

RIP CURRENT SAFETY AND PUBLIC AWARENESS— THE BEACH VACATION AS AN EDUCATION DESTINATION

BY WENDY CAREY, KATIE MOSHER, AND SPENCER ROGERS

OUR NATION'S SHORELINES ARE UNIQUE RESOURCES VALUED FOR THEIR NATURAL BEAUTY, recreational opportunities, and environmental significance. The social demand for rest and relaxation at the beach is unparalleled, with millions of vacationers and year-round residents enjoying coastal areas. In fact, all around the country—from the Great Lakes, to the eastern seaboard and Gulf and West coasts—approximately 54% of the nation's population lives within 50 miles of the shoreline, and more people are moving to coastal areas every day. More than 90 million Americans and foreign tourists visit coastal communities each year to enjoy a beach vacation. These visitors include many K-12 students and their relatives—part of an overall audience that provides Sea Grant communications and outreach specialists with opportunities to subtly integrate an educational component into the social and relaxation elements of a trip to the beach.

When the final bell rings to signal the end of the school year, most students are thrilled to be out of a formal classroom setting for the summer months. Yet, beach vacations offer kids of all ages the chance to wade into the fascinating world of surf-side science. Summer reading requirements may have temporarily taken a back seat to sun and fun, but effective graphic communications products easily integrate safety and science topics into a day at the beach. Outreach and education programs utilize innovative strategies to offer lessons in informal settings.

Using signage and brochures, Sea Grant programs around the county have coordinated efforts to infuse an education component into vacation time. Passive education is an important and enjoyable way to reach millions of visitors and teach them about the coastal environment—and public safety messages are a priority to many local, regional, and federal agencies. Thus, beach visitors can absorb important information along with sun, rest, and relaxation.

Coastal vacation destinations feature miles of beautiful beaches and welcoming surf. In many areas, access to the beach is provided by pedestrian dune crossovers and/or boardwalks. These access points, serving to funnel visitors towards a fun day at the beach, should also be viewed as marvelous miles of outdoor classrooms whose doors are open 24 hours a day. Boardwalks and beach access pathways offer incredible opportunities to educate people in a passive format about the coastal environment and beach safety issues. By using the beach as an outdoor classroom, vacationers and visitors can become better prepared for emergencies, more knowledgeable about coastal hazards, and more sensitive environmental stewards.

An example of a nationwide program to teach at the beach are rip current education and outreach programs developed nationally and regionally by many National Oceanic and

Atmospheric Administration (NOAA) agencies and programs. Significant rip current awareness projects have been initiated locally by individual NOAA-Sea Grant programs and nationally by Sea Grant in partnership with the NOAA-National Weather Service (NWS), NOAA-National Ocean Service (NOS), the U.S. Lifesaving Association (USLA), and local beach communities.

WHAT ARE RIP CURRENTS?

Rip currents are serious hazards that pose daily threats to surf zone swimmers and waders in all coastal regions. Rip currents form under specific conditions related to winds, waves, swell, tides, and the shape of the sandy ocean bottom beneath the waves. These strong, narrow seaward flowing currents extend from close to the shoreline, through the surf zone, and out past the line of breaking waves. Rip current strength and duration may vary dramatically depending on wave and swell parameters, and even the most experienced swimmers are in danger when they encounter a strong rip current. According to U.S. Lifesaving Association statistics, rip currents cause more than 100 drowning fatalities each year, and 80% of all rescues on surf beaches nationwide are rip current related.

These narrow channels of water flowing out to sea past the surf zone pose significant dangers to beachgoers, as they can pull even the strongest swimmers into deep water. Rip currents are usually narrow (~ 20 to 100 feet in the alongshore direction), may extend hundreds of feet offshore, and generally span the entire water column. However, offshore or outside the surf zone, they tend to be confined near the surface. Generally, rip current velocities increase as water levels (tide elevation) decrease; while rip current velocities also typically increase as wave heights increase.

Rip current locations may vary—some occur at fixed locations, near groins, piers, breaks in an offshore reef or sandbar, or adjacent to other natural or man-made structures where

water can be funneled out to sea in a narrow channel. Rip currents also may migrate along a stretch of shoreline. Some rip currents are persistent, while others may be ephemeral, forming quickly, and lingering for a few hours or days before dissipating and disappearing.

Rip currents can occur along any coastline with breaking waves. Although rip currents are often present daily on many beaches, the velocities are too slow to be a threat to many swimmers. Yet, their inherent variability makes them especially dangerous to unwary or uninformed beachgoers. While average rip current velocities of one to two feet per second do not pose serious hazards to strong swimmers, rip currents may rapidly reach or exceed velocities of three feet per second. Also, rapid fluctuations or pulses in wave groups can quickly generate rip currents with extreme velocities measured up to eight feet per second—faster than an Olympic swimmer can sprint! If a swimmer is caught in a rip current, attempting to swim directly back to shore against the seaward flowing current can result in exhaustion and possible drowning.

Rip currents are dangerous because they can be difficult to identify and they are often encountered by people who have no experience with ocean waves or currents. Additionally, when rip current formation is driven by offshore swells generated by a distant tropical cyclone, the worst rip currents may occur during ideal weather at the local coast. Although some rip currents are visibly obvious and easily discerned, they are often not readily or easily identifiable to the average beachgoer. Some of the clues to rip current identification include:

- a channel of churning, choppy water;
- a line of sea foam, seaweed, or debris moving steadily seaward;
- different colored water beyond the surf; and
- a break in the incoming wave pattern, as waves roll into shore.

None, one, or several of the above clues may be present to indicate the location of rip currents. General characteristics of a rip current are shown in Figure 1.

Just how serious is the risk to waders or swimmers from rip currents? Swimming in the ocean is very different from swimming in a pool or lake. The strength and force of ocean waves and currents are surprising to those unfamiliar with the power of the sea. Many unsuspecting vacationers who venture into the surf, even if they're only in knee-deep water, are swept off their feet by these strong ocean waves and currents. The NOAA-USLA Rip Current Task Force has recently summarized rip current fatality statistics. As weather- and ocean-related fatality statistics from the last 10 years document (Figure 2), the number or rip current deaths nationwide ranks second—after heat-related deaths and ahead of deaths from floods, tornadoes, lightning, and hurricanes.

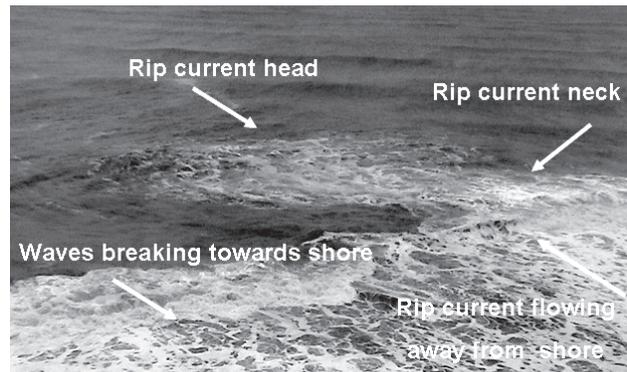


Figure 1. General rip current characteristics may be observed by an average beachgoer.

RIP CURRENTS Break the Grip of the Rip!

- USLA estimates at least 100 fatalities per year due to rip currents.
- 80 percent of all surf zone rescues are due to rip currents.

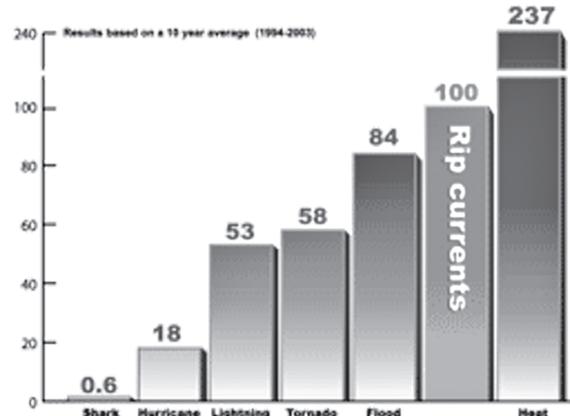


Figure 2. Weather- and ocean-related fatality statistics.

OUTREACH, EDUCATION, AND PUBLIC AWARENESS

Public education and outreach efforts regarding the dangers of rip currents have been widespread throughout shoreline states in the U.S., not only along ocean and Gulf coasts, but also along the Great Lakes shores. Sea Grant rip current outreach programs in Wisconsin, Florida, and North Carolina have been used as springboards for education and awareness projects in other states such as Delaware, New Jersey, and Michigan. Additionally, coordination and cooperation between Sea Grant programs and agencies—such as the NWS and USLA, along with local beach patrols, emergency response personnel, chambers of commerce, and coastal communities—have resulted in effective educational campaigns on rip currents and other beach safety topics. Rip current awareness has become a high priority issue in all coastal regions—a few examples are provided on the following pages.

North Carolina: Since the 1970s, North Carolina Sea Grant has partnered with beach communities on a variety of rip current safety efforts, including posters and a video. The popularity of early products resulted in requests for additional formats—such as the 50,000 brochures distributed around the country through support of at least eight other Sea Grant programs.

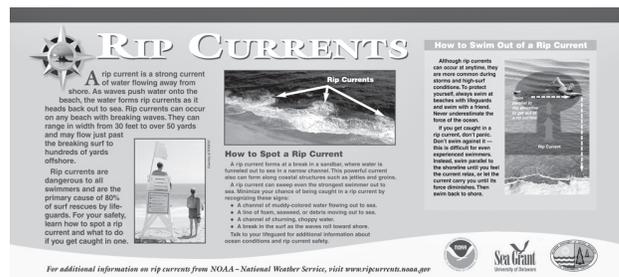
In 2002, at the request of coastal public safety officers, the rip current safety message was designed for metal signs. Since then, beach towns from Corolla to Calabash have posted 600 of the signs at public access points. Many towns partnered with the NWS to cover the costs of the signs, while others sought funding from state agencies or local community organizations. Wrightsville Beach Chamber of Commerce leaders and town officials even asked for a large sticker version that could be attached to trash containers along the shoreline. The signs also were adapted for South Carolina, Texas and Wisconsin, and several other Sea Grant programs have incorporated the graphics in various projects.

The public education campaign—which also included front-page stories in major North Carolina papers and mentions in media across the country—received a national APEX communications award.

North Carolina efforts continue. In particular, proactive community leaders in New Hanover and Dare counties have sought continued assistance from Sea Grant and NWS to get the beach safety message out to school children, residents, and vacationers.



Delaware: Similarly, Delaware Sea Grant has worked with several coastal towns to place larger, interpretive signs about rip current safety on boardwalks, beaches, and lifeguard stands. Another innovative program initiated by Delaware Sea Grant includes development of beach talk presentations, where information is presented about rip currents, and other coastal hazards to small gatherings of homeowner associations or community groups right on the beach.



In addition, Sea Grant outreach programs in Delaware have extended to training efforts targeting beach patrols and lifeguards, who daily record observations on rip currents and coastal wave conditions. With the assistance of Dewey Beach Patrol and the Delaware State Police Aviation Unit, dye experiments and video recordings have documented rip current development.

Through a partnership program with various coastal communities and Delaware's Department of Natural Resources and Environmental Control, Delaware Sea Grant has developed colorful, weather-resistant signs to increase public awareness and understanding on a range of coastal topics. More than 130 signs were produced on topics such as coastal storms, sand dunes, and bottlenose dolphins. The sign project is designed to serve as a "boardwalk classroom" for visitors to the Delaware coast.

New Jersey: New Jersey Sea Grant has also partnered with regional, state, and local partners to post rip current awareness signs at beach access points. Available in Spanish and English language versions, the sign catches the eye of beachgoers as they make their way across the sand to the water's edge. Working with the New Jersey Department of Emergency Preparedness and other local partners, New Jersey Sea Grant delivered approximately 2,000 signs to coastal communities throughout the state. The signs will be posted at virtually every public beach access-way along the New Jersey shore. More than 40,000 copies of an accompanying full-color brochure were also delivered to beach communities.



Michigan: Visitors to Great Lakes beaches are sometimes surprised to learn that rip currents are a serious coastal hazard along lake shorelines. In fact, rip currents pose a significant threat along any beach with breaking waves, including the Great Lakes. Many factors contribute to formation of dangerous rip currents in the Great Lakes, and research scientists and NWS forecasters are working to develop predictive forecast methodologies and indices for rip currents in the Great Lakes.

Working with community groups and other local and regional partners, Michigan Sea Grant has developed a water safety and rip current awareness campaign to prevent drowning incidents by alerting the public to the dangers of rip currents in the Great Lakes and providing information about how to escape them. The rip currents campaign message is directed toward all people who visit Michigan's Great Lakes beaches during the summer, including coastal residents and tourists, especially swimmers.

Florida: Florida's Coastal Management Program, with the state Department of Environmental Protection, has teamed with Florida Sea Grant and local government partners to educate Florida's beachgoers about rip currents. More than 900 rip current education/awareness signs have been provided to beach municipalities for posting at beach access points, fences, or boardwalks. Additionally, more than 5,000 rip current brochures have been distributed to local government tourist councils for distribution.

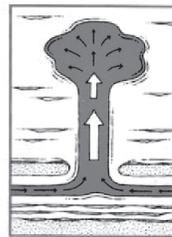
Florida Sea Grant has been an active partner in promoting national level rip current education and awareness efforts, and has supported scientific investigations of rip currents. Sea Grant programs from Florida, Delaware, North Carolina, South Carolina, Michigan, New Jersey, and Oregon, in conjunction with the Coastal Hazards Theme Team and the NWS, co-sponsored a rip current technical workshop in April 2004. The technical workshop improved communication and coordination of rip current research scientists, NWS meteorologists, and Sea Grant extension specialists, resulting in an improved national program to promote awareness of rip currents as a coastal hazard.

NATIONAL RIP CURRENT TASK FORCE

Recognizing the need to establish a national communications consensus on rip currents as a prerequisite for a successful public safety campaign, NOAA convened a task force in 2003 led by NWS. This coordinated task force consists of technical and communications representatives from NOAA's NWS, NOS, and Sea Grant, along with the USLA. The goals of the NOAA-USLA Rip Current Task Force include establishment of consistent communication, especially related to rip current education efforts, and improved data sharing relative to rip current rescues and observations related to nearshore coastal processes when rip currents are present. The NOAA-USLA Rip Current Task Force products include: a rip current brochure, distinctive rip current graphics, rip current video and public service announcement, a national rip current sign template that can be duplicated and posted along boardwalks, and

**DON'T PANIC
RIP CURRENTS
CAN BE KILLERS.
DO YOU KNOW
WHAT TO DO?**

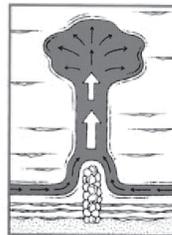
**RIP
CURRENTS**



WHAT IS A RIP CURRENT?

Often mistakenly called undertows, these powerful currents pull even experienced swimmers away from shore. Panic and drowning often result. The currents are formed when water rushes out to sea in a narrow path. This happens when there is a break in a nearshore sandbar or the current is diverted by a groin, jetty or other barrier. Rip currents can extend 1,000 feet offshore, reach 100 feet in width and travel up to 3 mph. Some are present a few hours; others are permanent. Rip currents are more prevalent after storms.

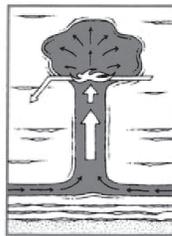
LEFT: Rip currents may form in breaks in nearshore sand bars.



TELLTALE SIGNS OF RIP CURRENTS

- A difference in water color — either murkier from sediments or darker from greater depth.
- A difference in the waves — larger, choppier waves in the rip current; smaller, calmer waves in front of the bar.
- Foam or objects moving steadily seaward.
- An offshore plume of turbid water past the sandbars.

LEFT: A groin or jetty may divert the current.



WHAT TO DO

If you're caught in a rip current, don't panic or swim against the current. Swim parallel to shore until you are out of the current. Rip currents are rarely more than 30 feet wide. If you can't break out of the current, float calmly until it dissipates, usually just beyond the breakers. Then swim diagonally to shore. If you don't swim well, stay in wading depths and watch for sudden drop-offs.

LEFT: If caught in a rip current, swim parallel to shore.



NORTH CAROLINA SEA GRANT

N.C. State University • Box 8605 • Raleigh, NC 27695-8605
919/515-2454 • www.ncsu.edu/ceagrants • UNC-SG-01-05

National Weather Service

For rip current threat forecasts, visit www.noaa.noaa.gov

Figure 3. NOAA rip current sign template.

beachfronts (Figure 3), and a NOAA rip current website (<http://www.ripcurrents.noaa.gov>). The sign, brochure, and graphics were designed by Michigan Sea Grant, while the website was developed and updated by NWS.

BREAK THE GRIP OF THE RIP!

The national campaign—*Break the Grip of the Rip!* was launched at a news conference May 24, 2004, in Wrightsville Beach, North Carolina. A satellite broadcast available to media nationwide featured the personal story of Sandee LaMotte, whose husband, CNN bureau chief Larry LaMotte, died while trying to save his children from a rip current in Florida in 2003. The event also included the debut of the new products and comments from NOAA Administrator Conrad Lautenbacher and USLA President Chris Brewster, and representatives from other participating agencies. The message from the national task force was delivered to more than 15 million households as a result of television coverage at the launch event. CNN coverage included general network coverage, as well as special packages for 24 affiliates around the country. Other media coverage included print and radio, as well as online coverage, such as a special package on WebMD.com.

NOAA has designated the week of June 5, 2005, as an inaugural national Rip Current Awareness Week. Thereafter, Rip Current Awareness Week will be held each year during the first full week of June. Local NWS Weather Forecast Offices plan to schedule local educational events and outreach activities related to rip current hazards, with a particular focus for 2005 directed towards reaching the large numbers of people using unguarded beaches. NWS is working to further enhance



national rip current awareness by featuring a rip current theme into the Mark Trail Sunday comics.

Around the country, NOAA programs are working to educate beachgoers and improve public safety through awareness campaigns, outreach networks, and partnerships. Through partnerships, agencies such as NOAA-National Weather Service, NOAA-National Ocean Service, NOAA-Sea Grant, and the U.S. Lifesaving Association have established rip current warning programs and public information campaigns in many coastal states. Locally, these agencies work with countless partners to get the word out. This program serves as an example of cooperative and coordinated efforts at local, state, regional, and national levels that have combined to improve public education of dangers associated with hazardous rip currents.

THE BOTTOM LINE—HOW CAN YOU PROTECT YOURSELF AGAINST RIP CURRENTS?

If you are caught in a rip current:

- Stay calm—don't fight the current.
- Escape the current by swimming in a direction following the shoreline. When free of the current, swim at an angle—away from the current—toward shore.
- If you are unable to escape by swimming, float or tread water. When the current weakens, swim at an angle away from the current toward shore.
- If at any time you feel you will be unable to reach shore, draw attention to yourself: face the shore, call, or wave for help.

How do I help someone else?:

- Don't become a victim while trying to help someone else! Many people have died in efforts to rescue rip current victims.
- Get help from a lifeguard.
- If a lifeguard is not present, yell instructions on how to escape.
- If possible, throw the rip current victim something that floats.
- Call 9-1-1 for further assistance.

Before leaving for the beach:

- Check the latest surf zone forecast on NOAA Weather Radio or online. During beach seasons, a number of National Weather Service offices issue a rip current outlook.

When you arrive at the beach:

- Speak with on-duty lifeguards about rip currents as well as other surf conditions expected for the day.

General safety tips:

- Know how to swim.
- Never swim alone.
- For maximum safety, swim near a lifeguard. Obey all instructions and orders from lifeguards.
- Be cautious at all times.
- If in doubt, don't go out!

FOR MORE RESOURCES:

For more information about rip currents, see the following websites:

- <http://www.ripcurrents.noaa.gov>
- <http://www.usla.org>
- <http://www.ocean.udel.edu/ripcurrents.html>
- <http://www.erh.noaa.gov/ilm/rcast/resource.html>

WENDY CAREY is the Coastal Processes/Hazards Specialist for Delaware Sea Grant, where her duties include developing workshops and public information seminars on coastal construction and vulnerability, coastal storm preparedness and mitigation, and coastal processes.

SPENCER ROGERS, Coastal Construction/Erosion Specialist for North Carolina Sea Grant, began working on rip current safety programs in the 1970s. He also works closely with state and federal officials to review the impacts of coastal storms and to develop construction and coastal management strategies to mitigate potential damage from future storms.

KATIE MOSHER, Communications Director for North Carolina Sea Grant, has a journalism background that includes newspapers, television, and an online news service. She is the managing editor of North Carolina Sea Grant's *Coastwatch* magazine.

PHOTO CREDITS

Page 21 (top): Courtesy of Delaware Sea Grant

Pages 27 (middle) and 29 (bottom): Courtesy of NOAA-USLA Rip Current Task Force

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