, tri glide buckles)
- 2. Gear ties
- 3. Utility wire
- 4. USB/Ethernet cables
- 5. Phone charger cables
- 6. Various ropes, ties
- 7. Carabiners
- 8. Stainless kitchen clips
- 9. Oil absorbing sheets / pads
- 10. Zip lock bags
- 11. Acetone
- 12. Holding tank septic liquid
- 13. Matches / lighter
- 14. Scissors
- 15. Pens/pencils
- 16. Rigging knives (one per crew)
- 17. Rigging tape
- 18. Whipping twine
- 19. Stainless hose clamps
- 20. Spare LPG gas for stove (stored outside)
- 21. Oil Lantern, liquid for it, funnel (or candle lantern and candles for it)
- 22. Plastic wire ties
- 23. Garbage bags
- 24. Paper towels
- 25. Boat wash soap
- 26. Bag of rags
- 27. Duct tapes
- 28. Electrical tape
- 29. Waterproof sacks
- 30. Dry lube

- 31. Air freshener
- 32. Odor neutralizing gel beads
- 33. Air deodorizer
- 34. Assorted bungee cords
- 35. Assorted shackles
- 36. Sail ties
- 37. Sail repair kit
- 38. Glue
- 39. Marine caulk
- 40. Caulking gun
- 41. Sand paper
- 42. Measuring tape
- 43. Bag of dehumidifying pellets
- 44. Bilge cleaner liquid
- 45. Boat pole holder

# Chapter 8. Hygiene / Health

- 1. Tooth paste / brush / toothpicks / mouth wash / dental floss
- 2. Eye drops
- 3. Eye contact lenses / liquid / prescription eye glasses with neck chord
- 4. Prescription medicines (labeled with name, patient name and instructions)
- 5. Hand sanitizer
- 6. Sun glasses, neck chord
- 7. Sun hat with lanyard
- 8. Long sleeve collared UV protective shirts
- 9. Sunscreen, lip balm
- 10. Hand soap
- 11. Q-tips
- 12. Supplements, vitamins
- 13. Skin moisturizer
- 14. Ibuprofen/Advil
- 15. Tylenol
- 16. Thermometer
- 17. Pepto bismol
- 18. Cotton balls
- 19. Tweezers
- 20. Wet wipes
- 21. Gatorade
- 22. Snakebite kit
- 23. Nail clipping toolkit
- 24. Bandages
- 25. First-aid manual (use Reeds Ocean Handbook)
- 26. Hydrogen peroxide
- 27. Anti-fungal creme
- 28. Antibiotic creme, neosporin
- 29. Skin rash, anti itch creme
- 30. Allergy medications

- 31. Shampoo
- 32. Body wash
- 33. Bath sponges
- 34. Deodorant
- 35. Shaving razor, shaving creme
- 36. Burn creme
- 37. Scissors
- 38. Bandana
- 39. Ear plugs
- 40. Sea sickness medications, bracelet, ginger gum / candies, ear plugs
- 41. Sleep mask
- 42. Marine toilet paper
- 43. Zip lock bags
- 44. Water shoes (for use on a dinghy)
- 45. Covid-19 masks, gloves
- 46. Feminine hygiene products (instruct not to dispose into the head)
- 47. Nicotine patches

# Chapter 9. Cooking / Galley

- 1. Stove (double-gimbaled is better)
- 2. Solar Stove (Ex: SunGo Sport with a marine mount)
- 3. Forks
- 4. Knives with covers
- 5. Ceramic knives with covers
- 6. Spoons, tea spoons
- 7. Chopsticks
- 8. Plates / bowls
- 9. Cups / glasses
- 10. Cooking pans
- 11. Spatula
- 12. Stainless steel cooking utensil set
- 13. Kettle
- 14. Pressure cooker
- 15. Windshield for the stove
- 16. Multi grater
- 17. Thermos
- 18. Mugs
- 19. Double gimbaled mug holder (Ex: Osculati)
- 20. Matches, lighters
- 21. Gas for the stove
- 22. Utencils holder
- 23. Spice rack
- 24. Zip-lock bags
- 25. Coffee maker
- 26. Potatoes peeler
- 27. Wine glasses (plastic)
- 28. Brushes for dish washing
- 29. Frying pan
- 30. Toaster or camping toast making tool (Ex: By Primus)

- 31. Cutting board
- 32. Can opener
- 33. Egg holder (plastic reusable)
- 34. Kitchen timer
- 35. Kitchen liners
- 36. Napkins
- 37. Paper towels
- 38. Aluminum foil
- 39. Plastic wraps
- 40. Cocktail shaker
- 41. Bubble wrap
- 42. Large plastic cookie jar
- 43. Pot holders
- 44. Dish scrubbie
- 45. Food saver (12v vacuum food sealer)
- 46. Colander
- 47. Outside storage for cooking propane/butane gas



Cooking below deck possesses a risk. Store cooking propane/butane gas containers outside. The bilge should be well ventilated to allow heavier than air flammable gases to escape. Prefer cooking on an outside gas grill.



Even if the risk is low but consequences are catastrophic you still need to mitigate the risk.

# Chapter 10. Food / Provisioning

- 1. Salt
- 2. Sugar
- 3. Black pepper
- 4. Spices (garlic powder, onion powder, bay leaves, basil, dill, etc)
- 5. Steak sauce
- 6. White vinegar
- 7. Gatorade
- 8. Trail mix bags
- 9. Vegetable oil
- 10. Olive oil
- 11. Rice
- 12. Pasta
- 13. Pasta sauce
- 14. Canned fruit snacks
- 15. Canned soups
- 16. Drinking water
- 17. Baking flour
- 18. Baking soda
- 19. Potatoes
- 20. Onions
- 21. Lemons, limes
- 22. Carrots
- 23. Potatoes
- 24. Tortilla chips / potatoes chips
- 25. Fruit snacks / dry fruits
- 26. Cookies, crackers
- 27. Cucumbers
- 28. Tomatoes
- 29. Lettuce
- 30. Bread

- 31. Apples
- 32. Coffee
- 33. Tea
- 34. Ketchup
- 35. Canned beans / dry beans
- 36. Mustard
- 37. Mayonnaise
- 38. Canned milk
- 39. Canned soups
- 40. Bouillon cubes, dry soup mix
- 41. Dry ramen noodles
- 42. Canned tomato paste
- 43. Sea food sauce
- 44. Avocados
- 45. Raisins
- 46. Cacao mix
- 47. Peanut butter
- 48. Protein bars, granola bars
- 49. Pretzel sticks
- 50. Peanut butter
- 51. Chips
- 52. Olives
- 53. Ginger ale
- 54. Tomato/apple/orange juice
- 55. Cheese
- 56. Thermos
- 57. BBQ / steak sauce
- 58. Pickles
- 59. Beer
- 60. White wine / sparkling wine
- 61. Cereal
- 62. Bacon

63. Eggs

# Chapter 11. Crew roles

## 11.1. Captain / Skipper

- 1. In-charge
- 2. Safety
- 3. Decision maker

## 11.2. Navigator

- 1. Position / weather tracking
- 2. Radio, radar, navigation electronics
- 3. Ship logs
- 4. Sail trim
- 5. Tides / currents

## 11.3. Engineer

- 1. Hull / integrity
- 2. Fire safety
- 3. Mechanical and electric equipment
- 4. Repairs / maintenance
- 5. Tools / spares
- 6. Plumbing / hull
- 7. Radio equipment

### 11.4. Cook

- 1. Food and galley
- 2. Provisioning

#### 11.5. Boatswain

- 1. Rig / spars / mast
- 2. Running rigging
- 3. Anchors

4. Deck equipment / safety gear

#### 11.6. Helmsman

- 1. Whoever is at the helm
- 2. Maintain course and speed
- 3. Watch out for vessels and obstructions
- 4. Monitor trim / rig / voltage / nav lights / weather conditions
- 5. Notify captain

## 11.7. Accountant / Bookkeeper

1. Expense tracking

#### 11.8. Doctor

1. Healthcare

## 11.9. DJ / animator

- 1. Entertainment
- 2. Music

## 11.10. Photographer / video operator

- 1. Photo
- 2. Video

#### 11.11. Fisherman

1. Anything fishing

#### **11.12. Lookout**

- 1. Observation of hazards
- 2. Landmarks
- 3. Person on a watch out
- 4. Anchor watch

## 11.13. Pilot

- 1. Dinghy operation
- 2. Boat to shore movements (from anchoring / mooring)

# Chapter 12. Entertainment

- 1. Blue tooth speakers, audio cable
- 2. Downloaded music
- 3. Computer (low power usage), movies (downloaded)
- 4. Some board games (chess, etc)
- 5. Card games
- 6. Small musical instruments (harmonica, ukulele, guitar, etc)
- 7. Guitar tuner
- 8. Books / magazines
- 9. Travel guides
- 10. Beach volley ball
- 11. Balderdash
- 12. Snorkel, mask, fins, mesh bag
- 13. GoPro camera, mounts
- 14. Waterproof smartphone, charging cables, 12v adapter, unlocked
- 15. Camera drone, charger, remote
- 16. Scuba gear, oxygen tanks
- 17. Fishing gear, fishing poles, fishing pole mounts, knives, lures, lines
- 18. Fishing spear / gun
- 19. Marine life identification book / phone app
- 20. Skateboard, roller blades, scooter, helmets
- 21. Small underwater sea scooter
- 22. GoPro camera + mounts
- 23. Folding electric bike
- 24. Domino
- 25. Chess
- 26. 3D Connect Four
- 27. Boogie board

# Chapter 13. Applications for smart phones / tablets

- 1. iNavX
- 2. Navionics
- 3. OpenCPN
- 4. SEAiq
- 5. Marine Traffic
- 6. Ship Finder
- 7. PredictWind
- 8. NOAA Weather Radar
- 9. Tide Alert
- 10. US Coast Guard
- 11. SeaTow
- 12. Dockwa
- 13. Snag a Slip
- 14. ActiveCaptain
- 15. CruisersSailingForums
- 16. Boatsetter
- 17. GoSailing
- 18. NauticEd
- 19. Knot Guide
- 20. StarChart
- 21. WebMD