PREDATOR MIS: A MECHANISM FOR ECOSYSTEMIC MANAGEMENT UNDER THE FCMA

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I. INTRODUCTION—THE CALL FOR ECOSYSTEMIC MANAGEMENT

In response to severe and unregulated overfishing at the hands of a concentrated domestic and international fishing effort in North American waters, Congress passed the Magnuson Fishery Conservation and Management Act (Magnuson Act or FCMA) in 1976.[1] A primary goal of the FCMA was conservation of fishery resources, which included the related goal of rebuilding depleted stocks.[2] The other major goal of the FCMA was maximizing the U.S. fishing industry by minimizing or eliminating foreign take. The latter goal was achieved quickly, but has proven incompatible with the former goal under current conservation and management approaches. While foreign take has bottomed out, the concurrent increase in domestic take has sent many fish stocks plummeting to perilously low levels. For example, the New England groundfishery was closed recently when overfishing caused the commercial extinction of stocks there.[3] Likewise, the Pacific Fishery Management Council closed that region's salmon fishery for the same reason.[4] It seems that the regional councils established by the FCMA have forgotten their conservation mandate, and the repercussions threaten not only marine ecosystems but the fishermen who depend on them.

Historically, regional councils have used single-species stock assessment in setting maximum sustainable yield (MSY) and allowable biological catch (ABC); looking only at the population dynamics (i.e., natural mortality) of the managed stock without considering any other significant factors. Single-species assessment fails to achieve conservation of the targeted stocks because of the adage that "what you don't see can kill you." In considering just one of the many factors that impact a managed stock's population, councils have been setting MSY/ABC too high for the managed stock to maintain or rebuild, and/or causing significant harm to the other species in the ecosystem.

There have, however, been stirrings in the direction of conservation through ecosystemic management. As early as 1979, the North Pacific Fishery Management Council, responding to the harm the

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1. Magnuson Fishery Conservation and Management Act. Pub. L. No. 99-659, 100 Stat. 3712 (codified as amended in 16 U.S.C. §§ 1801-1882).

2. 16 U.S.C. § 1801 (a) (1988 & Supp 1995).

3. *The Tragedy of the Fisheries: Nationwide Fish Declines Threaten Species and Economy*, LAND LETTER: THE NEWSLETTER FOR NATURAL RESOURCE PROFESSIONALS, April 20, 1994, at 3-5.

4. *Id.* at 5-8.

overfishing of pollock was having on Steller sea lions, recognized the need for a more comprehensive approach to conservation and management. It explored the use of an ecosystemic model, DYNUMES (Dynamical Numerical Marine Ecosystem Model), for setting MSY/ABC.[5]

> In the marine ecosystem there are intensive interactions between different species, their prey items, and environmental factors. Changes in abundance and distribution of one species (e.g. caused by fishery) affect the abundance and distribution of other species [e.g. the Steller sea lion] as well. Therefore, wise fisheries management requires the quantitative knowledge of all of these interactions; single species population dynamics' approaches are no longer fully adequate for modern fisheries management.[6]

In addition to the North Pacific Fishery Management Council, at least two other regional councils are exploring the use of an ecosystemic model. The Gulf of Mexico and South Atlantic shrimp fisheries are developing an ecosystemic model that examines the effects of shrimp bycatch on reef finfish.[7] The model "will enable managers to evaluate the relative cost-effectiveness of potential shrimp bycatch reduction management options."[8] The model looks at "biotic and abiotic factors such as: riverine input of nitrogen, solar radiation, plankton and benthic components, fishing effort, stocks of shrimp, bottomfish, migratory and pelagic finfish, large predators, scavengers, and utilization of bycatch by fishermen."[9]

Though the North Pacific, Gulf of Mexico, and South Atlantic regional councils are using or developing ecosystemic approaches to fishery conservation and management, they do so out of choice. The FCMA does not mandate ecosystemic management. Consideration of ecosystemic effects is discretionary.[10] However, a survey of domestic

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5. NORTH PACIFIC FISHERY MANAGEMENT COUNCIL, FISHERY MANAGEMENT PLAN FOR THE BERING SEA/ALEUTIAN ISLANDS GROUNDFISH 9-10, 9-11 (1995) [hereinafter FMP].

6. *Id.* at 9-10.

7. NATIONAL MARINE FISHERIES SERVICE, SOUTHEAST REGIONAL OFFICE, COOPERATIVE RESEARCH PROGRAM ADDRESSING FINFISH BYCATCH IN THE GULF OF MEXICO AND SOUTH ATLANTIC SHRIMP FISHERIES: A REPORT TO CONGRESS 39-40 (April 1995).

8. *Id.* at 39.

9. *Id.*

10. 50 C.F.R. § 602.11(e)(3)(iii) (1988).

and international law indicates that the United States is poised to require ecosystemic consideration in conservation and management of fisheries. Relevant provisions are found in the United Nations Conference on the Law of the Sea (UNCLOS),[11] the Endangered Species Act (ESA),[12] the 1990 amendments to the FCMA, and pending amendments to the FCMA.

A. UNCLOS

The consummate statement of domestic and international law on marine ecosystem conservation is found in UNCLOS. This comprehensive treaty is a codification of progressively developed international law.[13] Article 61 provides, in pertinent part:

> 2. The coastal State, taking into account the best scientific evidence available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation.
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> 3. Such measures shall also be designed to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield, as qualified by relevant environmental and economic factors . . . .
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> 4. In taking such measures the coastal State shall take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened.[14]

This is about as explicit an ecosystemic mandate as is possible. According to Article 61, nations cannot over-exploit their fishery resources; nor can they exploit them in such a manner that the exploitation interferes with the viability and health of dependent or

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11. United Nations Conference On the Law of the Sea, Dec. 10, 1982, Art. 61, 21 I.L.M. 1245, 1281.

12. Endangered Species Act Amendments of 1982, 16 U.S.C. § 1531 et. seq. (1988).

13. Martin H. Belsky, *The Ecosystem Model Mandate for a Comprehensive United States Ocean Policy and Law of the Sea*, 26 SAN DIEGO L. REV. 417, 466-67 (1989).

14. United Nations Conference On the Law of the Sea, Dec. 10, 1982, Art. 61, 21 I.L.M. 1245, 1281.

related nontarget species.[15] Though the U.S. is not a signatory to UNCLOS, it participated in the convention's development. Furthermore, U.S. policy and law on natural resource protection, as illustrated by the FCMA amendments, ESA, National Environmental Policy Act (NEPA),[16] etc., demonstrate the movement to an UNCLOS-like, conservation-minded approach to natural resources conservation and management.

B. Endangered Species Act—§ 7 "No Jeopardy" and § 9 "No Take"

Under § 7 of the ESA, federal agencies cannot "jeopardize the continued existence" of a listed species.[17] Section 7 requires that all federal agencies, including the National Marine Fisheries Service (NMFS), "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any [listed] species or result in the destruction or adverse modification of habitat of such species which is determined . . . to be critical . . . ."[18] The regulations under § 7 define "jeopardize the continued existence" as "engag[ing] in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."[19]

For example, the North Pacific Council would be barred from setting a Total Allowable Catch (TAC) of pollock, a vital food source of the listed Steller sea lion that was sufficiently high to prevent the sea lion population from recovering to a point where they would be removed from endangered or threatened status. This scenario was indirectly at issue in *Greenpeace Action v. Franklin*.[20] In that case, the North Pacific Council recognized that existing fishing practices were jeopardizing the continued existence of Steller sea lions.[21] The council consulted with the Fish and Wildlife Service as required by § 7 of the ESA.[22] To continue the

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15. *Id.*
16. National Environmental Policy Act of 1969, 42 U.S.C. § 4321 et. seq. (1988).
17. Endangered Species Act Amendments of 1982 § 7, 16 U.S.C. § 1536(a)(2) (1988).
18. *Id.*
19. 50 C.F.R. § 402.02(d) (1991).
20. Greenpeace Action v. Franklin, 14 F.3d 1324 (9th Cir. 1993). Greenpeace's main challenge was to the failure of the council to conduct an EIS for the fishery under NEPA, but they lost on that count. *Id.* at 1332.
21 *Id.* at 1327-28.
22 *Id.* at 1327 n.2.

pollock fishery, the council had to receive a "no jeopardy" opinion, which requires mitigation of any threat to the sea lions.[23] The council adopted two emergency measures to mitigate the jeopardy. First, it allocated the TAC in terms of location and season so that pollock would not be depleted from the areas where sea lions needed them most, at times of the year when they were needed most, specifically around rookeries during the breeding season.[24] It also banned trawling within ten nautical miles of rookeries.[25] The Secretary found the mitigation sufficient to issue a no-jeopardy opinion, and this was upheld on appeal.[26] Though the main focus of the case was on the council's failure to conduct an Environmental Impact Statement (EIS) for the fishery, it is clear that had the council failed to mitigate in the first place, the court would likely have required them to do so and found the issuance of a no-jeopardy opinion arbitrary and capricious.

However, § 7 is not as useful as one might assume from *Greenpeace Action*. The Secretary of Interior has interpreted the "no jeopardy" requirement to mean only that agency action cannot imperil the *bare survival* of the species; reading out the recovery aspect of the regulation.[27] If the species' population can remain stable under the agency action, the Secretary can issue a no-jeopardy opinion that would permit the agency action to continue. In the sea lion example, this would allow the Secretary to approve a TAC high enough to stabilize the sea lion population, but too low to induce recovery. Thus, mitigation measures are not always useful in the long term.

Another ESA tool for ecosystemic consideration when a listed species is involved is in § 9. Under that section, no person shall "take any [endangered or threatened] species within the United States or the territorial sea of the United States . . . ."[28] "Harm" is included within the definition of "take."[29] The Fish and Wildlife Service's implementing regulations define "harm" to include "significant *habitat modification or degradation* [which] actually kills or injures wildlife by significantly

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23. *Id.*; Endangered Species Act § 7, 16 U.S.C. 1536 (h)(1)(B) (1988).
24. *Greenpeace Action*, 14 F.3d at 1327-28.
25. *Id.*
26. *Id.* at 1336-37.
27. Paul D. Ort, Comment, *What Does It Take To Take and What Does It Take To Jeopardize? A Comparative Analysis of the Standards Embodied In Sections 7 and 9 of the Endangered Species Act*, 7 TUL. ENVTL. L.J. 197, 213 (1993).
28. Endangered Species Act of 1973 § 9(a)(1)(B), 16 U.S.C. § 1538 (a)(1)(R)(1988).
29. *Id.* at § 3, §1532(19).

impairing essential behavioral patterns, including . . . *feeding* . . . ."[30] Critical habitat is those areas occupied by the species "on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection [such as food sources]."[31]

Though the actual issue has yet to be litigated, § 9 may, like § 7, require ecosystemic consideration of Steller sea lions when the North Pacific Council sets TAC for pollock. As under § 7, the North Pacific Council arguably is barred under § 9 from setting a TAC that takes pollock needed by Steller sea lions. Such an action constitutes a harm under the definition of taking because it is "significant habitat modification or degradation" that results in a disruption of essential biological functions. The action would be an adverse habitat modification because "critical habitat" includes the biological features needed by the listed species, namely pollock.[32] The end result of a TAC that is set too high would be the certain death of at least a small percentage of the sea lion population, primarily pups. That means a taking has occurred.

The court in *Palila v. Hawaii Department of Land and Natural Resources (Palila II)*[33] would agree with this interpretation. It stated that the "actually kills or injures wildlife" requirement in the regulation defining "harm" does not require actual evidence of death or injury to individual members of a listed species (e.g., presenting a Steller sea lion that died from starvation).[34] As interpreted by the *Palila* court, § 9 is actionable when "habitat modification prevents the population from recovering [because it] causes injury to the species,"[35] and this should be the case with the sea lion scenario.[36]

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30. 50 C.F.R. § 17.3 (1988) (emphasis added).

31. Endangered Species Act § 3, 16 U.S.C. § 1532(5)(A) (1988).

32. *Id.*

33. Pallila v. Hawaii Dep't of Land and Natural Resources, 649 F. Supp. 1070 (D. Haw. 1986).

34. *Id.* at 1075.

35. *Id.* at 1077.

36. However, as with the § 7 no-jeopardy opinion, this protection is buffered by the possibility of the council obtaining an incidental take permit under § 10 of the ESA. 16 U.S.C. § 1539(a).

The applicant must file a "conservation plan" embodying essentially the same mitigation considerations as required for a no-jeopardy opinion under § 7, as well as discussions of alternatives to the action and the effects of the proposed action; the plan is open to public comment. *Id.* § 1539(a)(2)(A).

The United States Supreme Court has also taken this view. In *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*[37] the Court upheld the Secretary's definition of harm that included indirect injury to the listed species through habitat modification.[38] The plaintiffs, fearing a ban on logging operations under the Secretary's definition of "take," challenged the definition on its face.[39] The potentially "taken" species were the red-cockaded woodpecker and the northern spotted owl, both of which depend on old growth forests.[40] The Court upheld the Secretary's decision that habitat modification with the unintended effect of injuring or killing listed species is a prohibited taking.[41] Thus, takings are not constrained to those circumstances where the listed species is directly injured or killed by the activity, but include situations like the sea lion example, where the listed species is indirectly injured through the modification of its habitat (i.e., depletion of food source).

In summary, any time an endangered or threatened species depends on a commercially exploited stock for sustenance, there is a strong argument to be made that under the ESA a regional council must subtract the amount of fish needed by the listed species from the total biomass available for commercial exploitation. The regional council must also consider additional factors, such as breeding seasons and migratory patterns, in setting fishing seasons and determining which areas are off limits for commercial exploitation.

The significant drawback to utilization of the ESA as a mandate for ecosystemic management is that there must first be an endangered or threatened species in the ecosystem which is closely linked to the managed stock.[42] Even then the consideration goes only so far as to

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An incidental take permit will then be issued if, among other things, "the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild . . . ." *Id.* § 1539(a)(2)(B). Legislative history indicates that the standards under § 7 and § 9 are the same, H.R. Conf. Rep. No. 835, 97th Cong., 2d Sess. 29 (1982), so it is possible that the council could get an incidental take permit through the same mitigation implemented in *Greenpeace Action*, 14 F.3d at 1327-28.

37. Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 115 S. Ct. 2407 (1995).

38. *Id.* at 2418; 50 C.F.R. § 17.3.

39. *Sweet Home*, 115 S. Ct. at 2410.

40. *Id.*

41. *Id.* at 2412.

42. Furthermore, while the authors use the ESA as a safety net, it is a grave error to wait until a species is listed before taking proper steps to ensure its preservation.

consider the effects of commercial exploitation on the listed species, and not on the ecosystem as a whole.

C. 1990 Magnuson Act Amendments

Acknowledging the significant mortality of juvenile red snapper (a commercially targeted species) in the Gulf of Mexico as a result of shrimp bycatch, Congress amended § 1854 of the FCMA to include subsection (g) on "incidental harvest research."[43] The amendment requires the Secretary of Commerce to establish a program to assess the impact of shrimp bycatch on fishery resources.[44] The program shall "provide for the identification of stocks of fish which are subject to significant incidental harvest in the course of normal shrimp trawl fishing activity."[45] Once the bycatch species are identified, the Secretary shall commence a program to develop "technological devices and other changes in fishing technology for the reduction of incidental mortality of nontarget fishery resources[]."[46] This amendment led directly to the development of the previously mentioned Gulf of Mexico and South Atlantic ecosystemic model.[47] Though the amendment is specifically limited to the Gulf of Mexico and South Atlantic Fishery Management Councils, it illustrates Congress' gravitation toward ecosystemic management.

D. Proposed Amendments to the Magnuson Act

Most recently, the trend toward ecosystemic conservation and management is evidenced by two ecosystemic amendments that passed the House during the Magnuson Act reauthorization process.

> The U.S. House of Representatives showed strong bipartisan support for fisheries conservation. After passing [two] important amendments, Members voted 388 to 37 in favor of reauthorizing the Magnuson Fishery Conservation and Management Act.
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> Rep. Wayne Gilchrest (MD) argued masterfully for his amendment to prevent overfishing by diminishing

43. 16 U.S.C. § 1854(g).
44. *Id.* § 1854(g)(1).
45. *Id.* § 1854(g)(2).
46. *Id.* § 1854(g)(4).
47. *See supra* note 7 and accompanying text.

> the role of economics in setting catch limits. It passed 304 to 113. A crucial amendment by California Representative Sam Farr, requiring consideration of the effects of certain fishing practices on marine habitat, passed 251 to 162.[48]

These amendments illustrate Congress' awareness that single species assessment is no longer a valid approach to fisheries management. The amendments address two fundamental problems that have hindered the conservation mandate of the FCMA. First, in setting TAC, regional councils have had free reign to set the catch quota above MSY or ABC. ABC and MSY represent the maximum amount of fish that can be removed through fishing efforts (directed and incidental) and still allow the stock to rebuild to its current population. However, the FCMA allows the regional councils to set TAC above ABC/MSY if they find that relevant socioeconomic factors outweigh the need for biological conservation, and this is usually what the councils do.[49] Rep. Gilchrest's proposed amendment addresses this problem by diminishing the consideration given to socioeconomic factors in setting TAC, forcing the councils to focus on biology rather than money.

Second, Fisheries Management Plans (FMPs) have not been required to address habitat effects of fishing practices. The Code of Federal Regulations refers to these types of considerations as "ecological factors," but leaves any consideration of such factors to the discretion of the regional councils.[50] The amendment sponsored by Rep. Farr will remove this discretion by mandating consideration of ecological factors in setting TAC, and will thus foster a more holistic, conservation-oriented approach to fisheries management.

These examples of legislation and regulation, UNCLOS, ESA, and the amendments, enacted and proposed, to the Magnuson Act, clearly indicate that ecosystemic management is becoming a highly desirable management regime. The U.S. is poised to adopt a "greener" approach to managing its fisheries.

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48. *Victory for the Fish!*, MARINE CONSERVATION NEWS, Winter 1995, at 4.
49. 50 C.F.R. § 602.11 (1988).
50. *Id.* § 602.11(e)(3).

II. PREDATOR MIS (MANAGEMENT INDICATOR SPECIES)—A PROPOSAL FOR A VIABLE ECOSYSTEMIC MANAGEMENT REGIME FOR U.S. FISHERIES

A. Failed Attempts at Ecosystemic Management

Determining that there is a "call for ecosystemic management," and that such a management regime is desirable, however, is a far easier task than determining *how* to manage fisheries (or any other natural resource) ecosystemically. The DYNUMES model for ecosystemic management, discussed above, represents one such attempt to answer this question.[51] The DYNUMES model, created by the North Alaskan Fisheries Institute in 1979, and implemented by the North Pacific Fisheries Management Council beginning in the mid-1980s, was an extremely ambitious endeavor to analyze and consider each and every conceivable factor which could have any impact on the marine ecosystem of the East Bering Sea.[52] Factors ranging from population trends, breeding and feeding patterns, and possible symbiotic relationships between all identified marine species inhabiting the subject area were considered, along with the probability of periodic detrimental algal blooms, El Ninos, oil spills, and other environmental anomalies.[53] From this all encompassing analysis and comparison, the DYNUMES model would vector out acceptable biological catches for all commercially targeted species over the next one thousand years.[54]

DYNUMES was, in theory, the perfect model for ecosystemic management. All possible environmental factors were considered in managing the targeted fisheries, and the model thereby achieved the goal of ecosystemic management in its truest sense. Unfortunately, by attempting to analyze all conceivable factors in order to remove any guesswork in setting a targeted species ABC, the DYNUMES model became what it sought to avoid pure guesswork. Scientific data and/or methodology was unavailable for so many of the environmental factors which the DYNUMES creators chose to include that the assumptions which had to be made in order for DYNUMES to work outnumbered the pieces of reliable data. The DYNUMES calculation of a targeted stock's ABC was therefore, in reality, pure speculation. For this reason, in 1995

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51. *See supra* notes 5 and 6, and accompanying text.
52. *Id.*
53. *Id.*
54. *Id.*

the Pacific Fisheries Management Council chose to abandon ABC calculations under the DYNUMES model, and return to its historical single stock assessment analysis.[55]

The same outcome may be inevitable for the ecosystemic model presently being created by Dr. Roger Zimmerman for the Gulf of Mexico and South Atlantic Fisheries Council.[56] Zimmerman's model, like DYNUMES, factors in a plethora of unquantifiable environmental factors, a choice which will most likely again lead to speculative, unsubstantiated calculations and an unworkable management regime.[57]

There is a clear lesson to be learned from DYNUMES and its ilk. Modern technology and science is presently unable to provide a sound basis for an ecosystemic model which attempts to consider all possible environmental factors. Therefore, in order for any type of ecosystemic management regime to be considered scientifically sound, it must limit itself to consideration of those environmental factors which are currently identifiable and accurately quantifiable.

The ecosystemic management regime adopted by the United States Forestry Service comes closer to meeting this test. Under 36 C.F.R. § 219.19, the U.S. Forest Service is to manage:

> Fish and wildlife habitat . . . to maintain viable populations of existing native and desired non-native vertebrate species in the planning area. For planning purposes, a viable population shall be regarded as one which has the estimated numbers and distribution of reproductive individuals to ensure its continued existence is well distributed in the planning area. In order to insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.[58]

Section 219.19 is yet another call for ecosystemic management, this time for terrestrial ecosystems. The effects which this section attempts to address are, in fact, very much analogous to the problems

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55. *See* FMP, *supra* note 5, at 10-11.
56. *See supra* note 7.
57. *Id.*
58. 36 C.F.R. § 219.19 (1988).

faced by the country's fisheries. Section 219.19 takes aim at the impact which timber harvesting has on terrestrial ecosystems. Similarly, ecosystemic management under the FCMA must take aim at the impact which the harvest of fish stocks has on marine ecosystems.

Unfortunately, the U.S. Forest Service's management regime fails to furnish a good answer to the question of how to consider these types of impacts, although it provides an invaluable starting point.

The U.S. Forest Service's ecosystemic management regime is found under subsection (a) of section 219.19. Subsection (a) provides:

> Each alternative shall establish objectives for the maintenance and improvement of habitat for *management indicator species* selected under paragraph (a)(1) of this section, to the degree consistent with overall multiple use objectives of the alternative.[59]

Section 219.19(a) introduces the idea of management indicator species (MIS). Management indicator species are selected species inhabiting the target ecosystem, which the forest service carefully monitors and evaluates.[60] The theory behind management indicator species is that: (1) Ecosystems are simply too complex to attempt to identify, monitor and evaluate every living organism inhabiting them; and (2) By selecting a few, key organisms within a targeted ecosystem, and then carefully monitoring and evaluating the health of those species within the ecosystem, the health of the entire ecosystem can be gauged.

In theory, and perhaps in practice, management indicator species can be a very useful tool in managing a resource ecosystemically. Through MIS, the need to look at how the harvest of a given natural resource impacts the surrounding ecosystem is tempered by present day scientific and technological limitations. However, while the U.S. Forest Service's regime for ecosystemic management may have gotten off on the right foot via subsection 219.19(a), it quickly takes a wrong step in subsection 219.19(a)(1), which provides the criteria for selection of MIS. That subsection provides:

> [C]ertain vertebrate and/or invertebrate species present in the area shall be identified and selected as management indicator species and the reasons for their

59. *Id.* § 219.19(a) (emphasis added).
60. *Id.*

> selection shall be stated. These species shall be selected because their population changes are believed to indicate the effects of management activities. In the selection of management indicator species, the following categories shall be represented where appropriate: Endangered and threatened plant and animal species identified on State and Federal lists for the planning area; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; non-game species of special interest; and additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.[61]

The problem with subsection 219.19(a)(1) selection criteria is readily apparent. The U.S. Forest Service is given such broad discretion with regards to MIS selection that there really are no criteria to insure appropriate and meaningful selection of management indicator species. First, it is probable that any type of management activity will have some sort of effect on the population of every species present in the planning area. The initial "effects" criteria is therefore radically overbroad, and provides no meaningful guidance. Second, the selection of MIS from the enumerated categories is within the absolute discretion of the Forest Service. The Forest Service need only include such enumerated categories as it deems "appropriate."[62]

Finally, the enumerated categories themselves are too all-inclusive to provide any meaningful selection criteria. The endangered species category is of little use because the impacts of management activities on endangered species must already be considered under the

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61. *Id.* § 219.19(a)(1).

62. *See, e.g.,* Sierra Club v. Marita, 843 F. Supp. 1526, 1536 (E.D. Wis. 1994) (upholding the Wisconsin Forestry Service's decision to select only fourteen of sixty-five species within the planning area which were demonstrated to need population viability analyses as management indicator species), *aff'd*, 46 F.3d 606 (7th Cir. 1995); *see also* Oregon Natural Resources Council v. Lowe, 836 F. Supp. 727, 733 (D. Oregon 1993) (referring to the wide discretion given to the Forestry Service in planning for wildlife habitat). *But see* Seattle Audubon Society v. Lyons, 871 F. Supp. 1291, 1310 (W.D. Wash 1994) (citing Seattle Audubon Society v. Moseley, 798 F. Supp. 1483 (W.D. Wash 1992), for the proposition that NFMA requires planning for the entire biological community, and not for simply one species).

ESA before any such activity is sanctioned. Further, the categories for "species with special habitat needs," "commonly hunted, fished or trapped" species, "special interest" species, and "additional" species are so sweeping that they encompass any and all species inhabiting a selected planning area. Therefore, in practical terms, the Forest Service may select any species inhabiting a target planning area to serve as an MIS for that area.[63]

This absolute discretion in the selection of MIS turns the goal of ecosystemic management on its head. For example, in considering the ecosystemic effects of a plan to clear-cut large areas of western forest land, species such as white-tail deer and jackrabbits could be selected to serve as the MIS. Certainly, clear-cutting a large expanse of woodland will have an impact on the populations of these species inhabiting the planning area. The question is, what kind of effect will the action have, and is the effect a true indication of the impact the activity will have on the ecosystem as a whole? In the case of white-tail deer and jackrabbits, clear-cutting a large expanse of their habitat could cause "blooms" in their population levels. An increase in open grassy areas provides more readily accessible vegetation for their consumption, and increased available free space for living. On the basis of the selected MIS, the Forest Service could well find that the clear-cutting operation will be beneficial to the planning area's ecosystem.[64]

In actuality, however, such clear-cutting activities can and do have extremely detrimental effects on forest and woodland ecosystems, and on the creatures that inhabit them.[65] Yet, because the Service is able to choose whatever MIS it likes, these negative impacts may be conveniently overlooked, or ignored.[66] The goal of true ecosystemic

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63. *See* Marita; *see generally* Krichbaum v. Kelly, 844 F. Supp. 1107 (W.D. Virginia 1994) (holding Forest Service's biological evaluation adequate).

64. In fact, in Sierra Club v. Robertson, 845 F. Supp. 485 (S.D. Ohio 1994), the Forest Service did just that. In that case, the court upheld the Service's analysis of the Wayne National Forest, in which the Service rationalized that clear-cutting would enhance the habitat of certain management indicator species. *Id.* at 502. For accordance on this point, see also Cheri Brooks, *New Threat to Forests*, DEFENDERS, Winter 1995/96, at 16, 20.

65. Take, for instance, the northern spotted owl, whose population has been reduced to the point of near extirpation by clear-cutting efforts in the Pacific Northwest.

66. *See* Sierra Club v. Espy, 38 F.3d 792, 802 (5th Cir. 1994) (upholding the use of even-aged logging under the Service's rationale that certain management indicator species would benefit, while simultaneously finding that populations of fox squirrel and pileated woodpecker would be adversely affected).

management therefore remains unachieved in the Forestry Service's management regime.

B. Predator MIS as the Solution to Ecosystemic Management

Although the U.S. Forestry Service's attempt at ecosystemic management ultimately falls short, it does provide the touchstone for what may be a viable ecosystemic management regime for U.S. fisheries, i.e., the concept of MIS. As illustrated by the DYNUMES model, it is impossible to ascertain with any certainty how all possible environmental factors are going to affect a given ecosystem. The science just is not there yet. However, modern science and technology can furnish significant insight into how the harvesting of a natural resource impacts *certain species* within the harvest area's ecosystem. This is so for terrestrial ecosystems like forests and woodlands. It is even more so in the case of harvesting commercial fish stocks from the marine ecosystems which they inhabit. With this in mind, the real question then becomes which species in the marine ecosystem to select to serve as meaningful management indicator species. The authors believe that this question is easily answered. One must merely step back and consider what the most direct and significant impact which the harvesting of fish has on marine ecosystems: *It takes fish out of the ecosystem which would otherwise be consumed by other creatures within that ecosystem*. This impact is clearly the most direct and significant to marine ecosystems resulting from large harvests of fish. Unlike the clear-cutting of forests, harvesting fish does not strip the ecosystem of its very foundation, the physical habitat. Instead, harvesting fish stocks deprives marine ecosystems of an internal food source which sustains its members, both large and small.

For this reason, this paper proposes an ecosystemic management regime under the FCMA which relies on *Predator MIS* to provide a basis for analysis and consideration. By considering the impacts which commercial harvest of fish stocks have on the predators that naturally prey upon those stocks, and allocating for their needs, the entire ecosystem will benefit, and the goal of ecosystemic management will thereby be furthered. The proposal is set out and explained in suggested amendments to the FCMA and suggested regulations to be implemented under the FCMA, all of which are contained in the Appendix to this

Article.[67] Review of the Appendix will provide the reader with assistance in understanding the following discussion of the authors' proposal.

C. Predator MIS—How it Works

Briefly, the proposed management regime operates in this manner.[68] First, utilizing the best available science, the ABC for a commercially targeted stock is determined.[69] ABC will be set to sustain a stock which is already at its optimal, i.e., healthy and sustainable population, or to rebuild a stock which is depleted and below its optimal population.[70] Optimal population is not meant to be defined as the historical population of the stock prior to the initiation of human harvesting, but only that population level which is determined to safely provide for the healthy and perpetual existence of the stock in its natural environment.[71]

Once ABC is determined, the *Predator Need Index* (PNI) is calculated, again utilizing the best available science, in the following fashion. Animals which naturally prey upon the targeted commercial stock are identified and selected as the *Predator Management Indicator Species (Predator MIS)* for that particular commercial stock.[72] The

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67. This Appendix and the proposal which it embodies is written for purposes of clarification only, and should be read with the recognition that the authors are not charged with the development of federal regulations or legislation. The Appendix is offered for its content, and not with any intention that it contain the appropriate language or that it be in conformity with official drafting style or technique.

68. For the following discussion, *see infra* Appendix, and EABC Breakdown at p.40.

69. *See infra* Appendix at B., Author's Proposed Implementing Regulations, 50 C.F.R. § 602.11(c)(1).

70. *Id.*

71. *Id.* Although the use of the 5% NEFI is not based on hard statistical data, the authors believe that its use as a "safety net" or "buffer zone" is both reasonable and warranted and represents an adequate margin of safety. The use of such a device is regularly used in environmental law where hard statistics are unavailable, and represents an effort to make allowances for immeasurable contingencies. *See* Lead Indus. Assoc. v. Environmental Protection Agency, 647 F.2d 1130 (D.C. Cir.), *cert. denied*, 449 U.S. 1042 (1980) (upholding EPA's decision under the Clean Air Act to set air quality standards for lead twice as stringent as studies had demonstrated were necessary to protect the public from clearly harmful effects in order to allow for an "adequate margin of safety." *Id.* at 1154); Hercules, Inc. v. Environmental Protection Agency, 598 F.2d 91 (D.C. Cir. 1978) (upholding EPA's decision under the Clean Water Act to set discharge limits toxaphene and endrin (toxins) more stringent than studies indicated were necessary, because the analyses involved were "on the frontiers of scientific knowledge," and the discharge limits therefore allowed for an "adequate margin of safety." *Id.* at 106, 110).

72. *Id.* § 602.11(d)(1)-(2).

percentage of the targeted commercial stock's ABC that is required by these predators as a food source is then calculated and subtracted from the initial ABC.[73] As in the assessment of the commercial stock itself, the need of each predator is assessed based upon whether that predator is at its optimal population, or is depleted below its optimal population. If depleted, the allocation of the commercial stock to that predator is not calculated using the current population of the predator, but instead using the maximum population which the predator species could attain in the next-year assuming all other conditions are optimal for growth.[74]

Once the PNI is subtracted from the initial ABC, a noncontrollable environmental factor index (NEFI) is calculated for the targeted commercial stock.[75] The NEFI represents the estimated percentage of the targeted stock's total biomass which will be lost to noncontrollable, nonpredictable events within the next year, such as off-shore oil or chemical spills, on-shore releases of hazardous substances into the marine ecosystem, etc.[76] Because these factors are presently unquantifiable utilizing the best available science, a straight percentage of the targeted stock's total biomass is utilized for the five percent calculation.[77] While this figure may appear arbitrary, the authors feel that it is reasonable in light of the lack of available scientific data, and the awesome potential for destruction that many noncontrollable environmental factors impose on marine ecosystems. Once the NEFI for the targeted commercial stock is calculated, it too is subtracted from the initial ABC figure.[78]

What remains is what the authors consider to be the *Ecosystemic Acceptable Biological Catch (EABC)* for the targeted commercial stock.[79] The EABC is meant to replace optimal yield (OY) in existing single stock assessment practices for purposes of determining Total Allowable Catch (TAC).[80] A New EABC is determined annually.[81]

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73. *Id.* § 602.11(c)(1), (d)(1)-(2).

74. *Id.* § 602.11(d)(1)-(2). PNI should be distinguished from mere inclusion of estimated predator consumption as a factor in determining the natural mortality of the targeted stock, which is sometimes used in current single stock assessment analysis. PNI focuses on the health of the identified predator species' populations (not the targeted stock), allocating for the replenishment of depleted populations of predators, and for subsequent preservation of those predator species at optimal population levels.

75. *Id.* § 602.11(e).

76. *Id.*

77. *Id.*

78. *Id.* § 602.11(c)(3).

79. *Id.*

80. *Id.* § 602.11.

Finally, the authors' proposal provides for considerations of factors such as breeding seasons, migratory patterns, the amount of the targeted commercial stock's total biomass biologically available to identified predators, and the amount of the targeted commercial stock's total biomass technologically exploitable by fisheries when setting TAC, and in setting seasons, locations for permissible fishing harvest, etc.[82]

D. Predator MIS—Hypothetical Implementation

In order to illustrate the viability of the Predator MIS proposal, the authors have attempted to provide a hypothetical implementation of the management regime, utilizing the Bering Sea/Aleutian Islands pollock fishery as a factual setting.[83] The current estimate of the total biomass for pollock in the targeted area is roughly seven million metric tons.[84] However, in this particular instance, we shall assume that only 5.3 million metric tons are biologically available to identified predators or

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81. *Id.* § 602.11(c).

82. *Id.* § 602.11(f).

83. *See generally* FMP, *supra* note 5. The information contained in the following discussion is derived generally from the following sources: VIDAR G. WEPESTAD, NOAA, BERING SEA-ALEUTIAN ISLANDS WALLEYE POLLOCK ASSESSMENT FOR 1996 (1995) (Draft copy); NATIONAL MARINE MAMMAL LABORATORY, NOAA, STATUS REVIEW OF THE UNITED STATES STELLER SEA LION (EUMETOPIAS JUBATUS) POPULATION (July 1995); Lowell W. Fritz et al., AFSC PROCESSED REPORT 95-04: EFFECTS OF THE CATCHER VESSEL OPERATIONAL AREA ON WALLEYE POLLOCK FISHERIES AND MARINE MAMMALS IN THE EASTERN BERING SEA, 1990-94 (June 1995); RICHARD L. MERRICK & THOMAS R. LOUGHLIN, FORAGING BEHAVIOR OF ADULT FEMALE AND YOUNG-OF-YEAR STELLER SEA LIONS *(Eumetopias jubatus) in Alaskan Waters* (Feb. 27, 1995) (Draft copy); R.C. FERRERO & L.W. FRITZ, NOAA, TECHNICAL MEMORANDUM NMFS-AFSC-43: COMPARISONS OF WALLEYE POLLOCK, *THERAGRA CHALCOGRAMMA*, HARVEST TO STELLER SEA LION, *EUMETOPIAS JUBATUS*, ABUNDANCE IN THE BERRING SEA AND GULF OF ALASKA (Sept. 1994); RICHARD L. MERRICK & DONALD G. GALKINS, IMPORTANCE OF JUVENILE WALLEYE POLLOCK IN THE DIET OF GULF OF ALASKA STELLER SEA LIONS (June 8, 1994) (Draft copy); LOWELL W. FRITZ et al., THE THREATENED STATUS OF STELLER SEA LIONS (EUMETOPIAS JUBATUS) UNDER THE ENDANGERED SPECIES ACT: EFFECTS OF ALASKA GROUNDFISH FISHERIES MANAGEMENT (June 1994); LOWELL W. FRITZ, AFSC PROCESSED REPORT 93-13, ESTIMATED CATCHES OF WALLEYE POLLOCK, ATKA MACKEREL AND PACIFIC COD WITHIN CRITICAL HABITAT OF THE STELLER SEA LION IN THE BERRING SEA, ALEUTIAN ISLANDS AND GULF OF ALASKA FROM 1977-92 (Oct. 1993); LOWELL W. FRITZ, AFSC PROCESSED REPORT 93-08: TRAWL LOCATIONS OF WALLEYE POLLOCK AND ATKA MACKEREL FISHERIES IN THE BERING SEA, ALEUTIAN ISLANDS AND GULF OF ALASKA FROM 1977-92 (Aug. 1993); OFFICE OF PROTECTED RESOURCES, NOAA, FINAL RECOVERY PLAN FOR STELLER SEA LION (*EUMETOPIAS JUBATUS*) (Dec. 1992); DAYTON L. AVERSON, COMMERCIAL FISHERIES AND THE STELLER SEA LION (EUMETOPIAS JUBATUS): THE CONFLICT ARENA (Apr. 1991) (Fisheries Research Institute, University of Washington School of Fisheries).

84. EFFECTS OF THE CATCHER VESSEL OPERATIONAL AREA ON WALLEYE POLLOCK FISHERIES AND MARINE MAMMALS IN THE EAST BERING SEA, 1990-94, *supra* note 83, at 30.

technologically exploitable by the commercial fishery.[85] The other 1.7 million metric tons will be deemed to exist in very deep waters off of the continental shelf which most of the identified predators are unable to reach, and which commercial fisheries prefer to avoid, because of the distance from processing plants and the amount of bycatch found at deeper levels. Therefore, for purposes of this discussion, the figure 5.3 million metric tons will be used as the total biomass for the pollock fishery.[86]

The ABC for this portion of the pollock population will be estimated as three million metric tons, 2.3 million metric tons being allocated to natural mortality and baseline reproductive population.[87]

The following predators have already been identified by the North Alaskan Fishery Institute as part of their DYNUMES model data: (1) Marine avians (specific species identification had not yet been made available to the authors); (2) Pacific halibut; (3) Arrowtooth flounder; (4) Killer whales; (5) Gray whales; (6) other cetaceans (specific species identification had not yet been made available to the authors); (7) Steller sea lions; (8) Northern fur seals; (9) Ringed seals; and (10) Harbor seals.[88]

The North Alaskan Fishery Institute, for each of these predators, has determined both the extent to which pollock is relied on as a percentage of diet, and the current population of the species. From these calculations, it has determined annual pollock take by these predators as follows: (1) Marine avians—26,300 mt; (2) Halibut and flounder—550,000 mt; (3) cetaceans—354,200 mt; (4) pinnipeds (excluding Steller sea lions)—586,300 mt; and (5) Stellar Sea Lions—182,200 mt.[89] The sum of these figures, equaling the total take by identified predator species, is 1,699,000 metric tons. To this figure is added 18,200 metric tons representing a further allocation for the depleted Steller sea lion

85. *See* BERING SEA-ALEUTIAN ISLANDS WALLEYE POLLOCK ASSESSMENT FOR 1996, *supra* note 83, at 1; EFFECTS OF THE CATCHER VESSEL OPERATIONAL AREA ON WALLEYE POLLOCK FISHERIES AND MARINE MAMMALS IN THE EASTERN BERING SEA, 1990-94, *supra* note 83, at 29-42.

86. The authors derive this figure from a composite survey of all materials listed in note 83, and do not intimate that the figure is a proven scientific fact, but only helpful for purposes of the hypothetical. *See* EFFECTS OF THE CATCHER VESSEL OPERATIONAL AREA ON WALLEYE POLLOCK FISHERIES AND MARINE MAMMALS IN THE EASTERN BERING SEA, 1990-94, *supra* note 82, at 29-42.

87. *See supra* note 85 and accompanying text; *see also* BERRING SEA-ALEUTIAN ISLANDS WALLEYE POLLOCK ASSESSMENT FOR 1996, *supra* note 83, at 15-18.

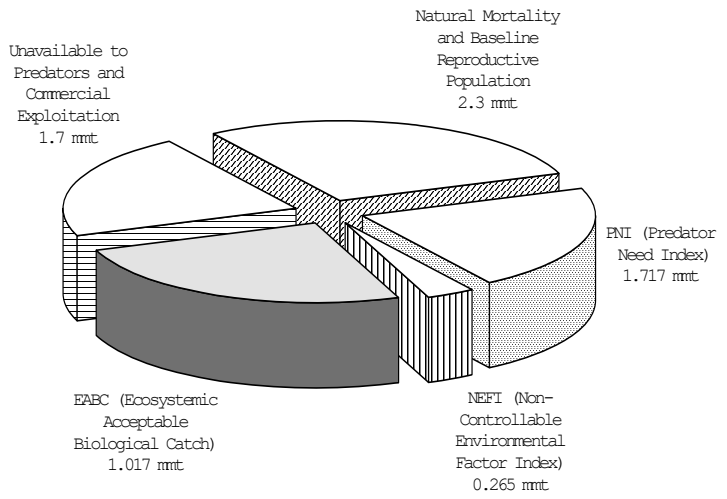
88. FMP, *supra* note 5, at 9-14.

89. *Id.*

stock equaling the need of an additional ten percent of its current population, thereby allocating for maximum potential next-year population growth.[90] The final figure is therefore 1,718,200 metric tons, which constitutes the PNI for purposes of the hypothetical.

The NEFI, calculated as five percent of the stock's total biomass, comes to 265,000 metric tons. PNI and NEFI are then added together, totaling 1,983,200 metric tons. This figure is subtracted from the stock's ABC, and the balance of this calculation, 1,016,800 metric tons, represents EABC for the hypothetical—that amount of pollock which the commercial fishery can harvest and still provide the targeted marine ecosystem with the resources it needs to sustain itself (see figure below).

HYPOTHETICAL EABC BREAKDOWN



* The entire pie equals Total Biomass, 7 million metric tons

90. The authors assumed a maximum potential annual growth rate of 10% for purposes of the hypothetical.

This hypothetical attempts to demonstrate that Predator MIS can, in fact, work as viable management regime. In practice it can effectively balance the need to consider ecosystemic impacts of fish harvest with present day scientific and technological limitations.

E. Predator MIS—Why it Will Work

Predator MIS as a vehicle for ecosystemic management of U.S. fisheries will work for three very important reasons. First, the science to implement this regime already exists. ABC calculations are routine, and have been utilized in single stock assessments for many years. More importantly, predator needs are equally ascertainable using existing and commonly practiced biological methods.[91] Identification of predator species is readily ascertainable utilizing common observation practices coupled with routine stomach contents studies.[92] Further, utilizing the same routine stomach content studies, the extent to which a particular predator species relies on a commercially targeted stock can be easily demonstrated.[93] Finally, existing and/or desirable populations for these same predator species can also be easily established through reliable scientific means.[94] Once these figures are determined, it becomes simple arithmetic to determine the amount of the targeted commercial stock which a particular predator needs.

One assumption utilized by the authors' proposal is found in the NEFI consideration. Although admittedly an assumption is made via the standard five percent calculation, the authors believe that the gravity of the harm which noncontrollable factors can cause to the marine ecosystem outweighs the need for a scientifically quantifiable calculation in this regard.

Second, Predator MIS will work because the proposed management regime conserves commercial fish stocks, sustaining them ad infinitem. Although commercial fisheries may face smaller harvests in the short term, in the authors' opinion this will be made up for in the long term by the existence of perpetually sustained commercial fisheries.

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91. *See, e.g.*, FMP, *supra* note 5, at 9-14.

92. *Id.*

93. *See* generally FINAL RECOVERY PLAN FOR STELLER SEA LION (*EUMETOPIAS JUBATUS*), *supra* note 83.

94. *Id.*

The third important reason why Predator MIS will work as a management regime, is that it achieves ecosystemic management in as true a sense as it presently can be achieved. By purposefully allocating a share of the targeted commercial stock to those nonhuman organisms which rely upon that stock for sustenance, the goal of a healthy ecosystem is furthered in two distinct ways. First, ensuring the health of the targeted commercial stock, and all of its identified predator MIS will likely have a synergistic effect on the health of the entire ecosystem. While many species of fish which are commercially targeted will be directly and perpetually sustained,[95] many more predator species which rely on commercially targeted fish species will likewise be directly and perpetually sustained. Further, by directly sustaining commercial fish stocks and their identified predators, still more species which prey upon the predator MIS will be sustained indirectly. So too will all those species closer to the bottom of the food chain, closer to the "heart" of the ecosystem, which rely on the interactions between predator and prey species above them for their own sustenance. It is not hard to imagine that if all commercially targeted species were managed in the proposed fashion, the benefits from such management could well reach to every living organism in the protected marine ecosystems.

Moreover, the goal of a healthy ecosystem is furthered by the heightening of human awareness to the fact that we are not the only predators in the sea, that we share the earth and all its bounty with all the other living organisms, and that we all rely upon our fellow creatures for our existence and well-being. Consciously sharing the Earth's living resources, in the form of fish stocks, brings us a step closer to Henry Beston's urging that:

> We need another and wiser and perhaps more mystical concept of animals. Remote from universal nature, and living by complicated artifice, man in civilization surveys the creature through the glass of his knowledge and sees thereby a feather magnified and the whole image in distortion. We patronize them for their incompleteness, for their tragic fate of having taken form so far below ourselves. And therein we err, and greatly err. For the

95. Further, perpetually sustaining a healthy population of the targeted species will benefit the ecosystem by ensuring that sufficient members of the targeted stock will exist to effectively suppress that stock's prey species, keeping such prey species at their own healthy and sustainable population levels.

> animal shall not be measured by man. In a world older and more complete than ours they move finished and complete, gifted of extensions of the senses we have lost or never attained, living by voices we shall never hear. They are not brethren, they are not underlings; they are other nations, caught with ourselves in the net of life and time, fellow prisoners of the splendor and travail of the earth.[96]

III. THE LEGAL WEIGHT OF THE ECOSYSTEMIC CONSIDERATION—PRESUMPTION IN FAVOR OF CONSERVATION

The teeth in any legislation come from the legal presumption it carries. Therefore, if Predator MIS is accepted as a viable management regime, the final question in the analysis becomes, "What presumptive weight does the conservation mandate carry once the EABC has been given to the council for purposes of setting TAC?" Under the current FCMA, and ignoring the proposed amendment limiting the role of economics in setting catch limits,[97] the regional councils are free to consider any socioeconomic factors in setting optimum yield and TAC, chiefly the economic dependence of coastal communities on commercial fisheries. When the best available science is unclear on whether or not a proposed TAC is too high from a biological perspective, the presumption is in favor of commercial exploitation, rather than conservation.[98]

For this reason, the authors determined that in order for their proposal to be effective, the current presumptive measure of the FCMA would need to be altered. Before deciding the presumptive weight to be proposed alongside Predator MIS and EABC, the authors examined the presumptive measures of several major environmental statutes for their treatment of the issue, including the National Environmental Policy Act (NEPA),[99] the Endangered Species Act (ESA),[100] the Clean Air Act (CAA),[101] the Resource Conservation and Recovery Act (RCRA),[102] and

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96. HENRY BESTON, THE OUTERMOST HOUSE 25 (1928) (11th ed. 1976).

97. *See supra* note 38 and accompanying text.

98. *See generally* Fishermen's Dock Cooperative, Inc. of Point Pleasant Beach, New Jersey v. Brown, 867 F. Supp. 385 (E.D. Va. 1994).

99. NEPA, 42 U.S.C. § 4332 et. seq. (1988).

100. Endangered Species Act Amendments of 1982, 16 U.S.C.A. § 1531 et seq. (1985).

101. The Clean Air Act, 42 U.S.C. § 7545 (C)(1)(1988) (specifically the ban on leaded fuel therein).

the Federal-Aid Highways Act (FAHA).[103] As demonstrated below, the latter two statutes were chosen by the authors to provide foundation for the proposed presumptive measure.[104]

A. Proposed Presumption

The authors' proposed presumption states that EABC, which is determined by what is best for the marine ecosystem, shall not be exceeded. There are, however, two important exceptions. Subsection (a)(1) of the proposed presumption is roughly analogous to the RCRA land ban in that it allows for best conclusive science to override the council's determination of EABC.[105] Subsection (a)(2) is roughly analogous to the FAHA presumption in that it allows for extreme socioeconomic hardship to override the presumption in favor of conservation:[106]

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102. The Resource Conservation and Recovery Act, 42 U.S.C. § 6924 (C)(1)(1988) (specifically the ban on land disposal of hazardous wastes contained therein).

103. The Federal-Aid Highways Act of 1968, 23 U.S.C. § 138 (1990) (specifically the consideration given to preservation of parklands when proposing construction of new highways).

104. *See infra* notes 105-106.

105. RCRA bans the land disposal of certain listed hazardous wastes unless "the Administrator determines the prohibition on one or more methods of land disposal of such waste is not required in order to protect human health and the environment for as long as the waste remains hazardous[.]" RCRA § 3004, 42 U.S.C. § 6924(d)(1) (1995). "Furthermore, the Administrator cannot find that a method of land disposal properly protects current and future human health unless "it has been demonstrated to the Administrator, to a *reasonable degree of certainty*, that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous." *Id.* (emphasis added). This is a weighty presumption in favor of environmental protection. The presumption can be rebutted, but with difficulty.

106. The FAHA sets up a scheme whereby the Federal government contributes funds to build state highways. FAHA, § 138, 23 U.S.C. § 138 (1990). However, as a condition to Federal funding, the FAHA employs a presumption against building roads through parklands. The exact language of the presumption states that no road shall be built through parkland unless "(1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park[.]" *Id.*

Though the presumption seems to call for a cost-benefit analysis, where one would weigh the value of building the road through a park against the additional cost of building it through non-parkland, including the cost of eminent domain acquisitions, the section has been interpreted more narrowly than that. In *Citizens to Preserve Overton Park v. Volpe*, the court construed the section to exclude a simple cost-benefit analysis because parklands would always lose. It is always cheaper to acquire parkland than to displace homes and businesses and pay reasonable compensation. 401 U.S. 402, 413 (1971). Instead, the court said that only under unusual, or "uniquely problematic" circumstances should a road through a park be built. *Id.* The court interpreted the section as meaning that parklands have a special value that cannot be measured in simple monetary terms, and that they should be protected at almost any cost. *Id.* This presumption is very difficult to rebut for obvious reasons. When the cost-benefit analysis is removed, proponents of road construction

> *Proposed Amendment to FCMA*
> §1851(a)(1) - National Standards.
>
> TAC (Total Allowable Catch) for a targeted commercial stock shall not exceed EABC, as referred to in 50 C.F.R. § 602.11, unless a regional fishery council is able to make specific factual findings and conclusions which, to the satisfaction of the Secretary, demonstrate to a reasonable degree of certainty that—
>
> (1) best conclusive science proves
>
> (i) the calculated EABC to be incorrect, and
>
> (ii) that a TAC above the calculated EABC will not cause a shortage of the targeted stock within its ecosystem which will impede the replenishment and subsequent preservation of
>
> (A) the targeted commercial stock, or
>
> (B) the identified predators of that stock; or that
>
> (2) setting TAC at EABC will cause uniquely problematic socioeconomic harm that substantially outweighs the long-term benefits of maintaining healthy levels of commercial stocks and their marine ecosystems. In weighing socioeconomic harm against the preservation of the natural marine ecosystem, the benefits of such preservation shall be considered to be of primary importance. A standard cost-benefit analysis shall not be used because the value of healthy marine ecosystems is not readily quantifiable.

B. The "Best Conclusive Science" Exception

The authors' proposed amendments to the FCMA seek to achieve two goals: (1) rehabilitation and preservation of natural marine ecosystems; and (2) long term predictability of catch quotas for the preservation of coastal fishing communities. Because these goals are somewhat inconsistent, a presumption leaning too strongly in favor of either goal will defeat the other. A balance must be struck.

The authors have attempted to strike this balance through subsection (a)(1) and (a)(2) of the proposed presumptive measure. Recognizing that

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through parks have few tools by which they can justify such projects. *See supra* notes 13-14 and accompanying text.

current science on ecosystemic conservation and management is incomplete, the authors believe that subsection (a)(1) will serve as an incentive to commercial fishing interests to promote scientific study of ecosystems. With conclusive best science, they may be able to override the Council's EABC with their own, and require the Secretary to increase the TAC under this exception. This is similar to the RCRA land ban wherein an entity may petition the Secretary to allow land disposal of hazardous waste if they can show with best conclusive science that the waste will pose no threat to humans for the hazardous life of the waste.[107]

The "best conclusive science" escape valve of subsection (a)(1) serves two purposes. First, it recognizes the fact that commercial fishermen have an interest in their harvest. Second, it encourages commercial fisheries to have a better, more thorough understanding of ecosystemic interactions. Ultimately, this greater understanding will allow regional councils to set consistent TACs from year to year without the ominous threat of sudden fishery shutdowns as has happened of late.

C. The Overton Park Exception

The escape valve in exception (a)(2) recognizes that in an effort to preserve the environment, legislation may be blind to socioeconomic interests. If uniquely problematic socioeconomic harm can be shown to stem from a council's EABC-based TAC, the Secretary may increase the quota. This is similar to the escape valve provided for in the FAHA, as interpreted by *Overton Park*.[108]

Establishing that socioeconomic harm attains the status of "uniquely problematic," is, however, no small hurdle. Because many marine ecosystems are either on the brink of, or are already in a permanently debilitating downward spiral, the presumption in favor of conservation will most often outweigh all but the most extreme socioeconomic hardship.

This does not mean that commercial interests will be excluded altogether. First, there will usually be some commercial take allowed even while the replenishment of the targeted stocks and their identified predators is underway. Second, once the ecosystem has recovered, EABC will be stabilized and allow for better commercial planning; the

107. *See supra* note 104.
108. *See supra* note 105.

uncertainty of next year's quota will no longer loom over commercial fishermen's heads.

IV. CONCLUSION

Though the proposal may seem harsh, the authors point to the proposed amendments to the FCMA recently passed by the House. The proposed amendments diminish the role of economics in setting TAC and require consideration of the environmental impacts of fishing practices.[109] Thus, the amendments illustrate that the needed swing towards conservation is underway, and that the ecosystemic management regime and legal presumption proposed herein are not great leaps in conservation-minded thought, but are instead simply one possible answer to a call which has already been made around the country and around the world.

109. *See supra* note 48 and accompanying text.

APPENDIX

A. Authors' Proposed Amendments to FCMA

§ 1851(a) - National Standards.

Conservation and management measures shall prevent overfishing *of any kind*, including, but not limited to "spiked" or sporadic overfishing, seasonal overfishing, or continuous overfishing, while achieving, on a continuing basis, the *ecosystemic acceptable biological catch (EABC)* from each fishery in the United States fishing industry.

(Original text: Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.)

§ 1802 – Definitions.

(18) EABC**.** The term "*ecosystemically acceptable biological catch*," with respect to the yield from a particular fishery, means the quantity of fish, expressed in metric tons, which can be removed through both direct and indirect fishing. This quantity is arrived at by subtracting from the total biomass of the targeted commercial species the baseline reproductive population for the targeted commercial species, the mortality of said species attributable to natural causes, the mortality of said species attributable to predation, and the mortality of said species attributable to other noncontrollable environmental factors, all based on next-year-mortality. (This definition replaces that of "optimum yield.")

(19) Best Conclusive Science**.** The term "best conclusive science," as used in § 1851(a)(1), shall mean such science which is demonstrated to be generally accepted in the scientific community, and which is not the subject of significant controversy within the scientific community.

B. Authors' Proposed Implementing Regulations

National Standard 1 – EABC. 50 C.F.R. 602.11 (1995). This section supersedes the regulation(s) defining the method for determining O.Y.

(a) Standard 1**.** Conservation and management measures shall prevent overfishing of any kind while achieving the ecosystemically acceptable biological catch (EABC) from each fishery in the United States fishing industry.

(b) General**.** The determination of EABC is a decisional

mechanism for resolving the Act's multiple purposes, specifically, maintaining a viable commercial fishing industry while simultaneously preserving healthy and ecologically optimal marine ecosystems. An optimal marine ecosystem is one which most closely resembles, in species diversity and population, the ecosystem as it was before the introduction of nonecosystem mortality.

(c) EABC**.** EABC is the largest annual catch that can be taken from each targeted commercial stock, and is to be determined annually.

(1) The first step in determining EABC is to determine, in metric tons, the next-year natural mortality and baseline reproductive population for the targeted commercial stock. The baseline reproductive population shall be that population which will enable said stock to maintain its existing population if such existing population is an optimal population in terms of the environment's carrying capacity, or, if such existing population is below its optimal population, or depleted, that population which will enable said stock to replenish itself to its optimal level within a period of five years. Once the targeted commercial stock's natural mortality and baseline reproductive population are determined, they shall be subtracted from said stock's total biomass, leaving a remainder, expressed in metric tons, which shall be considered the *acceptable biological catch* (ABC) for that stock.

(2) The second step in determining EABC is to determine, in terms of metric tons, the next year *predator need index* (PNI) for the targeted commercial stock, as calculated pursuant to subsection (d)(1)-(2)of this section.

(3) The third step in determining EABC is to determine, in terms of metric tons, the next year *noncontrollable environmental factor index* (NEFI) for the targeted commercial stock, as calculated pursuant to subsection (e)(1)of this section. Once the PNI and NEFI for the targeted commercial stock are determined, the sum of those two determinations, expressed in metric tons, shall be subtracted from the ABC for the targeted commercial stock as determined in subpart (1) of this section. The figure remaining from this calculation shall be considered EABC, and shall be expressed in metric tons.

(d) PNI**.**

(1) The first step in determining PNI for a targeted commercial stock shall be to identify, utilizing best available scientific means, those biological organisms within the targeted commercial stock's ecosystem

which prey upon the commercial stock as a part of their natural prey base, and what portion of said identified predator's natural prey base is based on the targeted commercial stock. Identified predators shall include, but are not limited to all marine, terrestrial and avian organisms which utilize the commercial stock as part of its natural prey base.

(2) Once said predators are identified, it must be determined for each such predator, whether such species is declining and below optimal carrying capacity for the ecosystem, stable and below optimal carrying capacity for the ecosystem, or stable and at optimal carrying capacity for the ecosystem.

> (i) For identified predators exhibiting populations below the carrying capacity for the ecosystem (either stable or declining), the highest potential next year population growth for that species shall be determined by looking at population dynamics for the species. Once the highest potential population growth is determined, the amount of the targeted commercial stock, expressed in metric tons, which is required to sustain the identified predators highest next year population shall be determined, and shall be considered the PNI for that identified predator species.
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> (ii) For identified predators exhibiting populations at the optimal carrying capacity for the ecosystem, the amount of the targeted commercial stock, expressed in metric tons, which is required to sustain the identified predator at its existing population shall be determined, and shall be considered the PNI for that identified predator species.

(e) NEFI**.** NEFI shall be determined by calculating a percentage of the total biomass of the targeted commercial species which can reasonably said to be in danger of mortality as a result of random, unforeseeable, or un-preventable ecosystemic impacts including, but not limited to hydrology changes, climatic changes, oil spills, and releases of other hazardous or nonhazardous materials. If such a percentage cannot be calculated utilizing best available scientific means, the percentage shall be set to equal 5% of the targeted commercial stock's total biomass.

(f) Factors in setting seasons**.** Once EABC has been determined, any other relevant ecosystemic considerations shall be factored in when setting seasons and identifying closed areas. Such factors may include but are not limited to, breeding seasons, migratory patterns, the amount of

the targeted commercial stock's total biomass which is biologically available to identified predators, the amount of the targeted commercial stock's total biomass which is technologically exploitable by the fishery, and any other relevant factors.