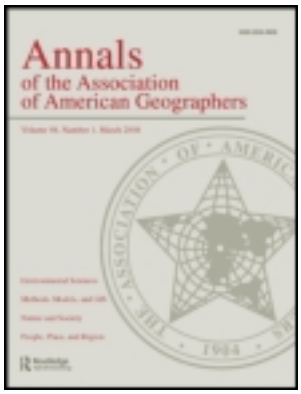

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Don't Fence Me In: Boundaries, Policy, and Deliberation in Maine's Lobster Commons

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Don't Fence Me In: Boundaries, Policy, and Deliberation in Maine's Lobster Commons

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Describing the necessary conditions for collective action in the interest of natural resource conservation, common property theory asserts the need for clear boundaries. This pertains to material boundaries that circumscribe target resources and social boundaries that circumscribe resource user group identities. In reality, socioecological systems are rarely closed or static, so boundary imposition can generate transaction costs and perhaps reduce adaptive capacity if implemented without allowances for broad and repeated public deliberation. Participant observation, interview, survey, archival, and focus group data from Maine's lobster fishery demonstrate that flexible, broadly negotiated, informal boundaries characterized the fishery for decades, embedded in localist institutions under de facto comanagement. Federal regulatory pressures and industry changes triggered formalization of a more statist comanagement regime, overlaying codified boundaries under the guise of resource conservation. Fishing boat captains leveraged the legal boundary-drawing precedent to consolidate fishery access and decision making away from crew, neighbors, and family. Precipitating factors included trap limits and tangles, entry limits and resource declines in other fisheries, law enforcement, abandonment of apprenticeship, recreational entry, and mail-in ballots. Instrumentalism eroded diversified, multivalent social networks, and ecological outcomes are uncertain. This evidence suggests that despite seminal contributions of common property scholarship, some policy applications might be overly reductive or sidestep democratic debate between individual and communitarian concerns. Attention to dynamic interactions across institutions can ensure that emergent political alliances and incremental changes in distributive and processual norms around resource allocation are not overlooked. *Key Words: common pool resources, governance, marine resources, political ecology, privatization.*

共同财产的理论声称，需要明确的界限以描述集体行动在自然资源保护利益上的必要条件。这与限制目标资源的材料界限和限制资源用户群体特征的社会界限有关。在现实中，社会生态学系统很少是封闭或静态的，所以如果在不允许广泛和多次公开审议的条件下施加边界，会产生交易的成本，并且可能减少适应能力。从对缅因州龙虾渔业参与者的观察，采访，调查，归档，和集中组数据表明，灵活而广泛地协商出的非正式的边界，表征了几十年来的渔业现状，它在事实上的共同管理下，嵌入于当地主义机构中。联邦监管压力和行业的变化，引发了更加中央集权的共同管理制度的形式化，把编纂的界限覆盖在了节约资源的幌子下。渔船船长利用先前绘制的法律的边界巩固渔业访问和船员，邻居和家庭的决策。促发因素包括陷阱的限制和纠缠，入境限制，在其他的渔业领域，执法，放弃学徒，休闲条目，和邮寄选票的资源下降。工具主义侵蚀了多元化的，多价的社会网络，其生态的结果是不确定的。这方面的证据表明，尽管共同财产制的开创性贡献，有些政策的应用可能会过于简单化或回避个人和社群之间的民主辩论。对各机构之间动态的相互作用的关注，可以确保新兴的政治联盟和围绕资源分配的分布和过程主义规范的增量变化不被忽视。*关键词：公共池塘资源，治理，海洋生物资源，政治生态，私有化。*

Al describir las condiciones necesarias para la acción colectiva en favor de la conservación de los recursos naturales, la teoría de la propiedad común proclama la necesidad de marcar límites claros. Esto concierne a los límites naturales que circunscriben determinados recursos y los límites sociales que circunscriben las identidades grupales de usuarios del recurso. En realidad, los sistemas socioecológicos son raramente cerrados o estáticos, de suerte que la imposición de límites puede generar costos de transacción y quizás reduzcan la capacidad adaptativa si son implementados sin la provisión de una deliberación pública amplia y repetida. La observación participativa, la entrevista, el estudio de campo, el archivo y los datos de gupos focales relacionados con la industria pesquera de langosta, en Maine, demuestran que los límites informales, flexibles y ampliamente negociados caracterizaron estas pesqueras durante décadas, incrustados en las instituciones localistas bajo administración compartida de facto. Las presiones reguladoras federales y las transformaciones industriales desataron la formalización de un régimen co-administrativo más estatista, que revistió los límites codificados bajo el disfraz de la conservación de recursos. Los capitanes de los barcos pesqueros apuntalaron el precedente del dibujado legal de límites para

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consolidar el acceso pesquero y la capacidad decisoria lejos de la tripulación, vecinos y familia. Los factores que precipitaron esta situación incluyeron las limitaciones en el uso de trampas y redes, los límites de entrada y declinación del recursos en otras pesqueras, la aplicación estricta de la ley, el abandono de las pasantías de aprendizaje, el ingreso recreacional y la votación por correo. El instrumentalismo erosionó las redes sociales polivalentes y diversificadas, y los resultados de orden ecológicos son inciertos. Esta evidencia sugiere que a pesar de las contribuciones seminales de la ciencia sobre propiedad común, algunas de sus aplicaciones políticas podrían resultar muy reductivas o sacarle el bulto al debate democrático entre las preocupaciones individuales y las comunitarias. La atención a las interacciones dinámicas entre instituciones puede asegurar que no sean pasadas por alto las alianzas políticas emergentes y los crecientes cambios en las normas distributivas y de procedimiento concernientes a la asignación de recursos. *Palabras clave: recursos del común, gobernanza, recursos marinos, ecología política, privatización.*

The naming of common property theorist and political scientist Elinor Ostrom as a winner of the 2009 Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel by the Royal Swedish Academy of Sciences encouraged geographers and fellow travelers concerned that overly abstract and atomistic models of human behavior prevent empirical understanding of social collectivities. Whereas most economists refine tidy but bloodless monetary formulas with decidedly mixed histories of environmental policy application, commons theorists identify numerous instances in which collective action beyond the purview of government or markets effectively supports the provision of ecosystem goods and services.

Ostrom's seminal contributions, like those of other leading common property scholars, are deeply transdisciplinary, opening possibilities for closer interactions with geography, especially our strengths in conceptualizing social–ecological linkages, and advancing policy-relevant core theory grounded in intensive field observation (White 1985; Wilbanks 1985; Kates 1987; Turner 2002; Liverman 2004; Rocheleau 2008). Human–environment geography already shares empirical and normative ground with the literature on common property institutions and the management of common pool resources (Emel and Brooks 1988; Bryant 1998; E. Young 2001; Giordano 2003; L. M. Campbell 2007; Mansfield 2007; Robbins and Bishop 2008). We share a driving concern with mutually causal relationships between social organization and resource management; awareness that environmental governance involves not only the state and associated formal institutions but also customary institutions emerging from local practice; and an implicit balance between pragmatism and ideals of equity and self-determination. Of the forty journals most frequently citing Ostrom's most cited book, eight are edited by geographers, only outnumbered by economists at thirteen, and tied with ecologists and biologists combined (van Laerhoven and Berge 2011). Nonetheless, our discipline's past and prospective contributions to the development of commons theory are not widely recognized. As commons scholars increasingly attend to questions of heterogeneous natural resources and resource user groups, ecological complexity, multiple-use commons, multilevel institutional linkages, and scale (Singleton 2000; Ostrom et al. 2002; O. Young 2006; van Laerhoven and Ostrom 2007; Ostrom 2009; Berkes 2010), geography's conceptual relevance should become more apparent. As in the case study presented here, our muddy boots tradition can expose limitations of abstract and atomistic social models, even when those models might be partially informed by commons theory. It can identify emergent dynamics and unintended outcomes at the interface of formal and informal institutions. It can reveal nuanced and multivalent sociomaterial relationships, including flux across social and ecological boundaries.

Specifically, this article finds that in a shift from localist to statist resource comanagement, loss of flux across resource user group boundaries can reduce adaptive capacity. That is, spatiotemporal flexibility and communitarian deliberation around user group membership can decline when informal institutions are overlaid by formal ones, even if the formal institutions are ostensibly imposed to protect natural resources and resource-dependent communities. The article offers evidence from Maine's lobster fishery, a case that provided early ethnographic material in support of foundational common property arguments that social norms existing outside markets and government can often conserve resources and that prominent commons authors continue to cite (McCay and Acheson 1987; Acheson 1988, 2003; Berkes et al. 1989; Ostrom 1990, 2009; Berkes et al. 2001). Recent field data enable a revisitation of core commons theory through the lens of human-environment geography, considering intimate and dynamic relationships among components of the socioecological system, between customary and legal institutions, across local to national jurisdictions, and balancing individual against collective interests.

Central tenets of geographic scholarship provide entrée, as our discipline routinely explores the permeability of boundaries, whether ecological, political, or cultural (Sahlins 1989; Bruce, Fortmann, and Nhira 1993; Zimmerer 2000; Blomley 2008). The traditions of political ecology and resource geography offer causal chains of explanation that place local resource management decisions within broader spatial, temporal, and institutional contexts, including empirical evidence from marine fisheries (Hapke 2001; E. Young 2001; Mansfield 2004; St. Martin 2006; L. M. Campbell 2007; Baird and Quastel 2011). The necessity of cross-scalar institutional analysis is also familiar, as is critical attention to the category of "local" (Brookfield 1964; Blaikie and Brookfield 1987; Smith 1995; Brenner 2001; Flint 2002; Norman and Bakker 2009). The need for concerted attention to the microrelations of formal institutions has been recognized, although perhaps less widely (Rocheleau et al. 2001; Häkli 2003; Robbins 2003). Geographers have been chastised for allowing the conceptual construct of private property to anneal beyond critique (Blomley 2005). Accordingly, this article advances more supple analyses of the commons and incremental enclosure. It begins by offering a geographic perspective on common property theory, a closely linked literature on natural resource comanagement, and boundaries of resource user groups. Subsequent sections discuss empirical evidence from the Maine lobster case, including historically adaptive boundaries, new comanagement institutions, convergence of fishing industry and management agency agendas, and resulting circumscription of fishery access and decision arenas. The conclusion offers syntheses relevant to larger policy challenges.

Common Property: Canons and Contingencies

The "tragedy of the commons" argument dates to early political and economic theory, asserting that without government or market controls, utility maximization by individuals results in the overuse of collectively accessed resources and inevitably erodes the public good of resource sustainability (Lloyd 1837; Gordon 1953; Hardin 1968; Aristotle 2009). Common property scholars respond by pointing out that some groups of resource users prevent overexploitation of common pool resources though informal rules and sanctions and that such informal arrangements are sometimes more efficient or effective than government or market mechanisms (Ciriacy-Wantrup and Bishop 1975; Runge 1981; McCay and Acheson 1987; Wade 1988; Berkes et al. 1989; Ostrom 1990, 2009; Bromley et al. 1992; Ostrom et al. 2002).

For more than two decades, the strength of the commons literature has been in rural, less developed settings, where governments have limited financial resources and households and villages are frequent units of analysis. A growing number of studies in more spatially extensive and monetarily prosperous contexts pose new challenges. Further questions emerge around resources such as information, genes, biodiversity, and the Earth's atmosphere (Pálsson and Rabinow 2001; Ostrom et al. 2002; Dolšak and Ostrom 2003; Hess and Ostrom 2007; Eggertsson 2011). These concern relationships between scientific knowledge and lay deliberation and externalities and negotiations involving multiple or heterogeneous resources, user groups, or institutions. Some contributions call for deeper appreciation of historical, symbolic, or biophysical contexts (Mosse 1997; B. Campbell et al. 2001; Agrawal 2002; Johnson 2004). Others query the transferability of findings from smaller scale and relatively homogenous sociophysical settings to cases in which larger scales, heterogeneity, and systemic complexity are more immediately apparent, and some explore the adaptive capacity of commons as multilevel, complex systems (Rocheleau and Edmunds 1997; Ostrom et al. 2002; Berkes 2006, 2008; German and Keeler 2010). Nonetheless, extensive, nuanced, or fine-grained treatment of larger scale and government institutions is rare. Of particular interest to geographers, empirically detailed case studies supporting theoretical examination of cross-institutional or cross-scalar dynamics have been relatively infrequent (Agrawal 2002; cf. Baland and Platteau 1996; Singleton 1998, 2000).

Comanaging the Commons

Ostrom and other commons scholars have built professional networks that bring together academics and field practitioners in the areas of international development and natural resource management. From these exchanges, theoreticians gain access to ample case material and testing grounds, and practitioners gain scientific leverage for institutional innovation. In addition to richly problem-driven foundational scholarship, this nexus has produced a more applied literature on natural resource comanagement, or the sharing of rule-making authority between resource users and government (Jentoft 1989; Pinkerton 1989; Berkes et al. 2001; D. C. Wilson, Raakjær-Nielsen, and Degnbol 2003). Some advocates have offered comanagement as a

second-best option, available in instances where conditions identified by Ostrom and others will not support an ideal common property solution of strictly local and informal rule making. For instance, when boundaries of resources or resource user groups are unclear, it is difficult to exclude free riders, attain collective agreement, enforce rules, or reap observable resource benefits. Purely local management of common pool resources is in fact an anomaly today, when even the most customary socioeconomic relations are embedded in international markets, technological changes, population shifts, and policy agendas of states, parastatals, and advocacy organizations (Baland and Platteau 1996; Singleton 1998; Agrawal 2002; Berkes 2006; O. Young 2006; German and Keeler 2010).

Comanagement has therefore become a catch-all term, encompassing a gradient in the levels of autonomy and authority granted to resource-reliant groups and those retained by government (Jentoft 1989; Pinkerton 1989; O. Young 2006). At one end of the spectrum, government encourages self-management by resource-reliant groups, whereas at the other end, government makes management decisions with limited input from citizen advisory committees. Partly for pragmatic purposes such as institutional legitimacy, implementation resources, and enforcement capabilities, many governments now delegate some resource management responsibilities to resource users. Even in the past, many governments tolerated the continuation of customary management practices as complement or parallel to state regulations, constituting de facto comanagement scenarios.

To this point, Ostrom (1990, 2005) noted the need for nested, cross-scalar institutional frameworks and for governments to support local common property regimes if they are to succeed. In the Maine lobster case described here, however, we find that comanagement relationships between government and resource users are deeply nuanced, multilayered, and evolve over time. Through unprecedented cooperation between government and lobster boat captains, a comanagement arrangement that began as state agency support for localist, customary management in the face of federal administrative encroachment rapidly developed formal mechanisms to restrict resource access to a privileged few. It sidestepped deliberation about user group membership among a broader range of interested villagers and replaced communitarian norms with individualism. Group boundary negotiations that were once iterated and adaptive in response to changing socioecological circumstances have been legally fixed, circumscribing the present group of resource beneficiaries and excluding would-be lobster fishermen.[1]

Deliberating Group Boundaries

Ostrom and other researchers have sifted through numerous case studies, including Maine's lobster fishery, to discern essential design principles for effective management of common property resources. The requirement that resource user group boundaries be clearly defined appears first in Ostrom's canonical list of criteria and prominently in lists compiled by other authors. It is generally accompanied by the explanation that without clear group boundaries, free riding can erode conservation benefits otherwise gained through collective investment in rule making, monitoring, and enforcement activities (Wade 1988; Ostrom 1990, 2005; Berkes et al. 2001). Arguing for clarity, Ostrom asserted that if "the specification of individuals who can use the resource remain[s] uncertain, no one knows . . . for whom [the resource is being managed]" (1995, 91). We might ask, however, for whom do we manage resources? At what juncture might managers consider not only resources and users per se but any broader span of social interests, including collateral effects on communitarian ideals of equity, justice, and democratic legitimacy? These questions are not new, nor is definitive resolution likely, as this tension between individual and communitarian concerns persists at the heart of democratic theory. Our society habitually recalibrates the balance between individual and collective well-being, in episodes as routine as household contention over domestic chores and as precipitous as congressional impasse over the federal budget. The lobster case usefully demonstrates how alliances that mobilize both customary and legal institutions and leverage authority across jurisdictional scales can shift and coalesce incrementally to tip the balance between individualist and communitarian outcomes, benefit a group of resource beneficiaries to the exclusion of others, and deter objections to the de facto privatization of a commons. Although clear group boundaries facilitate conservation in ideal and discrete models, and fixed boundaries are simpler to codify and administer from a bureaucratic viewpoint, the practice of democracy is an inevitably messy endeavor. When broad and rigorous debate does not precede boundary demarcation, the designation of winners and losers can quietly evade public scrutiny and accountability. To the extent that newly clarified group boundaries are also made impermeable and inflexible, future contestation by losers or interested bystanders might

be more difficult, and winners can more permanently consolidate resource benefits. Legal codification of newly fixed user group boundaries might also entail social and ecological costs borne by some larger public.

Study Methods

Data informing the following analysis include participant observation, interviews, surveys, focus groups, and archival review. More than twelve months of participant observation took place in Maine fishing-reliant households and on fishing waterfronts and boats in 1989, 1990, 2001, and 2002. This included more than thirty-five public meetings and dozens of private meetings with nonprofit, governmental, and scientific groups as a policy professional. Meetings occurred in 1991 and 1998–2010, mostly in Maine but also in other New England states and Washington, DC. Using purposive and snowball sampling strategies, more than 200 interviews and informal conversations took place with more than 150 Maine fishing industry members and more than sixty fisheries professionals and scientists between 1998 and 2010. More than eighty randomized surveys were completed by Maine fishermen in 2002, 2003, 2005, 2006, and 2010. In 2002, four focus groups were convened in eastern Maine. Archival review included government documents, news media, local histories, and print and electronic publications serving the fishing industry and environmental advocates.

Adaptive Flux in Maine's Lobster Fishery

Maine's coastline features numerous peninsulas and islands, separated by bays, estuaries, and rivers and linked by occasional bridges. Countless harbors and coves shelter dozens of distinct mooring areas and correlated fishing groups. Nearshore ledges and crevasses are interspersed with patches of bedrock plain, cobble, sand, and mud. Offshore waters cover vast canyons, basins, peaks, and banks. Fishing catch rates vary with gear deployment and rigging choices in ways specific to sediments, bottom cover, waves, currents, tides, predator and prey populations, and target species' population dynamics and behavior, including reproduction, growth, feeding, and migration. Europeans arrived on islands and outer peninsulas in the first decade of the seventeenth century for the primary purpose of cod fishing (O'Leary 1996). Commercial harvests diversified in the 1800s, when demand rose for Gulf of Maine halibut, haddock, pollock, hake, mackerel, herring, clams, and lobster. In the twentieth century, new markets developed for porgies, tuna, scallops, worms, shrimp, quahogs, mussels, urchins, eels, and other species.

Until recent years, many vessels harvested a number of different species over annual and interannual cycles of species behavior, market demand, and household access to capital and labor (J. A. Wilson 1982, 1990; Acheson 1988; Brewer 2010, 2011). Results from a random mail survey suggested that about half of 2002 Maine state commercial fishing license holders had participated in only one commercial fishery over their careers. The other half had participated in a mean of more than six fisheries. The mean number of fisheries participated in was 4.0 (Brewer 2010).[2] Another random mail survey indicated that 2002 state commercial lobster licensees participated in a mean of 2.8 fisheries (Brewer 2010).[3] In a nonrandom dockside survey of active midcoast Maine lobstermen in 1998 and 1999, more than half reported income from a species other than lobster in the previous year. Cross-fishery strategies were influenced by species abundance, markets, availability of labor or capital, family responsibilities, physical health, and other considerations. A random phone survey of 2005 groundfish[4] permit holders in Maine's largest harbor found that in 1983, 1993, and 2003, each person had been involved in a mean of 2.0 New England fisheries[5] in each year that he was fishing in New England and cumulatively in 2.8 fisheries[6] in those aggregated years (Brewer 2010).[7] Prior surveys in 1978 and 2002 reported similar rates of species switching (Acheson 1988; Market Decisions 2002).

Historically, the Maine lobster fishery was managed under a localist policy of détente between fishing harbors and state government (Acheson 1988; Acheson and Brewer 2000). The Maine legislature debated and established a few fishery conservation rules, such as minimum and maximum sizes of harvestable lobsters and prohibitions against harvesting egg-bearing females or females with egg-bearing histories indicated by small tail notches made by lobstermen before releasing them (Acheson 1988, 2003). Primary responsibilities of the state Department of Marine Resources (DMR) included legislative advisement and rule enforcement. Local harbors were permitted to control fishing areas and fishery entry[8] through informal institutional mechanisms as de facto comanagers. These customary institutions permitted frequent opportunities for adaptive adjustment of socioecological boundaries, triggered by flux of resources and people. Movement, or attempted movement, across physical or social dimensions could incur renegotiation or reinforcement of an existing boundary and reconstitution of the boundary as softer, harder,

clearer, fuzzier, or more or less permeable than before. As described later, these incidents transpired across spatial bounds of fishing areas and across social bounds of resource user and decision-making groups, with resolution mechanisms integrated into daily lives of local residents. More statist policies have emerged since the 1990s, as narrated in the second part of the case study, but local boundary management practices continue to the present day, albeit weakened.

Localist Identities and Spatial Strategies

Despite a cherished reputation for independence and self-reliance, lobster fishermen make calculated trade-offs between communitarian tradition and entrepreneurship. Routine and extraordinary business decisions can confirm, challenge, or reinvent social boundaries that circumscribe kin and exchange relations and group memberships. Members of long-established families are both constrained and supported by social relations and hierarchies that date back generations, some carrying surnames of early English settlers. Young people starting a family often acquire local land through family members, enabling them to share labor, capital assets, and information in paid and bartered work; construction and maintenance of homes, outbuildings, and working and decorative landscapes; food buying, gathering, growing, and preparation; child care and domestic handicrafts; hunting and fishing for subsistence or recreation; other leisure activities; and sometimes political ideology or allegiances.

Yet even among other Maine fishermen, "lobster pickers" have a reputation for clannishness. Most fish from the same harbor as family and neighbors, setting traps within 6 km, although a few venture out another few kilometers (Acheson 1972, 1988; Acheson and Brewer 2000). The mean lobster license holder (aged fifty, and having lobstered for twenty-nine years in 2002) assumes a family legacy of three or four lobstering generations and often a longer fishing or maritime heritage, has two immediate relatives lobstering, two additional immediate relatives participating in the fishing economy via paid or unpaid labor, and another descendant or two who might go lobstering in the future. He sees these people almost daily, either on the water or onshore, and often counts on them as allies in negotiating access to marine and terrestrial resources for himself and his family. Although kin and neighborly relationships are powerful social identifiers with strong historical precedent, individuals might leverage or manipulate them for varied purposes, subtly reconstituting and adapting group and fishing area boundaries to accommodate changing socioecological needs and pressures.

For more than a century, customary harbor-based lobstering groups have controlled the flow of new harvesters into the fishery and the spatial areas available to each harvester, kin group, or harbor group (Acheson 1972, 1988, 2003; Acheson and Brewer 2000). They exercise sanctions such as gossip, shunning, harassment, verbal and nonverbal threats, and damage of gear and other property. These can include jokes, comments, notes, radio transmissions, knots tied in buoy lines, opening others' traps, cutting trap lines, physical threats, or, rarely, gunfire or arson. Among established or encroaching fishermen, those who can claim kin ties or mobilize allies to support spatial claims have greater chances of success. In some cases, whole harbors act; in others, a single "whip" bears most of the risk; and in yet others, younger fishermen are burdened with riskier sanctioning responsibilities. Some kin groups or other alliances are particularly cohesive and maintain strong and enduring norms of collective action; elsewhere weaker ties undergird a more diffuse network of coalitions and alliances.

Much negotiation of fishery access is entirely nonviolent, however, and is predicated on close observation of spatiotemporal patterns of lobster behavior (Acheson and Brewer 2000). To maximize catch and profits, lobstermen shift traps continually: offshore and inshore, along crevices and ledges, between hard and soft bottom, and in and around deep holes. A patient fisherman might infiltrate an ostensibly forbidden area slowly and surreptitiously, setting a few traps when there are few lobsters to be caught there, unnoticed or dismissed as no immediate threat. Weeks or months later, when catches are higher in that area, the traps might be tolerated, having already been there for some time. In some instances, groups or individuals wishing to avoid conflict will meet to explain their differing perspectives and explore possible resolutions, sometimes arranging bilateral trades of access to specified areas.

Because lobster trap setting areas overlap in some places with trawling grounds for groundfish or other species, conflict can also take place between gear groups. When wire traps entangle in trawl gear, traps are often damaged beyond further use; trap lines can be accidentally or intentionally severed, causing traps to be lost; and trawl nets can be torn, often requiring hours of repair at sea, or a return to port. Fishermen who participate in more than one fishery, or whose close kin, friends, or other allies participate in another fishery,

are highly motivated to avoid other fishing gear and maintain diversified socioecological perspectives. Such breadth of collective experience and overlapping membership of fishing groups can be useful at times of intergroup conflict or impasse, helping antagonists to consider alternative viewpoints and forge compromise.

Routes to Fishery Access

Adaptive flux also manifests at boundaries of fishing groups in less spatially explicit terms. Customary mechanisms have allowed gradual and negotiated fishery entry for new lobstermen, permitting harbor groups to modify their size and spatial strategies over time. Although the general parameters of group membership and resource access rules are commonly understood, case-by-case weighting of some rules over others can permit flexibility and accommodate contingencies.

In many coastal Maine towns, fishing has long offered one of very few employment options. Some young people enter fishing less for love of the work, which can be backbreaking, than to maintain lifelong residence among friends and family (Acheson 1980). Individuals from long-established local families are virtually guaranteed entry rights to the lobster fishery, particularly if close kin are fishing at the time. Men without local kin can often gain entry privileges by marrying into a fishing family and establishing exchange relationships with their in-laws. At one time, living within a few miles of the harbor was prerequisite to entry (Acheson 1988). Customary entry rules have adjusted to prioritize kin over geography as escalating coastal property values attenuate kin relationships over longer distances. Maintenance of intergenerational family relationships has become more difficult, but shared fishing activities help cement those ties. Individuals with no local kin and few years of local residence often find establishment of a viable lobstering business to be slow to impossible, as they are excluded from necessary information and exchange networks. An aspiring entrant can advance his cause by crewing for and befriending esteemed fishermen, especially while young. In rare instances, in harbors where the number of fishermen is declining and the local trap setting area is threatened by neighboring harbors, a few new entrants might be welcomed or even recruited. Women's entry strategies are thus far undocumented. They were virtually forbidden from fishing until the late 1990s except for a few crew assisting immediate family, but a small number of those women are now established as boat owners.

Despite decades of study, relationships between fishing effort and lobster abundance are not well understood (Correia et al. 2006). In the last two decades, Maine lobster populations and landings have reached unprecedented highs. DMR data show that landings have quadrupled since a period of relative stability in the 1950s through 1980s, setting new records in 1990, 1991, 1994, 1997, 1999, 2000, 2002, 2004, 2006, 2009, and 2010. Existing biological research cannot attribute population changes to any single driver. Possible explanations include higher water temperatures; increased quantities of bait available to small lobsters that feed in traps and then escape harvest; declines in groundfish populations, which sometimes prey on small lobsters; and a population of larger, more fecund lobsters, protected by maximum size regulations and mostly found offshore (Saila, Nixon, and Oviatt 2002; Hanson 2009). Lobstering has become more profitable than most local employment options in service industries or the construction of summer and retirement homes. More people from nonfishing families wish to share in the bounty, even as weaker worldwide markets for luxury goods lower ex-vessel lobster prices per pound.

The influx of harvesters has encountered stronger or weaker entry barriers according to local circumstances. In many places, entry has been easier upriver, in fishing groups and areas less dominated by long-standing fishing families, and where lobsters were previously thought to be scarce (Acheson and Brewer 2000). Lobsters are still caught more predictably on rocky coastal bottom during periods of summer postmolt feeding and fall migration away from shore, but dense populations have probably expanded their habitat from deeper, rockier shelters to include shallower, softer bottom (Fogarty and Gendron 2004). Another opportunity for new entrants has lain offshore, where exclusive trap setting areas are virtually nonexistent, catches are good in winter, and rougher seas require larger, more expensive boats and engines. Many longtime fishermen also set traps in deeper waters now, especially in winter months when lobsters are scarce inshore, and high market prices can offset the brutal cold and serious danger.

Some find customary entry rules less prohibitive in the westernmost quarter of the coast. Until the last couple of decades, catches were lower there, and fewer people went lobstering, with less incentive for collective action supporting sociospatial boundaries. The sandier and flatter western benthic habitat is less attractive to small lobsters, offering less shelter from predation (Steneck and Wahle 1991), but high lobster densities and groundfish declines might have lured lobsters to those

grounds. Lobstermen there often set a number of traps on a single trawl line, tied in sequence for rapid and efficient hauling. Trap trawls tangle more easily in the midcoast, where the bottom is craggier and tides run faster, so they are rarely used in more than pairs. But even a few entangled lines become a frustrating, time-consuming, and costly delay in a day's work, sometimes triggering trap cutting, finger pointing, escalation, and a generalized disposition against new entry. In the more rural eastern quarter to third of the coast, different stories emerge around sociospatial boundaries. Human populations are fewer and farther between, intraharbor kin ties and other socioeconomic networks are denser, informal customs are stronger, inmigration is rare, retention of jobs to slow the outmigration of local youth is a primary concern, and codes of silence are more strictly observed. Fewer incidents of open conflict seem to take place around the farthest eastern fishing area and group boundaries, where the Canadian border keeps the fleet closer to shore, and the bottom is less contoured, but these episodes sometimes incur more dramatic acts of violence.

Compared to statist management institutions described in the following sections, the customary fishing area and group boundaries already described are deeply embedded in highly localized and communitarian social networks of multiple resource user groups and subgroups. Boundaries can harden and soften as deemed broadly acceptable by collectivities that might encompass consideration of nonfishing perspectives, whether voiced or not. Partial but persistent fishing-dependent identities permit general acknowledgment that many individuals other than boat captains rely to a greater or lesser degree on the lobster economy. Individual boundary transgressions, and individual or collective responses, can be narrated, interpreted, and reinterpreted through innumerable conversations and nonverbal signals not only on the water, but at kitchen tables, in pickup trucks, and in fish houses, where wives, children, grandparents, friends, neighbors, and other relatives might occasionally interject relevant observations, opinions, and interests, solicited or otherwise. Through perpetual news dissemination, rumor, gossip, and storytelling, fishermen can be held somewhat accountable to other villagers. Wives are often acknowledged or unacknowledged business partners, keeping books, manning the phone, running shoreside errands, and strengthening kin and neighborly relationships through the daily exchange of non-fishing-related information and household labor. Many sons and daughters make similar contributions. Although crew are rarely expected to voice opinions on fishing-related decisions, there is a general assumption that hard-working and loyal crew should receive a decent wage and be able to count on fishing futures, ideally as owner-operators. Fishermen pursuing other species often have an interest in lobster fishery decision making, especially because most have personal or family histories in lobstering. Prospective fishermen and their dependents also have vested fishery interests, as do shoreside service providers such as wharf owners, bait suppliers, boat builders, engine and electronics repair shops, and hardware and grocery purveyors. Although active consultation with this diversity of interests is rare, some boundary-related decisions are susceptible to their indirect influence. Boat owners converse with these people daily and rely on their services and goodwill, lending some weight to village-level concerns and communitarian ethics. As in many close-knit communities, the threat of shunning, gossip, or "slandering" by respected leaders, useful allies, key businesspeople, or blood relatives for some betrayal of collective values is subtle but omnipresent.

New Statist Institutions, Boundary Rearticulation, and Fixity

Although informal localist practices in Maine's lobster fishery continue largely as already described, these are overlaid with, and sometimes superseded by, federal, interstate, and state institutions. With statist management comes greater clarity but also greater fixity in boundaries around fishing groups and areas, and unprecedented capital investment in a new status quo. Federal and state regulations are reducing diversified, multiple-fishery strategies and favoring specialization in single fisheries such as lobster or groundfish. Similarly, state-sanctioned spatial boundaries superimposed on traditional lobster trap setting areas are codified in ways that disembed boundary negotiations from local social contexts that might involve fishery-reliant groups other than lobster license holders. Some trap area boundaries have hardened, violence has heighted around others, and yet others have weakened, shifted, or dissolved. Boundary rearticulation is taking place with the cooperation of, and encouragement from, many lobster boat captains, through formalized comanagement mechanisms. Flux in and out of fishing groups and areas is now inhibited by access to path-dependent financial or political capital. Results privilege boat captains over crew, family, and shoreside businesses.

Shifting Jurisdictions and Enclosure

Most U.S. fisheries have come under increasingly statist management policies since passage of the federal Magnuson–Stevens Fishery Conservation and Management Act in 1976, "Americanizing" ocean resources in an Exclusive Economic Zone, and tasking the new National Oceanic and Atmospheric Administration (NOAA) with responsibilities for fisheries development and oversight. From the early 1980s into the late 1990s, the New England Fishery Management Council (NEFMC), created by the Magnuson Act as one of eight Regional Fishery Management Councils, wielded new authority over the lobster fishery. NOAA appointed representatives from each of five state fishing industries and management agencies to develop regulatory proposals in fulfillment of federal management goals. Because NOAA retained legal rule-making authority, and must comply in turn with congressional mandates, NOAA staff were actively involved in council meetings, sometimes communicating regulatory parameters outside of which council proposals would likely be rejected. Despite early optimism surrounding the council process, profound differences of opinion emerged between NOAA scientists and Maine fishermen around NOAA's predictions of pending lobster population declines, the effectiveness of Maine's long-standing protections of lobsters exceeding a maximum size and tail-notched females, and NOAA pressures to increase the minimum harvestable lobster size and limit the number of traps fished by each captain (Acheson 2003). Citing these and more ideological arguments, Maine fishing communities were united in their opposition to federal intervention and found little reason to abandon localist management norms and customary practices.

With state lobster landings stable or increasing since the 1940s, by the early 1990s, DMR leadership and some lobster fishery leaders began organizing political support for the decentralization of, and stronger industry roles in, comanagement. In 1993 the Atlantic Coastal Fisheries Cooperative Management Act granted federal backup for rule enforcement to the Atlantic States Marine Fisheries Commission (ASMFC), a fifteen-state compact created in 1942 to facilitate interstate management coordination. With state agencies increasingly communicating an inability or unwillingness to enforce unpopular federal lobster regulations, NOAA reluctantly ceded routine regulatory rule-making to ASMFC but without formalizing the transfer until 1999 and still retaining ultimate jurisdiction and responsibility for the fishery's compliance with federal law (Brennan 2002).

Championing an ostensibly localist agenda, DMR obtained gubernatorial support to advance a state-level legislative initiative for further decentralization: the formal creation of several state lobster comanagement zones empowered to establish industry-supported conservation rules at the zone level. If lobster fishing in Maine waters would be held to federal and interstate lobster population goals, the state wanted its managers and harvesters to retain discretion in determining which specific fishing practices might accomplish those goals. In 1995, the DMR bill passed, establishing the zones and granting them authority to set zone trap limits, fishing times, and numbers of traps allowed per trawl (Alden 1995b; Goldthwait 1995; Acheson 2003). It was accompanied by a second bill creating a state-administered apprentice program intended to slow fishery entry without supplanting customary localist controls. Through an implementation committee process, DMR then consulted with lobstermen, social scientists, and others to draft zone boundaries perpendicular to the coast, intending to constrain trap numbers but not boat movements or traditional trap setting patterns (Finlayson 1998) and allowing interim zone councils to subsequently refine the lines (see Figure 1). Each of seven zones was divided into several districts made up of one or more harbor groups, and zone council elections were held so lobstermen could "regulate themselves." Even while warning that formal law could never replicate customary flexibility, state managers heralded the lobster zone law as a "landmark," initiating "true" fisheries comanagement in New England (Alden 1995a; J. Wilson et al. 1998). DMR leadership and comanagement supporters hoped that the zones would foster an unprecedented acculturation of the industry into the participatory civics of resource stewardship.

The initiative was hastened in 1997 when ASMFC responded to state pressures and created six lobster management areas along the Eastern seaboard with the ability to establish area-specific rules and consider input from appointed industry members, including provisions for state-specific "conservation equivalencies" or scientifically supported regulatory alternatives capable of achieving similar population goals. Around this time, research and constituent outreach began on how to effectively implement apprenticeship. Despite these apparent administrative victories on behalf of a localist agenda, some Maine industry members opposed the state's zone comanagement law for a few years, being opposed to trap limits and any perceived movement toward state entry controls (Crowley 1995; Jones 1996); many more were neutral, ambivalent, or

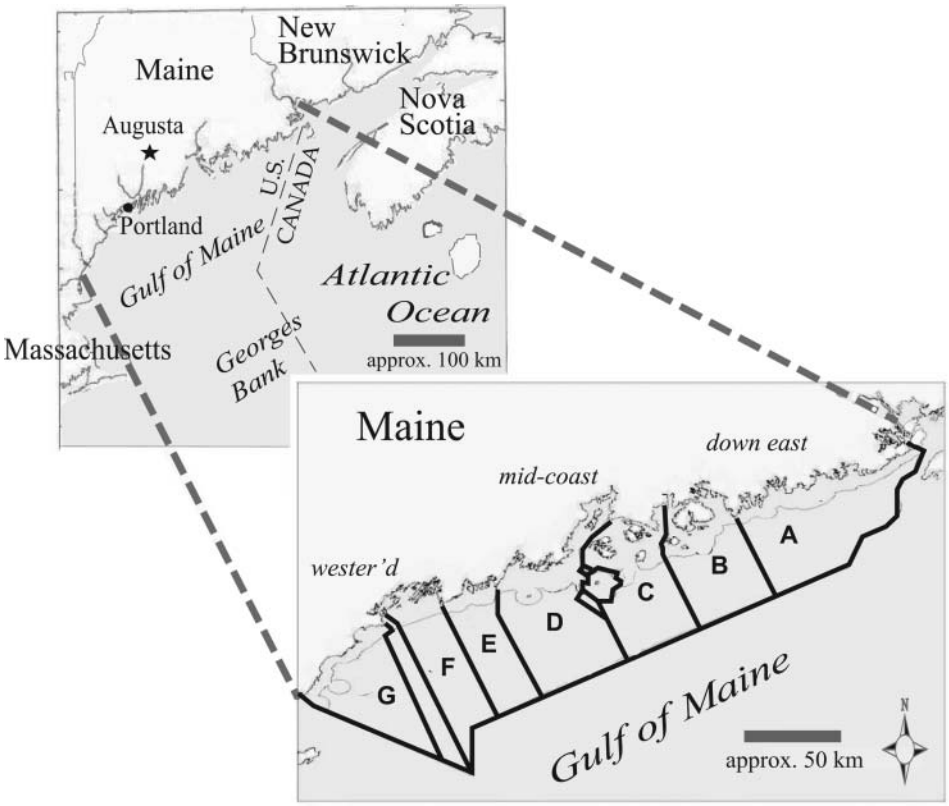

Figure 1. Maine lobster comanagement zones.

skeptical. Within a few years, industry support strengthened considerably, but outcomes have been mixed, especially for three boundary-related issues that are closely intertwined and of central interest to our discussion: trap limits, zone lines, and entry limits. The rapid evolution of these issues, especially entry limits, was driven by unanticipated interactions among the institutions and norms operant in formal and informal domains newly linked under comanagement and other changes in the human–environment system. The federal push for trap limits was a penultimate force behind zone creation by DMR, but zone line issues arose by virtual necessity from trap limits, and lobster license holders subsequently focused zone-level rule making around more profoundly transformative entry restrictions. As described later, antecedent roots of this evolution are older, but significant contemporary triggers include trap increases and tangles, law enforcement, entry limits and resource declines in other fisheries, abandonment of formal apprenticeship, recreational entry, and mail-in ballots (see Figure 2).

Lines and Limits

As early as the 1950s, some Maine lobstermen, especially from western harbors, asked the legislature to limit the number of traps allowed per license holder (Goldthwait 1995; Acheson 2003). At least as early as 1973, differential trap limits were proposed for different parts of the state (Greenlaw 1973; Acheson, Stockwell, and Wilson 2000). Through the early 1990s, the legislature and DMR were reluctant to set trap or entry limits because they perceived no supportive industry majority. Different fishermen in different areas fished more or fewer traps, and any proposed limit would force some to scale down their operations. In the 1970s, trap limit proposals became intertwined with proposals to limit entry by restricting or suspending the issue of new lobster licenses (Greenlaw 1973). It was argued that if some lobstermen were to cut back their operations or limit future business growth, newcomers setting additional traps could eliminate any ostensible conservation benefit.

Entry limits were anathema to most fishermen, however. Access to, and management of, marine resources was presumed to be the appropriate jurisdiction of fishing communities that had stewarded those resources for generations, not of government. Legal entry limits were broadly understood to constitute state-sanctioned privatization, allocating public resources to a privileged few and depriving others of basic rights of liberty and self-determination. Such sentiments generally

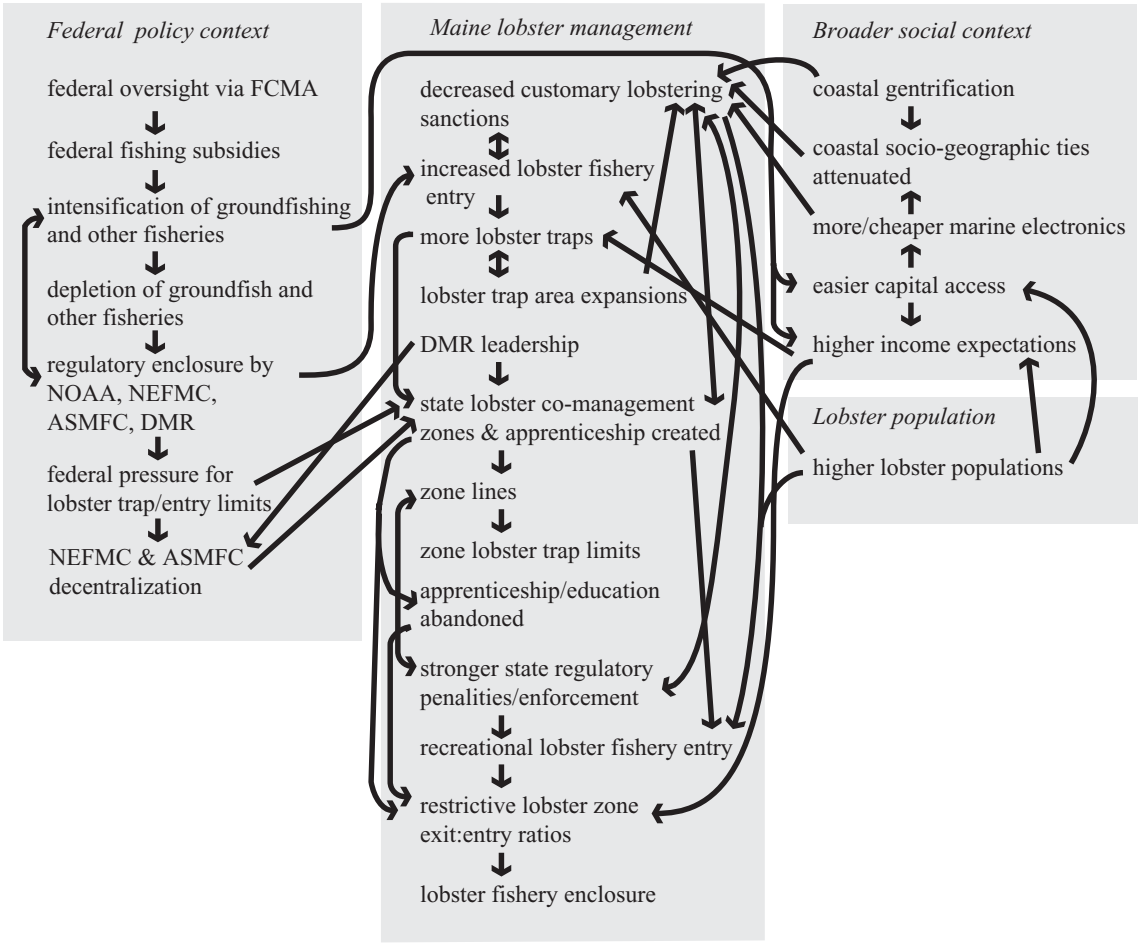

Figure 2. Causal linkages among Maine lobster management, federal policy, broader social context, and lobster population. *Note:* FCMA = Fishery Conservation and Management Act; NOAA = National Oceanic and Atmospheric Administration; NEFMC = New England Fishery Management Council; ASMFC = Atlantic States Marine Fisheries Commission; DMR = Department of Marine Resources.

prevailed in other New England fishing communities into at least the 1980s and in Maine into the 1990s (Alden 1995a; Alden and Brewer 2000). More pragmatically, young people were already leaving Maine because of limited local job prospects, especially down east.[9] Without lobstering as an employment option, departures and unemployment would surely rise (Alden 1994; Jones 1995). Fishing was also presumed to be a necessarily diversified livelihood, requiring access to any number of different species in different seasons, years, and career stages. Even entry limit supporters were extremely concerned about the possibility of excluding young people or restricting interspecies livelihood strategies (Acheson 1980). In the late 1980s, lobstermen in at least one midcoast harbor found an entry limit proposal unworthy of discussion, and even in the early 2000s, down east residents still voiced broad opposition to entry limits.

NOAA and ASMFC pressure for trap limits escalated in the 1980s and 1990s and became a key rationale for establishing the zones. Rather than allowing external decision makers to impose uniform and possibly draconian trap limits, forcing a jurisdictional confrontation or risking wholesale industry backlash against management writ large, DMR hoped fishermen might implement zone-appropriate trap limits themselves. Meanwhile, fleet interest in trap limits increased in the 1990s partly because numbers of traps per boat were increasing in western Maine harbors, especially among a very small number of "hogs" setting 1,000 or 2,000 traps apiece (Acheson 1998, 2003).

Matters were quickly complicated once the zones were in place and several passed trap limits, initially ranging from 600 to 800. Although trap limits slowed the rate of increase, they did not stop or reverse the trend. Just as the most ambitious lobstermen were forced

to scale down their operations, smaller scale lobstermen faced unprecedented incentives to scale up. Many noted that the trap limit set a new industry "target" or norm. Fishermen previously fishing fewer traps could now harvest a larger proportion of an area's average catch per trap than was possible when they had to compete with neighbors who fished much more gear. When a few fishermen suggested a freeze on new traps, or controls proportionate to present trap numbers, and DMR began issuing numbered trap tags, new incentives arose to set more traps or at least to maintain the maximum permissible number of tags, affixed to traps or not.

Also unanticipated, legal enforcement of different trap limits in adjacent zones necessitated an additional rule requiring each license holder to declare one zone in which he set the majority of his traps, thereby committing to that zone's trap limit. Although most license holders already fished all their gear within one zone, others had long set traps on both sides of a new zone line, in some cases following multigenerational precedent. A few lobstermen accustomed to fishing more traps, especially across the new zone lines, filed lawsuits against the state. In at least one case, a fistfight ensued over a zone line cutting through bottom that had long been shared by two harbor groups within a single town. Such conflicts plagued some zone lines for several years, ultimately requiring that the state hire an external mediator and draw a series of maps to designate areas of overlapping zone jurisdiction. In 2002, the average lobster license holder and average zone council member believed these conflicts to be an inevitable result of drawing the zone lines. Only 40 percent of license holders further believed the conflicts to be resolvable, almost half believed they were caused by "greed," a third believed them to be a major problem, and less than 1 percent found them to not be a problem.[10]

Trap limits and zone lines are policed by state marine patrol officers, who are authorized to board any boat without a warrant. In the few years preceding zone creation, a few lobstermen solicited unprecedented enforcement help from the patrol. Requests came especially from more gentrified and western harbors, where appetites for trap cutting were weakening and where the biggest hogs, some very willing to cut trap lines, were placing hundreds of traps far beyond historical areas. Apparent alternatives to legal enforcement seemed limited to dissolution of some harbor-based areas or large-scale trap cutting "wars." These developments, and a new law mandating harsh penalties for trap cutting, significantly reduced customary boundary negotiations in some parts of the coast, to the extent that some customary lines disappeared. This weakening of customary spatial controls began prior to zone creation (Acheson 1998, 2003), but starting shortly after zone creation, many fishermen acting in gross violation of customary spatial patterns (including some new to lobstering and without family lobstering histories) began citing the zone letter newly imprinted on their state lobstering license as designation of a legal right to set traps anywhere in the zone. Patrol officers are few, are selective in enforcement, and often respect customary norms. However, new patrol boats purchased in the 1990s, and more recent federal funds for drug interception and homeland security equipment, have increased surveillance and response capacities, especially close to shore.

Nearly simultaneous with the impetus to fix trap numbers and discrete boundaries of trap setting areas, a closely linked movement arose to similarly align and fix discrete boundaries around fishing industry membership. Shortly following the passage of trap limits in all seven zones, some factions in western Maine began asking for zone-level authority to establish regulatory entry-to-exit controls, whereby new licenses are issued proportionally to nonrenewed licenses. Legal entry restrictions were supported most vehemently by lobstermen who had previously set large numbers of traps and had to reduce their gear. They were also advanced by an increase in the size and frequency of trap tangles. By the late 1990s, some tangles in the midcoast area were totaling dozens of traps, heavy enough to require a U.S. Coast Guard vessel and crane to haul them ashore. Tangles raise the risk of personal harm and equipment damage when unexpectedly hauled by hydraulic winches built for single traps. They require time out from fishing and a break in the work flow to disentangle, and they can incur additional costs and conflict if a frustrated fisherman cuts traps loose without informing the owners. Some tangles were probably caused by a few captains setting so many traps that they could not tend them regularly or place them carefully. Some might have been caused by fishermen setting traps on bottom unfamiliar to them, citing zone lines to legitimize pushing the boundaries of customary trap setting and harbor group boundaries. Yet others might have been caused by neophyte recreational fishermen, as noted later. Some fishermen blamed increased tangles on a general decline in courtesy and conscientiousness. Regardless of who was to blame, as tangles became more frequent and severe, industry interest in entry restrictions increased.

Once zone referenda were held on entry–exit ratios and DMR honored those outcomes, several zones began

pressuring to decrease the ratio, so fewer new entrants would be allowed. Entry ratios reified the economic and political power of license holders, capitalized the newly state-sanctioned fishery boundaries, and excluded the influence of other resource-reliant groups from resource-related decision making. A majority of lobster license holders and state managers came to support them, despite decades of rigorous opposition to entry moratoria (Brewer 2011).

Perceived Pressures at the Margins

Other contributors to new industry interest in legal entry controls included lobstermen's perceptions about phenomena at the boundaries of the fishery, including their own exclusion from other fisheries, increased lobstering effort by formerly diversified fishermen, apprenticeship, and recreational lobstering. For many decades, a common annual livelihood rotation was to trap lobster in summer and fall, trap or trawl for shrimp in winter, and tub trawl, gillnet, or otter trawl for groundfish in spring. In some harbors, summer tuna fishing or winter scalloping were common. Groundfish showed signs of serious decline in the early 1990s, partly due to federal loans made available in 1976 to expand the domestic fishery. Under pressure from environmental lawsuits and NOAA, the New England Council limited groundfish permits and allocated fishing time to permit holders who had landed specified volumes in particular years (Brewer 2010, 2011). Because lobster catches had been good in those years and groundfish catches had fallen, many diversified fishermen who had been focused on lobster could not show sufficient groundfish landings to qualify for permits or enough fishing time to be worth the effort of rotating and maintaining groundfish gear and therefore became year-round lobstermen. Some dedicated ground fishermen had not lobstered in many years but returned to lobstering because groundfishing had become highly regulated, less lucrative, and more dangerous, as inshore fish populations were especially depleted. Although few lobstermen wished to deny lobster licenses to lifelong neighbors, ex-groundfishermen came with more offshore fishing experience and brought with them bigger, faster boats; more ambitious business plans; and less respect for customary boundaries.

By the 1990s, entry moratoria emerged as a favored regulatory strategy at NOAA and were a national norm (Brewer 2011). Beginning in the 1980s, they were implemented increasingly in fisheries managed by the New England Council and in some ASMFC-managed lobster areas, including federal waters less than 2 km off the Maine coast. By the 2000s, several federal permits or harvest quota, such as for quahogs, scallops, herring, and groundfish, had been made leasable or saleable. Scallop permits were selling for more than $1 million each, and most fishery access and regulatory control had consolidated to a few large firms fishing out of Massachusetts. Federal lobster permits were made saleable in the early 2000s. When neighboring fishermen were granted exclusive access to their primary target species, inshore lobstermen were emboldened to request the same, and by the late 1990s, entry–exit ratios were perceived by many state lobster license holders as an appropriate defensive or retaliatory move.

One industry-proposed regulatory alternative to an entry moratorium, dating back to the 1970s, was formalized apprenticeship. This approach was intended to slow entry without closing it and mimic customary entry routes through which new fishermen, especially young people, could gradually earn trust and acceptance from longer term fishermen while learning fishing practices, seamanship, local ecology, and harbor-based ethics (Greenlaw 1973; Alden 1995a, 1995b; Alden and Brewer 2000). The proposition of a DMR-administered apprenticeship program gained sufficient industry and governmental support to pass into law with the comanagement zones. Its clear intent was to avoid rigid entry limits, discourage casual entrants, and engender longer term individual commitments to the fishery and its stewardship by requiring two years of crew time prior to full licensure and authorizing DMR to develop structured educational programs on marine ecology, safety, and comanagement participation skills. Nonetheless, apprenticeship was largely superseded by zone-originated entry–exit ratios. Adequate funding was never obtained to implement apprentice education, and the subsequent Commissioner of Marine Resources was less personally committed to the program. At the request of families who resented state oversight of traditional routes to resource access and local knowledge acquisition by their children, the state legislature passed a law exempting young lobstermen from the two-year sterning requirement if they hauled their own traps for three years before turning eighteen. Some lobstermen further perceived the apprenticeship program to encourage entry by people who would not otherwise go lobstering, because an aura of legal legitimacy might diminish customary barriers. Some occasional and aspiring lobstermen did obtain landings documentation or waivers for military service or illness to qualify for full licenses and avoid formal apprenticeship, partly in fear of more restrictive entry limits in the future. Falling

costs and increased accuracy of sonar fathometers and Global Positioning System technologies helped others to bypass customary transmission of mental bathymetric models. Ultimately, it was less state-sponsored apprenticeship per se that facilitated entry limits than public misperceptions of the program's intent and impact and the state's virtual abandonment of the program.

New entry of recreational lobster fishermen further fueled commercial license holders' desire to restrict entry. In the past, anyone with noncommercial lobstering ambitions could request a commercial license, but very few did. When DMR feared legal and political challenges to new entry–exit rules from excluded would-be lobstermen, it created an unlimited number of dedicated recreational licenses, each allowing ten traps. The new perception of legalized access, and record lobster harvests on what inland Mainers occasionally call "the gold coast," attracted an unprecedented number of "recs." Some sold lobsters illegally, and others fished traps for more than one license from a single boat until a new law forbade it. Recreational lobster fishermen were responsible for a very small portion of the trap increase, and their impact on the resource was negligible, but they did introduce unfamiliar buoys, raising industry perceptions of unprecedented and state-protected entry. The majority of recs know little about lobstering and were perceived by commercial lobstermen to flagrantly violate laws, rules, and customs. Some trailer their boats from inland towns and most have no ties to local fishing families. Their behavior is difficult to sanction through customary channels because they have few traps to lose and are not reliant on the lobster resource or harbor-based social and exchange networks.

Through state-initiated decision making about these fluxes at the margins of the fishery, industry thinking shifted from an assumption of ebbs and flows around the edges of slightly overlapping collectivities, whereby persons with ambiguous or partial lobstering histories might possibly establish access, to a calculus of utility maximization and exclusion, assuming some limited number of harvestable lobsters will be distributed among a smaller number of more explicitly and permanently entitled beneficiaries. This trend was further accelerated by a change in DMR's administration of the zones, as detailed next.

Calculus of Exclusion

The public servants and social scientists originally promoting lobster comanagement envisioned extended face-to-face meetings at district and zone levels as participatory civic processes through which communitarian ethics of the fishery might be strengthened and perhaps extended to other fisheries. A few years later, new DMR leadership implemented referenda by mail-in ballot as standard comanagement practice. To prevent excessive administrative burdens on the agency, restrictions were also placed on the frequency of zone referenda. Industry decision making was thereby instrumentalized, removed from the local context of densely iterated conversation, broad negotiation, and social cohesion. Although 2002 survey data indicated that the average lobster license holder attended less than one zone meeting per year and did not speak publicly while there, he was far more willing to mail secret ballots.[11] Thus protected from public scrutiny, it is much easier to vote for measures that advance personal financial goals by restricting or prohibiting fishing by neighbors or kin. As of 2010, five zones issued only one new license for every five unrenewed licenses, and one zone issued one new license for every three unrenewed licenses, calculated annually. New provisions were added to calculate the number of traps tagged per retiring license, so that only a cumulative total of twelve new limited-entry licenses were issued in those zones in 2009 and seventeen in 2010. One zone, with several highly fishery-dependent islands, remains open to new entrants.

Although all zones still allow the entry of young people if they hold a student license for three years before turning eighteen, many have come close to overturning this provision. Some license holders, including young people, have proposed that state lobster licenses be made saleable, which would dramatically raise financial barriers to entry. In Nova Scotia, where lobster permits are saleable, prices ranged from around US$280,000 to $400,000 in 2008. Despite an owner-operator law similar to Maine's, many Nova Scotia permits are now controlled by large corporations such as seafood processors, which lend funds for license purchase and thereby raise permit prices further. Such arrangements would be abhorrent to virtually all Maine fishermen but seem quite possible if recent trajectories of enclosure and privatization continue.

Among license holder strategies to leverage state authority in more tightly bounding fishery access, parameters of zone voting eligibility have been a topic of prolonged debate. At one time, some industry members thought crew should be included (Finlayson 1998). Because crew rarely hold lobster licenses, however, and few can now hope to hold one in the future, they have no formal status in zone comanagement and rarely attend zone meetings. Few resource-dependent

nonfishermen, such as fishermen's wives, other family members, or other coastal residents, feel comfortable attending lobster zone meetings. Definitions of part-time and full-time lobstermen have plagued the zones since their inception, although less legalistic conflicts between full- and part-timers also predate the zones. Many captains required to scale down their operations to meet zone trap limits blamed new entrants and smaller scale lobstermen, who presumably supported trap limits and could now benefit by catching proportionately more lobsters. Some self-identified full-timers describe part-timers as "cherry pickers" with income alternatives, who only fish in good weather when catches are more predictable, thereby disadvantaging fishing-dependent families. Some advocate that full voting rights require proof of primarily fishing income, such as income tax records. In reality, smaller scale lobstermen include not only people with other jobs but also younger and older fishermen who are building up or scaling down their businesses and might be highly fishery dependent. Even in 2002, long after fiberglass and wire replaced wooden boats and traps and synthetic rope replaced fiber, the mean lobster license holder hauled traps only eight months of the year, spending some winter and spring months in tasks such as maintaining gear and boats and resting injured backs.

In 2008, a DMR survey found that 49 to 61 percent of license holders in the five westernmost zones supported a license freeze, whereas the level of support was 36 and 39 percent in the two easternmost zones. The freeze proposal found greater support among larger scale fishermen (Maine Department of Marine Resources 2008). Although a formal freeze vote had not yet been held by 2011, with lobster prices depressed due to troubled national and international markets, and with local employment alternatives in services and construction dramatically reduced, rhetoric favoring an entry moratorium was gaining ground in many harbors. This sentiment belied continued record lobster landings, which in past times might have ameliorated economic woes among kin and neighbors.

The cumulative changes in procedural rules by which decisions are made about the distribution of resource benefits, imposing state law over local custom, have wrought subtler effects on the individual rationalities of license holders. The lobster zones unintentionally displaced local accountability and embedded fishing identities with a more legalistic and profit-focused orientation, replete with discourses of exclusion and individual entitlement. As abstracted and standardized identifiers, letters designating membership in zones A though G help erode the centrality of harbor and kin. Family names once dominated the identities of lobstermen and other coastal residents, serving as lifelong social markers. One lobsterman meeting another from elsewhere in the state would often self-identify by saying, "I fish out of [such-and-such] harbor." This generally conjured in the other's mind some host of locally particular fishing opportunities and constraints, whether vaguely deduced from prior conversations or largely imagined but often voiced in a tentative stream of questions answerable only by an intimate of that harbor. Now, lobstermen are as often heard to self-identify as, "I fish in zone D," or, "I'm in zone E." The associated opportunities and constraints, intended by the speaker and perceived by the listener, are inherently more generalized in space and time, more publicly known, and mainly revolve around regulatory matters such as trap limits and entry–exit ratios.

Many longtime industry observers argue that the zones enabled trap limits, and trap limits have in turn conserved lobsters, sustaining the industry into the future. License holders also frame entry–exit ratios with resource conservation rhetoric. It is not clear that the lobster population was ever threatened, however. Although few lobsters escape capture long enough to reproduce more than once, making for precarious population dynamics, both lobstermen and scientists observe that the number of lobsters on bottom has steadily increased over the last decade or two (Correia et al. 2006). A more rapid increase in trap numbers might well have occurred without the zones and associated trap limits, perhaps triggering a lobster population decline or crash. Nonetheless, the conservation efficacy of trap limits is unclear. Maine's state lobster biologist has repeatedly said that trap limits might not limit overall fishing effort significantly unless reduced to about 300 per boat, half what most zones permit. At that level, hauling traps more often might not compensate for lower trap numbers. Further, the quantities of bait provided to undersize lobsters by large numbers of traps, and the use of more bait per trap than in the past, might stimulate lobster population growth (Saila, Nixon, and Oviatt 2002). Any trap limit likely increases overall industry efficiency and net profits for some individuals, however, increasing the ratio of landings volume to fishing inputs such as labor, fuel, bait, boat size, and gear. Contributions from large offshore lobsters, protected from harvest and producing more vigorous offspring in colder waters, could also be significant. Water temperature might be a dominant lobster population driver, but ideal temperature ranges vary across different life stages

and have poorly understood impacts on growth rates and disease (Cowan et al. 2007). More fundamentally, the desirability of a lobster-dominated benthos is rarely questioned, except among other fishermen whose target species are speared as bait by lobstermen when accidentally trapped or who now profess an inability to avoid entangling their gear with traps. With single fishery specialization, the industry loses adaptive capacity to generate integrative ecological knowledge and to build broad-based networks and coalitions from positions of experiential understanding, mutual respect, and shared interest in stewarding a diverse marine environment.

Further, once fishery access becomes a limited commodity, saleable or not, it accrues economic value. License holders are now reluctant to give up their legal access rights, even as they ease into retirement. They know they could never regain access after giving up a license, and a few wonder if license sale or lease might be legalized in the future. License holders seem more comfortable investing in larger boats and other long-term expansions, as they can be more confident of facing few new fishing competitors. Larger boats can fish farther offshore, catching more large, highly fecund lobsters, with unknown impacts on lobster populations at larger scales via distribution of larvae by coastal currents. More focused political organization has also emerged within the discretely bounded group of license holders to increase control of access rights and rules. This political wedge has mobilized to oppose state or federal efforts to impose more conservative harvest regulations, to protect industry access to particular fishing grounds in gear conflicts with other fisheries, and to restrict the issue of new licenses. It has polarized conflicts with other fisheries, especially groundfish trawlers. Hence, legal fixing of group boundaries once intended to keep people out and conserve the fishery now keeps people in. It coalesces industry interests into a more unified and capitalized political block, one able to claim a new political identity authorized at a higher jurisdictional level. This heightened capacity for mobilization could ultimately increase the risk of lobster population decline or other socioecological costs, as DMR personnel and other observers privately voice concern that the industry has achieved unprecedented political leverage.

Conclusion

Clear user group boundaries might be necessary for conservation of common property resources, as urged by Ostrom and others, but in policy application the extent to which public deliberation informs boundary parameters, permeability, and opportunities for boundary adjustments might deserve similar emphasis. Prioritization of boundary clarity without deliberation among prospective and marginal resource beneficiaries might help sustain a target resource per se but simultaneously encourage narrower distribution of resource benefits among a smaller collectivity and shift social dynamics and ecological incentives toward less equitable outcomes. Clearer lines between winners and losers might not be entirely desirable from a more broadly considered perspective, especially if they are fixed to prevent adaptive adjustments and privilege a select few. Boundaries that initially appear overlapping, fuzzy, ambiguous, or unclear can reflect persistent negotiations among competing commitments and values and permit individuals to subtly and iteratively reposition themselves in relation to ethical dilemmas. Flux across such boundaries can also be speeded or slowed accordingly. By contrast, clear and discrete boundaries imposed through statist legal mechanisms can isolate resource user interests from a wider range of social engagements and corresponding ethical deliberations.

Customary institutions around user group boundaries in Maine's lobster fishery enabled routine consideration of the balance between communitarian and individual interests in the course of daily decisions about who is allowed to fish, and where. Flexible boundaries embedded diversified livelihoods and multivalent identities. Incremental change in group membership over space and time was presumed. New legal boundaries, supported by converging interests of fishery management agencies and boat captains, fixed fishing areas and fishing groups by creating discretely bounded comanagement zones and increasingly exclusive license holder entry–exit ratios. This process was hastened by trap limits and tangles, increased law enforcement, access restrictions and resource declines in other fisheries, failure of formalized apprenticeship, recreational licenses, and mail-in referendum voting. Excepting trap tangles and apprenticeship failure, these drivers are linked to statist policy interventions. They entailed, in implementation and often in conception, unprecedented state administrative or enforcement presence.

Comanagement has emboldened lobster license holders to consolidate resource access and political power. Statist bounding of fishing areas and groups was largely prompted by federal and state agency preferences, but the cause was strategically advanced by lobster boat captains, who leveraged new jurisdictional resources at higher levels of governmental organization.

Prospects for access to fisheries and resource use decision making among non-license-holding members of fishing-dependent coastal communities diminished. One might argue that the zones promote rule-making transparency and expunge nepotism, but they also replaced direct discursive participation in local decision making with the more passive, instrumental mode of mail-in ballots. With this, a modernist conception of individual politico-economic rights tipped the balance away from communitarian ideals. Not only did the distribution of resource benefits consolidate, but distributive and procedural norms subtly shifted to accommodate the new concentration of resource benefits and the new comanagement decision processes by which beneficiaries accomplished the consolidation.

Although originators of Maine's lobster comanagement policy conceived of it as a way to resist more aggressively statist policies and bolster a customary commons regime, the national trend toward state-sanctioned resource privatization entrained locally emergent rules. The hardening of previously adaptive sociospatial boundaries played a significant role in this conversion, raising questions about the advisability of discrete boundaries for those who might advocate common property or comanagement solutions to resource management challenges. Clear boundaries need not preclude flexibility in theory, but when state preferences for administrative simplicity and regulatory stasis converge with the preference of capital to concentrate resource access, broad, vigorous, and persistent debate might be necessary to prevent boundary impermeability from following closely after clarity.

With resource management agencies increasingly wary of lawsuits and subsequent rulings by courts more comfortable with statistical resource models than with the messy empiricism of more socioecologically nuanced understanding, public administrators at all levels of government frequently make previously permeable and flexible boundaries fixed and rigid. This is true of both physical and user group boundaries, as fixity can simplify mathematical calculations of sustainable harvest levels, at least on paper. From a geographic perspective, it is apparent that a cascade of effects and feedback loops can result, in participatory processes and norms, resource-dependent identities, relationships between previously overlapping groups, diversified social networks for information sharing and collective action, and biophysical goods and services. Resilient commons regimes might instead require boundaries that are multivalent: fixed and rigid in some times and places but permeable and flexible in others, with such designations open to repeated discussion. The prospect of operationalizing such a framework in formal policy and administrative terms is daunting, at least in the context of a large representative democracy. To deny the inevitable complexity of institutional dynamics, however, can ultimately move questions of equity and sustainability beyond the purview of public scrutiny and accountability.

Taken in this light, Ostrom's Nobel Prize not only recognizes a fellow traveler but encourages geographers to help muddy the boots of other disciplines in more sociomaterial ontologies. This article has focused on local-scale implications of a single case where the balance between individual and collective interests shifts with the making and remaking of boundaries around groups of common pool resource users and in deliberation about the distribution of resource benefits. Similar questions and other cases await consideration at national and global scales, many with more profound policy implications. The very notion of a communitarian ethos raises questions about where the boundaries of key collectives fall and who decides; prospective changes in communal boundaries over time, space, and levels of organization; and the status of individuals and interests subsisting at the margins. These issues might apply to virtually any commons, including the most pressing of global environmental concerns. Our discipline hides its light under a bushel if we do not contribute our unique strengths to the exploration of these questions and others raised by the movement of the commons literature into new empirical and theoretical territories.

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Notes

1. Most Maine women who fish commercially identify themselves as "fishermen." The vast majority of lobster license holders are male (97 percent in a 2002 random mail survey, $n = 29$).
2. $N = 12$, $SD = 3.2$, CI = ± 0.3, $p < 0.1$.
3. $N = 29$, $SD = 1.8$, CI = ± 0.6, $p < 0.1$.
4. Groundfishermen pursue bottom-dwelling species such as cod, haddock, and flounders.
5. $N = 18$, $SD = 1.3$, CI = ± 0.3, $p < 0.1$.
6. $N = 18$, $SD = 1.5$, CI = ± 0.6, $p < 0.1$.
7. In the two surveys of 2002 license holders and the survey of 2005 permit holders, the lobster fishery also included crabs, and the groundfishery included several species, so species counts would be much higher than fishery counts, especially for those involved in groundfishing.
8. *Entry* is a term of art in fishery management. It is adapted in this article to describe both customary and regulatory entry into the fishery. Lobstermen themselves simply talk of "going" lobstering, including to describe any initial vocational decision "to go." Only rarely will they speak of whether or not other lobstermen will "let" someone "go" lobstering.
9. *Down east* is a relative term once used along the Eastern seaboard, originally referring to downwind sail transit with prevailing southwesterlies. When used to specify a region of Maine from a statewide perspective, present usage most often refers to the eastern quarter or third of the state coastline.
10. $N = 29$.
11. $N = 29$.

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