

Rip Currents - Tutorial Script

There are two common dangers for ocean swimmers - **undertow** and **rip currents**. Undertow is simply the orbital motion of the breaking waves. Just like sand, rocks, and floating toys, swimmers that get caught in a breaking wave will get pulled under and dragged along the bottom becoming part of the orbital motion. As long as swimmers caught in an undertow do not panic and can hold on for a few seconds, they will pop back up again as the orbital motion returns them to the surface. They can then ride the next wave up onto the beach.

Rip currents are streams of water moving perpendicularly off the beach. They are caused by a build up of water along the shore. When enough water piles up, it will force itself oceanward through the oncoming waves. What causes water to pile up on the shore? As the waves crash onto the shore, their water is funneled to the left and right where it collects. Rip currents then return it oceanward. Can you see the rip currents in this picture? It's a good idea before you get into the water to find a high area above a beach where you can look down at the surf and locate rip currents. Then be sure to avoid these areas. Some rip currents are quite strong and can carry you out many miles. Most are short. Surfers use rip currents to get themselves out of the surf zone and into the waters beyond, where they pick up waves to ride. If you find yourself caught in a rip current, do not fight it. Let it carry you a short distance beyond the major surf, then swim parallel to the beach until you are out of it. You can then ride the waves in. Rip current drownings occur where people panic or fight the current and try to swim directly back.

This image of a beach in Chile shows a number of regularly spaced rip currents. You will also notice the scalloped beach sands that result from this behavior - another good indicator of rip currents and potential danger. Here's another image from Australia. The rip currents move out from the little coves between the cusps. The cusps are where sand is thicker and pushing into the ocean. It's where the waves are hitting and then deflecting left and right. Where the little coves exist that's where the outwash has been funneled and carved out sand as it is ripped off the shore in the currents.

Where do we get rip currents in the San Francisco area? Anywhere that water piles up on the shore. Rip currents are common all along Ocean Beach, where the sands are thick and there are many offshore underwater sand bars that cause the waves to bend toward each other and create water pile ups on the shore. As waves approach beaches at an angle, they tend to push the water and sand along the beach in the opposite direction from which they come. We call that motion along the shore - **longshore current**. We'll talk more about longshore current in a future video tutorial. For now be sure you realize that if water is moving along the shore in one direction, there will be places where it will collide with obstacles and pile up, producing rip currents. In California, we find rip currents where the mostly southern-moving longshore current hits jetties and headlands, such as Devil's Slide and Chimney Rock. All popular surfing beaches have rip currents. The main beach in Pacifica at the base of Linda Mar has a consistent rip current right in the center of the cove - in front of the bathrooms. Swimmers have drowned in this rip current before so be extra careful if you frequent this beach.

Bottom line: pay careful attention to undertow and rip currents when swimming in the surf. Don't let yourself get caught in something you can't handle.

Pause now.

[End credits]

Waves Series:

Part 1: Wave Basics

Part 2: Big Waves

Part 3: Rip Currents

Rip Currents

Geoscience Video Tutorial

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All media produced by Katryn Wiese unless indicated below:

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**Rip current illustration with escape zone and feeder zones – NOAA*

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