An Indigenous Model of a Contested Pacific Herring Fishery in Sitka, Alaska

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ABSTRACT

This paper uses GIS and spatiotemporal analysis of a historically and culturally modified marine ecosystem to evaluate Pacific herring abundance, declines, vulnerabilities, and future prospects, about which a Native Tribe and state fisheries managers disagree. In 2008, the Sitka Tribe of Alaska (STA) requested that an area within its traditional waters be closed to commercial sac roe fishing to protect spawning Pacific herring (Clupea pallasii), a key species for Native subsistence and marine ecosystem health. This proposal was opposed by the Alaska Department of Fish and Game (ADF&G), which estimated that adequate biomass was available to accommodate all herring users’ needs. The disagreement exposes divisions between the Tribe’s and the State’s conceptualizations of the status, health, and management priorities for fisheries and marine ecosystems. The Tribe’s model is one of cultivated abundance, wherein herring eggs are harvested conservatively and habitat is enhanced to make coastal spawning areas more productive, stable, and resilient. The State’s paradigm, in contrast, follows a constitutional mandate to manage fisheries for Maximum Sustained Yield (MSY). A single-species biomass model is used to estimate “surplus” herring for commercial roe harvesting within management areas. This work analyses and compares the spatiotemporal prescriptions of State and Indigenous models of herring fisheries management as they are used within debates over a closed area (Proposal 239), and assesses their relative potential for improving herring fisheries and marine ecosystem management using a combination of GIS spatial and scientific analysis and traditional ecological knowledge.

Keywords: Ethnoecology, Fisheries Management, Indigenous Peoples, Pacific Herring, Tlingit

INTRODUCTION: MEASURING SUCCESS IN ALASKA HERRING FISHERIES MANAGEMENT

When combined with historical ecological analyses of the co-evolution of human societies and ecosystems, the application of GIS and use of spatial analysis has the potential to reveal long-term dynamics and vulnerabilities in key species populations. To date the potential to combine the integration, visualisation and analysis capabilities of GIS with traditional ecological knowledge to improve management of and decision making processes related to marine resources has been limited (cf. Aswani &

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Pacific herring (*Clupea pallasii*) is a biological and cultural keystone species (Garibaldi and Turner, 2004; Paine, 1995) for Southeast Alaskan Indigenous marine ecosystems. As forage fish and prey for many species, herring play a foundational role in the marine food web. Herring support large populations of predatory fish, mammals, and seabirds, especially during their spring spawning aggregations in protected coastal areas of Southeast Alaska, of which Sitka Sound (Figure 1) is the most productive by far. As a cultural keystone species among the Tlingit, Haida, and Tsimshian peoples of Alaska, herring are considered a highly significant component of subsistence production, trade, ritual and expressive culture. Among Sitka Natives, they figure prominently in oral history, names, songs, dances, regalia and other *at.ōow*, or sacred property.

Significant declines in herring abundance occurred as a result of heavy commercial herring reduction fishing (1882-1966) to produce industrial oil, livestock feed, and fertilizer (Herbert, 2012; Rounsefell, 1930, 1931; Thornton et al., 2010a; Woodby et al., 2005). Many Natives believe that local spawning populations of herring have never fully recovered from the heavy reduction fishing era, and thus remain vulnerable to the newer, intensive commercial sac roe fisheries which now dominate production, yielding salted roe, or *kozunoko*, for Japanese markets. The sac roe seine fishery, which kills herring at the cusp of spawning in order to harvest the roe skeins from pregnant females, commenced in the late 1970s and has grown significantly to serve the international market. Fishing quotas in Sitka Sound alone climbed to more than 28,000 tons in 2012, more than 50 times those set in 1976, when the first herring
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