# EFFECTS OF SAND PLACEMENT ON THE SURFABILITY OF A NEW JERSEY SANDY BEACH

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## Abstract

In February 2009, the New York District of the US Army Corps of Engineers (USACE) completed a beach renourishment project within the Long Brach, NJ reach of the Sandy Hook to Barnegat Inlet, Beach Erosion Control Project. The $9 million project placed 700,000 $yd^3$ of sand along a half-mile stretch of beach and included an alternative fill placement (feeder beach) that added approximately $1 million to the total project cost. The feeder beach design was agreed to by the USACE, the State of New Jersey, and local surfing groups as a way of minimizing the impact to existing surfing locations, and potentially creating new surfing opportunities through the creation of offshore sandbars downdrift of the feature. Preliminary monitoring and surfability results, including the rapid evolution of the fill within the first four months after construction, were presented at the ASBPA 2009 National Coastal Conference (Mahon *et al.*, 2009). The current analysis includes an expanded assessment of the surfing conditions and usage within the monitoring area, based on over a year's worth of beach profile data, wave data, and video imagery. The data includes the 2009-2010 winter storm season, which has been the most severe winter storm season in 20 years (Miller *et al.*, 2010).

A review of the published surfing literature reveals various approaches used to assess the surfability of beaches. Several surfability classification schemes have been published, with the main parameters used to classify surfability being wave height, peel angle and peel rate, wave steepness, seabed slope, and breaking intensity. Classification schemes include: (1) the surf similarity parameter (ratio of seabed slope to wave steepness), used to classify breaks as either surging, plunging, or spilling (Battjes, 1974), (2) Walker's (1974) classification based on peel angle, surfer velocity, and breaker height to identify beginner, intermediate and expert surfer skill, (3) the vortex ratio (a measure of the roundness of the plunging wave), used to determine wave breaking intensity, ranging from medium to extreme breaking intensity (Mead and Black, 2001), (4) the vortex ratio and peel angle, used to rate surfer skill from beginner to expert (Black and Mead, unpublished from 4th Surfing Reef Symposium), (5) the peel angle and breaking wave height, used to rate surfer skill from beginner to expert (Hutt *et al.*, 2001), and (6) a surfability index based on breaker height, winds and peel angle, which is then related to the dimensionless fall velocity to identify a morphodynamic stage of a beach (Dafferner and Klein, 2009).

Beach profiles collected over the monitoring period (using RTK GPS surveying methods) are being used to determine offshore seabed slope, wave data collected from an offshore ADV is being used to determine wave height, period, wave steepness, and wave direction, and video and still images from land based cameras are being used for visual inspection of surfers in the monitoring area. The aforementioned classification schemes will be used to determine the evolution of surfability since the project's completion. Finally, recommendations will be proposed for ways to alter the surfability classification schemes to be more applicable along the New Jersey coast (as the majority are based on breakers in highly surfed areas such as Hawaii, Australia and New Zealand), along with a discussion of ways to include surf zone width and length of ride as surfability parameters (which are currently not included in any classifications, but are equally as important when determining surfability).


**Figure 1. Still images of surfers within monitoring area.**

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