

The “Commons” Discourse on Marine Fisheries Resources: Another Antecedent to Hardin’s “Tragedy”

Harry N. Scheiber*

Throughout the fifty years since its publication, Hardin’s “The Tragedy of the Commons” has been regarded as a seminal paper in the environmental movement, although his emphasis on population control (which actually formed the core concern of the article) has been largely forgotten. Hardin argued that free access by a growing population to common resources would inevitably lead to the depletion of those resources, citing as one example how maritime nations’ belief in the freedom of the seas, combined with their belief in the inexhaustibility of marine resources, had brought whales and many species of fish close to extinction. Hardin failed, however, to take account of the extensive debates throughout much of the twentieth century by scientists and policymakers on the general problem of the ocean commons — what they generally termed the “dilemma of the commons” — as it applied not only to living marine resources but also to mineral resources. By mid-century, as improved fishing technology gave rise to ever greater catches, the notion of the inexhaustibility of fisheries was largely discredited; hence scientists as well as experts in both national and international law became focused on addressing the dilemma of the commons through fisheries management, and specifically by determining the Maximum Sustainable Yield. Some economists, arguing instead for maximum efficiency, urged that open access be abandoned in favor of limited entry. Such measures to

* Riesenfeld Professor of Law and History, and director, Law of the Sea Institute, emeritus, School of Law, University of California, Berkeley.
Cite as: Harry N. Scheiber, *The “Commons” Discourse on Marine Fisheries Resources: Another Antecedent to Hardin’s “Tragedy,”* 19 THEORETICAL INQUIRIES L. 489 (2018).

resolve the dilemma of the commons were the subject of numerous conferences (including the second UN Conference on the Law of the Sea in 1958) and were widely debated in scholarly publications and, indeed, by the late 1960s had been practically implemented by a number of laws and treaties. By 1966, national control over a twelve-mile fishing zone offshore of coastal nations had been well established. These developments regarding the oceans commons, predating Hardin's article, were apparently either of no interest to him or (if he knew of them) purposefully subordinated to his main polemical objective, which was his Malthusian analysis of the commons issue and his call for limits on "human breeding."

INTRODUCTION

The historical significance of Garrett Hardin's paper, "The Tragedy of the Commons," resides in the way that it has become "a pivotal trope in the environmental movement."¹ And it has continued to maintain its stature as an icon of environmental thought and discourse throughout the fifty years of debates since 1968 as they have addressed issues of law, policy, and moral values. As happens when the mists of passing time close in and obscure the full original meaning or context of intellectual events of even such extraordinary influence, however, it has too often been forgotten that Hardin's paper was essentially a narrowly focused polemic advocating a Malthusian position on unregulated human "freedom to breed." Paradoxically, the principal initial responses to the paper, and its longer-term impact, were most prominently concerned with the exposition he offered on the inherent problem of open access for users of common resources. Hardin contended that to head off disastrous depletion of natural resources, as the consequence of this problem, it was necessary to accept a coercive regime to curb birth rates, however repulsive the concept might be to the liberal *mentalité*; it must be recognized, he declared, that uncontrolled access to common resources would lead to continuously rising pressure on, and ultimately disaster for, those resources in counterpoint with the increasing demand for resources generated by unregulated human reproduction.

1 PAUL SABIN, *THE BET: PAUL EHRLICH, JULIAN SIMON, AND OUR GAMBLE OVER EARTH'S FUTURE* 36 (2013).

I. THE PROBLEM OF THE COMMONS THROUGH A MALTHUSIAN LENS

An essential element in his argument was his depiction of the way in which regimes of commons (in contrast to private property rights) had been used by communities in earlier periods of history, with their smaller population numbers and smaller-scale, less destructive tools for resource exploitation. Famously, he cited the example of the destructive overpressure on the grazing commons of traditional societies: there was an inherent disincentive for any individual with an acknowledged right of access to exercise any self-restraint in the intensity of that individual’s use of the “free” resource that the commons area offered. Once having pointed to the relevance of that metaphor (whatever the degree to which he oversimplified and overgeneralized the facts regarding traditional societies’ management of commons resources), Hardin proceeded to concentrate his polemical fire on the comparable licentiousness, as he saw it, with which uncontrolled population growth had placed modern society inevitably on the path to tragic Malthusian consequences.

In only a few brief passages — they were submerged, as it were, in the rhetorical tidal wave of the main argument about “breeding” — did Hardin provide substantive content to his concession that “the logic of the commons has been understood for a long time, perhaps since the discovery of agriculture or the invention of private property in real estate.” He immediately qualified this statement, asserting that it had been understood “only in an approximate way” and “mostly only in special cases which are not sufficiently generalized.” A special case in point that he mentioned in a few lines concerned how private cattle-raising firms were placing demands on the U.S. federal government to increase constantly the allowable count of their cattle permitted to graze on the publicly owned lands (i.e., the commons) — “to the point where overgrazing produces erosion and weed-dominance.”²

II. THE EXAMPLE OF THE OCEANS COMMONS

The only other significant reference in which Hardin’s text deviated from his focus on population was with respect to the contemporary resource-use problem represented by exploitative pressures that were damaging living marine resources, a vital source of protein food and other products important to human activities. With regard to whales, he noted specifically, certain species were close to extinction already; and, in a passing additional phrase,

2 Garrett Hardin, *The Tragedy of the Commons*, 162 *Sci.* 1243, 1244 (1968).

Hardin suggested that marine fisheries were being subjected to devastating exploitation because the philosophy of the commons prevailed: maritime nations, he contended, were committed to “the shibboleth of the ‘freedom of the seas,’” and on that basis were resisting any coercive restraint on their fishing and whaling operations at sea. Compounding the problem, he declared, these nations (and presumably fishing industry operators generally) held to a persisting belief in the myth of “the inexhaustible resources of the oceans.”³ Consequently, they were reinforced in their opposition to effective legal curbs on fishing or whale hunting on the high sea. In sum, they were fecklessly set on a course toward bringing many species of fish and whales closer and closer to extinction.

The sole citation in Hardin’s “Tragedy” that provided supportive empirical evidence with regard to the oceans issues was a then-recent article in *Scientific American* on the failures of the International Whaling Commission (IWC) to protect Antarctic whales from destructive levels of harvests.⁴ The author, Scott McVay, was not a scientist, let alone an expert on cetology or on international resource regimes; rather, he was a brilliant generalist and gifted writer, a liberal arts graduate then employed as a special assistant to the president of Princeton University. He brought together in his article (illustrated with portraits of the various species of whales being hunted) a summary of the abundant data on hunting effort and impacts on stocks that were readily available in the IWC reports. These data constituted a record of dismal failure, since the commission’s founding in 1946, either to agree upon reliable scientific standards for setting goals on annual whale kills, allocating the harvest quotas to individual member whaling nations on a basis that would protect the most obviously endangered species, or to command trustworthy compliance with the rules (whatever their value) that it promulgated. McVay’s article was not an original scientific report; it was, rather, a well-written summary popularization of information on a resource crisis that was already very well recognized in the research fields and in the larger professional community in biology to which one might reasonably think Hardin was connected and of whose scientific work he ought to have had some knowledge.⁵ In fact, the crisis of the whale stocks and the scandalous failures of the IWC — its regime routinely derided by knowledgeable critics as a “whalers club” at best, and as

3 *Id.* at 1244.

4 Scott McVay, *The Last of the Great Whales*, 216 *SCI. AM.* (1966).

5 The immediate background to McVay’s writing of his 1966 article, and his subsequent career as an activist in the campaign for whale conservation, are discussed in D. GRAHAM BURNETT, *THE SOUNDING OF THE WHALE: SCIENCE AND CETACEANS IN THE TWENTIETH CENTURY* 628-35 (2012).

a “fiasco” at worst — had long been well recognized, and deeply concerning, to biological oceanographers, marine zoologists, international lawyers, and resource conservation specialists.⁶ The considerable literature that they had produced in their respective professional fields was either unknown to Hardin or apparently of no interest to him, being perhaps too far beyond the boundaries of his purpose to sound his alarm regarding the Malthusian disaster that he believed was unfolding.

Other papers in the present symposium have refuted definitively any notion that Hardin’s pronouncements on the problem of the commons represented originality of thought; for, as Professor Banner contends, this thesis “was of course not invented by Hardin. It is a very old one.”⁷ Well-known writings, from the era of the ancients to the time that the “Tragedy” was published, had explicitly recognized and devoted systematic study to the problematic of uncontrolled access to a common resource.

In the same light, I submit, one ought to give close scrutiny to Hardin’s strictures about what he alleged was a widespread acceptance in ocean affairs of the dual “shibboleths,” freedom of the sea and the inexhaustibility of marine resources. His assertions on these points cannot be taken as a well-informed judgment, let alone a fully credible portrayal of how the commons issue in marine fisheries had in reality been defined, debated, and addressed by marine scientists, international lawyers and diplomats, and resource specialists throughout much of the twentieth century — and had been debated with intense focus and sense of urgency in the decade immediately prior to publication of the “Tragedy” article.⁸ Hardin was content with reiterating McVay’s message

6 *Id.*; MALGOSIA FITZMAURICE, *WHALING AND INTERNATIONAL LAW* (2015); KURKPATRICK DORSEY, *WHALES AND NATIONS: ENVIRONMENTAL DIPLOMACY ON THE HIGH SEAS* (2013); JOHAN N. TØNNESSEN AND ARNE O. JOHNSEN, *THE HISTORY OF MODERN WHALING* (R. I. Christophersen trans., 1982).

7 Stuart Banner, *The Banality of the Commons*, 19 *THEORETICAL INQUIRIES L.* 395 (2018). *Cf., contra*, Nathaniel Wolloch, *The Early Modern Prehistory of the Tragedy of the Commons*, 19 *THEORETICAL INQUIRIES L.* 409 (2018) (arguing that the tragedy of the commons is a modern concept). Of course, much depends on the meaning that one gives to “very old.”

8 Ironically, Hugo Grotius — credited with being the founder of ocean law as it prevailed for over two centuries, having set in place the theoretical and moral foundations of “freedom of the seas” in the early 17th century — wrote in his revered treatise that land was a resource that must be subjected to division into property rights holdings, because a commons holding would be depleted by the selfish actions of individuals (a concise expression of the “tragedy” as Hardin reiterated it); Grotius distinguished from property on land the high-seas oceans, which were too vast for their resources to be subject to effective control of any

on the whaling crisis and with what amounts to a few throwaway lines on the nature of the general problem of the ocean commons. He assumed no obligation to provide his readers with a sense of even the rudiments — let alone the rich complexities — that had characterized prior debates in ocean resource discourse. The following brief discussion seeks to recapture the main content and historic importance of that prior discourse, both on the merits and for the purpose of reconsidering Hardin’s article as to both originality and accuracy, in light of the contemporary intellectual context of his “Tragedy” thesis.

III. PRIOR DISCOURSES ON THE COMMONS ISSUE

First of all, there is the matter of terminology. It has been suggested that one reason why Hardin’s article gained such immediate (and perdurable) attention is that he invented an effective name — “tragedy of the commons” — for a long-familiar phenomenon. In fact, in the debates of ocean resources law, science and policy, a term of art was already being deployed: “the dilemma of the commons.” It is relevant to note that in a widely noticed 1966 symposium of oceans experts from several academic fields, law, and industry, the phrase was applied not only by presenters who addressed the issue of high-seas fisheries’ sustainability, but also by others who warned that the “dilemma” applied in a variant way to any regime for seabed mining in future years that failed to vest property rights in mining enterprises. They argued that open access would at best discourage investments, and even if investments were mobilized the foreseeable consequence of open access would be resource depletion wrought by firms with no stake in sustaining the resource itself for the future.⁹

asserted property rights in them, hence, must be considered legally, at least beyond the marginal sea (of varying width, by the 19th century most commonly three miles offshore of coastal nations), as rightfully belonging to all but, equally, being owned by none. HUGO GROTIUS, *THE FREE SEA* 20-38 (Davis Armitage ed., Richard Haklyut trans., 2004); HUGO GROTIUS, *THE RIGHTS OF WAR AND PEACE* 420-29, 462 (Richard Tuck ed., A. C. Campbell trans., 2005) (citing Ulpian: “The sea is by nature open and free for all, and is common as the air itself”).

9 The reference is to papers and panel discussions in the 1966 and 1967 Law of the Sea Institute conferences, proceedings of which were published in *THE LAW OF THE SEA: OFFSHORE BOUNDARIES AND ZONES* (Lewis M. Alexander ed., 1967); *THE LAW OF THE SEA: THE FUTURE OF THE SEA’S RESOURCES* (Lewis M. Alexander ed., 1968). For full analysis of the 1966 and 1967 papers, see HARRY N. SCHEIBER, *OCEAN LAW DEBATES: THE FIFTY YEAR LEGACY AND EMERGING ISSUES*, 11-92 (Harry N. Scheiber, Nilufer Oral & Moon Sang Kwon eds., 2018).

Second, regardless of when the phrase “dilemma of the commons” came to be used routinely, the dilemma itself had long been a central subject of debate among experts in relevant fields of study and policy. At one time, to be sure, there had been wide acceptance of the notion that fish stocks in the high seas were an “inexhaustible” resource, so that “overfishing” was a misguided concept. This perception began to change with the advent of trawler technology, linked with the supplanting of wind power by coal-fueled engine power and the larger vessels and trawls that it permitted, achieving larger-scale and increasingly efficient fishing operations in the early twentieth century. This was followed in the 1930s by the introduction in high-seas fishing of even larger-scale factory vessels driven by diesel power, with fleets of catcher boats and with refrigeration capacity permitting greater distances of operations. These developments largely put to rest the traditional “inexhaustibility” concept, as its implausibility was demonstrated by a flood of reported data on volume of catch, and more especially the data on catch per unit of effort for various commercial species, which indicated that significant, and increasingly alarming, levels of reduction of biomass were occurring in some intensively fished marine stocks.

By the mid-1950s, fishery science experts recognized almost universally that fishing intensity was certainly a key factor, if not the only one, as a cause of the observed declines. The rare but sensational occurrences of a complete collapse of a long-established and once-profitable commercial fishery — the result of the target stock having declined so drastically as to render operations financially insupportable for individual fishing firms or units — further impelled the already manifest concerns about the threats to sustainability of fish stocks globally. Those concerns extended not only to the comprehensive threat of unregulated entry and fishing operations on the high seas (where “freedom of the seas” doctrine continued to be dominant), but also to the open-access commons regimes of many nations’ coastal fisheries within the limits of their jurisdiction, being for most countries and their possessions the ocean waters out to a distance of three miles offshore.¹⁰

10 Even in the sailing ship era, before the 19th century, some whale stocks in the Barents Sea had been decimated and the whaling fleets were diverted to other ocean regions to conduct their operations; in the twentieth century, there was a widely noted collapse of the halibut fishery offshore of British Columbia and the State of Washington, impelling negotiation of a treaty creating a joint regime, whose commissioners closed down the fishery altogether and thereby successfully achieved a resurgence of the stock’s population so as to permit a resumption of fishing (closely regulated) at a future time; and after World War II, the most famous collapse of a commercial fishery, the sardine fishery based in Monterey, California, drew worldwide notice and occasioned the establishment

Third, once the notion of “inexhaustibility” had become discredited, fishery scientists and managers — together with a few mathematicians — began to focus on how best to address the dilemma of the commons. The problem became a major theme of scientific study, policy debate, and efforts at practical reform of both national regimes and international fisheries law. One of its important manifestations was the founding of the International Council for the Exploration of the Seas (ICES), an organization that enjoyed major support from marine nations and was devoted to the scientific study of the biology and population dynamics of marine fisheries; various applied uses of its investigations were expected to be valuable in the designing of more effective fisheries management regimes that addressed the dilemma of the commons.¹¹

Another line of study was directed at resolving the quintessentially practical “management” issue: devising the methodology for determining the point in a fishery’s harvest at which an increase in “effort” would no longer produce an increase in “catch” (yield). When that point was reached, it meant that the “commons dilemma” had become operative. The data for calculating CPUE (catch per unit of effort) in a given fishery were collected season by season, with “catch” being the aggregate weight of landings of the target species; the “unit of effort” was calculated from whatever the authorities determined as its basis (usually the number of boats, their aggregate time on the water, and the number of crew members).¹² And the CPUE data became the empirical

of a major scientific consortium, known in later years as CalCOFI, headquartered at Scripps Institution of the University of California, which won fame for its basic scientific work on the ecology of the fishery while, however, failing to solve definitively the mystery of the fishes’ “disappearance” or to produce a new basis for sustainable management. See Harry N. Scheiber, *Pacific Ocean Resources, Science, and the Law of the Sea: Wilbert M. Chapman and the Pacific Fisheries, 1945-70*, 13 *ECOLOGY L.Q.* 383, 417-27 (1986); Arthur McEvoy & Harry N. Scheiber, *Scientists, Entrepreneurs and the Policy Process: A Study of the Post-1945 California Sardine Depletion*, 44 *J. ECON. HIST.* 393 (1984); ARTHUR McEVROY, *THE FISHERMAN’S PROBLEM: ECOLOGY AND LAW IN THE CALIFORNIA FISHERIES, 1880-1980*, at 198-203 (1986); Harry Scheiber, *California Marine Research and the Founding of Modern Fisheries Oceanography: CalCOFI’s Early Years, 1947-64*, 31 *CALCOFI REP.* 63 (1990).

11 HELEN M. ROZWADOWSKI, *THE SEA KNOWS NO BOUNDARIES: A CENTURY OF MARINE SCIENCE UNDER ICES* (2002).

12 The latter protocol for data evaluation seldom included the differences in type, scale, and efficiency of harvest gear, although they were recognized prior to the 1950s as relevant to profitability for the individual fishing operator, and indeed became of central interest in economic studies later on, yet they were difficult

justification for identifying the critical point at which “effort” should be subjected to some kind of effective regulation, so as to ensure (as was hoped) the conservationist goal of the fish stock’s sustainability at the optimum level. This critical point came to be designated Maximum Sustainable Yield (MSY).¹³

In regard to the theoretical literature analyzing the validity of MSY — and also in regard to the evidence coming to light from the applications of MSY in the regulatory efforts actually deployed in various fishery management regimes — there was ample material for Hardin (had he been interested) to provide a fuller, more nuanced, and withal more accurate portrayal of the responses (whatever their strengths or weaknesses) to the unfolding “tragedy” that he regarded as being irreversible unless population increases were stopped and coercive measures on resource use were imposed. We need not rehearse here the details of a heated controversy over MSY and its applications that was taking place in the years before Hardin’s “Tragedy” appeared, except to underline Hardin’s puzzling failure to recognize, even in a passing way, how prominent a place was being given by the community of oceans scholars to the issue of how best to address the dilemma of the commons.¹⁴

There is a special irony in the fact that one of the most eminent figures in fishery management design, including analysis of the MSY model and its variants, and equally prominent in the marine biological research in this field was Milner Schaefer, a University of California colleague of Hardin’s. Schaefer held his professorship at the university’s Scripps Institution of Oceanography, located only a few hours’ drive south from the Santa Barbara campus, where Hardin was based. Schaefer’s research on fishery dynamics had become a powerful influence in the scientific study of MSY determination; and when

to quantify. In any case, their quantification was not necessary for a calculation of CPUE, which was a measure of aggregative fishing effort by vessels, gear, and other equipment of all kinds.

- 13 John A. Gulland, *The Concept of the Maximum Sustainable Yield in Fishery Management*, FAO Fisheries Tech. Papers No. 70, U.N. Doc. FRS/T70 (1968); John A. Gulland, *Fisheries Management and the Limitation of Fishing*, FAO Fisheries Tech. Papers No. 92, U.N. Doc FRs/T92 (1969).
- 14 The MSY concept long continued to attract scholarly attention as a matter of substantive importance and lively debate in resources management, and persists as a central concept in fisheries and whaling management, on which see Ellen Hey, *The Persistence of a Concept: Maximum Sustainable Yield*, 27 INT’L J. MARINE & COASTAL L. 763 (2012). See also Marc B. Mangel et al., *Requiem for Ricker: Unpacking MSY*, 70 BULL. MARINE SCI. 763 (2002). For historical perspectives, see TIM D. SMITH, *SCALING FISHERIES: THE SCIENCE OF MEASURING THE EFFECTS OF FISHING, 1855-1955* (1994); STUART M. KAYE, *INTERNATIONAL FISHERIES MANAGEMENT 62-75* (2000).

the United Nations, recognizing the critical nature of the overfishing threat globally, convened a fishery science specialists' conference on the subject, held in Rome in 1955, Schaefer's paper on the scientific issues in fisheries management was given a featured role.¹⁵

Closer to home, in 1964 (four years prior to the appearance of Hardin's article), Schaefer, then heading the university's Institute of Marine Research, was organizer and director of a symposium commissioned by the state's governor, Edmund Brown, that sponsored papers by leading researchers and policy analysts on a broad range of issues subsumed under the title "California and the World Ocean." The papers, widely noticed by scientists and others in the ocean resources community, were presented at a public event in Los Angeles in 1964 and published in revised form the following year.¹⁶ Here again, Hardin took no notice of what were some important papers providing insights into contemporary experts' perspectives on the ocean commons.

IV. ECONOMISTS' PERSPECTIVES ON THE COMMONS DILEMMA

An additional aspect of the commons debate antedating Hardin's paper was a concerted attack on the conventional wisdom in fisheries management that was launched by a group of economists, sparked mainly by the appearance in 1954 of an article on the dilemma of the commons written by Scott Gordon.¹⁷ This

15 Milner B. Schaefer, *The Scientific Basis for a Fisheries Management Program*, Rep. of the Int'l Tech. Conf. on the Conservation of the Living Res. of the Sea, A/CONF.10/6/Corr.1 (1955). On Schaefer's scientific research, see SMITH, *supra* note 14. On Schaefer's creative roles as research director of two major fishery research and management projects during the period of post-World War II initiatives, the Pacific Oceanic Fisheries Investigations, and the Inter-American Tropical Tuna Convention, together with the large strategy of fisheries diplomacy and scientific management that Wilbert Chapman championed, see Harry N. Scheiber, *Pacific Ocean Resources, Science, and Law of the Sea*, 13 *ECOLOGY* L.Q. 464 (1986); John L. Kask, *Dedication: Wilbert McLeod Chapman, 1910-70; Milner Baily Schaefer, 1912-70*, in *WORLD FISHERIES POLICY: MULTIDISCIPLINARY VIEWS* i-xi (Brian J. Rothschild ed., 1972).

16 California Museum of Science and Industry, *California and the World Ocean: Conference Proceedings* (Los Angeles 1964).

17 Scott H. Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 *J. POL. ECON.* 124 (1954). In the prefatory section of his article, Gordon credited earlier analyses that applied economic efficiency criteria, one of which, by Robert Nesbit, published more than a decade previously, had sparked a controversy between him and the prominent federal fisheries biologist

study inspired empirical research on specific management regimes, conducted by James Crutchfield (a University of Washington economics professor) and Giulio Pontecorvo (professor of business administration at Columbia). Other economists, most notably Francis Christy, Jr, and Anthony Scott, were severely critical of MSY or its variants, which were aimed at preservation of maximum levels of the fish stock; they contended, instead, that the objective of management regimes should be achieving efficiency — not only efficiency of fishing operations (i.e., the cost and benefit in profit to the individual fishing entity), but more comprehensively, efficiency in terms of the economy (so that the aggregate expenditure of funds to harvest the fish produced a net gain in returns — the capture of net rent — to the economy as a whole). The dilemma of the commons — that “no individual fisherman will restrict his effort or rate of output unless all others take the same measures, for, to the individual, restraint means loss of harvest [and] not deferment” — should be addressed, they contended, by persuading the fishing operators to accept the coercive measures necessary to engage them in “collective action” that would produce a “surplus value [rent] of the annual catch over total costs of labor and capital used in the fishery.”¹⁸ The MSY standard, the economists regularly asserted, was a “socially meaningless” objective;¹⁹ its widespread acceptance by fishery managers and most scientists was thus, they argued, a sadly misguided practice that militated against fish stock conservation in the long run. They argued that the optimum level of harvest effort should be signaled by the point of maximum economic yield, which is to say the level of fishing beyond which the rate of increase in product was lower than the

and management expert William C. Herrington, as to the adequacy of MSY as a standard. *Id.* at 124, citing Robert A. Nesbit, Fishery Management, U.S. Fish and Wildlife Service, Special Scientific Rep, No. 18 (mimeographed, Chicago, 1943). Nesbit contended for vesting in fishing operators specific property rights in harvest quotas, linked with limits on entry such as the State of Maryland had introduced by freezing the issuance of new licenses in one of the State’s major fisheries. For discussion of this predecessor debate to the ITQ (individual transferable quota) proposals of the 1960s onward, see Harry N. Scheiber & Christopher Carr, *From Extended Jurisdiction to Privatization: International Law, Biology, and Economics in the Marine Fisheries Debates, 1937-1976*, 14 BERKELEY J. INT’L L. 21-22 (1998).

- 18 FRANCIS T. CHRISTY JR. & ANTHONY SCOTT, THE COMMON WEALTH IN OCEAN FISHERIES: SOME PROBLEMS OF GROWTH AND ECONOMIC ALLOCATION 219-21 (1965). For an insightful overview of the literature and major theoretical arguments of the economists’ critique of MSY, see Anthony Scott, *Development of Economic Theory on Fisheries Regulation*, 36 J. FISHERIES RES. BOARD CANADA 724 (1979).
- 19 CHRISTY & SCOTT, *supra* note 18, at 65.

additional rent from a continued increase in fishing effort. This point would appear, in an equilibrium model, at an effort level below what the MSY model would justify.²⁰

The economists who spearheaded this attack on MSY augmented their critiques with a range of policy options (e.g., vesting of property rights in quotas, the licensing of fishing rights, tax incentives, and others) that they asserted would advance the goal of maximizing social rents from fisheries, as being superior to the instruments (such as gear restrictions, or reduced length of seasons for fishing) that were used by existing management regimes governed by the MSY principle while maintaining open access.

Taken from our own perspective today, however, the economists' signal contribution was to promote the idea of abandoning open access, substituting for it in one form or another the overarching alternative of limited entry. For at least ten years prior to the publication of Hardin's "Tragedy" article, proposals for limited entry were featured in a sequence of notable academic and industry-oriented conferences on fisheries management, beginning with The United Nations Food and Agriculture Organization international symposium, "The Economics of Fishing," in which the proceedings were dominated by the views of Gordon and Scott. The views of Jens Warming of Denmark, another economist seeking to introduce efficiency criteria in fisheries regimes by means of limiting entry, also had an influence on the direction and content of the discussions.²¹ In 1959 the University of Washington hosted a conference on the theme "Biological and Economic Aspects of Fisheries Management," in which Crutchfield, who edited the proceedings for publication, set the tone by denouncing even the Canadian-U.S. halibut management regime, which had brought back the stocks from virtual collapse eighteen years earlier to a sustainable level — yet one that was achieved by a confessedly "inefficient" policy of allowing the fishing units to operate for only a few weeks each season, until the MSY catch level, as calculated by the regime's scientists, was achieved. Defenders of the halibut commission countered that the biological objective of conservation, and the "social values" associated with preservation of the fishers' way of life, more than offset the shortfall in "efficiency" or "social rent" that was involved.²²

In Canada, meanwhile, a heated controversy was initiated by the publication in 1960 of a government-sponsored study by the economist Sol Sinclair, who

20 *Id.* at 6-16, 221-25.

21 The Economics of Fisheries, FAO Roundtable (Int'l Econ. Ass'n, Rome, 1956), <http://www.fao.org/docrep/011/ai761e/ai761e00.htm>.

22 JAMES A. CRUTCHFIELD, BIOLOGICAL AND ECONOMIC ASPECTS OF FISHERIES MANAGEMENT 79, 84 (1959).

had been charged with making recommendations as to regulations that would “permit [more efficient] economic operations” in the halibut and salmon grounds of British Columbia. Rejecting some of his fellow economists’ recommendations for achieving limited entry through taxes by volume on the catch or privatization of ownership of quotas, Sinclair contended for a licensing scheme that over time would transition into an annual auction for licenses. The fishermen’s unions coalesced in a powerful political campaign to defeat adoption of Sinclair’s proposal. Ironically, the British Columbia government actually did institute a limited entry program in 1969, after salmon harvests had experienced a decline, threatening the danger of complete commercial collapse.

In subsequent years, other conferences and journal publications — all in print prior to the 1968 appearance of the “Tragedy” article — debated the terms of how open-access commons in fisheries might best be supplanted by “rational exploitation” maximizing operations by the economists’ efficiency standards. Also relevant to the ocean resources debate, as an antecedent, is the fact that in counterpoint to the controversy over the purposes and technical calculation of the optimal point in fishing effort, the principal scientific researchers in the field were also cognizant of the problem of rising population. Taking into account the then-current rate of population increase, they sought to predict the volume of food fish and other resources (such as krill) in the marine biomass that could be processed for fertilizer and for aquaculture-feeding in relation to the estimated volume of demand from rising consumer market volume.²³

23 These conferences featuring economists’ reformist arguments included another FAO meeting on the economics of fisheries, held in Ottawa in 1961, at which arguments for allocating “sole ownership” rights as a way of limiting fishing intensity were first put forward in a systematic analysis by Scott, foreshadowing the later movement for “individual transferable quotas” as the instrument for full privatization (albeit under the aegis of regulatory authorities imposing total limits on the harvest as well as allocating individual quotas). See, the discussion of the several conferences and their key papers, in Scheiber & Carr, *supra* note 17, at 30-50. For discussions expressing concern about future capacity of aggregate marine fisheries to meet the nutritional needs of rising population, see, for example, papers and commentary by Wilbert Chapman, Donald McKernan, Milner Schaefer et al., *The Future Development of World Fisheries*, in *THE LAW OF THE SEA: THE FUTURE OF THE SEA’S RESOURCES* 121-42 (Lewis M. Alexander ed., 1968). For discussion of the various estimates of maximum potential food fish harvests, and implications as to adequacy in meeting human needs, see John A. Gulland, *Fishery Management and the Needs of Developing Countries*, in *WORLD FISHERIES POLICY* 25-51 (B. J. Rothschild ed., 1972).

In sum, advocacy for limited entry, based on recognition of the “dilemma of the commons,” was anything but a quiet, behind-the-scenes academic movement, waiting for Hardin to step forward as discoverer or originator. Furthermore, practical applications of the limited entry principle were already in operation. In the northeastern quadrant of the Pacific Ocean, in the rich salmon grounds offshore of Alaska, Canada and the State of Washington, for example, a tripartite treaty of Canada, the United States, and Japan placed in operation the policy of “abstention” — an agreed regime limiting altogether entry of Japanese distant-water fishing vessels into the prescribed ocean area, which was reserved to Canadian and U.S. fishing — with exclusion contingent upon periodic scientific investigations demonstrating that the salmon and several other species stocks in that prescribed area were found to be at maximum sustainable yield.²⁴ In Japan’s own domestic policy for coastal fisheries, meanwhile, a 1949 New Fisheries Law (enacted during the Occupation, when all legislation was under “guidance” and in fact required approval from General Douglas MacArthur’s command) established a system of property rights for collectives, together with licensing that limited intensity of effort.²⁵ In 1958, the second UN Conference on Law of the Sea, held in Geneva, produced four new conventions, one of which was on fishing and conservation of living resources of the high seas, and another on the extent of a newly defined “contiguous area beyond the limit of territorial seas” (i.e., limit of complete sovereignty). Both these agreements impelled still further movement, dramatically debated in diplomatic forums but also in the scientific and legal arenas, in international ocean law.

The well-known “ocean enclosure” movement, in which coastal nations began declaring exclusive control over fishing, barring entry by other nations’ distant-water fishing vessels, was given impetus when the enhanced powers of coastal states in their declared contiguous zones (as stated in the Contiguous Zone Convention) were interpreted — at first arbitrarily, by unilateral actions, then as a matter of emerging customary law — as including the power to exercise full control over fishing. The Fishing Convention, on the other hand, addressed

24 Harry N. Scheiber, *Origins of the Abstention Doctrine in Ocean Law: Japanese-US Relations and the Pacific Fisheries, 1937-1958*, 16 *ECOLOGY L.Q.* 23 (1989). On the longer-term influence of the doctrine, see Harry N. Scheiber, *Reflections on the Abstention Doctrine in the Diplomatic History of Modern Ocean Law*, in *LAW OF THE SEA: FROM GROTIUS TO THE INTERNATIONAL TRIBUNAL FOR THE LAW OF THE SEA* 64 (Lilian del Castillo ed., 2015).

25 W. Neville, *Supreme Commander of the Allied Powers, Fisheries Programs in Japan 1945-1951* (Natural Resources Section Rep. No. 152, (1951)); HARRY N. SCHEIBER, *INTER-ALLIED CONFLICTS AND OCEAN LAW, 1945-1953: THE OCCUPATION COMMAND’S REVIVAL OF JAPANESE WHALING AND MARINE FISHERIES* 64-67 (2001).

the vexed issue of maximum sustainable yield, opting for the alternative designation of Optimal Sustainable Yield (which implicitly incorporated the relevance of the “efficiency” standard, albeit without systematically defining it operationally).²⁶

Neither of these developments that were given new salience by the 1958 UN Conventions resolved the dilemma of the commons, to be sure. Whatever the lack of full clarity in either of the two conventions, the process of limiting entry by declarations of offshore fishing zones went forward rapidly in the ensuing decade. By 1966, so many coastal nations, including the great fishing powers Japan, the United States, and Canada, had issued proclamations establishing twelve-mile fishing zones, that as a matter of “state practice” the twelve-mile zone was close to attaining the status of an embedded feature of international law.²⁷

CONCLUSION

Long before 1968 the dilemma of the commons and the enclosure of the oceans that was taking place at a pivotal moment in ocean resources history were widely recognized and given intensive attention by experts in all the professions, including biology, concerned with ocean resources management. There was no informational gap that warrants one’s viewing Hardin’s article as a breakthrough in that regard, whatever its other merits. Moreover, in the years immediately following publication of his article, as confirmation of where his real interest lay, Hardin’s further engagement with the general

26 KAYE, *supra* note 14, at 68-75; SCHEIBER, *supra* note 9. A cautiously optimistic appraisal of the 1958 agreement was written in 1966 by the State Department officer who was instrumental in advancing the U.S. position on the abstention doctrine. William C. Herrington, *The Convention on Fisheries and Conservation of Living Resources: Accomplishments of the 1958 Geneva Conference*, in *THE LAW OF THE SEA: OFFSHORE BOUNDARIES AND ZONES* 26-35 (Lewis M. Alexander ed., 1967).

27 Shigeru Oda (then a senior professor of international law, and later a long-serving and revered judge on the International Court of Justice), though he remained in 1963 a determined opponent of ocean enclosure, conceded in 1960 that “no one can ignore . . . the trend” toward incorporation of the twelve-mile fishing zone into the corpus of accepted law. SHIGERU ODA, *INTERNATIONAL CONTROL OF SEA RESOURCES* 136-37 (1989). On the trend of fishery law development after 1958, see WILLIAM T. BURKE, *THE NEW INTERNATIONAL LAW OF FISHERIES: UNCLOS 1982 AND BEYOND* (1994); FRANCISCO ORREGO VICUÑA, *THE CHANGING INTERNATIONAL LAW OF HIGH SEAS FISHERIES* (1999).

topic of the “Tragedy” was focused entirely on population control, manifested especially in an alliance with Paul Ehrlich and others in polemical writings and in the activities of the Zero Population Growth movement.²⁸

From the 1960s to the present day, however, the dilemma of the commons has continued to be a subject of enormous concern in the development of ocean resources law and policy, at both the national and international levels.

The issues and complex debates in this area of environmental concerns, identified here for the years antedating Hardin’s article, have continued to dominate the ocean science, law, and policy literature. The definitions of both problems and of potential solutions have been newly reconfigured as to the basic legal framework with the signing of the UN Law of the Sea Convention in 1982 and its entering into force in 1994. The limited entry and MSY controversies have become interwoven with a set of varying concepts of “ecosystem management.” The “precautionary approach” has taken on new force as a requirement validated in multinational agreements for high-seas fisheries regimes, and in a decision of the International Tribunal for the Law of the Sea. Most recently, the UN has authorized a series of potentially transformative negotiations for the protection of biodiversity in the high-seas areas beyond national jurisdiction. Among other already accepted changes in the structure of ocean governance and the expansion of legally endorsed environmental and resource protections, changes such as these in the last fifty years have imposed in environmental debates not only a transformed legal context but also an enriched scientific agenda and vital changes in moral context.²⁹

28 SABIN, *supra* note 1, at 36-41. Sabin also points out that Hardin’s “Tragedy” was in the tradition of an already established line of writings warning of Malthusian consequences from unrestrained population growth; he refers especially (*supra* note 1, at 16-18, 116) to FAIRFIELD OSBORN, *OUR PLUNDERED PLANET* (1948). Of equal importance in establishing the ideology of the modern environmentalist movement, especially its Malthusian premises, was the book by William Vogt, *ROAD TO SURVIVAL*, also published in 1948. Vogt’s influence is analyzed in a newly released monograph by CHARLES C. MANN, *THE WIZARD AND THE PROPHET: TWO REMARKABLE SCIENTISTS AND THEIR DUELING VISIONS TO SHAPE TOMORROW’S WORLD* (2018).

29 An incisive overview is provided by Tullio Treves, *Historical Development of the Law of the Sea*, in *OXFORD HANDBOOK OF THE LAW OF THE SEA* 1-23 (Donald R. Rothwell, Alex G. Oude Elferink, Karen N. Scott, & Tim Stephens eds., 2015); and numerous other entries, on individual topics, *id.*; *OCEAN LAW AND POLICY: 20 YEARS UNDER UNCLOS* (Carlos Espósito, James Kraska, Harry N. Scheiber & Moon-Sang Kwon eds., 2016); *THE LAW OF THE SEA: PROGRESS AND PROSPECTS* (David Freestone, Richard Barnes & David Ong. eds., 2006);

Looking back at Hardin’s “Tragedy” today, the challenges of population pressure on resources that has continued since 1968 — and the persistent gaps and frustrations, despite positive changes of great moment, in the law and policy — well justify its seemingly fixed place on reading lists for our students. But such recognition of Hardin’s contribution requires one’s attaching, in the interests of candor and accuracy, a set of appropriate caveats as to the historical and intellectual contexts of the article as of the time Hardin published it.

THE WORLD OCEAN IN GLOBALISATION: CLIMATE CHANGE, SUSTAINABLE FISHERIES, BIODIVERSITY, SHIPPING, REGIONAL ISSUES (Davor Vidas ed., 2011). Innovations in both hard law and soft law, together with the emergence of the newly accepted ecosystem management paradigm, and with further advances in technologies for resource location and assessment, came into play even as early as the last two decades of the twentieth century, on which see Harry N. Scheiber, *Ocean Governance and the Marine Fisheries Crisis: Two Decades of Innovation — and Frustration*, 20 VA ENV’T L. INL. 119-137 (2001).

