The Deep Seabed: Customary Law Codified

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ABSTRACT

Recognizing that a fragmented international policy regarding the use of the seas did not serve well the global community and jeopardized valuable environmental resources, the United Nations undertook the task of codifying the Law of the Sea. The Conventions, approved following U.N. Conferences on this law, aim to eliminate conflict and to assure environmentally responsible development of resources.

Although the United States and other technologically advanced countries have not yet ratified the latest Convention on the Law of the Sea, legitimate precedent in the Outer Space regime and a contractual revision of res communis as a peremptory norm eminently favor ratification. Pursuant to the Convention, agreements intended to accommodate technologically advanced countries specifically target the deep seabed. Regulations promulgated by the International Seabed Authority guarantee the organized and responsible exploitation of undersea minerals that are beyond the jurisdiction of coastal states. The same regulations allow for a controlled scientific study of the deep seabed and provide for the collection of data in a single depositary organ.

The author contends that the choice of the United States to position itself outside the legal framework developed by the United Nations and its International Seabed Authority is nothing less than shortsighted in view of the overarching aim to preserve the seabed. But the United Nations must also recognize that the “as is” rule presents undue constraints that can only impede acceptance of what could prove to be a most useful tool in the protection of the marine environment.

I. INTRODUCTION

Water is basic to life. No living cell can exist without it, and if we were to view the earth as the living cell that it is,1 the importance of the

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molecule with the single oxygen atom bonded to two hydrogen atoms becomes plain. Water covers two-thirds of the earth's surface and, together with the water vapor in the atmosphere, makes this a "blue planet" when viewed from space. Yet, the vast "blue" remained unexplored until fairly recently in human history. Although the world's seas are no longer uncharted, their systematic exploration is only now being undertaken due to sufficiently developed equipment. Throughout history, humans have been fascinated with tools. Technology has been a partner in the world community's progression through the ages. To borrow a phrase from Adam Smith, the "invisible hand" of technology has crossed borders. In the process, technology has significantly affected international law. Innovations necessitated new laws, and this is especially true in one of the newest frontiers, the deep seabed.

Nations have grappled with the issues involved in maritime exploration since navigation first became possible. Vastness of the seas and the perceived inexhaustibility of their resources gave rise to the concept of "common heritage of mankind." But the path to this understanding was not entirely even throughout history. Disputes over sea rights led Carthage to prevent Romans from washing their hands in the Sicilian Sea, a contributing cause to the Punic Wars. Nevertheless, the common heritage of mankind concept became established as a peremptory norm—jus cogens—in international law. Its axiomatic nature defies amendment according to some, while others argue that it remains inexact and unbefitting the current state of progress in maritime activities. Furthermore, along with advanced navigational capability came scientific evidence that proved marine resources to be finite and destructible, prompting international action toward cooperation in the maintenance of these resources.

Multilateral efforts to develop international policy regarding the use of the seas culminated in the third U.N. Conference on the Law of the Sea, which addressed, inter alia, the problems of conservation and

3. Id.
allocation involved in mining the deep seabed. The Convention that emerged from that effort awaited ratification for 12 years, but the framework needed to achieve the objective of creating “favorable conditions for peace and order in the oceans” had been established. Other treaties and declarations complement this framework as *lex lata* or *lex ferenda* to state, respectively, what the international law is or ought to be. Under the auspices of the United Nations, continuing work by the International Seabed Authority has begun to bear fruit through regulations approved in July of 2000. To a large extent, these Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area codify customary law pertaining to the deep seabed. In addition, the Regulations impose environmental responsibility that should be heeded by any residual conflicting mining interests in the United States and elsewhere in order to safeguard the blue planet, our “common heritage,” for future generations.

To place the Regulations in historical context, a brief overview of the law of the sea is provided in part II of this article. Part III examines the U.S. position in international negotiations regarding the deep seabed. Part IV introduces the reader to the geography and geology of the deep seabed and one particular resource to be found there, the polymetallic nodule. Part V deals with sovereignty issues, while part VI analyzes the Regulations now in place for prospecting and exploration of deep-sea resources. Part VII assesses the remedies designed to both eliminate conflict and assure environmentally responsible development of resources. The article concludes that U.S. isolationist policy with regard to a common resource is shortsighted and risks compromising the integrity of the deep seabed environment.

II. TOWARD CODIFICATION OF THE LAW OF THE SEA

It was once believed that a feature of the earth so vastly great as the seas could easily be shared among the earth’s peoples. The idea of common ownership surfaces again and again among scholars and legislators. Justinian, in 529 A.D., declared that “the sea is common to all, both as to ownership and as to use. It is owned by no one; it is incapable

of appropriation, just as is the air. And its use is open freely to all men.”

This opinion echoed Celsus’ dictum that *mare communum usum omnibus hominibus*, or all men have free use of the sea.\(^9\)

Opposing views were not unheard of, both before and after Justinian and Celsus. The ancient Greeks considered the Mediterranean their own, while Alexander the Great relied on sea power to conquer nations great and small. The sea law of Rhodes was internationally recognized as the first maritime legal code of conduct.\(^10\) Later, Gaius’ *res nullius* declared the seas belonging to no one and as such falling under the ownership of the first occupant.\(^11\) This thinking, in fact, was most consistent with reality as Rome declared the Mediterranean its own, or *mare nostrum*.\(^12\) But Hugo Grotius, Dutch jurist and statesman, writing a thousand years after Justinian, reiterated that “the high seas were not within the sovereignty of any state.”\(^13\)

Thus, the legal regime applicable to the high seas was characterized by fragmentation and fraught by mandates and “soft law”\(^15\) that failed to adequately protect marine resources. By the mid-twentieth century, custom was no longer sufficient to govern use of the seas and attempts at codification began to be made. Conventions regarding use of the seas and settlement of disputes were approved following U.N. Conferences that gradually increased in scope and aim.

In 1967, Arvid Pardo, Ambassador of Malta to the United Nations, revived the principle of commonality in a strikingly altruistic fashion. He proposed that the seabed with its mineral resources be declared as belonging to mankind in common, that limits of national jurisdiction be frozen until the continental shelf is clearly delineated, and that an international agency be charged with safeguarding the high seas.\(^16\) Pardo astutely realized that it was not sufficient to simply declare...
the high seas as belonging to all mankind, since the technologically advanced states would be most likely to draw benefit from newly accessible riches. In order to truly reserve the vast resources of the high seas for all mankind, it was necessary to settle jurisdictional issues and questions of access. Natural resources were to be used in accordance with the Principles and Purposes of the Charter of the United Nations, to principally benefit poor countries.

It was not until 1974 that the Group of 77—the over 120 developing countries at the United Nations—would demand that an international authority be created to enable the Group to mine the seabed independently. To satisfy these demands, the third U.N. Conference on the Law of the Sea established an International Seabed Authority charged with mining the seabed “on behalf of mankind as a whole” and with granting contracts to those who wish to mine privately. The United States, dissatisfied with this arrangement, entered into a “mini-treaty” with France, the Federal Republic of Germany, and the United Kingdom to mine the seabed. Shortly, the agreement was expanded to include eight states, a situation deemed illegal by the Group of 77.

Thus, the Group of 77 rejected the concept of res nullius, which implicitly allowed ownership to the first claim on deep seabed mining, while considerably expanding the concept of res communis as it refers to the common heritage of mankind. Not only would the seas be common property of all states, but the Group’s mining efforts would be specifically facilitated by an international authority. In contrast, the “freedom of the seas” principle allowed the United States and several other western states to assert their rights to mine the deep seabed


17. HARRY F. YOUNG, U.S. DEPT. OF STATE, ATLAS OF UNITED STATES FOREIGN RELATIONS (Colleen Sussman ed., 1984). Today the group is comprised of 134 countries; for a list of members, see GROUP SEVENTY-SEVEN AT THE UNITED NATIONS, at http://www.g77.org/main/docs.htm (last visited Aug. 28, 2004).
18. Harry, supra note 5, at 211.
without, of course, claiming ownership of the seabed itself. It was abundantly clear, however, that this freedom-of-the-seas principle no longer would accommodate states in their quest for what were obviously finite resources.

III. THE U.S. POSITION

Necessitated by the exclusive federal interest in matters concerning its international affairs, the United States, in 1947, brought suit against the state of California. The Supreme Court in that case recognized the "paramount rights in [and] power" of the United States over its submerged lands.23 Dispute over these lands with other coastal states over oil and gas leasing led Congress to enact the Submerged Lands Act24 and the Outer Continental Shelf Lands Act25 in 1953. In more recent cases, the position of the Supreme Court has been that "each state yielded sovereignty over submerged lands in accepting statehood and the Constitution."26 By the same token, it is the function and responsibility of Congress to introduce legislation that protects the interests of U.S. companies engaging in deep seabed mining.27 Toward that end, and to cooperate with countries adopting similar legislation, U.S. companies introduced bills to regulate deep-sea mining.28

Senate Bill 1134, introduced to promote conservation and orderly development of deep sea mineral resources, was intended as a stop-gap measure until such time that an international regime would be in place.29 Proponents of the bill believed that enactment of such legislation by the United States would have the effect of prompting timely international negotiations regarding the seabed.30 Further, they argued that the bill was "designed to be compatible" with any future international regime by acceding to that regime and "shar[ing] the benefits with other nations."31 Certain provisions of the bill, such as the establishment of an insurance program for the benefit of companies undertaking deep sea mining, were rightfully criticized, since it is not a

29. Metcalf, supra note 27.
30. Id.
31. Id. at 431.
function of the U.S. government to subsidize private business whether other governments engage in such practices or not.\(^3\)\(^2\) Legislating mining activity, however, is a governmental duty and was indeed a necessary condition imposed by banks that would potentially finance the mining industry.\(^3\)\(^3\) But interim bills did not sufficiently protect the rights of U.S. mining interests, insofar as U.S. citizens engaging in deep sea mining were required to observe "regulations designed to protect...other uses of the sea, including prospecting and mining by persons not subject to the jurisdiction of the United States in the very areas in which they are licensed to mine."\(^3\)\(^4\)

The U.S. Congress, noting that deep-sea exploration technology would require a substantial investment,\(^3\)\(^5\) and that UNCLOS III was likely to financially obligate the United States to an international organization,\(^3\)\(^6\) adopted the Deep Seabed Hard Mineral Resources Act.\(^3\)\(^7\) In this statute, Congress urged acceleration of the environmental study necessary to assess exploratory and commercial recovery activities.\(^3\)\(^8\) The Act also acknowledges that deep seabed resources are a common heritage of mankind,\(^3\)\(^9\) states that the United States is not asserting jurisdiction over any areas of the deep seabed while engaging in exploration or commercial recovery of resources,\(^4\)\(^0\) and encourages the Secretary of State to pursue negotiations for a comprehensive Law of the Sea Treaty.\(^4\)\(^1\)

Refusal of the United States to be a signatory to UNCLOS III did not imply that the United States was rejecting the customary international law, which is now codified by the Convention. America's policy toward UNCLOS III has largely remained as President Reagan enunciated in his six-point statement in 1982.\(^4\)\(^2\) The United States did

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32. Id. at 432.
34. Id. at 437, 3(b).
36. Id. § 1401a(15).
37. Id. §§ 1401 et seq.
38. Id. § 1419a(1).
39. Id. § 1401b(1).
40. Id. § 1402a(1), (2).
41. Id. § 1402b(1).
42. Statement by the President, U.S. Policy and the Law of the Sea, Jan. 29, 1982, and White House Fact Sheet Accompanying the Presidential Statement, DEP'T ST. BULL., Mar. 1982, at 54–55. The points are that, to be ratified by the United States, UNCLOS III must:
   • Not deter development of any deep seabed mineral resources to meet national and world demand;
   • Assure national access to these resources by current and future qualified entities to enhance U.S. security of supply, to avoid monopolization of the resources by the
sign the Convention on July 29, 1994, after modifications to Part XI dealing with issues of the deep seabed were negotiated by the U.N. Secretary-General with the developed nations. In 1995, President Clinton called on Congress to create an Oceans Commission and ratify the Law of the Sea Convention. Although the United States has not yet ratified UNCLOS III, attempts to coordinate U.S. oceans policy with the Convention continue through participation in the various U.N. entities charged with the development of this law.

After November of 2001, President Bush created a Commission on Ocean Policy and encouraged the Senate to ratify the Convention before 2002. The President's strong push to get this legislation ratified by the Senate met a major stumbling block at the Foreign Relations Committee. Led by Senator Lugar, the Committee convened on October 14 and October 21, 2003. At the first meeting, the Committee spoke with non-administration members such as the American Bar Association and various retired and current members of the Coast Guard and the Navy, as well as with various groups such as the Bureau of Oceans and International Environmental and Scientific Affairs. Unlike Chairman Helms, who had withheld any decision on the legislation, Chairman

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operating arm of the international authority, and to promote the economic development of the resources;

- Provide a decision-making role in the deep seabed regime that fairly reflects and effectively protects the political and economic interests and financial contributions of participating states;
- Not allow for amendments to come into force without approval of the participating states, including, in our case, the advice and consent of the Senate;
- Not set other undesirable precedents for international organizations;
- Be likely to receive the advice and consent of the Senate. In this regard, the convention should not contain provisions for the mandatory transfer of private technology and participation by and funding for national liberation movements.


44. President Clinton, Address at the National Oceans Conference in Monterey, Cal. (June 12, 1995).

45. Such U.N. entities include the U.N. General Assembly, the International Maritime Organization, the U.N. Food and Agriculture Organization, the International Oceanic Commission, the International Tribunal for the Law of the Sea, the Commission on the Limits of the Continental Shelf, and The International Seabed Authority. See GALDORISI & VIENNA, supra note 4, at 134.


Lugar stated that "[t]he Law of the Sea Convention has great potential to advance U.S. interests related to the navigation of the seas, the productive use of their resources, and the protection of the marine environment."48 After that promising start, the rest of the meeting went well with each of the parties stressing the value of ratifying the Convention. In the second meeting, administration officials, the military, and other groups also agreed that there was little to prevent the United States from ratifying the Convention.

Since that time, no further news has emerged. As of the drafting of this article, President Bush's first term in office is nearing its end. Though he has attempted to get the Convention ratified, progress remains elusive and it is uncertain that the goal will be reached before the election.

IV. GEOGRAPHY AND GEOLOGY OF THE DEEP SEABED

As man became more adept at navigating the oceans, the question of boundaries needed to be satisfied. Jurisdictional areas were established largely depending on custom and geographical, undersea features. Dividing the waters on their surface followed custom and generated the territorial sea adjacent to the coastal states, the contiguous zone, the exclusive economic zone (EEZ), and the high seas. Dividing the land under the waters was accomplished by geographical features, the inaccessibility of which rendered the exercise academic until very recently. Nevertheless, two zones were recognized and consisted of the continental shelf and the deep seabed.49 The latter is a source of various minerals perceived to have strategic and economic importance.

A. Area of the Deep Seabed

The deep seabed is comprised of all submerged lands beyond territorial jurisdiction of the coastal states. Its exploration and exploitation are a very recent reality, beginning with submersibles and progressing to today's floating experiment stations. The discovery of "nodular polymetallic structures containing large amounts of manganese"50 during the H.M.S. Challenger expeditions from 1872 to 187651 hinted at the potential of this area of the seas. "Project Mohole"
was organized to drill to the Mohorovicic Discontinuity in order to obtain a sample from the earth’s mantle.\textsuperscript{52} Deep-sea submersibles created by Auguste Piccard and his son Jacques\textsuperscript{53} held a promise akin to that of space exploration that would arrive generations later. Trieste II, a submersible created by Jacques Piccard and purchased by the United States, successfully reached the Challenger Deep of the Marianas Trench.\textsuperscript{54} Yet, progress has been slow in both research and exploitation of the area and much of the information acquired remains proprietary in nature.

B. Geology of the Deep Seabed

Oceanic ridges form a continuous range that surrounds the earth underwater and is called a Mid-Ocean Ridge though it does not always occupy a mid-ocean place. Together with its branches, the ridge extends 36,000 miles.\textsuperscript{55} Valleys and volcanoes occur along the ridge, and abyssal plains lie along both sides. Trenches and smaller basins as well as individual volcanoes are the other main features of the seabed.\textsuperscript{56}

Geologically, the deep seabed is a product of the forces attributed to continental drift. Specifically, it is the shifting and sliding of plates on the earth’s molten core that shape both the dry land and the seabed. The process is continuous and most obvious in its manifestation as seismic events or volcanic eruptions. When these events take place in the deep seabed, seawater enters magma chambers and reacts with minerals there as it is heated. The water “boils” back out through fissures and, as it cools, the minerals are precipitated as polymetallic sulfide deposits.\textsuperscript{57}

\begin{itemize}
  \item \textsuperscript{1876} (1891). See also JOHN L. MERO, THE MINERAL RESOURCES OF THE SEA 147 (1965); Allen, \textit{supra} note 5, at 577.
  \item \textsuperscript{54} P. Huggard, \textit{The Deep Ocean and Its Non-Living Resources: A New Legal Realm} 43 (1972), in \textit{Emerging Ocean Oil and Mining Law} 5 (Seymour W. Wurfel ed., 1974) (unpublished manuscript, on file with the University of New Mexico School of Law Library). See also JURAJ ANDRASSY, \textit{INTERNATIONAL LAW AND THE RESOURCES OF THE SEA} 28 n.36 (1970).
  \item \textsuperscript{55} McGRAW-HILL ENCYCLOPEDIA OF SCIENCE & TECHNOLOGY 192 (7th ed. 1992).
  \item \textsuperscript{56} V.E. MCKELVEY & FRANK F.H. WANG, U.S. DEP’T INT., U.S. GEOLOGICAL SURV., WORLD SEABED MINERAL RESOURCES (1969).
  \item \textsuperscript{57} FILLMORE C.F. EARNEY, MARINE MINERAL RESOURCES 85–86 (1990); Allen, \textit{supra} note 5, at 569.
\end{itemize}
C. Manganese Nodules

In addition to unconsolidated deposits, polymetallic manganese nodules have been found in many areas of the deep sea. Manganese nodules were first found in 1803, but it was not until after the Second World War that the world's oceans began to be explored systematically. This was the last frontier on the planet and scientists to this day are continuing to make new discoveries. Manganese nodules have been considered a potential source for various ores since the 1960s. Their value depends on their constituents, but the richest nodules have been found in the Pacific Ocean at depths of 12,000 to 18,000 feet. As their name suggests, manganese is the principal constituent of polymetallic manganese nodules. The metal is used in the production of steel. The nodules' other constituents are iron, silicon, nickel, copper, and cobalt.

The thin oceanic crust is made up mostly of basaltic bedrock and the nodules are scattered on its surface and also found in the substrate in some areas. Other metals, such as zinc, mercury, chromite, and platinum are also expected to occur in the basaltic rock that originates from the earth's mantle. The polymetallic sulfide deposits have been found to contain iron, copper, and zinc sulfides, and, in some cases, gold and silver. The nodules alone are an unexpectedly rich resource, containing, by one estimate, 400 billion tons of manganese, 16.4 billion tons of nickel, 8.8 billion tons of copper, and 918 billion tons of cobalt. They are believed to be "the largest mineral deposit on this planet." Nevertheless, and despite their ubiquity—they have been found at the

59. Id.
60. Louis Henkin, Law of the Sea's Mineral Resources 3 n.7 (1968), in Emerging Ocean Oil and Mining Law 42 (Seymour W. Wurfel ed., 1974) (unpublished manuscript, on file with the University of New Mexico School of Law Library). See also F. LaQue, Deep Ocean Mining: Prospects and Anticipated Short Term Benefits, in PACEM IN MARIBUS 133 (Elisabeth Mann Borgese ed., 1972).
61. David B. Brooks, Low Grade and Nonconventional Sources of Manganese 8 (1966), in Emerging Ocean Oil and Mining Law 5 (Seymour W. Wurfel ed., 1974) (unpublished manuscript, on file with the University of New Mexico School of Law Library).
62. LaQue, supra note 60, at 136; THE AMERICAN ASSEMBLY, COLUMBIA UNIVERSITY, USES OF THE SEA 19 (1968), in Emerging Ocean Oil and Mining Law 43 (Seymour W. Wurfel ed., 1974) (unpublished manuscript, on file with the University of New Mexico School of Law Library).
63. MCKELVEY & WANG, supra note 56.
64. Id.
65. Allen, supra note 5, at 569.
66. CLINGAN, supra note 49, at 266.
bottom of all the oceans and even the Great Lakes—theories of their formation are tentative.

The nodules appear to be most numerous in undisturbed areas, raising the possibility that mining activities will negatively impact this resource. It has been hypothesized that they form through accretion of ions in layers, much like the layers of an onion, but at a very slow rate of between 1 mm per 1000 years to 1 mm per 100,000 years. It must be noted that theories advanced regarding the age of polymetallic nodules continue to be debated. The finding of nodules in the North Pacific on deposits above Miocene-Oligocene strata and in Paleogene sediments above Late Cretaceous strata, as well as within the strata themselves, suggests the fossil origin of the nodules. Isotopic dating places the speed of nodule formation at around one to ten mm/million years. It is unclear whether nuclei, such as small rocks or shark's teeth, attract the mineral particles that eventually form the nodules, or whether sediments contribute to the mineral deposition, or even whether microorganisms assist in nodule formation.

For all that we have learned about these nodules, crucial details are still missing about their formation. In addition to material that may precipitate from ocean water, especially from hydrothermal solutions present near volcanoes, diagenetic remobilization of manganese in the sediments, and concentration by submarine weathering of basalt are processes implicated in nodule formation. Attempts to study the nodules can be grouped into three areas: the source of ore matter and manganese balance, the genetic classification of manganese nodules, and the biogenic aspects in manganese nodule genesis. Scientists have found scant support for the idea that the source of ore matter is

71. Id.
74. Id.
exclusively volcanic, terrigenous, or hydrothermal. Goldshmidt in 1954 and Elderfield in 1976 presented evidence that levels of manganese and other metals in the nodules exceed the supply from the above-named sources. As early as 1928, Butkevich gave evidence that a third factor, biogenic activity, lent itself to the formation of manganese nodules. Discovery of bacteria in the nodules suggested that microorganisms such as iron bacteria have some part in the accretion of iron (Fe), manganese (Mn), and other metals in the nodules. It may well be debated that, rather than being responsible for nodule formation, the bacteria are simply attracted to the iron deposits already present in the nodules. The nodules are classified according to ore content. They are considered to be hydrogenous if they contain large amounts of base metals and a variable Mn/Fe ratio; hydrothermal if they are high in iron and low in other metals, with again a variable Mn/Fe ratio; and diagenetic if they are high in Mn/Fe but low in base metals.

D. Mining of Manganese Nodules

Exploration of the deep seabed for manganese nodules involves prospecting activity over a large area before potentially rich sources can be pinpointed. The surveying and mapping of the seabed with optical, acoustic, magnetic, and satellite systems is a complicated and expensive proposition. The actual sampling prior to mining presents more logistical problems. Samples are taken widely apart by free-fall samplers, gravity or piston corers, or by dredging. Capabilities vary among these samplers, the free-fall ones being best suited for obtaining nodules from a square-foot area. Corers provide sediment information under the nodules, while dredging is feasible only in areas with rich nodule concentrations.

Once a site is selected for mining, collection by mechanical, air, or hydraulic system follows. These are kept simple to minimize maintenance. Lifting the nodules is accomplished with dredge buckets and miles of rope in the mechanical case, or with a hydraulic pump that lifts water and nodules together, or with an airlift that operates by

75. Mining in Manitoba, supra note 58.
76. Id.
77. Id.
78. Id.
81. Id.
suction like a vacuum that collects nodules from the ocean floor.\textsuperscript{82} The simplest and least expensive of these, the bucket system, collected seven tons of nodules near Hawaii in August and September of 1972.\textsuperscript{83} It is important, however, to attempt to suit the method to the particular site selected, since narrow trenches or an uneven floor may disable some of the systems or render them inefficient.\textsuperscript{84} The task is further complicated by the light weight of the nodules themselves. It is expected that some will be entirely missed by the collection apparatus, while others will float away, being only twice as heavy as water.\textsuperscript{85} The proprietary nature of the undertaking suggests that little information is available on the results, but it is reasonable to assume that the applicable techniques will have to vary according to nodule composition and will be refined in the future.

The attraction of a stable, rich supply of copper, nickel, and, to a lesser extent because of its erratic distribution, cobalt would encourage deep sea mining activity by the United States were it not for political control of this area by the United Nations.\textsuperscript{86} Nevertheless, the United States can exercise undisputed sovereignty over the Blake Plateau\textsuperscript{87} off the coast of Florida and, therefore, mining activity can be expected there. Weighing the efficiency of various mining methods, speakers at the Ocean Mining Symposium II held in Houston, Texas, on February 20–21, 1973, predicted that, despite difficulties encountered in deep seabed mining, "[i]ncreasing inland mining costs and international politics will make offshore mining ventures more attractive in the near future."\textsuperscript{88}

The United States has since resolved conflicting interests with other states and issued licenses for exploration of the deep seabed to four private consortia.\textsuperscript{89} Commentators believe that continuing jurisdictional questions pertaining to the deep seabed, as well as discovery of the polymetallic nodules within the EEZ of the United States, render U.S. objections to Part XI of UNCLOS III "academic."\textsuperscript{90} The American Bar Association, noting that Part XI no longer presents an obstacle, urged support of UNCLOS III in view of the significance of the Convention to

\begin{thebibliography}{99}
\bibitem{82}\textsuperscript{82} Eckert, supra note 68, at 220.
\bibitem{83}\textsuperscript{83} Clingan, supra note 49, at 268.
\bibitem{84}\textsuperscript{84} Eckert, supra note 68, at 224.
\bibitem{85} Id.
\bibitem{86} Id.
\bibitem{87} Emery & Skinner, supra note 70, at 34.
\bibitem{88} Id.
\bibitem{89} David M. Frazier & Ole P. Erickson, Ocean Mining Symposium OSM II, Cutter Suction Dredges in Mining Operations, World Dredging Conference 38 (1973).
\end{thebibliography}
international interests. Economic impediments persist, however, since "before investing, banks normally require borrowers to obtain exclusive rights to an ore body." Economic questions complicate a fair assessment of U.N. policy as well. Critics of U.N.’s advocacy for the developing nations point out that those states “may assert many rights, but...are burdened with very few reciprocal obligations.” Others argue that the rivers of some inland countries such as Congo (Kinshasa) contribute to the accumulation of the rich sediments found in the deep sea. For its part, in support of deep seabed mining, the U.N. Secretariat stated that exploitation of deep seabed mineral resources might stabilize raw material markets by diversifying the sources of supply. International measures to avoid flooding the world markets with seabed minerals would protect developing countries from suffering economic harm.

V. SOVEREIGNTY ISSUES

Although the feared “wholesale partition” of the deep seabed by the coastal states did not come to pass, expecting the “invisible hand” of technology and political development to solve the quandary appears utopian and promises a chaotic confrontation among the various interests in this final frontier. Since freedom of the high seas implies absence of any territorial jurisdiction, recognition of the authority of a flag nation was the only viable alternative for jurisdiction in the high seas. A flag nation system, however, is perceived as an obstacle to the achievement of an international regime that would reduce the potential for conflict and impose mandatory dispute settlement. The risk of creeping jurisdiction, of granting limited sovereignty over seabed

91. Id. at 427 n.25.
94. ANDRASSY, supra note 54, at 172–73.
96. Id.
97. ANDRASSY, supra note 54, at 167.
99. Id. at 453 n.24.
100. Id. at 456.
resources only to have it expand into full territorial sovereignty, would be ever present without an international regime governing the deep seabed.\textsuperscript{101}

A. The Outer Space Regime

Following UNCLOS III, a doctrine of non-appropriation appears to be universally endorsed regarding the deep seabed, even by countries that have not ratified the Convention. Commentators point out that provisions of the Draft Convention—as well as the final document—bear similarities to the outer space treaty and the Antarctic treaty in that national interests are subordinated to international ones under a doctrine of non-appropriation.\textsuperscript{102} Outer space law began to take shape in earnest after the launch of Sputnik in 1957.\textsuperscript{103} A Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space\textsuperscript{104} in 1963 was followed in 1967 by the Treaty of Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies.\textsuperscript{105} Article 2 of that treaty provides that space and celestial bodies are "not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." Similarly, the Antarctic Treaty of 1959 provides that no state may acquire an interest in Antarctic territory by conducting research therein.\textsuperscript{106}

The differences between the relatively recent and limited nature of outer space law and the customary, comprehensive nature of the law of the sea have also been pointed out.\textsuperscript{107} Unlike outer space law, the law of the sea governs many existing uses and concerns many nations.\textsuperscript{108} Nevertheless, many provisions included in UNCLOS III were modeled on the outer space treaty\textsuperscript{109} so as to accord "a legitimate paternity"\textsuperscript{110} to the 1967 treaty.

\begin{thebibliography}{10}
\bibitem{101} Ann L. Hollick, \textit{United States Ocean Politics}, 10 SAN DIEGO L. REV. 467, 475 (1973); Knight, \textit{supra} note 98, at 456.
\bibitem{103} Picker, \textit{supra} note 2, at 76.
\bibitem{107} LOUIS HENKIN, \textit{LAW FOR THE SEA'S MINERAL RESOURCES} n.23 (1967).
\bibitem{108} \textit{Id}.
\bibitem{109} MORELL, \textit{supra} note 89, at 151.
\end{thebibliography}
B. Res Communis and the Free-Rider Problem

Under the present res communis principle in operation, the high seas are common property and as such may be explored and exploited by all states. The large investment costs in ships and machinery and the high expenses involved in mining these areas, coupled with the lack of applicable property rights have the effect of discouraging potential deep sea miners. It has been conjectured that recognition of property rights would encourage mining by eliminating the free-rider problem. The free-rider argument posits that, once mining activity in an area is undertaken by an entity, others may encroach on the same deposit site since only the nodules actually recovered from the ocean floor become private property.\textsuperscript{111}

C. Res Communis Applied: Economic/Technological Solutions

Concerns of countries that rely on income derived from the production of metals such as manganese, copper, cobalt, and nickel also have the effect of delaying and influencing regulation pertaining to deep-sea mining. Many of the producers are developing countries, while consumers are the industrialized countries. Should deep-sea mining of metals increase the supply, thereby reducing prices, producer countries would experience a drop in their income that they can ill-afford.\textsuperscript{112}

Economic solutions have been proposed, such as a system of international taxation that could be implemented to guarantee an equitable distribution of the proceeds from deep seabed mining.\textsuperscript{113} Whether this takes the form of a profits tax or a royalty, and the effects of each on mineral production and redistribution of profits have been debated without necessarily considering that these schemes encourage dependency of the developing nations rather than promoting efficient recovery of resources.

Based on the res communis principle, exploitation of deep-sea resources obligates developed nations to a transfer of technology as well as a revenue sharing scheme. Although some commentators oppose the transfer of deep seabed mining technology to developing nations, claiming that such transfer is patently unfair to private interests,\textsuperscript{114} others

\textsuperscript{111} ECKERT, \textit{supra} note 68, at 241.
\textsuperscript{112} LEIPZIGER & MUDGE, \textit{supra} note 9, at 131.
\textsuperscript{113} \textit{Id.} at 191.
point out that states have the power to appropriate property with just compensation or to revoke patents if necessary.\textsuperscript{115} In addition, deep seabed mining technology that enjoys patent protection in the United States can be pirated outside U.S. jurisdiction, where U.S. patent laws are largely unenforceable.\textsuperscript{116} Similarly debated revenue sharing provisions found eventual acceptance under the principle of a common heritage of mankind.\textsuperscript{117}

D. \textit{Res Communis} Revised

Protecting the world’s seas against abuses of rights that may threaten to exhaust resources called for international regulation, either “customary or contractual.”\textsuperscript{118} Since freedom of the seas assumed inexhaustibility of resources, a condition that proved unfounded in the case of polymetallic nodules,\textsuperscript{119} a revised understanding of \textit{res communis} as a peremptory norm is in order. The concept of \textit{jus cogens}\textsuperscript{120} accepts no derogation or inconsistency.\textsuperscript{121} Although the freedom of the seas principle has historically been recognized as a peremptory norm,\textsuperscript{122} derogation from that norm in order to stem destruction of resources is not a violation of the principle when states agree among themselves to limit their use: “[T]here would seem to be no reason why two States shall not agree that, \textit{as between themselves}, the width of territorial waters should be fifty miles.”\textsuperscript{123}

The provisions of UNCLOS III regarding the interests of developing countries to a large extent codify customary international law, since “as early as 1950 the U.N. International Law Commission had endorsed exploitation of submarine resources ‘for the benefit of all mankind.’”\textsuperscript{124} Further, the classical doctrine of natural law that

\begin{itemize}
  \item \textsuperscript{115} Morell, \textit{supra} note 89, at 99.
  \item \textsuperscript{116} \textit{Id.}; see also Dieter Stauder, \textit{Patent Protection in Extraterritorial Areas (Continental Shelf, High Seas, Air Space, and Outer Space)}, 7 \textit{IIC INT’L REV. INDUS. PROP. & COPYRIGHT L.} 470, 470–79 (1976).
  \item \textsuperscript{117} Morell, \textit{supra} note 89, at 104.
  \item \textsuperscript{118} \textit{Id.} at 175.
  \item \textsuperscript{119} \textit{Id.} at 392–93 n.315.
  \item \textsuperscript{121} Morell, \textit{supra} note 89, at 183.
  \item \textsuperscript{122} Christos L. Rozakis, \textit{The Concept of Jus Cogens in the Law of Treaties} 15 (1976); Christos L. Rozakis, \textit{Law of the Sea Institute, the Greek-Turkish Dispute Over the Aegean Continental Shelf}, Occasional Paper No. 28 (1975).
\end{itemize}
recognized both the validity of international treaties and the common—as opposed to private—rights in force when using a res communis existed for centuries.\textsuperscript{125} The "yielding nature" of \textit{jus dispositivum} in international relations is superseded by \textit{jus cogens}, which becomes effective once its norms are codified in a treaty.\textsuperscript{126} Most importantly, codification should not blind interested parties, whether developing or developed nations, to the limits that need to be placed on exploitation of deep seabed resources.

\section*{VI. THE INTERNATIONAL SEABED AUTHORITY}

Creation of an International Seabed Authority (ISA), proposed by the Group of 77, is now a reality. The ISA "is an autonomous international agency having a relationship agreement with the United Nations."\textsuperscript{127} Established under UNCLOS III, "as modified by the 1994 Agreement relating to the Implementation of Part IX [sic] (seabed provisions) of the Convention,"\textsuperscript{128} the ISA was implemented through a now-defunct Preparatory Commission (PREPCOM). PREPCOM became operational upon the signing of UNCLOS III by the fiftieth state and when the Final Act was adopted on December 9, 1982.\textsuperscript{129} PREPCOM meetings were open for observation (rather than voting) to states that did not sign the Convention but did sign the Final Act. Although at the time the United States had signed the Final Act, it did not attend PREPCOM meetings and, beginning in 1983, the U.S. government refused to fund PREPCOM's work.\textsuperscript{130}

Today, the Authority has 143 members\textsuperscript{131} and its organization includes an Assembly, a Council, a Secretariat, an Enterprise, an Economic Planning Commission, and a Legal and Technical Commission.\textsuperscript{132} The International Tribunal for the Law of the Sea functions autonomously and may elect members to a Sea-Bed Disputes Chamber.\textsuperscript{133} The task of the Authority "is to organize and control all mineral-related activities in the international seabed area beyond the

\begin{thebibliography}{100}
\bibitem{125} MORELL, \textit{supra} note 89, at 184–85.
\bibitem{128} \textit{Id}.
\bibitem{129} EARNEY, \textit{supra} note 57, at 29.
\bibitem{130} \textit{Id}.
\bibitem{131} Press Release, \textit{supra} note 127. For a list of current members, see www.isa.org.jm (last visited Aug. 24, 2004).
\bibitem{132} EARNEY, \textit{supra} note 57, at 25.
\bibitem{133} \textit{Id}.
\end{thebibliography}
jurisdiction of any State, an area underlying most of the world's oceans.'"\textsuperscript{134} Although coastal states can claim and exploit areas of the continental shelf more than 200 nautical miles from shore, under UNCLOS, states are required to make payments to the international community through the ISA.\textsuperscript{135}

The 2003–2004 budget of the Authority is $10,509,700, while assessments of member states were reduced by $2.6 million through both savings and a payment in the sum of $1,074,000 by the United States in September 2002, to "[cover] its arrears for the period up to November 1998 during which it was a provisional member."\textsuperscript{136} States that fall more than two years behind in their payments risk losing their vote.

A. Regulations on Polymetallic Nodules

On its seventy-sixth meeting, held in Kingston, Jamaica, on July 3–14, 2000, the ISA considered and approved the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area.\textsuperscript{137} The Regulations state that prospecting, exploration, and exploitation must be conducted in accordance with the Convention, for the benefit of mankind as a whole, and in such a way as to avoid serious harm to the marine environment.\textsuperscript{138} A coup for the ISA, the Regulations resulted from a very productive session and represent the initial segment of "a mining code that will eventually govern exploration for and exploitation of all deep seabed minerals."\textsuperscript{139}

1. Prospecting

In addition to protection and preservation of the marine environment, the Regulations specify that prospectors must cooperate in training programs and transfer of technology stipulated in articles 143 and 144 of the Convention.\textsuperscript{140} The Secretary-General reserves the

\textsuperscript{134} Press Release, \textit{supra} note 127.
\textsuperscript{135} \textit{Id.} The outer boundaries of the coastal states may be extended further, but, to do so, a submission must be made to the Commission on the Limits of the Continental Shelf (CLCS). That body then studies the issue and gives advice to the coastal states.
\textsuperscript{136} \textit{Id.}
\textsuperscript{138} INT'L SEABED REGULATIONS, \textit{supra} note 8, pmbl., regs. 1, 2.
\textsuperscript{140} INT'L SEABED REGULATIONS, \textit{supra} note 8, reg. 3.
authority to deny a prospecting application should it involve an area deemed likely to result in serious harm to the marine environment.\textsuperscript{141} Prospecting does not confer exclusive rights and is merely a search for deposits that may include estimation of their composition and value.\textsuperscript{142} The ISA requires reports on the progress of prospecting within 90 days of the end of each calendar year\textsuperscript{143} and assures confidentiality of data contained in such reports.\textsuperscript{144} The prospector bears the burden of notifying the Secretary-General in writing should prospecting result in serious harm to the marine environment or should any archaeological or historical objects be found in the course of prospecting activity.\textsuperscript{145}

2. Exploration

Exploration confers exclusive rights and involves the search, analysis, tests of equipment, estimation of commercial viability, and other activities necessary in identifying potential mining sites.\textsuperscript{146} States or other entities proposing to explore for polymetallic nodules must have the financial and technical capabilities to undertake the work.\textsuperscript{147} To qualify, such a state or entity must have spent "an amount equivalent to at least U.S. $30 million in research and exploration activities" and no less than ten per cent of that amount in the specific area to be explored.\textsuperscript{148} Registered pioneer investors are exempt from this requirement. Applications for exploration must contain sufficient data and information regarding the specific area to allow the Council to reserve the area based on its estimated commercial value.\textsuperscript{149} The Council also requires oceanographic and environmental baseline studies of the proposed area in order to assess the environmental impact of exploration.\textsuperscript{150}

To process applications, ISA Regulations stipulate a fee of U.S. $250,000, part of which may be refunded should the actual costs be less.\textsuperscript{151} Once an application is approved, the ISA prevents other entities from exploring for polymetallic nodules in the same area or from performing other work that interferes with the entity granted the

\begin{enumerate}
\item \textsuperscript{141} Id. reg. 4.
\item \textsuperscript{142} Press Release, supra note 127.
\item \textsuperscript{143} INT’L SEABED REGULATIONS, supra note 8, reg. 5.
\item \textsuperscript{144} Id. reg. 6.
\item \textsuperscript{145} Id. regs. 7, 8.
\item \textsuperscript{146} Press Release, supra note 127.
\item \textsuperscript{147} INT’L SEABED REGULATIONS, supra note 8, reg. 12.
\item \textsuperscript{148} Id.
\item \textsuperscript{149} Id. reg. 16.
\item \textsuperscript{150} Id. reg. 18.
\item \textsuperscript{151} Id. reg. 19.
\end{enumerate}
exploration contract. No area under contract can be larger than 150,000 square kilometers and contracts are issued for 15 years, with five-year extensions possible. The contractor is expected to train ISA personnel in exploration methods. Should the required state sponsorship of the contractor change or terminate, the Secretary-General must be notified in writing.

3. Contractors' Environmental Responsibilities

For any damage to the marine environment occurring during exploration, the contractor continues to remain responsible and liable after completion of the work. To effectively protect the marine environment, the precautionary approach set forth in principle 15 of the Rio Declaration will be applied and the Legal and Technical Commission is charged with making recommendations to the Council in this regard.

It is expected that contractors will use the best technology available in order to "prevent, reduce and control pollution and other hazards to the marine environment." Annual reports of the effects of exploration on the marine environment must be submitted by contractors to the Secretary-General and cooperation with the Authority is expected. To assess these effects, contractors are required to set aside areas used as impact reference zones once exploitation begins. The power to take immediate, temporary measures—not exceeding 90 days—"to prevent, contain, and minimize serious harm to the marine environment" is vested in the Secretary-General, should a situation arise that requires such measures. Emergency orders may then be issued to adjust or halt work in progress. If compliance is not immediate, the Council will act to forestall damage, and, to assure the Council this

152. Id. reg. 24.
153. Id. reg. 25.
154. Id. reg. 26.
155. Id. reg. 27.
156. Id. reg. 29.
157. Id. reg. 30.
159. INT'L SEABED REGULATIONS, supra note 8, reg. 31, § 2.
160. Id. reg. 31, § 3.
161. Id. reg. 31, §§ 5, 6.
162. Id. reg. 31, § 7.
163. Id. reg. 32, §§ 1, 2.
164. Id. reg. 32, § 5.
ability to intervene, a guarantee of the contractors' or sponsoring state's financial and technical capability is required.\textsuperscript{165}

4. Confidentiality

Data and information submitted by the contractor remain confidential for an initial term of ten years and subsequent terms of five years, as long as the Secretary-General and the contractor determine the existence of an economic risk to the contractor.\textsuperscript{166} Although a contractor may waive confidentiality of data and information,\textsuperscript{167} the Secretary-General and staff of the ISA, under penalty of appropriate action, are forbidden from disclosing any data or information received during their employment with ISA, even after such employment has ceased.\textsuperscript{168} Technical or administrative recommendations for the guidance of contractors may be issued by the Legal and Technical Commission, but such recommendations will be modified or withdrawn if not consistent with the Regulations.\textsuperscript{169}

The Convention, and specifically Part XI, Section 5, governs disputes arising from the interpretation or application of the Regulations.\textsuperscript{170} The Convention also governs resources other than polymetallic nodules found in the course of prospecting activity.\textsuperscript{171} The ISA and the contractor may at any time agree to revise the contract in force should it become inequitable or should its objectives prove "impracticable or impossible to achieve."\textsuperscript{172}

B. Application of the Regulations

Despite ISA's detailed planning, the monitoring of environmental conditions did not always proceed as expected. The seven contractors approved to explore the seabed for polymetallic nodules between 1987 and 2001 had registered claims for two seabed areas of equal value intending to reserve one for the Authority. Exploration would take place in an area up to 150,000 square kilometers, with the contractor later relinquishing 75,000 square kilometers to the Authority. According to the Authority, "these relinquishments have now been

\begin{itemize}
  \item \textsuperscript{165} Id. reg. 32, § 7.
  \item \textsuperscript{166} Id. reg. 35, § 3.
  \item \textsuperscript{167} Id. reg. 35, § 5.
  \item \textsuperscript{168} Id. reg. 36, §§ 4, 5.
  \item \textsuperscript{169} Id. reg. 36, §§ 1, 2.
  \item \textsuperscript{170} Id. reg. 39, § 1.
  \item \textsuperscript{171} Id. reg. 40.
  \item \textsuperscript{172} ASSEMBLY, supra note 137, Annex 4, § 24.
\end{itemize}
accomplished." 173 The Regulations did not require that contractors provide information to ISA regarding their findings on relinquished areas, largely defeating the purpose of this arrangement. This gap in ISA’s planning indicates the pitfalls encountered in attempting to draft regulations on an international scale. Therefore, ISA’s recommendations can best be described as a work in progress, as indeed they have been in the latest meeting of the Authority. 174

C. Assessing Effectiveness of the Regulations

The law to protect the deep seabed obviously exists. As the Secretary-General of the ISA indicated, 175 there is no shortage of international laws for preserving both the resources and biodiversity of the deep seabed. 176 To deny that fact is to deny international efforts at regulation spanning 50-plus years. As with all lawmaking efforts, the product generated is perhaps imperfect, but it represents a great stride toward the equitable sharing of resources among nations and, more importantly, toward the preservation of the marine environment. Self-reporting in case of harm caused to the marine environment may well be claimed as insufficient protection, and enforcement of environmental responsibility may need to be more strictly delineated. Holding contractors responsible indefinitely for damages, as the Regulations do, is a step in the right direction. In addition, requiring contractors to set aside equivalent areas in order to assess the effects of exploitation ensures that a controlled scientific study takes place.

The choice of some nations, including the United States, to position themselves outside the legal framework developed by the United Nations through UNCLOS III and by ISA through the


176. E.g., INT’L SEABED REGULATIONS, supra note 8; UNCLOS III, supra note 19; Rio Declaration, supra note 158; Convention on Biological Diversity (CBD), June 5, 1992, 31 I.L.M. 818.

177. Notwithstanding the dual atrocities of piracy and terrorism in the high seas; see William Langewiesche, Anarchy at Sea, 292 ATLANTIC MONTHLY, Sept. 2003, at 50.
The deep seabed regulations can only be described as shortsighted. The United Nations, for its part, should do better than offer a Hobson’s choice to potential members regarding ratification of UNCLOS III. The “as is” rule should give way to reasonable modification of the law to provide incentives to join for the nations that today remain outside the UNCLOS umbrella. The ISA needs to recognize that, just as the model for polymetallic nodule deposits in the North Pacific should “allow for continuing refinement,” so should the regulations admit amendments to become a truly useful tool in protecting the marine environment. Perhaps the true measure of the success of the regulations will become evident fifty or a hundred years hence—mere nanoseconds in geologic terms—through the realization that many potential disasters to the deep-sea ecosystem were avoided.

D. Planned Modifications/Securing Compliance

On May 14, 2003, the Legal and Technical Commission reported that the two-week meeting during the Ninth Session of the ISA would include consideration of a progressive fee system rather than a relinquishment system. The grid and parallel systems for licensing and resources would be evaluated and the Secretariat would take into account the “relevant national legislation both on land and offshore.” The Commission would also “examine the second round of reports from seven government-sponsored entities holding contracts with the Authority that entitle them to explore for polymetallic nodules in specified ocean tracts.” The reports are required under the terms of the contractors’ 15-year contracts signed with the Authority in 2001 and “[cover] the contractors’ activities during the previous year.”

178. When the third Conference on the Law of the Sea began in 1974 in Caracas, Venezuela, its intention was to avoid the fragmentation of principles that characterized the first Conference of 1958. Accordingly, consensus was to be reached on matters under consideration and votes would be taken only as a last resort. In addition, the document had to be accepted by a state in its entirety without rejecting specific resolutions. The expected effect was that participating states would find it in their interest to adopt a treaty if the majority of substantive matters proposed were acceptable, even though a number of disfavored issues were included. See CLINGAN, supra note 49, at 3.

179. SA Project, supra note 173.

180. INT’L SEABED AUTH., INFORMATION FROM RELEVANT NATIONAL LEGISLATION RELATING TO ISSUES ASSOCIATED WITH THE DRAFT REGULATIONS ON PROSPECTING AND EXPLORATION FOR POLYMETALLIC SULPHIDES AND COBALT-RICH CRUSTS IN THE AREA (May 14, 2003).

181. Press Release, supra note 127.

182. Id.
Although annual reports contain information related to exploration, environmental study, mining tests, and training, as well as a financial statement, not all contractors submitted reports with the required documentation for 2001. A number of 2002 reports due at the end of March 2003 were still not received as of May 2003.\textsuperscript{183} This may or may not indicate reluctance on the part of contractors to divulge confidential information on research and finances. For its part, the ISA on July 29, 2003, issued a press release indicating that contractor reports as well as reports on the Authority’s scientific and technical work were examined in closed meetings,\textsuperscript{184} which should allay fears that confidential information will be made public.

The Authority is mindful that the Regulations must ensure that the sharing of resources take place in a way that avoids limiting commercial incentives or intellectual property rights.\textsuperscript{185} In addition, since it is difficult to distinguish between scientific research and commercial exploration, “a system of effective monitoring and enforcement” needs to be put in place to regulate what is known as bioprospecting, or “scientific research on the genetic resources of the Area.”\textsuperscript{186} Although researchers currently abide by a voluntary code of conduct to protect the environment during research and exploration, formalization of that code is the next step for the ISA.\textsuperscript{187}

E. Scientific Benefits of Regulating Use of the Deep Seabed

The ISA can be credited for collecting and centralizing scientific data regarding the deep seabed. The Legal and Technical Commission of the ISA, on April 29, 2003, issued a report on the status of ISA’s Central Data Repository (CDR) on marine mineral resources.\textsuperscript{188} These contain geochemical and location data sets, as well as cruise data and a reference data set that includes the literature sources used to construct the CDR database. In addition, a survey of international patents relating to nodule mining technology identified 352 patents, the majority of which were

\begin{itemize}
\item \textsuperscript{184} Press Release, supra note 174.
\item \textsuperscript{185} Press Release, supra note 127.
\item \textsuperscript{186} Statement, supra note 175.
\item \textsuperscript{187} Id.
\item \textsuperscript{188} The data sets are available at INT’L SEABED AUTH., CENTRAL DATA REPOSITORY, at www.cdr.isa.org.jm (last visited Aug. 23, 2004).
\end{itemize}
issued by the United States, Japan, and the former U.S.S.R.\textsuperscript{189} If patent issuance is any indication, the research activity that began in the 1960s reached a peak with 34 patents in 1983 and has tapered off since.\textsuperscript{190}

The Clarion-Clipperton Zone (CCZ), located in the north-central Pacific Ocean between Hawaii and the North American coast, has been identified as having the richest supply of polymetallic nodules.\textsuperscript{191} The most recent technical workshop of the ISA, held in Nadi, Fiji, in May 2003, proposed a scheme to develop a geological model for CCZ. The work will entail the collaboration of scientific institutions, “with ISA encouragement and support,” and will result in a geological model that utilizes maps and information from existing research.\textsuperscript{192} Standardization of data “to increase confidence in the model” was proposed\textsuperscript{193} and, if achieved, it will no doubt improve the usefulness of the model. In 2003, the Secretariat intended to begin a compilation of “a digital atlas of the international seabed area showing boundaries, geological features, seafloor topography and the location of all known mineral deposits.”\textsuperscript{194}

Research is underway to protect biodiversity in the CCZ. Known as the Kaplan Project, this is a “five-year, privately funded cooperative venture by research institutions in several nations” in which ISA also participates.\textsuperscript{195} The first of three research cruises under the Project took place in February and March of 2003. Two more are planned for 2004.\textsuperscript{196}

Since 1998, workshops and seminars sponsored by the ISA on deep seabed mining continue to draw experts and scientific researchers from various nations including the United States. Two of the objectives of these workshops are to assess the environmental impact of activities on the deep seabed and to foster international collaboration in protecting the deep seabed environment and its resources, both animal and mineral.

Sadly, attendance in recent years at ISA meetings has declined, making it difficult to obtain the quorum required under the Convention, which is one-half the members of the Authority.\textsuperscript{197} Measures were taken

\begin{itemize}
\item \textsuperscript{189} INT'L SEABED AUTH., STATUS OF THE INTERNATIONAL SEABED AUTHORITY'S CENTRAL DATA REPOSITORY ON MARINE MINERAL RESOURCES (2003).
\item \textsuperscript{190} Id.
\item \textsuperscript{191} Press Release, supra note 127.
\item \textsuperscript{192} Id.
\item \textsuperscript{193} SA Project, Statement of Jiancai Jing, supra note 173.
\item \textsuperscript{194} Press Release, supra note 127.
\item \textsuperscript{195} SA Project, supra note 173.
\item \textsuperscript{196} Id.
\end{itemize}
to improve planning of the Ninth Session, taking place in the summer of 2003, in order to increase attendance.

VII. DISPUTE RESOLUTION

Although no disputes regarding the deep seabed have reached the International Tribunal for the Law of the Sea (ITLOS) or the International Court of Justice (ICJ), several fisheries cases have been decided and may be helpful in determining ownership issues. At the very least, the fisheries cases serve to clarify the probable ITLOS direction in future deep seabed mining disputes.

Whether it is a question of treaty interpretation, or a threat to international order, or simply resource exploitation by one state perceived as excessive by another, there has been no shortage of disputes pertaining to the use of the seas and especially to fishery jurisdiction. In fact, it was the abundance of such disputes that led to the attempts to formulate an international regime for the sea, however imperfect. Part of the imperfection stems from the fact that states can neither be made to accede to a treaty nor to submit to the judgment of an international tribunal, unless they have previously accepted the tribunal's jurisdiction or adopted a compromis to submit disputes to the tribunal.

Thus, a compromissory clause is part of many treaties relating to the law of the sea, whereby parties agree to take any dispute arising from the interpretation of the treaties in question to an international tribunal. Conventions adopted under the auspices of the International Maritime Organization contain provisions to submit disputes to the International Court of Justice or to an arbitral tribunal. In general, under UNCLOS III, articles 280 and 282, dispute settlement methods are left to be decided by the parties involved, but provision is made for systems of dispute resolution. These are the International Court of Justice, the International Tribunal for the Law of the Sea, an international arbitral tribunal, and a special technical arbitral tribunal. Arbitration is required when disputing parties have not accepted the same

198. Sara M. Mitchell & Brandon C. Prins, Beyond Territorial Contiguity: An Examination of the Issues Underlying Democratic Interstate Disputes, 43 INT'L STUDIES Q. 169, 169–83 (1999). The authors find that maritime, fisheries, or navigation issues account for nearly half of all militarized disputes between democracies since World War II.
199. UNCLOS III, supra note 19, pt. XI, § 5.
201. Id. at 238, 239.
202. Id. at 241.
203. UNCLOS III, supra note 19, art. 287(1).
procedure. Guidance on selection of an arbitral tribunal is provided in Annex VII to the Convention.

Experience indicates that resorting to an international commission to settle disputed matters, although not binding on the parties to the dispute, usually proves successful. Nevertheless, commentators have pointed out the incompatibility of international law with the doctrine of state sovereignty. Although it is paradoxical to expect sovereign states to submit to the will of another state (or states), bilateral or multilateral agreements with a minimum of ambiguity were indeed necessary in governing the resources of the sea. Justiciable questions pertaining to the interpretation or application of international law are considered to have a legal basis and are best served by binding adjudication, whereas disputes arising from disregarding a law or from the desire to change the law are assumed to be politically motivated and nonjusticiable.

To equitably resolve disputes and balance the various rights involved, the Hague Convention on Pacific Settlement of Disputes of 1907 recognized the need for “an impartial and conscientious investigation” to aid in fact finding prior to resolution. When diplomatic negotiations fail, a state that is not involved in the dispute, or a prominent international official, may offer “good offices” as an intermediary to assist in settlement of the dispute. If the role of the intermediary grows to an active position in the settlement, the process becomes a mediation. When the mediator is an independent body rather than a noninvolved state or prominent official, the process is termed a conciliation. The recommendations following a conciliation are nonbinding, in contrast to those of binding arbitration where the settlement of an issue is undertaken by a judge.

Issues vary in their suitability to these methods of dispute settlement, and, although the courts are accepted as being the most formal and juridical, their opinion is occasionally disregarded or

204. Id. art. 287(5).
205. Id.
206. SOHN & GUSTAFSON, supra note 200.
207. CLINGAN, supra note 49, at 517.
208. Id. at 519.
210. CLINGAN, supra note 49, at 520.
211. Id.
212. Id. at 523, 524.
suspected of partiality. When tribunals are called to interpret a treaty or to balance conflicting claims, they too need to exhibit fairness and impartiality and "be willing to brave political displeasure, searching always for generalizable principles, even as they search for formulations or procedural mechanisms to render the principles more palatable to the states concerned." In rendering the principles "palatable" to the states, legal scholars have suggested that tribunals build on existing consensus or, when there is no consensus, follow a generalized path to encourage further negotiation and refrain from establishing detailed guidelines. The benefit of a tribunal's availability as a forum is the speed with which critical conservation issues can be settled.

The existence of varied fora for dispute resolution has been criticized by some for introducing fragmentation to a process that ought to be streamlined and uniform. However, it is precisely this choice of forum that has the potential to encourage swift and relatively noncontentious settlement of the disputes that will inevitably continue to arise among states forced to share dwindling resources.

A. The Swordfish Cases

A dispute rooted in the issue of court jurisdiction arose in the late 1990s when European Union (EU) fishing fleets began to hunt swordfish over the Nazca Ridge in the Southeast Pacific. Swordfish (Xiphias gladius) are a migratory species found in the tropical and temperate seas of the world, from approximately 45 degrees north to 45 degrees south. Because of their far ranging travels, the fish cross the jurisdictional boundaries of several countries, and this allows for the argument that they are a common resource open to all and thus must be protected for future generations. Chile, to protect the swordfish in its EEZ and adjacent high seas, has enacted several regulations for...
conservation that specify what gear is to be used and that halt the issuance of new permits.\textsuperscript{220} In addition to limiting the size of the fish that can be caught to 106 cm, Chilean Fisheries Law, article 162 states that Chilean ports are not open to factory ships and EU longliners\textsuperscript{221} that disregard the catch regulations.\textsuperscript{222}

To settle the dispute that arose, the EU chose to take its case to the World Trade Organization (WTO) in the belief that the WTO was a better forum because (1) the dispute was about jurisdictional rather than environmental issues, \textit{i.e.}, Chile’s interpretation of an EEZ; (2) the WTO could enforce a positive judgment for the EU by imposing retaliatory measures; and (3) the WTO has tighter time limits for dispute resolution.\textsuperscript{223}

The European Union contended that the Chilean regulations violated article V of the General Agreement on Tariffs and Trade (GATT), which allows free transit of goods along contracting parties’ territories.\textsuperscript{224} In addition, the EU argued that because its ships were prevented from landing in Chilean ports, they were unable to process and ship the fish to markets in the United States and other North American Free Trade Agreement (NAFTA) states, thus violating article XI of GATT, which prohibits quantitative restrictions on imports or exports.\textsuperscript{225}

The right of access to the ports of a foreign country is governed by that foreign country, since a sovereign nation can determine which non-native ships may have access to its ports. This international norm was upheld in an International Court of Justice (ICJ) case involving Nicaragua and the United States, where the ICJ stated, “by virtue of its sovereignty...the coastal State may regulate access to its ports.”\textsuperscript{226} Since

\begin{itemize}
\item \textsuperscript{220} \textbf{CRUZ}, \textit{supra} note 218, at 12 n.1.
\item \textsuperscript{221} Longliners are vessels that drag a long fishing line (several miles in length) baited with hundreds of hooks. \textbf{NAT. RESOURCES DEF. COUNCIL, SWORDFISH IN THE NORTH ATLANTIC: THE CASE FOR CONSERVATION} (1998), \textit{available at} http://www.nrdc.org/wildlife/fish/sword.asp#intro (last visited May 17, 2004).
\item \textsuperscript{222} \textbf{CRUZ, supra} note 218, at 11.
\item \textsuperscript{225} Press Release, EUROPA, EU and Chile Reach an Amicable Settlement to End WTO/ITLOS Swordfish Dispute (Jan. 25, 2001), \textit{available at} http://europa.eu.int/comm/fisheries/news_corner/press/inf01_05_en.htm (last visited May 17 2004).
\item \textsuperscript{226} Concerning Military and Paramilitary Activities in and Against Nicaragua (Nicaragua v. United States), 1986, I.C.J. 14, at 111 (June 27).
\end{itemize}
article V has never been applied to fisheries or to port access for fishing boats—issues more commonly dealt with by customary law and bilateral treaties—it could be claimed that article V should be made a *lex specialis*, an exception to the law of a state's total control over its ports.  

An additional consideration for port access is that article 23(3) of the 1995 U.N. Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks allows a state to forbid a foreign fishing boat from landing if the boat has caught the fish in a manner that violates the state's multilateral conservation measures. While not a signatory to this agreement, Chile is a member of the Permanent Commission for the South Pacific (CPPS). This organization has enacted several multilateral conservation measures and, since 1952, has worked to make the EEZ an international customary norm. On August 14, 2000, the CPPS agreed to the creation of conservation measures for marine resources that are highly migratory (Galapagos Agreement). Had Chile made the argument that its actions in CPPS were similar to what would have been required of it under the Straddling Fish Stocks agreement, it may have been successful.

Chile, in response to the EU's actions, brought the case to ITLOS and sought to use that organization's dispute settlement mechanism. Chile stated that the issue before ITLOS was whether the EU had complied with UNCLOS article 64 (regarding cooperation with coastal states in managing conservation of migratory and straddling stocks in EEZ waters), articles 116–119 (regarding conservation and management of the living resources of the high seas), article 297 (pertaining to dispute settlement), and article 300 (pertaining to good faith and not abusing rights). In addition, Chile asked the tribunal to find that the EU had not enacted proper methods for conservation because it allowed the use of longlines on its boats and it failed to report its catches to the Food and Agriculture Organization.

The European Union agreed to have the case heard before ITLOS but, along with Chile, asked that a special chamber be formed because ITLOS as a whole lacked the jurisdiction to hear the case. This was agreed to by Chile, and the special five-judge chamber was formed.

227. CRUZ, *supra* note 218, at 11.
228. *Id.* The organization's members are Ecuador, Peru, Columbia, and Chile.
229. *Id.* at 11–12.
230. *Id.* at 11–12.
232. *Id.*
233. *Id.*
The EU then requested the tribunal to find that Chile had violated all of the UNCLOS articles previously stated, as well as article 87 (specifying that coastal states may not unjustifiably interfere with the freedoms, including fishing, of a ship on the high seas) and article 89 (asserting that high seas are open to all, subject to conservation regulations, and cannot be controlled by any state). In addition, the EU argued that Chile was exercising excessive control over its EEZ and that its actions with the CPPS in the Galapagos Agreement were improper because interested states, other than the members of the CPPS, were not permitted to attend.

The two questions facing ITLOS were (1) whether to use environmental law to interpret UNCLOS articles and (2) how much control a state can project beyond its borders onto the high seas. With respect to the first question, the ITLOS judgment in the Southern Blue-Fin Tuna Cases (discussed below) indicated that the tribunal was aware of a need to have a general rule that could be applied to the management of all fisheries. That case showed that scientific uncertainty about the proper means to preserve the tuna had caused the dispute, prompting the court to require that provisional measures be enacted to preserve existing stocks. In the case before the special chamber, therefore, it would be hoped that the justices note this (nonbinding) precedent or use the same reasoning to protect the swordfish.

The ICJ has recognized that there is emerging customary law requiring that states respect the environment beyond areas of national control. States also have the duty to respect the interests of other states when exercising fishing rights under the Convention on the High Seas.

Precedent therefore suggests that ITLOS would have to decide if longlines, which are non-discriminatory and catch not just adult swordfish but also sub-legal immature swordfish, tuna, marlins, sailfish, sharks, pilot whales, migratory leatherback turtles, and albatross seabirds in great numbers, allow a state to respect the environment and meet its obligations under international law. Chile would probably argue that since the high seas are a sort of global common space, the

235. Id.
237. Advisory Opinion No. 95, Legality of the Use by a State of Nuclear Weapons in Armed Conflict, 1996 I.C.J. 66, at 141 (July 8).
environmental norms become obligations *erga omnes*, i.e., universally applicable.\(^{240}\) Not only do coastal states need to speak on the issue of the protection of the high seas, but non-coastal states have a right to as well, even though the high seas are far beyond their areas of national control.\(^{241}\)

It would have been interesting to see what ITLOS would have decided, but Chile and the EU halted the proceedings in the last week of January 2001, creating a provisional agreement that became operational in March 2001.\(^{242}\) The parties were given 90 days from January 1, 2004, to make objections regarding the agreement.\(^{243}\)

While this case has essentially ended, it brings to light another flaw of UNCLOS III, that no international council exists with the ability to enforce its decisions or to handle all disputes regarding the management of the seas. In the above case, the EU took the dispute to the WTO arguing that this was a purely economic matter. Chile, on its part, took the case to ITLOS, arguing that it was an environmental matter. If there were a single court to hear all disputes, there would be no argument about the lack of jurisdiction. This issue reemerges in the Southern Blue-Fin Tuna Cases discussed below.

**B. The Southern Blue-Fin Tuna Cases**

New Zealand and Australia sought adjudication against Japan for violating UNCLOS III articles 64 and 116–119 dealing with the conservation and management of fish stocks.\(^{244}\) The experimental fishing program and the total allowable catch number were the issues keeping the two sides from reaching an agreement.\(^{245}\) Japan maintained that since it engaged in an experimental fishing program to assess the viability of the stock, the dispute was scientific rather than legal. The factor that made this case difficult to resolve was that science could provide no answer as to what methods were necessary to preserve the southern

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\(^{240}\) Orellana, *supra* note 224.

\(^{241}\) *Id.*


\(^{243}\) *Id.*


\(^{245}\) Japan argued that New Zealand and Australia had not discussed every single possible procedure to settle the dispute as required under Part XV, Section 1 of UNCLOS III and requested a provisional measure requiring both to recommence negotiations. S. Bluefin Tuna, 38 I.L.M. at 1630, 1633 (1999).
blue-fin tuna, what catch rate would allow the stock to remain strong enough to survive and, most importantly, what was the sustainable yield of the tuna.\textsuperscript{246} In view of the scientific debate, ITLOS recognized the uncertainty involved in the issue.\textsuperscript{247} The tribunal ordered the parties (1) to avoid aggravation of the dispute, (2) to reasonably carry out the decision, (3) to set the total allowable catch at levels last agreed upon by the disputants, (4) to refrain from an experimental fishing program unless the disputants mutually agree upon one, (5) to resume negotiations in order to reach agreement on conservation and management measures of southern blue-fin tuna, and (6) to make additional efforts to reach agreements with other states regarding conservation and management of southern blue-fin tuna.\textsuperscript{248} ITLOS also provided for interim measures until all points were in place.\textsuperscript{249} Though the disputants were now able to proceed to arbitration,\textsuperscript{250} the problem of scientific uncertainty was not addressed.

The troubles between New Zealand/Australia and Japan were not over. The arbitration panel agreed with Japan that ITLOS did not have jurisdiction, an action that canceled the interim measures.\textsuperscript{251} A settlement was finally reached when all sides agreed to continue fishing, subject to the scientific data produced by a third party regarding catch size and the fishing program.\textsuperscript{252} This agreement has also been used to force New Zealand to lift a ban on whaling.\textsuperscript{253} It is noteworthy that the arbitration panel rejected a binding decision by ITLOS, and the two sides were forced to renegotiate a settlement. In addition, the arrangement did not solve the underlying disagreements and the dispute continues\textsuperscript{254} and will probably not end until the science can become more exact.

C. Customary Law/Compulsory Adjudication

In a case seeking injunctive and declaratory relief against the funding of the “Contras” in Nicaragua,\textsuperscript{255} the U.S. Court of Appeals in the District of Columbia Circuit made clear its position that “no

\begin{itemize}
\item \textsuperscript{246} Id. at 1634.
\item \textsuperscript{247} Id.
\item \textsuperscript{248} Id. at 1635–36.
\item \textsuperscript{249} Id. at 1635.
\item \textsuperscript{250} Id. at 1634.
\item \textsuperscript{251} Japan to Conduct Joint Tuna Research with Australia, N.Z., JAPAN ECON. NEWswire, Nov. 27, 2000.
\item \textsuperscript{252} Id.
\item \textsuperscript{253} Jonathan Milne, Tuna Pact Stirs Other Tensions, DOMINION, Dec. 26, 2000, at 2.
\item \textsuperscript{254} Id.
\item \textsuperscript{255} Comm. of U.S. Citizens Living in Nicaragua v. Reagan, 859 F.2d 929 (D.C. Cir. 1988).
\end{itemize}
enactment of Congress can be challenged on the ground that it violates customary international law."256 Peremptory norms may enjoy the highest status within international law, but the court rejected appellants' assertion that such norms rise to the level of constitutional obligations.257

Until such time as the Regulations enjoy widespread acceptance and the international community as a whole conforms to provisions therein, the Seabed Authority cannot claim that the Regulations rise to the level of peremptory norms. In the Nicaragua case, the court, quoting from Restatement (Third) of Foreign Relations Law,258 noted that customary international law requires consistent practice that arises out of states' sense of legal obligation. And again, quoting from the ICJ, the court noted that state practice must be "extensive and virtually uniform."259 In addition, for a customary norm to rise to the peremptory norm level, the international community must accept it as "a norm from which no derogation is permitted."260

It must also be noted that fewer than a third of the U.N. member nations agree to compulsory adjudication, raising the question of whether the ICJ or ITLOS will have any real authority to prosecute cases arising from seabed disputes. As in the fisheries cases discussed above, the likelihood remains that ICJ orders will be found to be arbitrary or unreasonable by either party to a dispute. Commentators have noted that the existence of compulsory third-party adjudication may, at the very least, retard claims of ownership over international resources.261 As such, the provisions for third-party adjudication within the Regulations would have the felicitous effect of limiting disputes and leading conflicting entities to good faith negotiation in an effort to reach agreement. It remains to be seen whether this expectation will indeed materialize. Although the case between the EU and Chile did indeed reach provisional agreement, this has not always been the case in either territorial262 or fisheries263 disputes.

Some commentators are troubled by the fact that dispute resolutions may involve adjudicators who are not entirely independent,

256. Id. at 939.
257. Id. at 940.
258. Section 102(2) (1987).
262. For example, the Greek/Turkish conflict over Cyprus.
263. For example, the dispute between Iceland/Norway and Japan/Australia.
as befits third-party adjudication. Others point to the necessity of allowing state interests to have some input in any international dispute, this being "a divided and heterogeneous world." What is important is to keep the channels of communication open among the various states in order to both settle disputes and improve upon the Regulations.

Technological progress mandates international negotiations and the creation of international fora for dispute settlements. This fact is implicitly recognized by UNCLOS III and has been variously implemented by the 1985 Vienna Convention for the Protection of the Ozone Layer and the 1988 Convention on the Regulation of Antarctic Mineral Resource Activities. Joint ownership of the deep seabed by the global community, in addition to presenting adjudication difficulties, serves to deter private investment by individual states that would improve technological capabilities of exploration and extraction of mineral resources. There is no incentive to develop a resource that will be claimed by others. Depressed metals prices and adequate land-based supply present a further disincentive to deep seabed mining. Nevertheless, a fluctuating global economy and the impermanence of supply level calculations make assumptions regarding the presumed futility of seabed mining especially treacherous. Accordingly, the move to replace the unbounded freedom to claim deep seabed resources by any single state with the collective rights of the international community is a move in the right direction. The ISA Regulations provide a framework to establish and protect those rights. In addition to ensuring that economic gain from a common resource does not unfairly accrue to a single entity, the Regulations prevent exploitation of deep seabed resources to the detriment of the environment. In fact, even if division among states—a method suggested for claiming Antarctic oil reserves—were adopted for development of the deep seabed, ISA Regulations are a step ahead since they include area limits and requirements for such development with an aim to preserve intact the seabed territories as far as possible.

266. Noyes, supra note 261, at 694.
267. Id. at 695.
268. UNCLOS III, supra note 19, art. 136.
Inasmuch as self-regulation evidences a maturing in the management of the world's resources by the international community, the effort should be supported by the United States and other countries that have not yet ratified UNCLOS III. Arguably, inadequacies in the lawmaking effort can be better improved from within. In any case, regulation of deep seabed mining activity outside the EEZ of coastal states is now a reality for the international community. And although skepticism abounds regarding the profitability of nodule mining, in 2001 the ISA granted exploration contracts in the eastern equatorial Pacific to seven groups of pioneer investors. Should the regime developed by the ISA prove unsatisfactory—and there is, as yet, no indication that it will—it can be improved. The regulatory machinery presents a complex picture, as would any emergent legislation of worldwide scope that needs to impose order on such a multitude of factors, but it is much preferable to the chaotic system of clashing independent interests that existed previously.

Past failures in the application of customary international law underscored the frozen nature of the disorder and the unyielding problem in need of a solution. Having overcome objections and instituted a plan for prospecting and exploration acceptable to international consortia, the ISA is now capable of influencing opinion—should any state remain reluctant to follow the Regulations, perceiving them as a curb in its degree of freedom. This alone suggests reason for optimism. Even if not immediately embraced, regulatory restraint is a mandatory solution to preserving and optimizing resources of the deep sea. Achieving comity at the international level may be challenging but is nevertheless tenable. The philosophy of the ISA Regulations is premised on both our common heritage and our environmental obligations, which require cooperation on a global basis.

VIII. CONCLUSION

As the common heritage of mankind, the deep seabed merits careful management and an argument can be made that the United States must yield to international pressure and assist U.N. efforts to craft a solution. Isolationist policies neglect current geopolitical realities. The foregoing appraisal of the law of the sea pertaining to the deep seabed indicates that customary law is evolving and capable of keeping pace

272. UNCLOS III, supra note 19, pt. XV, art. 197.
with progressing technology. Though the ISA Regulations impose a sizeable financial obligation on the states sponsoring deep seabed mining activity, they are reasonable and should be acceptable to the U.S. government. The United States enjoys unprecedented technological and economic advantages and is therefore eminently able to commit to the precautionary environmental policies such as those promulgated by the ISA Regulations. The crucial point is to recognize the truth encapsulated in the observation that, "[a]lthough the scientists have seen the sea as a biological whole for a long time, policy makers and lawyers still attempt to place their policies and legal drafts into neat compartments." As compartmentalization of ocean policy progresses, the challenge to preserve the integrity of the seas and the resources of the deep seabed is intensified.

Preserving the deep-sea marine environment is all the more critical because of the extreme diversity of species present on the seabed, "rivaling that of coral reefs and rainforests." The ubiquitous polymetallic manganese nodule itself has been characterized as "a black box [containing] the story of the history of the sea" and should be accorded the study it deserves. Perhaps, therefore, it is propitious that the global economic climate is not conducive to mining of the deep seabed at present and that further scientific and technological improvements need to be made in order to best protect the seabed. As ISA Secretary-General Satya N. Nandan observed in the opening of the proceedings at the Ninth Session, the difficulty in assessing available ocean mineral resources is due to the fact that "the water is very transparent but the ocean is very opaque."

Delaying mining activity will allow the ISA to get its affairs in order, i.e., to make good progress in its work of responsibly managing the mineral resources of the international seabed area and to succeed in its stated aim to become a depository of scientific data. Protection of the deep seabed environment, however, cannot rely on regulation alone but needs international collaboration in monitoring scientific research and commercial mining activities along with strict enforcement of environmental regulations.

274. SA Project, Statement of Craig R. Smith, supra note 173.
275. SA Project, Statement of Michel Hoffert, supra note 173.
276. SA Project, Opening Remarks, supra note 173.