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Seeding nature, ceding culture: Redefining the boundaries of the marine commons through spatial management and GIS

Julia Olson

Northeast Fisheries Science Center, NMFS/NOAA Fisheries, 166 Water St., Woods Hole, MA 02543, United States

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ABSTRACT

The oceans are not only being transformed through privatization as management moves towards market mechanisms, the oceans are also being "zoned", with zoning increasingly proposed as the ideal conduit for weighting different uses of the ocean. This is concomitant with a move towards ecosystem-based management that also partakes in a policy environment imbued with the commodification of nature, in which environmental services are ranked and valued according to neoliberal percepts. Crucial to these projects are the utilization of GIS technologies. This paper considers these zones of preservation and sites of conflict through an ethnographic case study of the scallop fisheries of New England, examining conflicts between harvesters, different projects to map the fishery, and ongoing efforts to reseed scallop beds. The paper explores how participants themselves articulate the changing practices of fishing and farming, redefining boundaries of nature and culture. While reseeding projects, for example, arguably participate in the market logic of neoliberalism, at the same time they may resist and redefine the terms, as communities see themselves sowing the seeds of their own sustainability and changing the terms of what counts, literally, as nature.

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1. Introduction

In 1993, a new way of managing Atlantic Sea Scallops in the Northeast United States was ushered in with the approval of Amendment 10 to the Scallop Federal Management Plan, a change that resulted in a spatially-based system of rotationally closed areas. Such a system of managing was part of a growing interest in re-conceptualizing both ocean space and livelihoods, changes that draw upon both ecologically-minded discourses of ecosystem-based management (Pikitch et al., 2004) as well as increasingly neoliberal tendencies in fisheries management (Mansfield, 2004). While neoliberalism—as many theorists have stressed (e.g. Castree, 2008; McCarthy and Prudham, 2004)—manifests itself in a variety of heterogeneous forms and contexts, it also draws upon sets of coherent arguments and practices, which in fisheries management center primarily on privatizing the commons and substituting market-based controls for governmental regulations. This convergence of influences in the scallop fishery, while ostensibly seeking simply to increase the productivity of what is the largest wild scallop fishery in the world, has also heralded a transformation from fishing to farming the resource. This transformation has been promoted as a more rational form of stewardship, but it also implies changes in subjectivity—along with changing forms of knowledge and ways of knowing the ocean—with potentially broader and longer-term implications for social-resource dynamics (cf. Agrawal, 2005). Moreover, these new forms of management have developed along with more spatially-specific modes of science at the same time that they have utilized technologies of visualization such as GIS, as will be discussed. The effect of these new spatialities in the ocean has been to make fisheries in some ways seem more "land-like" and terrestrial (cf. Steinberg, 1999) such that fishermen can more easily participate in neoliberal moments of enclosure. Farming the ocean, however, also engages the politics of knowledge involved in fishing, and as such has also enabled diverse and internal resistances (e.g. Mansfield, 2007a,b). The structuring context of a seemingly smooth fit between a neoliberal drive to privatization and farming's appeal to private property—at least in this sociocultural context—not only does not fully determine the beliefs and practices of the many different fishermen involved in the scallop fishery (cf. Glassman, 2003), but has also served as a means to rethink more empowering ways of producing nature.

The inability to fix resources in space has been at the heart of many understandings of common property. Mobile resources such as fish have given rise to particularly intractable common-pool problems, for their mobility implies a lack of "excludability (or control of access). That is, the physical nature of the resource is such that controlling access by potential users may be costly and, in the extreme, virtually impossible" (Feeny et al., 1990, p. 3). Not only do fish move but, at least in conventional accounts, so do mobile fishermen, ever seeking highest profit in a rationalist

E-mail address: Julia.Olson@noaa.gov

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movement through space (e.g. Sanchirico and Wilen, 1999). There are of course fissures in this story, even for such seemingly mobile resources as fish. While rotational management is argued particularly appropriate for semi-sedentary species such as scallops (e.g. Hart, 2003), others similarly contend that locally diverse sub-species, like populations of cod in Norway that follow the ebb and flow of particular fjords and inlets, necessitate more locally-based science and management (e.g. Jorde et al., 2007). Fishermen too, while often portrayed as opportunistically mobile, may have multiple rationalities that inform their fishing practices, including their spatial decision-making (Olson, 2006). My point here is not to counter movement with an equally mythical lack of movement, but rather to ask how forms of resource use—here especially, fishing or farming the ocean—involve culturally constructed subjectivities, networks of social relations, and spatially grounded knowledge and practice.

In the case of contemporary fisheries management, these subjectivities, relations, and knowledge and practice are now increasingly mediated through technologies like GIS. While mapping and counter-mapping have become more intertwined with stories of common property in general, the case of fisheries poses a double sort of enigma, for not only is there the issue of mobility and excludability in space but there is also the question of visualization, or lack thereof. In Hardin's classic account of the tragedy of the commons, for example, he asked that we "*Picture* a pasture open to all" (1968: 1244, italics added), where the herders, herds, and resource degradation are palpable and countable. For fisheries management however, this has not been such an easy task. The inability to see what is happening has in part structured the orientation of both fisheries management and biology: stock assessment is a statistical exercise in estimating hidden populations, while management tries to reconcile its strategies around fishermen who might cheat without being seen. Fisheries management, however, has recently begun to take a distinctly visual turn through the use of GIS and other spatial techniques for understanding and monitoring where different resources are and how they are used—not only supporting policy analyses from habitat classification and protection of essential fish habitat, to the social and economic impacts of closed areas (Meaden, 2000; NOAA, 2004; St. Martin, 2004), but also coupled to increasing interest in spatially-based methods of management.

What tends to be missing, however, is an appreciation of arguments raised within geography and other social sciences that critique the use of GIS as technologically or socially neutral, or which have conversely grappled with how to use GIS for qualitative and critical approaches to social knowledge.[1] The presumed neutrality and objectivity of GIS in fisheries management has not only assumed a sense of "space that is broadly taken for granted in Western societies—our naïvely assumed sense of space as emptiness" (Smith and Katz, 1993, p. 75), but has also tended to privilege universal understandings. Thus while the fishery management process has begun to incorporate spatially sensitive analyses into its development of area-based management, such incorporation has utilized neoliberal constructions of the typical fisherman that are challenged by more nuanced notions of fishing and resource dependence. New directions in the mapping of scallops that focus on crucial habitat and life cycle issues, for example, promise changes both in the science underlying fisheries management and in management itself by better directing fishing effort to particular places and by better understanding the conditions for resource enhancement through seeding, which at first glance recalls the warnings from early GIS critics that digital maps would serve to create or reinforce relations of power through the discovery of new things or people to exploit (Schuurman, 2000, p. 580). Yet as this reframing of resources from fishing to farming intersects with an increasing interest in aquaculture (where the idea of farming is obviously more explicit), it becomes clear that while ideas about property can be more easily enrolled into neoliberal discourses that commodify resource relations, transformations from fishing to farming also enable alternative projects through their articulation with cultural practices and processes. This includes the differential spatial practices of often smaller-scale fishermen as well as community-based interests in scallop seeding, who have sought—quite literally—to sow the seeds of community stability and, in the process, resist and redefine the terms of neoliberal market logic. This paper thus considers the differing worldviews, practices, and spatialities among and between so-called highliners and small-scale fishermen, fishers and farmers of scallops, different resource-users and the scientists who map them, and the radically new forms of economic practice and sustainability that inhere, potentially, in different uses and forms of maps and spatial knowledge, looking in particular at US Federal management of Sea Scallops, a Canadian example of a private-state partnership, and community-based seeding efforts in Downeast Maine.

2. Zoning the ocean

These mappings and transformations happen within broader spatial imperatives that are fundamentally reshaping the ocean. The majority of the world's fisheries are estimated to be fully exploited, overexploited or depleted (FAO, 2007). Political conflict over fisheries pit the many fishermen arguing that fisheries are rebounding against the many fisheries scientists and environmentalists arguing otherwise; many resource-users have demanded a greater voice in the very process of knowledge production, and efforts at co-management, cooperative research, and traditional ecological knowledge point to potential directions such involvement may produce. Yet conventional arguments about the tragedy of the commons finger the rational, self-interested resource user—economic man of neoclassical economic theory—operating in a socio-ecological environment of incorrect institutional norms and economic incentives. With too many fishermen chasing too few fish in an open sea, such understandings seek privatizing, neoliberal solutions to fisheries dilemmas—solutions many advocates fear destroy fishing communities and cultures. While this hegemony of bio-economics in fisheries management has been maintained, as St. Martin (2001) argues, through a geographic imagination that places the rationalist and self-interested "economic man" in a spatially homogenous commons,[2] the increasing efforts to use area-specific forms of fisheries management signal the potential for a "paradigm shift" from individuals to communities and ecosystems, in which the "promise of GIS" hinges especially on the *integration* of social and biological data (St. Martin, 2004). Though the actual practice of ecosystem-based management is still taking shape, its recognition of connections and multiple spatial scales, as well as its use for local knowledge in time and space, may be a way to involve people as members of social groups (rather than simply individuals) more integrally in the management process (St. Martin et al., 2007; Clay and Olson, 2008).

The actual implementation of ecosystem-based fisheries management, some argue, should happen through a planned system of "ocean zoning" that replaces the patchwork of ad hoc, uncoordi-

[1] See Kwan (2002) and Harvey et al. (2005) for a general review of issues involved in critical GIS.

[2] Fisheries science has relied on broad, grid-like areas for data collection and statistical analyses that are based partly on scientific constructions (e.g. ideas about stock distribution for some species but not others), while also tempered by political exigencies (Halliday and Pinhorn, 1990). Clay (1996) has termed the mismatch of these grids with how many fishermen actually use the ocean a "dissonance in fisheries management" that calls for greater sensitivity to local knowledge.

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