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## Environmental history of Mexican North Pacific fishing communities<sup>☆</sup>

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### ABSTRACT

Environmental history studies have focused on the negative environmental and equal rights access to natural resources, more recently scholars becoming interested in the study of successful cases of natural resources management. We present a successful co-management fisheries case that is product of a century of environmental history in the Mexican North Pacific region. In this historical process, the passage from rancher settlers to well-organized fishermen in fishing cooperatives took place together with the transition from an intensive exploitation to a sustainable co-management system. External factors played a crucial role in regional fisheries development, first by triggering their being with the arrival of a Japanese company and, afterwards by changing its course during the Great Depression. Two current threats have emerged from unpredictable and detrimental marine environmental factors related to global warming, and from cultural roots loss due, once more, to external factors. We conclude that, at present, the nature of the next historical stage of this enlightened environmental history self-learning case remains unknown.

### 1. Introduction

An extensive human impact on the coastal zones and inshore biota characterized the exploitation of marine resources during the twentieth century that especially affected fisheries (Schwerdtner-Máñez and Pauwelussen, 2016). In that context, the world's coastal fringe encompasses 8% of the ocean surface, is the habitat of nearly 90% of the total number of marine species (Gorman, 1993: 106–107), and 99% of the about fifty million fishermen worldwide make use of coastal fisheries (Berkes et al., 2001). In addition, pollution of coastal waters and overexploitation of fisheries because of ill management are common (see McNeill, 2000; Roberts, 2009).

From the perspective of the study of environmental history, there is a trend to aim at proposals of theoretical approaches, comprehensive methods, and renewed perspectives (Carey, 2009; Pawson and Dovers, 2003). In the case of studies of the history of coastal Marine Protected Areas, these have not only showed evidence of one of the most viable and politically acceptable approaches to marine conservation for 50 years (Wells et al., 2016), but together with studies of the history of fisheries –like those made in developing countries (Espinoza-Tenorio et al., 2010a)– they have provided plenty of experiences that help to

build knowledge for future management of marine and coastal ecosystems. One of the conclusions of studies of the history of Marine Protected Areas and fisheries is the key factor role played by community based perceptions and knowledge in the (frequently missing) success of adopted policies. In fact, most environmental history studies have focused on the negative impacts on ecosystems, the unequal rights to access natural resources (Bourassa and Strong, 2000: 156; Jorgenson and Rice, 2007: 273–274; Weisz, 2007: 290; Endfield, 2009), and the lack of suitable policies or political willingness to solve the problems –like in Mexico (Espinoza-Tenorio et al., 2010b; Nava Fuentes et al., 2017). These characteristics of recent environmental history studies further evidence the contributor's focus in describing today's ecological crisis, propose solutions for it (Carey, 2009), and also, on the understanding of the relationships between peripheral regions and countries in order to adapt and improve development strategies (Barton, 2006: 367). Recently, scholars have been interested in the study of fisheries from the fishermen's perception and knowledge (Ramírez-Sánchez and Pinkerton, 2009; Alcalá and Camargo, 2011; Belton, 2012). The histories of successful marine natural resource management have become more common in recent years. Examples are the studies by Velez et al. (2014), who in a non-take zone for lobsters within a marine protected

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area of southern Mexico recorded the positive perception of fishers, and by Pérez-Ramírez et al. (2012), who reviewed the fishermen's success in empowerment through a certification processes of lobster species in northwestern Mexico. Environmental history aids to understand the interactions between societies and their environment in different ways through the identification of strategies for the use of resources, of the forms of perception and appropriation of nature, and of the productive organization inserted in different types of life, among others. Sustainable practices that can be adapted and implemented in present case studies can be identified through the analysis of these interactions and, in that sense, applied environmental history (Fernández Prieto y Picado Umaña, 2014) can contribute to the solution of environmental issues and to revalue of cultures that lead to the construction of sustainable communities. Indeed, environmental history research analyses –both of negative and positive aspects of human-nature interactions– becomes a means to find a pathway to collective community-based solutions to overfishing, to the resolution of conflicts within fishing communities, and to provide ideas for sustainable fisheries to counteract the global ecological crisis in coastal zones.

To understand complex systems like the marine ecosystems where fisheries occur, the best conceptual frame available today is the complementary framework of environmental, historical, and political ecology. We agree with the conclusion of Davis (2009:286) in her editorial of *Geoforum*: "...if more scholars interested in environmental change over time, whatever their discipline or sub-discipline, explore the complex links between stories of environmental change, the "science" used to bolster those stories, the biophysical data, and the political and economic forces motivating the use of a particular story over another, I believe we would produce more historical research that has the potential to make significant contributions to environmentally sound and socially just development today" ... Historical political ecology provides an excellent example of at least one way to conduct this kind of research. Political ecology can be used to understand the decisions that communities make about the natural environment in the context of their political environment, economic pressure, and societal regulations. It can also help to understand a diversity of issues that occur in marine socio-ecosystems, going from socio-productive organizational arrangements to conflicts and their possible negotiation (Bebbington et al., 2010).

Political ecology is characterized by the conjunction of various research lines (critical ecological economic s, Marxist ecology, critical geography, environmental history, social anthropology, political sociology and socio-cultural studies) and comes from distinct traditions (Anglo-Saxon, Ibero-American, Indian, etc.). It embraces the studies of access, plundering, use, and of the beneficial ownership of territories and the resources they contain (in many cases including the recognition and verification of existing counterforces, along with proposed alternatives) (Delgado and Fonseca, 2013).

The importance of this complex research approach is the fact that it allows to unveil causes and not only symptoms of theoretical-empiric issues, which entails to profound understanding of contemporary social and productive relationships at all time and spatial scales.

The present research attempts to carry out a historical analysis similar to that made for other regional cases: Endfield 2009: 228; McNeill, 2000; Barton, 2006: 366; Jorgenson and Rice, 2007: 273–288. Additionally, our research attempts to show how the combination of local knowledge with scientific knowledge (Withers and Finnegan, 2003; Moller et al., 2004) in fisheries management leads to more efficient and sustainable alternative measures, because socio-environmental dynamics can hardly be explained according to a single cognitive system.

Methodologically, the increased diversity involved in the knowledge dialogue established between local and scientific knowledge nourishes a richer knowledge horizon. Moreover, due to the different origins of these forms of knowledge these provide the capability of approaching issues from a wider perspective, therefore reaching higher levels of

understanding.

Our reference to local knowledge is similar to the Traditional Ecological Knowledge defined by Huntington (2000) as: "... the knowledge and insights acquired through extensive observation of an area or a species. This may include knowledge passed down in an oral tradition, or shared among users of a resource." This defines the community's knowledge, on which our work was based, and that was addressed through fieldwork and historical research.

In this study case we see the opportunity to investigate the dialogue between past and present worries and experiences in an attempt to write the future (O'Connor, 1997), and to make a contribution to the search for solutions to overfishing, conflicts within fishing communities, and the global ecological crisis in coastal zones.

The main objective was to reconstruct and analyze the environmental history of Mexican North Pacific (MNP) fishing communities from 1912 to 2011, in order to explain the configuration of their specific territory and its implications in the particularities of the seascape and landscape, and to identify the main socio-environmental factors that have influenced these communities to the search for the sustainable management of their fisheries. We analyze the appropriation of a geographical space to determine a particular territory through fishing and to establish fishing communities. This historical process reveals how fishermen organized in cooperatives and how they improved their fishing management aiming at sustainable development. Finally, our research explains how these fishing communities came to be by their own initiative, thus becoming enlightening examples of social organization and co-management. Importantly, in this case decision-making processes, problem solving, and adoption of strategies to avoid over-exploitation followed a bottom-up approach, as opposed to the top-down approaches that usually have not yielded good results.

## 2. Methods

The research involved an interdisciplinary method (Table 2). Formal (scientific data and official information) and local knowledge were integrated to contrast, compare, complement data, and overcome the apparent contradictions between them. Triangulation was used to validate the data, allowing highlighting the complexity and richness of this research in a rigorous framework (Denzin and Lincoln, 2000; Castillo et al., 2005; Hay, 2010: 69–79; Memon and Kirk, 2011: 107). Data collection and fieldwork were carried out between 2011 and 2013. Data collection consisted in qualitative and quantitative information searched for in documents, databases, images, and cartography, and gathered from key informants. The fieldwork consisted in application of ethnographic techniques as in-depth, semi-structured, open group interviews, participatory workshops, and non-participant observation. A code was developed for use in the results section to identify the key informants (identifiable in Table 2). The documented environmental history was classified according to previously identified historical stages (Alvarez et al., 2015), important events, internal and external factors, development and management changes, and their social, political and economic implications.

### 2.1. Study area

The MNP fishing communities in the El Vizcaíno Natural Protected Area Biosphere Reserve (the largest biosphere reserve in the world) located in the centre of the Baja California Peninsula have historically been relatively isolated (Cariño et al., 2004; Cariño and Monteforte, 2008). The study area is limited to the east by the El Vizcaíno Desert, to the north and west by the Pacific Ocean, and to the south by the San Ignacio coastal lagoon. The Development Plan of the Baja California Sur state government considers this region as a stand-alone Planning Unit because of its economic and geographical homogeneity (GBCS, 2011). Internationally, it is recognized for its long-standing tradition of abalone and lobster management (García, 2009), and known because of

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