www.elsevier.com/locate/csr

Does human pressure affect the community structure of surf zone fish in sandy beaches?

Leonardo Lopes Costa, Júlia G. Landmann, Luiz R. Gaelzer, Ilana R. Zalmon

PII: S0278-4343(16)30408-3
DOI: http://dx.doi.org/10.1016/j.csr.2016.11.007
Reference: CSR3506

To appear in: *Continental Shelf Research*

Received date: 2 August 2016
Revised date: 31 October 2016
Accepted date: 14 November 2016

Cite this article as: Leonardo Lopes Costa, Júlia G. Landmann, Luiz R. Gaelze and Ilana R. Zalmon, Does human pressure affect the community structure o surf zone fish in sandy beaches?, *Continental Shelf Research* http://dx.doi.org/10.1016/j.csr.2016.11.007

Does human pressure affect the community structure of surf zone fish in sandy beaches?

Leonardo Lopes Costa[a], Júlia G. Landmann[a], Luiz R. Gaelzer[b], Ilana R. Zalmon[a*]

[a] Laboratório de Ciências Ambientais, Universidade Estadual do Norte Fluminense, Campos dos Goytacazes, RJ, Brazil.

[b] Instituto de Estudos do Mar Almirante Paulo Moreira. Departmento de Oceanografia – Divisão de Biologia. Arraial do Cabo, RJ, Brazil.

* E-mail: costa.ecomar@gmail.com, ilana@uenf.br

Abstract

Intense tourism and human activities have resulted in habitat destruction in sandy beach ecosystems with negative impacts on the associated communities. To investigate whether urbanized beaches affect surf zone fish communities, fish and their benthic macrofaunal prey were collected during periods of low and high human pressure at two beaches on the Southeastern Brazilian coast. A BACI experimental design (Before-After-Control-Impact) was adapted for comparisons of tourism impact on fish community composition and structure in urbanized, intermediate and non-urbanized sectors of each beach. At the end of the summer season, we observed a significant reduction in fish richness, abundance, and diversity in the high tourist pressure areas. The negative association between visitors' abundance and the macrofaunal density suggests that urbanized beaches are avoided by surf zone fish due to higher human pressure and the reduction of food availability. Our results indicate that surf zone fish should be included in environmental impact studies in sandy beaches, including commercial species, e.g., the bluefish *Pomatomus saltatrix*. The comparative results from the less urbanized areas suggest that environmental zoning and visitation limits should be used as effective management and preservation strategies on beaches with high conservation potential.

1. Introduction

Marine and coastal ecosystems provide a wide variety of goods and services, including vital food resources; however, they are vulnerable to anthropogenic impacts, particularly those related to the increasing urbanization of these environments (Small and Nicholls, 2003).