Introduction to Sailing

Torrey Pines Sailing Club
San Diego, CA
October/November 2024

Instructor: Pete Politzer

website: sailtpsc.com

Schedule

Wednesdays
October 30; November 6, 13, 20
5:30 – 7:30 pm

Text

“Basic Keelboat”
published by USSailing
$20, here and now

Outline

- Introductory stuff
- Parts of a sailboat
- Making a boat go
- Sail control, steering, getting from here to there
- Sailing rules & safety
- Local knowledge

Plus: Lots of information about TPSC
– membership, water lessons,
…

These classes will give you some of the principles of sailing;
to learn to sail, you MUST get into a boat
– we can arrange that.

Things I won't cover

- setting up and putting away a boat
- motors
- docks – leaving and returning
- anchoring
- reefing a sail
- man-overboard rescue
- etc.

– there's not enough time in this class
– much variation, depends on the boat type and model
– better covered during lessons on the water

Very briefly about the Torrey Pines Sailing Club

- >50 years old!
- Roughly 70 members
- Cooperative organization
  – members do the work
- 7 boats at Shelter Island Marina
- Inexpensive
- Vlad will tell you more

Very briefly about the Torrey Pines Sailing Club

- >50 years old!
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- 7 boats at Shelter Island Marina
- *Inexpensive*
- Vlad will tell you more

Many kinds of sailboats

Star of India (1863)

Preussen (1902)

America (1851)

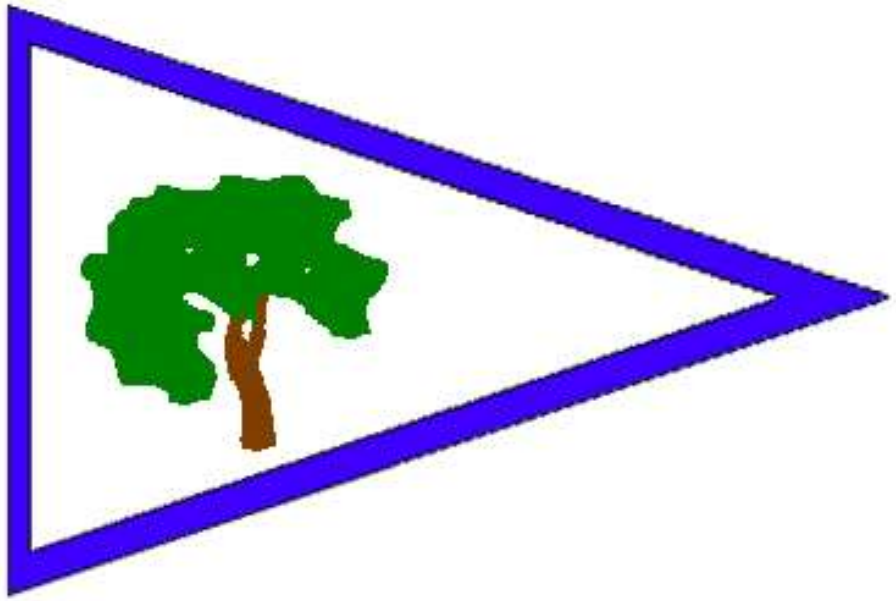

Fly
Emirates
OMEGA
Torpedo7
PIRELLI
TOYOTA
NESPRESSO
OMEGA

AC75

ketch

felucca

TPSC Victory (Bermuda-rigged sloop)



part 2

TPSC burgee

Parts of a boat

- Lots of nautical names & terms
- Mostly historical origin (some very obscure)
- Very specific
- Necessary for accurate & rapid communication

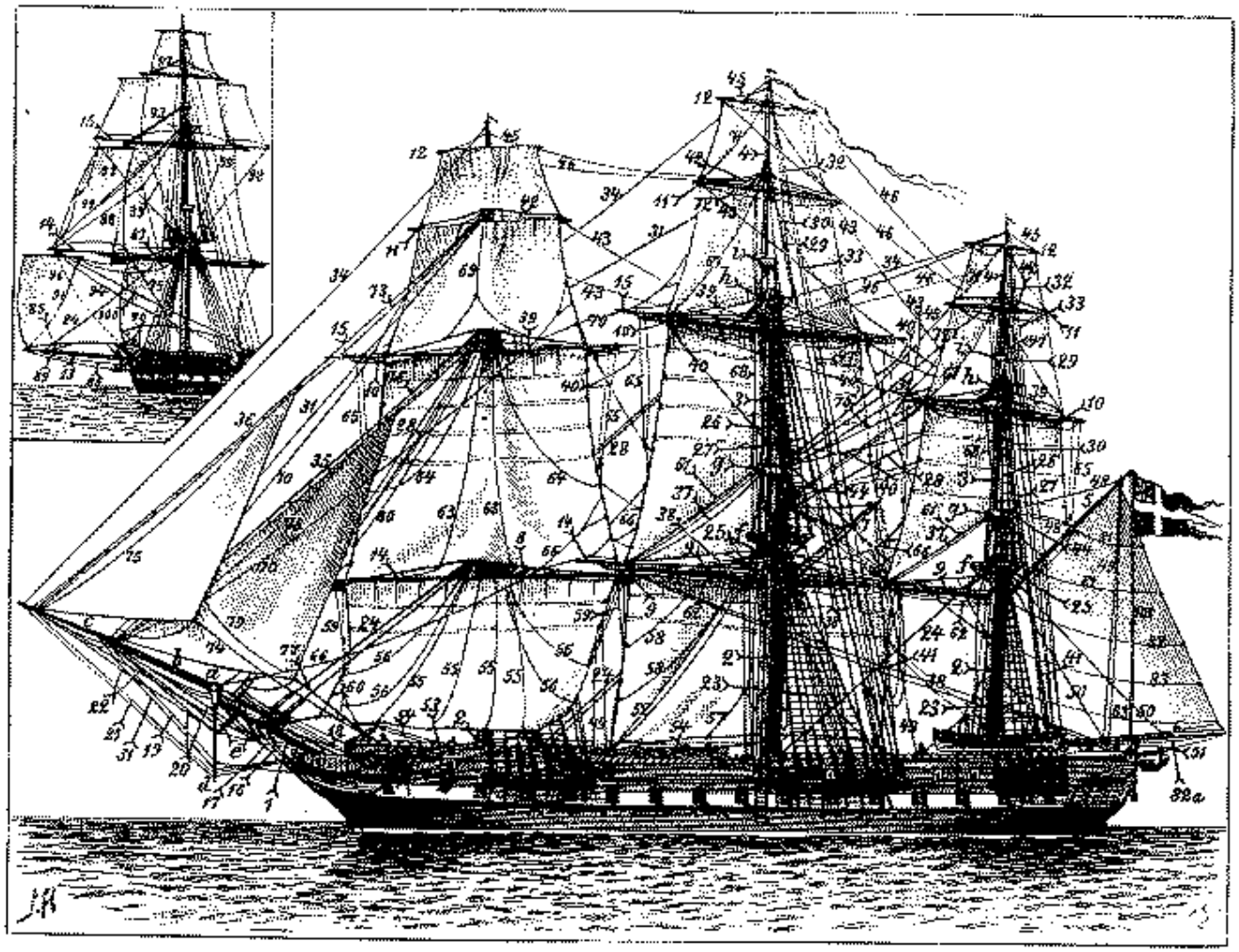
For example:

– **rope** is what you buy at the store

– when it's on or near a boat, it becomes a **line**

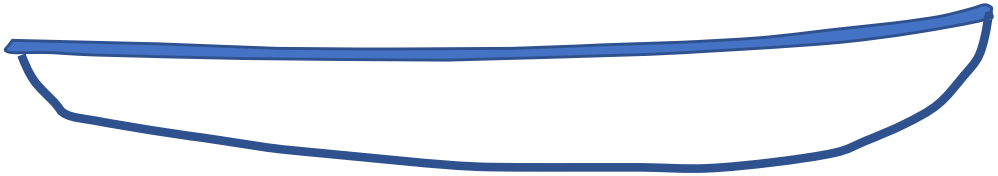
– when it's used for something, it gets a specific name

e.g., **jib sheet**, **main halyard**, …

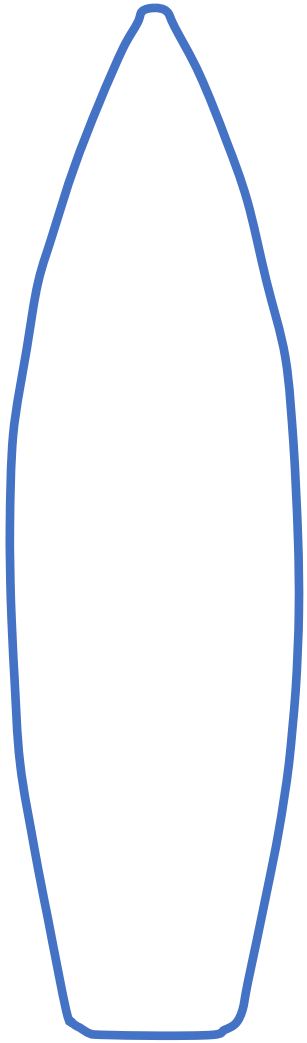


San Salvador (1542/2015)

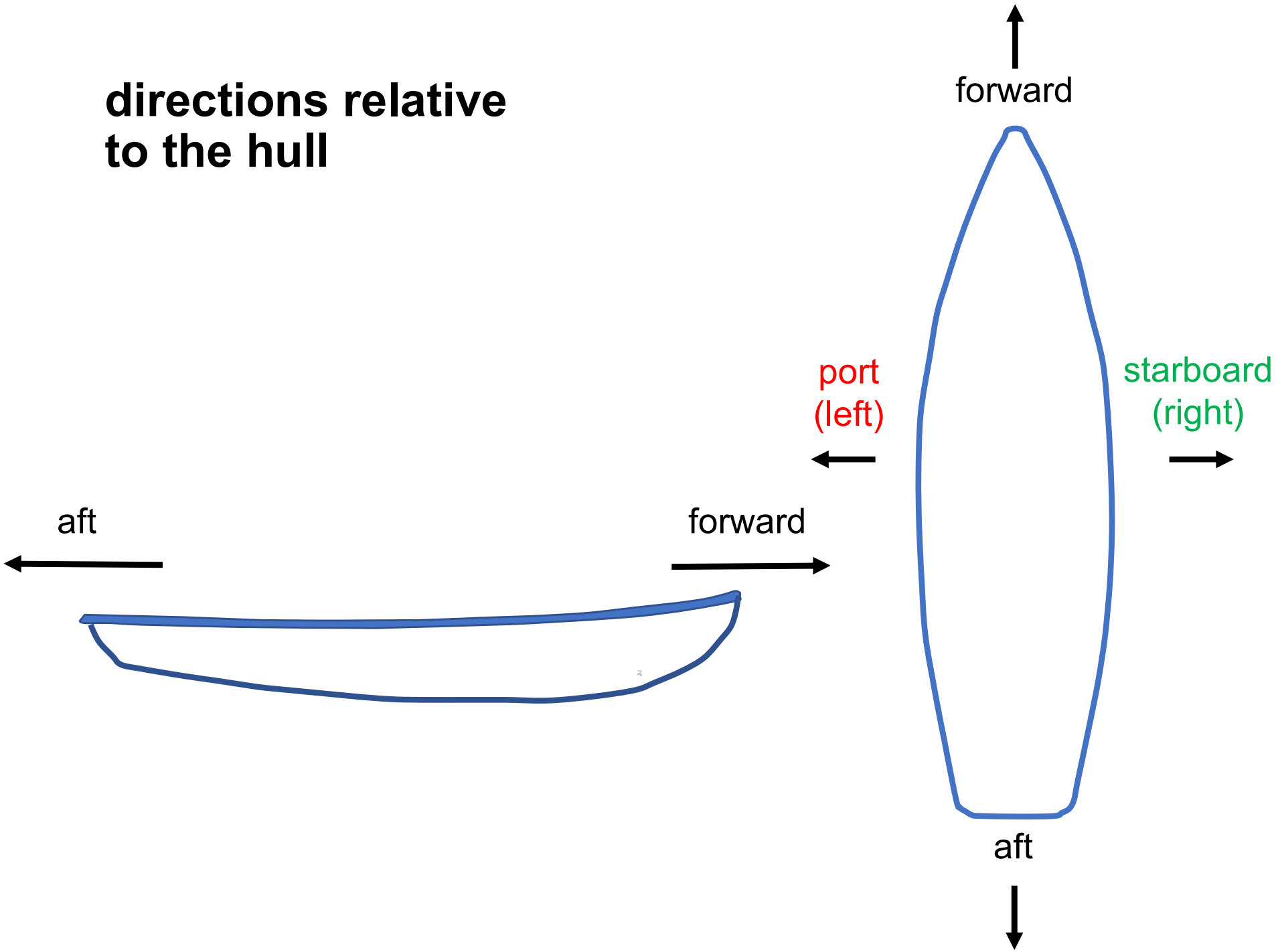
build a boat – learn the main parts



hull



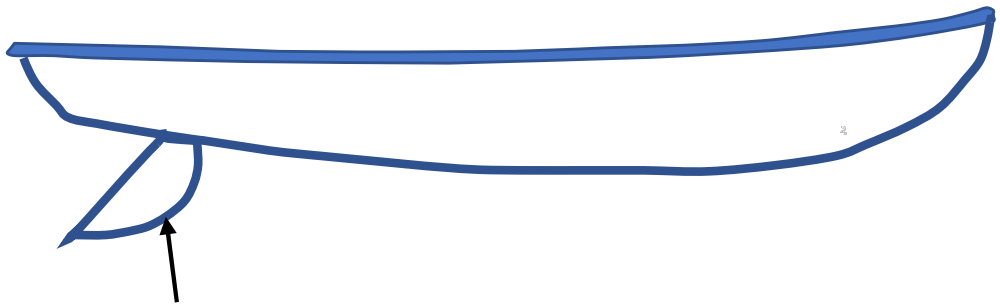
directions relative to the hull

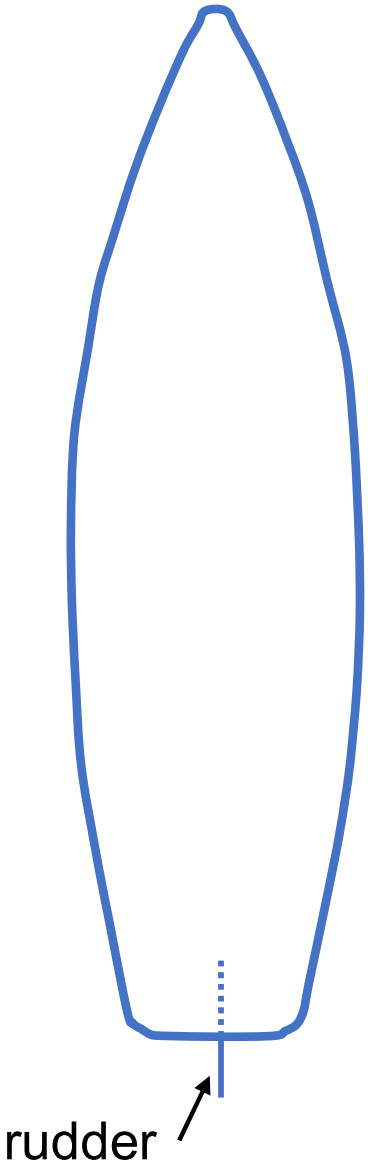


steering oar
(Old English: steorbord – steer board)

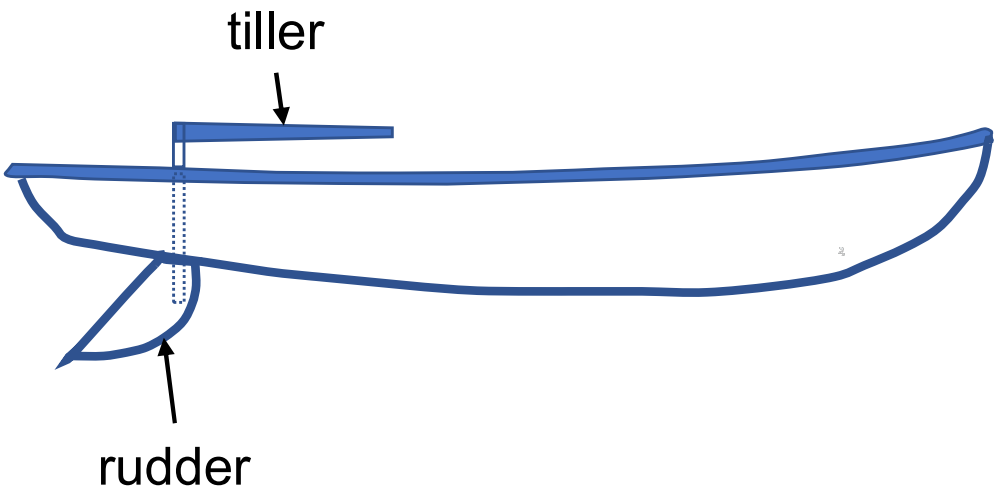
Bayeux tapestry c. 1070

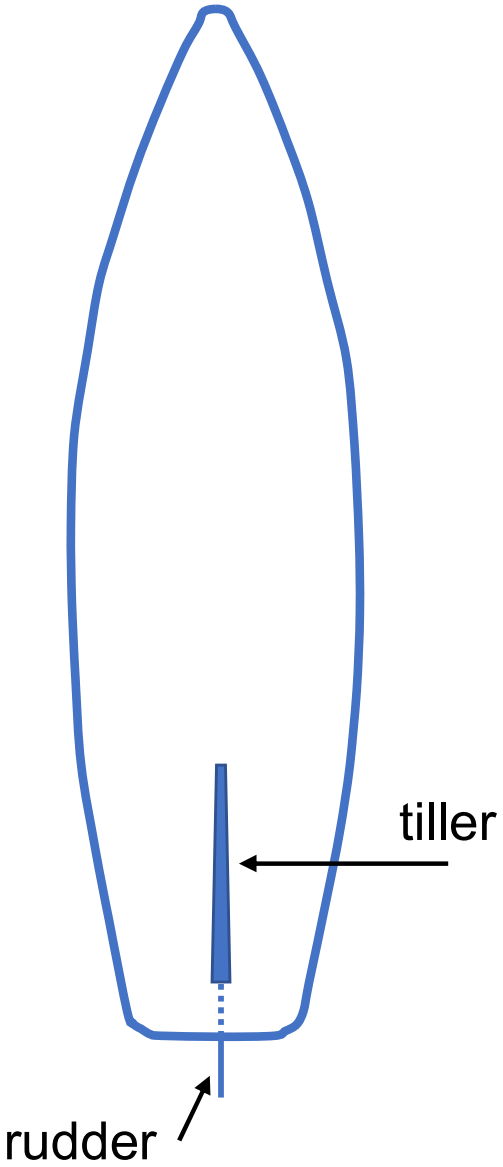
– we need something to steer with



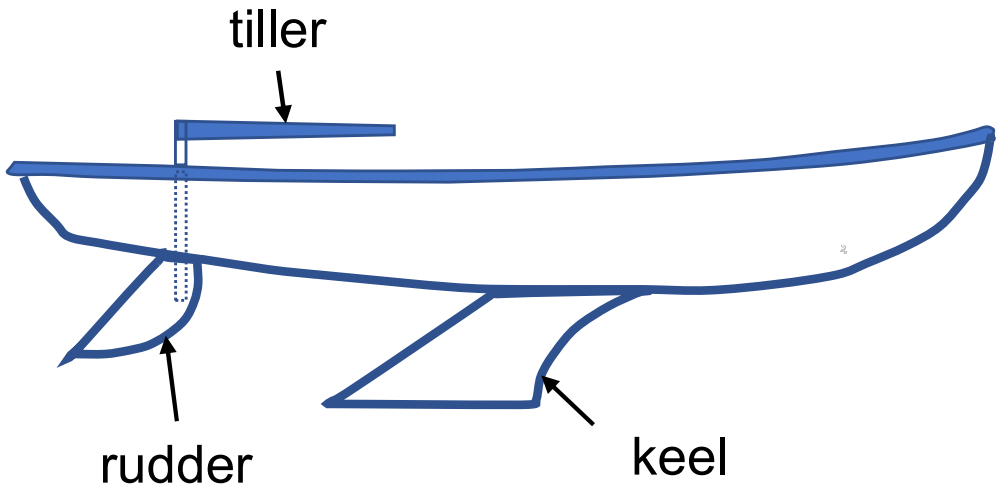


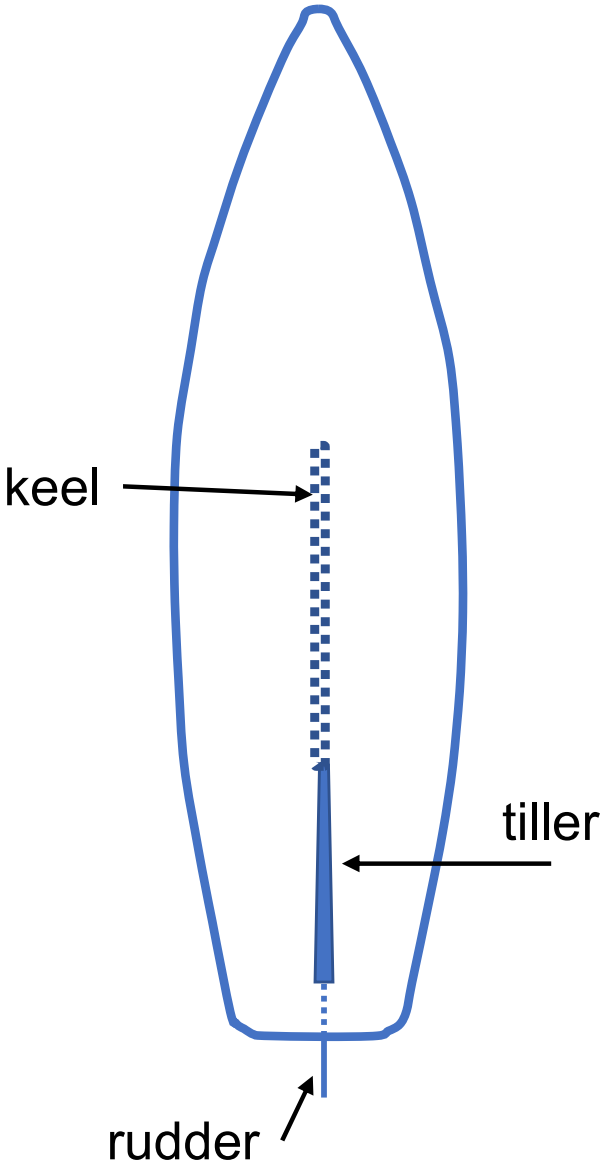
– we need something to steer with;
– then, something to control the rudder



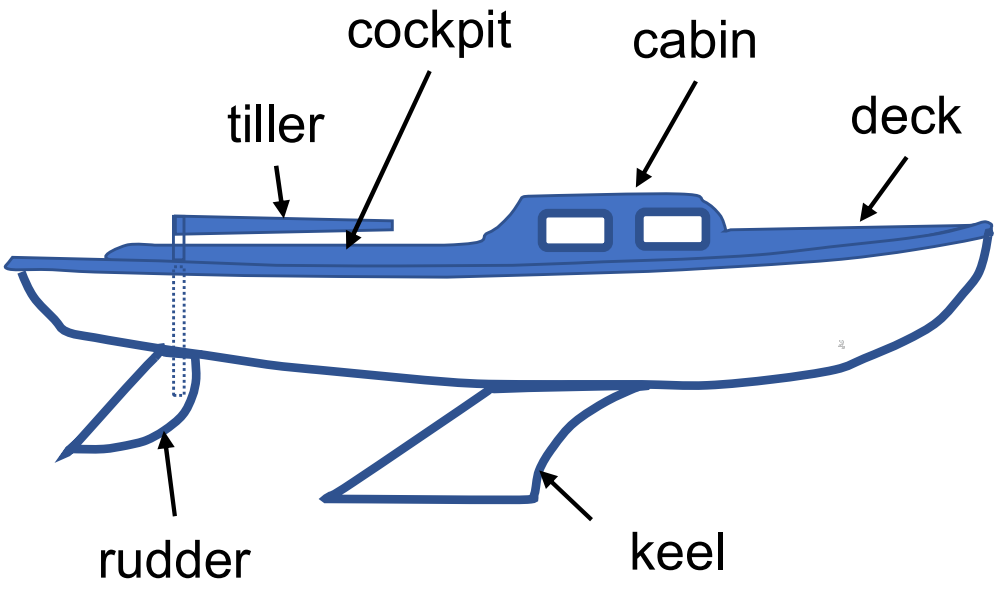


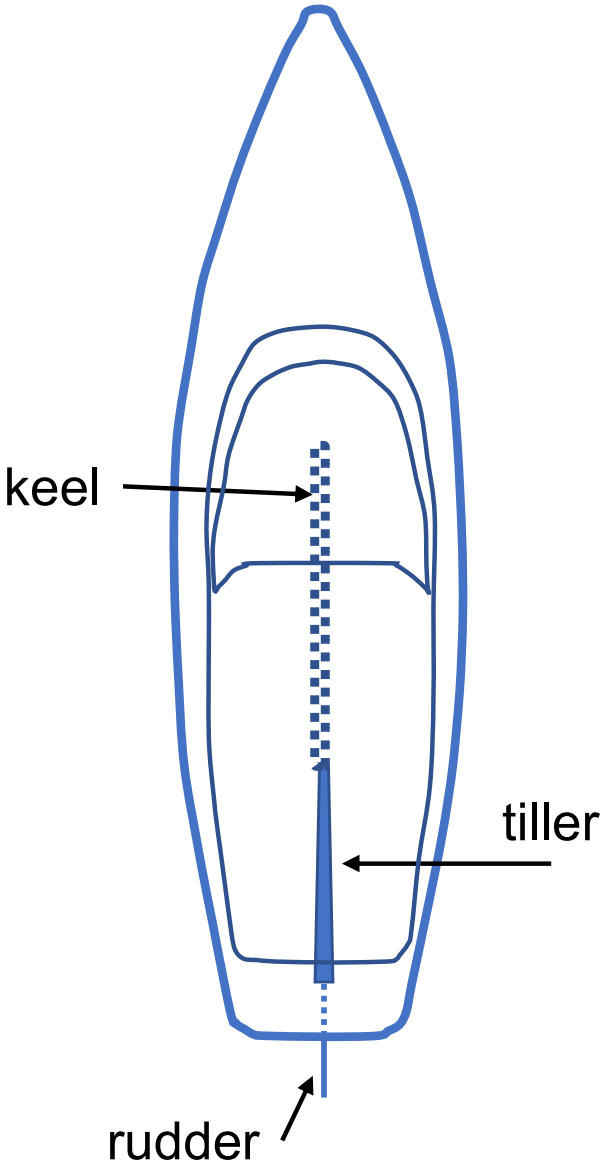
– we need something to steer with;
– then, something to control the rudder;
– and one more attachment under the hull
(why have a keel? – later)



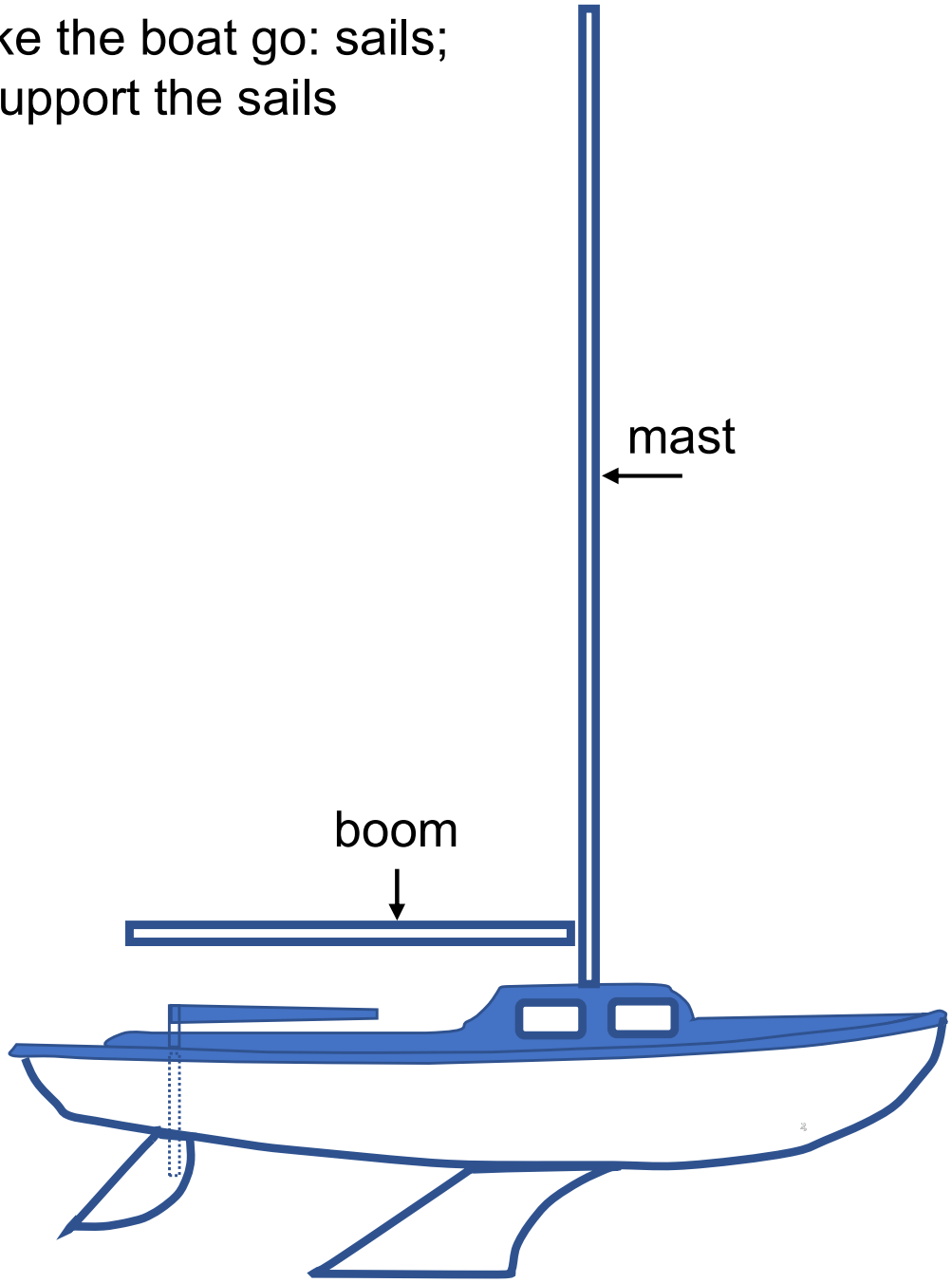


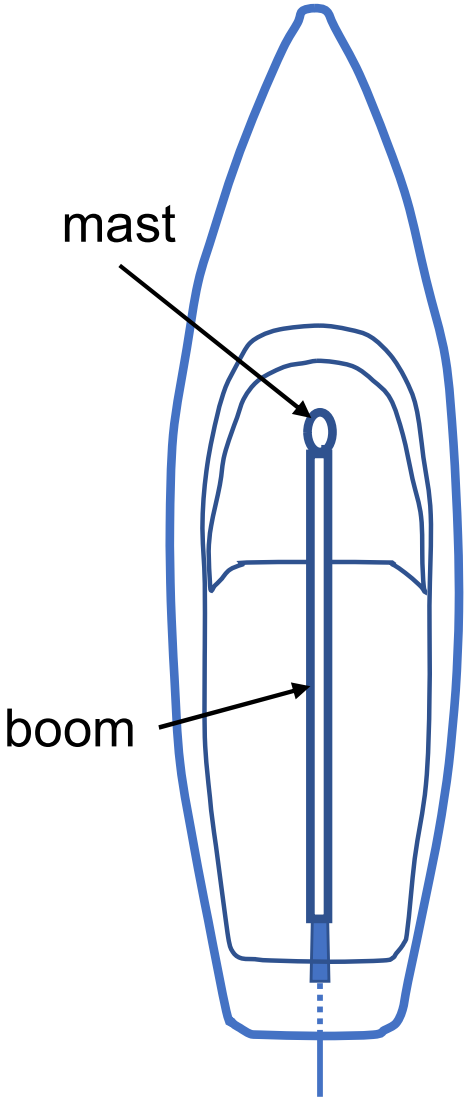
– we need something to steer with;
– then, something to control the rudder;
– and one more attachment under the hull
(why have a keel? – later)
– finish the top of the hull





to make the boat go: sails;
first, support the sails





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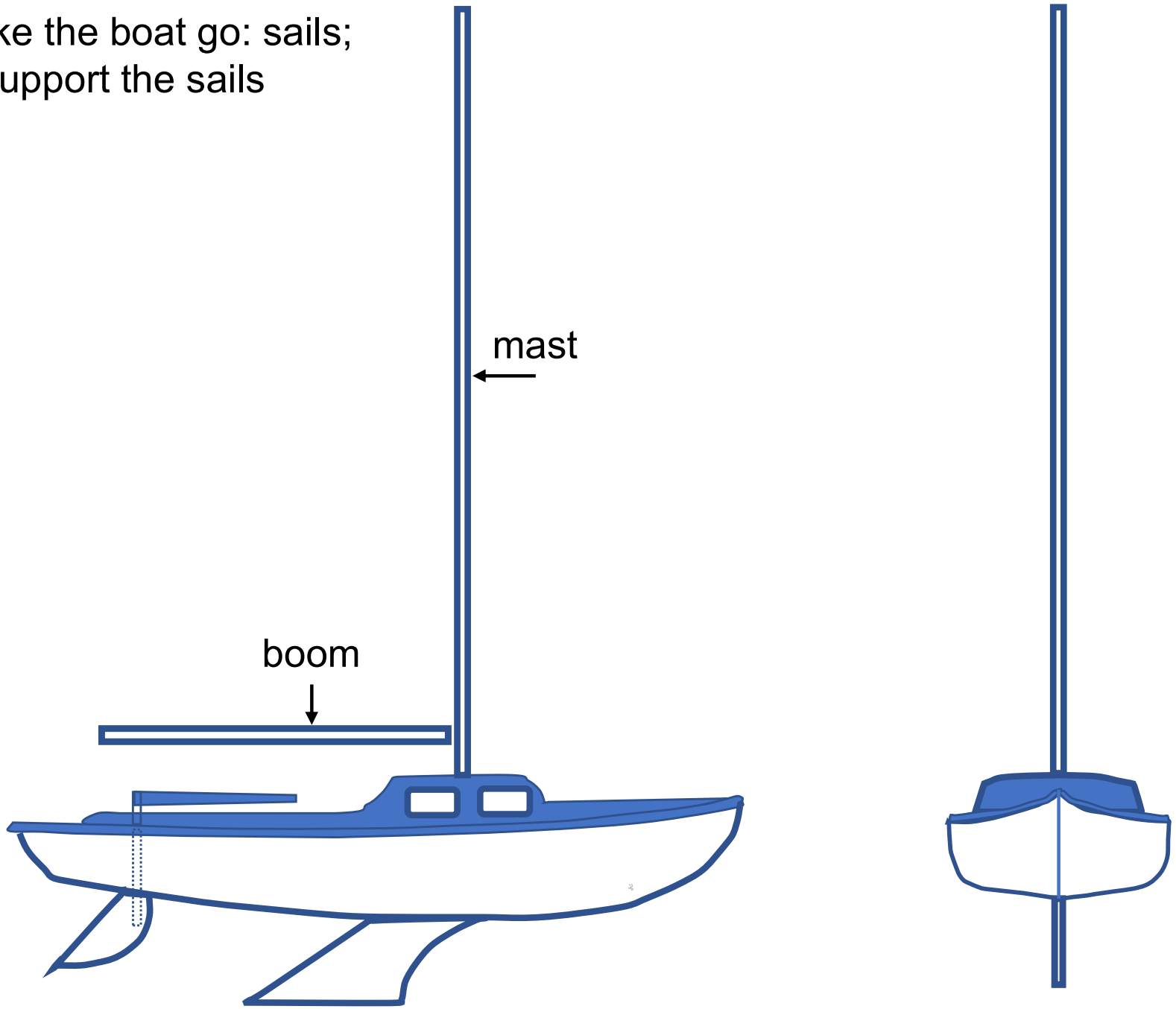
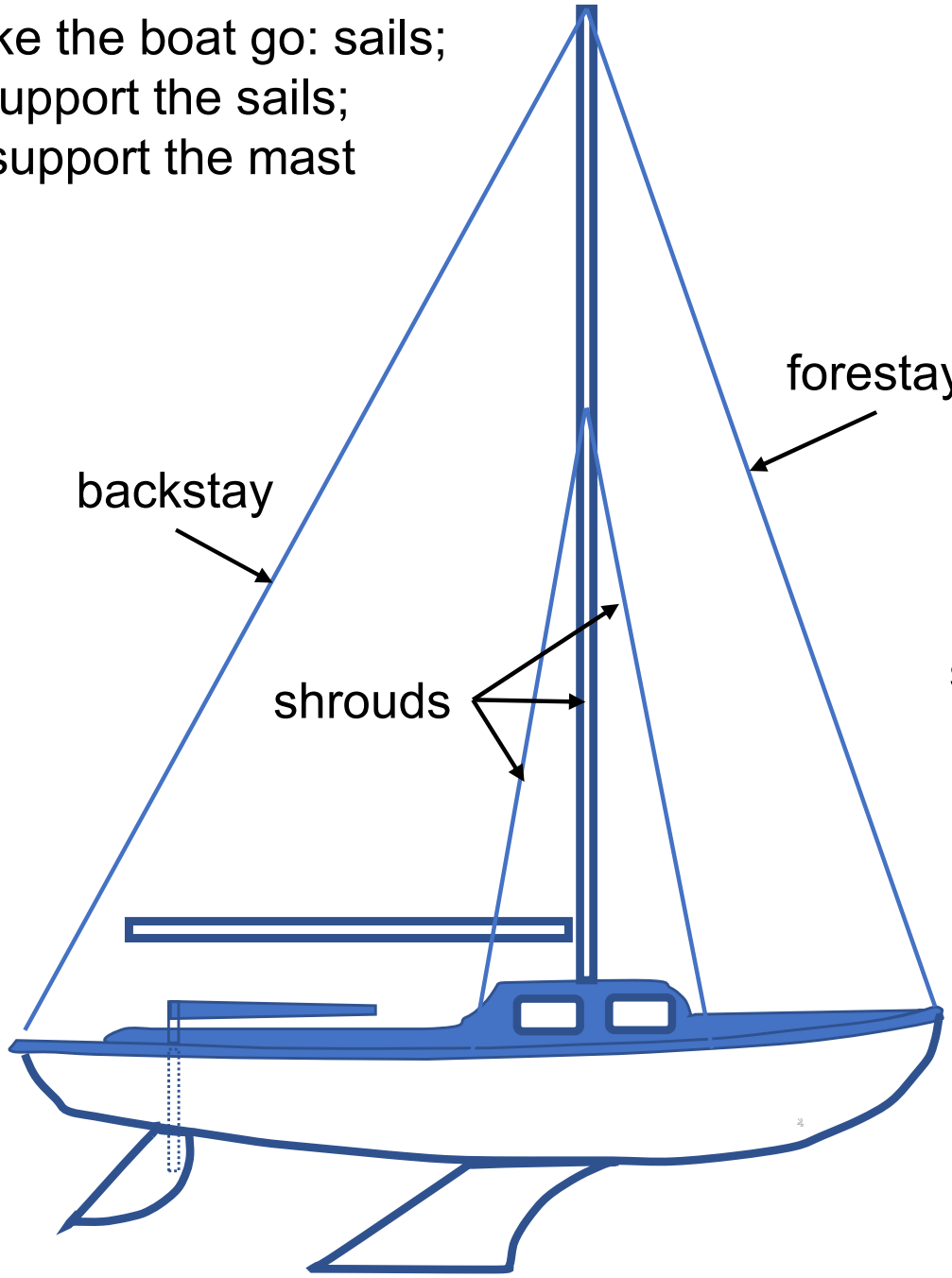
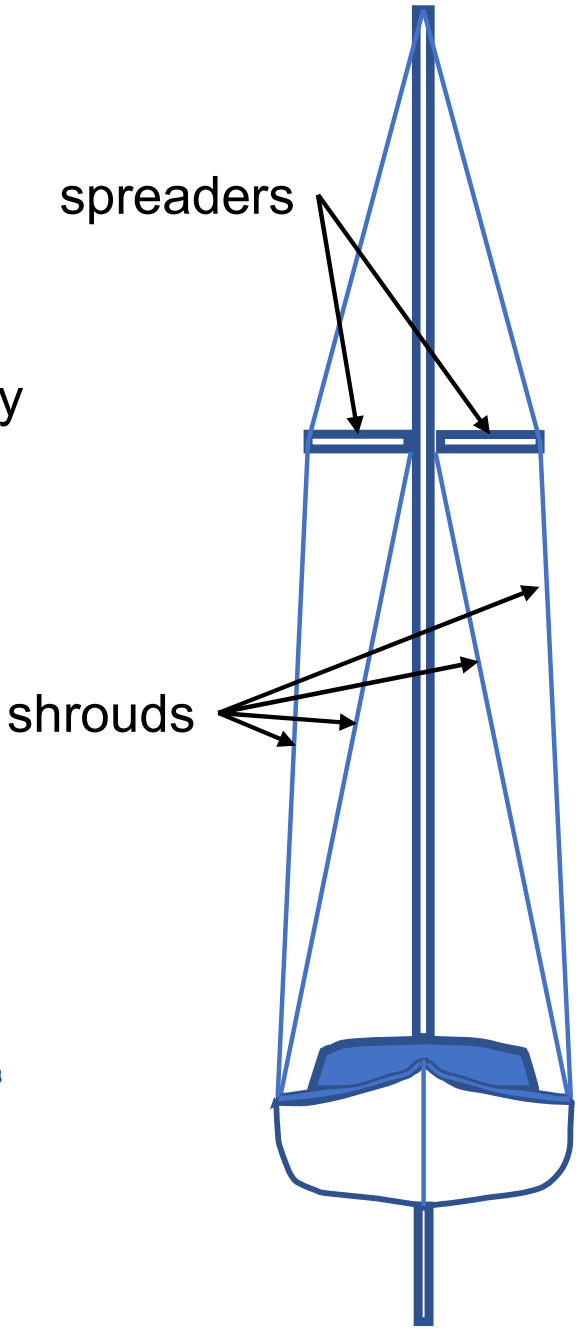
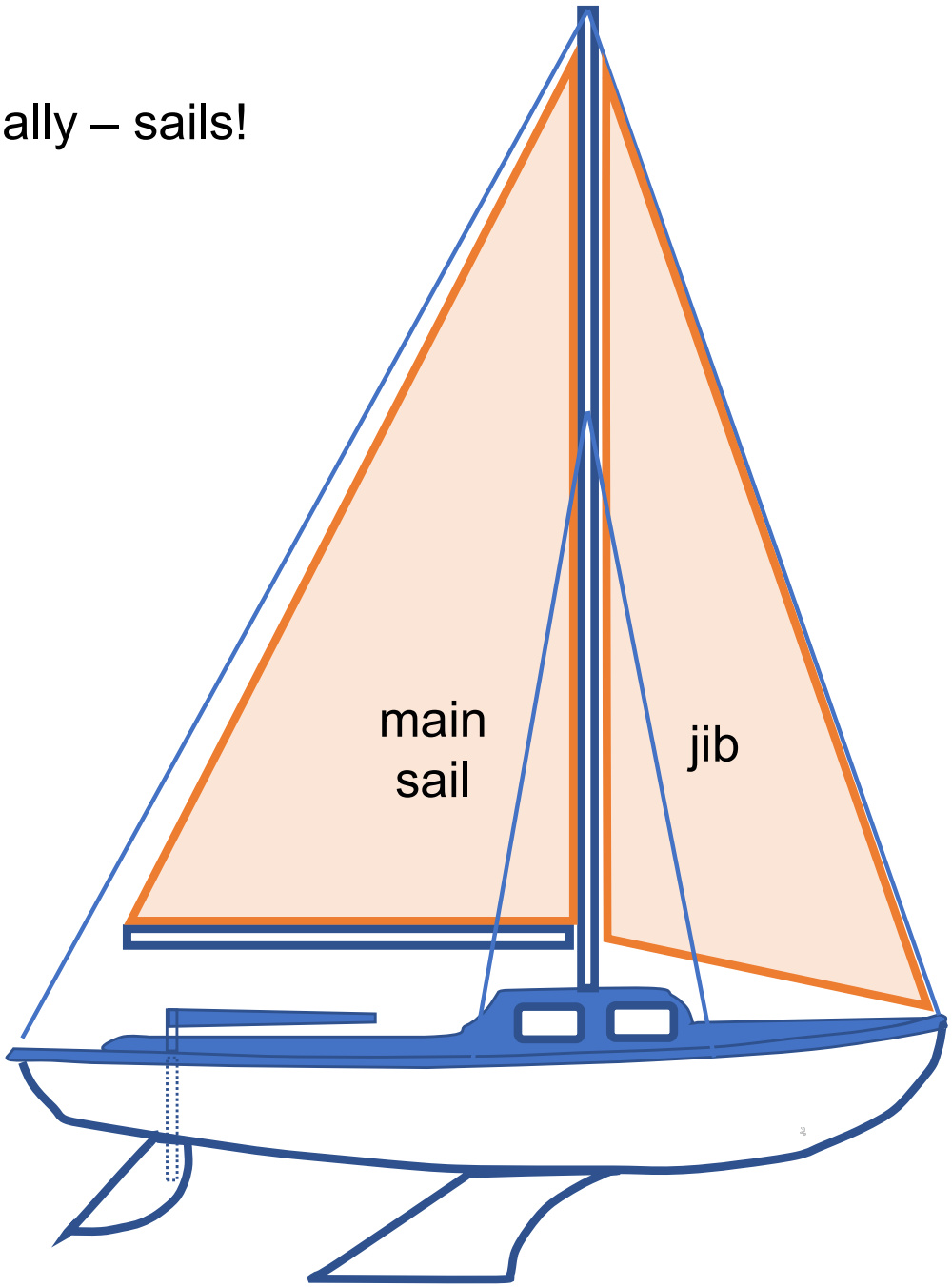


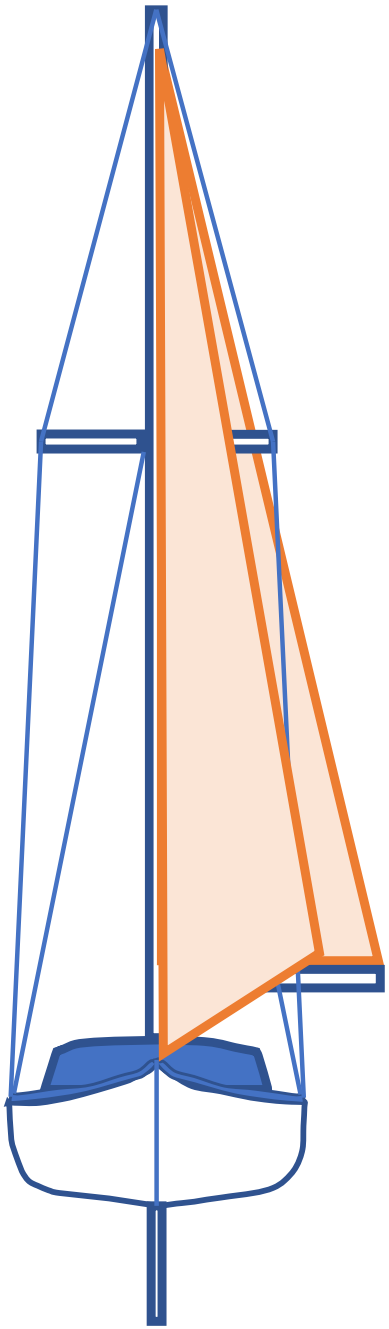
to make the boat go: sails;
first, support the sails;
also, support the mast

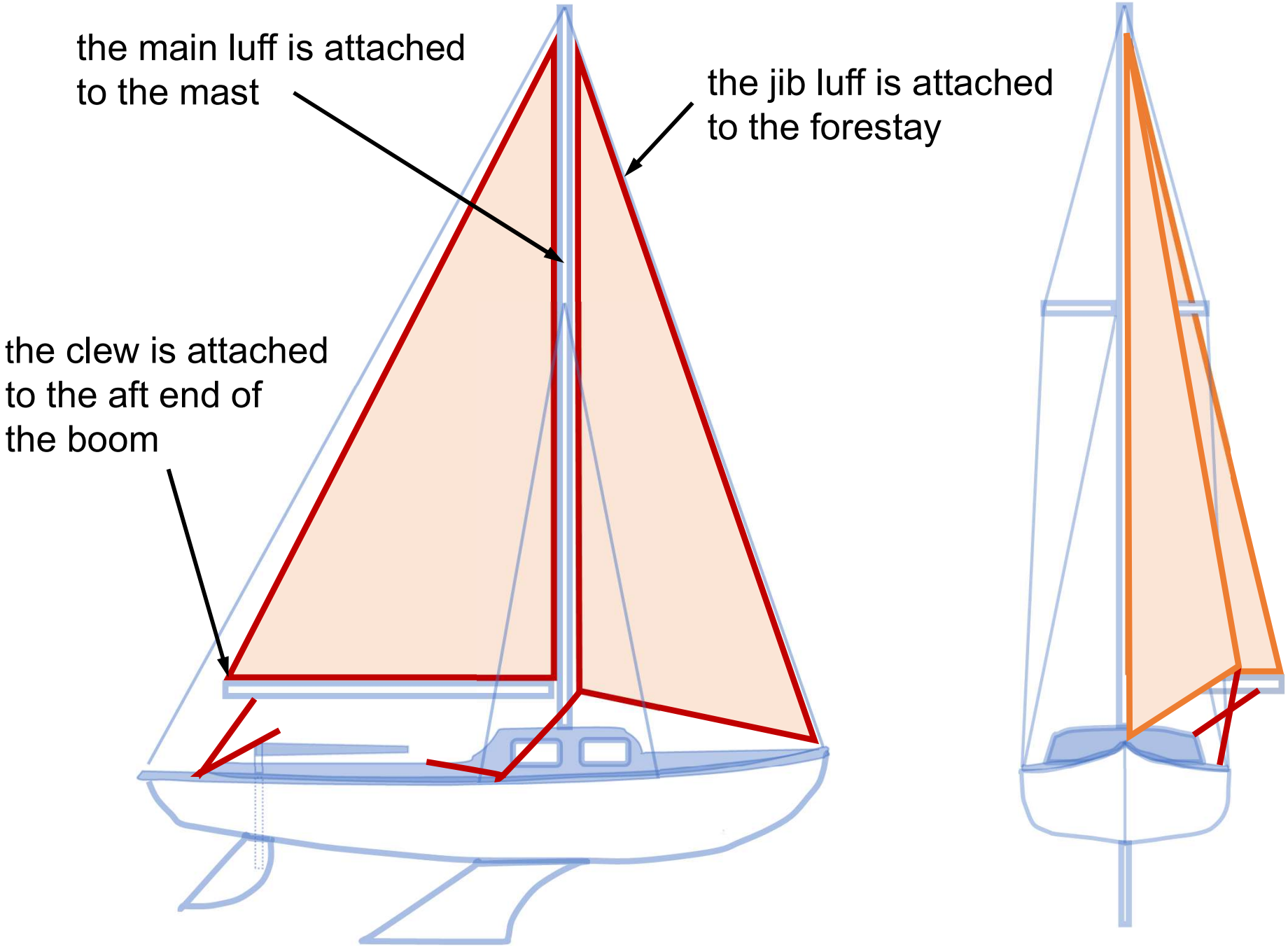




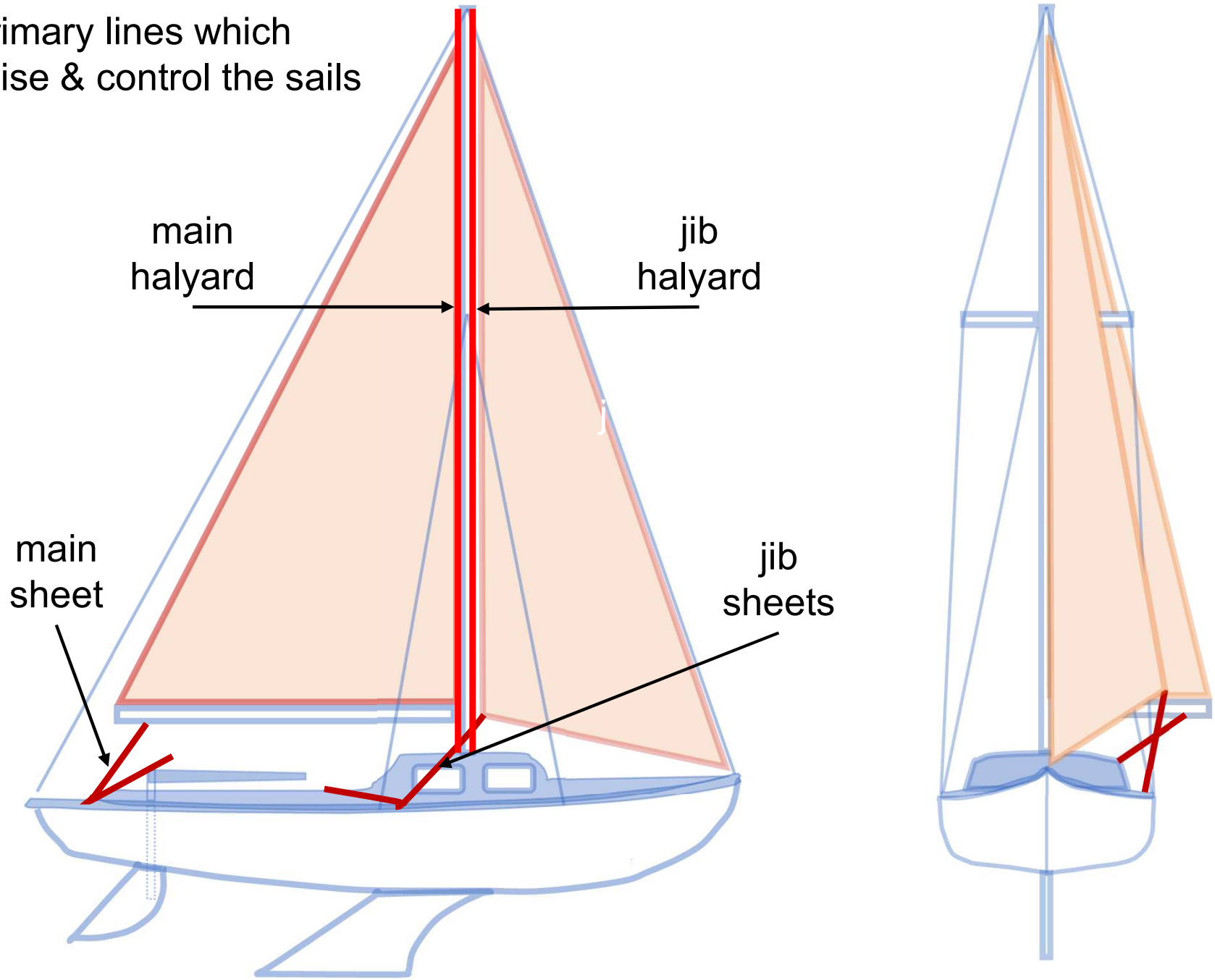
finally – sails!

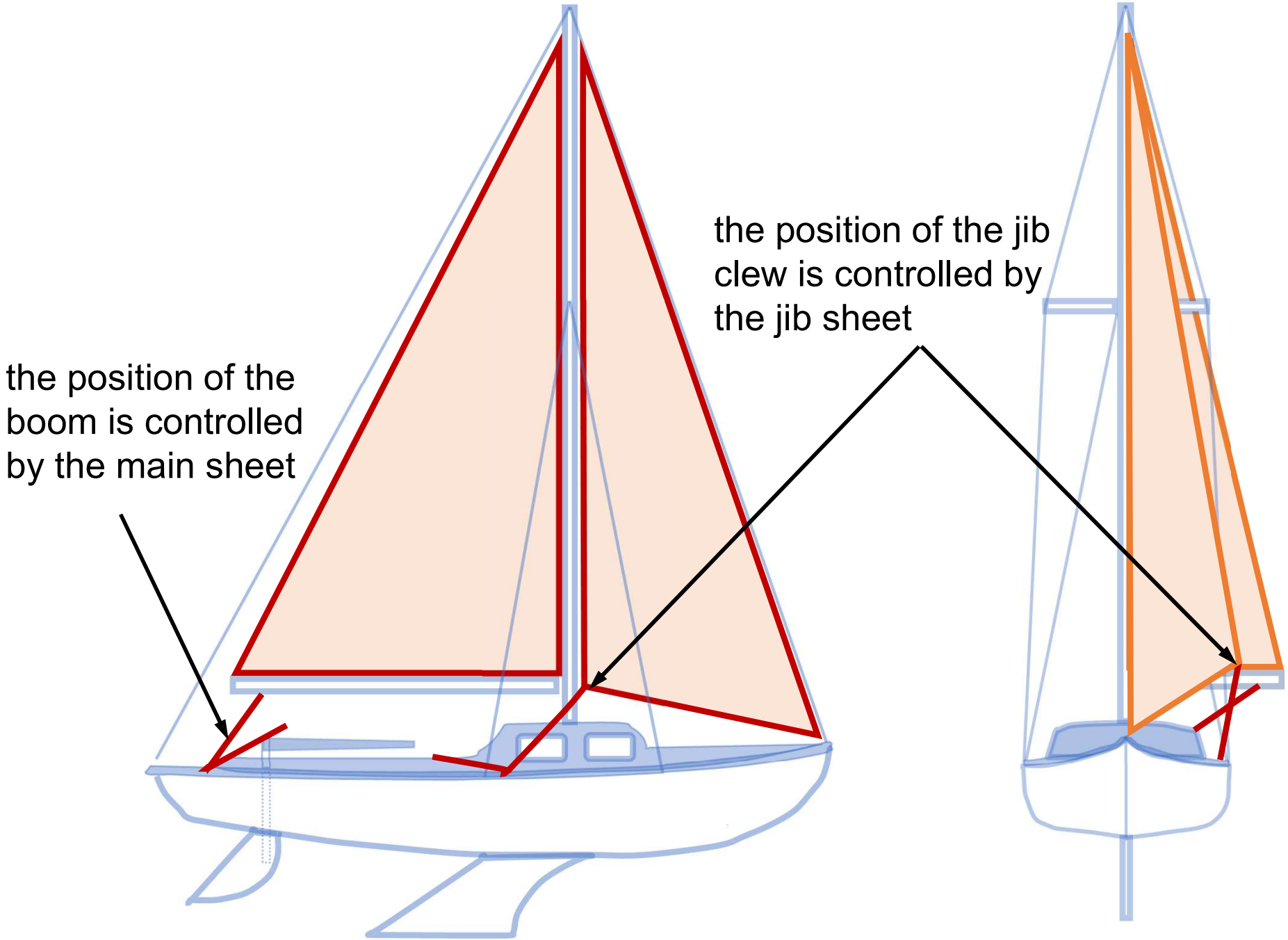




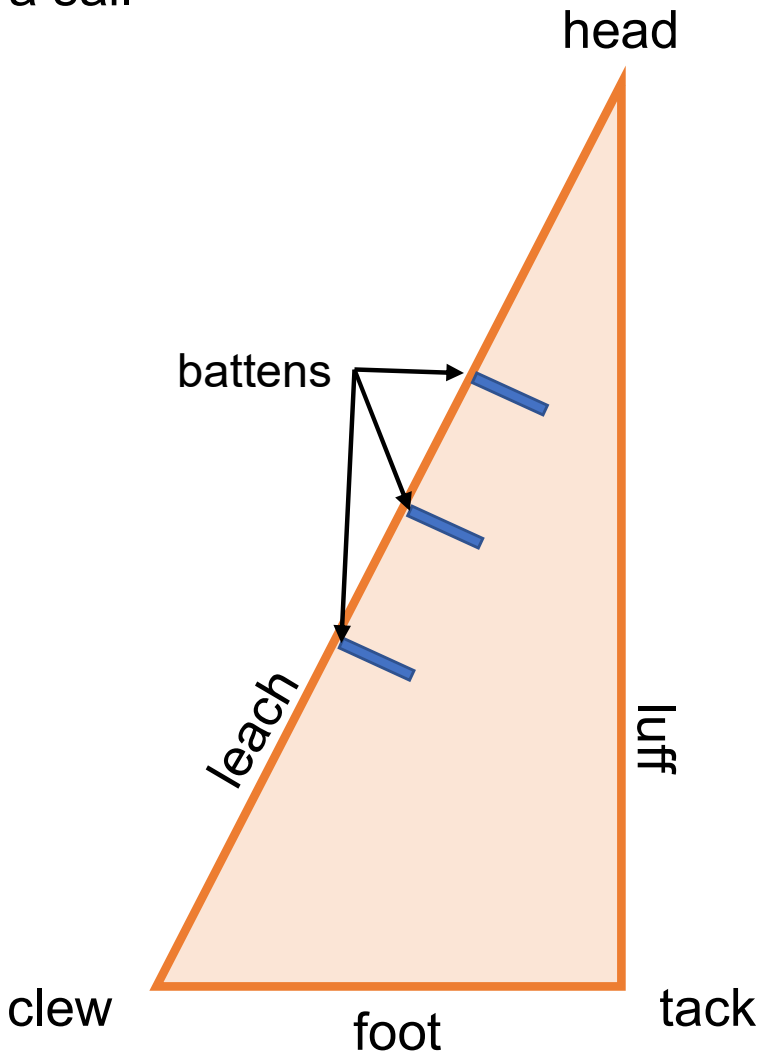

the main luff is attached
to the mast
the jib luff is attached
to the forestay
the clew is attached
to the aft end of
the boom

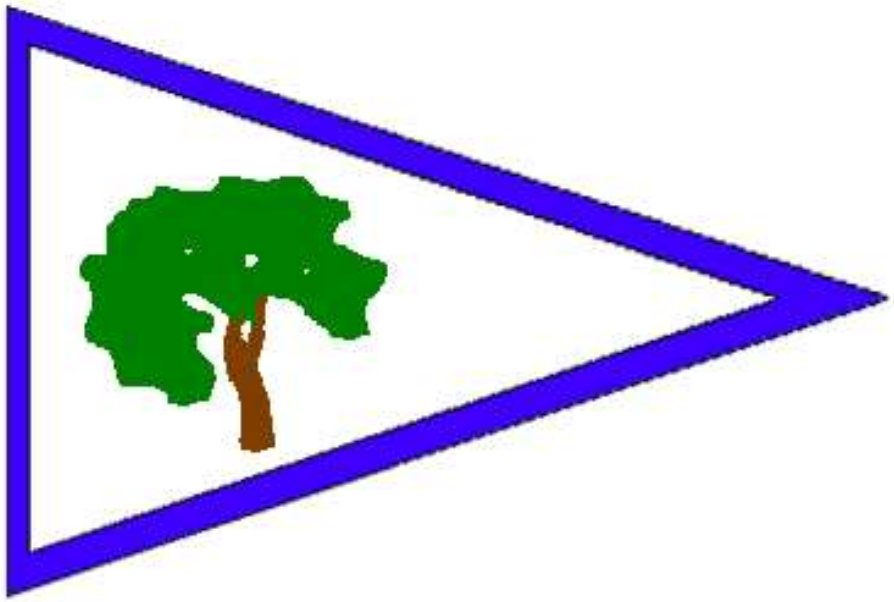
primary lines which
raise & control the sails




the position of the jib clew is controlled by the jib sheet
the position of the boom is controlled by the main sheet

parts of a sail



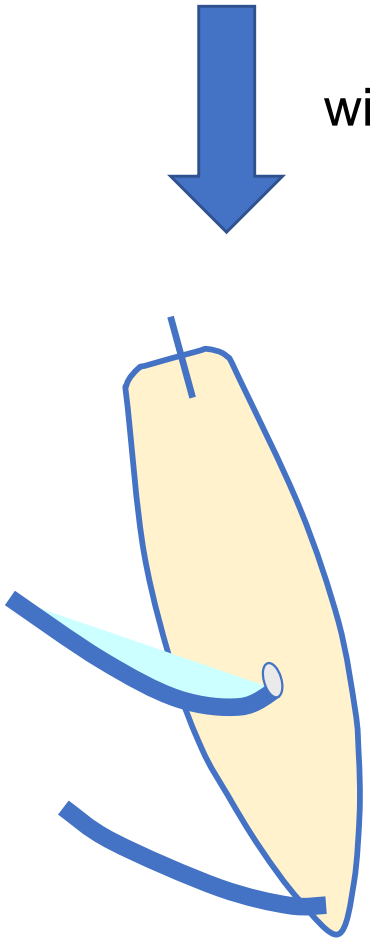


part 3

Making a boat go

- Downwind
- Upwind
- Forces
- Sail trim

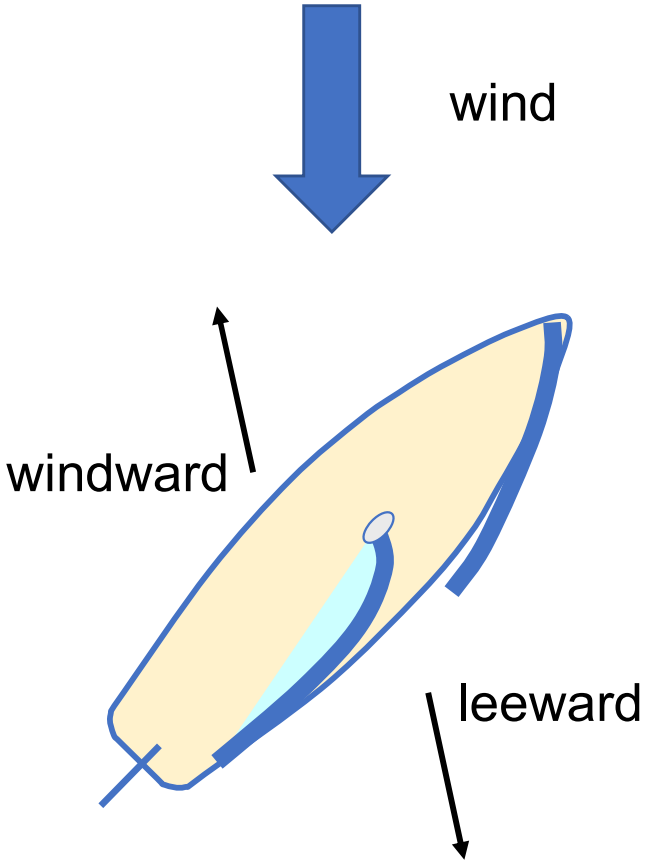
Sailing downwind



– pretty simple
– wind pushes on sail
(like Viking ships
or square-riggers)

Sailing upwind

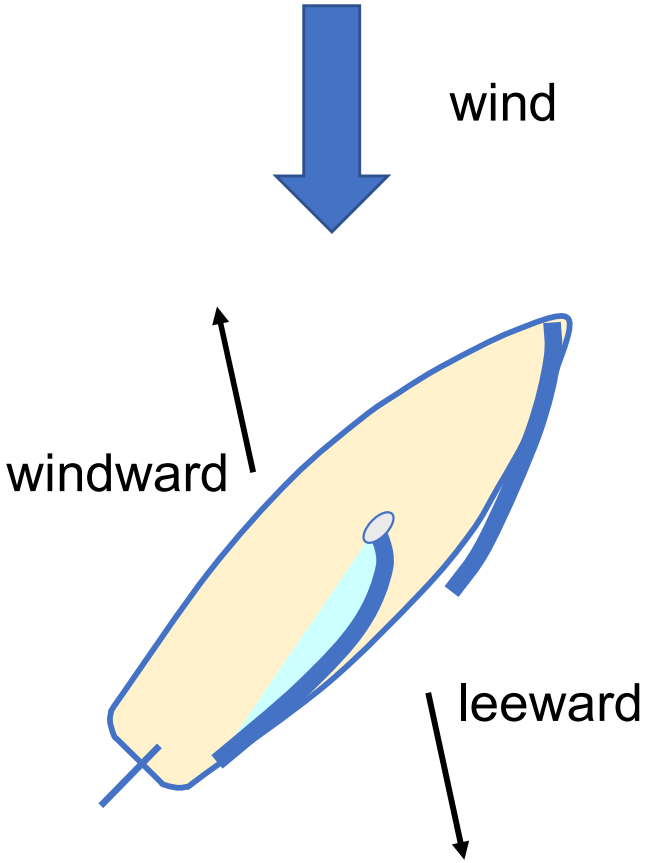
lots going on here

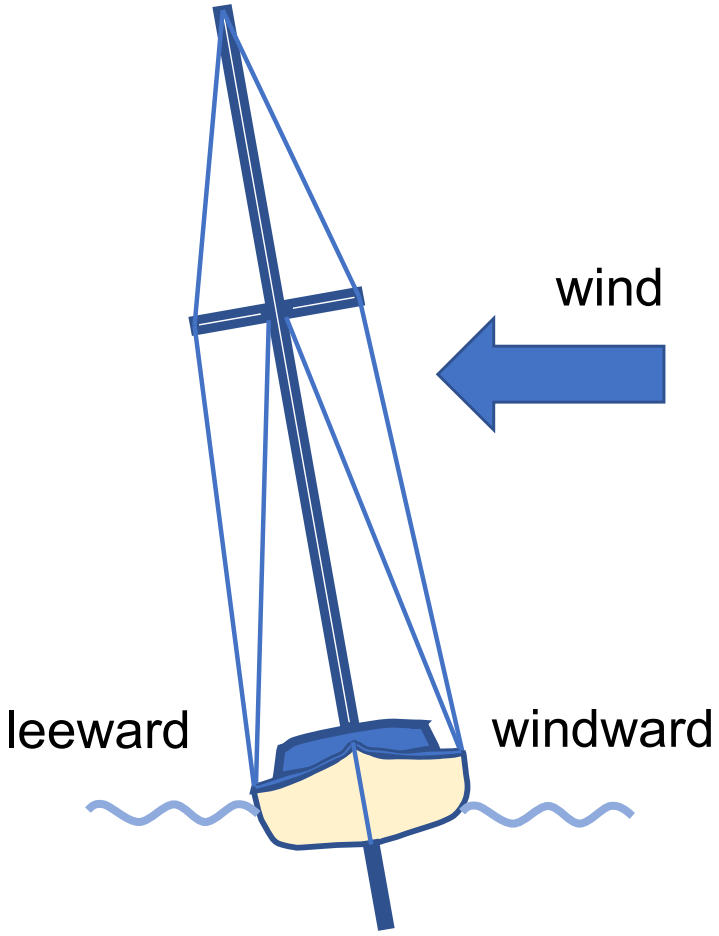


windward – toward the wind
leeward – away from the wind

Sailing upwind

lots going on here

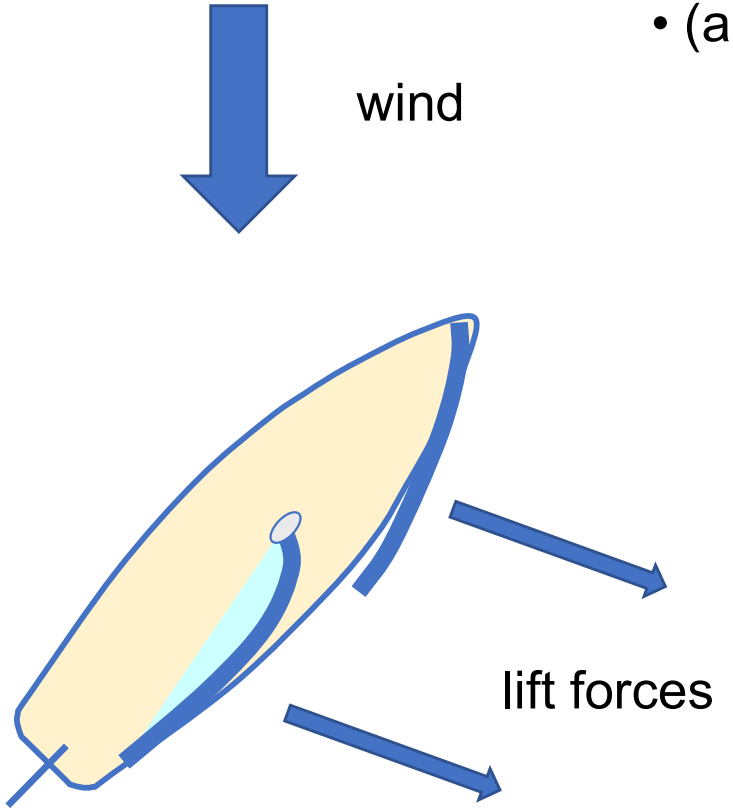


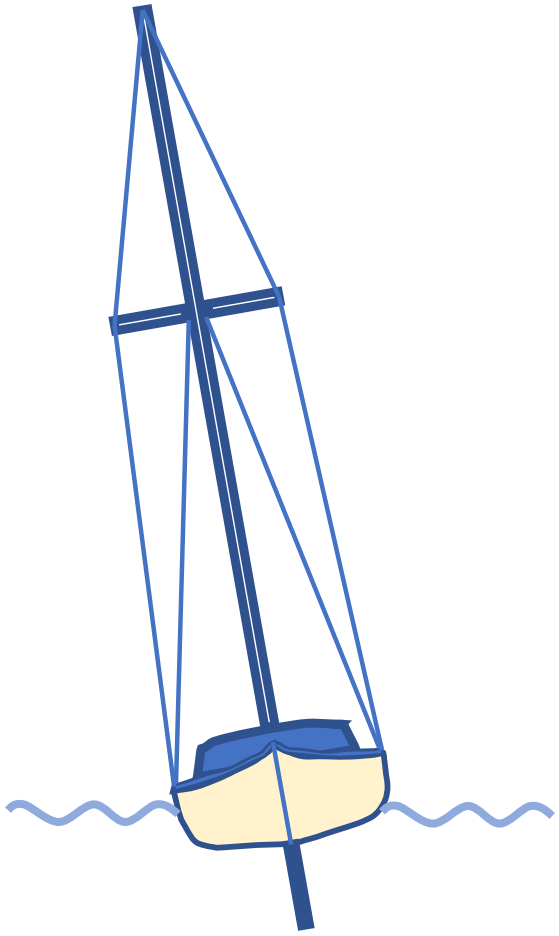


windward – toward the wind
leeward – away from the wind

Sailing upwind

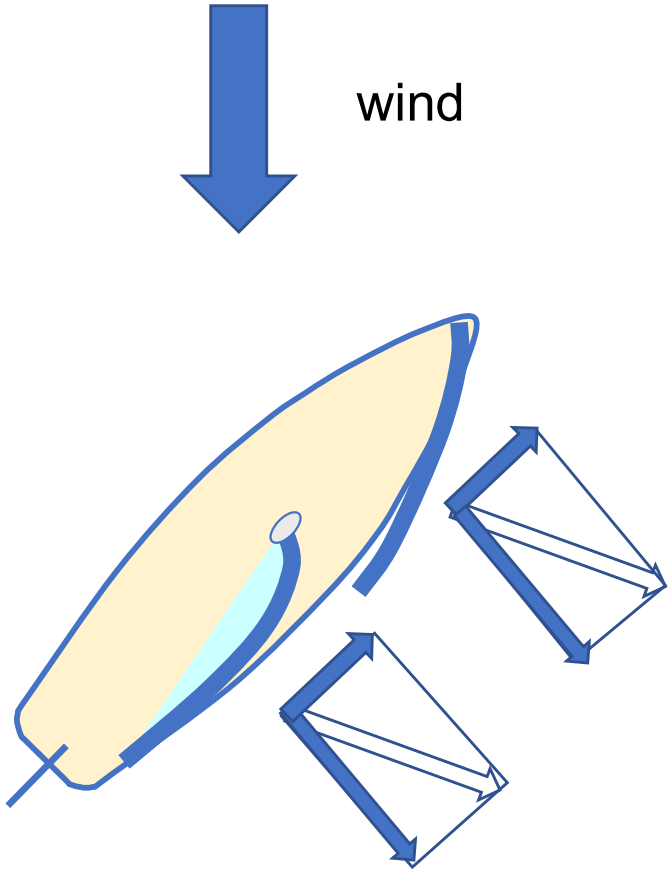
- air flow around curved sail causes lift
- (as with an airplane wing)

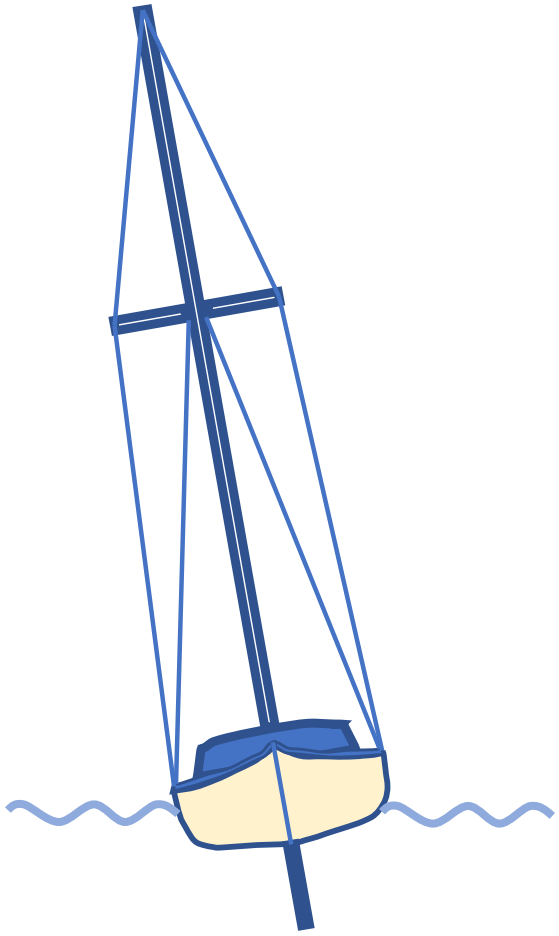




Sailing upwind

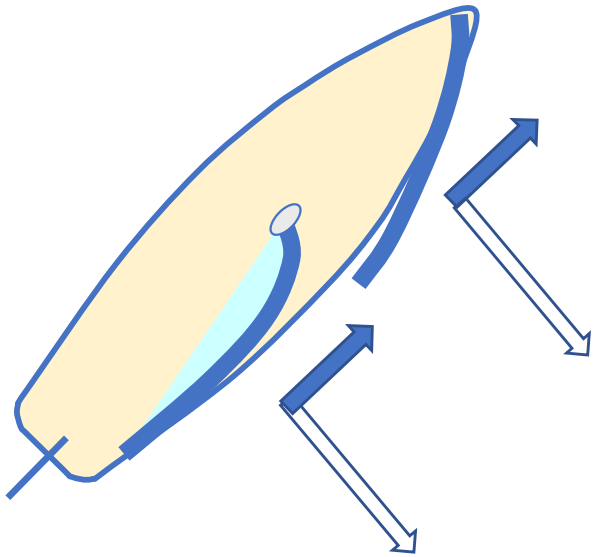
lift force leads to both
– forward force
– sideways force



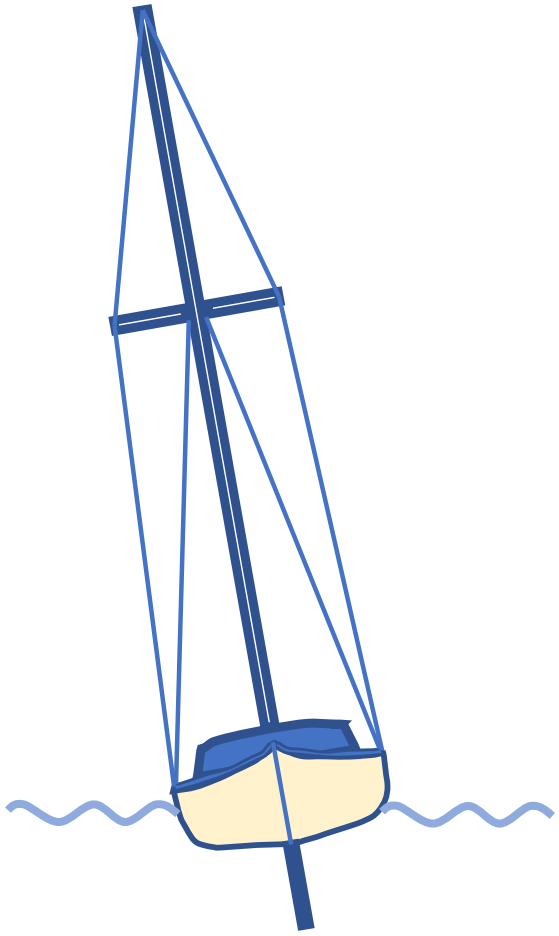


Sailing upwind

wind

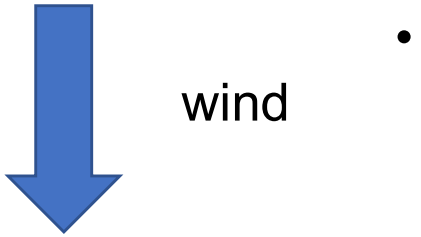


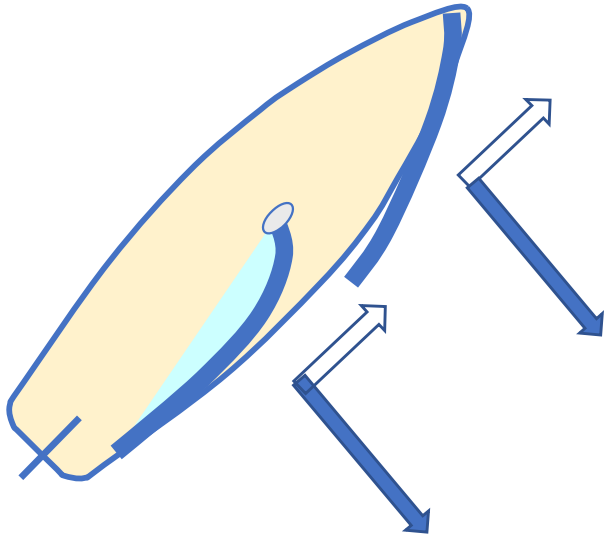
forward force pushes boat forward
(what we want)

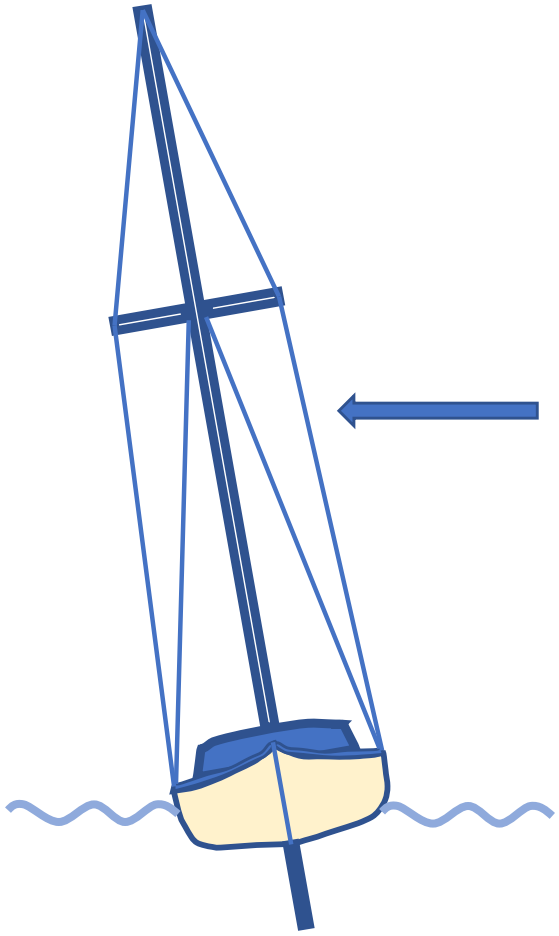


Sailing upwind

- sideways force tries to push boat sideways through the water
- resisted by the keel* & the hull
- get slow drift to leeward



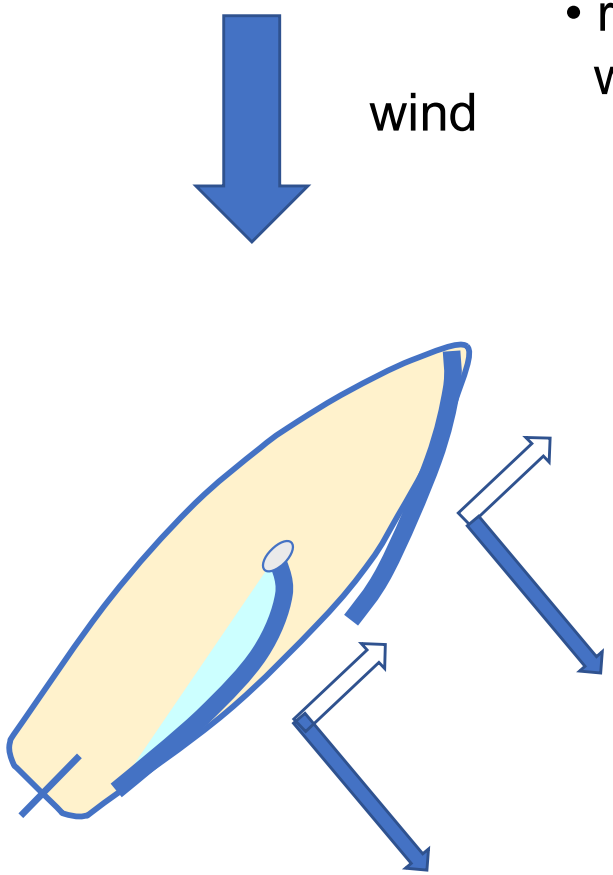


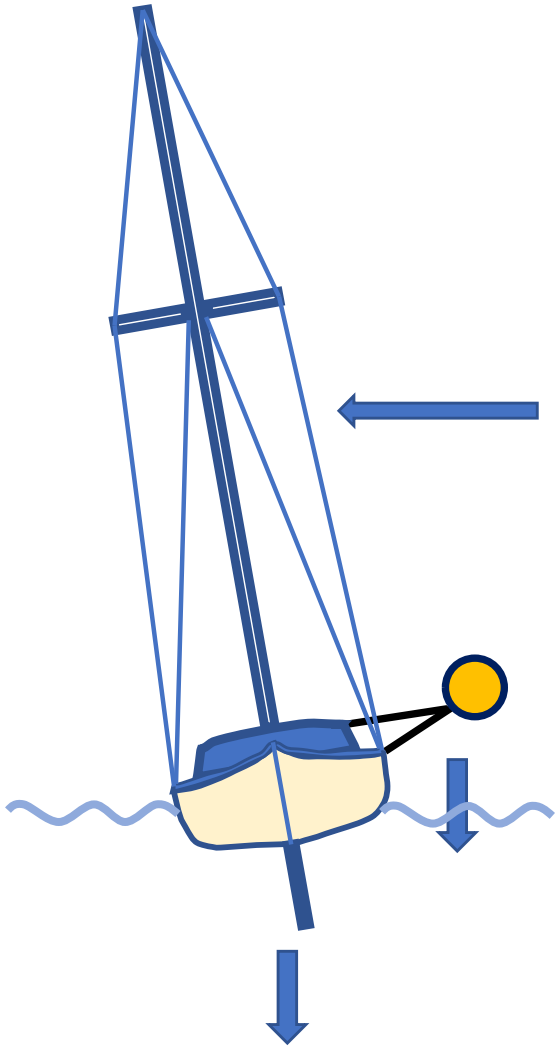


* one reason for a keel

Sailing upwind

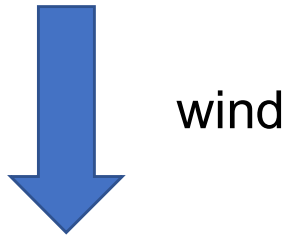
- sideways force also causes boat to **heel** (tilt)
- resisted by weight of keel* and weight of crew on windward (high) side





*another reason for a keel

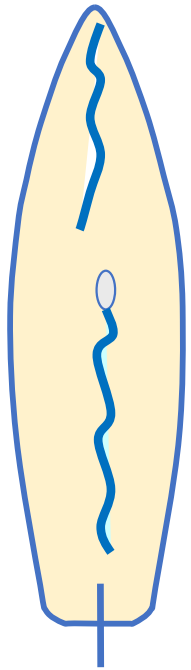
Sailing directly into the wind



wind

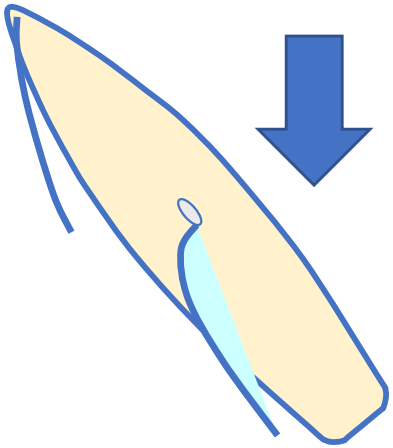
- doesn't work
- "in irons"
- boat stops
- lose control

– to get out of irons, drift backwards and to one side



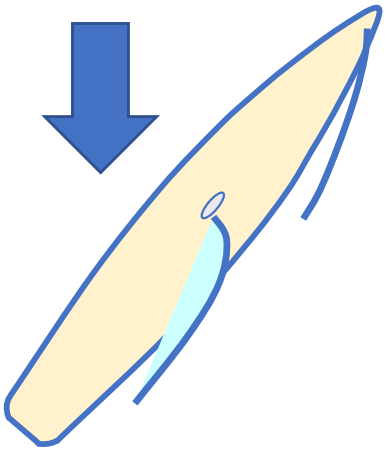
tell how the boat is oriented w.r.t. the wind

starboard tack



wind comes over
starboard side

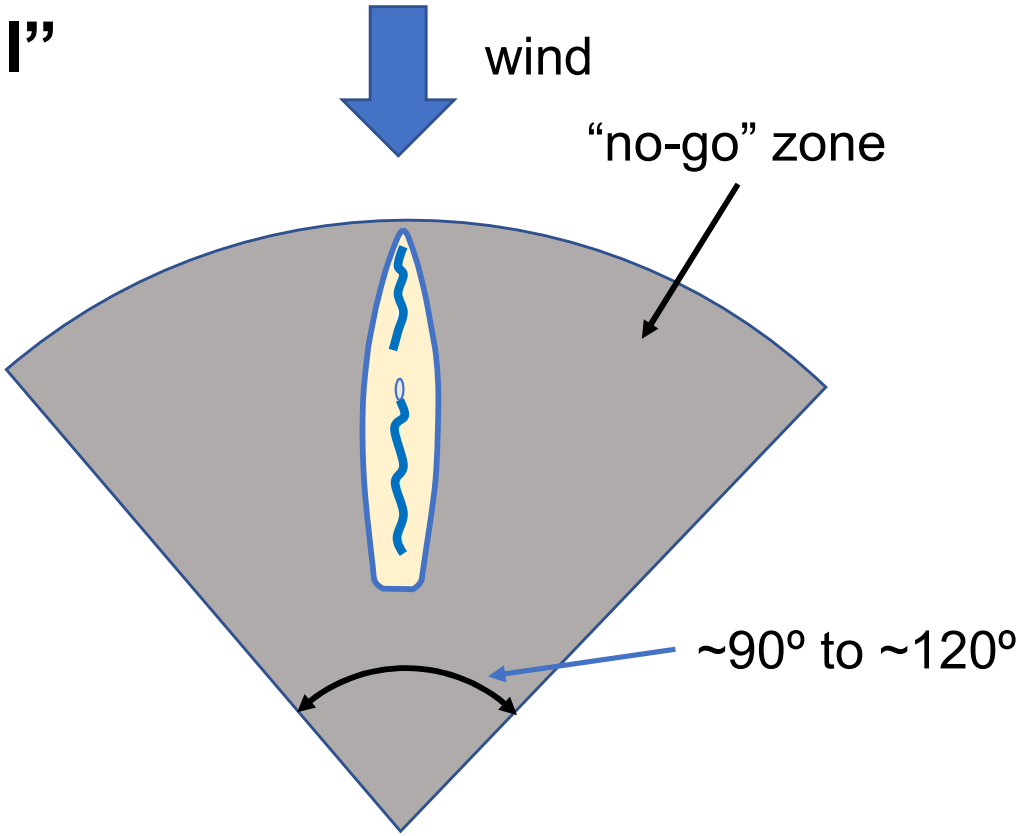
port tack



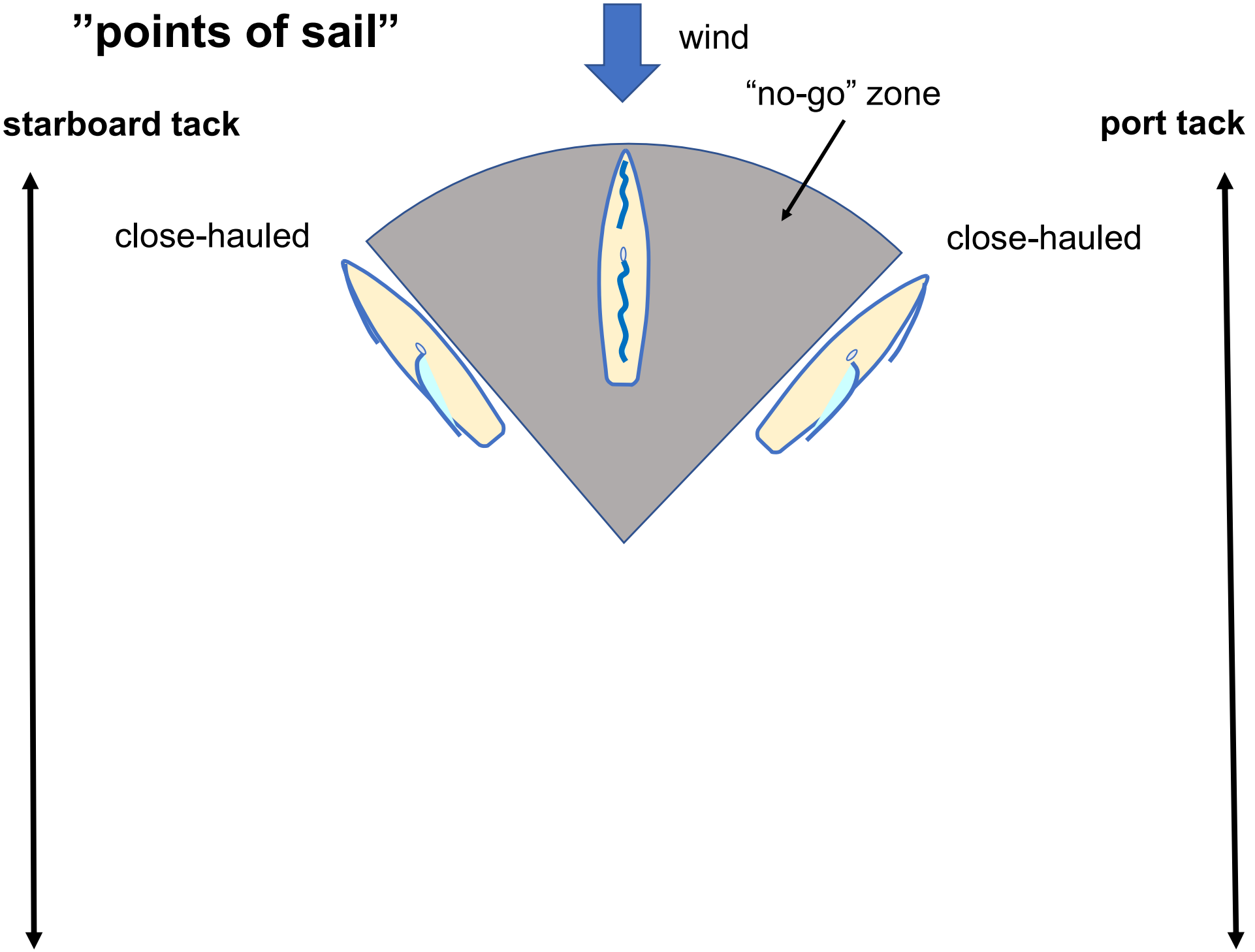
wind comes over
port side

”tack” has two meanings:
noun – sailing direction relative to wind
verb – turn through the direction of the wind

”points of sail”



”points of sail”



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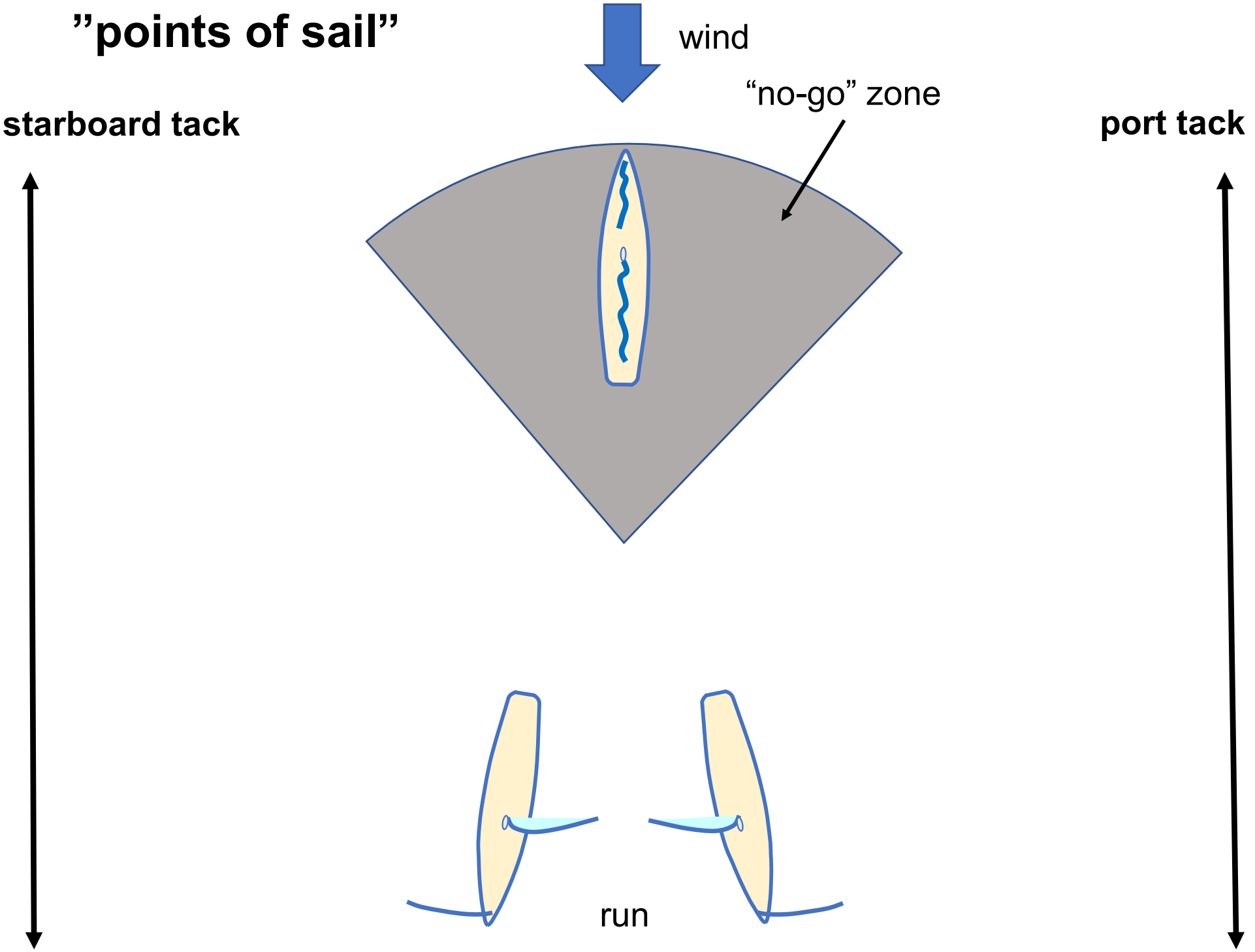
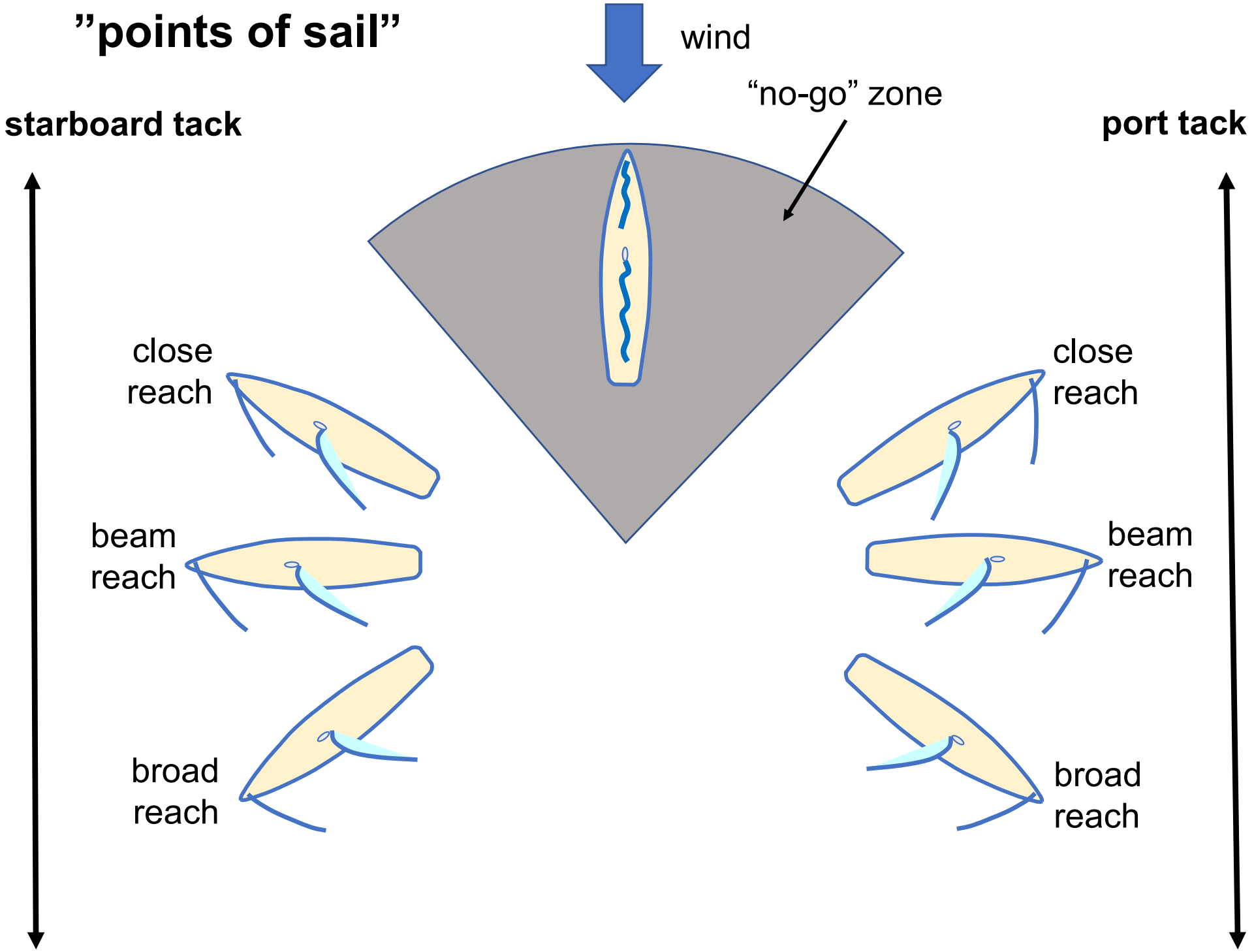
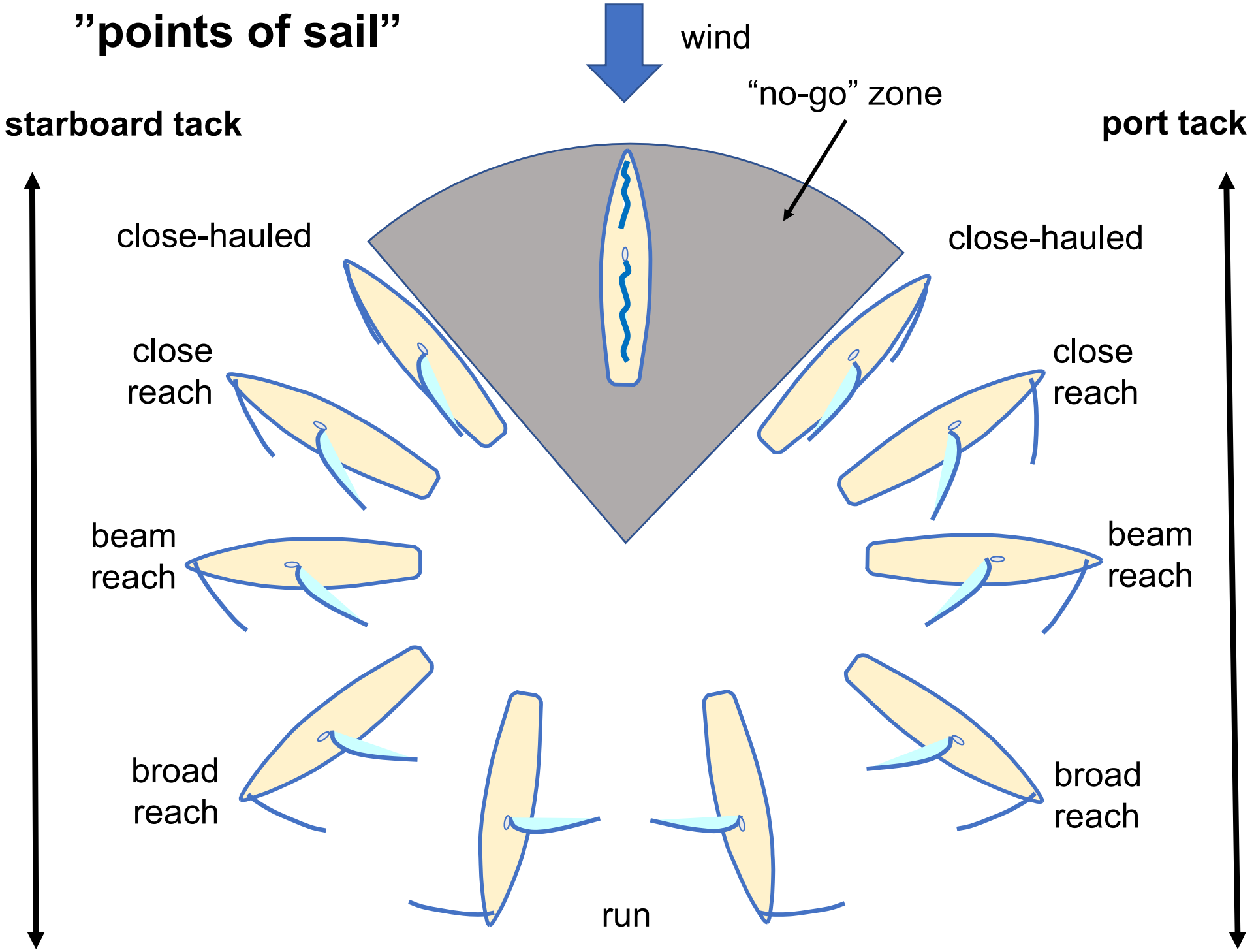


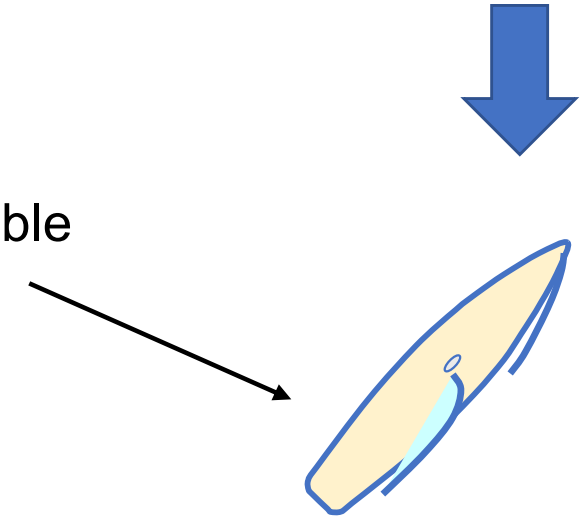
”points of sail”




”points of sail”
wind
“no-go” zone
starboard tack
port tack
close-hauled
close-hauled
close reach
close reach
beam reach
beam reach
broad reach
broad reach
run

some observations about points of sail

- sailing **close-hauled** can be uncomfortable and requires constant tweaking – you may prefer a close reach



some observations about points of sail

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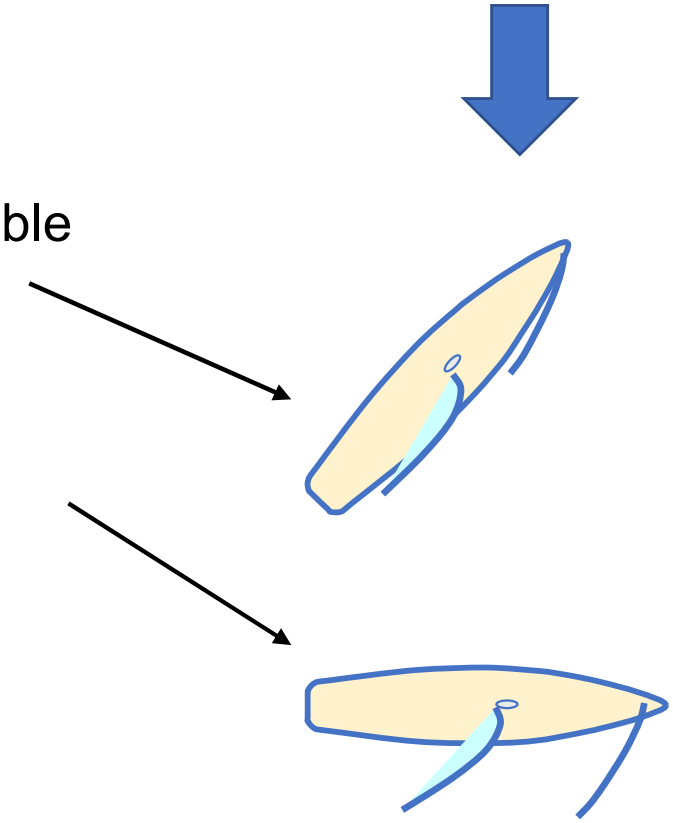
- a broad **reach** is fastest and most fun



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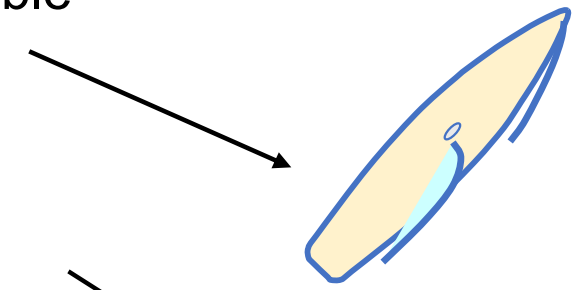
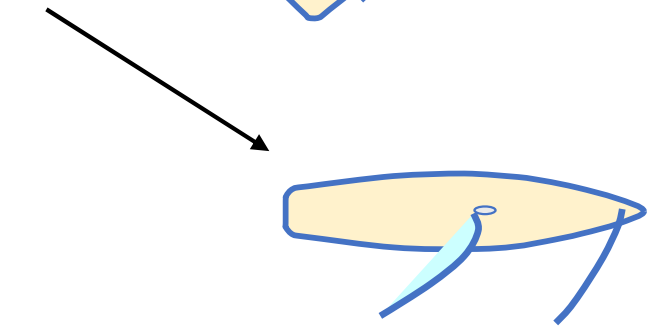
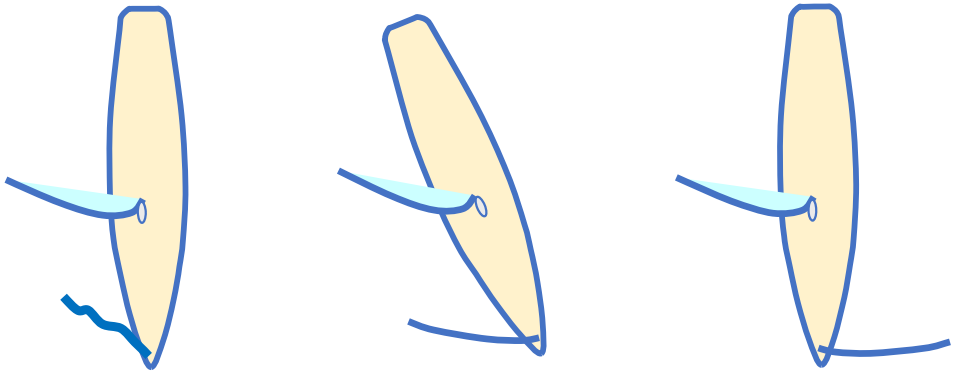
- sailing **close-hauled** can be uncomfortable and requires constant tweaking
  – you may prefer a close reach



- a broad **reach** is fastest and most fun



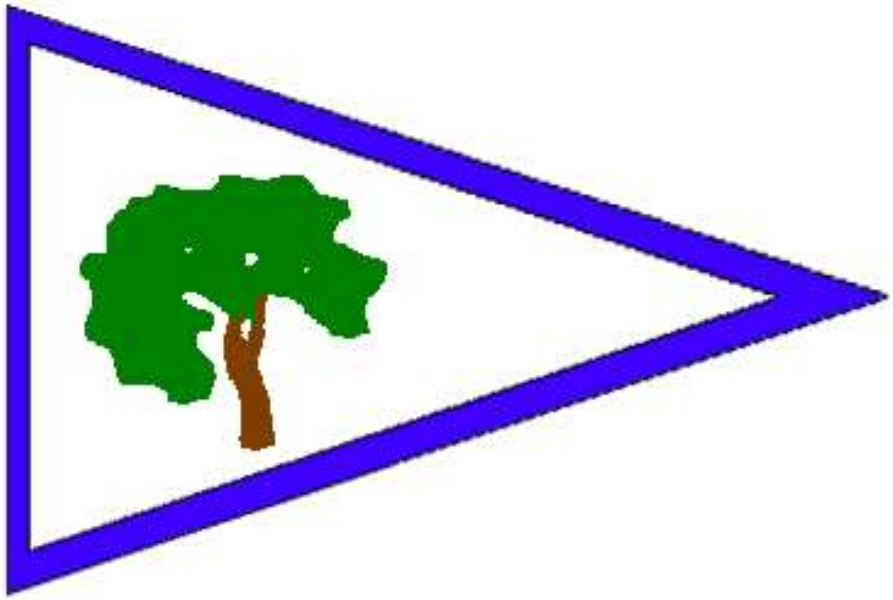
- going straight downwind, the main blankets the jib
  – either head up a little
  – or put the jib on the other side "wing-and-wing"



Summary (1-3)

We covered:

- Parts of a boat
- How the wind makes a boat go
- Points of sail



part 4

Sail control, steering, getting from here to there

- controlling and trimming the sails
- sail adjustments
- de-powering

Controlling and trimming the sails

- sheets: primary sail control

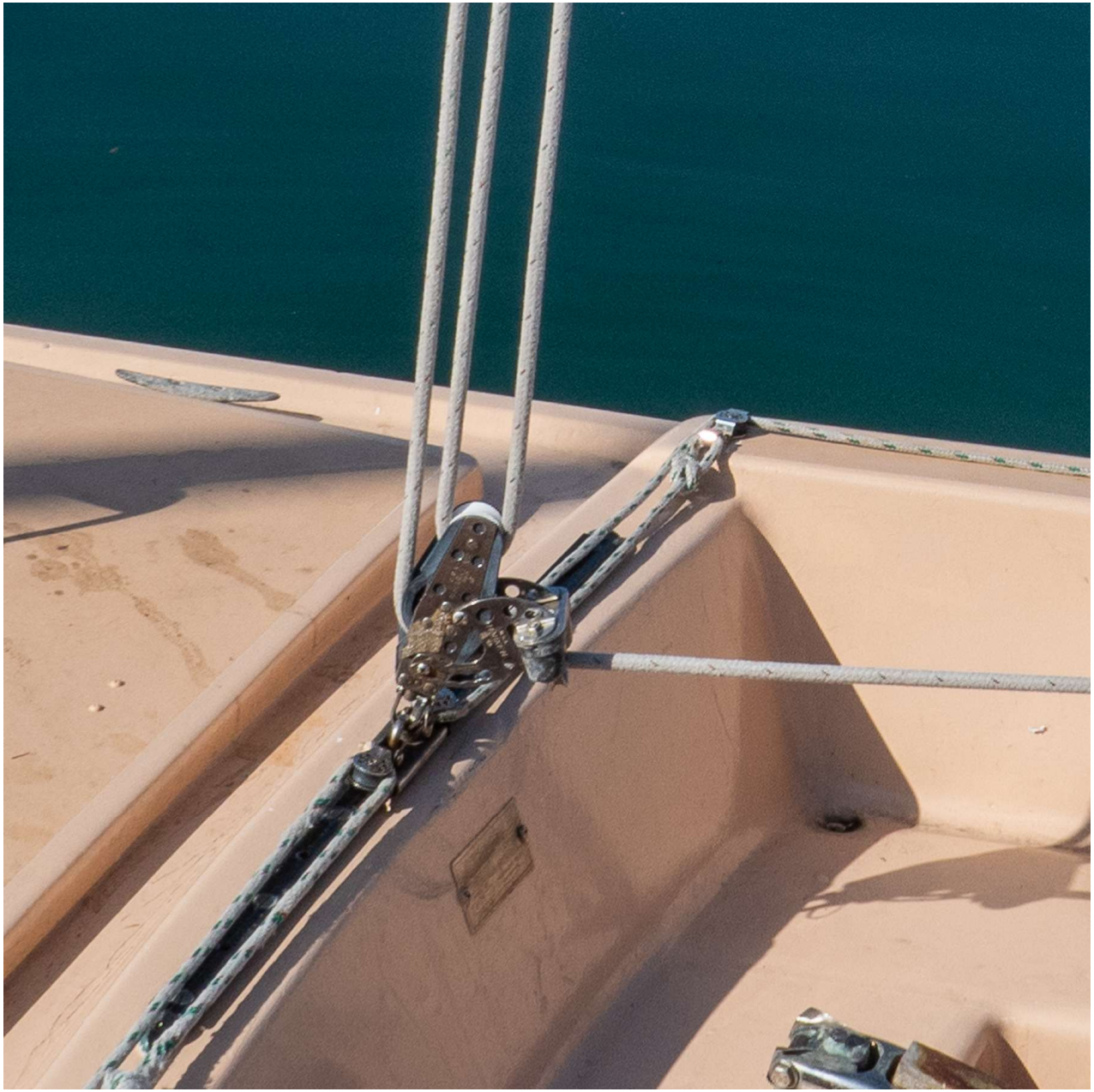
Controlling and trimming the sails

- sheets: primary sail control

- The **main sheet** controls the position of the boom, and so the angle between the mainsail and the boat.
- It connects the aft end of the boom to the cockpit. (Location varies from boat to boat.)
- Usually in a block-and-tackle arrangement.


HONDA

Sea Psalm
Dana Point



Controlling and trimming the sails

- sheets: primary sail control

- **jib sheets** are attached to the clew (aft corner) of the jib
  - there are two jib sheets; passing to the cockpit outside of the shrouds
  - one is used to control the position of the jib clew,
    the other is slack (depends on which tack we're on)

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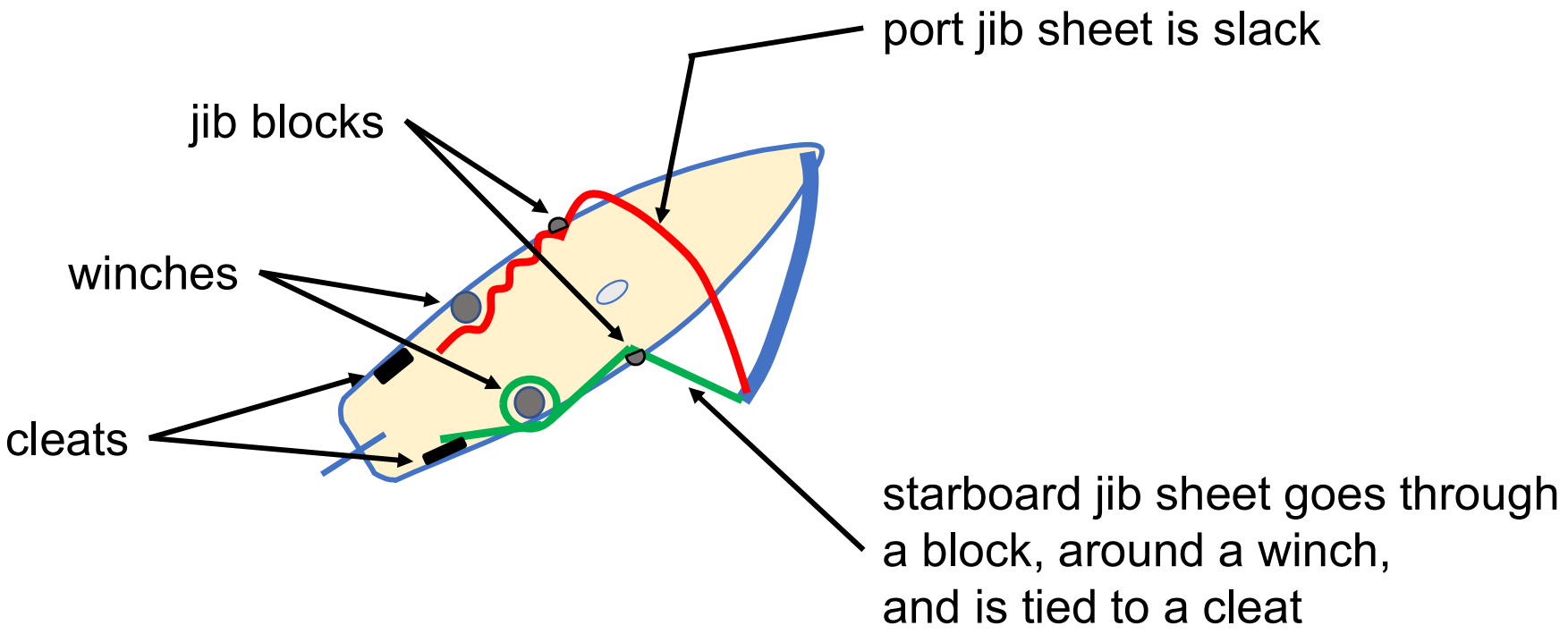
- for example, on port tack:



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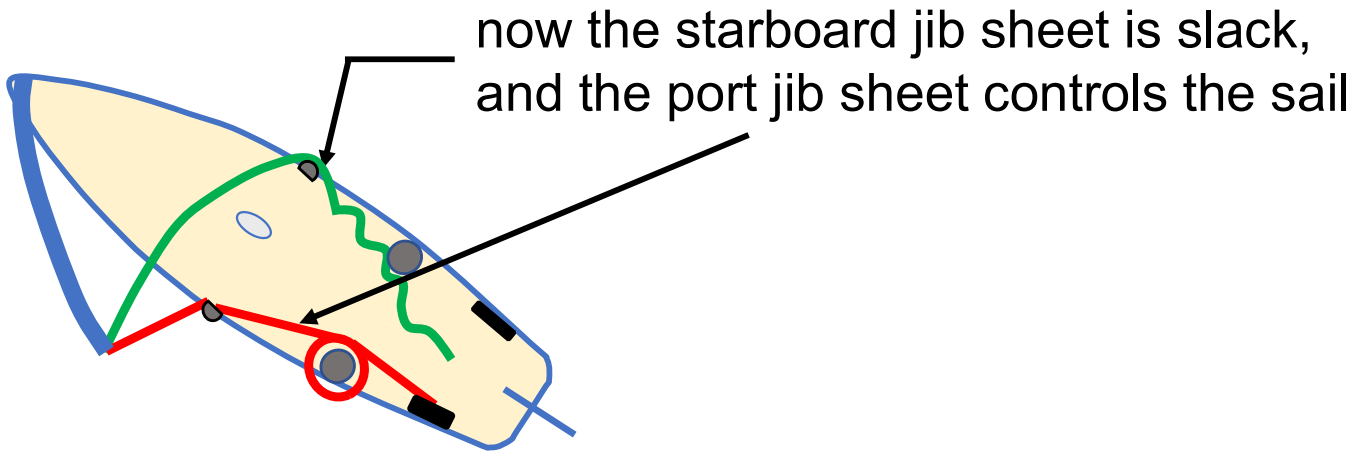
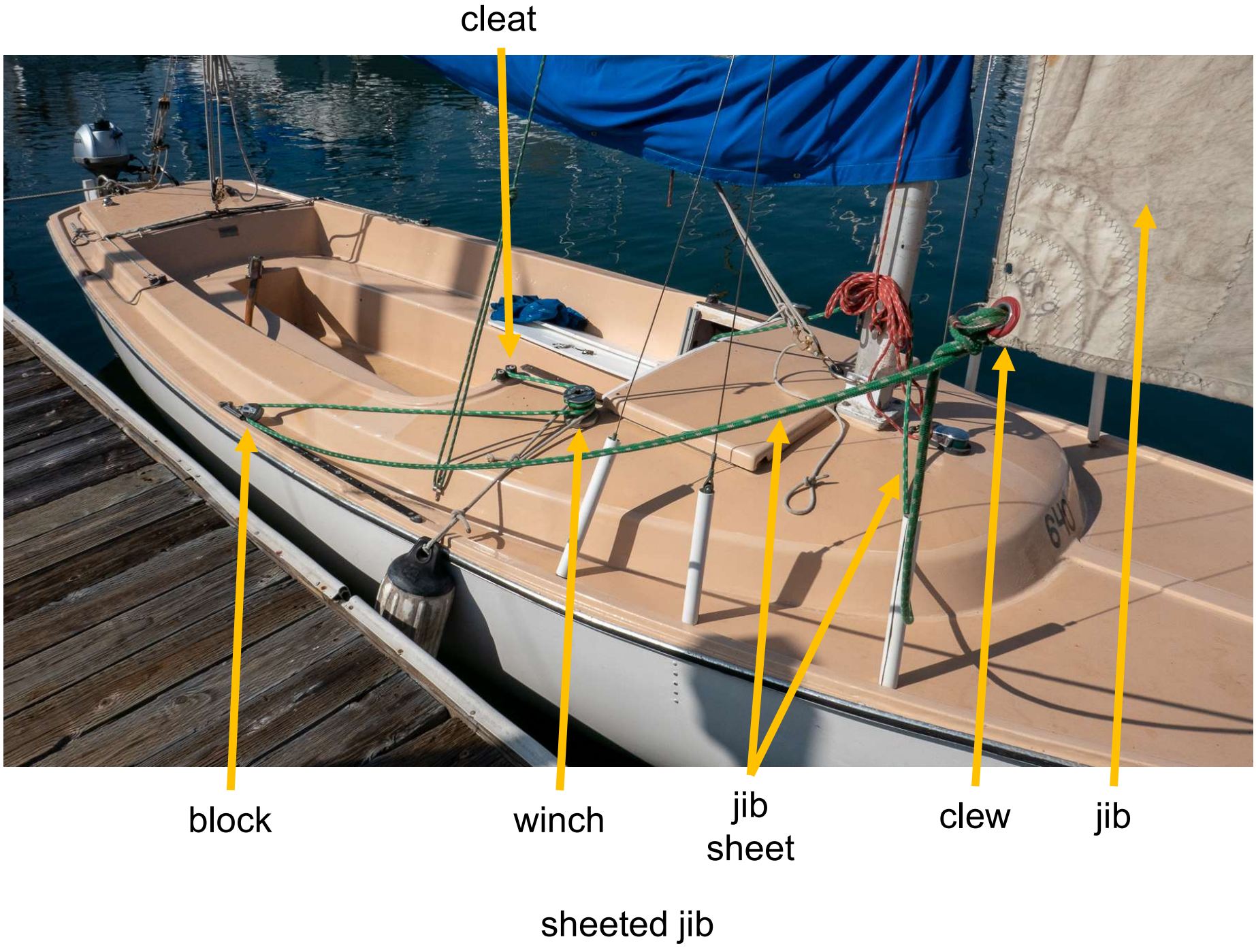
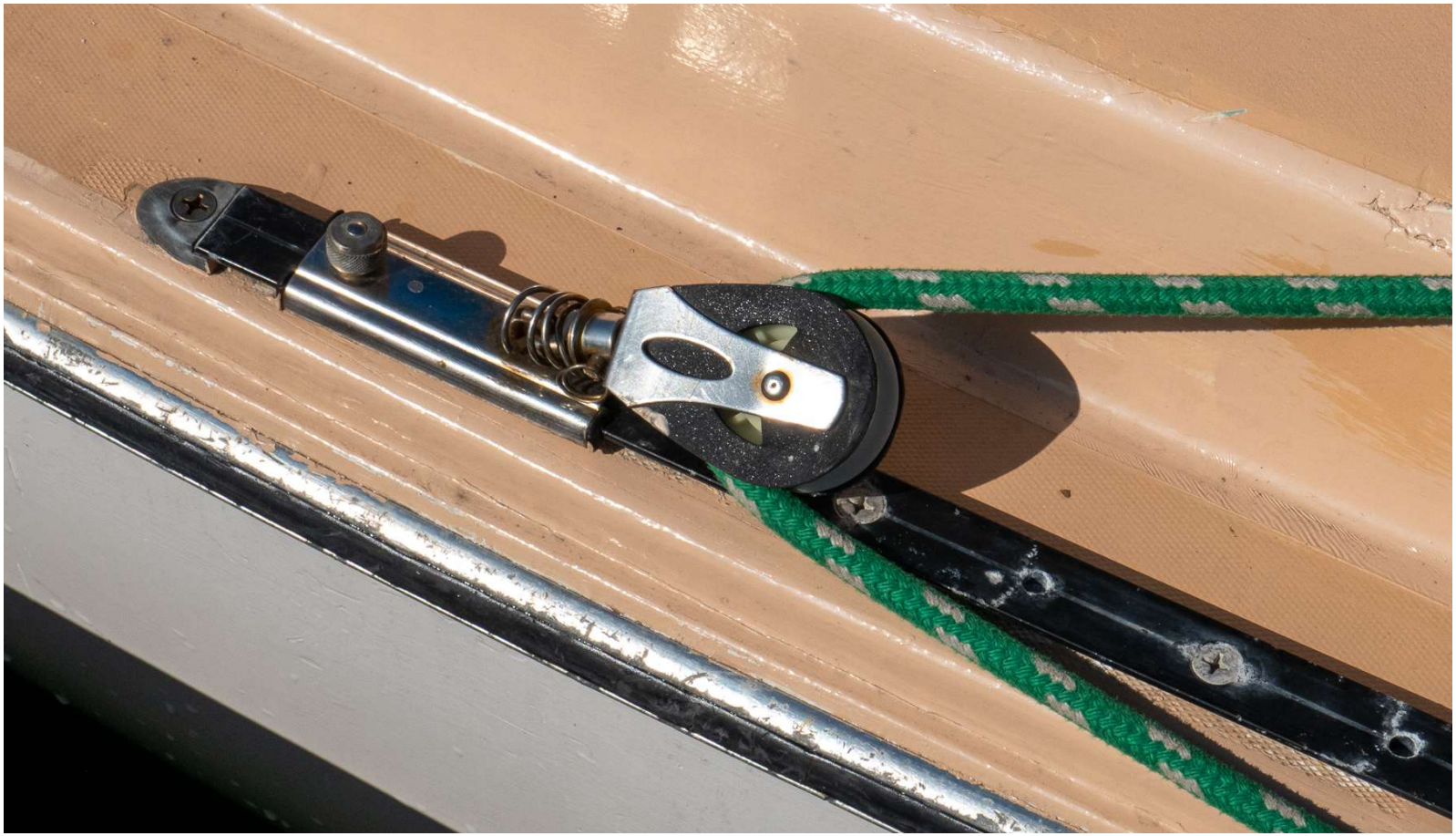
- after turning to starboard tack:





sheeted jib



jib block on Victory

winch on Victory

cleat for Victory jib sheet (cam cleat)


Relaxin'

There are many possible adjustments of a sail

- Poor **trim** => lose power
- Most basic: adjust sheet (position of clew)

trim: adjust the shape and position

There are many possible adjustments of a sail

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- Most basic: adjust sheet (position of clew)

Too loose:

– first the sail will **luff**; bulge to windward at the luff

– then it will flap like a flag

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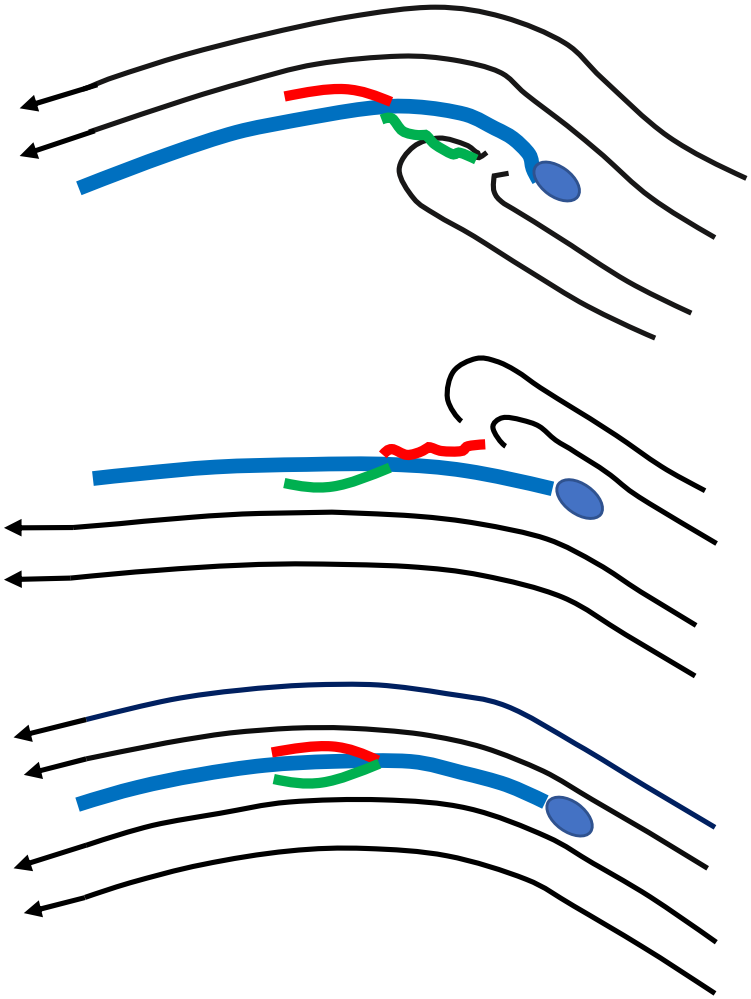
Just right:

– smooth flow => optimum performance

Tell-tales

- There may be tell-tales attached to the surface of the jib, or main, or both.
- Also at the leach (trailing edge) of the main.



– windward tell-tale flutters

– leeward tell-tale flutters

– both tell-tales stream smoothly aft

- With practice, you will be able to judge optimal trim by feel!

Tell-tales on window in jib

De-powering

- sometimes there is too much wind for your comfort level
  – either there is a brief puff or a longer stretch of high wind
  – your response is to reduce the power of the sail

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  – make the sail luff
    => ease the sail – *“when in doubt, let it out”*
    => or head up (turn into the wind)

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- in a steadier strong wind
  – flatten the sails
    => tighten the vang, outhaul, downhaul, jib leech
  – (in a very light wind, do the opposite => loosen everything)
  – “**reef**” the sails (reduce their area)
  – lower the jib (sail only with the main)

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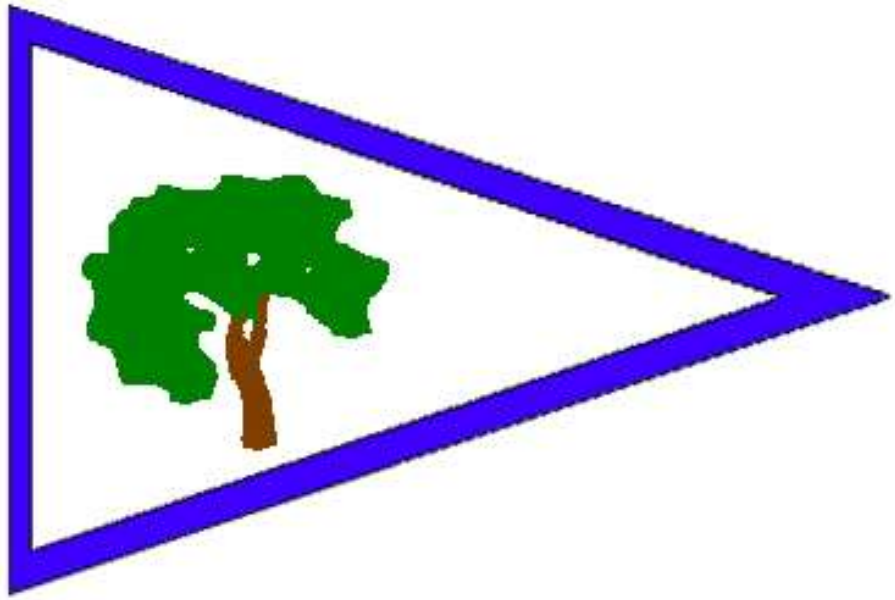
- last – if you don't feel safe, lower the sails,
  start the motor, go home



part 5

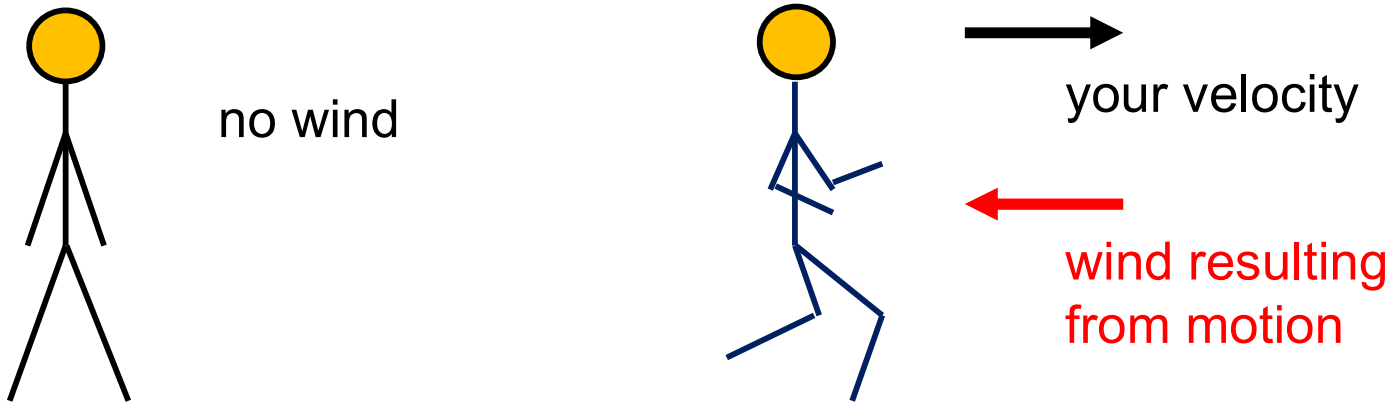
Driving the boat

- Wind – true and apparent
- Turning
- Sailing straight

Where is the wind coming from?
How strong is it?

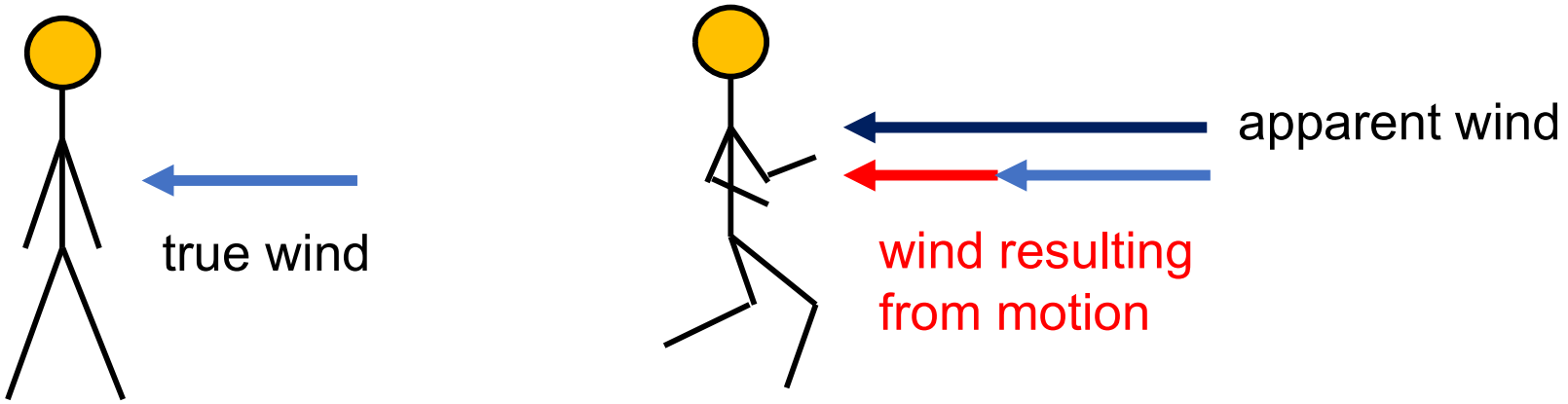
“Apparent wind”

- A sailboat moves through air and is driven by air.
- Air speed and direction are usually thought of as measured with respect to instruments fixed to the ground (or you, standing still); called “true wind”
- But: you can make your own wind, by moving.
- The velocity of the wind due to your motion is equal and opposite to your velocity.

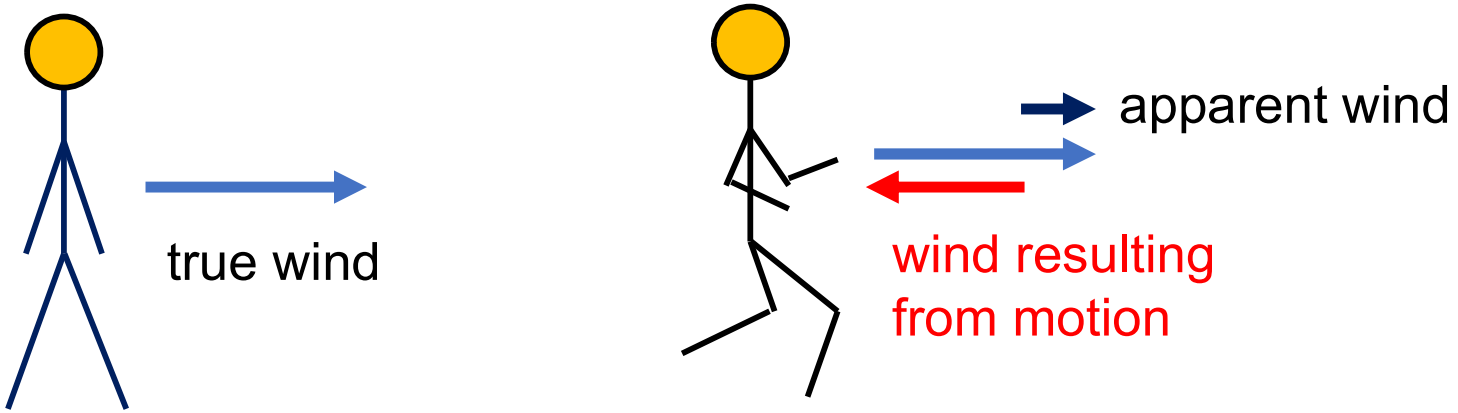


Apparent wind

running into the wind => true wind and motion wind add
=> apparent wind is larger

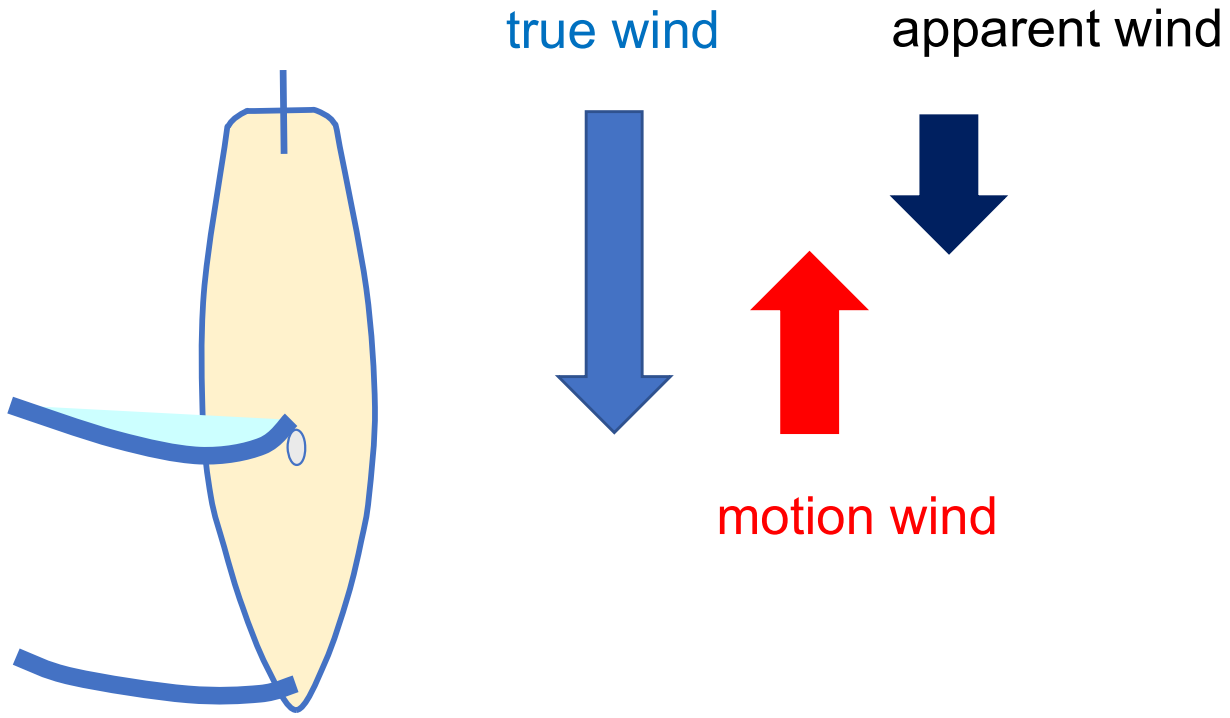


running with the wind => winds subtract
=> apparent wind is smaller



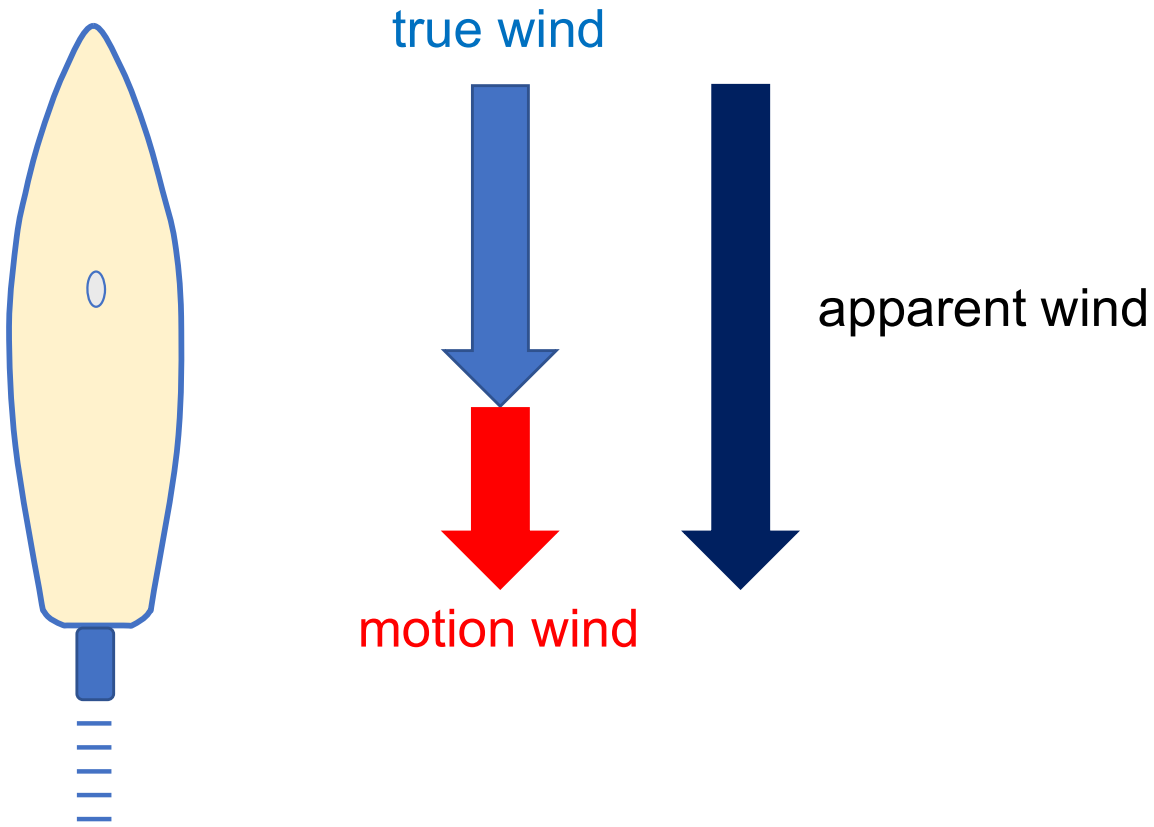
A sailboat is moving through the air and so it responds to the <u>apparent</u> wind

Sailing downwind



- The wind driving the boat, and felt by the crew is less than the true wind
- This makes a downwind run a good time to take it a bit easier

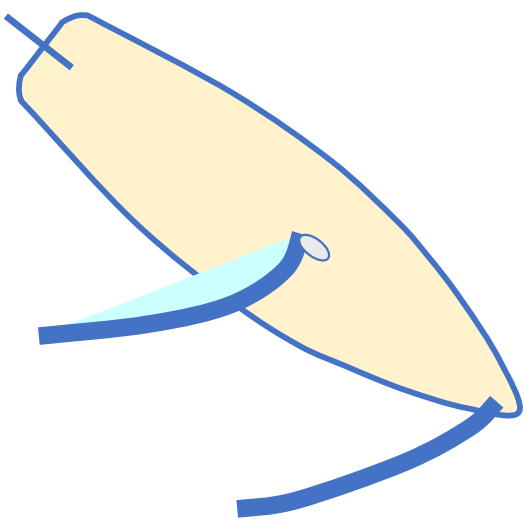
~~Sailing~~ motoring upwind

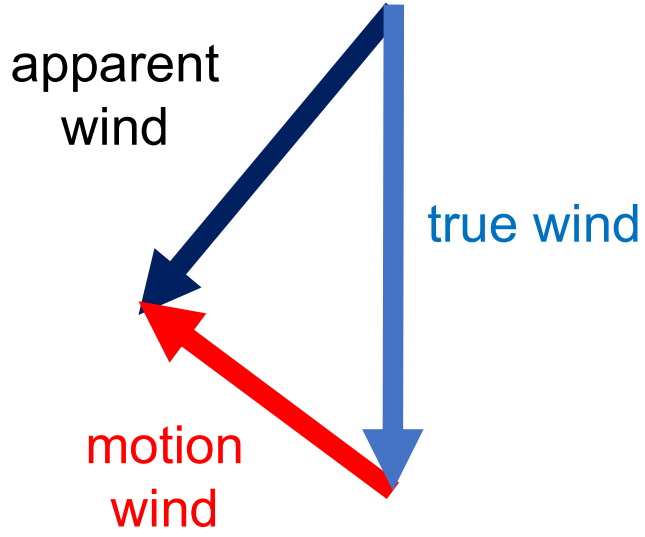


- The wind felt by the boat and the crew is large
- This can make going upwind less comfortable
- Note that the apparent wind can vary a lot, depending on the direction you're moving

What is the apparent wind when sailing another course?

on a broad reach:

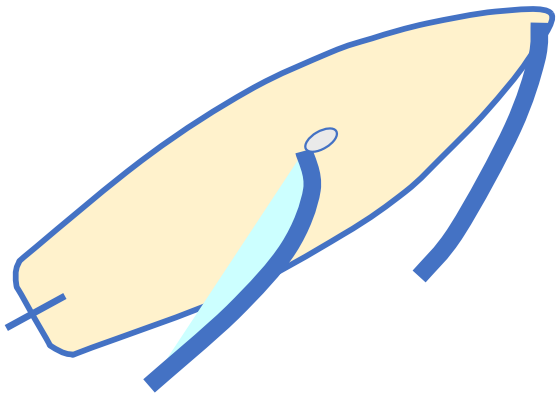


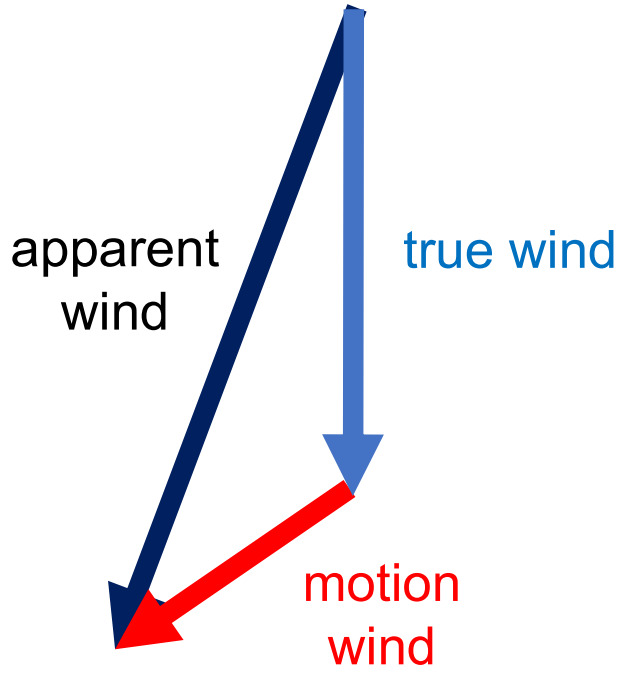


- The (apparent) wind strength is reduced
- Its direction has changed
  – crew should adjust the sails

What is the apparent wind when sailing another course?

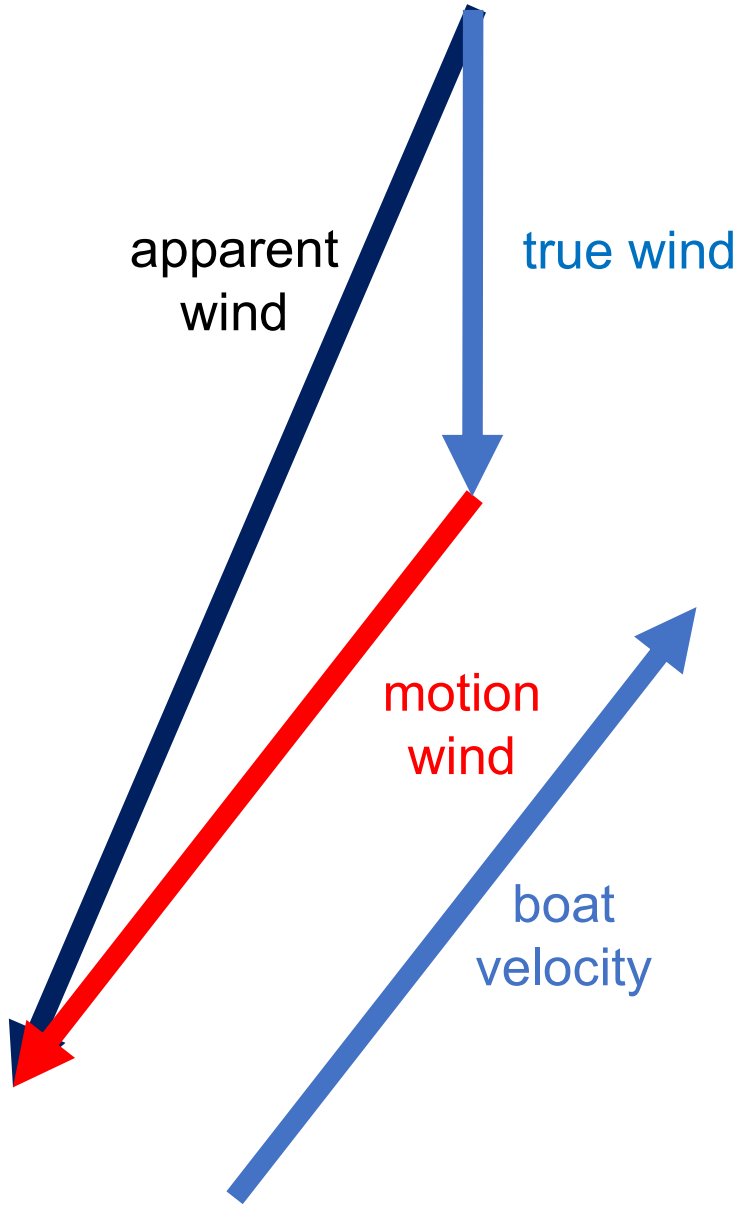
on a close reach:





- The (apparent) wind strength is increased
- Its direction has changed
  – crew should adjust the sails

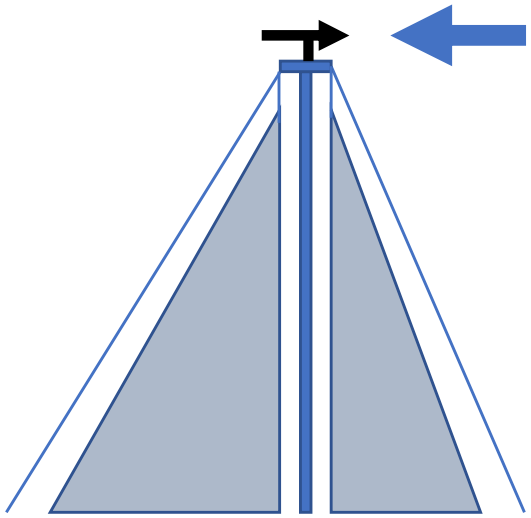
Boats on foils (and ice boats) which have little drag can sail much faster than the wind.



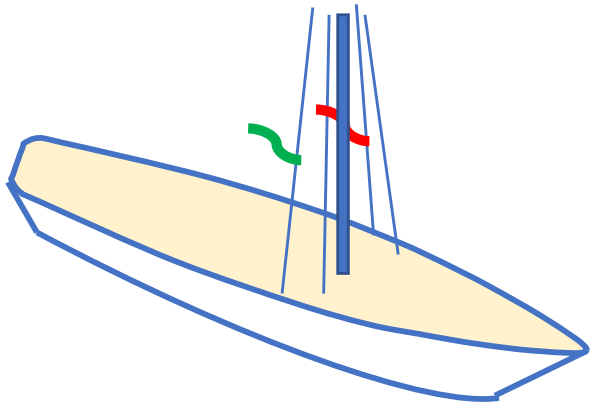
How to tell where the wind is coming from

- Most important: learn to judge the feel of the wind on your face!

- Wind vane (“fly”) on top of mast



- Tell-tales (strips of yarn) on shrouds



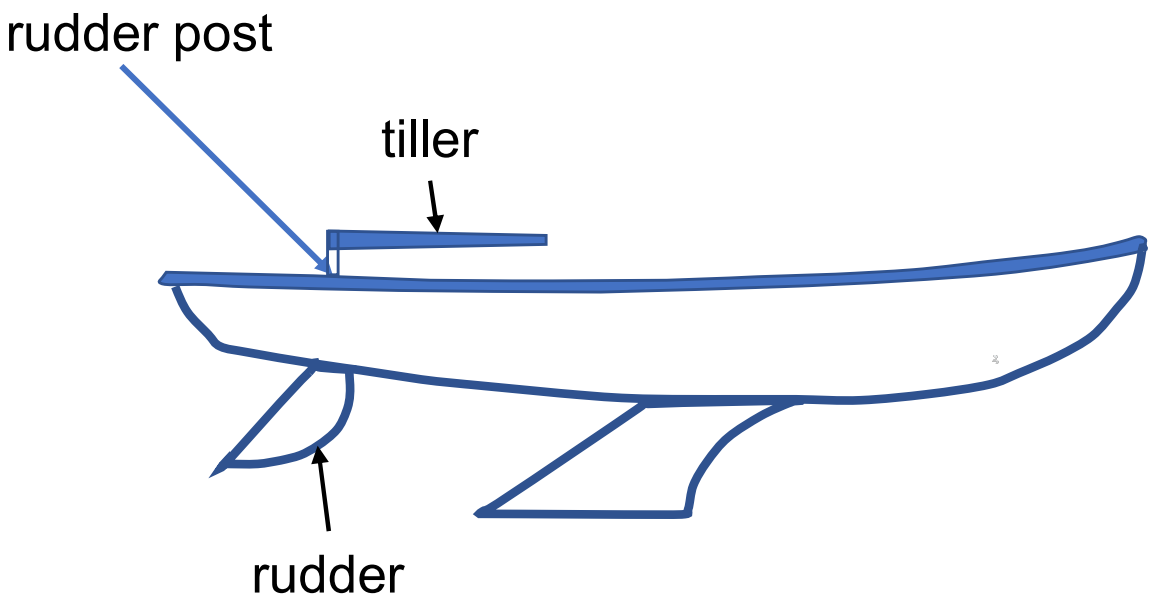
- Ripples on water (roughly perpendicular to wind)

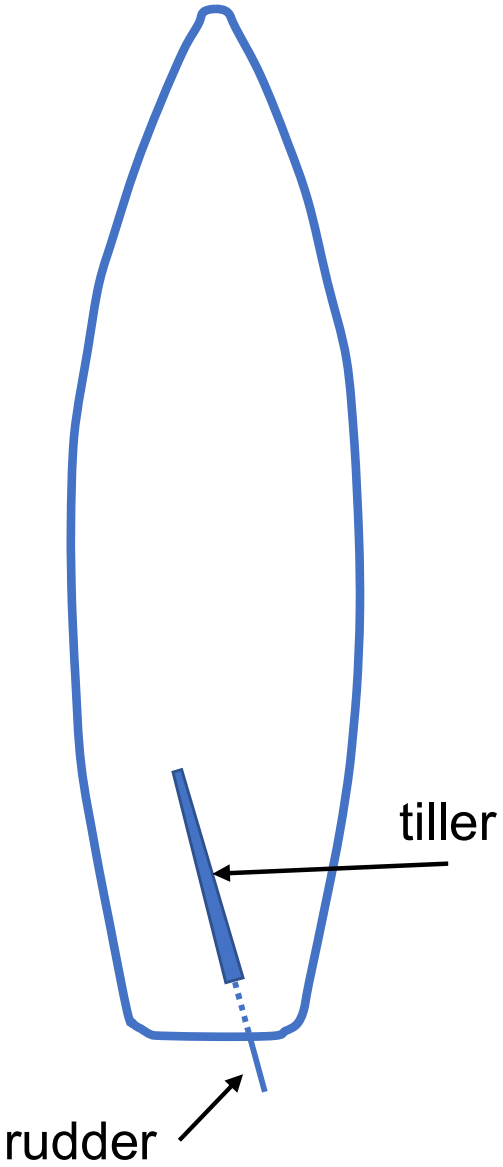
masthead fly

tell-tale on shroud

Steering

- The **rudder** is mounted on a vertical axle (the rudder post).
- The **tiller** is attached to the top of the post, allowing the helmsman to move the rudder.

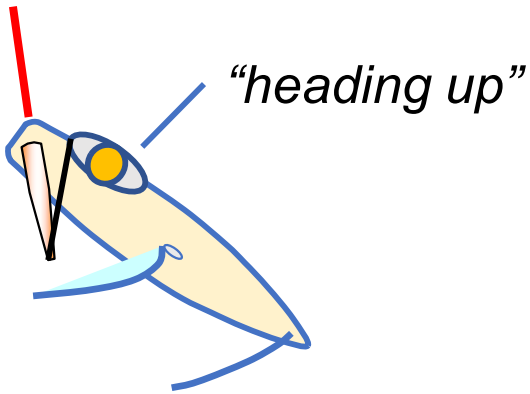




helmsman: the person steering the boat

helmsman

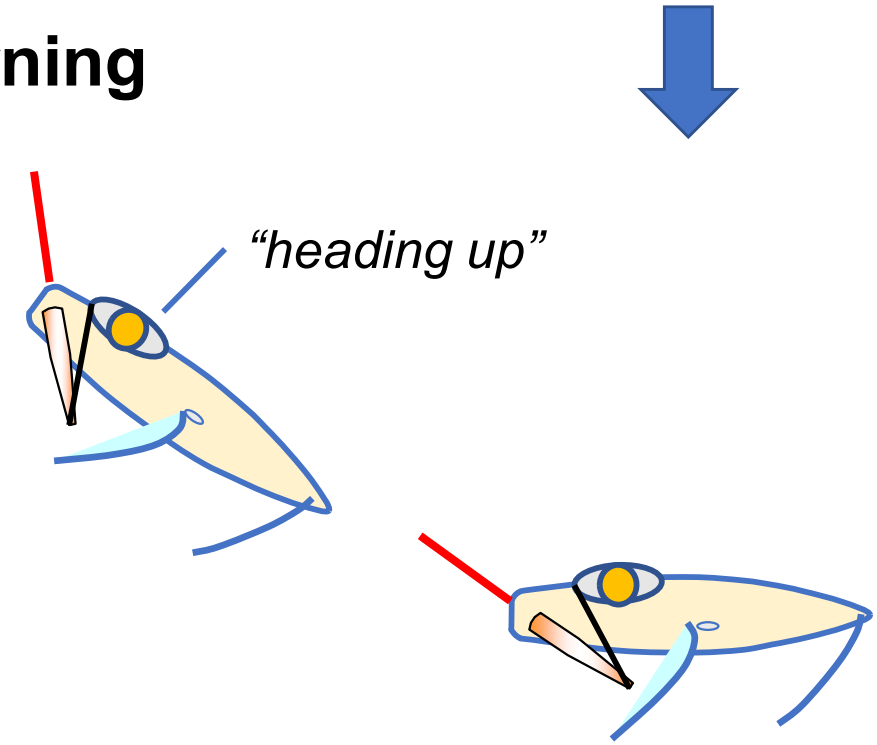
Turning



- To turn to port (left) put the tiller to starboard.
- Think: you are steering the back of the boat.

“head up” => turn toward the wind
“bear off” => turn away from the wind

Turning



- To turn to port (left) put the tiller to starboard.
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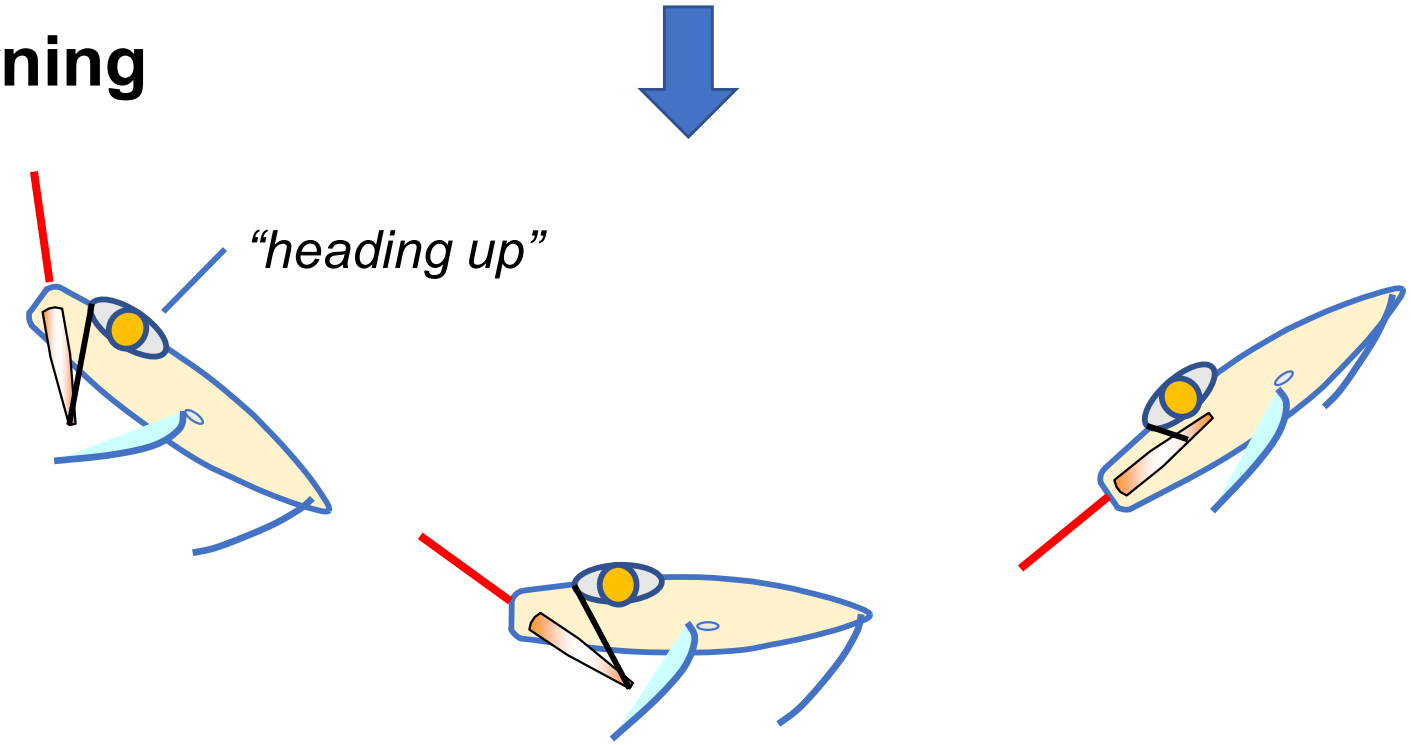
- Crew adjusts sails during turn.

Turning

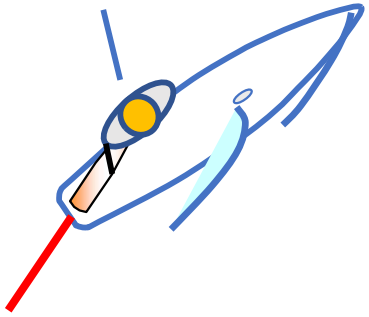


- To turn to port (left) put the tiller to starboard.
- Think: you are steering the back of the boat.
- Crew adjusts sails during turn.
- When turn is completed, straighten tiller.

– Generally the helmsman and crew will be on the windward (high) side.

Turning

“bearing off”



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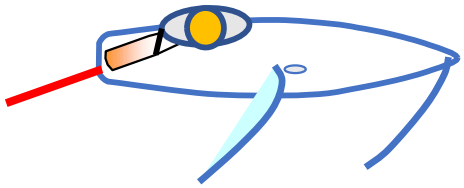
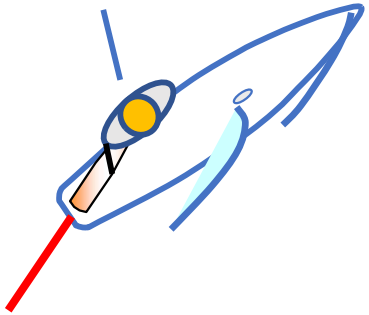
- Again: you are steering the back of the boat.

Turning



“bearing off”



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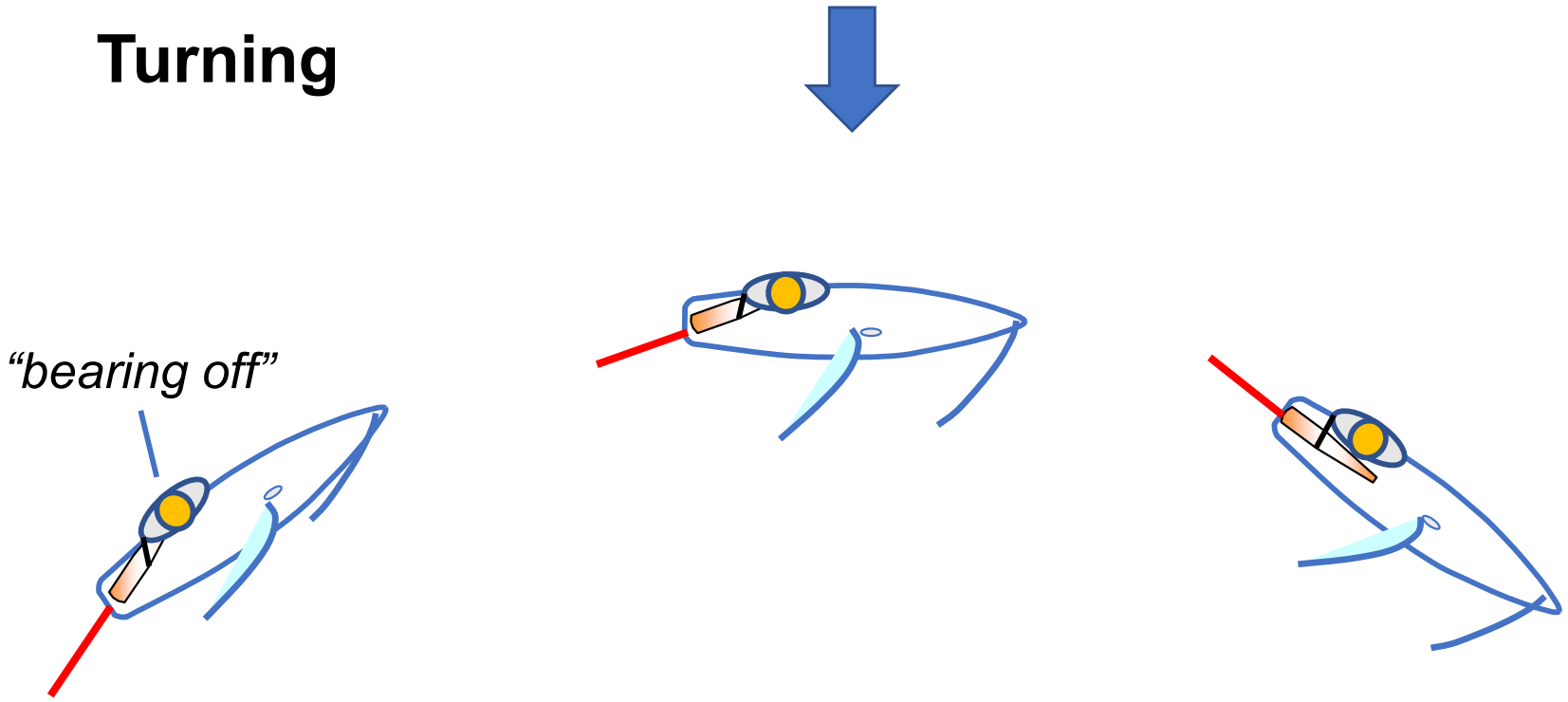
Turning



- To turn to starboard, put the tiller to port.
- Again: you are steering the back of the boat.
- When turn is completed, straighten tiller & crew adjusts sails.

– Directions of turns are called out w.r.t. the wind, so the crew knows what to do with the sails.

Sailing a “straight” course

- The wind is never entirely steady.
  Also waves and currents vary from moment to moment.

$\Rightarrow$ The helmsman and crew need to constantly adjust tiller and sails.

- When not close-hauled (on a reach or run) the helmsman generally holds his course, and the crew adjusts the sails for wind changes.

- When close-hauled (sails pulled in as far as they’ll go), the helmsman must adjust for changes in wind speed and direction.

Sailing a “straight” course

- Out at sea, the helmsman maintains a course using a compass or (if really skilled) by the sun and stars and wave patterns.

- Near shore or in the bay (the rest of us), pick a recognizable point on shore (e.g., an airport tower) and aim for it.

- However, water currents and the wind (remember leeway) can push the boat sideways. So be aware of sideways drift.

- If possible, pick two points on shore (one near and one far) that line up with each other (called a “**range**”), and keep them in line.

North Island control tower

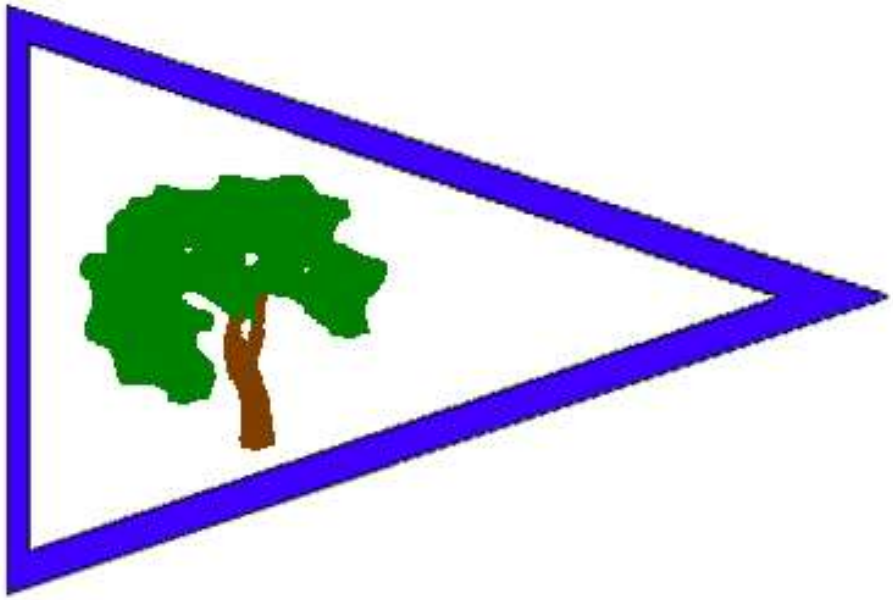
range marks at south end of Shelter Island

Harbor Island range marks

Summary (4-5)

We covered:

- Gear that controlls the boat
- Optimal sail adjustment
- True and apparent wind
- Steering
- Turning

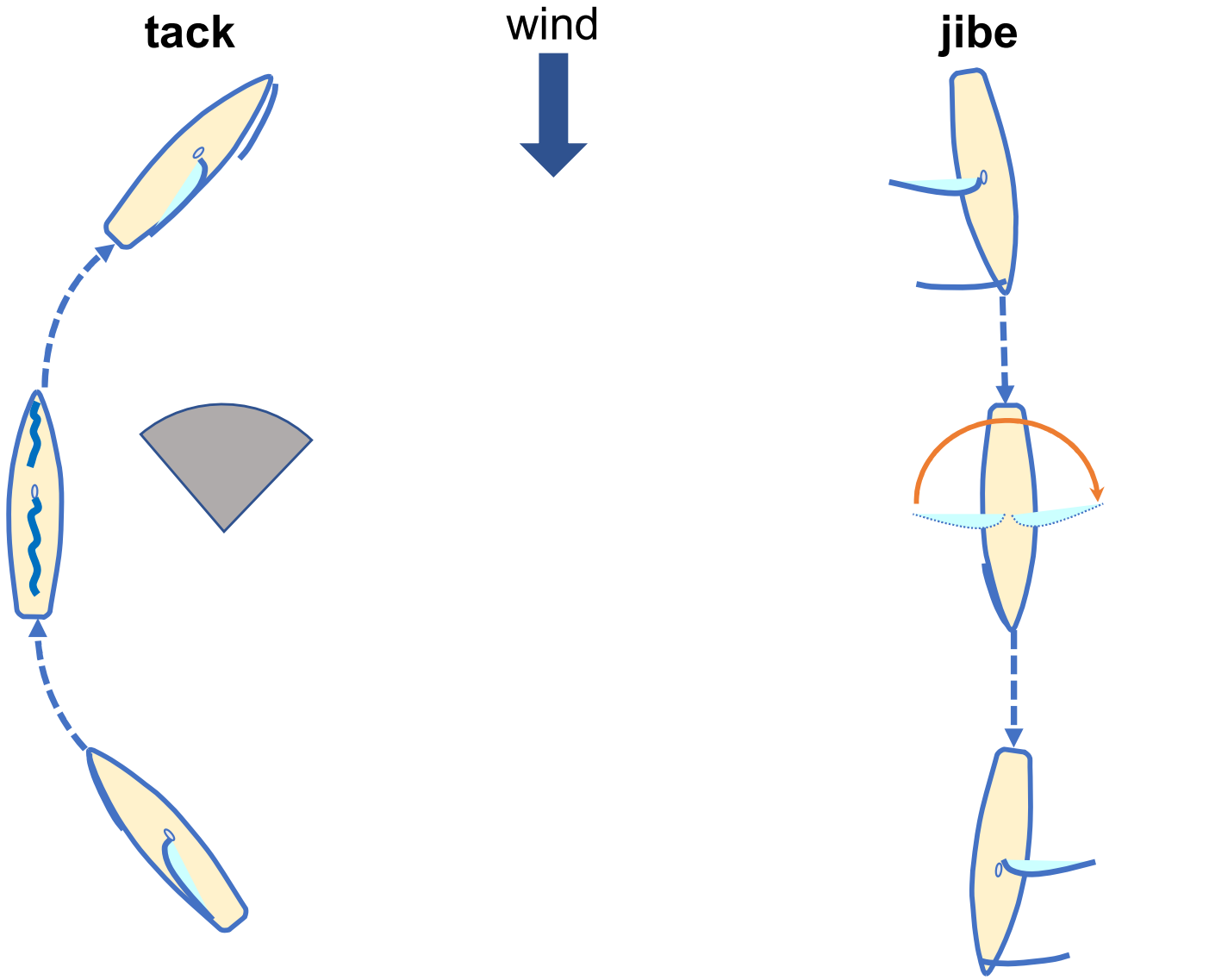


part 6

Driving the boat

- Tacking
- Jibing
- Stopping

Turning through the wind

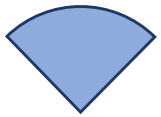


gybe = jibe (alt spelling)

Getting where you're going – upwind

you want to go here

wind

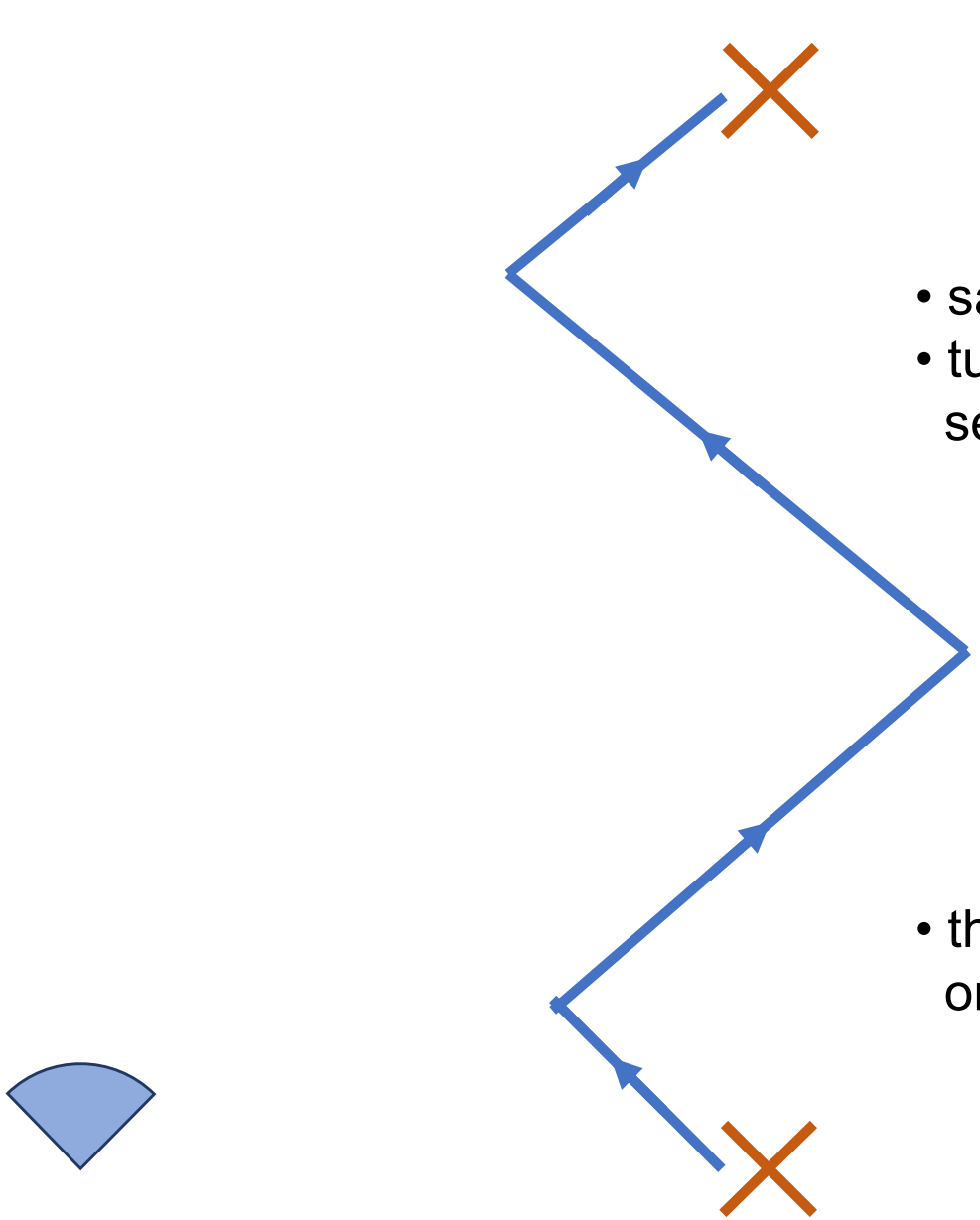


but you can't sail in the no-go zone

what do you do?

you are here

Getting where you're going – upwind



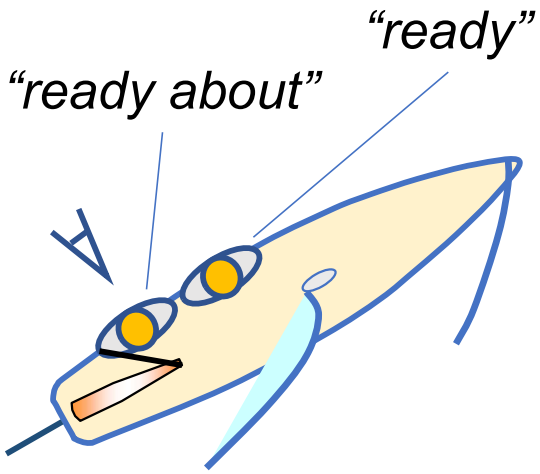
wind

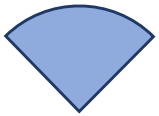
- sail close-hauled
- turn through the wind – "**tack**" – several times

- this is "**beating**" or "beating to windward"

Tacking

- look around
  - make sure the way is clear
  - look in the direction you're turning and pick a landmark (so you know when to end the turn)
- communicate with the crew
  - "prepare to tack" or "ready about"
- crew checks sheets & answers
  - "ready"

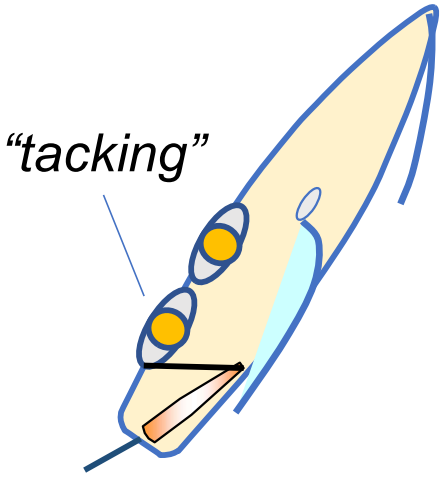


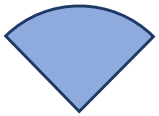


Tacking

wind

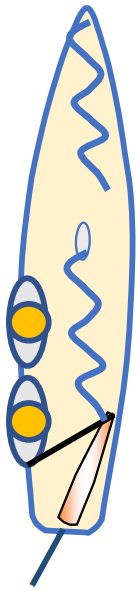
- communicate with crew
  - "tacking" or "hard a-lee"
- head up (turn into the wind)

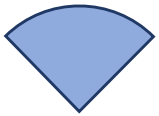




Tacking

- as the jib begins to luff,
  - crew releases the working jib sheet
- coast through the no-go zone
  - turn too slowly
    => get stuck in no-go zone
    ”in irons”
  - turn too quickly
    => too much drag due to rudder
    lose most forward speed
  - when boom crosses centerline
    helmsman moves to other side

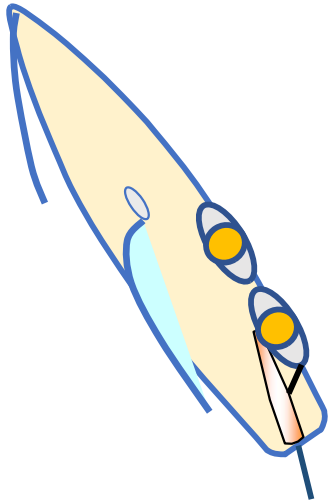




Tacking

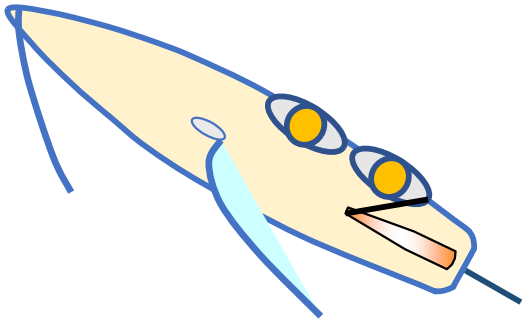
wind

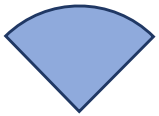
- when the wind catches the jib and pushes it to leeward, crew sheets in the new working jib sheet
- crew crosses to the other side



Tacking

- straighten tiller
- sail in direction selected before tacking
- adjust for new apparent wind
- adjust sails for optimum performance
- tidy up loose lines





Getting where you're going – downwind

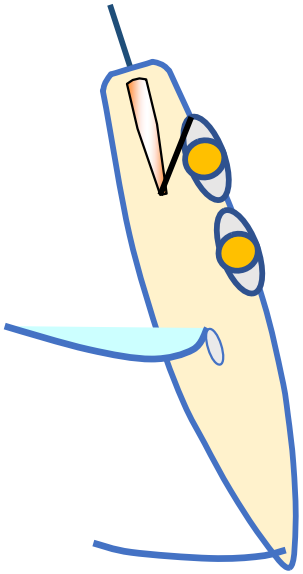
- you're sailing downwind on a run
  or a broad reach
  – for example, on a port tack

wind

- you want to switch to a starboard tack
  (there's a rock or another boat in front of you)

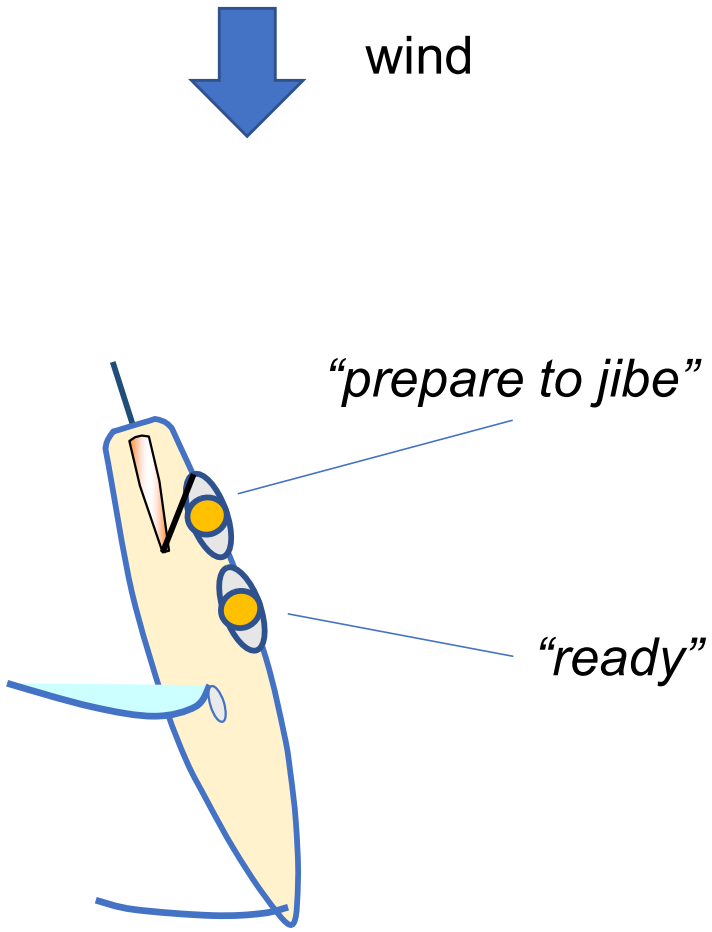
- what do you do?

=> **jibe** (or gybe)



Jibing

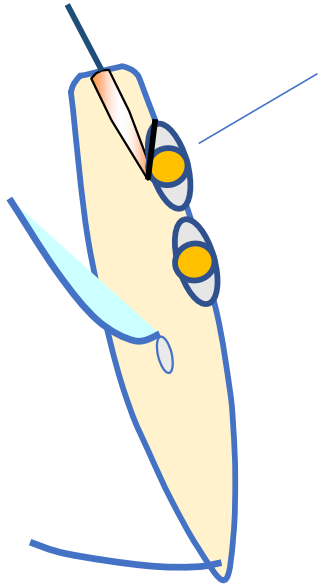
- look around; make sure the way is clear
- communicate with the crew
  – “prepare to jibe”
- crew checks sheets,
  says “ready”



Jibing

wind

- start to turn
- say “jibing” (or “jibe-ho”)
- as turn proceeds, sheet in the main



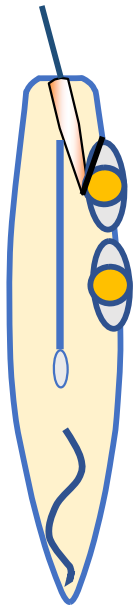
“jibing”

(“sheet in” => pull in on the main (or jib) sheet)

Jibing

- as the turn proceeds,
  continue to sheet in the boom
- get boom to centerline
  when wind crosses the stern

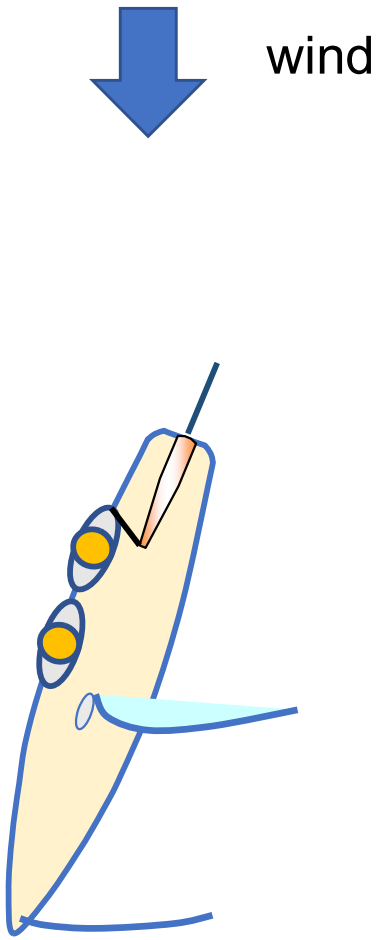
wind



Jibing

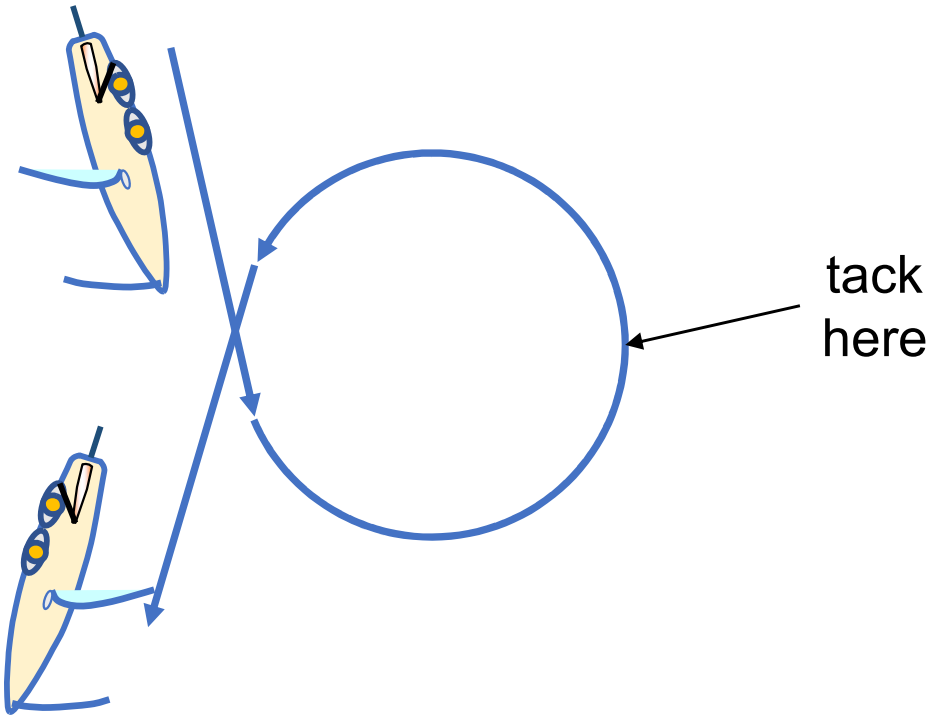
- very quickly:
  - let the main out
  - straighten tiller
  - move to other side
  - release old jib sheet and sheet in jib on the other side (the wind will flip the jib)

<u>Important: the boom moves fast, keep your head down!</u>



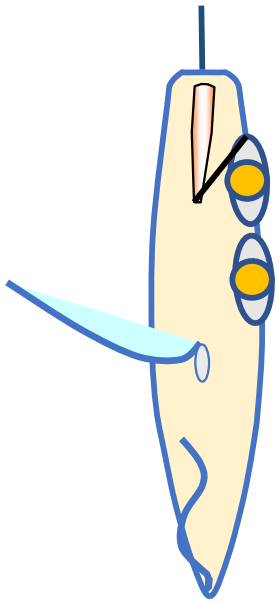
In high winds => the chicken jibe

In very high winds, a jibe can be quite violent. If you're not comfortable doing a jibe, but need to, do the "chicken jibe".

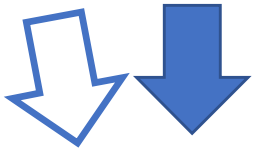


Beware – the uncontrolled jibe

- you are sailing downwind
- (the jib is flapping because it is shielded by the main)
- suddenly the wind shifts just a little bit



Beware – the uncontrolled jibe



wind

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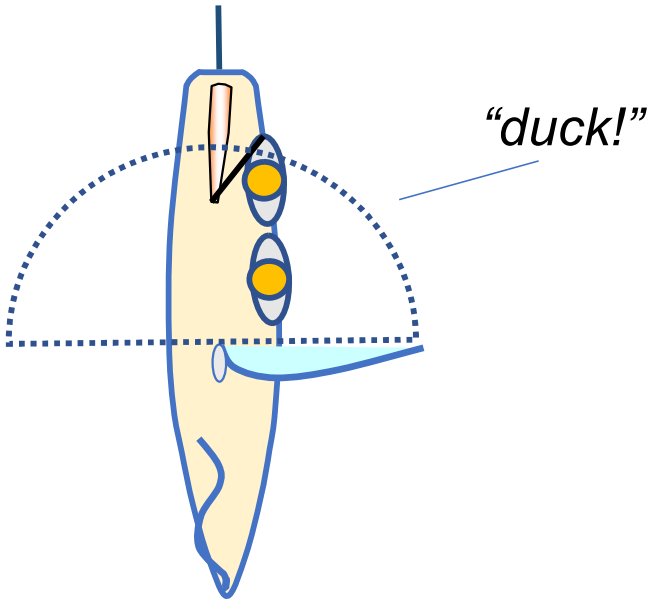
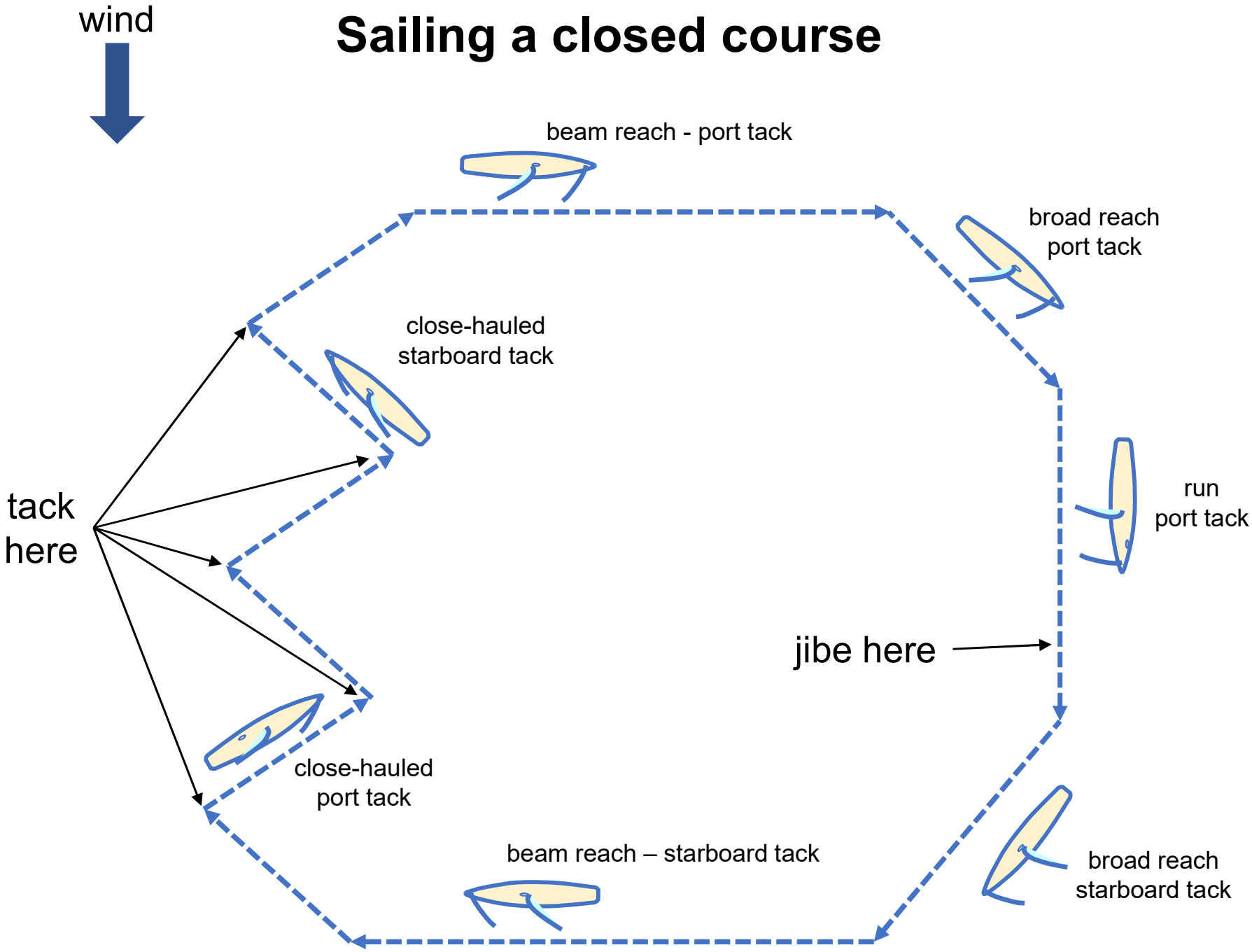


“duck!”

- it catches the leech of the main
- slamming the main and boom across the boat
- can cause serious injury or toss someone overboard

⇒ when sailing downwind
  – be aware of the possibility of an uncontrolled jibe
  – keep your head below the level of the boom
  – if it starts to go, yell “duck”

Sailing a closed course



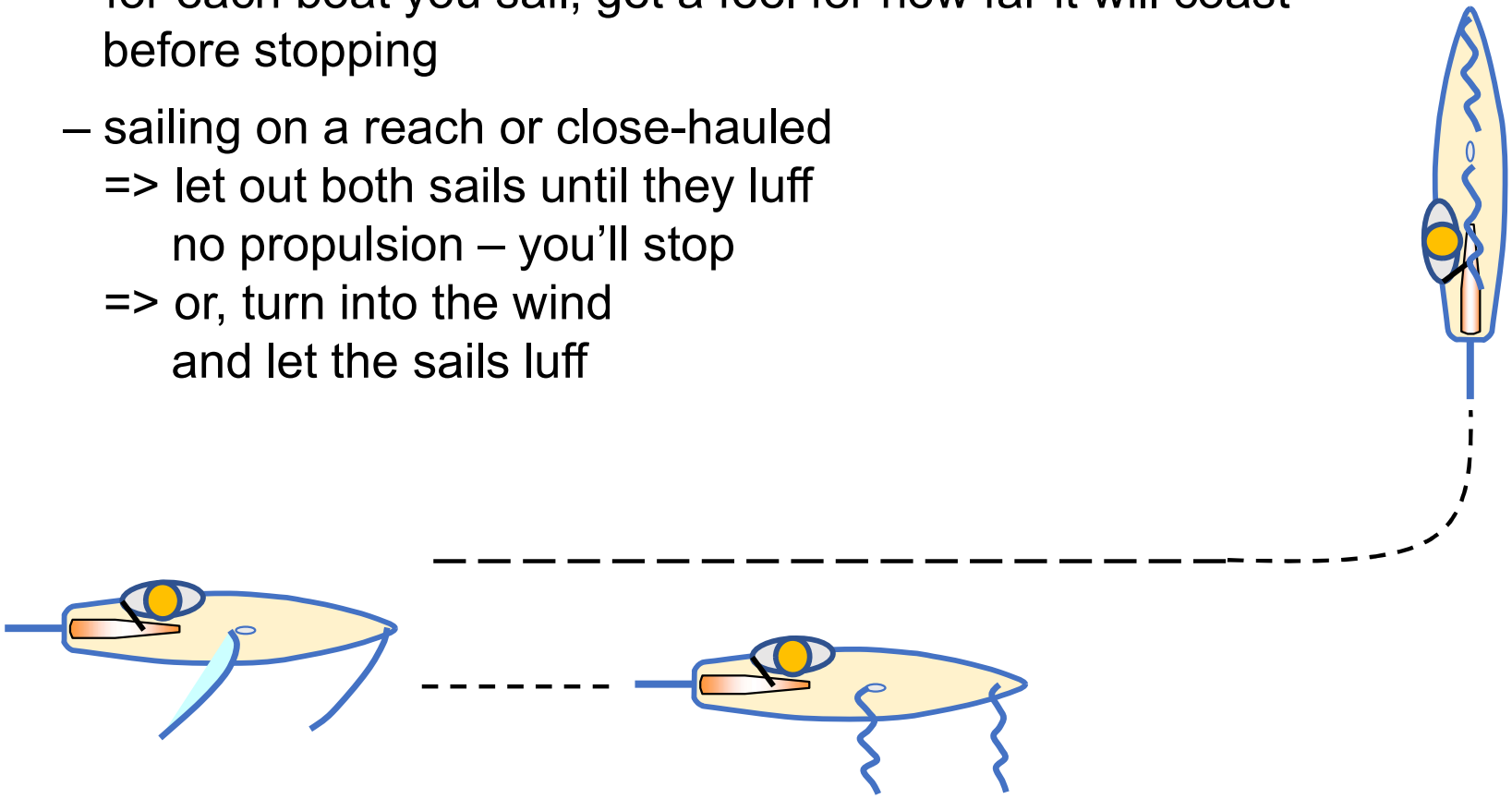
Stopping

- learn to stop the boat where you want
- critical for docking, man-overboard
- for each boat you sail, get a feel for how far it will coast before stopping

Stopping

- learn to stop the boat where you want
- critical for docking, man-overboard
- for each boat you sail, get a feel for how far it will coast before stopping

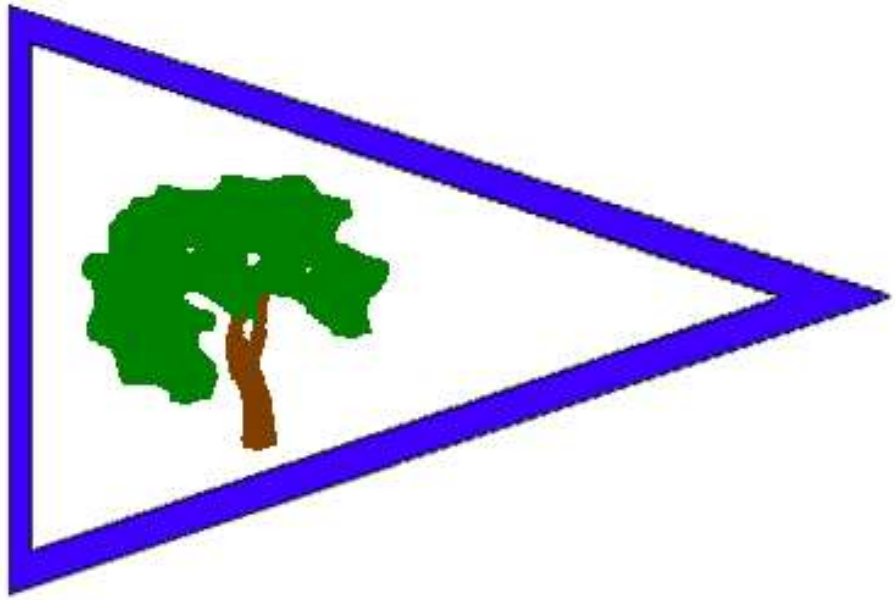
– sailing on a reach or close-hauled
  => let out both sails until they luff
     no propulsion – you'll stop
  => or, turn into the wind
     and let the sails luff



Learning small boat sailing

Racing

– There's no better (and quicker) way to get comfortable handling a sailboat than to try racing.
– TPSC participates in monthly Victory races on the bay.
– 4 classes; all skill levels.
– Maybe crew for a more experienced sailor.
– After checkout, contact our racing chief (Fred MacDougall)



part 7

Ropes & knots

- knots you should know:
  - cleat hitch
  - bowline
  - figure-eight
  - clove hitch
  - reef (square) knot
- many how-to apps and videos

Cleat hitch

to attach a line to the boat
(halyards, sheets, …)

to tie boat to dock

won’t jam and easily removed

(“hitch”: knot to tie a line to an object;
e.g., taut line hitch, anchor hitch, rolling hitch, …)

note: you have two lines under and one over

Bowline

to make a loop at the end of a line
that won't slip
and is easily undone

very useful – not just for boats

then pull it tight

Figure 8 knot

a stopper knot at the end of a line

prevents the line which passes through a block
from slipping back through the block

looks sort of like a figure eight

Clove hitch

to quickly attach a line to a pole or bar

relies on friction
may slip under load!

Reef knot
a.k.a. square knot

– Used for reefing a sail,
  tying packages, tying shoelaces, …
  i.e., when there's friction against an object

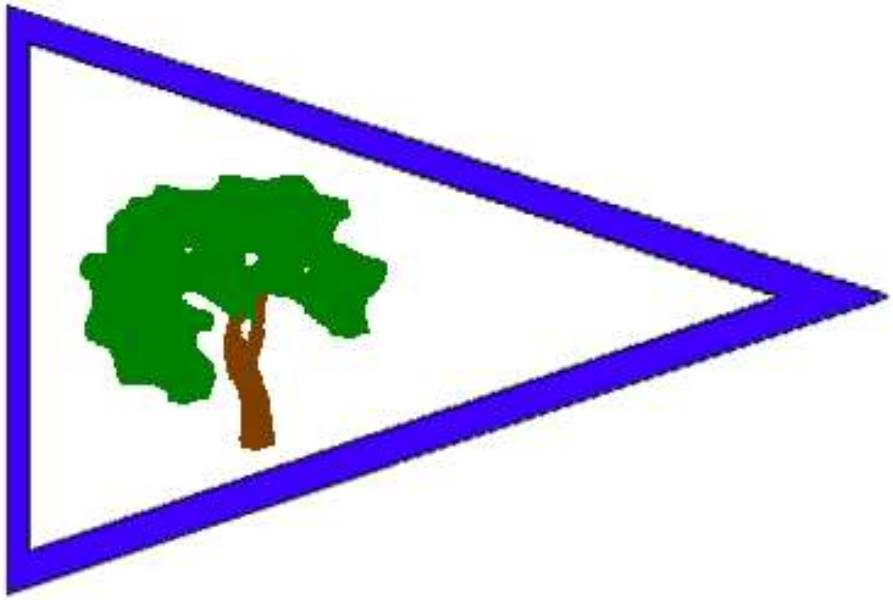
– Do not use for tying two lines together!
  it can collapse under load

– For joining two lines look up "bends"
  e.g., sheet bend, fisherman's knot, ashley bend,
  zeppelin bend, carrick bend, …

Summary (6-7)

We covered:

- Tacking & jibing
- Stopping
- Knots



part 8

Rules & safety

- CA Boater Card program
- Required equipment
- Signs and signals
- Meeting another boat

Safety

Basic principles:

– avoid injury

– avoid collisions

– avoid damage

California Boater Card

- website: https://www.californiaboatercard.com
  for information on how to get the card

- online safety course and test

- program overseen by CA State Parks
  Division of Boating and Waterways

- TPSC requires that you take the course and get the card
  before becoming a member

- CA requires that all boaters have the card

Required equipment

The Coast Guard <u>requires</u>:

- a life jacket for each person on board
  - – must be easily accessible
  - – show everyone where the jackets are
  - – must be worn by anyone under 13
- a throw-able flotation device
  - – must be readily accessible
- fire extinguisher
- sound signal (horn, whistle, …)
- proper lights when sailing between sunset and sunrise
- a distress signal (flares, distress flag, flashlight, …)

The TPSC boats also have

- paddle, bucket, sponge, anchor, tool box, gas tank

=> do an inventory check each time you go out

Buoys, channel marks, navigation aids

- very important in San Diego Bay

- marks provide information about
  – location of a safe channel
  – hazards
  – traffic control

- learn the most basic marks:
  – channel marks, warnings

- Pay attention to warning signs (diamond shaped; on buoy or post)
  – e.g., ”danger”

red buoys

– even numbered
– mark the right side (starboard) of a channel
when sailing inland from the sea
(mnemonic: “red right return”)
– may be pointy (“nun” buoys)

green buoys

– odd numbered
– mark the left (port) side of a channel
when sailing inland from the sea
– cylindrical shape (“can” buoys)

to ocean

inland

marked channel
(entrance to Shelter Island basin)

larger buoys marking the channel in the middle of the bay

Daymarks

daymarks are signs giving navigation information
– can be mounted on land or on a piling
– this one is a channel mark (red, even number, triangular)

(across the channel it would be green, odd number, and square)

Warnings

slow – no wake

speed limit

yellow ball or buoy marks an anchorage
or swimming area – use extreme caution!

Meeting another boat

Some observations:

- the rules refer to the "**stand-on**" vessel and the "**give-way**" vessel
- the stand-on vessel should hold its course and allow the give-way vessel to maneuver around it (except to avoid a collision)

Meeting another boat

More observations (important):

- do not assume:
  – the other guy is looking where he's going
  – that he's sober
  – that he knows the rules

Meeting another boat

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=> it's more important to keep safe and yield the "right-of-way" to the other boat than to be right and get in trouble

Meeting another boat

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=> it's more important to keep safe and
yield the "right-of-way" to the other boat
than to be right and get in trouble

=> if a collision seems possible, signal your intentions
by turning well in advance

Meeting another boat

More observations (important):

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=> it's more important to keep safe and
yield the "right-of-way" to the other boat
than to be right and get in trouble

=> if a collision seems possible, signal your intentions
by turning well in advance

=> Be generous, be kind

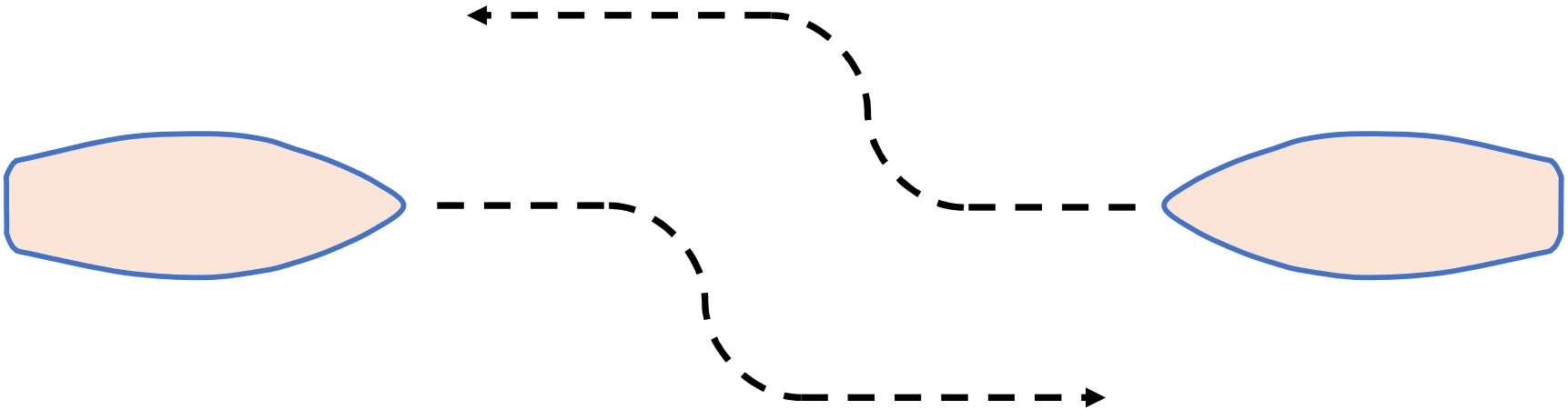
Order of precedence
(who is the stand-on boat and who is give-way)

(essentially based on maneuverability)

- anything anchored, moored, disabled
- large ships in a channel
- large ships, generally
- human-powered craft (kayaks, canoes, paddleboards, …)
- sail boats
- motor boats
- personal watercraft (jet-skis, …)

(a sail boat with its motor running is a motor boat
– even with sails up)

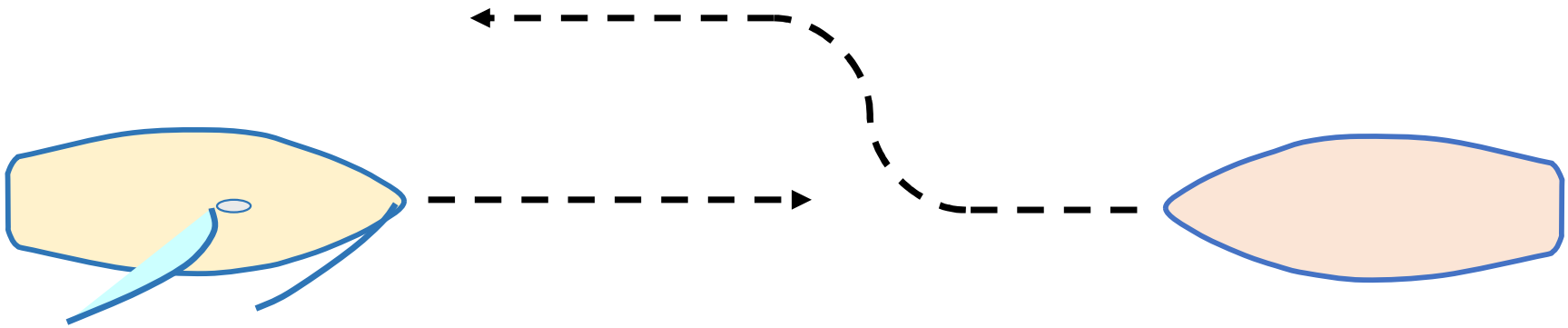
motor boats meeting head-on



The usual custom is to pass port-to-port

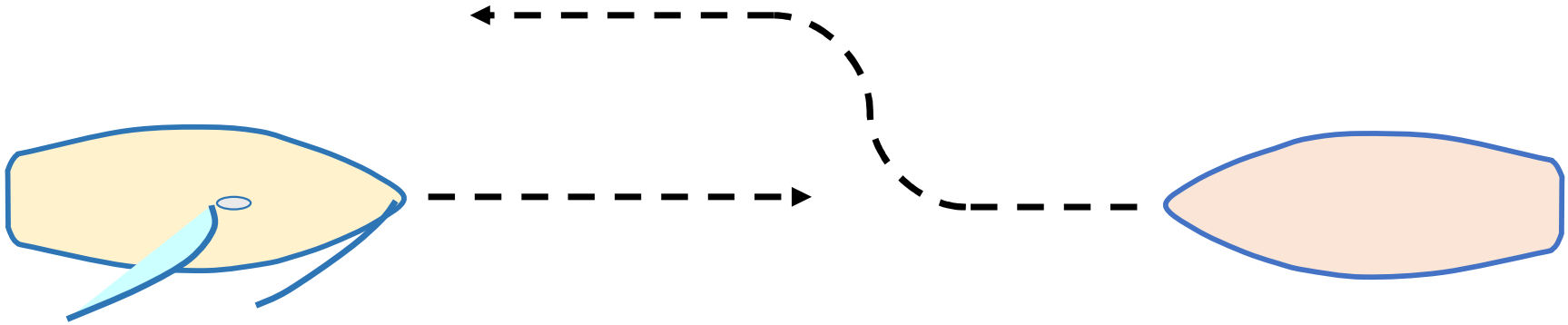
sailboat and motor boat meeting head-on

how the rules say it should happen

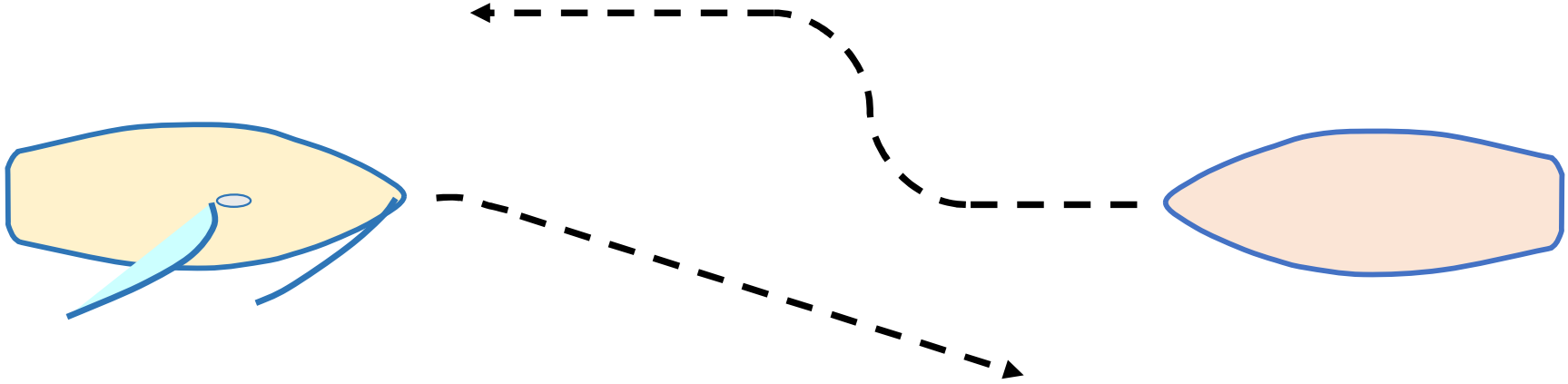


sailboat and motor boat meeting head-on

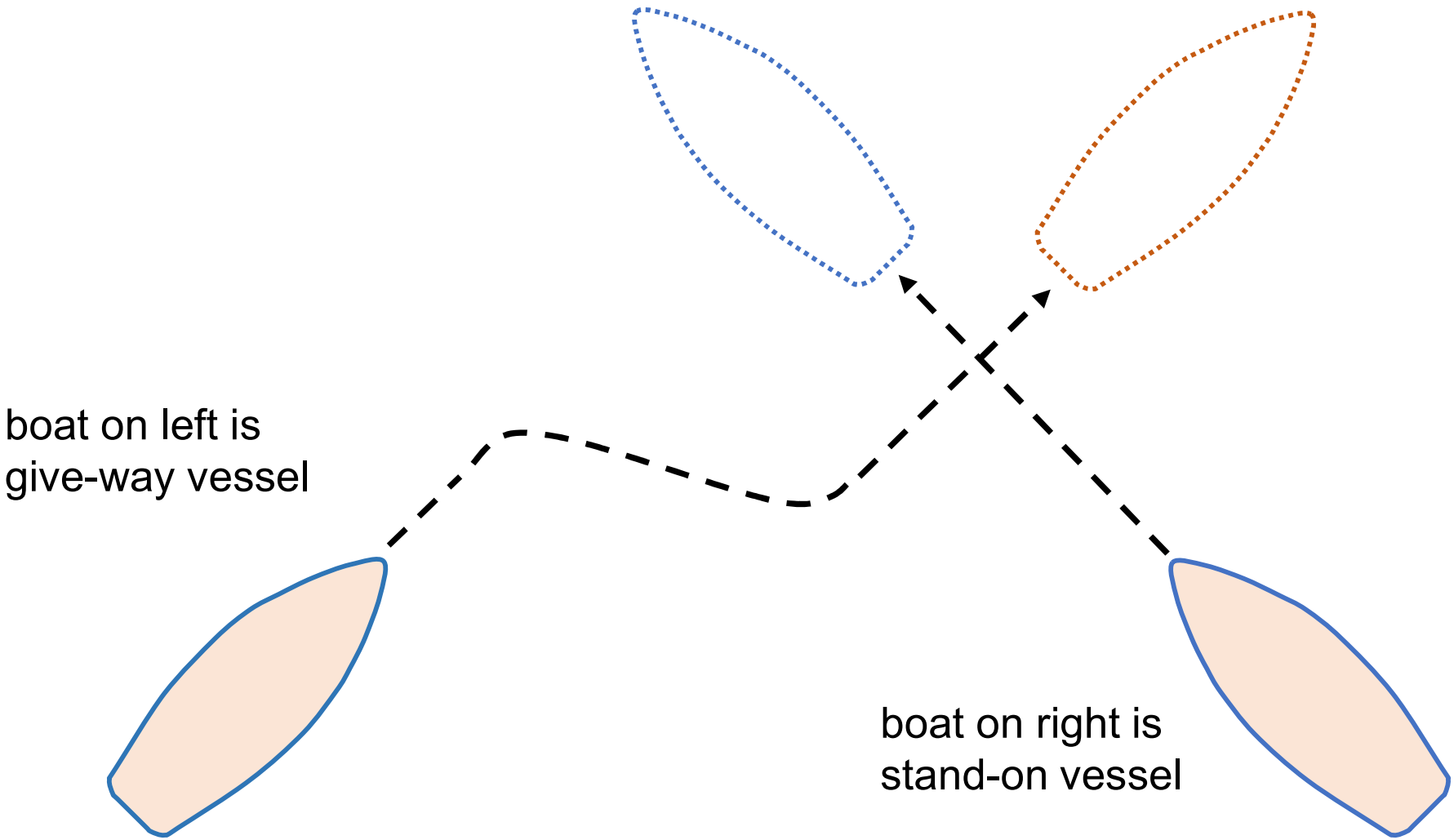
how the rules say it should happen



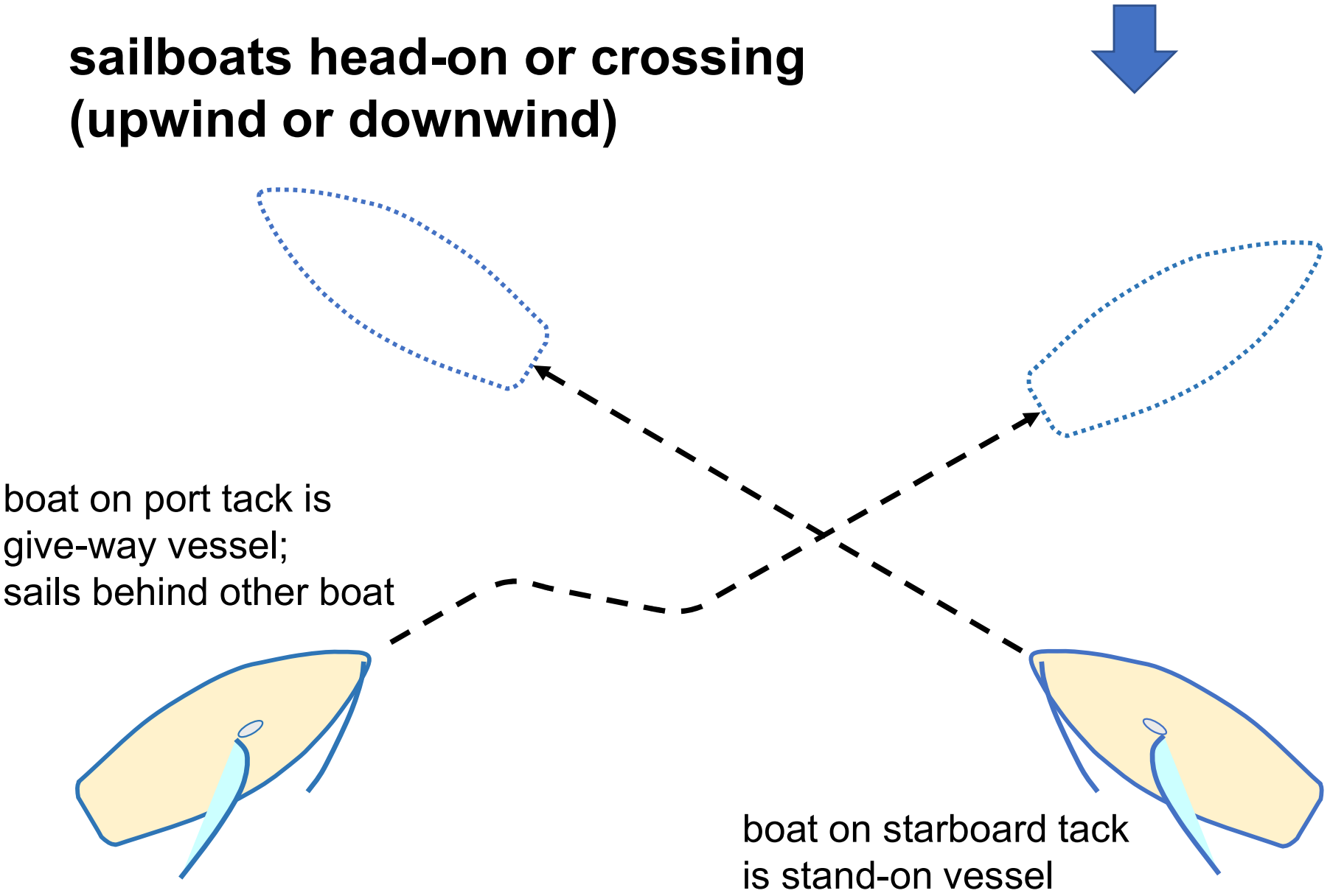
wise move for sailboat is to bear off a bit



motor boats on a crossing path



sailboats head-on or crossing (upwind or downwind)



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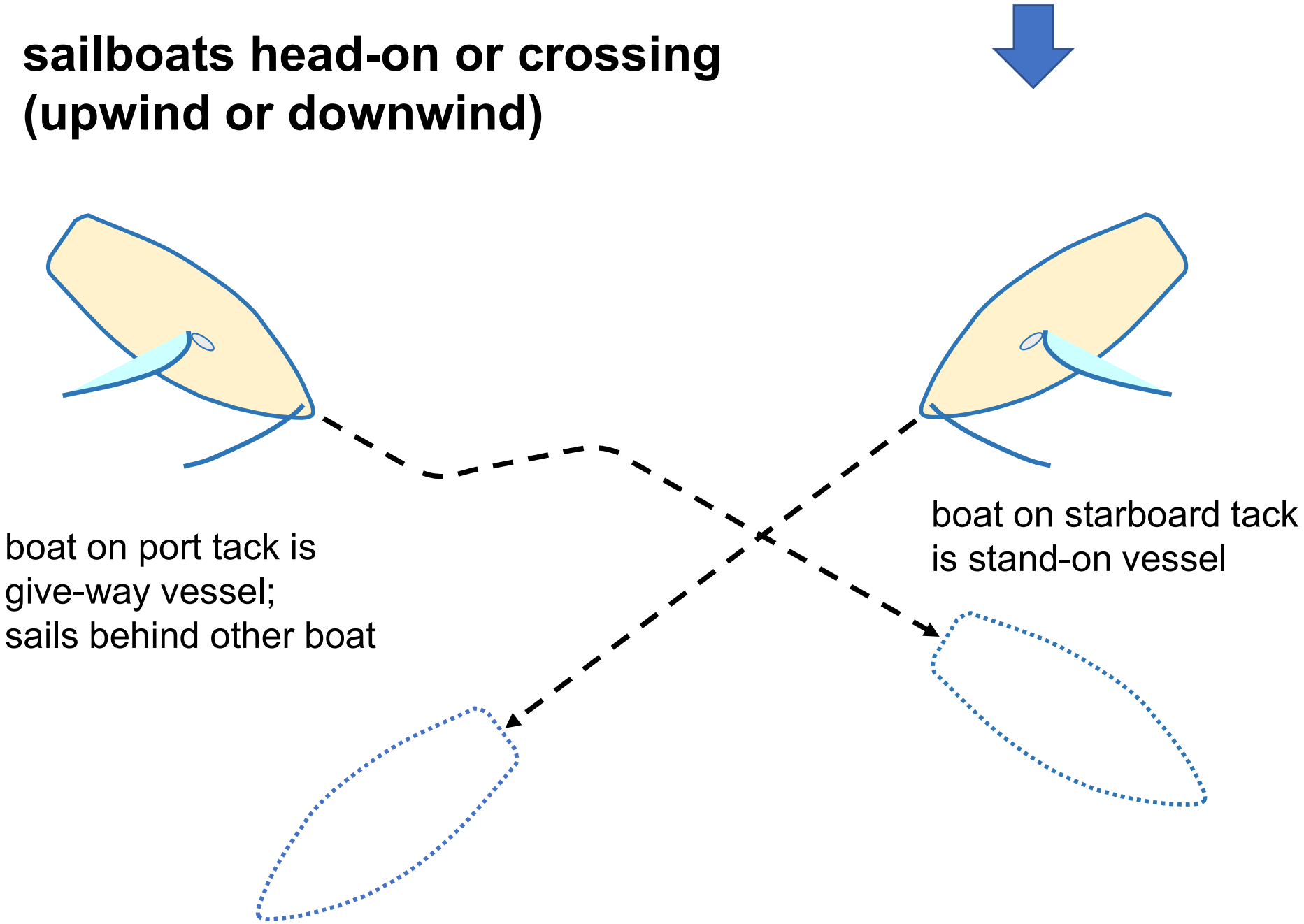
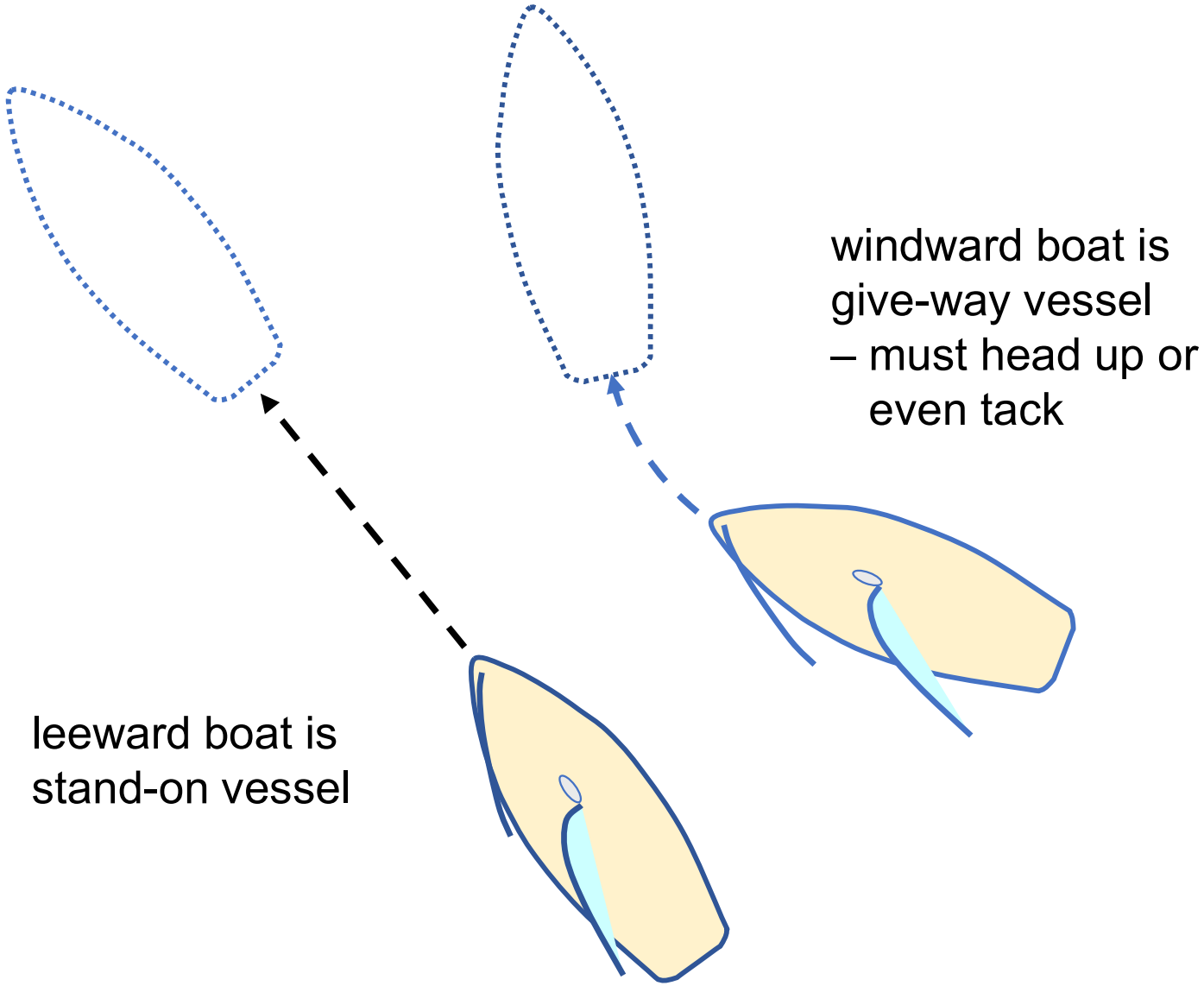
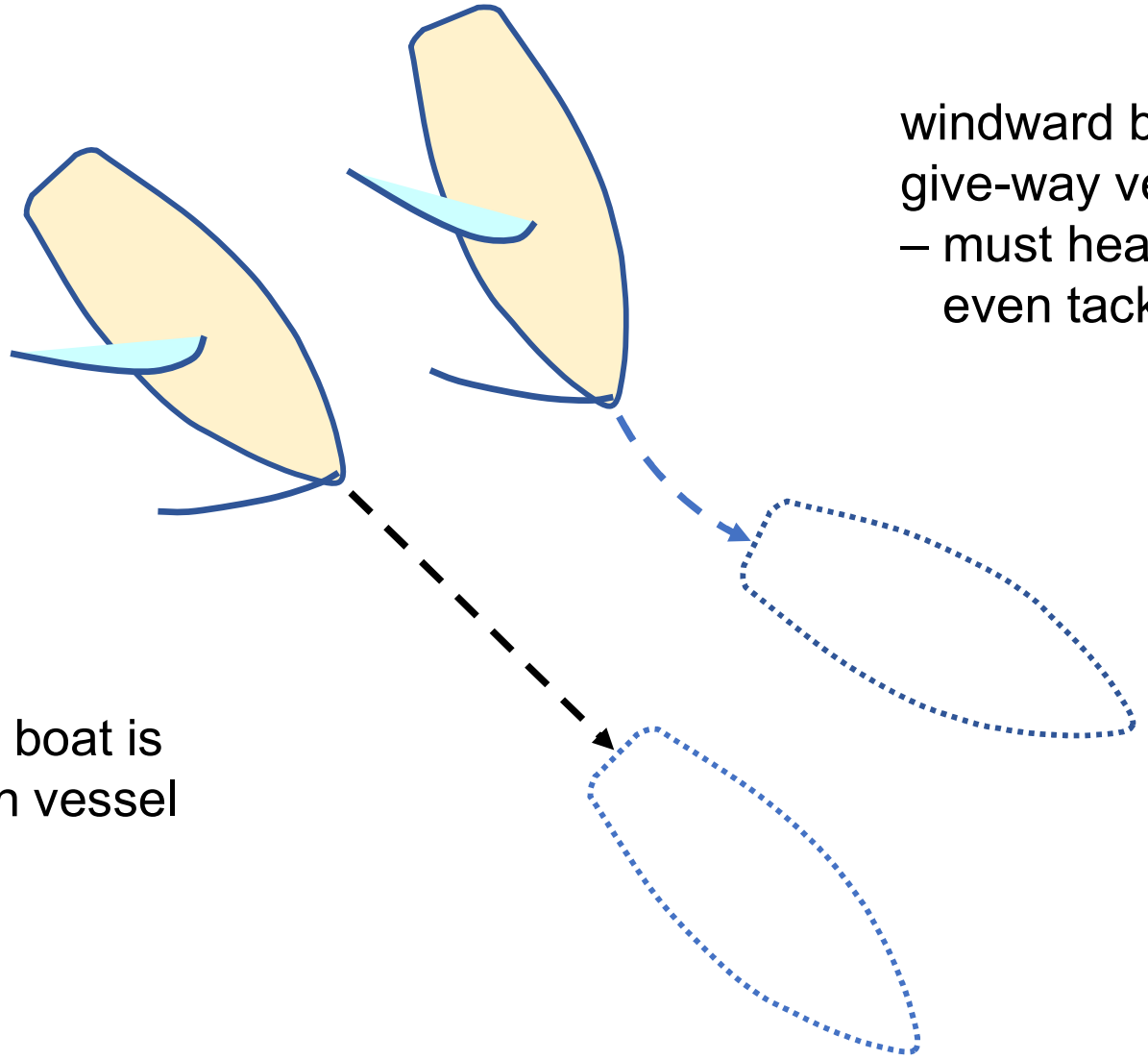


sailboats crossing on the same tack (upwind or downwind)



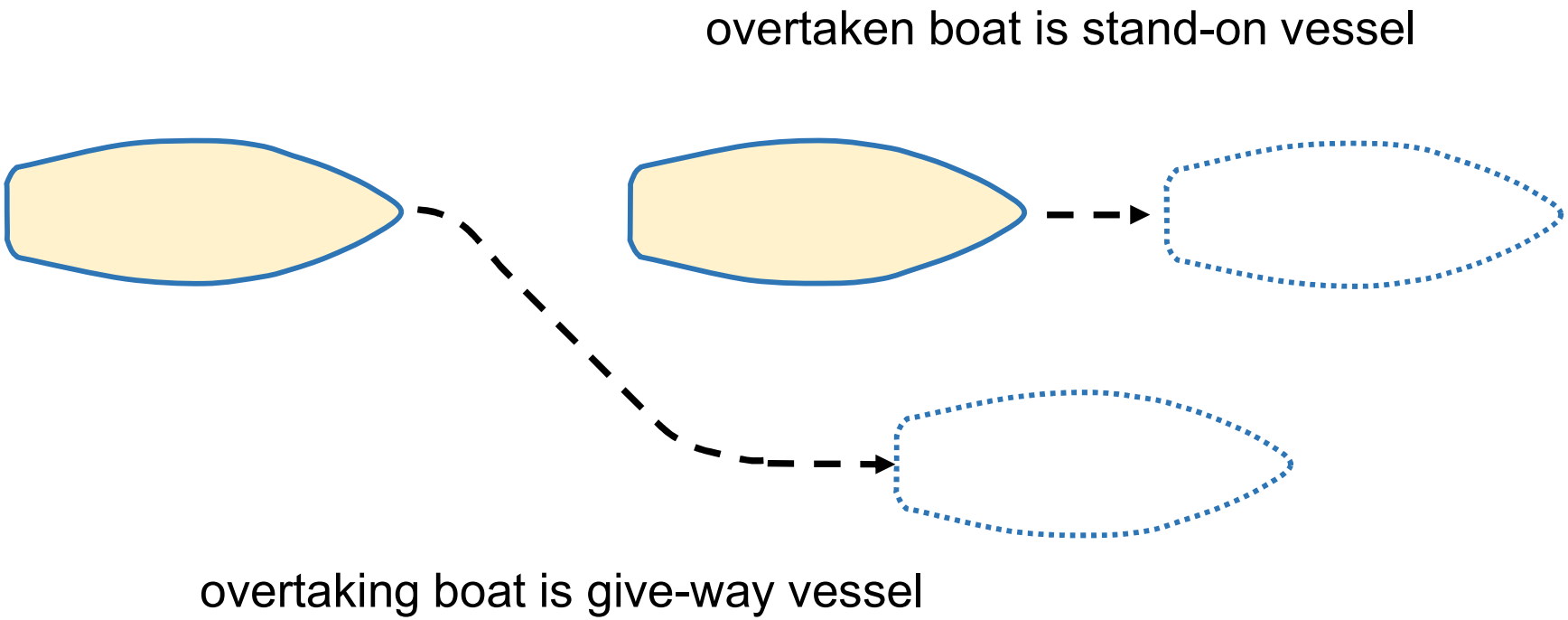
sailboats crossing on the same tack (upwind or downwind)



windward boat is give-way vessel – must head up or even tack

leeward boat is stand-on vessel

one boat overtaking another (motor or sail)



Big boats in San Diego Bay

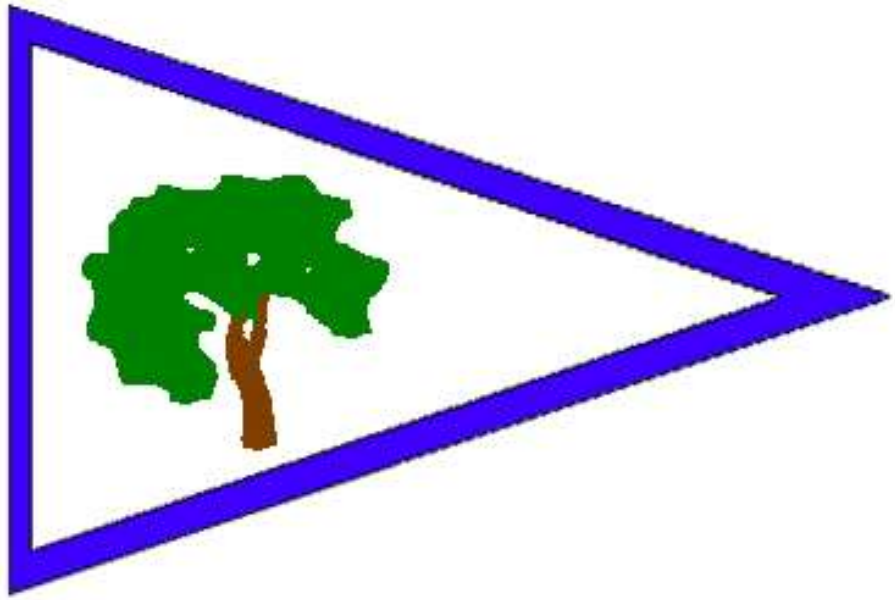
- There's a channel down the middle of San Diego Bay
  - marked by red and green buoys
  - dredged deep enough for large ships

- Small boats can sail outside of the channel

- Always know whether you are in the channel
  - check the buoys
  - keep a lookout for large ships

- 5 horn blasts (• • • • •) mean "you are in my way"
  - look around to check whether it's meant for you
  - get out of the channel a.s.a.p.

- Tug boats and tour boats don't stay in the channel
  - be aware of them



part 9

Local knowledge

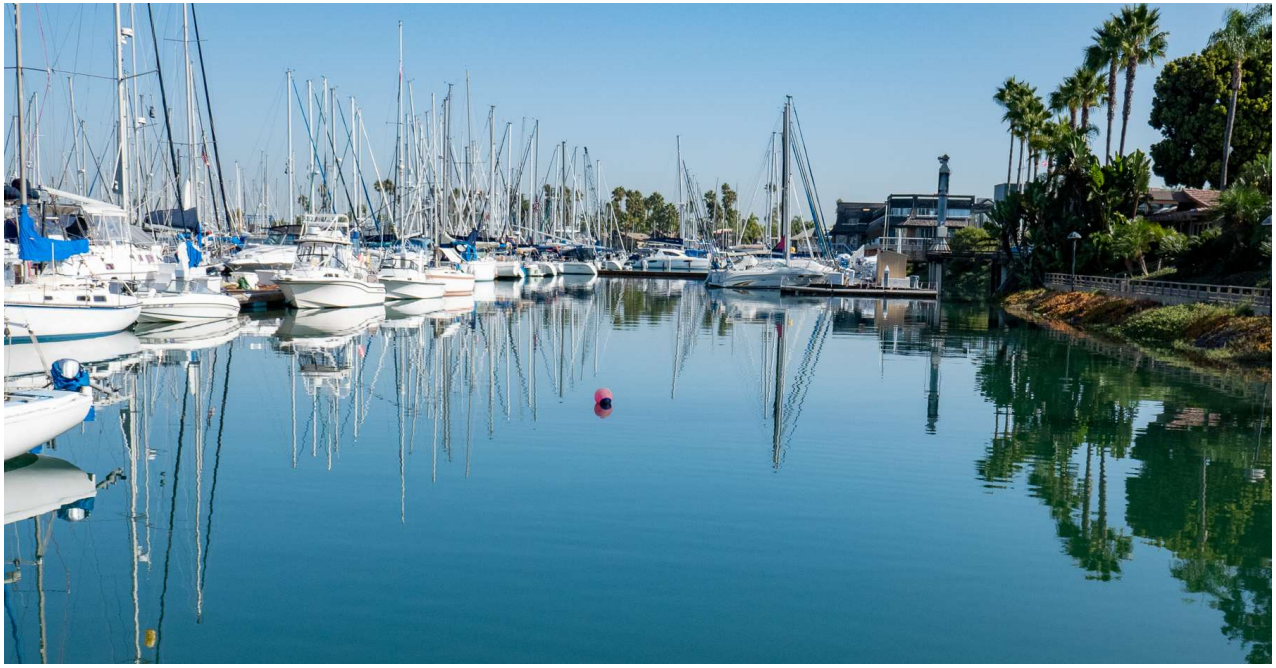
- winds
- tides
- a brief tour of San Diego Bay

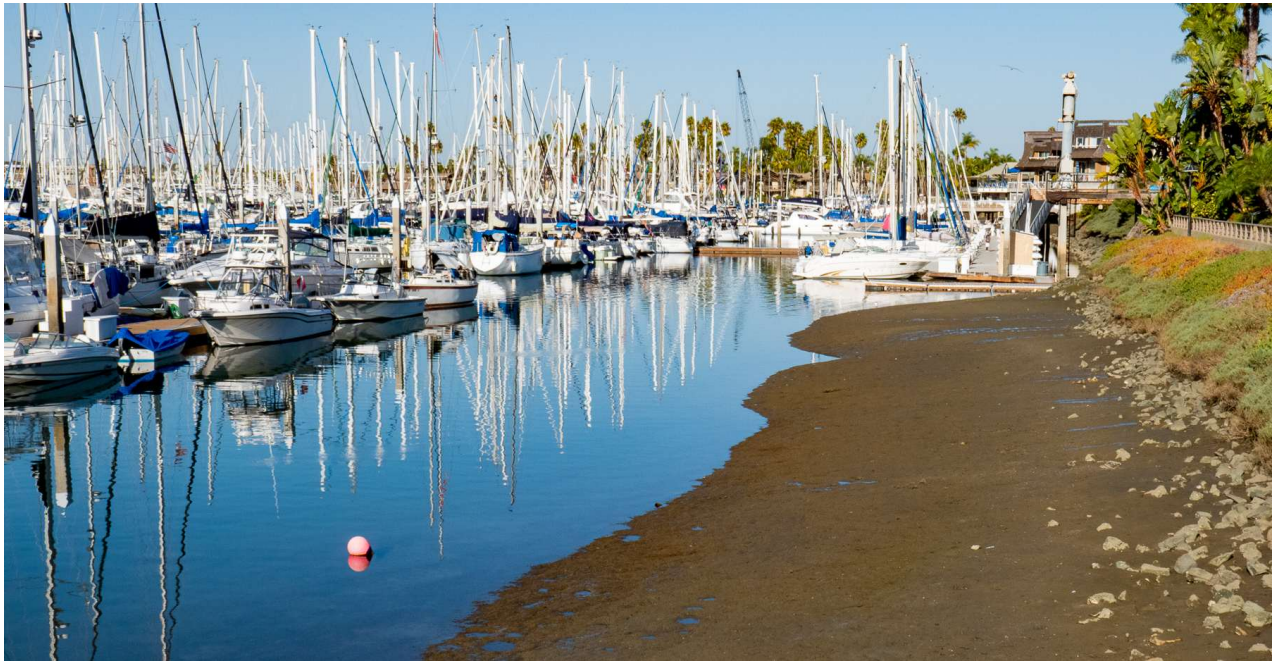
winds

- winds are generally from the west to north-west
- San Diego winds are relatively light
  - more than 12-14 mph is rare
  - small white-caps at this wind speed
- usually calm-to-light before noon and after 6:00 pm
- check National Weather Service website
  - go to *weather.gov* and enter *san diego, ca* for forecast at SD airport
  - for details, click *hourly weather forecast* at bottom

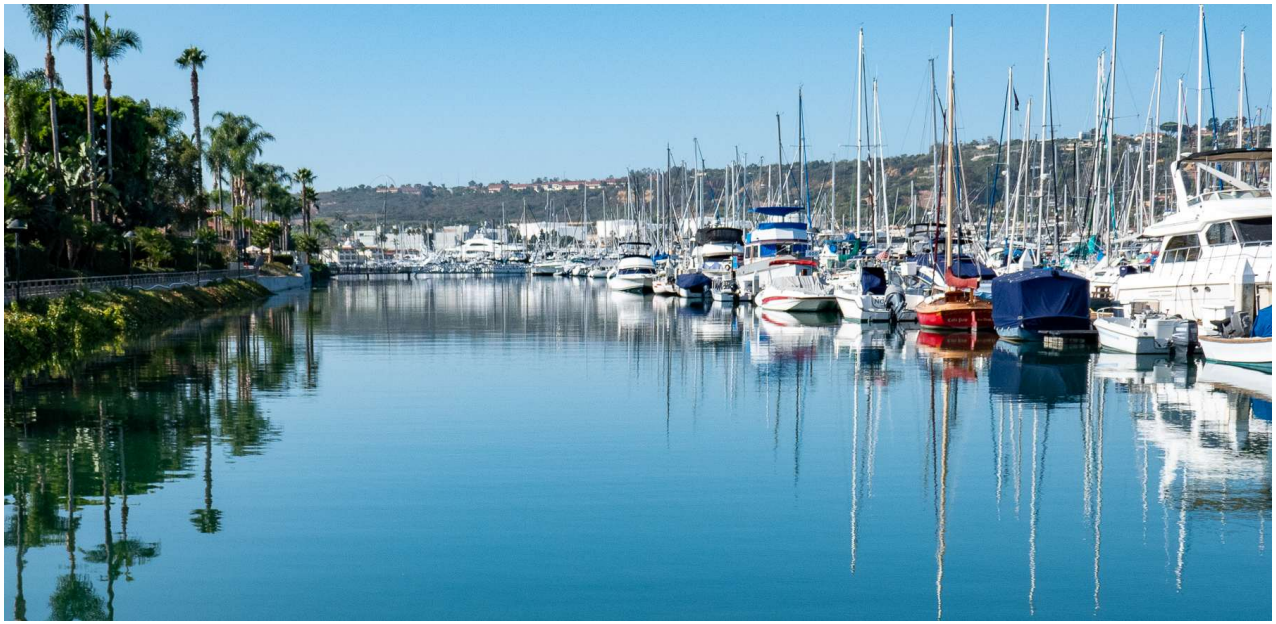
tides

- two high and two low tides each day
  – 6-7 hours from high to low (or low to high)
- number is relative to m.l.l.t.
  (mean-low-low-tide)
  – this is the depth given on charts
- largest swing around new and full moon
  – occasionally as much as 9 feet
  (at entrance to Shelter Island basin)
- many tide apps
- current can be as much as 2 knots in SD Bay
  – sometimes not enough wind to move boat against it
  – greatest current at and south of Ballast Point
- before going out, check tide and wind forecast!





+6.7’ to -0.8’; a 7.5’ swing



Sights Around
San Diego Bay


Bird Rock
Garnet Ave
West Ski Island
East Ski Island
Fiesta Island
Vacation Isle
Enchanted Isle
163
Mission Valley
Mid-City
209
Alligator Rock
Cabrillo Fwy
Escondido Fwy
Harbor Island
94
Shelter Island
San Diego
Martin Luther King Jr Fwy
Point Loma
North Island
15
282
Coronado
5
National City
805
54
Chula Vista
Crown Island
Coronado Cays
75
Palomar St
Imperial Beach
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2018 Google
5
4
3
2
1
0
miles
N


Harbor Island
Shelter Island
North Island
Coronado
San Diego
N Harbor Dr
Laurel St
W Laurel St
W Hawthorn St
W Grape St
Elm St
W Ash St
Ash St
W A St
A St
B St
G St
Market St
W Harbor Dr
E Harbor Dr
1st St
Third St
4th St
Orange Ave
Alameda Blvd
San Diego-Coronado Bridge
Talbot St
Catalina Blvd
Nimitz Blvd
Park Blvd
282
75
163
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3.0
5.9
1.5
Harbor Island
Shelter Island
North Island
Coronado
San Diego
Point Loma
N Harbor Dr
W Harbor Dr
E Harbor Dr
Talbot St
Nimitz Blvd
Rosecrans
Laurel St
Ash St
Elm St
Market St
1st St
Third St
4th St
Orange Ave
Alameda Blvd
San Diego-Coronado Bridge
Cabrillo Memorial Dr
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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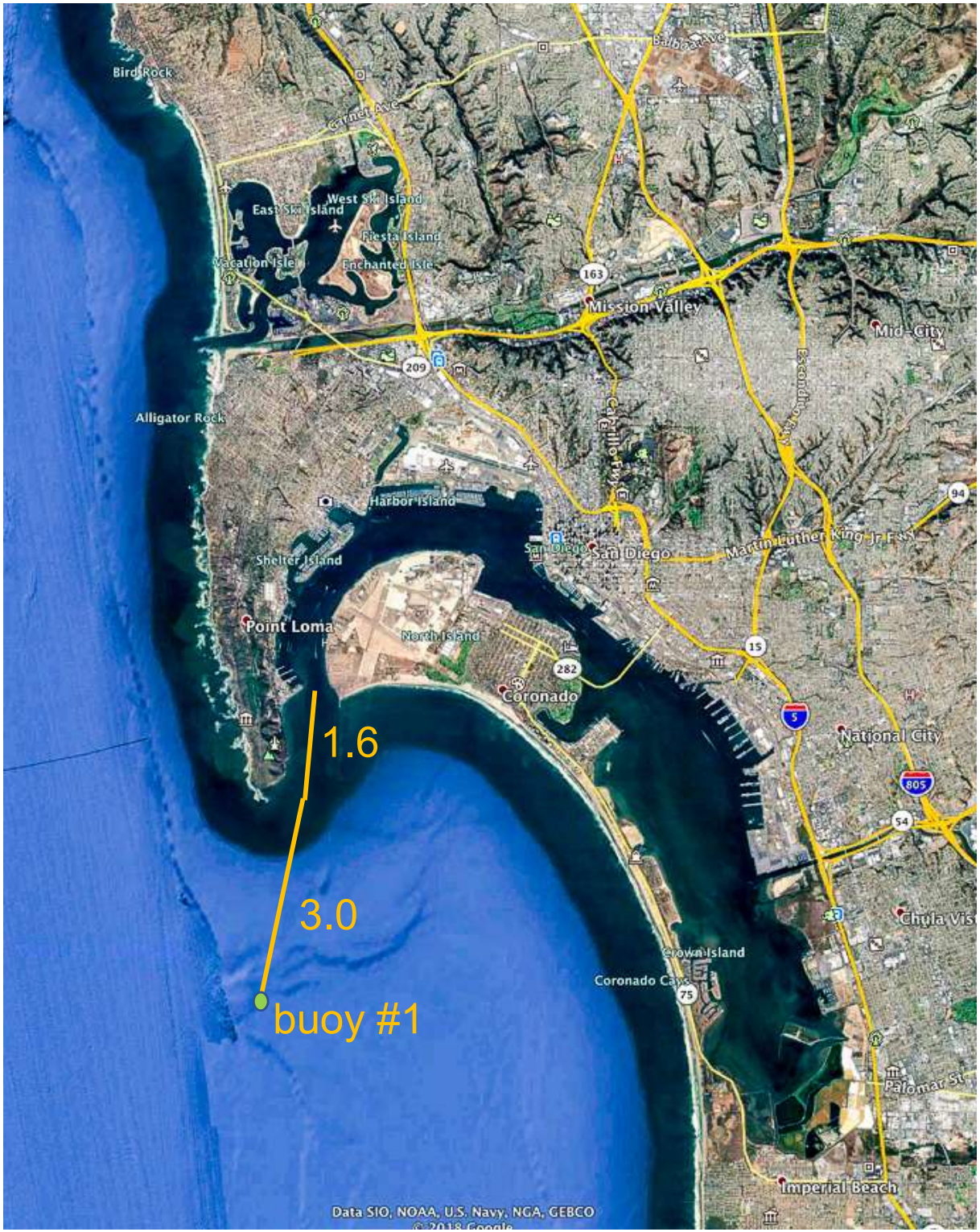
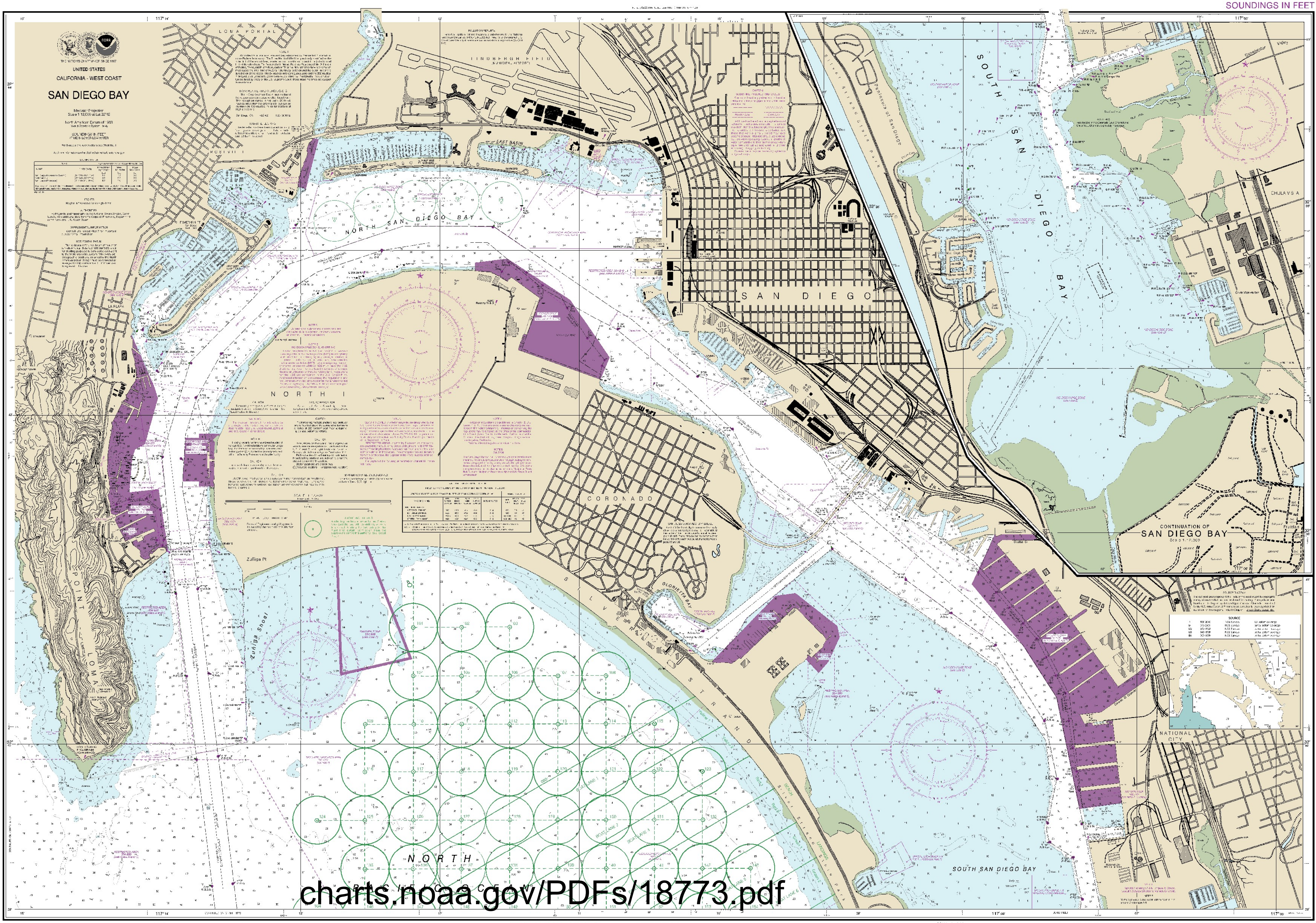

N
Bird Rock
Garnet Ave
West Ski Island
East Ski Island
Fiesta Island
Vacation Isle
Enchanted Isle
163
Mission Valley
Mid-City
209
Alligator Rock
Harbor Island
Shelter Island
San Diego
Martin Luther King Jr Fwy
94
Point Loma
North Island
15
282
Coronado
5
National City
805
54
1.6
3.0
buoy #1
Crown Island
Coronado Cays
75
Chula Vista
Palomar St
Imperial Beach
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

SOUNDINGS IN FEET



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18773

SOUNDINGS IN FEET

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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
COAST SURVEY

San Diego Bay
SOUNDINGS IN FEET

18773


Catalina Blvd
Shelter Island
Point Loma
Cabrillo Memorial Dr
209
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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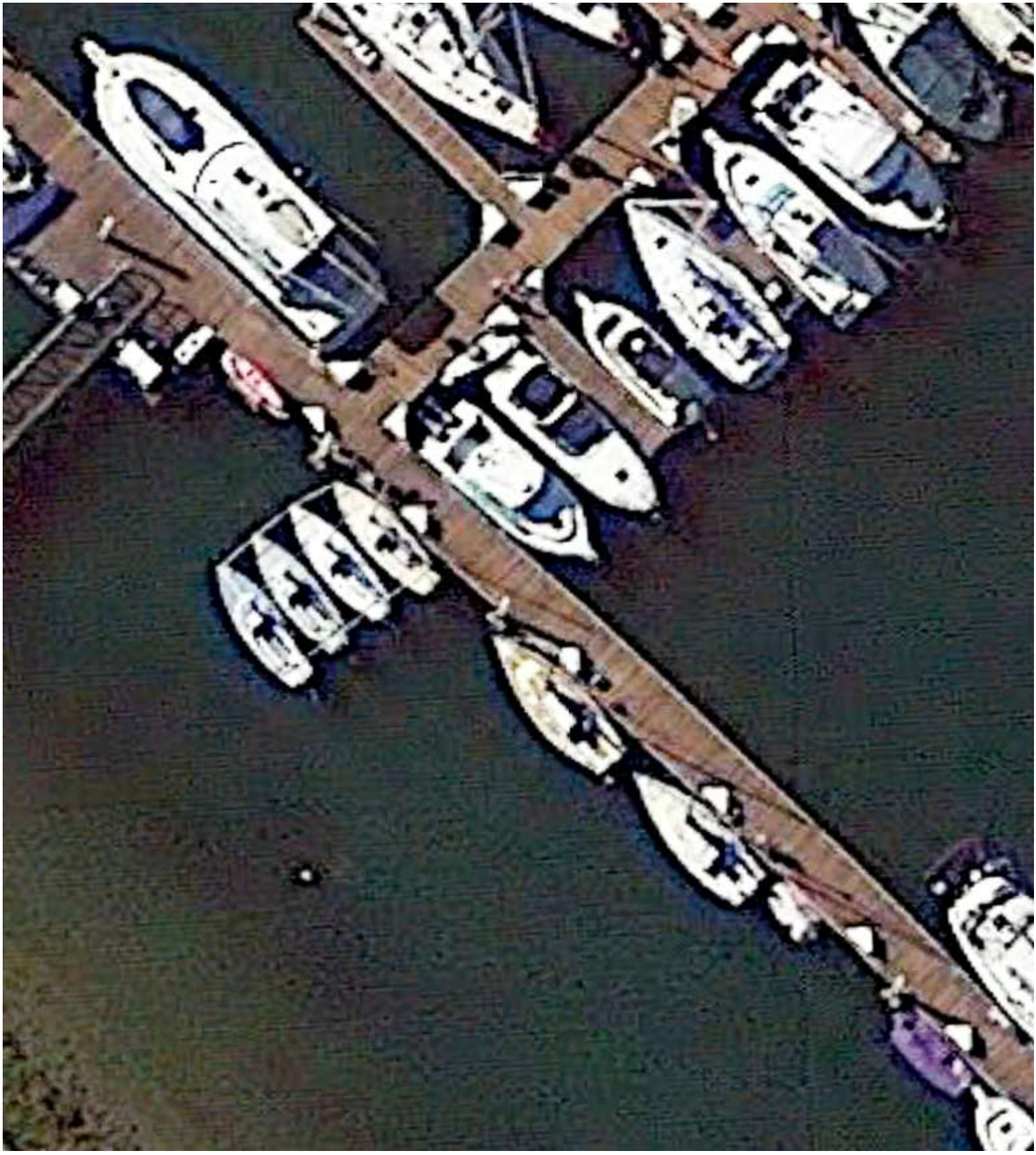
Data USGS

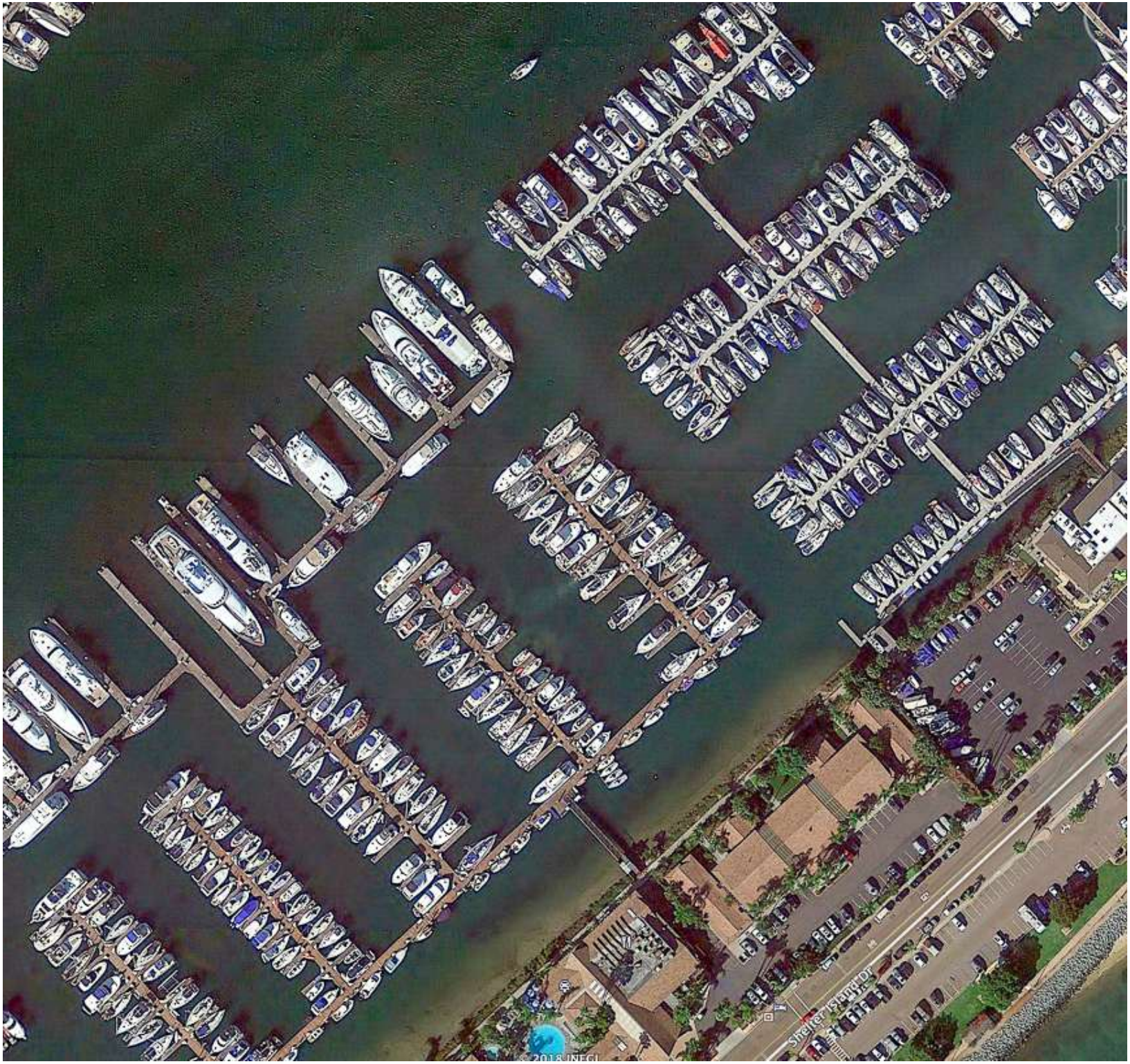
prevailing wind

prevailing wind

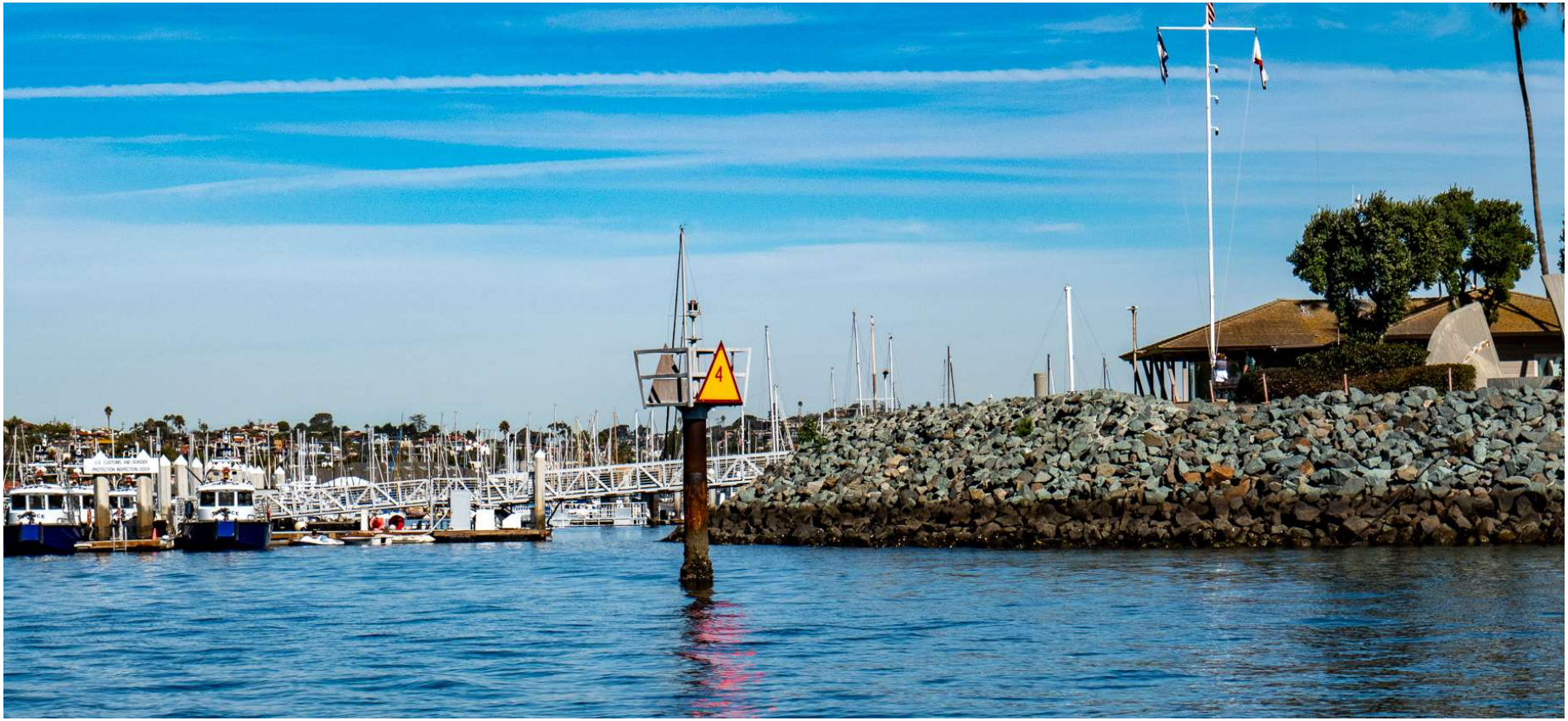



FAUSTINA

prevailing wind



Hill St
Evergreen St
Martinez St
Upshur St
Yacht Club Condos
Bessemer St
Golden Gate Ave
Toma Valley Rd
Bangor St
La Playa
Rogers St
Bessemer Path
Qualtrough St
Perry St
Shelter Island
Owen St
Nichols St
Mc Call St
Lawrence St
San Antonio Ave
Shelter Island Dr
Bolt St
Burham St
Hoop St
Strothe Rd
Craig Rd
Gate Rd
Rosecrans St
Scott St
Moffett Rd


4


UNDERSEA
RESCUE
COMMAND


4
LHD4


EMPIRE STATE
WILMINGTON, DE


71


FUEL
DOCK


Angel Wind


Prelude


Make a SPLASH on the
SEAL


WELCOME HOME


CARNIVAL MIRACLE


Bank of America


ESET

Thank you for sticking with it

Sail fast

Sail safe

Enjoy yourself

Join the club