Publication by ERDC Coastal and Hydraulics Laboratory "Surf Hazards Before and After a Beach Nourishment in Virginia"

Impact Statement: Lifeguard agencies across the Nation have made anecdotal claims that beach nourishments create dangerous conditions for swimmers, which has been reported in the media when drownings occur after beach nourishment projects. Researchers from the ERDC Coastal and Hydraulics Laboratory (CHL) investigated these reports using lifeguard data collected at a USACE Norfolk District (NAO) beach nourishment in Virginia Beach, VA, during the summer of 2019. Results of this study suggest there is no increase in hazards to swimmers and can be referenced by District PAOs in future media inquiries.

Between 2015 and 2019, an average of 61 surf zone fatalities occurred annually across the beaches of the Nation, primarily due to rip currents. Some of these rip current related fatalities have been blamed, without evidence, on recently completed USACE beach nourishment projects in the area. To better understand if a correlation exists, researchers from the ERDC Coastal and Hydraulics Laboratory (CHL) analyzed daily lifeguard logs collected before, during, and after the USACE Norfolk District's (NAO) 2019 beach nourishment of Virginia Beach, VA, (Figure 1). Lifeguard logs from 2018 and 2019 containing the time and location of rescues were combined with ocean conditions and the nourishment status (pre-/post-) of the location at the time of the rescue. Unlike previous studies that only include year-over-year analysis, this effort includes comparisons during the season to remove biases due to seasonal and yearly beach changes.

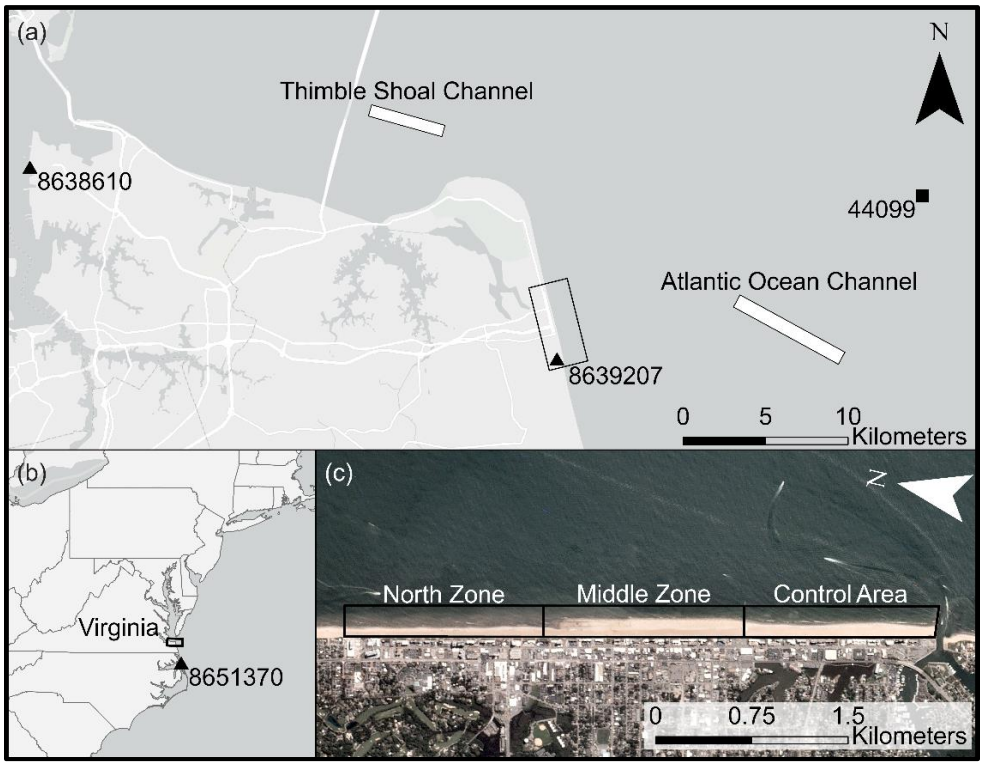

Figure 1. (a, b) Map of the study area, with the location of the study site in Virginia Beach, VA, indicated by the black-outlined rectangle in the center of the frame (b). (c) Satellite imagery

from 15 July 2019 of Virginia Beach (black-outlined rectangle in frame [a]) showing the control and nourished sections of the study area. In the image much of the Middle Zone has been nourished, while the North Zone is still fully in its pre-nourishment state. (Satellite Image © Planet Labs).

The number of rescues during peak tourist season (Memorial Day weekend through Labor Day Monday) during the summer of the nourishment decreased compared to 2018, from 309 to 224 rescues. Comparison of rescues during the 2019 season between pre-nourishment and post-nourishment sections of beach showed no statistically significant increase and were most common during periods of high rip current probability or low water level regardless of nourishment status (Figure 2). As there was no increase in rescues from 2018 and 2019, and no statistically significant increase between pre-nourishment and post-nourishment areas during 2019, the researchers concluded that there is no substantial evidence that the nourishment increased the hazards to swimmers.

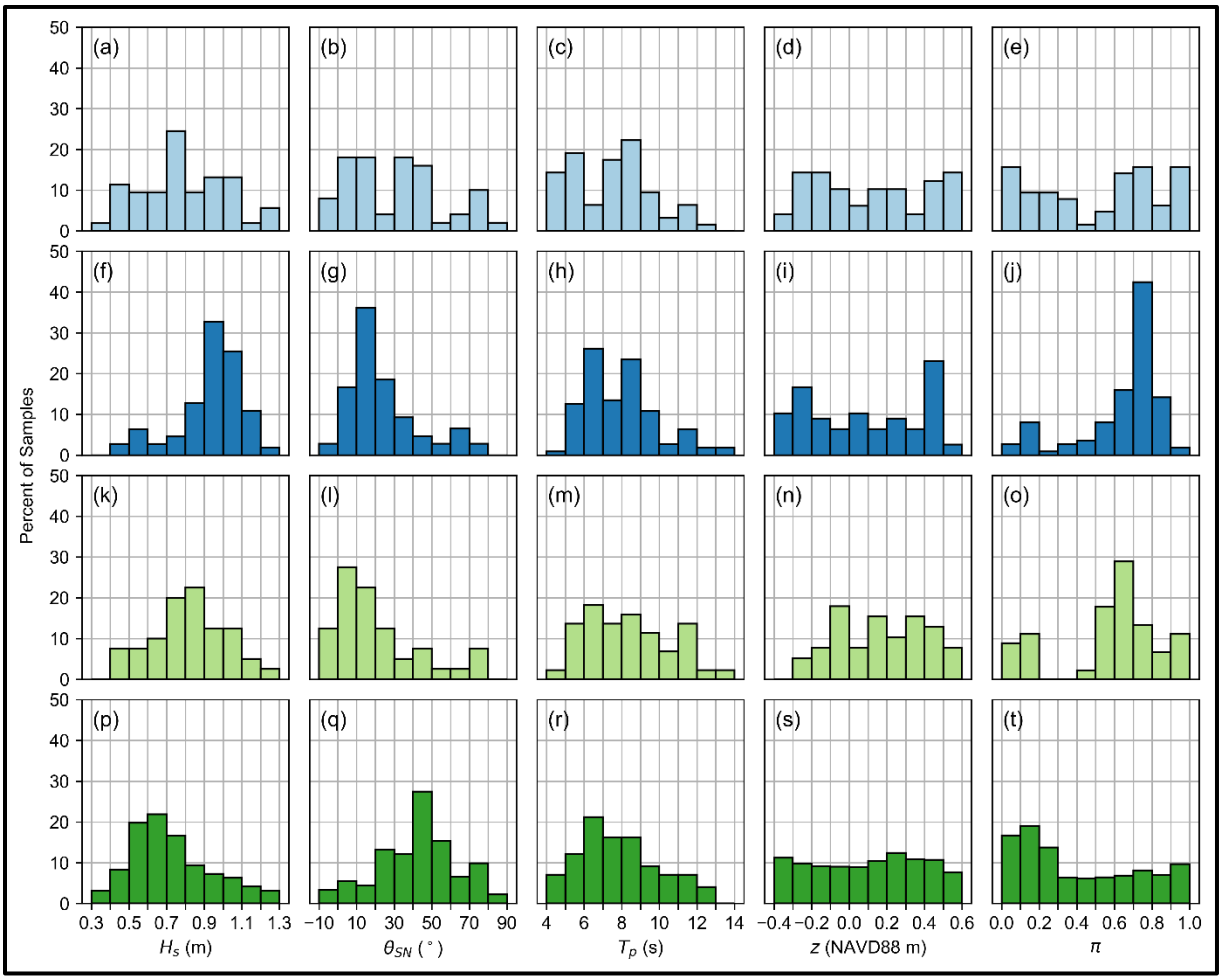

Figure 2. Distribution of significant wave height H_S, wave direction θ_{SN}, peak wave period T_p, water level z, and rip current probability π corresponding to 2019 rescue events in the pre-placement Middle and North Zones (a–e), post-placement Middle and North Zones (f–j), and all rescues in the unnourished Control Area (k–o). For comparison, the half-hourly (p-r; t) and 6-min (s) instrument recordings for the entire study when lifeguards were on duty are also shown.

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