The global fisheries crisis has made its way into the mainstream consciousness. Scientists, economists, fishermen, fisheries managers, environmental lawyers, and policy makers are joining forces in the search for sustainable fisheries management techniques that will more optimally align species’ ecological characteristics with economic circumstances, legal constraints, and social and political landscapes. In this Article, I discuss the potential use of a spatial, property rights-based fisheries management technique called “territorial use rights in fisheries,” or “TURFs.” I consider how notions of marine property rights may affect the implementation of TURFs, with a focus on California. I analyze several possible avenues for TURF implementation in California, including fee simple ownership, submerged lands leases, the Marine Life Protection Act, and the Marine Life Management Act. I conclude that many of the policy rationales undergirding existing California law and regulation support the general idea of TURF management. However, they do not expressly provide for TURF implementation, and there exists no straightforward path to instituting TURFs in California. If California chooses to move forward with TURFs as a fisheries management tool, it may be necessary for the state to craft TURF-specific regulations. I close my discussion with a description of various ecological, economic, social, and political considerations that California policymakers and fisheries managers might take into account in crafting TURF policy.
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INTRODUCTION

News of the global fisheries crisis has made its way from the pages of scientific journals to the public at large. Newspaper headlines decry dramatic declines in populations of tuna, swordfish, and other large predatory fish, and warn of the possible collapse of all fished species by the year 2048. The recent film documentary The End of the Line takes its

2. See, e.g., Troubled Seas, N.Y. TIMES, Nov. 14, 2006, at A26; Hook, Line and Extinction; Global Study Warns Seafood Could Be Gone in 40 Years, GRAND RAPIDS PRESS, Nov. 3, 2006,
viewers on a visual journey of our overfished seas and encourages consumers to purchase sustainable seafood. In the midst of this media maelstrom, scientists continue to search for solutions to the fisheries crisis. Scientists are working actively with resource managers and fishermen to develop a fisheries management regime that will more optimally align species’ ecological characteristics with economic circumstances, legal constraints, and social and political landscapes.

United States fisheries managers traditionally have relied upon a combination of techniques to manage fisheries, including restrictions on season length, gear type, fishing grounds (such as spatial restrictions and area closures), the number of fishermen allowed to fish, and the total allowable catch (TAC). In fisheries with a “hard TAC,” the fishery is closed once the TAC has been harvested for a given species in a given fishing season. A fishery’s impending closure often leads fishermen to

at A3. These articles refer to Boris Worm et al., Impacts of Biodiversity Loss on Ocean Ecosystem Services, 314 SCIENCE 787, 790 (2006).


4. For example, CALOBOSTER is a collaborative fishery research project whose mission is to “advance[] research and education partnerships between fishermen, scientists, resource agencies, and environmental groups dedicated to generating democratic forms of resource management.” CALOBOSTER, http://www.calobster.org (last visited Jan 6, 2011).


6. NOAA defines TAC as “the total regulated catch from a stock in a given time period, usually a year.” Definition of Fisheries Technical Terms, NOAA NORTHEAST FISHERIES SCIENCE CENTER, http://www.nefsc.noaa.gov/techniques/tech_terms.html#t18 (last visited Jan. 6, 2010). TACs that, when reached, result in the closure of a fishery are called “hard TACs.” See 50 C.F.R. § 648.87(b)(vi) (stating that for fisheries of the northeastern United States, “[o]nce a hard TAC allocated to a Sector is projected to be exceeded, Sector operations will be terminated for the remainder of the fishing year”); 50 C.F.R. § 679.20(d)(2) (setting hard TACs for Gulf of Alaska and Bering Sea/Aleutian Island commercial groundfish fisheries). For an example of NOAA closing a fishery when the TAC is reached, see NAT’L MARINE FISHERIES SERV. ALASKA REG’L OFF., NOAA FISHERIES, INFORMATION BULLETIN 05-40, NMFS PROHIBITS RETENTION OF ALASKA PLAICE IN THE BERING SEA AND ALEUTIAN ISLANDS (May 6, 2005) (closing the plaice fishery “because the Alaska plaice total allowable catch in the BSAI has been reached”); see also PAMELA B. BAKER ET AL., MANAGING THE GULF OF MEXICO COMMERCIAL RED SNAPPER FISHERY 11 (1998), available at m.edf.org/documents/550_
embark upon a “race to fish,” as each fisherman strives to catch as many fish as possible before the season ends. This race to fish is not only unsafe for fishermen, who may defy hazardous weather conditions to take part in the derby, it can also lead to overcapacity in fishing fleets (otherwise known as overcapitalization) and overexploitation of wild fish stocks. When fishermen are engaged in the race-to-fish frenzy, they may exceed the seasonal TAC and utilize fishing practices that damage or destroy marine habitat. The combination of the race to fish, rampant

RedSnapper.PDF ("Under derby conditions, red snapper fishers are encouraged to harvest fish as quickly as possible to maximize their share of the quota before it is filled and the season closed."). The term “fishery,” as used in this article, is context-specific and can mean either “(a) One or more populations of marine fish or marine plants that may be treated as a unit for purposes of conservation and management and that are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics,” or “(b) [f]ishing for or harvesting of the populations described in (a).” CAL. FISH & GAME CODE § 94 (West 2009).


8. Overcapitalization occurs when “harvesting capacity . . . increase[s] beyond that which will be required to take the TAC.” Dominique Gréboval & Gordon Munro, Overcapitalization and Excess Capacity in World Fisheries: Underlying Economics and Methods of Control, in FAO FISHERIES TECH. PAPER 386, MANAGING FISHING CAPACITY: SELECTED PAPERS ON UNDERLYING CONCEPTS AND ISSUES § 2.3 (1999), available at http://www.fao.org/DOCREP/003/X2250E/x2250e03.htm.

9. See David R. Griffith, The Ecological Implications of Individual Fishing Quotas and Harvest Cooperatives, 6 FRONTIERS IN ECOLOGY & ENV'T 191, 191–192, 194 (2008) (discussing safety implications and habitat implications of the race to fish); see also Press Release, U.S. Dep’t of Labor, Bureau of Labor Statistics, Nat’l Census of Fatal Occupational Injuries in 2009 – Preliminary Results (August 19, 2010), available at http://www.bls.gov/news.release/pdf/cfoi.pdf (finding that fishers and other fishery workers had the highest fatal work injury rate in 2009); Fishing Safety Fact Sheet, ENVTL. DEF. FUND, available at http://www.edf.org/documents/11299_fishing-safety-factsheet.pdf (citing the above census for the fact that “[i]n 2009, fishing (and fishing-related jobs) was the deadliest occupation in the United States, with the highest fatality rate (200) per 100,000 full-time equivalent workers—approximately 60 times the average fatality rate among U.S. workers,” and stating further that the “‘race for fish’ created a negative trend in safety as captains became more willing to risk crew safety by fishing in adverse weather and water conditions in order to maximize catches during limited days at sea. Specifically, it led to a 20 percent decline in safety indices in select U.S. and British Columbia commercial fisheries”)


10. See Costello et al., supra note 7, at 1679 (stating that the race to fish “can lead to poor stewardship and lobbying for ever-larger harvest quotas, creating a spiral of reduced stocks, excessive harvests, and eventual collapse”); SETH MACINKO & DANIEL W. BROMLEY, WHO OWNS AMERICA’S FISHERIES 15 (2002) (stating that “[u]nder TAC allocations, managers face the difficult task of trying to set the length of the fishing season so that the catch does not exceed the TAC. In a derby, the season may be compressed to a matter of days, if not hours, and the fleet can easily overrun the TAC before managers can prohibit further catches”); Paul K. Dayton et al., Environmental Effects of Marine Fishing, 5 AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS 205 (1995) (discussing habitat impacts from fishing generally); id. at 212 (stating that “each of the . . . habitats that were destroyed by trawling probably represent very important nursery areas for many species, often including some of the target species of fisheries”); S.J. Turner et al., Fishing Impacts and the Degradation or Loss of Habitat
overcapitalization, and government subsidization of the fishing industry can lead to the commercial extinction of fish species and staggering economic waste.

The race to fish is a manifestation of the tragedy of the commons, a phenomenon often seen with common pool resources like wild fisheries. The tragedy of the commons occurs when a resource—in this case fish—is exploited by numerous, self-interested individuals. Since each individual fisherman obtains all the benefits of his intensive fishing behavior but shoulders only a fraction of the costs (which are borne instead by the group at large), he acts in a way that, along with all the other individual fishermen's similar actions, leads to resource overexploitation. Given the ubiquity with which the tragedy of the commons manifests in wild fisheries, it comes as no surprise that many important global fish stocks are declining. The key to reversing this trend is to develop fishery management techniques that will prevent fishermen from engaging in destructive and ultimately self-defeating behavior.

11. See generally Greboval & Munro, supra note 8, for a comprehensive overview of the problem of and reasons for fishery overcapitalization.


16. See Hardin, supra note 14, at 1244; see also Sinden, supra note 15, at 545-56.

17. See generally Worm et al., supra note 2 (describing fisheries declines).
In his seminal article *The Tragedy of the Commons*, Garrett Hardin identified two primary techniques with which to solve the tragedy: assigning property rights in the commons, and government regulation. To date, the second of these solutions has proved less than successful in the fisheries management context when used in isolation. While governmental regulation undoubtedly plays, and will continue to play, a critical role in fisheries management, many scientists, economists, and fisheries managers are now recommending the incorporation of property rights into the fisheries management framework.

Property-rights based approaches to fisheries management collectively are called “limited access privilege programs,” or “LAPPs.” Globally, the most commonly-used LAPP is the individual fishing quota (IFQ).

Under an IFQ program, an individual fisherman or group of

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18. Hardin, *supra* note 14. From a legal perspective, what Hardin was analyzing was not a "common" property regime but rather an "open access" regime, that is, with a regime in which no property rights exist. See Rieser, *supra* note 15, at 399; Sinden, *supra* note 16, at 547 ("The phrase 'the commons' tends to conflate two distinct regimes: common ownership regimes and open access regimes. The former is a property rights system—group members jointly hold property rights in the resource as against the rest of the world. Thus, while they cannot exclude each other from the resource, they can exclude outsiders. An open-access regime, on the other hand, is an absence of property rights."). As discussed in Part I.A., *infra*, fisheries management in the United States today falls under a common property regime.


20. See generally Myers & Worm, *supra* note 1 (describing fisheries declines that have occurred to date under past and current governmental regulation); Worm et al., *supra* note 2 (same); Costello et al., *supra* note 7 (same).

21. See Wyman, *supra* note 5, at 527 ("Economists . . . have tended to prescribe private property rights for wild fisheries, such as territorial use rights, or proxies for private rights, such as cooperatives or [individual transferable quotas (ITQs)]."); Shankar Aswani, *Customary Sea Tenure in Oceania as a Case of Rights-Based Fishery Management: Does it Work?*, 15 REV. FISH BIOLOGY & FISHERIES 285, 286 (2005) ("Since the 1970s, fishery scientists and resource economists have discovered that rights-based fishery management schemes such as Individual Transferable Quotas (ITQs), Territorial Use Rights in Fishing (TURFs), and Community Development Quotas (CDQs) can be means for re-establishing economic efficiency in open-access managed fisheries. . . . Today, proponents argue that rights-based fishery management, particularly when it involves ITQs, is conducive to resource conservation, capacity reduction, improved product quality, and the maximization of economic efficiency . . . "); Gail Osherenko, *New Discourses on Ocean Governance: Understanding Property Rights and the Public Trust*, 21 J. ENVTL. L. & LITIG. 317, 325 (2006) ("One approach to problems of overexploitation is privatization of resources, and this solution is frequently promoted for marine resources. For example, the National Center for Policy Analysis, among others, recommends replacement of current regulatory (command-and-control) approaches to fishery management with a system of property rights."); Rod Fujita & Kate Bonzon, *Rights-Based Fisheries Management: An Environmentalist Perspective*, 15 REV. FISH BIOLOGY & FISHERIES 309 (2005) (discussing the intersection between rights-based fisheries management and incentive structures). But see Sinden, *supra* note 15, at 538 ("It's only under a very limited and idealized set of circumstances that the delineation of property rights and/or the creation of markets can actually solve the tragedy.").

fishermen is guaranteed a yearly percentage of the TAC for a given species. Other promising LAPP techniques include territorial use rights in fisheries (TURFs), which take a spatially-explicit approach to fisheries management, and fishery cooperatives. This paper considers whether and how TURFs, a spatially-based LAPP that is in many ways similar to the shellfish bed leases already in place in many coastal states, may be designed and implemented in California waters.

I begin by providing a general overview of marine property rights, and then turn my attention to the ways in which notions of marine property rights may affect the implementation of TURFs in U.S. waters. I focus my analysis on possible avenues for TURF implementation in California, including fee simple ownership, submerged lands leases, the Marine Life Protection Act (MLPA), and the Marine Life Management Act (MLMA). I conclude that, in California, fee simple TURF ownership may be an option in limited circumstances; there exists a gap in California’s submerged lands leasing law such that TURFs do not fit seamlessly into the state’s current legal framework; and the MLPA and MLMA provide conceptual support for TURFs but may not be ideal avenues for TURF implementation for reasons of tenure and security. I conclude with a summary of my findings and offer suggestions for crafting TURF policy in California.

I. LEGAL PERSPECTIVE

One of the primary questions decision makers must ask themselves when designing a new fisheries management regime is whether the program comports with relevant law. Considering the legal landscape at which individual transferable quotas (ITQs) are the most common.”); Kevin J. Lynch, Student Article, Application of the Public Trust Doctrine to Modern Fishery Management Regimes, 15 N.Y.U. ENVTL. L.J. 285, 304 (2007) (“Today, the most commonly used LAPPs include catch shares such as Individual Fishing Quotas (IFQs) (as they are known in the U.S.) and Individual Transferable Quotas (ITQs) (as they are known in places like New Zealand, Australia, Canada, and Iceland.”).


24. See generally Osherenko, supra note 21, at 319–20 (“Before the United States approves a new generation of stationary ocean and seabed uses, we should have a clear understanding of the extent and limits of Congressional authority in the oceans.”).


27. See, e.g., D.L. BURKE, FAO, MANAGEMENT INFRASTRUCTURE FOR RIGHTS-BASED FISHING 59, available at ftp://ftp.fao.org/docrep/fao/009/x7579e/x7579e02.pdf (last visited Oct. 7, 2010) (stating that fisheries policy making “must articulate the objectives for management and secure consensus on those objectives from all stakeholders with an expressed interest in the protection or use of resources. It must also develop the legal base (legislation and regulations) needed to pursue the objectives.”).
the outset will help fisheries managers craft ecologically- and economically-sound policy better able to withstand legal challenges to those regimes. While this would seem a straightforward task, marine property rights constitute a somewhat murky and complex area of law. As a prelude to a TURF-specific analysis, I first consider the general nature of marine property rights in the United States.

A. Property Rights in a Nutshell

Property rights can be thought of as a "bundle of sticks," with each stick representing one particular right that vests in the property owner. The four main sticks in the bundle include the rights of use, exclusion, possession, and disposition. The use (or "usufructuary") right allows an individual to utilize property for a particular purpose. Use rights are often spatially or temporally restricted. The exclusionary right allows an individual to prevent others from using the property. Possessory (or proprietary) rights allow an individual to "keep, reinvest or apportion the value" of the property. Finally, disposition rights allow an individual to alienate (sell, exchange, or transfer) his interest in the property. An individual can hold one, some combination, or all of these rights. If an individual possesses all of the sticks in the bundle, he is said to own the

28. See generally Rieser, supra note 14, at 395-96 ("The difficulties encountered in the attempt to introduce private property rights into the fisheries commons suggest the need for a better integration of economics, political theory, and property law in environmental law and policy.").


30. See Osherenko, supra note 21, at 331; Alison Rieser, Property Rights and Ecosystem Management in U.S. Fisheries: Contracting for the Commons?, 24 ECOLOGY L.Q. 813, 819 (1997). Further elaborating on the property rights concept, resource economist Anthony D. Scott describes various characteristics of property rights, including "quality of title, exclusivity of use, duration of the property right, divisibility and transferability." Id. at 819 n.27 (citing Anthony D. Scott, Conceptual Origins of Rights-Based Fishing, in RIGHTS BASED FISHING 11-38 (P.A. Neher et al. eds., 1988). A "perfect" property right encompasses all of these features, and is said to be "fully exclusive, secure, permanent and tradable." Ragnar Arnason, Conflicting Uses of Marine Resources: Can ITQs Promote an Efficient Solution?, 53 AUSTRALIAN J. AGRIC. RESOURCE ECON. 145, 151 (2009).

31. See Osherenko, supra note 21, at 332 ("Use (usufructuary) rights entitle the holder to use a particular property for specific (usually limited) purposes (such as extraction of oil, gas, or minerals; agriculture; aquaculture; and fishing."); Rieser, supra note 30, at 820 ("A usufruct is a right to use and enjoy the profits and advantages of something belonging to another.").

32. See Osherenko, supra note 21, at 332 ("Use rights may be limited to a particular time (five-year lease or seasonal fishing license).").

33. See id. ("Exclusionary rights entitle the holder to exclude others from using or trespassing on the property, and set conditions for others to use the property.").

34. See id. at 332 fig.2.

35. Osherenko, supra note 21, at 332-33 ("Disposition rights entitle the holder to dispose of, or in legal terminology, 'alienate' the property"); id. at 332 fig.2.
property in fee simple. Fee simple ownership is common in United States real estate transactions and is the situation we typically think of as "private property." As a general rule, marine resources are not "owned" in the traditional sense (that is, in fee simple). Rather, they fall within a class of property known as "common property." Common property includes resources that "remain common to all the citizens, who take of them and use them, each according to his necessities, and according to the laws which regulate their use." These resources, which include "the air, the running water, the sea, the fish, and the wild beasts," are "to be held, protected, and regulated for the common use and benefit."

Common property must be distinguished from two similar classes of property: open access and public property. Open access exists in the rare situation where no identifiable entity holds rights to the property in question. While the oceans historically were regarded as open access, they are now more accurately described as global common property. Public property exists when the government owns the full bundle of sticks, as, for example, with state or federal parklands. Because the oceans and marine resources are common property rather than public property, the government cannot sell them freely as it can with its terrestrial landholdings.

36. See Definitions, USLEGAL, http://definitions.uslegal.com/r/real-estate-fee-simple/ (last visited Jan. 7, 2010) (defining "fee simple" as "absolute title to land, free of any conditions, limitations, restrictions, or other claims against the title . . . ha[ving] a virtually indefinite duration. . . . It . . . is the most complete ownership interest one can have in real property . . . .").

37. See id. (stating that fee simple ownership "is the most common way real estate is owned in common law countries").


39. Id.

40. See Osherenko, supra note 21, at 327 ("Nul property, with access open to all (though often confused with common property), seldom occurs in practice today.").

41. See id. ("Historically . . . the exclusive economic zone (EEZ) and high seas . . . were nul property."); id. at 328 ("Under international law, title to or ownership of the oceans belongs to a wider community: oceans and their resources have been treated as common property."); see also discussion infra Part I.B.

42. See id. at 327.

43. See, e.g., Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387 (1892) (discussing restrictions on alienation); Idaho v. Coeur d'Alene Tribe, 521 U.S. 261, 284-85 (1997) (noting that "American law adopted as its own much of the English law respecting navigable waters, including the principle that submerged lands are held for a public purpose," and referring to Illinois Central as an example where "[a]n attempted transfer was beyond the authority of the legislature since it amounted to abdication of its obligation to regulate, improve, and secure submerged lands for the benefit of every individual"); State ex rel. v. Super. Ct. of Sacramento Cnty., 900 P.2d 648, 661 (Cal. 1995) (discussing the "public trust doctrine and the inalienability of trust lands"). As Gail Osherenko, a law and policy research scientist at the University of California, Santa Barbara's Marine Science Institute, explains, "[i]f the seas were purely public property, then it would follow that Congress could also convert the seas to private property. But the oceans, seabed, subsurface, and living resources are common property subject to the public trust responsibility of the government or governments that exercise regulatory authority over them."
over the seas has implications for the implementation of TURFs in U.S. waters; government regulators cannot provide to fishermen a greater bundle of rights than the government itself holds.44

B. International and U.S. Law

The international community considers marine resources to be global common property, governed by rules of jurisdiction and sovereignty as opposed to true ownership.45 For example, the 1982 United Nations Convention on the Law of the Sea (UNCLOS) provides a coastal state with “sovereign rights for the purpose of exploring and exploiting, conserving and managing the [ocean’s] natural resources.”46 While granting jurisdiction to nation states, UNCLOS stops short of providing that coastal states own marine resources.

While the United States has yet to ratify UNCLOS, it has tended to adhere to the customary international ocean law principles of jurisdiction and sovereignty, both historically and into the present.47 In the 1842 case

Osherenko, supra note 21, at 330; see also discussion of public trust doctrine infra Parts I.C, II.B.2.a.ii.
44. See Osherenko, supra note 21, at 334.
45. See id. at 336.
46. United Nations Convention on the Law of the Sea, pt. V, art. 56(1)(a), Dec. 10, 1982, 1833 U.N.T.S. 3 [hereinafter UNCLOS], available at http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf; see also Osherenko, supra note 21, at 339-40 (discussing this section of UNCLOS). UNCLOS further limits coastal states’ ability to exert complete, unilateral control over the marine realm by requiring that states “protect and preserve the marine environment.” UNCLOS, supra, pt. XII, art. 192; see also Osherenko, supra note 21, at 342 (mentioning coastal states’ obligation to conserve resources). This conservation obligation is reiterated in UNCLOS specifically with respect to natural resource exploitation. See UNCLOS, supra, pt. XII, art. 193.
47. See, e.g., United States v. Alaska, 503 U.S. 569, 588 n.10 (1992) (pulling from the United States’ brief the statement that “the United States has not ratified [the UNCLOS], but has recognized that its baseline provisions reflect customary international law”); United States v. Royal Caribbean Cruises, Ltd., 24 F. Supp. 2d 155, 159 (D.P.R. 1997) (“Although [UNCLOS] is currently pending ratification before the Senate, it nevertheless carries the weight of law from the date of its submission by the President to the Senate... The submission of the treaty to the international community the United States’ ultimate intention to be bound by the pact. Pending a treaty’s rejection or ratification by the Senate under Article 18 of the Vienna Convention, the United States is bound to uphold the purpose and principles of the agreement to which the executive branch has tentatively made the United States a party.”); Mayaguezanos por la Salud y el Ambiente v. United States, 198 F.3d 297, 305 n.14 (1st Cir. 1999) (stating that while UNCLOS “has been signed by the President... it has not yet been ratified by the Senate.” However, “the United States ‘is obliged to refrain from acts that would defeat the object and purpose of the agreement.’”); Mansel v. Baker Hughes, Inc., 203 F. Supp. 2d 745, 746 n.1 (S.D. Tex. 2002) (same); R.M.S. Titanic, Inc. v. Haver, 171 F.3d 943, 965 n.3 (4th Cir. 1999) (“Even though the United States has not yet ratified [UNCLOS],... it generally recognizes th[e] 200-mile economic zone” recognized under the treaty); see also Jon M. Van Dyke, The 1982 United Nations Convention on the Law of the Sea, in OCEAN AND COASTAL LAW AND POLICY 381 (Donald C. Baur et al. eds., 2008) (“[T]he United States adheres to almost all provisions of [UNCLOS] and considers most provisions to be a reflection of binding customary international law.”).
of Martin v. Lessee of Waddell, the Supreme Court rejected the defendant's argument that a parcel of submerged land had been converted to private property, finding that it remained common property subject to a public trust.\textsuperscript{48} Similarly, in United States v. California, the Court held that the federal government had "paramount rights" to coastal waters and submerged resources,\textsuperscript{49} but did not go so far as to hold—as the federal government had argued—that the United States had fee simple ownership of this property.\textsuperscript{50} The 1945 Truman Proclamation provided for U.S. "jurisdiction and control" over—but not ownership of—its coastal continental shelf resources.\textsuperscript{51} More recently, in the 1992 case of United States v. Alaska, the Supreme Court noted that while \textquotedblleft the

\begin{itemize}
\item \textsuperscript{48} Martin v. Lessee of Waddell, 41 U.S. 367, 406-09, 411, 413-14 (1842); see also id. at 419 (Thompson, J., dissenting) ("A majority of the Court seem to have adopted the doctrine of Arnold v. Mundy, . . . in which it is held, that navigable rivers, where the tide ebbs and flows, and the ports, bays, and coasts of the sea, including both the waters and the land under the water, are common to the people of New Jersey; and that . . . all the rights . . . passed to the duke as governor of the province, exercising the royal authority, and not as the proprietor of the soil; but that he held them as trustee for the benefit of all settlers in the province.") (internal citations omitted). For more on the public trust, see infra Part I.C.
\item \textsuperscript{49} United States v. California, 332 U.S. 19, 38-39 (1947). This holding was reiterated several years later in United States v. Louisiana, 339 U.S. 699, 705-06 (1950) (finding that the ocean and the resources of the soil under that area are "in the domain of the Nation rather than that of the separate States") and United States v. Texas, 339 U.S. 707 (1950) (same). A 1954 case temporarily confused the issue when the Supreme Court held that, pursuant to the Constitution's Property Clause, the United States owned and could alienate marine subsoil and the seabed. See Alabama v. Texas, 347 U.S. 272, 273 (1954). The Court returned to its original position several decades later in United States v. Maine, where it reiterated that seabed allocation cases "do[] not turn on title or ownership in the conventional sense." 420 U.S. 515, 520-21 (1975).
\item \textsuperscript{50} See United States v. California, 332 U.S. 19, 22 (1947) ("The complaint alleges that the United States 'is the owner in fee simple of . . . the lands, minerals, and other things of value underlying the Pacific Ocean."). Justice Black commented extensively on the rationale for this distinction, stating that [t]here is no substantial support in history for the idea that [settlers] wanted or claimed a right to block off the ocean's bottom for private ownership and use in the extraction of its wealth." Id. at 32-33. Rather, "the distance of three miles from shore was more or less formally adopted by most maritime states as . . . more definitely fixing the limits of their jurisdiction and rights for various purposes, and, in particular, for exclusive fishery." Id. at 32 n.12 (internal citations omitted).
\item \textsuperscript{51} See Proclamation No. 2667, released with Exec. Order No. 9633, 3 C.F.R. 437 (1943-1948); see also Osherenko, supra note 21, at 347 (internal citation omitted). This pronouncement provided the foundation by which the United States extended authority over its 200-mile exclusive economic zone (EEZ). See id. at 347-48; see also Ludwik A. Teclaff, Protecting Abyssal Species in the Law of the Sea, 8 FORDHAM ENVTL. L. REV. 251, 261 (1997) (stating that in the Truman Proclamation of 1945, [the United States] asserted jurisdiction over the natural resources of the subsoil and the seabed of the continental shelf beneath the high seas contiguous to the U.S. coast"); Kenneth W. Swenson, Note, A Stitch in Time: the Continental Shelf, Environmental Ethics, and Federalism, 60 S. CAL. L. REV. 851, 862 (1987) (stating that the "Truman Proclamations brought the resources of the continental shelf under the ambit of United States jurisdiction vis-à-vis other nations"); Peter Prows, Tough Love: The Dramatic Birth and Looming Demise of UNCLOS Property Law (and What Is to Be Done About It), 42 TEX. INT'L L.J. 241, 270 (2007) ("Since Truman's Proclamation, the 'continental shelf' has come to mark the line separating coastal States' exclusive jurisdictions from the commons beyond.").
\end{itemize}
United States has not ratified [the United Nations Convention on the Law of the Sea], it has recognized that its baseline provisions reflect customary international law.5

State governments also respect these notions of jurisdiction and sovereignty. The 1953 Submerged Lands Act (SLA)3 provides states with "title to and ownership of" submerged lands and natural resources up to three geographical miles (three marine leagues in the Gulf of Mexico) offshore.4 On first read, the language of the SLA appears to grant to coastal states full property rights in ("title to and ownership of") submerged lands.5 However, Congress qualified this apparent grant of title and ownership by stating that "[t]he United States hereby releases and relinquishes unto said States and persons aforesaid . . . all right, title, and interest of the United States, if any it has, in and to all said lands . . . and natural resources."56 By explicitly granting to states only those rights actually held by the federal government, Congress acknowledged in the SLA the uncertainty surrounding the scope of marine property rights. States, such as California, thus govern submerged lands and resources pursuant to more limited notions of jurisdiction and sovereignty as opposed to true ownership.

C. The Public Trust Doctrine

The public trust doctrine further limits the ways in which states manage marine resources.57 This doctrine requires that the government

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52. United States v. Alaska, 503 U.S. at 588 n.10 (quoting United States' brief).
54. Id. § 1301(b), 1311(a). The SLA also provides that
the right and power to manage, administer, lease, develop, and use the said lands and
natural resources . . . are . . . recognized, confirmed, established, and vested in and
assigned to the respective States or the persons who were on June 5, 1950, entitled
thereto under the law of the respective States in which the land is located, and the
respective grantees, lessees, or successors in interest thereof.
43 U.S.C. § 1311(a)(2). The Supreme Court held that the "persons who were on June 5, 1950" clause "means nothing more than that state law determines the proper beneficiary of the grant of land under the Act; it is clear that federal law determines the scope of the grant under the Act in the first instance." California ex rel. v. United States, 457 U.S. 273, 288 (1982). For an example of the "persons who were on June 5, 1950, entitled thereto," see the discussion of the Act of 1851 infra Part II.B.2.a.i.
55. See id. § 1311(a)(2).
56. Id. § 1311(b)(1) (emphasis added).
57. See generally Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387 (1892) (discussing the public trust doctrine). For examples of California public trust doctrine case law, see Envt'l Protection Info. Ctr. v. Cal. Dep't of Forestry & Fire Prot., 187 P.3d 888, 926 (2008) (discussing "two distinct public trust doctrines. . . . First is the common law doctrine, which involves the government's 'affirmative duty to take the public trust into account in the planning and allocation of water resources.' . . . The second is a public trust duty derived from statute, specifically Fish and Game Code section 711.7, pertaining to fish and wildlife: 'The fish and wildlife resources are held in trust for the people of the state by and through the department.'")
hold common property resources in trust for the public at large. The government—as a trustee, not an owner—has an affirmative, fiduciary obligation to protect public trust resources and consequently cannot alienate those resources at will.

In the marine context, the public trust doctrine provides that the government holds the water column, seabed, and marine resources in trust for the public. Historically the doctrine applied to state waters and submerged lands, but there have been recent calls for its application to federal waters as well. A strong argument has also been made that any

(internal citations omitted); Ctr. for Biological Diversity, Inc., v. FPL Group, Inc., 166 Cal. App. 4th 1349, 1354 (Cal. Ct. App. 2008) (noting that in California, “[w]hile . . . is considered to be a public trust resource”); Zack’s, Inc. v. Sausalito, 165 Cal. App. 4th 1163, 1175–76 (Cal. Ct. App. 2008) ("The public trust doctrine, which is traceable to Roman law, rests on several related concepts. First, that the public rights of commerce, navigation, fishery, and recreation are so intrinsically important and vital to free citizens that their unfettered availability to all is essential in a democratic society. An allied principle holds that certain interests are so particularly the gifts of nature’s bounty that they ought to be reserved for the whole of the populace. . . . Finally, there is often a recognition, albeit one that has been irregularly perceived in legal doctrine, that certain uses have a peculiarly public nature that makes their adaptation to private use inappropriate. The best known example is found in the rule of water law that one does not own a property right in water in the same way he owns his watch or his shoes, but that he owns only an usufruit—an interest that incorporates the needs of others. It is thus thought to be incumbent upon the government to regulate water uses for the general benefit of the community and to take account thereby of the public nature and the interdependency which the physical quality of the resource implies.") (internal citations omitted).

58. See Osherenko, supra note 21, at 334–35 ("The public trust doctrine protects the public's interest in resources that are common property, such as tidelands and submerged lands."); id. at 371 ("In governing common property, in contrast to public property, the public trust doctrine protects the interests of the actual owners (the people) against privatization or destruction of their rights.").

59. See Lynch, supra note 22, at 288 (describing the affirmative obligation and limited alienation power); Osherenko, supra note 21, at 366–67 (describing the government's fiduciary duty and limited alienation power).

60. See Arnold v. Mundy, 6 N.J.L. 1, 12 (N.J. Sup. Ct. 1821) (stating that the public trust doctrine encompasses “the navigable rivers, where the tide ebbs and flows, the ports, the bays, the coasts of the sea, including both the water and the land under the water, for the purposes of passing and repassing, navigation, fishing, fowling, sustenance, and all the other uses of the water and its products”); Carstens v. Cal. Coastal Comm’n, 182 Cal. App. 3d 277, 294 (1986) ("[T]he public trust doctrine insures protection of the tidelands for commerce, navigation, and fisheries."); see also Weber & Heneman, supra note 9, § 2, para. 1 ("California's fisheries are a public trust resource. As such they are to be protected, conserved and managed for the public benefit."); Osherenko, supra note 21, at 326; id. at 369 ("In the United States, the public trust doctrine has been applied widely to navigable waters, and tidal and submerged lands. Living resources within these waters and on these lands are also subject to the public trust."); Lynch, supra note 22, at 289 ("The doctrine historically protected navigation, commerce, and fishing, but recent judicial decisions have extended the doctrine to protect other uses as well.").

61. See Lynch, supra note 22, at 288 (stating that the public trust doctrine applies to “certain resources, particularly navigable and tidal waters and the land submerged beneath them.")

62. See, e.g., Mary Turnipseed et al., The Silver Anniversary of the United States' Exclusive Economic Zone: Twenty-Five Years of Ocean Use and Abuse, and the Possibility of a Blue Water Public Trust Doctrine, 36 ECOLOGY L.Q. 1 (2009); Mary Turnipseed et al., Legal Bedrock for Rebuilding America's Ocean Ecosystems, 324 SCIENCE 183 (2009); see also Lynch, supra note 22,
private use of public trust resources, such as fishing, must be consistent with the long-term public interest.\textsuperscript{63}

The United States Supreme Court summarized the public trust doctrine's application to fisheries in \textit{Toomer v. Whistell}:

Ever since Roman times, animals \textit{ferae naturae}, not having been reduced to individual possession and ownership, have been considered as \textit{res nullius} or part of the "negative community of interests" and hence subject to control by the sovereign or other governmental authority. More recently this has been expressed by saying that fish and game are the common property of all citizens of the governmental unit and that the government, as a sort of trustee, exercises this "ownership" for the benefit of its citizens. In the case of fish, it has also been considered that each government "owned" both the beds of its lakes, streams, and tidewaters and the waters themselves;\textsuperscript{63} hence it must also "own" the fish within those waters. Each government may . . . regulate the corpus of the trust in the way best suited to the interests of the beneficial owners, its citizens, and

\textsuperscript{63} See, e.g., Donna R. Christie, \textit{Marine Reserves, the Public Trust Doctrine and Intergenerational Equity}, 19 J. LAND USE 427 (2004); Osherenko, supra note 21, at 367 ("[T]he trustee must weigh current-use value against the interest of future beneficiaries to determine the appropriate trade-off between current profits and long-term provision of goods and services from the public trust property."). For a constitutional example of the intergenerational equity concept, see FLA CONST. art. X, § 16(a) (1994) (providing that "[t]he marine living resources of the State of Florida belong to all of the people of the state and should be conserved and managed for the benefit of the state, its people, and future generations").

64. See Martin v. Lessee of Waddell, 41 U.S. 367, 413 (1842) (indicating that "the shores, and rivers, and bays, and arms of the sea, and the land under them . . . [are] held as a public trust for the benefit of the whole community, to be freely used by all for navigation and fishery, as well for shell-fish as floating fish," notwithstanding land grants that appeared to grant such lands to a private individual); see also III. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 435 (1892) ("It is the settled law of this country that the ownership of and dominion and sovereignty over lands covered by tide waters, within the limits of the several States, belong to the respective States within which they are found."); id. at 452 ("That the State holds the title to the lands under the navigable waters of Lake Michigan . . . we have already shown . . . . But it is a title \textit{different in character} from that which the State holds in lands intended for sale. It is different from the title which the United States hold in the public lands which are open to preemption and sale. It is a \textit{title held in trust} for the people of the State . . . .") (emphasis added).
may discriminate as it sees fit against persons lacking any beneficial interest.\textsuperscript{65}

The ownership referred to by the Court is not true, fee-simple ownership, but "generally regarded as but a fiction expressive in legal shorthand of the importance to its people that a State have power to preserve and regulate the exploitation of an important resource."\textsuperscript{66}

While the government exerts regulatory control over fishery resources, fisheries must as a general rule remain open to public use.\textsuperscript{67} This concept is referred to as the public "right of fishing"—a right that is specifically provided for by the public trust doctrine.\textsuperscript{68} More specifically, the Supreme Court has stated that public trust resources are "held in trust for the people of the state that they may . . . have liberty of fishing therein, freed from the obstruction or interference of private parties."\textsuperscript{69}

This concept does not, as sometimes mistakenly believed, guarantee to every individual member of the public an absolute, unfettered "right to fish."\textsuperscript{70} The Court's focus is on the "right of fishing" as against private parties; the right protected by the public trust is thus a general or community right of fishing subject to reasonable government regulation.\textsuperscript{71}

States have "a trust duty to manage the fish, wildlife and water resources . . . for the common use and benefit of the public."\textsuperscript{72} This is a common law trust ("the public trust doctrine") that has its roots in Roman law. According to Roman law, "all rivers and ports are public; hence the right of fishing in a port, or in rivers, is common to all men." J. INST. 2:1.2. So, "[t]he fisheries basis of the public trust doctrine was not concerned with any common right to fish themselves, they remained res nullius." Seth Macinko, \textit{Public or Private?: United States Commercial Fisheries Management and the Public Trust Doctrine, Reciprocal Challenges}, 33 \textit{NATURAL RESOURCES J.} 919, 945 (1993). Rather, "[t]he focal point was instead an activity judged res communes, the common 'right of fishing.'" Id.; see also Lynch, supra note 22, at 300 (noting that the public trust doctrine "does not protect the public rights of access as absolute").

\textsuperscript{65} Toomer v. Whistell, 334 U.S. 385, 399-400 (1948); see also Stephenson v. Wood, 34 S.W.2d 246, 248 (Tex. 1931) ("The fish in the streams and coastal waters of Texas are the property of the state, and no person has any vested property rights therein. Furthermore the preservation of the wild game life of the state, including the fish in its streams and coastal waters, is a matter in which the people generally over the state are interested."); id. at 249 ("[T]he protection of fish and their spawning grounds along any part or all of the coast line of the State is a matter of general public interest.").

\textsuperscript{66} Toomer, 334 U.S. at 402; see also Alabama v. Texas, 347 U.S. 272, 279 n.1 (1954) (Black, J., dissenting) ("This Court has referred to ownership of submerged lands under navigable streams as 'theoretical ownership and dominion,' 'a qualified title', and 'a bare technical title.'") (citing Scranton v. Wheeler, 179 U.S. 141, 160, 163 (1900)).

\textsuperscript{67} See, e.g., Dobard v. State, 233 S.W.2d 435, 436, 439 (Tex. 1950) (striking down as contrary to the state constitution's due process clause a fishing law that established a quota limiting the number of boats that could harvest "edible aquatic life" from State waters).

\textsuperscript{68} See Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 452 (1892) (discussing the public trust); Lynch, supra note 22, at 307 (using the phrase "right of fishing" in a discussion of LAPPs consistency with the public trust doctrine).

\textsuperscript{69} Id.

\textsuperscript{70} The public trust doctrine is traceable to Roman common law. See Zack's, Inc. v. Sausalito, 165 Cal. App. 4th 1163, 1175-76 (Cal. Ct. App. 2008) (stating that "[t]he public trust doctrine . . . is traceable to Roman law"). More specifically, the doctrine is traceable to the Justinian Institutes. The "right of fishing" (which is not necessarily the same as the "right to fish") is stated therein: "All rivers and ports are public; hence the right of fishing in a port, or in rivers, is common to all men." J. INST. 2:1.2. So, "[t]he fisheries basis of the public trust doctrine was not concerned with any common right to fish themselves, they remained res nullius." Seth Macinko, \textit{Public or Private?: United States Commercial Fisheries Management and the Public Trust Doctrine, Reciprocal Challenges}, 33 \textit{NATURAL RESOURCES J.} 919, 945 (1993). Rather, "[t]he focal point was instead an activity judged res communes, the common 'right of fishing.'" Id.; see also Lynch, supra note 22, at 300 (noting that the public trust doctrine "does not protect the public rights of access as absolute").

\textsuperscript{71} See Ill. Cent. R.R. Co., 146 U.S. at 452.
of the state for the benefit of all the people" and must strive to protect fishery resources in the long run.

Determining which activities are consistent with the public trust doctrine is a context-specific exercise. The doctrine is inherently flexible and adaptive, and the list of activities consistent with the doctrine may change over time along with shifts in societal values and needs. As I describe in more detail in Part II.B.2.a.ii, infra, I believe that properly designed and implemented TURFs—which constitute the primary focus of my analysis in this Article—fully comport with the public trust doctrine. I now turn my attention to the potential use of TURFs in U.S. fisheries: their rationale, governmental support for their use, and their potential use under California law.

II. TERRITORIAL USE RIGHTS IN FISHERIES (TURFS)

A. Limited Access Privilege Programs—In General

As described in the Introduction, fisheries worldwide are collapsing and fisheries managers are seeking alternative management techniques to halt or reverse this trend. One class of management techniques that appears to hold promise for sustainable fisheries management is LAPPs. Under a LAPP system, an individual fisherman or group of fishermen is guaranteed exclusive access to some portion of the catch. The allure of LAPPs is that they offer a larger bundle of sticks to fishermen than traditional fisheries management approaches; in other words, LAPPs offer more than the usufruct. In particular, LAPPs provide for exclusivity, thus eliminating the "excludability" problem that characterizes common

72. Owsichek v. State Guide Licensing & Control Bd., 763 P.2d 488, 495 (Alaska 1988); see also Lynch, supra note 22, at 303 ("The public trust doctrine must create an affirmative duty on the state to protect and conserve public trust resources, otherwise simply providing access until the resources are destroyed would not meet the obligations on the government to protect public resources for use by the public.").

73. See, e.g., Ill. Cent. R.R. Co., 146 U.S. at 460 ("The legislation which may be needed one day for the harbor may be different from the legislation that may be required at another day."); Marks v. Whitney, 491 P.2d 374, 380 (Cal. 1971) ("The public uses to which tidelands are subject are sufficiently flexible to encompass changing public needs. In administering the trust the state is not burdened with an outmoded classification favoring one mode of utilization over another.").

74. See supra notes 1-24 and accompanying text.

75. See generally Costello et al., supra note 7 (quantitatively analyzing the promise of ITQs, one type of LAPP).

76. Group allocations typically go to cooperatives or communities. See generally Branch et al., supra note 5, at 1656-59. This type of allocation helps to preserve the sustainability incentive structure that LAPPs provide.

77. See, e.g., Magnuson-Stevens Fishery Conservation and Management Act (MSA), 16 U.S.C. § 1802(21)(A) (2007); see also Branch et al., supra note 5, at 1057.
pool resources. LAPPs provide this exclusivity without requiring complete alienation of the fishery resource, an important point given the strictures of the public trust doctrine. The more exclusive, encompassing, secure nature of LAPPs theoretically cultivates in fishermen a vested interest in the future health of the fishery because “fishing participants . . . stand to directly suffer the consequences of overexploitation and directly benefit from maintaining high stock sizes of exploited populations.”

To date, empirical evidence on the performance of the most commonly implemented LAPP, the individual fishing quota (IFQ), supports the theoretical predictions of the sustainability value of LAPPs. According to a recent comprehensive survey of 11,135 fisheries, half as many fisheries managed with IFQs were collapsed as non-IFQ fisheries. That IFQs do seem to provide fishermen with a sustainability incentive might be attributable to the fact that “IFQs, particularly when transferable, . . . have two of the essential attributes of property: exclusivity and transferability.” By vesting fishermen with an exclusive

78. In other words, LAPPs provide fishermen with a legal, enforceable means of excluding others from some portion of the total catch. See Rieser, supra note 14, at 401 (describing the excludability problem); Aswani, supra note 21, at 289 (same).

79. See Rieser, supra note 30, at 826 (“Assigning the right to exclude does not require a complete alienation of state or public ownership in the resources—an important characteristic given notions of public ownership in the current regime of wildlife and fishing law in the United States.”). For a discussion of the notions of public ownership in fisheries, see discussion supra Part I.

80. See Costello et al., supra note 7, at 1679 (“[T]he idea [with LAPPs] is to provide—to fishermen, communities, or cooperatives—a secure asset, which confers stewardship incentives.”); Weber & Heneman, supra note 9, § 2, para. 6.

81. Timothy E. Essington, Ecological Indicators Display Reduced Variation in North American Catch Share Fisheries, 107 PROC. NAT’L ACAD. SCI. 754, 754 (2010); see also Christopher J. Costello & Daniel Kaffine, Marine Protected Areas in Spatial Property-Rights Fisheries, 54 AUSTRALIAN J. AGRIC. RESOURCE ECON. 321, 321 (2010) (“Economists argue that appropriate assignment of rights internalizes externalities and facilitates stewardship, leading to sustainability through a profit motive. . . . With private property rights over tracts of ocean, owners have a strong incentive to manage their TURFs for long-term profitability, which typically involves steady-state solutions with sustainable harvests in perpetuity.”) (internal citation omitted). For a discussion on the race to fish, see supra notes 7–13 and accompanying text.

82. See, e.g., Costello et al., supra note 7.

83. See id. at 1678, 1680; see also Juan Carlos Castilla, Fisheries in Chile: Small Pelagics, Management, Rights, and Sea Zoning, 86 BULL. MARINE SCI. 221, 230 (2010) (stating that since TURFs, another form of LAPP, were implemented in Chile, “the ‘race for fish’ appears to have been counteracted”); Weber & Heneman, supra note 9, § 8, para. 5 (“The first 15 years of experience with individual quota management has shown that they end the race for fish and provide incentives to fishermen to change their business to maximize revenues and minimize costs.”). A “collapsed” fishery is one that has experienced a decline of greater than 90 percent from baseline abundance. See Myers & Worm, supra note 1, at 788; Costello et al., supra note 7, at 1679.

84. Rieser, supra note 30, at 823; see also Aswani, supra note 21, at 289 (discussing transferability).
interest in the fishery resource, IFQs reduce the need for fishermen to race to fish or engage in activities harmful to fish stocks or habitat.\(^{85}\) Fishermen can take their time and harvest fish in a more ecologically-friendly, efficient, and economically-sensible manner.\(^{86}\) Despite any shortcomings,\(^{87}\) properly-designed IFQs represent a marked improvement over more traditional fishery management techniques from both ecological and economic perspectives.\(^{88}\)

From a legal perspective, U.S. courts have tended to uphold IFQ programs. For example, in *Sea Watch International v. Mosbacher*, the court rejected plaintiffs' claim that an IFQ program was tantamount to an unauthorized, illegal privatization of the surf clam and quahog fishery.\(^{89}\)

85. See Trevor A. Branch, *How Do Individual Transferable Quotas Affect Marine Ecosystems?*, 10 *Fish & Fisheries* 39, 50–52 (discussing effects of IFQs on habitat, and noting that in the "Aitutaki trochoth fishery ... the reef was damaged during the competitive race for the TAC, and this halted under ITQs"); Tim Adams, *The Interface Between Traditional and Modern Methods of Fishery Management in the Pacific Islands*, 40 *Ocean & Coastal Mgmt.* 127 (1998) (stating that in the Aitutaki trochoth fishery, the race to fish led to a "tendency to overload boats and damage the reef in order to land as much as possible within the time limit," and that the introduction of IFQs alleviated the problems associated with the TAC/race to fish); Donald R. Leal et al., *The Ecological Role of IFQs in U.S. Fisheries: A Guide for Federal Policy Makers* 8, available at http://ifqsforfisheries.org/pdf/pr_ifq Ecology pdf (stating that "[a]nother crucial ecological role for IFQs is in reducing fleet excesses and their environmental impacts," including habitat damage); Wyman, supra note 5, at 527 ("Property rights should reduce the need fishers currently have to race for the fish ... Fishers with property rights such as territorial use rights or individual transferable quotas also might become more focused on conserving fish stocks and less likely to pressure regulators to increase total allowable catches because fishers will internalize the benefits of improved stewardship.").

86. See Wyman, supra note 5, at 527 ("Economists argue that granting fishers private property rights transforms fishers' incentives. Under this analysis, property rights should reduce the need fishers currently have to race for the fish, reduce the excess capacity that currently plagues many wild fisheries, and increase the efficiency of harvesting. Fishers with property rights such as territorial use rights or individual transferable quotas also might become more focused on conserving fish stocks and less likely to pressure regulators to increase total allowable catches because fishers will internalize the benefits of improved stewardship."); see also Robert T. Deacon et al., *Improving Efficiency by Assigning Harvest Rights to Fishery Cooperatives: Evidence from the Chignik Salmon Co-op*, 50 *Ariz. L. Rev.* 479, 479 (2008) (describing how members of a cooperative in Alaska's Chignik salmon fishery "concentrated effort among [the fishery's] most efficient members, fished closer to port, spread harvesting over a longer time span, and shared information on stock locations").

87. One of the primary shortcomings of IFQs is their distributional impacts. See generally Olivier Guyader & Olivier Thebaud, *Distributional Issues in the Operation of Rights-Based Fisheries Management Systems*, 25 *Marine Pol'y* 103 (2001).

88. See generally Costello et al., supra note 7 (describing ecological benefits of IFQs); Deacon et al., supra note 86 (describing economic benefits in the Chignik salmon cooperative that resulted from a cooperative being granted a fixed portion of the catch).

89. *Sea Watch Int'l v. Mosbacher*, 762 F. Supp. 370, 375, 382 (D.D.C. 1991). The court noted that Congress expressly authorized the use of LAPPs in the Magnuson-Stevens Act, and that establishing an IFQ system was a valid exercise of the Regional Fisheries Management Council's authority. See id. at 375. The court further noted that "the interests created by [the ITQ system] fall short of actual full-scale ownership." Id. at 376. The court expounded,

The new quotas do not become permanent possessions of those who hold them, any more than landing rights at slot-constrained airports become the property of airlines,
Likewise, in *Alliance Against IFQs v. Brown*, the Ninth Circuit found that the halibut and sablefish IFQ program and its associated allocation scheme comported with relevant statutory law and were not arbitrary and capricious.\textsuperscript{90}

\section*{B. Limited Access Privilege Programs—TURFs}

This Article goes beyond IFQs to focus on another LAPP that has the potential for expanded use in wild capture fisheries: “territorial use rights in fisheries,” or “TURFs.”\textsuperscript{91} In TURF systems, a limited number of individual fishermen or a group of fishermen\textsuperscript{92} is allocated a spatial property right to the sea floor and has exclusive harvesting rights to the species of interest on (or in the water column overlying) that limited spatial area.\textsuperscript{93} TURFs generally are thought to be most useful for nearshore species that are sedentary or have a relatively small home range.\textsuperscript{94} As such, TURFs are similar to the offshore oyster bed lease or radio frequencies become the property of broadcasters. These interests remain subject to the control of the federal government which, in the exercise of its regulatory authority, can alter and revise such schemes, just as the Council and the Secretary have done in this instance. An arrangement of this kind is not such a drastic departure from ordinary regulation, nor is it akin to the sale of government property . . . .

\textit{Id.} The court found the IFQ program valid and dismissed the case. \textit{Id.} at 382.


\textsuperscript{91} TURFs-qua-TURFs have not yet been brought before U.S. courts. LexisNexis Academic searches in the combined U.S. Federal and State case law database for (“territorial use rights in fisheries” OR “territorial user right fisheries”) and (“territorial use*” and fish*) produced no relevant results (search run Aug. 12, 2010).

\textsuperscript{92} See Wyman, \textit{supra} note 5, at 517–18 (pointing out that “in Japan, fishing cooperatives—not individuals—have TURF rights to fish in ‘specific territories extending as far as five and a half miles seaward’”) (internal citations omitted). Community-based subsistence fishing areas in Hawaii similarly assign harvest rights to native Hawaiian communities for spatially delineated marine areas. See \textit{generally} HAW. REV. STAT. § 188-22.6 (2009). The “group” concept is more fully described in the following paragraphs.

\textsuperscript{93} See Costello & Kaffine, \textit{supra} note 129, at 321 (defining TURFs as a property rights-based approach to fisheries management that “allocate units of space to private firms, cooperatives, or fishermen”); Wyman, \textit{supra} note 5, at 517 (stating that TURFs “give fishers ownership of the stock of fish in designated areas”); see also Lynch, \textit{supra} note 22, at 305 (describing TURFs as LAPPs that “allocate a section of the ocean to be used exclusively by the holder of the ‘TURF’ and noting that “[i]n addition to rights of access and withdrawal, TURFs generally give the holders the right to exclude others from their section of the ocean”).

\textsuperscript{94} Because of the logistical difficulty in accessing the deep sea floor, in addition to high seas jurisdictional issues, TURFs generally are thought to be most useful for nearshore fisheries. \textit{See} Wyman, \textit{supra} note 5, at 517 (mentioning TURFs for inshore fisheries). In addition, TURFs are most useful for managing sedentary species that do not routinely migrate out of the TURF boundary. \textit{See} Castilla, \textit{supra} note 83, at 229 (“Fisheries . . . for benthic species, showing spatially explicit population structure . . . , have been rightly argued to be more appropriate for these management approaches than fisheries for pelagic mobile species.”); see also Omar Defeo & Juan Carlos Castilla, \textit{More Than One Bag for the World Fishery Crisis and Keys for Co-
systems currently in place in some states, wherein individual “lessee[s] . . . enjoy the exclusive use of the water bottoms leased and of all oysters and cultch grown or placed thereon.”95

The concept of exclusivity is of primary importance when considering whether a particular spatial fisheries management regime constitutes a TURF.96 It could be argued that the waters under a given state’s jurisdiction—or even the entire United States Exclusive Economic Zone—constitute a TURF insofar as they represent a spatially-delineated area with restricted fishing access.97 In other words, the status quo could be conceived of as a TURF (albeit a large one). As discussed in the Introduction, however, the status quo is not preventing fish stocks from trending toward collapse. Historical management techniques have not incentivized fishermen to conserve stocks, and the race to fish has ensued. The rationale behind LAPPs generally, and TURFs specifically, is to stop the race to fish by providing fishermen with an incentive to sustainably harvest the resource for the long term. This requires a particular form of spatial management.

What I am referring to as a TURF, then, represents a subset of the universe of spatial management techniques. Specifically, I am referring to delimited, spatial fishing rights allocated by “a formal mechanism of assigning exclusive use rights over a particular fishery[98] area to an individual or group.”99 Each delimited fishing ground or “plot” of sea floor or water column (the size of which would be a function of various factors including species life history100), is assigned to an individual

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96. See Branch et al., supra note 5, at 1655 (“Spatial controls have long been part of fisheries management and are exercised over a wide range of scales . . . Spatial management may be based on existing political boundaries, species distribution, or the distribution of fishing effort.”).
97. Personal communication with Dr. Christopher Costello, Professor of Environmental and Resource Economics, Bren School of Environmental Science and Management, University of California, Santa Barbara, in Santa Barbara, Cal. (Sept. 27, 2010).
98. In this Article, a “particular fishery” refers to a “population[] of marine fish . . . that may be treated as a unit for purposes of conservation and management and that [is] identified on the basis of geographical, scientific, . . . and economic characteristics.” CAL. FISH & GAME CODE § 94 (West 2009).
99. Branch et al., supra note 5, at 1656.
100. See discussion infra Part II.C.3.
fisherman or a group of fishermen.\textsuperscript{101} By "group," I refer specifically to fishermen who actively coordinate fishing efforts through a cooperative or community;\textsuperscript{102} this coordination helps to preserve the sustainability incentive structure underlying true TURF regimes.\textsuperscript{103} As one commentator summarized, "[a]ccess to, and use of, a [TURF]—however the area is delimited—is restricted to the group which determines how to harvest fish from the fishery and to whom the fish in the fishery are allocated."\textsuperscript{104}

As with IFQs, TURFs provide fishermen with an exclusive harvesting right and, theoretically, the associated incentive to sustainably harvest the target stock.\textsuperscript{105} Because of their spatial nature, TURFs may also provide fishermen with the incentive to protect the habitat lying within their allocated parcels.\textsuperscript{106} All else equal, better habitat will enhance the productivity and value of the TURF and the long-term economic returns to the fisherman.\textsuperscript{107} Indeed, compared to common oyster beds, leased oyster beds with exclusive rights of access—which are similar to TURFs in structure and function—tend to be more productive and

\textsuperscript{101} For a visual image of how TURFs might map onto ocean space, see Costello & Kaffine, \textit{supra} note 129, at 326 fig.1 (creating a map of forty-eight hypothetical TURFs for a species similar to kelp bass (\textit{Paralabrax clathratus} off the coast of California).

\textsuperscript{102} Generally speaking, fishery cooperatives "are groups of individuals, each of which are allocated a share of the TAC." Trevor A. Branch et al., \textit{Fleet Dynamics and Fishermen Behavior: Lessons for Fisheries Managers}, 63 CAN. J. AQUAT. SCI. 1647 (2006). Cooperatives just as easily can be granted the right to fish in a delimited geographic area. See Katrina M. Wyman, \textit{The Property Rights Challenge in Marine Fisheries}, 50 ARIZ. L. REV. 511, 517–18 (2008) ("[i]n Japan, fishing cooperatives—not individuals—have TURF rights to fish in 'specific territories extending as far as five and a half miles seaward.'"). Communities can also be granted TURF rights. The MSA contains a provision for "community development quotas." See 16 U.S.C. § 1855(i). Broadly speaking, these quotas are "dedicated access privileges . . . granted to communities." Branch et al., \textit{supra}, at 1657. As such, they could be implemented via TURF regimes.

\textsuperscript{103} See generally Branch et al., \textit{supra} note 5, at 1656–59 (discussing TURFs, cooperatives, and community development quotas).

\textsuperscript{104} Rebecca Metzner, \textit{Fishing Aspirations and Fishing Capacity: Two Key Management Issues}, 20 INT’L J. MARINE & COASTAL L. 459, 477–78 (2005); see also Burke, \textit{supra} note 27, at 122 ("One of the basic questions facing a decision to create a TURF and to facilitate a community-approach to management is that of defining the community that is to receive the rights and responsibilities.").

\textsuperscript{105} The Supreme Court has held that TURF-like leases for oyster beds constitute true property rights. See McCready v. Virginia, 94 U.S. 391, 395 (1876) (stating that in the context of oyster grants, "[t]he right which the people of the State thus acquire . . . is, in fact, a property right"). This secure right should encourage conservation incentives.

\textsuperscript{106} See Sinden, \textit{supra} note 15, at 600 (noting the suggestion that "if people owned various patches of the ocean, they would have an economic incentive to protect their holdings") (internal citation omitted); Cancino et al., \textit{supra} note 94, at 400-01 (describing habitat enhancement activities on TURFs); Defeo & Castilla, \textit{supra} note 94, at 269 (stating the potential for use of "low-cost stock enhancement activities").

command higher market prices.\textsuperscript{108} Other possible advantages of TURFs lie in monitoring and enforcement duties.\textsuperscript{109} TURF holders have an incentive to monitor the conditions of their assigned site and ensure that others do not encroach upon their property; they may self-enforce TURF boundaries accordingly.\textsuperscript{110} Enforcement can occur even with informal TURF systems, as was the case with the “lobster gangs” of Maine.\textsuperscript{111} In addition, peer pressure may be sufficient to induce compliance with

\textsuperscript{108} See Wyman, supra note 5, at 517 n.34. Aquaculture and TURFs both represent spatially-defined harvesting regimes, and as such have some parallels. See id. (“TURFs resemble aquaculture in that the holders of TURFs may take steps to actually grow species such as oysters.”). An aquaculturist generally obtains the exclusive right to use an area of the water column or seafloor through some combination of licenses, permits, and leases. See id. at 516. While the federal government has yet to pass an offshore aquaculture bill (but see the recently introduced National Sustainable Offshore Aquaculture Act of 2009, H.R. 4363, 111th Cong. (2009)), many coastal states have regimes in place to govern aquaculture operations in state waters. See, e.g., LA. REV. STAT. ANN. § 56:423(A) (2009) (“A lessee shall enjoy the exclusive use of the water bottoms leased and of all oysters and cultch grown or placed thereon.”). The Submerged Lands Act (SLA) and Supreme Court opinion have validated the use of these exclusive use arrangements. The SLA provides states with “the right and power to . . . lease . . . the said lands and natural resources.” 43 U.S.C. § 1311(a)(2) (2006). The Supreme Court discussed such beds in Illinois Central: “It is true that to utilize the fisheries, especially those of shell fish, it was necessary to parcel them out to particular operators, and employ the rent or consideration for the benefit of the whole people; but this did not alter the character of the title. The land remained subject to all other public uses as before, especially to those of navigation and commerce, which are always paramount to those of public fisheries.” Ill. Cent. R.R. Co. v. Illinois, 146 U.S. 387, 457 (1892); see also McCready, 94 U.S. at 396 (stating, in the context of Virginia’s oyster cultivation grants, that “all concede that a State may grant to one of its citizens the exclusive use of a part of the common property”); discussion of aquaculture infra Part II.B.2.b.iii.

\textsuperscript{109} See, e.g., Weber & Heneman, supra note 9, § 2, para. 6 (stating that restricted access programs “can . . . increase compliance with fishery regulations since an individual with a restricted access permit is much less likely to risk losing the opportunity to participate in that fishery because of a fishery violation.”). But see Aswani, supra note 21, at 286 (noting that critics of LAPPs argue that they increase management costs).

\textsuperscript{110} See Steffen Hentrich & Markus Salomon, Flexible Management of Fishing Rights and a Sustainable Fisheries Industry in Europe, 30 MARINE POL’Y 712, 716 (2006) (“Use of a TURF system can effect a significant reduction in the problems of surveillance and control, and modern surveillance technologies allow reliable protection of territorial access rights. If a TURF system is managed by a group of fishers . . . within a specific marine region, the relatively small size of the group can limit the costs of monitoring and ease the resolution of potential conflicts regarding stock use.”); Aswani, supra note 21, at 303 (“The spatial distribution of entitlement holders . . . establishes whether transaction costs can be reduced and collective action problems can be solved by traditional authorities or if outside intervention is required. Generally, close-knit communities of people . . . can reduce negotiation, monitoring, and enforcement costs more effectively than communities whose entitlement holders are geographically dispersed from their holdings.”).

\textsuperscript{111} See, e.g., James M. Acheson & Roy J. Gardner, Spatial Strategies and Territoriality in the Maine Lobster Fishery, 17 RATIONALITY & SOC’Y 309, 310 (2005) (noting that in the Maine lobster fishery, “[a]t the local scale is an informal territorial system whose rules are enforced by the fishermen themselves, sometimes by illegal means”); see also Defeo & Castilla, supra note 94, at 370 (“Self-policing provides motivation and the control needed for local fishery communities to have effective custody of the resources, even in cases when there is not formal recognition with property rights.”).
TURF boundaries. Reasonable regulatory fees imposed on TURF-holders also could be used to provide supplemental funding for enforcement efforts.

1. The Federal Basis

Before diving into a detailed analysis of the viability of TURFs in California state waters, it is instructive to briefly consider how federal support for TURFs would place California’s efforts within a nationwide context. Federal support for TURFs as a fisheries management tool comes from several sources. First, TURFs fit neatly within the coastal and marine spatial planning (CMSP) framework provided for by President Obama’s Executive Order on the “Stewardship of the Ocean, Our Coasts, and the Great Lakes.” CMSP is “a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas.” The goals of CMSP are to “identify areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives.” The spatial nature of TURFs, as well as their focus on socio-economic and environmental objectives, allows them to square easily with a CMSP approach to managing marine resources.

Secondly, TURFs find support in the National Oceanic and Atmospheric Administration’s (NOAA) Catch Share Policy. NOAA’s...
National Marine Fisheries Service, the government agency charged with managing fisheries in U.S. federal waters, has recognized that, in appropriate circumstances, rights-based approaches to fisheries management (collectively called "catch shares" by the agency) can help achieve sustainable fisheries. In an effort to facilitate consideration of rights-based fishery management approaches, NOAA recently released a *Catch Share Policy*. In this document, NOAA defines catch shares as including TURFs:

"Catch share" is a general term for several fishery management strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Each recipient of a catch share is directly accountable to stop fishing when its exclusive allocation is reached. The term includes specific programs defined in law such as "limited access privilege" (LAP) and "individual fishing quota" (IFQ) programs, and other exclusive allocative measures such as Territorial Use Rights Fisheries (TURFs) that grant an exclusive privilege to fish in a geographically designated fishing ground.

It is relevant to note that this definition characterizes TURFs as a privilege as opposed to a true right. This language is in accordance with the language of the Magnuson-Stevens Fishery Conservation and

119. See id.

120. Fishing cooperatives are defined as per the Fishermen's Collective Marketing Act of 1934 as a group of "persons engaged in the fishing industry, as fishermen, catching, collecting, or cultivating aquatic products, or as planters of aquatic products on public or private beds, [that] may act together in associations, corporate or otherwise." *CATCH SHARE POLICY*, supra note 118, at 20 (citing 15 U.S.C. § 521 (2006)).

121. A "community" is defined per the Magnuson-Stevens Act as "a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community." *CATCH SHARE POLICY*, supra note 118, at 20 (citing 16 U.S.C. § 1802(17) (2006)).

122. The Magnuson-Stevens Act defines a LAPP as a "Federal permit, issued as part of a limited access system under section 303A to harvest a quantity of fish expressed by a unit or units representing a portion of the total allowable catch of the fishery that may be received or held for exclusive use by a person, and ... includes individual fishing quotas, but ... does not include community development quotas as described in section 305(i)." 16 U.S.C. § 1801(26) (2006). A "limited access system" is defined as "a system that limits participation in a fishery to those satisfying certain eligibility criteria or requirements contained in a fishery management plan or associated regulation." *CATCH SHARE POLICY*, supra note 118, at 21 (citing 16 U.S.C. § 1802(27) (2006)).

123. An IFQ is defined in the MSA as a "Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a portion of the total allowable catch of a fishery that may be received or held for exclusive use by a person. Such term does not include community development quotas as described in section 305(i)." *CATCH SHARE POLICY*, supra note 118, at 21 (citing 16 U.S.C. § 1802(23) (2006)).


125. See id. at 20 ("Even though the term ["territorial use right fishery"] itself uses the word 'right' the catch share programs in this policy are defined in terms of a granting of a privilege, not a property right.").
Management Act (MSA), which defines a LAPP as a revocable permit, rather than a “right, title, or interest in” the fishery resource. The limited property interest of the LAPP as defined in the MSA and the TURF as defined in NOAA’s Catch Share Policy is intended to prevent fishermen from developing distinct investment-backed expectations that would be grounds for a compensable takings claim. An exploration of the takings issue goes beyond the scope of this paper, but the privilege/right distinction is relevant in the TURF context because, from an economic perspective, a privilege is less desirable than a right in providing for stewardship incentives.

Finally, TURFs complement the LAPP policy outlined in the MSA. The MSA is the primary federal statute governing fishery management in the United States. The MSA does not define TURFs per se, but it does authorize “limited access privilege programs,” defined as “permit[s] . . . to harvest a quantity of fish expressed by a unit or units representing a portion of the total allowable catch.” Exactly how TURFs would fall into the MSA scheme remains to be determined.

127. Specifically, the MSA states that a

Limited access privilege, quota share, or other limited access system . . . (1) shall be considered a permit . . . ; (2) may be revoked, limited, or modified at any time . . . , including revocation if the system is found to have jeopardized the sustainability of the stock or the safety of fishermen; (3) shall not confer any right of compensation to the holder of such limited access privilege, quota share, or other such limited access system authorization if it is revoked, limited, or modified; (4) shall not create, or be construed to create, any right, title, or interest in or to any fish before the fish is harvested by the holder; and (5) shall be considered a grant of permission to the holder of the limited access privilege or quota share to engage in activities permitted by such limited access privilege or quota share.

128. See Penn Cent. Transp. Co. v. New York City, 438 U.S. 104, 127–28 (1978) (discussing the importance of “distinct investment-backed expectations” in the context of regulatory takings claims); Rieser, supra note 30, at 821 (noting that the Congressional “intent behind [the MSA’s] language is clearly to prevent IFQ holders from developing ‘investment-backed expectations’ that could require the government to compensate them for the elimination of such rights”). Submerged lands takings claims have been rejected under state law as well. See, e.g., Avenal v. Louisiana, 886 So. 2d 1085 (La. 2004).
129. See generally Christopher J. Costello & Daniel Kaffine, Natural Resource Use with Limited-Tenure Property Rights, 55 J. ENVTL. ECON. & MGMT. 20, 21 (2008) (describing the importance of the perceived security of a property right in fostering stewardship behavior among resource users); See discussion infra Part II.C.
131. See id. The MSA applies to all fisheries in federal waters, in other words, fisheries between three nautical miles (or three marine leagues in the Gulf of Mexico) and 200 nautical miles offshore. See REG’L FISHERY MGMT. COUNCILS, http://www.fisherycouncils.org/ (last visited June 8, 2010) (“[The] eight Regional Councils develop management plans for marine fisheries seaward of state waters of their individual regions.”). The SLA provides for state jurisdiction over fisheries in state waters. See 43 U.S.C. § 1301(b) (2006).
though the Act's LAPP provisions provide conceptual support for TURF use.

2. California Law

As is the case nationwide, commercial fisheries in California have come under increasing pressure. Historically, California did not restrict fishing efforts in state waters. Harvest capacity began to increase in the mid-1800s and hastened after World War II. This overcapitalization, along with habitat loss, degradation, and lack of regulation, led to widespread fisheries decline. California began limiting harvest in the 1980s, but its complex system of law and regulation has proven confusing at best and ineffective at worst. The Fish and Game Commission has begun looking at LAPPs as a means to remedy fisheries overharvest.

This subpart describes the legal landscape for implementing TURFs in California state waters. In California, "state waters" extend from the mean high water line to three nautical miles from the shore. State waters include both "tidelands," which lie between the mean high and low tide lines, and "submerged lands," which extend from the mean low tide line to three miles offshore. The California courts often conflate the terms "tidelands" and "submerged lands," and this Article does the same. The analysis generally holds regardless of the term used. In total,
California's tidelands and submerged lands encompass approximately four million acres.\textsuperscript{142}

Table 1 provides a conceptual framework for considering a spectrum of ways in which TURFs could be implemented in California state waters. I discuss many of these approaches in more detail in the sections that follow; those I do not discuss in the body text I briefly explain in the footnotes.

\textbf{TABLE 1. THIS TABLE BRIEFLY OUTLINES THE POSSIBLE MEANS BY WHICH TURFS COULD BE IMPLEMENTED IN CALIFORNIA STATE WATERS.}

<table>
<thead>
<tr>
<th>Fee Simple Purchase</th>
<th>Lease</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Act of 1851 Lands</td>
<td>Leasing from Private Owners</td>
<td>Voluntary Agreements\textsuperscript{143}</td>
</tr>
<tr>
<td>Post Act of 1851, pre-1879 Constitutional Ban</td>
<td>General Submerged Lands Lease (State Lands Comm'n)</td>
<td>Scientific and Educational Experiments\textsuperscript{144}</td>
</tr>
<tr>
<td>Post-1879, pre-1909 Statutory Ban</td>
<td>Leasing from Cities, Towns, and Harbor Districts\textsuperscript{145}</td>
<td>Marine Life Protection Act</td>
</tr>
<tr>
<td></td>
<td>Aquaculture Lease (Fish &amp; Game Comm'n)</td>
<td>Marine Life Management Act</td>
</tr>
<tr>
<td></td>
<td>Kelp Lease (Fish &amp; Game Comm'n)</td>
<td></td>
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143. One way to move forward with TURFs in state waters is to have a group of fishermen voluntarily agree to engage in an experimental TURF system. Voluntary agreements have the advantage of being implemented without some of the red tape characteristic of formal contractual agreements. However, the ultimate success of voluntary TURF agreements will depend on whether the fishermen comply with and enforce TURF boundaries—as occurred with the Maine lobster fishery, albeit by sometimes questionable means—or whether they cheat. See generally Acheson & Gardner, supra note 111 (discussing the lobster fishery); Hirotsugu Uchida, Collective Fishery Management in TURFs: The Role of Effort Coordination and Pooling Arrangement 4 (2007) (unpublished Ph.D. dissertation, University of California, Davis) (noting that co-management regimes “can be vulnerable to cheating”) (on file with author). While voluntary agreements are a possible means of moving forward with TURFs (and thus warrant inclusion in the table), they are tangential to this legal analysis (insofar as they do not represent a wholesale shift in state fisheries policy) and are thus not discussed in depth in the body text.
a. Ownership of Submerged Lands

i. In General

As described above, true ownership of submerged lands in the United States is a rarity. In most instances, fee simple ownership of
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Tidelands and submerged lands is not possible due to tradition, historical norms, and statutory and constitutional law. However, the existence of privately owned submerged lands in California and other states suggests that—at least in limited circumstances—fee simple ownership is possible. Most of these holdings occur between the mean low and mean high tide lines, but occasionally reach seaward of the mean low tide line.

The possibility of fee simple ownership of submerged lands in California dates back to the Mexican-American War and California’s ensuing statehood. According to the United States Supreme Court, the war between the United States and Mexico was formally ended by the Treaty of Guadalupe Hidalgo in 1848. Under the terms of the Treaty, the United States undertook to protect the property rights of Mexican landowners.

To fulfill its obligations under the Treaty and to provide for an orderly settlement of Mexican land claims, Congress passed the Act of March 3, 1851 (“Act of 1851”), setting up a comprehensive claims settlement procedure. Claimants were required to present their claims within two years, however, or have their claims barred.

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146. See generally Osherenko, supra note 21.
147. See, e.g., Michael W. Beck et al., New Tools for Marine Conservation: the Leasing and Ownership of Submerged Lands, 18 CONSERVATION BIOLOGY 1214, 1215 (2004) (“Submerged lands are in fact widely available for ... ownership.”); Osherenko, supra note 21, at 326 (“A limited number of parcels close to the coast are held privately ... and may well provide a new vehicle for private conservation ownership.”). Much of this private ownership flows from grants made prior to statehood that survived incorporation into the Union. See Beck et al., supra, at 1215-16, 1217; see also Osherenko, supra note 21, at 345 (“Today, private rights to tidelands and bottomlands run the gamut from fee title to something less than a lease.”); id. at 346 (“Conservation organizations such as the Nature Conservancy are purchasing and leasing intertidal and sub-tidal lands to restore biodiversity and ecosystem services.”); MCA CALIFORNIA, supra note 149 (“The Nature Conservancy, California Audubon, and local land trusts own and lease tidelands, submerged lands and associated resources in California at present.”). For example, Audubon California owns three parcels of San Francisco Bay Area submerged lands, including one acre of tidal marshes and adjoining uplands in Corte Madera Marsh purchased on a 1999 tax default sale (with “uplands” defined as “lands bordering on navigable waterways,” CAL. CODE REGS. tit. 2, § 1900(g) (2010)); thirty-one acres of tidal marsh, intertidal baylands, and adjacent uplands in Triangle Marsh (acquired in 1999); and eighty-four acres of tidal marsh in Atherton Avenue Bayland (acquired in 2000). See MCA RICHARDSON BAY, supra note 143.
148. See Osherenko, supra note 21, at 346.
149. See id.; TOWNSEND ET AL., supra note 142, at 1.
150. Summa Co. v. California ex rel. 466 U.S. 198, 202–03 (1984) (internal citations omitted). The 14,000-acre parcel at issue in this case, the Rancho Ballona, included some 2000 acres of tidelands. See id. at 202 n.2. By the time of the litigation, only a lagoon remained; the remainder of the tidelands had been filled either naturally or by development. See id.
Since Mexican landowners were permitted to own submerged lands, the courts have held that such lands confirmed under the Act of 1851 remain in private ownership.\textsuperscript{151} Additional submerged lands purchases were made after the Mexican-American War but before a state constitutional prohibition on such sales took effect in 1876.\textsuperscript{152} The constitutional prohibition applies to all tidelands within two miles of any incorporated city, county, or town.\textsuperscript{153} The ban was adopted to prevent the "undesirable consequences" that had resulted in the past from monopolistic private ownership of tidelands.\textsuperscript{154} While the constitutional provision specifically refers to "tidelands," the Supreme Court of California has held that the prohibition against alienation extends "to lands which are continuously submerged."\textsuperscript{155} The State further expanded the prohibition with a 1909 law that prohibits the sale of all submerged lands regardless of their distance from an incorporated city, county, or town.\textsuperscript{156}

\textbf{ii. Implications for TURFs}

Fee simple ownership is thus possible on a select subset of submerged lands in California, including (1) lands confirmed under the Act of 1851, (2) lands sold subsequent to the Act of 1851 but prior to the 1876 constitutional prohibition on such sales, and (3) lands that fell outside the constitutional restrictions (i.e., submerged lands more than two miles from any incorporated city, county, or town) and that were sold prior to the 1909 statutory ban on all submerged lands sales. In theory, then, fee simple ownership of TURFs is possible in situations where submerged lands are privately owned, available for acquisition, and contain adequate target species habitat.\textsuperscript{157}
An additional consideration in the fee simple context involves application of the public trust doctrine to privately-owned submerged lands. Fee simple submerged lands granted pursuant to the Act of 1851 are not subject to the public trust doctrine.\footnote{1} Parcels sold after statehood but prior to the 1876 constitutional prohibition on sales of submerged lands, as well as parcels sold prior to the 1909 statutory ban, remain subject to a public trust easement.\footnote{5} Yet even in the situations where the public trust doctrine applies, I believe TURFs are likely to survive public trust scrutiny.

Critics of LAPPs often argue that these programs are antithetical to the public trust doctrine because they freely transfer public trust resources into private hands.\footnote{160} In the case of fishery resources, it is...
alleged that this transfer divests the public of its "right of fishing" and instead provides benefits to a select few private individuals. Critics of LAPPs further argue that the short-term interests of fishermen will not be in harmony with the long-term interests of the public in fishery resources, thus violating the public trust doctrine's principle of intergenerational equity.

Proponents of LAPPs, on the other hand, argue that they are consistent with the public trust doctrine for several reasons. First, LAPPs—including TURFs—do not unreasonably hinder the "right of fishing," as critics of LAPPs argue; rather, they are a means of reasonable government regulation no more restrictive than the widespread fishery management practices of temporal or spatial fishery closures. Virtually every fishery management technique used in the United States imposes some sort of restriction on fishing behavior; such restrictions are not unique to LAPPs, and many have been upheld by the courts. Second,
the public trust doctrine requires the government to regulate fisheries so as to conserve fish stocks. If LAPP management promotes sustainable fishing and enhances fishery conservation, it is completely consonant with the public trust doctrine. The fact that LAPPs constitute a relatively new fisheries management technique is of no consequence to the public trust analysis. The doctrine is "sufficiently flexible to encompass changing public needs. In administering the trust the state is not burdened with an outmoded classification favoring one mode of utilization over another." Finally, LAPPs should provide a long-term, sustained benefit stream to fishermen and fishing communities, fully comporting with the principle of intergenerational equity. In sum, the nature of LAPPs as a management tool appears to align with the public trust doctrine, and TURFs should thus survive public trust scrutiny in the courts.

b. Submerged Lands Leasing

i. In General

Fee simple ownership—while possible—is unlikely to be a common means of implementing TURFs in California, as the vast majority of tidelands and submerged lands in the state are not available for private ownership. Rather, the majority of these lands fall under state jurisdiction. The leasing of submerged lands thus appears to hold the greatest potential as a means for TURF implementation in California. While state and federal governments generally do not have the authority

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165. See Lynch, supra note 22, at 308.

166. "New" is a relative term, and refers to the use of TURFs in modern U.S. fisheries management. The technique has been used historically in fisheries from Japan to the South Pacific Islands. See generally Uchida, supra note 143 (discussing Japan) (on file with author); Aswani, supra note 21 (discussing Oceania). TURFs are also similar to shellfish and kelp bed leasing in the United States. See discussion note 114, supra, and infra Part II.B.2.b.iii.


168. This long-term focus of LAPPs has been noted by California's Fish and Game Commission. Weber & Heneman, supra note 9, § 1, para. 9, no. 3 (stating that restricted access programs should "[p]rovide long-term social and economic benefits to the State and fishery participants").

169. Such authority flows from the SLA, 43 U.S.C. §§ 1301-1315. The California courts have also discussed the matter. According to the California Supreme Court, "[i]t is a well . . . established proposition that the lands lying between the lines of ordinary high and low tide, as well as that within a bay or harbor and permanently covered by its waters, belong to the state in its sovereign character and are held in trust for the public purposes of navigation and fishery." People v. Cal. Fish Co., 138 P. 79, 82 (Cal. 1913).

170. The use of leasing allows the California Fish and Game Commission (one of the entities with oversight over fisheries management in the state) to achieve its goal of "retain[ing] the public ownership status of [fishery] resources" while providing for a long-term, sustainable harvest. Weber & Heneman, supra note 9, § 2, para. 3.
to fully privatize ocean space, they do "have authority to grant limited
property rights that fall short of ownership through leases, easements,
concessions, or other instruments."\textsuperscript{171} The leasing approach has been used
successfully in offshore oil and gas development, aquaculture, and other
marine resource management contexts.\textsuperscript{172}

In considering how best to institute TURF leasing programs, one
must consider which agencies have primary jurisdiction over both the
submerged lands themselves and the resources of interest (that is, the
fisheries). In California, submerged land and resource leases are
generally issued by one of two entities: the State Lands Commission or
the Fish and Game Commission. The State Lands Commission has
jurisdiction over all tidelands and submerged lands, and can issue general
submerged lands leases.\textsuperscript{173} The California Department of Fish and
Game\textsuperscript{174} and Fish and Game Commission\textsuperscript{175} have jurisdiction over fish

\begin{itemize}
\item \textsuperscript{171} Osherenko, supra note 21, at 362.
\item \textsuperscript{172} See id. at 318 (describing the construction of "thousands of stationary and floating
platforms, pipelines, and related infrastructure" for oil and gas leasing); id. at 341 ("Economic
investments normally are not undertaken without secure rights to recoup and even profit from
the investment."). For an example of the security provided by such leases, consider the case of
\textit{Union Oil Co. v. Morton}, 512 F.2d 743 (9th Cir. 1975). In that case, the Ninth Circuit considered
the implications of the federal government's suspension of an oil and gas lease in the Santa
Barbara Channel following the massive Santa Barbara oil spill. \textit{Id.} at 746. The Ninth Circuit
begins its opinion by describing the nature of a lease under the Outer Continental Shelf Lands
Act:
\begin{quote}
A lease issued under this Act . . . does not convey title in the land, nor does it convey
an unencumbered estate in the oil and gas. . . . The lease does convey a property
interest enforceable against the Government, . . . but it is an interest lacking many of
the attributes of private property. Oil and gas deposits beneath the continental shelf
are precious resources belonging to the entire nation. Congress, although encouraging
the extraction of these resources by private companies, provided safeguards to insure
that their exploitation should inure to the benefit of all.
\end{quote}
\textit{Id.} at 747 (referencing Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1331-1356a (2006)).
The court remanded for consideration of whether the lease suspension was temporary or indefinite,
an indefinite suspension constituting a Fifth Amendment taking of property. \textit{Id.} at 751-52.
Likewise, in \textit{Mobil Oil Exploration v. United States}, the Supreme Court held that the United
States owed $158 million in restitution to Mobil Oil for repudiating lease contracts for petroleum
\item \textsuperscript{173} \textit{See Frequently Asked Questions, CAL. STATE LANDS COMM', http://www.slc.ca.gov/
Online_Forms/FAQ.html} (last visited Oct. 8, 2010).
\item \textsuperscript{174} The California Department of Fish and Game is a state department charged with
"managing California's diverse fish, wildlife, and plant resources, and the habitats upon which
they depend, for their ecological values and for their use and enjoyment by the public." \textit{About
the California Department of Fish and Game, CAL. DEPT OF FISH AND GAME, http://www.dfg.ca.gov/about/} (last visited Oct. 6, 2010). For more information on the Department, see
generally \textit{http://www.dfg.ca.gov/}.
\item \textsuperscript{175} The California Fish and Game Commission consists of "up to five members, appointed
by the Governor and confirmed by the Senate. The Commissioners are not full-time State
employees, but individuals involved in private enterprise with expertise in various wildlife-
related fields. . . . The Commission meets at least eleven times each year to publicly discuss
various proposed regulations, permits, licenses, management policies and other subjects within
its areas of responsibility. Probably the best known responsibility of the Commission is its

and wildlife in state waters, and may issue aquaculture and kelp harvest leases.

Neither of the current leasing regimes provides a perfect avenue for TURF implementation. Nevertheless, because the details of these leasing programs can inform the development of a TURF lease framework, this Part discusses how submerged lands leasing law in California is currently structured (including components such as lease duration, size restrictions, and public trust requirements), the types of activities these leasing schemes allow, and the policy rationales underlying the existing leasing frameworks.

ii. General Leasing: State Lands Commission

In California, general leasing of tidal and submerged lands occurs both along the open coast and within estuaries and bays. The State Lands Commission has "broad discretion in all aspects of leasing including category of lease or permit," lease terms, competitive bid processes, and rental rates. Lease terms are restricted to the length "necessary to accomplish the intended use or purpose," with a maximum length for general leases and permits of forty-nine years. Leases can be granted for any "purpose or purposes as the commission deems advisable," so long as those uses are "in the best interest of the State."

In addition, all submerged lands leases issued by the State Lands Commission must comport with the public trust doctrine. The "public

general regulatory powers function, under which it decides seasons, bag limits and methods of take for game animals and sport fish." STATE OF CAL. FISH & GAME COMM'N, http://www.fgc.ca.gov/ (last visited Oct. 6, 2010).

176. See MCA CALIFORNIA, supra note 143. However, "[l]eases or permits for tide or submerged lands shall generally only be issued to riparian or littoral upland owners or use right holders." CAL. CODE REGS. tit. 2, § 2000(c) (2010). This restriction is not absolute, however; the regulation goes on to state that "leases or permits may be granted to the best qualified applicant irrespective of riparian or littoral status." Id.

177. The regulations also state that "[t]he term for leases and permits including any optional renewal periods shall be no longer than necessary to accomplish the intended use or purpose," and specify lease terms for the broad categories of leases as follows: general leases—49 years; agricultural leases—25 years; grazing lease—10 years. See CAL. CODE REGS. tit. 2, § 2004 (2010).

178. See § 2000(b).
180. CAL. PUB. RES. CODE § 6501.1 (West 2009).
181. CAL. CODE REGS. § 2000(b) (2010); see CAL. PUB. RES. CODE § 6005 (West 2009) ("Whenever permissive authority or discretion is vested in any public officer or body under this division, such authority or discretion is subject to the condition that it be exercised in the best interests of the State."); TOWNSEND ET AL., supra note 142, at 5–6.
182. See TOWNSEND ET AL., supra note 142, at 3, 6. Implementation of the public trust doctrine by the Commission is done through careful consideration of [the doctrine's] principles and the exercise of discretion within the specific context of proposed uses. . . . The Commission applies
trust doctrine as codified in the California Constitution does not prevent the state from preferring one trust use over another, but where possible uses of trust lands conflict, "such conflicts [must] be resolved in a manner which on balance is the most protective of significant coastal resources." As described in Part II.B.2.a.ii, supra, TURFs appear to comport with public trust doctrine requirements. While TURFs are not one of the specific, applicable categories of leases listed in the State Lands Commission’s regulations, neither do TURFs fall within the Commission’s categories of impermissible public trust land uses. In addition, the conservation benefits of TURFs align with the management goals of the State Lands Commission: in 2000, the Land Management Division Chief stated that the foremost issue respecting submerged land management was “preserving the environmental integrity of the [submerged] lands and reserves for future generations.”

On many levels, then, TURFs appear to fit well within the State Lands Commission’s general submerged lands leasing scheme. However—and this is where part of the gap in current California submerged lands leasing law becomes evident—the California Code of Regulations states that the State Lands Commission leasing scheme “applies to the leasing of all lands under the Commission’s jurisdiction for all surface uses except the exploration for or extraction of natural resources.” This regulatory language appears to prohibit leases for the

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CSLC PUBLIC TRUST POLICY, supra note 159, at 2–3. State regulation contains language indicating that new and emerging uses of submerged resources fall squarely within the State Land Commission’s leasing authority: “the Commission shall have broad discretion in all aspects of leasing including category of lease or permit.” CAL. CODE REGS. tit. 2, § 2000(b) (2010).


184. CAL. PUB. RES. CODE § 30007.5 (West 2009). The Commission is authorized to “choose among competing valid trust uses” and “accommodat[e] the changing needs of the public while preserving the public’s right to use public trust lands for the purposes to which they are uniquely suited.” CSLC PUBLIC TRUST POLICY, supra note 159, at 3.

185. See CAL. CODE REGS. tit. 2 § 2002(a), (c)–(d) (2010) (listing general leases, which include commercial, industrial, and right-of-way uses; grazing leases; and agricultural leases). The regulations do not specify whether or not this list of lease types is exclusive. See TOWNSEND ET AL., supra note 142, at 8–9. Thus, pursuant to this particular regulation, TURFs potentially could be a permissible lease purpose under the Commission’s multiple use mandate.

186. See CSLC PUBLIC TRUST POLICY, supra note 159, at 2 (proscribing uses “that are not trust use related, do not serve a public purpose, and can be located on non-waterfront property, such as residential and non-maritime related commercial and office uses”).


188. CAL. CODE REGS. tit. 2, § 2000(a) (2010) (emphasis added). This prohibition applies to “minerals, oil, gas or other hydrocarbons, or geothermal resources or any other natural resources, excluding timber.” Id.
purposes of fish harvest, which necessarily involves the extraction of a natural resource. This prohibition respects the non-overlapping jurisdiction between the State Lands Commission and the other California agencies that manage natural resources. Management of fishery resources falls to the California Department of Fish and Game and Fish and Game Commission, and the State Lands Commission may not “establish or impose any controls with respect [to wildlife and fishery management] that duplicate or exceed regulatory controls established by these agencies pursuant to specific statutory or requirements or authorization.”

iii. Aquaculture Leasing (Fish & Game Commission)

*In General*

As noted above, the Department of Fish and Game and the Fish and Game Commission have oversight over fishery management programs in California. This managerial authority encompasses both wild capture fisheries and aquaculture, and the Department of Fish and Game draws a sharp distinction between the two practices. Aquaculture is defined as “that form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and fresh water,” whereas “[r]egardless of whether its purpose is commercial or recreational, fishing involves the take of public trust resources.” Fishing “is therefore distinct from aquaculture, which is an agricultural activity involving the cultivation and harvest of private

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189. Conservation of natural resources has been recognized by both the California courts and the State Lands Commission as a valid public trust purpose. See discussion in TOWNSEND ET AL., supra note 142, at 8–9.

190. “The Department of Fish and Game and the Fish and Game Commission are the principal state agencies responsible for the establishment and control of wildlife and fishery management programs . . . .” CAL. PUB. RES. CODE § 30411 (West 2009).

191. *Id.* Nor may it grant leases “for any purpose . . . otherwise provided for by law.” CAL. PUB. RES. CODE § 6502 (2009).

192. CAL. PUB. RES. CODE § 30411 (“The Department of Fish and Game and the Fish and Game Commission are the principal state agencies responsible for the establishment and control of wildlife and fishery management programs”).

193. CAL. FISH & GAME CODE § 17 (West 2009); see also CAL. CODE REGS. tit. 14, § 235 (2010); CAL. CODE REGS. tit. 8, § 6051 (2010) (defining aquaculture synonymously with mariculture to include “[t]he culture and husbandry of aquatic organisms”). The term “aquaculture” does not include “species of ornamental marine or freshwater plants and animals not utilized for human consumption or bait purposes that are maintained in closed systems for personal, pet industry, or hobby purposes.” CAL. FISH & GAME CODE § 17 (West 2009).

property." The way a particular target species stock is managed, specifically the degree to which it is propagated, cultivated, and maintained prior to harvest, will thus affect whether the management regime is more akin to a wild capture fishery or a true aquaculture operation. While this Article focuses more on TURFs for wild capture harvest ("fishing" in Fish and Game parlance), the aquaculture regulations are relevant insofar as they describe how Fish and Game has structured the private harvest of living marine resources. As such, the regulations shed light on how a TURF-specific leasing regime might be designed.

Aquaculture leases may grant rights to the water bottom and/or water column, and initial lease terms can extend up to twenty-five years (ten years for finfish). Upon expiration, leases may be renewed for another five-year (finfish) or twenty-five-year (non-finfish) maximum term if the lessee is still actively engaging in aquaculture operations. Existing, active lessees have a prior right to renew. Once an aquaculture lease is terminated, the lessee must restore the area to its original state and remove any structures.

As a general rule, aquaculture leases may not "unreasonably interfere with fishing or other uses or public trust values, unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the marine environment to support ecologically significant flora and fauna," nor may they have "have significant adverse cumulative impacts." Each lease site must operate under Commission-approved best management practices, which "shall include a regular monitoring, reporting, and site inspection program that requires at least annual monitoring of lease sites to ensure that the operations are in compliance

195. Id. (emphasis added).
196. The entity with primary responsibility for aquaculture in California is the Fish and Game Commission. See CAL. CODE REGS. tit. 14, § 235(a)(1) (2010) (providing contact information for California's aquaculture regulations). The Fish and Game Commission is responsible for issuing shellfish leases, see discussion of shellfish aquaculture leases infra Part II.B. 2.b.iii, and for setting marine finfish aquaculture standards pursuant to the 2006 Sustainable Oceans Act, see MCA CALIFORNIA, supra note 143; discussion of marine finfish aquaculture leases infra Part II.B.-2.b.iii. Aquaculture applicants must also register with the California Department of Fish and Game, which approves facility siting and design specifications. See TOWNSEND ET AL., supra note 142, at 14. The State Lands Commission does not participate in the aquaculture leasing process, though it is notified of all lease applications, executions, assignments, and renewals. Id. at 15 (citing CAL. FISH & GAME CODE §15415 (2009)).
197. See CAL. FISH & GAME CODE § 15400(a) (West 2009); see also MCA CALIFORNIA, supra note 143.
198. See CAL. FISH & GAME CODE §15405 (West 2009).
199. See id. § 15406(c)–(d).
200. See id. § 15405.
201. See id. § 15406(a).
202. See id. § 15409(a).
203. Id. § 15400(b)(2).
with best management practices related to fish disease, escapement, and environmental stewardship." 204 Noncompliance with best management practices is cause for lease termination. 205

Shellfish Leases

When a shellfish aquaculture lease is granted, the lessee owns and has secure, exclusive cultivation and harvesting rights over all cultivated organisms within the lease area. 206 All animals and plants cultured under an aquaculture lease are the exclusive property of the lessee, and any individual who wrongly appropriates such property may be prosecuted for theft. 207 While the lessee is not permitted to "unreasonably impede public access to state waters for purposes of fishing, navigation, commerce, or recreation," he may "limit public access to the extent necessary to avoid damage to the leasehold and the aquatic life culture therein." 208 Furthermore, the Commission "may prohibit any recreational activity in any aquaculture area 209 subject to a state water bottom lease if it determines that the activity is detrimental to the enhancement of the resource." 210 Shellfish leases are encumbered by detailed, minimum planting and harvesting requirements to ensure lease tracts are actively cultivated. 211

204. Id. § 15400(b)(4).
205. See id.
206. TOWNSEND ET AL., supra note 142, at 15 (citing CAL. FISH & GAME CODE § 15402 (West 2009)). Shellfish species include all "native or nonnative bivalve mollusks." CAL. CODE REGS. tit. 14, § 237(a)(8) (2010). Currently, the three most commonly cultivated marine shellfish species in California include abalone, mussels, and oysters. See MCA CALIFORNIA, supra note 143. Public clam digging beds may not be leased. See CAL. FISH & GAME CODE § 15401 (West 2009).
207. See CAL. FISH & GAME CODE §§ 15001-15002, 15402 (West 2009).
208. Id. § 15411.
209. An "aquaculture area" is defined as "any public waters or private waters contiguous to public waters set aside for the purpose of cultivating, harvesting or relaying of any aquatic plant or animal life." CAL. CODE REGS. tit. 14, § 237(a)(1) (2010) (emphasis added).
210. CAL. FISH & GAME CODE § 15411 (West 2009).
211. For example, bottom-culture oyster cultivation leases must be improved at an average rate of at least two cases of seed-bearing shell (160 pounds of seed-bearing shell) or 30 bushels of shellfish one or more years of age per acre over the allocated acreage per year. Improvements by unattached, single seed (less than one year old) shall consist of planting an average rate of 10,000 single seed per acre per year over the allocated acreage. . . . [T]he annual harvest rate shall be an average of 2,000 oysters per year (over one year of age) over the allotted acreage effective three years after the effective date of the lease.

CAL. CODE REGS. tit. 14, § 237(i)(1) (2010). Shellfish species other than oysters also have minimum planting and harvesting requirements. Id. § 237(i)(2). A determination of whether the minimum planting and harvest requirements have been met can be determined from required reporting. Id. § 237(c)(6), (j). Certain districts have additional requirements; for example, shellfish "harvested from Districts 12 and 13 for commercial purposes must be taken by licensed commercial fishermen." Id. § 237(h).
Finfish Leases

The California Fish and Game Commission has responsibility for setting standards for marine finfish\(^{212}\) aquaculture pursuant to the 2006 Sustainable Oceans Act.\(^{213}\) The Act outlines the conditions required for the California Department of Fish and Game, in conjunction with the Aquaculture Development Committee,\(^{214}\) to prepare a California Environmental Quality Act-consistent programmatic environmental impact report on marine finfish aquaculture operations.\(^{215}\) The report itself is still in the development process, and must address a variety of issues related to environmental sustainability.\(^{216}\)

Before a finfish aquaculture lease may be issued, a lessee will be required to conduct “baseline benthic habitat and community assessments” on the proposed site.\(^{217}\) Lessees will also be required to utilize Commission-approved best management practices, including provisions for monitoring, reporting, and site inspection,\(^{218}\) and must meet all state and regional water quality requirements.\(^{219}\) Finfish lessees must

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212. Finfish include “any species of bony fish or cartilaginous fish (sharks, skates and rays).” CAL. CODE REGS. tit. 14, § 1.46 (2010). “Marine finfish aquaculture” is defined as “the propagation, cultivation, or maintenance of finfish species in the waters of the Pacific Ocean that are regulated by this state.” CAL. FISH & GAME CODE § 54.5 (West 2009).

213. S.B. 201, 2005-06 Leg. ch. 36 (Cal. 2006) (amending CAL. FISH & GAME CODE §§ 15400, 15405-15406, 15406.5, 15409 (West 2009)).

214. The Aquaculture Development Committee is an appointed body consisting of twelve members, including One member representing the department [of Fish and Game], two members from and chosen by the University of California, one with expertise in aquaculture science and one with expertise in outreach to the fisheries community, and one member each from and chosen by the Department of Food and Agriculture, the California Coastal Commission, the State Lands Commission, the State Water Resources Control Board, the State Department of Health Services, and the Joint Legislative Committee on Fisheries and Aquaculture.

215. S.B. 201, 2005-06 Leg. § 3 (Cal. 2006) (codified at CAL. FISH & GAME CODE § 15008(a) (West 2009)); see also CAL. PUB. RES. CODE § 21000 (West 2009) (describing California Environmental Quality Act requirements applicable to programmatic environmental impact reports). The California Environmental Quality Act “is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.” Frequently Asked Questions about CEQA, CAL. NATURAL RES. AGENCY (2007), http://ceres.ca.gov/ceqa/more/faq.html.

216. CAL. FISH & GAME CODE § 15008 (West 2009).

217. See § 15400(b)(3).

218. See id. § 15400(b)(4).

219. See id. § 15400(b)(10).
provide the Commission with financial assurances, such as surety bonds, trust funds, or irrevocable letters of credit, sufficient to ensure full site restoration upon lease termination.\textsuperscript{220} If the Commission determines that a marine finfish aquaculture operation has resulted in natural resource damages or other damages, the lessee will be liable.\textsuperscript{221} Initial marine finfish aquaculture lease terms will be capped at ten years' duration,\textsuperscript{222} and renewals may not exceed five years each.\textsuperscript{223} As with shellfish aquaculture leases, marine finfish aquaculture leases must be in the public interest.\textsuperscript{224}

\textit{Aquaculture and TURFs}

Marine finfish and shellfish aquaculture provide some parallels with TURFs, notably in their spatial, rights-based structure. The relative security and exclusivity of an aquaculture lease accords with the security and exclusivity characteristic of TURF systems. Both TURFs and aquaculture programs further California's stated goals of "augment[ing] food supplies . . . promot[ing] economic activity, increas[ing] native fish stocks, enhanc[ing] and recreational fishing, and protect[ing] and better us[ing] the land and water resources of the state."\textsuperscript{225} TURFs also have the potential to "protect and better use the land and water resources of the state" as compared to traditional fishing management practices.\textsuperscript{226} Despite the fact that TURFs might eliminate overcapitalization\textsuperscript{227} (and hence contract rather than expand employment), TURFs' benefits overwhelmingly align with the legislative intent underlying the state's aquaculture regulations.

\begin{flushleft}
220. See § 15409(a)-(b).
221. See id. § 15409(c).
222. See § 15405(b).
223. See § 15406(d).
224. See § 15400(a).
225. CAL. PUB. RES. CODE § 826 (West 2009). This provision also states a goal of "expand[ing] employment," which may be achieved through aquaculture but is unlikely to occur with TURFs, which by definition limit participation in a fishery. TURFs, for example, could "enhance commercial . . . fishing" through rationalization, which concomitantly "promote[s] economic activity." Id.
226. See id.
227. For a discussion of the ways in which LAPPs can reduce overcapitalization, see, e.g., DONALD R. LEAL, FENCING THE FISHERY 16 (2002) (noting reductions in overcapacity); Branch et al., supra note 5, at 1659 (stating that IFQ "systems . . . promote economic efficiency, improve profitability, reduce overcapitalization, and result in a better quality of product"); AT-SEA PROCESSORS ASS'N, THE POLLOCK CONSERVATION COOPERATIVE: A PRIVATE SECTOR INITIATIVE PROMOTING CONSERVATION OF MARINE RESOURCES 2 (2006), available at http://www.atsea.org/doc/co_op_position_paper.pdf (stating that LAPPs' help in "e[nding] the race for fish also helps resolve the problem of overcapitalization" because "[t]here is no economic return for investing capital to catch fish faster since the amount of fish available to be harvested remains relatively constant").
\end{flushleft}
At the same time, the cultivation-intensive nature of aquaculture sets it apart from wild capture TURFs. In reality, there exists a continuum of possible spatial fishery management regimes, with intensive cultivation and propagation on one end, and spatial management of wild capture fisheries on the other. TURFs as conceptualized in this Article are more likely to fall at the wild-capture end of the spectrum.

California's aquaculture regulations as written would impinge on TURF holders' management authority and could disrupt the stewardship incentives underlying TURF frameworks. For example, the minimum harvest requirements that apply to shellfish leases would restrict the autonomy of a TURF owner operating as an aquaculture lessee; he would not, for example, be able to build stock levels by harvesting fewer than the minimum harvest requirement over an extended period of time.228 The closest analogue for true, wild-capture TURF management in California is kelp harvest leasing, a program also run by Fish and Game.

IV. Kelp Leasing (Fish & Game Commission) & TURFs

California law defines eighty-seven distinct coastal kelp beds in state waters, sixty-one of which are open to leasing.229 Pursuant to the kelp leasing regulations, the Fish and Game Commission may, upon a determination that a lease is in the public interest,230 "lease to any person...
the exclusive privilege\cite{232} to harvest kelp in any designated kelp bed, or part thereof.\cite{232} While kelp leasing is currently restricted to two species, giant kelp (Macrocystis pyrifera) and bull kelp (Nereocystis spp.),\cite{233} this type of leasing structure closely resembles that which would govern a true, wild-capture TURF. Just as Fish and Game has defined distinct kelp beds, so too could it define distinct, species-specific or multi-species TURF beds that could be leased upon a finding that the lease is in the public interest.\cite{234}

The similarities between the existing aquaculture and kelp leasing regulations and (an as yet hypothetical) TURF leasing regime suggest that TURF leasing would be “[c]onsistent with current Commission policies, practices and procedures used for administering lands within its jurisdiction.”\cite{235} Likewise, the economic successes experienced by TURF holders around the world suggest that TURFs are “economically viable, necessary and desirable.”\cite{236} TURFs have counteracted the race to fish,\cite{237} suggesting that they are “[c]onsistent with environmental protection.”\cite{238} Since TURFs were incorporated into Chile’s Fisheries Act of 1991, for example, there has been “a stark contrast between the status of the stocks within the [TURFs] and those in open access ‘historical grounds’: fishermen are highly protective of the first, while a ‘tragedy of the

\cite{231} Note that the interest granted is termed a “privilege” rather than a “right.” CAL. FISH & GAME CODE § 6700 (West 2009); see also CAL. CODE REGS. tit. 14, § 165.5(a) (2010).

\cite{232} CAL. FISH & GAME CODE § 6700 (West 2009); see also CAL. CODE REGS. tit. 14, § 165.5(a) (2010).

\cite{233} See CAL. CODE REGS. tit. 14, § 165.5(a) (2010); see also id. § 632(b)(52)(B)(2) (specifying the applicable Latin names of giant and bull kelp).

\cite{234} See, e.g., Costello & Kaffine, supra note 129, at 326 fig.1 (mapping forty-eight hypothetical TURFs for a species similar to kelp bass (Paralabrax clathratus) off the coast of California).

\cite{235} Id.

\cite{236} Id. For example, fishermen holding de facto lobster TURFs in Maine averaged 39 percent higher incomes than open access fishermen. FRANCIS T. CHRISTY, THE DEVELOPMENT AND MANAGEMENT OF MARINE FISHERIES IN LATIN AMERICA AND THE CARIBBEAN 53 (1997), available at www.bvsde.paho.org/bvsacd/CD11/christy.pdf. The scallop fishery of Nemuro Bay, Japan, is another example of a TURF fishery that has experienced enhanced economic returns. Francis T. Christy, Enhancement, Efficiency and Equity TURFs: Experiences in Management, in FAO FISHERIES REPORT NO. 474, FAO/JAPAN EXPERT CONSULTATION ON THE DEVELOPMENT OF COMMUNITY-BASED COASTAL FISHERY MANAGEMENT SYSTEMS FOR ASIA AND THE PACIFIC 143 (1993); see also Defeo & Castilla, supra note 94, at 266 (“showing] that co-managed artisanal shellfisheries are more effective than open access regimes from a socio-economic point of view”).

\cite{237} See, e.g., Castilla, supra note 83, at 230 (stating that since TURFs were implemented in Chile, “the ‘race for fish’ appears to have been counteracted”).

\cite{238} CAL. STATE LANDS COMM’N REGS. art. 9, § 2802(e) (2007).
commons’ situation prevails in the latter. . . . So far, experience shows that the TURF system provides the right incentives to prevent the overfishing of benthic shellfish resources.”

In designing an environmentally sound TURF regime, issues of lease duration, bed size, transferability, and stewardship capability must be addressed. The kelp leasing framework provides a model for incorporating these factors into a regulatory regime. Pursuant to the California kelp leasing regulations, individual leaseholds may not exceed the greater of twenty-five square miles or half the total, mapped area of the kelp resource. Lease applications must include an intended use development plan and describe the area to be leased, harvest specifications, and the lessee’s financial capabilities. Applicants must demonstrate the ability to harvest and use kelp “in a manner beneficial to the state.” Kelp leases, which may run up to twenty years, are renewable. Lessees have a prior right to renew, and renewal terms are also restricted to twenty years. Leases may not be transferred, assigned, or sublet without prior permission from the Fish and Game Commission. Finally, California’s kelp leasing regulations state that the Commission may, if it finds that the kelp harvesting “will tend to destroy or impair any kelp bed or beds, or parts thereof, or tend to impair or destroy the supply of any food for fish,” close part or all of the relevant kelp bed(s) for up to one year. Any person who harvests from a closed bed or violates any other kelp-related law or regulation may have his license revoked for up to one year.

These types of restrictions illustrate that while kelp leases provide a lessee with exclusive use of the target resource, the state still retains some managerial oversight regarding permissible activities on the leased lands. Similar restrictions will likely appear in TURF leasing regulations, though the precise degree of managerial control ceded to TURF lessees remains to be determined. As discussed in more detail in Part II.C, infra,
the ideal size of a TURF leasehold and the length of a TURF lease will be species- and area-specific. The issue of transferability (that is, whether TURFs are non-transferable, freely transferable, or transferable only with the Commission's prior approval) must be determined with an eye to both economic efficiency and equity/consolidation concerns.

v. Submerged Lands Leasing Summary

The overall submerged lands leasing discussion demonstrates that there currently exists a gap\(^{249}\) in California’s statutory and regulatory regime when it comes to TURF implementation. TURFs do not fit well under the State Lands Commission’s general leasing structure, insofar as TURFs necessarily involve the extraction of a natural resource. Nor do TURFs fit well under the aquaculture framework, unless they involve the active propagation and manipulation of the harvested resource.\(^{250}\) Even then, the aquaculture regulations do not necessarily foster the stewardship incentives underlying TURF management regimes. For example, the minimum harvesting and planting requirements of shellfish aquaculture leases usurp some of a lessee’s managerial control, and could encourage him to act counter to what he perceives to be in the long-term interest of the fishery resource. Kelp leases provide the best analogue for true, wild-capture TURFs, but are currently limited in their application to two species.

While California submerged lands leasing and resource law and regulation currently fall short of providing an easy path for TURF implementation, we can look to current leasing law for guidance in crafting a TURF regulatory framework. Certain provisions of the extant leasing regimes—such as exclusive, spatially-defined harvest privileges and adequate lease terms—will be directly applicable to TURF leasing, while others—such as detailed harvesting and planting requirements—would be counterproductive. Suggested considerations for TURF leasing provisions are discussed in more detail in Part II.C, infra.

\(^{249}\) By “gap,” I mean that California law does not provide an easy, seamless, clear-cut means of implementing TURFs.

\(^{250}\) See CAL. FISH & GAME CODE § 17 (West 2009) (defining aquaculture as involving propagation and cultivation); see also CAL. CODE REGS. tit. 14, § 235 (2010) (“[A]n aquaculture facility is one that is devoted to the propagation, cultivation, maintenance and harvesting of aquatic plants and animals in marine, brackish or fresh water.”); CAL. CODE REGS. tit. 14 § 237(i)(1) (delineating oyster cultivation requirements). The California Code of Regulations defines aquaculture synonymously with mariculture to include “[t]he culture and husbandry of aquatic organisms.” CAL. CODE REGS. tit. 8, § 6051 (2010).
c. The Marine Life Protection Act

An additional law to consider with respect to TURF implementation in California is the Marine Life Protection Act (MLPA), also administered by the Department of Fish and Game. California's MLPA seeks to use "[marine protected areas (MPAs)] and sound fishery management" practices as "complementary components of a comprehensive effort to sustain marine habitats and fisheries." Insofar as TURFs represent a "sound fishery management" practice that helps "sustain marine habitats and fisheries," they fulfill the legislature's goals in enacting the MLPA.

The spatial nature of TURFs appears to place them within the MLPA's definition of an MPA. Specifically, the MLPA defines an MPA as a discrete geographic marine or estuarine area seaward of the mean high tide line or the mouth of a coastal river, including any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna that has been designated by law, administrative action, or voter initiative to protect or conserve marine life and habitat...[including] areas that allow for specific commercial and recreational activities, including fishing for certain species but not others, fishing with certain practices but not others, and kelp harvesting, provided that these activities are consistent with the objectives of the area and the goals and guidelines of this chapter.

The MLPA expressly states that MPAs may allow species-specific and practice-specific fishing; theoretically, this could encompass the use of TURFs to fish for particular target species. The MLPA also expressly permits kelp harvesting, which can occur pursuant to a lease scheme that, as discussed above, closely parallels a TURF operation.

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251. CAL. FISH & GAME CODE §§ 2850–2863 (West 2009).
253. CAL. FISH & GAME CODE § 2851(d).
254. Id. § 2852(c) (emphasis added).
255. See id; see also § 2853(c) (stating that MPAs "may include areas with various levels of protection"); CAL. CODE REGS. tit. 14, § 632 (2010) ("Public use of marine protected areas...shall be compatible with the primary purposes of such areas.").
256. See discussion supra Part II.B.2.b.iv.
257. The MLPA requires that "[t]he department and team, in developing the preferred siting alternative, shall take into account the existence and location of commercial kelp beds." CAL. FISH & GAME CODE § 2857(d) (West 2009) (emphasis added). This compatibility between kelp leasing and MPAs is cross-referenced in the California Code of Regulations, which states that landing records shall contain, where applicable, information on the "marine protected area where plants were harvested." CAL. CODE REGS. tit. 14, § 165(b)(3)(E) (2010). Kelp harvesting is prohibited in marine reserves. See id. § 165(b)(5).
As long as a TURF is designed to meet the MLPA’s “primarily inten[tion of] protect[ing] or conserv[ing] marine life and habitat,” it appears to fall within the legislation’s definition of an MPA. 259

If TURF-MPAs were created pursuant to the MLPA, they could advance a variety of the Act’s goals. Those goals include, first, “protect[ing] the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems.” 260 As described above, properly-designed TURFs can lead to resource stewardship and habitat protection, in turn enhancing ecosystem structure and function. 261 Second, TURF-MPAs can “help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted.” 262 These sustainability and conservation goals align with the fundamental rationales for TURF implementation and have been realized in a variety of contexts. For example, territorial use strategies in the Solomon Islands have led, all else equal, to higher fishery yields. 263 Catch per unit effort and size measurement data suggest the rebuilding of shellfish stocks inside Chilean TURFs.264

Third, designating TURFs through the MLPA has the potential to “improve . . . educational[] and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and . . . manage these uses in a manner consistent with protecting biodiversity.” 265 Designating certain MPAs as TURFs would allow for a unique educational and study opportunity; as our country seeks to make fisheries management more effective and sustainable, TURFs may—for certain species and in certain circumstances—provide an appropriate management strategy. Using the MLPA as a catalyst for studying TURFs

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258. CAL. FISH & GAME CODE § 2852(c) (West 2009).
259. TURFs implemented via MPAs would also fall squarely within the Commission’s ability to “regulate commercial and recreational fishing and other taking of marine species in MPAs.” Id. § 2860(a); see also CAL. CODE REGS. tit. 14, § 632(b) (2010) (referencing CAL. FISH & GAME CODE § 2860 (West 2009)).
260. CAL. FISH & GAME CODE § 2853(b)(1) (West 2009).
261. See Aswani, supra note 21, at 286. For example, a TURF-like community based subsistence fishing area in Hawaii harbors higher fish biomass than similar reef communities elsewhere in the Islands. See A. Friedlander et al., Application of Hawaiian Traditions to Community-Based Fishery Management, 2 PROCEEDINGS 9TH INT’L CORAL REEF SYMPOSIUM 813, 815 fig.2 (2000). TURF-holders in Japan and Chile have engaged in habitat enhancement activities such as kelp cultivation. See Cancino et al., supra note 94, at 401; see also Defeo & Castilla, supra note 94, at 269 (stating the potential for use of “low-cost stock enhancement activities”). In Chile, many TURF-holders are attempting to rebuild stocks of both the target species and species that are ecologically linked to the target species, such as their prey items. See Cancino et al., supra note 94, at 400. Chilean law also permits the implementation of small-scale aquaculture projects within TURF boundaries to enhance benthic habitat. See id. at 401.
262. CAL. FISH & GAME CODE § 2853(b)(2) (West 2009).
263. See Aswani, supra note 21, at 289.
264. See Defeo & Castilla, supra note 94, at 271.
265. CAL. FISH & GAME CODE § 2853(b)(3) (West 2009).
would help illuminate when and how TURFs can play a role in U.S. fisheries management. To the extent TURFs are successful in incentivizing sustainable harvest and stewardship of the underlying habitat, they can help achieve the MLPA's goal of "protect[ing] marine natural heritage." Successful TURF-MPAs in California waters could be used as models for implementing spatial fisheries management elsewhere in the country.

Even though TURFs have not been included in MPA networks in the first iteration of the MLPA process, they can still be considered during subsequent "establishment, modification, or abolishment" proceedings. Specifically, the Commission is required to, "at least every three years, receive, consider, and promptly act upon petitions from any interested party, to add, delete, or modify MPAs." A petition for a TURF-MA that is demonstrably consonant with the goals and guidelines of the MLPA could be reviewed pursuant to this process. At the same time, this three-year review process has the potential to skew stewardship incentives; in essence, a TURF holder would have a three-year maximum secured harvesting right to his TURF-MPA. Every time the review process was initiated, the TURF designation could change. As discussed in Part II.C.2, infra, such short tenure is unlikely to foster a strong sense of stewardship in the TURF-holder, potentially altering his behavior. For this reason alone, the MLPA may not provide an ideal avenue for TURF implementation in California.

d. The Marine Life Management Act

The final law I consider is California's Marine Life Management Act ("MLMA"), which provides the Department of Fish and Game and the Fish and Game Commission with greater management authority over marine wildlife. While this law does not provide an explicit framework for establishing TURFs in California waters, it does contain language that appears to endorse the use of TURFs in appropriate circumstances.

266. Id. § 2853(b)(4).
267. Id. § 2853(c)(5).
268. CAL. FISH & GAME CODE § 2861(a).
269. See, e.g., Costello & Kaffine, supra note 129, at 21 (finding that "the possibility of renewed concessions is sufficient to cause an appropriator to choose either a good stewardship infinite-time path or a poor stewardship finite-time path. ... To induce the first-best economic outcome, concessions contracts will have to contain longer tenure periods when: (1) species grow slowly, (2) appropriators believe the probability of renewal is small, and (3) discount rates are high"); Aswani, supra note 21, at 289-90 (discussing durability, property rights, and security of title).
The MLMA was adopted on January 1, 1999, and applies to a subset of California fisheries including the white seabass fishery and nearshore finfish fishery. The MLMA has several stated goals, including habitat conservation and sustainability of fisheries and fishing communities. The Act states that programs for the conservation and management of the marine fishery resources of California shall be established and administered to prevent overfishing, to rebuild depressed stocks, to ensure conservation, to facilitate long-term protection and, where feasible, restoration of marine fishery habitats, and to achieve the sustainable use of the state’s fishery resources.

The Act seeks to achieve these goals through the development and use of fishery management plans. To the extent plans incorporate new conservation and management measures, Fish and Game must summarize how those new measures are expected to affect the fishery resource, fish habitat, fishermen, and fishing communities.

As discussed in some detail throughout this article, TURFs can help reduce the race to fish and thus achieve many of the MLMA’s stated goals such as sustainability and habitat conservation. TURFs achieve these goals through “restricted access” and “restricted harvest,” two of the fishery management means permitted by the MLMA. While the

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272. See id.; see also CAL. FISH & GAME CODE § 7055(a) (West 2009) (stating that it is the policy of the state of California that the state’s “commercial fisheries, and the resources upon which they depend, are important to the people of the state and, to the extent practicable, shall be managed in accordance with the policies and other requirements of this part in order to assure the long-term economic, recreational, ecological, cultural, and social benefits of those fisheries and the marine habitats on which they depend”); id. § 7050(b) (“It is the policy of the state to ensure the conservation, sustainable use, and, where feasible, restoration of California’s marine living resources for the benefit of all the citizens of the state. The objective of this policy shall be to accomplish . . . (1) Conserv[ing] the health and diversity of marine ecosystems and marine living resources; (2) [a]llow[ing] and encourag[ing] only those activities and uses of marine living resources that are sustainable; . . . (4) [r]ecogniz[ing] the importance to the economy and the culture of California of sustainable . . . commercial fisheries . . . ; (6) [m]anag[ing] marine living resources on the basis of the best available scientific information and other relevant information that the commission or department possesses or receives; . . . [and] (9) . . . encourag[ing] regional approaches to management.”) (alteration to original punctuation); id. § 7056(a)–(b) (reiterating sustainability and habitat health goals). “Sustainability” is defined as including both “(a) [c]ontinuous replacement of resources, taking into account fluctuations in abundance and environmental variability,” and “(b) [s]ecuring the fullest possible range of present and long-term economic, social, and ecological benefits, maintaining biological diversity, and, in the case of fishery management based on maximum sustainable yield, taking in a fishery that does not exceed optimum yield.” § 99.5.
273. CAL. FISH & GAME CODE § 7055(b) (West 2009).
274. See §§ 7070, 7072.
275. See § 7083(b).
276. See CAL. FISH & GAME CODE §§ 99, 7071(c), 8587.1(a) (West 2009). Section 7071(c) specifically provides that “[r]egulations adopted by the commission may include, but need not be
MLMA does not specifically list TURFs as a fishery management tool, it does provide a non-exclusive list of management regulation types including "restricted access" fisheries, that is, fisheries "in which the number of persons who may participate, or the number of vessels that may be used in taking a specified species of fish, or the catch allocated to each fishery participant, is limited by statute or regulation." TURFs limit both the number of participants and the allocated catch, albeit by spatial as opposed to fractional quota means.

The Fish and Game Commission touts the advantages of restricted access programs in a policy document, stating that such programs should help achieve the goals of "contribut[ing] to the effective conservation and management of the State's marine living resources, provid[ing] long-term social and economic benefits to the commercial fishing industry and the State, and retain[ing] the public ownership status of those resources." But while the Commission supports the use of restricted access programs in general, it recognizes the concerns that many people have with programs that restrict harvest rights, like IFQs and TURFs. The

277. See id. § 99.

278. As with IFQs, TURF programs can be designed with transferability options. See Weber & Heneman, supra note 9, § 6, para. 1 ("Permits within a restricted access program may be transferable or not, depending on the fishery. California currently manages some restricted access fisheries in which the permits are not transferable. Although non-transferable permits may be appropriate for some fisheries, the Commission expects that the trend will be toward transferability."); id. § 6, para. 2 ("In California, as in nearly all states and federal fisheries, most limited access permits are transferable.").

279. Id. § 2, para. 3; see also id. § 1, para. 8, nos. 1-4 (stating that restricted access programs should "[c]ontribute to sustainable fisheries management by providing a means to match the level of effort in a fishery to the health of the fishery resource and by giving fishery participants a greater stake in maintaining sustainability; [p]rovide a mechanism for funding fishery management, research, monitoring, and law enforcement activities; [p]rovide long-term social and economic benefits to the State and fishery participants; and [b]roaden opportunities for the commercial fishing industry to share management responsibility with the Department"); id. § 2, para. 3 (stating that "the Commission's purposes for restricting access or entry to a fishery are described as being to: 1) promote sustainable fisheries; 2) provide for an orderly fishery; 3) promote conservation among fishery participants; and 4) maintain the long-term economic viability of fisheries").

280. See id. § 8, para. 4.
Commission states that it will consider harvest rights systems “only after careful consideration of stakeholder input.”

While the MLMA focuses largely on sustaining wild fish stocks, it also recognizes “the long-term interests of people dependent on fishing for food, livelihood, or recreation,” and seeks to minimize “[t]he adverse impacts of fishery management on small-scale fisheries, coastal communities, and local economies.” Any restricted access/restricted harvest rights program, including TURFs, necessarily restricts access to the fishery resource, and will have some effect on fishermen and fishing communities. As fisheries managers consider how best to use, design, and implement TURFs, such distributive impacts will need to be considered, minimized (to the extent possible), and fairly allocated. For example, priority for participating in a restricted access program could be given to fishermen that historically have participated in the fishery in a meaningful way. Fishermen and other stakeholders should be actively involved in a TURF development process, and any TURF program should be designed to meet the unique needs of the target fishery. To avoid the consolidation concerns that often accompany discussions of transferability, the Commission could place conditions on permit transfers.

Per the MLMA, fishery management plans that incorporate some form of restricted access must be reviewed every four years, and revised as appropriate. In addition, the Commission’s general restricted access policy must also be reviewed at least every four years. As with the MLPA, these review and revision requirements might skew the desired incentive structure underlying TURF systems. The Fish and Game Commission attempts to temper this uncertainty by providing that, as long as permit conditions are met, “[p]ermits may be renewed annually

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282. CAL. FISH & GAME CODE § 7056(i) (West 2009).

283. Id. § 7056(j).

284. See, e.g., id. § 7086(c)(2) (stating that for overfished fisheries, the Department must “[a]llocate both overfishing restrictions and recovery benefits fairly and equitably among sectors of the fishery”); Weber & Heneman, supra note 9, § 2, para. 7 (noting that restricted access programs must be designed to “avoid restricting access more than is necessary”).

285. Weber & Heneman, supra note 9, § 8, para. 6, nos. 1–2.

286. See generally id. § 3.

287. See id. § 6, para. 3. A primary concern is that one large company or processor will buy up all (or a vast majority) the permits, consolidating control of the fishery, excluding many participants, and effectively creating a monopoly. See Aswani, supra note 21, at 286 (stating that critics of LAPPs argue that the programs “encourage the monopolization of fishing quotas”).

288. See Weber & Heneman, supra note 9, § 3, para. 6.

289. See id. § 3, paras. 4, 6.
for the life of the restricted access permit." However, the conditions imposed on permit renewal may themselves skew incentives. For example, "a minimum number of landings could be required to qualify for permit renewal." Just as with shellfish aquaculture leases, such minimum harvesting requirements usurp some of a lessee’s authority to manage the resource as he sees fit. For these reasons, the MLMA appears a less than ideal means for instituting TURFs in California state waters.

C. TURF Design: Final Considerations

1. In General

In sum, neither fee simple ownership, existing submerged lands leasing regimes, the MLPA, nor the MLMA represents a straightforward means of implementing TURFs in California state waters. If California becomes serious about using TURFs as a fisheries management tool, it may behoove the state to craft TURF-specific policy. TURF policy can be informed by the state’s existing submerged lands leasing laws, the MLPA, and the MLMA, and will require consideration of a number of factors. The Fish and Game Commission’s own list of possible considerations for harvest rights system establishment includes

(1) fair and equitable initial allocation of quota shares which considers past participation in the fishery,
(2) resource assessment for establishing total allowable catch estimates,
(3) fishery participation goals and aggregation limits,
(4) cost recovery from quota holders,
(5) quota transferability and,
(6) recreational fisheries issues.

290. Id. § 5, para. 8. The Commission recognizes the importance of duration of tenure, stating that

Limiting participation to a period less than the actual life of the limited access program has several drawbacks. First, it could eliminate incentive for conservation among permit holders if they know that their participation in the fishery will be limited. Second, a limitation on permit life would tend to discouragement investment and diminish the value of existing investment (vessels, for instance) in the fishery. New investment in many fisheries is needed for safer, more fuel efficient vessels, for equipment to maintain quality of the catch, and for changing gear. That will be discouraged if the duration of the permits is limited.

Id.; see also Aswani, supra note 21, at 289 (discussing duration or durability).

291. Weber & Heneman, supra note 9, § 4, para. 9, no. 3.

292. Id. § 8, para. 7, nos. 1-6. This list of considerations is in reference to individual allocation schemes under the MLMA.
The specific way in which each of the above considerations is included in a TURF regime will determine how effective that system is in promoting or hindering California's stated goals of sustaining fish and fishing communities. Such factors, as well as lease duration and TURF size, should be considered and addressed in the TURF design process by decision makers, whether they be agency employees, state legislators, or fishermen instituting voluntary TURFs.

2. Lease Duration

One of the most important considerations in TURF design is lease duration. Lease duration can have a profound impact on whether or not stewardship incentives (which undergird the ecological and economic rationales for TURFs) inhere in the lessee. Lease duration affects behavior because "[t]he decision to restrict harvest in one period to enhance future profits is fundamentally an investment decision by the” lessee. If the lease term is so short that the lessee cannot reap the benefits of his investment (as likely would be the case with the three- and four-year terms provided by the MLPA and MLMA, respectively), he will have little to no incentive to steward the resource.

The interplay among lease duration, probability of lease renewal, species’ intrinsic growth characteristics, and lessees’ discount rates shapes a lessee’s behavior in the TURF context. Lease duration plays a central role in determining whether a lessee will choose a good stewardship path that leads to sustainable harvest in perpetuity, or a poor stewardship path that depletes or “mines” the resource. Several factors that affect what lease duration is required to induce stewardship behavior include the perceived probability of lease renewal, the target species

293. Costello & Kaffine, supra note 129, at 22.

294. Seijo et al. state:

The . . . rate to which future revenues are discounted at present values is the discount rate. A higher discount rate would lead to a lower present value, and vice versa. . . . Sustainable exploitation of a fishery resource requires that the sum of the present value of net revenues be maximized. Setting sustainable yield levels for this purpose will depend on: (a) the biological balance between recruitment, somatic growth and mortality rates; (b) dynamic fluctuations in costs and prices in a regional and international context, probably reflected in the interest rate; and (c) socio-economic and political conditions. . . . In this context, the selection of a specific discount rate value will be critical in setting an adequate exploitation strategy, and will depend on the expected variability in the bio-socio-economic variables above mentioned.


295. See generally Costello & Kaffine, supra note 129.

296. See id. at 21.
stock's growth rate, and the lessee's discount rate. A lower perceived probability of renewal requires a relatively longer lease duration, and there exists some lower bound on renewal probability below which no lease duration is sufficient to induce stewardship behavior. Conversely, higher perceived renewal probabilities permit less lengthy lease durations, and there exists an upper bound on renewal probability above which any lessee will choose to steward the resource. Higher discount rates amplify these requirements; in other words, if a lessee has a higher discount rate, he will require an even higher renewal probability and/or lease duration to pursue the stewardship path.

The growth rate of the target species stock also affects how long a lease must be to promote stewardship behavior. All else equal, a higher growth rate is more conducive to stewardship behavior. Stocks that grow more slowly will be susceptible to resource mining without relatively longer lease duration and/or higher renewal probability. Costello and Kaffine test this principle through an analysis of two TURF fisheries in Baja California, Mexico: the spiny lobster (Panulirus interruptus) and abalone (Haliotis sp.). Both fisheries are managed via twenty-year, geographically-delineated concessions; TURFs are granted to each of twenty-six fishing cooperatives. Spiny lobsters have a relatively high intrinsic growth rate and have been managed quite sustainably since the inception of the concession system in 1936. The abalone growth rate is much lower, and as would be expected, yields have fallen over the years.

As the spiny lobster and abalone examples show, there is no easy, fixed answer as to proper TURF lease duration. That determination will be a species-specific exercise tailored to regional circumstances. In sum, if species grow slowly, discount rates are high, or the probability of renewal is perceived by the lessee to be low, longer lease terms will be necessary to induce good stewardship behavior. All of these factors must be taken into account by decision-makers when designing a TURF regime. If California chooses to pursue TURFs as a fisheries management
tool, explicit consideration of the interplay among lease duration, species growth characteristics, the probability of renewal (as perceived by the lessee), and the lessee's discount rate can enhance the chances of successful resource stewardship.

3. TURF Size & TURF-Specific TACs

Numerous biological and ecological variables will affect how large an individual TURF must be to provide for sufficient, sustainable, long-term harvest. Spatial heterogeneity—differences in habitat productivity across space—must be taken into account. Target species' life history, including home range size, must also be considered. TURFs should be sized such that they largely encompass the home range of the target species. If the target species' home range exceeds the size of an individual's TURF, the TURF-holder would be expected to overharvest the resource as it passes through his TURF so as to prevent a neighboring TURF holder from realizing any "unearned" conservation benefits.

In addition to proper sizing, another way of preventing the overharvesting outcome is to impose a TURF-specific TAC (that is, a spatial TAC). Other countries have taken this approach. For example, Chile sets annual TACs on a per-species, per-TURF basis. A spatial TAC set at the optimal level should have no impact on the TURF holder's behavior; presumably, he would have arrived at the same level of harvest on his own. If the TAC is set too high, the TURF-holder would voluntarily catch fewer fish so as to attain the optimal long-term benefits of harvest. If the TURF is set too low, an economic inefficiency would ensue, though no detrimental ecological impacts would be expected.

Setting TURF-specific TACs would be an information-intensive endeavor, and would ideally involve patch-specific stock assessments and

308. See Cancino et al., supra note 94, at 398 (discussing habitat heterogeneity). One alternate or supplementary way of addressing this issue is to rotate fishing grounds on a daily, weekly, etc. basis. See id. at 399. This approach works better where TURFs are provided to cooperatives as opposed to individuals, to ensure that the conservation incentive structure remains in place. See id. at 403 (discussing the importance of pooling arrangements in TURF systems).

309. See, e.g., Defeo & Castilla, supra note 94, at 266, 269–70 ("highlighting] the role of species life histories in the successful implementation of spatially-explicit management tools [such as ... Territorial User Rights for Fishery (TURFs)]."

310. This might be the case for some of the moderately mobile species managed by Japanese Fisheries Cooperative Associations. See Cancino et al., supra note 94, at 394.


312. In this case, the TURF-holder could presumably communicate his concerns to the fisheries management agency, which could alter the TAC accordingly.
take into account inter-TURF habitat variability. TURF-holders ultimately could provide much of the required information, as they would be most intimately acquainted with the prevailing conditions on their particular sites. While such data collection might appear cost- and labor-prohibitive, this type of area-specific information is already required in California’s kelp harvest and aquaculture contexts. For example, for a subset of kelp beds, lease applicants must submit, each year, “evidence of a scientifically acceptable survey of the requested kelp bed, conducted within one year of the date of the application, showing the extent of the kelp bed and the quantity (biomass) of kelp present.” Before an agency issues an aquaculture lease, “the lessee shall provide baseline benthic habitat and community assessments of the proposed lease site . . . and shall monitor the benthic habitat and community during the operation of the lease.” Similar provisions could be incorporated into a TURF policy.

CONCLUSION

While LAPPs—specifically IFQs—have become more common in the United States in recent years, the adoption of TURFs as a management strategy is still in its infancy. This is largely due to considerable uncertainty regarding legal options for implementing true spatial property rights in the sea. This Article seeks to clarify exactly what property rights can be granted to fishermen under TURF systems, and to outline the various ways in which these grants can be made.

While California law and regulation generally support the idea of TURFs, they do not expressly provide for TURF implementation. For example, while TURFs potentially fall under the MLPA’s definition of an MPA, they are not expressly mentioned in the legislation. Likewise, the MLMA generally supports restricted access fisheries, but cautions against the indiscriminate use of harvest rights restrictions like IFQs and TURFs. While fee simple TURF ownership is possible on a subset of submerged lands, it is not likely to be a common occurrence. Leasing, on the other hand, holds more promise, but again, current submerged lands leasing law in California provides no direct means for TURF implementation. Kelp harvest leases provide the closest parallel to true, wild-capture TURF leases, but currently only consider the harvest of two species. If

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313. Habitat variability information could be obtained through, for example, the California Department of Parks and Recreation’s marine nearshore ecosystem mapping project. See CAL. FISH & GAME CODE § 2856(a)(1) (West 2009).
315. CAL. FISH & GAME CODE § 15400(b)(5) (West 2009).
316. The two species are giant kelp (Macrocystis pyrifera) and bull kelp (Nereocystis spp.). CAL. CODE REGS. tit. 14, §§ 165.5(a), 632(b)(52)(B)(2) (specifying the applicable Latin names of giant and bull kelp).
California decides to move forward with TURFs, it appears that, rather than trying to wedge TURFs into existing law, the most straightforward path would be to craft TURF-specific policy.

Exactly when TURFs will work best as a fisheries management tool remains an open question. Scientists and fisheries managers must collaborate and experiment to find the answers, and states can do much to foster such collaboration and experimentation. California tends to be progressive in its environmental policies, and has the potential to be a leader in TURF management. If California decides to move forward with TURF-specific regulation, it can look to its existing kelp leasing framework, as well as the aquaculture regulations, MLPA, and MLMA, for guidance.

For any target species, the Fish and Game Commission, acting pursuant to its regulatory power function, could, for example:

- Designate properly-sized, geographically-delimited harvesting areas that account for spatial heterogeneity;
- Issue an exclusive harvesting lease for a defined harvest area upon a determination that the lease was in the public interest;
- Designate the lease an exclusive “privilege” as opposed to a true right;
- Cap the total area leased to any one individual or group to prevent fishery consolidation;
- Determine the minimum length of time required to incentivize sustainable fisheries harvest and cap lease terms (and renewals) at the appropriate tenure;
- Provide a prior right to renew for existing lessees

317. See CAL. FISH & GAME CODE § 200 (West 2009) (establishing the Fish and Game Commission’s general regulatory power: “There is hereby delegated to the commission the power to regulate the taking or possession of birds, mammals, fish, amphibia, and reptiles to the extent and in the manner prescribed in this article.”); CAL. FISH & GAME CODE §§ 200–220 (West 2009) (describing the Commission’s regulatory power in detail); CAL. DEPT OF FISH & GAME, 2010 DIGEST OF CALIFORNIA COMMERCIAL FISHING LAWS AND LICENSING REQUIREMENTS (2010), available at http://www.dfg.ca.gov/marine/pdfs/2010commercialdigest.pdf (noting that the Fish and Game Commission “[s]et[s] California’s fish and wildlife resource management policies;” “[s]et[s] California’s fish and wildlife resource management policies;” and “[b]uild[s] active fish and wildlife resource management partnerships with individual landowners, the public and interest groups, and federal, state, and local resource management agencies”).


319. See CAL. FISH & GAME CODE § 6700 (West 2009); CAL. CODE REGS. tit. 14, § 165.5(c) (2010).

320. See CAL. FISH & GAME CODE § 6700 (West 2009); CAL. CODE REGS. tit. 14, § 165.5(a) (2010).

321. See CAL. FISH & GAME CODE § 6703 (West 2009).

322. See generally CAL. FISH & GAME CODE §§ 6703–6704 (West 2009); Costello & Kaffine, supra note 129 (describing tenure requirements).
• Freely permit transferability, or permit transferability only with the Commission's prior permission;\textsuperscript{324}
• Encourage the study of TURFs as a management tool by incorporating a scientific research provision in the regulations.\textsuperscript{325}

This list is not meant to be exhaustive, and this Article does not seek to develop a comprehensive TURF management regime for California. Rather, it seeks to highlight the promise of TURFs and provide some key considerations for decision makers charged with developing a TURF regime. The Article's analysis of current law and policy provides a jumping-off point for the creation of a comprehensive TURF policy in California. A TURF leasing framework could be modeled on the existing kelp leasing regime, or developed entirely from scratch. Regardless, California—with its extensive coastlines and progressive environmental policies—is well poised to provide a living laboratory for alternative fisheries management techniques. To the extent these techniques prove successful, they can ensure that we sustain our fish and our fishing communities well into the future.

323. See CAL. FISH & GAME CODE §§ 6703, 6704(a), 6706 (West 2009); CAL. CODE REGS. tit. 14, § 165.5(f), (b), (i) (2010).
324. See generally CAL. FISH & GAME CODE § 6708 (West 2009) (requiring prior Commission permission for kelp lease transfer, assignment, or sublet); Weber & Heneman, supra note 9, § 6 (discussing transferability options).
325. See CAL. FISH & GAME CODE § 6657 (West 2009).

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