Rip Currents & High Surf

In West Central & Southwest Florida

Presented by: **Tony Hurt**

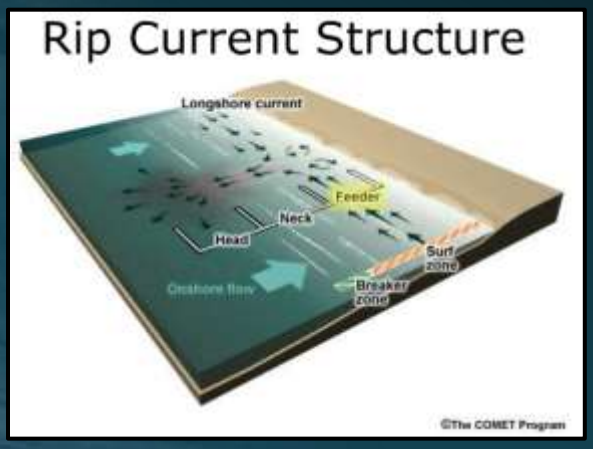
What is a rip current?

(surf zone: tidal area of beach thru the breaking waves)

A "Rip Current" is defined as a relatively small-scale surf-zone current moving away from the beach.

Rip currents form at low spots or breaks in the sandbars as waves disperse along the beach causing water to become trapped between the beach and a sandbar, or other structures like jetties or piers.

What is a rip current?



These fast flowing channels of water can carry swimmers out to sea with incredible speed.

Rip Currents currents usually start close to shore, travel through the surf zone, and disperse beyond the line of breaking waves.

Rip currents & high surf: Forecasting and Observations

- TBW High Surf Advisory: 5+ ft breaking waves at area beaches.
- TBW Rip Current Statement: Moderate to High risk of rip currents along area beaches; typically need surf of 2 ft or larger.

General Pattern Recognition

Cold fronts, especially with moderate-strong W-NW winds in Gulf

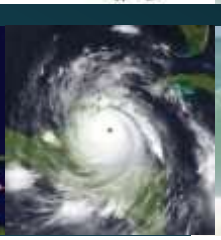

Dec 2018

Persistent light-moderate+ W flow (summertime pattern, lots of beach goers and numerous rip currents)


July 2020

Gulf Lows or Tropical systems, even in NW Carib (Yucatan Channel swells).


2007 Hurricane Dean



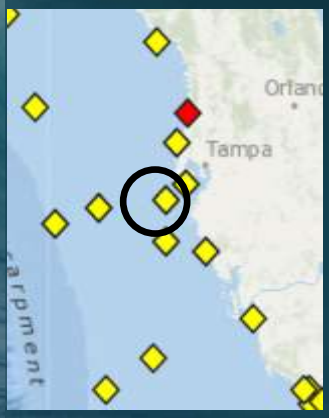
TBW beaches have many days of small to medium sized surf

General High Surf Height Rules of Thumb(outer waters):

Offshore Buoys (42036, 42099, 42097): 9+ ft with period of 6 to 10 seconds from direction of 190-340 degrees (SW-NW).

General High Surf height Rules of Thumb(nearshore waters):

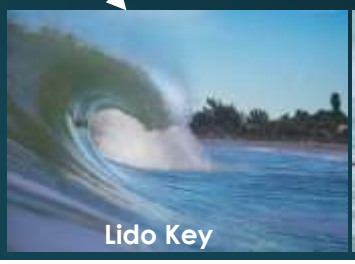
Egmont Buoy (42098): 6½ to 9 ft with period of 6-10 sec from direction of 190-340 degrees (SW to NW).



East Gulf wave characteristics and influences

- Spilling: breaking water spills directly down the face of the wave; these are most waves in our area.
- Plunging: base of the wave decelerates rapidly and the top of the wave pitches out in front, forming a curl or tube. Does occur locally, mainly near shallow shoals and sandbars.


Captiva


Lido Key


Anna Maria Island

Choppy Waves vs Clean Waves

Wind direction and speed, at the beach or coast, are the most important factors in wave quality. All incoming wave energy can produce dangerous rip currents.

Strong onshore flow for *choppy* to rough conditions.

Light side shore to moderate offshore flow for *clean* and glassy conditions.

Wave Height Observations and Measurements

- Getting accurate and timely wave height observations is the most difficult aspect of forecasting surf heights because most are subjective and possibly biased or averaged over a large area.
- Measure the wave face from the trough to the crest/peak.

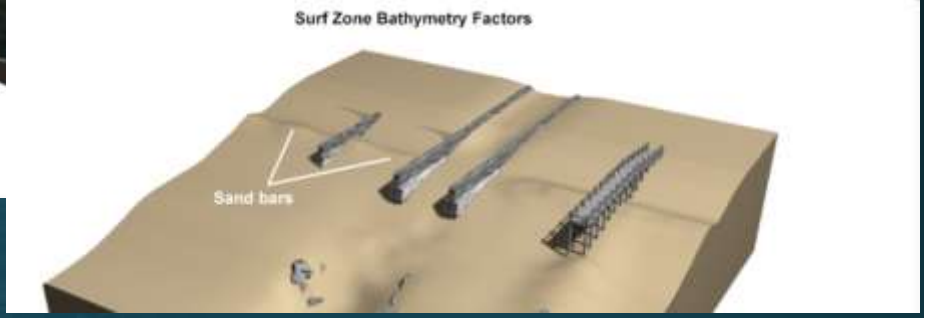
Mote Marine and County Lifeguards

Webcams and commercial surf sites

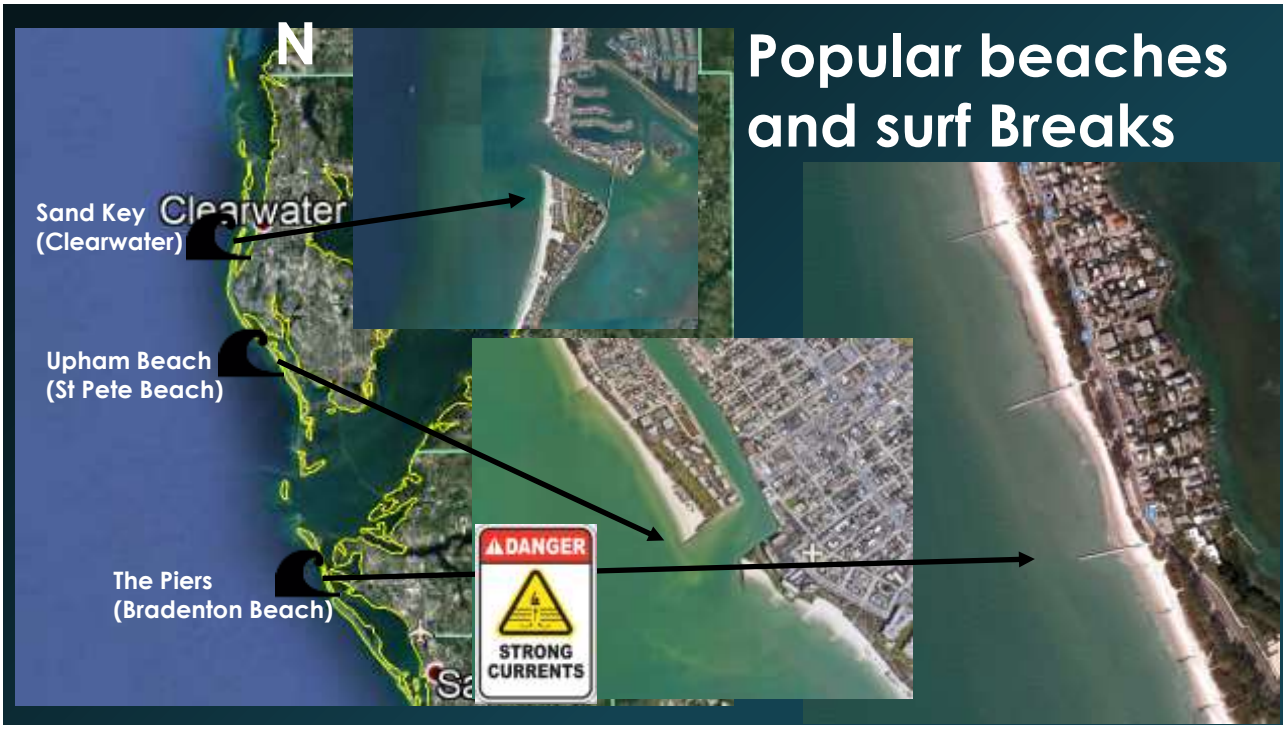
Shoulder to Head High or ~ 5-6 ft.

Surf zone variability

Our coastline has hundreds of artificial and natural structures.



Popular beaches and surf Breaks



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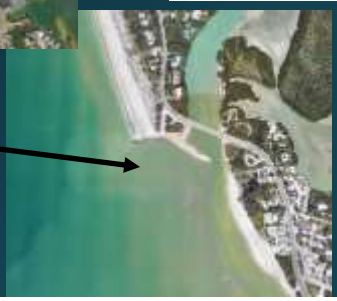
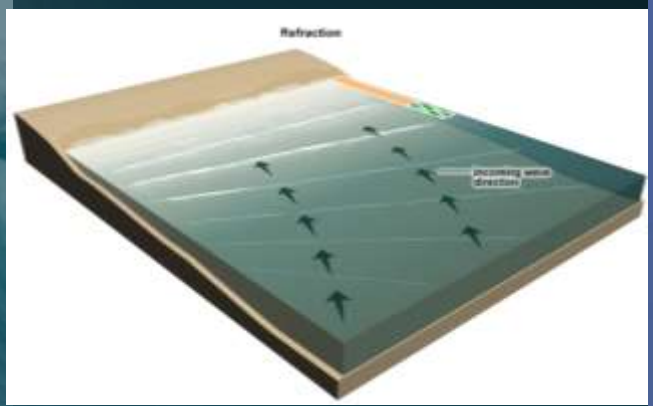
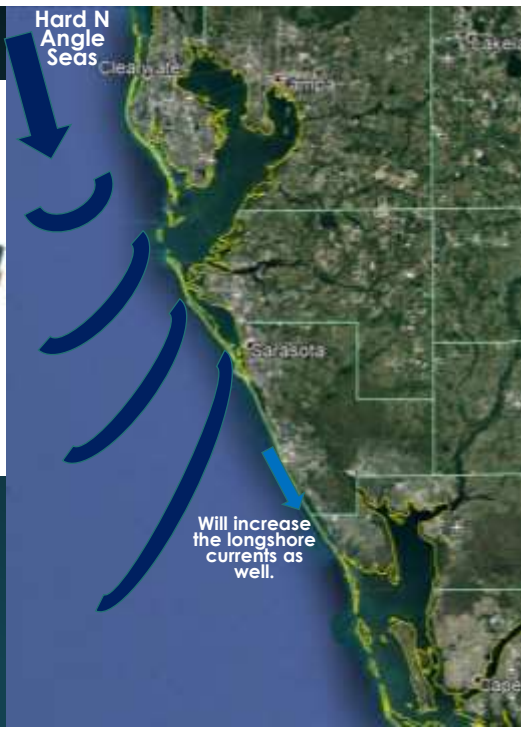


Many near inlets, manmade features, or shifting sandbars.

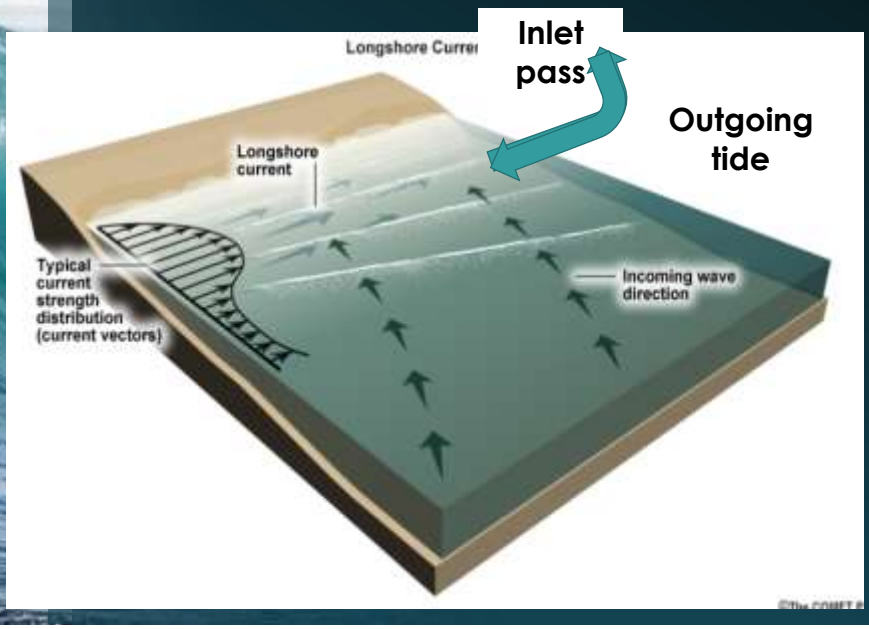
Other surf height considerations



- Local beach angles differ significantly along our complex shoreline with many natural and manmade features that influence wave direction and surf height.
- Most area beaches face SW-W but refraction will allow NW-N seas to propagate ashore and can produce high surf and rip currents. Also, surface wind speeds and direction will vary and impact surf conditions and choppiness.



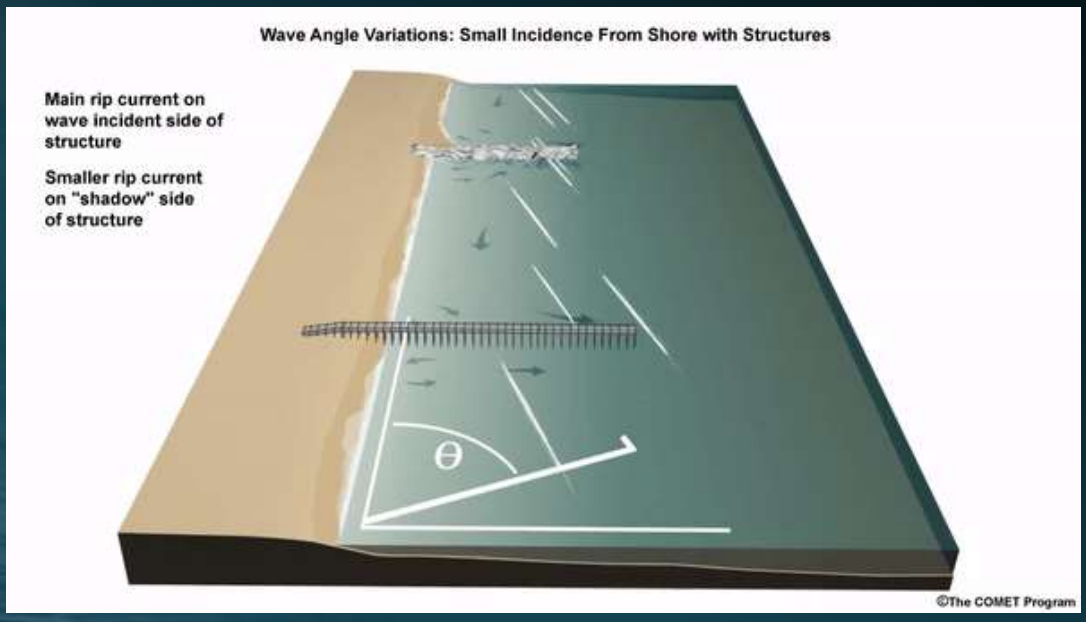
Longshore currents



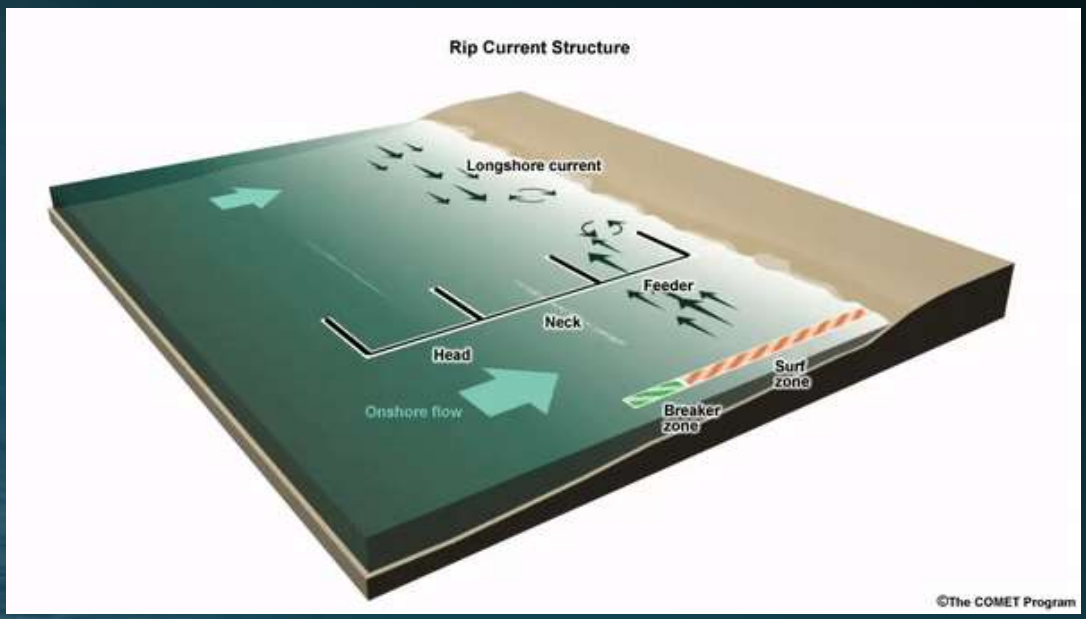
They move water through the surf zone parallel to the beach face. Can be hazardous by carrying swimmers significant distances down the beach relative to their entry point in the water.

Wind direction and speed along with tide cycle can enhance longshore currents significantly.

Rip currents with structures



General rip current illustration



Types of rip currents (All more prevalent around Low Tide)

- Permanent
  - Develops in same location, including artificial structures such as piers, jetties, and natural structures such as points, sand shoals. Inlets.
- Fixed
  - Occurs along beaches devoid of natural or artificial structures, including sand bars.
- Flash
  - A short duration event which is enhanced by heavy surf, e.g., long period swell from offshore Storm. As the term suggests, they're unpredictable.
- Traveling
  - Moves slowly down the beach, aided by prevailing wave direction and is shifted by longshore or tidal currents.

Identifying a rip current

Elevated location is best; sun glare can also be a hindrance.

Channel of churning, choppy water flowing seaward

Difference in water color (can be lighter or darker)

Line of foam, seaweed, or debris moving seaward

Break in the incoming waves

Rip current examples

Rips can develop due to the longshore current interaction with artificial structures and variability of breaking wave heights.

A given rip current typically lasts 10-20 minutes (except ones induced by artificial structures), is less than 10 yards wide, and can extend several hundred yards offshore.

Permanent rip current

Pier (left) and Jetty (right) influenced rip currents

Fixed rip current: sand bar

Both images are used to visualize how a break in a sandbar may induce a rip current. On the left, a sand bar is exposed at low tide. On the right, it's covered at high tide.

Note: the images were not taken at the same location, so they cannot be used to infer sandbar break vs. rip current width.

Also note that sandbars will likely not be this exposed in locations with small tidal variations (1-2 ft).

Aerial view of rip currents

Taylor Busbee
Pensacola Beach, March 2021

Any evidence of rip currents here?

Rip Currents: How to Survive

- Do not panic! Rip currents will not pull you under the water
- Do not swim against the current (toward the beach)
- Instead, swim out of the current (parallel to the beach)
- If you cannot escape the current, FLOAT
- Yell and wave for help

National Weather Service

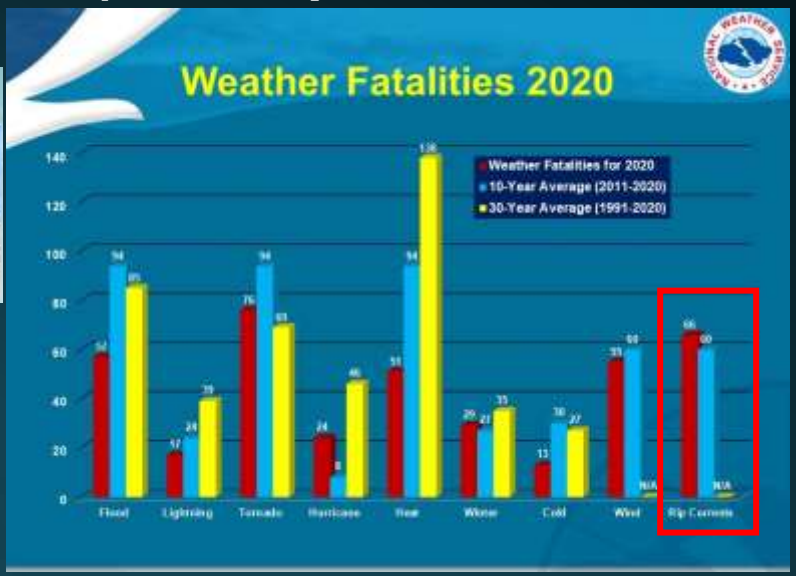
weather.gov/beach

100 Surf Zone fatalities in U.S. in 2020 (66 Rip Current)

The majority of rip current victims swam at unguarded beaches and were...

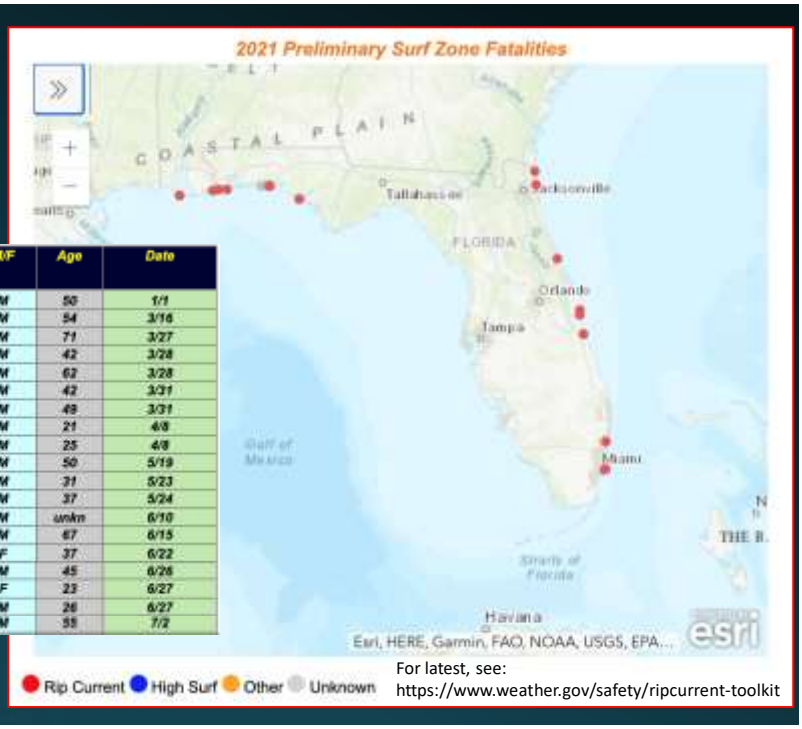
- Young male (distressed swimmer)
- Older male (attempted rescuer)
- Non-residents

Many near drownings and hospitalizations are underreported as well.



Preliminary FL stats for 2021 (thru July 8th) – *19 fatalities*

Location	ST	M/F	Age	Date
Pompano Beach	FL	M	50	1/1
Miramar Beach	FL	M	54	3/16
Ft. Pickens	FL	M	71	3/27
Miramar Beach	FL	M	42	3/28
Johnson Beach	FL	M	62	3/28
Miami Beach	FL	M	42	3/31
Miami Beach	FL	M	49	3/31
Miramar Beach	FL	M	21	4/8
Miramar Beach	FL	M	25	4/8
Cape Canaveral	FL	M	50	5/19
Huguenot State Park	FL	M	31	5/23
Fernandina Beach	FL	M	37	5/24
Pensacola Beach	FL	M	unkn	6/10
Daytona Beach	FL	M	67	6/15
Panama City Beach	FL	F	37	6/22
Coca Beach	FL	M	45	6/26
Juan Ponce De Leon Landing Beach	FL	F	23	6/27
Juan Ponce De Leon Landing Beach	FL	M	26	6/27
Mirmar Beach	FL	M	55	7/2



For latest, see: https://www.weather.gov/safety/ripcurrent-toolkit

2014 - 2018 National Lifesaving Statistics

Category	2014	2015	2016	2017	2018
Beach Attendance	361,946,171	367,234,717	381,440,039	355,327,104	328,548,202
Rescues	91,745	95,052	89,092	75,963	83,433
Preventative Actions	7,846,592	8,613,044	8,502,966	8,799,633	8,031,341
Medical Aids	339,974	337,475	344,089	346,708	244,062
Boat Rescues	4,232	3,673	2,383	2,256	2,355
Passengers	13,236	5,856	12,914	4,677	4,737
Vessel Value	$77,818,845	$72,622,730	$68,533,930	$38,583,735	$62,005,385
Drowning Fatalities	115	109	179	135	157
Unguarded	95	96	154	111	133
Guarded	20	13	25	17	24
Lost And Found Persons	14,486	14,034	11,923	11,519	12,206
Public Safety Lectures	22,360	26,034	59,907	29,486	107,469
Students Attending	296,251	374,960	461,760	460,970	575,102
Reporting Agencies	133	141	150	150	136

Drowning

- 3rd leading cause of accidental death in the US
- 2nd leading cause of accidental death for persons aged 5 to 44.
- # 1 leading cause of death in FL for persons < 15.
- Male to female drowning ratio is 5: 1

General Forecasting Guidelines From NWS TAE Alex Gibbs & Lance Franck

Assessing Rip Current Risk

Assessing the rip current risk can often be difficult, as we will only know part of the picture – the meteorological and expected surf conditions. However, other factors such as bathymetry and structures on the beach can play a significant role. Therefore, the early morning rip current risk in the SRF is simply your best guess based on available information.

A FEW FORECASTING RULES OF THUMB

LOW RISK	MODERATE RISK RP.S	HIGH RISK
Surf heights should generally be 0-1 feet.	Surf heights reach the 2-4 foot range.	Generally, surf heights 4 feet or higher.
Winds around 10-12 knots or less, or large offshore component.	Winds around 12-15 knots or higher, with onshore component.	Strong, gusty, onshore winds expected.

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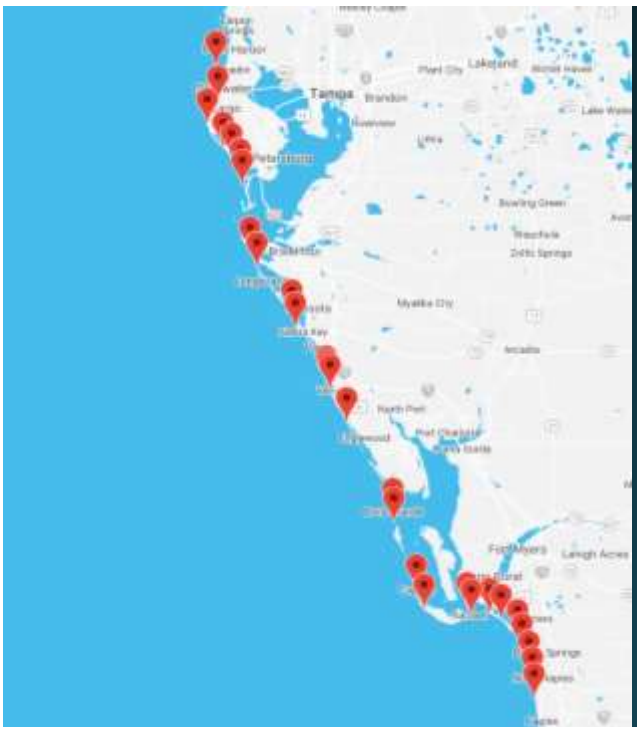
THINGS THAT CAN INCREASE YOUR RIP CURRENT RISK

- Longer wave periods (*7 sec or more*) up to the coast
- Multiple wave groups (*Example: waves approaching from both the southwest and northwest*)
- Large, organized thunderstorm clusters or lines that can produce broad areas of strong winds and introduce other wave groups. (*Be wary of large MCSs offshore in the north-central or northeast Gulf of Mexico*)
- Winds shifting when the tide is going out. (Per beach patrol feedback)
- Active rip channels from a previously active day. (*In other words, it may take time for the rip current risk to diminish following numerous and significant rip currents*)

Local rip currents hazards

Beach Warning Flag Program

- Uniform flag system adopted in 2005 for use by Florida's beachfront communities
- Uses flags in conjunction with interpretive signs to explain the different flag colors
- Provide general warnings about the overall surf conditions, including rip currents
- Minimize the risks of drowning & serious injury



Beaches with Life Guards
https://visitbeaches.org/#

Anclote Key to Bonita Beach is nearly 150 miles of beaches.

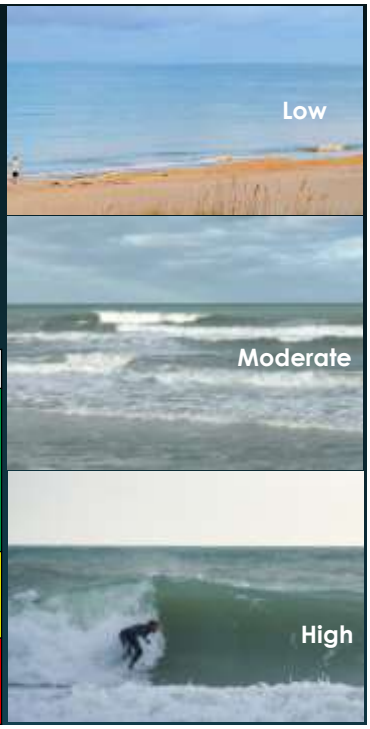
But less than 10 total miles of that are actually life guarded beaches!

TBW GHWO

None	No unusual risk from rip currents.
Low	Weak rip currents possible. Weak swimmers should stay in shallow water.
Moderate	Rip currents likely. Weak swimmers should not enter the surf above the knees.
High	Strong rip currents likely. Stay out of the surf.
Extreme	Severe rip currents likely. Surf may be deadly.

TBW SRF

Risk Level	Beach Flag	Forecast Statement
Low	Green	"The risk of rip currents is low, however, life threatening rip currents often occur in the vicinity of groins, jetties, reef, and piers"
Moderate	Yellow	"Life threatening rip currents are possible in the surf zone"
High	Red or Double Red	"Life threatening rip currents are likely in the surf zone"



Collaboration: Beach Safety Partners and NWS

- The partnership between beach safety officials and NWS is important to ensure consistent rip current messaging.
- This ensures conditions observed / anticipated match the rip current risk in the Surf Zone Forecast / beach website.
- Beach safety officials provide valuable observations, which are used to adjust our forecasts, and ultimately improve them.

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weather.gov/beach

Special thanks to:

Rick Davis (TBW)
Lance Franck (TAE)

…and other contributers

Questions?