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ACHIEVING ENVIRONMENTAL SUSTAINABILITY IN THE FACE OF CLIMATE CHANGE: A JOINT CROSS-BORDER CONFERENCE ON SUSTAINABILITY

L. Kinvin Wroth*

Sustainability—the principle that development must meet the economic and social needs of present populations without compromising the environmental quality upon which the ability of future populations to meet their own needs depends¹—is a key component of environmental policy, law, and planning in Canada and the United States. It is a principle that the two nations recognize both as a matter of domestic necessity and as an obligation under international law. In particular, sustainability is a transnational issue for Canada and the U.S., given their shared geographic, economic, and cultural interests and history.²

On June 11, 2011, Vermont Law School (VLS) joined with the McGill University Faculty of Law, and other McGill academic units, to present a conference in Montreal that brought together legal, environmental policy, and urban planning scholars and professionals to provide insights leading to approaches of general applicability on these specific and immediate sustainability issues:

- Sustainability and Land Use, including the use of market and regulatory approaches to address such matters as urban sprawl, development in rural areas, and the use of resources in a sustainable manner.

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¹ For the classic definition, see U.N. General Assembly, Report of the World Commission on Environment and Development: Our Common Future (Brundtland Report), available at www.un-documents.net/ocf-02.htm (“[s]ustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”).

Sustainability and Trans-Border Environmental Policy, Planning, and Regulation, including sustainable approaches to air pollution, regulation of onshore and offshore energy production, protection of transnational water bodies, such as the Great Lakes, Lake Champlain, and the Arctic Ocean, and other common environmental concerns.

Sustainability and International Law, including issues concerning the International Joint Commission created by the Boundary Waters Treaty of 1909, and numerous other bi-national and international agreements that affect sustainability in the U.S. and Canada.

Sustainability, Sovereignty, and Human Rights, including comparative constitutional analyses of sustainability-related rights, such as the right to scarce natural resources (e.g., water) and the inherent rights of native peoples.

These issues are both broad and open-ended, and their enumeration was not intended to preclude consideration of other issues. The purpose of the conference was to encourage participation by a diversity of scholars and others with the widest possible range of interests that could be brought under the umbrella of sustainability.

This purpose is consistent with the goals of the longstanding relationship between VLS and the McGill Faculty of Law that the Sustainability Conference furthered. Following a successful series of conferences and exchanges begun in the 1990s and partially funded by Canadian Studies Program Enhancement and Conference grants awarded by the Government of Canada through the Canadian Embassy in Washington, the two faculties formally established the “Vermont-McGill Initiative on Cross-Border Sustainability” in August 2006. The Initiative was intended to establish a serious long-term relationship between the two institutions that would take advantage of Vermont’s leadership in environmental law and McGill’s leadership in international and comparative law and sustainable

development. With further Canadian Studies Program Enhancement Grant support for VLS, the two faculties jointly planned and conducted a “Workshop on Water” at VLS in October 2009. Seven faculty members from each institution participated as presenters or discussants, and eight resulting papers were published in the Vermont Law Review.

The Sustainability Conference, funded by a generous Canadian Conference Grant awarded to VLS in 2010, built on the success of the Workshop on Water and broadened its scope by including colleagues from other McGill faculties and other Canadian institutions. The broad rubric of sustainability was intended to encourage scholars—particularly junior scholars—to bring their own current research interests to bear on aspects of this critical topic. The interchange among colleagues from both sides of the border afforded by the conference creates opportunities for continuing long-term relationships among individuals that will bear fruit in future joint research and teaching projects, not only in law, but also in the related disciplines of planning and environmental studies, to the benefit of both VLS and McGill University.

The Conference, coordinated by Assistant Professor Hoi Kong of the McGill Faculty of Law and the present author, consisted of presentations by 14 faculty members and four students from VLS; the McGill Faculty of Law, School of Environment, and School of Urban Planning; the Schulich School of Law, Dalhousie University; and the University of Montréal Faculty of Law. The presentations were grouped in five sessions: Ecology and Policy, Domestic Law, Comparative Coastal Zone Management, Bi-National Management and Comparative Law, and International Law. Six of the presentations resulted in papers published here that address the concept of sustainability in various contexts; others have been accepted or are being considered for publication elsewhere.

4. For documentation of the development of the Joint Initiative on Cross-border Sustainability, see http://www.vermontlaw.edu/Documents/Land%20Use%20Institute/lui-mcgill-scharf-1-1-011109-k021010.pdf, last visited 2/28/12.
Three papers consider the actual or potential impact of various régimes of coastal zone management and marine spatial planning on sustainability in a coastal environment. The joint paper of Aldo Chircop, Director of the Marine and Environmental Law Institute and Professor of Law, Schulich School of Law, Dalhousie University, and student researcher Ryan O’Leary is a comparative study of the interplay of integrated coastal and ocean management and integrated coastal zone management in Canada and the European Union.\(^8\) The authors note initially that, despite the greater institutional complexity of the E.U., both polities share many common attributes, including a commitment to sustainable development. The Canadian federal legislative framework, through a system of integrated coastal and ocean management, provides a regime of marine spatial planning with guidelines for the provinces to address coastal zone management issues. Although the E.U. has labeled its initiatives as integrated coastal zone management, its most recent initiatives have emphasized the development of general marine spatial planning guidelines. Structural and funding issues mean that both polities have a long way to go in bridging the gap between marine spatial planning and coastal zone management, but each can learn from the other’s experience. Both can also learn from the U.S. Coastal Zone Management Act, under which general guidelines supported by the incentives of funding and the federal consistency requirement have led to locally appropriate coastal zone plans in virtually all coastal states.

Richard Brooks, Professor Emeritus at VLS, considers the relationship between ecosystem management and sustainability in the application of the federal Coastal Zone Management Act and Connecticut’s Coastal Management Act, adopted pursuant to the federal act, to Long Island Sound.\(^9\) After describing his personal relationship to the Sound and its ecological and cultural attributes, Brooks characterizes the federal act as founded on ecosystem management principles but striking a balance with the needs of the human environment, while the Connecticut act initially, though deferring to the existing local land use régime, essentially embodied ecosystem management principles. Despite some successes, the net effect of the legislative and regulatory web that came to surround the federal and


state acts was to fracture their integrity by causing key coastal issues to be determined through other avenues. Most important, the basic scientific data, assessment, and monitoring that is a key component of ecosystem management was inadequate to sustain the original purpose of the legislation, given the difficulty of accounting for variables resulting from ever-changing human activity on and around the Sound. Brooks concludes that the future health of the Sound must be determined in sustainability terms that balance current and future human needs with those of the natural environment.

The present author’s paper focuses on current environmental problems in Lake Champlain and suggests that the extension to the Lake of the federal Coastal Zone Management Act and the Coastal Marine Spatial Planning initiative, proposed by a recent federal executive order, could provide a new and effective mechanism for addressing those problems. The Lake and its basin fall within the jurisdiction of six entities—the United States, Canada, New York, Vermont, Québec, and the International Joint Commission. Though there is no formal environmental regulatory and planning structure in place for the Lake in either Canada or the U.S., agencies of all six régimes have engaged in cooperative management under the Lake Champlain Basin Program established under the Clean Water Act. Recent litigation, however, has shown the fragility of such arrangements. The paper, looking to analogous possibilities in the Great Lakes region, proposes that the Coastal Zone Management Act and the Coastal Marine Spatial Planning initiative be made applicable to Lake Champlain. The resulting framework, extended to involve the participation of Canada, Québec, and the International Joint Commission, could serve as a well-structured and enforceable mechanism that would oversee the development of a coordinated bi-national régime of sustainability for the human ecosystem of the Lake Champlain Basin.

Two papers address the role of indigenous peoples and practices in the development of sustainability principles in international law. Dr. Konstantia Koutouki of the University of Montréal Faculty of Law illustrates the increasing importance of international sustainable development law by describing the development and adoption of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization, in 2010, to put teeth into the Access and Benefits Sharing (ABS) provisions of the Convention on Biological

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Diversity (CBD) of 1992. Koutouki focuses on the role of indigenous peoples in continuing to press for international protection of their biodiverse genetic resources, which are threatened by their increasing economic value and use in the health food and pharmaceutical industries. She details the provisions of the Protocol that address the weakness of the CBD and ABS, including the slow development and non-binding nature of detailed guidelines for implementation. In conclusion, Koutouki notes failures of the Protocol, such as the continued dominance of the interests of states, its failure to impose direct obligations on them, and the lack of recognition and protection of intellectual property in the traditional knowledge of the indigenous peoples. She calls for interpretation of the Protocol that will recognize protection of genetic resources and traditional knowledge as the essence of the idea of sustainability.

In a similar vein, Samantha Fow, a 2012 graduate of VLS, describes the development of the Arctic Council, an integrated governance mechanism for the Arctic environment in which the indigenous tribes of the region are active partners with the eight nations that claim sovereignty of portions of the Arctic. She sketches the practices of an historic indigenous subsistence culture at one with the ecosystem, and describes the impact on that culture and the environment of economically driven European exploitation beginning in the 19th century. That development first despoiled the resources and degraded the environment and then, through activities both within and outside the region, brought significant air and water pollution and major effects of global warming upon the Arctic ice and the human and animal life dependent on it. Recognition of these impacts by the European nations, particularly Finland and Canada, led to the establishment of the Council in 1996 and the emergence of the Arctic Sustainability Principle from its continuing deliberations over environmental issues of common concern. Application of the Principle results in significant deference to indigenous practices in decisions concerning the development of the natural resources of the Arctic in an environmentally sustainable way.

In his paper, Professor Kong applies the concepts of instrument choice, as developed in administrative law, to the use of non-Euclidean land use regulation to achieve sustainability. His purpose is to serve the purpose of achieving sustainability in land-use decision-making by shifting the focus

of land use discourse from a property rights to an instrument analysis. Identifying recognition of a range of interests, flexibility in development of regulatory approaches, and the necessity of public participation as essential to legitimacy, Kong demonstrates their role in evolving ideas of non-Euclidean land use regulation aimed at halting sprawl and promoting sustainable development by adapting devices such as floating and overlay zones to implement the ideas of the New Urbanists and other smart-growth advocates. Offering Dockside Green in Victoria, B.C., as a case study, he argues that the use of instrument choice principles in producing a comprehensive development zone and master development agreement avoided the obstacles that an unrestricted contract zoning approach would present to sustainable development. In conclusion, he suggests that use of additional regulatory approaches would have addressed issues raised in Dockside Green concerning adequate attention to the public interest in providing affordable housing, treating individual landowners fairly, and addressing regional sustainability concerns.

It is the hope of the sponsors of the VLS-McGill Conference on Sustainability that publication of these papers will achieve the goal of the conference by providing insights and guidance to Canadian and U.S. policy-makers, planners, and regulators concerned with devising new and coordinated ways of addressing critical issues of trans-border sustainability. Policy and the practicalities of its implementation are central to the academic disciplines of law, planning, and environmental studies that this conference brought together. These papers suggest that partnerships forged by the conference can serve as a vital resource in policy development and implementation as the federal governments of Canada and the U.S. and the provincial and state governments that share our common border work together for a sustainable future.
INTRODUCTION

As an approach and paradigm for the management of the land-sea interface, integrated coastal zone management (ICZM) is firmly rooted in many States around the world. Rooted to a lesser extent in the practice of States, integrated coastal and ocean management (ICOM) has wider geographical connotations, placing greater emphasis on the ocean side of the land-sea interface and less emphasis on terrestrial issues. In practice,
the two approaches overlap substantially and are functionally more extensions of the same process of integration than alternatives. Although there is no dedicated global legal instrument in international law for ICZM or ICOM, there are several instruments which can serve as framework or provide useful tools. In at least one region, States adopted a dedicated ICZM legal instrument to facilitate cooperation at that level. However, most efforts at ICZM and the development of appropriate governance frameworks occur at the national and sub-national levels.

The legal framework for governance in ICZM and ICOM has been identified as an important element in the management of coastal and ocean space. The development of such a framework at the national level poses special challenges to federal States because there is an expectation that it be guided by an integrated approach. In this article, and for comparative law purposes, federal States are described as “complex jurisdictions” because their pursuit of an integrated approach has to contend with a wide range of factors including: political system and history; constitutional framework and division of powers among various levels of government; aboriginal peoples’ entitlements; diverse geography that frequently includes more than one ocean and/or sea; uneven state of socio-economic development among sub-national units; eco-regional diversity; and multi-level judicatures. The challenge for such States is the development of a legal framework sufficiently broad to encompass all key issues without being too thin as to lack effectiveness.


4. See Protocol on Integrated Coastal Zone Management in the Mediterranean, Jan. 21, 2008, 2009 O.J. (L 34/19) (an agreement by Mediterranean States meant to facilitate integrated coastal zone management in the region to which the European Union (E.U.) is a party).

5. See generally S. Boelaert–Suominen & C. Cullinan, Food and Agric. Org., FAO 93, Legal and Institutional Aspects for Integrated Coastal Area Management in National Legislation, iii (2006) (describing the increased role of integrated coastal management in addressing coastal issues); a Cicin-Sain & Knecht, supra note 2 (stating that legal considerations are a key dimension of an integrated coastal management program); John Gibson, Integrated Coastal Zone Management Law in the European Union, 31 Coastal Mgmt. 127 (2003) (U.K.) (arguing that law has a significant impact on the implementation and success of integrated coastal zone management); Cormac Cullinan, Integrated Coastal Management Law: Establishing and Strengthening National Legal Frameworks for Integrated Coastal Management 3, 6–10 (2006) (stating that “law is one of the primary mechanisms used by government to ensure that their policies and programmes are implemented,” including integrated coastal management).
The United States, which is the quintessential federal State and initiator of coastal management, has long had a federal legal framework with a functional relationship with its component states. This relationship has enabled the pursuit of ICZM in several states over a period of decades. Other confederations have not been as successful. This article undertakes a comparative study of Canada and the European Union (E.U.) to explore the factors that have constrained the development of a legal framework at the “federal level” while identifying actual or potential facilitating factors. Although the E.U. is a supranational organization rather than a confederation stricto sensu, its “constitutional framework”—now consolidated in the Treaty of Lisbon, amending the Treaty on European Union and the Treaty establishing the European Community of 2007 (Lisbon Treaty)—is analogous to that of a federal State. For political and legal reasons, both jurisdictions have developed policy and/or legal frameworks for ICOM, rather than ICZM, leaving the focus on the land-sea interface to the respective provincial and Member State levels. A study of Canada and the E.U. is also appropriate because both jurisdictions claim to exercise international leadership in this field. Both jurisdictions share similar social missions. Canada as a “confederation” and the E.U. share common values and approaches to promoting and maintaining their respective social unions and pursuing vigorous environmental policies.

The purpose of this article is to identify, analyze, and reflect upon the opportunities and limitations of federally-led ICOM and consider consequences for ICZM in Canada and the E.U. The article uses a contextual and comparative approach. Comparisons are also drawn with other federal States on particular issues. The exercise is guided by several questions, including the following. Given constitutional or treaty limitations, how are the Canadian federal government and the European Commission leading ICOM in their respective jurisdictions? What is the relationship between the broader ICOM approach and ICZM? What policy and legislative approaches are they using and how effective are they? How can differences be explained? What might the Canadian federal government and the European Commission take from each other in pursuing ICOM and ICZM?

I. CONTEXTS IN COMPARISON

A significant factor in the comparison is how diversity of coastal and marine geography impose a major challenge to developing a federal (in the case of Canada) and supranational (in the case of the E.U.) policy and legal framework. Both jurisdictions have coastal frontages on very diverse marine environments.

Canada has coasts on three oceans (Arctic, Atlantic, and Pacific) and borders on the Great Lakes. There are three territories (rather than provinces) in the Arctic. The Northwest Territories, Nunavut, and Yukon are significantly less populated, have substantial concentrations of aboriginal peoples, and are significantly less developed than their provincial counterparts to the south.7 The Canadian Arctic has one of the world’s largest coastal archipelagos and is generally considered a very sensitive marine environment that is undergoing significant impacts from global warming and climate change.8 The provinces bordering on the Laurentian Gulf and the Atlantic (Newfoundland and Labrador, New Brunswick, Nova Scotia, Prince Edward Island, Québec) include some of the least economically developed in the confederation.9 Ontario is the only province with shores on the Great Lakes—specifically, Lakes Erie, Huron, Ontario, and Superior.10 Manitoba, Ontario, Québec, and the Territory of Nunavut front the Hudson Bay, much of which is in sub-arctic waters, south of the Arctic Circle.11 British Columbia is the only province with frontage in the Pacific. Canada shares a delimited boundary with the U.S. in the Great Lakes; partially delimited maritime boundaries with the U.S. in the Gulf of Maine, and France at St. Pierre et Miquelon in the Atlantic; a partial maritime boundary in the Pacific; and a continental shelf boundary with

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11. Canada defines “Arctic waters” as the “internal waters of Canada and the waters of the territorial sea of Canada and the exclusive economic zone of Canada, within the area enclosed by the 60th parallel of north latitude, the 141st meridian of west longitude and the outer limit of the exclusive economic zone.” Arctic Waters Pollution Prevention Act, R.S.C. 1985, c. A-12, s. 2 (Can.). The effect is to capture as much as a third of the Hudson Bay within the definition of Arctic waters. Id.
Denmark in the Arctic. 12 Canada has yet to establish complete maritime boundaries with the U.S. in the Atlantic and Pacific, as well as establish a maritime boundary in the Arctic with the U.S. Canada is also likely to delimit maritime boundaries with other Arctic States after it defines the outer limits of the continental shelf in accordance with the criteria set out in the United Nations Convention on the Law of the Sea (1982) and related procedures. Canada has only two outstanding territorial sovereignty disputes, both of which are minor. 13

Through its Member States, the E.U. has coastal frontage on the Atlantic in France, Ireland, Portugal, Spain, and the United Kingdom, as well as coastal frontage on several seas. Eight Member States have coastal frontage in the Baltic (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, and Sweden), and a further seven in the North Sea and Kattegat (Belgium, Denmark, France, Netherlands, Germany, and the United Kingdom). 14 There are two Member States with coasts in the Black Sea (Bulgaria and Romania) and seven in the Mediterranean (Cyprus, France, Greece, Italy, Malta, Slovenia, and Spain). Overseas countries and territories of Member States are technically not part of the E.U. Whereas the maritime boundaries in the Atlantic, Baltic, and North Sea are mostly delimited, several maritime boundaries in the Mediterranean between Member and non-Member States are disputed, completed in part, or yet to be delimited. 15 Most Mediterranean States have not yet declared exclusive economic zones. 16 The E.U., through its Member States, shares significantly more maritime boundary and transboundary management issues with neighboring States than Canada. Consequently, the E.U. has the challenge of sharing significantly more transboundary management responsibilities


with non-Member States that have uneven standards of development. Unlike Canada, however, the E.U. has no coastal frontage on the Arctic Ocean.\textsuperscript{17} Although having land territory within the Arctic Circle, Finland and Sweden’s coastal frontage is only in the Baltic. Greenland, now enjoying autonomy under Denmark, ceased to be a member of the European Economic Community (the predecessor of the E.U.) in 1985 following a referendum.\textsuperscript{18}

The diverse marine regional geography of Canada and the E.U. imposes a major challenge in developing and maintaining a balance between, on the one hand, a general framework and directions for coastal and ocean management that promotes coherence, consistency, and common standards across jurisdictions, and, on the other, to do so at a level of detail sufficient to provide practical guidance to provinces and Member States. In addition to the diverse regional geography and marine eco-regions, socio-economic and cultural diversity suggest that decision-makers in Ottawa and Brussels have to exercise care in launching centralized approaches that might not respond to local needs.\textsuperscript{19} Accordingly, it will be important for policy initiatives at the federal and supranational levels to permit and facilitate local approaches to local problems.

II. DISTRIBUTION OF POWERS AND INSTITUTIONAL FRAMEWORKS

Characteristic of “complex jurisdictions” are the division of powers principle and responsibilities between different levels of government, including a system of checks and balances.\textsuperscript{20} Both the Canadian federal


\textsuperscript{19} See Irene Aronstein, Lisbon’s Concessions to Euroscepticism, 6 UTRECHT L. REV. 89 (2010) (Neth) (describing the tension between maintaining the cultural diversity of Member States of the E.U. and developing a more centralized political entity).

government and the European Commission face significant challenges to integrated policy-making simply by virtue of the constitutional frameworks in which they operate. In Canada, this distribution of powers is dictated by The Constitution Act of 1867.21 In the E.U., all supranational activity is subject to the E.U.’s founding treaties and, more recently, the Lisbon Treaty.22 These “constitutional” frameworks set out powers and constraints that form the basis of policy and legislative options available at the federal/supranational and provincial/Member State levels.23 Although not addressed in this paper, the constitutional framework of each Member State provides further allocation of powers and responsibilities relevant for ICOM and ICZM at national and sub-national levels.24 In general, the law-making systems of the two jurisdictions can be described as parallel in Canada, and as parallel and hierarchical in the E.U. Both intergovernmental levels in the two jurisdictions have protected core competencies, with some areas of overlapping competence. However, in the E.U., there is also a hierarchical law-making system that enables E.U. legislation to bind Member States, as will be explained below.

Many of the powers relevant for ICOM and ICZM in Canada are divided between federal and provincial governments. The federal government has primary jurisdiction in the oceans with power over extra-territorial matters, sea-coast and inland fisheries, navigation, and shipping.25 It is also given responsibility over beacons, buoys, lighthouses, and Sable Island.26 This allocation helps explain the emphasis on ICOM at the federal level. Provinces, on the other hand, have more landward jurisdiction, principally through their power over property and civil rights. They are also responsible for local works and undertakings, non-renewable natural resources, and, generally, all matters of a merely local or private nature in the province.27 These powers are important for undertaking ICZM at the provincial level and, by extension, at the territorial level—depending on powers allocated to the territory concerned.28 In the authors’ view, a truly

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23. Id. Constitution Act, supra note 21.
24. The national constitution of each individual Member State provides for the domestic distribution of powers relevant for coastal and ocean management.
25. Constitution Act, supra note 21, s. 91.
26. Id.
27. Id. at s. 92.
28. See, e.g., Nunavut Act, S.C. 1993, c. 28 (Can.) (statute separating Nunavut from the Northwest Territories and establishing it as an independent territory). The Constitution Act of 1982 affirmed aboriginal and treaty rights and, in turn, this found expression in the Nunavut Lands Claim
integrated approach will thus depend on an organized coordination of both federal and provincial/territorial responsibilities, which collectively provide the full range of powers and tools needed for integrated management of coasts and oceans.  

In practice, the distribution of powers and the exercise of related jurisdictions in Canada’s coastal zones and marine areas are not always clear. The federal government has the potential to exercise a leadership role that begins in the oceans—where jurisdiction is clear—and eventually brings provinces, territories, and coastal communities into the fold through a collaborative and consultative process. This potential has effectively been transformed into an approach to engage multiple levels of government to cooperate in areas of jurisdictional overlap in the spirit of “cooperative federalism.” For example, British Columbia and Nova Scotia have entered into a memorandum of understanding (MOU) to promote ICZM. Similar agreements with other provinces are expected to follow.

Agreement Act which established the Nunavut Wildlife Management Board. Nunavut Land Claims Agreement Act, S.C. 1993, c. 29 (Can.).

29. Such an integrated approach would have to include municipal governments. In Canada, municipalities are creatures of the provinces. They are established and changed by provincial legislatures.

30. As recently as 2009, a British Columbia Court held that aquaculture would be subject to federal jurisdiction despite arguments that farmed fish constitute private property and should continue to be regulated by the provinces. The Court chose to postpone declaring the provincial regime invalid to give the federal DFO time to prepare its own replacement regulatory framework. The provincial regulations would remain in force for a one-year period or until the federal government was prepared to replace them. In Canadian constitutional law, a suspended declaration of invalidity is an infrequently used remedy. It allows a constitutionally unacceptable state of affairs to continue on a temporary basis. The need for its use in this instance demonstrates the persistent and continued jurisdictional confusion regarding some aspects of Canada’s coasts and their uses and the new and pressing matters that affect them. See Morton v. British Columbia (Agriculture and Lands), 2010 BCSC 100 (Can.) (ruling that aquaculture is subject to federal rather than provincial jurisdiction, and suspending a constitutionality ruling to allow the parliament time to draft new legislation). Although navigation and shipping matters are generally considered federal jurisdiction, Courts of Appeal in British Columbia and Nova Scotia recently characterized occupational health and safety matters on fishing vessels as constituting local undertakings or issues over which jurisdiction is shared, with the consequence that the provinces can regulate such matters. See R. v. Mersey Seafoods Ltd., 2008 NSCA 67 (CanLII), 295 DLR (4th) 244; Jim Pattison Enterprises Ltd. v. British Columbia (Worker’s Compensation Board), 2011 BCCA 35, para. 93 (Can.). In the case of Pattison, an application for leave to appeal to the Supreme Court of Canada was recently denied.

31. Peter Ricketts & Peter Harrison, Coastal and Oceans Management in Canada: Moving into the 21st Century, 35 COASTAL MGMT 5, 16 (2007).

32. Pattison Enterprises v. B.C., supra note 30, ¶ 57.

Similar jurisdictional complexity is evident in the E.U. When it came into force on December 1, 2009, the Lisbon Treaty amended the Treaty Establishing the European Community and renamed it the Treaty on the Functioning of the European Union of 2009. Part of this process involved clarifying the division of competences between individual Member States and the E.U.'s supranational organizations. E.U. law has primacy over the law of Member States. While exclusive competence is given to the Union on matters affecting the conservation of marine biological resources, the majority of issues affecting the management of the coastal zone fall under the second category of shared competence. This includes: agriculture and fisheries; economic, social, and territorial cohesion; environment; transportation; and energy. In addition, a third category exists where the Union is to have only a supporting and coordinating role. Areas of interest here are industry, tourism, and administrative cooperation. To summarize, the governance framework for ICZM in Europe is heavily dependent on a high level of cooperation between the Union and its Member States.

This need for cooperation is exacerbated by the three significant treaty principles in which the European Union must operate. First, the principle of conferred powers, also known as the principle of attributed powers, holds that the E.U. can only act in areas that have been explicitly granted to it by its founding treaties. In other words, the E.U. has no inherent legislative jurisdiction. This stands in contrast to the residual powers retained by Canada’s federal government. Second, the principle of subsidiarity holds that the E.U., in areas outside its exclusive competence, may only act to achieve objectives that cannot be sufficiently achieved by Member States acting on their own. The proposed action must be demonstrably more


35. See Declaration Concerning Primacy, 2010 O.J. (C 83) 344 (establishing that laws of the European Union have primacy over the laws of the individual Member States).

36. TFEU, supra note 34, art. 3.

37. Id. at art. 4.

38. Id. at art. 6.


40. Her Majesty The Queen v. Crown Zellerbach Canada Ltd. [1988] 1 S.C.R. 401, 401 (Can.) (demonstrating that Canadian federal legislation prohibits dumping of substances into the sea unless a permit allows such activities).

41. Gibson, supra note 5, at 129.
conducive to regulation at a European level. It is a doctrine based on the idea that devolved decision-making is always preferred. Only where it is impossible to achieve a common objective will the E.U. be permitted to act. In areas of shared competence, the E.U. is always required to take this into account. It is, in a sense, the European equivalent of a “provincial inability test” applied to all E.U. action. Third, the principle of proportionality is concerned with the acceptable degree of intervention in national legislation. According to this doctrine, the E.U. is permitted to intervene legislatively only as much as is absolutely necessary to achieve its treaty objectives. The limiting nature of these three principles suggests a clear concern for the “competence creep” of the European Union.

With these constraints in place, it is perhaps unsurprising that the approach to ICZM at the European level has been one characterized by general guidance. Member States are left to determine the specifics as they develop their own national strategies. As an approach to ICZM, this may seem ideal. It allows for top-down coordination while leaving room for local solutions that can take into account regional and local specificities. The E.U. also has a broad spectrum of legislative and policy instruments to choose from that are particularly well suited to this approach. The most significant of these for European environmental and coastal law are regulations, directives, recommendations, and communications. This system contrasts sharply with the Canadian federal legislative process, which consists of primary (statutes preceded by policy proposals) and subsidiary legislation (regulations as authorized by statute).

E.U. Regulations can be described as the highest order of European law and differ from Directives in three significant ways. The first is in their general application. The binding obligations of a directive can only be imposed by the Commission on one of its Member States. Regulations, on the other hand, apply with equal force to all E.U. legal persons. They provide E.U. citizens with rights and obligations that can be enforced in

43. Queen v. Crown Zellerbach, supra note 40, at 434 (explaining the Canadian provincial inability test).
44. Law of the European Union and the European Communities, supra note 39, at 145.
45. Hartley, supra note 42, at 116–18 (defining the scope of the European Union competences. If the European Union tries to exert any powers in addition to what is expressly authorized, then it is a “competence creep”).
46. Id. at 243.
48. Id. at 172.
both national courts and the European Court of Justice. The second major difference is that regulations are binding in all respects and not just in the result that must be achieved. In other words, there is no discretion granted to Member States on the form and method of implementation. Finally, unlike directives, regulations are significant, as they are considered directly applicable. This means that once a regulation has entered into force, it is as though the law were internally enacted by a national legislature. Direct applicability, however, would be meaningless if regulations did not also have primacy over any conflicting national legislation. Acknowledging this, the co-principle of supremacy for E.U. law was introduced by the European Court of Justice as early as the 1960s, and is somewhat comparable to the Canadian doctrine of federal paramountcy.

E.U. Directives offer the E.U. a unique instrument with no clear parallel in national law. They operate by establishing legally binding results, but allow each Member State to delegate powers to its domestic authorities as it sees fit. States may also choose to implement these objectives through either legislative or administrative means. As a result, there are really two steps to the legislative process for every directive. The first is the European level agreement on the directive itself. The second is the adoption in each Member State’s national legislation of measures aimed at achieving the stipulated objectives. This implementation method can be both a strength and a weakness of the directive framework. While having two steps means that it can often be a time-consuming process, it does leave Member States free to develop their own strategies at a national or regional level based on common principles. However, it also leaves room for significant variation, thus often making consistency among Member States a challenge.

E.U. Recommendations provide the E.U. with yet another tool. While their adoption is subject to all the formalities of a regulation, directive, or a

49. See ANDREAS STAAB, THE EUROPEAN UNION EXPLAINED 68–69 (2008) (clarifying that individual citizens can bring cases to the ECJ once they have exhausted their national judicial system).
52. STAAB, supra note 49, at 70.
53. See Case 6/64, Flaminio Costa v. ENEL, 1964 E.C.R. 585 (holding that regulations are binding on all Member States of the European Union and that they cannot be overridden by Member State Laws).
56. Id. at 172.
57. Id. at 285.
decision, they are not legally binding. This has the significant benefit of making them politically easier to agree upon and allows for more detailed standards to be articulated. Any implementing national legislation, however, will only be adopted on a voluntary basis. Canada has no comparable tool. 

Finally, E.U. Communications provide the E.U. with more of a persuasive tool rather than a peremptory one. They are particularly useful for identifying and clarifying E.U. policies and standards. While not binding in any technical sense, their significance should not be underestimated. Through the doctrine of legitimate expectations, communications can be potentially limiting on the future decisional power of the European Commission. There is also an implicit obligation on the part of Member States to respond in good faith. Communications and other “soft law” instruments like recommendations are, thus, not necessarily devoid of persuasive value. They inevitably inform the framework in which national policies are developed and institutional actors must operate. These instruments give the E.U. a unique opportunity to influence national policies in areas outside the E.U.’s exclusive competence. Again, Canada has no comparable federal instrument.

It should be noted that the E.U. lawmaking process is necessarily complex. The Commission’s proposals for new legislation are, in effect, negotiating documents. Parliament and Council may substantially modify the original proposal. This process has to contend with the challenge of drafting different negotiation intentions in several languages. Thus, a proposal from the Commission may experience significant change and if the Commission does not accept proposed changes from other bodies, then it may not have any other option but to withdraw the proposal.

III. APPROACHES TO ICOM AND ICZM

A. Canada

The distribution of powers in Canada’s constitution makes formal cooperation between federal and provincial governments a requirement for ICOM rather than simply a suggested good practice. Unsurprisingly, this

58. Gibson, supra note 5, at 133.
60. Id. at 292.
61. Id. at 154.
cooperation can often be difficult to achieve. It has resulted in periods of legislative and policy stagnation as Canada sought to truly integrate the management of its oceans and coasts experienced throughout successive governments. As a result of these jurisdictional issues, the federal government has developed an approach to ICOM that begins in the oceans and then seeks to move landward, where the division of responsibilities is less clear.

In 1987, the federal government released the Oceans Policy for Canada. The policy recognized the limitations of Canada’s fragmented approach to oceans management and was an early attempt to create a coordinated national framework. Several years later, the Federal Framework and Action Plan for Marine Environmental Quality was developed. Co-led by the Department of the Environment and the Department of Fisheries and Oceans (DFO), the aim of this initiative was to coordinate the numerous federal-level programs that impacted the marine environment. The challenges of horizontal or interdepartmental integration would prove significant. The next step in the process would ideally have led to cooperation with provincial, territorial, and aboriginal governments in a nation-wide coordination of programs and policies. Unfortunately, this desired vertical integration was never fully realized under this early policy.

Undoubtedly, Canada’s most significant legislative milestone in the field has been the Oceans Act of 1996. The Oceans Act was the first legal tool for better management of Canada’s oceans and it is significant for several reasons. First, Part I sets out Canada’s maritime zones and jurisdictions in accordance with the United Nations Convention on the Law of the Sea. These declaratory provisions on national maritime zones are rarely combined with ocean management functions in a coastal and/or ocean management statute. Second, the Oceans Act assigns a lead role to a department (the DFO) and further assigns it a duty to lead the development of a national oceans strategy and integrated management initiatives. Effectively, it facilitates the coordination of existing federal programs and

64. Ricketts & Harrison, supra note 31, at 7.
65. Id.
67. Id.
68. Oceans Act, S.C. 1996, c. 31 (Can.).
69. Id.
70. Id.
tools rather than redistributing bureaucratic powers. 71 Thus, it is a framework for integrated oceans management and not a restructuring. Finally, the Act is perhaps best understood as a piece of enabling legislation (rather than directive). 72 It has been described as a constitution for Canada’s oceans. 73 In other words, it establishes operational principles and responsibilities for the field without dictating specifics on how the objectives are to be achieved. The legislation remains at a high level of generality. Little guidance on how to exercise these responsibilities is given. In this sense, and from a functional perspective, the Oceans Act is somewhat comparable to a directive of the E.U. While it establishes both common principles and legal obligations, it leaves significant discretion as to the form and method of implementation.

As mandated by the Oceans Act, Canada’s Oceans Strategy was released as a policy document in 2002. 74 The Oceans Strategy was designed to be sensitive to jurisdictional boundaries and was careful to respect the complex distribution of powers in this area. 75 It would also create two useful tools: Large Ocean Management Areas (LOMAs) and the smaller, but inter-related, Coastal Management Areas (CMAs). 76 LOMAs constitute a distinctive characteristic of the Canadian approach to ICOM. The federal government has moved ahead in areas where it has clear jurisdiction, but has yet to move landward and incorporate non-federal partners. A number of management issues addressed by the CMAs fall within provincial jurisdiction. 77 Effective integrated management requires cooperation with provincial and territorial departments, agencies, and management boards. 78 It should also be noted that the Oceans Strategy, like the Oceans Act, is still

72. Id.
73. Aldo Chircop & Larry Hildebrand, Beyond the Buzzwords: A Perspective on Integrated Coastal and Ocean Management in Canada, in TOWARDS PRINCIPLED OCEANS GOVERNANCE: AUSTRALIAN AND CANADIAN APPROACHES AND CHALLENGES 19, 28 (R. Rothwell and David L. VanderZwaag eds. 2006).
75. Chircop & Hildebrand, supra note 73, at 40.
77. Id. at 19.
78. Id. at 21.
at a fairly high level of generality. It is not intended to provide guidance for specific circumstances.\textsuperscript{79}

In terms of implementation, 2005 saw the introduction of Phase I of the National Oceans Action Plan,\textsuperscript{80} which provided some much needed funding for 2005-2007. Previous funds had come from a reallocation of resources within the DFO.\textsuperscript{81} More recent additional funding has come in the form of the Health of the Oceans Initiative in 2007,\textsuperscript{82} with funding for 2007-2012. However, lack of adequate funding remains an issue for the implementation of federal programs. For example, the federal elections of 2011 resulted in the re-election of a conservative government committed to cross-government program cuts in an attempt to bring the national budgetary deficit under control by 2016.\textsuperscript{83} The cuts to the federal oceans and environment budgets are substantial.\textsuperscript{84}

At this time and continuing into the future, MOUs between federal and provincial governments are being concluded as a means to overcome some of the jurisdictional difficulties in implementation. British Columbia is a notable example with an MOU respecting the implementation of Canada’s Oceans Strategy on the Pacific Coast dating back to 2004.\textsuperscript{85} The agreement establishes regular meetings between federal and provincial implementing departments and agencies to ensure progress, coordination, and harmonization of initiatives.\textsuperscript{86} An analogous MOU with Nova Scotia was signed on March 23, 2011, to promote cooperation to advance Nova Scotia’s and Canada’s priorities for coastal and ocean management under the oversight of a provincial-federal Regional Committee for Coastal and

\textsuperscript{79} Ricketts & Harrison, supra note 31, at 9–10.


\textsuperscript{81} Timo Koivurova, Comparing the Integrated Maritime Policy of the European Union and the Oceans Policy of Canada, in UNDERSTANDING AND STRENGTHENING EUROPEAN UNION-CANADA RELATIONS IN LAW OF THE SEA AND OCEANS GOVERNANCE 19, 28 (Timo Koivurova et al., eds. 2009).


\textsuperscript{85} Implementation of Canada’s Oceans Strategy, supra note 38.

\textsuperscript{86} Id.
Oceans Management. However, the complexity of these collaborations has often made the pace of regulatory and legislative development in the field frustratingly slow. It remains to be seen how these federal-provincial agreements will fare at a time of scarce public funding and consequent, substantial cutbacks.

B. The European Union

Shared competence over most aspects of ICZM means that the E.U.’s leadership power is somewhat limited, certainly in terms of implementation. Given the constraints of subsidiarity and proportionality, it is perhaps unsurprising that the approach at the supranational level has been one characterized by general guidance. Member States are left to determine specifics as they develop their own national strategies. Numerous E.U. instruments and policies clearly affect the coastal zone, but few are tailored to it specifically. The 2002 Recommendation on Integrated Coastal Zone Management (ICZM Recommendation) is a notable exception, although its implementation has been fairly uneven. At the European level, significant steps have been taken towards more integrated approaches, but the wide array of issues that affect marine and coastal areas will always make this a challenge.

The E.U.’s legislative and policy process began in the early 1990s with Council resolutions that led to a proposal for a European Parliament and Council Recommendation on ICZM. This led to a three-year Demonstration Program and the development of numerous ICZM initiatives throughout E.U. Member States. After the program ended in 1999, few of

87. Memorandum of Understanding between Canada and Nova Scotia Respecting Coastal and Oceans Management in Nova Scotia, supra note 33.
88. Mageau et al., supra note 71, at 58.
the funded projects continued. The project has since been criticized for its
time-limited nature and project-based (rather than process-based) mindset.
In 2000, the Commission released a Communication to Council and
Parliament concerning a European Strategy for Integrated Coastal Zone
Management. Where possible, the strategy was to build on existing
programs and policies. Like in Canada, the focus has been on coordination
of efforts rather than redistribution of responsibilities. The Communication
sees the overall role of the E.U. as providing guidance through the creation
of an enabling framework for action at other levels of government.
Essentially, the Commission advocates an approach similar in principle to
the Coastal Zone Management Act of the U.S. The E.U., like the
American federal government, should be providing direction in the form of
a clear endorsement of principles and financial incentives for
implementation. Unfortunately, these financial incentives have often been
lacking.

A clear endorsement of principles came in 2002 with the ICZM
Recommendation. The Commission outlined eight core principles to guide
Member States in the development of their own national ICZM strategies.
These include a long-term perspective, working with natural processes, and
involving all parties concerned (both economic and social) in the
management process. Like Canada’s Oceans Act, the ICZM
Recommendation is designed as a guiding framework that establishes the
operational principles on which future action will be based. Its generality
means that it offers little in the way of solutions to particular problems and
it is likely that more detailed guidance will be needed. As of 2006, no
country had fully implemented a national ICZM strategy as prompted by
the 2002 ICZM Recommendation, although several had strategies

92. Brian Shipman & Tim Stojanovic, Facts, Fictions, and Failures of Integrated Coastal Zone
93. Id. at 384–85.
94. Communication from the Commission to the Council and the European Parliament on
Integrated Coastal Zone Management: A European Strategy, at 1, COM (2000) 547 final (Sept. 27,
Communication from the Commission on ICZM].
95. Id. at 3.
96. Id. at 11.
98. ICZM Recommendation, supra note 89.
99. Id. at II(b),(e),(f).
100. Id. For a discussion of the eight core principles, see John McKenna et al., Managing by
Principle: A Critical Analysis of the European Principles of Integrated Coastal Zone Management, 32
In 2007, the Commission released another Communication on ICZM which indicated a notable change in tone. The focus was no longer on ICZM itself, but on ICZM as part of the broader Integrated Maritime Policy (IMP). ICZM is described as having an important role to play, but the emphasis has shifted to finding ways for this management process to fit with newer (and better funded) oceans-based initiatives, such as maritime or marine spatial planning (MSP). The Communication concludes that, while the approaches of most Member States are still largely sectoral, progress towards integration has been achieved as a result of the ICZM Recommendation. No further legal instrument for ICZM is envisioned.

After several years in development, the IMP was released in 2008 as a strategic framework for the better management of Europe’s oceans. Like Canada’s Oceans Strategy, one of the main principles underlying the IMP was to coordinate existing policies rather than to replace them. The goal was to identify gaps in the current sectoral framework and find scope for added value. The IMP acknowledges that all matters relating to the sea are inter-linked and that these policies must be developed in an integrated fashion. The Commission has already started the process of bringing together various E.U. agencies with maritime-related functions. To this end, a Steering Group of Commissioners on Maritime Affairs has been established along with an Interservice Group on Maritime Affairs. According to a 2009 Progress Report, structures have been established for

101. RUPPRECHT CONSULT & INTERNATIONAL OCEAN INSTITUTE, supra note 90, at 9.


104. Id. at 6.

105. Id.

106. Id. at 2.


109. Id. at 4.

Considering the umbrella nature of the IMP, the importance of this cooperation should not be underrated.

The IMP also incorporates the Marine Strategy Framework Directive (MSFD)\textsuperscript{112} as its environmental pillar. The MSFD is an excellent example of the European supranational approach to oceans management. The Commission has set a variety of obligations and objectives and it is up to the individual Member States to fill in the details. The directive leaves each State the responsibility of determining the precise characteristics of “good environmental status,” but gives guidance on the necessary factors to consider.\textsuperscript{113} While Member States draft their own national strategies, the E.U. has the responsibility of ensuring regional coherence and consistency.\textsuperscript{114} The Commission also has the significant task of evaluating each national program.\textsuperscript{115}

The E.U.’s Water Framework Directive (WFD) is also worth noting.\textsuperscript{116} The WFD provides the first legislative framework for integrated management of groundwater and surface water at the European level.\textsuperscript{117} It commits Member States to achieve good ecological status for all water bodies by 2015.\textsuperscript{118} While its focus is predominantly on inland waters, the WFD extends one nautical mile off the coastal baseline.\textsuperscript{119} It thereby provides a basis for an integrated approach to the hydrological cycle and includes a belt of inshore waters. It is described by the European Commission as the tool for bridging the gap between management of land

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114. Id. at 41.

115. Id.


118. Id.

and sea. While these are some of the more notable instruments affecting Europe’s Coastal Zone, the (non-exhaustive) list also includes the Common Fisheries Policy, the Cohesion Policy, the Birds and Habitats Directives, and the Maritime Transport Strategy. Out of this complex system, however, emerges a common pattern of governance. Decision-making power is often left with the Member States.

C. Comparing Principled Approaches

Both jurisdictions have relied on principled approaches to ICOM and ICZM. While on one hand the very nature of guiding principles suggests that the principles can be applied flexibly and by various institutional actors, some overall coherence and consistency is desirable on the other hand. A more directed approach to ICOM through more specified forms of guidance at the federal level of complex jurisdictions is likely unrealistic because of the diversity of geographical and environmental contexts, and the cultures and governance systems in both Canadian and European coastal zones.

Canada’s Oceans Act identifies three core principles on which the national strategy is based—namely, sustainable development, integrated management, and the precautionary approach. In the ICZM Recommendation, the E.U. outlined eight principles for good coastal zone management that drew on experience gained from the Commission’s three-year demonstration program. Both approaches are similar in several respects. The concept of sustainable development is implied in the Recommendation’s principles of long-term perspective and the need to work with natural processes. The concept of integrated management is evident as well, through the practice of involving all relevant governance actors.


122. Oceans Act, supra note 68.

123. ICZM Recommendation, supra note 89.

124. Id. at II(b).

125. Id. at II(e).
bodies at national, regional, and local levels\textsuperscript{126} and the use of a wide range of instruments to achieve sectoral coherence.\textsuperscript{127} However, unlike the Oceans Act, the ICZM Recommendation does not make any explicit reference to the precautionary approach. This could be partially explained by possible implicit consideration when seeking to promote “a long-term perspective.”\textsuperscript{128} Nonetheless, its absence as a stand-alone principle is still surprising, given the established nature of the concept.\textsuperscript{129}

Another similarity between the two approaches is that neither jurisdiction has binding legislation specifically tailored to ICZM. Both Canada and the E.U. have attempted to embed the concept within a broader policy. This is accomplished in Canada through the National Oceans Action Plan and Health of the Oceans Initiative\textsuperscript{130} and, in the E.U., through the ICZM Recommendation and the IMP.\textsuperscript{131} There is no particular disadvantage in incorporating coastal management in a larger oceans management framework, and, in theory, this approach helps achieve integration. However, clearer guidance for the pursuit of ICZM is needed to better explain how these processes are expected to interact. There has been discussion in the E.U. concerning a possible ICZM directive or new recommendation at some point.\textsuperscript{132} While a directive has the potential for securing greater continuity in ICZM across the E.U., an initiative of this type could face difficulty in securing the required qualified majority. The added value of a new recommendation, whose legal character is “soft” at best, is also questionable. It is possible that there could be some resistance from Member States that would want to maintain as much freedom as possible in land-use policy. The policy on territorial cohesion could be an alternative to, or at least a supplementary framework for, promoting ICZM at the sub-regional level.

Canada has been dealing with the need to clarify the relationship between ICOM at the federal level and ICZM at the provincial level for

\begin{itemize}
\item \textsuperscript{126} Id. at II(g).
\item \textsuperscript{127} Id. at II(h).
\item \textsuperscript{128} Id.
\item \textsuperscript{129} McKenna et al., supra note 100, at 943.
\item \textsuperscript{130} FISHERIES AND OCEANS CANADA, supra note 80, at 5.
\item \textsuperscript{131} Integrated Maritime Policy, supra note 103, at 2.
\end{itemize}
several years. Numerous challenges remain. Canada has addressed this, in part, through intergovernmental committees, and, more recently, through a series of MOUs with some provinces.

With the passage of only three years since its adoption, the E.U.’s IMP can only be considered novel. The adequate incorporation of ICZM will require significant effort. Despite interagency processes and communications, the exchanges between the Directorate-General for Fisheries and Oceans (DG Mare) and the Directorate-General for Environment (DG Environment) in the lead up to the IMP and, eventually, in relation to the former’s MSP initiative were not without difficulties. One such difficulty includes defining the respective directorate’s competence. In the preparation of the Roadmap for Maritime Spatial Planning, the issue was addressed by separating the “dry” spaces (coasts) from the “wet” (marine) spaces. This might have helped clarify respective institutional competences, but, in a sense, it was not consistent with the integrated approach. The Commission’s 2007 Communication addressed the need to clarify the relationship, but there is still a need for clearer guidance for individual Member States. How to combine ICZM with the Union’s new focus on MSP is one such example.

The IMP, like Canada’s Oceans Strategy, is a predominantly sea-based policy and using MSP as an implementing tool is an example of that focus. Cited as one of the three areas of major importance, the MSP is described as a decision-making tool. It provides a framework for balancing human uses of the marine area and managing their impact. In a sense, it takes ICZM principles, articulates them at a high level of generality, and pushes them further out to sea. ICZM and MSP are by no means incompatible, but the relationship between the two is not clearly set out—although opportunities for coordination and cooperation exist and are encouraged. Even so, their co-existence raises some confusing issues. In developing national strategies for ICZM (pursuant to the ICZM Recommendation)

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133. See generally FISHERIES AND OCEANS CANADA, supra note 83 (concluding that a broader, more holistic approach to managing ocean resources will take significant investments of time, money, and governmental cooperation).


135. Communication from the Commission on ICZM, supra note 103, at 9.

136. The other two are maritime surveillance and a comprehensive source of data and information. Integrated Maritime Policy, supra note 110, at 6.


and/or in developing national integrated maritime policies (pursuant to the 2008 Guidelines), to whom are Member States to turn for guidance? One possibility is looking to DG Mare, which is responsible for MSP. The newly reorganized Directorate has a broad mandate and some professional expertise, but is barely sufficient to address the needs of multiple Member States. A second possibility is seeking direction from DG Environment, which is responsible for ICZM, but the professional and other resources for ICZM are even more limited than those for MSP at the time of writing this article. DG Environment is also responsible for the legal requirements of the MSFD, for which it appears better resourced than it is for its ICZM activities. The directorates are not endowed with the technical resources to be deployed to support a Member State’s initiative, as is the case, for instance, with Canada’s federal departments, which do provide professional technical expertise (e.g., scientists). In the E.U., the answer is unclear. Member States are responsible for drafting strategies tailored to the specifics of their regional context. The E.U. is responsible for providing guidance and ensuring that the national efforts are coherent and consistent, focusing on the “big picture” in terms of ecosystem-level cooperation (including between neighboring States at the regional sea level), but resources do not appear to have been made available to accomplish these tasks. While this kind of policy overlap within the Commission persists, confusion at the national level will be somewhat inevitable. Canada has not gone as far as the E.U. in terms of framing a big-picture approach to facilitate cooperation between provinces in shared marine regions.

In Canada, the DFO, while tasked as the lead agency for oceans, has experienced a progressively diminishing budget for oceans and fisheries-

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144. Juda, supra note 113, at 41.
related activities. Unlike in the case of the E.U., Canada does not have the equivalent of Union-wide recommendations for ICZM or an authoritative MSP roadmap that the provinces are expected to implement. Canada’s position on the utility and possible adoption of MSP as a tool has been uncertain, despite strong advocacy from non-governmental organizations. This is possibly because the added value to current ocean management efforts in Canada is not clear. It may be argued that MSP, if deployed in Canada’s marine regions, would be a federal responsibility. While that is a fair point, Canadian provinces’ ICZM initiatives are also concerned to some extent with adjacent coastal waters. In their pursuit of ICZM, provinces and territories do not have a set of commonly-agreed-to principles to serve as guidance and to promote ICZM coherency across Canada’s marine regions. The DFO’s challenge of promoting coherency is made more difficult without proper funding to entice ICZM initiatives at the provincial level, a problem shared with both DG Mare and DG Environment. The federal government in Canada and the E.U. institutions, in relation to Member States, do not have a program of financial support provided against broader principles and goals, such as in the U.S. does. In this respect, the U.S. has in place a stronger framework for the promotion of ICZM at the sub-national level, provided individual states buy in. Federal consistency principles then ensure that individual states pursue ICZM programs with federal government support within the framework of the Coastal Zone Management Act of 1972.

Without clearer guidance, the requirements of the Water Framework Directive (WFD) could also add to the challenges faced by Member States seeking to develop their own national strategies. Many of the principles articulated in the WFD (such as required public participation) are


146. See Andrew Dumbrille, Marine Spatial Planning: Its Time Has Come, WWF-CANADA BLOG (July 21, 2010), http://blog.wwf.ca/blog/2010/07/21/marine-spatial-planning-its-time-has-come/ (example of a prominent non-profit organization advocating for the Canadian government to adopt marine spatial planning).


clearly compatible with the ICZM Recommendation. The challenge lies in the fact that the WFD is pulling the coastal zone in yet another direction. It has a strong environmental focus and, despite including the coastal area, it is a policy that looks predominantly inland. How should Member States incorporate WFD principles in their ICZM Strategies and in their Integrated Maritime Policies? There is an answer to this, but the E.U. needs to make it clearer. None of these instruments are incompatible. As mentioned, the combined implementation of the Water Framework Directive and the Marine Strategy Framework Directive is actually expected to bridge the gap between the protection of inland waters and the open seas. Inhibiting this is the kind of policy overlap at the European level that real integration seeks to avoid.

The ICZM Recommendation encouraged Member States to undertake a national stocktaking of the major actors and laws that impact the coastal zone and to identify mechanisms for the coordinated implementation of Community legislation and policies. This process of stocktaking and coordination should also have been undertaken within the Commission at the supranational level. While integrated solutions to concrete problems can only be found at the local level, any integration of policies must begin at the higher levels of administration. It is only through policy integration at the European level that the necessary institutional and legal context can be created, within which national ICZM strategies can effectively develop. In short, the level of policy integration achieved by the Commission itself will largely determine the quality of future ICZM strategies developed by Member States. The IMP is now taking active steps towards this E.U.-level policy coordination, but there is still work to be done.

The latest step in the E.U.’s quest to promote ICZM is OURCOAST, a program funded by DG Environment and designed to facilitate the exchange of knowledge, experiences, and best practices in coastal planning and management. The purpose was “to create an information base and groundwork that will further support implementation of ICZM in coastal areas by the establishment of long-lasting information mechanisms that

149. Compare Directive for Community Action, supra note 116 (stating that the success of the WFD relies on public involvement), with ICZM Recommendation, supra note 89 (requiring participating Member States to identify measures to promote public participation).
150. THE EU MARINE STRATEGY, supra note 120.
151. ICZM Recommendation, supra note 89, at IV(3)(f).
152. Communication from the Commission on ICZM, supra note 94, at 9.
153. Rupprecht Consult & International Ocean Institute, supra note 90, at 242.
promote the sharing of experiences and practices throughout Europe." The three-year program culminated in a conference of coastal and marine stakeholders convened in Riga in October 2011. The conference was an opportunity to present ICZM case studies from around the Union. It is instructive to note that over 350 case study examples or experiences were gathered. It is conceivable that this wealth of experience, much of it at a local level, may help address some of the concerns relating to lack of guidance for Member States mentioned earlier and further help shape future directions for ICZM in the Union as a whole. The challenge will be sustaining the critical mass built as support for this program as specific-purpose funding, rather than continuing programmatic funding, voted for by the European Parliament in 2008.

**CONCLUSION**

The quest for ICOM in Canada and the E.U. continues to be a work in progress. What might the two jurisdictions learn from each other? Senior officials from both jurisdictions have looked to each other’s experiences on specific initiatives. DG Mare took a close look at Canada’s Oceans Act, Oceans Strategy, and related processes in developing the IMP. Officials in DFO have similarly studied DG Mare’s initiative concerning MSP. This is not surprising because there is appreciation on both sides of the challenge of playing internal and external leadership roles in ICOM. While officials take mutual solace in their respective predicaments, perhaps there are other lessons that the two jurisdictions can draw upon each other and also from the U.S., which has the more mature jurisdiction in this field. There is value for the E.U. in the Canadian approach of setting out a broad framework in one instrument for ocean policy, integrated management, lead role and institutional framework, and processes. Leadership for coasts and oceans in the E.U. is frequently unclear, if not conflicting. There is greater emphasis on communities in the Canadian approach to ICOM than in the E.U., whose policies appear to be directed more at betterment of social conditions for citizens, rather than communities. Canada can benefit from an important principle in the Lisbon Treaty that aims at promoting

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consistency among Union policies and activities. Lessons can be learned from the utilization of a sophisticated array of legislative and policy instruments to influence provincial compliance with federal initiatives. Also, the growing emphasis in E.U. ocean and coastal policy on regional approaches informed by ecosystem-based management, in particular within the framework of the MSFD, has value for Canada, which appears to favor centralized decision-making under the current conservative government. Canada’s diverse ocean environments could benefit from less-centralized decision-making. However, both Canada and the E.U. could learn from the U.S. approach in federally-led ICZM—the development of a broad framework with objectives, supported by a funding program and a federal consistency rule, is more likely to promote widespread integrated management practices at the sub-national and member-State levels.

Richard O. Brooks*  

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INTRODUCTION

[A] fresh, green breast of the new world.
—F. Scott Fitzgerald, 1925

In 1979, Connecticut adopted its Coastal Management Act (CCMA). This law essayed to authorize coastal management of the Long Island Sound and its urbanized coastline. While recognizing the presence of the urban life that bordered the Sound, the law embodied a variety of ecosystem management terms and techniques. After its passage and for the next thirty years, a proliferation of federal laws and state actions were undertaken to protect the Sound and its coastal resources. These laws responded to the problems of coastal access, fishery management, energy development, non-point source pollution, tidal wetlands depletion, even air deposition, as well as inadequate local land use regulation in coastal communities. Some of these federal and state laws were loosely linked to a holistic vision of the ecosystem management of the Sound, but most originated independently and proceeded under their own steam. Integrated coastal management suffered.

There are three major reasons for the decline of an integrated coastal management effort. First, our federal legal system, with its bureaucracies and pluralistic political system, fragments any unified system of environmental management. Second, despite its ecological language, the synoptic view taken by ecosystem management encounters a serious lack of knowledge of ecosystemic relationships and the change in those relationships over time. Third, the Sound, including its urbanized coast, is not merely an ecosystem, but also “a place”—a public culture consisting of an inshore urban community—with ongoing ways of life which are only partly compatible with natural systems. These ways of life embody a series of social norms—private property, commitments to equality and equity, the felt urgency of economic needs, the willing acceptance of environmental risks, a recognition and appreciation of the “coastscape’s” beauty, and the subordination of effective environmental protection to the requirements of representative democracy. Conflicts between the coastal ways of life and the natural setting in which they take place are inevitable.

Though the body of state and federal law just described spoke in terms of ecosystem management, its effect, as it has evolved over time, is best understood not as an effort to protect a natural coastal ecosystem, but rather
as the development of a sustainable coastal community in which the natural ecosystem and coastal ways of life are maintained in a continuing balance.

Returning to these laws and their subsequent history allows me once again to assess the laws’ concern with both ecosystem management and sustainability. I would like to explore the question of whether the coastal management laws and their offshoots, over the years, advanced the sustainability of the Long Island Sound through ecosystem management. Since these laws were passed, new knowledge (regarding ecosystems and estuaries), new technologies (such as aquaculture innovations), new problems (such as global warming), new concepts (such as the commons, resource regimes, adaptive management, and sustainability), and new legislation have come into being. Neither I nor my reader can hope to digest all of this material, but I can survey it and suggest some ways of thinking about it.

Following a brief personal reminiscence and reflection in Part I of this paper, I introduce two views of the Sound: first, the Sound as an elegant estuary and, second, as a somewhat tarnished urban inshore ambience which reflects the past and present ways its denizens have chosen to assault her purity. These past assaults leave a legacy of pollution compounded by a second legacy—ongoing ways of life which continue to pollute her. Part II outlines the Coastal Zone Management Act (CZMA) and the CCMA and suggests how, at a shallow level, they roughly fit the definition of ecosystem laws, but, at a deeper level, both laws fall short of what I regard to be the unattainable ideal of ecosystem management. Subsequent to their adoption, these coastal management laws have been deconstructed into a variety of more specific laws and programs that address issues of inadequate local land use regulation, unequal beach access, the loss of tidal wetlands, pollution caused by energy and electricity production, depleted fisheries, and non-point source pollution (which is evidenced in oxygen depletion of the waters of the Sound). In Part III, I trace the history of the legal treatment of these issues in the Sound and identify some specific questions arising out of this treatment. I ask in Part IV why, in light of these issues, the ecosystem management aspects of these laws failed to achieve sustainability. In conclusion, in Part V, I suggest that the Sound might be better conceived of as “an urban inshore place” that reflects and serves ways of life which are only compatible in part with the natural state of the Sound. It is the sustainability of this imperfect inshore urban community with which we should concern ourselves.
REMINISCENCE AND REFLECTION

[T]he entire history of landscape . . . is indeed a mindless race toward a machine-driven universe, uncomplicated by myth, metaphor or allegory where measurement, not memory is the absolute arbiter of value . . . .

—Simon Schama, 1995

In old age, I am trying to revisit important places of my past to recapture their meaning and assess some of the work I have done in seeking to protect them. For many years I had lived along the Long Island Sound—in Greenwich, New Haven, and Waterford. My family summered on her beaches and we supped at her coastal restaurants. I plied my Cape Cod Bullseye sailboat over her waters, sailing on one daylong reach along the entire Connecticut coast (but truth to tell, I was a lousy sailor). More than 30 years ago, in 1977, I joined with a small band of environmental attorneys to consult with Art Roque, then Director of the Connecticut Coastal Program, to draft state legislation for Connecticut’s coastal management program, adopted in 1979. The assignment continued coastally-related legal work I had done in earlier years—litigating the siting of the Millstone Two Nuclear Power Plant on the Sound and drafting an amicus brief for the NRDC supporting the state’s response to a takings challenge regarding the state’s refusal to permit a coastal wetlands development.

Since I loved our life along the Sound (which I reluctantly left more than 30 years ago), and since my children and grandchildren now revisit her coastal beaches, it seemed to be especially suitable to return to examine the history of the Sound and the CCMA, designed in part to protect the Sound. The CCMA was Connecticut’s response to the national CZMA of 1972, which itself was an early example of an ecosystem management approach to environmental protection. Late one night when researching this paper, I turned to the original CCMA we had prepared in the mid-70s. Much to my shock, there was a frank description of the real coast of Connecticut—not simply the few fishing villages, crescent beaches, and tidelands, but also the oil tanks, railroads and highways, electricity generating plants, and sewer treatment facilities—all the accouterments of urban civilization. The plan did not propose removing these. Indeed, it accepted them as part of the coastal area it was proposing to manage. At that moment, I realized that I had participated in the design of an environmental law which was not only

aimed at protecting this large estuary as an ecosystem, but also embodied concerns about the sustainability of an inshore place with a public urban culture—a law that sought to reconcile the importance of ongoing economic activities with environmental protection and restoration for both present and future generations.

I. THE LONG ISLAND SOUND AND ITS ENVIRONMENTAL RESOURCES AND THREATS

[They] have swept the Sound, and covered their fields with the immense shoals of whitefish with which in the beginning of summer its waters are replenished.
—Rev. Timothy Dwight, 1804

In Norwich, two tributaries of the Thames—the Yantic and Shetucket rivers—were lined with outhouses that drained into the waterways; and in Derby, . . . “The house refuse and filth is removed by the river.”
—Connecticut Board of Health, 1879

Despite these early intimations of harmful human incursion, in 1864, Daniel Webster could describe the Long Island Sound, where he had fished and hunted, as “the Mediterranean of the Western Hemisphere.” Nearly a century later, in 1925, Fitzgerald’s narrator, Nick Carraway, contemplating Gatsby’s tragically deserted mega-mansion on the Sound, imagined the first Dutch sailors stunned by their first sight of the Island in its pure state as “a fresh, green breast of the new world.”

Two very different books capture views of the Sound today. The first, Mary Buckles’s *Margins*, delicately traces the natural life of the Sound—the owls, oysters, and ospreys. The other, John Stilgoe’s *Alongshore*, explores the human landscape of the coast—the boat hoists, the skiffs, the bikinis, and the battered sheds. The first view highlights the Long Island

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4. TOM ANDERSEN, THIS FINE PIECE OF WATER: AN ENVIRONMENTAL HISTORY OF LONG ISLAND SOUND 78 (2002) (paraphrasing and quoting CONNECTICUT STATE BOARD OF HEALTH, FIRST ANNUAL REPORT 1878 (1879)).
5. See id. at 2.
6. FITZGERALD, supra note 1.
Sound as a natural saline tidal estuary, the consequence of glaciation and now an arm of the Atlantic Ocean, beginning at its race in eastern Connecticut, extending south of Connecticut and north of Long Island, New York, for 110 miles to Devil’s Gate and another source of its fresh water, the East River in New York. The Sound has an average depth of 79 feet and fattens to a width of 21 miles between Shoreham, New York, and New Haven, Connecticut. It is also the terminus of the Connecticut, Housatonic, and Thames rivers. These rivers bring fresh water (as well as pollution!) into an otherwise saline water body, contributing currents of water movement to its tidal fluctuations.

Its natural shoreline features include sand beaches, mud flats, tidal wetlands, headlands, and bluffs. These provide the structural support for habitats of upland vegetation, including black oak and hickory, bayberry, and an upland border of switch grass and marsh elder. Black and salt meadows occupy the high marsh, and salt water cord grass occupies the low marsh. The intertidal mudflats may lead to barrier beaches comprised of dunes and beaches, the former with goldenrod, beach plum, pea, and dune grass. A variety of benthic organisms live on the sea floor, feeding on the plankton population. The Sound is home to a variety of crustacea including blue crabs, hermit crabs, shrimp, and lobsters. Of the last, the most well known is the American lobster, which is commercially fished. Mollusks, including soft and hard shelled clams, Atlantic bay scallops, and blue mussels, have been harvested and work is under way to improve the oyster population. The fish population includes marine fish such as the scup, flounder, blackfish, and bluefish. Resident anadromous fish include striped bass, Atlantic salmon, and shad. A variety of shorebirds, including plovers, sandpipers, ducks, geese, swans, and herons, occupy a variety of habitats—some as they pass through the area during seasonal migrations. The piping plover and the osprey are two of Connecticut’s endangered species. The Sound is also home to many mammals and reptiles, including the muskrat and the diamondback terrapin, the latter an endangered species.9

including the people and places that make the region unique). See generally ANDERSEN, supra note 4 (detailing the natural and cultural history of the Sound, and explaining how this history affected the health of the Sound’s ecosystem); BUCKLES, supra note 7; MARILYN E. WEIGOLD, THE LONG ISLAND SOUND: A HISTORY OF ITS PEOPLE, PLACES, AND ENVIRONMENT 176–77 (2004) (tracing the development of the Sound from fishing and shipbuilding villages to modern industrial ports and suburban communities, and discussing the resulting pollution problems). This Part is based on these works.

9. See BUCKLES, supra note 7 (examining, from a naturalist’s perspective, the ecosystem of the Sound and showing that, despite threats from pollution, it is still a vibrant community). The Long Island Sound provides natural habitat to more than 1,200 species of invertebrates, 170 species of fish, and dozens of migratory birds. LONG ISLAND SOUND STUDY, LONG ISLAND SOUND STUDY ACTION
In Stilgoe’s *Alongshore*, however, the Sound is not merely a set of environmental resources. It is “a place” with a rich history and the setting of unique ways of life found in its city harbors, small coastal towns, and the clustered vacation retreats that line its coast, as well as in its waters crowded with barges, sail boats, submarines, and fishing vessels. This way of life is supported by a variety of water-related activities, ranging from ports and marinas, shoreline restaurants, and small cove beaches, to shipbuilding, commercial fishing, and water-dependent manufacturing. Its occupants also include non-water dependent uses—interlopers such as oil tanks, railroads and highways, and coal and oil fired power plants—upon which those who ride the roads or use electricity depend. Behind both the natural and man-made life is a “coastal magic”—unique natural and human created sights, a bouillabaisse of sounds and smells that the residents relish. Unfortunately, such a coastal way of life also includes a myriad of coastal and non-coastal activities that its residents have either intentionally or accidentally undertaken, treating the coastal waters as dumping grounds of all forms of pollution.

Despite the present-day activity of the Sound, it is difficult to imagine that it was the center of a whaling industry in the 18th century and an oystering empire in the 19th and early 20th centuries. First individual skiffs, then fleets of dredging vessels plied the waters of the Sound, seeding and collecting oysters from both shallow and deeper waters for a world-wide market. It was this kind of lucrative oystering activity that stimulated the famous 1842 coastal case of *Martin v. Waddell*. In this famous case, the Supreme Court held that the oystering mudflats in New Jersey (and hence other northeastern coastal states) were the property of the state and not of private parties who claimed them under patent from the English king. Only after typhoid from sewage crept into the oysters of a Wesleyan College fraternity party, when several students fell deathly ill or died, did the industry collapse. It was discovered that these filter feeders were “fattened” by leaving them in shallow rivulets of sewage on the coast! The

10. STILGOE, supra note 8.
12. See Charles Harrington, *Some Reported Cases of Typhoid Fever Attributed to Contaminated Oysters, with Certain Facts Concerning this Means of Infection*, 144 BOS. MED. & SURGICAL J. 439 (1901) (discussed in ANDERSEN, supra note 4, at 95–99) (reporting on how oysters contaminated by pollution served at fraternity and sorority dinners were the possible cause of a typhoid fever outbreak).
13. Id.
oyster industry collapsed. On the other hand, the problem of sewage, as we
shall see, lingers on in a new form today!

The Sound is both loved and abused, its wounds hidden like the
submarines that ply its depths. The resulting assaults profoundly affect this
natural system, its habitats, its flows of water and nutrients, and its stocks of
plants and animals, in ways which are not often visible. In the late-18th to
the mid-19th century, a venerable early history of whaling enabled the ports
along the Sound to thrive, and New London reached its pinnacle. The
collapse of whaling due to new sources of oil not only left a depleted world-
wide stock of whales, but also an elegant row of whaler’s homes in New
London. This whaling port was second in size only to New Bedford and
Nantucket, the towns epitomized for the world in Melville’s classic, Moby
Dick.14 After the whaling era, the Sound saw the rise of a variety of
industrial uses located both along its shores, as well as in the tributary rivers
and nearby valleys. One such industry was the brass industry in the
Naugatuck Valley, which, while making the brass buttons on our soldiers’
uniforms, polluted the Housatonic River. The brass industry thus left a
legacy of chemicals and metals, especially copper, in the estuary bottom
sediments of today—a legacy that affects, among other things, the present-
day mollusk population of the Sound.15 The industrial legacy of the 19th
century is well illustrated in Keyser v. Coe (1871), in which the plaintiff, a
Connecticut shoreland resident, sued in nuisance, claiming that the
defendant’s business on Goose Island—a manure business in which
artificial manures were made up of dead fish “and other offensive
materials”—resulted in offensive smells affecting the plaintiff’s property.16

A variety of manufacturing and electrical generating activities have
continued to both enliven and assault the Sound, including such denizens as
Electric Boat, a company which builds nuclear submarines;17 the U.S.
submarine base, which operates them; and, until recently, the Pfizer Drug
company, which used to dump its drug-related waste in the race of the

14. See generally ANDERSEN, supra note 4, at 63–66 (examining the rise and fall of the
whaling industry in Connecticut); HERMAN MELVILLE, MOBY DICK; OR, THE WHALE (1851), reprinted
in GREAT BOOKS OF THE WESTERN WORLD (Robert Maynard Hutchins ed., Encyclopedia Britannica,
Inc., 1952).

15. See generally ANDERSEN, supra note 4, at 69, 94–95 (examining the history of the brass
industry in Connecticut and its effect on the oyster population in Long Island Sound).

16. Keyser v. Coe, 9 Blatchf. 32 (C.C.D. Conn., 1871) (on plea to the jurisdiction that Goose
Island was in New York, held on the facts that it was in Connecticut).

17. See generally Electric Boat: The Past, Present and Future of Submarines, GENERAL
company’s business, both on the Sound and worldwide).
Sound.\textsuperscript{18} In my ecology class, we took samples of this waste, spread it on the land, and watched it cook fledgling plants with the heat it generated. These activities are in addition to more common types of ocean dumping (including garbage and sewage initially, and now dredge spoils from the deepening of the Sound’s ports). Electrical production, in the form of oil and coal fired power plants, distributes dry and wet acid “rain” on the Sound. Nuclear plants, meanwhile, spew warm water to the Sound at the expense of winter flounder. Energy production, in the form of a proposed natural gas pipeline and an immense terminal that promised to loom over the Sound, has threatened to harm the shellfish beds at the bottom of the Sound as well as harm other fisheries. Over the years, there has been a significant depletion of coastal wetlands not only from residential developments, but also from marina developments seeking to promote recreation activities on the Sound. There are less dramatic but even more harmful pollutants that are the direct consequence of population growth and suburbanization of the watershed. The effluent of coastal and inland sewer treatment facilities combines with non-point source run-off (some of which is deposited by air) from Connecticut cities and farms to contribute to the hypoxia in the western Sound. In addition, over-fishing, the spraying of insecticides, and excessive harvesting of bivalves and crustaceans have all threatened the clam, oyster, and lobster populations.

These assaults on the Sound have stimulated the coastal communities surrounding the Sound to seek to regulate environmentally-harmful activities and foster restoration efforts to protect and increase the Sound’s resources and beauty. What follows is the story of one such law—the CCMA—and the laws which followed in its wake.

II. THE COASTAL ZONE MANAGEMENT ACT AND THE CONNECTICUT COASTAL MANAGEMENT ACT

\textit{The waters of Long Island Sound and its coastal resources, including tidal rivers, streams and creeks, wetlands and marshes, intertidal mudflats, beaches and dunes, bluffs and headlands, islands, rocky shorefronts and adjacent shorelands form an integrated natural estuarine ecosystem which is both unique and fragile.}

—Connecticut Coastal Management Act, Legislative Findings, 1979\textsuperscript{19}

\textsuperscript{18} \textsc{Weigold, supra note 8.}

\textsuperscript{19} \textsc{Conn. Gen. Stat. Ann. § 22a-94 (West 2010).}
A. The Coastal Zone Management Act of 1972

In the waning days of the Nixon administration, Congress adopted the CZMA.\textsuperscript{20} In one sense, this new law was one of several environmental laws adopted in the glow of Earth Day—the Federal Water Pollution Control Act (FWPCA), the Clean Air Act (CAA), and the National Environmental Policy Act (NEPA).\textsuperscript{21} Unlike these laws, the CZMA was a federal-state law that provided grants to coastal states (including those which border the Great Lakes, though not Lake Champlain) to develop and administer federally-approved coastal management programs to regulate land and water uses. On the one hand, the law echoed NEPA by seeking to inject consideration of coastal policies into the decision making of those state and local agencies which conducted coastally related activities and regulations. On the other hand, the CZMA echoed the fashionable land use regulations of the time. It was originally part of a proposed (and later discarded) National Planning Act, which encouraged state land use control by regulating “critical areas” and “developments of regional impact."\textsuperscript{22} The CZMA followed this “zoning” approach with its provisions for protecting critical areas of the coastal zone, enabling coastal programs to assess the impacts of land and water uses of coastal activities, and encouraging states to assign “priority of uses” according to zones on the land and in the water.\textsuperscript{23}

The CZMA introduces a “tier one” dimension of ecological thinking—taking the first steps by defining the coastal zone as “coastal waters . . . and the adjacent shorelands . . . strongly influenced by each other,” invoking a

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number of ecological values, identifying key coastal ecosystem features, recognizing coastal ecological problems, and setting aside “fragile” coastal areas. The founders of coastal management did not see the coast purely in terms of natural ecosystems. After all, the major concerns at the time were offshore oil and the growth of recreational boating! Unlike many environmental laws of the time, the CZMA recognized the importance of economic development on the coast. It thus required states to balance economic development and the environment in a variety of ways, including the fostering and control of “water dependent” uses and permitting uses serving important “national needs.”

One important device for balancing the environment and development was the Act’s “consistency provisions,” which require federal activities and permitting of developments to be “consistent” with state-adopted and federally-approved state coastal programs. If a state finds a development to be consistent or inconsistent with these programs, parties may appeal such “consistency determinations” to the U.S. Secretary of Commerce. Thus, despite the CZMA’s enactment during the full flower of the environmental era and its focus on the coastal ecosystem, the law also promoted sustainability in its recognition of the need to reconcile environmental and economic values for both present and future generations.

B. The Connecticut Coastal Management Act (CCMA)

Connecticut’s Coastal Management Act, a late arrival to the coastal management game, was adopted in 1979. The state already had a variety of coastal protection programs on the books, well established local wetlands laws, and a study of its Long Island Sound. In regard to coastal matters, political power in the state rested in large part in the coastal cities of New Haven and Bridgeport, as well as within the state bureaucracy and its constituent fishery and recreation interests on the coast. Much of Connecticut’s population lived inland and was indifferent to coastal issues. The strategy for securing passage of the law was to defer to local regulation as well as the existing activities of state agencies. The legislation delineated a “coastal area” bounded by the state’s jurisdiction three miles seaward of the low water mark and the inland boundaries of the respective coastal

25. Id. § 1452(2)(D), (3).
26. Id. § 1456(c).
towns. 28 A more limited “coastal boundary” extended from the landward side of the coastal flood line or 1,000 feet inland to the seaward limits of the state jurisdiction. 29 Finally, a municipal coastal boundary could be set by the locality. 30

The new law modified the already existing state permit requirements for developments in coastal wetlands and for dredge and fill operations, as well as local planning, zoning, and subdivision requirements, by requiring permits to comply with a detailed list of coastal policies and findings drafted as part of the new statute. 31 Existing state plans were also to be modified and coordinated in light of these findings and policies. The state law enabled municipal coastal programs that required the municipal plan of development, municipal ordinances, and zoning regulations to be incorporated within or “consistent” with the coastal findings and policies. To enhance the bridge between the statement of policies and the local planning and zoning regulations, a special provision required state preparation of a model municipal plan and set of regulations, a statement of planning methodologies, and methods for ensuring conformity between regulations and policies. 32 To ensure compliance between local plans and regulations, the state law mandated “coastal site plans” for all zoning and subdivision related developments. 33 These coastal site plans were to incorporate the findings and policies of the state coastal law, and were subject to state review by the state Commissioner of the Environment. 34

Although the federal CZMA introduced the notion of “coastal management programs,” an early version of ecosystem management, the theory of ecosystem management did not flower until after the law was adopted. Ecosystem management may be schematically outlined as based upon an identifiable ecosystem, an enabling law focused upon a given ecosystem, a collaborative governance process, a collection of ecosystem information, an adoption of a plan or program, a specification of ecosystem policies, standards and permit criteria, mechanisms for coordinated ecosystemic regulation, and a system of monitoring and evaluation. 35 At one

29 Id. § 22a-94(b).
30 Id. § 22a-94.
31 Id. §§ 22a-100–10.
32 Id.
33 Id.
34 Id.
level, the CCMA, its regulations, and the preceding and subsequent Long Island Sound studies together contain each of these factors. The history of the Sound, as well as its resources and their regulation, reveals the necessary “public culture of place.”

The second Long Island Study was the product of an environmental movement of citizens; there was a public uproar at the “discovery of hypoxia” and the prospect of a natural gas terminal in the Sound. Thus, the CCMA (together with both the laws it incorporated and the subsequent legislation and plans it influenced) embodied ecosystem considerations and provided a loose matrix of enabling laws focused upon the ecosystem.

III. THE “DECONSTRUCTION” OF COASTAL REGULATION

Deconstruction would be the effort to take this limitless context into account . . .

—Derrida, 1988

There are many ways of understanding the CCMA within the historical march of Connecticut’s coastal legislation. If one looks at it from the perspective of a starting point of coastal management in 1979, it might be viewed as the beginning of adaptive management, in which a variety of subsequent laws modify and adjust coastal management in light of encounters with newly recognized coastal problems. Under this view, the coastal laws are hypotheses to be tested in action and, if necessary, rectified.

C. Bauer, & Jennifer L. Schorr, Legal Authorities for Ecosystem-Based Management in U.S. Coastal and Ocean Areas, in OCEAN AND COASTAL LAW AND POLICY 597–654 (Bauer, Eichenberg, & Sutton eds., 2008) (establishing how the process of ecosystem management through the system functions).

36. See generally RICHARD O. BROOKS, NEW TOWNS AND COMMUNAL VALUES (1974) (writing about the public and communal culture of Columbia); SCHAMA, supra note 2 (describing the importance and advantages of a public culture for the community and the environment); EDWARD C. CASEY, GETTING BACK INTO PLACE: TOWARD A RENEWED UNDERSTANDING OF THE PLACE-WORLD (2d ed. 2009) (examining, from a philosophical standpoint, the importance of place and locality).

37. See ANDERSEN, supra note 4, at 153–54 (explaining the public reaction to the Long Island Sound Study, which found hypoxia to be an impending problem in the Sound).


by later amendments and other laws. Thus, the coastal management law
initially sought to change local land use decision making and ensure beach
access, protect the tidelands, restore fisheries, prevent coastal water
pollution, and facilitate water dependent uses and developments serving
national needs. From this perspective, the federal CZMA, after its early
“test run,” required changes. These changes included amendments to the
CZMA to protect barrier beaches, improve shell-fish areas, restore urban
water fronts, promote further access to coastal resources, control non-point
sources, and conduct estuarine research and management.40

Despite the temptation to view coastal management and subsequent
legislation as simply a continuous exercise in adaptive management, such
an interpretation would fail to recognize that, even before the CZMA and
the CCMA were adopted, there were other laws bearing upon the protection
of Connecticut’s coast and the Long Island Sound. After the coastal
management legislation, new laws were adopted and brought to bear upon
the coast and the Sound with little or minimal attention to coastal
management. Federal environmental legislation involving water pollution
(non-point sources), air pollution control (air deposition), fisheries
management, control of ocean dumping, and protection of marine
sanctuaries are some of the laws adopted or expanded after the coastal
management legislation. In addition, a variety of development-oriented
laws, including new energy and aquaculture legislation, facilitated
developments in the Sound.41

The subsequent laws pose the following questions: Why were they
needed? Were they necessary to correct the inadequacies of the initial
CZMA and CCMA and, if so, what were those inadequacies? Moreover,
since those laws were passed, and since many of them had little explicit
relationship to the coastal management program, were such state and
federal programs “coordinated” by CZMA and CCMA and, if not, why not?
What lessons regarding the feasibility of an integrated coastal management

supra note 23, at 151–52 (explaining how amendments affected the CZMA and its application).
(2006); Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801–03 (2006);
(relating to offshore alternative energy leases).
A rough chronology of issues arising out the coastal management law and its allied programs includes modification of traditional land use laws (beginning in the 1960s), new provisions governing beach access (beginning in the 1960s), tidal wetlands regulation (developed in the 1970s), fishery management (expanded in the 1980s), and non-point source pollution control (taken seriously in the 1990s and after). Issues concerning electricity generation and energy production extended over the full half century from the first nuclear plants in the 1960s to the recent natural gas proposals of the last few years. Each of these issues has a life cycle of its own, which can be seen as waxing and waning with the years.

A. Coastal Land Use Regulations

The adoption of the Coastal Zone Management Act in 1972 took place at a time when there was a “quiet revolution” in the land use law of many states, with an increase in the power of states to plan and control for “critical areas” and “developments of regional impact.” Although the National Planning Act, which sought “revolutionary” changes in all state and local land regulation, was not enacted, the CZMA, which was part of the original bill, was enacted in response to many of the coastal problems resulting from inappropriate land uses. Thus, the congressional findings of the law refer to ill-planned developments and inadequate land and water use regulations—regulations that directly affect the quality of the waters and habitats. The declaration of policy reiterates the law’s intent to authorize control of some coastal developments, and the management programs require “controls of land uses . . . .”

Because the national coastal management law directs its attention to land use planning and regulation, which had been traditionally part of state and local regulation, rather than a federal mandate, states were given the

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42. FRED P. BOSSELMAN, DAVID L. CALLIES, COUNCIL ON ENVIRONMENTAL QUALITY, THE QUIET REVOLUTION IN LAND USE CONTROL (1971).
43. Coastal Zone Management Act, 16 U.S.C. § 1452(2) (2006). See Fletcher, supra note 23 (clarifying the general statutory scheme of the CZMA and explaining how the CZMA works); BURROUGHIS, supra note 23 (examining how states have chosen to undertake coastal management); BOSSELMAN & CALLIES, supra note 23 (illustrating the various novel land use laws several states have adopted); Bronin, supra note 23 (examining the shift from governmental authority to local authority in the protection of critical coastal zones).
44. Coastal Zone Management Act, 16 U.S.C. § 1451(g), (h), (k) (2010).
45. Id. §§ 1452(1)(B), (D), (E), (F), 1455(2)(D).
option of undertaking a management plan. Financial incentives for state planning and administration of coastal programs were offered in the early years.

If the state chose to undertake coastal management, then it was necessary for the CZMA to require the state to ensure coordination among municipalities and between municipalities and the states. This was because the CZMA focused upon the “coastal zone” extending beyond any one municipality or county, and because, prior to its adoption, many coastal states and municipalities had undertaken comprehensive plans and zoning and subdivision regulations dealing with coastal wetlands. The CZMA also offered options for states to elect the kind of management program they might adopt to meet the federal criteria for a satisfactory program. These options include a “direct state program” in which the state governs permitting, a program in which the state establishes criteria and standards for local implementation, or state review of all plans, projects, and regulations. As indicated above, Connecticut adopted a combination of the second and third approaches, setting forth a set of detailed policies that were to guide both the relevant state agencies and municipalities in their coastal projects and permitting decisions.

As indicated elsewhere, the applications of these policies were illustrated in the drafting of a model municipal coastal program which embraced model plans, regulations, planning methods, procedures for revision of plans, and regulations to conform with coastal policies and suggested criteria and procedures. Later, a detailed state manual was prepared to help guide municipalities. Detailed requirements were set forth in the Connecticut statute for municipal coastal programs requiring revision of existing comprehensive plans, zoning, subdivision regulations, and a variety of other land use ordinances in light of the myriad of statutory policies. The revisions are subject to review by the Commissioner of

46. Id. § 1455(3)(A).
47. Id. § 1455(11).
48. See id. § 1455(1)–(16) (listing the federal criteria).
50. CONN. GEN. STAT. ANN. § 22a-92 (West 2010).
52. CONN. GEN. STAT. ANN. § 22a-96 (West 2010).
53. Id. § 22a-101.
Environmental Protection for consistency with the coastal policies, but need not be approved by the Commissioner to go into effect.\textsuperscript{54} In addition, coastal municipalities had to require specific coastal site plans for all subdivisions, special exceptions, variances, and rezoning which assess the impact of proposed activities upon coastal resources and upon “any goal or policy.”\textsuperscript{55} The approval or denial of these plans may be reviewed by the Commissioner.

As a consequence of these statutes, over the past three decades, the coastal communities revised their land use regulations and related ordinances for consistency with the coastal management policies. To offer but one example, the City of New Haven revised its comprehensive land use plan by means of a 3,700-acre overlay district under which coastal site plans are required, development standards are specified, a “coastal benefits” program is initiated, shoreline stabilization is undertaken, arrangements for coastal access are made available, and economic development programs are incorporated.\textsuperscript{56}

Many of these municipalities have also undertaken to implement the requirement of coastal site planning. Coastal municipalities may include coastal policies as part of their conservation and management plans, their zoning regulations, and their site plans. For example, since the loss of tidelands is often due to the nibbling away by small developments, regulated at the local level, this approach handed the task of tidelands regulation for smaller developments to the localities. Several cases litigated since the CCMA was enacted suggest that at least some towns and cities have included coastal policies in their plans and regulations, and the Connecticut courts have upheld the municipal denial of development based upon these regulations.\textsuperscript{57}

Evaluating the impact of these land use regulations is difficult. The updated assessment of the program suggests that there are now a low loss of tidal wetlands, an undertaking of a wide variety of management efforts to prevent or mitigate coastal hazards, improvements in coastal access, and minimization of the increase of land cover as “developed.”\textsuperscript{58} Thus, the

\textsuperscript{54.} Id. \S 22a-110.
\textsuperscript{55.} Id. \S\S 22a-105–22a-109. These provisions were initially suggested by Professor Terry Tondro of Connecticut Law School.
\textsuperscript{57.} Pinchbeck v. Planning & Zoning Comm’n of Guilford, 796 A.2d 1208 (Conn. 2002), cert. denied, 806 A.2d 1065 (Conn. 2002).
\textsuperscript{58.} ASSESSMENT, supra note 49.
coastal land use plans and regulations appear on the face to retain an integrated approach to coastal management, at least on a town by town basis.

However, by delegating the regulation of a myriad of land use developments on a town-by-town basis, the coastal program was fractured into a variety of local land use decisions. This fracturing of the management program makes it difficult to assess the overall impact of the coastal management program. Two exceptions are the current Sentinel Monitoring Program for Climate Change in Long Island Sound, which is presently underway, and the Connecticut Coastal and Estuarine Land Conservation Program Plan.

B. Beach Access

Unlike many coastal states, Connecticut’s beaches are not impressive. Connecticut lacks the broad and long barrier beaches and, for the most part, her beaches are small crescent shaped stony affairs (a gift of the Ice Age!). Nevertheless, one residue of the civil rights movement of the 1950s was the effort to secure more equal access for minorities and others to the beaches of the coast, including those in the Sound. In the 1960s and early 1970s, the civil rights movement led to an effort to strike down exclusionary zoning laws, which excluded low-income and black residents from certain areas of the city. This effort was joined to an effort to strike down municipal residents-only restrictions on beach access, which was supported by the rise of the notion of a public trust in beach access. In the late 1960s, a federal beach access bill was proposed, followed by proposed language in the National Planning Act. The CZMA made vague reference to beach access, and the CCMA also made some carefully crafted references.

During the drafting of the CCMA, we gave careful attention to the beach access issue. Because the Connecticut beaches were, for the most

59. To be sure, these decisions had to incorporate state wide policies, the site plans were subject to review by the Commissioner of Environmental Protection, and there were supplemental statewide controls for dredge and fill. However, there was no statewide comprehensive coastal plan.

60. ASSESSMENT, supra note 49, at 37–47 (discussing the Sentinel Monitoring Program for Climate Change in Long Island Sound).


63. U.S. SENATE, supra note 22.
part, small crescent beaches controlled either by municipalities or residential associations (members of which were state political officials with summer homes on the coast), we decided to leave that battle for another day. That day arrived with the 1980 amendments to the CZMA, which adopted more explicit language providing grants to promote beach access at the same time that it provided incentives for not building upon barrier beaches. Hence, at least in theory, this lowered the amount of beach land available for development.64 The statutory language of the CCMA remained unchanged. It was more than a decade later that the Connecticut Supreme Court upheld the right of non-residents to beach access on the Sound in Leydon v. Town of Greenwich, based upon a constitutional freedom of association. The plaintiffs, in their complaint, and the Connecticut Supreme Court, in its decision, made no mention of the CCMA.65 The Connecticut Department of Environmental Protection has sought to promote beach access through better signage for state beaches and the removal of municipal erected barriers beyond the mean high tide line, but neither the state nor the program has sought to challenge the differential fees that many coastal municipalities continue to apply to residents and non-residents. A recent report evaluating the CCMA lists many state beaches and parks, as well as municipal beaches, which are now accessible to the general public; the report indicated that no programs to promote beach access were to be undertaken at the present time.66

The beach access problem raises the fundamental question of how to think about fairness in the distribution of coastal resources and the more general issue of how environmental resources are to be distributed in pursuing sustainability. This issue has also been raised by tidelands development applicants who claim to be treated unequally and fisherman who are disputing their fish quotas and other fish regulations. The law has sought to address the issue of beach access by appealing to several doctrines: (1) the common law and statutory public trust doctrine, which is deemed to ensure lateral passage of the public beyond the mean high tide

line; (2) the constitutional doctrine of equal protection, which seeks to strike down grossly unequal municipal fees charged for access to municipal beaches; and (3) the constitutional First Amendment doctrines, which view obstacles to beach access as a barrier to free association and free speech. All of these rationales suggest that different meanings can be given to coastal access.

C. Depletion of Coastal Wetlands

The coastal tidelands of the Sound were protected by a vigorous, but not totally successful, permitting program adopted in the 1950s and 60s and implemented in the 1970s prior to the adoption of the CCMA. Aside from federal legislation requiring a permit for the dredging and filling of wetlands, the state had its own tidal wetlands program that required permits for developments in tidal wetlands, and that also operated to provide the required certification for federal permits. There were also permits required under local zoning regulations enabled by state law.

When adopted in 1979, the CCMA provided two avenues for the applicability of coastal management policies to tidal wetlands permits. First, there was an explicit requirement that any state tidelands permitting be consistent with the range of coastal zone policies. These policies were explicitly incorporated by statutory references in both the CCMA and the tidelands law. As a consequence, the regulations of the state tidal permitting program include explicit attention to both coastal policies. Thus, rather than build a new state “coastal bureaucracy” with new permits, the CCMA modified the decision-making of the existing bureaucracy. Such an approach mirrored a similar approach taken under federal law by NEPA and the approach for modifying local land use decision-making described above.

One of the central issues of the tidelands program, when fully implemented in the 1970s, was the constitutionality of the permit requirement under state and federal law. In 1974, the Connecticut Supreme Court upheld the state tidelands legislation against a takings challenge under federal and state law. The court held that, unless there is “practical

67. See Poirier, supra note 62 (examining issues of race and class in the environmental movement).
70. Id. §§ 22a-28–22a-35, 22a-92, 22a-93(7).
confiscation” of all value of the land, the court would balance the degree of diminution of value, the nature of the harm threatened, and the alternatives available to the plaintiff.\textsuperscript{71} This case was followed by takings challenges under the CCMA, and its rationale helped to shape the administration of tidal permitting.\textsuperscript{72} Reports on tideland permitting in Connecticut indicate that the Department of Energy and Environmental Protection approves the vast majority of permit applications; however, most of the permits issued have conditions placed upon them. This approach reflects the natural consequence of the court opinion in \textit{Breciaroli}, where the court upheld the regulation in part because it left some of the property open for development.\textsuperscript{73}

Coastally-related Connecticut claims of unconstitutionality for either the taking of private property or violation of due process are not limited to tidelands challenges. Perhaps the most famous case is the \textit{Kelo} case, in which there was an unsuccessful challenge to New London’s efforts to redevelop a coastal community.\textsuperscript{74} Takings cases in the U.S. Supreme Court and other jurisdictions demonstrate that there is a generic issue inherent in the taking of private property in the regulation of coastally related activities, whether that activity is the development of tidal lands, the securing of fishery permits, or the retention of one’s house with a view of the water.\textsuperscript{75}

\begin{itemize}
\item 72. \textit{See}, e.g., DeBerardinis \textit{v.} Zoning Comm’n of Newark, 635 A.2d 1220, 1224–25 (1994) (discussing that the imposition of conditions on a coastal site plan under the CCMA was not a taking in absence of proof of a final deprivation (citing Gil \textit{v.} Inland Wetlands Agency of Greenwich, 503 A.2d 1368 (1991))).
\item 73. Brecciaroli, 362 A.2d at 951. Unfortunately, information is not available about the nature of these conditions and their enforcement. However, the reports indicate that recipients of the permits have compensated for the loss of wetlands by granting significant amounts of restored tideland areas in mitigation.
\item 74. \textit{Kelo} \textit{v.} City of New London, 545 U.S. 469 (2005). \textit{See} Richard O. Brooks, \textit{Kelo and the “Whaling City”: The Failure of the Supreme Court’s Opportunity to Articulate a Public Purpose of Sustainability, in THE SUPREME COURT AND TAKINGS: FOUR ESSAYS 5–21 (2006) (explaining how the Supreme Court’s failure may be a benefit to the environmental community).}
\item 75. \textit{See} Lucas \textit{v.} S.C. Coastal Council, 505 U.S. 1003 (1992) (denial of permit to build in critical beach area was a taking, when no economically viable use of property remained and state action was not based on “background principles” of law); Palazzolo \textit{v.} Rhode Island, 533 U.S. 606, 617 (2001) (denial of permit to build in wetland was not a taking where significant portion of total parcel remained buildable, though preexisting land use regulation was not a “background principle”); Stop the Beach Renourishment, Inc. \textit{v.} Fla. Dep’t of Envtl. Prot., 130 S. Ct. 2592 (2010) (holding a state beach renourishment project was not a taking of upland owners’ littoral rights, which, as reasonably interpreted by the Florida court, were “background principles”); Gove \textit{v.} Zoning Board of Appeals of Chatham, 831 N.E.2d 765 (Mass. 2005) (denial of building permit on barrier island flood plain not a taking where some value remained and \textit{Penn Central} regulatory takings test satisfied); La. Seafood Mgmt. Council \textit{v.} La. Wildlife and Fisheries Comm’n, 715 So.2d 387 (La. 1998) (commercial gillnet ban not a taking).
\end{itemize}
All of these property and market claims have implications for viewing the Sound and its coast as an ecosystem.

D. Overfishing and Harvesting

In the Introduction, I identified some of the fishing-related problems of the Sound, including the overfishing of fish stocks, the overharvesting of lobsters, as well as diseases affecting oyster stocks. In addition, a variety of other activities threatened harmful conditions for the growth of future fish populations. Water pollution, developments reducing tidal wetlands and affecting sediment bottoms, and deposition of air pollutants are some of these activities. Prior to the adoption of the CCMA in 1980, there was both state and federal regulation of some aspects of fisheries. In 1976, the basic fishery management law, the Magnuson-Stevens Act, was adopted.\(^76\) This law created eight regional fishery management councils, one of which—the New England Fishery Management Council—includes Connecticut and, thus, oversees the region that includes Long Island Sound.\(^77\) In the 1980s, the Councils prepared fishery management plans and began the thankless task of regulating the fisheries. Amendments to this law in the 1980s included requirements to ensure the long-term health of the fisheries, protect their “essential habitat,” and specify the scientific data needed to develop adequate fishery management plans.\(^78\)

The 1990s marked a more serious effort at fishery regulation in the Sound. The Atlantic Fisheries Cooperation and Management Act of 1993 facilitated the establishment of the Atlantic States Marine Fisheries Commission to facilitate state representation in the management of the fisheries.\(^79\) This Commission has developed fishery management plans for 24 Long Island Sound species, including the American lobster—one of the few that has currently been designated as “overfished” in the Sound region. Legislation in the 1990s, the Sustainable Fisheries Act, also began to promote giving attention to “essential habitat” as part of the fish management plans and attention to fisheries communities.\(^80\) As a


\(^{78}\) Id. § 1853.


consequence, the Commission has begun to undertake limited habitat study and management efforts.

Although the CZMA and the CCMA mentioned the importance of fish resources as part of the coastal ecosystem and applied their policies to the fish habitat of tidal wetlands, the CCMA failed to establish a legal basis for an explicit and direct connection between fisheries management at the federal and state levels and its own coastal management policies. Although there has been no litigation, the fishery management plans and their regulations constitute federal activities and permits that are subject to the consistency requirement of the CZMA and the CCMA. In addition, the CCMA has sought to regulate at least some of the development activities that would affect the habitats for fisheries by inserting coastal policies as part of tidal wetland regulations.

With the advent of the Long Island Sound Program discussed in section E below, there were additional fishery-related activities undertaken, including a variety of restoration efforts of fish, bivalve, and crustacea habitats. These activities are authorized by recent Connecticut legislation to promote aquaculture.81 This effort has been particularly successful with the production of soft-shelled clams. However, an unexpected outbreak of MSX disease recently decimated the previously restored oyster population; this population is presently recovering.82

The history of fishery management, while revealing an increasing recognition of the ecosystem, also demonstrates some of the serious scientific problems that bedevil fish management on the coast or elsewhere. First, there are a variety of migratory fish populations, many of which are not limited to any one coastal area. Second, fish habitat conditions are influenced by the conditions of the tributary rivers, tidal wetlands, air deposition, sedimentation, water quality, presence of other fish species, as well as the fishery practices themselves. Knowledge of these factors remains limited as evidenced not only by the MSX outbreak, but also the recent case of Fox v. Cheminova, Inc.83 In Fox, commercial lobstermen from Connecticut and New York brought a class action in tort against the manufacturers of insecticides for a massive die-off of Long Island lobsters.84 These insecticides allegedly caused the die-off when sprayed in

81. CONN. GEN. STAT. ANN. §§ 22-11c–22-11h (West 2010).
82. See ANDERSEN, supra note 4, at 228 (examining the cause of the oyster and lobster die-offs in the Bay during the late 1990s).
84. Id.
New York City in 1999 to prevent the spread of the Nile Virus. The court certified the class and, after two of the defendants had settled, denied the remaining defendant’s motion for summary judgment in part because there were material issues of fact as to whether the spray was indeed the cause in fact of the die-off. The defendants had claimed that the insecticide had been used elsewhere and at different times, that other pesticides were used, and that many other conditions of the Sound could contribute to the die-off. The case illustrates the fortuitous events that can affect the Sound and the myriad of causal conditions that will determine the health of its occupants.

E. Non-Point Sources and Hypoxia in the Sound

In the summer of 1987, Barbara Welsh, a leading scientist of the Sound, recorded the lowest oxygen readings ever seen in western Long Island Sound, 1 milligram of oxygen per liter at a depth of 28 feet. What Welsh measured was the consequence of both point source pollution (especially from sewer treatment facilities) as well as non-point sources from air deposition, agriculture, construction, marinas, hydro-modification, and natural sources. The hypoxia of the Sound became the principal focus of pollution clean-up in the Sound over the past decade.

The chronology of the federal and state efforts to control non-point source pollution is a long and unhappy story. It began with the Federal Water Pollution Control Act of 1972, which enabled the planning for control. In 1985, the second Long Island Sound study identified non-point source pollution of the Sound to be a serious problem. In 1987, the federal National Estuary Program was enacted and new non-point source requirements were adopted in the amendments to the Clean Water Act. In 1988, the Long Island Sound became an “estuary of national significance”
in the national estuary program. In 1990, reauthorization amendments of the CZMA authorized enforceable controls for non-point sources affecting coastal waters.92 In 1994, the Long Island Sound Study (LISS) issued a Comprehensive Conservation and Management Plan (CCMP) and in 1996, the Governors of New York and Connecticut signed the Long Island Sound Agreement. The Long Island Sound program identified seven issues: (1) low oxygen (hypoxia); (2) toxic contamination; (3) pathogen contamination; (4) floatable debris; (5) habitat degradation and loss of health of living organisms; (6) public involvement; and (7) land use issues.93 As part of the non-point source program, both states have introduced “best management practices” directly, as part of a watershed planning process and in making efforts to restore the Sound habitat.

Following the CCMP and the LISS agreement, the two states and EPA made a commitment to reduce nitrogen, primarily from sewer treatment facilities, as part of the attack on hypoxia. A three-phase plan began in 1990 with the freeze of a selection of regional sewer plants’ discharges of nitrogen and the subjecting of those plants to a non-net increase. In the second stage, reductions were adopted in selected plants by adopting low-cost nitrogen removal. As of 1996, human-caused nitrogen levels showed modest reductions. In the third phase, minimum oxygen benchmarks were set. A cost effectiveness study was conducted, which appears to show that, perhaps with a certain capital cost for upgrades, minimal oxygen improvement was attained. But, for various reasons, the third phase plan proposed to allocate responsibility for upgrades of sewer treatment facilities equally in 11 management zones.94 However, this is modified by the nitrogen trading program.

In 2001, Connecticut adopted legislation enabling a nitrogen trading program. Initially, the participants were approximately 79 Connecticut sewage treatment plants. A cap was established by a general permit containing the Total Maximum Daily Load (TMDL) for the total nitrogen that may be discharged each year by the combined sewage plants. The cap declines each year until 2014, when the TMDL requirement is met. The permit for each plant sets its nitrogen limit, which it can meet by either


controlling its pollutants or purchasing credits from the state. Plants emitting less than their TMDL cap can sell credits to the state. Credit ratios were established to reflect the fact that some plants are in less hypoxic areas and others are in more hypoxic areas. At the end of the year, each plant that controls in an excess amount will receive payments from the state. Each plant that does not make its permitted amount by controls must purchase credits from the state. The 2010 report on the program suggests a significant amount of both distribution of credits and payments and an on-time staged reduction of nitrogen pollution.95

Many questions remain regarding the program. How harmful is hypoxia, especially if it is temporary and occupies only one part of the Sound? How accurate is the estimation of the sources of hypoxia and, hence, what relative impact will the nitrogen controls have? Another way of asking the question is: How accurate are the TMDLs? The major location of the hypoxia is in the western Sound, where it is caused largely by New York facilities. Yet, New York chose not to participate in the trading arrangement because upgrades of their plants were already underway and some plants were subject to court orders. In fact, a 2010 report from the state on hypoxia projects very modest gains in the Sound.96 The cost estimates provided by a 2006 report suggest that, beyond a limited capital investment, there is no significant benefit in reduced hypoxia as capital investment increases.97 It is unclear whether the level set by the TMDL reflects this economic reality.

As of 2010, the amounts of reduction of nitrogen were on schedule as phased in over time, but what does the progress as of 2010 signify? Unlike some air quality trading, the water quality trades are affected by significant public subsidies for upgrades to participating plants, making it difficult to determine whether any improvements are due to trading or public investments. Finally, the trading program envisages ratios between areas depending upon the hypoxia levels. It is unclear what effect such ratios may have in affecting non-degradation in the future.98


96. See id. (highlighting the fact more plants will be coming online to help further reduce nitrogen pollution on the Long Island Sound).

97. REPORT OF THE NITROGEN CREDIT ADVISORY BOARD, supra note 89.

Many of these doubts are reflected in the changing of the TMDL rule in 2010. This revision includes a recent agreement to expand the program to surrounding states.99 Such an expansion indicates that, at a minimum, the program as targeted at the Connecticut plants is not sufficient to reduce hypoxia in the Sound. Further modeling of a wider range of nitrogen sources, including the modeling of air deposition sources, is under way. It remains to be seen whether all of these efforts will yield more dramatic results in the immediate future.

F. Impacts of Electricity Generation and Energy Production

Over the last fifty years, the Sound has been a magnet for proposed and actual energy production and transmission. Near a major market for energy, the Sound offers a reservoir for cooling and a medium for energy transfers through electrical lines and gas pipelines.100 The CZMA does not prohibit electricity production and energy production facilities in the coastal areas and, indeed, appears to permit them, at least within some areas under its “national need” provisions. Similarly, the CCMA also did not explicitly prohibit electricity generation and energy developments to be sited on the Sound. There has been litigation over air pollution produced by coal- and oil-powered plants—such pollution may well settle over the Sound. Such litigation has not been successful,101 and, even if it were, it did not seek to completely prevent the deposition of sulfur oxide pollutants on the Sound. In addition, at least three nuclear power units have been built in Waterford, Connecticut; recent permits have conditioned their intake and disposal of water and other pollutants, but, unlike recent New York plants, closed cycle cooling has not been required.102 In the past decade, an electrical transmission line has been built across the bottom of the Sound, but not before a temporary moratorium was adopted by the Connecticut legislature.
and upheld by the courts. Interestingly, the moratorium was challenged in court as an unconstitutional taking, and, in assessing the public interest, the court looked to the coastal management legislative description of the Sound’s natural resources. More recently, a natural gas pipeline facility was proposed, but rejected, after extensive litigation under the Clean Water Act and the CZMA. In addition, a natural gas terminal was proposed, but rejected, by the Secretary of Commerce on a CZMA consistency determination on an objection under the New York Coastal Management legislation. Finally, ideas for a wind farm in the Sound have been circulated, but were abandoned in 2007 as uneconomical.

IV. THE LIMITS OF ECOSYSTEM MANAGEMENT

Our working hypothesis is that the status of knowledge is altered as societies enter what is known as the postindustrial age and cultures enter what is known as the postmodern age.

—Jean-Francois Lyotard, 1979

Nature in the twenty first century will be a nature that we make.

—Daniel Botkin, 2009


We saw above that the CCMA was part of a more extensive history of the coastal communities of Connecticut and New York’s Long Island Sound, beginning before the whaling ships sailed out of New London and extending to the present day. The law is merely a small part of a half-century effort to both develop and protect the Sound and its resources. The events that took place after the CCMA was enacted in 1979 reveal both its strengths and shortcomings. On the one hand, the law has helped coastal communities to attend to the coastal impacts of its land use decisions and minimize the eclipse of the tidal wetlands. It has provided some legal support for community opposition to developments such as the proposed natural gas terminal and pipelines. It laid the basis for the discovery, or at least the documentation, of hypoxia, which helped to stimulate the organization of the Long Island Sound Committee that promoted the control of hypoxia in the Sound.

However, this history also reveals limitations in the original CCMA. The original CCMA did not provide any legal basis for linkage of coastal management of fish habitat to the regulation of fishery management. It remained for amendments to the fisheries laws themselves to make the connection (which still remains weak). It did not offer support for “a working Sound” supported by aquaculture and other water-related enterprises. The efforts to control the significant water pollution impacts upon the Sound from both pre-existing and later nuclear power plants had to rely upon the federal Clean Water Act and corresponding state laws rather than on the CCMA, and these efforts failed. The effort to remove the cumulative point source and non-point source pollutants within the Sound was ultimately funded, for the most part, under new legislation, and it remains to be seen whether that effort will be successful. The CCMA also failed to provide a full resolution of the problem of beach access, deferring instead to the courts to weigh in on constitutional grounds.

As a consequence of shortcomings in the CCMA, other laws stepped into the vacuum, including constitutional claims for equal beach access, amendments to the fisheries management laws, new funding for sewer treatment facilities, increased regulation of some energy facilities, and renewed attention to air deposition. These initiatives may be regarded as adaptations of the original CCMA. However, they may represent the fact that, despite the adoption of coastal legislation, the culture of the coast remains and the ways and norms of life, concerns about private property and equality, urgent economic needs, and traditional patterns of waste disposal continue.

Why has the CCMA legislation and later legislation not been more successful? First, the CCMA echoes its land use origins, focusing upon land
developments in the immediate coastal area. Hence, the law cut itself off from the planning, management, and control of water and water resources such as the fisheries. Second, the initial boundaries of the coastal area and the coastal zone did not reach to the watershed that contained many of the past industries and present sewer treatment facilities that affected the coastal resources and the water quality in the Sound. Nor did the law extend its jurisdiction to the air pollution deposition upon the Sound from sources outside the immediate coastal area. Only with the 1990 federal Clean Air Act amendments was serious attention paid to air deposition. Third, the funding of all of the laws was modest, which, in turn, limited the funds available to encourage benign water-related uses, and, equally important, pay for environmental protection and restoration.

There is, however, another reason for the failure of the CZMA’s and the CCMA’s efforts to ensure ecosystem management. There was no successful scientifically-guided Sound program. Despite the provisions in both the federal and state coastal management laws, proper assessments and monitoring were not undertaken. This failure is a failure to meet the principles which I call the principles of “Tier II” ecosystem management. The U.S. Ecosystem Advisory Panel identified a series of these principles: (1) the limited ability to predict ecosystem behavior; (2) the presence of thresholds and limits which, when exceeded, can effect major system restructuring; (3) the possibility of irreversible change; (4) the importance of diversity to ecosystem functioning; (5) the presence of multiple scales within and among ecosystems; (6) linked components of ecosystems; (7) open boundaries; and (8) change of ecosystems over time.109

The history of regulation of the coast and the Sound reveals that knowledge is lacking in regard to this system. Fisheries management cannot predict the relative impacts of water quality, habitat condition, and other factors on the fish population. The impacts of many energy activities upon fish population and the sediment conditions are difficult to assess. The relative contributions of point sources and non-point sources to overall pollution of the Sound are difficult to quantify.

One of the principal reasons for the lack of firm knowledge about the relations among the components of the Long Island ecosystem is that these “natural relationships” are affected by the fact that the Sound and its coast are heavily influenced by a range of social and economic activities of the surrounding human community. For example, given the multiple changing

human activities influencing the flow of non-point source pollutants into the Sound, as population changes, agricultural activities shift, construction waxes and wanes, marinas grow, air pollution changes, and the natural sources of pollution change, the total amount and location of pollutants in the Sound will change. Consequently, it is necessary to see these changing relationships of natural variables as part of a larger social and political system.

The acceptance of this surrounding economic and social activity and its impact upon the natural ecosystem of the Sound poses a challenge for sustainability.

V. THE LONG ISLAND SOUND AND ITS COAST: THE PLACE OF AN URBAN INSHORE COMMUNITY

*Our entire landscape tradition is the product of a shared culture . . . built from the rich tradition of myths, memories and obsessions.*

—Simon Schama, 1995

*The state comes into existence, originating in the bare needs of life, and continuing in existence for the sake of the good life.*

—Aristotle, 384-322 BC

The CCMA was enacted before most laws began to express the evanescent and diaphanous ideal of sustainability. “Sustainability” is a term that assumed public popularity with the World Commission on Environment and Development’s *Our Common Future* in 1984. Since then, sustainability has been a popular idea and one which has festooned the titles of several more recent environmental laws, such as the “Sustainable Fisheries Act.”

110. SCHAMA, supra note 2, at 14.


I do not plan an extended discussion of the nature of sustainability here. I am content to adopt Bryan Norton’s schematic definition in his now classic work, *Sustainability*, as “a relationship between generations such that the earlier generations fulfill their individual wants and needs so as not to destroy or close off, important and valued options for future generations.” According to Norton, the implicit values of such sustainability are: (1) “community-procedural values,” in which the individuals’ relationship to the environment is defined as a shared responsibility of the relevant community to present and future generations; (2) “weak sustainability values” indicated by economic measures of the value of the environment and its services now and in the future; (3) risk avoidance values, in which unacceptable risks are avoided, now and in the future; and (4) community identity values which individuals develop in their ways of life over time and project, through their life ways, for future generations.

If one were to examine the history of the laws pertaining to the Sound, there is little doubt that “community-procedural values” have been expressed in frequent and widespread citizen action to “save the Sound.” Some of the federal and state laws listed above seek to ensure the protection and development of the Sound by enabling citizen participation. Although we neglected to include an explicit citizen participation provision in the CCMA, the law was adopted with a substantial number of public hearings and the law indirectly incorporates the participation mandated as part of local planning and zoning laws. Earlier and subsequent federal and state laws strengthened the standing of citizens to sue. Turning to the second

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116. *Id.* at 365.


measure of sustainability within the planning process, there have been sophisticated efforts to measure the economic values of the Sound—although much of this effort remains limited to the valuing of fisheries resources. In the case of energy facilities, cost/benefit analysis is applied to nuclear development as part of environmental assessments and/or environmental impact statements. These include the controversial estimation of economic value of future benefits as indicated by a present value measured by the use of discount rates. Great debate continues to swirl around cost/benefit analysis and discount rates. The third dimension of sustainability—the avoidance of present and future unacceptable risks—characterizes most of the environmental protection efforts in the Sound, but each of the laws clearly embraces something less than zero risks. Thus, for example, the management measures adopted for non-point source control under the CZMA have to be “economically achievable.”

It is the fourth dimension of sustainability—the projection of community identity values—that I deem to be most important. Community is implicit in the participation of citizens in the management of the Sound. A community’s values are reflected as they seek to balance both the economic values of the past and future, as well as the appropriate level to be set between economic and environmental goals. But the sustainability
of the Sound calls for something more—the values of a place-based social culture of the inshore community—the working landscape of a way of life that is not captured in ecosystem language. It is the underpinnings of this way of life that interfere with any mechanical understanding of the natural workings of the Sound and its coast as a whole.

This projection of a way of life is captured in the recent 2009 decision in the Consistency Appeal of Broadwater Energy LLC and Broadwater Pipeline LLC.124 In this decision regarding the proposed Long Island Sound natural gas terminal and pipeline, the U.S. Secretary of Commerce held that, although the project served the national interest by serving the needs for natural gas in the Northeast, these national needs did not outweigh the adverse coastal effects—especially the effects on scenic and aesthetic enjoyment. The Secretary found that, “[w]hile the scenic and aesthetic effects might carry less weight if located elsewhere, they are significant when occurring in an area that is nationally prized by federal, state, and local governments in a manner calculated to protect its unique scenic and aesthetic character.”125

The Secretary based this conclusion, in part, on New York’s argument:

The visual landscapes of the Sound are valued for their sweeping, unbroken water vistas, with views to the distant Connecticut shoreline and the transient passage of freighters, ferries and commercial fishing vessels. These landscapes are a ‘major contributor to the character’ of the region and the primary basis for public appreciation of the Sound’s landscape.”126

In short, what underlay the landscape of the Sound to be protected was not the ecosystem alone, but the scenic identity resting upon the workings of the inshore way of life.

125. Id. at 20.
126. Id. at 18–19.
In writing this paper, I discovered that not only did the federal and Connecticut coastal management laws that I have described seek to protect the large estuary that is Long Island Sound as an ecosystem, but they also embodied concerns about sustainability, seeking to reconcile the importance of ongoing economic activities with environmental protection and restoration for both present and future generations. This discovery was a shocking one to me. I had hoped to celebrate the coastal management laws as embodying a continuous holistic ecosystem view, implemented to protect the Sound over the years. What I discovered is that the coastal management laws were not fundamentally an ecosystem management tool; they were not designed primarily to protect the nature of the Sound, but to perpetuate the urban sea of which I had been a happy resident. I found that the problems which the coastal laws adopted subsequently to the CCMA, and litigation related to them, concerned activities well beyond nature itself, appealing to legal and political norms that were not part of the original ecosystem management effort, but that were part of our political and legal culture. Most shocking, I came to believe that, ultimately, the Sound and its urbanized coast is best understood as a place-based urbanized inshore community embodying both a natural environment and a cultural history which reflect and shape—in contradictory ways—the current and future ways of life of its denizens. As Broadwater shows, these ways of life can be sustained only in continual tension with the natural environment.
SIX FLAGS REVISITED: COASTAL ZONE MANAGEMENT OR MARINE SPATIAL PLANNING FOR LAKE CHAMPLAIN?

L. Kinvin Wroth*

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INTRODUCTION

In a previous paper, I noted that six national, sub-national, and international regimes assert jurisdiction over Lake Champlain.1 I described the statutory, regulatory, and other instruments through which they assert jurisdiction and their efforts to coordinate measures affecting the

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1. L. Kinvin Wroth, Six Flags over Champlain: Starting Points for a Comparative Analysis, 38 J. of Great Lakes Res. (Supp. 1) 167 (2012) (this article provides the foundation upon which this introduction and Part I below are based).

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* Professor of Law and Director, Land Use Institute, Vermont Law School. The author wishes to thank the students in his spring semester 2011 course, “Regulating the Marine Environment,” upon whom he inflicted the question posed in this article as a final examination and whose insights illuminated his understanding if they did not provide the answer. The author also wishes to express his gratitude to Briana Collier and Patrick Donoghue, both JD VLS 2011, and Vanessa Brown, JD VLS 2012, whose research papers provided useful information and insights on particular issues. CORRECTION: This article reflects changes made since the original print publication.
environment of the Lake.\textsuperscript{2} In the present paper, I ask whether the federal Coastal Zone Management Act or the Obama Administration’s recent Coastal Marine Spatial Planning Initiative could apply to Lake Champlain and, if so, whether their application would advance the efforts of these measures. In the process, I hope to suggest some broader insights into each.

Lake Champlain, 120 miles long, with depths to 400 feet and widths ranging from a few hundred yards to twelve miles, is bounded on the east by Vermont, on the west by New York, and on the north by the Province of Québec.\textsuperscript{3} As a result, it is subject to the sometimes conflicting legal systems, not only of those three jurisdictions, but of the United States, Canada, and the regime of international law. Each of these six jurisdictions has a significant stake in the environmental quality of the Lake and its watershed. Vermont constitutes fifty-six percent of the land area of the Lake Champlain Basin and is home to sixty-eight percent of its population; New York has thirty-seven percent of the land area and twenty-seven percent of the population; and Québec has seven percent of the land area and five percent of the population.\textsuperscript{4} Of the ten major tributaries which flow into the Lake, five enter from Vermont, four from New York, and one, the Pike River, directly from Québec.\textsuperscript{5} The Lake is part of the navigable waters of the United States and Canada and is an international water way.

Yet, the relatively modest size and remoteness of Lake Champlain mean that, despite continuing efforts, no overarching structure is in place to assure coordinated planning and regulation that would address the environmental, economic, and cultural issues that confront the Lake and its Basin. The roots of the situation lie in history: The common origin of the legal polity of the U.S. and Canada in Great Britain’s 18th-century North American empire; the military, and ultimately constitutional, American Revolution, which rejected Britain’s imperial framework in favor of a government of separated powers presiding over a federal union of states; Canada’s two-century evolution within the imperial framework to achieve national sovereignty as a confederation of provinces under a limited federal government, with legislative and executive powers still wielded by the

\textsuperscript{2} Id.
\textsuperscript{4} Quick Facts, supra note 3; LAKE CHAMPLAIN BASIN PROGRAM, supra note 3.
same hands; and the survival of the Civil Code as the private law of Québec in sharp contrast to the principles and methods of the common-law heritage of the other Canadian provinces, as well as most of the United States, including New York and Vermont. The result is that the watershed and waters of Lake Champlain are subject to the potentially conflicting statutes, regulations, and court decisions of the U.S., Canada, New York, Vermont, and Québec (with their underlying structural differences). They are also subject to the International Joint Commission (IJC) and other international bodies created by treaties and agreements designed to manage issues concerning the extensive border shared by these two largely peaceable and friendly neighbors.

I. Efforts to Date

Since the 1980s, recognition of shared interests has led to the creation of a quasi-governmental bi-national structure for planning and development of cooperative approaches to the problems of the Champlain Basin. Cooperative bi-national management began with a Memorandum of Understanding (MOU) signed on August 23, 1988, and renewed most recently in March 2010, by the governors of New York and Vermont and the Premier of Québec. Under the MOU, the two states and the province agreed to develop a joint approach to protecting the environment of the Lake and its Basin. Amendments to the federal Clean Water Act (CWA) in 1991 and 2002 established the Lake Champlain Basin Program (LCBP) in the U.S. The LCBP is charged with developing and updating a management plan for the Lake, channeling federal and other funding to projects implementing the Plan, and coordinating activities of federal agencies, state and provincial agencies, the International Joint Commission, and various NGOs. LCBP’s 1996 Plan, Opportunities for Action, was updated in 2010 and endorsed by the governors of New York and Vermont,

7. Id. at 170-71.
11. Id.
the premier of Québec, and the administrators of the Environmental Protection Agency’s (EPA) Regions One and Two.\textsuperscript{12}

The Plan covers various environmental issues, as well as economic and cultural concerns. In recent years, however, joint efforts have focused on the Plan’s highest priority among its substantive goals—reduction of excess phosphorus loading from point and nonpoint sources. Phosphorus loading affects the Lake’s water quality\textsuperscript{13}—a concern exacerbated and complemented by the continuing effects of the unprecedented flooding of the Lake and its watershed in both the U.S. and Canada in 2011. The principal effort to reduce phosphorus began in 2002, following a 1996 agreement and EPA-funded studies. New York and Vermont, as required by section 303(d) of the CWA for waters for which existing wastewater effluent limitations do not meet EPA-approved state water quality standards, adopted a jointly prepared Lake Champlain Phosphorus Total Maximum Daily Load (TMDL) with targets representing a thirty percent reduction from the total watershed load estimated in 1991.\textsuperscript{14} The EPA’s Region One office approved Vermont’s TMDL, and Region Two approved New York’s.\textsuperscript{15} Also in 2002, consistent with the TMDL, Québec and Vermont agreed to establish shared phosphorus load targets for Missisquoi Bay and apportion them between Vermont (sixty percent) and Québec (forty percent).\textsuperscript{16} The parties are free to choose appropriate point and nonpoint source controls to achieve the targets.\textsuperscript{17} In 2010, the Vermont Agency of Natural Resources (ANR), as directed by the Legislature, submitted a revision of the Vermont portion of the TMDL, proposing a ten-step

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\textsuperscript{13} Id. at 51.


\textsuperscript{15} See Guercio, supra note 14 (discussing Vermont and New York submission and the EPA’s approval of the joint TMDL).


\textsuperscript{17} Id.
phosphorus reduction plan at a projected 15-year cost of $500-800 million.\textsuperscript{18}

In 2005, the IJC noted that Missisquoi Bay’s phosphorus loads greatly exceeded the target levels set by the two states and Québec, and recommended that the U.S. and Canada take joint action to address the situation.\textsuperscript{19} In August 2008, at the request of Canada and the United States, the IJC established the International Missisquoi Study Board to gather data identifying critical areas that contribute disproportionately to phosphorus loading in the Bay.\textsuperscript{20} In coordination with the Board, the LCBP undertook a study to identify and rank critical source areas for phosphorus pollutants in the Missisquoi Bay Basin.\textsuperscript{21} The study, which identified numerous ways to prioritize and implement land treatment measures at major sub-watershed, sub-basin, and field scales, was released on January 3, 2012, and will be considered by the Study Board in preparing its report to the IJC.\textsuperscript{22}

Despite the willingness and continuing efforts of the six regimes to address a common problem through the LCBP with cooperative approaches, recent legal proceedings show that more needs to be done to make coordinated action effective. In 2008, the Conservation Law Foundation (CLF) sued the U.S. EPA in federal court in Vermont, claiming that the agency had violated the CWA in 2002 when it approved the Vermont portion of the Lake Champlain Phosphorus TMDL.\textsuperscript{23} CLF asked that the approval be set aside and that, as provided in the CWA, EPA be directed to establish a new TMDL that would satisfy section 303(d) of the

\begin{footnotesize}
\begin{enumerate}
\item VT. AGENCY OF NATURAL RES., REVISED IMPLEMENTATION PLAN FOR LAKE CHAMPLAIN PHOSPHORUS TMDL 3–5, 12, 19–21 (2010), available at http://www.leg.state.vt.us/reports/2010ExternalReports/252919.pdf. The plan was required by Act 130 of 2007 (Adj. Sess.), § 2, codified as 10 V.S.A., § 1386; see Guercio, supra note 14, at 491–92 (criticizing the plan for failing to integrate its strategies with existing statewide and local water quality planning and regulation, and for its significant cost).
\item STONE ENVTL., INC., supra note 19 at xvi.
\end{enumerate}
\end{footnotesize}
Although Vermont, as intervenor, moved to dismiss the action because CLF had failed to challenge the entire Lake Champlain TMDL and to join New York as a party, the court granted EPA a stay to reconsider its approval of the TMDL. The court held, in effect, that the CWA required separate analysis, and therefore separate evaluation, of the New York and Vermont components of the TMDL. In January 2011, EPA issued a determination disapproving the Vermont portion of the 2002 TMDL on the ground that portions of it did not comply with the CWA. CLF consequently withdrew its action. EPA has now begun the process of establishing a new TMDL in collaboration with Vermont’s ANR.

This case epitomizes the difficulties of developing a constructive approach to a critical environmental problem like phosphorus in Lake Champlain amidst different legal structures that control and sometimes conflict. EPA took a compartmented approach under a strict reading of the CWA in approving the TMDL in separate decisions. This approach, which also did not take into account Québec’s role, led to the narrow focus of CLF’s action. Acceptance of CLF’s focus by EPA—perhaps willing to move toward reconsideration under a new administration—further supported the court’s rejection of Vermont’s argument for recognition of New York’s interest, which ANR undermined with the 2010 proposed TMDL revision.

24. Id.; see 33 U.S.C. § 1313 (d)(2) (EPA to establish TMDL if it does not approve state TMDL).
26. Id.
27. See Letter from H. Curtis Spalding, Regional Administrator, U.S. E.P.A., to Deborah Markowitz, Secretary, Agency of Natural Resources (Jan. 24, 2011) available at http://www.epa.gov/region1/eco/tmdl/pdfs/vt/LakeChamplainTMDLDisapprovalDecision.pdf (reconsidering the 2002 approval of Vermont’s Lake Champlain Phosphorus TMDL and disapproving the Vermont portion of the TMDL); see also id. at 2 n.3 (noting that in the EPA’s Reconsideration and Determination, CLF had not challenged New York’s portion of the joint TMDL, and that, regardless, the statute of limitations had run on a possible challenge to Region 2’s approval of the New York portion of the joint TMDL).
II. A NEW FRAMEWORK

In light of the geography and economy of the Lake Champlain Basin, and the more than two decades of joint efforts to address the problem of phosphorus, CLF v. EPA illustrates the need to view the problems of the Basin as a whole—as suggested in the 2010 revision of Opportunities for Action.\textsuperscript{30} Much U.S. federal environmental legislation delegates considerable authority and responsibility to the states. In Canada, the constitutional balance of power gives the provinces significant authority and responsibility for environmental matters.\textsuperscript{31} Of the nine segments of the Lake identified for separate analysis and treatment by the 2002 TMDL, and the studies on which it was based, five are shared by New York and Vermont, one is shared by Vermont and Québec, and three are solely in Vermont’s jurisdiction.\textsuperscript{32} The tributaries that arise in all three jurisdictions and form the Lake’s watershed, to some degree, affect all the waters of the Lake. These three primary state and provincial jurisdictions operate within the overarching framework of U.S., Canadian, and international law, but the preceding section demonstrates that the framework lacks a focal point that can promote smooth and enforceable coordination among the six regimes.

The federal Coastal Zone Management Act (CZMA) and the Obama Administration’s Coastal marine spatial planning initiative (CMSP) provide two approaches to establishing such a framework. The CZMA was developed and implemented over nearly thirty years, whereas the CMSP was developed on a theoretical basis but is still largely untried. The purpose of considering their application to Lake Champlain is twofold: to examine their potential effect on the real problems of the Lake, and to use the issues raised by applying them as a means of reflecting more generally on their scope and effectiveness. The remainder of this paper will summarize the operating provisions of each and how they might apply to Lake Champlain, existing bodies of law, and an ecosystem divided by state and international boundaries. The paper concludes with a summary of conditions under which adoption of both measures would be a good solution to the issues confronting the Lake.

\textsuperscript{30} Opportunities for Action, supra note 12.
\textsuperscript{31} Wroth, supra note 1, at 2–3.
\textsuperscript{32} VT Dep’t Envtl. Conservation & N.Y. Dep’t Envtl. Conservation, supra note 14, at 1–6.
A. The Coastal Zone Management Act

The Coastal Zone Management Act of 1972, as amended, is an example of cooperative federalism. Though originally enacted with a broad purpose to protect marine ecosystems, its actual implementation has focused on economic and social sectors rather than ecosystems, and its real emphasis is on sustainability rather than ecosystem-based management. This is evidenced by its state-by-state planning approach, its local land-use orientation, and the increasing emphasis, in subsequent amendments, on accommodating commercial and industrial uses, and managing energy and climate issues. The Act provides that the Secretary of Commerce (acting through the National Oceanic and Atmospheric Administration (NOAA) pursuant to regulation) may approve a coastal management program submitted by a “coastal state” if the program meets specific and strict standards pertaining to both content and process, including development of a nonpoint source pollution control program. A “coastal state” is a state “in or bordering on, the Atlantic, Pacific, or Arctic Ocean, the Gulf of Mexico, Long Island Sound, or one or more of the Great Lakes.” Currently, thirty-five U.S. states and territories have approved programs. There are two major incentives for state participation: (1) A state with an approved management program is eligible for grants (of diminishing value) for administering the program, and for specific coastal resource and enhancement and other programs; and (2) federal activities and federally permitted activities, including offshore energy production, within, or affecting, a state’s coastal zone, must be consistent “to the maximum extent practicable” with the state’s management plan, unless exempted on a finding by the President that the federal activity “is in the paramount

35. Id.
37. 16 U.S.C. § 1453(4) (including “Puerto Rico, the Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, and the Trust Territories of the Pacific Islands, and American Samoa”).
interest of the United States,” unless the state concurs in the grant of a 
permit, or unless the Secretary finds on appeal from a state’s non-
concurrence that the permitted activity “is consistent with the objectives [of 
the Act], or is otherwise necessary in the interest of national security.”

Under the Act, a state may set the inland boundaries of its coastal zone 
“to the extent necessary to control shorelands” that may affect coastal 
waters or be vulnerable to sea-level rise. The seaward boundary 
extends to the outer limits of the state’s territorial sea, or in the Great Lakes to the 
international boundary. A state may implement its plan by establishing 
state standards for local implementation, by adopting direct state land use 
planning and regulatory legislation, by providing state administrative 
review of all local plans, projects, and regulations, or by a combination of 
these methods.

B. Coastal Marine Spatial Planning

Coastal Marine Spatial Planning is best understood as an 
implementation strategy for developing ecosystem-based management 
(EBM) in the context of a marine environment necessarily impacted by 
existing and projected human activity and development. The term is 
employed as the key component of the Obama Administration’s July 2010 
The Policy is designed to assure the health and productivity of the oceans, 
coasts, and Great Lakes by encouraging sustainable land uses; “using best 
available science”; supporting access and a variety of traditional maritime

40. 16 U.S.C. §§ 1456, 1465; see also Federal Consistency with Approved Coastal 
41. 16 U.S.C. § 1453(1).
42. Id.
43. Id. § 1455(d)(11).
44. CHARLES EHLER & FANNY DOUVERE, UNITED NATIONS EDUC., SCIENTIFIC CULTURAL 
ORG., MARINE SPATIAL PLANNING: A STEP-BY-STEP APPROACH TOWARD ECOYSTM-BASED 
MANAGEMENT 18 (Rachel Dahl ed., 2009), available at http://www.unesco-ioc-
mariesp.be/uploads/documentenbank/d87c0c-421da4593d93bbee1898e1d51.pdf; see also TUNDI 
AGARDY ET AL., UNITED NATIONS ENV'T PROGRAMME, TAKING STEPS TOWARD MARINE AND COASTAL 
ECOSYSTEM-BASED MANAGEMENT: AN INTRODUCTORY GUIDE 10 (2011), available at 
http://www.unep.org/pdf/ebm_manual_r15_final.pdf; see also Aldo Chircop & Ryan O’Leary, Legal 
Frameworks for Integrated Coastal and Ocean Management in Canada and the EU: Some Insights from 
Comparative Analysis, 13 VT. J. ENVTL. L. 425 (2012); see also Patrick A. Parenteau, et al., Legal 
Authorities for Ecosystem-Based Management in U.S. Coastal and Ocean Areas, in OCEAN AND 
COASTAL LAW AND POL’Y 597 (Donald C. Baur et al. eds., 2008) (providing a definition of Coastal 
Marine Spatial Planning).
uses; complying with the international law of the sea; furthering scientific understanding of ecosystems and the impact on them of changing environmental conditions and human activity; and fostering public understanding of the value of the oceans.\textsuperscript{46}

In this context, the Executive Order defines CMSP as “a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas,”\textsuperscript{47} that:

[I]dentifies areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives” [and is] “a public policy process for society to better determine how the ocean, our coasts, and Great Lakes are sustainably used and protected—now and for future generations.\textsuperscript{48}

The Order, by incorporating the Task Force report on which it was based (“the Final Recommendations”), makes clear that it builds on past efforts to develop a system of ocean governance based on ecosystem-based management and makes EBM and CMSP the highest priorities in implementing the National Ocean Policy.\textsuperscript{49} The definition indicates that CMSP, like the CZMA, focuses on sustainability rather than on ecosystem management. In this respect, the definition, though more explicit, is comparable to the formulation in UNESCO’s Marine Spatial Planning: A Step-by-Step Approach toward Ecosystem-based Management and to Canadian and EU approaches to integrated coastal and ocean management.\textsuperscript{50} CMSP, as described in the Final Recommendations, seeks to embody ecosystem-based management principles.\textsuperscript{51} The Order also calls for

\begin{itemize}
\item \textsuperscript{46} Id. § 2.
\item \textsuperscript{47} Id. § 3(b).
\item \textsuperscript{48} Id.
\item \textsuperscript{49} Id. § 5(b); Final Recommendations of the Interagency Ocean Policy Task Force, White House Council on Environmental Quality 32 (July 19, 2010), available at www.whitehouse.gov/files/documents/OPTF_FinalRecs.pdf [hereinafter Final Recommendations].
\item \textsuperscript{50} See Ehler & Douvene, supra note 44; Parenteau, et al., supra note 44; Chircop, supra note 44.
\item \textsuperscript{51} Final Recommendations, supra note 49.
\end{itemize}
use and management of the best available scientific data, public education and participation, and widespread stakeholder involvement.\textsuperscript{52}

The Executive Order establishes the National Ocean Council (NOC), co-chaired by the chair of the Council on Environmental Quality and the director of the Office of Science and Technology Policy.\textsuperscript{53} Other members of the NOC include: the administrators of the EPA, NOAA, and NASA; the directors of the Office of Management and Budget, National Science Foundation, and National Intelligence; the chairman of the Joint Chiefs of Staff; other advisors and assistants to the President; a federal employee designated by the Vice President; and other federal employees whom the co-chairs may designate.\textsuperscript{54} The NOC is charged to carry out The National Ocean Policy through coastal and marine spatial plans to be developed and implemented through separate initiatives of nine Regional Planning Bodies that are established in the \textit{Final Recommendations}.\textsuperscript{55} The Council is also charged with seeing that relevant federal executive agencies act in accordance with the National Ocean Policy and participate in the regional planning process.\textsuperscript{56} The Council is also required to establish a Governance Coordinating Committee consisting of “18 officials from State, tribal, and local governments,”\textsuperscript{57} “to deliberate and coordinate with the NOC on issues of inter-jurisdictional collaboration and cooperation on the National Policy and related matters.”\textsuperscript{58}

Regional plans are to be approved by the National Ocean Council if consistent with the National Ocean Policy and the \textit{Final Recommendations}.\textsuperscript{59} When a plan has been certified as approved, a regional participant or federal agency is to incorporate components of the plan into its regulations or processes and must justify deviations from the plan.\textsuperscript{60} The \textit{Final Recommendations} propose a five-year timeline for completion and certification of the regional plans.\textsuperscript{61} In the period since adoption of the Executive Order, NOC has been engaged in the development of a draft implementation plan, which was published for a final comment period that

\textsuperscript{52} Exec. Order No. 13,547, \textit{supra} note 45.
\textsuperscript{53} Id. § 4(b)(i).
\textsuperscript{54} Id. § 4(b)(ii).
\textsuperscript{55} \textit{FINAL RECOMMENDATIONS}, \textit{supra} note 49, at 52.
\textsuperscript{56} Exec. Order No. 13,547, \textit{supra} note 45, § 1.
\textsuperscript{57} Id. § 7.
\textsuperscript{58} \textit{FINAL RECOMMENDATIONS}, \textit{supra} note 41, at 27.
\textsuperscript{59} See Exec. Order No. 13,547, \textit{supra} note 45, § 1 (stating the purposes and general authority of the National Ocean Council).
\textsuperscript{60} \textit{FINAL RECOMMENDATIONS}, \textit{supra} note 49, at 65.
\textsuperscript{61} Id. at 60.
closed on March 28, 2012.\textsuperscript{62} The draft plan, developed after an extensive public comment and education process, sets forth the nine priority goals previously set forth in the \textit{Final Recommendations}.\textsuperscript{63} The priority goals span “adopt[ing] ecosystem-based management as a foundational principle” to “implement[ing] comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.”\textsuperscript{64} The Governance Coordinating Council has been established, preliminary discussions and training sessions concerning the establishment of Regional Planning Bodies have taken place, and the process of forming and setting in motion those bodies has begun.\textsuperscript{65}

\textbf{C. The Integration of CZMA and CMSP.}

The Executive Order provides that each executive agency or office involved in the NOC or the activities of which affect the oceans, coasts, or Great Lakes must “(i) take such action as necessary to implement” the National Ocean Policy and the principles and policies set forth in the \textit{Final Recommendations} as elaborated by the NOC, and “(ii) participate in the process for coastal and marine spatial planning and comply with Council certified coastal and marine spatial plans, as described in the \textit{Final Recommendations} and subsequent guidance from the Council.”\textsuperscript{66} The \textit{Final Recommendations} note that CMS Plans approved by the NOC are not intended to have regulatory and binding effect, but are nevertheless to be participated in and adhered to by relevant federal agencies as appropriate.\textsuperscript{67}

\begin{footnotesize}
\begin{enumerate}
\item \textsuperscript{63} \textit{Draft National Ocean Policy Implementation Plan, supra} note 62 at 8.
\item \textsuperscript{64} \textit{Id.}
\item \textsuperscript{66} \textit{Exec. Order No. 13,547, supra} note 45, § 6(i)–(ii).
\item \textsuperscript{67} \textit{Final Recommendations, supra} note 49, at 51–74; App. C at VIII.
\end{enumerate}
\end{footnotesize}
In particular, collaboration between the states and federal agencies in development of regional CMS plans should result in provisions in those plans that blend state and federal policies and designs to achieve consistency without the need for formal CZMA consistency review.\textsuperscript{68}

A recent memorandum prepared by NOAA’s Office of Ocean and Coastal Resource Management (OCRM) identifies a number of specific ways in which CZMA provisions and requirements could provide a medium for state involvement in the development of regional CMS plans.\textsuperscript{69} Existing state coastal management plans approved under CZMA, including recently approved state ocean management plans, could serve as a starting point for the development of regional CMS plans, and CZMA implementation and enhancement grants to states could provide partial funding.\textsuperscript{70} CMS plans cannot contain enforceable mandates or policies that could supersede legal obligations of federal agencies.\textsuperscript{71} Nevertheless, federal agencies are required by the Executive Order to participate in the regional planning process, and state involvement in the process would allow state policies to be addressed in federal waters within the region, thus reducing or eliminating federal-state conflicts that would otherwise have to be addressed through formal consistency proceedings, including interstate consistency.\textsuperscript{72} Though the CMS plans would not be enforceable, a state could incorporate its region’s plan into its coastal management program to show the state’s acceptance of the plan and provide a clear channel for the state to receive benefits from the plan.\textsuperscript{73} Finally, CMS plans could contain provisions establishing consistency on key points in advance and states could modify their coastal management policies for consistency with the plan.\textsuperscript{74} NOAA and the NOC are working to determine whether CZMA’s federal consistency provisions can provide a framework for establishing consistency between a state’s coastal management policies and an approved or certified regional CMS plan.\textsuperscript{75}

\textsuperscript{68} Id. at 61.
\textsuperscript{70} Id. at 8.
\textsuperscript{71} Id. at 9.
\textsuperscript{72} Id.
\textsuperscript{73} Id. at 10.
\textsuperscript{74} Id. at 10–11.
\textsuperscript{75} NOAA MEMO, supra note 69, at 10. See also Environmental Law Institute and Center for Ocean Solutions, COASTAL AND MARINE SPATIAL PLANNING: LEGAL CONSIDERATIONS 55–75 (2010)
D. CZMA and CMSP in the Great Lakes

The status of CZMA and CMSP in the Great Lakes may provide some guidance for assessing their potential for Lake Champlain. The five Great Lakes are bounded by eight states—Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin—and the Province of Ontario. Only Lake Michigan lies entirely within the United States. The Canada-U.S. boundary divides the other four lakes. Significant progress in eliminating toxics and other contaminants from the waters of the Lakes has been made since the adoption of the Great Lakes Water Quality Agreement by the U.S. and Canada in 1978. After negotiations that began in 2008, the two countries, on September 7, 2012, signed a significantly amended version of the Agreement, committing them to address issues such as the nearshore environment, aquatic invasive species, habitat degradation, the effects of climate change, and existing threats to health and the environment. The amended Agreement also assigns responsibilities to the International Joint Commission, which, in its January 2011 biennial report on Great Lakes Water Quality, noted that—particularly in the nearshore zone—there are grave water quality problems caused by excessive phosphorus loading resulting from urban and agricultural nonpoint source pollution and from inadequately regulated chemical components in common products found in the wastewater stream. The report offered

recognizing advantages of CZMA-CSMP integration, including potential benefits from CZMA consistency provisions but noting as disadvantages (1) cumbersome CZMA structure and different priorities, (2) voluntary nature of CZMA plan amendments, (3) limit of state coastal zone to territorial waters, (4) no complementary federal coastal zone responsibilities).


77. Id.

78. Id.


Thirty-two recommendations for revision or more effective implementation of the Agreement.\(^\text{82}\)

A plethora of governmental and nongovernmental agencies have assumed interconnecting and sometimes overlapping responsibilities for Great Lakes water quality issues. The Great Lakes Commission, established under the Great Lakes Compact entered into by the eight Great Lakes States in 1955 and approved by Congress in 1968, with Québec and Ontario added subsequently as associate members, focuses on public communication and education, policy research, and advocacy.\(^\text{83}\) The Council of Great Lakes Governors established in 1983 includes the governors of all eight states.\(^\text{84}\) Though the Council pursues the economic interests of the region, its initial focus and present major concern is water quality and security.\(^\text{85}\) The premiers of Ontario and Québec are associate members of the Council.\(^\text{86}\) The Council created the Great Lakes Charter in 1985, with a 2001 annex, to provide a management structure for water issues.\(^\text{87}\) Québec and Ontario were signatories.\(^\text{88}\) In 2005, the Council adopted the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement, under which the Great Lakes states, Ontario, and Québec sought to ban most new diversions of water from the Basin, develop standards for review of proposed water uses, provide for collection and sharing of data, and balance water use with economic development.\(^\text{89}\) The agreement was to be implemented through the Great Lakes-St. Lawrence River Basin Water Resources Compact adopted by the Great Lakes states and by Congress in

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82. Id. at 7.
85. Id.
86. Id.
88. Id.
2008 and through the laws of the two provinces. The Agreement and Compact both gave the bodies established to administer them discretion to establish a secretariat or other executive arm; The Governor’s Council has taken on that role.

In 2004, a federal Great Lakes interagency task force created by executive order of President Bush developed a framework for the Great Lakes Regional Collaboration, which includes as principal partners, the Council of Great Lakes Governors, the Great Lakes and St. Lawrence Cities Initiative, the Great Lakes Congressional Task Force, the Great Lakes Indian Fish and Wildlife Commission, and the U.S. EPA Great Lakes National Program Office. The Collaboration has developed a strategy for the restoration and protection of the Great Lakes and several specific plans to implement it.

The International Joint Commission’s 15th Biennial Report recognized that these “jurisdictions and institutions are not aligned with the hydrological boundaries of the Great Lakes basin.” The lack of alignment creates complications that “lake circulation patterns may result in adverse impacts from a pollution source in the nearshore area of one jurisdiction to the nearshore area of another (and also to offshore waters)” and that “water flows along watershed boundaries make it difficult to manage the flow of stressors, such as sediments, nutrients, and toxic substances, which are carried in the water as they flow downstream and cross over jurisdictional boundaries.” In addition, “Canada and the United States have diverse legislative, programmatic and policy tools for addressing water-quality problems in nearshore waters of the Great Lakes at the federal, state and provincial levels, and municipalities have their own set of programs and


91. History, supra note 84; Great Lakes–St. Lawrence River Basin Sustainable Water Resources Agreement, supra note 89, at art.401(2); Compact, supra note 90, §§ 2.5, 2.6.


94. INTERNATIONAL JOINT COMMISSION, supra note 81 at 17.

95. Id.
policies that potentially can influence the quality of nearshore waters." Further resources include binational institutions and arrangements such as the IJC itself, the Lakewide Management Plan (LaMP) adopted for each of the Great Lakes, and the “many environmental non-governmental and watershed associations that make key contributions to protecting the Great Lakes and share an active involvement in nearshore issues.” Accordingly, the Report rejected the idea of a single entity to manage the Great Lakes water quality and called for new processes for collaboration and coordination of “plans, programs, and activities.”

Among the regulatory and planning overlays are the coastal management plans of all eight Great Lakes states approved by NOAA under the CZMA. In general, these plans address coastal and nearshore issues local to each state, and there are few instances of interstate cooperation. The Great Lakes Commission and Great Lakes Regional Collaboration are supportive of state CZMA activities and funding opportunities and give some indication of support for interstate efforts that would have a broader ecosystem impact. Within the context of their coastal management plans, Michigan and Ohio, responding to potential wind energy projects, have taken a marine spatial planning approach by developing mapping and other tools for analyzing a variety of ecological factors in determining favorability of project sites.

The Final Recommendations, on which Executive Order 13,547 is based, contrast the particular jurisdictional setting of the Great Lakes with that of the other regions and note that:

CMSP efforts in the Great Lakes would be complementary to and closely coordinated with the GLWQA and other Great Lakes initiatives and authorities, such as the

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96. Id.
97. Id. at 17–18.
98. Id. at 18.
99. Id.; States and Territories, supra note 38.
President’s Great Lakes Restoration Initiative and Executive Order 13340, which established a cabinet-level Great Lakes Interagency Task Force, its Regional Working Group, and a multi-stakeholder Great Lakes Regional Collaboration.103

The stately pace of the development of CMSP described above, means that there has been no development of a regional planning body for the Great Lakes Region. Given the position of the IJC described above and apparent negative attitudes toward the CMSP Framework in the region, it is unclear when and whether the existing agencies will be brought into the process.104 In particular, it should be noted that the Great Lakes Region presents, in the extreme, a problem inherent in the Executive Order’s articulation of CMSP. Namely, the boundaries of the region, as indicated in the IJC Report, stop at the international boundary, while the ecosystem or ecosystems to be managed are not so delimited. A Great Lakes Regional Planning Body, like the existing Great Lakes regional entities described above, can be constructed to include representatives of Environment Canada and Ontario, but the question of a binational mechanism that will lead to the kind of interagency cooperation envisioned by the Executive Order and the Final Recommendations remains. Perhaps, despite the misgivings of the IJC, this question should be on the table after the recent renegotiation of the binational Great Lakes Water Quality Agreement.

III. THE CZMA, CMSP, AND LAKE CHAMPLAIN

This section examines issues and opportunities that arise in considering the application of the Coastal Zone Management Act and Coastal Marine Spatial Planning to Lake Champlain.

A. Political and Legal Issues

The first problem to be addressed is that neither the CZMA nor CMSP specifically applies to Lake Champlain.

103. Final Recommendations, supra note 49, at 50.
The key language defining the scope of the CZMA is the definition of “coastal state” as “a state of the United States [and enumerated territories] in, or bordering on, the Atlantic, Pacific, or Arctic Ocean, the Gulf of Mexico, Long Island Sound, or one or more of the Great Lakes.” The case has been made both academically and politically that Lake Champlain, as the nation’s sixth largest international lake with many other similarities to the Great Lakes, should be included in the CZMA, but to no avail. In fact, in a piece of political theater, Vermont’s Senator Leahy caused legislation to be enacted and signed by President Clinton in 1998 that would have changed the definition of “Great Lakes” for purposes of National Sea Grant Program funding to include Lake Champlain, later apocryphally described as “a pretty great lake.” The resulting furore raised by Midwestern colleagues led to Senator Leahy agreeing that Champlain should be “the cousin instead of a little brother” of the Great Lakes and to immediate repeal amid laughter on Capitol Hill. The best explanation for the presence of the Great Lakes and the absence of Champlain in the Act is a combination of longstanding recognition of the Great Lakes’ importance as both recreational and economic assets, and the assiduous labors of members of Congress from districts bordering the Lakes for a number of years. If sound policy would be served and current politics will permit, the Great Lakes might include Lake Champlain.


109. See Straub, supra note 106, at 756–60 (citing Zigurds L. Zile, A Legislative-Political History of the Coastal Zone Management Act of 1972, 1 COASTAL ZONE MGMT. J. 235 (1974)) (Outlining the economic, recreational, and Congressional rationales for including the Great Lakes states as coastal states under the Coastal Zone Management Act). Senator Leahy has successfully secured funding for Lake Champlain by less controversial means, including direct support for the UVM Sea Grant program and the Clean Water Act amendments, see Clean Water Act, supra note 10, that
the addition of Lake Champlain to the CZMA would be a simple matter. The regional pride evoked by Senator Leahy’s effort to expand the historic notion of “the Great Lakes” could be avoided by simply adding “or Lake Champlain” to the CZMA language quoted above and elsewhere in the Act where the phrase “the Great Lakes” appears.\textsuperscript{110}

2. CMSP

There is no direct history to overcome with the administration’s CMSP initiative, though Executive Order No. 13,547 and the Final Recommendations that it incorporates specifically include “the Great Lakes” Regional Planning Area as one of the nine areas through which CMSP is to be developed and implemented.\textsuperscript{111} New York is included in both the Great Lakes and Mid-Atlantic regions, and Vermont is in the Northeast Region with the other New England states, all of which have sea coasts.\textsuperscript{112} Express inclusion of Lake Champlain under the existing or a modified Executive Order would not involve the hurdles required for legislative change. The regional planning bodies are given considerable discretion in developing their plans. The National Ocean Council established by the order and charged with administering it has discretion to modify the order for the purpose of improving “its effectiveness and efficiency in furthering the policy.”\textsuperscript{113} It could be argued that because the Great Lakes are connected to Lake Champlain by canal and river, improving the health and productivity of Lake Champlain would have that effect. Inclusion of Lake Champlain could be effected by moving Vermont to the Great Lakes Region, including New York and Vermont’s Lake Champlain interests in the regional planning body, and making clear that its charge include development of CMSP for the Lake.

\textsuperscript{110} See 16 U.S.C. § 1453(4) (setting forth the current definition of a coastal state under the CZMA).

\textsuperscript{111} Exec. Order No. 13,547, supra note 45.

\textsuperscript{112} Final Recommendations, supra note 49, at 53. For the Northeast RPB, see supra note 65.

\textsuperscript{113} Exec. Order No. 13,547, supra note 38, § 5.
B. The CZMA and Lake Champlain

If Lake Champlain were eligible under the CZMA, the first step for Vermont would be to prepare and submit for approval a coastal management plan—a task that would presumably fall within the responsibilities of the State Agency of Natural Resources. Vermont’s coastal zone would be bounded by the New York state boundary on the west and the international boundary to the north. The inland boundaries to the south and east could extend to the Massachusetts border and the spine of the Green Mountains respectively, if appropriate studies indicate that these extended boundaries are necessary to achieve the goal of protecting the water quality of the Lake. The nature of Vermont’s state and local land use planning and regulation laws suggests that implementation would be most effective with a combination of specific provisions added to Act 250 (the statewide land use regulatory scheme)114 and mandatory standards incorporated in the state land use planning and regulation enabling act.115 New York would have to amend its present coastal management plan through a process similar to initial approval procedures required to embrace its Lake Champlain “coast.” That process would be made easier because the existing New York coastal management plan designates the Department of State as the responsible agency and contains the necessary infrastructure to permit amendment. In addition, New York has designated Lake Champlain and other inland water bodies as “inland waterways” on which towns and counties can plan for waterfront revitalization in a process parallel to that for coastal areas.116 The Town of Essex, other New York Lake Champlain communities, and Essex and Clinton counties have already engaged in this process.117

The CZMA requires an approved plan to show that the state has coordinated with applicable “local, area-wide, and interstate plans,” but does not offer much guidance on the means or scope of coordination.\(^\text{118}\) Given the history of interstate cooperation discussed above, New York and Vermont may be able to achieve a higher and more stable degree of coordination than has been previously possible by coordinating the development of their respective plans for Lake Champlain. Through such coordination, the states should be able to incorporate provisions responding to energy and climate change concerns. Further, they could avoid the issues that have arisen from the application of the CZMA consistency requirement to federal activities or permits in one state that affect the coastal zone program of another state.\(^\text{119}\) The CZMA has even less to say about issues involving international waters. Again, the history of participation by Québec and the International Joint Commission in the Lake Champlain Basin Program, discussed above, should lead New York and Vermont to address coordination with international partners in their coastal management plans.

\section*{C. CMSP and Lake Champlain}

If New York and Vermont participate in an appropriate regional planning body for Lake Champlain, existing planning efforts would benefit from the coordination and prioritization of federal funding that Executive Order No. 13,547 is intended to establish for certified regional plans. Joint participation by New York and Vermont would also facilitate consideration of Lake Champlain as an ecosystem—an objective of the Lake Champlain Basin Program’s planning efforts—and improve incorporation of ecosystem-based management in the development of coordinated state management plans under the CZMA. As previously noted, coordination with federal agencies and other states in the process of developing the CMS

\begin{itemize}
\item \(^{118}\) 16 U.S.C. § 1455(d)(3).
\item \(^{119}\) See, e.g., Decision and Findings in the Consistency Appeal of the Va. Elec. and Power Co. from an Objection by the N.C. Dep’t of Env’t, Health and Natural Res., (Dep’t of Commerce May 19, 1994), available at http://www.ogc.doc.gov/czma.nsf/5919824A383F4C5585256C8E00712833/$File/vepc.pdf?OpenElement (The Secretary of Commerce held that Virginia Electric and Power Company pipeline permit to withdraw water from Lake Gaston on the Virginia/North Carolina border “foster[ed] development of the coastal zone and coastal zone resources” and its contribution to national interests outweighed its adverse effects to the North Carolina coastal zone under the CZMA. Thus, the Secretary overruled the objection of the North Carolina Department of Environment, Health and Natural Resources to Virginia Electric and Power Company’s federal permit to construct the pipeline); 15 C.F.R. § 930.150 (2011).
\end{itemize}
The plan would tend to simplify, if not eliminate, CZMA consistency issues.\(^{120}\) The Executive Order and Final Recommendations call for U.S. cooperation and leadership at the international level.\(^{121}\) They also call for the exercise of rights and duties under applicable provisions of customary international law and international treaties and agreements, which would include the International Joint Commission.\(^{122}\) These provisions should lend support for full participation by Québec and the IJC in the more robust planning process provided by CMSP.\(^{123}\) The Final Recommendations recognizes that the different circumstances of the Great Lakes as a regional planning area stemming from its fresh-water status, and the history of joint planning efforts in the region, may lead to different approaches to CMSP.\(^{124}\) The discussion above of the effect of CMSP in the Great Lakes region suggests numerous structural problems with its implementation. However, implementation of a CMSP for Lake Champlain would likely be easier, because the region’s organization is not as complex and has a long history of cooperated and coordinated management. In fact, the 2010 Lake Champlain Basin Program’s Opportunities for Action demonstrates that Lake Champlain has already developed an ecosystem-based marine spatial plan that could be the foundation for a plan to be developed and approved by the regional planning body and NOC.\(^{125}\) Further, the Final Recommendations leaves open the possibility of developing sub-regional plans in particular regions, which might be appropriate for Lake Champlain.\(^{126}\)

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121. Id. at 65; Exec. Order No. 13,547, supra note 45, § 2(vii)
125. Opportunities for Action, supra note 12.
CONCLUSION

In conclusion, were they available, Lake Champlain would benefit from the adoption of both CZMA and CMSP, provided that the process of adoption took advantage of lessons learned in other states and regions and applied those lessons to the specific context of the Lake Champlain Basin.

Professor Brooks’ history of the CZMA in Connecticut shows us that, for a body of water surrounded by land and heavily impacted by well-developed shore-side uses, management of the marine ecosystem cannot be isolated from the planning and regulatory regime that governs its surrounding coastal regions. This type of region is a “place”—an “ecosystem” that includes the dominating structure of human enterprise and society—that must be managed. The goal of management must be sustainability of that larger ecosystem, to preserve the balance of the natural and the human environments for future generations. Further, the management must be “adaptive,” i.e., a continuing evolution of planning and regulation methods based on both experience and changing conditions.127 Professor Chircop and Mr. O’Leary suggest that in a federal system, ecosystem-based management and spatial planning are best developed as principles by the central government that can be applied only at the sub-federal level, and only if the concepts are accepted there.128 The current CMSP initiative makes clear that it incorporates the ideas of both with its focus on sustainability and devolution to the regional level for implementation—though the fragility of its future is evident from the organizational difficulties yet to be identified and surmounted.

Lake Champlain, like Long Island Sound, is a confined body of water heavily—though not as heavily—impacted by agriculture, forestry, industry, and human habitation. If we view the Lake Champlain Basin, with both its human and natural components, as the “ecosystem,” CZMA and CMSP, applied in light of the lessons learned elsewhere, present the opportunity to unify the present array of planning and regulation in a proactive way to address the Lake’s issues. The history of cooperation among New York, Vermont, and Québec on those issues would serve as a foundation. In the process of preparing CZMA management plans for approval, Vermont and New York could work in parallel to develop identical plans that would address the kinds of issues that undermined

127. Brooks, supra note 34.
128. Chircop, supra note 44.
Connecticut’s planning and would provide for an adaptive approach to change. The plans could harmonize differences in the states’ existing planning and regulatory systems with a set of common goals and practices based on a shared understanding of the watershed and its problems; and could expressly provide for joint consultation and administration and a role for Québec. Approval of the plans would also make available CZMA funding and the benefits of the consistency requirement. The regional plan developed under CMSP could involve Québec and the IJC as partners, and could draw heavily on not only planning and regulatory joint ventures of the past, but on the new framework created under the CZMA. The regional plan, if certified, could give new priority to Lake Champlain’s needs, and expressly link Lake Champlain’s issues and solutions to planning for the five Great Lakes. This new framework would fulfill the promise of Lake Champlain as “a pretty great lake”—one entitled to the same recognition and support as the Great Lakes, its cousins that lie to the west.
Dr. Konstantia Koutouki & Katharina Rogalla von Bieberstein

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INTRODUCTION

International sustainable development law has seen a veritable acceptance in the international legal arena over the past twenty years. Part of this success can be attributed to indigenous peoples and their persistent calls for international legal instruments that provide protection for the natural environment and consider biodiversity as more than an economic resource but also as a necessity for life on earth and as central to many cultural and spiritual rituals. Currently, there are over 300 international legal instruments1 that explicitly or implicitly support various aspects of...
sustainable development. One of the most successful and widely accepted is the Convention on Biological Diversity (CBD).\textsuperscript{2} Besides strides made in terms of environmental protection, it is also one of the few legal instruments that explicitly mentions indigenous peoples and the importance of their traditional ecological knowledge.

For indigenous peoples, an important feature of the CBD was the notion of access to and benefits-sharing from genetic resources. It is not a coincidence that the vast majority of the world’s remaining biodiversity is located in areas populated by indigenous groups.\textsuperscript{3} For these groups, the biodiversity that they cultivated for centuries using sustainable practices is vital to their survival. Hence, controlling access to this resource is important from a subsistence point of view as well as an economic one. The value of this biodiversity for industries such as health foods and

\begin{footnotesize}
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  \item Convention on Biological Diversity, supra note 1.
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The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (NP). Given its economic importance, the international community saw fit to gather in 2010 to further clarify and develop this aspect of the CBD. The result of this effort was the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (NP). Adopted in October 2010 in Nagoya, Japan by the Parties to the CBD, the NP opened for signature on February 2, 2011 and will, according to Article 33 of the NP, come into force after its fiftieth ratification. The Protocol was conceived to respond to the many criticisms voiced concerning the Access and Benefits-Sharing (ABS) provisions in the CBD. One of the most frequent critiques concerned the protection afforded to indigenous traditional knowledge, a great deal of which regards sustainable methods of natural resource management.

The basic reproach is that ABS provisions have simply not been realized. There have been some success stories, but overall, almost two decades after the CBD came into force, indigenous peoples are still waiting for legal protection of the genetic resources that underlie their traditional knowledge and to share in the benefits therefrom. Current estimates for herbal products exceed 60 billion dollars and are projected to reach 5 trillion dollars by 2020. Furthermore, where pharmaceuticals are concerned, Alikhan states that “Eli Lilly’s extraction of the rosy periwinkle plant and traditional knowledge from Madagascar and commercialisation [sic] of the resultant drug total[ed] US$ 100 million [in profits] with no returns to the local people.”

This paper examines the NP, focusing on how this protocol impacts indigenous peoples’ rights and, more specifically, addresses any further

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8. Id. at 82.
protection beyond that of the CBD that is afforded to indigenous peoples, local communities, and their sustainable traditional knowledge practices under international law.

I. ABS AND THE CBD

ABS, as an international legal concept, was first introduced in 1992 in the CBD. Article 15 states:

Article 15. Access to Genetic Resources

1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.

2. Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.

3. For the purpose of this Convention, the genetic resources being provided by a Contracting Party, as referred to in this Article and Articles 16 and 19, are only those that are provided by Contracting Parties that are countries of origin of such resources or by the Parties that have acquired the genetic resources in accordance with this Convention.

4. Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article.

5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.

6. Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties.

7. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19 and, where necessary, through the financial mechanism established by Articles 20 and 21 with the aim of sharing in a fair
and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms.9

Thus, the main idea is that in recognition of the sovereign rights of states over their natural resources, states can regulate access to genetic resources within their jurisdiction. Thereby the CBD defines genetic resources as genetic material of actual or potential value.10 Furthermore, access to genetic resources shall be subject to the prior informed consent (PIC) of the Contracting Party providing such resources. Article 15 of the CBD also provides that access shall be based on mutually agreed terms (MAT) in order to ensure the fair and equitable sharing of benefits arising from the commercial or other utilization of these genetic resources with the Contracting Party providing such resources. In addition to regulating access to genetic resources and the sharing of the benefits arising out of the utilization of their use, Article 8(j) of the CBD addresses ABS with regard to traditional knowledge (TK).11 The provision promotes a wider application of TK associated with genetic resources, with the approval and involvement of the holder, and encourages the equitable sharing of the benefits arising from its utilization. However, Article 8(j) does not require the PIC of indigenous TK holders.

Article 8(j) of the CBD earned a lot of criticism for its soft language.12 It stipulates:

Each Contracting Party shall, as far as possible and as appropriate: j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from

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9. Convention on Biological Diversity, supra note 1, at art. 15.
10. Id. at art. 2.
11. Id. at art. 8.
12. Id.
the utilization of such knowledge, innovations and practices.

Moreover, parties and stakeholders debated whether the provision contained an obligation for users to require PIC of Indigenous Local Communities (ILC) to access TK as well as an obligation to share the benefits from the utilization of TK. In response to this debate, the Fifth Meeting of the Conference of the Parties (COP5) in 2000 established a general principle that access to TK of ILC should be subject to the PIC of its holders. However, the text of the CBD was never amended to require such consent, and thus the debate continues as to whether this is a suggestion or a requirement under international law.

This is partly because the adoption of the CBD in 1992 as one of the three “Rio Conventions” introduced a paradigm shift. For the first time an international agreement with conservation as the overall goal not only addressed environmental issues, but also recognized the importance of other issues including social, economic, scientific, educational, cultural, recreational, and aesthetic values for conservation. In the spirit of the Rio Earth Summit and the Brundtland Report, the different goals and interests were thereby not seen as contrary, but as mutually reinforcing or complementing. In this regard, the parties stated in the preamble of the CBD that Contracting Parties are “[a]ware that conservation and sustainable use of biological diversity is of critical importance for meeting the food, health and other needs of the growing world population, for which purpose access to and sharing of both genetic resources and technology are essential.”

Parties also recognized that, “economic and social development and poverty eradication are the first and overriding priorities of developing
countries[.]" The legal approach to taking into account all the different interests was the introduction of the concept of access and benefits-sharing. In response to the concern raised by developing countries that industrialized countries would exploit their natural wealth, provider countries of genetic resources (and thus mainly developing countries) were empowered to regulate access to their genetic resources with the aim of benefits-sharing arising out of their utilization. At the same time, Parties were encouraged to create conditions to facilitate access to genetic resources for environmentally sound uses as ABS was not seen as an instrument of exclusion of users, but as an instrument to generate and share benefits from genetic resources in order to incentivize conservation and sustainable use.

Hence, the CBD equipped genetic resource providers (mainly nations in the Southern Hemisphere) with new powers to control and benefit from access to these resources. It is argued, however, that the tense nature of the relationship between states and indigenous peoples makes it unlikely that states would give indigenous people access to an international arena in an unfettered manner in order to assert their rights over the very same genetic resources. Sovereignty over natural resources is attributed to national governments and the CBD is unable to deal with the volatile nature of the relationship between indigenous peoples and their respective national governments, both in the developed and developing worlds. Khor, in assessing the CBD, suggests that “reflecting the uncomfortable political deal which was struck in bringing the CBD to conclusion, the language of the Convention is unfortunately vague. The positive affirmation of principles in a number of areas is qualified by vague transcendental values.”

19. Id.
21. Convention on Biological Diversity, supra note 1, at art. 15.2.
23. Martin Khor, Intellectual Property, Biodiversity and Sustainable Development: Resolving the Difficult Issues 40 (2002); Chidi Oguamanam, Genetic Resources & Access and Benefit Sharing: Politics, Prospects and Opportunities for Canada after Nagoya, 22 J. Envtl. L. & Prac. 87, 103–04 (2011) (also according to Oguamanam: Without question, for these countries, the requirement of an equitable ABS in their dealings with genetic resources is an irritation, to the extent that it is also a call to an accounting that may redress the unbalanced unidirectional transfers of
Giving all control over natural resources to the State severs the all-important connection between community and biodiversity. This results in a lack of control for indigenous peoples over the ecosystems that they have developed and maintained since time immemorial. There is ample evidence to suggest that cultural diversity, and the unique natural resource management techniques that ensue therefrom, are elemental to a healthy ecosystem. As Parajuli explains, “[t]he field of politics for ecological ethnicities is the community, and not necessarily the civil society or the nation-state as one would usually suppose . . . the seeds of regeneration need the firm soil of community and culture, vernacular technology and agriculture, collectivities and memories.”

Furthermore, the implementation of the CBD proved slow due to the complexity of the issues addressed as well as a lack of guidance from the CBD as a framework convention. After almost no or insufficient domestic implementation efforts were undertaken to accomplish “fair and equitable benefit sharing,” and a call stressing the necessity for a harmonized global

valuable genetic resources and the knowledge of indigenous and local communities in this era of rapid biotechnology progress. Leading biotechnology countries would prefer that the genetic resources and associated indigenous knowledge remain, as they had been: that is, outside the realm of real or intellectual property claims and, consequently, to be freely accessible to them without any restraints. Ironically, while these countries desire to have unrestricted access to vital genetic materials and, in some cases, the associated indigenous knowledge, they deploy intellectual property, particularly the patent system, to exercise proprietary control over the out-come or benefits of their dealings with freely obtained materials. In many narratives of biopiracy, the providers of genetic resources and associated indigenous knowledge are outraged that not only are they denied basic compensation and legal recourse; as well, that they are unable to afford the resulting drugs, seeds or agricultural products, as the case may be, that emerge from the genetic resources they provided, often in trust and good faith, for the common good. Id.


25. Bram De Jonge & Niels Louwaars, The Diversity of Principles Underlying the Concept of Benefit Sharing, in GENETIC RESOURCES, TRADITIONAL KNOWLEDGE AND THE LAW: SOLUTIONS FOR ACCESS AND BENEFIT SHARING, 37, 42 (Evanson C. Kamau & Gerd Winter eds., 2009); MIRIAM DROSS & FRANZISKA WOLFF, GERMAN FEDERAL AGENCY FOR NATURE CONSERVATION, NEW ELEMENTS OF THE INTERNATIONAL REGIME ON ACCESS AND BENEFIT-SHARING OF GENETIC RESOURCES—THE ROLE OF CERTIFICATES OF ORIGIN 12 (2005); GURDIAL SINGH NIJAR, THE NAGOYA PROTOCOL ON ACCESS AND BENEFIT SHARING OF GENETIC RESOURCES: ANALYSIS AND IMPLEMENTATION OPTIONS FOR DEVELOPING COUNTRIES 7 (South Centre 2011); KATHRYN GARFORTH ET AL., OVERVIEW OF THE NATIONAL AND REGIONAL IMPLEMENTATION OF MEASURES ON ACCESS TO GENETIC RESOURCES AND BENEFIT-SHARING 4 (3rd ed. 2005) (pointing out that some developing countries were frustrated by the slow rate of implementation of the CBD).
The Nagoya Protocol

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instrument on ABS at the 2002 Johannesburg World Summit on Sustainable Development, Parties adopted the non-binding Bonn Guidelines on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising out of Their Utilization in 2002 in an attempt to guide and foster implementation of ABS in domestic legislation.26

The interaction of the ABS regime with other international regimes, especially the Agreement on Trade Related Aspects of International Property Rights (TRIPS) under the World Trade Organization (WTO), is also regarded as critical in achieving fair and equitable benefits-sharing and in achieving negotiations on harmonizing different legal regimes, and has been ongoing since the adoption of the CBD.27 The most prominent call has thus been to require the disclosure of the origin of genetic resources or associated TK in patent applications as a compliance measure for ABS.28 Also, it is argued that TRIPS needs to specifically address TK, which it currently does not.29

II. THE BONN GUIDELINES

Although the CBD was adopted in 1992 and entered into force at the end of 1993, the operationalization and thus the implementation of

provisions related to ABS were slow.\textsuperscript{30} Starting with the Philippines in 1995, select provider countries started enacting ABS legislation. But as its approaches to access were mainly restrictive and thus contrary to the CBD objective of facilitating ABS, COP 5 in 2000 established the Ad Hoc Open-ended Working Group on ABS with the mandate to develop guidelines.\textsuperscript{31} The result was the Bonn Guidelines, adopted unanimously by some 180 countries.\textsuperscript{32}

The Bonn Guidelines are voluntary, and according to I.A.1., “may serve as inputs when developing and drafting legislative, administrative or policy measures . . . under Articles 8(j), 10(c), 15, 16 and 19; and contracts and other arrangements under mutually agreed terms for access and benefit-sharing.”\textsuperscript{33} The Guidelines identify the steps in the ABS process, with an emphasis on the obligation for users to seek PIC of providers. They also identify the basic requirements for MAT and define the main roles and responsibilities of users and providers.\textsuperscript{34} With regard to PIC, the Bonn Guidelines distinguish between ILC and the TK of ILC regarding the genetic resources being accessed. In both cases PIC should be obtained with respect to established legal rights.\textsuperscript{35}

Furthermore, the Guidelines introduce a proposed list of elements that could be considered guiding parameters in contractual agreements as well as basic requirements for MAT, particularly with regard to ILC and TK:

\begin{itemize}
  \item[a.] Regulating the use of resources in order to take into account ethical concerns of the particular Parties and stakeholders, in particular indigenous and local communities concerned;
  \item[b.] Making provision to ensure the continued customary use of genetic resources and related knowledge;
  \item[c.] Provision for the use of intellectual property rights include joint research, obligation to implement rights on inventions obtained and to provide licences by common consent;
\end{itemize}

\textsuperscript{30} De Jonge & Louwaars, \textit{supra} note 25, at 37; DROSS & WOLFF, \textit{supra} note 25, at 12 (explaining that some issues took several years to resolve); NIJAR, \textit{supra} note 24 at 2; GARFORTH ET AL., \textit{supra} note 25; Kamau et al., \textit{supra} note 14, at 248.

\textsuperscript{31} Kamau et al., \textit{supra} note 14, at 249.

\textsuperscript{32} Sixth Meeting, \textit{supra} note 26, at 4, 5.

\textsuperscript{33} Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of Their Utilization ¶ 1, \textit{available at} http://www.cbd.int/decision/cop/?id=7198 (last visited July 17, 2012) [hereinafter Bonn Guidelines].

\textsuperscript{34} \textit{Id.} at ¶ 23.

\textsuperscript{35} \textit{Id.} at ¶ 31.
d. The possibility of joint ownership of intellectual property rights according to the degree of contribution.\textsuperscript{36}

Finally, the Bonn Guidelines state that “benefits should be shared fairly and equitably with all those who have been identified as having contributed to the resource management, scientific and/or commercial process. The latter may include governmental, non-governmental or academic institutions and ILC.”\textsuperscript{37} Besides the voluntary nature of the Guidelines, representatives of indigenous peoples have criticized that they do not distinguish between their role and the role of any other stakeholder who might be involved in resource management.\textsuperscript{38} As a result, their participation in ABS is not a question of rights enforcement but rather a question of national recognition of ILC rights.\textsuperscript{39}

In addition, the Guidelines have been criticized for focusing too much on the access side and thus on provider country measures as opposed to user country measures.\textsuperscript{40} Whereas access and the agreement to share benefits take place in the country providing the genetic resources, the actual utilization of the genetic resources and thus the benefits-triggering moment usually happens in another jurisdiction—the one of the user country. Commentators stress the need for user-country measures in order to ensure compliance with domestic ABS legislation of the provider country and to monitor the utilization of genetic resources and associated TK to enforce benefits-sharing agreements.\textsuperscript{41}

Different groups of developing countries, including the Group of 77 and China as well as the Group of Like-Minded Megadiverse Countries (LMMC),\textsuperscript{42} thus pushed for a protocol on ABS.\textsuperscript{43} At COP 7 (2004) the Working Group on Access and Benefit-Sharing was given the mandate to

\textsuperscript{36} Id. at ¶ 43.
\textsuperscript{37} Id. at ¶ 48.
\textsuperscript{38} VON BIEBERSTEIN, supra note 29, at 10; DROSS & WOLFF, supra note 25, at 19.
\textsuperscript{39} VON BIEBERSTEIN, supra note 29, at 10.
\textsuperscript{40} Id.
\textsuperscript{41} THE POLITICAL ECONOMY OF THE INTERNATIONAL ABS REGIME NEGOTIATIONS, supra note 27.
\textsuperscript{42} The LMMCs include Bolivia, Brazil, China, Colombia, Costa Rica, Democratic Republic of Congo, Ecuador, India, Indonesia, Kenya, Madagascar, Malaysia, Mexico, Peru, the Philippines, South Africa, and Venezuela. ICTSD, BIODIVERSITY AND THE LAW, supra note 28.
elaborate and negotiate an international regime on ABS in cooperation with the Working Group on Article 8(j). 44

III. THE NAGOYA PROTOCOL

In its preamble, the NP recalls Article 15 of the CBD (Access to Genetic Resources) and Article 8(j) of the CBD (In-situ Conservation). It also references the 3rd objective of the CBD:

[T]he fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding. 45

In addition, the NP affirms the linkage of this objective of the CBD to the other two objectives by adding the following phrase: “thereby contributing to the conservation of biological diversity and the sustainable use of its components.” 46 Many have perceived the adoption of a new Protocol under the CBD 47 as a milestone, even though reactions, in particular with regard to the interests of developing countries as well as ILC, have been diverse. 48

45. Convention on Biological Diversity, supra note 1, at art. 1.
According to different observers, the final adoption of the Protocol at the meeting in Nagoya was not certain until the last minute. The critical points were the scope of the NP, the design of compliance or user-country measures, as well as the involvement of ILC when access to TK associated with the genetic resources is not requested. The NP is structured into 27 preambular paragraphs, 36 articles, and one annex. In the following, the core provisions will be summarized and analyzed.

The preamble first repeats some of the preambular paragraphs of the CBD and further clarifies the importance of ABS for conservation by stating that the “economic value of ecosystems and biodiversity and the fair and equitable sharing of this economic value with the custodians of biodiversity are key incentives for the conservation of biological diversity and the sustainable use of its components . . . .” Furthermore, the preamble refers to some of the difficulties in the implementation of the CBD so far, thus recognizing the importance of promoting equity and fairness in negotiations of MAT between providers and users of genetic resources. The last seven points are concerned with TK, highlighting, amongst others, Article 8(j) of the CBD, the importance of TK for the conservation of biological diversity, the diversity of circumstances in which TK associated with genetic resources is held or owned by ILC, and their right to identify the rightful holder of their TK. In addition, and for the first time in an international treaty, the preamble refers to the UN Declaration on the Rights of Indigenous People (UNDRIP) adopted in 2007.

The Protocol starts with the provisions on benefits-sharing before moving on to the regulation of access, clearly separating the two. Furthermore, Article 5 of the NP (Fair and Equitable Benefit-sharing) also clearly distinguishes between benefits arising from the utilization of genetic resources, benefits that are arising from genetic resources that are held by ILC, and benefits arising from the utilization of TK associated with genetic resources:

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49. Kamau et al., supra note 14, at 250.
50. NUAR, supra note 25, at 11; see also Kamau et al., supra note 14, at 253–54 (overviewing controversial issues and outcome of negotiations).
51. Nagoya Protocol, supra note 5, at preamble.
52. Id.
53. After the Canadian government initially blocked reference to the UNDRIP, Canada only accepted to include in the preamble: “Noting the United Nations Declaration on the Rights of Indigenous Peoples” after widespread international criticism. Joint Statement of North American Indigenous Organizations, supra note 48.
[B]enefits arising from the utilization of genetic resources as well as subsequent applications and commercialization shall be shared in a fair and equitable way with the party providing such resources that is the country of origin of such resources or a Party that has acquired the genetic resources in accordance with the Convention.54 Each party shall take legislative, administrative or policy measures, as appropriate, with the aim of ensuring that benefits arising from the utilization of genetic resources that are held by indigenous and local communities, in accordance with domestic legislation regarding the established rights of these indigenous and local communities over these genetic resources, are shared in a fair and equitable way with the communities concerned . . . .55

[B]enefits arising from the utilization of traditional knowledge associated with genetic resources are shared in a fair and equitable way with indigenous and local communities holding such knowledge.56

In accordance with the CBD, the NP requires that all such sharing shall be upon MAT and benefits may include monetary and non-monetary benefits, including but not limited to those listed in the Annex of the Protocol, which mainly reiterates the list of the Bonn Guidelines.57 The Protocol also deals separately with access to genetic resources in Article 6 and access to TK associated with genetic resources in Article 7.

Article 6 reiterates that, under reaffirmation of sovereign rights over natural resources, access to genetic resources for their utilization is subject to PIC of the providing party.58 With regard to previous implementation efforts, the Protocol is very elaborate on the procedural facilitation of access.59 At this point it should be highlighted that Article 6.3(e) requires each Party to provide for the issuance at the time of access of a permit or its equivalent as evidence of the decision to grant PIC and of the establishment of MAT, and to notify the Access and Benefit-Sharing Clearing-House (established by Article 14 of the NP) accordingly.60

55. Id. at sec. 2.
56. Id. at sec. 5.
57. Id. at annex.
58. Id. at art. 6.
59. Kamau et al., supra note 14, at 250.
60. Nagoya Protocol, supra note 5.
Article 6.2 requires each Party to take measures that the PIC or approval and involvement of ILC is obtained for access to genetic resources where they have the established right to grant access to such resources.\footnote{Id. at art. 6.} Article 7 only consists of one paragraph and states that, “in accordance with domestic law, each Party shall take measures, as appropriate, with the aim of ensuring that [TK] associated with genetic resources that is held by [ILC] is accessed with the prior and informed consent or approval and involvement of these [ILC], and that [MAT] have been established.”\footnote{Id. at art. 7.} Utilization of genetic resources is defined as “research and development on the genetic and/or biochemical composition of genetic resources, including through the application of biotechnology as defined in Article 2(c) of the Convention.”\footnote{Id. at art. 2.} Whereas the CBD defined genetic resources as genetic material of actual or potential value,\footnote{Nagoya Protocol, supra note 5, at art. 2.} the term utilization of genetic resources has not been defined before and experts and national legislations offered different interpretations on the types of activities covered by the term.\footnote{Union for Ethical BioTrade, Nagoya Protocol on Access and Benefit Sharing—Technical Brief, http://ethicalbiotrade.org/news/wp-content/uploads/UEBT_ABS_Nagoya_Protocol_TB.pdf (Berne, Switzerland: Union for Ethical BioTrade, 2010).} The new definition thus aims at creating more legal certainty by including biochemical compositions under the scope of ABS. According to Kamau, Fedder, and Winter, this is of high importance because, for example, drugs based on the extraction of chemicals from biological resources are now subject to benefits-sharing.\footnote{Kamau et al., supra note 14, at 251–52.} The NP also contains a definition of “derivative,” which was also a central concern of developing countries, but the implications of this incorporation are not clear.\footnote{Union for Ethical BioTrade, supra note 65.}

Article 3 of the NP states that the NP shall apply to genetic resources within the scope of Article 15 of the CBD, to the benefits arising out of the utilization of such resources, to TK associated with genetic resources within the scope of the Convention, and to the benefits arising from the utilization of such knowledge.\footnote{Nagoya Protocol, supra note 5, at art. 3.} The provision was one of the most critical points in the negotiations. Developing countries wanted the NP to apply to existing collections of genetic resources and thus to genetic material accessed prior...
to the adoption of the NP and prior to the adoption of the CBD. But industrialized countries (mainly found in the European Union) argued that this would go against legal clarity and certainty, and eventually they successfully limited the scope of the CBD to genetic material accessed after the CBD’s adoption.

However, some commentators have argued that the provision does not imply that benefits-sharing only relates to benefits from genetic resources and TK accessed post-CBD or even post-NP. Drawing on general principles of international law, the position is that new benefits arising from prior or on-going uses may be considered as new situations for benefits-sharing requirements and thus that the NP would be applicable. In addition, the NP, as a way to bridge the different positions on temporal scope, refers to a Global Multilateral Benefit Sharing Mechanism that shall apply in situations where PIC from provider countries cannot be obtained. This mechanism could potentially cover collections made before the protocol is implemented. Article 10 states in part:

Parties shall consider the need for and modalities of a global multilateral benefit-sharing mechanism to address the fair and equitable sharing of benefits derived from the utilization of genetic resources and [TK] associated with genetic resources that occur in transboundary situations or for which it is not possible to grant or obtain [PIC]. The benefits . . . through this mechanism shall be used to support the conservation of biological diversity and the sustainable use of its components globally.

The establishment of a multilateral benefits-sharing fund has already been proposed by the Africa Group. The wording “not possible to grant or obtain [PIC]” is broad and could thus cover genetic resources or associated TK whose origin is not clear or that was obtained prior to the entering into force of the NP and the CBD, for instance for ex situ collections. As such,

69. Swiderska, supra note 43.
70. NIAR, supra note 25, at 13; Swiderska, supra note 43.
71. See Kamau et al., supra note 14, at 255 (suggesting that some legal theories may support the sharing of new benefits that can be traced to prior uses); Union for Ethical BioTrade, supra note 65.
72. Nagoya Protocol, supra note 5, at art. 10.
73. Union for Ethical BioTrade, supra note 65.
74. Nagoya Protocol, supra note 5, at art. 10.
75. Swiderska, supra note 43.
the fund provides a potential means of addressing the concerns of developing countries over the temporal scope.76

Aside from a global benefits-sharing mechanism, the NP also encourages regional cooperation. Article 11 of the NP (Transboundary Cooperation) foresees cooperation between Parties and involvement of ILC if the same genetic resources are found in situ within the territory of more than one Party, or where the same TK is shared by one or more ILC in several Parties. In their assessment, Kamau, Fedder, and Winter come to the conclusion that Articles 10 and 11 of the NP constitute a weak “derogation of absolute state sovereignty,” and draw the comparison with the multilateral ABS of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).77 Furthermore, the Union for Ethical BioTrade observes that:

In the [NP], the need to share the benefits derived from the use of genetic resources appears to have been detached from access to these resources. Fair and equitable sharing of benefits must still take place on the basis of [MAT], but it is not clear that benefit sharing requires, or only takes place ensuing, access procedures.78

Therefore, compliance measures are rather complex under the NP. According to Article 15, each Party shall take measures to provide that genetic resources utilized within its jurisdiction have been accessed in accordance with PIC, and that MAT have been established “as required by the domestic [ABS] legislation or regulatory requirements of the other Party.”79 In addition, Parties shall take measures to address situations of non-compliance and cooperate in cases of alleged violation of domestic ABS legislation or regulatory requirements.80

Article 16 of the NP reinforces the compliance measures for the use of TK associated with genetic resources.81 These compliance measures are a development beyond the obligations imposed by the CBD. Although Article 15.7 CBD requires each contracting Party to ensure fair and equitable benefits-sharing and thus also addresses user countries, for the first time the NP explicitly addresses and specifies compliance measures to

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76. Id.; Kamau et al., supra note 14, at 258; Union for Ethical BioTrade, supra note 65.
77. Kamau et al., supra note 14, at 253, 257.
78. Union for Ethical BioTrade, supra note 65.
79. Nagoya Protocol, supra note 5, at art. 15.
80. Id.
81. Nagoya Protocol, supra note 5, at art. 16.
be implemented by user-countries.82 Because little progress has so far been made on compliance or user-country measures and also because this is widely perceived as one of the biggest obstacles for fair and equitable benefits-sharing, the issue was one of the most critical points of the negotiations.83

Whereas Articles 15 and 16 of the NP leave it primarily to Parties to decide on “appropriate, effective and proportionate legislative, administrative or policy measures” for compliance, Article 17 of the NP requires Parties to support compliance by monitoring and enhancing transparency about the utilization of genetic resources.84 A corresponding provision on TK is missing, which could have far reaching consequences taking into account the clear distinction the NP draws between the utilization of genetic resources and the utilization of TK.85 The most important requirement for Parties listed in Article 17.1(a) of the NP is the designation of one or more checkpoints. Checkpoints shall receive or collect information related to PIC, the source and utilization of the genetic resource, and the establishment of MAT, and then submit the information to relevant authorities, the provider party, and the ABS Clearing-House Mechanism.86 To facilitate monitoring, the Protocol introduces internationally recognized certificates of compliance that “shall serve as evidence that the genetic resource which it covers has been accessed in accordance with [PIC] and that [MAT] have been established.”87 Thereby, the already mentioned permit issued in accordance with Article 6.3(e) of the NP shall constitute such a certificate.88

The demand, mainly from developing countries, to include a list of mandatory checkpoints was not successful. 89 Nevertheless,

82. NIJAR, supra note 25, at 12.
85. See Kamau et al., supra note 14, at 253 (pointing out that the Protocol distinguishes between the use of genetic material and TK).
86. Nagoya Protocol, supra note 5, at arts. 15–17.
87. Id. at art. 17.
88. Id.
89. See Kamau et al., supra note 14, at 257 (pointing out that checkpoints under Article 17 are not mandatory); Union for Ethical BioTrade, supra note 65.
Article 17.1(a)(iv) specifies that “[c]heckpoints must be effective and should have functions relevant to implementation of this subparagraph (a). They should be relevant to the utilization of genetic resources, or to the collection of relevant information, at, inter alia, any stage of research, development, innovation, pre-commercialization or commercialization.”

Possible checkpoints could, for example, include the patent application process (in response to the already mentioned critical relationship with IP protection), application processes for government funding for biodiversity-based research and development, or market approval processes.91 Whereas Article 17 of the NP only monitors the establishment of MAT, Article 18 aims at achieving compliance with MAT by requiring Parties to encourage providers and users to include provisions in MAT to cover dispute resolution.92 Below, examples are listed specifying what those provisions should encompass. Article 18 of the NP makes clear that the enforcement of MAT, and thus benefits-sharing, is an issue of contract enforcement.93

This leads Kamau, Fedder, and Winter to their conclusion about the main problem and material issue:

There is no specified obligation of user states to ensure benefit sharing. As before, the enforcement of benefit-sharing duties is left to contractual means, with all the difficulties of forum, litigation costs, and prosecution of titles. The fact that the Protocol does not go further in that direction constitutes a major disappointment for the provider side.94

Nevertheless, Parties shall take measures regarding access to justice and the utilization of mechanisms regarding mutual recognition and enforcement of foreign judgments and arbitral awards. Paragraph 4 specifically requires the review of the effectiveness of this article.95

90. Nagoya Protocol, supra note 5, at art. 17.
91. Union for Ethical BioTrade, supra note 65.
93. Kamau et al., supra note 14, at 252.
94. Id. at 257.
95. Nagoya Protocol, supra note 5, art. 18.
IV. OTHER PROVISIONS

The NP introduces simplified conditions on PIC for basic research without either a further definition of the latter or an emergency clause. It also encompasses comprehensive measures on improving capacities with a special focus on ILC as well as complementing funding provisions.

In regard to ILC, Article 12 of the NP (TK Associated with Genetic Resources) should also be mentioned. Article 12 requires Parties to take into consideration ILCs’ customary laws, community laws, and procedures with respect to TK associated with genetic resources; establish mechanisms to inform potential users of TK associated with genetic resources about their obligations; support the development by ILC of (a) community protocols in relation to ABS in TK, (b) minimum requirements for MAT, and (c) model contractual clauses for benefits-sharing; and to not restrict the customary use and exchange of genetic resources and associated TK within and amongst ILC in their implementation of the Protocol.

In addition, and in the footsteps of the Bonn Guidelines, the NP requires each Party to designate a national focal point on ABS as well as to designate one or more competent national authorities on ABS which are, among others, responsible for granting access. Last, but not least, the NP establishes an ABS Clearing-House as part of the clearing-house mechanism under Article 19, paragraph 3 of the CBD, which shall serve as a means for sharing of information related to ABS.

V. NP AND SUSTAINABLE DEVELOPMENT IN INDIGENOUS COMMUNITIES

The place of indigenous TK in the administration of ABS regulation impacts several sustainable development issues for indigenous communities. Capacity building, health and well-being, sustainable economic growth, cultural diffusion, et cetera all have strong links with indigenous knowledge as well as the genetic resources found on indigenous lands. With the

96. Id. at art. 8.
97. Id. at arts. 22, 25.
98. Id. at art. 12.
99. Id. at art. 13.
100. Id. at art. 14.
101. See generally Kamau et al., supra note 14, at 251 (presenting the importance of capacity building under the NP); Jane Kimbwarata, Want Sustainable Development? Try Indigenous Knowledge,
adoption of the NP as an international binding treaty, which implements the ABS provisions of the CBD, the Parties of the CBD succeeded in addressing many of the perceived obstacles to implementation so far, including the role of ILC.

Nevertheless, the Protocol is the outcome of compromise between all the different Parties of the CBD and thus national governments, and that is the entry point for most of the criticism expressed by indigenous people or by others on their behalf. From the critics’ point of view, state sovereignty clearly overrules the rights of indigenous peoples throughout the whole Protocol.102 The main arguments brought forward are the following:

First of all, the language creates a double standard between ILC rights and those of state parties by using the terms “in accordance with domestic law,” “established rights,” “as appropriate,” “as applicable,” and “with the aim of ensuring” whenever it dealt with ILC rights throughout the whole NP.103 Second, and in particular with regard to Article 12.1 of the NP, references to customary laws are undermined when Parties shall only take them into account in accordance with domestic law.104 Another point of criticism is, of course, still that the Protocol does not address the issue of intellectual property rights of Indigenous peoples’ TK. This is critical, as Koutouki states: The discovery-invention distinction and the importance of the collective are central to a discussion of Indigenous traditional knowledge of medicinal plants and patent law. Many patent owners feel that Indigenous traditional knowledge is not proprietary-type knowledge, but knowledge that belongs to all and hence not patentable. Indigenous traditional knowledge . . . therefore falls into the category of discovery, whereas products manufactured by patent owners based on this knowledge fall into the category of invention and are therefore patentable.

BAOBAB, Jan. 2010, at 1, 2, 4 (asserting the positive impact of indigenous knowledge on health, growth, and cultural diversity).


103. See Kamau et al., supra note 14, at 262 (asserting that the NP suffers from poor wording); Native Women of Quebec, supra note 48; See also Nagoya Protocol, supra note 5, at art. 6.2, 7, 11, 12, 16.1.

Collective rights do not really exist in patent law either; instead, there is a stark preference for individualism. In other words, a community as a whole could not apply for a patent based on its collective knowledge and use of a particular plant.\textsuperscript{105}

Instead, the majority of states deferred the issue to the World Intellectual Property Organization, despite the fact that the Organization’s mandate does not cover the protection of TK.\textsuperscript{106} The main concern therefore is that the CBD, and now the complementing NP, only increase the pressure the indigenous peoples already faced in protection of TK through the commodification of their knowledge and by making it subject to domestic law if no sui generis system of protection is acknowledged.\textsuperscript{107}

The next COP as well as the established Interim Committee will primarily deal with cooperation procedures and institutional mechanisms to promote compliance with the NP as well as a Multilateral Benefit-Sharing Fund as proposed by the Africa Group.\textsuperscript{108} In addition to the development and outcome of these meetings, much will depend on the implementation of provider and user-countries—since the CBD, despite all criticism, is foremost an international treaty between sovereign states.

Focusing on indigenous peoples’ rights under the NP has broad implications given the shortcomings of the CBD. As Oguamanam reminds us:

By some accounts well over 70 per cent [sic] of global biological or genetic resources are located in indigenous and local communities across the globe. These communities are the centres of global biodiversity. Analysts find a correlation between biological diversity and cultural diversity. Hence, centres of biological diversity are also centres of cultural and epistemic diversity. For many indigenous and local communities, dealings with biological resources constitute a fundamental reality of their lived experience. These dealings are a site for the exploration of community knowledge and innovation systems, and for practical translations of the community’s worldview and cultural expressions. Despite the excessive romanticism

\textsuperscript{105} Koutouki, \textit{supra} note 4, at 23.
\textsuperscript{107} \textit{Id. Tobin, supra} note 104, at 102.
\textsuperscript{108} Kamau et al., \textit{supra} note 14, at 252; Swiderska, \textit{supra} note 43.
prevailing in many of the narratives of indigenous and local communities’ relationship with biological resources, it is undeniable that such relationships are premised on the imperative for a sustainable ecological order.109

CONCLUSION

The Nagoya Protocol did much to improve many shortcomings found throughout the CBD. This is especially true of the access and benefits-sharing provision. The protocol emphasizes the importance of preserving biodiversity and highlighting the tremendous economic value of the natural world. However, when it comes to ensuring protection for indigenous peoples’ traditional knowledge and control of the genetic resources found in their territories, the Nagoya Protocol disappoints.

This is unfortunate, given that much of the cutting edge discussions taking place in international environmental law of late are based on traditional theories of indigenous peoples and local communities. The rationale behind such concepts as intergenerational justice and crimes against future generations are based on the notion of the seven generations. Basically, before acting we must consider the implications of our actions for the next seven generations.

The Nagoya Protocol is still very new. We would hope that future legal opinions would ensure an interpretation of its many articles that considers and reinforces the sustainable development methods of natural resource management underlying indigenous traditional knowledge and acknowledges the fundamental role indigenous and local communities have had in the creation, preservation, and understanding of the world’s biological diversity. At the very least, we hope that priority be given to indigenous and local community interests in access to and benefits-sharing from the genetic resources found on their lands and the traditional knowledge associated with this biological diversity.

INTRODUCTION

Although every sovereign State has the right to exploit domestic resources pursuant to its own economic and environmental policy, human beings are entitled to live healthy, productive lives without the threat of disruption to their natural environment. Sustainable development policies are initiated to resolve the innate conflict between principles of environmental conservation and economic development in the context of natural resource exploitation. In essence, sustainable development marries economic progress with environmental conservation and intergenerational equity. In the international political forum, sustainable development means fostering cooperative efforts meant to ultimately mitigate both global poverty and environmental degradation. In the Arctic, this is accomplished

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2. Id. at Principles 4–7.
by integrating indigenous interests into a collaborative system of
governance that forms a clear nexus between traditional Northern
indigenous culture, Western concepts of environmental protection, and
economic development of the region’s natural resources.

The Arctic Sustainability Principle presents a workable solution to
problems of collaborative governance by framing indigenous practices as
the starting point for any decision of Arctic policy, while also allowing for
divergence as necessary. Arctic Sustainability, therefore, has developed as a
“hub-and-spoke” model of decision-making for sustainable development;
policy is formulated in the context of divergent nationalistic economic
motives (the “spokes”) that must revolve around indigenous practices (the
“hub”) in order to form a functional system of governance. This paper
begins with a discussion of resource management practices of the Northern
indigenous peoples and continues into a discussion of the natural resource
exploitation and resulting environmental problems which have plagued the
region. The analysis continues to discuss the development of sustainable
natural resource practices in the Arctic and, following a discussion of the
principles’ unique features and benefits, concludes that Arctic national
resources are developed pursuant to a unique “Arctic Sustainability
Principle” defined by a collaborative governance structure that dedicates
significant focus to the traditional practices of indigenous peoples.

I. RESOURCE MANAGEMENT PRACTICES OF THE INDIGENOUS PEOPLES
OF THE NORTH

Natural resource extraction in the Arctic occurs within a uniquely
isolated context. The Arctic is rich in natural resources that are particularly
susceptible to exploitation by virtue of the fact that they are harvested as
part of a uniquely un-transparent commodity market. Various foreign
sovereigns govern the region pursuant to nationalistic economic motives,
and there are relatively few people with a direct interest in mitigating the
resulting damage to the Arctic region. The Arctic region is only home to
about four million permanent residents, and this inherent lack of oversight
by non-commercial residents creates the possibility of pervasive and

3. NICOLE STUCKENBERGER, THEN ICE: INUIT TRADITIONS WITHIN A CHANGING ENVIRONMENT 31 (2007). It was not until 1987 that President Gorbachev announced that the Soviet government would
cooperate with the West with respect to Arctic affairs, thus opening up the Arctic region as a subject of
undetectable market abuses. Notably, the Arctic is home to a number of indigenous peoples\(^4\) who have traditionally maintained a subsistence culture based upon the unique Arctic environment.\(^5\) However, eight “Arctic States” have jurisdiction over the various territories that compose the Arctic region: Canada, Denmark (as the sovereign of self-governing Greenland), Finland, Norway, Sweden, Iceland, Russia, and the United States.\(^6\) Over 40% of the land in the Arctic and almost half of the region’s coastline are under Russian jurisdiction,\(^7\) which was shielded from international exploitation politically by the Soviet Iron Curtain\(^8\) and physically by impermeable ice throughout most of the twentieth century.\(^9\)

Although the indigenous peoples of the North have embraced Western institutions to some degree—one clear example being the operation of the Inuit Circumpolar Conference—indigenous cultures in the Arctic remain closely tied to their historic cultural roots.\(^10\) Climate change, modernization, and globalization have forced profound changes upon the Arctic region,\(^11\) but the indigenous peoples have very particular cultural practices that have allowed them to survive a part of the world that is notably inhospitable to human life.\(^12\) Indigenous sociopolitical and economic values pervade life in the Arctic, regardless of which Arctic State has jurisdiction over a particular territory.\(^13\) This is particularly true in the context of natural resource management and environmental conservation practices. For example, the Inuit culture has a very acute and sophisticated concept of climate which feeds directly into regional climate change policy. Social systems in the Arctic revolve around seasonal and daily climates both as a matter of necessity and as a result of cultural identity.\(^14\) Concisely, the Inuit culture conceptualizes climate as a universal force that is manifested as physical reality, either by means of the weather or by means of human behavior.\(^15\)

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5. STUCKENBERGER, supra note 3, at 31.
6. Id.
7. YOUNG, supra note 4, at 4.
9. STUCKENBERGER, supra note 3, at 57.
10. Id.
11. Id. McElroy, supra note 3, at 107.
12. STUCKENBERGER, supra note 3, at 31.
13. Id.
14. Id. In the Inuit culture, the term “sila” is the most direct analogue to the western conception of climate, but the phrase also connotes the sky, the universe, and general notions of human psychology. Id. at 33. Sila is expressed as changing weather conditions, traditionally indicated as snow and ice quality, but it is also used as a general concept of human intelligence. Id. For example, “silaluttuq” is defined simply as “bad weather,” whereas a “silatittuq” is a term used to describe a nonsensical or insane person. Id.
15. Id. at 33.
The Inuit also have a very particular relationship to the game traditionally hunted for subsistence. Indigenous groups in the Arctic sustained themselves for centuries by means of gathering, fishing, and hunting large mammals of the land and sea, such as caribou, polar bears, seals, and whales.16 These animals are revered as intelligent entities; they were hunted for the subsistence of humankind, but tradition required the hunt to be carried out with proper respect in order for the animal’s immortal soul to return for reincarnation and further perpetuity.17 Conversely, if the animal is hunted in a disrespectful manner, then its soul will not reincarnate and return, and the following season’s hunt will be less successful. This model of wildlife resource utilization fosters both local economic progress and conservative environmental policies—achieving the major goal of sustainable development.

In general, indigenous peoples of the North conceive of themselves as part of the Arctic ecosystem.18 Subsistence cultures generally resist overexploiting natural resources because they depend upon the environment for meeting immediate biological needs.19 In this sense, the Arctic indigenous peoples live according to a concept of unity between individual self-interest and general environmental protection. In general, indigenous peoples of the North conceive of themselves as part of the Arctic ecosystem.20 Thus, indigenous groups focus on the environment—rather than the economy—in deciding how to form Arctic policy,21 and there is an inherent practice of conservation in traditional resource management.22 This “Conservation Ethic” includes respect for the integrity of wildlife, knowledge of where to find valuable resources, the best methods of taking them, and an understanding of the dangers of taking more than necessary.23

From their very cultural origins, the Inuit and other indigenous peoples of the North innately conceptualize humanity as a substantial part of what Western culture describes as “the integral and interdependent nature of the

16. Id. at 32.
17. Id. at 36.
20. Johnson, supra note 18, at 3.
21. Id.
22. Collings, supra note 19, at 18–19.
23. Id. at 18.
However, the expansion of economic development in the Arctic and related Western interloping on indigenous markets has significantly altered the traditionally sustainable practices of the Arctic’s indigenous peoples.

II. NATURAL RESOURCE EXPLOITATION IN THE ARCTIC

The rise of commercial whaling and fur trading in the nineteenth century notably altered traditional indigenous practices. With the rise of fur trading in the Arctic, the indigenous peoples began to alter traditional subsistence hunting practices in order to adapt to their changing socio-economic environment. Foreign commercial entities brought new technologies to the Arctic—namely firearms, steel traps, fishnets, and wooden ships—which eventually became an important part of subsistence hunting practices. The new technologies allowed indigenous hunters to capitalize on the trade of seal skin, beaver pelts, and arctic fox fur, and indigenous groups benefitted from longer periods of subsistence on stored whale and caribou meat.

Despite these benefits, the fur and whaling trades did not bear any substantial growth in indigenous economies, mostly due to competition by Western entities, fluctuations in the fur market, and commonly adverse weather conditions. However, the fur and whaling commodities traditionally utilized by the indigenous peoples attracted new settlers, trading posts, and shipping entities, which began to steer the Arctic region toward economic development. The discovery of Klondike gold in 1896 and the ensuing influx of foreign speculators further catalyzed commercial development in the Arctic and marked the beginning of a period of foreign exploitation that provides a useful analog to modern mining development in the region. The burgeoning market for Klondike gold brought thousands of settlers to an area of the Arctic that is both exceedingly difficult to access

24. See generally Rio Declaration, supra note 1 (stating that the Conference on Environment and Development recognizes the integral and interdependent nature of the Earth).
26. Id. at 188-89.
27. Id. at 188.
28. Id. at 189.
29. Id.
and particularly inhospitable to human occupation.\textsuperscript{31} This ultimately culminated in the establishment of large-scale commercial mining operations in the North with related environmental consequences.\textsuperscript{32}

In that same year, the Working Group on Arctic International Relations was initiated, which led research on maritime issues and potential strategic conflict that could arise between the Arctic States.\textsuperscript{33} Initial collaboration among the Arctic States reflected a sentiment that, in addition to being a necessary subject of environmental research and exploration, the region was an important part of national security as well.\textsuperscript{34} Summarily, environmental regulation in the Arctic region was inherently collaborative, and necessarily so because multiple nations shared responsibility for the environmental problems in the region, in addition to common economic motives.\textsuperscript{35}

The Arctic States share common economic motives with regard to hydrocarbon development, mining, and commercial fishing. Fish exports accounted for nearly 80\% of the export income of Iceland and Greenland in the early 1990s.\textsuperscript{36} The United States has declared “the renewable resources of the Arctic, specifically fish and other seafood,” to be “one of the Nation’s greatest commercial assets,”\textsuperscript{37} and Arctic fisheries produce as much as 10\% of the world’s catch.\textsuperscript{38} Additionally, the Arctic States also share concerns about non-economic policies in the Arctic, such as indigenous rights and environmental protection. Taking these mutual interests into account, multinational governance over the Arctic region by the Arctic Council is particularly effective at ensuring that economic development of the region is sustainable. However, multinational governance necessarily involves

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\textsuperscript{31} Graeme Wynn, Canada and Arctic North America: An Environmental History 260 (Mark R. Stoll ed., 2007). Canadian regulations requiring at least a ton of supplies exacerbated the difficulty of this journey. \textit{Id}.

\textsuperscript{32} Foreign speculators had to carry supplies for miles, sometimes on hands and knees, through latitudes of permafrost and icy slopes so steep as to be “almost perpendicular.” \textit{Id}. at 260. These conditions posed an obvious deterrent to large-scale commercial mining in the Arctic, but thousands of foreign speculators managed the journey regardless. \textit{Id}. Some historians estimate that as many as 200,000 people attempted the journey to the Klondike, but only about 40,000 reached the area and only around 4,000 actually managed to strike gold in the region. \textit{Id}. at 263.


\textsuperscript{34} E.C.H. KeskiTalo, Negotiating the Arctic: The Construction of an International Region 47 (2004).

\textsuperscript{35} \textit{Id}. at 48.

\textsuperscript{36} \textit{Id}. at 78.


\textsuperscript{38} KeskiTalo, \textit{supra} note 34, at 78.
collective action problems, and consensus becomes more difficult as the number of sovereign entities required for agreement increases.

III. MAJOR ENVIRONMENTAL ISSUES CREATED BY ECONOMIC DEVELOPMENT OF ARCTIC RESOURCES

Early Western miners extracted gold from the subterranean stream beds in anticipation of the spring thaw, and, during winter, speculators lit fires to thaw the permafrost, melting and excavating at ever-deeper depths and creating ever-larger piles of displaced earth. These fires released noxious gasses and other pollutants into the once pure Arctic air and demanded substantial timber resources. The environmental effects of industrial mining practices, beginning with the Klondike gold rush, remain a significant issue in the Arctic environment. Furthermore, early miners decimated the old-growth forests in the region, resulting in substantial ecological disruption that quickly transformed the formerly robust environment into a relative wasteland. This domestic use expanded substantially through evolution of the transatlantic timber trade and related logging activities. Unsustainable logging activities, such as the over-logging of old-growth forests, have resulted in continued environmental degradation in the Arctic. In addition to the pollution created by local industrialization, trans-boundary pollution has been identified as an official threat to the Arctic environment. The Chernobyl disaster in 1986, for example, released radioactive fallout upon the Arctic North. Additionally, worldwide industrial activity has caused substantial acidification and ozone depletion problems in the region.

40. Id.
41. Id. at 262. According to one historical account, half a cord of wood was required to thaw five cubic feet of frozen gravel. Id.
43. Id.
44. Id. at 104.
45. Keski-Talas, supra note 34, at 56.
47. Keski-Talas, supra note 34, at 56–57.
48. Id.
Though the issues posed by local and trans-boundary pollution are substantial, their environmental impacts pale in comparison to the potential impacts of hydrocarbon extraction and combustion. An early U.S. Geological Survey estimated that the Arctic contains about 13% of the world's oil and as much as 30% of its gas.\footnote{Anderson, After the Ice: Life, Death, and Geopolitics in the New Arctic 181 (2009).} The bulk of the oil and gas produced in Russia and the United States in the 1990s was extracted from Arctic regions, resulting in widespread adverse direct and indirect environmental effects.\footnote{Young, supra note 4, at 4.} Directly, offshore oil rigging disrupts whale migration and interferes with traditional indigenous whale hunts.\footnote{Anderson, supra note 49, at 182.} Indirectly, the world market’s pervasive dependence upon fossil fuels has resulted in the accumulation of excessive carbon dioxide in the atmosphere and related global warming. Unfortunately, both trans-boundary pollution and global warming pose serious threats to traditional Arctic cultures, but Arctic natives have no control over these pollution sources.\footnote{Johnson, supra note 18, at 4.}

Notably, the Arctic is particularly sensitive to the effects of global warming because so much of the region's ecosystem depends upon thick ice sheets. In the summer of 2007, the Arctic sea ice was melting at an average of four centimeters each day—more than six times averages calculated in the 1990s and more than double the rate of the previous year.\footnote{Anderson, supra note 49, at 86.} In that same year, solar radiation heating the Arctic seas was recorded at levels as much as 500% higher than usual, largely due to a feedback effect from warmer seawater.\footnote{Id. at 87.} This feedback effect is partly due to the fact that open water absorbs 93% of the solar radiation in the Arctic region. Thus, the region will get warmer as more ice melts, causing further melting and further warming. \footnote{Id.} The integration of indigenous natural resource management practices presents one solution to the environmental consequences of natural resource extraction in the Arctic that reserves the potential for future economic growth.\footnote{Johnson, supra note 18, at 4.}
IV. DEVELOPMENT OF THE ARCTIC SUSTAINABILITY PRINCIPLE THROUGH COLLABORATIVE GOVERNANCE AND ACKNOWLEDGEMENT OF INDIGENOUS RIGHTS IN THE ARCTIC COUNCIL

Arctic governance functions by means of a particular focus on the participation of the indigenous peoples of the North, which serves as a starting point for any decisions about Arctic policy. Historically, Finland acted as a conduit of Western ideas into the Soviet Union, and Arctic environmental policy largely arose out of Finland’s reaction to Soviet policies. In particular, the Finnish believed that the Arctic States should work towards a collaborative treaty to address the Arctic’s environmental protection issues, particularly trans-boundary pollutants. Notable Finnish contributions to sustainable development of the Arctic included the reversal of the atmospheric acidification processes, the development of an effective environmental monitoring system, and mitigation of the radioactive fallout in the region, which occurred as a result of the Chernobyl disaster. Most significantly, the Finnish led the development of the Arctic Environmental Protection Strategy (AEPS) as a result of concern over the environmental problems in the region.

While Finland instigated early collaboration in Arctic governance, these initiatives largely laid the framework for Canadian development of the modern Arctic Sustainability Principle. Canada emphasized that Arctic governance should be focused on sustainable development, even suggesting the AEPS be renamed the “Arctic Sustainable Development Strategy” to indicate that the policy had a broader focus than environmental protection. Canadian interests dominated the early development of Arctic policy, culminating in the formation of the Arctic Council—an international agreement which calls for sustainable development of the Arctic region, in addition to establishing bolstered environmental protection in conjunction with the protection of indigenous rights.

The AEPS, which predated the Rio Declaration by almost exactly one year, is replete with principles of sustainable economic development in the context of necessary Arctic environmental protection measures. The AEPS recognizes that “[t]he use of natural resources is an important activity of

55. Keskitalo, supra note 34, at 58 (quoting Oran R. Young, Creating Regimes 72 (1998)).
57. Id.
58. Id. at 54–57.
59. Id. at 54.
60. Id. at 62. This proposition was rejected, although it reemerged later as an Arctic Council initiative. Id.
61. Id.
Arctic nations. Therefore, [the AEPS] should allow for sustainable economic development in the north so that such development does not have unacceptable ecological or cultural impacts.”  

Through the AEPS, the Arctic States committed to collaboration and cooperation “to ensure the protection of the Arctic environment and its sustainable and equitable development, while protecting the cultures of indigenous peoples,” with a primary objective being the “protection, enhancement and restoration of environmental quality and the sustainable utilization of natural resources, including their use by local populations and indigenous peoples in the Arctic.”  

Although indigenous practices were not binding upon the Arctic States, the AEPS made it official policy that the Arctic States “seek to accommodate the traditional and cultural needs, values, and practices of the indigenous peoples as determined by themselves, related to the protection of the Arctic environment.”

Canadian involvement directly resulted in collaborative environmental protection strategies such as the Conservation of Arctic Flora and Fauna (CAFF), which embodies sustainability principles in conjunction with the special involvement of the Arctic indigenous peoples. Though the AEPS was initiated by the Finnish, Canadian policy perspectives were integral in the inclusion of the indigenous peoples of the area. Particularly, Canada advanced Arctic governance principles beyond the Finnish focus on pollution remediation to ensure that the region was governed according to principles emphasizing the practices of indigenous people with a traditional relationship to the Arctic environment. Canada was the driving force in promoting the theme of sustainable development for the AEPS, which

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63. Id.
64. Id. at art. 2.1(ii).
65. Id. at art. 2.1(iii).
66. CAFF instructs the Arctic States “to create a distinct forum for scientists, indigenous peoples and conservation managers engaged in Arctic flora, fauna and habitat related activities to exchange data and information on issues such as shared species and habitats and to collaborate, as appropriate, for more effective research, sustainable utilization and conservation.” Id. at art. 9; see also Keskitalo, supra note 34, at 62 (stating that CAFF was initiated when the Canadian Wildlife Service of Environment Canada suggested external affairs should include a flora and fauna conservation component).
67. Keskitalo, supra note 34, at 64.
68. Id. Canada had a long-standing political relationship with the indigenous peoples of the Canadian North. Even before the official recognition of the Nunavut territory pursuant to a 1990 agreement and ratification by democratic vote in 1992, indigenous political organizations such as the Inuit Tapirisat of Canada wielded substantial political influence in domestic governance. Id. See also McElroy, supra note 3, at 122 (explaining how the Inuit Tapirisat of Canada pushed for land claim negotiations and self-governance throughout the 1970s and 80s).
eventually came to be embodied in the collaborative Arctic Council policies.69

The Arctic States formed the Arctic Council in “recognition of the special relationship and unique contributions to the Arctic of indigenous people and their communities.”70 In addition to coordinating an effort among the Arctic States and indigenous interests in implementing the AEPS, CAFF, and other Arctic policies, the Arctic Council “provide[s] a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic.”71

V. UNIQUE FEATURES OF THE ARCTIC SUSTAINABILITY PRINCIPLE

The fact that non-governmental indigenous groups are allowed to participate in Arctic governance through the Arctic Council is truly unique.73 Although sustainable development inherently focuses on indigenous economics, the degree of indigenous participation in Arctic decision-making within the Arctic Council is particular to the concept of sustainable development in the Arctic.74 The “Arctic Sustainability Principle” arose within the context of this unique governance structure, defined by the combination of multinational cooperative governance and a focus on indigenous expertise.

The concept of sustainable development was agreeable to the varied, often competing, interests of the Arctic States,75 and requiring indigenous practices to provide a foundation for discussions of Arctic policy provided much-needed focus to the collaborative governance structure. This “environment-indigenous nexus”76 allowed for certain practices commonly

69. Participants in the Arctic Council include: the Arctic States, the Inuit Circumpolar Conference, the Saami Council and the Association of Indigenous Minorities in the Far north, Siberia, and the Far East of the Russian Federation, although participation is also open to other organizations of Arctic indigenous peoples “with majority Arctic indigenous constituency, representing: a single indigenous people resident in more than one arctic State; or more than one Arctic indigenous people resident in a single Arctic State.” Declaration on the Establishment of the Arctic Council art. 2, Sept. 19, 1996, 35 I.L.M. 1382 [hereinafter Ottawa Declaration].

70. Keskitalo, supra note 34, at 75.

71. Ottawa Declaration, supra note 69, at Declaration on the Establishment of the Arctic Council.

72. Id. at art. 1(a).

73. Keskitalo, supra note 34, at 63.

74. Id. at 78.

75. Id. at 75.

76. Id.
thought of as environmentally exploitative—such as limited commercial use of endangered species—while still requiring consideration of the indigenous Conservation Ethic.\(^7^7\) The Arctic Sustainability Principle embodies this nexus between Western concepts of environmental protection and Northern indigenous knowledge in developing a framework for sustainable economic development, culminating in the formation of policy that embodies the natural environment-indigenous-sustainability relationship.

VI. BENEFITS OF THE ARCTIC SUSTAINABILITY PRINCIPLE

By requiring indigenous interests to form the argumentative—but not imperative—framework in which Arctic policy is decided pursuant to multinational interests, the Arctic Sustainability Principle protects indigenous peoples from exploitative practices of a foreign sovereign and, conversely, protects the Arctic environment from potentially exploitative indigenous practices. This duality comes to a head when Western concepts of environmental protection conflict with traditional indigenous conceptions, such as in the legal and ethical opposition to the killing of wild animals for consumptive purposes.\(^7^8\) By requiring certain indigenous interests to form the argumentative framework of natural resource policy development, rather than any given sovereign’s economic imperatives, the structure of Arctic governance facilitates a particularly flexible and effective implementation of sustainable development principles. Although there are particular Western resource management policies which have proven more effective than indigenous practices, there are inherent benefits to a government structure which requires consideration of indigenous values in the context of local natural resource development.

Wildlife resources provide the most explicit example of potential conflict between Northern and Western concepts of environmental conservation. In the Arctic North, consumption of wild animals is a critical economic and cultural activity.\(^7^9\) However, traditional activities such as whaling and seal hunting have elicited political opposition among the Arctic States, which consider the practices environmentally harmful. The United States outlaws whaling, but traditional whaling remains an important economic and cultural activity among indigenous peoples in the northern

\(^{77}\) Id. at 76.

\(^{78}\) YOUNG, supra note 4, at 127.

\(^{79}\) Id. at 126.
regions of Canada, Iceland, Greenland, Norway, and Russia. A circumstantial analogue exists in seal hunting practices. Until the mid-1980s, seal hunting was a viable economic activity in the United States. However, environmental groups intent upon ending the seal harvest exerted sufficient political pressure and the legislature was subsequently forced to end the practice of commercial seal harvesting within U.S. jurisdictions. Campaigns against commercial seal harvesting in the U.S. and Canada substantially undermined the market for seal fur harvested by the Inuit and Aleut peoples, and, to some degree, turned these Northern indigenous groups against Western preservationists.

In this regard, the Arctic Sustainability Principle requires deep consideration of which indigenous practices should form the basis for official policies, as there is often a lack of consensus among even the various indigenous peoples represented by the Arctic Counsel. While indigenous resource management practices are generally more environmentally sound than the exploitative free market, Western regulatory technologies cannot be disregarded. In this regard, the Arctic States provide an important check and balance to potential shortcomings in indigenous natural resource management practices.

Offshore oil prospecting is another clear point of divergence among the interests of the indigenous peoples of the Arctic. Notably, the Inuit Circumpolar Conference supports onshore oil development because of the infrastructural and educational benefits that it has yielded for the indigenous peoples of the North. However, many indigenous peoples oppose offshore oil development because of the degree to which the practice disrupts indigenous traditions. Despite opposition from the Inuit Circumpolar Conference, 2.76 million acres of offshore oil-prospecting leases in the

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80. Keskitalo, supra note 34, at 79.
81. Pursuant to a multinational agreement, seals were harvested for their fur by the U.S. Government until 1984, when Congress passed the Fur Seal Amendments, PL 98-129 (1983), wherein the U.S. government withdrew from any direct seal harvesting activities and instead delegated the practice to the village corporation of the Pribilof Community. Young, supra note 4, at 129. However, political opposition to the practice by environmental groups made the legislature unwilling to ratify the multinational seal hunting protocol in 1984, ending the practice completely within the United States. Id. at 127, 129.
82. Id. at 129.
83. Id. at 127, 129.
84. For example, wildlife management policies in the Canadian North are partially based on an observation that indigenous natural resource management practices have failed to effectively manage resources subject to the tragedy of the commons. Collings, supra note 19, at 14. Under indigenous management, caribou populations have thinned substantially and some local muskoxen species have gone extinct. Id. at 15–16.
86. Id.
Chukchi Sea were sold to various international oil companies in February 2008 pursuant to the 2007-2012 Outer Continental Shelf leasing program.\(^{87}\) However, any hydrocarbon explorations licensed under this program are conditioned upon a guarantee that “such exploration will not be unduly harmful to aquatic life in the area, result in pollution, create hazardous or unsafe conditions, unreasonably interfere with other uses of the area, or disturb any site, structure, or object of historical or archeological significance.”\(^{88}\) Additionally, offshore hydrocarbon exploration is licensed “so as to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone.”\(^{89}\) These offshore oil leases—though not sustainable in-and-of-themselves—reflect sustainable sentiments, at least to the degree that they allow for economic hydrocarbon development while requiring a mandatory degree of environmental remediation. Further, indigenous people are at least afforded additional bargaining power in offshore oil development deals when indigenous values are integrated into Arctic natural resource management practices. Russia particularly affords the indigenous people of the Arctic additional protection against exploitative practices of hydrocarbon developers.\(^{90}\)

\[\text{CONCLUSION}\]

Indigenous knowledge is valuable in any effective system of wildlife resource management, particularly the practices of quantifying environmental phenomenon that subsistence cultures must develop to survive.\(^{91}\) Traditional indigenous activities depend upon the land, whereas a foreign sovereign has little disincentive to mitigate environmental

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87. Id. at 185.
89. Id. § 1344(a)(3) (2006). In general, “[m]anagement of the Outer Continental Shelf shall be conducted in a manner which considers economic, social, and environmental values of the renewable and nonrenewable resources contained in the outer Continental Shelf, and the potential impact of oil and gas exploration on other resource values of the outer Continental Shelf and the marine, coastal, and human environments.” Id. § 1344(a)(1) (2006).
91. See Collings, supra note 19, at 31–33 (applying Milton Freeman’s theories regarding the utility of traditional knowledge in environmental resource management practices to Arctic practices).
disruption. In the Arctic, indigenous practices clash with the interests of the Arctic States with regard to some points of industrial development and commercialization, but they are consistent with other types of economic development. However, the particularities of Arctic governance force decision-makers to consider natural resources with different economic utility from the indigenous perspective.

While the indigenous peoples themselves do not have sovereignty over the region, indigenous values are taken into account by means of the uniquely collaborative governance structure that defines Arctic law. Modern Arctic governance revolves around the Inuit Circumpolar Conference, which actively pursues Arctic policies that are mutually satisfying to both the indigenous peoples and the Arctic States that serve as their legal sovereign. One of the earliest U.S. Arctic policies declares that “the ... Arctic provides an essential habitat for marine mammals, migratory waterfowl, and other forms of wildlife which are important to the [United States] and which are essential to Arctic residents.” However, this representation of indigenous peoples does not always translate into a realization of indigenous interests in Arctic policy.

This model justifies some exploitative behavior, such as commercial whaling, hunting, and fishing, but obliges the Arctic States to approach non-traditional economic activity from a context of environmental conservation.

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92. This relationship is hyperbolized in Russia’s largely exploitative relationship with the indigenous Arctic cultures and has provided a fulcrum for debate over the development of Arctic resources. See GAIL FONDAHL, Environmental Degradation and Indigenous Land Claims in Russia’s North, in CONTESTED ARCTIC: INDIGENOUS PEOPLES, INDUSTRIAL STATES, AND THE CIRCUMPOLAR ENVIRONMENT 65–83 (Eric A. Smith & Joan McCarter eds., 1997) (arguing that the Russian North has constrained aboriginal peoples’ abilities to continue to use their lands).

93. KESKITALO, supra note 34, at 78.

94. STUCKENBERGER, supra note 3, at 31.

SUSTAINABILITY AND LAND USE REGULATION IN CANADA: AN INSTRUMENT CHOICE PERSPECTIVE

Hoi Kong*

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INTRODUCTION

The academic literature on land use regulations has tended to focus on property law implications.1 Given the interests affected by such regulations, this emphasis is not surprising, and, indeed, one leading scholar in the field, Professor Bill Fischel, has argued that the power to zone should be

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1. Some have noted that, at least in the United States context, the focus has centered on the Takings Clause. Julie A. Ronin et al., Reassessing the State and Local Government Toolkit, 77 U. Chi. L. Rev. 1, 1 (2010) ("[E]minent domain . . . has been the subject of intense scholarly scrutiny . . .").
understood as a collectively held property right. In this paper, I hope to redirect the analytical attention along the lines that have been suggested by contributors to a recent symposium held at the University of Chicago on the “State and Local Government Toolkit.” These contributors examined a range of policy instruments that state and local governments can deploy to achieve regulatory ends. In this paper, I will similarly undertake an instrument choice analysis of land use regulation, and, in keeping with the theme of this workshop, I will assess how land use instruments can be deployed to achieve sustainability ends. Before I move to the main body of the article, I will make my suggestions based on an instrument choice analysis and what I understand to be the relationship between that form of analysis and scholarship on environmental regulation.

Professor Roderick Macdonald has written a brief history of instrument choice scholarship in Western democracies and divided that history into three periods. In the first period (1977-85), scholars argued that express rules, enunciated by official organs of the state, were to be deployed to correct market failures. In the second period (1988-95), scholars expanded the scope of values to be taken into consideration beyond efficiency and widened the range of regulatory institutions beyond those of the state. Finally, according to Macdonald, in the contemporary period, scholars recognize that there is no single metric for determining what policy instrument is appropriate for a given context, and, instead, understand that a variety of perspectives, criteria, principles, values, and institutional forms can be brought to bear on any governance question.

2. See William A. Fischel, A Property Rights Approach to Municipal Zoning, 54 LAND ECON. 64 (1978). (arguing that zoning can be understood as an incomplete property right that belongs to a community, i.e. zoning is under the control of the community, but can only be selectively leased (in the form of fiscal zoning) and cannot be alienated). Scholars have noted that environmental regulation has been similarly framed in private law terms. Professor Richard J. Lazarus has argued that natural resources law can be understood as protecting property entitlements, while pollution control law can be understood as addressing harms that are traditionally dealt with by tort law. RICHARD J. LAZARUS, THE MAKING OF ENVIRONMENTAL LAW 178–79 (2004).

3. Ronin et al., supra note 1.


Scholarly debates in the environmental law context have resembled those in the first two eras of the instrument choice literature. Disagreements in the environmental law context have focused on the appropriate role of markets in regulating environmental problems. Proponents of market-based approaches have argued that trading mechanisms are an efficient means of reducing harmful emissions. In contrast, proponents of state regulation have tended to argue for forms of administrative agency regulation that involve agencies monitoring industry activity, issuing prescriptive rules, and enforcing compliance.

Recent scholarly work by administrative law scholars on environmental regulation has departed from this debate between market and prescriptive or command and control regulation, and has come to resemble the current state of instrument choice literature. I will claim below that arguments about sustainable development in the land use context can be situated in this scholarly conversation. There are three features of the recent administrative law scholarship on environmental regulation that are relevant to the land use discussion. First, scholars recognize that a range of interests is implicated in environmental regulation. Second, scholars note that no single regulatory instrument can address the full complexity of environmental concerns. Third, scholars emphasize that public participation in regulatory regimes is necessary for them to be effective and democratically

7. See Sabel, infra note 12 & Freeman & Farber, infra note 20 (providing overviews of this debate and prescriptions for transcending the debate); DOUGLAS A. KYSAR, REGULATING FROM NOWHERE: ENVIRONMENTAL LAW AND THE SEARCH FOR OBJECTIVITY (2010) (providing a recent normative critique of utilitarian approaches to environmental regulation that aims to reconceive the normative underpinnings of more prescriptive policy orientations (and, in particular, the precautionary principle)). Kysar argues that in the United States’ federal environmental regulation originally adopted a prescriptive approach, which relied on a conception of regulation that placed environmental, health, and safety objectives in the foreground, while introducing cost concerns only at the point of assessing the feasibility of means chosen to advance those objectives. Id. at 4–5. Kysar also notes that, according to critics of this feasibility approach, all regulation necessarily requires an up-front assessment of the costs and benefits of regulatory choices, instead of relegating cost considerations to the role of a side-constraint. Id. at 7–9. See RICHARD A. POSNER, CATASTROPHE: RISK AND RESPONSE 155–65 (2004) (outlining a utilitarian approach to environmental regulation that prescribes cost benefit analysis in the context of environmental regulation).


9. See Bruce Ackerman, Beyond the New Deal: Coal and the Clean Air Act, 89 YALE L.J. 1466 (1980) (providing a classic study of U.S. environmental regulation and its relationship to the New Deal consensus about independent agency regulation).
legitimate.\textsuperscript{10} We will see below that these concerns animate scholarship on sustainable land use development and on land use regulation more generally. I shall further argue that a particular choice of land use instrument, which aimed to achieve sustainability objectives, evidences these core concerns of contemporary administrative law scholarship on environmental issues.

The paper is divided into two parts. In Part I, I will set out the background for this paper’s arguments by describing two positions in the administrative law scholarship on environmental regulation that share concerns with my instrument choice approach to land use regulation. I will, moreover, argue that an instrument choice approach is applicable \textit{in general} to questions of land use regulation and land use regulation in the sustainable development context. In Part II, I shall argue that a \textit{particular instance} of land use regulation reveals the utility of an instrument choice approach and highlights the regulatory significance of the concerns that animate contemporary administrative law and land use scholarship on environmental issues.

I. \textbf{ADMINISTRATIVE LAW AND ENVIRONMENTAL REGULATION, AND SUSTAINABLE LAND USE REGULATION: SITUATING THE DEBATE}

In this part, I will situate my instrument choice approach to sustainable land use in the context of (1) positions in the administrative law scholarship concerning environmental issues and (2) contemporary scholarship on sustainable land use regulation and land use regulation more generally. Once that context is set, I will, in Part II, outline the particular instrument choice approach to land use regulation that will be taken in this paper, and I hope to demonstrate in that argument both the utility of the approach and the effectiveness of the instrument analyzed. I begin by situating my instrument choice arguments in the context of two contemporary positions in administrative law that address environmental issues, namely New Governance and Modular theories.

\textsuperscript{10} These three elements of environmental regulation are described in standard texts on environmental law. \textit{E.g.}, Kubasek, \textit{supra} note 8, at ch. 4; Salzman, \textit{supra} note 8, at chs. 3, 4 (providing American examples); JAMIE BENEDICKSON, \textit{ENVIRONMENTAL LAW} chs. 7, 16, 17 (3rd ed. 2009) (exploring Canadian considerations of some regulatory options).
A. New Governance and Modular Approaches to Environmental Regulation

Scholars working in the New Governance paradigm have argued that environmental regulation should avoid the atavisms of market and command and control paradigms. These scholars argue that this end can be achieved when diverse localities gather and share information and a central authority (whether state or federal) acts as a clearing house for this information and sets best practice standards. In the New Governance regime, local communities, whose memberships are determined by the nature of the environmental concern to be addressed, monitor their surroundings and assess local regulatory efforts against the standards set and information collected by central authorities. Professors Sabel, Fung, and Karkkainen argue that this emergent regulatory architecture overcomes the core problem of the market and command and control models. In both models, accurate information is a pre-requisite for effective regulation, but neither has an effective mechanism for amassing and assessing the diverse and variegated information. By contrast, in the New Governance model, local actors are delegated responsibility to report on environmental conditions to a centralized agency, which makes that information public and permits comparisons among the conditions of various localities.

In addition, in some jurisdictions such as Massachusetts, the state provides instruction to firms to assist them in meeting their reporting requirements and in adopting strategies to reduce their emissions. Effective strategies thereby become part of the regulatory system’s shared and public knowledge. Citizens and interest groups monitor the efforts of firms, and, in some cases, gather information themselves. State institutions then deploy regulatory measures, ranging from permits to funding, directives, penalties, and informational campaigns that incentivize firms to

12. By contrast, the market and command and control models require some centralized entity to gather the relevant information, whether for the purpose of determining the price of permits or setting precise standards. CHARLES SABEL ET AL., BEYOND BACKYARD ENVIRONMENTALISM (Joshua Cohen & Joel Rogers eds., 2000). For a similar critique of cost-benefit analysis in the administrative state, see HENRY S. RICHARDSON, DEMOCRATIC AUTONOMY: PUBLIC REASONING ABOUT THE ENDS OF POLICY 122–29 (2002) (arguing that cost benefit analysis assumes a relationship between regulatory ends and means that is at variance with the demands of practical intelligence).
14. Id. at 17–22.
15. Id.
16. Id.
satisfy the performance measures that emerge from the rolling regime of best practices. Proponents argue that this New Governance architecture, unlike the market and command and control models, effectively aggregates information. Moreover, they claim it engages citizens, firms, and state authorities in deep and collaborative deliberation about the means and ends of environmental regulation.

Professors Freedman and Farber have argued for a modular approach to environmental regulation, which also responds to the market and prescriptive methods of environmental regulation. Freedman and Farber articulate the well-established criticisms of prescriptive regulations that impose uniform regulation on all firms in a given industrial sector: such regulation is insensitive to variations in industrial practices, is stifling local innovations, is vulnerable to informational asymmetries in which firms control the flow of information, and is burdensome and costly. By contrast, advocates of market approaches argue for extensive recourse to emissions trading regimes. But these regimes are also subject to criticism. For example, government intervention is necessary to establish the baseline levels of entitlements in trading regimes, and this initial allocation is open to influence from interest groups, as the market does not provide a standard for determining the appropriate allocation. Trading systems suffer from additional concerns. Effective trading is made difficult by problems of incommensurability and the fact that emissions can be non-fungible. Moreover, monitoring costs may erase any gains in efficiency generated by the system.

Freedman and Farber argue for a modular approach which acknowledges that market mechanisms require initial government intervention and continuing government monitoring, and recognizes that prescriptive regimes need not be as inflexible or resistant to innovation as

17. Id.
18. Id.
19. Id.
20. Jody Freeman & Daniel Farber, Modular Environmental Regulation, 54 Duke L.J. 795, 814–15 (2005) (proposing a modular approach to environmental regulation as an alternative to traditional approaches). These criticisms are also summarized in Kysar, supra note 7, at 5–11. But see Steven P. Crolely, Regulation and Public Interests: The Possibility of Good Regulatory Government (2008) (offering a more optimistic view of a prescriptive approach’s information-generating capacities that takes into consideration the deliberative benefits of “public interested administration”); Id. at 163–79, 258–61 (specifically analyzing the administrative process in environmental regulation).
21. Freeman, supra note 20, at 816.
22. Id. at 817–18.
critics charge. The authors argue for a conception of environmental regulation that resembles the core insights of contemporary instrument choice theory: that a range of factors, in a variety of combinations, can and should be deployed in ways that are sensitive to context and that pay close attention to issues of implementation and monitoring. Advocates of a modular approach to environmental governance argue for imaginative combinations of agencies and stakeholders working together to address governance issues. The focus of such an approach is on generating information and facilitating deliberation for the purpose of solving long-term problems, rather than, as is often the case with administrative agency decision-making, for the purposes of justifying short-term decisions. Finally, Freedman and Farber argue that modular structures facilitate public participation, which “not only improves the quality of decision but also helps to provide accountability.”

In this section, I have surveyed two movements in the administrative law scholarship addressing environmental concerns, and I have shown how that scholarship reflects the three central concerns identified in the Introduction. These scholars recognize that a range of interests are implicated in environmental regulation; they note that no single regulatory instrument can address the full complexity of environmental concerns, and they emphasize that public participation in regulatory regimes is necessary for them to be effective and democratically legitimate.

B. Sustainable Land Use Regulation: Defining the Debate, Choosing Regulatory Instruments

This paper’s instrument choice approach shares the emphases of New Governance and Modular approaches to the regulation of environmental issues. Like these approaches, the present paper emphasizes that sustainable land use regulation gives rise to complex issues, stresses that a range of instruments can be brought to bear on this kind of regulation, and recognizes the significance of broad stakeholder consultation. We shall see in the case study in Part II that these concerns animated the instrument choice analysis made by a particular local government. Before I turn to that

23. Id. at 818–19.
24. Id. at 822. See THE TOOLS OF GOVERNMENT: A GUIDE TO THE NEW GOVERNANCE 39 (Lester M. Salamon & Odius V. Elliott eds., 2002) (discussing the three bodies of knowledge that are critical to New Governance).
25. Freeman & Farber, supra note 20, at 823.
26. Id. at 824.
27. Id. at 894.
discussion, I will examine the similarities between concerns of the administrative law scholarship on environmental issues and the land use scholarship on sustainability. Let me begin by clarifying how the expression “sustainable development” is used in land use scholarship and articulating what I intend by that expression.

Land use scholars have long understood that patterns of land use development and, in particular, urban sprawl have caused significant environmental harms. The litany is familiar: sprawl increases dependence on automobiles, damages vulnerable ecological systems, leads to the abandonment of inner city infrastructure, and contributes to substantial energy consumption. As a result, the “ecological footprint” of North Americans is disproportionately large.28 These circumstances have led scholars in the legal academy to consider the various regulatory instruments that are available to local governments to reduce the harms caused by land use development. It is these strategies for harm reduction that I characterize as “sustainable development.” I recognize that the term has been the subject of significant controversy. For instance, some have claimed that the term sustainable development is a mere rhetorical device that justifies a particular kind of consumption and accepts and reinforces “the prevailing form of mass market consumption.”29 I do not intend to engage the claim made by these authors about the relationship between the term “sustainable development” and a Foucaultian “society of normalization.”30 My goals are more modest and less speculative. I mean only to use the term in the limited way that I have specified above and I offer proposals that advance the goal of environmental harm reduction.

I am not alone in this endeavor, and the aims of land use scholarship on sustainable development resemble those of the Modular and New Governance scholarship surveyed above. In the same way those administrative law scholars, academics working in the land use context, recognize that a range of interests are implicated in sustainable development regulation, and like administrative law scholars working on environmental concerns, land use scholars note that no single regulatory instrument can address the full complexity of environmental concerns in the

30. Id. at 236.
land use context. Consider first the complexity of interests at play. Dernbach and Bernstein have characterized sustainable development land policies as those that “minimize sprawl and maximize sound development opportunities to conserve important lands, preserve the natural environment, protect air and water quality, promote affordable housing through compact development and urban renewal, and encourage ‘infill’ rather than rural development.”

Lately, land use scholars have focused on the capacity of localities to slow climate change, and, more specifically, have examined closely the range of land use instruments that can be deployed to mitigate climate change. These include: revisions to building codes, adaptations to zoning ordinances that would permit the installation of solar panels and wind turbines that are otherwise excluded for aesthetic reasons, transfer of development right programs, and the inclusion in official or comprehensive plans of conservation goals. Writers in Canada have argued for the use of form-based codes and performance zoning and have advocated for regulation in a whole host of subject matters (water, transportation, sewage, solid waste, and parks and recreation) that fall under municipal powers and that would enable municipalities to pursue climate mitigation strategies.

In general, this recognition that local governments have available to them a range of regulatory responses to sustainability concerns is consistent with an emerging recognition among land use scholars that there exists a variety of means to achieving land use regulation objectives. This body of scholarship resonates with the instrument choice literature, as it expressly weighs the costs and benefits of different regulatory choices, and, moreover, it represents a movement away from land use law scholarship’s tendency to focus on the property law dimensions of land use regulation.

33. Salkin, supra note 32, at 2; Nolon, supra note 32, at 9.
For instance, Professor Neil Komesar, writing from an institutional choice perspective, expresses this emerging understanding of land use regulation when he assesses the relative advantages of regulating a nuisance using market, judicial, or political processes.\(^\text{36}\) Similarly, land use scholars have articulated the flaws of Euclidean zoning and have argued for a range of alternatives that deploy different zoning instruments, assessing the advantages of such alternatives relative to Euclidean zoning.\(^\text{37}\) For example, land use law scholars writing in the New Urbanist tradition have criticized Euclidean zoning for its division of land into “single use districts with uniform requirements.”\(^\text{38}\) Scholars argue that these features of Euclidean zoning are contrary to forms of urban development that are “diverse, compact, pedestrian, and celebratory of the public realm.”\(^\text{39}\) In response to the perceived inadequacies of Euclidian zoning, New Urbanist proposals deploy a range of instruments that “address the relationship between building facades and the public realm, the form and the mass of buildings in relation to one another, and the scale and type of streets and blocks.”\(^\text{40}\) New Urbanists proposals have taken two general forms. First, they have prescribed comprehensively revised zoning regulations to make them consistent with New Urbanist principles of “mixed-use, mixed-income housing, identifiable community centers, quality urban design, and


37. See Donald L. Elliott, A Better Way to Zone: Ten Principles to Create More Livable Cities ch. 2 (2008) (providing a recent critique of Euclidean zoning’s assumptions and an articulation of design principles that should guide land use regulation). In the following, I set out in detail the New Urbanist alternative because New Urbanist principles are present in the development that is the object of the case study in Part II. It should be noted, however, that there are other alternatives to Euclidean zoning, including performance zoning and British development control. See James Marwedel, Opting for Performance: An Alternative to Conventional Zoning for Land Use Regulation, 13 J. PLAN. LITERATURE 220 (1998) (giving an overview of performance zoning’s principles and objections to it); Douglas C. Baker, Performance-Based Planning: Perspectives from the United States, Australia, and New Zealand, 25 J. OF PLAN., EDUC. AND RES. 396 (2006) (evaluating performance zoning in various jurisdictions); Philip Booth, Managing Land-Use Change, 26 LAND USE POL’Y 154 (2009) (discussing British development control).


walkable and connected street systems.” Second, scholars have prescribed New Urbanist orientations for particular zoning instruments that are themselves attempts to introduce flexibility into Euclidean zoning, such as floating zones or overlay zones.

The particular development that is the object of this article’s case study falls in the second category of land use regulation, and, in the next part, I will assess this particular instance of regulatory instrument choice and consider the public law theory implications of this choice of instrument. Before I turn to a description of the City of Victoria’s deployment of a comprehensive development zone in the Dockside Green project, it is worth noting a final similarity between trends in land use scholarship and those in administrative law that I identified in Part I. As we have seen above, there is a preoccupation in the contemporary administrative law scholarship on environmental issues with how regulatory systems facilitate citizen engagement in governance. This concern emerges strikingly in land use scholarship that is marked by sustainability concerns when New Urbanists argue for institutional reforms that can lead to “communities that are able to self-govern,” and that alter a status quo in which planning processes are dominated by special interests, including developers. Moreover, this

41. Jill Grant & Stephanie Bohdanow, New Urbanism Developments in Canada: A Survey, 1 J. OF URBANISM 109, 109 (2008) (arguing for the adoption of a Smart Code). Grant and Bohdanow note that Vancouver has adopted New Urbanist principles in its land use regulations. Id. at 121. Ohm and Sitkowski conduct a similar survey of American jurisdictions. Ohm & Sitkowski, supra note 38, at 788–89. A related regulatory form, the Smart Code, classifies zones, or “transects,” on a continuum from urban to rural and articulates form-based design principles that govern particular transects, as well as the entire region that is covered by the Code and specific lots. See Duany et al., supra note 39, at 1445 (articulating the Smart Code design principles and the concept of the transect).

42. Ohm & Sitkowski, supra note 38, at 790. See Daniel P. Selmi, The Contract Transformation in Land Use Regulation, 63 STAN. L. REV. 591, 601 (2011) (describing the characteristics of floating zones); Robert J. Blackwell, Overlay Zoning, Performance Standards, and Environmental Protection After Nollan, 16 ENVT. AFF. 615, 616 (1989) (assessing the purposes and structure of overlay zones); Grant & Bohdanow, supra note 41 (examining the Canadian incorporation of New Urbanist principles into particular zoning projects such as urban infills and greenfield and brownfield redevelopments). In the Canadian context, Buholzer has argued that various legal instruments introduce a measure of flexibility into Euclidean zoning. These instruments include variances, contract zoning, bonus zoning, holding zones, architectural controls, and comprehensive development zones. WILLIAM BUHOLZER, HALSBURY’S LAWS OF CANADA: PLANNING AND ZONING ch. 6 (2008).

43. Dan Slone, Strategies for Change, in A LEGAL GUIDE TO URBAN AND SUSTAINABLE DEVELOPMENT FOR PLANNERS, DEVELOPERS AND ARCHITECTS 313, 327 (Daniel Slone & Doris Goldstein eds., 2008).

concern about citizen engagement is present in recent legal scholarship on land use regulation that assesses the capacity of emerging local government institutions to facilitate democratic deliberation.\footnote{See, e.g., Kong, supra note 44; Parlow, supra note 44, at 137.} This focus on citizen engagement in regulatory institutions, as well as the recognition of the complexity of land use regulation and the understanding that a range of regulatory instruments can be brought to bear on such regulation, can be seen in the City of Victoria’s choice of instrument to address a specific environmental concern. It is to this instance of instrument choice that I now turn.

II. DOCKSIDE GREEN AS A CHOICE OF GOVERNING INSTRUMENT

The Dockside site in the City of Victoria was an abandoned dockyard that was owned by the Province of British Columbia and sold to the City for one dollar.\footnote{The following draws on the case study Chris Ling, Katherine Thomas, & Jim Hamilton, \textit{Triple Bottom Line in Practice: From Dockside to Dockside Green}, COMMUNITY RES. CONNECTIONS (Mar. 6, 2008), http://www.crcresearch.org/case-studies/case-studies-sustainable-infrastructure/land-use-planning/triple-bottom-line-practice-4.} The site was a brownfield and had been the object of several failed attempts at remediation. In 2001, the City of Victoria brought to bear on the site the expertise of several partners. The City had entered into a memorandum of understanding with the British Columbia Building Corporation that enabled the City to cooperate with the Corporation and draw on expertise in real estate development, which the City staff lacked. The City then created a project team that brought together “planners, development economists, engineers, financial personnel from within the City as well as representation from the local community association” to develop a business case study of the site.\footnote{Id.} The community association was consulted at the outset, but only at key moments of decision-making, and held a veto power over the project.
A. Process, Agreement and a Comprehensive Development Zone

The City invited expressions of interest in the project and made public an evaluation grid that awarded points for achieving LEED Silver standards. Moreover, prospective bidders were informed that they would be required to include in their bids remediation strategies to address ground contaminants on the site. The City set out two possible uses for the site: a high-tech light industrial development and a mixed-use New Urbanist development. Developers who responded to the call for expressions of interest were “asked to comment upon the criteria and suggest improvements that would lead to a more sustainable project.”48 These modifications were incorporated into the Request for Proposals and those involved in the bidding presented their development plans to an open meeting of the City council. VanCity and Windmill Development made the winning bid. VanCity is the largest credit union in Canada and has had extensive experience in social housing, and Windmill Development has significant experience with environmentally-conscious land use development projects.49 The developer’s staff met regularly with the local community association to ensure that their concerns were met. Indeed, rather than begin with a proposed development, the developer started with a “largely blank canvas” that ensured meaningful input into design choices from the community.50

The funding for the project came from a variety of sources. The City invested in the site to make it ready for development and set the break-even price at $6 million. The cost to Windmill/VanCity was approximately $600 million, $8 million of which went to the purchase price of the land. The Federation of Canadian Municipalities made $350,000 available to support the development of innovative sustainable infrastructure, and the City has provided a dedicated staff member to the project. The costs of this staff position are shared with Dockside Green Ltd., a corporation that is wholly owned by Windmill/VanCity.

The primary regulatory instrument that the City relied on in developing the project was a comprehensive development zone.51 In addition, the City

48. Id.
50. Ling, supra note 46.
entered into a Master Development Agreement with the developer that set out specific terms under which the land would be developed, including the provision of amenities, affordable housing, construction of off-site and on-site amenities, and phased development after Council’s adoption of the Rezoning Bylaw and Design Guidelines. One of the conditions precedent to the obligations of the Developer under the Agreement was Council’s adoption of the bylaw creating the comprehensive development zone so as to incorporate the design guidelines into the City’s Official Community Plan. The Agreement also imposed an annual reporting obligation on the developer. Finally, the City instituted a monitoring program that was made a responsibility of a staff person at the City of Victoria.

B. Assessing the Instrument

The Dockside Green development project evinces many of the aims of the New Governance and Modular regulatory movements, as well as the core insights of contemporary instrument choice scholarship. In this section, I consider the three elements that are shared among these bodies of scholarship and that are relevant to the case of Dockside Green. First, the development shares with these scholars the recognition that a range of interests are implicated in any instance of regulation. Second, the development shares their understanding that no single regulatory instrument can address the full complexity of regulatory issues. Third, the development and the scholars both emphasize that public participation in regulatory regimes is necessary for them to be effective and democratically legitimate.

Consider first the pragmatic recognition of the diversity of interests at stake in regulation. The case studies examined by New Governance and Modular scholars evidence the complexity of interests at stake in regulation. Similarly, the City of Victoria explicitly acknowledged a


53. Master Development Agreement, supra note 52, at § 3.1(b).

54. Id. at § 10.1.


56. Freeman & Farber, supra note 20, at 845; Sabel et al., supra note 12, at 13–15.
similar degree of diversity in the criteria for evaluation in its call for expressions of interest and for bidding: the City raised economic concerns, as it did not want to take a loss on the sale of the lands, and it also addressed issues of affordable housing, environmental sustainability, and community design concerns.\textsuperscript{57} I have already dealt with the first three issues, but the last is worth mentioning briefly, in light of the discussion in Part I of New Urbanism. The mixed-use proposal accepted by the City aims to create a sense of place and of community. It provides for a walkable environment with public paths, and links to the city’s waterways and bike-paths. It also aims at more diffuse aesthetic values as it ensures sightlines for neighboring property owners and provides for the mix of uses that New Urbanists typically point to as necessary for creating a sense of place and of community.

Consider next the range of regulatory instruments that were involved in the Dockside Green project. The City used a comprehensive development zone, which might be conceived of as a command and control instrument, but it is important to understand the wider context in which that instrument was adopted. Recall that the city engaged in an open bidding process for development of the site that ultimately involved the sale of the land and the completion of a detailed contract. Moreover, the regulatory form chosen was a departure from the basic aims of Euclidean zoning, with its emphasis on separation of uses. The project blended together mandatory regulation, in the form of the zoning by-laws that created the comprehensive development zone, with softer instruments such as the Master Development Agreement and the instruments referred to in it, including design guidelines,\textsuperscript{58} annual reports,\textsuperscript{59} and ongoing monitoring.\textsuperscript{60} This blending of instruments is consistent with the mixing of regulatory instruments that

\begin{itemize}
\item \textsuperscript{60} E.g., CITY OF VICTORIA, DOCKSIDE GREEN PERFORMANCE INDICATORS (Mar. 2007).
\end{itemize}
instrument choice, New Governance, and Modular scholars all understand to be appropriate to contemporary regulation.

Finally, consider the nature of the stakeholder engagement in Dockside Green. The engagement was broad and intensive, drawing together diverse professional groups and the community. The interactions between various City departments, the Building Development Corporation, and the City followed the Modular scholars’ emphases by breaking down formal divisions within government agencies and departments and between jurisdictions and creating a jointly-funded staff position to monitor the development project. The engagement of the public, in the form of the local community association, responds to the New Governance scholars’ concerns about the democratic legitimacy and effectiveness of the regulation that is undertaken in the absence of public engagement. Finally, the drawing together of the various stakeholder groups, with their divergent areas of expertise but common concern for the specific regulatory issue, calls to mind the understanding, shared among New Governance, Modular, and instrument choice scholars, that the “public” interests in a particular instance of regulation are contingent and fluid. They escape a simple definition and they do not divide themselves along the boundary lines of the political or administrative state.61

C. A Defense of the Instrument Choice

To this point in this Part, I have attempted to demonstrate how the overlap between two contemporary movements in administrative law theory and land use scholarship on sustainability issues is evident in a specific instance of instrument choice. One objective has been to show, generally, the relevance of an administrative law perspective in the context of sustainable land use regulation. I hope to have shown that the general concerns of administrative law with the values, forms, and legitimacy of state regulation are directly pertinent to questions of land use regulation in the sustainable development context. This kind of analysis may help to redirect the land use law literature away from its tendency to focus on property law issues and towards general questions of public law and instrument choice. I close this Part with what I hope will be an argument that demonstrates the value of an instrument choice analysis. I hope to demonstrate that an instrument choice approach has a critical edge in the

61. Freeman & Farber, supra note 20, at 835–36; Dorf & Sabel, supra note 11, at 314.
land use context, and that it does not merely offer a plausible description of what is at stake in a particular choice of regulatory instrument.

With this discussion, I join arguments recently advanced by Professor Daniel Selmi, who adopts a perspective that resonates with this paper’s attempt to draw the insights of administrative law scholarship into an analysis of land use regulation. As does this paper, Selmi notes that there is a similarity between the concerns of New Governance scholarship on administrative law and the rationales for regulation of land uses, which incorporates private law instruments into public law decision-making. In what follows, I will outline Selmi’s arguments and respond to some issues that he raises with respect to an instrument of land use regulation that resembles the coupling of a comprehensive development zone with a master development agreement in the Dockside Green development.

Selmi notes that there has been an increasing recourse to contractual forms in the regulation of land uses in the United States. In the United States, the primary contractual form adopted is the development agreement, wherein a developer commits to providing funds for public projects in exchange for the zoning desired by the developer and the municipality commits to refraining from further regulation of the property in question. Selmi places development agreements on a historical continuum that includes the planned unit development, which, like the comprehensive development zone, permits an owner to custom-design zoning and then seek approval from the municipality. Although there are some differences between the Master Development Agreement coupled with the comprehensive development zone in the Dockside case on the one hand, and the development agreements described by Selmi on the other, the core similarity is that they both involve a degree of negotiation that is absent from standard zoning processes.

62. Selmi, supra note 42, at 595.
64. Selmi, supra note 42, at 601.
65. Perhaps the most salient difference is that the Master Development Agreement does not exempt the property in question from future regulatory changes. The Master Development Agreement takes the form of a restrictive covenant pursuant to section 219 of the Land Titles Act, and this provision does not expressly authorize a fettering of discretion. See Pac. Nat’l Investments Ltd. v. Victoria (City), [2004] 2 S.C.R. 919 (Can.) (holding that the requirement that such express authorization is necessary for an agreement to fetter the exercise of a municipality’s legislative powers). By contrast, the legislation governing phased development agreements seems to authorize explicitly the fettering of municipal discretion by means of these agreements. Local Government Act, R.S.B.C. 1996, ch. 323, §§ 905.4(4), 905.1, available at http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/96323_30.
There are two consequences that flow from this difference that are significant for this paper. Selmi argues that these standard land use law processes rest on a public law logic that is vertical and hierarchical, and that places developers in a dependent position relative to municipalities. The procedures governing this relationship, he claims, aim to structure the discretion of the decision-makers in order to satisfy a norm of neutrality.66 By contrast, Selmi argues, land use regulation that is based on a contract model shifts the governing logic of regulation from one grounded in a hierarchal relationship towards one that emphasizes the mutual interests of the municipality and the developer.67 According to Selmi, because interests that are necessarily partial drive the parties in this latter logic and because the parties seek to maximize those interests, there is no pretense that the resulting decisions reflect a neutral perspective.68

One further consequence of this shift towards a land use development model grounded in negotiation is pertinent for the present discussion. Selmi argues that norms of transparency and public participation govern standard zoning processes and, as a result, that land use decisions serve democratic ends, generate information for decision makers, and prevent abuses of power by decision-makers.69 In contrast, a land use process that is marked by a logic of negotiation, Selmi claims, undermines democratic norms because negotiations typically do not involve third parties. Moreover, he concludes that, because the negotiating process is informal and difficult to monitor, it is less open and transparent than the public hearing processes that accompany standard land use decision-making in a municipality.70

The Dockside Green project manages to evade these criticisms of contractual zoning. As we have seen above, the initial stages of the development project involved determining and articulating criteria of evaluation that would be applied in the bidding process. These criteria were publicly available and were generated with an eye towards achieving public policy objectives that were at least in part independent of the partial interests of the parties to the subsequent agreement. In addition, the decision-making process was public and involved interested third parties, including a local community association, and, therefore, achieved some measure of democratic participation and transparency. Finally, the ongoing process of reporting required by the master development agreement opens

66. Selmi, supra note 42, at 612.
67. Id. at 613.
68. Id. at 615–16.
69. Id. at 638–39.
70. Id. at 643.
the activities of the developer to public scrutiny and introduces an element of transparency that is consistent with the democratic norms that underlie the public hearings of standard land use processes.

There are three final, general concerns that can be raised about the City’s choice of a comprehensive zoning district. First, consider issues related to the effect of private involvement in public projects on the capacity of these projects to advance the public interest. Scholars writing in other contexts, particularly those involving public-private partnerships, have noted that, when the state enters into agreements with private actors for the provision of services that the state itself cannot afford, concerns arise about whether the public interest is adequately protected.71 In the case of Dockside Green, and of comprehensive development zones generally, one might be concerned about the capacity of a municipality to advance a specific element of the public interest, namely the protection of disadvantaged populations’ interests. Indeed, the most serious criticism of the project has been directed against the measures providing for affordable housing. Commentators have noted that affordable housing was not initially a part of the development bidding process and that its subsequent integration has posed serious challenges for the project, as it increased the complexity of realizing the project.72

Two additional concerns relate to the effects of instruments, such as comprehensive development zones, on an individual landowner’s interest and on regional interests. One might be concerned that this form of zoning results in municipalities engaging in undemocratic extractions from developers.73 Moreover, one might worry about the appropriateness of pursuing objectives on a site-specific scale that are better regulated on a

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72. Ultimately, the developer included in the development a contribution of “$3 [million] dollars to go towards providing approximately 50 rental units and 26 ownership units that are geared towards families with incomes in the range of $30,000–$60,000.” Ling, supra note 46.

broader geographic scale. A response to both of these concerns could take the form of a regulatory instrument that would force municipalities passing any bylaw, including one that is a condition precedent for a master development agreement, to consider explicitly the interests of the particular entity being regulated, as well as regional concerns. In other words, in order to improve upon the instrument chosen in Dockside Green, a municipality might deploy further regulatory instruments that offset the potential cost of that choice. Such a reform would be consistent with the aspirations of an instrument choice approach to land use regulation.

CONCLUSION

In this paper, I have examined an instrument that addresses concerns that are shared by administrative law scholars working on environmental issues and by an emerging body of scholarship on land use regulation, in general, and on sustainability issues, in particular. In so doing, I have assessed the benefits and trade-offs involved in an instrument choice, and I have suggested ways in which the instrument choice of the municipality in question might be altered to offset some potential costs of the instrument selected. One conclusion that can be drawn from this case study is that a range of instruments optimally regulates land uses and that the central challenge for those interested in land use regulations lies in assessing how to select instruments and how to coordinate the deployment of multiple instruments. This conclusion, and the administrative law concerns that underwrite it, serve as a counter-weight to the property law focus of much land use law scholarship. Finally, the case study suggests that these kinds of arguments apply in the specific context of sustainable land use regulation.

My goals on this dimension have been relatively modest. I hope to have shown, contra some critics of the concept of sustainable development, that the concept can have real analytic force. I hope also to have contributed to the growing body of scholarship on the use of local government powers in the service of sustainable development ends. I have benefitted from the insights of participants in this workshop of sustainable development and I

74. Id. at 24, 28.
75. In order to address the concern about extractions from a single developer, courts might develop doctrines that impose a high burden of justification for such regulation. Moreover, in order to address regional concerns, provinces might require that municipal bylaws conform to provincially-articulated regional policies. See Hoi Kong, Something to Talk About: Regulation and Justification in Canadian Municipal Law, 48 OSGOODE HALL L.J. 499, 528, 539 (2010) (discussing the instruments that achieve these two effects).
hope that we have initiated an ongoing conversation about issues that are of deep and abiding concern on either side of the 49th parallel.
INTRODUCTION

Advocates of natural gas call it a “bridge fuel” into a clean energy future.¹ Those in favor of expanding its use for energy production point out that it pollutes less than oil or coal when consumed and can potentially generate far more electricity with existing technology than

¹ 2012 J.D. and M.E.L.P. graduate of Vermont Law School; Intern at the Vermont Natural Resources Council. The author would like to extend thanks to V.J.E.L. for its students’ hard work, dedication to ethical scholarship, and commitment to environmental issues, and to ProPublica, for its thorough and accurate reporting on natural gas extraction among many other important issues.

all the existing renewable energy technologies combined.\textsuperscript{2} These qualities assure that natural gas will account for an increasing share of the United States’ energy mix over the next several decades, with large unconventional reserves playing a key role. New horizontal drilling techniques coupled with high volume hydraulic fracturing, known as fracking, have made these unconventional reserves viable.\textsuperscript{3} Yet accumulating reports of contaminated ground water near fracking sites across the country have spurred intense scrutiny and protests, threatening the future of natural gas in the United States.\textsuperscript{4} The Industry has blamed these reported contamination events on improper drilling practices, accidental surface leaks and spills, and natural occurrences.\textsuperscript{5} However, as the study and extent of high volume slick water hydraulic fracturing increases, so to does a body of evidence which points to the underground migration of fracking fluid and methane into groundwater as the culprit.\textsuperscript{6}

This note will focus on the poorly understood interaction between fracking fluid and underground strata as well as the serious and permanent harm caused by the unintended migration of gases and drilling fluids into aquifers. I will argue that hydraulic fracturing’s potential to irreparably contaminate essential groundwater supplies demands a precautionary approach, and therefore preemptive action. This note will focus on the precautionary principle and the common law doctrine of anticipatory nuisance. Together, these two legal mechanisms provide a predictable and rational legal response to an uncertain causal connection between groundwater contamination and


\textsuperscript{5} Id.

\textsuperscript{6} Id.; see also Abrahm Lustgarten, \textit{EPA: Chemicals Found in Wyo. Drinking Water Might be From Fracking}, PROPUBLICA (Aug. 25, 2009), http://www.propublica.org/article/epa-chemicals-found-in-wyo.-drinking-water-might-be-from-fracking-825 ("'It starts to finger-point stronger and stronger to the source somehow being related to the gas development,” said Nathan Wiser, an EPA scientist and hydraulic fracturing expert . . . .").
I will argue that preemptive action should take the form of state and local regulation and should utilize a precautionary framework. I will further argue that the common law doctrine of anticipatory nuisance can facilitate an increased role for the judiciary, and more importantly, refine some of the ambiguities associated with the precautionary principle.

Inevitably, a precautionary approach forces one to evaluate how a legal system measures and values the probability of future harm occurring and what standard of proof is sufficient to trigger action. Part I of this note will provide a technical overview of fracking. Part II will offer an exploration into the precautionary principle and the common law doctrine of anticipatory nuisance in order to illustrate the similarities in rationale and the problems in applying these doctrines. Part III will focus on the arguments among the industry, local communities, environmental groups, and government about the interactions of fracking fluid, methane, and dynamic underground geology. Part IV will apply a precautionary approach through both regulation and common law, in an attempt to prevent permanent environmental harm before it occurs.

I. A TECHNOLOGICAL OVERVIEW OF FRACKING

The Massachusetts Institute of Technology Energy Initiative’s study, *The Future of Natural Gas*, asserts that “[a]ssessments of the recoverable volumes of shale gas in the United States have increased dramatically over the last five years.” Reserve assessments have grown considerably, driven by the crowning achievement of the oil and gas industry—the technologically advanced drilling technique known as slick water high volume hydraulic fracturing. According to a 2009 study by the Potential Gas Committee, which tracks gas supplies throughout the world, natural gas reserves in the U.S.
jumped 35% from 2006 to 2008, partly attributed to the increased use of hydraulic fracturing techniques. Current average projections of recoverable shale gas resources are approximately 650 trillion cubic feet (Tcf), enough to supply the United States for 30 years at the 2009 rate of consumption. Other estimates put these reserves at 90 years of consumption. The Energy Information Administration (EIA) estimated that the U.S. possesses enough shale gas to supply the nation’s needs at the 2010 rate of consumption for over 65 years, with a high estimate of 80–100 years. The vast size of these now economically viable reserves has been called a “game changer” in the energy industry, both in where world energy supplies will flow from in the future, and in the billions of dollars that is at stake.

Contrary to popular belief, hydraulic fracturing is not a new technique. Since the early fifties, the basic concept was used to stimulate production in old oil and gas wells. This is done by forcing water, usually mixed with proppants (sand or beads to hold the fractures open) and chemicals (to reduce friction and kill bacteria) down a well bore at extremely high pressure in order to create or expand fractures in order to release gas from the rock formation in which it is trapped. Within the last ten years, advances in horizontal drilling (drilling down, then turning the well bore horizontally and following the vein of shale laterally underground), new chemical

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additives, the use of higher volumes of water, and stronger pumps have revolutionized hydraulic fracturing, enabling the extraction of natural gas from shale formations previously thought technically and economically infeasible.17

The Marcellus Shale Formation is a relatively thin rock layer ranging from 20 to a couple hundred feet thick and stretches from eastern Ohio through West Virginia, Pennsylvania, and New York. Recently, this formation has experienced sharp increases in new well drilling.18 Pennsylvania is a prominent example of this newfound gas rush. In 2008 alone, at least 4,000 new oil and gas wells were drilled in Pennsylvania, more than any other state except Texas.19 Furthermore, the pace of drilling on these permits is astounding; in the first nine months of 2010, “2,300 permits had been issued and nearly half of those wells have been drilled.”20

Fracking is extremely water intensive. Drilling and fracturing a single horizontally drilled gas shale well typically requires a total of two to 7.8 million gallons of fluid (on average 5.6) per frack.21 The phrase “per frack” describes each time water is pumped down the well bore to release the trapped gas after the borehole is drilled.22 This can be done multiple times for each well to stimulate the flow of gas back up the well.23 The fluid injected into a well to fracture the surrounding rock is approximately 99% water and sand, with the remainder comprised of some subset of over 200 chemicals used to

22. Id.
23. Id.
enhance the fracturing process by reducing friction, preventing corrosion, and killing bacteria.24 The industry stresses the small percentage of chemicals in fracking fluid in an attempt to dispel safety concerns.25 However, even a small percentage of the millions of gallons of fluid used in one single frack contains hundreds of thousands of pounds of chemical additives, many of them known carcinogens and endocrine system disruptors.26 These chemicals include but are not limited to benzene, naphthalene, aromatic hydrocarbons, glycol ethers, and hydrochloric acid.27

Along with the chemical additives, fracking fluid also picks up naturally occurring radioactive materials (NORMs) such as uranium, and total dissolved solids (TDS), which is a mixture of salt and other minerals that lie deep underground.28 Ron Bishop, a leading biochemist and professor at SUNY Oneonta stated that “[s]hales, more than any other kind of rock, selectively trap heavy metals such as lead, arsenic, barium, strontium, and chromium.”29 This means that even if no chemicals are used in the fracking fluid, the water that is pumped underground becomes infused with radioactive and toxic elements that had previously been locked safely underground for millions of years. ProPublica reported on a New York Department of Environmental Conservation study that “analyzed 13 samples of wastewater brought thousands of feet to the surface from drilling and found that they contain levels of radium-226, a derivative of uranium, as high as 267 times the established limit safe for discharge into the environment and thousands of times the limit safe for people to drink.”30

27. Id. at 4, 19.
Disposing of the highly toxic fluid that is recovered from fracking is a serious problem. Of equal concern is what is lost in the process. On average, only 15 to 20% of the fracking fluid is recovered; the rest remains underground. The natural gas industry assumes it will stay put, locked safely away from our drinking water thousands of feet below ground. The Union of Concerned Scientists states that the geological formations targeted for fracking “are typically thousands of feet deeper than freshwater aquifers.” However, fracturing a specifically targeted location thousands of feet underground is difficult. As one lawyer working on an underground trespass case involving fracking stated, “[t]he problem is . . . that fracture stimulation isn’t a precise science . . . in some ways, cracking the shale [predictably] could be thought of as trying to hammer a dinner plate into equal pieces . . . ‘You may plan a fracture that will go 1,000 feet and it might go 2,000 feet or 400 feet.’”

Uncertainty also exists as to whether new or existing geological features such as preexisting faults and joints will allow methane gas and fracking fluid to escape into drinking aquifers. Scientists are also concerned that the hydraulic fracturing process itself could compromise the multiple layers of rock separating the shale formations from aquifers, leading to contaminated groundwater supplies. Furthermore, in shale formations, “once the presence and

36. See James O’Toole, EPA Sounds Alarm on Fracking in Wyoming, CNN MONEY, (Dec. 9, 2011), http://money.cnn.com/2011/12/09/news/economy/epa_fracking_wyoming/index.htm (“Given the area's complex geology and the proximity of drinking water wells to ground water contamination, EPA is concerned about the movement of contaminants within the aquifer and the safety of drinking water wells over time.”); see also Abrahm Lustgarten and Nicholas Kusnetz, Feds Link Water Contamination to Fracking for the First Time, PROPUBLICA, (Dec. 8, 2011), http://www.propublica.org/article/feds-link-water-contamination-to-fracking-for-first-time
thickness of the formation is established, the drilling companies do not perform further seismic data collection, which would lead to identifying faulting in the area." Compare this practice with vertical wells, which depend on 3D seismic mapping for success, and therefore utilize seismic data collection throughout the process. “[Hydraulic fracturing] may open faults and may increase permeability along laterally and vertically extensive fault planes and fault zones—thereby increasing the risk of contaminant and gas excursions.” As one reporter wrote of the fracking fluid injected underground, “[h]ow far it goes and where it ends up, no one really knows.” The unique qualities of high volume hydraulic fracturing create scientific uncertainty as to the short and long-term effects of the activity. Consequently, this also creates uncertainty regarding what regulations are needed to protect the health and safety of the environment and those who live above shale gas reserves.

The gas industry vehemently denies that any causation exists between fracking and water contamination. They suggest instead that these reports of contaminated, cloudy, smelly, and flammable drinking water emerging across the country are “anecdotal” at best and that “no science or investigation has ever verified the contamination as true.” Yet, as ProPublica’s excellent reporting makes clear, by this same reasoning, there are no substantive and thorough studies or evidence that demonstrate hydraulic fracturing is safe either. It is in the context of this truth that the legal framework for hydraulic fracturing must operate, even as drilling continues.

39. Id.
40. Id.
42. Abrahm Lustgarten and Nicholas Kusnetz, Feds Link Water Contamination to Fracking for the First Time, ProPublica, (Dec. 8, 2011), http://www.propublica.org/article/feds-link-water-contamination-to-fracking-for-first-time (“The presence of synthetic compounds such as glycol ethers . . . and the assortment of other organic components is explained as the result of direct mixing of hydraulic fracturing fluids with ground water in the Pavillion gas field,” the draft report states. “Alternative explanations were carefully considered.”).
43. Id.
44. Id.
There are a myriad of other environmental problems associated with fracking. These include wastewater treatment and storage, chemical spills and disposal, air and noise pollution, water withdrawal and radioactive waste permitting, monitoring and enforcement of best practices, and the degradation and fragmentation of wildlife habitat. It seems the list could continue indefinitely. Fortunately, all of the aforementioned environmental problems are understood fairly well, even if a solution is not. The problem with hydraulic fracturing is not with these well-understood and visible impacts of gas extraction. Instead, the real danger lies within the poorly understood interaction of fracturing fluids, methane, and subsurface geology. This raises the very real possibility that fracking, no matter how stringently regulated, may never be safe, and that hard science supporting this conclusion will only be discovered after it is too late.

II. TWO LEGAL RESPONSES TO AN UNCERTAIN PROBABILITY OF HARM

In an ironic twist, the inherent flaw in many of the legal mechanisms developed to cope with scientific uncertainty is one of vagueness. Specifically, these regimes suffer from an ambiguous level of proof or probability of harm necessary to both trigger regulatory action and allow a proposed activity to proceed. This section lays out the application and criticisms of the precautionary principle and compares its essential features to the common law doctrine of anticipatory nuisance; two legal mechanisms that function to prevent permanent environmental damage before it occurs.

A. The Precautionary Principle

At its most basic level, the precautionary principle calls for regulators to take the position of “better safe than sorry.” Specifically, the precautionary approach “requires that where a causal
link cannot be shown between the activity or substance introduced and a potential harm, caution must be taken before allowing such an activity.” At first glance, this concept sounds straightforward. Yet the true beauty of this principle is two-fold: first, it justifies regulation before full scientific certainty can be established (and before permanent environmental damage occurs), and second, it enables legislators to shift the burden of proof from the traditional structure that requires regulators prove that regulation is necessary to requiring that the industry prove that regulation is unnecessary.

Talbot Page, a noted economist, produced the traditional and oft-used reasoning behind this principle in 1978. Page argued that “a false negative could cost lives, while a false positive, such as banning a truly harmless chemical, would have only economic consequences, and probably minor ones at that.” While simplistic in its rationale, the continued relevancy of this concept is seen in its adoption throughout the world. The continued relevancy of the precautionary principle is especially true as the development of new technology outpaces our understanding of its effects.

Various formulations of the precautionary principle are written into at least fourteen international documents. The first inclusion of this principle into a formal document was in the Declaration of the Second International North Sea Conference on the Protection of the North Sea in 1987 and stated that “in order to protect the North Sea from possible damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolute clear scientific evidence.” The principle became embedded in international law when it was drafted into the 1992 Rio Declaration on the Environment and Development at the United National Conference on Environment and Development. Principle 15 of the Rio Declaration states, “[i]n order to protect the

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47. Id. at 148 (defining the basic premise of the precautionary principle).
50. Id.
52. Id. at 1012 (citing to the Second International Conference on the Protection of the North Sea).
53. Id.
environment, the precautionary approach shall be widely applied by States. . . . Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.54 While these formulations are non-binding, they provide guidance for the evolution of international environmental law and illustrate the utility of precautionary reasoning.55

The European Union (EU) attempted to clarify exactly what the precautionary principle demanded during a European Commission meeting in 2000.56 Unfortunately, no set definition was agreed upon and it was decided that the precautionary principle “applies only to risk management . . and is triggered only by risks identified by scientific risk assessment.”57 This interpretation presupposes that a structured approach to risk analysis exists before the activity or substance is introduced. Furthermore, the term “scientific risk assessment” implies an orderly process by which scientific experts come to a certain conclusion. Yet in the context of a contentious and high stakes activity such as fracking, a structured approach for studying the effects of an activity and implementing necessary regulations is rarely put in place before the activity is underway. A policy statement clarified this risk assessment to mean that a precautionary approach “must follow a scientific evaluation based on enough data to establish a possibility of occurrence.”58 What level of possibility it demands is still an open question. The EU clarification further limits the scope of the precautionary principle by including “the value of ‘cost analysis’ in the application of the precautionary principle.”59 This interpretation requires that the cost of a precautionary approach be taken into account when deciding the appropriate regulatory action, ensuring a proportionality of

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55. Mead supra note 38, at 163.
56. Mead, supra note 46, at145 (reviewing the attempts of the European Union to determine the definition of the precautionary principle).
57. Id.
59. Mead, supra note 46, at 145 (reviewing the controversy of including cost analysis in the application of the precautionary principle).
response.\textsuperscript{60} Because of the consideration of cost, this interpretation could fail to prevent a harm of high magnitude but relatively low probability due to prohibitive cost.\textsuperscript{61} Stereotypically, Europe is seen as risk-averse, skeptical of science and technology and collectivist in their support for a unified government whereas the U.S. is thought of as risk-taking, technologically optimistic and individualistic.\textsuperscript{62} These stereotypes are inaccurate.\textsuperscript{63}

The United States has incorporated a precautionary approach into several important domestic statutes, regulating both environmental and public health concerns.\textsuperscript{64} A common thread of precaution is evident in environmental regulations based on conservative assumptions.\textsuperscript{65} One example is National Primary Ambient Air Quality Standards under the Clean Air Act, which mandates an “adequate margin of safety” when setting emission standards.\textsuperscript{66}

The U.S. Food and Drug Administration’s (FDA) approach to new drug approval is precautionary as well.\textsuperscript{67} “Rather than placing pharmaceuticals with uncertain health risks on the market, the FDA requires that all new drugs be subjected to numerous tests . . . in order to ensure a certain level of safety.”\textsuperscript{68} The United States also applies precaution in the area of pesticide regulation. As an example, in 1977, “the U.S. government removed the widely used pesticide Dibromochloropropane (DBCP) from the U.S. market even though possible health risks had not been established with scientific certainty.”\textsuperscript{69} The Environmental Protection Agency (EPA) also took a

\begin{footnotes}
\item[60.] Mead, supra note 46, at 151-152.
\item[62.] Jonathan B. Weiner, Professor of Law, Duke University, Comparing Risk Regulation in the United States and Europe at the Conference on REACH 2 (June 8, 2007), www.ucis.pitt.edu/euce/events/policyconf/07/PDFs/Wiener.pdf.
\item[63.] Id. at 42.
\item[64.] Cross, supra note 49, at 852, 855.
\item[65.] See Id. at 856–58 (describing environmental statutes that utilize conservative assumptions).
\item[68.] Id.
\item[69.] Id. See also Pesticides and Breast Cancer Risk: Dibromochloropropane (DBCP), SPRECHER INSTITUTE FOR COMPARATIVE CANCER RESEARCH (July 2004), http://envirocancer.cornell.edu/FactSheet/pesticide/fs50.dbcp.cfm (“Currently there is not enough scientific information to determine whether or not DBCP causes breast cancer in people. Very few studies have been done on women who were exposed to DBCP . . . . DBCP was banned by the US Environmental Protection Agency (US EPA) in 1977.”).
\end{footnotes}
precautionary approach in the assumption that the dose-response curve of low level toxic agents is linear—that there is no safe threshold for exposure
—when they wrote that “EPA continues to believe that the most scientifically valid approach, given the lack of critical data, is to use the linear approach to assessing the mode of action.”
Even without full scientific certainty, EPA banned any exposure to certain chemicals rather than assume that exposure below a certain level would be safe.
Congressional legislation is not the only area where the U.S. takes a precautionary approach. Because most environmental standards are promulgated through administrative agencies, the judiciary frequently reviews agency action. Courts have upheld regulations based on conservative assumptions in the regulation of lead. For example, the District of Columbia Circuit Court held that “Congress directed the Administrator to err on the side of caution . . . . We see no reason why this court should . . . require[e] the Administrator to show that there is a medical consensus that the effects on which the lead standards were based are ‘clearly harmful to health.’”
In the Supreme Court’s Benzene decision, the Court emphasized that risk assessment for hazardous substances “is free to use conservative assumptions in interpreting the data with respect to carcinogens, risking error on the side of overprotection rather than under-protection.”
These cases illustrate that there is a window, albeit a narrow one, where an agency can promulgate standards based on precaution without exceeding its delegated power or risk being overturned by a court upon a finding that their action was arbitrary and capricious.
Taking the lead in utilizing a precautionary approach in order to safeguard its citizens, California passed Proposition 65, the Safe Drinking Water and Toxic Enforcement Act. Proposition 65 dispatches the burden of proof a governmental agency must carry

70. Sunstein, supra note 51, at 1026.
72. Sunstein, supra note 51, at 1026.
73. Lead Indus. Ass’n v. EPA, 647 F.2d 1130, 1155 (D.C. Cir. 1980).
before it can regulate a chemical known to cause cancer or reproductive toxicity. These chemicals are no longer “considered ‘innocent’ until proven ‘guilty’”.

The city of San Francisco adopted its own Precautionary Principle Ordinance in 2003. The ordinance states that “[w]here threats or irreversible damage to people or nature exist, lack of full scientific certainty about cause and effect shall not be viewed as sufficient reason for the City to postpone cost effective measures to prevent the degradation of the environment or protect the health of its citizens.” It is important to note that in both formulations, a bare suspicion of risk of injury is not enough; “known to cause cancer or reproductive toxicity” and “lack of full scientific certainty” show that some evidence is needed to trigger a precautionary action. Yet the question of just how much evidence is required before a preemptive action remains. It is this ambiguity that must be resolved before a consistent and workable precautionary approach can be applied.

Illustrating the issue of what level of evidence is required before legislative action can be taken, several cities overlying or dependant on drinking water originating in the Marcellus Shale formation have passed moratoriums on fracking based on what critics would call minimal evidence. Pittsburgh became the first Pennsylvania city to ban drilling within its boundaries in November of 2010. Soon after, Pittsburgh was joined by Philadelphia, New York City, as well as a number of smaller towns in the northeast, Texas and Colorado.
city of Quebec has also “halted most new natural gas exploration and development following an environmental assessment of shale-gas extraction that called for further studies.” The men and women sitting on the councils and commissions that voted for these moratoriums have seen the same anecdotal evidence that has been circulating around the country and seem to have decided: first, there is something more than coincidence linking fracking with drinking water contamination, and second, the potential harm, should it occur, would be irreparable.

Most of the criticism surrounding a precautionary approach to potentially harmful activity has focused on this issue of what level of proof is sufficient for both triggering preemptive action as well as demonstrating that an activity is safe. Other concerns include the possibility of unfairly burdening a party that has not conclusively caused damage or has yet to act, as well as the possibility that the principle could restrict technological and economic benefits. The precautionary principle’s vagueness lies in the amount of certainty needed both before an activity is allowed and what probability of harm is needed to trigger a precautionary approach. According to one scholar, “for a term so widely applied with such a strong following among nations, lawyers, environmentalists, scientists and academics alike, there is little agreed upon about this principle.” As an example of the amorphousness of this concept, the Rio Declaration’s precautionary principle can be seen as too ambiguous to be workable. “In interpreting the meaning of the precautionary principle from this definition one could reach the conclusion that the directive would be, if taken literally, ‘don’t do anything.’ This is due to the uncertainty attached to the words ‘adverse effects . . . not fully understood.’” The need to clearly explicate the probability of harm necessary before preemptive action is justified is vital in ensuring that a precautionary approach does not freeze technological

85. Mead, supra note 46, at 138 (reviewing the criticism of the precautionary principle).
86. Cross, supra note 49, at 860.
87. Mead, supra note 38, at 143–45.
88. Mead, supra note 46, at 138 (considering the ambiguity surrounding the use of the precautionary principle).
89. Mead supra note 46, at 143, 145.
90. Id. at 142.
innovation and economic growth as well as fail to prevent environmental harm.\textsuperscript{91}

The lack of a concrete, easily applied definition can lead to arbitrary application of the principle with no beneficial effect.\textsuperscript{92} However, the term “principle” itself implies that the precautionary approach is a guiding perspective when crafting legislation, not a rigid rule that would demand a specific regulatory approach.\textsuperscript{93} “The precautionary principle is more about the direction of the decision and how the decision is adopted than about the exact content of the decision.”\textsuperscript{94} This sentiment is similar to the EU’s approach, which interprets the precautionary principle as providing an overarching framework for risk assessment.\textsuperscript{95} Regardless of the vagueness associated with the principle, and the multitude of definitions, scholars have found common elements that all formulations of the precautionary principle share.\textsuperscript{96} They are “threat of harm,” “lack of scientific certainty or evidence,” “cause and effect relationship is not yet proven,” and “necessity or duty to act.”\textsuperscript{97}

Strong and weak versions of the principle exist because of flexibility both in defining and applying the principle’s core characteristics.\textsuperscript{98} Four different versions are evident.\textsuperscript{99} The first is the Non-preclusion Precautionary Principle that states, “[r]egulation should not be precluded by the absence of scientific uncertainty about activities that pose a risk of substantial harm.”\textsuperscript{100} This is the weakest formulation.\textsuperscript{101} A lack of evidence should not be a justification for inaction, but nothing more is required and no real direction is given to regulators faced with a potentially dangerous activity.\textsuperscript{102}

\textsuperscript{91} Sunstein, supra note 51, at 1019-1029
\textsuperscript{92} Id. at 145.
\textsuperscript{93} Mead supra note 46, at 160.
\textsuperscript{94} Alessandra Acri, The Case for a Procedural Version of the Precautionary Principle Erring on the Side of Environmental Preservation, in FRONTIERS IN THE ECONOMICS OF ENVIRONMENTAL REGULATION AND LIABILITY 37 (Marcel Boyer et al. eds., 2006).
\textsuperscript{95} Bontoux, supra note 58.
\textsuperscript{96} Mead, supra note 46, at 150 (consolidating elements common in the various formulations of the precautionary principle).
\textsuperscript{97} Id.
\textsuperscript{98} Sunstein, supra note 51, at 1014.
\textsuperscript{99} Sunstein, supra note 51, at 1014.
\textsuperscript{100} Id.
\textsuperscript{101} Id.
\textsuperscript{102} Sunstein, supra note 51, at 1012, 1014.
The second formulation, *Margin of Safety Precautionary Principle* dictates that “[r]egulation should include a margin of safety, limiting activities below the level at which adverse affects have not been found or predicted.”103 This formulation is stronger because of its requirement that conservative estimates below what is considered safe should be used in crafting regulation. Margin of safety regulations are comparable to the EPA Clean Air standards mentioned earlier. Unfortunately, this formulation still suffers from an unspecified level of evidence required before a margin of safety regulation is passed.104 The phrase “found or predicted” allows an analysis that overlooks the magnitude or impact of the harm and could result in burdensome and potentially overcautious and rigid laws.105 Furthermore, this formulation is rooted in the belief that an activity or substance actually has a margin of safety at which it is safe, an assumption that can cause serious problems if later found to be wrong.

*Best Available Technology Precautionary Principle* is similar in strength to the previous formulation. It demands that “[b]est available technology requirements should be imposed on activities that pose an uncertain potential to create substantial harm, unless those in favor of the activities can show that they present no appreciable risk.”106 Once again, the words “uncertain potential,” “substantial harm,” and “no appreciable risk” are overly ambiguous and could lead to overly burdensome regulation or dangerously unregulated activities.107 In addition, while technology is a powerful tool in the prevention of environmental harm, a false sense of security can result. This has the potential to produce decision-making, which in hindsight appears flawed, even arrogant.

The last and strongest formulation is *Prohibitory Precautionary Principle*, which states “[p]rohibitions should be imposed on activities that have an uncertain potential to impose substantial harm, unless those in favor of the activities can show that they present no appreciable risk.”108 This formulation suffers from the same problem of vagueness as to the level of potential harm needed before action

103. *Id.*
104. *Sunstein, supra* note 51, at 1031.
105. *Id.* at 1024.
106. *Id.*
107. *Id.*
108. *Id.*
can be taken. Critics argue that no activity can be proven completely safe and that a prohibitory approach would stifle economic growth and technological innovation. It is even suggested that the unintended consequences of banning an activity or substance could be worse than the potential harm itself.

In its current adopted formulations, the precautionary principle operates as a guiding framework for legislatures and policy makers to face an unproven causal connection and decide whether to act preemptively. However, as discussed above, the vagueness and ambiguities found in these formulations, the cementing of a cost-benefit analysis into a precautionary analysis and political and economic realities have left a precautionary approach relatively ineffective thus far. By looking at a common law mechanism that struggles with the same problems of certainty of harm and preemptive action, a clearer formulation of a workable precautionary approach may be found.

B. Anticipatory Nuisance

Tort law generally requires one to suffer injury prior to asserting an action for damages or injunctive relief. The justification for this is twofold; an adequate remedy at law is assumed to exist after the harm occurs, and if an anticipated harm is uncertain or contingent, it is unfair to assume that defendants will conduct their businesses or activities so as to create injury. However, the common law doctrine of anticipatory nuisance enables courts of equity to prevent permanent harm in circumstances where it may be difficult or even impossible to restore the damage.

109. Mead, supra note 46, at 141 (presenting the opposing arguments about the effect of uncertainty in the application of the precautionary principle).
111. Mead, supra note 46, at 160.
112. Id. See also Sunstein, supra note 51, at 1054–1058; Mead, supra note 46, at 176.
113. Andrew H. Sharp, An Ounce of Prevention: Rehabilitating the Anticipatory Nuisance Doctrine, 15 B.C. Envtl. Aff. L. Rev. 627, 637–638; (citing to RESTATEMENT (SECOND) OF TORTS: PRIVATE NUISANCE § 827 (1979) (discussing how courts generally only enjoin nuisances that have already occurred)).
114. Id. at 637–38.
115. Id. at 629.
The anticipatory nuisance doctrine focuses a court’s analysis on “whether or not injury should be prevented before it occurs.” A private nuisance is defined as any activity on the part of a defendant that creates a substantial and unreasonable interference with a plaintiff’s use and enjoyment of his or her own land. Aggrieved plaintiffs can use an anticipatory nuisance cause of action to prevent what is perceived to be a nuisance before it interferes with the use and enjoyment of his or her own land. The first hurdle a plaintiff must clear is proving that injury will occur. In cases that utilize the anticipatory nuisance doctrine as a cause of action, courts focus their analysis on the probability of future harm actually occurring and have generally “required a high probability (although not an absolute certainty) of injury before enjoining the threatening activity.” Similar to the precautionary principle, the application of this doctrine throughout the United States has been inconsistent regarding the level of certainty required before a court can act.

Courts applying the most rigid version of the anticipatory nuisance doctrine have only taken action against a potentially harmful activity if the activity itself can be categorized as a nuisance per se. Although some courts end their inquiry at this point, many others continue their analysis a

119. See Doane, supra note 116 at 453–54 (analyzing various anticipatory nuisance approaches taken by courts to show harm will occur).
120. Doane, supra note 116 at 443; see also W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS § 89, at 640–41 (5th ed. 1984) (citing Hamilton Corp. v. Julian, 101 A. 558, 560 (Md. 1917)); see also Purcell v. Davis, 50 P.2d 255, 258 (Mont. 1935) (refusing to enjoin proposed oil refinery in residential neighborhood due to uncertainty of threatened noxious fumes, explosions, and fire).
121. Doane, supra note 116, at 453 (“Courts have failed, however, to arrive at a single, clearly articulated definition of how imminently a defendant’s conduct must threaten injury to a plaintiff before it can be enjoined.”).
122. Serena M. Williams, The Anticipatory Nuisance Doctrine: One Common Law Theory For Use in Environmental Justice Cases, 19 WM. & MARY ENVTL. L. & POL’Y REV. 223, 242 (1994–1995) (“A nuisance per se is an act, instrument or structure which is a nuisance at all times and under any circumstances, regardless of location or surroundings. Nuisances per se have included prostitution and gambling . . . .”); see also Doane, supra note 116, at 453 (“The strictest courts will only grant prospective injunctions against defendants whose conduct can be categorized as nuisance per se.”).
step further and focus on the defendant’s actions and whether this conduct “necessarily results” in a nuisance to the plaintiff.123 Like the language used in various formulations of the precautionary principle, the “necessarily results” language is difficult to interpret because of its vagueness. Furthermore, this amorphous language would result in inaction if the link between an activity and the potential injury is seen as inconclusive or attenuated.124 Other courts have used the terms “beyond all ground of fair questioning” and “conclusive evidence.”125 Regardless of the formulation, the result appears to be the same; the burden of proof a plaintiff must show in order to prove an injury will occur is high.126

Still another standard that has been applied in these cases is one of “reasonable certainty.”127 This approach has been called “more probabilistic.”128 Reasonable certainty analysis allows courts the flexibility to analyze not just whether the activity itself, isolated from the context in which it occurs, necessarily results in a nuisance, but allows courts to take into account the facts of each case.129 Another example of the variety of language used by courts to define the required probability of harm is “clear and convincing evidence” as found in O’Laughlin v. City of Fort Gibson.130 In O’Laughlin, the Oklahoma Supreme Court applied “a rule requiring clear and convincing evidence of a reasonable probability of injury for an injunction to issue against a threatened nuisance.” Other similar

123. Doane, supra note 116, at 453 (“In Purcell v. Davis, for example, the Montana Supreme Court held that the proposed construction of an oil refinery in a residential neighborhood would not constitute a nuisance per se. Nevertheless, the court held that the defendant’s activity could also be enjoined if it necessarily resulted in a nuisance.”).

124. Williams, supra note 122, at 243–44 (“In Village of Goodfield v. Jamison, plaintiff sought to enjoin the construction of a hog transfer station, fearing possible offensive odors and increased traffic, noise, flies and pests. However, the plaintiff presented no evidence of traffic, and the defendant countered the plaintiff’s evidence as to the odor reaching the village due to prevailing winds and as to the noise from the loading and unloading of animals; all evidence concerning the flies and pests indicated that proper operation of the station would limit any problems. Thus, the court found the plaintiff’s fears speculative.”).

125. Id. at 243–44.

126. Doane, supra note 116, at 454.

127. Williams, supra note 122, at 244–45.


129. Williams, supra note 122, at 244 (“In one instance, the Texas Court of Appeals upheld the award of an injunction for the threatened nuisance of a parking lot and emphasized that a nuisance is to be determined by considering all the circumstances, not merely the thing itself. The court stated that ‘every case must stand on its own footing. The plaintiffs introduced sufficient evidence that the location, time, and manner of use of the proposed parking lot would constitute a nuisance.’”).

variations of this language include certainty of harm, the definiteness of injury, clear and satisfactory evidence, sufficient evidence, and the immediacy of danger.\footnote{131}

Georgia and Alabama have both codified the anticipatory nuisance doctrine, using “reasonable certainty” language.\footnote{132} The Alabama statute states: “Where the consequences of a nuisance about to be erected or commenced will be irreparable in damages and such consequences are not merely possible but to a reasonable degree certain, a court may interfere to arrest a nuisance before it is completed.”\footnote{133} The Georgia statute is similar and requires that the injury be irreparable and “not merely possible but to a reasonable degree certain.”\footnote{134} However, confusion over what exactly constitutes “reasonably certain” harm has allowed similar cases with similar facts to reach different results because of this variability.\footnote{135} This illustrates that, regardless of how the standard is phrased, courts struggle to determine just what level of certainty or probability of harm is required.\footnote{136} Furthermore, while courts’ application of the reasonable certainty standard has been inconsistent, it generally requires a high probability of injury.\footnote{137} The high burden of proof a plaintiff must show to prove injury and the inconsistency in the application of this doctrine have discouraged plaintiffs from utilizing this cause of action.\footnote{138} A reasonable analysis must include a focus on the probability of future injury. A more quantitative and effective analysis exists, which maintains its focus on the probability of future injury but allows for flexibility in its application.

In \textit{Village of Wilsonville}, residents brought a nuisance action to enjoin the building of a hazardous waste landfill over an abandoned coalmine.\footnote{139} The residents of Wilsonville argued that there was a substantial risk of toxic waste release, explosions, and fumes.\footnote{140} The

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\begin{itemize}
\item \footnote{131}{Doane, \textit{supra} note 116, at 454; see also Sharp, \textit{supra} note 113 (presenting a historical look at the doctrine’s use in state and federal courts).}
\item \footnote{132}{Doane, \textit{supra} note 116, at 454 (citing to ALA. CODE § 6-5-125 (2005), GA. CODE ANN. § 41-2-4 (West 2011)).}
\item \footnote{133}{Id.}
\item \footnote{134}{Doane, \textit{supra} note 116, at 454 (citing to GA. CODE ANN. § 41-2-4 (West 2011)).}
\item \footnote{135}{Sharp, \textit{supra} note 113, at 646.}
\item \footnote{136}{Id.}
\item \footnote{137}{George P. Smith, \textit{Re-Validating the Doctrine of Anticipatory Nuisance}, 29 VT. L. REV. 687, 688 (2005).}
\item \footnote{138}{Doane, \textit{supra} note 116, at 455.}
\item \footnote{139}{Id. (citing to Vill. of Wilsonville v. SCA Servs., Inc., 426 N.E.2d 824, 827 (Ill. 1981)).}
\item \footnote{140}{Id. (analyzing Vill. of Wilsonville v. SCA Servs., Inc., 426 N.E.2d at 829–30).}
\end{itemize}
Illinois Supreme Court granted injunctive relief finding there was a high probability that operating a toxic waste landfill would create a nuisance and necessarily result in substantial injury.\(^{141}\) The majority opinion was in line with past cases that applied the anticipatory nuisance doctrine.\(^{142}\) Both “high probability” and “reasonable certainty” were used to define the potential for injury and according to the court, were met.\(^{143}\) However, Justice Howard C. Ryan’s concurrence stated that the court established too high a threshold for a plaintiff to overcome and argued the balancing test should weigh both the probability and magnitude of an injury.\(^{144}\) Justice Ryan wrote:

“[i]f the harm that may result is severe, a lesser possibility of its occurring should be required to support injunctive relief. Conversely, if the potential harm is less severe, a greater possibility that it will happen should be required.... This balancing test allows the court to consider a wider range of factors and avoids the anomalous result possible under a more restrictive alternative where a person engaged in an ultra-hazardous activity with potentially catastrophic results would be allowed to continue until he has driven an entire community to the brink of certain disaster. A court of equity need not wait so long to provide relief.”\(^{145}\)

This is an inverse balancing test: as the magnitude of the harm increases, the lesser the probability required for an injunction.\(^{146}\) Conversely, as the probability increases, a lesser magnitude of harm will justify injunctive relief. Shifting the analysis from an exclusive focus on the probability of harm, and analyzing the magnitude of harm as well, provides a rational, consistent, and flexible standard

\(^{141}\) Id.
\(^{142}\) Id.
\(^{143}\) Id.
\(^{144}\) Smith, supra note 137, at 713; see also Doane, supra note 116, at 455.
\(^{145}\) Doane, supra note 116, at 455 (analyzing Vill. of Wilsonville v. SCA Servs., Inc., 426 N.E.2d at 842).
\(^{146}\) Doane, supra note 116, at 443 (analyzing Vill. of Wilsonville v. SCA Servs., Inc., 426 N.E.2d at 842).
that alleviates much of the ambiguity associated with the anticipatory nuisance doctrine.\textsuperscript{147}

\textbf{C. Common Ground}

The precautionary principle is a legislative tool that allows lawmakers to grapple with an uncertain causal connection within a guiding framework.\textsuperscript{148} The anticipatory nuisance doctrine offers a cause of action to abate or enjoin a future nuisance.\textsuperscript{149} The rationale underlying both of these legal instruments is the prevention of significant harm before it occurs. Both have varying degrees of strength in the different levels of probability and certainty required before action can be taken, and both allow for flexible outcomes whether it is an equitable remedy or a technology based regulation. Furthermore, both have the ability to augment the burden of proof a prospective victim of a proposed activity must meet before action can be taken.

The fundamental flaw of both the precautionary principle and the doctrine of anticipatory nuisance is the struggle to pin down just how much certainty is needed before legal action can be taken. Justice Ryan’s concurrence in \textit{Village of Wilsonville} simply states that the more severe the potential harm, the less certain it must be to occur in order to issue injunctive relief. Contrariwise, if the harm is not very severe, then a much higher likelihood of occurrence should be required before a preliminary injunction will lie.\textsuperscript{150} This inverse balancing test would ensure a more predictable and usable anticipatory nuisance doctrine than the inconsistent, neglected, and inconsistently applied doctrine that now exists.

Furthermore, it is possible that this test could be adopted in a precautionary approach in order to erase much of the ambiguity inherent in explicating just what standard of proof is sufficient to trigger preemptive action. Justice Ryan’s test would provide a much clearer definition of what level of certainty is necessary before implementing a regulation. This test would also influence the choice of regulatory tool or strength of precaution taken in a given situation.

\begin{itemize}
\item \textsuperscript{147} Williams, \textit{supra} note 122, at 247.
\item \textsuperscript{148} Mead, \textit{supra} note 46, at 138, 150 (reviewing the use of the common elements of the precautionary principle by legislators).
\item \textsuperscript{149} Doane, \textit{supra} note 116, at 443.
\item \textsuperscript{150} Vill. of Wilsonville v. SCA Servs., 426 N.E.2d at 842.
\end{itemize}
as well as ensure a proportionality of response to a given threat. The result would be a workable and flexible regulatory legal mechanism that would expand the focus of lawmakers and judges to prevent current and future harms while mitigating the negative effects that could arise from an overcautious approach. A regulatory framework complements a strong judicial role. Together, these legal mechanisms can ensure a consistent and rational approach to how our legal system deals with uncertain probabilities of harm.

III. UNCERTAINTY UNDERGROUND

High-volume hydraulic fracturing injects two to 7.8 million gallons of fluid per frack (on average 5.6), and it is possible that wells may be fracked multiple times over their life spans. Thus, high-volume hydraulic fracturing requires 70 to 300 times more fluid than the older, more traditional fracking techniques. Typically, chemical additives comprise two percent or less of fracturing fluid (i.e. .44% of Fayetteville Shale fracturing fluid is made up of chemicals). As noted earlier, roughly 15% of the fracking fluid comes back up the wellhead; what happens to the fluid left underground is unknown. The industry claims that the fluid will be locked underground for all time and that there has never been a proven drinking water contamination case in 60 years of fracking. This statement is misleading. In the 60 or so years that fracking has been used commercially, companies have been drilling vertical wells using smaller amounts of fracking fluid with a smaller

151. Logan, supra note 21; see also Erik Mielke et al., supra note 19 (analyzing issues affecting water consumption during shale gas production including use of additional hydraulic fracturing).

152. Logan, supra note 21.

153. The typical percentage of chemicals in hydraulic fracturing solutions for the Fayetteville Shale is reported as 0.44% by weight (NY SGEIS, Section 5.4.3, p. 5–44). 0.44% by weight of 5.6 million gallons is 205,000 lbs. (water weighs 8.34 lb./gallon). The NY SGEIS also states that chemical additives typically comprise two percent or less of the fracturing fluid (Section 5.4, p. 5–33). Two percent by weight of 5.6 million gallons is 935,000 lbs. New York State Department of Environmental Conservation Division of Mineral Resources, Supplement Generic Environmental Impact Statement On the Oil, Gas and Solution Mining Regulatory Program 5–33, 5–44 (2009), available at ftp://ftp.dec.state.ny.us/dmm/download/OGdSGEISFull.pdf.


number of chemicals injected at lower pressures in rock formations different than the Marcellus shale formation. High volume slick water hydraulic fracturing employs up to 16 horizontal leads from each vertical shaft, uses millions of gallons of water per well, and has only been used for about ten years. This technique has never been used in as dense a matrix of water supplies and population as in the Marcellus Shale Play.

Think of the act of fracking as the setting off of a pipe bomb underground. While drillers do their best to control where the fractures will develop, the immense pressures and unpredictability inherent in the process means that fracturing fluids and natural gas can move in unexpected directions, even ending up in aquifers and water wells. “Even more disturbing, at least two hydrogeologists wrote to the EPA expressing concern that as groundwater tables rise (post oil or gas development), the groundwater could mobilize these stranded fluids.” Geologist Richard Young, a leading authority in the field, spoke about the complex and dynamic geology of upstate New York, and the probability that hydraulic fracturing will contaminate aquifers that millions of people on the eastern seaboard depend on. Deep fracture systems—including faults and joints—


157. Id.

158. Id. at 32.


161. Complex Geology and Fracking, SPECTRA ENERGY WATCH (Sept. 29, 2010), http://www.spectraenergywatch.com/blog/?p=800; see also Lustgarten, supra note 31 (“Between Pennsylvania’s Delaware and Susquehanna River basins and the Catskill watershed in New York—an area that lies in the heart of the eagerly sought Marcellus Shale gas deposits—drinking water is supplied to New York City, Philadelphia, Baltimore, and Trenton, NJ, another 5 percent of the U.S. population. Add those segments together, and a significant percentage of the U.S. water supply—not to mention at least 15 percent of the country’s agriculture—could potentially be affected if it turns out that drilling for natural gas leads to significant pollution over a long period of time.”).
are complex and the details are seldom known with accuracy. The two acting together—faults and joints—can carry fluids a long distance. The interaction of these rock structures becomes the problem in terms of groundwater flow. Young summarized his view when he stated, “[f]racking can be an irresponsible and unwarranted environmental experiment with uncertain and potentially dangerous effects.”

At the very least, the question of whether fracking fluid and methane can migrate into aquifers is very much open for debate. “This is a field where there is almost no research,” said Geoffrey Thyne, a geologist and former professor at the Colorado School of Mines and an environmental engineering consultant. Thyne has found methane and drilling wastewater in dozens of domestic wells in Colorado and thinks it could have traveled through underground fractures. “It is very much an emerging problem,” he says. Dennis Coleman, an expert on tracking underground migration, states:

[M]ore data must be collected before anyone can say for sure that drilling contaminants have made their way to water or that fracturing is to blame. But Coleman also says there’s no reason to think it can’t happen. He says he has seen methane gas seep underground for more than seven miles from its source. If the methane can seep, the theory goes, so can the fluids.

The EPA has found fracking fluid in drinking wells in Pavillion, Wyoming. Residents of Dimock, Pennsylvania claim fracking fluid has contaminated their wells. Natural Resources Defense Council

162. Complex Geology and Fracking, supra note 161.
163. Id.
164. Lustgarten, supra note 41.
165. Id.
166. Id.
167. Id.
168. Id.
has compiled a list of incidents from across the country where fracking was the suspected cause of water contamination.\textsuperscript{170} In Colorado, methane showed up frequently in water wells. Researchers thought it might be originating from the same gas reservoirs being drilled deep underground.\textsuperscript{171} In Ohio, gas seepage from a natural gas well blew up a house.\textsuperscript{172} “In Pennsylvania, a vast underground gas injection cave, where gas is put for long-term storage, had somehow leaked into water supplies over 50 square miles.”\textsuperscript{173}

The first EPA study on fracking was completed in 2004 and found that fracturing may release potentially hazardous chemicals into aquifers and drinking wells, but concluded that there was no reason to study it further.\textsuperscript{174} The 2004 study determined that fracturing posed “little or no threat” because most of the fracking fluid is pumped back up and disposed of, and the chemicals left underground would be “diluted or biodegrade on their own.”\textsuperscript{175} These assertions have been the subject of vigorous debate.\textsuperscript{176} Soon after the report was published, an EPA whistleblower named Weston Wilson claimed that the study’s findings were “unsupportable.”\textsuperscript{177} He further alleged that evidence showing that benzene and other toxic chemicals in fracking fluid could migrate into groundwater had been suppressed in the final report, and that five of the seven reviewers on the panel had conflicts of interest.\textsuperscript{178} Wilson wrote “EPA’s failure to regulate the injection of fluids for hydraulic fracturing of coal bed methane reservoirs appears to be improper under the Safe Drinking Water Act and may result in danger to public health and safety.”\textsuperscript{179} According to Wilson, EPA found that toxic and carcinogenic fluids were injected underground where the groundwater was used to supply drinking water.\textsuperscript{180} EPA

\begin{itemize}
\item \textsuperscript{170} Mall, \textit{supra} note 4.
\item \textsuperscript{171} Id.
\item \textsuperscript{172} Id.
\item \textsuperscript{173} Lustgarten, \textit{supra} note 41.
\item \textsuperscript{175} Id.
\item \textsuperscript{176} Id.
\item \textsuperscript{177} Letter from Weston Wilson, EPA Employee, to U.S. Senators Wayne Allard and Ben Nighthorse Campbell and U.S. Representative Diana DeGette (Oct. 8, 2004), \textit{available at} \url{http://www.earthworksaction.org/pubs/Weston.pdf}.
\item \textsuperscript{178} Id.
\item \textsuperscript{179} Id.
\item \textsuperscript{180} Id.
\end{itemize}
further discovered that some, but not all, of the fracking fluids would be pumped out and assumed that the remainder would be diluted to some unspecified degree. EPA’s Quality Assurance Plan, the scientific basis for the 2004 study, specified that EPA would continue to study the matter and obtain data, yet EPA had no data on the amount of toxic fluids injected, what percentage of fluid remained in the ground after extraction, whether the water will still be usable for drinking, and what the potential health risks are.

According to Wilson, EPA’s conclusion that hydraulic fracturing poses little or no threat to drinking water sources is unsupportable and scientifically unsound. As for the seven member peer review team, Wilson wrote that “[i]t’s a hand-picked, conflicted small group, who failed to even read the final report and met only once. This is not peer review—this is a mockery of what is supposed to be an independent and balanced review. This is the thin veneer cover to a scientifically unsound study while the scientific process of peer review was abandoned.”

On a very related note, the scientific peer review system has been held out as an effective substitution for a precautionary approach by those who disagree with the precautionary principle’s effectiveness. A strident critic of the precautionary principle and former administrator of the Office of Information and Regulatory Affairs argued that third party peer review of agency actions is superior to a precautionary approach. Criticizing this point of view, one scholar wrote “the peer review system is vulnerable to abuse and misuse. . . . An abusive peer review system can result in the suppression of evidence and the approval of decisions with serious environmental consequences.” A precautionary approach would create a more transparent investigation into a proposed activity; one where industry, community, and

181. Id.
182. Soraghan, supra note 171.
183. Id. See also Tom Kane, Local Agencies Allow Gas Drilling Exemption, THE RIVER REPORTER (March 26, 2008), http://riverreporter.com/issues/08-03-20/head1-gas.html (“With the help of Cheney, Halliburton and the other major gas producing companies have successfully gotten the EPA to declare the patented formula for the fluids as ‘proprietary’ and therefore private.”).
186. La Franchi, supra note 75.
government work together in gathering and reviewing scientific data before deciding the appropriate course of action.187

Wilson is not the only critic of the 2004 study. EPA spokeswoman, Enesta Jones, wrote that, “[t]he use of hydraulic fracturing has significantly increased well beyond the scope of the 2004 study.”188 The 2004 report addressed only coal bed methane (geologically different than shale), and failed to study the new practice of drilling and hydraulically fracturing horizontally for up to a mile underground (which requires about five times more chemical-laden fluids than vertical drilling).189 A close analysis of the 2004 report “shows that the body of the study contains damaging information that wasn’t mentioned in the conclusion. In fact, the study foreshadowed many of the problems now being reported across the country.”190 The 424-page report states “fluids migrated unpredictably through different rock layers, and to greater distances than previously thought—in as many as half the cases studied in the United States.”191 Jeffrey Jollie, a hydrogeologist working for the EPA, stated that the 2004 report “was never intended to be a broad, sweeping study.”192 Yet, even with all of these criticisms of the 2004 study, mounting evidence of groundwater contamination caused by fracking throughout the country, and another EPA study underway and predicted to be completed by the end of 2012, the gas rush has continued in and around watersheds that supply millions of people with drinking water.193

EPA has conceded “there are serious concerns from citizens and their representatives about hydraulic fracturing’s potential impact on drinking water, human health and the environment, which demands further study.”194 EPA’s Office of Research and Development (ORD)

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187. Id at 720; see also Mead, supra note 46, at 156 (illustrating how the precautionary principle can be used to increase transparency).
188. Lustgarten, supra note 9.
189. Id.
191. Id.
192. Id.
is currently conducting a scientific study aimed at investigating any potential relationship between hydraulic fracturing and groundwater contamination. Disclosure of the specific chemical ingredients and amounts used in fracking fluid is finally underway by both the Bureau of Land Management and EPA. The Delaware River Basin Commission has already allowed several exploratory wells in the area and just recently published rules for gas development in the region. These regulations have opened the door for gas development in the 13,539 square-mile watersheds that covers portions of all four member states. Therefore, while the potential dangers of fracking are known, the process continues, albeit with a heightened anxiety over potential health and safety concerns.

IV. PRECAUTION APPLIED

The precautionary principle dictates that where there is scientific uncertainty concerning a proposed action, the proponent of such action should carry the burden of proving that the activity will not be harmful. Ideally, the principle should be incorporated early in the process of regime development. In the case of fracking, the precautionary principle dictates studying potential impacts to

195. Natural Gas Extraction—Hydraulic Fracturing, supra note 193. See also EPA, PLAN TO STUDY THE POTENTIAL IMPACTS OF HYDRAULIC FRACTURING ON DRINKING WATER RESOURCES, at x (2011), available at http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/hf_study_plan_110211_final_508.pdf ("A first report of research results will be completed in 2012. This first report will contain a synthesis of EPA's analysis of existing data, available results from retrospective cases studies, and initial results from scenario evaluations, laboratory studies, and toxicological assessments. Certain portions of the work described here, including prospective case studies and laboratory studies, are long-term projects that are not likely to be finished at that time. An additional report in 2014 will synthesize the results of those long-term projects along with the information released in 2012.").


199. Mead, supra note 46, at 152 (suggesting reversing the burden of proof for the precautionary principle).

drinking water before employing the technology on a grand scale. Judging from the inaction of lawmakers and the continued use of fracking in critical watersheds and aquifers, the precautionary principle seems to have missed its chance at halting the gas rush until more is known of its effects. However, a precautionary approach can still be taken.

The principle can continue to serve as guidance for the evaluation of information and the crafting of future regulations. “[P]recautionary reasoning operates not only to gather momentum for the negotiation of a regime but also as an argument guiding decisions at later stages of regime development, including when it comes to evaluating state responsibility for preventing environmental damage.” 201 In the context of fracking, a precautionary approach would demand a thorough and transparent review of the scientific data and spur the development of rules and policy choices necessary to prevent potential harms. This approach can influence regulatory decision-making in the short-term purgatory created by EPA as it continues to study the effects of fracking on drinking water, and into the future as the substance of the EPA report is analyzed and put into action. 202 At what level of government this framework should be implemented is the question.

Scott La Franchi writes, “[w]ith the U.S. judiciary beholden to a system of deference, and the administrative state bound to risk assessment and cost-benefit analysis, the future of the precautionary principle currently rests entirely with the legislative branch of government.” 203 In the short term, regulation at the state level is the most feasible course of action. Former Pennsylvania Department of Environmental Protection Chief John Hanger agrees, citing the federal government’s failure to prevent the Deepwater Horizon drilling disaster and the problem of agency capture. 204 While agency

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201. Id. at 447–48.
202. See La Franchi, supra note 75, at 710 (arguing that a precautionary framework must be fleshed out with more specific regulations in order to be effective).
203. Id.
204. Nicholas Kusnetz, John Hanger, PA’s Former Environmental Chief, Talks About Challenges of Keeping Gas Drilling Safe, PROPUBLICA (Feb. 11, 2010), http://www.propublica.org/article/john-hanger-pa-s-former-environmental-chief-talks-about-challenges-of-keepin (“I laugh when people ask that question because, basically, if the BP oil spill showed anything, it’s that you can’t rely on the federal government to regulate the oil and gas industry. The Minerals Management Service was completely captured by the industry. There’s no guarantee that doesn’t happen at the state level either, but I think local people have much more ability to impact their governor. They pick their governor, they elect their
capture can occur at the state level as well, there is a closer relationship between regulators and citizens and therefore a stronger level of accountability exists.\textsuperscript{205} Furthermore, regulation must reflect the distinct geological and hydrological qualities of each state. The next step in applying a precautionary framework is drafting.

Due to the inherent ambiguities associated with the precautionary principle, drafting a rule of law can be extremely difficult. There are those that argue a precautionary principle is merely a “general guiding policy” that should not function as a binding, legal rule.\textsuperscript{206} Still others argue that the effectiveness of the precautionary principle depends on its evolution into a “legally binding rule.”\textsuperscript{207} A middle ground between the two also seems to exist, as state lawmakers can pass legislation that incorporates the precautionary principle explicitly or uses it to justify legislation specifically focused on groundwater contamination from the underground migration of fracking fluids and methane. By narrowing the focus of the precautionary principle’s application to an identifiable and scientifically uncertain phenomenon, and clearly defining the margin of safety that is being sought, the legislation will mirror that of other U.S. environmental laws that utilize precautionary reasoning.\textsuperscript{208}

Any adoption of a precautionary approach must recognize that “there is no such thing as no risk in a dynamic and changing environment.”\textsuperscript{209} A workable precautionary principle would accept this fact by clearly explicating the probability of harm necessary to trigger preemptive action. As stated earlier, Justice Ryan’s inverse balancing test for an anticipatory nuisance, where the probability and magnitude of harm are assessed when determining whether an activity creates a reasonably certain injury, would flesh out a precautionary approach considerably. This balancing test provides a clearer and more easily applied principle that would allow flexibility as well as consistency. Justice Ryan’s test incorporated into a

\begin{itemize}
\item \textsuperscript{205} Id.
\item \textsuperscript{206} Mead, \textit{supra} note 46, at 162–63 (addressing the differing opinions about the use of the precautionary principle).
\item \textsuperscript{207} Id. at 163.
\item \textsuperscript{208} \textit{See supra} notes 64–74 (cataloging several domestic statutes which base regulations off of conservative assumptions that utilize a margin of safety).
\end{itemize}
precautionary principle would guide legislators in anticipating harm, determining what burden of proof should fall on those promoting fracking, and ensure an open, informed, and participatory decision-making process.

The contamination of an entire fresh water aquifer would be catastrophic both environmentally and economically. The probability of this injury occurring varies widely depending on whom you believe. A legislature must weigh the flaws in the 2004 EPA report, an EPA study currently underway, recent moratoriums passed in cities throughout the Northeast, and thousands of reports of contaminated water. One must also look at the magnitude of harm when determining the threshold for taking regulatory action and the burden of proof on those in favor of an activity. After reviewing the mounting evidence linking fracking and groundwater contamination, one could easily reach the conclusion that this evidence reaches a reasonable certainty standard. Furthermore, if Justice Ryan’s test were adopted, the magnitude of harm that would result from fracking would ensure that current evidence of injury would meet the probability requirement. There are those that completely disagree.210 Others admit that risks do exist but are negligible.211

The hard realities of a faltering economy, the influence of special interest groups, forward momentum of the gas industry, and the economic interests at stake seem to point to the inevitability that a completely prohibitory precautionary principle is infeasible at this point. However, a prohibitory method may be narrowed in scope and imposed selectively. Firstly, an immediate ban should be imposed on fracking in primary watershed areas and critical water supplies, both surface waters and underground. Secondly, a prohibition should be imposed on the use of carcinogenic, mutagenic, and toxic chemicals in fracking fluid, regardless of location, until there is a high probability that groundwater is NOT in danger of contamination,

210. Hydraulic Fracturing, PERMIAN BASIN PETROLEUM ASSOCIATION (2011), http://pbpa.info/regulation/hydraulic-fracturing/. (“Hydraulic fracturing is a safe, well-regulated, environmentally sound practice that has been employed over one million times without a single incidence of drinking water contamination. Hydraulic fracturing’s record of safety and impressive ability to help make the most of our domestic energy resources designate it as one of the most important tools in our nation’s effort to achieve energy independence.”).

211. Kusnetz, supra note 204 (“Yes, it’s safe in this respect. Is the risk zero? No. But is it as safe as mining and producing and burning coal? It’s actually much safer. . . . Is it as safe or safer than drilling, producing and burning oil? It is actually much safer. . . . None of our risks in energy production are zero.”).
whether through underground migration, surface spills, or otherwise. The reduction or complete elimination of the chemicals used in the fracking fluid would be relatively easy to achieve, as there are safer alternatives to the dangerous chemicals used in fracking fluids already available. These prohibitions would allow fracking to continue, albeit in a more limited and environmentally sensitive capacity, until the risk of harm can be ascertained. These prohibitions can be complimented with the application of margin of safety regulations.

Margin of safety precautionary principle dictates that “regulation should include a margin of safety, limiting activities below the level at which adverse affects have not been found or predicted.” In this context, margin of safety regulations should focus on several issues. Firstly, well spacing and density must be regulated to a level where the risk of fractures interacting with each other and naturally occurring faults and joints is minimal. Intensive geological review of the underground strata should be required before drilling starts and monitoring should continue throughout the entirety of the drilling process to ensure safety. Set back requirements already exist for how close wells can be to a surface water source intended to prevent surface water contamination from spills. These should be strengthened and incorporated into the state-wide planning regulations. Furthermore, the location of underground aquifers and critical watersheds should be avoided at all costs; at least until it can be demonstrated that fracking will pose no risk to these waters. Lastly, an intensive geological survey should be undertaken to ascertain the locations of likely pathways of migration for fracking fluid and methane, such as naturally occurring faults and joints as well as abandoned oil and gas wells from decades past. A margin of safety precautionary approach is generally more accepted as administrative agencies such as OSHA and EPA have promulgated


214.  New York State Dept. of Envtl. Conservation, Draft Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program (GEIS) 8-4 (1988), *available at* http://www.dec.ny.gov/docs/materials/minerals_pdf/dgeisv1ch8.pdf (“Most wells must be spaced according to the statewide 40 acre spacing rule unless they are in a field subject to a spacing order or other spacing regulations.”).

215.  *Id.* at 8-15.
regulations based on this approach and have survived judicial scrutiny.\(^{216}\)

Similar to margin of safety precaution, a best available technology standard should be required. This would encourage technological innovation. Together, these regulations would work to create a culture of safety, which is desperately needed in the mining industry. A serious concern relating to these types of regulation is one of enforcement. In order to effectively implement these regulations, monitoring and enforcement must be properly funded. Many states are already short-staffed as it is and as the pace of drilling increases, the strain on federal, state and local governments will likely get worse.\(^{217}\) This issue requires its own focus as, time and again, environmental regulations have been proven only as effective as the body responsible for oversight and enforcement.\(^{218}\)

Shifting the burden of proof onto the proponents of fracking would facilitate “public disclosure and the independent review of testing procedures and results.”\(^{219}\) This would ensure the accuracy and transparency of the peer review process, and create a cooperative process, where industry and government can align their interests and work together towards gaining an understanding of the activity’s effects before they occur. While there is concern that the interactions of water, gas, and strata thousands of feet below ground will never be known with certainty, the benefits of shifting the burden of proof, especially during the scientific evaluation stage, outweigh the possibility that the industry will never be able to carry this burden. Action taken on the basis of uncertainty is tentative and must always be revisited again and again as new evidence surfaces.\(^{220}\) This ensures that there is continued re-visitation of the evidence used to justify regulation. “Whatever the EPA does, its environmental research is

\(^{216}\) See supra notes 64–74 (these domestic regulations have been upheld even while they rely on conservative assumptions as to what is “safe.”).

\(^{217}\) See Ian Urbina, Regulation Lax as Gas Wells ’Tainted Water Hits Rivers, N.Y. TIMES, Feb. 26, 2011, http://www.nytimes.com/2011/02/27/us/27gas.html?pagewanted=1 (“Part of the problem is that industry has outpaced regulators. ‘We simply can’t keep up,’ said one inspector with the Pennsylvania Department of Environmental Protection who was not authorized to speak to reporters.”).


\(^{219}\) Mead, supra note 46, at 156 (explaining how reversing the burden of proof and public disclosure would reduce the risks of potentially harmful activities).

\(^{220}\) Id. (suggesting use of risk assessment and testing methods that would address the uncertainty of evaluating the benefits of a new technology).
guaranteed to go slower than the pace of drilling development.”

Reversal of the burden of proof thus ensures that a precautionary approach can continue to affect decision-making. However, this provides little comfort to those who live in the middle of the gas rush. The anticipatory nuisance doctrine would provide private landowners with a cause of action that could prevent permanent harm to their land before fracking commences. Two recent Pennsylvania lawsuits, filed separately against Southwest Energy Co. and Chesapeake Energy Corp., claim that their gas drilling has contaminated local water supplies and harmed the related property values. The first claim of contaminated water supply is the issue garnering the most attention. However, it is uncertain whether there is enough evidence to prove causation, not to mention whether the plaintiffs have enough time, money, and resilience to maintain such a suit. A diminution in property values claim avoids drawn out litigation solely on the causation of water contamination. Generally, litigation of environmental claims under any theory is expensive and time consuming because expert testimony is usually required to prove causation and the extent of harm. However, plaintiffs alleging an actual nuisance can seek injunctive relief for the more easily shown presence of odors, flies, noise and increased traffic beyond a tolerable and safe level.

An anticipatory nuisance claim can avoid the causation issues associated with a contaminated water claim by focusing on the damage to property values. However, the plaintiff must still carry the burden of proving that a fracking operation next door poses a substantial and unreasonable interference with the use and enjoyment of their land. This burden is theoretically less difficult and expensive because it does not rely entirely on technical and scientific evidence. A favorable precedent could be established as a model for the thousands of other landowners who seek to prevent fracking from destroying the value of their property, and perhaps give scientists and

221. Lustgarten, supra note 41 (“In 2010, another 14,324 new gas wells were drilled in the United States, including in Wyoming.”).
223. Williams, supra note 122, at 250.
decision makers slightly more time to uncover evidence and make the right decisions.

CONCLUSION

It is impossible to contemplate all of the effects of a given activity, or prove that an activity is completely harmless. Critics of a precautionary approach wrongly believe that it rigidly demands a contemplation of all possible effects before any action can be taken. The precautionary principle is a flexible concept that can be applied throughout the entire lifespan of a project and in differing levels of rigidity or strength. The ambiguity inherent in assessing when a probability of harm becomes enough to act on can be greatly reduced by borrowing from the case law and legal rationale underlying anticipatory nuisance and incorporating Justice Ryan’s balancing test. In this way, a clearer and more workable principle can be adopted and continue the evolution of the precautionary principle from a guiding concept to a legally binding rule of law.

Although the continued use of hydraulic fracturing seems like a foregone conclusion, the precautionary principle can still contribute as a justification for stricter regulation. Specifically, it would focus on groundwater contamination and prohibitions in critical watershed and geologically unstable areas. A precautionary approach also has the potential to be a valuable guide for future regulations as our understanding of fracking fluid’s interaction with geology over time improves.

Scholars in favor of an increased judicial role question whether administrative agencies are sensitive enough to the public interest in regulating risks such as: fracking, whether the scientists and engineers that develop these drilling technologies are capable of objectively assessing the risks they create, and whether legislatures are capable of responding quickly enough to the dangers posed by such activities. An active judicial role in the regulation of modern technological risk is essential. Common law tort remedies can coexist with administrative remedies. In this context, the anticipatory nuisance doctrine can compliment a regulatory regime, ensuring that private landowners are not beholden to an irresponsible legislature.

The EPA is currently involved in an intensive study of groundwater contamination and fracking. Therefore drillers, landowners, and regulators are playing a dangerous game; betting
against mounting evidence that fracking will not have serious and irreversible environmental consequences. There are numerous reports from across the country that point to fracking as the culprit in groundwater contamination, not from surface spills and leaks in the equipment, but the inherently unpredictable method of gas extraction. The anticipatory nuisance doctrine compliments the adoption of a precautionary principle. These legal mechanisms, if properly implemented, can expand the focus of lawmakers and judges from present to future effects. In that way, these mechanisms may prevent permanent environmental damage before it occurs.