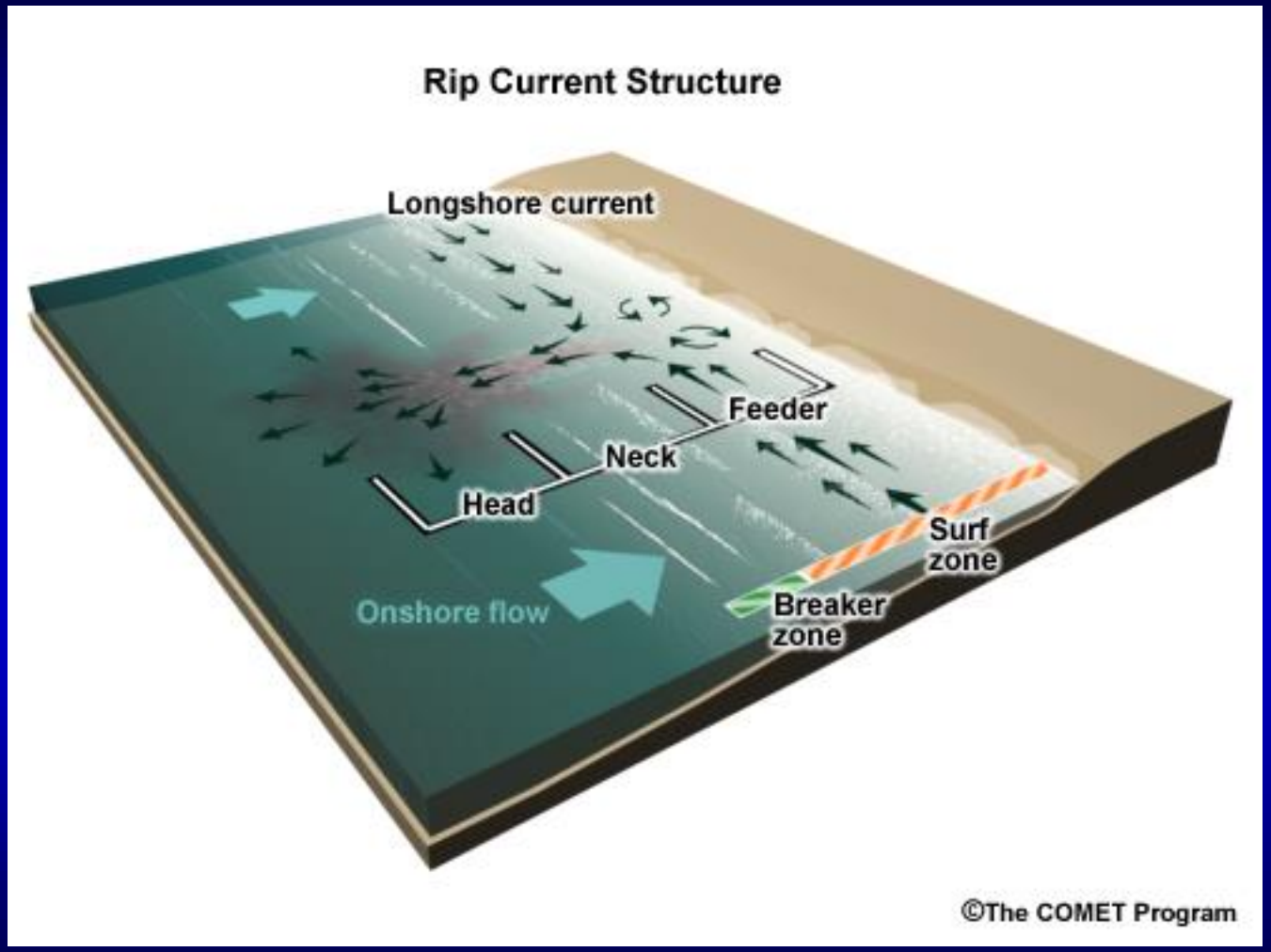
Lifeguard Beach Current Observations and NOAA: A Partnership to Improve Beach Safety

Rip Current Definition

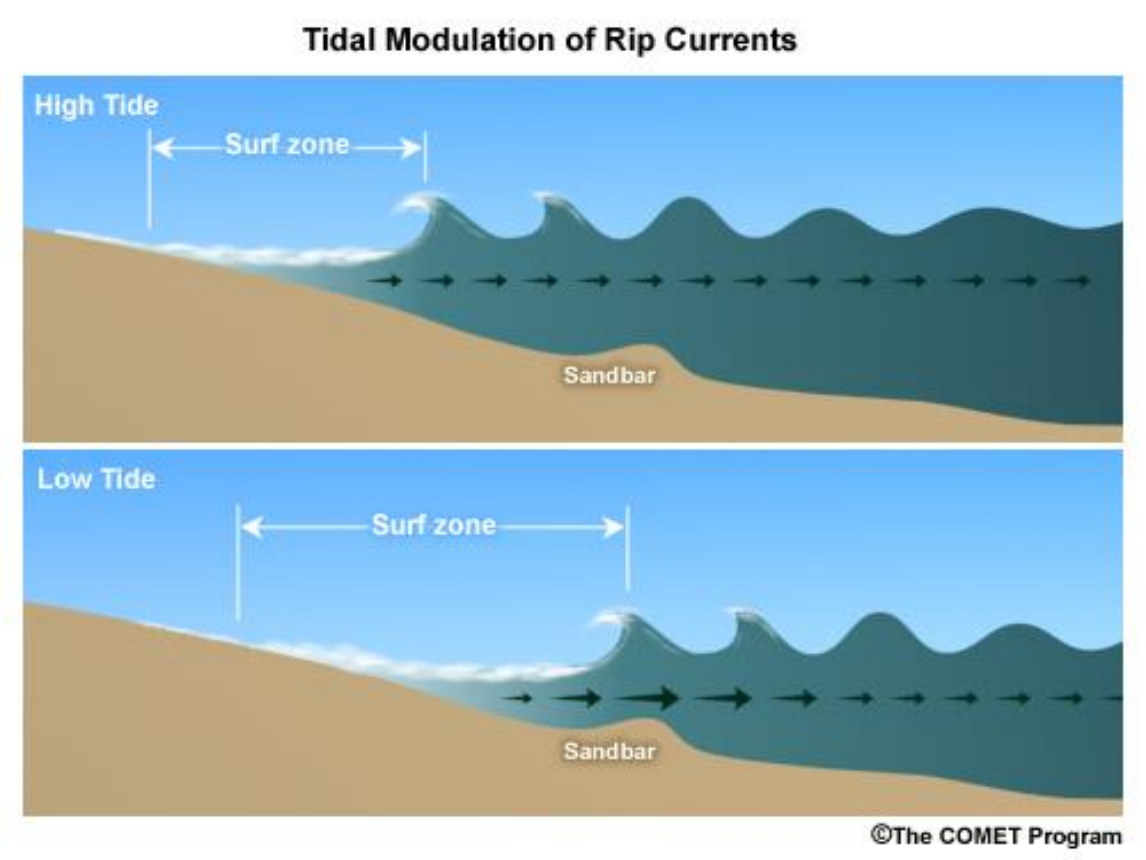
Rip Currents -- A jet-like seaward flow across the surf zone of a beach.

Rip Current Structure



In the surf zone, water from breaking waves tumbles forward toward shore, and then retreats. A rip current can form when the water gathers and rushes back through a narrow channel.

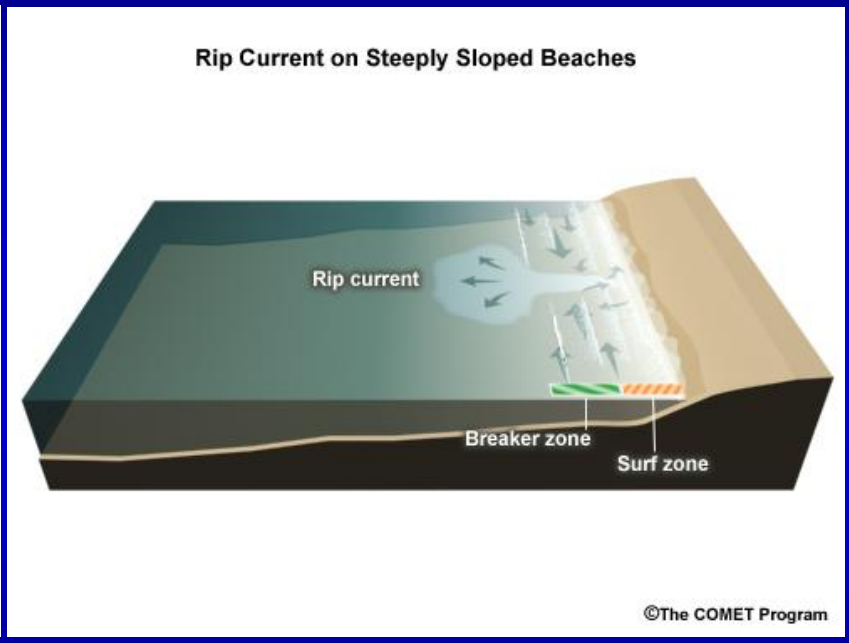
Rip Currents – Effects of Water Level



Changes in water level due to seiches or seasonal variations can provoke rip currents (tides, important for water levels along oceanfront beaches, are very minor on the Great Lakes). Lower water levels can lead to a wider surf zone, and more displaced water, as waves break on a sandbar further from the shore. The greater amount of displaced water can lead to more rip currents.

Rip Currents – Effects of Beach Slope

Wave breaks when wave height
is > ~0.8 times the water depth.



Rip currents are more often seen at beaches with mild slopes instead of steep slopes, because this affects the surf zone width and therefore the amount of water transport. Wider surf zones can lead to more displaced water that will flow back offshore, potentially leading to more rip currents.

Rip Current – Telltale Signs (1)

Rip Currents often can be identified as areas of turbulence or turbidity just outside the surf zone, often in a mushroom shape.

Rip Current – Telltale Signs (2)

Grand Sable Dunes, near Grand Marais, MI, on Lake Superior. NOAA

Rip Currents can often be identified as areas of turbulence or turbidity just outside the surf zone, often in a mushroom shape.

Rip Current – Telltale Signs (3)

Rip Currents channels can sometimes be revealed as breaks in the surf (which may be mistaken by unsuspecting swimmers as calm areas of safety.)

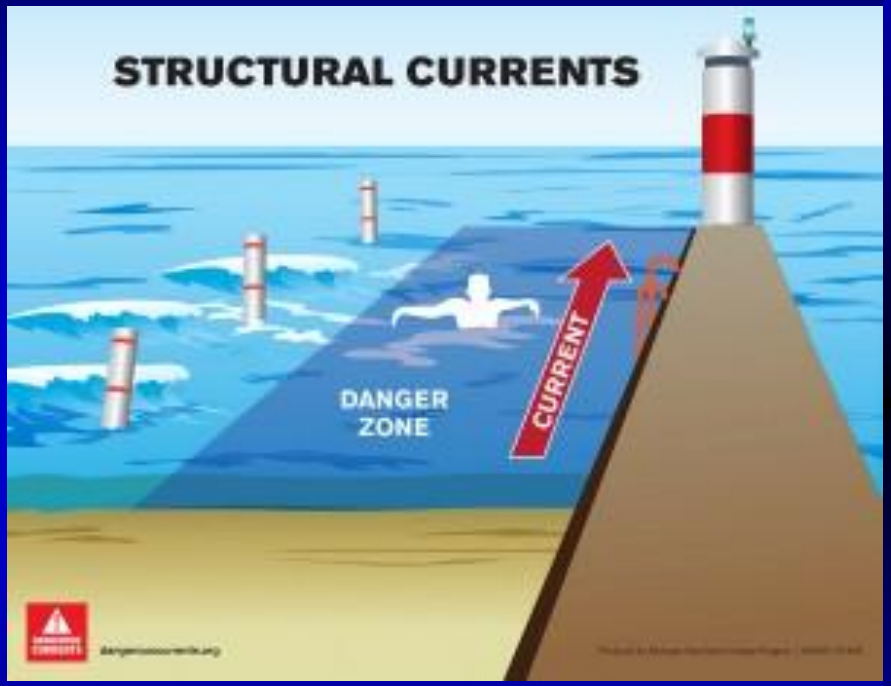
Rip Current – Telltale Signs (4)

Courtesy of Dennis Decker, WCM, NWS Melbourne, FL

Rip currents often form at gaps and low points in sandbars, or will scour out a new channel at a low point in the sandbar

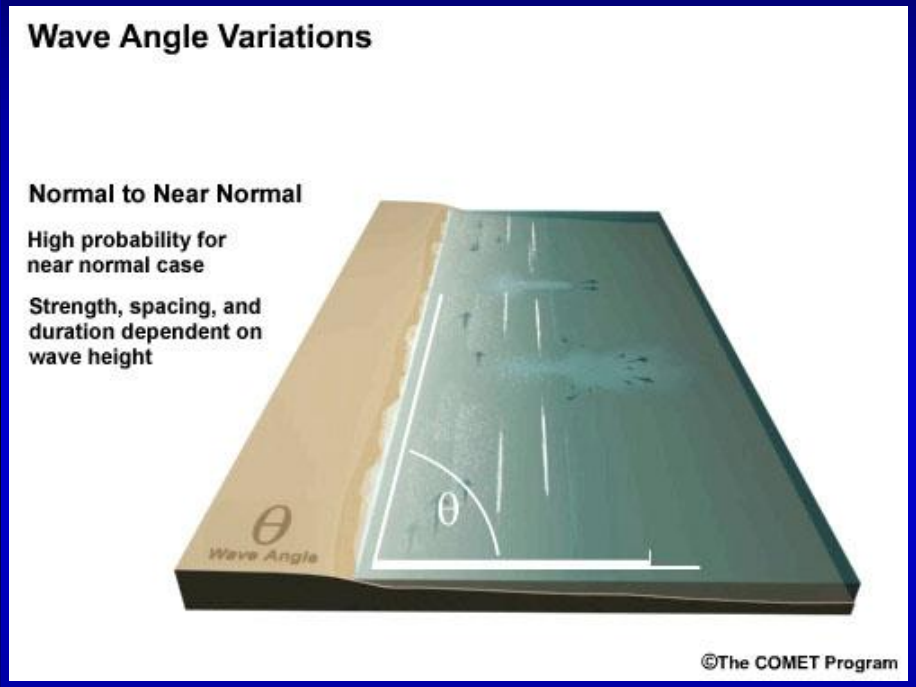
Rip Currents vs. Structural Currents (1)

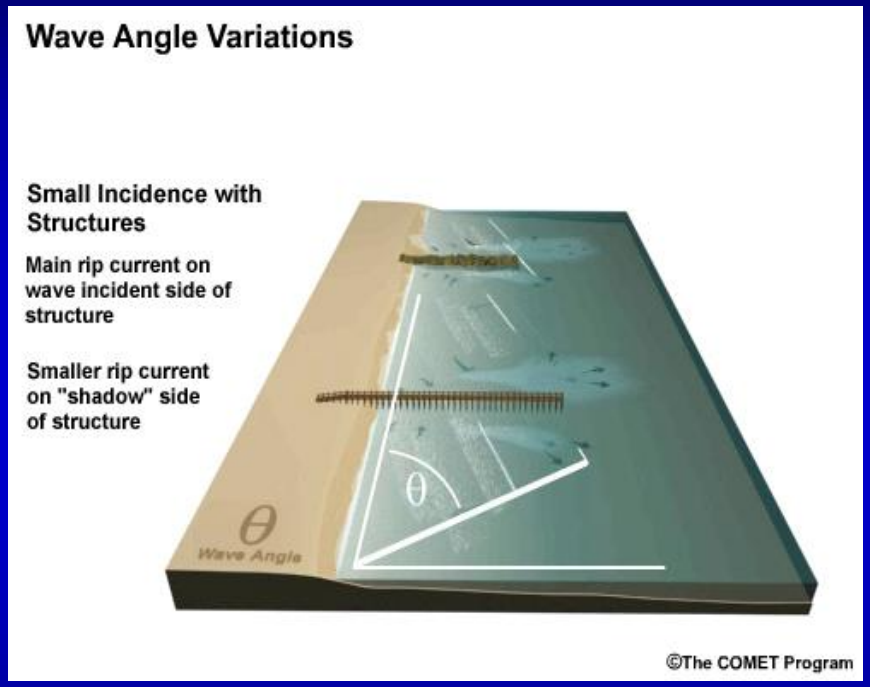
Rip Currents are induced by waves and can occur anywhere along the beach.



Structural Currents occur near piers, jetties, groins, and other permanent structures, as water piles up along the structure and rushes offshore.

Rip Currents vs. Structural Currents (2)

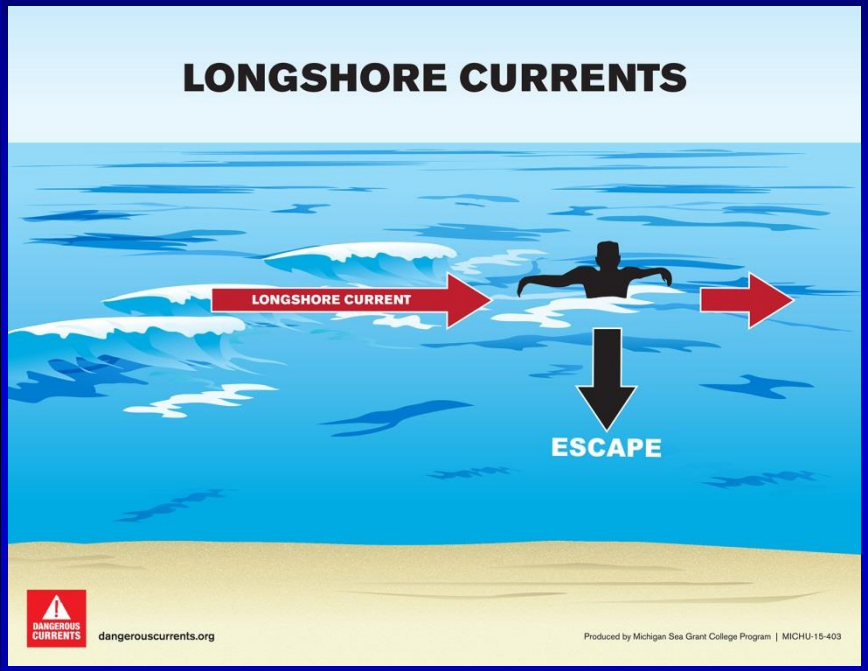


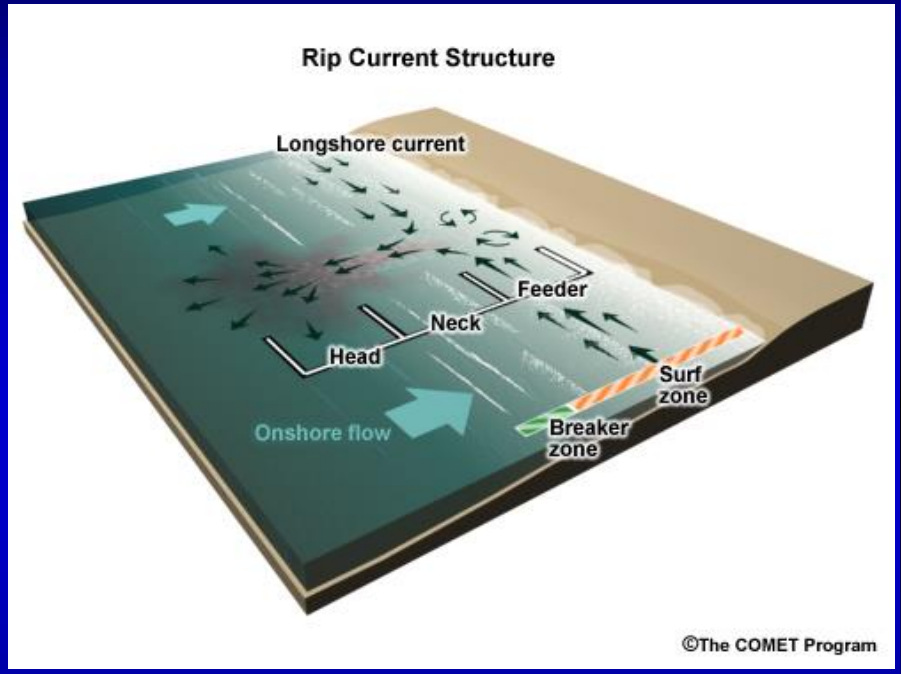


Waves coming directly or nearly directly onshore incoming waves will most likely cause wave-induced rip currents.

Structural currents (referred to as rip currents in the diagram above) are more likely to occur when waves arrive at an angle to the beach.

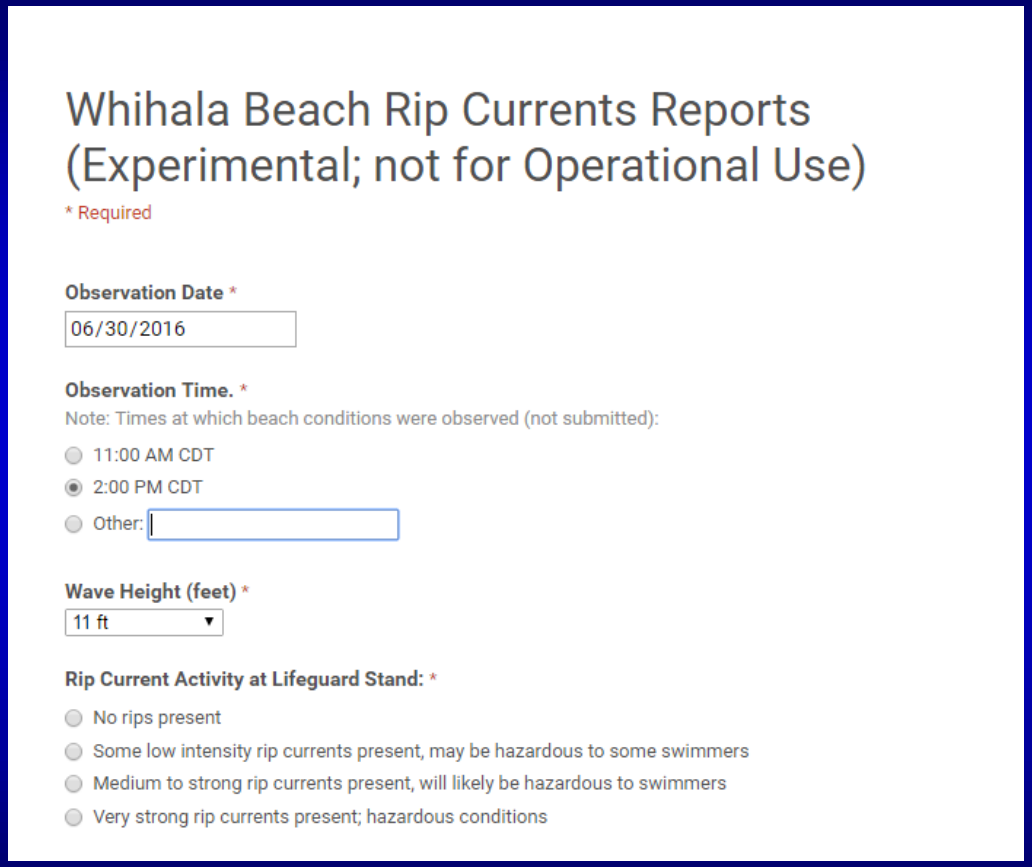
Longshore Currents





Longshore currents move parallel to the shore. They can feed into rip currents and structural currents.

Observation Reporting Form



Whihala Beach Rip Currents Reports (Experimental; not for Operational Use)

* Required

Observation Date *

06/30/2016

Observation Time. *

Note: Times at which beach conditions were observed (not submitted):

- 11:00 AM CDT
- (•) 2:00 PM CDT
- Other:

Wave Height (feet) *

11 ft

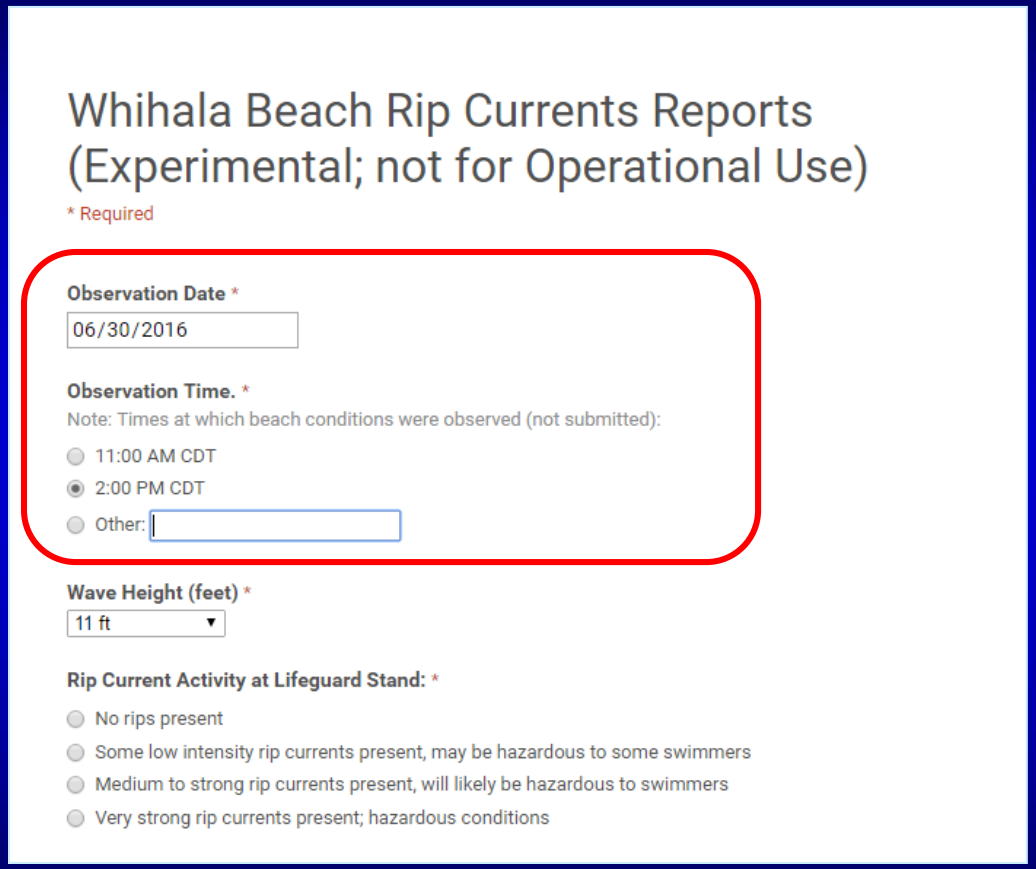
Rip Current Activity at Lifeguard Stand: *

- No rips present
- Some low intensity rip currents present, may be hazardous to some swimmers
- Medium to strong rip currents present, will likely be hazardous to swimmers
- Very strong rip currents present; hazardous conditions

Observations from lifeguards are a critical component in helping NOAA/NWS develop rip current forecast models.

NWS compares lifeguards' reports against model output to learn how well the model is performing.

Observation Form Parameters (1)



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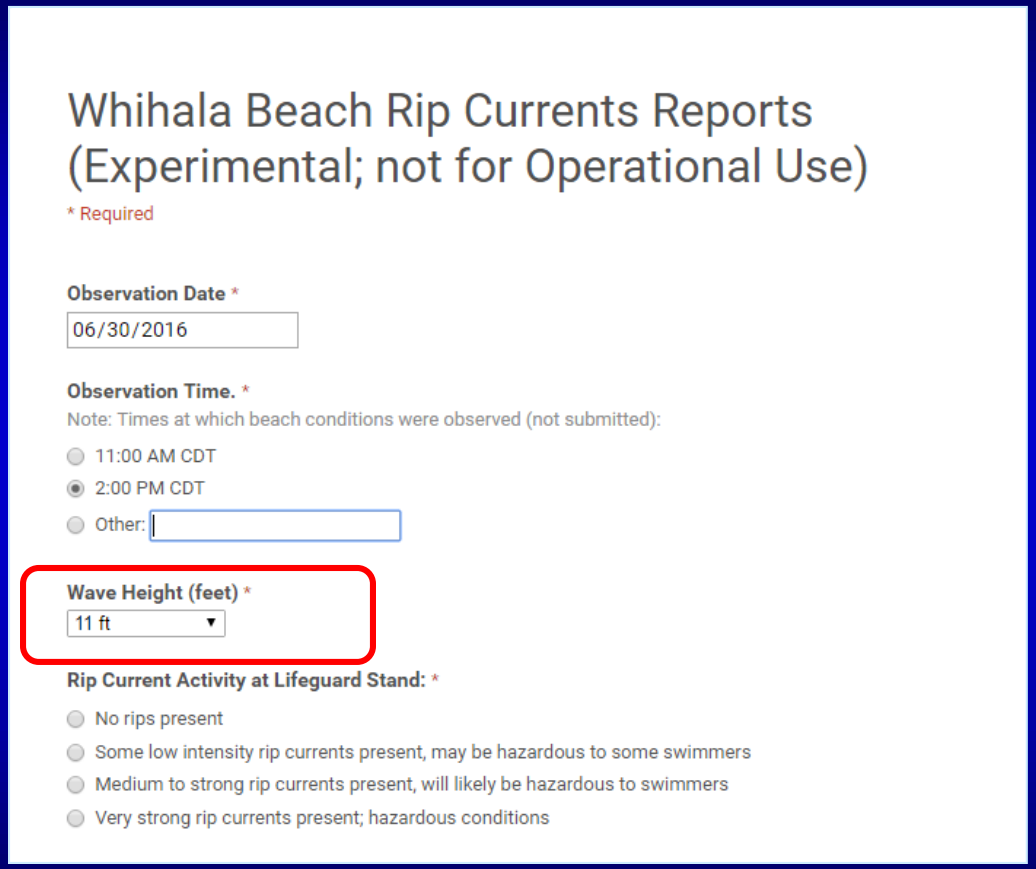
Observation Date & Time

Why we're asking: To sync beach conditions with model output.

Note: The times submitted should represent when the conditions were noted, not necessarily when the forms were submitted.

Observation Form Parameters (2)



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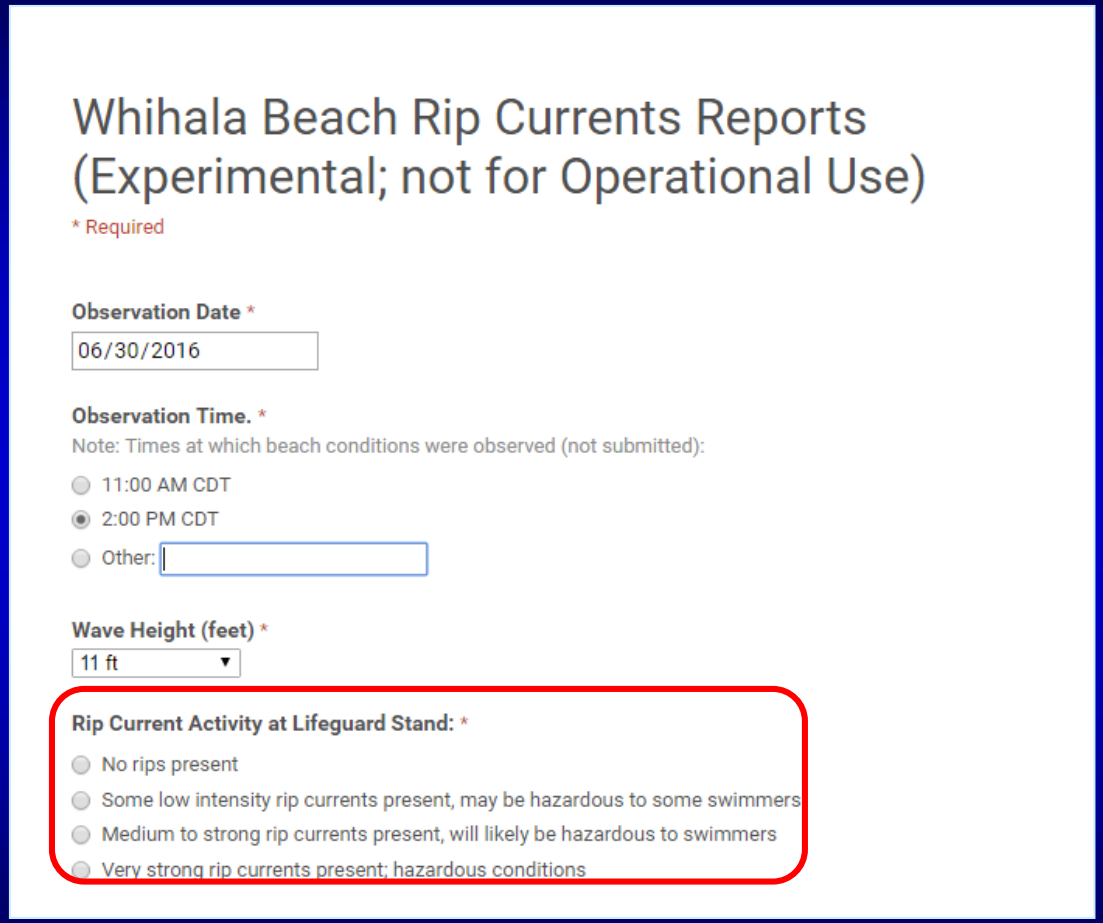
Wave Height

Why we're asking: To allow comparison against the forecast model wave heights. Rips are wave-driven, so it's important that the model forecasts the waves accurately. bBuoys are too far offshore to represent the inshore wave behavior

Note: This parameter can also be referred to as surf height – the height of the wave just as it breaks.

Observation Form Parameters (3)



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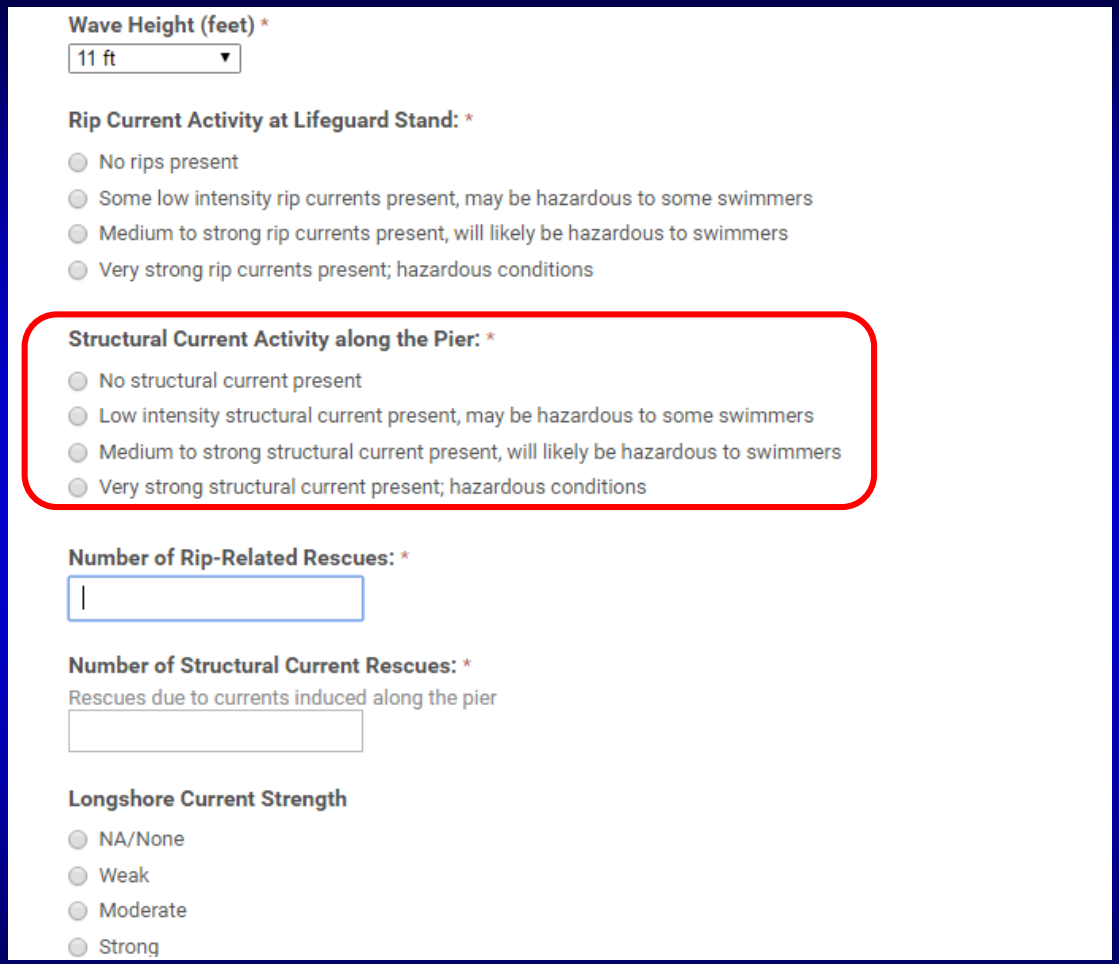
Rip Current Activity

Why we're asking: To record the presence and strength of the rip currents.

Note: While judging rip strengths is inherently subjective, it's important that a lifeguards at a beach are judging them by a common, agreed-upon criteria.

Observation Form Parameters (4)

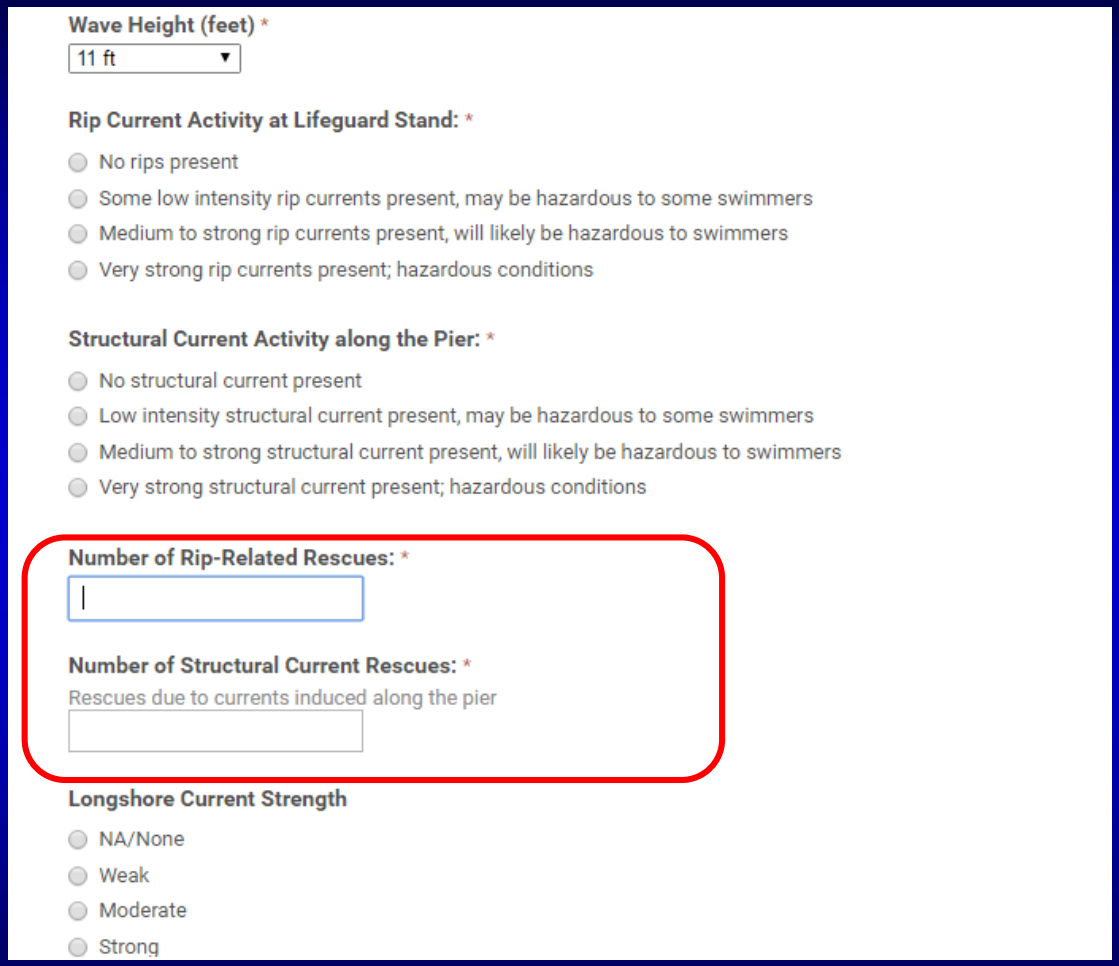


Structural Current Activity (some beaches)

Why we're asking: To record the presence and strength of currents along piers, groins, and jetties. This parameter is added at appropriate beaches to distinguish structural currents from wave-generated rips currents.

Note: As with rip currents, observing the strength of structural currents is inherently subjective, it's important that a lifeguards at a beach are judging them by a common, agreed-upon criteria.

Observation Form Parameters (5)



Wave Height (feet) *

11 ft

Rip Current Activity at Lifeguard Stand: *

- No rips present
- Some low intensity rip currents present, may be hazardous to some swimmers
- Medium to strong rip currents present, will likely be hazardous to swimmers
- Very strong rip currents present; hazardous conditions

Structural Current Activity along the Pier: *

- No structural current present
- Low intensity structural current present, may be hazardous to some swimmers
- Medium to strong structural current present, will likely be hazardous to swimmers
- Very strong structural current present; hazardous conditions

Number of Rip-Related Rescues: *

Number of Structural Current Rescues: *

Rescues due to currents induced along the pier

Longshore Current Strength

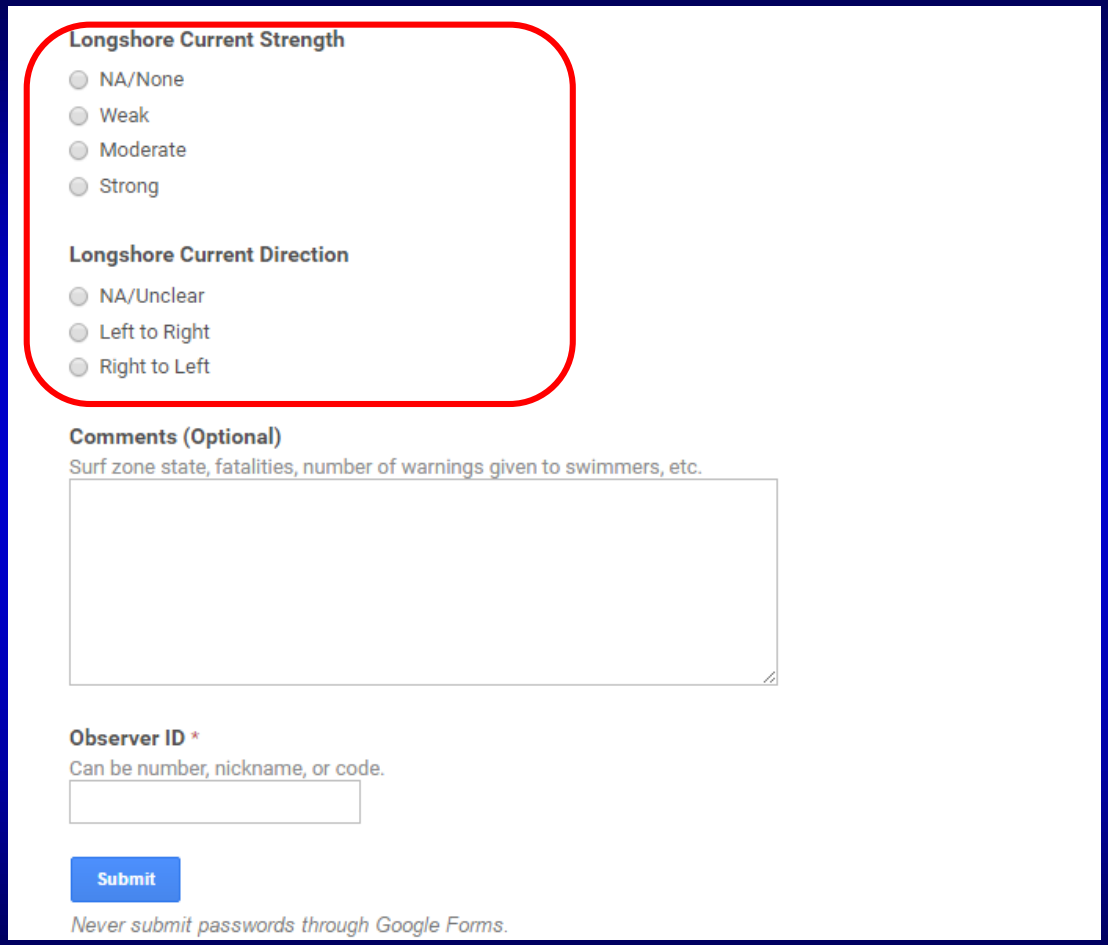
- NA/None
- Weak
- Moderate
- Strong

Number of Rescues (Rip and Structural Currents)

Why we're asking: To compare rescue data against rip/structural current reports, to allow quality control of the current strength parameters and to gage surf zone behavior.

Note: The desired information is to provide the best estimate as to how many rescues were related to rip/structural currents, as opposed to other causes.

Observation Form Parameters (6)

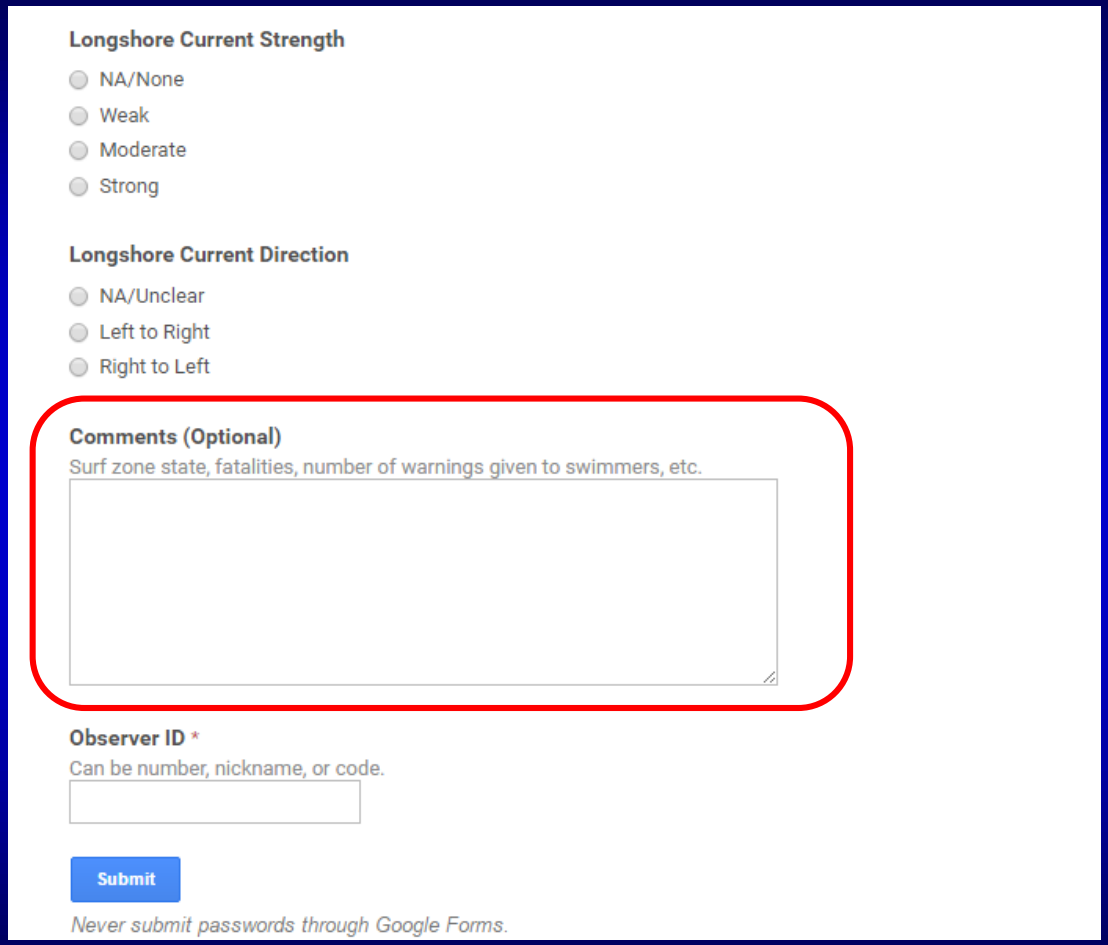


Longshore Current Strength and Direction

Why we're asking: Longshore currents contribute to rip currents and structural currents.

Note: The need for common criteria for strength is important for longshore currents as well.

Observation Form Parameters (7)



Longshore Current Strength

- NA/None
- Weak
- Moderate
- Strong

Longshore Current Direction

- NA/Unclear
- Left to Right
- Right to Left

Comments (Optional)

Surf zone state, fatalities, number of warnings given to swimmers, etc.

Observer ID *

Can be number, nickname, or code.

Submit

Never submit passwords through Google Forms.

Comments

Why we're asking: Some relevant conditions might not be recorded by our multiple choice parameters (e.g., if rip currents are strong but there are zero rescues because bad weather or cold water is keeping swimmers out of the surf).

Note: This field is optional, but is an opportunity for lifeguards to communicate what they feel is important to NWS.

Lifeguard Observations Are a Critical Contribution Toward Improving Beach Safety