

## **Coastal Scientist Statement on Groin Impacts**

Program for the Study of Developed Shorelines  
Western Carolina University

North Carolina law (G.S 113A-115.1) prohibits the use of groins – steel, rock or wood walls built perpendicular to the beach in order to trap shifting sand - and other permanent erosion control structures along ocean shorelines. This ban is based on: 1) extensive studies and technical data documenting the detrimental impacts of erosion control structures and 2) 150 years of documentation of the negative impacts of shoreline stabilization on the barrier islands in New Jersey.

The negative impact of groins and jetties on downdrift shorelines is well understood. When they work as intended, sand moving along the beach in the so-called downdrift direction is trapped on the updrift side, causing a sand deficit and increasing erosion rates on the downdrift side. This well-documented and unquestioned impact is widely cited in the engineering and geologic literature.

The United States Army Corps of Engineers' Coastal Engineering Manual describes groins as: "...probably the most misused and improperly designed of all coastal structures...Over the course of some time interval, accretion causes a positive increase in beach width updrift of the groin. Conservation of sand mass therefore produces erosion and a decrease in beach width on the downdrift side of the groin" (USACE, 2002).

In his textbook (used by most coastal engineering programs to introduce beach processes) Paul Komar, professor emeritus in the College of Oceanographic and Atmospheric Sciences at Oregon State University, states, "Groins and jetties have the same effect in damming the longshore sediment transport, the shoreline builds out on the updrift side and erodes in the downdrift direction" (Komar, 1998).

There is no debate: A structure placed at the terminus of a barrier island, near an inlet, will interrupt the natural sand bypass system, deprive the ebb and flood tide deltas of sand and cause negative impacts to adjacent Islands.

In a complex coastal system, the precise location, onset and scale of these impacts are very difficult to pinpoint. As with all erosion control structures, it may take years for groin impacts to become apparent. This is why promises to monitor such projects ring hollow, and why disputes over groin impacts often end up in court where judges, rather than scientific experts, end up making critical coastal management decisions.

Using groins in conjunction with beach nourishment projects is of dubious value as well. When big storms occur, groins direct strong currents that carry large amounts of sand seaward, in an offshore direction parallel to the groins. After Hurricane Hugo, for example, sidescan sonar studies showed gullies excavated on the continental shelf adjacent to each of the groins on Pawleys Island in South Carolina. Because much sand loss is offshore during storms, groins will have little impact on holding sand in place (and may even accelerate loss).



There is nothing experimental about groins, terminal or otherwise, and the insinuation that a terminal groin will be removed or altered if it doesn't work is nothing more than lip service. Experience on many other American shorelines indicates that removal of a structure, once put in place, is a rare event - no matter what promises were made beforehand.

The localized and temporary updrift benefits afforded by groins and jetties rarely, if ever, justify the downdrift damage caused by increased erosion – regardless of whether it is to developed or undeveloped shorelines, inlets and islands.

Thank you for your time and consideration.

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