

Feedbacks between tidal energy extraction and physical processes

*Simon P Neill¹, Peter Robins¹, Matthew Lewis¹

1. Bangor Univ.

It is agreed that exploitation of the tidal (stream) energy resource, particularly at significant scales of electricity generation, will impact the marine environment. Although significant levels of extraction will alter the resource itself, particularly in narrow channels, there is one physical process that can indirectly impact the tidal energy resource: sediment dynamics and associated morphodynamics. Here I review the physical mechanisms of how tidal energy conversion influences sediment dynamics, both at device and array scale. I review local and regional impacts, and examine methods of simulating and validating the impact, based on idealized numerical experiments, and case studies including the Alderney Race and the Pentland Firth.

Keywords: Tidal energy, Sediment dynamics, Numerical model, Pentland Firth, Alderney Race