USCG-190
Boat Operator Safety (Alaska)

INSTRUCTOR: Luke Holton

DATE: 4/21/25

CONTACT: (907) 723-5420

Course Considerations

- Cell Phones
- Student Participation
- Privacy and Professionalism
- Be Patient with Classmates
- Explore New Methods
- Graphic Material

AGENDA

- Hazards to Mariners
  - Top 5 Maritime Emergencies in Alaska
  - Analyzing your Waterways
- Legal Duties and Considerations
  - Required Safety Equipment
  - Maritime Law and Duty to Act
  - Passenger and Cargo Restrictions
- Boat Fires and Fire Response Plan
  - Identify the Onboard Fire Hazards
  - Fire Fighting Methods
  - Emergency Response Procedures
- Man Overboard/ Cold Water Immersion
  - Prevention and Response Procedures
  - Cold-Water Survival Techniques
  - Expanding Square Grid Search Procedures

AGENDA (cont)

- Abandoning a Vessel
  - Making the Decision to Ditch
  - Managing Escape and Survival with Crew
- Perilous Weather
  - Reading Weather Reports
  - Anchoring at Sea in Rough Weather
  - Plan to Escape Serious Weather
- Towing and Open Water Passenger Transfers
  - Towing Equipment and Adequate Towing Vessels
  - Constructing a Tow Bridal
  - Hazards of Towing
- Medical Emergencies
  - CPR Refresher
  - Hypothermia Response and Treatment
  - Traumatic Injuries

BOATING IN ALASKA

Maritime Emergency Fact Sheet

- There were 2,116 accidents reported to officials in 2022, resulting in 130 fatalities
- 31% of all fatalities from boat accidents are drownings.
- 80% of all boaters who drowned in accidents were in a vessel less than 21 feet in length.
- At 17%, operating a watercraft while intoxicated is the leading factor behind boating accident deaths.
- Among all victims who were killed in these incidents, 85% were not wearing a life jacket

Alaska Department of Natural Resources, Office of Boating Safety

BOATING IN ALASKA

Top 5 Maritime Emergencies

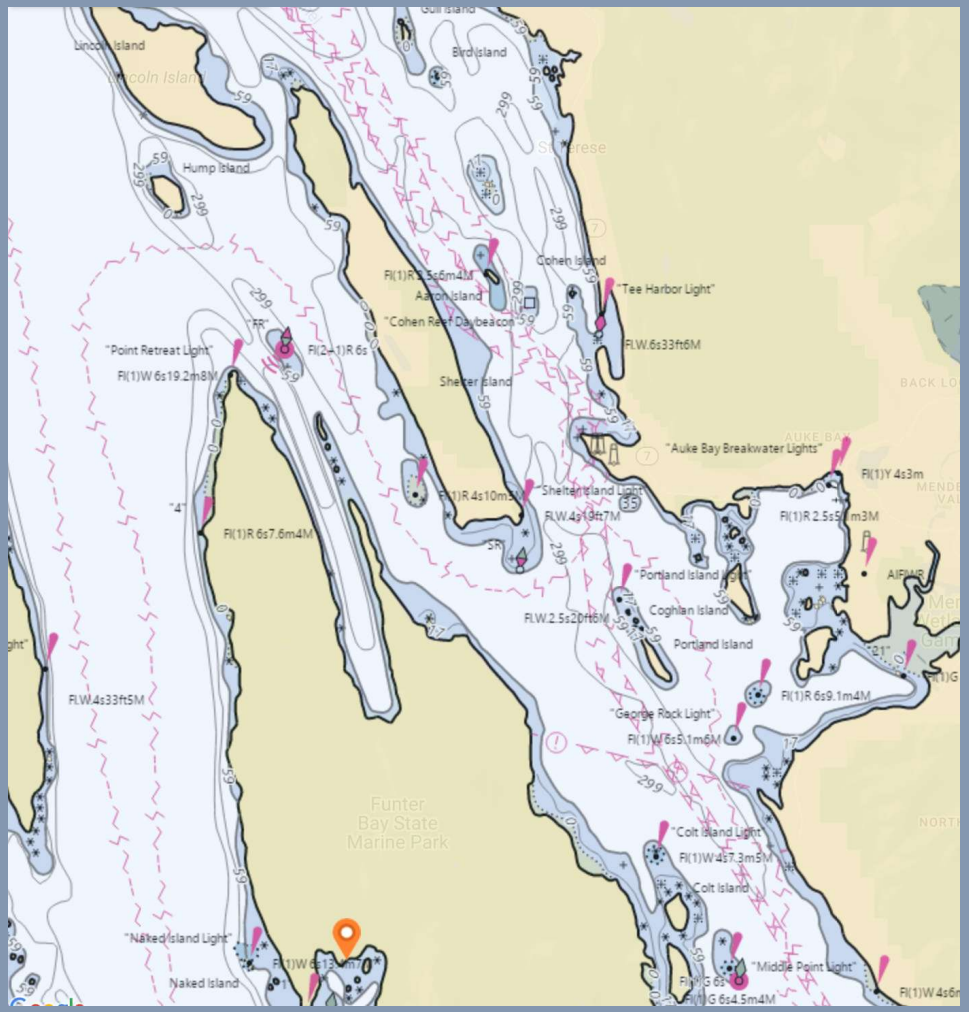
1. Capsizing
2. Equipment Use Injury
3. Cold Water Immersion
4. Collision
5. Fire

BOATING IN ALASKA

Top 5 Accident Contributors

1. Operator Inexperience
2. Operator Inattention
3. Improper lookout
4. Excessive speed
5. Equipment/ Mechanical Failure

BOATING IN ALASKA



Researching Your Waterway

Identify Natural Hazards

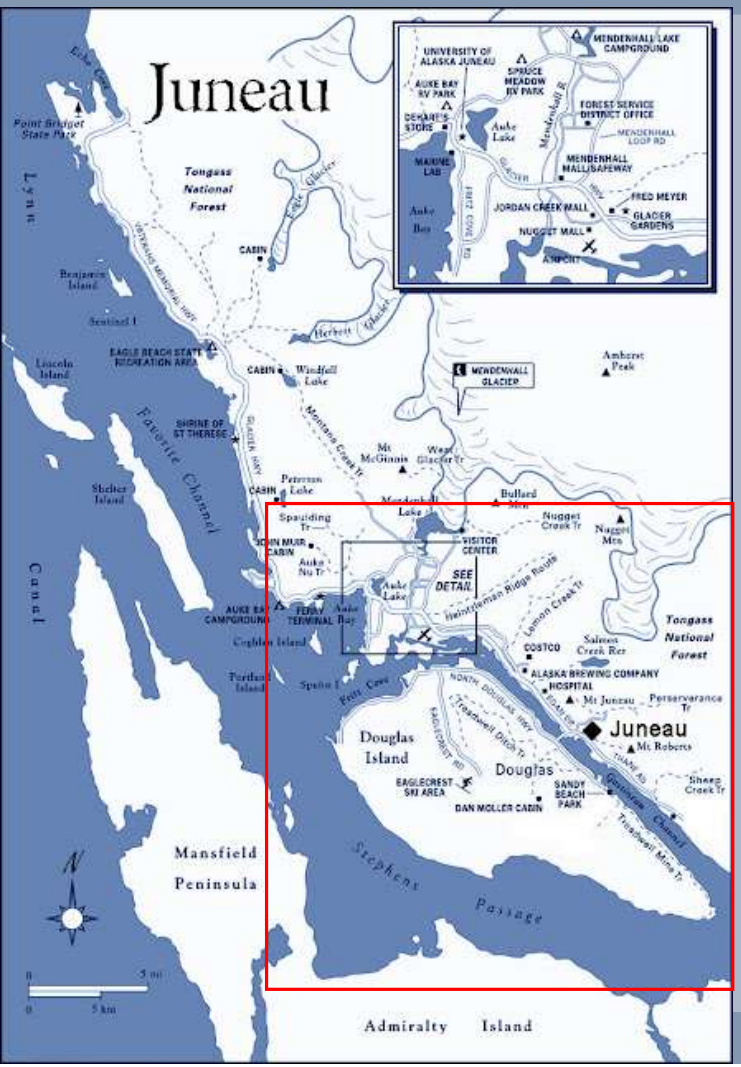
- -Landslide Areas
- -Narrow Passages and Tidal Effects
- -Floating Hazards (Ice, Logs, Wildlife)
- -Submerged Rocks and Shallow Areas

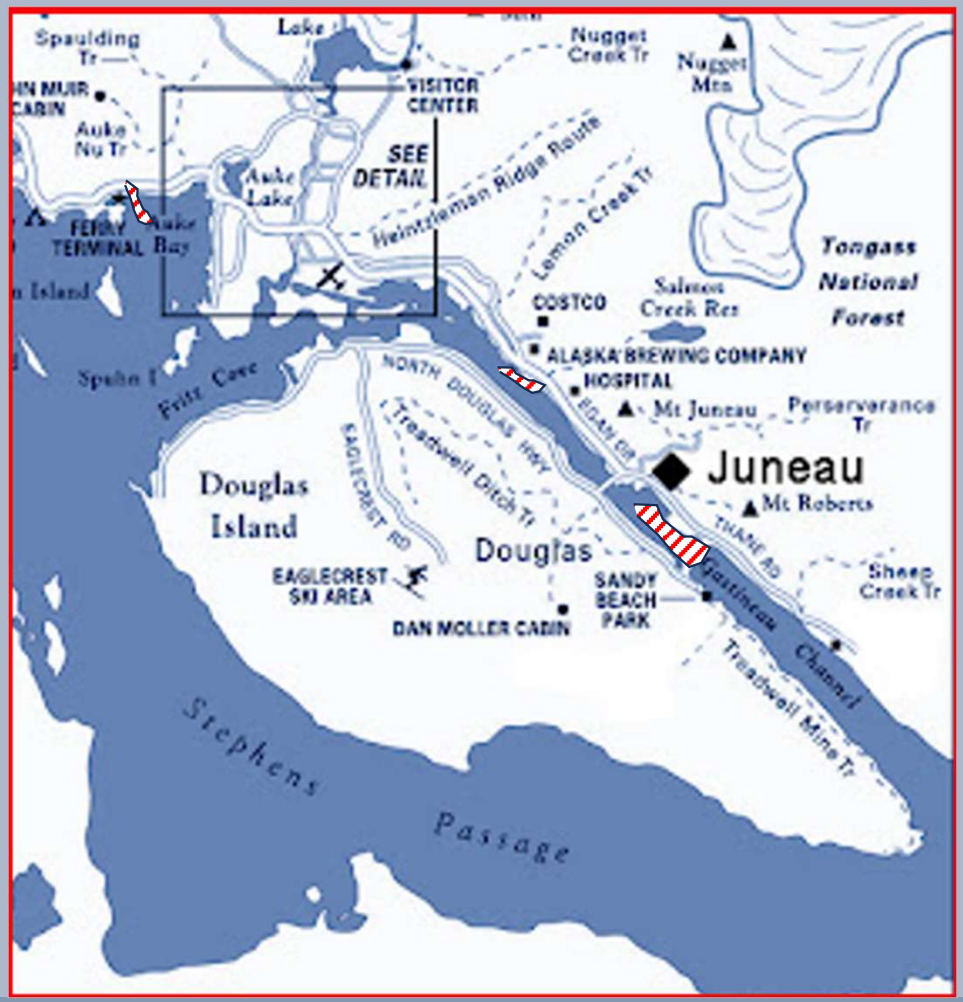
Identify Other Hazards

- -Regional Vessel Activity
- -Temporary Placements (Traps, Construction, Moorage, Divers)

Identify Services (Towing, USCG-Sector, Emergency Access, Rescue Points)

Security Avoidance Areas





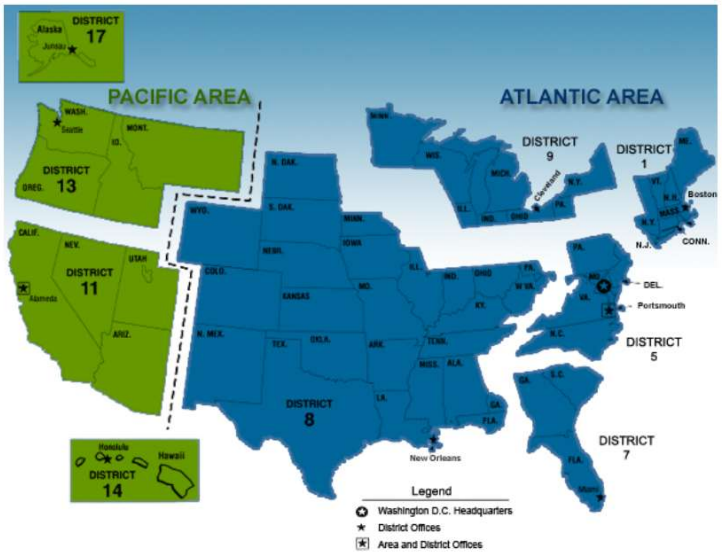
BOATING IN ALASKA

Local Notice to Mariners

Home

Weekly messages informing subscribers when the Coast Guard District Local Notices to Mariners (LNM) is available for downloading from the Navigation Center website.

Please subscribe to receive email updates here:



Researching Your Waterway

Check Online for Updates to your Regional Waterways:

https://www.dco.uscg.mil/Local-Notice-to-Mariners-LNMs/

File a Float Plan:

https://pledgetoliveak.org/

Talk with Harbor Staff or USCG Sector Office

BOATING IN ALASKA

Weather Considerations

Detailed Forecast

Synopsis: AT 16Z...OR 9 AM PDT...A 1027 MB SURFACE HIGH PRESSURE SYSTEM WAS CENTERED 500 NM W OF SEATTLE AND AN ELONGATED TROUGH OF LOW PRESSURE WAS OVER THE CENTRAL AND SOUTHERN CALIFORNIA COAST. THIS PATTERN WILL RESULT IN LIGHT TO MODERATE WINDS ACROSS THE COASTAL WATERS THROUGH EARLY THURSDAY AFTERNOON...THEN W TO NW WINDS WILL START TO INCREASE ACROSS THE OUTER WATERS FOR LATER IN THE WEEK AND THE WEEKEND. ISOLATED SPRINKLES AND SHOWERS WILL BE POSSIBLE THROUGH THIS EVENING.

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BOATING IN ALASKA

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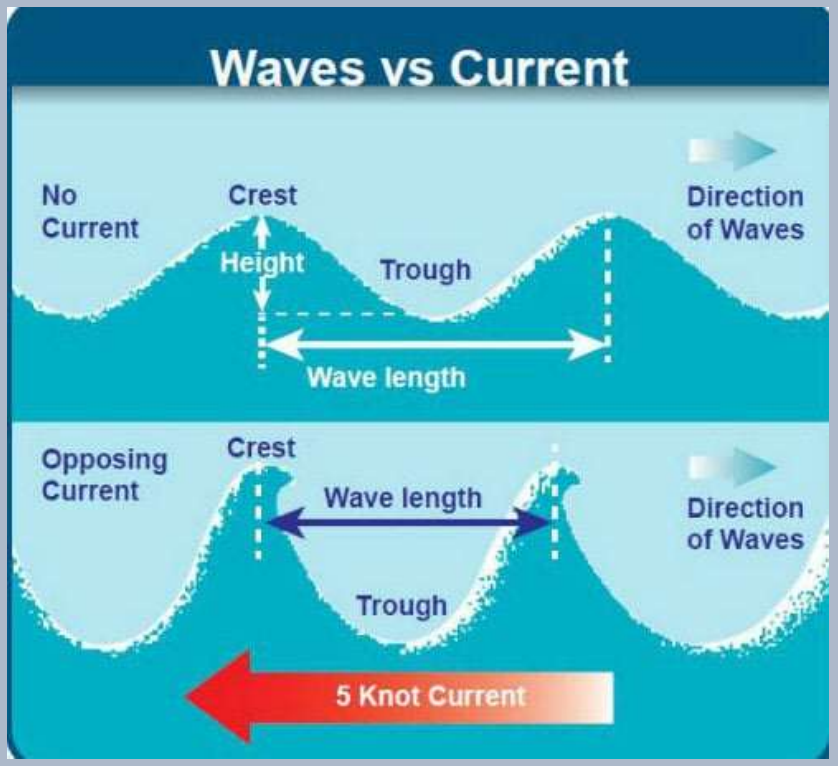

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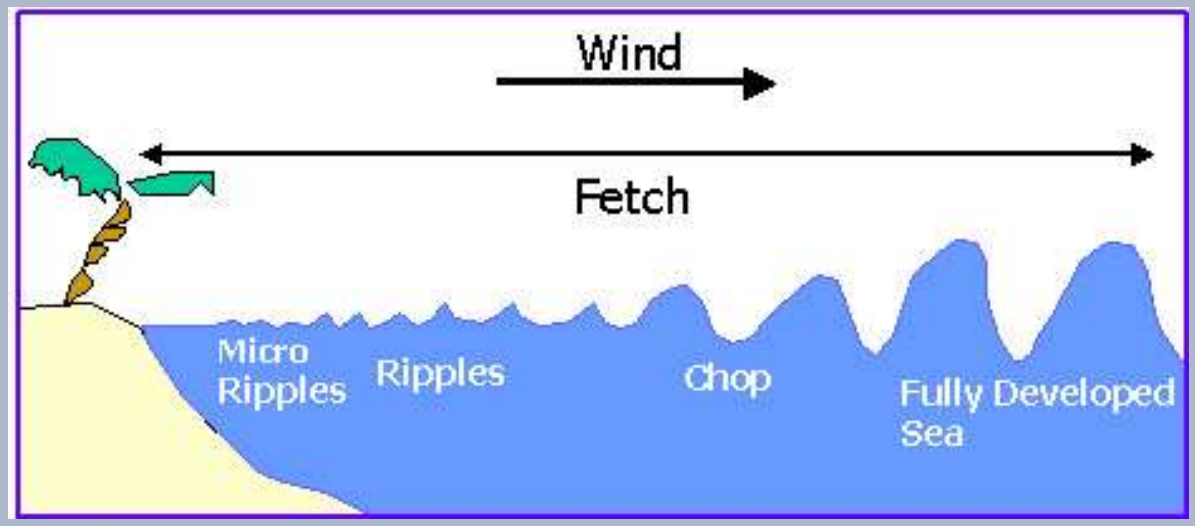
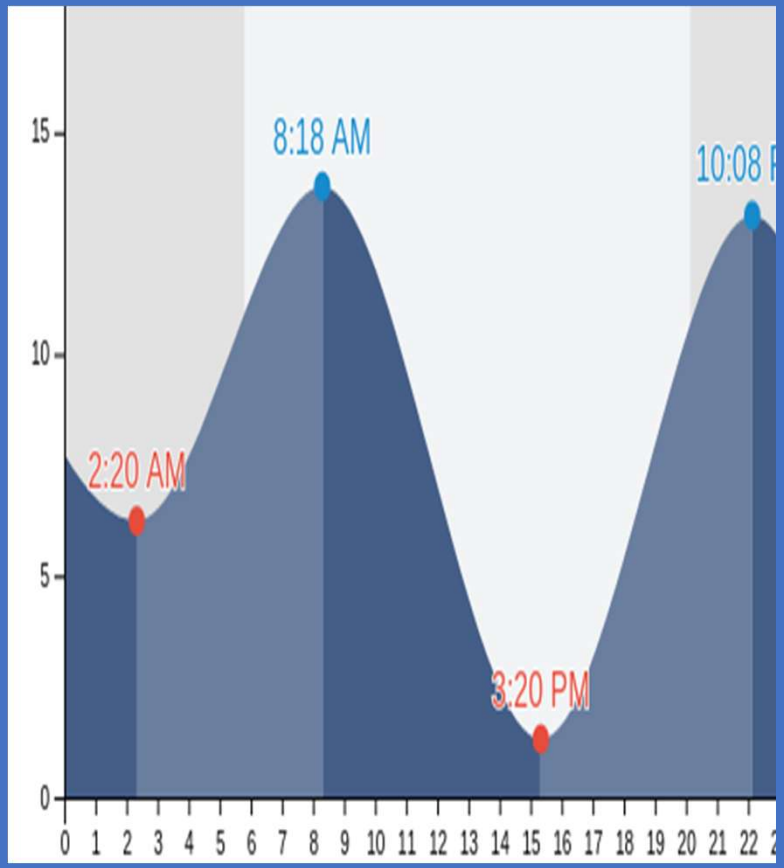


HYDROLOGY AND TIDAL EFFECTS



Ocean Tides in Juneau

Semi-Diurnal (2 High, 2 Low @ 6.15 hours)

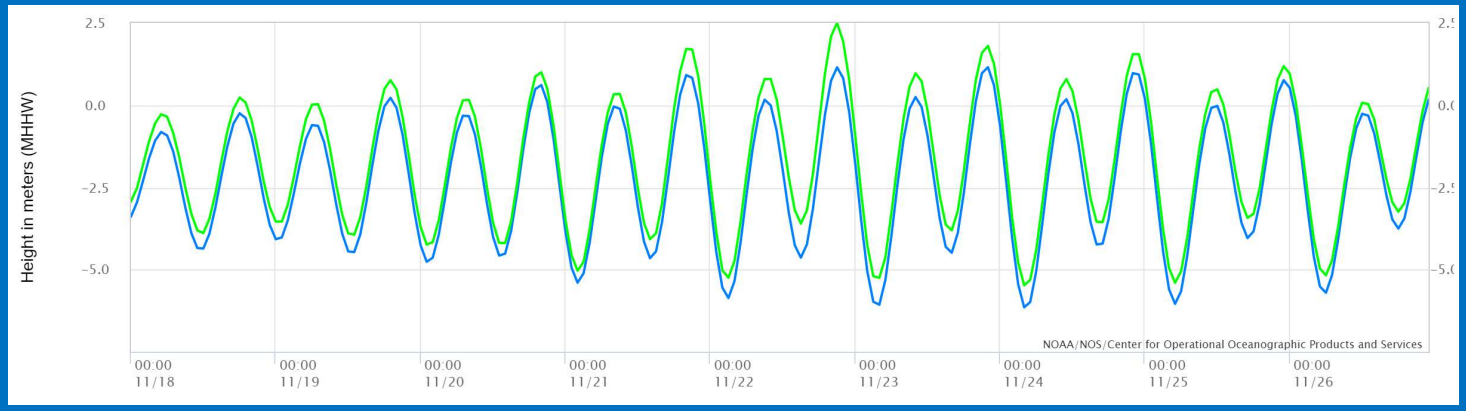
Narrow passes and channels can create tidal flows exceeding 15 mph (record: 24 mph, Turnagain Arm, AK)

Creates unique ecosystems for intertidal species

Extreme low tides can accelerate land rebound by 360%

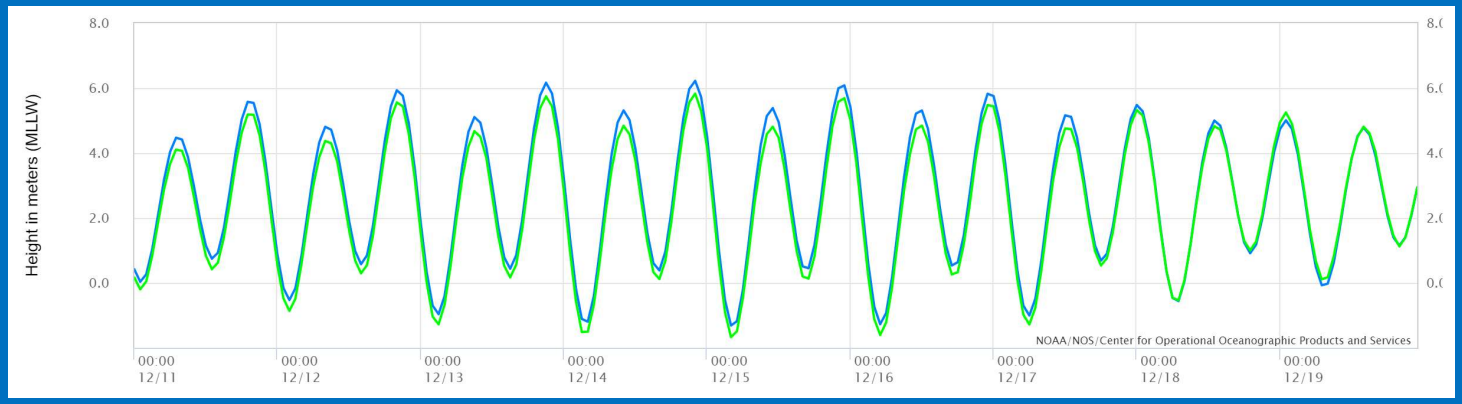
HYDROLOGY AND TIDAL EFFECTS

20.4’ (April 2000)



Mean Range: 13.74 ft

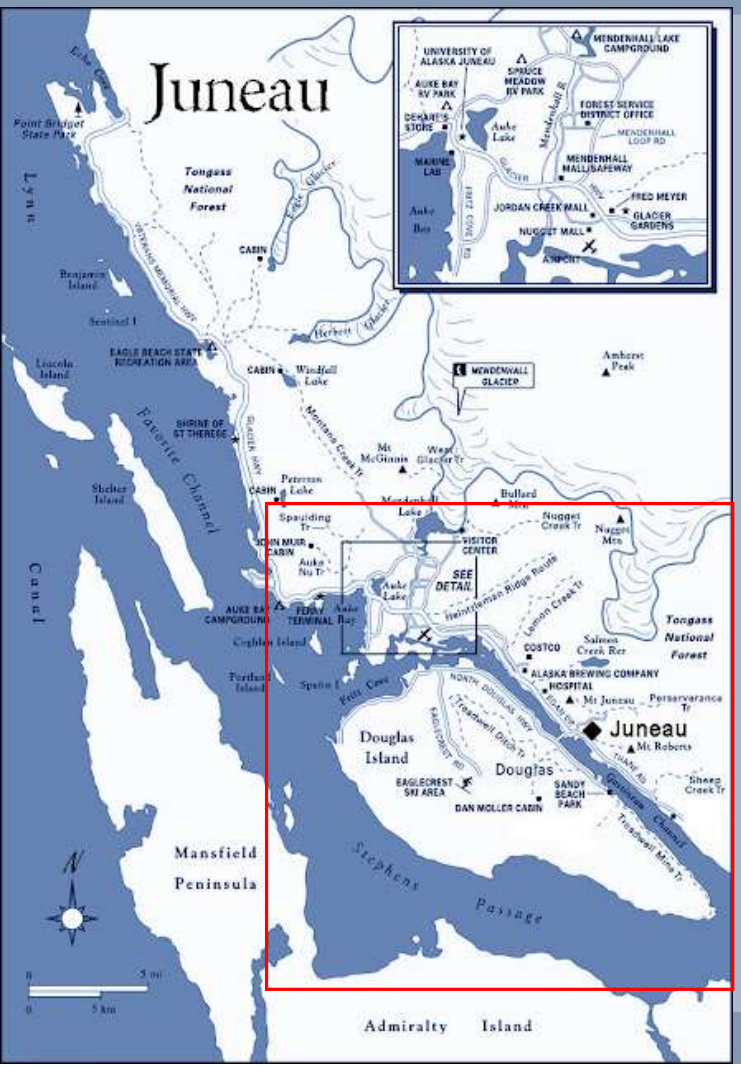
-4.9’ (March 2019)

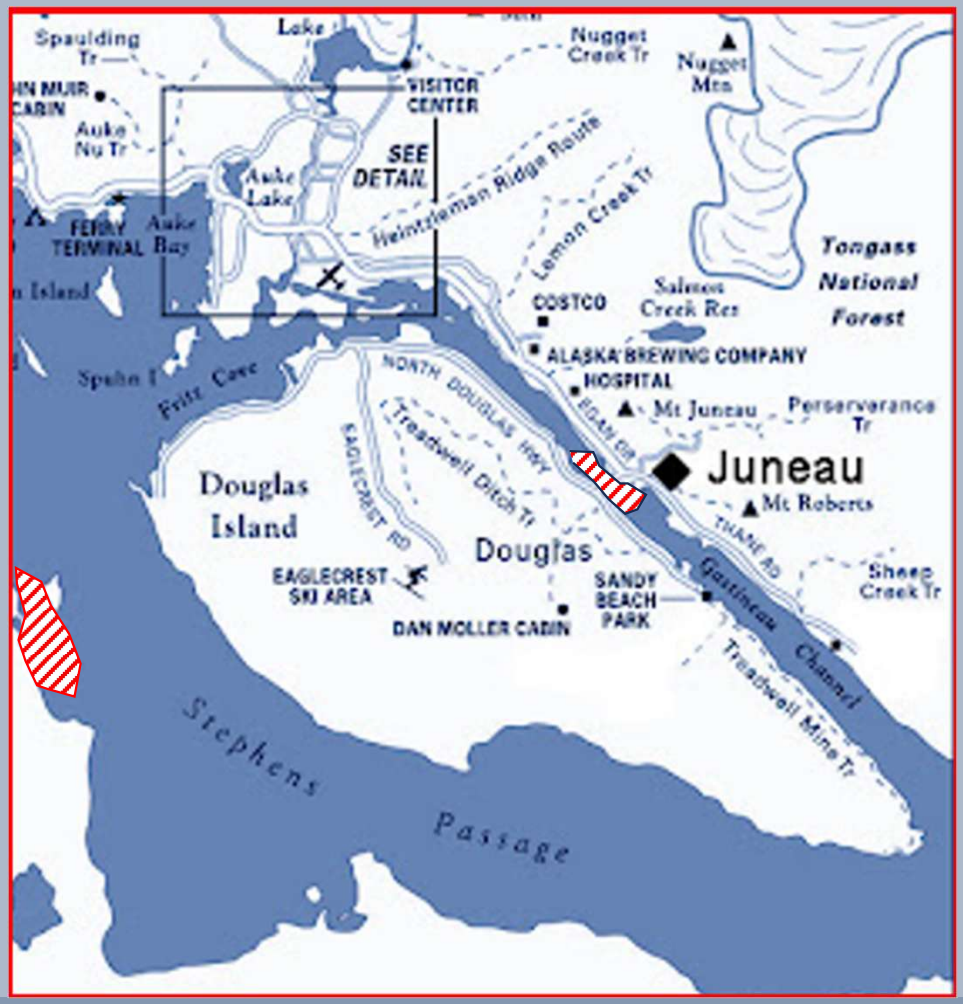


“SOURDOUGH”

2023

Tidal Confluence Areas





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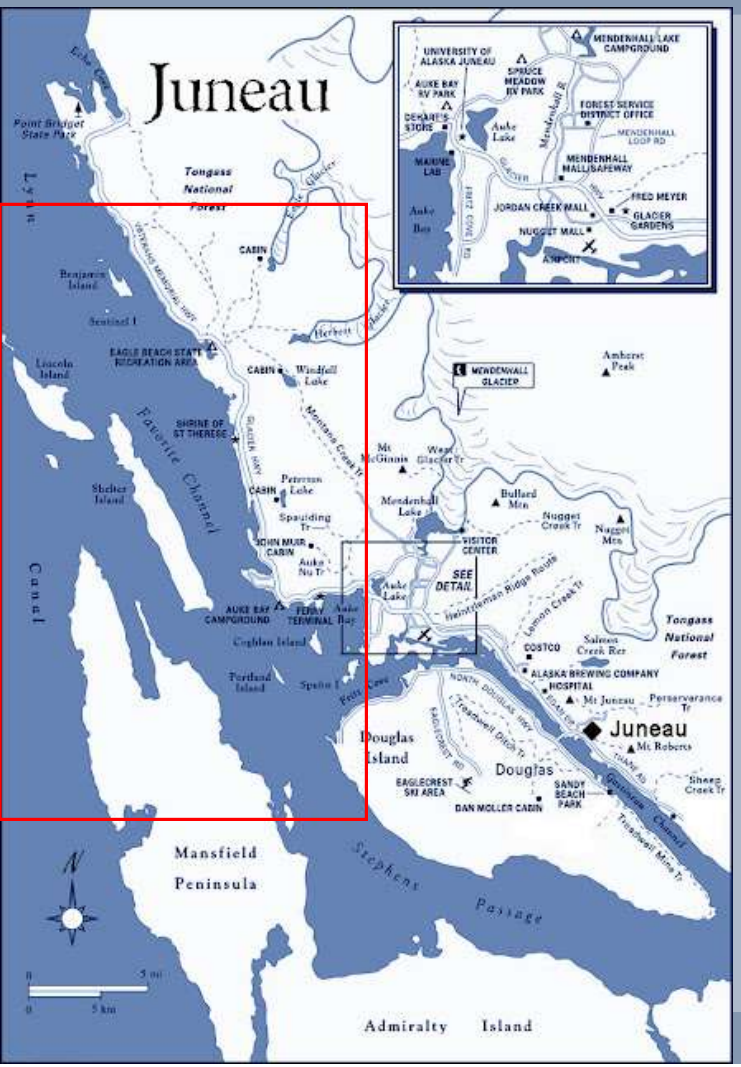
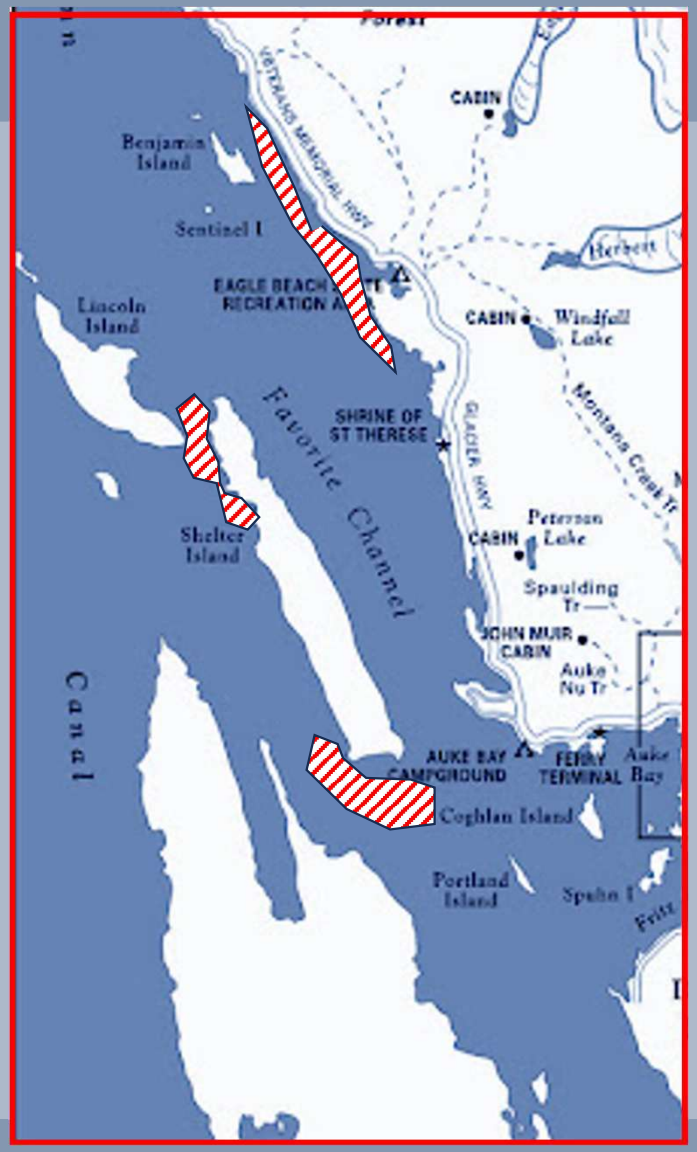
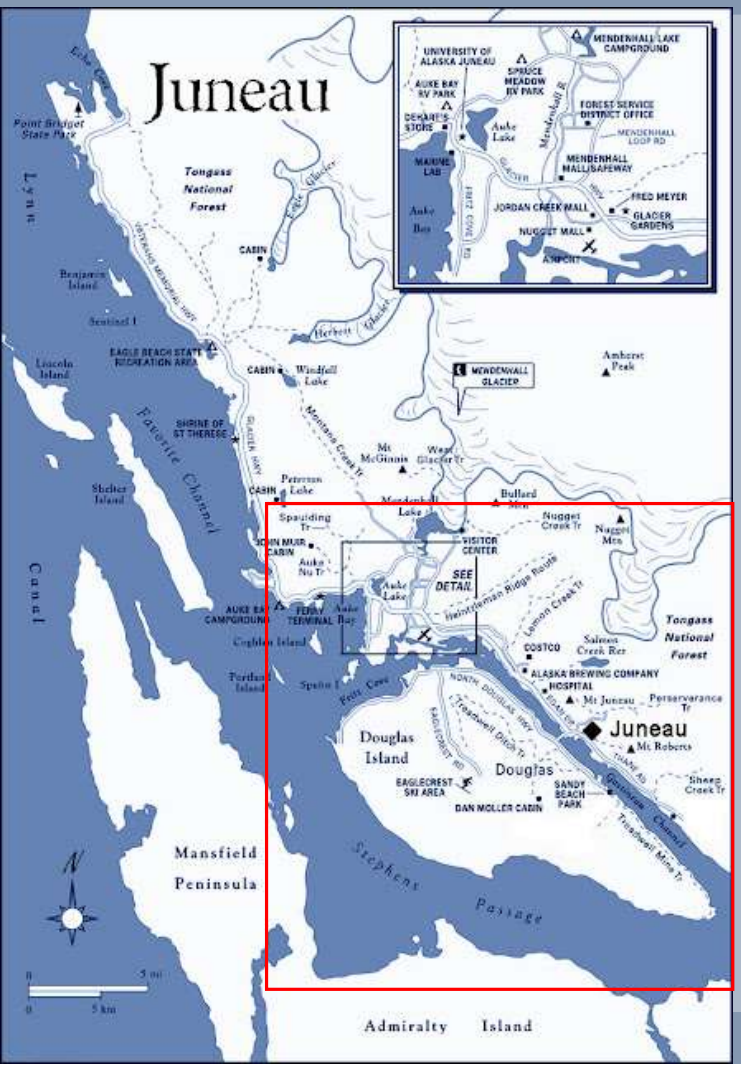
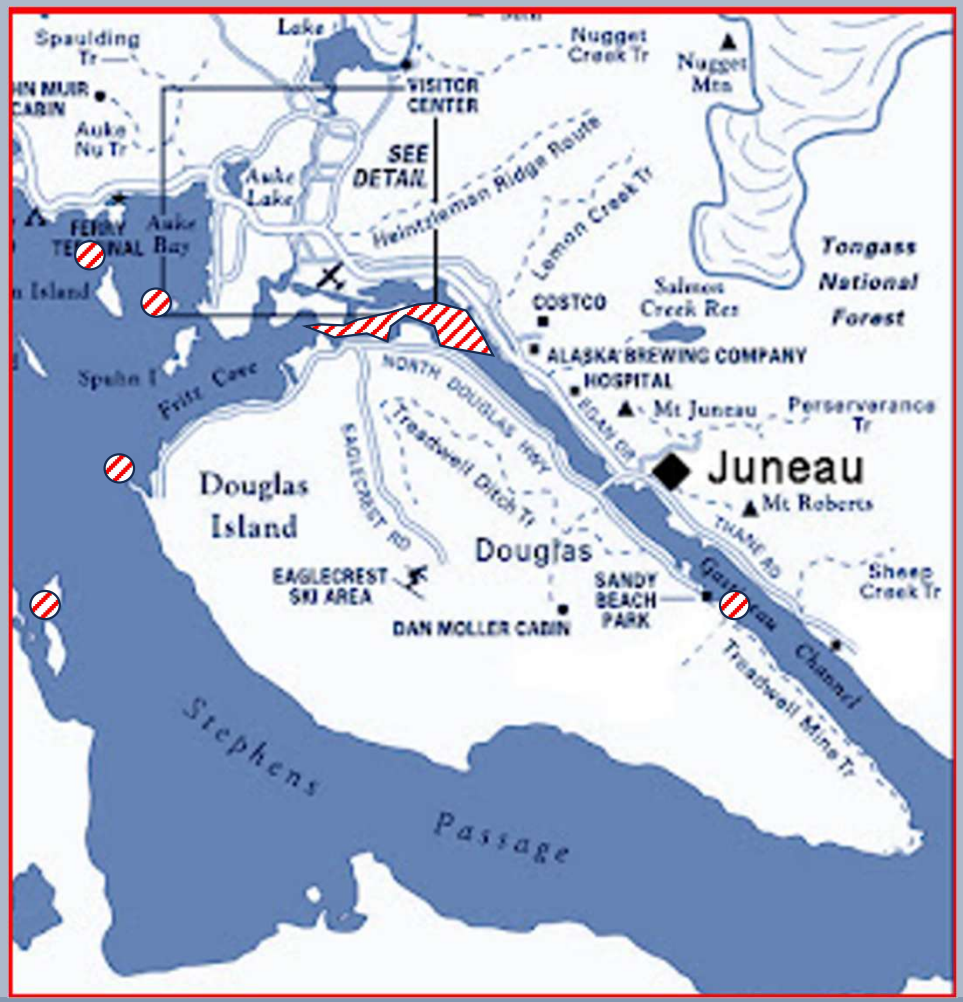




Submerged Hazard Areas





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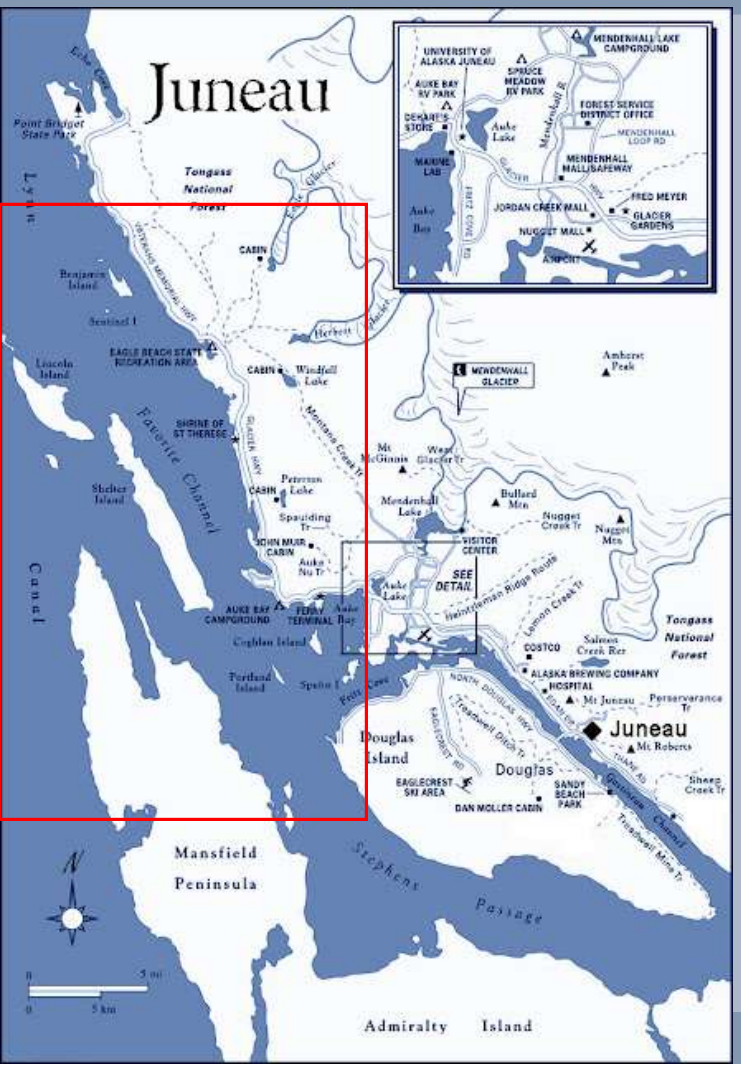
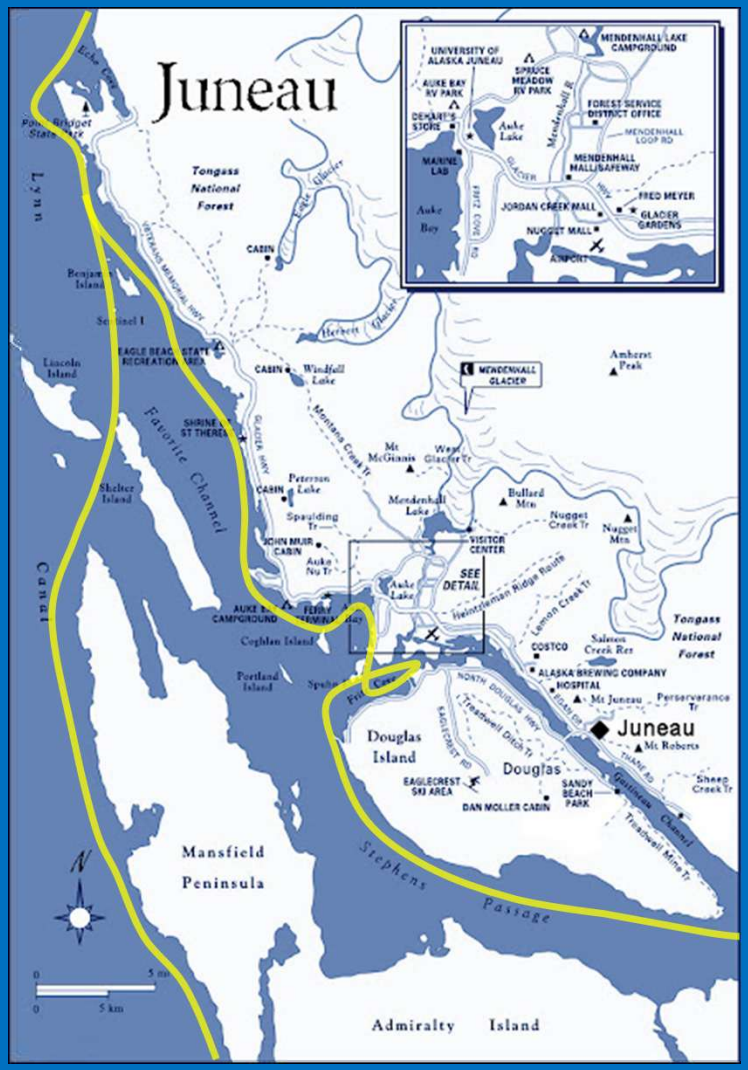


MARINE MAMMALS OF JUNEAU



Killer Whale/ Orca

-Protected under the MMPA (no approach limit)

-Turn off Transducers/ SONAR

MARINE MAMMALS OF JUNEAU

Humpback Whale

Population: 20,000+ North Pacific/ 60 Juneau

Safe Viewing Areas: North Pass, Halibut Cove, Fritz Cove, Saginaw Channel

Notes:

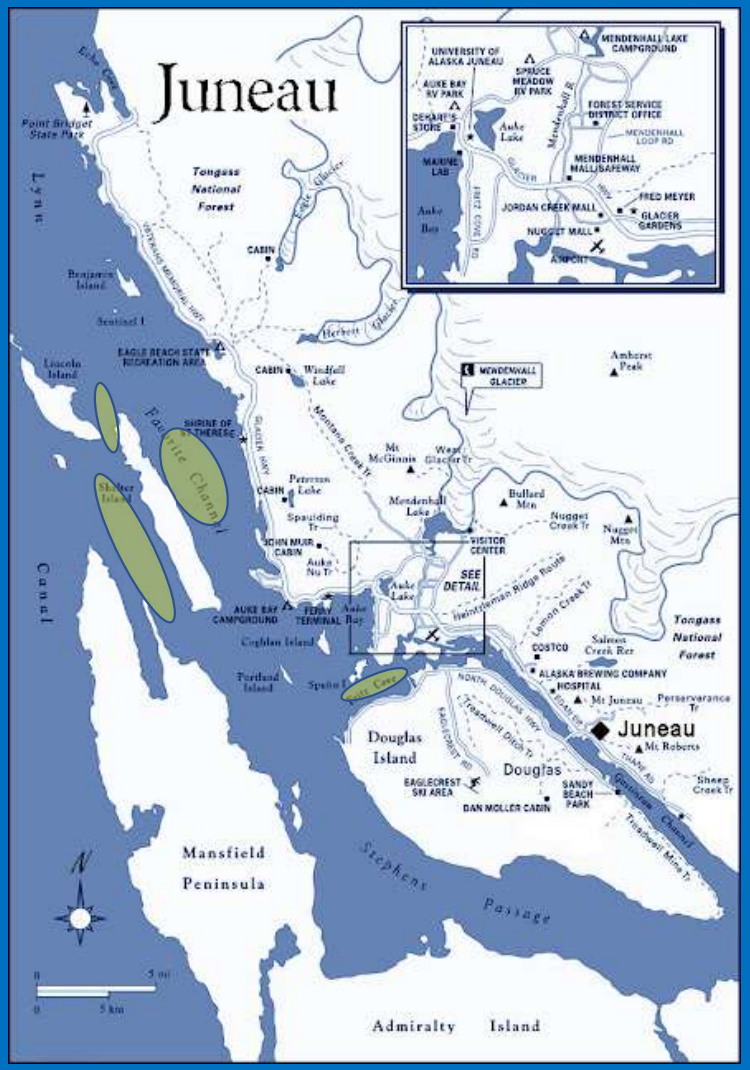
-Bubble Net Feeding most prominent in July and August

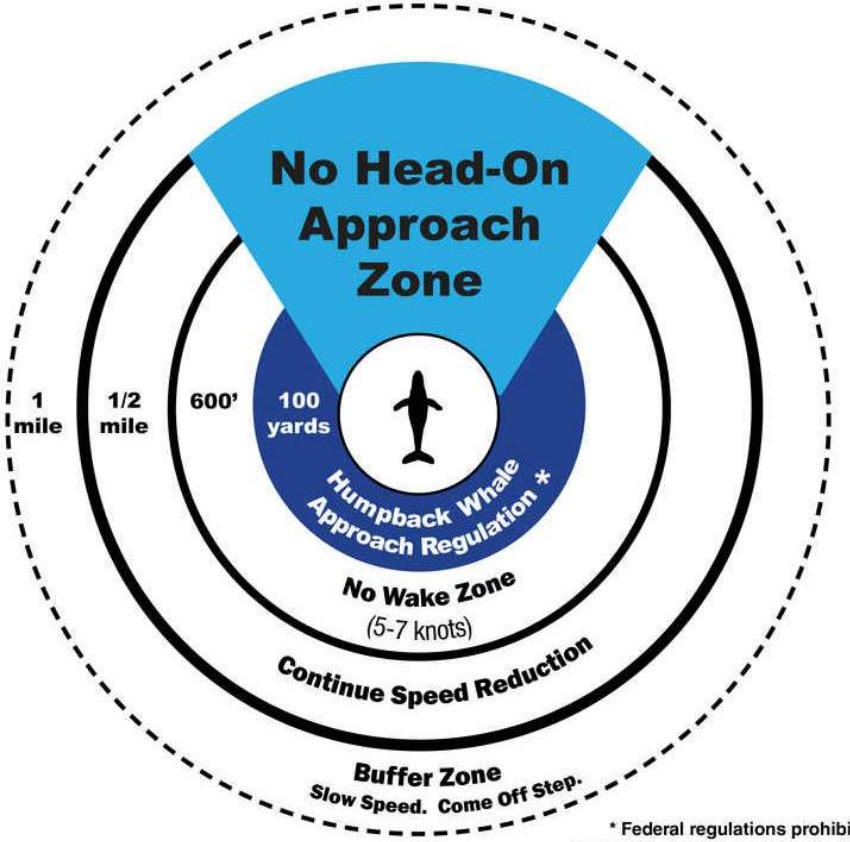
-Lunge Feeding most prominent in early Spring

-Protected under the MMPA (100 yards approach limit)

-NOAA Enforcement: 1(800) 853-1964

MARINE MAMMALS OF JUNEAU





2025

MARINE MAMMALS OF JUNEAU

Stellar Sea Lion

Population: 120,000 Alaska/ 600 Juneau

Safe Viewing Areas: Fritz Cove, Faust Rock, Little Island, Benjamin Island

Notes:
-Can be aggressive towards humans

-Differentiated from seals by small ear flaps

-Protected under the MMPA (no approach limit)

-NOAA Enforcement: 1(800) 853-1964

MARINE MAMMALS OF JUNEAU

Harbor Seal

Population: 250,000 Alaska/ 1300 Juneau

Safe Viewing Areas: Fritz Cove, Hump Island, Fishermen's Bend

Notes:

-Very timid of noise and human approach

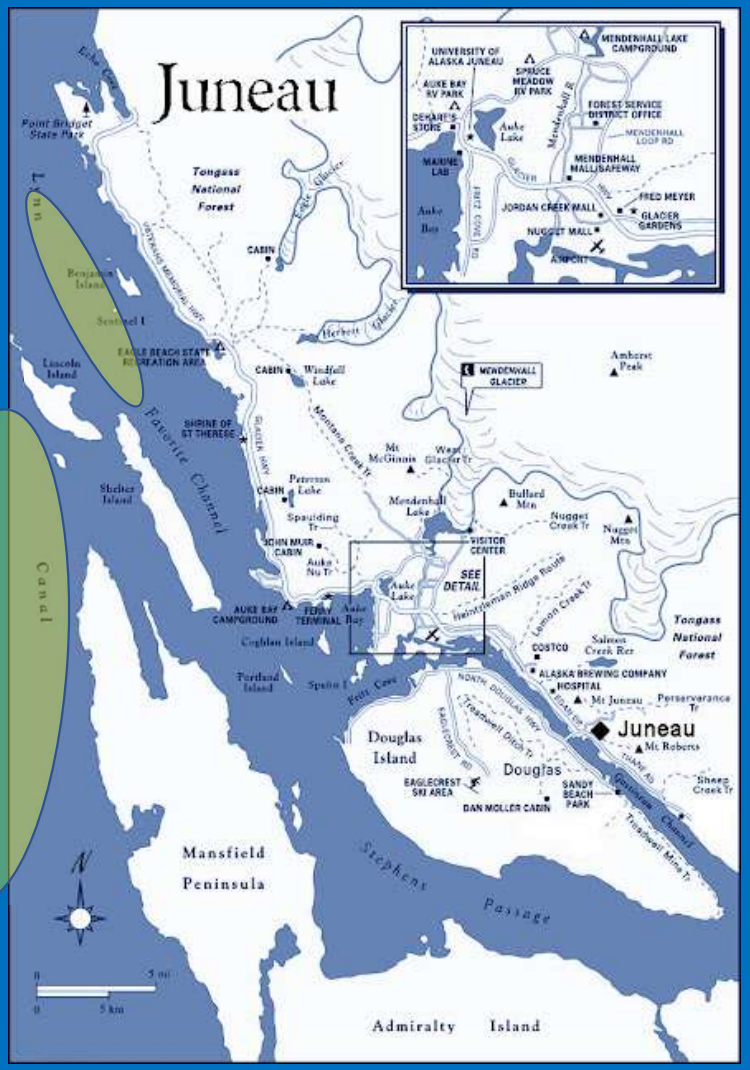
-Differentiated from sea lions by deep ear canal

-Often best viewed at low tide

-Protected under the MMPA (no approach limit)

-NOAA Enforcement: 1(800) 853-1964

MARINE MAMMALS OF JUNEAU



Dall's Porpoise

Population: 83,000 Alaska/ 800 Juneau

Safe Viewing Areas: Lynn Canal

Notes:
-Can travel 40 MPH for short distances

-Protected under the MMPA (no approach limit)

-NOAA Enforcement: 1(800) 853-1964

FISHING/ HUNTING IN JUNEAU

Salmon

Safe Harvest Areas: DIPAC, Sheep Creek, Fish Creek, Fritz Cove, North Pass, Cordwood Creek

Notes:

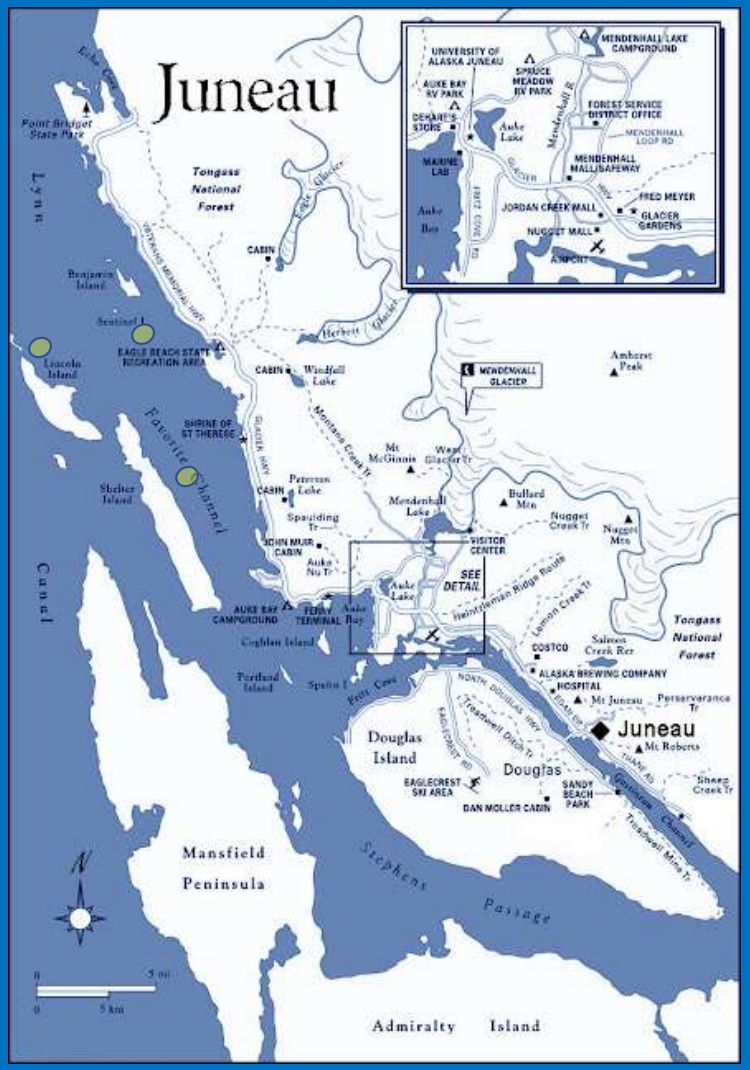
-License carry options:

- **Print, signed, and carried on person**
- **ADFG Mobile App (free)**
- **Digital picture of printed and signed license**

-Always review updated ADFG statements for area closures prior to harvesting

-adfg.Alaska.gov

FISHING/ HUNTING IN JUNEAU



Halibut

Safe Harvest Areas: Underwater slide areas with prominent topographical humps or plateau

Notes:

-License carry options:

- **Print, signed, and carried on person**
- **ADFG app (free)**
- **Digital picture of printed and signed license**

-Always review updated ADFG statements for area closures prior to harvesting

-Adfg.Alaska.gov

State and Federal Waterway Regulation

Agencies

United States Coast Guard

- *-Safety/ Prevention*
- *-Rescue*
- *-Inspections/ Licensing*
- *-Law Enforcement*

Law Enforcement

-Juneau Police Department	*(907) 586-0600*
-Alaska State Troopers	*(907) 465-4000*
-US Forest Service	*(907) 586-8800*
-US Customs and Border	*(907) 586-7211*
-Alaska Dept of Fish and Game	*(907) 465-2376*
-US Fish and Wildlife Service	*(907) 780-1160*
-NOAA	*(907) 586-7414*

State and Federal Waterway Regulation

Agencies

Alaska Marine Exchange

-Safety/ Prevention

-Vessel Tracking and Command
(907) 463-2607

Alaska Department of Natural Resources, Office of Boating Safety

-Safety, Education

-Statistics

-Harvest and Subsistence Regulation
(907) 269-8700

AMSEA- Alaska Marine Safety Education Association

(907) 747-3287

State and Federal Waterway Regulation

Restrictions

Commercial Enterprise Restrictions

Drugs are not allowed on board any vessel (Includes Marijuana and Cannabis-Infused Products)

Alcohol limit is .08%

No Firing of Weapons to Onshore Targets

Refer to Coast Pilot for Borough and Harbor Laws

Juneau Cruise Ship Terminal Area

State and Federal Waterway Regulation

Frequently Asked Questions

"Can Law Enforcement board my vessel without a cause or Warrant?"

State and Federal Waterway Regulation

Frequently Asked Questions

"Can Law Enforcement board my vessel without a cause or Warrant?"

Yes. Any State or Federal Law Enforcement Officer, State or Federally charged statistician, or Regional Safety Officer may board any vessel, at any time, for any reason, while unmoored

State and Federal Waterway Regulation

Frequently Asked Questions

"Are passengers required by law to wear Life Jackets?"

State and Federal Waterway Regulation

Frequently Asked Questions

"Are passengers required by law to wear Life Jackets?"

No. However, any passenger UNDER 13-years of age is required to wear a size-appropriate life jacket while engaged in water sports, or while aboard 'open deck' craft

State and Federal Waterway Regulation

Frequently Asked Questions

"What constitutes 'Negligent Operation of a Vessel?"

State and Federal Waterway Regulation

Frequently Asked Questions

"What constitutes 'Negligent Operation of a Vessel?"

'NOV' is a citable offense in which a Law Enforcement Officer witnesses reckless or unsafe behavior from a boat operator or passengers. Interpretation of 'NOV' offenses is determined by Coast Guard Investigative Service (CGIS)

State and Federal Waterway Regulation

Frequently Asked Questions

"Am I legally obligated to assist other mariners in distress?"

State and Federal Waterway Regulation

Frequently Asked Questions

"Am I legally obligated to assist other mariners in distress?"

Yes. "(1)A master or individual in charge of a vessel shall render assistance to any individual found at sea in danger of being lost, so far as the master or individual in charge can do so without serious danger to the master's or individual's vessel or individuals on board.

(2)Paragraph (b): A master or individual violating this section shall be fined not more than $1,000, imprisoned for not 2 years, or both."

(Title 46 U.S. Code § 2304)

State and Federal Waterway Regulation

Frequently Asked Questions

"Which safety items am I legally obligated to have onboard?"

State and Federal Waterway Regulation

ALASKA REQUIREMENTS SUMMARY

Requirements	Boats under 16 feet	Boats 16 feet to less than 26 feet	Boats 26 feet to less than 40 feet	Boats 40 feet to less than 65 feet
Personal Flotation Devices (PFD)	One USCG-approved Type I, II, III or V PFD for each person on board. Must be in serviceable condition. Persons under 13 must wear a PFD when in an open boat, on the deck of a boat or when waterskiing.			
Throwable Devices (Type IV)	Recommended but not mandatory.	Except for canoes and kayaks, one USCG-approved Type IV (seat cushion or throw ring) device must be carried.		
Sound Producing Devices	Boats less than 39.4 feet (12 meters) in length must be able to make an efficient sound signal (such as that made with a whistle or horn) to signal intentions and to signal position in periods of reduced visibility.			Boats 39.4 feet (12 meters) or more in length must carry on board a whistle or horn.
Visual Distress Signals	USCG-approved night signals required between sunset and sunrise.	USCG-approved visual distress signals for both day and night time use must be carried. Exception: boats and open sailboats not equipped with mechanical propulsion and under 26 feet in length are not required to carry day signals. *Note: Pyrotechnic devices, if used to meet this requirement, must be current, serviceable and readily accessible. At the minimum, a total of three day/night combination devices or three day and three night devices must be carried.*		

State and Federal Waterway Regulation

ALASKA REQUIREMENTS SUMMARY

Requirements	Boats under 16 feet	Boats 16 feet to less than 26 feet	Boats 26 feet to less than 40 feet	Boats 40 feet to less than 65 feet
Fire Extinguishers	At least one USCG-approved B-I required for boats with inboard engines, living spaces, permanent fuel tanks or enclosed storage areas or hull voids not sealed or filled with flotation material.		At least two B-I or one B-II USCG-approved fire extinguishers.	At least three B-I or one B-I and one B-II USCG-approved fire extinguishers.
Navigation Lights	Display required between sunset and sunrise and during periods of restricted visibility. International configuration required (varies with length and mode of operation). See the International Navigation Rules.			
Backfire Flame Arrestors	One USCG-approved backfire control device on each carburetor of all inboard gasoline engines.			
Ventilation	Boats with permanently installed engines, closed compartments or permanent fuel tanks must have efficient natural or mechanical ventilation.			
Registration	Undocumented boats equipped with mechanical propulsion (gas, diesel or steam engines, and electric motors) and any undocumented vessel used in sport fishing charter activities must be registered with the Division of Motor Vehicles. Certificate of Number must be carried onboard. Registration numbers and validation decals must be properly displayed on hull of boat. REV 11.5.12			

Alaskaboatersafety.org

US Coast Guard Approved

Mustang Inflatable Suspenders

Stearns Inflatable Suspenders

Mustang Khimera Hybrid and Inflatables

HERO Inflatable Rash Guard

Stearns Foam Work Vest

Mustang Manual Belt Pack Inflatable

Non- USCG Approved

Kent Rogue

Float Tech Sea-Tee
Inflatable Rash Guard

Stormline 662 Heavy Duty
Oilskin Fishing Flotation Pants

Regatta Fisherman's
Oilskins with Floatation

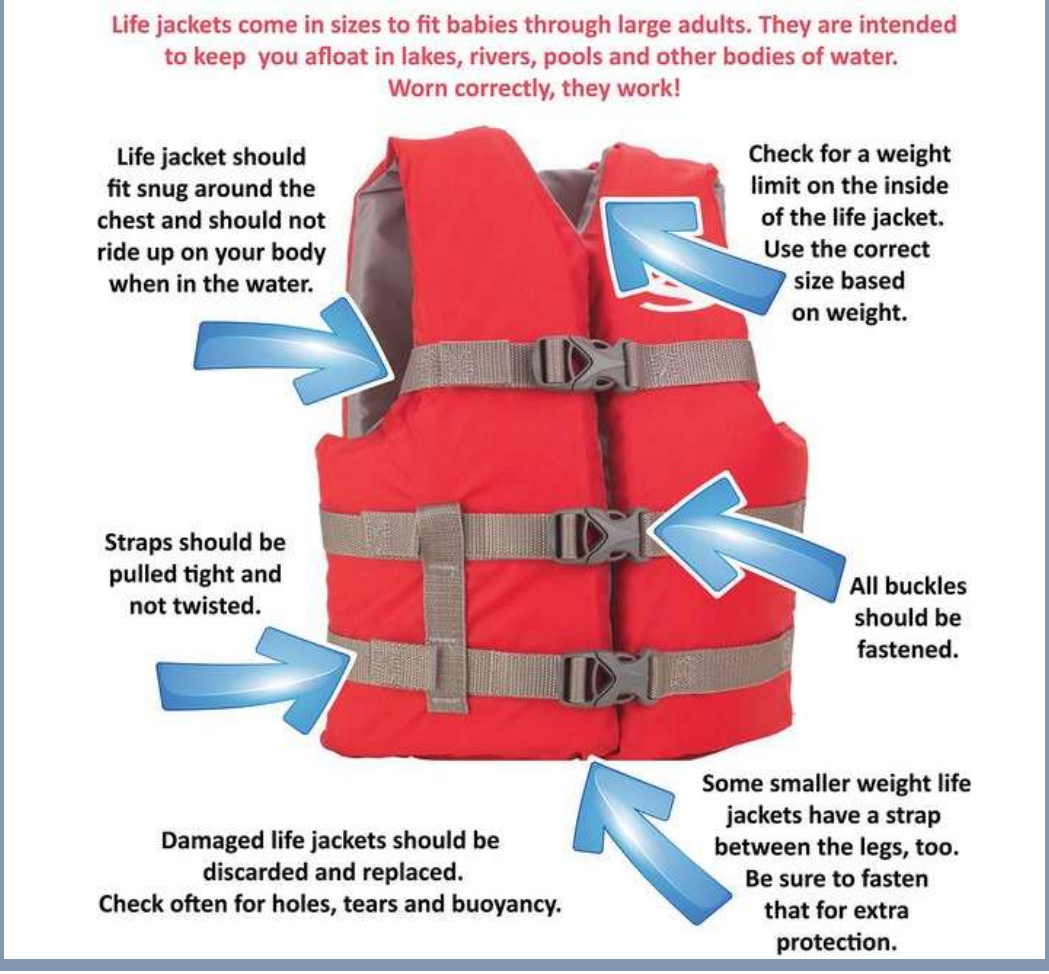
SCAN ME

PFDs That Work

SCAN ME

PFD Reimbursement
Online Form

Proper Fit and Wear of PFD



Question:

Which PFD is most effective?

THE ONE YOU WEAR!

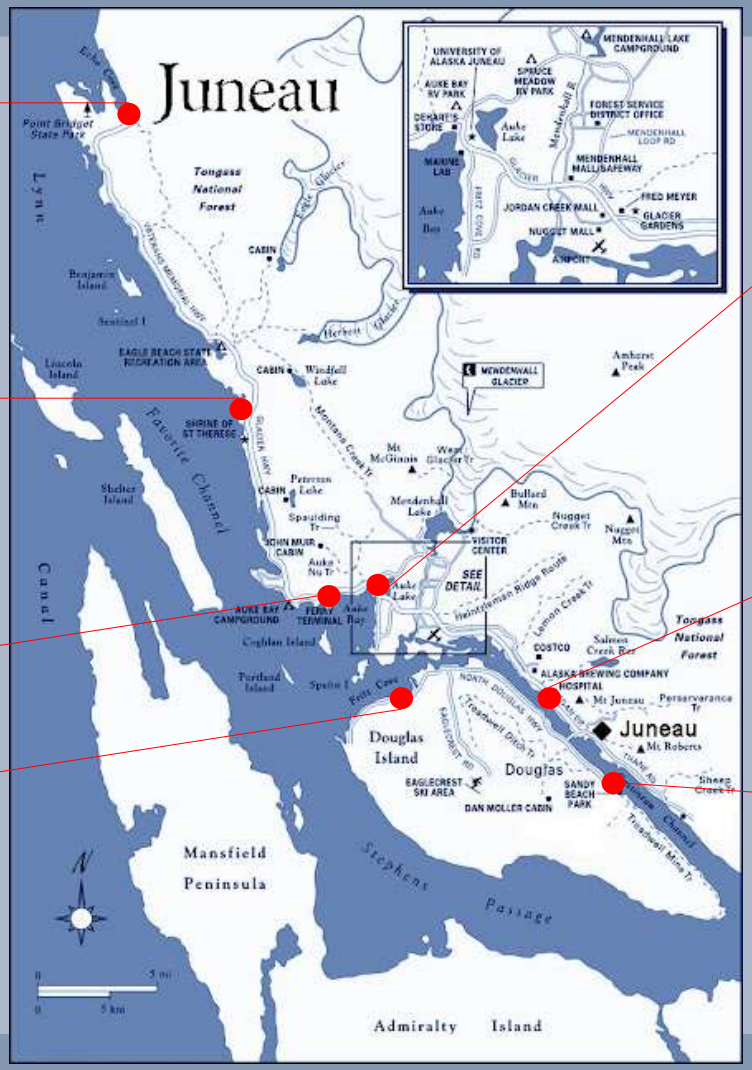
Juneau Harbors (CBJ)

Echo Cove Boat Launch

Amalga Harbor

Auke Bay Loading Facility

North Douglas Boat Launch



Juneau Harbors (CBJ)

www.juneauharbors.com

Day-Use Recreational Launch Ramp Permit

$18.81

Annual Recreational Launch Ramp Permit

$112.92

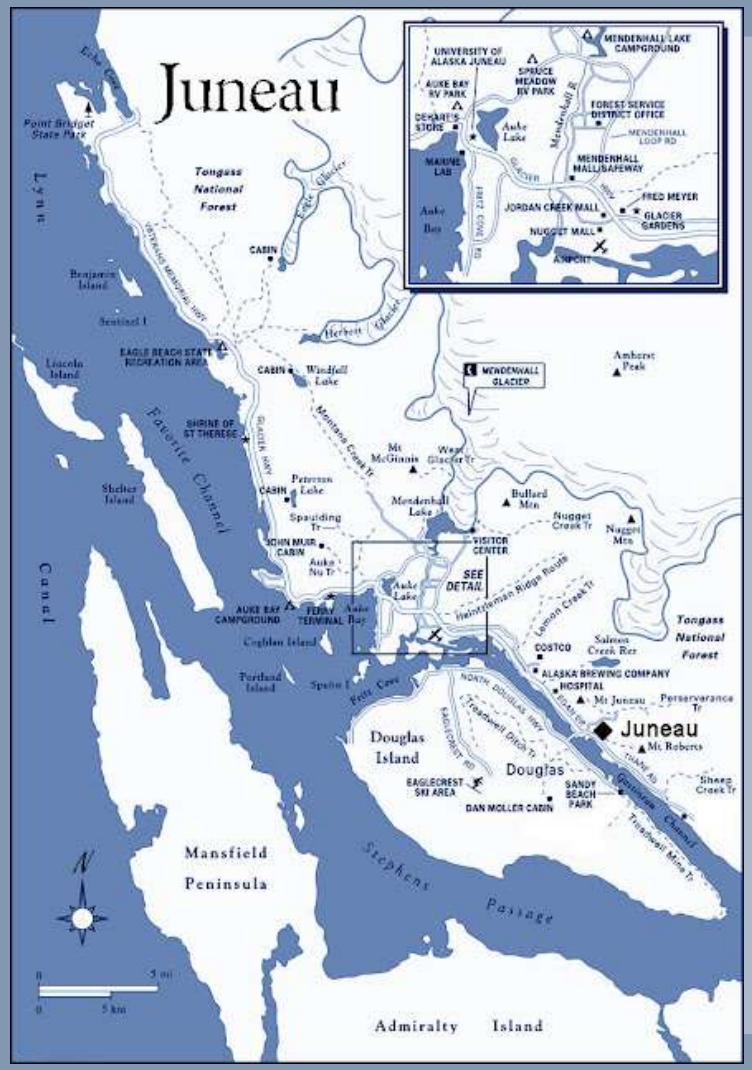
Day-Use Commercial Launch Ramp Permit

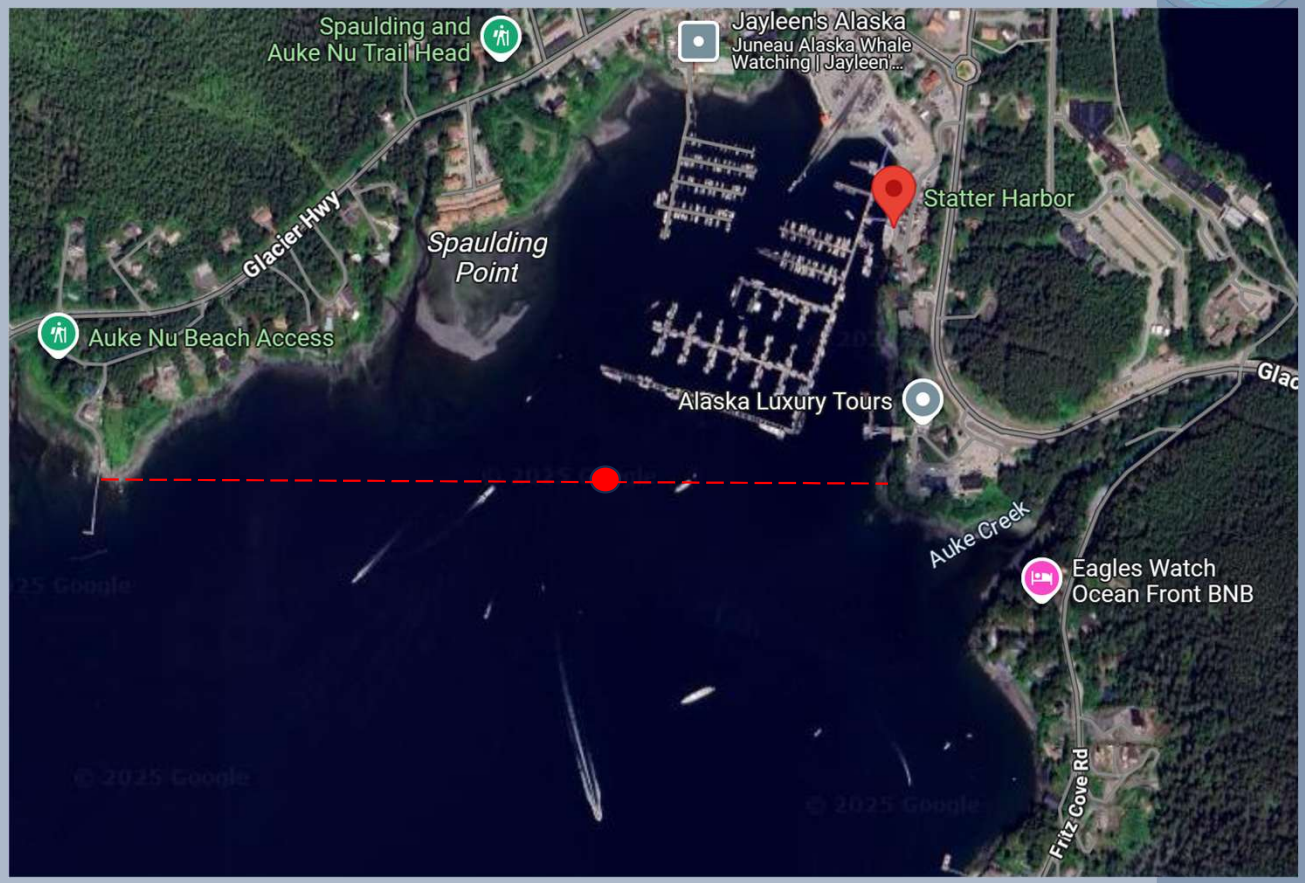
$37.64

Annual Commercial Launch Ramp Permit

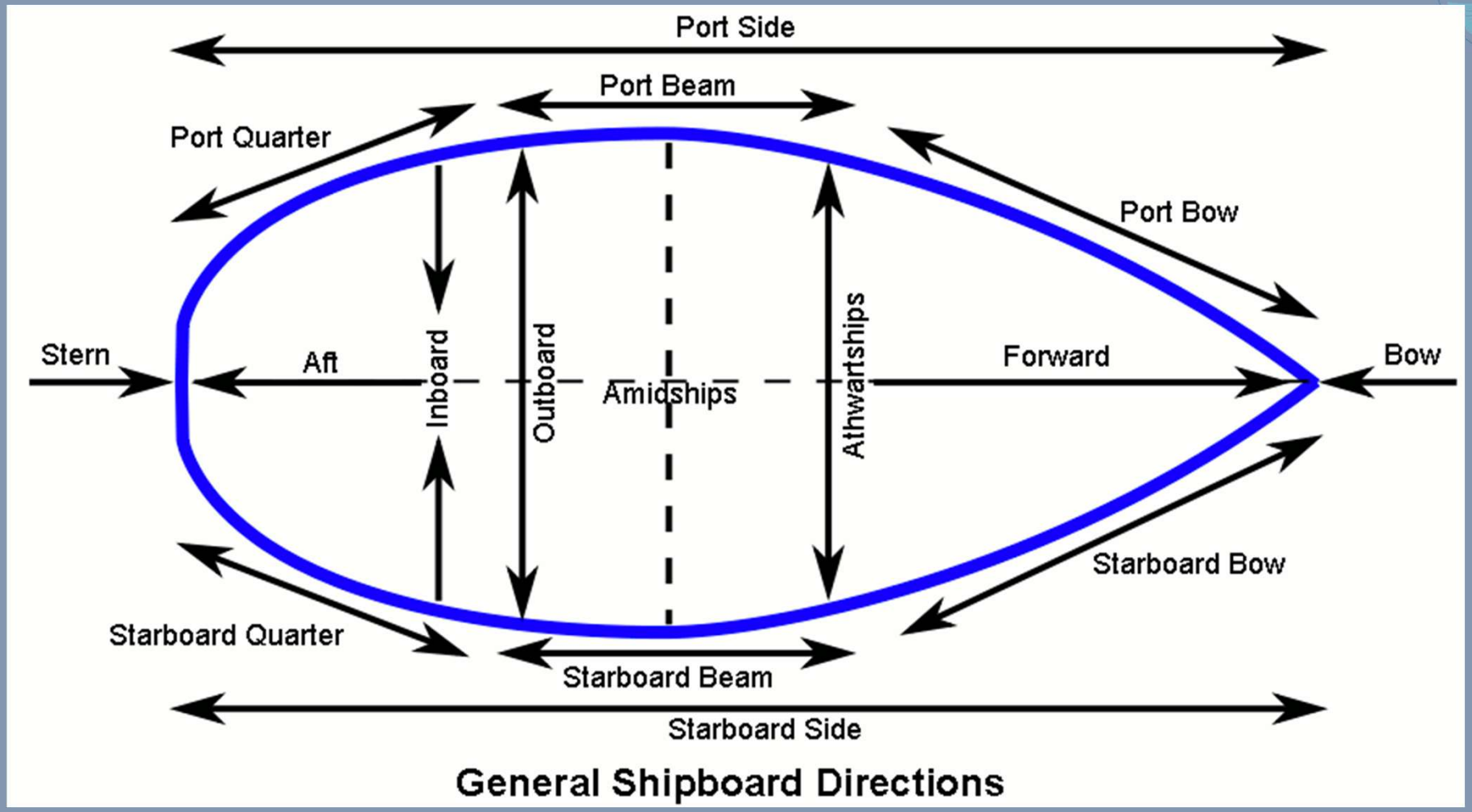
$313.64

Juneau Harbors (CBJ)



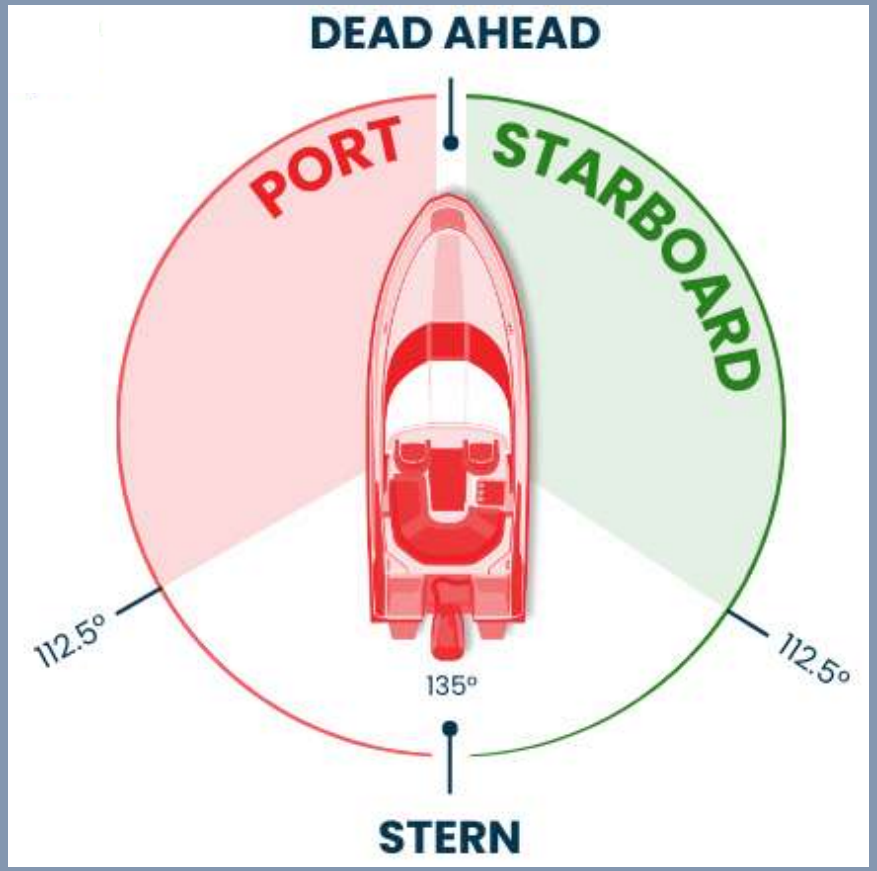


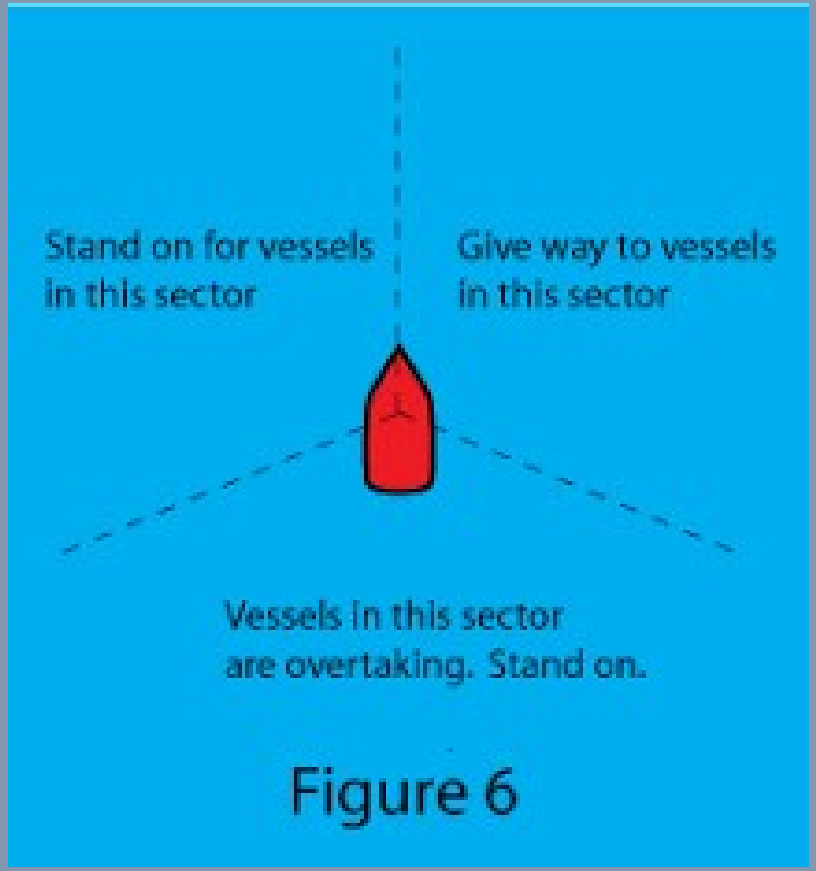
BOATING IN ALASKA



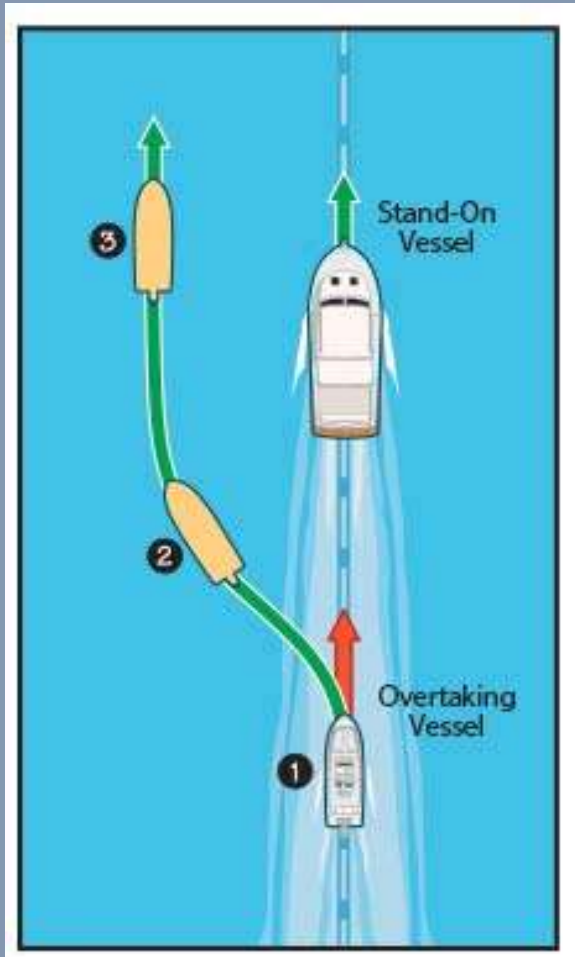
General Shipboard Directions

BOATING IN ALASKA





BOATING IN ALASKA



1. OVERTAKING

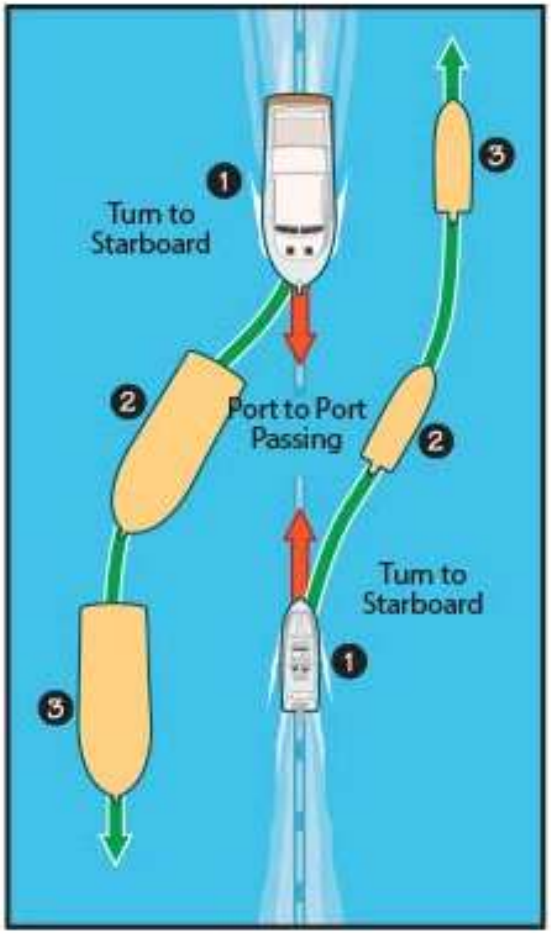
Rules of the Road

When overtaking (passing) another vessel, you can approach either side of the stand-on vessel

You must not cause interference to the stand-on vessel's original course or speed

Your altered course must be deliberate and obvious to the stand-on vessel

BOATING IN ALASKA



2. HEAD-ON SITUATION

Rules of the Road

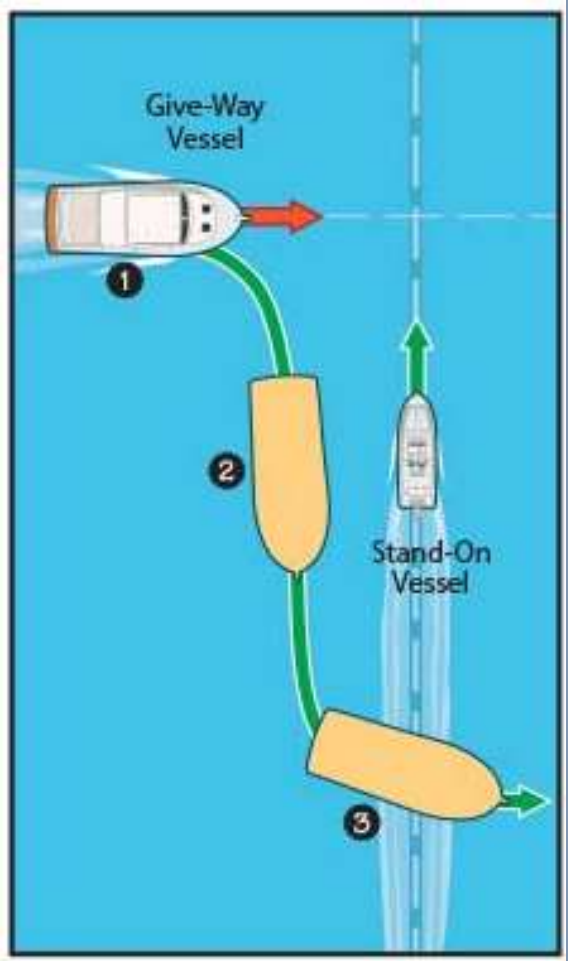
When approaching "head-on" with another vessel, you must pass:

PORT to PORT

...unless you communicate with the vessel to pass **Starboard to Starboard.**

The other vessel must confirm the altered arrangement by VHF or two Horn Blasts

BOATING IN ALASKA



3. CROSSING SITUATION

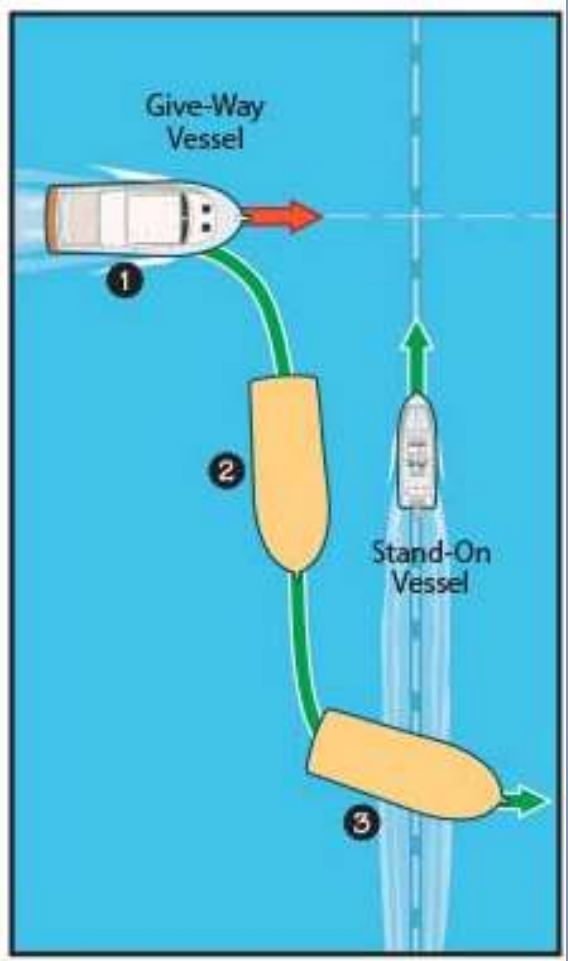
Rules of the Road

If a vessel is approaching from your **Starboard** side, you must give-way by passing:

BEHIND the stand-on vessel

Make your course alteration early, and obvious to the Stand-on vessel

BOATING IN ALASKA



3. CROSSING SITUATION

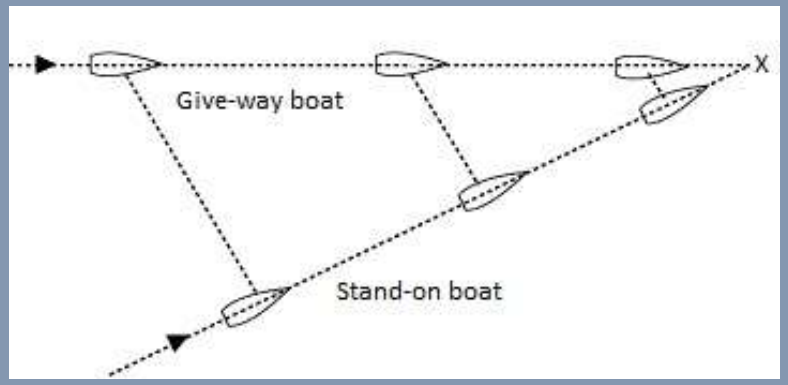
Rules of the Road

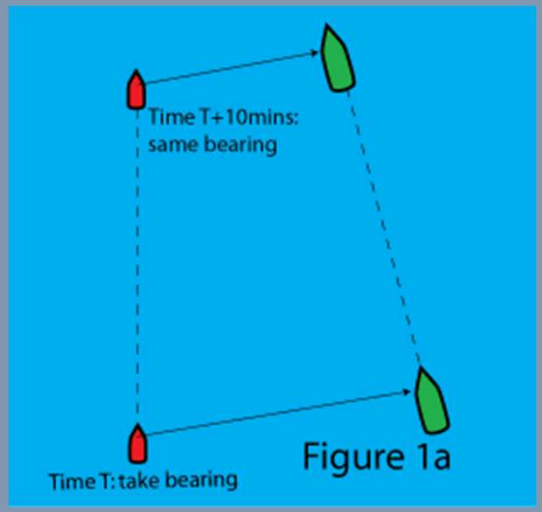
If you are the stand-on vessel, do not alter your course

If in doubt of the give-way vessel's intentions slow your speed and emit **1-prolonged blast (5 seconds)**

If collision is nearing, allow the give-way vessel to pass ahead. Place your engines astern (reverse) and sound **3-short blasts (1 second)**

BOATING IN ALASKA



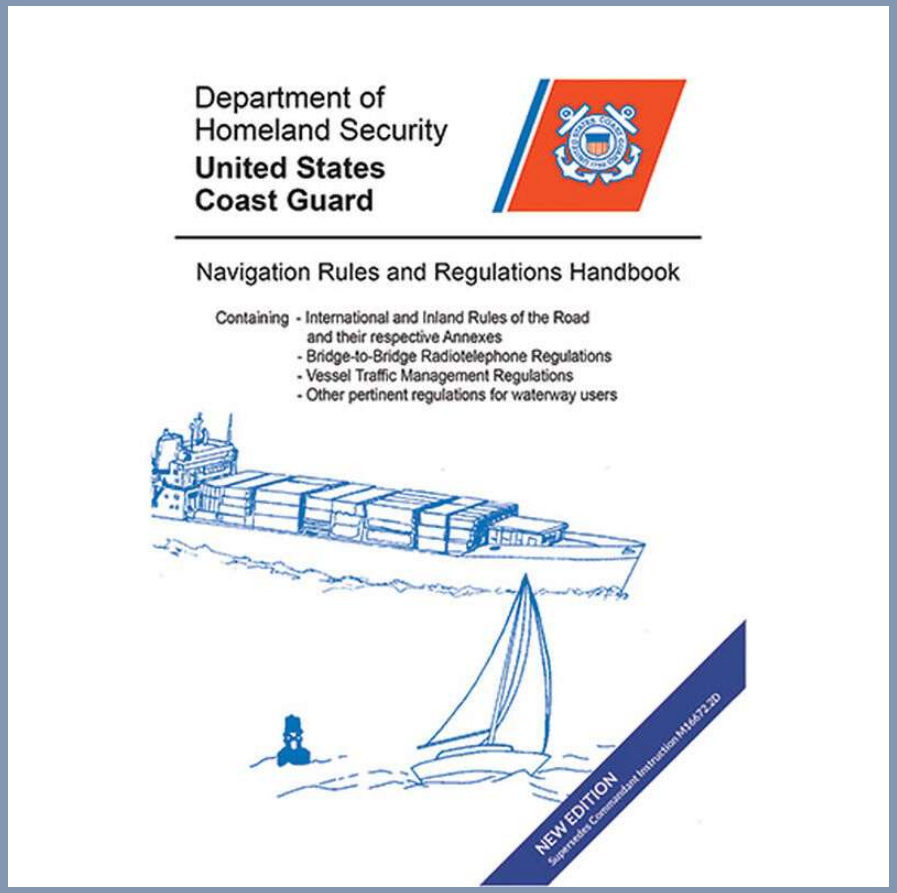


Rules of the Road

If a vessel in (seemingly) traveling parallel to you, but the vessel's bearing does not change, you are on a

Collision Course!

BOATING IN ALASKA



Rules of the Road

No vessel has ultimate legal right of way over another.

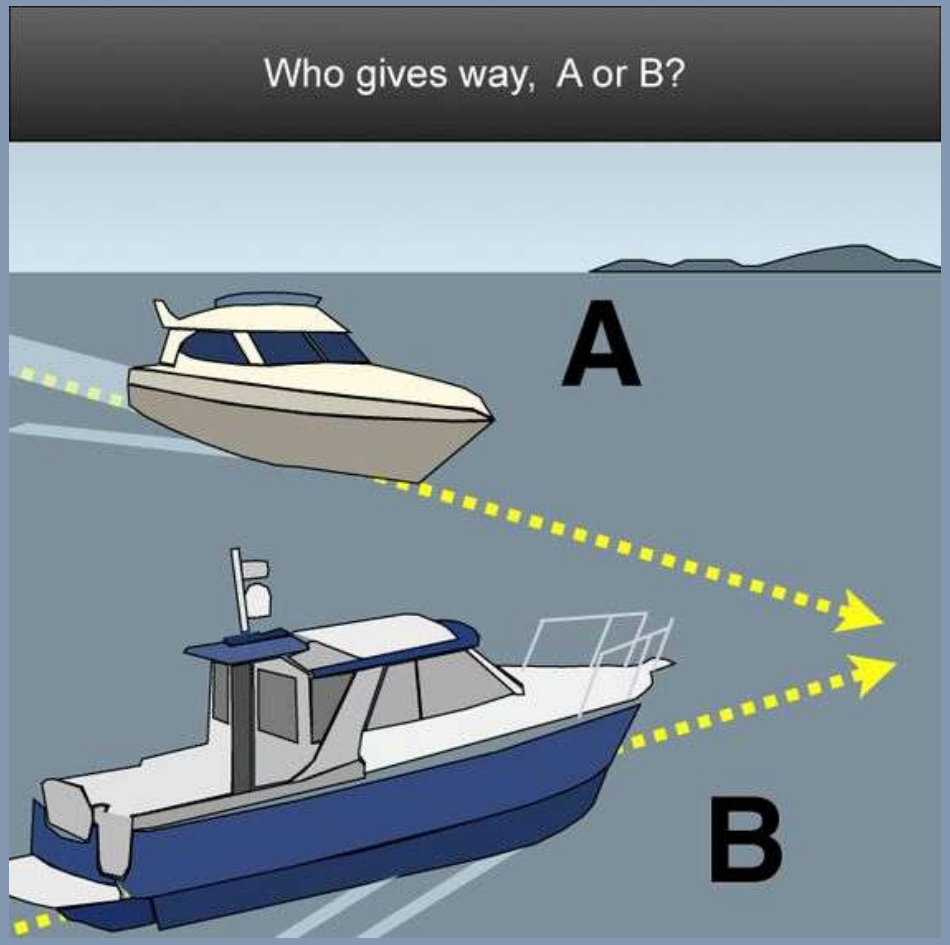
Navigation Rules of the Road govern how different situations should be handled based on the vessel type and activity

Avoid a collision at all costs, even if it means breaking another rule

Ketchikan and surrounding area falls under 'Inland Waters' boating regulation

Vessels under sail, engaged in Commercial Fishing (to include Sportfishing), or restricted ability to maneuver, have right of way

BOATING IN ALASKA



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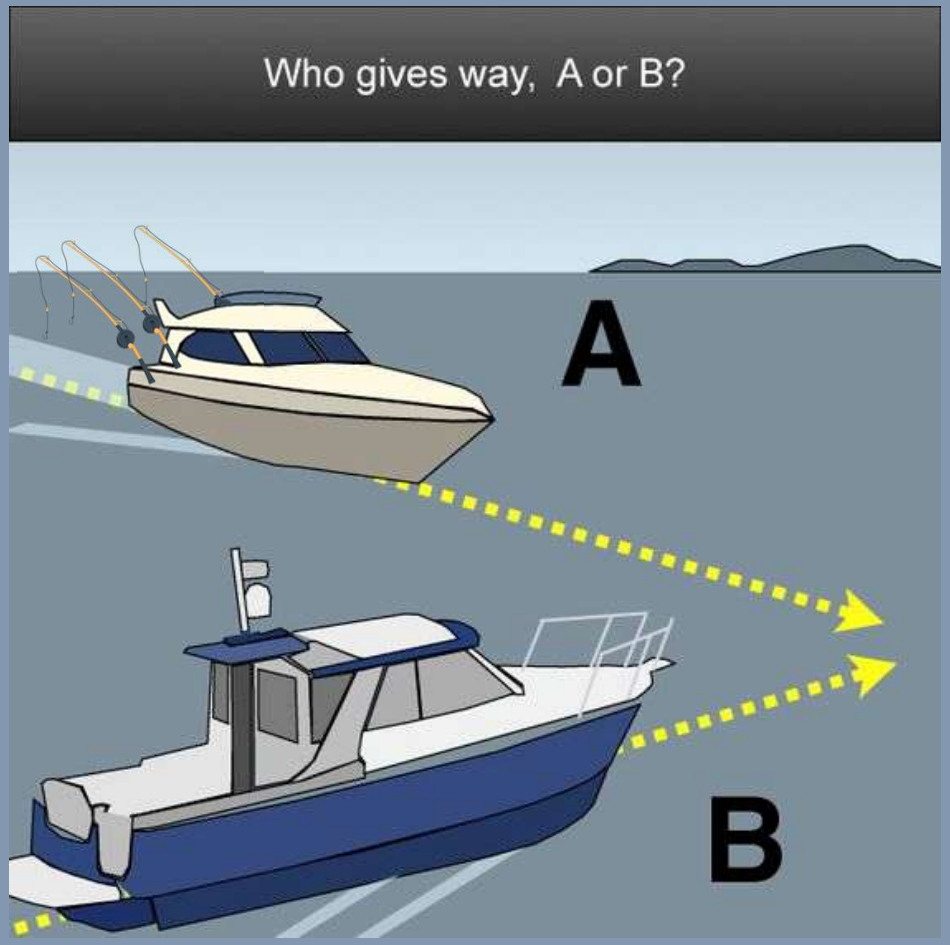
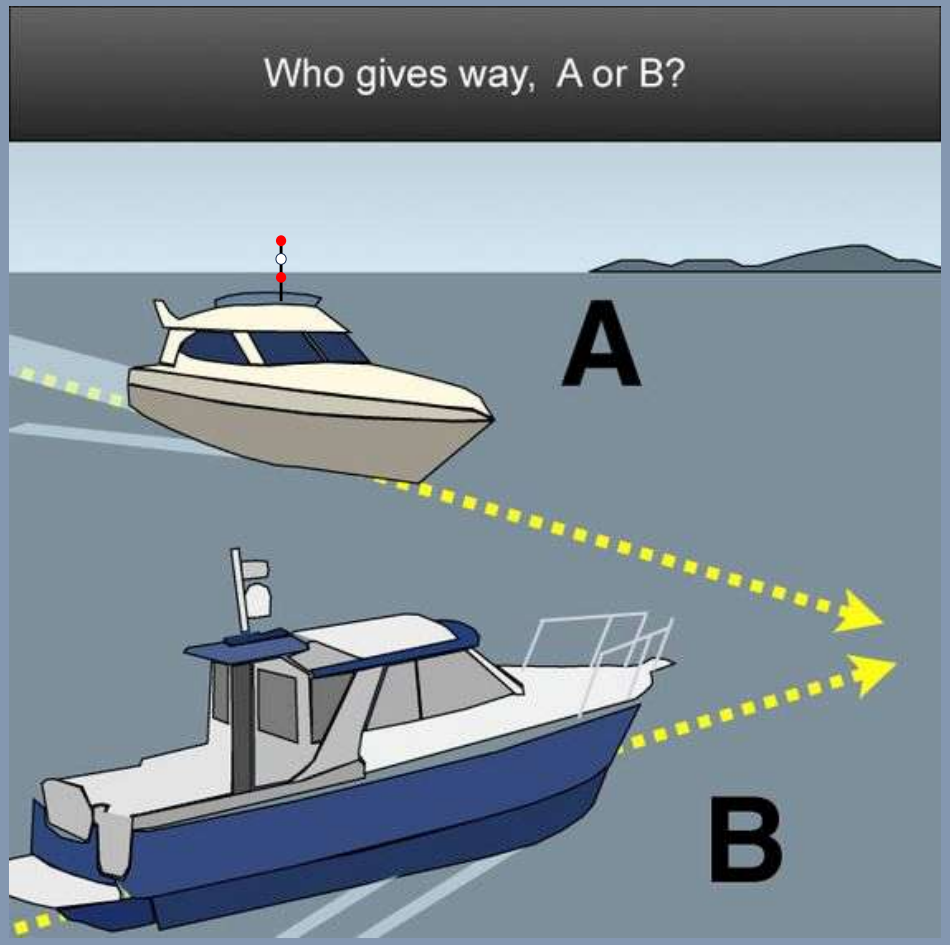


BOATING IN ALASKA



RADIOS

MAYDAY- ONLY IF LIFE THREATENING

Select Highest Broadcast Setting (wattage)

If enabled, press ‘Distress Button’

Hold microphone key/ button to transmit

Breathe Deeply

Speak slow, and clear

RADIO

Pan-Pan: 2nd priority calls
Impending Emergency

Securite: 3rd priority calls
Nav concern, Weather, Nav Light Out, Restricted Ability to Maneuver, Towing

RADIOS

Exercise:
YOU are the Coast Guard!

Write the 5 most important things you hear on the following actual MAYDAY

5 MAYDAY Call Priorities

1. MAYDAY (3x)
2. Location (geographic + Lat/long)
3. Vessel Name
4. Vessel Description
4. Nature of Emergency
5. # of people onboard

MAYDAY RELAY

If no one responds to a MAYDAY call, respond to caller and relay message to Coast Guard

- State your vessel name and position
- Repeat what you heard in MAYDAY
- Standby for instructions

DIGITAL SELECT CALLING (DSC)

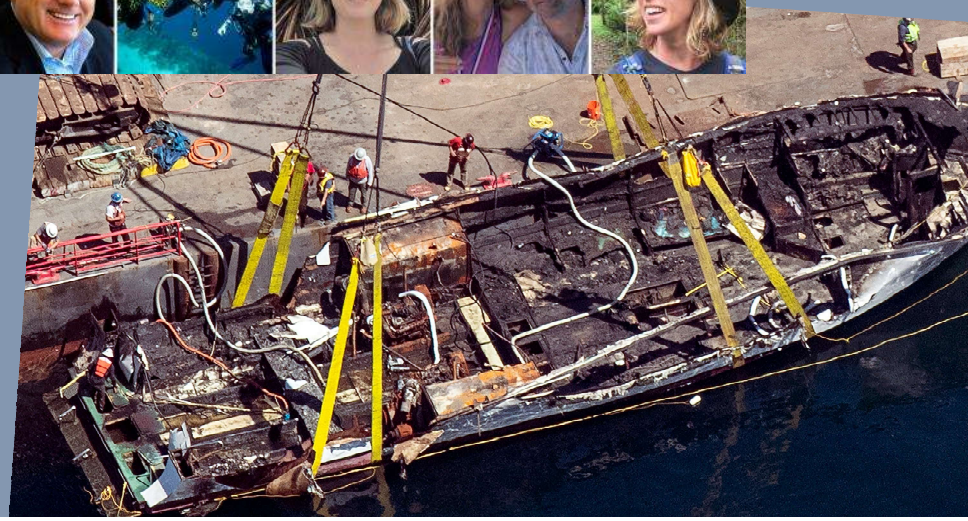
Functions:

- Broadcasts distress call
- Inc. vessel & owner info
- Lat./Long position

To make operational:

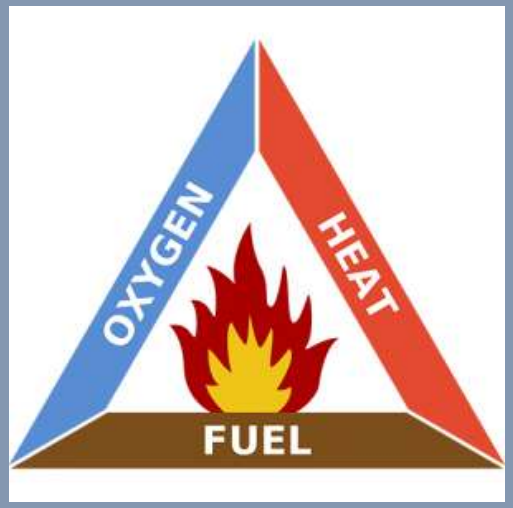
- Have to wire into GPS
- Obtain MMSI # - boatus.com/mmsi or from FCC license
- Enter # into radio (owners manual)
- Test call to another DSC radio

FIRE EMERGENCY PLAN



M/V 'Conception'
September 2nd, 2019
34-Deaths

FIRE EMERGENCY PLAN



Fire Hazards

Fuels

-Gasoline (tank, lines, fittings, vapors)

-Lithium Batteries

-Plastics (upholstery, trim, carpet)

-Wood

Fire Tetrahedron

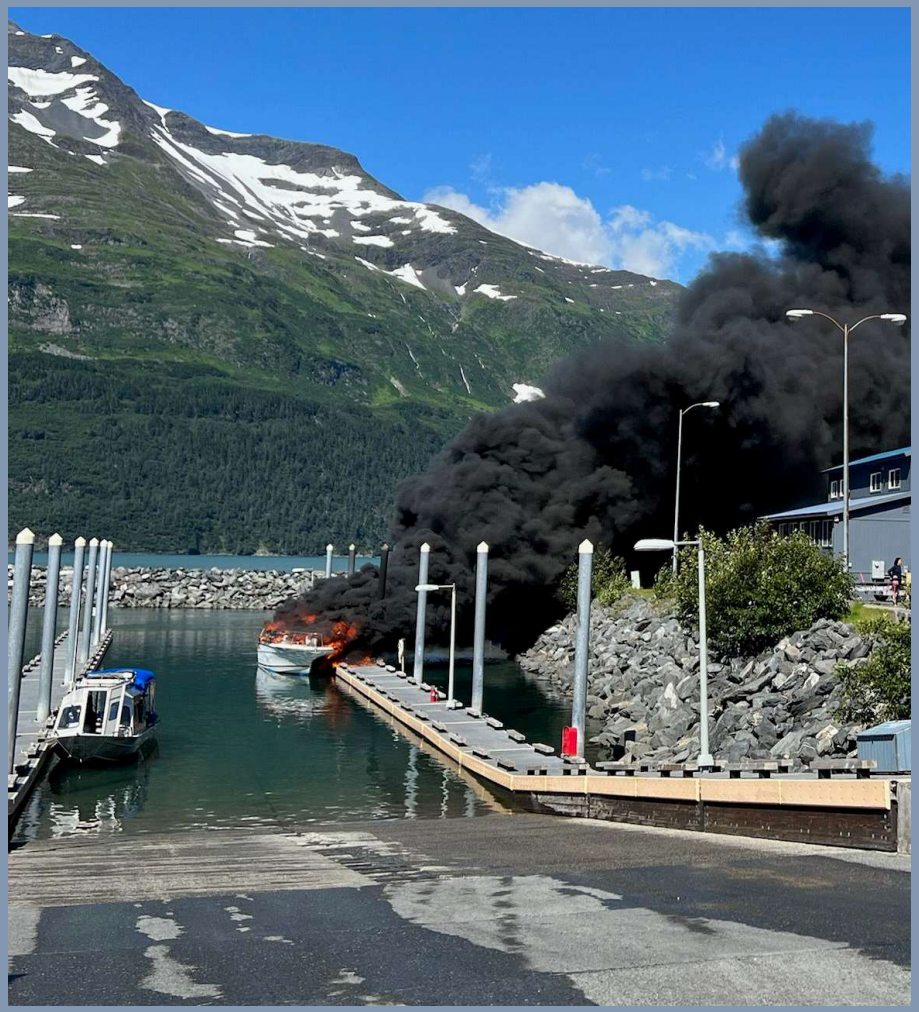
Heat/ Ignition

Oxygen/ Oxidizer

Fuel

**Remove one or more item(s)*

FIRE EMERGENCY PLAN



Fire Hazards

Ignition Sources

26% Off-The-Boat Sources

20% Engine Electrical: For boats older than 25 years, old wiring harnesses

15% Other DC Electrical: Reversing the positive and negative cables.

12% AC Electrical: Shore Power/Inverter

9% Engine Overheat

8% Outboard Electrics: Voltage Regulator

FIRE EMERGENCY PLAN

SECTION 5: FIRE SOURCE REFERENCE

Engine/ Combustion Area(s)

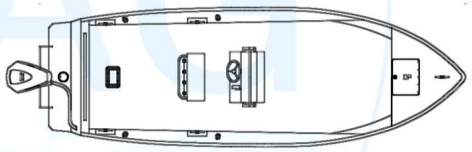
Fuel Vapor Areas

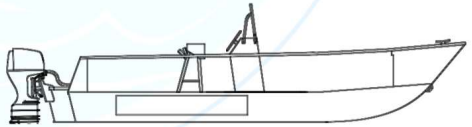
Flammable Fluid Storage

Fuel Tank/ Compartment

Fuel Lines

Electrical Housing





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FIRE EMERGENCY PLAN

Fire Extinguishers

Classes Of Fires	Types Of Fires	Picture Symbol	Extinguisher
A	Wood, paper, cloth, trash and other ordinary materials.		Water Foam Spray ABC Powder Wet Chemical
B	Gasoline, oil, paint and other flammable liquids		Foam Spray ABC Powder Carbon Dioxide
C	May be used on fires involving live electrical equipment without danger to the operator		ABC Powder
D	Combustible metals and combustible metal alloys		ABC Powder Carbon Dioxide
K	Cooking media (Vegetable or Animal Oils and Fats)		Wet Chemical

FIRE EMERGENCY PLAN

Fire Extinguishers

P= Pull

A= Aim

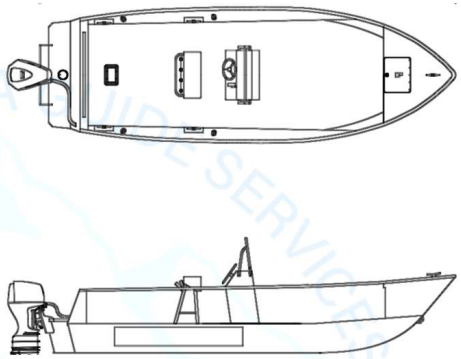
S= Squeeze

S= Sweep

FIRE EMERGENCY PLAN

SECTION 4: EMERGENCY EQUIPMENT

- ☐ Fire Extinguisher TYPE: A B C
- ☐ Fuel Shutoff
- ☐ Water Bucket(s)
- ☐ Fire Blanket
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____



Fire Extinguishers

Store away from highly flammable areas

Store below waist-level, but not on deck flooring

Ensure each type of fuel extinguisher is available for each fuel type present

Always completely discharge the entire contents of the Extinguisher

FIRE EMERGENCY PLAN

IMMEDIATE RESPONSE

- ☐ Yell "FIRE" and location
- ☐ Move passengers away from fire and smoke
- ☐ Instruct crew and passengers to don life jackets and locate tools listed in Section 4
- ☐ Initiate radio call listed in Section 2

SECTION 2: RADIO CALL

- ☐ Select highest broadcast setting (amps)
- ☐ If enabled, press 'Distress Button'
- ☐ Key microphone, breathe deeply, and begin radio call is a slow, and clear voice.

"MAYDAY, MAYDAY, MAYDAY.

This is _____ (3X),

My position is _____, ←

Use Degree Decimal Minute Second (DDMS) format (ex: 'N 30 14.537 W 88 18.372' is read as: *"30 tack 14 decimal 537 North, by 88 tack 18 decimal 372 West")*

I have a fire on board, located in the vessel's:

_____, ←

(On deck, galley, engine, etc)

My vessel is ___' in length and _____ in color.

There are _____ souls on board. We are:

_____. ←

"Attempting to extinguish the fire" or "abandon ship"

MAYDAY, MAYDAY, MAYDAY.

This is _____ (3X)

Position is _____."

SECTION 3: SECONDARY RESPONSE

- ☐ Direct smoke away from helm and crew
- ☐ Do not terminate fuel lines until decision has been made to abandon ship
- ☐ Do not activate engine compartment fuel suppression before deactivating engine and ventilation ports
- ☐ Remove fuel source, oxygen, or heat from fire

Response Procedures (Immediate)

1. Alert Crew and Passengers of the fire by yelling "FIRE" and the location of the smoke/ flames
2. Direct passengers upwind of the flames/ smoke
3. Instruct Crew and Passengers to don life-jackets with the intention to abandon the vessel
4. Secure all fire-fighting materials

FIRE EMERGENCY PLAN

IMMEDIATE RESPONSE

- ☐ Yell "FIRE" and location
- ☐ Move passengers away from fire and smoke
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- ☐ Remove fuel source, oxygen, or heat from fire

Response Procedures (Radio Call)

Digital Selective Calling: VHF must be networked to a GPS unit for 'Distress Button' to replay coordinates and IMSI Info

Ensure your transmission output is set to the highest amperage/wattage (1 watt= 1 mile of signal travel)

Remember, boat fires happen fast. Consider your *first* radio call to be your *only* radio call

FIRE EMERGENCY PLAN

IMMEDIATE RESPONSE

- ☐ Yell "FIRE" and location
- ☐ Move passengers away from fire and smoke
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- ☐ Do not activate engine compartment fuel suppression before deactivating engine and ventilation ports
- ☐ Remove fuel source, oxygen, or heat from fire

Response Procedures (Secondary Response)

Keep smoke and fumes away from: Helm, passengers, escape routes, life raft platforms

Attempt to maintain propulsion until doing so will increase fire risk

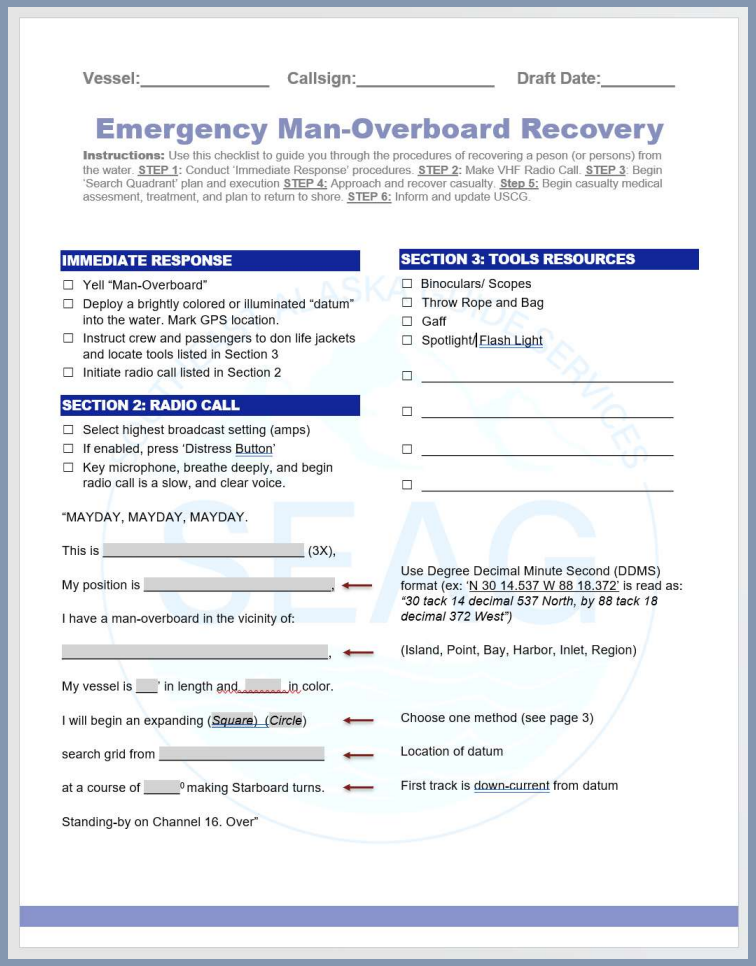
Know how to restart your engines after an automatic engine shutdown

Do not introduce oxygen to inboard or below deck fires

When possible, anchor your vessel prior to ditching

COLD WATER EMERGENCIES

COLD WATER CASUALTY



Vessel:_____ Callsign:_____ Draft Date:_____

Emergency Man-Overboard Recovery

Instructions: Use this checklist to guide you through the procedures of recovering a peson (or persons) from the water. **STEP 1:** Conduct 'Immediate Response' procedures. **STEP 2:** Make VHF Radio Call. **STEP 3**: Begin 'Search Quadrant' plan and execution **STEP 4:** Approach and recover casualty. **Step 5:** Begin casualty medical assesment, treatment, and plan to return to shore. **STEP 6:** Inform and update USCG.

IMMEDIATE RESPONSE

- ☐ Yell "Man-Overboard"
- ☐ Deploy a brightly colored or illuminated "datum" into the water. Mark GPS location.
- ☐ Instruct crew and passengers to don life jackets and locate tools listed in Section 3
- ☐ Initiate radio call listed in Section 2

SECTION 2: RADIO CALL

- ☐ Select highest broadcast setting (amps)
- ☐ If enabled, press 'Distress Button'
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Use Degree Decimal Minute Second (DDMS) format (ex: 'N 30 14.537 W 88 18.372' is read as: *"30 tack 14 decimal 537 North, by 88 tack 18 decimal 372 West")*

I have a man-overboard in the vicinity of:

_____, ←

(Island, Point, Bay, Harbor, Inlet, Region)

My vessel is ___' in length and _____ in color.

I will begin an expanding (*Square*) (*Circle*) ←

Choose one method (see page 3)

search grid from _____ ←

Location of datum

at a course of ____° making Starboard turns. ←

First track is down-current from datum

Standing-by on Channel 16. Over"

SECTION 3: TOOLS RESOURCES

- ☐ Binoculars/ Scopes
- ☐ Throw Rope and Bag
- ☐ Gaff
- ☐ Spotlight/Flash Light
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Types of Cold-Water Emergencies

Man Overboard

-Known position

-Unknown position

Hypothermia

Drowning

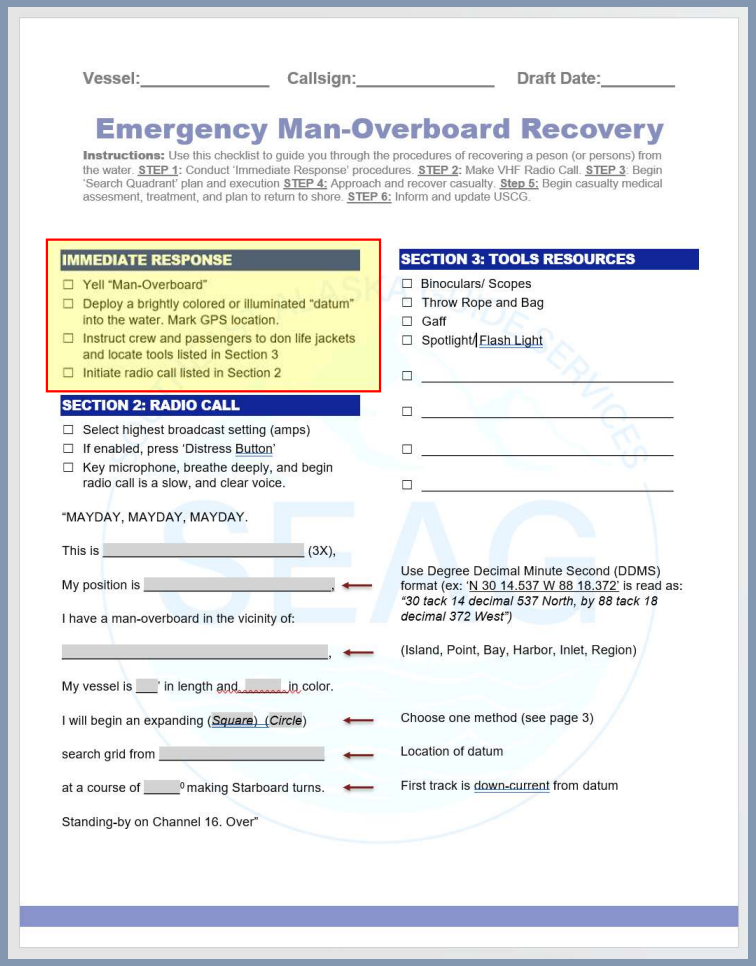
Capsizing/ Foundering

Response Role

-Direct

-Assisting

COLD WATER CASUALTY



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search grid from _____ ← Location of datum

at a course of ____° making Starboard turns. ← First track is down-current from datum

Standing-by on Channel 16. Over"

SECTION 3: TOOLS RESOURCES

- ☐ Binoculars/ Scopes
- ☐ Throw Rope and Bag
- ☐ Gaff
- ☐ Spotlight/Flash Light
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Man Overboard (Immediate Response)

Identify immediate collision hazards and do not turn vessel *away* from casualty.

Always turn your wheel in the direction of the casualty

Datums: Brightly colored, light emitting, additional flotations, rises from the water surface

If MOB is visible, instruct crew to keep fingers pointed at casualty until operator is approaching

Manage your wake

COLD WATER CASUALTY

Man Overboard (Radio Call)

SECTION 2: RADIO CALL

- ☐ Select highest broadcast setting (amps)
- ☐ If enabled, press 'Distress Button'
- ☐ Key microphone, breathe deeply, and begin radio call is a slow, and clear voice.

"MAYDAY, MAYDAY, MAYDAY.

This is _____ (3X),

My position is _____, ← Use Degree Decimal Minute Second (DDMS) format (ex: 'N 30 14.537 W 88 18.372' is read as: *"30 tack 14 decimal 537 North, by 88 tack 18 decimal 372 West")*

I have a man-overboard in the vicinity of:

_____, ← (Island, Point, Bay, Harbor, Inlet, Region)

My vessel is ___' in length and _____ in color.

I will begin an expanding (*Square*) (*Circle*) ← Choose one method (see page 3)

search grid from _____ ← Location of datum

at a course of _____^{0} making Starboard turns. ← First track is down-current from datum

Standing-by on Channel 16. Over"

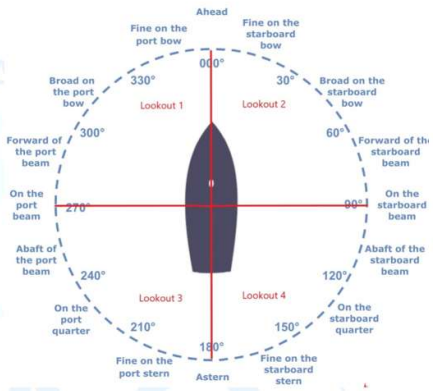
COLD WATER CASUALTY

Emergency Man-Overboard Recovery

Instructions: Use this checklist to guide you through the procedures of recovering a peson (or persons) from the water. **STEP 1:** Conduct 'Immediate Response' procedures. **STEP 2:** Make VHF Radio Call. **STEP 3:** Begin 'Search Quadrant' plan and execution **STEP 4:** Approach and recover casualty. **Step 5:** Begin casualty medical assesment, treatment, and plan to return to shore. **STEP 6:** Inform and update USCG.

SECTION 4: CREW INSTRUCTIONS

- ☐ Assign lookouts to each four quadrants. If available, assign secondary lookouts
- ☐ Instruct crew to "scan the horizon, not the foreground"
- ☐ Assign a crewmember to relay datum direction and distance
- ☐ Instruct crewmembers to NOT leave their quadrant in the event of a possible sighting



SECTION 5: SPOT AND APPROACH

- ☐ Notify USCG and surrounding vessels that you have spotted a man-overboard:

"All-Stations, All-Stations, All-Stations,

This is _____,

I have spotted a man-overboard in the water at

_____° from position _____.

We are attempting recovery. All vessels

maintain your search grids and standby on

Channel 16."

- ☐ Release lookouts from quadrant once casualty identity is confirmed
- ☐ Choose an approach from the windward side of the casualty

Man Overboard (Searching)

Use all available onboard personnel

Small movements are best seen through your peripheral vision, scanning the horizon line

When available, one competent crewmember should assist the boat operator in scoping DATUM, and logging track speeds

Only scan within your quadrant and rotate crew to avoid eye fatigue

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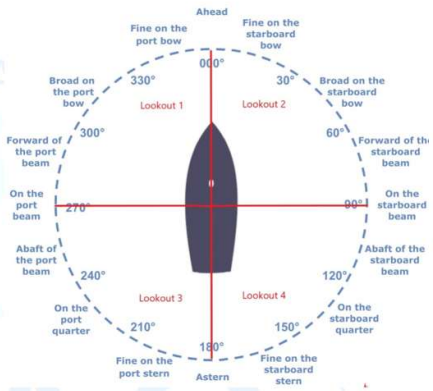

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- ☐ Choose an approach from the windward side of the casualty

Man Overboard (Upon Discovery)

Do not release vessels from search areas until confirmation is made

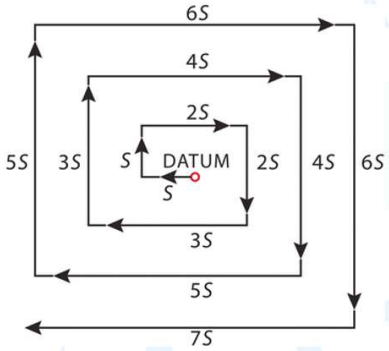
Approach from the windward side of casualty to lessen propulsion adjustments and block wave action

Train crewmembers on 'walking the casualty' alongside the beam of the vessel

Never 'Back Down' on a victim in the water

COLD WATER CASUALTY

Initiating an Expanding Square Search Grid



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Man Overboard (Expanding Grid Searches)

Most effective when the location of the search object is known within relatively close limits.

The search commencement point is always the datum position.

Most effective in single ship searches.

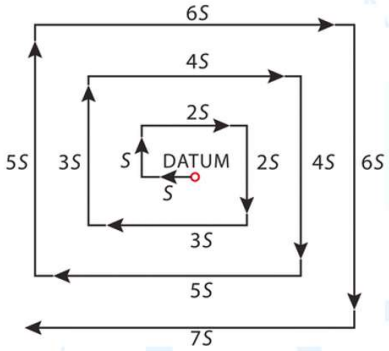
Accurate navigation is critical for proper tracks.

The first leg is usually directed ALONG the wind and/ or current.

All course alterations are of 90-degrees starboard.

COLD WATER CASUALTY

Initiating an Expanding Square Search Grid



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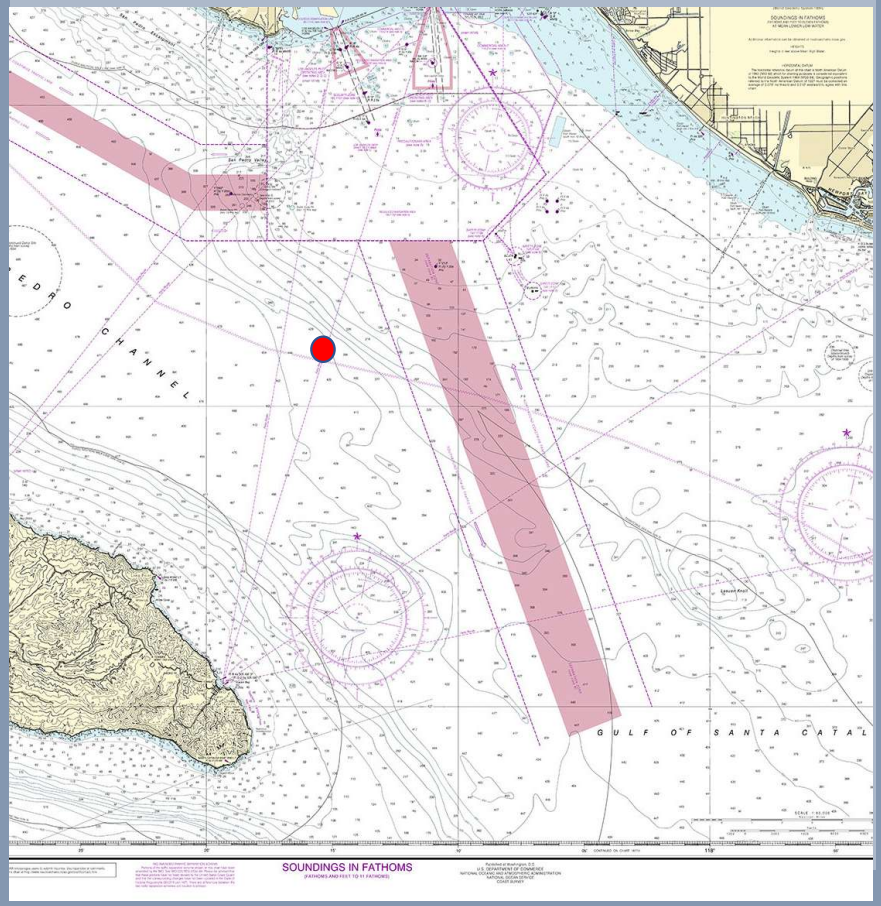

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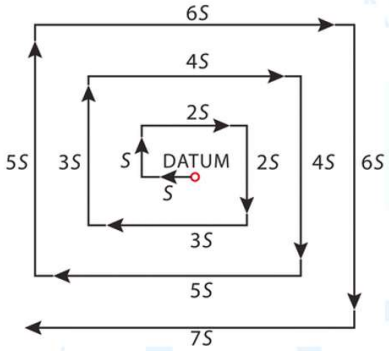

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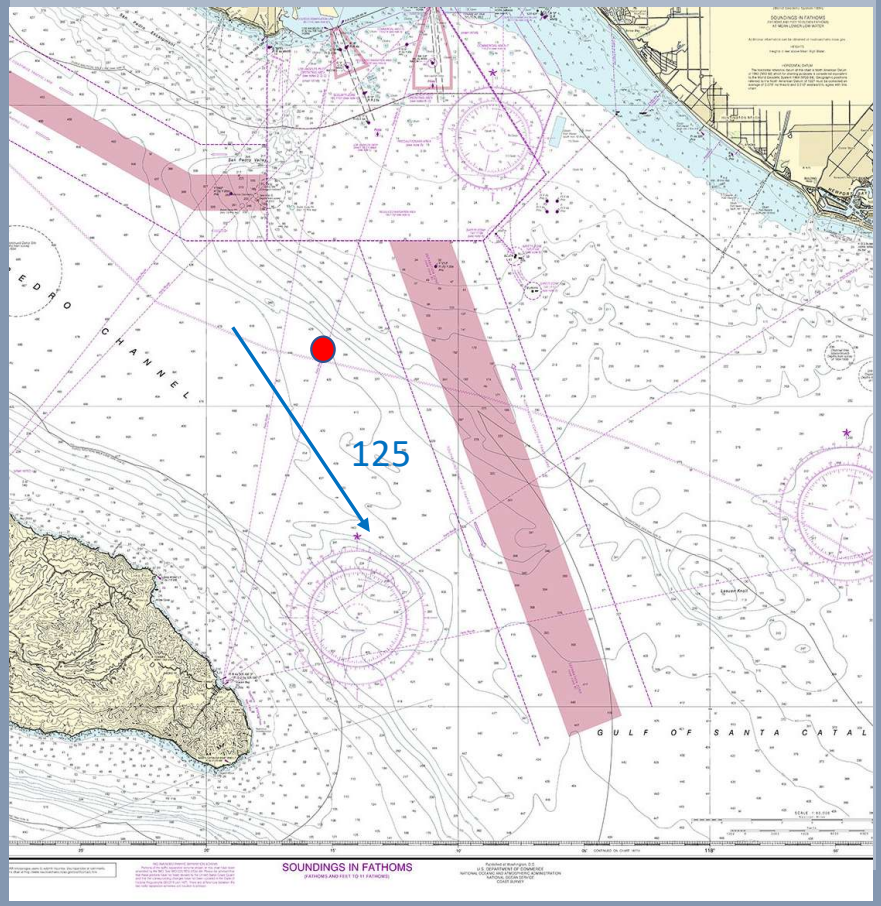

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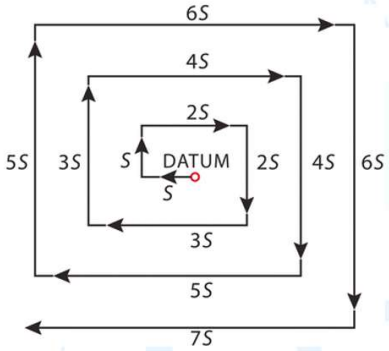

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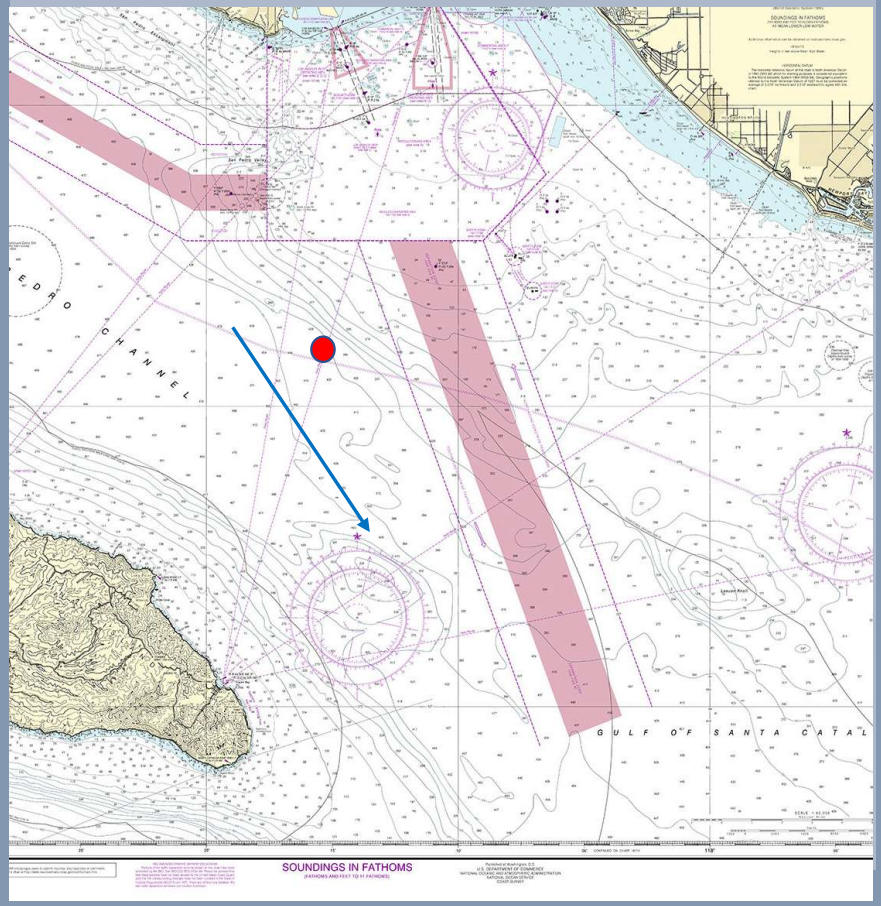

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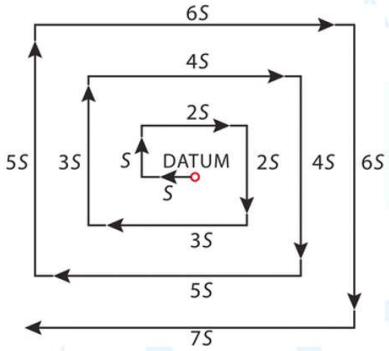

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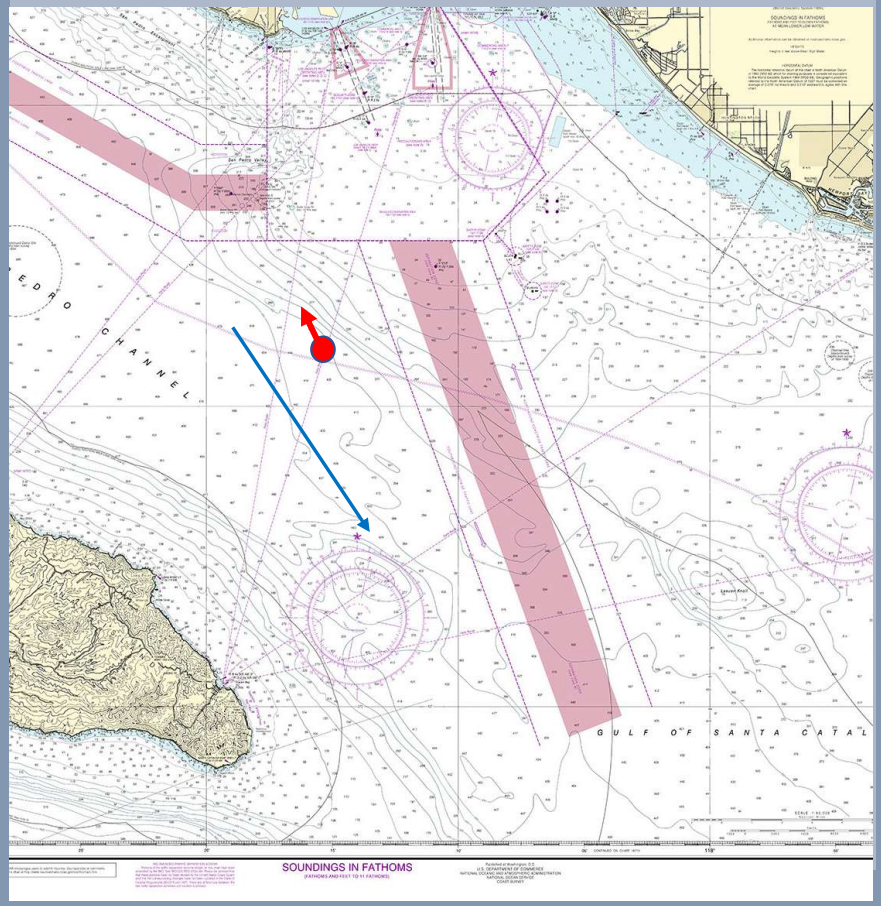

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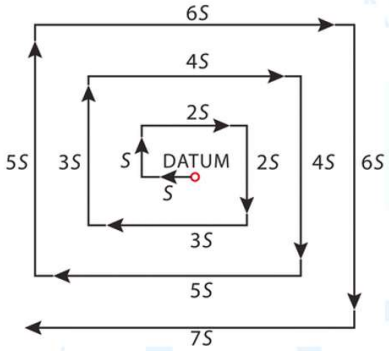

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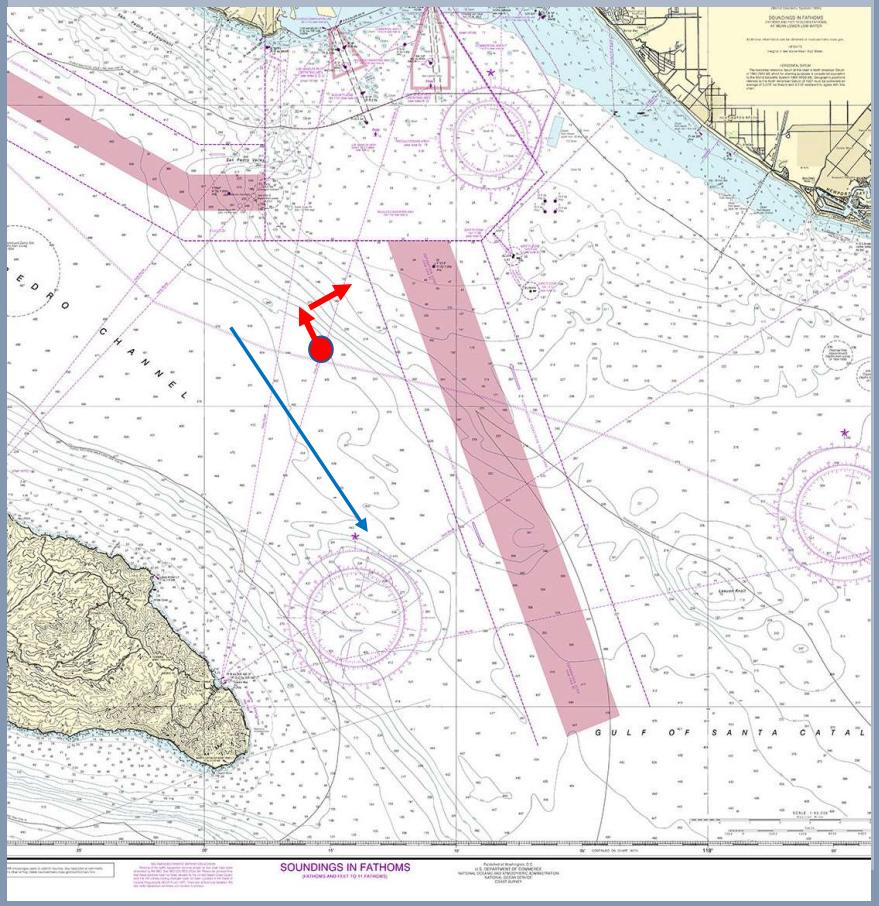

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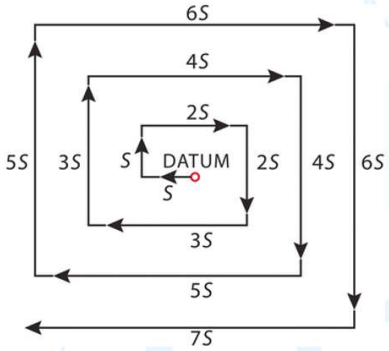

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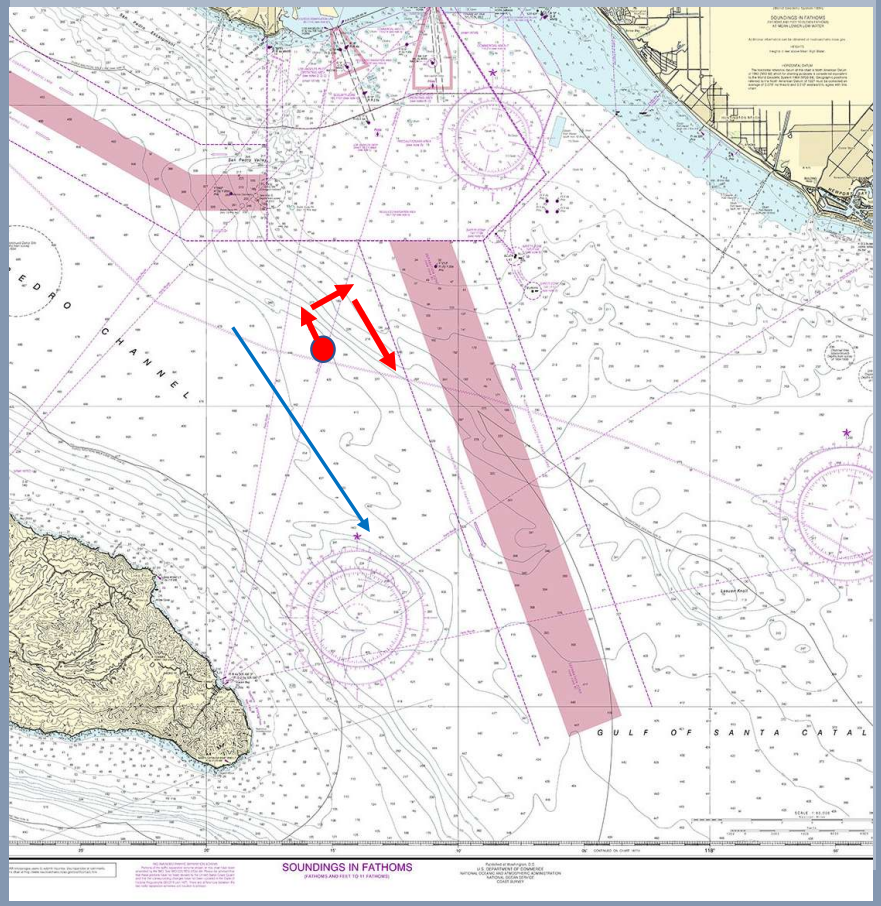

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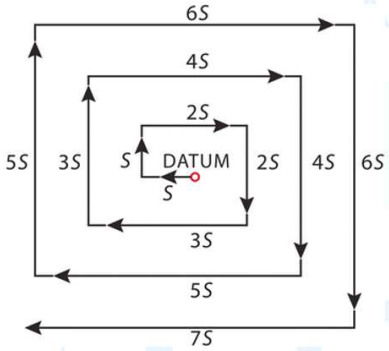

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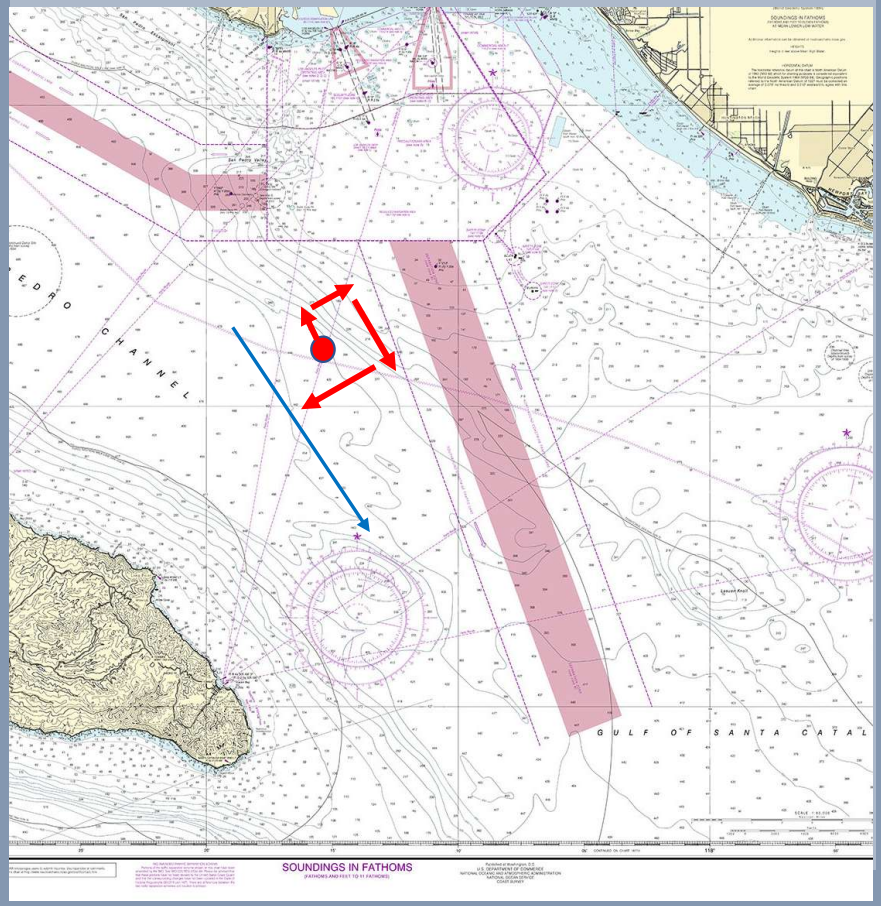

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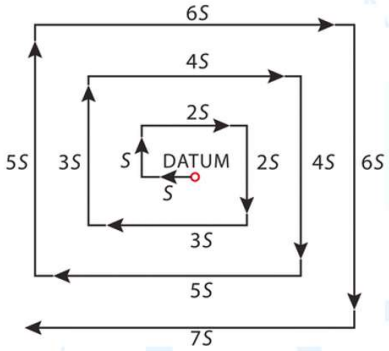

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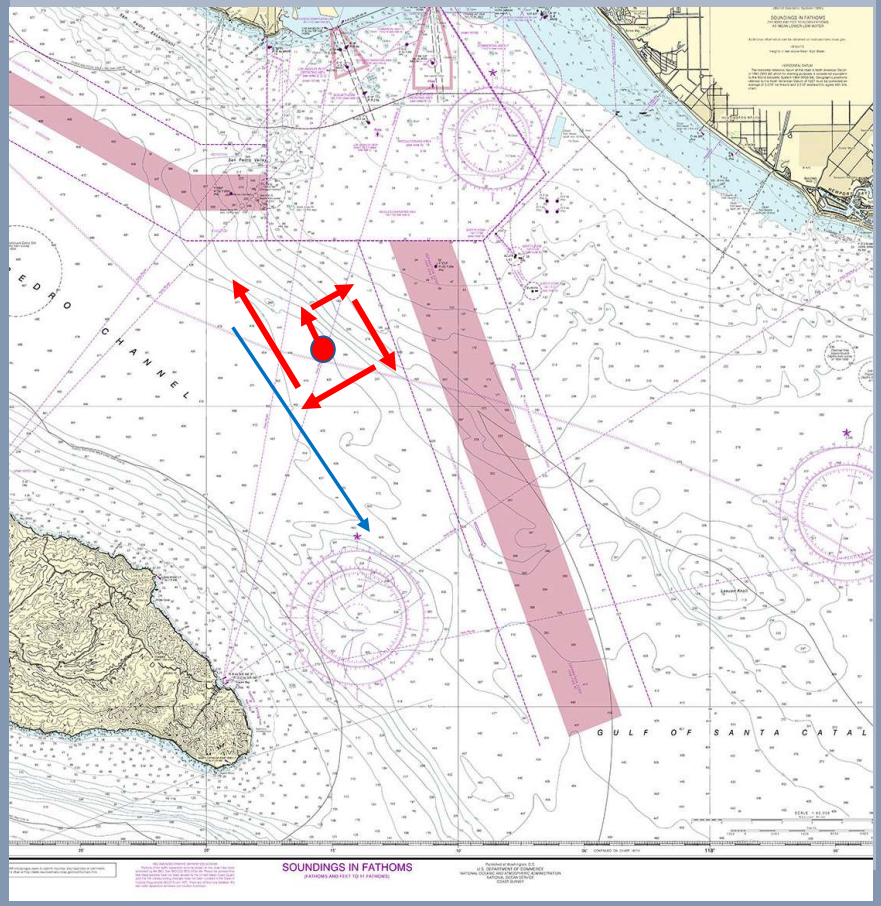

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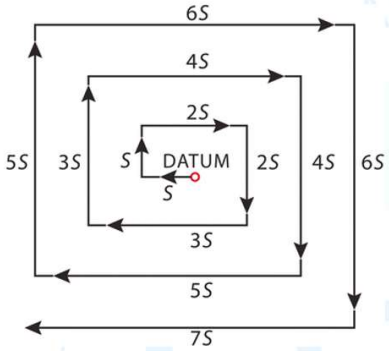

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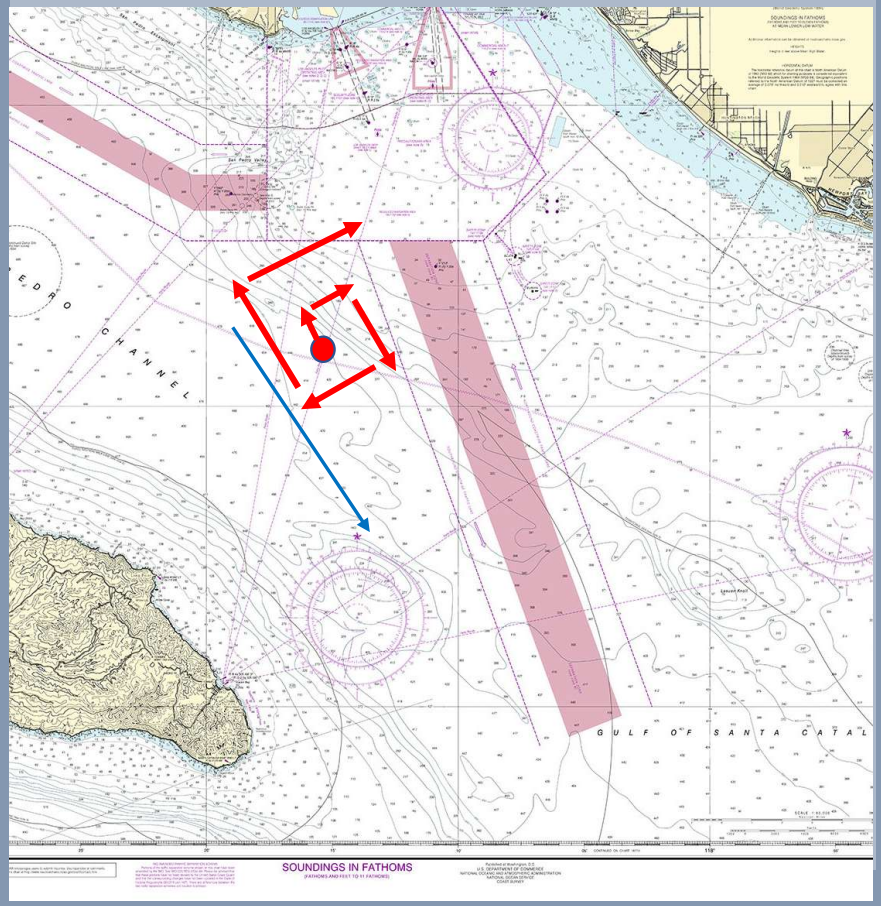

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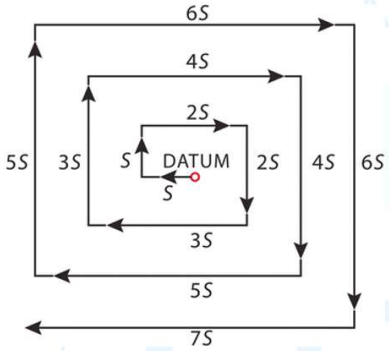

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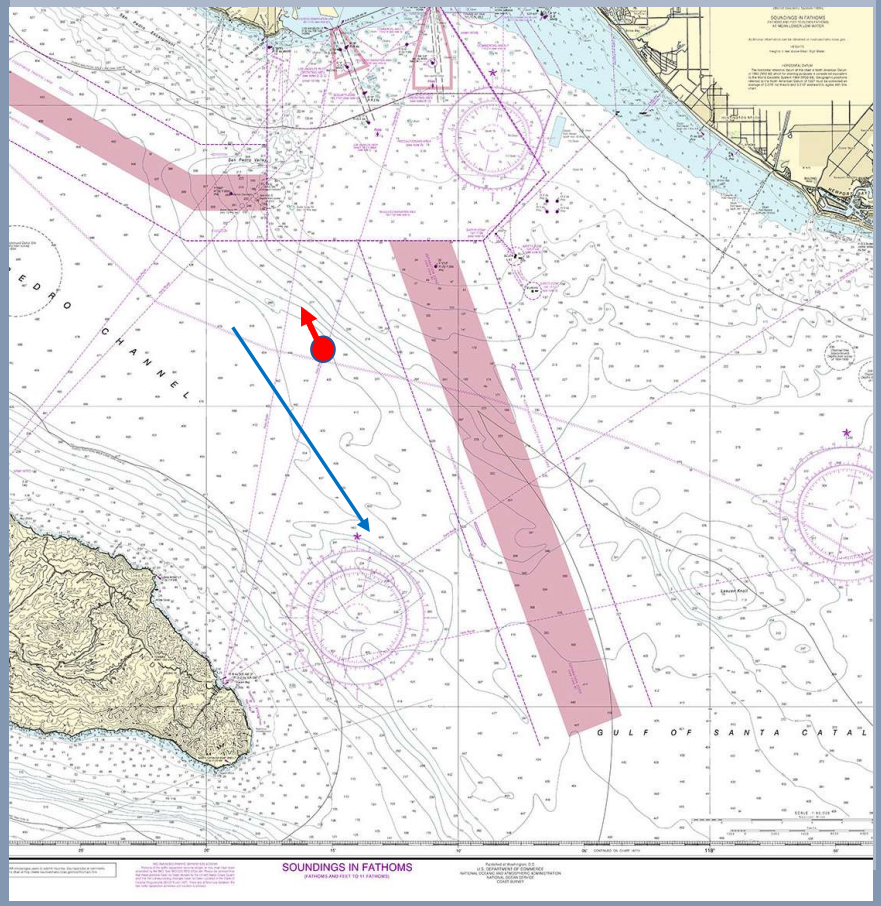

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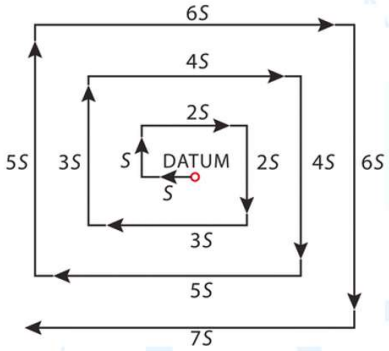

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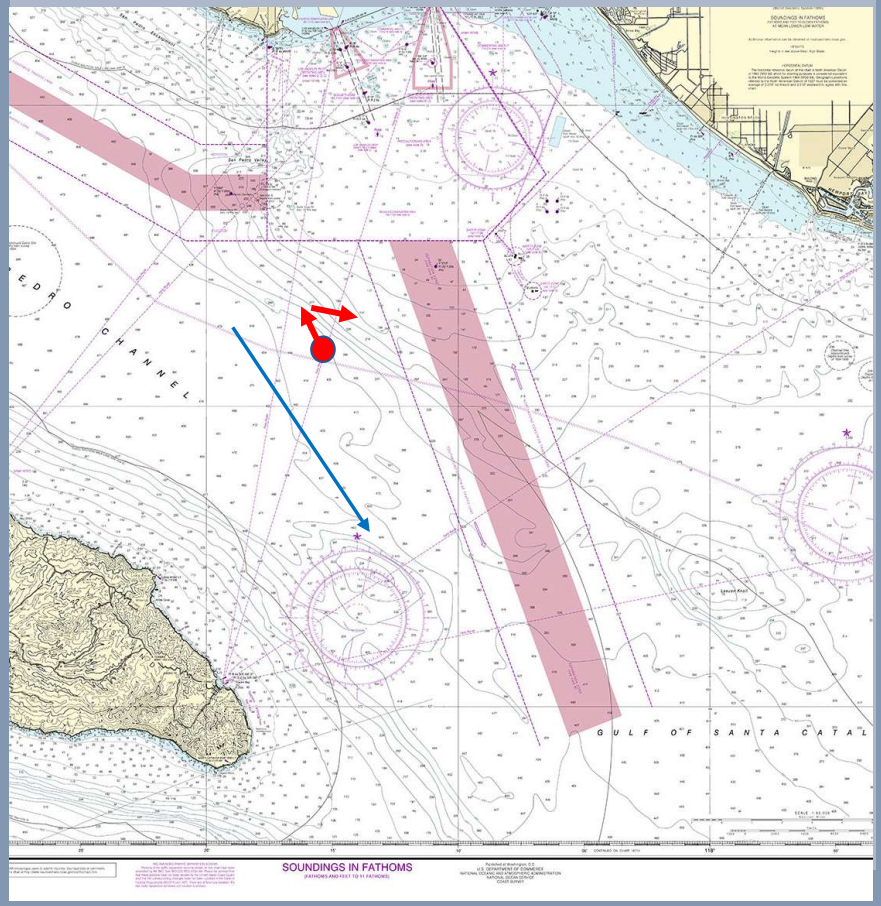

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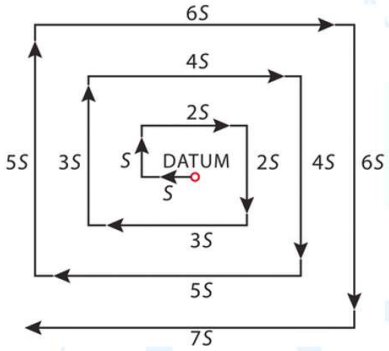

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Step 6: Travel heading for 120-seconds (2-minutes)
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Initial Heading 305 **Track Speed** 10 kts

Track Time (minutes) 1 1 2 3 4 5 6 7 8 9 10

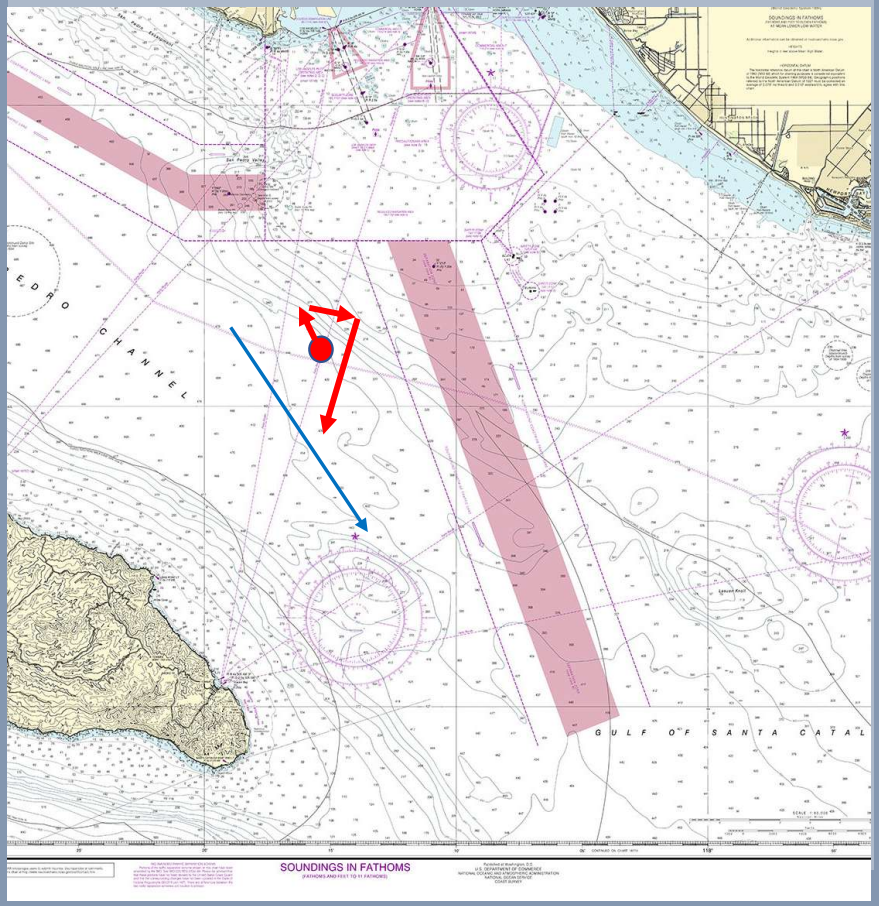
11 12 13 14 15 16 17 18 19 20 21 22

23 24 25 26 27 28 29 30 31 32 33 34

35 36 37 38 39 40 41 42 43 44 45 46

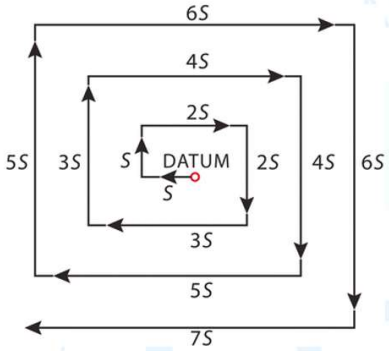
47 48 49 50 51 52 53 54 55 56 57 58

Man Overboard (Expanding Grid Searches)



COLD WATER CASUALTY

Initiating an Expanding Square Search Grid



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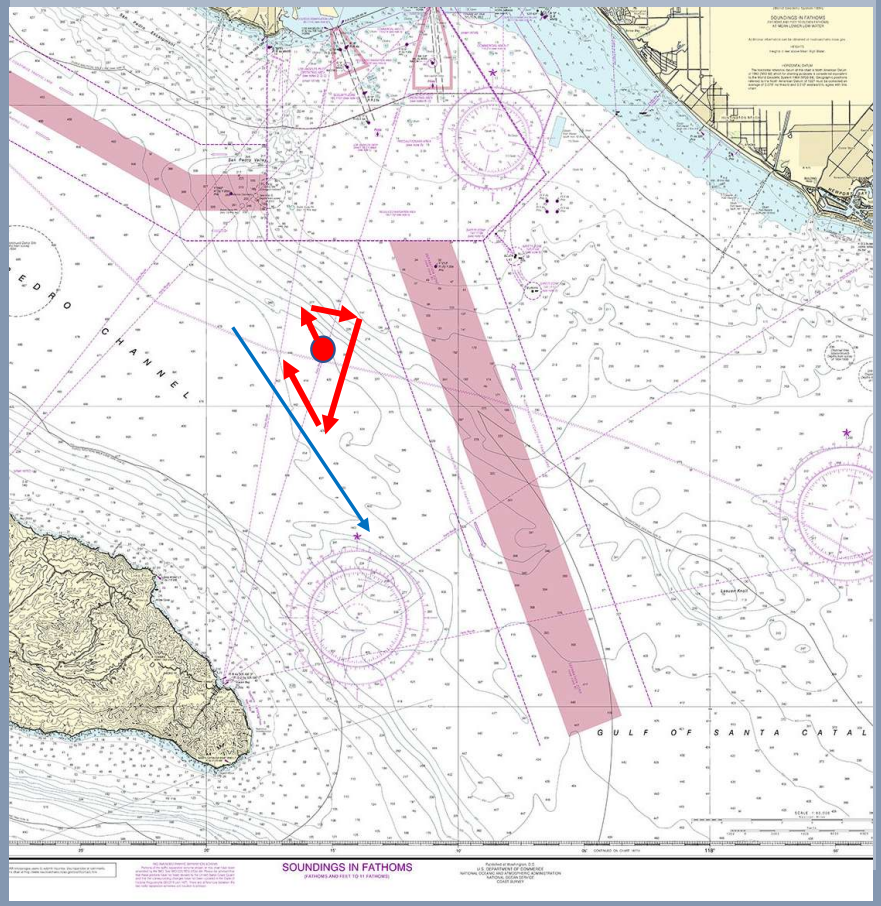

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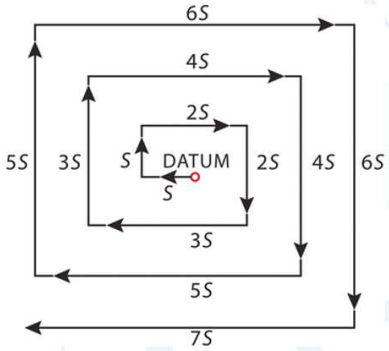

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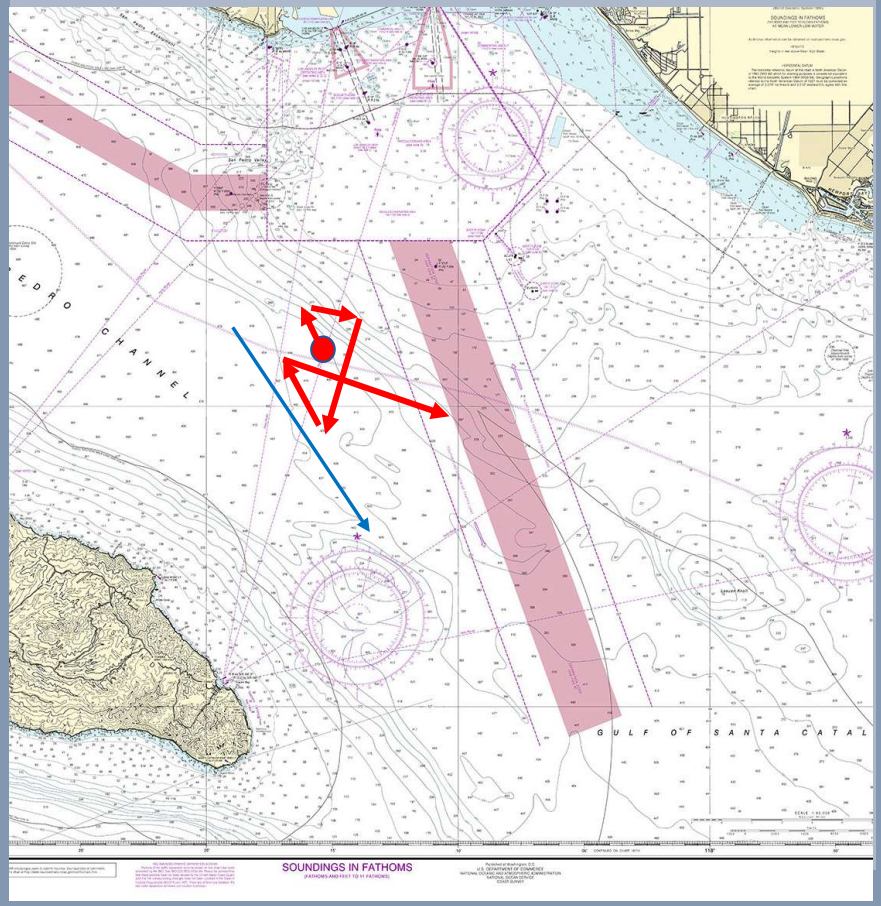

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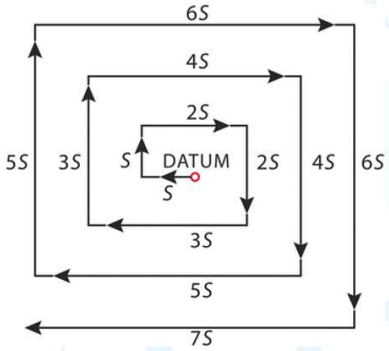

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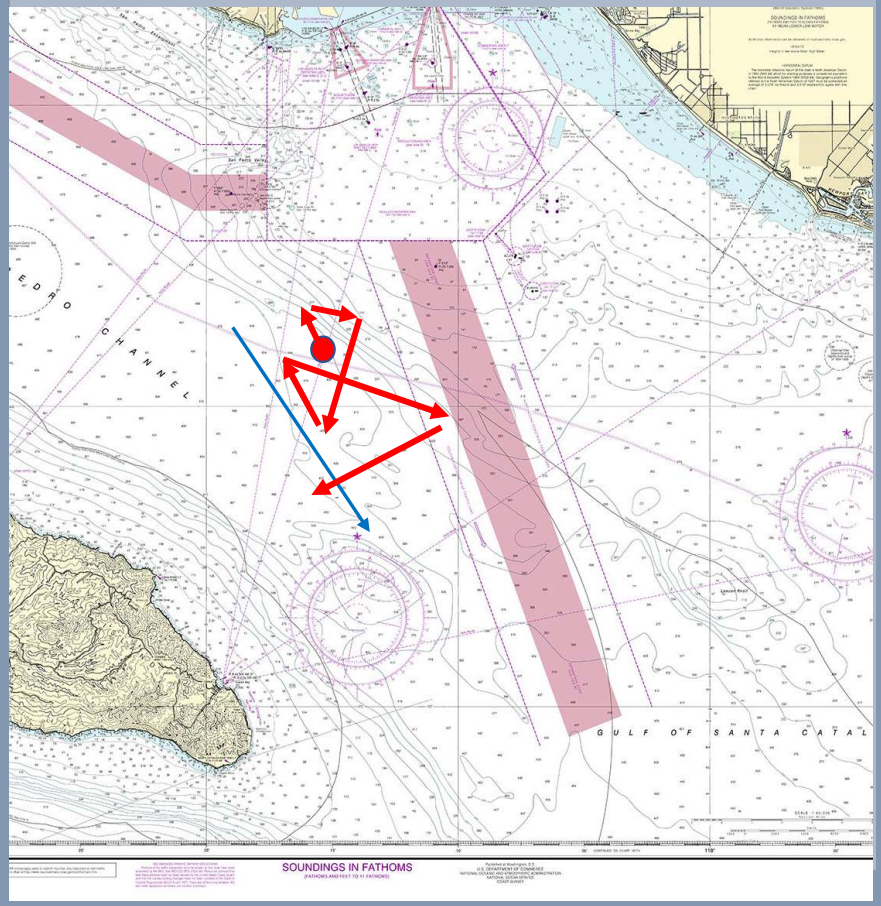

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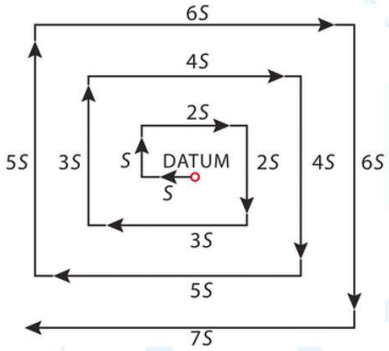

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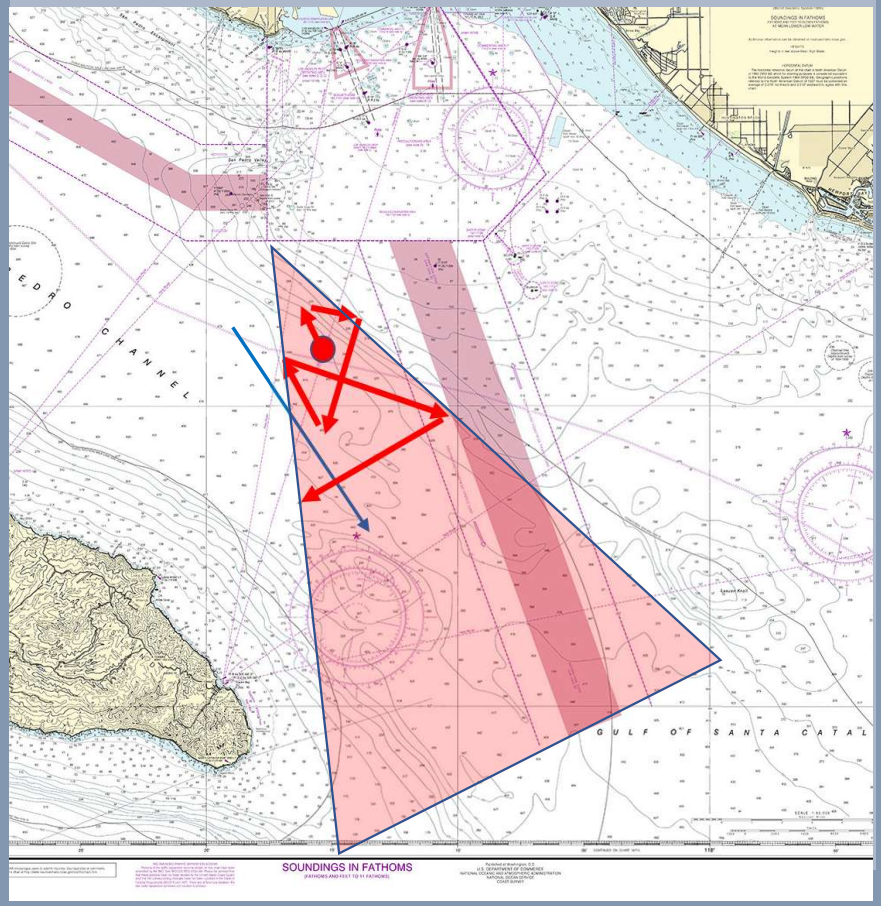
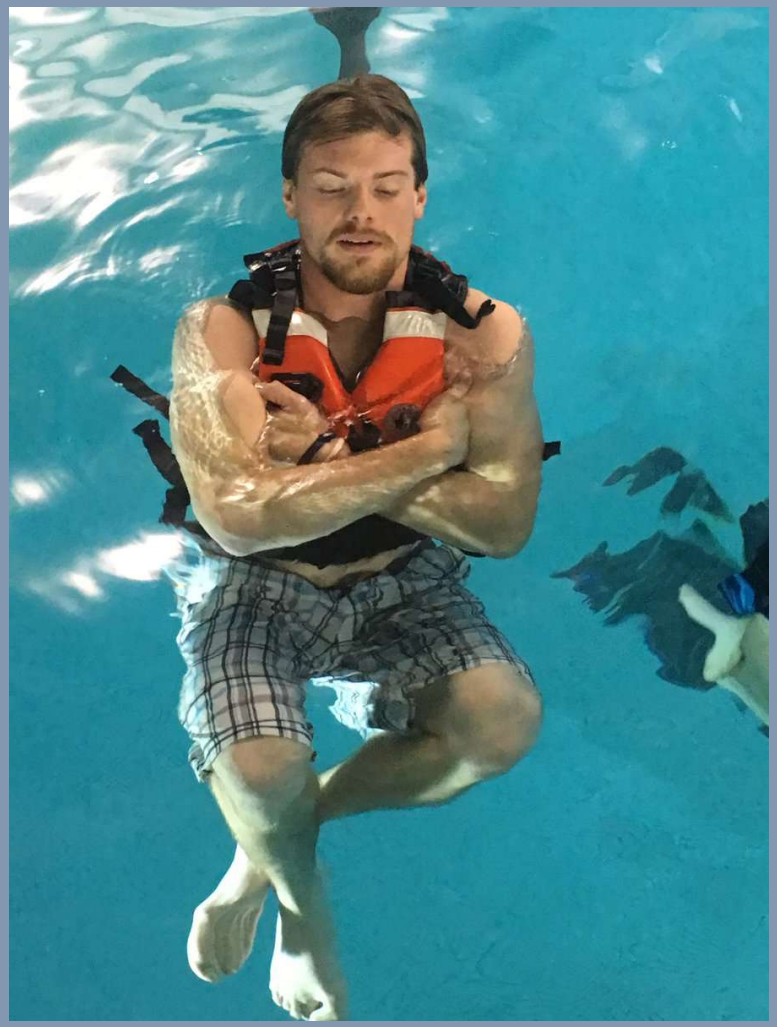


COLD WATER CASUALTY

Man Overboard (Drowning Victims)

- Must complete ‘Rescue Breaths” before compressions or AED
- Turn victim to ‘Recovery Position’ when fluid rises into mouth
- Listen for gurgling and wheezing
- Begin CPR and continue until unable or when higher care arrives

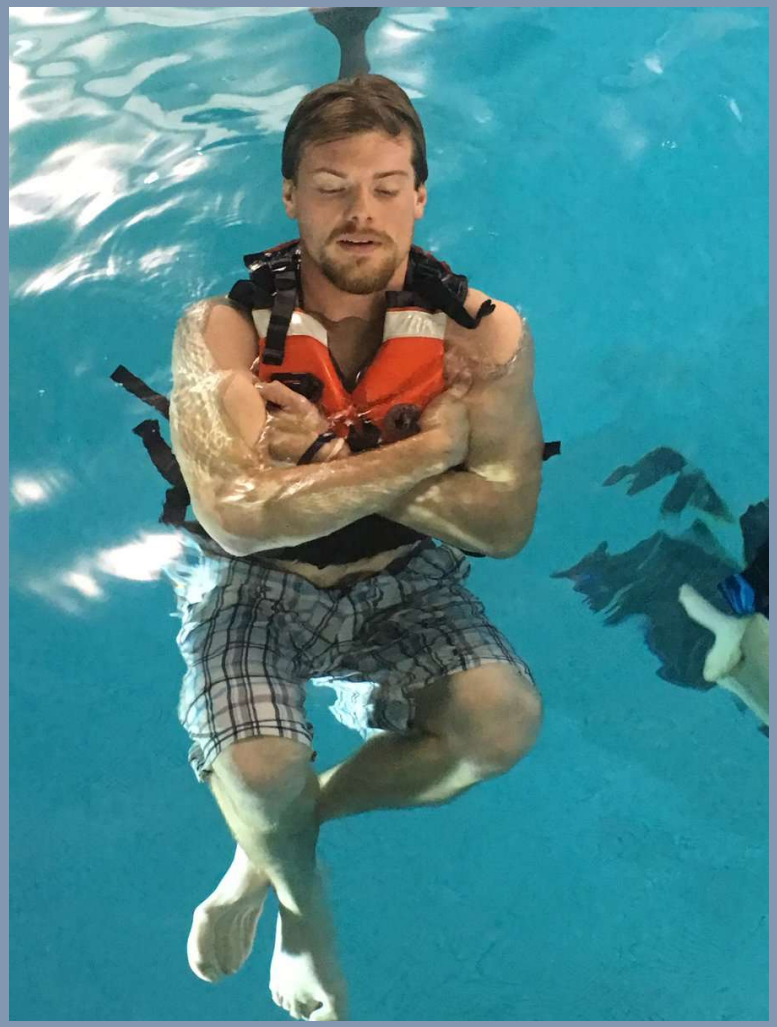
COLD WATER CASUALTY



Man Overboard
(Signs of Hypothermia)

- Confusion, memory loss, or slurred speech
- Drop in body temperature below 95 Fahrenheit
- Loss of consciousness
- Numb hands or feet
- Shallow breathing
- Uncontrollable Shivering

COLD WATER CASUALTY



Man Overboard
(Treatment of Hypothermia)

- Remove casualty from water
- Do NOT overwarm
  - Incremental warming methods: Remove wet clothes; don dry clothes, cover in blankets, skin-to-skin contact, sip warm fluids, keep feet ventilated
- Monitor heart rate and keep casualty alert
- Administer CPR if patient is not breathing
- Do NOT apply warmers or hot water to skin

COLD WATER CASUALTY

(Capsize/ Founder)

1 – 10 – 1

1- Minute of Breathing Control

10- Minutes of Planning for Survival

1- Hour of Consciousness

Square Breathing:

- Inhale deeply for 4 seconds
- Hold your lungs full for 4 seconds
- Exhale for 4 seconds
- Hold your lungs empty for 4 seconds

Wave Approach and Handling

(Capsize/ Founder)

Improper Weight Distribution and Tie-Downs

Increased water levels in Buoyancy Voids

Waves/ Inclement Weather

- -Tidal breaks
- -Following Seas
- -Cross-Seas (Confused Seas)
- -Tsunami/ Tidal/ Rogue Wave

Stern Slipping

Wave Approach and Handling

PROPER BALANCE

STIFF vs TENDER

PROS:
Most stable balance for self-righting after a vessel rolls

CONS:
Uncomfortable and possibly dangerous roll rate

PROS:
Most comfortable "ride" for crew and cargo.

CONS:
If center of buoyancy cannot overcome the lateral push of gravity, vessel will not recover from healed position

(Capsize/ Founder)

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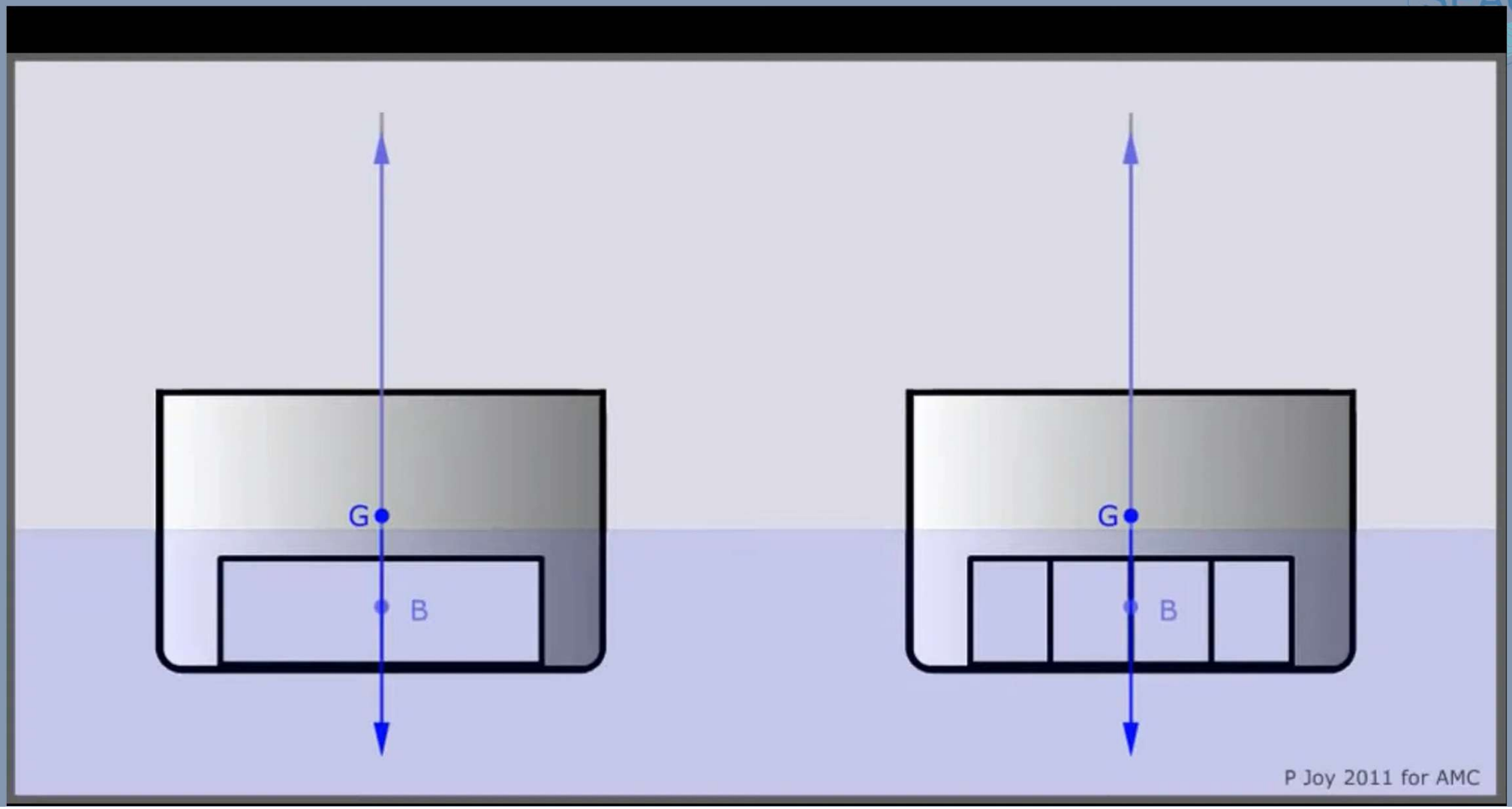

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Stern Slipping

Trimming

Trimming In (Down)

*Lowers the bow

*Results in quicker planing, especially with a heavy load

*Improves ride in choppy water

*Increases steering torque or pull to the right

Neutral Trimming

*Normally results in greater efficiency. (Note that the propeller shaft, which connects the propeller to the drive shaft, is parallel to the surface of the water.)

Trimming Out (Up)

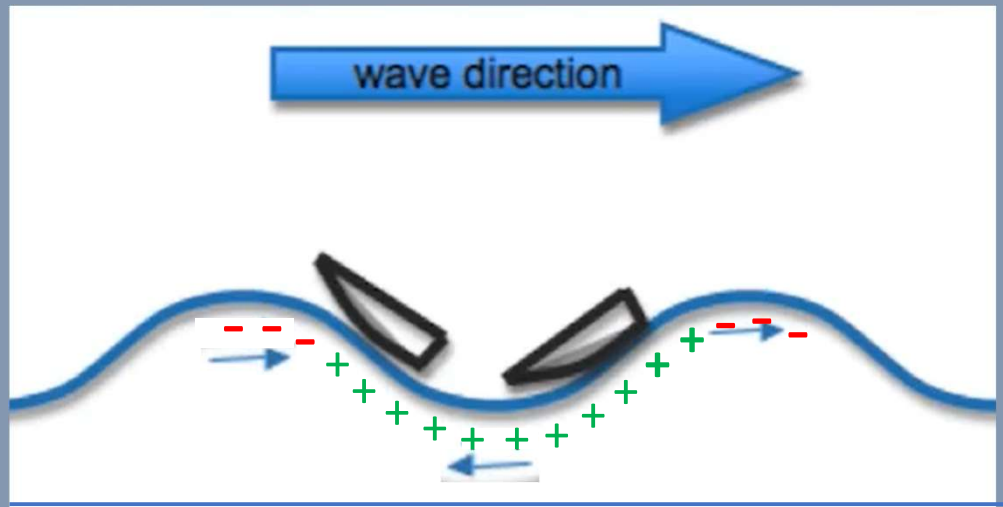
*Lifts the bow

*Increases top speed

*Increases clearance in shallow waters

*Increases steering torque or pull to the left

Wave Approach and Handling



(Capsize/ Founder)

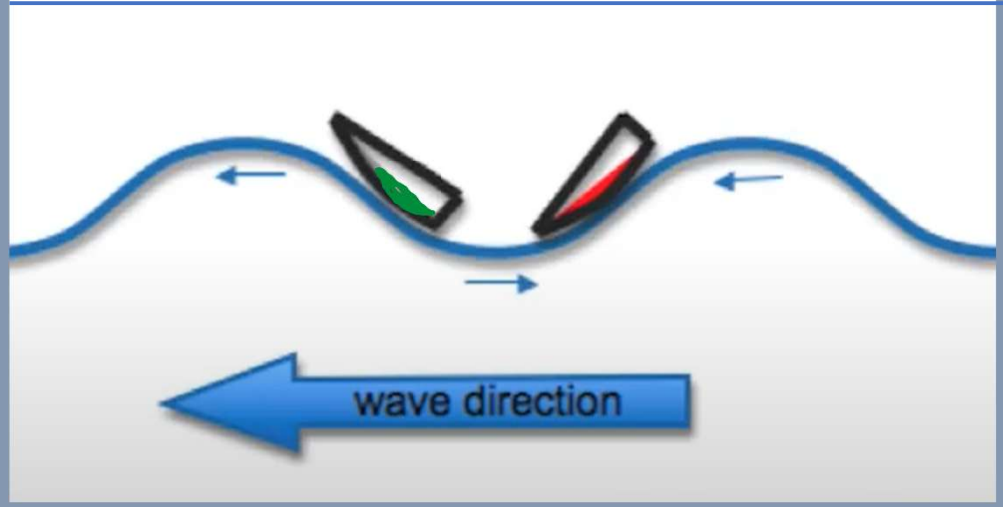
Head Seas:

-Bow Level/ Down

-Accelerate UP wave

-Decelerate BEFORE crest

-Accelerate DOWN wave

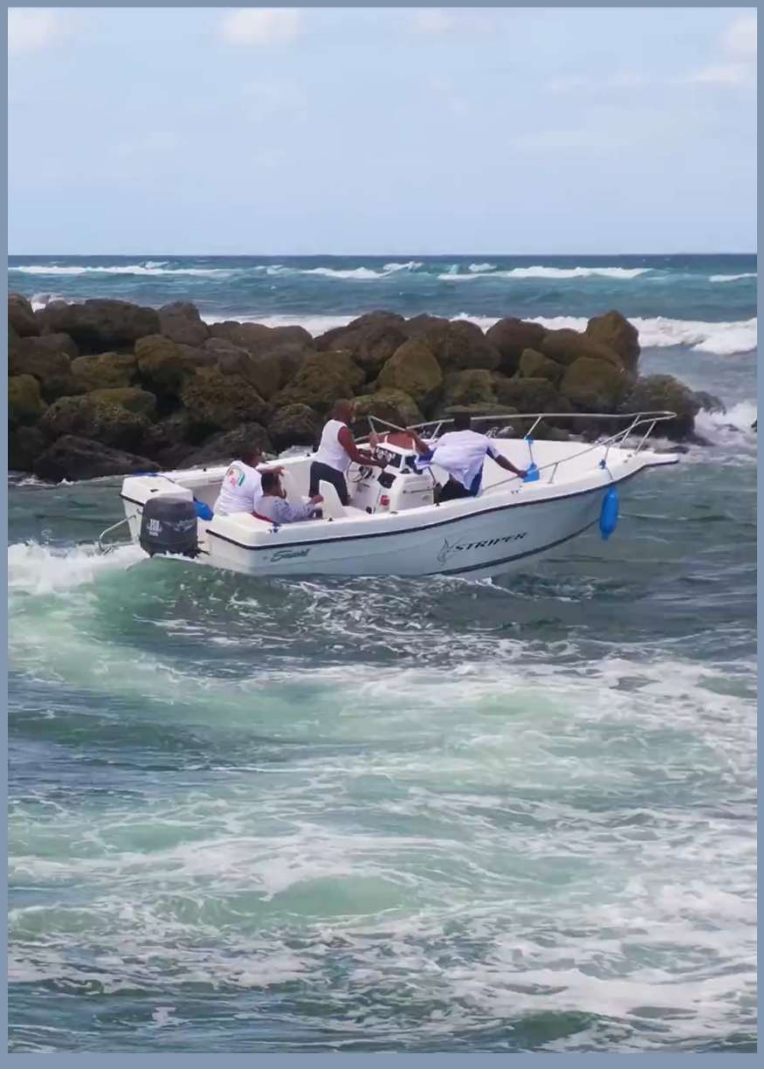


Following Seas:

-Bow Up

-Ride the back of the wave. Do not allow aft wave set to overtake your stern

Wave Approach and Handling



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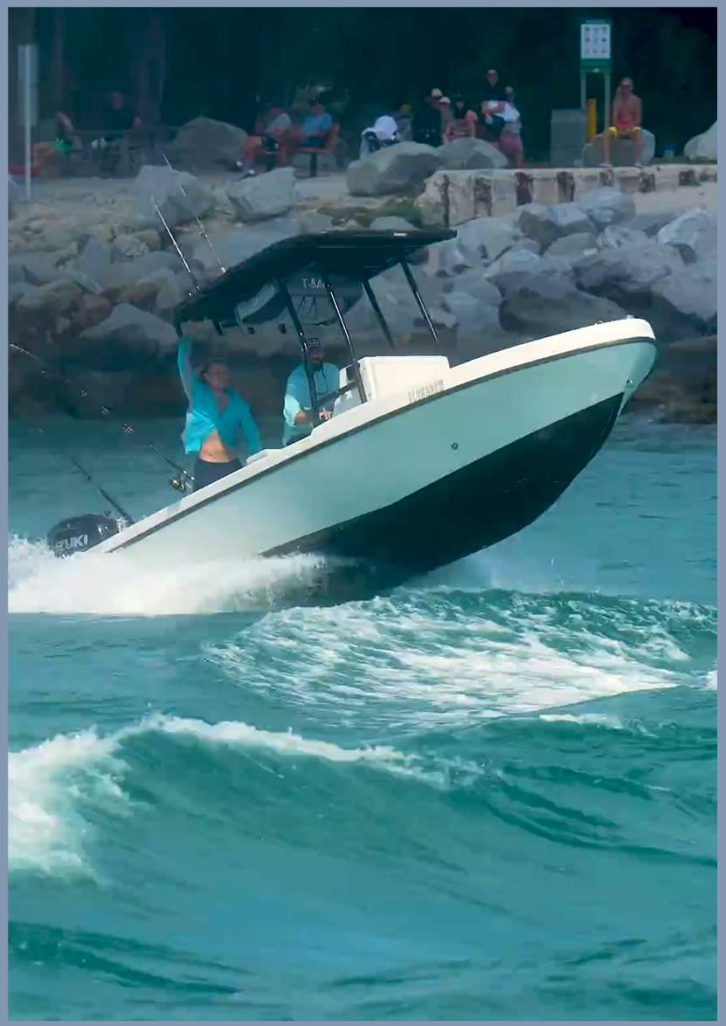
Stern Slipping

Bow Stuffing/ Pendulum

Wave Approach and Handling



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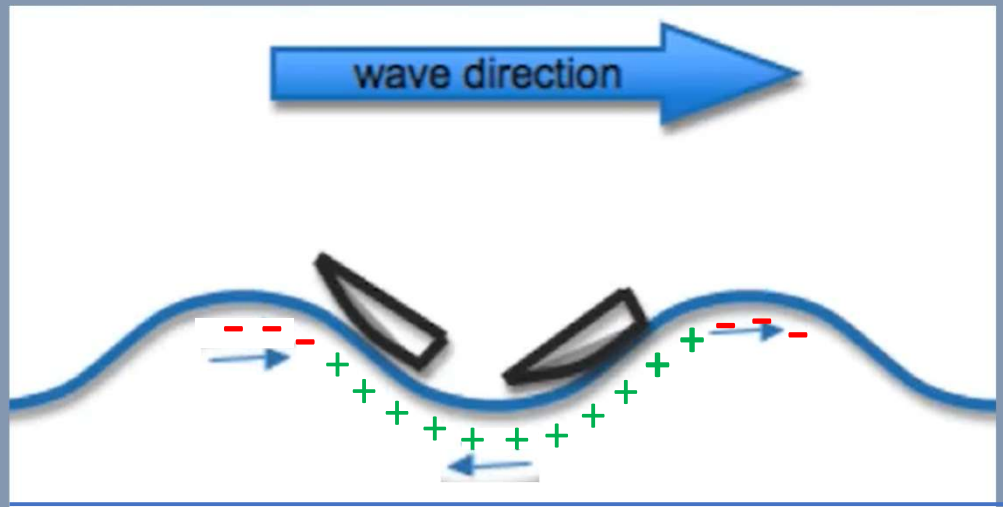

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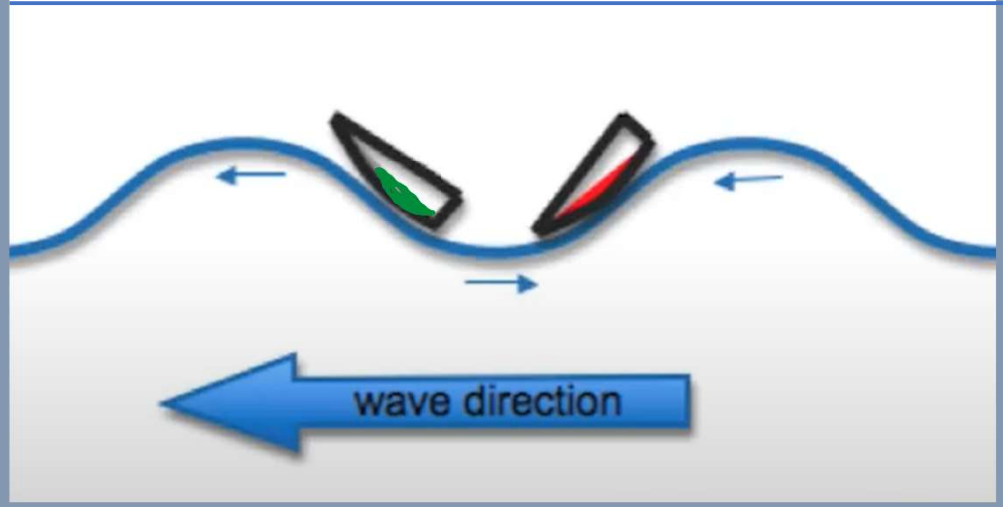

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Abandoning Ship

Abandoning Ship

Emergency Abandon Ship

Instructions: Use this checklist to guide you through the procedures to prepare for evacuation of crew and passengers. **STEP 1:** Conduct 'Immediate Response' procedures. **STEP 2:** Make VHF Radio Call. **STEP 3:** Inform passengers and direct crewmembers to gather tools **STEP 4:** Deploy life rafts **Step 5:** Make final radio call **STEP 6:** Abandon vessel and take command of life raft

IMMEDIATE RESPONSE

- ☐ Notify crew of intention to 'Abandon Ship'
- ☐ Sound 7-Short/ 1-Long blasts from horn
- ☐ Instruct crew to gather Tools in Section 3
- ☐ Initiate radio call listed in Section 2

SECTION 2: RADIO CALL (VHF 16)

- ☐ Select highest broadcast setting (amps)
- ☐ If enabled, press 'Distress Button' or DSC
- ☐ Key microphone, breathe deeply, and begin radio call is a slow, and clear voice.

"MAYDAY, MAYDAY, MAYDAY.

This is _____ (3X),

MAYDAY, this is _____.

My position is _____,

in the vicinity of _____.

We are abandoning ship and evacuating #____

souls (into #___ life rafts) (into the water).

Requesting immediate rescue. Lookout for:

- o INFRARED BEACON
- o _____ COLORED SMOKE
- o _____ COLORED FLARES
- o _____ COLORED SEA-DYE

SECTION 3: TOOLS RESOURCES

- ☐ EPIRB_____
- ☐ Rescue Signals_____
- ☐ Manifest_____
- ☐ VHF Radio_____
- ☐ _____
- ☐ _____
- ☐ _____

Use Degree Decimal Minute Second (DDMS) format (ex: 'N 30 14.537 W 88 18.372' is read as: *"30 tack 14 decimal 537 North, by 88 tack 18 decimal 372 West")*

(Island, Point, Bay, Harbor, Inlet, Region)

Repeat full broadcast until you receive acknowledgment from the U.S.C.G. or until it is no longer safe to remain on board.

General Procedures for Ditching

Conduct 'Immediate Response' Checklist

-Notify Crew of Intent to Leave Vessel

-Sound 7-Short/ 1-Long blast of a signal device

-Assign crewmembers to locate and secure rescue items

-Notify Passengers of Intent to Leave Vessel

Initiate "MAYDAY" call over VHF Radio

-If possible, continue to repeat scripted call until no longer safe to do so

Abandoning Ship

Emergency Abandon Ship

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Survival items should be consolidated in a dry bag

-Regular inspections of your dry bag are paramount to survival

-Dry bag should have easily attachable/ detachable device (ie: D-Ring)

Abandoning Ship

Emergency Abandon Ship

Instructions: Use this checklist to guide you through the procedures to prepare for evacuation of crew and passengers. **STEP 1:** Conduct 'Immediate Response' procedures. **STEP 2:** Make VHF Radio Call. **STEP 3**: Inform passengers and direct crewmembers to gather tools **STEP 4:** Deploy life rafts **Step 5:** Make final radio call **STEP 6:** Abandon vessel and take command of life raft

SECTION 4: CREW INSTRUCTIONS

- ☐ Assign a crewmember to assist passengers in donning lifejackets and removing hazards to life raft
- ☐ Instruct crew to prepare exit platform by lashing hand-holds and cutting obstructions, to leeward
- ☐ Instruct all-crew to lash life rafts to leeward and await orders to enter.
- ☐ Order 'all-stop' to motors and activate fuel shut-offs

SECTION 5: DEPLOY LIFE RAFT

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Do not deploy life raft into oil slicks or flames

Do not pull painter-line taut until raft is on the desired side of the vessel

Check for entanglement hazards prior to deploying raft over decking

SECTION 6: PREPARE TO EXIT VESSEL

- ☐ Search the surrounding area for hazards (rocks, oil slick, electrical cables, entanglement hazards, electrical cables/ wires)
- ☐ Lash tools and emergency equipment to life raft
- ☐ Note time and GPS Location
- ☐ Make final evacuation radio call:

"MAYDAY, MAYDAY, MAYDAY…

This is the _____.

This is our final transmission. We are abandoning ship at _____.

This is the _____.

Out."

- ☐ Turn radio volume to "Max" prior to leaving helm station

SECTION 6: EVACUATE

- ☐ Load at least one strong crewmember first to assist with passengers
- ☐ Balance weight of passengers throughout the life raft, in far corners from one-another
- ☐ Use extra moorage line to tie around the waist of weak or injured passengers during transfer
- ☐ Use knife to cut-away from the vessel, located in life raft kit
- ☐ Immediately assign lookout for rescue vessels and do not use signal devices until rescue seems imminent.

General Procedures for Ditching

Preparing the Crew and Passengers

-Check Life Jackets are appropriately fitted by pulling up on the jacket. It should not rise above the head.

-Instruct all aboard to remove puncture hazards (pens, hair clips, open knives, etc)

-Create handholds by lashing line in large loops around the rails and fixed points along the leeward side

Abandoning Ship

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-Check Life Jackets are appropriately fitted by pulling up on the jacket. It should not rise above the head.

-Instruct all aboard to remove puncture hazards (pens, hair clips, open knives, etc)

-Create handholds by lashing line in large loops around the rails and fixed points along the leeward side

Life Raft Considerations

-Identify hazards and manipulate the raft into a safe position before inflating

-If Fire or flammable fluid is present, deploy from the windward side of the vessel

-Lash survival equipment to the raft, not individuals

Abandoning Ship

Emergency Abandon Ship

Instructions: Use this checklist to guide you through the procedures to prepare for evacuation of crew and passengers. **STEP 1:** Conduct 'Immediate Response' procedures. **STEP 2:** Make VHF Radio Call. **STEP 3**: Inform passengers and direct crewmembers to gather tools **STEP 4:** Deploy life rafts **Step 5:** Make final radio call **STEP 6:** Abandon vessel and take command of life raft

SECTION 4: CREW INSTRUCTIONS

- ☐ Assign a crewmember to assist passengers in donning lifejackets and removing hazards to life raft
- ☐ Instruct crew to prepare exit platform by lashing hand-holds and cutting obstructions, to leeward
- ☐ Instruct all-crew to lash life rafts to leeward and await orders to enter.
- ☐ Order 'all-stop' to motors and activate fuel shut-offs

SECTION 5: DEPLOY LIFE RAFT

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Do not deploy life raft into oil slicks or flames

Do not pull painter-line taut until raft is on the desired side of the vessel

Check for entanglement hazards prior to deploying raft over decking

SECTION 6: PREPARE TO EXIT VESSEL

- ☐ Search the surrounding area for hazards (rocks, oil slick, electrical cables, entanglement hazards, electrical cables/ wires)
- ☐ Lash tools and emergency equipment to life raft
- ☐ Note time and GPS Location
- ☐ Make final evacuation radio call:

"MAYDAY, MAYDAY, MAYDAY…

This is the _____.

This is our final transmission. We are abandoning ship at _____.

This is the _____.

Out."

- ☐ Turn radio volume to "Max" prior to leaving helm station

SECTION 6: EVACUATE

- ☐ Load at least one strong crewmember first to assist with passengers
- ☐ Balance weight of passengers throughout the life raft, in far corners from one-another
- ☐ Use extra moorage line to tie around the waist of weak or injured passengers during transfer
- ☐ Use knife to cut-away from the vessel, located in life raft kit
- ☐ Immediately assign lookout for rescue vessels and do not use signal devices until rescue seems imminent.

General Procedures for Ditching

Make final broadcast with an updated GPS Location

Leave radio on full volume prior to leaving the helm

FLARES & OTHER SIGNALS

Orange smoke

Hand-held flare

Meteor (aerial) flare

Pistol-fired meteor flare

Rocket-prop. parachute flare

Signal Mirror

Dye Marker

Pg 100 in Beating the Odds **for details**

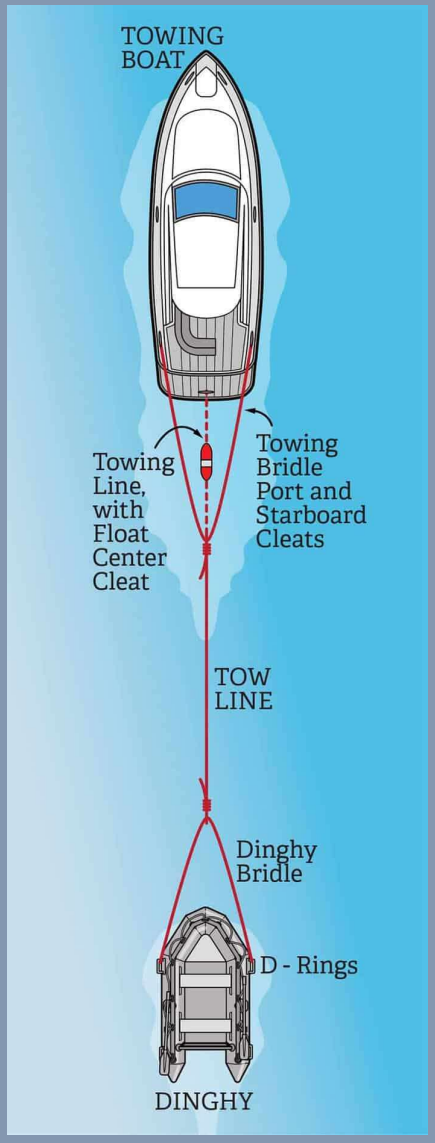
RESCUE

Type	Image	Optimum Visibility	Signal Duration	Advantages	Disadvantages
Orange Smoke		3 to 5 miles at water level, more from the air	50 seconds to 2 minutes	Compact, good for day use, can show helicopter pilots wind direction, can help locate a person overboard in daylight.	Smoke dissipates rapidly in windy conditions, must be used in well-ventilated area, container can damage raft or cause personal injury.
Handheld Flare		3 to 5 miles	50 seconds to 2 minutes	Compact, longest burning of any flare type, secondary use as a fire starter, inexpensive. Helps rescuers locate you.	Ash and slag can damage raft, signal is low to the water.
Meteor (Aerial) Flare		10 to 20 miles	5.5 to 8 seconds	Compact, helps alert rescuers. Maximum height about 100 feet.	Ash and slag can damage raft, can be difficult to operate with cold hands.
Pistol-Fired Meteor Flare		19 to 40 miles	5.5 to 30 seconds	Easy to use, helps alert rescuers. Maximum height about 100 feet.	Flares unusable if the pistol breaks, flare can cause personal injury or damage raft
Rocket-Propelled Parachute Flare		40 miles	30 to 60 seconds	Most visible flare on the market for night use. Maximum height about 1,000 feet.	Flare may drift or be blown from your area flare can cause personal injury or damage raft.
Signal Mirror		40 miles	As long as there is enough light.	Compact, easy to use, good for day use, doesn't deteriorate in bad weather.	Needs sun or other light source to work, must be manned constantly.
Dye Marker		10 miles at 3,000 feet of altitude	20 to 30 minutes in calm seas, dissipates more rapidly in rough seas	Compact and easy to use, can also be used on snow, doesn't deteriorate is bad weather.	Only visible during the day, not as visible from the sea as from the air, dissipates rapidly in rough seas.

FLARE TYPES

FLARE USE

Vessel Towing



General Procedures for Towing

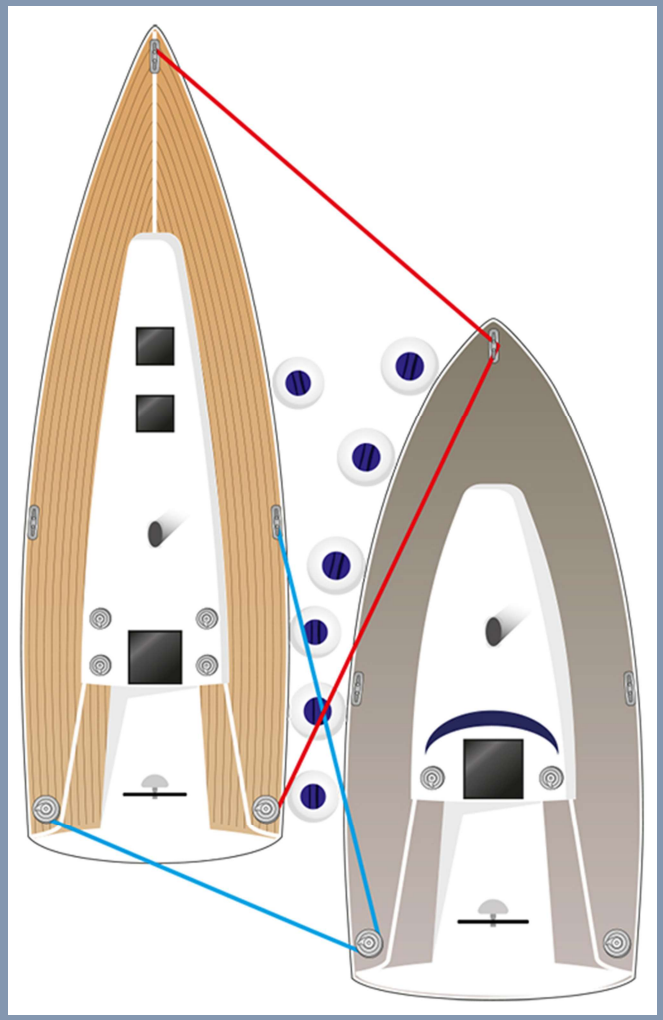
Do not tow vessels in tidal areas

Nylon or other strong, stretchy line is ideal

Do not carry passengers in towed vessel

Identify rebound areas and keep them clear of passengers and crew

Vessel Towing



General Procedures for Towing

Do not tow vessels in tidal areas

Nylon or other strong, stretchy line is ideal

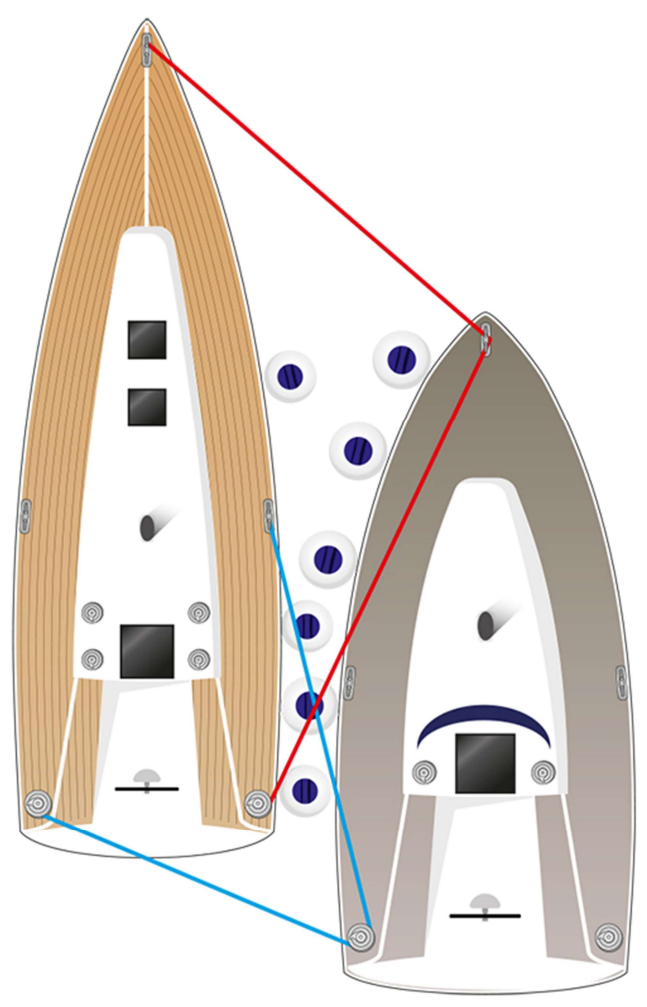
Do not carry passengers in towed vessel

Identify rebound areas and keep them clear of passengers and crew

'Hip-Towing' increases control of towed vessel

Make "SECRURITE" call and announce your restricted ability maneuver

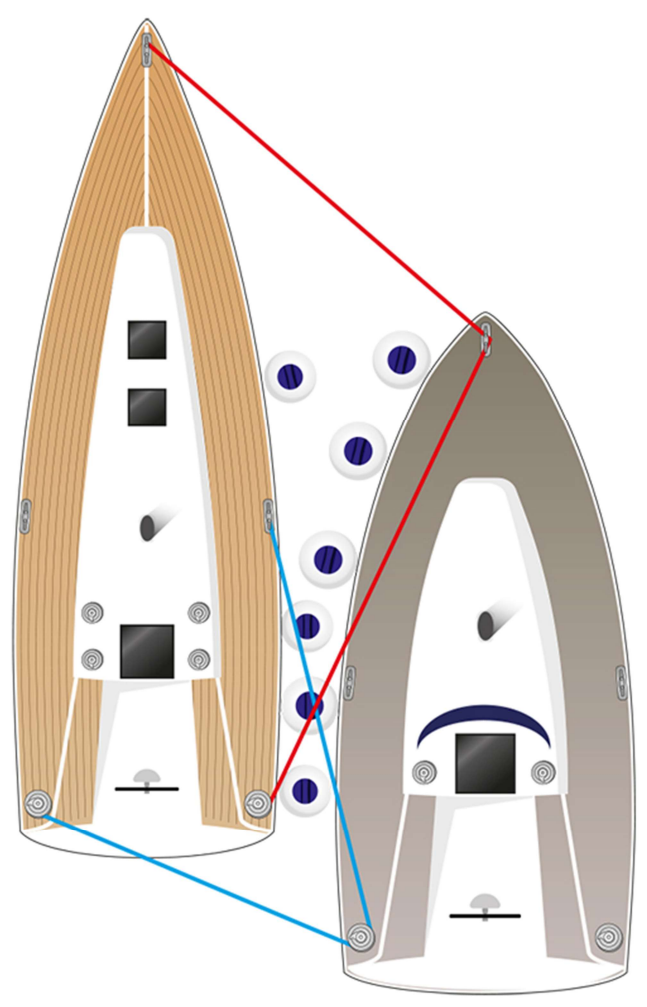
Vessel Towing



General Procedures for Towing

ESTABLISH A DESTINATION BEFORE TOWING

Vessel Towing

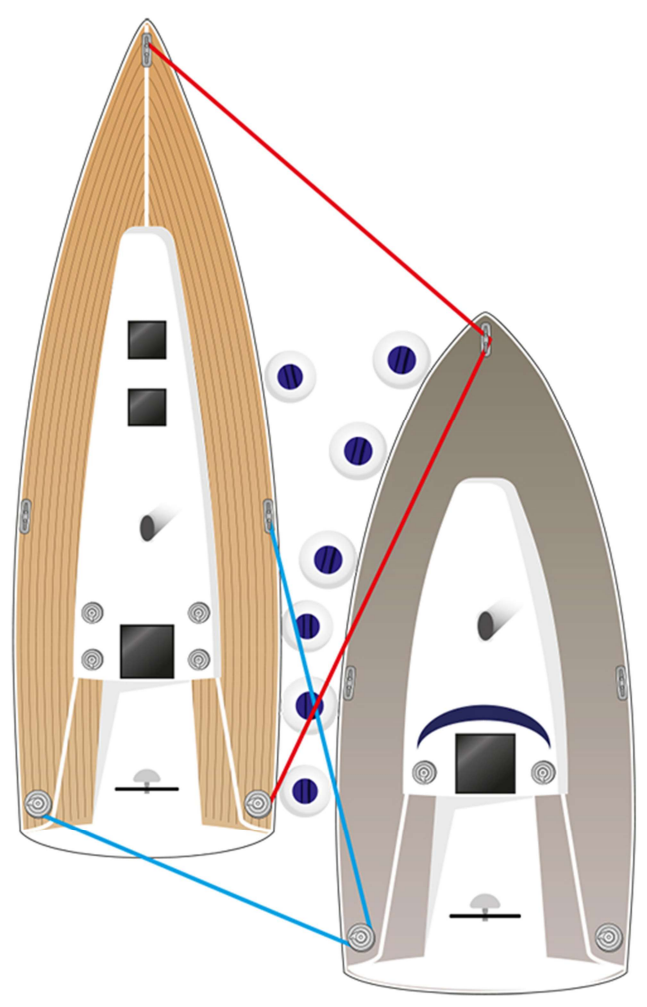


General Procedures for Towing

ESTABLISH A DESTINATION BEFORE TOWING

ESTABLISH A FORM OF COMMUNICATION

Vessel Towing



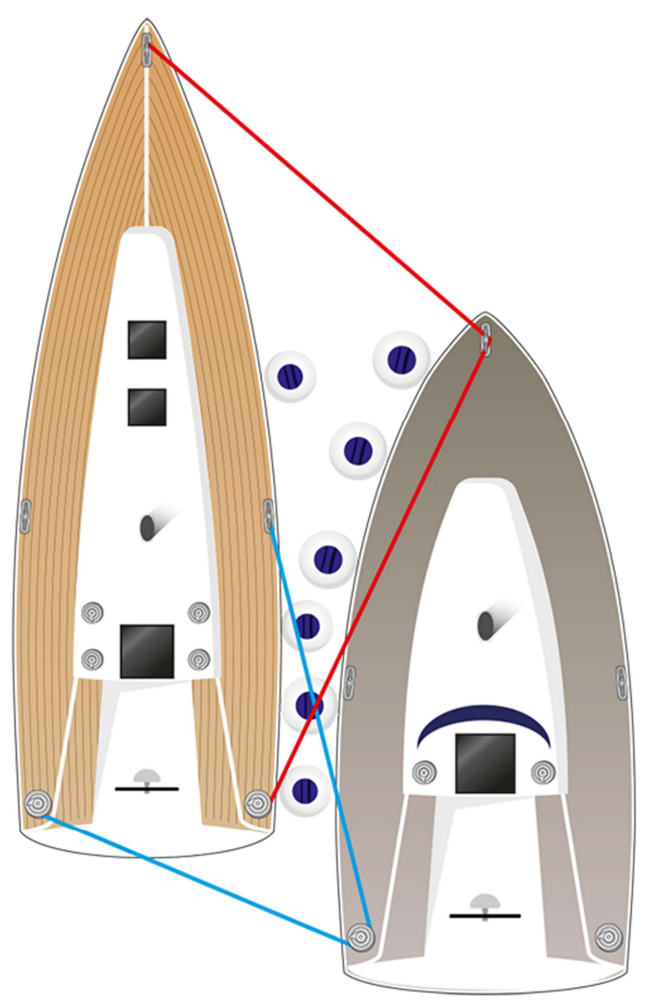
General Procedures for Towing

ESTABLISH A DESTINATION BEFORE TOWING

ESTABLISH A FORM OF COMMUNICATION

ASSIGN LOOKOUTS AND KEEP WATCH

Vessel Towing



General Procedures for Towing

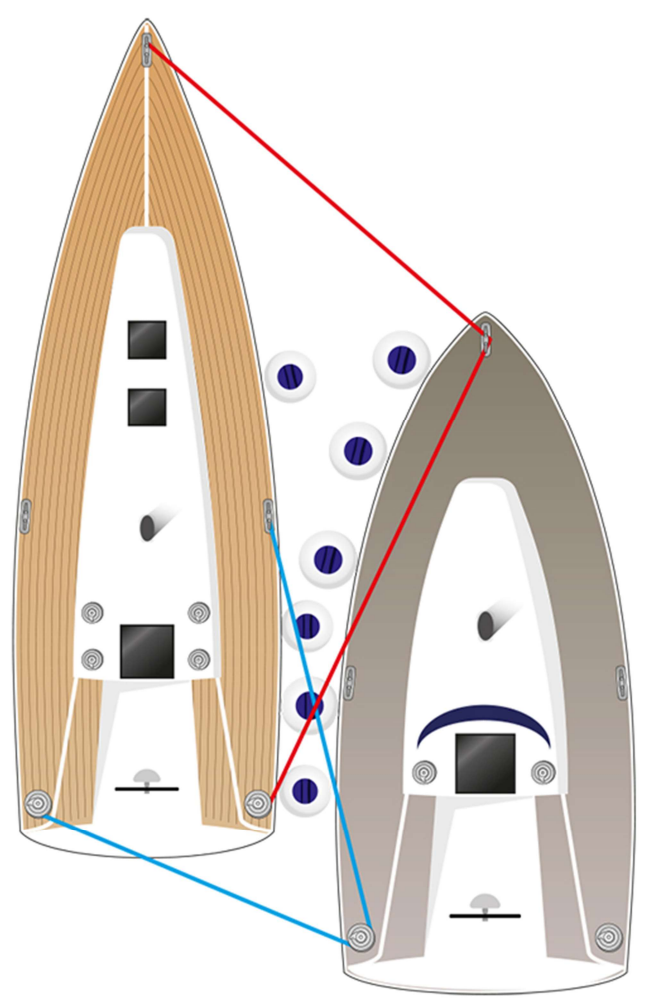
ESTABLISH A DESTINATION BEFORE TOWING

ESTABLISH A FORM OF COMMUNICATION

ASSIGN LOOKOUTS AND KEEP WATCH

ADJUST LENGTH TO ACHIEVE SYNCRONEOUS WAVES

Vessel Towing



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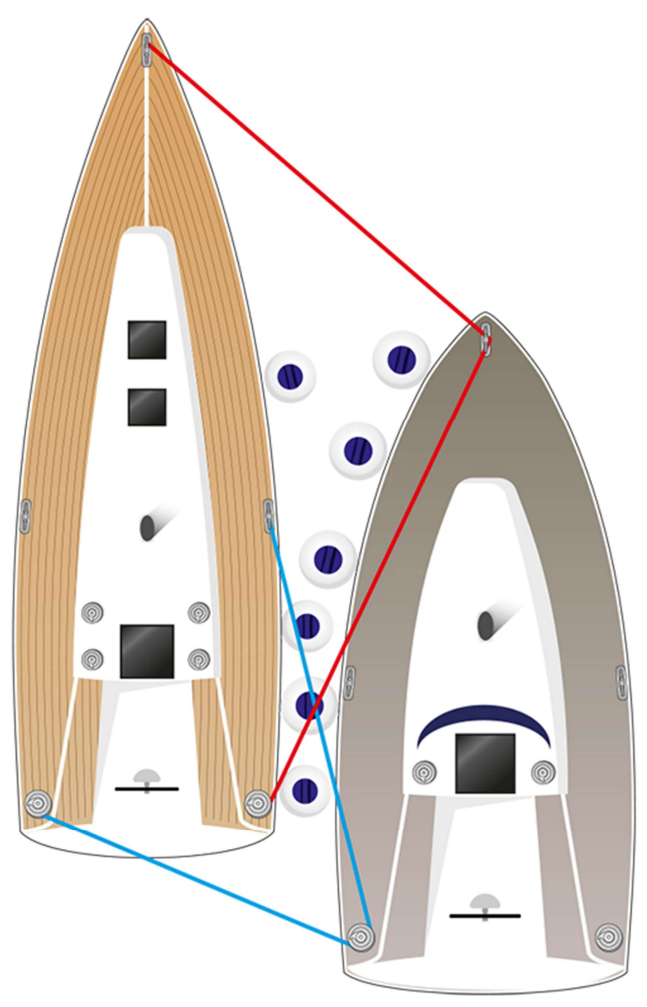
ASSIGN LOOKOUTS AND KEEP WATCH

ADJUST LENGTH TO ACHIEVE SYNCRONEOUS WAVES

REDUCE TOWLINE CHAFFING

Vessel Towing



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ADJUST LENGTH TO ACHIEVE SYNCRONEOUS WAVES

REDUCE TOWLINE CHAFFING

DO NOT ‘HIP TOW’ IN FOLLOWING SEAS

Vessel Towing

Transferring Passengers

Similar Line Assembly as 'Hip Towing'. Add short spans of line abreast the two vessels

Only the disabled vessel should place fenders

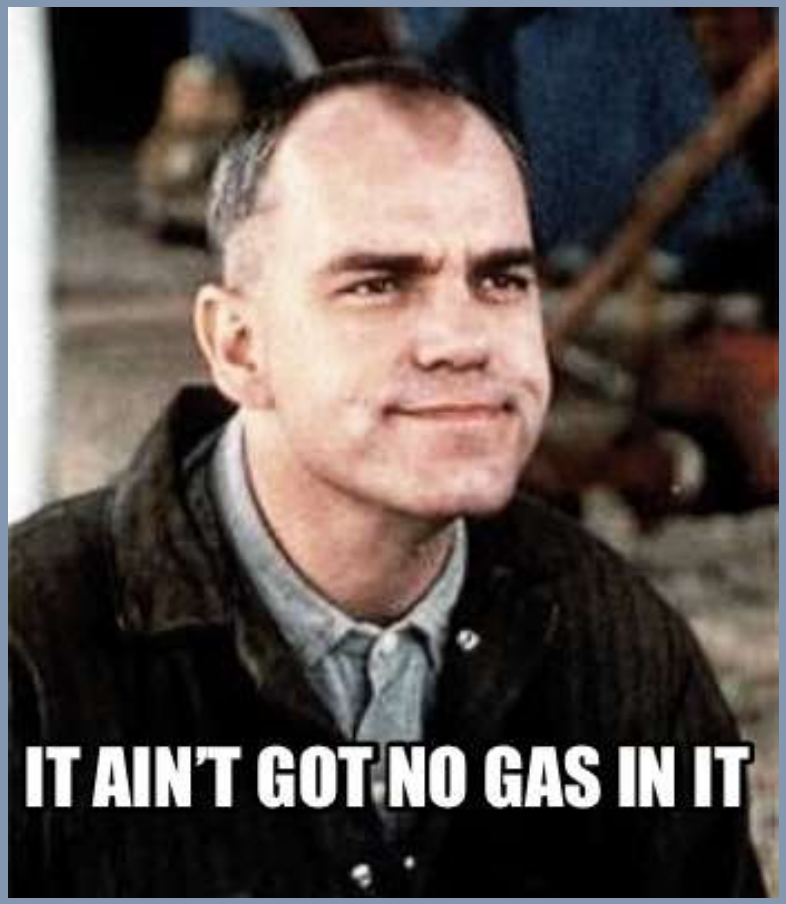
Assign a Lookout to warn of approaching waves or wakes

Identify at least 3-points of contact

Do not 'span' the two boats

When assisting others across the span, do so from the receiving vessel

Troubleshooting Systems



Troubleshooting Systems

Generic Outboard Engine Troubleshooting Guide

AMSEA
Alaska Marine Safety Education Association

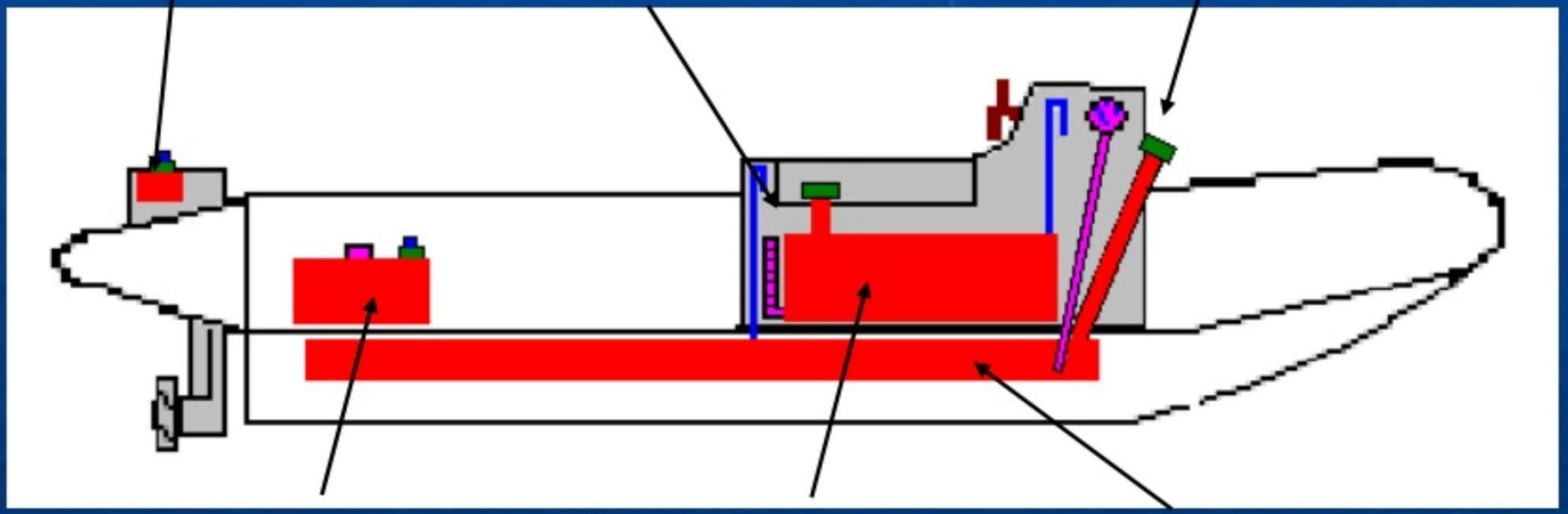
Engine does not start	
Possible Cause	**Solution**
Fuel tank is empty	Refill tank. Fuel that has been in the tank for over 30 days should be drained and replaced with clean, fresh fuel.
Kill switch is engaged	Disengage the kill-switch.
Kill switch clip is not inserted	Insert the kill switch clip firmly into place. Or try removing the clip and putting it back in place.
Engine is in gear	The engine needs to be set to neutral in order to start. Slip the engine lever to neutral and try starting again.
Dead battery	Charge the battery to give the engine enough power to start up. Also, check the electrical connections of the engine for any signs of damage, corrosion, or loose wires.
Engine flooded	Turn choke off and try starting. If still not starting, take out spark plugs and allow fuel to evaporate from plugs and combustion chamber before trying to start again.
Damaged spark plugs or ignition system	Make sure the plugs are seated tightly and not loosely. Use a spark plug tester to check if the ignition system is in good condition or if the plug is sparking. If tester is unavailable, unscrew plug and with plug connected to ignition system look for spark while trying to start engine. If no spark, replace the spark plugs. In more extreme cases of damage, the ignition system may need to be replaced.

Engine overheated	
Possible Cause	**Solution**
Water is blocked from entering the cooling system	Turn engine off and check for any blockage in water flow. Remove weeds, foreign objects, etc. from intake vent. Try running engine again after it has cooled down. Water cooling system should always be "peeing" while the engine is running.
Broken water pump impeller (round disc with blades that circulates water though the engine)	Replace the water pump impeller with a new one.

Console

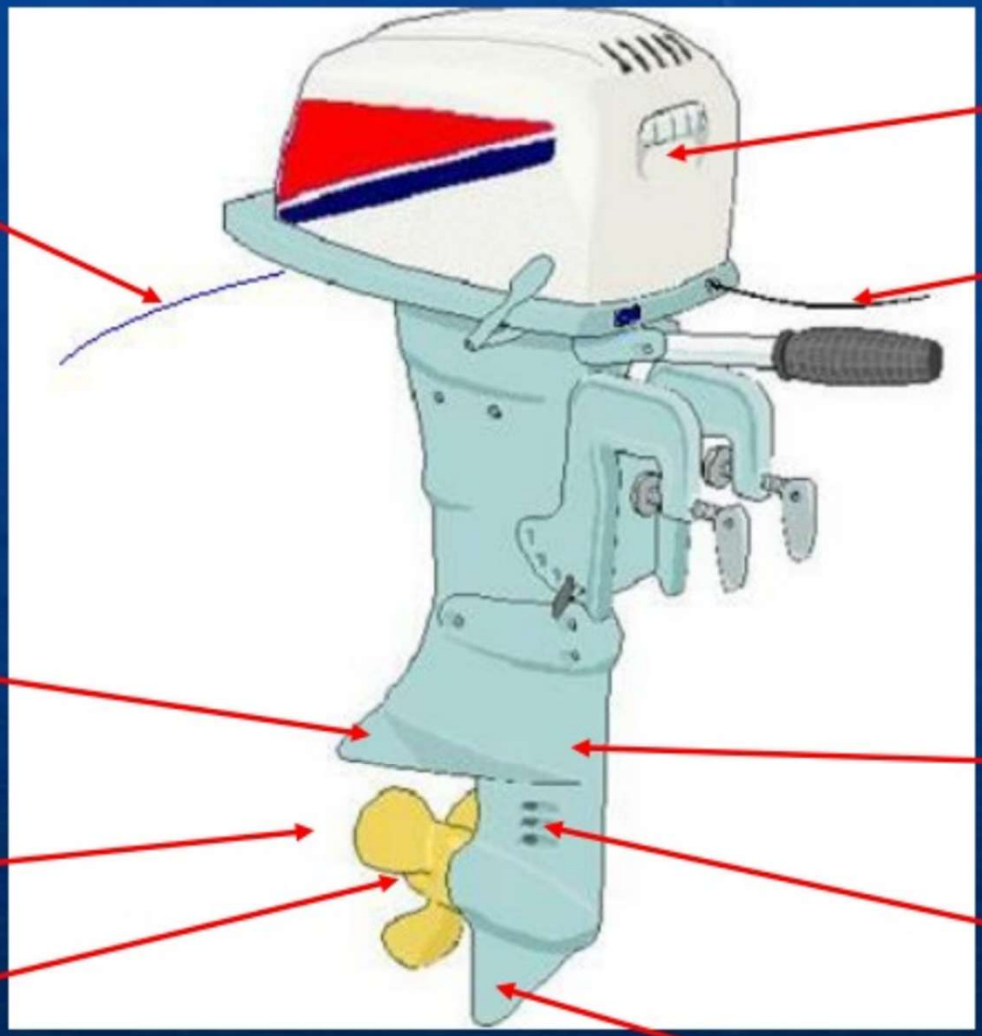
- Helm (Remote) Steering
- Throttle / Gear Change
- Tilt / Trim Switch
- Cold Start / Neutral Throttle
- Deadmans
- Ignition Key
- Other dials and lights and thingys…

Engine tank Fuel vent Filler cap

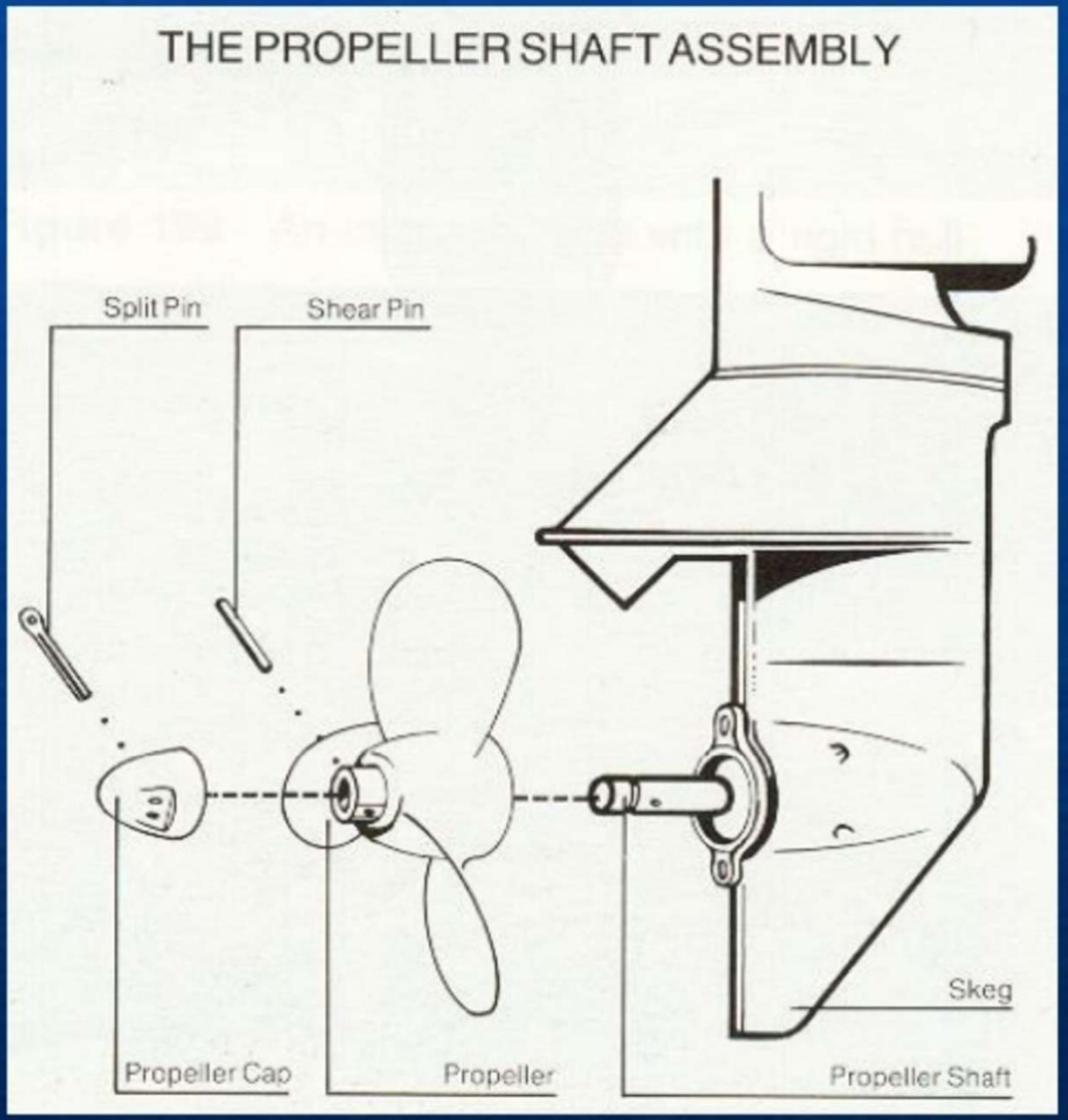


Reserve tank Underseat tank Underfloor tank

- Unleaded Fuel
- Oil / Fuel Mixing - Manual Mixing
  - Oil Injection


Tell-tale
(open circuit)
Cowl
Fuel line
Anti-cavitation
plate
Water pump
Prop
Exhaust
Water inlet
Skeg

- Shafts
- Propeller pitches
- Shear pins
- Splined hubs
- Spare prop
- Prop guards



QUESTIONS