

2015

Securing the Resources of the Deep: Dividing and Governing the Extended Continental Shelf

Clive Schofield

Recommended Citation

Clive Schofield, *Securing the Resources of the Deep: Dividing and Governing the Extended Continental Shelf*, 33 BERKELEY J. INT'L LAW. (2015).

Available at: <http://scholarship.law.berkeley.edu/bjil/vol33/iss1/7>

This Article is brought to you for free and open access by the Law Journals and Related Materials at Berkeley Law Scholarship Repository. It has been accepted for inclusion in Berkeley Journal of International Law by an authorized administrator of Berkeley Law Scholarship Repository. For more information, please contact jcera@law.berkeley.edu.

Securing the Resources of the Deep: Dividing and Governing the Extended Continental Shelf

Clive Schofield*

Half of the world's coastal States are in the process of delineating continental-shelf limits seawards of their 200-nautical-mile exclusive economic zones. This Article outlines the complex criteria and process involved in the definition of outer-continental-shelf limits, highlights associated uncertainties and ambiguities, and points to progress and remaining obstacles to the finalization of such limits. Key potential marine resource opportunities that may arise within seabed areas seaward of the 200-nautical-mile limit are noted and challenges to securing rights over these resources are explored.

TABLE OF CONTENTS

INTRODUCTION	275
I. DEFINING THE OUTER LIMITS OF THE CONTINENTAL SHELF	276
A. <i>The Terms of Article 76</i>	279
B. <i>The United Nations Commission on the Limits of the Continental Shelf</i>	281
II. DEADLINES AND PROGRESS TOWARDS FIXING LIMITS.....	284
III. EXTENDED-CONTINENTAL-SHELF RESOURCES	286
IV. SECURING THE RESOURCES OF THE EXTENDED CONTINENTAL SHELF: PROSPECTS AND CHALLENGES	291
CONCLUSIONS.....	293

* Professor and Director of Research, Australian National Centre for Ocean Resources and Security (ANCORS), University of Wollongong (UOW), Wollongong, NSW 2522, Australia. He is also the Leader of the University's Sustaining Oceans and Coastal Communities research theme within UOW's Global Challenges Program. E-mail: clives@uow.edu.au. Professor Schofield is the recipient of an Australian Research Council Future Fellowship (FT100100990).

INTRODUCTION

Early 2009 saw a flurry of submissions on proposed outer-continental-shelf limits to the United Nations (UN) Commission on the Limits of the Continental Shelf (CLCS)¹—a specialized scientific and technical body created through the United Nations Convention on the Law of the Sea (LOS or the Convention).² These submissions relate to continental-shelf limits located seawards of the 200-nautical-mile (nm)³ limit from coastal baselines.⁴ The so-called extended- or outer-continental-shelf areas contained within these proposed limits encompass an enormous area: in excess of twenty-nine million square kilometers of continental shelf area seawards of the 200 nm exclusive-economic-zone (EEZ) limits.⁵ This vast “extension” of the maritime jurisdictions of many coastal States raises significant potential resource opportunities. Arguably, because extended-continental-shelf areas are subject to well-established national regulatory regimes they are more likely to be subject to exploration and development than is the international seabed area (the Area)—seabed and subsoil areas beyond national jurisdiction⁶—regulations for which are being progressively developed by the International Seabed Authority (ISA).⁷

1. The Commission comprises twenty-one scientists, whose purpose is “to facilitate the implementation of the United Nations Convention on the Law of the Sea . . . in respect of the establishment of the outer limits of the continental shelf beyond 200 nautical miles [] from the baselines from which the breadth of the territorial sea are measured.” *Commission on the Limits of the Continental Shelf (CLCS), Purpose, Functions and Sessions*, COMM’N ON LIMITS OF CONT’L SHELF, http://www.un.org/Depts/los/clcs_new/commission_purpose.htm#Purpose.

2. United Nations Convention of the Law of the Sea, 10 Dec. 1982, 1833 U.N.T.S. 3, 399 (entered into force Nov. 16, 1994) [hereinafter LOSC]. “LOSC” is preferred to “UNCLOS” as the acronym for the Convention in order to forestall confusion with the three United Nations Conferences on the Law of the Sea of 1958, 1960 and 1974–1982. The terms “UNCLOS I,” “UNCLOS II,” and “UNCLOS III” are used to refer to the three United Nations Conferences on the Law of the Sea. UNCLOS III was devoted to the negotiation and drafting of the LOSC.

3. It is acknowledged that technically the correct abbreviation for a nautical mile is “M” and that “nm” properly refers to nanometres. However, “nm” is widely used by many authorities (for example the UN Office of Ocean Affairs and the Law of the Sea) and appears to cause less confusion than “M,” which is often assumed to be an abbreviation for meters. Consequently “nm” will be used to denote nautical miles herein.

4. See Clive Schofield & Robert van de Poll, *Exploring the Outer Continental Shelf, in IMPLEMENTATION OF ARTICLE 82 OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA: REPORT OF THE INTERNATIONAL WORKSHOP CONVENED BY THE INTERNATIONAL SEABED AUTHORITY IN COLLABORATION WITH THE CHINA INSTITUTE FOR MARINE AFFAIRS IN BEIJING, THE PEOPLE’S REPUBLIC OF CHINA*, Nov. 26–30, 2012, 69, 69–81 (Int’l Seabed Auth., Working Paper No. 12, 2013).

5. See *id.* at 72.

6. See LOSC, *supra* note 2, art. 1, para. 1(1) and part XI.

7. For details of the Mining Code, a “comprehensive set of rules, regulations and procedures” issued by the International Seabed Authority (ISA) to “regulate prospecting, exploration and exploitation of marine minerals in the international seabed Area,” see the ISA’s website at <http://www.isa.org.jm/en/mcode>.

While significant marine-resource opportunities may exist, so too do notable obstacles to their realization. In particular, it is clear that many of the submissions made to the CLCS relate to the same areas of extended continental shelf.⁸ For example, the first submission made, that of the Russian Federation, generated five reactions from interested States (Canada, Denmark, Japan, Norway, and the United States) keen to reserve their positions in the event that their own submissions would relate to the same areas of extended continental shelf.⁹ These overlapping submissions highlight the existence of multiple potential extended-continental-shelf boundaries that have yet to be delimited, as well as the prospect of disputes over these boundaries developing, especially as efforts to access the resources of these areas progress.

This paper outlines the process by which coastal States delineate outer-continental-shelf limits, before providing an overview and assessment of extended-continental-shelf submissions. The paper goes on to discuss a number of the salient challenges that are emerging in respect to both securing and governing continental-shelf areas under national jurisdiction beyond 200 nm from the coast—challenges that have significant implications for accessing and securing the resources of the extended continental shelf.

I.

DEFINING THE OUTER LIMITS OF THE CONTINENTAL SHELF

A particular virtue of the LOSC¹⁰ is the spatial framework it establishes for claims to maritime jurisdiction. Both the Convention and its established maritime-jurisdictional framework are now generally accepted,¹¹ and the vast

8. These overlapping submissions areas can be viewed via the maps and data provided by the GRID-Arendal Continental Shelf Programme. See *Updated Extended Continental Shelf Areas*, CONTINENTALSHelf.ORG, <http://www.continentalshef.org/onestopdatashop.aspx> (last visited Dec. 24, 2014). The overlaps between areas of extended continental shelf defined by proposed outer-continental-shelf limits are also demonstrated by the reactions of States to submission recorded on the CLCS website. See *Submissions, Through the Secretary-General of the United Nations, to the Commission on the Limits of the Continental Shelf, Pursuant to Article 76, Paragraph 8, of the United Nations Convention on the Law of the Sea of 10 December 1982*, COMM'N ON LIMITS CONT'L SHELF, http://www.un.org/Depts/los/clcs_new/commission_submissions.htm (last updated Dec. 17, 2014) [hereinafter *Submissions to the CLCS*].

9. See *Submission by the Russian Federation*, COMM'N ON LIMITS CONT'L SHELF, http://www.un.org/Depts/los/clcs_new/submissions_files/submission_rus.htm (last updated June 30, 2009).

10. See *United Nations Convention on the Law of the Sea of 10 December 1982, Overview and full text*, DIV. FOR OCEAN AFFAIRS & LAW OF SEA, http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm (last updated Aug. 22, 2013).

11. At the time of writing, 165 States plus the European Union were parties to the Convention. See *Status of the United Nations Convention on the Law of the Sea, of the Agreement Relating to the Implementation of Part XI of the Convention and of the Agreement for the Implementation of the Convention Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks: Table Recapitulating the Status of the Convention and of the Related Agreements, as at 10 October 2014*, DIV. FOR OCEAN AFFAIRS & LAW OF SEA,

majority of maritime claims are in keeping with its terms.¹² This is particularly the case where clear distance-based limits to maritime claims were defined from baselines along the coast,¹³ namely twelve nm as the maximum breadth of the territorial sea,¹⁴ twenty-four nm for the contiguous zone,¹⁵ and 200 nm for the EEZ (see Figure 1).¹⁶

Agreement on the limits of the territorial sea and the introduction of the EEZ were especially noteworthy developments, bringing a measure of certainty to the maximum breadth of maritime claims that had previously been lacking. Three decades after LOSC opened for signature, twelve nm territorial seas have become commonplace, although a few exceptions to the rule remain, largely in the form of anachronistic 200 nm territorial-sea claims.¹⁷ Here it is worth recalling that the general consensus on the maximum limit of the territorial sea was a significant breakthrough given the contentious nature of this issue, which had confounded earlier codification efforts. The codification of the EEZ also

http://www.un.org/Depts/los/reference_files/status2010.pdf. While it is the case that Article 309 of the LOSC precludes “reservations or exceptions” to the Convention, save where permitted by other Articles, Article 310 allows for “declarations or statements” relating, for example, to the harmonization of a State’s laws and regulations with the provisions of the Convention, provided that such declarations and statements “do not purport to exclude or modify the legal effect” of the provisions of the Convention to the declaring State. Numerous States parties to the Convention have opted to make such declarations or statements, whether on signing LOSC, upon ratification or accession to the Convention, or subsequently. *See Declarations and Statements*, DIV. FOR OCEAN AFFAIRS & LAW OF SEA, http://www.un.org/depts/los/convention_agreements/convention_declarations.htm (last updated Oct. 29, 2013).

12. *See Table of Claims to Maritime Jurisdiction (as at 15 July 2011)*, DIV. FOR OCEAN AFFAIRS & LAW OF SEA, available at http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/table_summary_of_claims.pdf.

13. Such baselines along the coast are often termed “territorial sea baselines”—see Figure 1—but are important to the definition of the full range of zones of maritime jurisdiction under the Convention. LOSC defines “normal” baselines as being consistent with “the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State.” LOSC, *supra* note 2, art. 5. LOSC also allows for a number of other types of straight line-type baselines to be constructed along the coast. These include straight baselines, river closing lines, bay closing lines, lines related to ports and permanent harbour works, and in respect of archipelagic States. *See id.* arts. 7, 9–11, 47.

14. *Id.* arts. 3, 4.

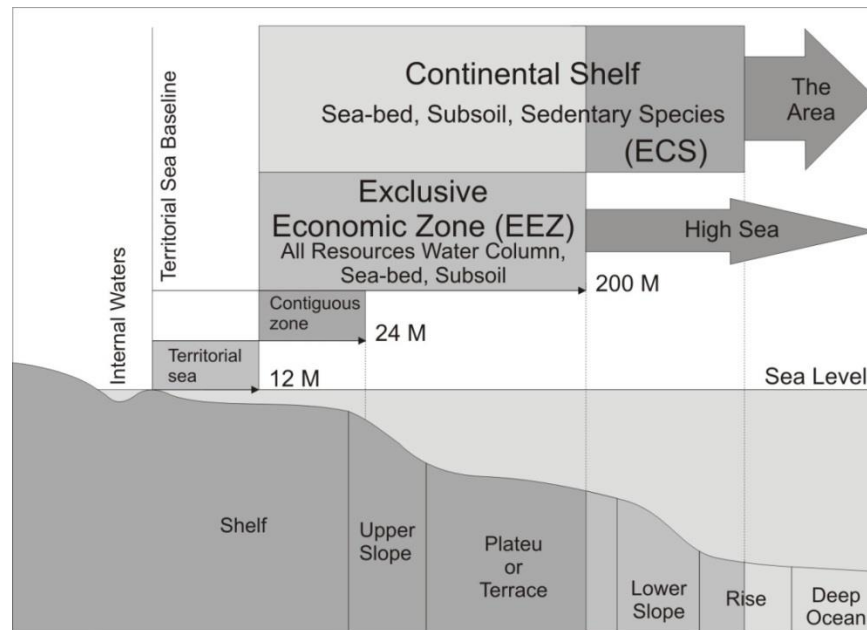
15. *Id.* art. 33.

16. LOSC Article 57 states that: “The exclusive economic zone shall not extend beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured.” *Id.* art. 57. As most coastal States claim a 12 nm territorial sea, the actual breadth of the EEZ is usually 188 nm seaward of territorial-sea limits.

17. While the majority of “excessive” territorial-sea claims have been “rolled back” to the international norm of twelve nm, a number of coastal States retain claims to 200 nm territorial seas (Benin, Ecuador, El Salvador, and Peru) or, in the case of Togo, a thirty nm territorial sea. *See J. ASHLEY ROACH & ROBERT W. SMITH, EXCESSIVE MARITIME CLAIMS* 148 (3d ed. 2012). It is worth noting that Somalia, long thought to claim a 200 nm breadth territorial sea has, since June 30, 2014, claimed a 200 nm breadth EEZ. *See Proclamation by the President of the Federal Republic of Somalia, Dated 30 June 2014*, DIV. FOR OCEAN AFFAIRS & LAW OF SEA, available at http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/SOM_2014_Proclamation.pdf.

represented a major change, essentially transferring rights over resources within 200 nm of baselines along the coast from an international regime (the high seas) to national jurisdiction. The significance of this shift is underlined by the fact that in 1984 the UN's Food and Agriculture Organization estimated that ninety percent of marine fish and shellfish were caught within 200 nm of the coast.¹⁸ Similarly, it was estimated that eighty-seven percent of the world's known submarine oil deposits would fall within 200 nm breadth zones of jurisdiction.¹⁹

FIGURE 1: ZONES OF MARITIME JURISDICTION²⁰



LOSC's definition, or redefinition, of the limits of the continental shelf was similarly groundbreaking because it marked a distinct shift away from the unsatisfactorily open-ended definition provided by the Convention on the Continental Shelf of 1958.²¹ Article 1 of that Convention defined the continental shelf as either "the seabed and subsoil of the submarine areas adjacent to the

18. Rachel A. Schurman, *Tuna Dreams: Resource Nationalism and the Pacific Island's Tuna Industry* 29 DEV. & CHANGE 107, 107 (1998).

19. ROBIN CHURCHILL & VAUGHAN LOWE, *THE LAW OF THE SEA* 162 (3d ed. 1999).

20. See Clive Schofield, *The Delimitation of Maritime Boundaries: An Incomplete Mosaic*, in *THE ASHGATE RESEARCH COMPANION TO BORDER STUDIES* 665, 669 (Doris Wastl-Walter ed., 2011). The author would like to thank Andi Arsana for his assistance in the preparation of this figure.

21. Convention on the Continental Shelf, Apr. 29, 1958, 499 U.N.T.S. 285.

coast but outside the area of the territorial sea to a depth of 200 metres,” or, “beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas.” The latter criterion for the definition of continental shelf limits is clearly dependent on the technologies available to enable the exploitation of seabed resources. Consequently, continental-shelf limits defined on this basis were potentially susceptible to change over time.

LOSOC instead offers a complex series of formulae, outlined below, through which the coastal State can establish the outer limit of its continental shelf, seaward of the 200 nm limit. While the criteria laid down under LOSOC for the delineation of outer-continental-shelf limits are undoubtedly complex, they provide for a definable outer limit to coastal States’ continental-shelf claims. Nevertheless, a number of uncertainties and ambiguities are attendant on the critical part of LOSOC—Article 76.

A. The Terms of Article 76

Article 76 provides three options for establishing continental-shelf entitlement, coupled with two “cut off” lines.²² First, it sets the 200 nm limit as the continental shelf of a coastal State that consists of “the seabed and subsoil of submarine areas” extending to a distance of 200 nm from relevant baselines.²³ This definition of continental-shelf limits is in keeping with the codification of the EEZ, which provides every coastal State with the potential to claim sovereign rights over both the seabed and water column out to 200 nm, provided that there are no overlapping claims with neighbouring States.²⁴ This applies regardless of whether the continental-shelf margin physically extends that distance offshore or not.

The two other options relate to coastal States whose continental margins extend beyond the 200 nm limit of the EEZ. Both criteria are designed to demonstrate that such continental-shelf areas exist beyond the 200 nm limit and form part of the “natural prolongation” of the coastal State in question.²⁵ In accordance with Article 76 of the Convention, the two ways in which coastal States can establish the existence of a continental margin beyond the 200 nm limit that forms part of the State’s natural prolongation are through the application of either the “Gardiner Line,” based on a reference to the depth or

22. The term “cut off line” is not a term of art drawn from the Convention but is a commonly used shorthand for the two constraint lines defined in Article 76(5). See LOSOC, *supra* note 2, art. 76, para. 5.

23. *Id.* art. 76, para. 1.

24. These rights are, however, governed in accordance with Part VI (dealing with the continental shelf) of the Convention rather than Part V (dealing with the EEZ).

25. LOSOC Article 76(1) states that, as an alternative to the 200 nm limit, the continental shelf is defined as extending “throughout the natural prolongation of its land territory to the outer edge of the continental margin.” LOSOC, *supra* note 2, art. 76, para. 1.

thickness of sedimentary rocks overlying the continental crust,²⁶ or the “Hedberg Line,” which uses a distance formula of sixty nm.²⁷ Both entitlement formulae are measured from the foot of the continental slope, which is defined as the point of maximum change in gradient at the base of the continental slope (unless there is “evidence to the contrary”).²⁸

However, the extended continental rights of broad-continental-margin States are constrained by two maximum cut-off lines, defined as either a distance of 350 nm from relevant baselines or 100 nm from the 2500-meter isobath.²⁹ Furthermore, Article 76 provides that the coastal State may define the outer limits of its continental shelf where it extends beyond 200 nm from its baselines “by straight lines not exceeding 60 nautical miles in length, connecting fixed points, defined by coordinates of latitude and longitude.”³⁰ Areas of continental shelf seawards of the 200 nm limit are often termed the “outer”³¹ or “extended”³² continental shelf. However, both of these terms are less than ideal. On the one hand, the term outer continental shelf suggests that the continental shelf is divided into distinct inner and outer parts when, in fact, this is not the case.³³ On the other hand, the term extended continental shelf appears to suggest

26. Specifically “a line delineated in accordance with paragraph 7 by reference to the outermost fixed points at each of which the thickness of sedimentary rocks is at least 1 per cent of the shortest distance from such point to the foot of the continental slope.” *Id.* art. 76, para. 4(a)(i).

27. *See id.* art. 76, para. 4(a)(ii); *see also* INT’L HYDROGRAPHIC BUREAU, A MANUAL ON TECHNICAL ASPECTS OF THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA—1982, ch. 5, secs. 2, 7.4 (4th ed. 2006) [hereinafter TALOS MANUAL]; Robert W. Smith & George Taft, *Legal Aspects of the Continental Shelf*, in CONTINENTAL SHELF LIMITS: THE SCIENTIFIC AND LEGAL INTERFACE 17, 19 (Peter J. Cook & Chris M. Carleton eds., 2000).

28. *See* LOSC, *supra* note 2, art. 76, para. 4(b). Whichever of the formulae is most advantageous to the coastal State may be used.

29. *Id.* art. 76, para. 5. Again, whichever of these cut-off lines is most advantageous to the coastal State may be used.

30. *Id.* art. 76, para. 7. All the straight lines and distances referred to in the Convention are geodesics, that is, straight lines on the surface of a mathematical model (reference ellipsoid) of the Earth. *See* Alan Dodson & Terry Moore, *Geodetic Techniques*, in CONTINENTAL SHELF LIMITS, *supra* note 27, at 87, 102.

31. For example, the International Hydrographic Organization in its Manual on Technical Aspects of the Law of the Sea (TALOS Manual) refers to “outer continental shelf.” *See* TALOS MANUAL, *supra* note 27, at ch. 5, sec. 7.

32. For example, the CLCS, in its Scientific and Technical Guidelines, uses the term “extended continental shelf.” *See* Comm’n on the Limits of the Cont’l Shelf, *Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf*, CLCS/11 (May 13, 1999), available at http://www.un.org/Depts/los/clcs_new/commission_documents.htm#Guidelines [hereinafter CLCS Scientific and Technical Guidelines].

33. For example, in its judgment in the Bay of Bengal Case, the International Tribunal for the Law of the Sea observed that “Article 76 of the Convention embodies the concept of a single continental shelf” and that “in accordance with Article 77, paragraphs 1 and 2 of the Convention, the coastal State exercises exclusive sovereign rights over the continental shelf in its entirety without any distinction being made between the shelf within 200 nm and the shelf beyond that limit.” *See* Dispute Concerning Delimitation of the Maritime Boundary between Bangladesh and Myanmar in the Bay of Bengal (Bangl./Myan.), Case No. 16, Judgment of Mar.

that coastal States are claiming additional areas of continental shelf, which conflicts with the well-established view that the continental shelf is inherent to the coastal State.³⁴

B. The United Nations Commission on the Limits of the Continental Shelf

In order to establish the outer limits of its continental shelf in accordance with Article 76, a coastal State is required to make a submission to the CLCS on its proposed continental-shelf limits seawards of the 200 nm limit.³⁵ Such submissions need to fulfill the complex requirements of Article 76 outlined above. Accordingly, coastal States are required to gather information related to the morphology (in order to locate the foot of continental slope) and geological characteristics of its continental margin (in order to define the Gardiner Line) as well as the bathymetric information relating to water depth (with a view to locating the 2500-meter isobaths plus 100 nm cut-off line).³⁶ Additionally, geodetically robust distance measurements are necessary in order to determine, for example, the location of 200 nm EEZ limits and the 350 nm cut-off line.³⁷

The process of gathering the necessary scientific and technical information, analyzing and interpreting this data, and preparing a submission for and presenting it to the CLCS represents a complex, time-consuming, and expensive process. For example, Japan reportedly devoted in excess of \$500 million on preparing its submission.³⁸ Even if the Japanese experience is an extreme example, it is nonetheless indicative of the substantial costs involved in gathering the information for a submission for the CLCS on outer-continental-shelf limits—an especially daunting issue for many developing coastal States. Formulating a submission therefore almost inevitably requires a State to assemble a multidisciplinary team. This was certainly the case for Australia, which adopted a “whole-of-government” approach involving the participation of

14, 2012, 12 ITLOS Rep. 4, ¶ 361, available at http://www.itlos.org/fileadmin/itlos/documents/cases/case_no_16/1-C16_Judgment_14_02_2012.pdf [hereinafter Bay of Bengal Case]; see also Clive Schofield, *New Marine Resource Opportunities, Fresh Challenges*, 35 U. HAW. L. REV. 715, 718 (2013).

34. See LOSC, *supra* note 2, art. 77, para. 3; North Sea Continental Shelf (Fed. Rep. of Ger./Neth.; Fed. Rep. of Ger./Den.), Judgement, 1969 I.C.J. 3, ¶ 19; see also Schofield, *New Marine Resource Opportunities*, *supra* note 33, at 718.

35. See *The Definition of the Continental Shelf and Criteria for the Establishment of its Outer Limits*, COMM’N ON LIMITS OF CONT’L SHELF, http://www.un.org/Depts/los/clcs_new/continental_shelf_description.htm#definition (last visited Dec. 24, 2014).

36. See Clive Schofield & I Made Andi Arsana, *Beyond the Limits?: Outer Continental Shelf Opportunities and Challenges in East and Southeast Asia*, 31 CONTEMP. SE. ASIA 28, 34 (2009).

37. See *id.* at 34.

38. Reportedly over fifty-two billion yen. See Shin Tani, *Continental Shelf Survey of Japan 6*, presented on Oct. 16, 2008 at the Advisory Board on the Law of the Sea Conference on Difficulties in Implementing the Provisions of UNCLOS, Oct. 15–17, 2008, Monaco, <http://www.gmat.unsw.edu.au/ablos/ABLOS08Folder/Session4-Paper4-Tani.pdf>.

multiple government agencies.³⁹ The commitment towards preparing and delivering a submission to the CLCS is also often a long-term process. In Australia's case this team devoted over a decade to the task of preparing, delivering, and defending its submissions.⁴⁰

The CLCS assesses the submissions made to it and makes "recommendations" to the coastal State in question, on the basis of which the coastal State can establish limits that are "final and binding."⁴¹ An important consideration in this context is that the provisions of Article 76 are specifically "without prejudice" to the delimitation of continental shelf between neighbouring States, and thus, the Commission lacks the mandate to consider the relative merits of competing and overlapping submissions.⁴² Instead, the CLCS plays, or was intended to play, a technical role, evaluating whether coastal States through their submissions have fulfilled the requirements of Article 76.

Coastal States making such submissions are not claiming outer-continental-shelf areas as such. As noted above, coastal States' rights over the continental shelf are inherent. Therefore, the submissions made to the CLCS concern the outer limits of the continental shelf beyond the 200 nm limit rather than outer-continental-shelf areas per se. That said, the establishment of those limits based on the Commission's recommendations in effect confirms the rights of a particular coastal State to areas of extended continental shelf.

The Commission's consideration of submissions and the subsequent fixing of final and binding outer-continental-shelf limits takes considerable time. As a

39. The project team was led by Geoscience Australia (scientific/technical issues) but also included significant contributions from the Department of Foreign and Trade (diplomatic) and Attorney General's Department (legal), together with support from the Royal Australian Navy Hydrographic Service (hydrographic charting), and the Department of the Environment, Water, Heritage and the Arts (environmental issues and territorial sea baselines in external territories).

40. Australia became a party to LOSC on October 5, 1994 and the Convention itself came into force on November 16 of the same year (a year subsequent to the submission of its sixtieth ratification). Australia made its submission to the CLCS on November 15, 2004, one day prior to the original deadline. In one sense, therefore, Australia took around a decade to make its submission. However, if the time taken to present and defend that submission is included, this time span is nearer to a decade and a half. See, e.g., Clive Schofield, *Australia's Final Frontiers?: Developments in the Delimitation of Australia's International Maritime Boundaries*, 158 MAR. STUD. 2 (2008). Similarly, New Zealand's submission took around ten years to prepare at a cost of NZ \$44 million. See New Zealand's Continental Shelf and Maritime Boundaries, N.Z. MINISTRY FOREIGN AFFAIRS & TRADE, <http://www.mfat.govt.nz/Treaties-and-International-Law/04-Law-of-the-Sea-and-Fisheries/NZ-Continental-Shelf-and-Maritime-Boundaries.php> (last updated Nov. 23, 2010).

41. See LOSC, *supra* note 2, art. 76, para. 8. Regarding the question of on whom such limits might be "final and binding," see, e.g., Ted L. McDorman, *The Role of the Commission on the Limits of the Continental Shelf: A Technical Body in a Political World*, 17 INT'L J. MAR. & COASTAL L. 301, 313–17 (2002).

42. LOSC, *supra* note 2, art. 76, para. 10; see also *id.*, annex II, arts. 8–9; Comm'n on the Limits of the Cont'l Shelf, *Rules of Procedure of the Commission on the Limits of the Continental Shelf*, r. 46, annex I, para. 5, CLCS/40/Rev.1 (Apr. 17, 2008) [hereinafter CLCS Rules of Procedure].

part of this process, the coastal State has the opportunity to send representatives “to participate in the relevant proceedings without the right to vote.”⁴³ This offers the coastal State an opportunity to interact with the Subcommission tasked with evaluating its proposed outer-continental-shelf limits. Dialogue between the coastal State and Subcommission can take the form of consultations where the Subcommission requires some clarification on aspects of the submission,⁴⁴ or “[a]t an advanced stage during the examination of the submission” when the Subcommission “shall invite the delegation of the coastal State to one or several meetings at which it shall provide a comprehensive presentation of its views and general conclusions arising from the examination of part or all of the submission.”⁴⁵

The practical application of the process by which outer-continental shelf submissions are dealt with by the CLCS has raised a number of issues in respect to the Commission’s interpretation of certain aspects of Article 76. For example, Article 76(6) contains specific, though potentially problematic, provisions concerning how the constraint lines mentioned above are to be applied to submarine ridges and analogous features, which commentators have termed “a masterpiece of ambiguity”⁴⁶ and “manifestly unhelpful.”⁴⁷ The Commission’s Scientific and Technical Guidelines offer little clarification, merely stating: “[T]he issue of ridges will be examined on a case-by-case basis.”⁴⁸

Further, the work and practice of the Commission itself has excited considerable debate, especially with respect to the apparently rigorous nature of its assessment of submissions; issues related to data gathering, baselines and maritime disputes; and the time that is required by the Commission for the consideration of each submission.⁴⁹ Additionally, concerns have been raised over the fact that there is no requirement for submissions to be made public, leading many interested coastal States to keep the detailed contents of their submissions—save for an executive summary—confidential.⁵⁰ This means that

43. LOSC, *supra* note 2, annex II, art. 5; *see also* CLCS Rules of Procedure, *supra* note 42, r. 52.

44. While such clarifications can be submitted in writing, “[i]f the delegation of experts from the coastal State is available at United Nations Headquarters in New York, the written communication should be combined with consultations between the national experts and members of the subcommission at meetings arranged by the Secretariat.” *See id.*, annex III, para. 6.

45. *See id.* annex IV, para. 10(3).

46. VICTOR PRESCOTT & CLIVE SCHOFIELD, *THE MARITIME POLITICAL BOUNDARIES OF THE WORLD* 197 (2d ed. 2005).

47. Ron Macnab, *Submarine Elevations and Ridges: Wild Cards in the Poker Game of UNCLOS Article 76*, 39 OCEAN DEV. & INT’L L. 223, 223 (2008).

48. CLCS Scientific and Technical Guidelines, *supra* note 32, at 55.

49. These debates are beyond the scope of the present paper. For further discussion of these issues, see McDorman, *supra* note 41; Macnab, *Submarine Elevations*, *supra* note 47; Schofield & Arsana, *supra* note 36, at 33–41.

50. On confidentiality requirements, see CLCS Rules of Procedure, *supra* note 42, annex II. *See also* Ron Macnab, *The Case for Transparency in the Delimitation of the Outer Continental Shelf*

coastal States preparing their submissions have found it difficult to build on the experience of those States that have already made their submissions and had them considered by the Commission.⁵¹ Consequently, some have suggested there is a danger that a submitting State may “make the same faulty assumptions concerning ridges and elevations that caused problems for other coastal States,” forcing a costly and time-consuming reevaluation and resubmission as a result.⁵²

II.

DEADLINES AND PROGRESS TOWARDS FIXING LIMITS

According to LOSC, as it was originally drafted, the deadline for the submission of information on the outer limits of the continental shelf was defined as “10 years of the entry into force of this Convention for that State.”⁵³ As the Convention entered into force on November 16, 1994,⁵⁴ the ten-year deadline applicable to coastal States that had ratified the Convention by the date when it entered into force was set as November 16, 2004. However, it became clear as this deadline approached that many interested coastal States would struggle to formulate submissions in time—something perhaps not surprising given the complexity of the terms of Article 76 and the exacting nature of the task of gathering the required information. Further, the Commission itself was only established in 1997, three years after the Convention’s entry into force, and the CLCS did not adopt its Scientific and Technical Guidelines until 1999.⁵⁵ In 2001, concerns over the approaching deadline, coupled with the fact that the Commission’s Guidelines provide official guidance for coastal States on how to delineate the outer limits of their continental shelf, led the State Parties to the Convention to push the deadline back. The ten-year clock was reset to ten years from the date that the Commission’s Guidelines were adopted—which was May 13, 1999—to May 13, 2009.⁵⁶

in Accordance with UNCLOS Article 76, 35 OCEAN DEV. & INT’L L. 1, 11–14 (2004); Macnab, *Submarine Elevations*, *supra* note 47, at 224–225.

51. Schofield & Arsana, *supra* note 36, at 40.

52. Macnab, *Submarine Elevations*, *supra* note 47, at 225.

53. LOSC, *supra* note 2, annex II, art. 4.

54. *See Status of Treaties: United Nations Convention on the Law of the Sea*, UNITED NATIONS TREATY COLLECTION, https://treaties.un.org/pages/ViewDetailsIII.aspx?&src=TREATY&mtmsg_no=XXI-6&chapter=21&Temp=mtmsg3&lang=en (last updated Dec. 24, 2014).

55. *See* CLCS Scientific and Technical Guidelines, *supra* note 32, at 1.

56. *See* Comm’n on the Limits of the Cont’l Shelf, *Decision [of the Eleventh Meeting of States Parties] Regarding the Date of Commencement of the Ten-Year Period for Making Submissions to the Commission on the Limits of the Continental Shelf set out in Article 4 of Annex II to the United Nations Convention on the Law of the Sea*, SPLOS/72 (May 29, 2001), available at <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N01/387/64/PDF/N0138764.pdf?OpenElement> [hereinafter *Eleventh Meeting of States Parties*]; *see also Issues with Respect to Article 4 of Annex II to the Convention*, COMM’N ON LIMITS OF CONT’L SHELF, http://www.un.org/Depts/los/clcs_new/issues_ten_years.htm (last visited Dec. 24, 2014).

As this deadline approached, it once again became clear that many coastal States would struggle to make their submissions in time. In order to address these concerns, rather than once again revising the deadline, a meeting of the State Parties to the Convention in June 2008 opted to relax the terms for meeting the deadline.⁵⁷ As a consequence of this decision, instead of a full submission, States have the alternative option of submitting “preliminary information indicative of the outer limits of the continental shelf beyond 200 nautical miles and a description of the status of preparation and intended date of making a submission.”⁵⁸

The May 2009 deadline induced a notable surge in submissions to the CLCS. From eleven submissions a year prior to the May 2009 deadline, the Commission was faced with fifty-one full submissions and forty-one submissions of preliminary information in the immediate aftermath of the deadline.⁵⁹ These figures have since expanded to over 100 submissions overall (seventy-four full and thirty-one preliminary) involving eighty coastal States.⁶⁰

These submissions collectively encompass an enormous area, in excess of thirty million square kilometers.⁶¹ As coastal States have made their submissions, it has become clear that there are numerous overlapping claims to the same areas of outer continental shelf. These overlaps encompass well over three million square kilometers of potential outer-continental-shelf areas.⁶²

These figures on the areas covered by submissions and the areas subject to overlapping submissions are likely to grow significantly over time.⁶³ For example, the above-mentioned submissions area does not include submission areas for Chile, China, the Comoros, and Vanuatu. This is because the

57. See Eleventh Meeting of State Parties, *supra* note 56; see also *Issues with Respect to Article 4 of Annex II to the Convention*, COMM’N ON THE LIMITS OF THE CONT’L SHELF, http://www.un.org/depts/los/clcs_new/issues_ten_years.htm.

58. Comm. on the Limits of the Cont’l Shelf, Decision [of the Eighteenth Meeting of States Parties] *Regarding the Workload of the Commission on the Limits of the Continental Shelf and the Ability of States, Particularly Developing States, to Fulfil the Requirements of Article 4 of Annex II to the United Nations Convention on the Law of the Sea, as well as the Decision Contained in SPLOS/72, Paragraph (a)*, SPLOS/183 (June 20, 2008), available at <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N08/398/76/PDF/N0839876.pdf?OpenElement> [hereinafter Eighteenth Meeting of States Parties].

59. See Submissions to the CLCS, *supra* note 8.

60. See *id.* As of September 18, 2014, the Commission had received sixty-eight individual State full submissions and six joint full submissions involving sixty States as well as twenty-eight individual State preliminary submissions and three joint preliminary submissions involving twenty States. Schofield & van de Poll, *Exploring the Outer Continental Shelf*, *supra* note 4, at 72.

61. Schofield and van de Poll put the approximate area covered by outer-continental-shelf submissions at the end of 2013 at approximately 29,417,052 square kilometers. Subsequent submissions have taken this figure well beyond thirty million square kilometers. Schofield & van de Poll, *Exploring the Outer Continental Shelf*, *supra* note 4, at 72.

62. In late 2013, Schofield and van de Poll put the approximate area covered by overlapping outer-continental-shelf submissions at approximately 3,227,110 square kilometers. *Id.*

63. *Id.*

submissions of preliminary information for these States are not explicit as to which areas seawards of their 200 nm EEZ limits are subject to submission.⁶⁴ Additionally, a number of coastal States may yet make submissions, meaning that the process is not yet at an end.⁶⁵ Such anticipated further submissions are also highly likely to result in additional overlaps between submissions.

Therefore, as many as eighty-five coastal States may ultimately be in a position to make submissions for outer-continental-shelf rights to the Commission.⁶⁶ Additionally, the substantial number of preliminary submissions that have been made will in due course be replaced by full submissions, clarifying areas of extended continental shelf where there is currently some uncertainty.

At the time of this writing, the Commission had adopted twenty sets of recommendations on submissions over the period from 2002 to 2014.⁶⁷ The Commission has been constrained by the limited number of subcommissions that can be formed to consider each submission and formulate recommendations, although this issue is now being at least partially addressed through revised working practices on the part of the Commission.⁶⁸ Other constraints include practical issues such as the provision of support facilities at UN headquarters in New York, including access to geographical information systems services and related technical support, as well as funding for its members. These factors, coupled with the arguably rigorous examination the Commission conducts of the proposed outer-continental-shelf limits, mean that the rate of consideration of submissions has been around two per annum.⁶⁹ Given the 2009 surge in submissions with many more full submissions to come, it is clear that the Commission has a daunting backlog of work. At the Commission's current rate of progress, several decades are likely to pass before final and binding outer limits to national continental-shelf claims can be fixed for all States that have submitted claims.

III. EXTENDED-CONTINENTAL-SHELF RESOURCES

Coastal States exercise sovereign rights over continental-shelf areas “for the purpose of exploring [them] and exploiting [their] natural resources.”⁷⁰

64. *Id.*

65. *Id.*

66. *Id.*

67. *See* Submissions to the CLCS, *supra* note 8.

68. For example, through adopting flexible working practices regarding the size of subcommissions, the frequency and length of meetings, tasking subcommissions to examine more than one submission at a time and relating to Commission members working remotely from New York. *See* Eighteenth Meeting of States Parties, *supra* note 58.

69. *See* Submissions to the CLCS, *supra* note 8.

70. LOSC, *supra* note 2, art. 77, para. 1.

Although the potential resources of the extended continental shelf are necessarily remote from shore and often overlain by deep water, these extensive areas of seabed and subsoil are of increasing interest from a marine-resource-development perspective. Key emerging seabed-resource opportunities in extended-continental-shelf areas potentially include energy resources (such as oil, gas, and gas hydrates), seabed minerals, and marine genetic resources.⁷¹

With respect to seabed hydrocarbons, extended-continental-shelf areas are likely to be of increasing interest to oil companies. This is the case because global demand for oil remains high, and it is anticipated that demand will continue to rise in the future, in particular driven by the transport and petrochemical sectors.⁷² At the same time, conventional crude-oil production is set to decline.⁷³ Moreover, it has been estimated that forty-five percent, or 1200 billion barrels, of “remaining recoverable conventional oil resources . . . [are] located in offshore fields.”⁷⁴ Similarly, demand for natural gas is expected to rise significantly in the future, with the International Energy Agency predicting a rise of “1.6 percent per year on average” in the 2012–2035 period.⁷⁵ Offshore gas resources are likely to play an increasingly important role in this context with, analogously to oil resources, enhanced exploration in deeper waters and in more hostile environments, potentially including the extended continental shelf. Indeed, industry figures suggest that thirty percent of global oil production and twenty-seven percent of global gas production in 2010 came from offshore sources, such that offshore areas represent “a nonnegotiable imperative for oil companies.”⁷⁶

These factors, coupled with elevated oil prices⁷⁷ and notable advances in drilling technology⁷⁸ allowing for exploration in deeper waters, have excited

71. Schofield, *New Marine Resource Opportunities*, *supra* note 33, at 715.

72. See INT’L ENERGY AGENCY, *WORLD ENERGY OUTLOOK 2013* 501 (2013).

73. The International Energy Agency notes that once past their initial production peak, conventional oil fields show decline in production rates of “6% per year.” *Id.* at 457.

74. INT’L ENERGY AGENCY, *REDRAWING THE ENERGY-CLIMATE MAP: WORLD ENERGY OUTLOOK SPECIAL REPORT 2013* 93 (2013). This estimate excludes “light tight oil.” Light tight oil has been defined as “oil produced from shales or other very low permeability formations, using multi-stage hydraulic fracturing in horizontal wells.” See *WORLD ENERGY OUTLOOK 2013*, *supra* note 72, at 424.

75. This estimate is consistent with the International Energy Agency’s New Policies Scenario, which countenances a “continuation of existing policies and measures as well as cautious implementation of policies that have been announced by governments but are yet to be given effect.” *REDRAWING THE ENERGY-CLIMATE MAP*, *supra* note 74, at 33, 36, 99.

76. Sylvain Serbutoviez, *Panorama 2012: Offshore Hydrocarbons*, IFP ENERGIES NOUVELLES 1 (2012), available at http://www.ifpenergiesnouvelles.com/content/download/71825/1530746/version/6/file/Panorama2012_09-VA+-+HydrocarbureOffshore.pdf.

77. For example, the average price of Brent crude oil, one of the major classifications of crude oil in use internationally, over the five-year period 2008–2012 was \$92.27, as compared with \$51.83 for the previous five-year period. See *BP Statistical Review of World Energy June 2013*, BP PLC 15 (2013), available at http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf.

increasing interest in hydrocarbons exploration in extended-continental-shelf areas.⁷⁹ Accordingly, although inevitably remote from shore, it has been suggested that extended-continental-shelf areas are likely to offer the “‘next frontier’ for the oil and gas industry over the next 25 years.”⁸⁰

It remains to be seen, however, to what extent the drivers for deep-water hydrocarbon exploration and development are offset by recent developments with respect to the exploitation of unconventional sources of oil and gas, such as terrestrial shale gas and oil. In the offshore context, gas hydrates offer an especially attractive potential resource opportunity for the future, including in areas of extended continental shelf. “Gas hydrates” have been defined as “naturally occurring ice-like solids (clathrates) in which water molecules trap gas molecules.”⁸¹ In effect, lattices or cages of frozen water molecules trap gas molecules, predominantly methane but potentially also ethane and carbon dioxide.⁸² The International Energy Agency has observed that although estimates regarding methane hydrate deposits “vary by several orders of magnitude,” they are uniformly “extremely large.”⁸³

According to the United States Geological Survey, it has been estimated that “most of the global gas hydrate occurs in the uppermost hundreds of meters of sediments at ocean water depths greater than ~500 [meters] and close to continental margins”—locations and water depths consistent with areas of extended continental shelf.⁸⁴ While formidable technical barriers to the commercial development of offshore gas hydrate deposits exist, leading them to be generally considered the “most difficult and expensive of all unconventional gas resources to recover,”⁸⁵ the potential for the development of gas-hydrate resources has excited increasing interest in recent years. This has led to efforts to overcome the technical obstacles involved. For example, in May 2012 a

78. See Paul L. Kelly, *Deepwater Oil Resources: The Expanding Frontier*, in *LEGAL AND SCIENTIFIC ASPECTS OF CONTINENTAL SHELF LIMITS* 413, 414–16 (Myron H. Nordquist et al. eds., 2004).

79. See *Worldwide Progression of Water Depth Capabilities for Offshore Drilling and Production*, in 2 *DEEP SEA MINERALS: DEEP SEA MINERALS AND THE GREEN ECONOMY* 35 (Elaine Baker & Yannick Beaudoin eds. 2013), available at http://www.grida.no/graphicslib/detail/worldwide-progression-of-water-depth-capabilities-for-offshore-drilling-and-production_a460.

80. Robert van de Poll & Clive Schofield, *Exploring to the Outer Limits: Securing the Resources of the Extended Continental Shelf in the Asia-Pacific* 71 (Oct. 3–5, 2012) (unpublished manuscript) (on file with author).

81. AUSTL. GOV'T, *AUSTRALIAN GAS RESOURCE ASSESSMENT 2012* 5 (2012), available at http://www.ga.gov.au/webtemp/image_cache/GA21116.pdf; see also *Gas Hydrates Primer*, U.S. GEOLOGICAL SURVEY, <http://woodshole.er.usgs.gov/project-pages/hydrates/> (last updated Aug. 20, 2014); Nick Owen & Clive Schofield, *Disputed South China Sea Hydrocarbons*, in *Perspective*, 36 *MARINE POL'Y* 809, 813 (2011).

82. See *Gas Hydrates Primer*, *supra* note 81.

83. See *WORLD ENERGY OUTLOOK 2013*, *supra* note 72, at 119.

84. *Gas Hydrates Primer*, *supra* note 81.

85. Owen & Schofield, *supra* note 81, at 813.

successful field test of gas-hydrate production was made from a test well on the North Slope of Alaska.⁸⁶ Moreover, in March 2013, methane was successfully extracted from hydrates in sediments located in the Nankai Trough east of Japan in what was billed as “the world’s first hydrate production test in deep water.”⁸⁷ While efforts to extract methane from submarine gas-hydrate deposits remain in their infancy, there exists considerable potential for the development of such resources in the future, including from extended-continental-shelf areas.

Analogous to developments in the oil and gas industry, high mineral prices, coupled with progress in exploration and extraction technologies, suggest that the commercially viable extraction of mineral resources from seabed areas, including from areas of extended continental shelf, may now be in view. Such potential seabed-resource opportunities include those offered by polymetallic or manganese nodules, seafloor massive sulphide deposits, ferromanganese nodules and crusts, cobalt-rich crusts, and marine phosphates.⁸⁸ These deposits also have the potential to contain rare-earth elements, something that is likely to enhance their attractiveness as targets for seabed-resource development.⁸⁹

States such as the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, and Palau have expressed interest in seabed mining, including on areas of outer continental shelf,⁹⁰ with some suggesting that “tens of billions” of dollars could be at stake.⁹¹ For all the excitement associated with potential seabed-mining opportunities, whether on the extended continental shelf or otherwise, it should be borne in mind that commercial exploitation of such resources has yet to occur. Indeed, the most advanced project of this type is the *Solwara 1* project concerning the exploitation of high-grade seafloor massive sulphide deposits in the Bismarck Sea off Papua New Guinea,⁹² where the

86. See *Successful Test of Gas Hydrate Production Test Well Ignik Sikumi on Alaska’s North Slope*, U.S. GEOLOGICAL SURVEY (May 24, 2012), <http://energy.usgs.gov/GeneralInfo/EnergyNewsroomAll/TabId/770/ArtMID/3941/ArticleID/812/Successful-Test-of-Gas-Hydrate-Production-Test-Well-Ignik-Sikumi-on-Alaskas-North-Slope.aspx>; *U.S. and Japan Complete Successful Field Trial of Methane Hydrate Production Technologies*, U.S. DEP’T OF ENERGY (May 2, 2012), <http://energy.gov/articles/us-and-japan-complete-successful-field-trial-methane-hydrate-production-technologies>.

87. Henry Fountain, *Unlocking the Potential of “Flammable Ice,”* N.Y. TIMES, Sept. 16, 2013, at D2, available at http://www.nytimes.com/2013/09/17/science/earth/unlocking-the-potential-of-flammable-ice.html?pagewanted=2&_r=1&ref=science&pagewanted=all.

88. See Clive Schofield & Robert van de Poll, *Exploring the Outer Continental Shelf*, *supra* note 4, at 77.

89. See, e.g., Jim Hein, *Briefing Paper 02/12*, INT’L SEABED AUTH. (2012), available at <http://www.isa.org.jm/files/documents/EN/Pubs/BP2.pdf>.

90. Schofield, *New Marine Resource Opportunities*, *supra* note 33, at 726–29.

91. *Id.* at 728; see also Rupert Neate, *Seabed Mining Could Earn Cook Islands Tens of Billions of Dollars*, THE GUARDIAN (Aug. 6, 2013), <http://www.theguardian.com/business/2013/aug/05/seabed-mining-cook-islands-billions>.

92. See *Responsible Environmentally*, NAUTILUS CARES, <http://www.cares.nautilusminerals.com/SubSeaEnvironment.aspx?npath=1,6> (last visited Dec. 24, 2014).

government granted the world's first deep-sea mining lease in January 2011.⁹³ However, the project has run into serious difficulties as a consequence of commercial disputes over funding the development and concerns over the social and particularly acute environmental impacts.⁹⁴ Nonetheless, seabed mining developments in areas of extended continental shelf can be anticipated in the future, especially as outer-continental-shelf limits are progressively confirmed and finalized.

In addition to mineral and other nonliving resources contained in the seabed and subsoil of the outer continental shelf, coastal States also have sovereign rights over "living organisms belonging to sedentary species," defined as "organisms which, at the harvestable stage, either are immobile on or under the seabed or are unable to move except in constant physical contact with the seabed or the subsoil."⁹⁵ The continental shelf, including extended-continental-shelf areas, therefore offers resource potential in living resources, possibly encompassing valuable marine genetic resources.

Marine biota (plants and animals) represent a relatively untapped resource offering developmental potential for a range of valuable applications. In the context of marine genetic resources and biotechnology, marine species and microorganisms that have evolved to exist in extreme environments, so-called extremophiles, are of particular interest.⁹⁶ Organisms living in these environments have adapted to survive in the complete absence of light, in conditions of extremely high pressure, in either low or very high temperatures (such as in the vicinity of a hot water vent), and in extremely saline or acidic waters.⁹⁷ While this suggests enormous potential, there are significant challenges, obstacles, and limitations, which serve to limit the realization of this potential of marine genetic resources, including that of the extended continental shelf. In particular, securing adequate supplies of marine natural products or, alternatively, cultivating or synthesizing such marine-derived biotechnology products at a reasonable cost, has proved to be highly problematic.⁹⁸ Furthermore, it has been suggested that "technological revolutions" in the fields

93. The lease was granted to Nautilus Minerals Inc. Mohammad Bashir, *PNG Grants First Deep Sea Mining Lease In "Risky New Frontier,"* PACIFIC SCOOP (Jan. 19, 2011), <http://pacific.scoop.co.nz/2011/01/png-grants-first-deep-sea-mining-lease-in-risky-new-frontier>.

94. See Catherine Wilson, *Environmental Uncertainties Halt PNG Deep Sea Mining*, THE JAKARTA GLOBE (Dec. 21, 2012), <http://www.thejakartaglobe.com/international/environmental-uncertainties-halt-png-deep-sea-mining/562974>.

95. LOSC, *supra* note 2, art. 77, para. 4.

96. Danielle Skropeta, *Exploring Marine Resources for New Pharmaceutical Applications*, in MARINE RESOURCES MANAGEMENT 211–24 (Warwick Gullett et al. eds., 2011).

97. *Id.* at 222.

98. See *id.* at 217–19; see also Schofield, *New Marine Resource Opportunities*, *supra* note 33, at 731.

of biology and biotechnology “could eventually result in the biotechnology of the future being less and less dependent on biodiversity.”⁹⁹

For all of the considerable obstacles to their development, it seems clear that there are multiple marine resource opportunities associated with extended-continental-shelf areas and that coastal States engaged in finalizing their outer-continental-shelf limits are exhibiting increasing interest in how such resources may be located, developed, and managed in the future.

IV.

SECURING THE RESOURCES OF THE EXTENDED CONTINENTAL SHELF: PROSPECTS AND CHALLENGES

While extended-continental-shelf areas offer considerable potential marine resource opportunities, accessing the resources of the extended continental shelf is dependent on determining the spatial extent of coastal-State sovereign rights. While some progress has been made in the finalization of outer-continental-shelf limits, much remains to be done. Despite its diligent work, the CLCS faces a daunting backlog of submissions to address—something which will inevitably lead to significant delays in the finalisation of outer-continental-shelf limits. Further, as noted above, overlapping outer-continental-shelf claims encompass seabed areas in excess of three million square kilometers.¹⁰⁰ These overlaps give rise to multiple “new” outer-continental-shelf boundaries and possibly a proliferation in outer-continental-shelf boundary disputes. The resolution of these disputes through the delimitation of outer-continental-shelf boundaries remains a key challenge for the coastal States involved, as this task is beyond the purview of the Commission.¹⁰¹ Overlapping jurisdictional claims will likely compromise the realization of marine resource opportunities and the benefits potentially arising from rights over outer-continental-shelf areas. This is because the existence of overlapping claims deprives commercial entities, such as international oil and gas companies, of the fiscal and legal certainty they require in order to invest the billions of dollars necessary to undertake offshore exploration, let alone development.

Although the delimitation of outer-continental-shelf boundaries, and thus the resolution of overlapping claims to outer-continental-shelf areas, is limited, it appears that the approaches to delimitation within and beyond 200 nm limits will be similar. This is supported by past State practice, where it has been

99. David Leary & S. Kim Juniper, *Addressing the Marine Genetic Resource Issue: Is the Debate Heading in the Wrong Direction?*, in *THE LIMITS OF MARITIME JURISDICTION* 732, 769–85 (Clive Schofield et al. eds., 2014); see also Schofield, *New Marine Resource Opportunities*, *supra* note 33, at 780.

100. Van de Poll & Schofield, *Exploring to the Outer Limits*, *supra* note 80, at 3.

101. As noted above, in keeping with LOSC Article 76(10), the Commission’s recommendations are specifically without prejudice to the delimitation of continental-shelf boundaries.

concluded that geophysical factors have had no more than “a limited role.”¹⁰² Additionally, in the *Bay of Bengal Case* between Bangladesh and Myanmar before the International Tribunal on the Law of the Sea,¹⁰³ Bangladesh argued unsuccessfully that geophysical factors constituted relevant circumstances that should influence the course of the maritime delimitation line both within and beyond the 200 nm limit.¹⁰⁴ Instead, the Tribunal deemed that coastal geography was the dominant consideration to delimit both the EEZ and extended-continental-shelf boundaries.¹⁰⁵ Analogously, in the case between Bangladesh and India, coastal-geography factors were crucial to the delimitation of the maritime boundary between the two States.¹⁰⁶ The outcome of these cases suggests that outer-continental-shelf delimitation will proceed on substantially the same basis as delimitations within the 200 nm inner-continental-shelf/EEZ limit.

Similarly, significant ocean-governance challenges arise with respect to outer-continental-shelf areas, even where no overlapping claims exist. Although much of the debate relating to the outer continental shelf has been concerned with the process by which States can secure their rights over continental-shelf areas located seaward of their 200 nm limits, this is only the beginning. Once extended-continental-shelf areas are secured, considerable management and ocean-governance responsibilities and challenges with respect to these remote, subsurface seabed areas under national jurisdiction are likely to arise.¹⁰⁷ Coastal States are, however, in a position to draw inspiration from the rapidly increasing experience of the International Seabed Authority.¹⁰⁸ In particular, the International Seabed Authority has progressively developed a Mining Code for activities in the Area. Regional approaches may prove advantageous, as illustrated by the recent drafting of a regional legislative and regulatory framework for deep-sea minerals exploration and exploitation for the African

102. Brian J. Van Pay, *Disputed Areas Beyond 200 Nautical Miles: How Many and Will Geophysical Characteristics Matter in their Resolution?*, in *MARITIME BORDER DIPLOMACY* 47–67 (Myron Nordquist & John Norton Moore eds., 2012).

103. *Bay of Bengal Case*, *supra* note 33.

104. *Id.* at ¶¶ 322, 415–17, 435, 449, 460; *see also* Clive Schofield, Anastasia Telesetsky & Seokwoo Lee, *A Tribunal Navigating Complex Waters Implications of the Bay of Bengal Case*, 44 *OCEAN DEV. & INT’L L.* 363, 373–75 (2013).

105. *Bay of Bengal Case*, *supra* note 33, ¶ 322.

106. *Bay of Bengal Mar. Boundary Arbitration (Bangl. v. India)*, ¶¶ 465–75 (Perm. Ct. Arb. 2014), http://www.pca-cpa.org/showfile.asp?fil_id=2705.

107. Joanna Mossop, *Protecting Marine Biodiversity on the Continental Shelf beyond 200 Nautical Miles*, 38 *OCEAN DEV. & INT’L L.* 284 (2007).

108. The ISA is an “autonomous international organization established under” LOSC. *See About Us*, INT’L SEABED AUTH., www.isa.org.jm/en/about (last visited Dec. 24, 2014). It is defined as “the organization through which States Parties shall . . . organize and control activities in the Area, particularly with a view to administering the resources of the Area.” LOSC, *supra* note 2, art. 157, para. 1.

Caribbean Pacific States.¹⁰⁹ These developments offer some positive prospects for the future, though daunting surveillance, regulation, and enforcement challenges remain with respect to securing the resources of extended-continental-shelf areas.

CONCLUSIONS

The United Nations Convention on the Law of the Sea codified and clarified the criteria whereby the outer limits of the continental shelf seaward of 200 nm from baselines along the coast may be established. Over half of the world's coastal States have delineated, or are in the process of delineating, their outer-continental-shelf limits. The existence of a deadline applicable to many coastal States to deliver submissions to the scientific and technical body tasked with considering and making recommendations on proposed outer-continental-shelf limits, the CLCS, resulted in a surge in such submissions in early 2009. Consequently, at present rates of progress, it will take considerable time, perhaps decades, for the Commission to address this backlog. This is despite the dedicated work of the Commissioners themselves as well as recent efforts to alter the working practices of the CLCS so as to speed up the process.

Although the establishment of outer-continental-shelf limits is a complex, expensive, and time-consuming one, the potential benefits of doing so may be significant, at least in terms of "extending" the maritime jurisdiction of coastal States spatially. Already established and presently proposed outer-continental-shelf limits encompass vast areas of extended continental shelf. Proposed extended-continental-shelf limits have, however, resulted in substantial seabed areas beyond 200 nm limits subject to more than one submission, giving rise to multiple "new" extended-continental-shelf boundaries to delimit and, perhaps inevitably, outer-continental-shelf disputes to resolve.

The broad areas of seabed and subsoil within established and proposed outer-continental-shelf limits afford coastal States rights over the resources contained thereon or therein. Such valuable marine resources potentially include seabed energy resources and seabed mineral opportunities as well as marine living and genetic resources. While these resources may well be realized in time, challenges are associated with each of these potential resource opportunities and a sense of perspective is advisable.

109. SECRETARIAT OF THE PAC. CMTY, PACIFIC-ACP STATES REGIONAL LEGISLATIVE AND REGULATORY FRAMEWORK FOR DEEP SEA MINERALS EXPLORATION AND EXPLOITATION (2012), available at <http://www.smenet.org/docs/public/FinalDeepSeaMineralsProjectReport.pdf>.