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TITLE: Traditional Ecological Knowledge Supports Ecosystem-Based Management in Disturbed Coastal Marine Social-Ecological Systems

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ABSTRACT:

A growing number of studies suggest a participatory ecosystem approach to support decision-making towards resilience and sustainability in social-ecological systems. Social-ecological resilience (SER) principles and practices are recommended to manage natural crises. However, it is necessary to broaden our understanding of SER on human-induced disturbances driven by economic development projects. In this paper we present the social-ecological system of Araçá Bay (Brazil), a small-scale fishery community that has experienced successive disturbances due to development projects since the 1930s. There was a lack of studies about the impacts of development projects in this bay. As part of a major project that aimed to build an ecosystem-based management plan for Araçá Bay through a participatory planning process, we focused on investigating fishers' traditional ecological knowledge (TEK) to understand Araçá Bay's small-scale fisheries social-ecological system. The objectives were to: (1) investigate fishers' TEK regarding management practices and linked social mechanisms, human-induced disturbances and their consequences for the social-ecological system, ecosystem goods and services, and future threats; and (2) provide information based on TEK to the participatory planning process and analyze its contribution to Araçá Bay's ecosystem-based management plan. Combined methods were used during 3 years of intense research-action (2014-2017): in-depth ethno-oceanographic interviews with expert fishers; monitoring Araçá Bay participatory meetings; and participant observation. Genuine local practices and social mechanisms from traditional culture were recorded, as well as TEK about 57 target fish species and methods to protect habitats and natural resources. Fishers also reported ecosystem disturbances and recovery processes. TEK was codified through SWOT analysis to assist the participatory planning process. Ecosystem services and threats based on TEK were brought to the participatory process, acknowledged by the participants, and incorporated into the management plan. TEK analysis proved to be an important methodology to provide historical environmental data regarding the impacts of development projects and support planning in disturbed ecosystems. In order to support coastal marine ecosystem-based management strategies towards SER and sustainability, researchers and practitioners should consider traditional territories in planning, recognize local practices and social mechanisms, and consider TEK on ecosystem goods and services and on historical human-induced disturbances.

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