

**From:** Tim McKay.com tim@timmckay.com  
**Subject:** Fwd: Proposal to conduct beach nourishment on Shackleford Banks, part of the Cape Lookout National Seashore  
**Date:** June 4, 2014 at 1:19 PM  
**To:**



----- Original Message -----

**Subject:** Proposal to conduct beach nourishment on Shackleford Banks, part of the Cape Lookout National Seashore  
**Date:** Thu, 30 Jan 2014 10:08:51 -0500  
**From:** Charles H Peterson <[cpeters@email.unc.edu](mailto:cpeters@email.unc.edu)>  
**To:** <[Hugh.Heine@usace.army.mil](mailto:Hugh.Heine@usace.army.mil)>

Dear Mr. Heine:

I provide here some of my professional reactions to the possible nourishment of Shackleford Banks. I am a professor at the UNC Institute of Marine Sciences, where I have conducted research since 1976. I am one of the few (about 20) marine ecologists worldwide noted for their studies ocean beach ecosystems and I have done numerous research projects on the NC barrier islands, including the Outer Banks, Shackleford, Bogue Banks, Bear Island, Onslow Beach, and Topsail Island. I characterize my professional expertise as interdisciplinary marine conservation ecology. For a decade, I have served on the Coastal Hazards Science Panel advisory to the NC CRC so as to bring my ecosystem expertise to panel deliberations where it is useful.

Shackleford Banks is special for many reasons, among which is its relatively natural character on which natural environmental processes can take place without human intervention and gross modification. Consistent with the National Park Service Organic Act, the appropriate management of Shackleford is the let it remain natural so as to highlight natural environmental processes and to protect its rich biological and geological resources. This Organic Act mandate should only be violated when necessary to protect an important cultural or historical resource, such as one of the historic lighthouses. Of all the North Carolina coastal barriers on which I have done research, Shackleford is the only one of these coastal barriers that has not been impacted by substantial beach fill projects. Bogue Banks has been modified along its entire ocean shoreline by numerous beach fill projects, many of which I have studied. Any continuing study of recovery of the Bogue Banks beach ecosystem from the 2001-2 (Phase I) and 2003 (Phase II) major nourishment projects must now establish un-nourished control sites on Shackleford because there is no other remotely similar coastal barrier that has not experienced beach filling. Even Bear Island receives periodic dumps of fine dredge spoils from maintenance dredging of navigation channels, as does Onslow Beach. Now keeping Shackleford undisturbed by this major ecosystem perturbation is a critical scientific and management need so that at least one control system is left against which to measure and judge recovery and to serve as an ecological baseline of what beach ecosystem structure and process should be everywhere in geologically similar settings.

I have published numerous scientific papers on the impacts of beach nourishment and spoil disposal on North Carolina coastal barriers. I attach copies of some to this letter. Both beach nourishment and spoil

disposal have a common immediate consequence of killing virtually all of the beach invertebrates, such as coquina clams and mole crabs, that feed our beach crabs, shorebirds, and surf fishes. The recovery time required for the come-back of these invertebrate populations varies depending on the nature of the sediments used as fill. Matching the natural beach sedimentology, grain size distributions and mineralogical content, especially amount of shell and shell hash, leads to the most rapid recovery, probably requiring about a year. When the fill materials are composed of unnaturally fine (muddy) sediments, this material is eroded off the beach by waves causing periodic outbreaks of turbid waters exceeding the State's water quality standard for turbidity. These muddy water events inhibit visual feeders, like fish (pompano, bluefish, and Spanish mackerel) and seabirds (terns, pelicans, osprey, and gulls). They can also cause further mortality of sensitive marine invertebrates and reduce their growth rates by clogging feeding and respiratory organs. Recovery from beach fill projects using fine sediments is incomplete after a year but probably occurs during the second year after natural sedimentology has been restored through erosion of the excess fines. Finally, beach nourishment using fill comprised of unnaturally coarse sediments, such a shell and shell hash, induces multi-year impacts on the beach sedimentology and biota. The Bogue Banks beaches nourished in 2001/2 and 2003 with excessive coarse shelly materials did not exhibit recovery of natural sedimentology 4 years after nourishment, when our study ended. Similarly, the depression in coquina clams and amphipods on the intertidal beach also showed incomplete recovery after 4 years. Our surveys of shorebirds foraging on those nourished beaches revealed that this persistent multi-year depression of coquina clams and other invertebrate prey and persistent shell cover on the intertidal beach was promulgated upwards to their shorebird predators. This demonstrates that the habitat value of ocean beaches is compromised by beach filling and those effects transfer to shorebirds, a resource of great management concern. Furthermore, we have shown that a surf fish, the Florida pompano, also suffers from dramatic reduction in feeding capacity and rate under conditions of unnaturally high levels of shell fragments in the sediment and under conditions of elevated turbidity. Hence, sustaining the beach habitat and seimentology is critical to the habitat function and the wildlife of such high value on Shackleford.

Many of our shorebird populations have declined dramatically, some of which are federally listed while others are species of state conservation concern. Most of these species exhibit more successful breeding on natural beaches where overwash is allowed to occur naturally. The benefits of such overwash derive largely from covering dune vegetation with sand and providing a preferred low level of vegetational cover. Piping plovers, a species that is federally listed, nests only on beaches with very low vegetational cover, explained by avoidance of concealed predators using the vegetation in which to hide. Continuation of natural dynamics of erosion, overwash, and deposition of sands on the western end of Shackleford is beneficial to piping plovers and to other depressed species of shorebirds.

I have no doubt that nourishment of Shackleford Banks would damage its capacity to illustrate and champion natural processes and cause direct harm to the beach and surf habitat, with consequent harm to shorebirds, crabs, and surf fishes as well as to piscivorous aerially diving seabirds along shore.

Sincerely,

Charles H. "Pete" Peterson  
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