

# THE AQUATIC ENVIRONMENT & OCEAN HAZARDS





# THE AQUATIC ENVIRONMENT

This lecture is going to focus on the Ocean Hazard part of the “Preventative Action Equation”:

Preventative Action = Ocean Hazard + Potential Victim



# OCEAN HAZARDS

- Water
- Waves/Surf
- Currents
- Ocean Floor
- Structures
- Tides
- Contamination
- Reef
- Rocks
- Coves
- Tsunami



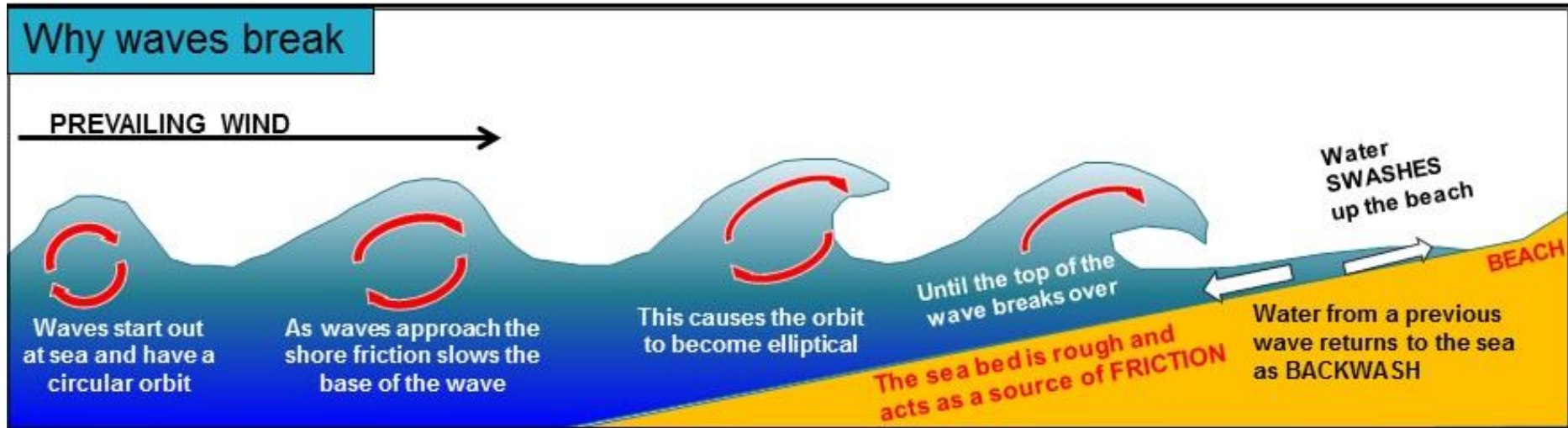


# WATER



- Weight 4 Kg / gallon
- Cold
- Buoyancy
- Salt vs Fresh
- Creates panic
- It is moving

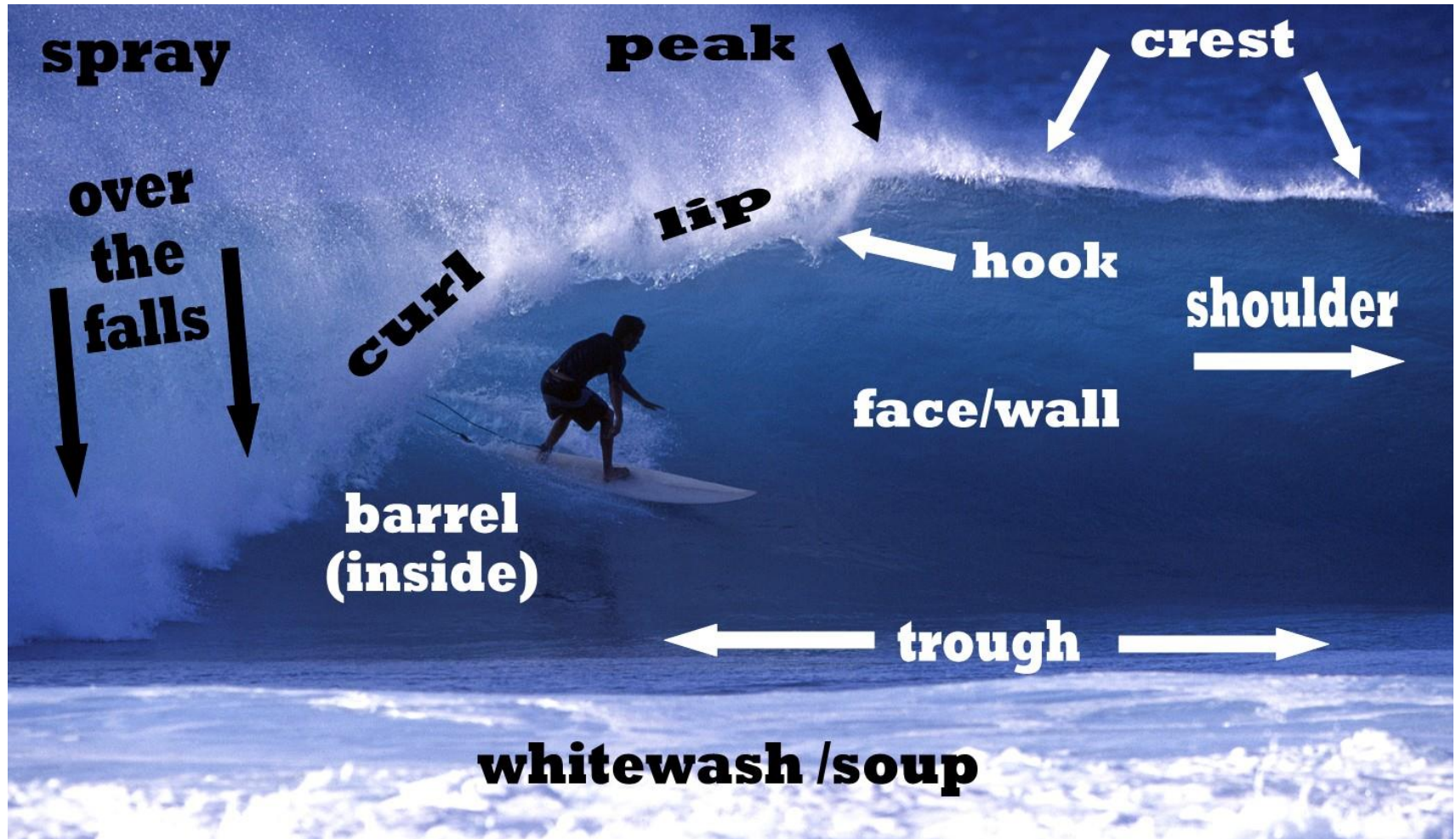
# WAVES & SURF



- Created by wind, gravity, earthquakes
- Very strong impact and forces
- Provides recreation
- Creates risk



# ANATOMY OF A WAVE



Shoulder Safe Position

# WAVES & SURF

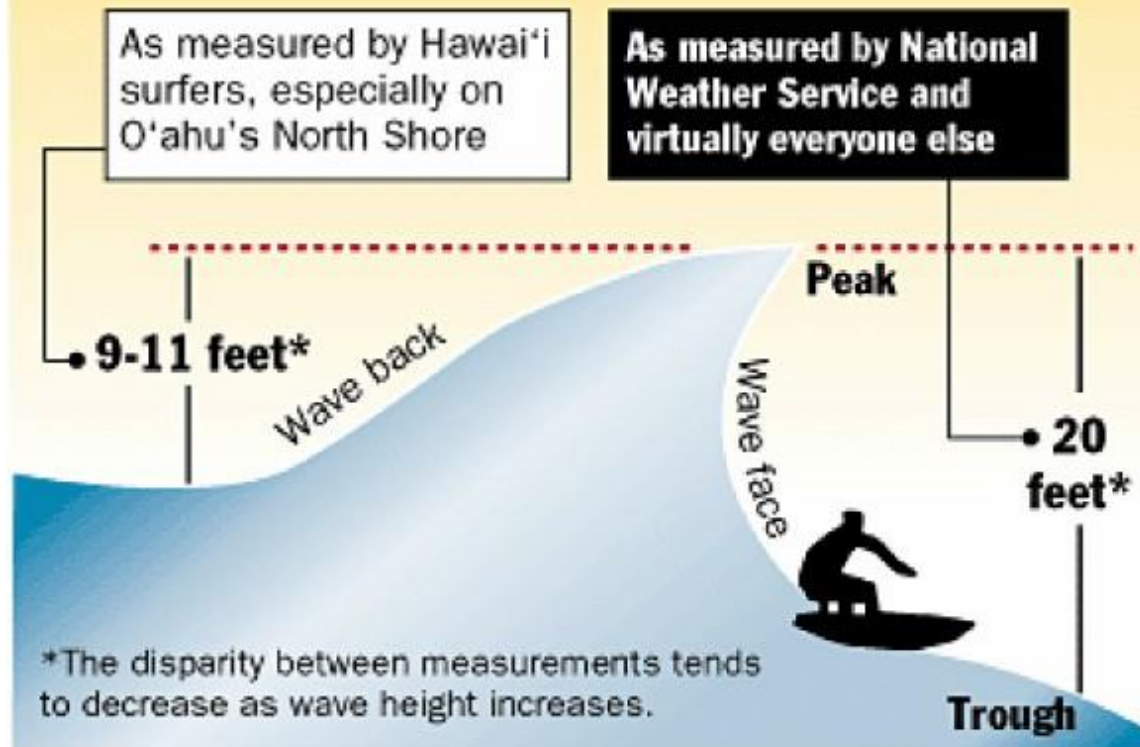
- Close to the coast
- Waves break when they "feel" the ground
- The bottom (sand, reef) shape determines the shape of the wave
- Steep = Swell sinking "Plungers"
- Gradual = Wave Scattering (Spilling Waves)

Lifeguards can "see" the shape of the sea floor by seeing the color of the water & studying the waves when they break.

# WAVES & SURF

## Measuring wave height

Wave heights are measured differently by surfers and other beachgoers in other parts of the world. The National Weather Service is trying to standardize wave-height reporting, measuring the wave face, from trough to peak.





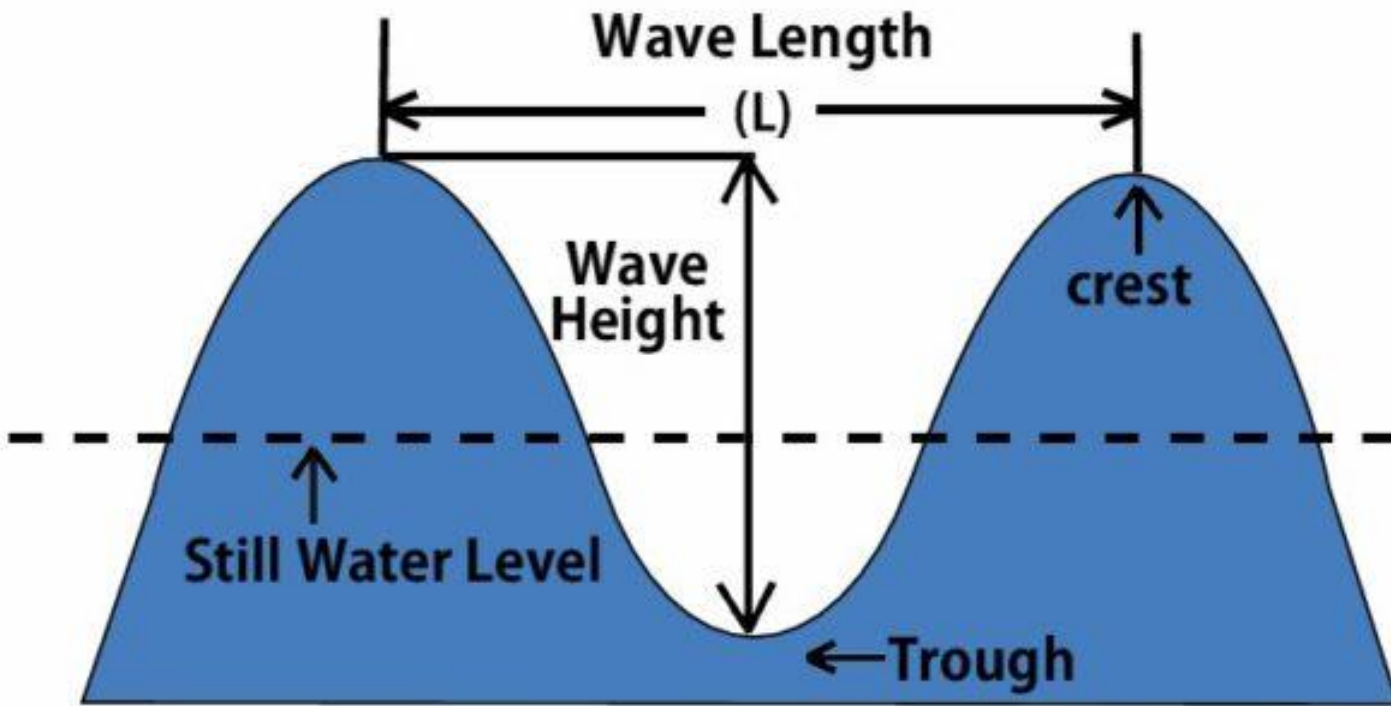
# WAVES & SURF

## Wave Sizes Chart

(Its not an exact science)

Wave Size (in feet)	Hawaiian Scale	Face Scale	
	0 - 1	0 - 2	Ankle Busters
	1 - 2	2 - 3	Knee High
	1 - 3	3 - 4	Waist High
	2 - 3	4 - 5	Shoulder High
	2 - 4	6 - 7	Head High
	3 - 5	8 - 9	Over Head
	4 - 6	9 - 10	
	5 - 7	10 - 12	Double Over Head
	6 - 8	13 - 14	
8 - 10	16 - 18	Triple Over Head	
10 - 12	18 - 20		
12 - 15	22 - 25		
15 - 20	25 - 30	Huge, Bombs, Narly, Heavies, Bitchin	
20 - 25	25 - 35		
25 - 30	35 - 45		
35 +	50 +		

# WAVES & SURF



- Surf comes in sets of waves
- Lulls are between sets when there are no breaking waves

# SURF RISKS

- Panic
- Dis-orientation
- Side currents
- Surf injuries
- Rip Currents
- Back-wash
- Impact and power of water



# SURF TYPES

- Plungers
- Shore break
- Backwash
- Giant / Storm Swell

# PLUNGERS



- Break hard
- Can injure swimmers / surfers
- Can hold swimmers under water



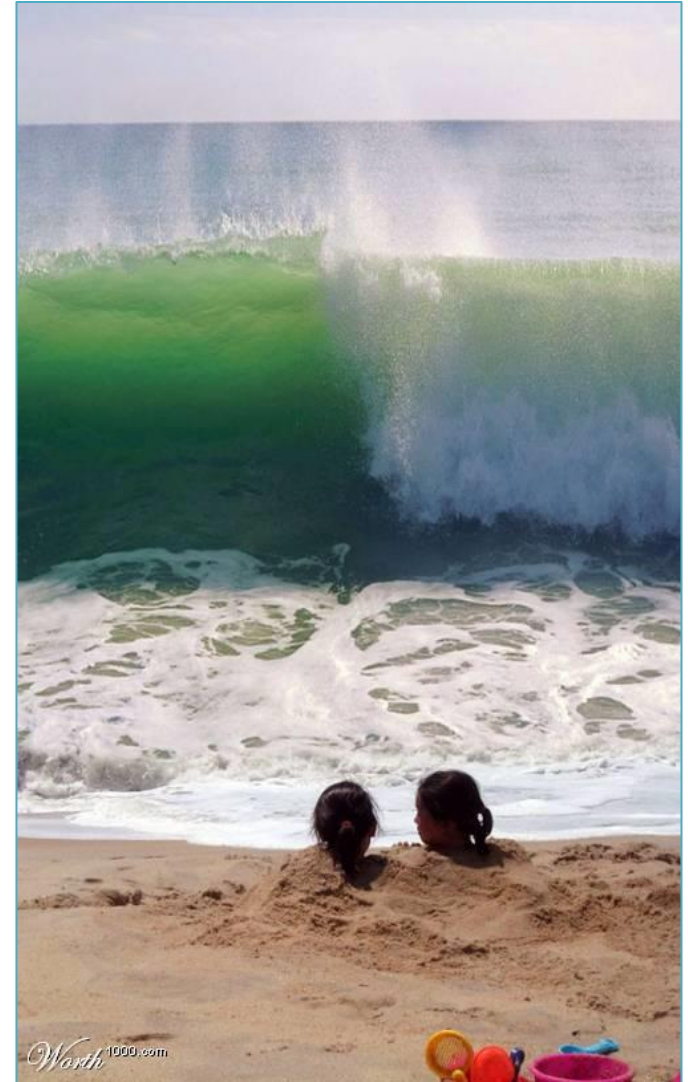
# PLUNGERS





# SHORE BREAK

- Close to shore
- Shallow water
- Steep Berm
- Dangerous for kids & elders



©Worth1000.com

# SHORE BREAK



# BACKWASH



- A refracting wave moving seaward
- It can be combined with a wave moving shoreward
- Generally unexpected
- Usually on High Tide with a high sand berm



# STORM / GIANT SWELL



# GIANT SWELL

- Caused by storms
- Dangerous to boats



# RIP CURRENTS

- **Are the cause of 90% of ocean rescues**
- **Most people do not see or understand them**
- **But....They can work in your favor**





# WAVES & RIP CURRENTS ARE RELATED



Large Waves = Large Rip Currents  
Small Waves = Small Rip Currents  
No Waves = No Rip Currents

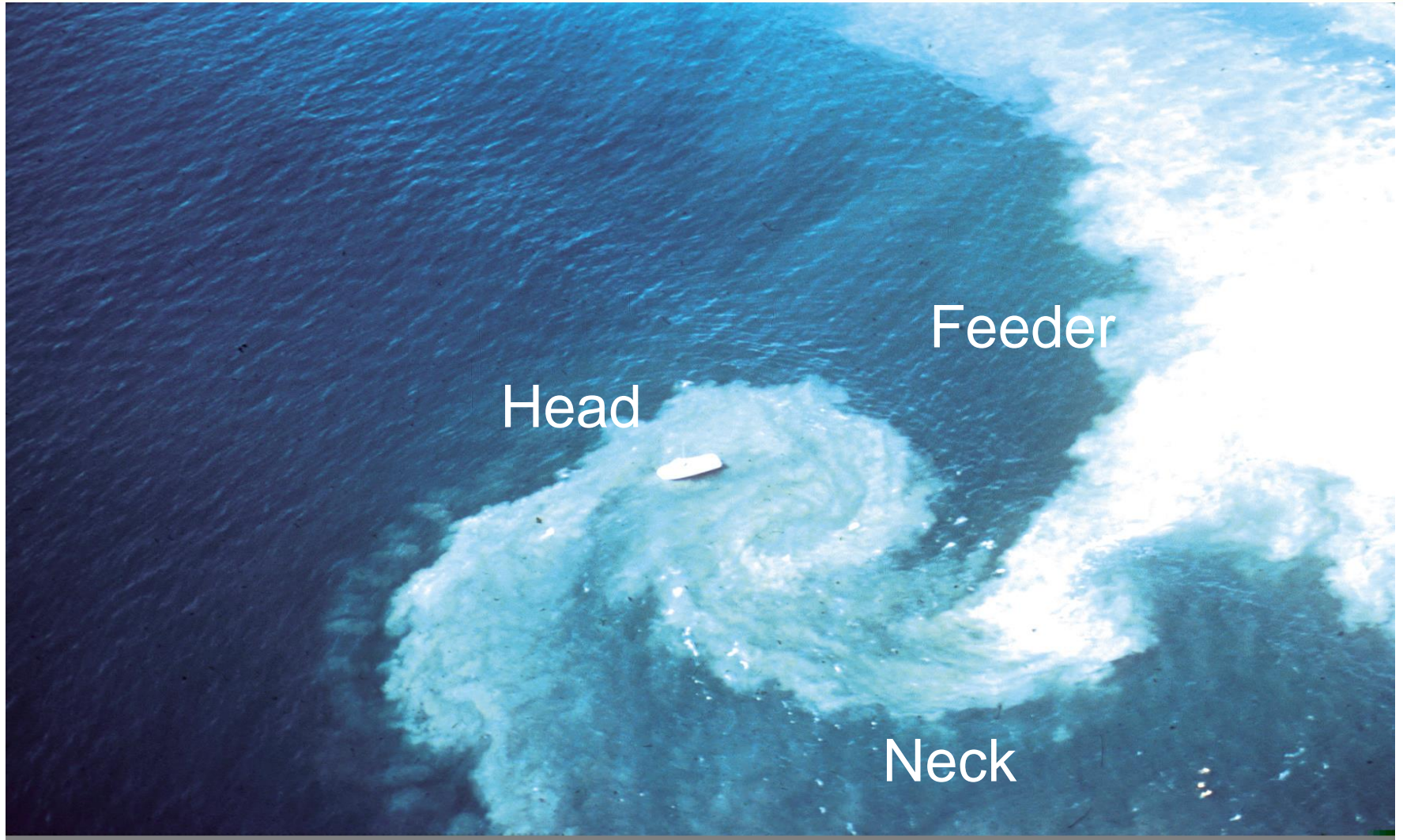
# HOW RIP CURRENTS FORM



- Waves come to the shore
- Holes and Channels
- Sands erodes by water returning
- Water seeks to return the easiest
- Obstructions (people, structures)
- Storm drains



# PARTS OF A RIP CURRENT





# TYPES OF RIP CURRENTS

- Structural – Caused by manmade objects (jetty, pier, etc.)
- Permanent – Caused by natural objects (rocks, river, etc)
- Stationary – Caused by low funnel points in the sand
- Flash – Disappear & reappear, caused by set waves
- Moving – Similar to Flash, but the relocation of sand from waves against a berm changes the bottom of the shore floor, which impacts the Flash Recurrent causing it to move.



# HOW TO IDENTIFY A RIP CURRENT

- Brown/muddy colored water
- White foam
- Water chopped and stirred
- Waves breaking in places different from the rest of the surf
- People or things carried by water
- One area that looks different from the rest of the water

# CAN YOU SEE THE RIP CURRENT?





# CAN YOU SEE THE RIP CURRENT?



# CAN YOU SEE THE RIP CURRENT?





# CAN YOU SEE THE RIP CURRENT?





# CAN YOU SEE THE RIP CURRENT?



# CAN YOU SEE THE RIP CURRENT?



# CAN YOU SEE THE RIP CURRENT?





# A RIP CURRENT IN ACTION





# CAN YOU SEE THE RIP CURRENT?





# CAN YOU SEE THE RIP CURRENT?





# CAN YOU SEE THE RIP CURRENT?



# CAN YOU SEE THE RIP CURRENT?



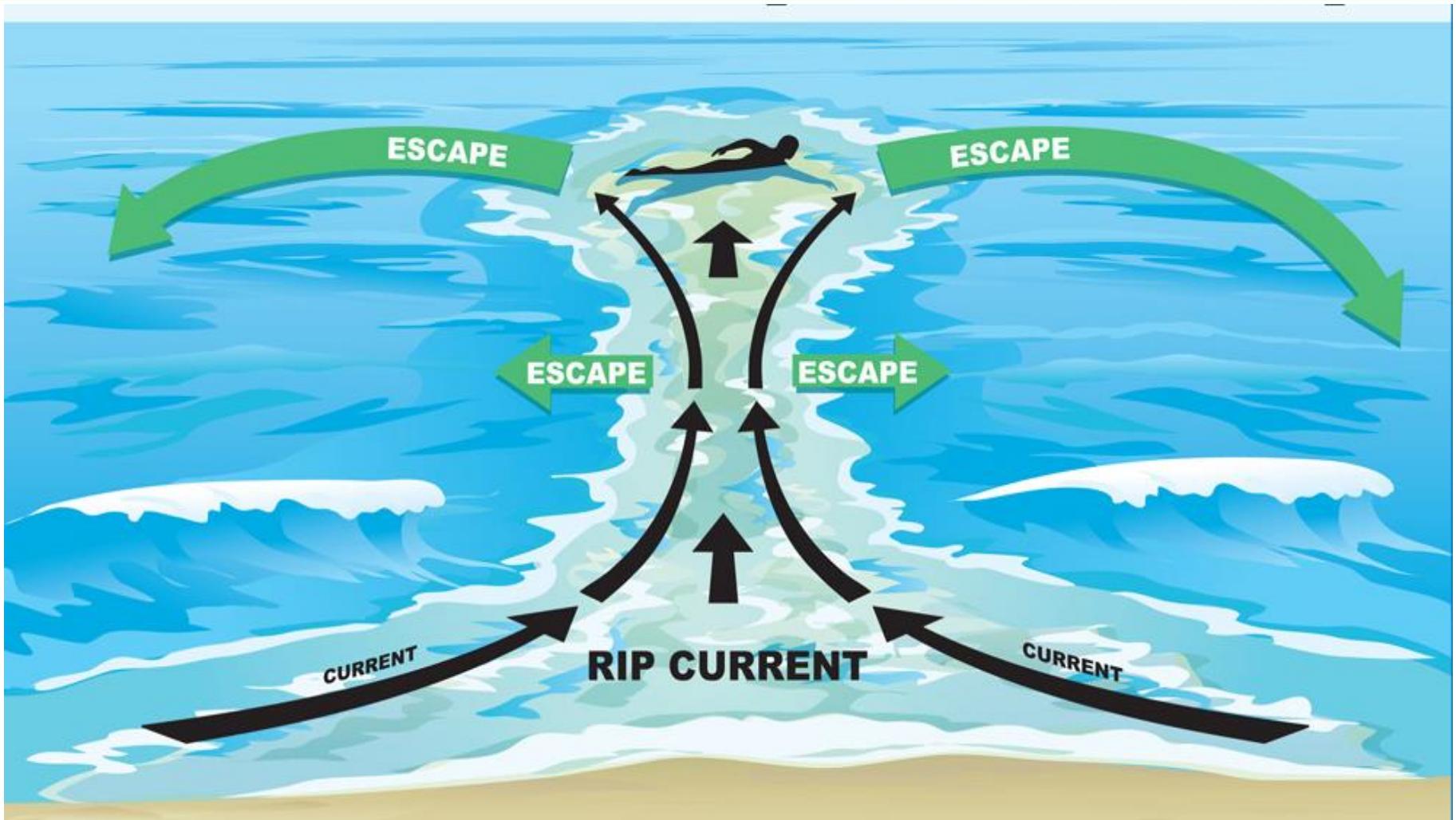


# CAN YOU SEE THE RIP CURRENT?





# ESCAPE & USING RIP CURRENTS



# INSHORE HOLES

- Created by waves
- May be near the pier or sandbars
- Issues for Children
- May be more dangerous as tide changes
- Create tripping hazards for lifeline

# INSHORE HOLES



Dont Be This Guy!



# INSHORE HOLES



# SAND BARS



- Created by waves and lateral currents
- Risk of diving in shallow water



# OCEAN CLIMATE

- Wind
- Rain
- Temperature – Air & Water
- Lightning





# OCEAN CLIMATE: LIGHTNING

- Identify safe shelter locations in your area
- Determine distance of lightning by using “Flash to Bang” Rule: divide counts (in seconds) by 5 to get the distance in miles
- IE: 5 seconds = 1 mi. 50 seconds= 10 mi.
- Evacuate swimming area if lightning is within ten miles
- Wait 30 minutes after storm to resume activities