

# ELR

## NEWS & ANALYSIS

### The Siren Sounds for Nitrogen

by Jeremy S. Scholtes

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*Editors' Summary: The international community is intensifying its efforts to combat nitrogen pollution, a threat to human health and the environment. In this Article, Jeremy S. Scholtes examines the nature of this type of pollution and the legal instruments currently in place that deal with it. He begins by explaining the theoretical concerns that negotiators must consider when designing legal instruments, recommending that regional hard law instruments in concert with partnership coordination platforms are the most effective tools for addressing nitrogen pollution. He concludes that the 1979 Convention on Long-Range Transboundary Air Pollution (LRTAP) should be used as the model for developing additional regional air pollution regimes around the globe to address nitrogen pollution. Finally, he asserts that an additional benefit of negotiating regional multilateral environmental agreements modeled after LRTAP is that the comprehensive regional programs could be used to implement applicable provisions of the United Nations Framework Convention on Climate Change and the Kyoto Protocol.*

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Nitrogen pollution is rapidly moving to the fore as a significant international environmental concern.<sup>1</sup> Recently, the United Nations Environment Programme (UNEP) and the Woods Hole Research Center (WHRC), with substantive contributions and editorial support from the International Nitrogen Initiative (INI),<sup>2</sup> published a report<sup>3</sup> encouraging increased international focus on the development of effective policies and the implementation of workable

plans to address nitrogen pollution. The rationale for sounding the alarm regarding nitrogen pollution is not so much that nitrogen pollution is more hazardous for human health or the environment than other pollutants, but rather that the global community has thus far failed to adequately use existing legal instruments and partnership platforms, or alternatively, has failed to develop new instruments and partnerships, to address the problem. (Partnership platforms are partnership-building facilitators that operate to provide a forum for entities to come together as partners and the basic tools needed to build effective partnerships.)

Thus, this Article endeavors to educate the reader in two ways. First, it presents a brief introduction to what nitrogen pollution is and how it impacts the world. Second, it recommends existing instruments and partnership platforms that should be the primary tools, as established or with little modification, to most efficiently and effectively address nitrogen pollution in the water and the air.<sup>4</sup>

So just what is nitrogen pollution? Under natural conditions, nitrogen is found in an inert form referred to as molecular nitrogen (N<sub>2</sub>).<sup>5</sup> Breaking the bond that holds the two atoms of nitrogen together is possible through natural processes such as lightening and biological nitrogen fixation (BNF). Once broken apart, the individual atoms can transform through various processes, in combination with other

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Jeremy S. Scholtes is a third-year law student at the University of Maryland School of Law. He thanks Profs. Anne Berns and David Gravallesse at the University of Maryland School of Law for providing substantive feedback and encouragement on multiple occasions. The idea for the title of this Article came from the explanation of how and why *Siren* was selected as the name for the Regional Seas newsletter. See Regional Seas, United Nations Environment Programme, *The Siren*, [http://www.unep.ch/regional\\_seas/main/hsiren.html](http://www.unep.ch/regional_seas/main/hsiren.html) (last visited Feb. 22, 2008).

1. Jocelyn Kaiser, *The Other Global Pollutant: Nitrogen Proves Tough to Curb*, SCIENCE, Nov. 9, 2001, at 1, available at <http://www.esf.edu/EFB/mitchell/Class%20Readings%5CSci.294.1268.1269.pdf>.
2. See INI, *Overview*, [http://www.initrogen.org/initrogen\\_history.0.html](http://www.initrogen.org/initrogen_history.0.html) (last visited Feb. 22, 2008) (click on "History" section). The idea to create the INI originated in the 1st International Nitrogen Conference (INC) held in the Netherlands in March 1998. The concept was further explored and groundwork was prepared for its creation at the 2d INC held in Potomac, Maryland, in October 2001. Finally, in January-February 2003, the International Geosphere-Biosphere Program (IGBP) and the Scientific Committee on Problems of the Environment (SCOPE) jointly sponsored the program now known as the INI; see also INI, *Overview*, [http://www.initrogen.org/initrogen\\_objectives.0.html](http://www.initrogen.org/initrogen_objectives.0.html) (last visited Feb. 22, 2008) (click on "Objectives" section).
3. UNEP & WHRC, *REACTIVE NITROGEN IN THE ENVIRONMENT: TOO MUCH OR TOO LITTLE OF A GOOD THING* (2007), available at [http://www.initrogen.org/fileadmin/user\\_upload/2007\\_docs/2007-reactive-N-UNEP-WHRC-INI.pdf](http://www.initrogen.org/fileadmin/user_upload/2007_docs/2007-reactive-N-UNEP-WHRC-INI.pdf).

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4. Soil is a third medium of primary concern. This Article will not address soil independently, as nitrogen buildup in soil will to some extent be naturally addressed as the instruments and partnership platforms discussed work to reduce acidic deposition on the soil from air pollution and reduce the agricultural use of fertilizer, *inter alia*.
  5. UNEP & WHRC, *supra* note 3, at 11.

elements, into what is termed reactive nitrogen.<sup>6</sup> In balanced amounts, reactive nitrogen is necessary for plant and animal life. However, when reactive nitrogen enters the ecosystem in excess, it is hazardous to human health and the environment. Further, when in the form of nitrous oxide (N<sub>2</sub>O), it is one of the most potent and persistent pollutants, with a life-span of over 100 years, and is nearly 300 times more potent than an equal volume of carbon dioxide.<sup>7</sup>

The problem in our modern, industrialized world is that N<sub>2</sub> can also be broken apart through man-made technological processes and then rapidly introduced into the environment at unmanageable and dangerous levels.<sup>8</sup> An excerpt from an INI publication describes the complexities of nitrogen and the myriad effects this single pollutant has on the global community:

As nitrogen moves along its biogeochemical pathway, the same atom can contribute to many different negative impacts in sequence: as [nitrogen oxide (NO<sub>x</sub>)] it can increase ozone concentration in the atmosphere, decrease atmospheric visibility, and increase acidity of precipitation; following deposition it can increase soil acidity, decrease biodiversity, lead to coastal eutrophication, and then emitted back to the atmosphere as nitrous oxide it can increase greenhouse warming, and decrease stratospheric ozone.<sup>9</sup>

Such a complex and transient pollutant is clearly a pervasive problem that demands immediate attention. Thus, Part I presents an introduction to the theoretical concerns that potential negotiating participants must consider when determining what type of instrument to use and how to best implement the provisions of the instrument to attain the desired goals. Part II addresses how to control land-based nitrogen pollution in the marine environment that leads to eutrophication. Part II.A evaluates the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) in order to understand the points discussed in Part I. Then, Part II.B evaluates two partnership platforms which work in support of the Barcelona Convention, *inter alia*—the UNEP Global Programme of Action (GPA) for the Protection of the Marine Environment From Land-Based Activities,<sup>10</sup> and the Regional Seas Programme (RSP).<sup>11</sup> The section concludes with the recommendation that regional hard law instruments like the Barcelona Convention, in concert with partnership coordination platforms like the UNEP GPA and the RSP, are effective tools for addressing nitrogen pollution as it contributes to eutrophication.

6. *Id.*

7. *Id.* at 12.

8. Peter M. Vitousek et al., *Human Alteration of the Global Nitrogen Cycle—Causes and Consequences*, ISSUES ECOLOGY, Spring 1997, at 4-6, available at <http://www.epa.gov/watertrain/pdf/issue1.pdf> (last visited Feb. 4, 2008).

9. INI, THE ISSUES OF NITROGEN: BACKGROUND, PROBLEM, CHALLENGES, OPPORTUNITIES, PROCESSES, FOUR CENTRAL QUESTIONS OF NITROGEN DISTRIBUTION 4 (2006), available at [http://www.initrogen.org/fileadmin/user\\_upload/2006\\_docs/INI\\_Brochure\\_12Aug06.pdf](http://www.initrogen.org/fileadmin/user_upload/2006_docs/INI_Brochure_12Aug06.pdf).

10. GPA, UNEP, *Home*, <http://www.gpa.unep.org/> (last visited Feb. 22, 2008).

11. See GPA, UNEP, *GPA Programmes*, <http://www.gpa.unep.org/content.html?ln=6&id=286> (last visited Feb. 22, 2008) (click on “Regional Seas” section); see also RSP, UNEP, *Home*, <http://www.unep.org/regionalseas/> (last visited Feb. 22, 2008).

Part III evaluates the 1979 Convention on Long-Range Transboundary Air Pollution (LRTAP) and concludes that the LRTAP should be used as the model for developing additional regional air pollution regimes around the globe to address nitrogen pollution. The section also recommends that regional partnership coordination platforms modeled after the RSP should be developed to coordinate the regional LRTAPs in an effort to realize global results. Part III also briefly addresses nitrogen as a component of global warming and climate change. Given the interrelated nature of eutrophication, acid rain, and climate change—as the single atom of nitrogen cycles through its biogeochemical pathway—the Article asserts that an additional benefit of negotiating regional multilateral environmental agreements (MEAs) modeled after the LRTAP is that the comprehensive regional programs could be used to implement applicable provisions of the United Nations Framework Convention for Climate Change (UNFCCC) and the Kyoto Protocol.

## I. Background Theory

Before delving into specific discussion of how to address excessive nitrogen in the air and water, it is helpful to briefly discuss the types of instruments available and the associated implementation mechanisms. Accordingly, this discussion is broken into three parts: (1) types of instruments; (2) contextual factors in choosing mechanisms; and (3) cooperative partnership platforms. To be sure, these are not the only issues that participants consider when trying to determine the most effective approach to address environmental problems, but they are certainly three of the biggest threshold issues.

### A. Instruments

#### 1. Soft or Hard Law

One of the most important threshold issues for potential participants interested in negotiating an instrument to address nitrogen pollution is whether to negotiate a hard law or soft law instrument.<sup>12</sup> Hard law instruments include conventions and protocols that bind Member States to one another.<sup>13</sup> Alternatively, soft law includes instruments in the form of plans or programs of action, recommendations, resolutions, declarations, principles, goals, guidelines, and codes of conduct that are not legally binding.<sup>14</sup> The decision of which type of agreement to use is multi-faceted and turns on a number of political, cultural, financial, and environmental concerns.

12. It is important to note in this Article that reference to hard law or soft law refers to the type of instrument, and not necessarily the substance of each provision therein. Due to the complex and delicate nature of the many issues addressed in a treaty, itself a hard law instrument that is overall legally binding on all participating States, there are sometimes individual provisions that use soft or passive verbs like “encourage” or “strive” instead of more committal verbs like “shall” or “will.” Conversely, some soft instruments will include “hard” or non-passive verbs in provisions to which Member States are more universally committed.

13. UNEP, *Program of Work*, [http://www.unep.org/law/Programme\\_work/Devt\\_international\\_law/index.asp](http://www.unep.org/law/Programme_work/Devt_international_law/index.asp) (last visited Feb. 22, 2008) (click on the “Development of International Environmental Law” section).

14. *Id.*; DAVID HUNTER ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 356 (3d ed. 2007).

One political scientist, Marc Levy, identified five ways soft law can help governments improve relationships with each other and develop an effective set of solutions.<sup>15</sup> First, soft law can provide a home for follow-up hard law, such as framework conventions providing the basis for protocols.<sup>16</sup> Second, soft law can help converge expectations by positively altering present behavior in response to expectations of future regulation.<sup>17</sup> Third, soft law can provide a focal point for tacit agreements where otherwise would-be hold-out negotiators might not be willing to commit to binding standards.<sup>18</sup> Fourth, it can serve as a vehicle for disseminating information.<sup>19</sup> Fifth, it can help validate information consensually because participants are more willing to accept information and believe in processes in which they themselves played a part.<sup>20</sup> It is important to note that although soft law instruments are not legally binding and thus the provisions are not compulsory or legally enforceable, soft law can have the effect of creating international norms and responsibilities that many Members of the global community begin to expect from well-governed and cooperative States.<sup>21</sup>

Levy further argues that soft law can serve as a better starting point for negotiating Parties than hard law because there is a greater likelihood that negotiators with more technical expertise and less bureaucratic influence will participate in creating the agreement, and that the consensus-building process is much faster than in hard law negotiations.<sup>22</sup> Another commentator, Daniel Bodansky, offers an additional consideration. He argues that negotiating a soft law instrument rather than a hard law instrument can be a better use of the limited time, money, and credibility available to national governments.<sup>23</sup> For example, when a State is committing significant resources to the often time-consuming process of negotiation, the State is keenly aware that those finite resources are diverted from other pressing concerns. If the investment to negotiate takes too much away from other State concerns, the State may simply opt not to participate at all.

Bodansky does, however, provide an alternative perspective that supports hard law. First, although potentially more time-consuming than non-State actor negotiation, the government negotiators in binding agreements often provide a more realistic picture of what exactly the home governments are willing to commit.<sup>24</sup> In the end, the time saved in negotiation of a soft law instrument may be countered by the lack of will power from the State when it comes time to act in accordance with the agreement in which its bureaucratic decisionmakers were not as invested. Second, hard law instruments, with their legally binding terms, tend to provide a sense of assurance for States. Enforcement mechanisms in-

cluded in hard law help to encourage, if not ensure, compliance by each of the stakeholders. Thus, governments often feel that they can develop strict domestic policy without compromising their competitive economic edge because other-bound States will reciprocate with similar domestic policy.<sup>25</sup> Even if the reciprocated policy and legislation is not immediately forthcoming, and strict sanctions are not part of the instrument, States recognize that their credibility and political capital are tied to an instrument that the world views as binding and thus often feel compelled to comply.

Finally, Bodansky offers two other interesting considerations which he calls “attitudinal costs” and “systemic costs.”<sup>26</sup> Attitudinal costs result when States are more concerned with claiming credit for having successfully negotiated a hard law instrument that in fact does very little to solve the problem. Perhaps even worse, however, are systemic costs, which result when the ineffective binding instrument devalues the credibility of binding agreements in other fields. When the international community sees that States fail to comply with the provisions of binding instruments in one field, that observation can inspire questions about the utility of similar instruments in other fields. The bottom line is that potential participants want their time, money, and reputation invested in an instrument that will be effective in attaining the goals of the instrument, as well as serving as a positive contribution to the overall integrity of international law.

In sum, there are many factors for negotiators to consider as they decide whether to negotiate a hard or soft law instrument. Soft law might be the better route for States that are not prepared to submit themselves to a legally binding document, are simply looking for a starting point to share information and set the conditions for future hard law instruments, or are not prepared to invest the time and resources to go through the negotiation and implementation process. However, States that are more prepared to develop the infrastructure and to implement the policy, legislation, and regulations often required to meet the commitments in treaties and conventions may be ready to immediately negotiate hard law instruments. Further, those States concerned with reciprocity from Member States are more likely to enter into legally binding agreements.

## 2. International or Regional Level

An issue potential participants must consider at the same time is whether the agreement should be forged at the international or regional level. Robert J. McManus argues that “[a]bsent a truly compelling danger, nations are unlikely to subordinate important economic activities under their jurisdiction to supranational controls.”<sup>27</sup> Specifically in terms of marine and atmospheric pollution, McManus indicates that soft law agreements at the international level seem to be most palatable for potential Parties. Other commentators go further and encourage international regulatory schemes—hard law—that carry threat of sanctions. Particularly in air pollution, “[b]ilateral or regional agreements

15. Symposium, *Environmental Law: When Does It Make Sense to Negotiate International Agreements?*, 87 AM. SOC'Y INT'L L. PROC. 377, 389-90 (1993).

16. *Id.* at 390.

17. *Id.*

18. *Id.*

19. *Id.*

20. *Id.*

21. HUNTER ET AL., *supra* note 14, at 357-59.

22. Symposium, *supra* note 15, at 390.

23. *Id.* at 392.

24. *Id.* at 393.

25. *Id.* at 392.

26. *Id.*

27. Robert J. McManus, *Environmental Law: When Does It Make Sense to Negotiate International Agreements?: Limitations on Treaties to Protect the Environment*, 87 AM. SOC'Y INT'L L. PROC. 377, 383 (1993).

may be sufficient to control the transnational effects of local pollutants, but these agreements cannot protect the global commons.<sup>28</sup> The idea is that if pollution emitters from around the globe are not forced to internalize the cost by threat of sanction or some other enforcement mechanism, then rational actors will simply continue to take advantage of the unregulated commons.

McManus notes, however, that in marine regulation there is a developing trend toward regional treaties focused on land-based sources (LBS) of marine pollution.<sup>29</sup> The rationale for the regional agreements seems to be that although the health of the oceans is of global concern, many pollutants have certain adverse effects in a localized manner.<sup>30</sup> This indicates that Parties are more likely to commit themselves to regional agreements because the principles, standards, or rules established are more appropriately focused on the specific pollution problems in their regions.

The point is that international instruments may be more effective where the pollution is produced around the world, the environmental harm is felt globally, and the mechanisms and standards used to arrest the pollution can be somewhat universal. Alternatively, a regional instrument may be more effective where the sources of pollution are similar, the effects tend to be localized, and the implementation mechanisms and set standards need to be tailored to a more special set of circumstances.

### B. Contextual Considerations for Choosing Mechanisms

In determining which tool or mechanism to use for addressing pollution, each State must account for the cultural, historical, and political environment of each of the other States in order to make the chosen mechanisms effective. While efficiency, cost effectiveness, and national sovereignty are chief concerns in choosing the right tool or set of tools, all negotiators in the development process must account for the local context in which the tools will be applied. One author, Ruth Greenspan Bell, notes that negotiators must consider “distinct differences in how people think about or even experience laws and markets, what infrastructure and institutions are available to carry out particular approaches to environmental protection, and what motivates daily actions of the numerous stakeholders in each country.”<sup>31</sup>

This dialogue is particularly important today for two reasons. First, instruments today are often negotiated not only by developed States, but also developing States. One participant might be a developed State that has a strong economic base, a diverse mixing-pot of cultural values, and an integrated web of standing environmental regulations. This State may be prepared to use mechanisms that require significant monetary investments, that require a complex regulatory infrastructure, or that require intensive technical resources. Simultaneously, other participating States that are key to solving or controlling the pollution problem may have a developing economy, weak domestic environmental

policy, and unique closely held cultural, historical, or religious norms. This State may be more concerned with avoiding mechanisms that will put its industries at a disadvantage as they grow and attempt to engage in international trade. Each participant must be willing to take the time to explore and strive to understand the existing legal systems and the relationships between governmental and nongovernmental organizations (NGOs) in the other participating States.<sup>32</sup> Instruments that require immediate development of domestic policy and the implementation of strict enforcement mechanisms and compliance monitoring programs may work well in the United States where the rule of law is carried out by long-established and independent governmental bodies.<sup>33</sup> In a State like China, however, where personal relationships, power, and authority have served as the governing framework for centuries, significant bodies of written law and implementation of complex programs may not be as well received or as effective.<sup>34</sup>

Second, there exists an emerging trend, particularly in developed States, of incorporating more complex and cost-intensive market-based/market-incentive instruments (MBIs) into the conventional pollution control approaches.<sup>35</sup> MBIs such as emissions cap-and-trade programs are prime examples of mechanisms in instruments that emerged in the past one or two decades and yielded significant reductions in a variety of harmful pollutants in developed countries. However, those cap-and-trade programs are not universal mechanisms that will necessarily prove effective for all pollutants, in all media, in all States.<sup>36</sup> The absence of technical expertise, a market-based economy, and developed domestic regulatory regimes can severely limit the ability of States that otherwise truly desire to attack pollution problems at home and across the globe.

The important idea is that negotiating States—and when appropriate, NGOs and other public and private entities—must be flexible and prepared to think beyond their own borders and capabilities. Each participant must be willing to think creatively when developing mechanisms so that the final instrument accounts for the social, cultural, financial, and legal institutions that limit or motivate other participants.

### C. Partnership Platforms

Since the 2002 World Summit on Sustainable Development (WSSD), partnerships and partnership implementation platforms have moved forward.<sup>37</sup> The basic idea is that after developing a hard or soft law instrument at the in-

32. *Id.* at 642.

33. *Id.*

34. *Id.* at 644-45.

35. *Id.* at 638.

36. See Robert B. McKinstry Jr., *Laboratories for Local Solutions for Global Problems: State, Local, and Private Leadership in Developing Strategies to Mitigate the Causes and Effects of Climate Change*, 12 PENN ST. ENVTL. L. REV. 15 (2004); Byron Swift, *U.S. Emissions Trading: Myths, Realities, and Opportunities*, NAT. RESOURCES & ENV'T, Summer 2005, at 3; Jacob Kreutzer, *Cap and Trade: A Behavioral Analysis of the Sulfur Dioxide Emissions Market*, 62 N.Y.U. ANN. SURV. AM. L. 125 (2006); David M. Driesen, *Trading and Its Limits*, 14 PENN ST. ENVTL. L. REV. 169 (2006).

37. Christopher C. Joyner, *Rethinking International Environmental Regimes: What Role for Partnership Coalitions?*, 1 J. INT'L L. & INT'L REL. 89, 104 (2005)

28. Shireen Irani Bacon, *Up in Smoke: The Need for International Regulation of Hazardous Waste Incineration*, 29 TEX. INT'L L.J. 257, 270 (1994).

29. McManus, *supra* note 27, at 385.

30. *Id.* at 386.

31. Ruth Greenspan Bell, *Culture and History Count: Choosing Environmental Tools to Fit Available Institutions and Experience*, 28 IND. L. REV. 637, 669-70 (2005).

ternational or regional level, partnerships are useful tools for serving as the bridge between the agreements and actual implementation of the provisions as national domestic regulations and policy.<sup>38</sup> The partnerships are “voluntary, non-negotiated, multi-stakeholder, multilateral, collaborative enterprises,”<sup>39</sup> which serve to both break down the larger global goals into specific local projects and to facilitate the coordination of the disparate activities of multiple international and domestic entities to focus on the specific environmental issues.<sup>40</sup> Construction of the partnerships is generally a four-step process which includes initiating dialogue amongst interested Parties, devising a strategy for making the partnerships operational, mobilizing resources, and finally, monitoring the progress and appraising the partnerships results.<sup>41</sup> Ultimately, the goal of partnerships is to integrate nongovernmental and private-sector entities into the implementation of the instrument goals at the national and local level in order to more effectively yield success.

It is important to note that partnerships as discussed in this Article are not an alternative to multilateral hard and soft law instruments, but are rather complementary—they are enablers for implementing the already existing instruments or facilitators to assist with the development of soft or hard law instruments.<sup>42</sup> Many of these partnerships and platforms that coordinate partnerships are formed under the auspices of UNEP, or are even administered by UNEP, and thus must abide by certain guidelines.<sup>43</sup> In Part II, this Article will assess two such U.N.-based partnership platforms—the UNEP/GPA for the Protection of the Marine Environment From Land-Based Activities and the RSP.<sup>44</sup> There is yet another variation of use of partnerships. This type nearly or completely exists apart from the United Nations.<sup>45</sup> These partnerships often have their own set of criteria for admission of participants and are not grounded in the context of the WSSD. Thus, they do not necessarily adhere to the specifications and guidelines outlined in the WSSD Partnership

Mandate nor do they necessarily complement an instrument.<sup>46</sup> Sometimes, these partnerships are in fact the only coordinating entity and in no way formally bind States through an internationally recognized instrument.

In sum, the interested participants need to determine whether they desire to negotiate a hard or soft law instrument at either the regional or international level. They also will need to strive to understand the contextual limitations and motivations of other participating States so that the corporate body can develop the appropriate mechanisms to bring the goals of the instrument to fruition. Finally, the participants should consider whether a partnership would assist the implementation of the instrument’s provisions and mechanisms. Although the instrument itself may contemplate or in fact create information- and expertise-sharing mechanisms, financial assistance programs, strict and attainable standards, *inter alia*, a partnership may serve as a useful platform for coordination with other interested States and regional or international coalitions. The partnerships can also assist with the coordination of the expertise and resources of NGOs and private-sector entities. Finally, there are instances where States may desire to initiate the development of a partnership or join an existing partnership, which can provide a starting point for the development of future instruments.

The reader is now armed with a brief introduction to the theoretical and background considerations potential negotiators must consider as they begin the process of negotiating instruments that address environmental pollution. The following sections will put the theory into context. Part II will evaluate existing instrument and partnership platforms that address marine pollution, and Part III will evaluate instrument and partnership platforms that are in place to deal with air pollution.

## II. Eutrophication

Nitrogen pollution creates a whole host of water pollution concerns that impact human health and the environment. The most predominant water issues are toxic concentrations of nitrates in ground and drinking water,<sup>47</sup> acidification of and eutrophication in lakes,<sup>48</sup> and eutrophication in estuaries and coastal waters.<sup>49</sup> Each of these dangerous conditions results primarily from combinations of land-based agricultural and point source residential and industrial runoff, nitric acid deposition from fossil fuel combustion and biomass burning,<sup>50</sup> and discharge and dumping from ocean vessels.<sup>51</sup> This section, however, will focus only on eutrophication.

Nitrogen pollution of the rivers, estuaries, coastal zones, and the oceans in general leads to eutrophication—the buildup of excessive nitrogen which results in the formation of algal blooms and then oxygen depletion. This eutrophic state negatively affects the biodiversity of the marine eco-

38. *Id.*

39. *Id.*

40. *Id.* at 105.

41. *Id.* at 108-09.

42. See Division for Sustainable Development, United Nations Department of Economic & Social Affairs (UNDESA), *Partnerships*, <http://www.un.org/esa/sustdev/partnerships/partnerships.htm> (last visited Feb. 22, 2008) and RSP, UNEP, *Home*, <http://www.unep.org/regionalseas/About/Strategy/default.asp> (last visited Feb. 22, 2008) (click on “About Regional Seas” section and then “Strategy” section).

43. UNDESA, *Partnerships*, [http://www.un.org/esa/sustdev/partnerships/partnerships\\_mandate.htm](http://www.un.org/esa/sustdev/partnerships/partnerships_mandate.htm) (last visited Feb. 22, 2008) (click on “Partnerships Links” section and then “About Partnerships,” and then “Mandate”).

44. The UNEP/GPA and the RSP are complementary partnerships. The two programs include action plans, which in various regions are established in lieu of, in anticipation of development of, or to implement multilateral environmental agreements. In this sense, the action plans sometimes serve as an even less formal type of soft law framework. However, because the two forums exhibit characteristics of a partnership with several actors providing coordination of information, technology, and monetary resources, facilitation of policy development between stakeholders, and negotiation forums to deal with emerging problems, both platforms are used here to exemplify successful complementary partnerships.

45. *Id.* See Alex Hetherington, *Asia-Pacific Climate Talks: Just Smoke and Mirrors?*, BUSINESSDAY, Jan. 19, 2006, <http://www.businessday.co.za/articles/topstories.aspx?ID=BD4A140683> (last visited Feb. 22, 2008).

46. See *supra* note 43.

47. UNEP & WHRC, *supra* note 3, at 18-19.

48. *Id.* at 21-22.

49. *Id.*

50. *Id.* at 23-24, 33-34.

51. *Id.* at 23; Vitousek et al., *supra* note 8, at 5, 10-12; Joyner, *supra* note 37, at 94; Robin Kundis Craig, *Protecting International Marine Biodiversity: International Treaties and National Systems of Marine Protected Areas*, 20 J. LAND USE & ENVTL. L. 333, 344-49 (2005).

system.<sup>52</sup> In the context of marine ecosystems, coastal wetlands have the capacity for denitrification—a bacterial process to convert reactive nitrogen back to unreactive N<sub>2</sub> gas.<sup>53</sup> However, the significant volume of reactive nitrogen introduced into the environment from our rapidly expanding human population, our modern industrial capacity, and our agricultural and fertilizing methods creates such high levels of reactive nitrogen that wetlands cannot manage to return the nitrogen to its inert status. In fact, recent studies indicate that most eutrophication—perhaps as high as 70-80%—is the result of human-related LBS.<sup>54</sup>

While several legal instruments<sup>55</sup> and partnerships exist to address the various forms and sources of marine pollution, this section will focus on one specific marine convention and two closely associated U.N. partnership coordination platforms that support the convention. Part II.A evaluates the Barcelona Convention.<sup>56</sup> Part II.B then evaluates two partnership platforms which work in part to support implementation of the Barcelona Convention: (1) the UNEP GPA for the Protection of the Marine Environment From Land-Based Activities; and (2) the RSP.<sup>57</sup> The Barcelona Convention and the two supporting partnership platforms were chosen because they already specifically deal with land-based source pollution and can be readily used with few modifications, if any, to directly address nitrogen pollution in coastal waters. This section concludes with the recommendation that despite the challenges in attaining the stated goals as quickly and fully as the Member States intended, hard law instruments like the Barcelona Convention regime are the best option for directly and most effectively attacking eutrophication.

### A. Barcelona Convention Regime

As discussed in Part I, one of the first decisions negotiating States face is whether to negotiate a hard law or soft law instrument. The Barcelona Convention will serve as a case study for an assessment of the strengths and weaknesses of a hard law instrument at the regional level. The convention is a particularly useful model for three reasons. First, it has an LBS Protocol<sup>58</sup> which is pertinent to this evaluation because

of the estimated 70-80% of nitrogen pollution in the marine environment that comes from LBS. Second, the convention was among the very first MEAs negotiated to address marine pollution at the regional level. Further, subsequent to its adoption and entering into force, the convention was revised in an effort to respond to environmental changes and to better attain the goals of the Member States. Third, the convention and LBS Protocol are hard law legal instruments that serve as the central framework for a regional plan of action within the UNEP GPA and the RSP. Thus, both instruments serve to help illustrate the relationship between legal instruments and partnership platforms.

The Barcelona Convention is the oldest convention of the 12 conventions now in existence that are associated with the 18 regional plans of action of the RSP.<sup>59</sup> Negotiated in 1975 and effective as of 1978, the Barcelona Convention proved to be one of the most successful instruments in the world for reducing marine pollution at the regional level. The convention, in combination with its Mediterranean Action Plan (MAP), was used by UNEP as the model for other conventions and plans of action in the RSP.

One of the five protocols to the Barcelona Convention, the LBS Protocol, “sets limits on industrial, municipal, and agricultural emissions into the Mediterranean”<sup>60</sup> and “provides for the formulation and adoption of guidelines and, when appropriate, common standards.”<sup>61</sup> The LBS Protocol is particularly important for addressing eutrophication because as a hard law instrument, it legally binds the 22 Member States in the Mediterranean region to commitments that address the sources that contribute 70-80% of marine pollution in coastal regions.

Despite serving as a model for other regional marine conventions, both the Barcelona Convention and the LBS Protocol have been criticized. One criticism is that in order to address tensions that arose between developed and developing States during the negotiation of the instrument, many of the standards were incrementally weakened and the “polluter-pays” provision was all but disposed of.<sup>62</sup> Another criticism is that the wording of the supervision provision of the convention, Article 20, did not mandate Member States to adopt domestic laws and regulations to reduce marine pollution.<sup>63</sup> Setting particularly strict standards proved difficult because the developed States did not want their booming industries restricted, and the developing States did not want their emerging industries inhibited before they even arrived

52. William J. Shapiro, *Protocol to Abate Acidification, Eutrophication, and Ground-Level Ozone*, 1999 COLO. J. INT'L ENVTL. L. & POL'Y 208, 214.

53. UNEP & WHRC, *supra* 3, at 15.

54. Kundis Craig, *supra* note 51, at 345; UNEP 2006 ANNUAL REPORT 56 (2007), available at [http://www.unep.org/pdf/annualreport/UNEP\\_AR\\_2006\\_English.pdf](http://www.unep.org/pdf/annualreport/UNEP_AR_2006_English.pdf).

55. See United Nations Convention on Biological Diversity (CBD), June 5, 1992, 31 I.L.M. 818 (1992); United Nations Convention on Migratory Species (CMS), June 23, 1979, 19 I.L.M. 15 (1980); United Nations Convention on the Law of the Sea (UNCLOS), Dec. 10, 1982, 21 I.L.M. 1261 (1982).

56. Feb. 16, 1976, 15 I.L.M. 290 (1976), available at [http://www.unepmap.org/Archivio/All\\_Languages/WebDocs/BC&Protocols/BC95\\_eng.pdf](http://www.unepmap.org/Archivio/All_Languages/WebDocs/BC&Protocols/BC95_eng.pdf) (last visited Feb. 4, 2008) [hereinafter Barcelona Convention]. The Barcelona Convention entered into force Feb. 12, 1978. It was, however, revised in Barcelona, Spain, June 9-10, 1995, and renamed the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean. The revised version is not yet in force.

57. See *supra* note 11.

58. Mediterranean Land-Based Sources Protocol, June 17, 1983, 22 I.L.M. 1227 (1983), available at [http://www.unepmap.org/Archivio/All\\_Languages/WebDocs/BC&Protocols/BCP\\_2005/LBS96\\_Eng.pdf](http://www.unepmap.org/Archivio/All_Languages/WebDocs/BC&Protocols/BCP_2005/LBS96_Eng.pdf) (last visited Feb. 4, 2008) [hereinafter Mediterranean Land-

Based Sources Protocol]. The LBS Protocol was adopted May 7, 1980, and entered into force on June 17, 1983. This was the original protocol which was subsequently amended on Mar. 7, 1996, following the amending of the underlying Barcelona Convention in 1995. The amended form, the Protocol for the Protection of the Mediterranean Sea Against Pollution From Land-Based Sources and Activities, has yet to go into effect.

59. RSP, UNEP, *Home*, <http://www.unep.org/regionalseas/Programmes/Conventions/default.asp> (last visited Feb. 22, 2008) (click on “RS Programmes” section and then “Conventions”); RSP, UNEP, *Home*, [http://www.unep.org/regionalseas/About/Background/Key\\_Dates/default.asp](http://www.unep.org/regionalseas/About/Background/Key_Dates/default.asp) (last visited Feb. 22, 2008) (click on “About” section and then “Background,” and then “Key Dates”).

60. Mediterranean Land-Based Sources Protocol, *supra* note 58, art. 4.

61. *Id.* art. 7.

62. Suh-Yong Chung, *Is the Convention-Protocol Approach Appropriate for Addressing Regional Marine Pollution?: The Barcelona Convention System Revisited*, 13 PENN ST. ENVTL. L. REV. 85, 101-02 (2004).

63. *Id.* at 97.

in the international marketplace.<sup>64</sup> Yet another criticism of the Barcelona Convention is that although it was effective in reducing pollution loading into the Mediterranean, it failed to set the conditions for the Mediterranean Sea to recover.

While there is some validity to the criticisms offered above, the reader must have an appreciation for the context in which the Barcelona Convention and its LBS Protocol were created and now operate. The Mediterranean region is one of the most diverse marine regions in the world. Approximately 145 million people, or roughly 35% of the Mediterranean population, live along the 46,000-kilometer coastline surrounding the semi-enclosed sea.<sup>65</sup> In any given year, an estimated 170 million tourists add their waste to the coastal region.<sup>66</sup> With such a robust population contributing human waste into sewers of coastal cities where less than 55% of the cities treat municipal waste or operate treatment plants, the Mediterranean faces its leading source of nitrogen pollution. Additionally, while the generally more developed Member States in the North Mediterranean are finally arresting their contribution of industrial pollution into the marine environment, the developing eastern European and South Mediterranean States are just beginning to load nitrates and phosphates into the sea from industrial activity such as cement production.<sup>67</sup> This is all in addition to acid rain that precipitates into the sea, accidental spillage and intentional discharges from the intensive shipping industry in the region, and the agricultural runoff that taints the over 80 rivers that feed into the Mediterranean Sea.

To further complicate the issue, the sea is land-locked except for two small outlets—one at the Bosphorus Strait in Turkey and the other at the Strait of Gibraltar between Spain and northern Africa. This semi-enclosed condition results in the waters of the Mediterranean only being exchanged once every 70-100 years.<sup>68</sup> In the interim years, instead of natural flushing assisting with cleaning the sea, much of the pollution remains in place. In addition to the challenges presented by the semi-enclosed geography of the sea combined with the high volume of pollution emitted by the 22 Member States that range along the entire spectrum of stages of industrial and economic development, the Barcelona Convention was negotiated without a comprehensive inventory of pollutants and their sources. Further, the reader must recall that the precautionary principle did not even exist in the 1970s and the early 1980s when the Barcelona Convention and LBS Protocol were negotiated. Had the precautionary approach or principle been used in those years, it might have helped provide the rationale for setting strict standards in the absence of clear and supported data.

Ultimately, judging the success of any convention framework in the field of international environmental law is complex and always subject to debate. Three criteria, however, help to provide structure and objectivity for the assessment. First, the convention should create a long-term platform that facilitates joint action between Member States. Second, it should lead to concrete results in the subject area. Third, it

should have the capability of developing new and more efficient ways of reaching environmental targets.<sup>69</sup>

The Barcelona Convention regime served as a platform to facilitate action. It was the foundation around which was built the MAP. It was the rallying framework for the original 16 Mediterranean States and the European Community that partnered in the MAP, and it remains the centerpiece today for the now 22 contracting Parties.<sup>70</sup> Consolidated concrete results in the form of reports that provide specific numbers for reduction of various pollutants, in raw data or by percentage points, are difficult to attain, because the Mediterranean region did not start with a body of data indicating the baseline in the mid-1970s and because the Barcelona Convention did not include strict reporting requirements for all Member States on an annual basis. Other, newer conventions that include fewer States, more developed States, or which included monitoring and reporting requirements from their beginning, have better results for reference.<sup>71</sup> Perhaps better examples of concrete results for the Barcelona Convention include Albania, Croatia, France, Italy, Slovenia, Spain, and other States developing environmental codes and acts.<sup>72</sup> Also, Egypt, Italy, and Tunisia established national environmental agencies. These actions demonstrate that States that were not in a position in 1978 to immediately tackle the complex environmental problems of the Mediterranean are now capable of making strides toward developing the infrastructure required to develop, implement, and enforce national rules and regulations.<sup>73</sup>

Finally, the Barcelona Convention and the LBS Protocol were pivotal in the development in 1997 of a Strategic Ac-

69. Knut Arild Hareide, *Reducing Air Pollution in Europe—The Success of the LRTAP Convention*, at 1, <http://www.unece.org/env/documents/2004/eb/Ministerial%20Statements/Norway.pdf> (last visited Feb. 4, 2008).

70. See *supra* note 65. The Parties revised the MAP in 1995; it was renamed Action Plan for the Protection of the Marine Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II).

71. See KARI NYGAARD ET AL., MARINEBASE DATABASE ON AGGREGATED DATA FOR THE COASTLINE OF THE MEDITERRANEAN, ATLANTIC, NORTH SEA, SKAGERRAK, KATTEGAT, AND BALTIC, TECHNICAL REPORT 58 (2001), available at [http://reports.eea.europa.eu/Technical\\_report\\_No\\_58/en/tech58.pdf](http://reports.eea.europa.eu/Technical_report_No_58/en/tech58.pdf). The European Environment Agency (EEA) published this report with data supplied by the International Council for the Exploration of the Seas (ICES) and the Mediterranean Pollution Monitoring and Research Programme (MEDPOL), which was made available by monitoring and reporting provisions of the Commission of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and the Helsinki Commission of the Convention for the Protection of the Marine Environment of the Baltic Sea (HELCOM). Even had this report, however, been supported by more complete input from Barcelona Convention Member States that are part of the European Union (EU), it still would not provide a clear picture of the overall status of the Mediterranean because eutrophication causing nutrients from the African and Asian Member States would not be reflected. The reader should, however, be able to find comprehensive compilations of data in the near future as the Short-Term Eutrophication Monitoring Strategy, UNEP(DEC)/MED WG.231/14 (2003) of MEDPOL (UNEP/MAP) for the Mediterranean Sea begins to produce results. See also MAP for Barcelona Convention, UNEP, *Technical Reports*, [http://www.unepmap.eu/index.php?module=library&mode=mts&action=results&s\\_category=MAP%20Technical%20Reports%20MTS](http://www.unepmap.eu/index.php?module=library&mode=mts&action=results&s_category=MAP%20Technical%20Reports%20MTS) (last visited Feb. 22, 2008).

72. A SUSTAINABLE FUTURE FOR THE MEDITERRANEAN: THE BLUE PLAN'S ENVIRONMENT AND DEVELOPMENT OUTLOOK 51-53 (Guillaume Benoit & Aline Comeau eds., 2005), available at [http://www.planbleu.org/red/pdf/partie1\\_uk.pdf](http://www.planbleu.org/red/pdf/partie1_uk.pdf) (last visited Feb. 4, 2008).

73. *Id.*

64. *Id.* at 99.

65. MAP for Barcelona Convention, UNEP, *Home*, <http://www.unepmap.eu/index.php> (last visited Feb. 22, 2008) (click on "Activities" section).

66. *Id.*

67. *Id.* (click on "Land-Based Sources" section).

68. *Id.*

tion Programme (SAP) to reduce and eliminate pollution of the Mediterranean Sea. Since the SAP was implemented, the Mediterranean region now has “a full inventory of all coastal sources of pollution, an agreed list of pollution hot spots, a number of pre-investment studies, and finally National Action Plans [(NAPs)] that describe the interventions that the countries intend to make to reduce pollution in the next ten years.”<sup>74</sup> More recently, Member States of the convention partnered together in the development of the Mediterranean Strategy for Sustainable Development (MSSD).<sup>75</sup> The MSSD “focuses mainly on the integration of environmental concerns into key economic development sectors, while giving due consideration to social and cultural dimensions.”<sup>76</sup> In order to ensure the Member States meet the four objectives in the seven priority fields of action, the Mediterranean Commission for Sustainable Development (MCSD) of the MAP will use 34 indicators to evaluate the strategy every two years with the intent of refining the strategy where it appears to be failing.<sup>77</sup>

Recalling Levy’s and Bodansky’s arguments for negotiating soft law instruments, it appears that a region like the Mediterranean, composed of a mix of developing and developed States where significant interstate tensions existed regarding the appropriate standards for the region, the use of soft law might have been a reasonable starting point. However, the use of a regional convention regime proved to serve as a functional base around which a regional action plan formed, multiple partnership platforms rallied to facilitate its implementation, and from which comprehensive strategies emerged to balance the competing demands of the region. While the politics, languages, cultural values, and developmental status of each State was starkly different in 1975 and remains so today, at least those in the same “neighborhood” are aware of each other’s needs and desires and invested in their shared backyard.

In sum, the Barcelona Convention and LBS Protocol, along with all of its associated plans of action, strategies, and supporting partnership platforms, collectively serve as an efficient and effective set of tools in which the Member States should fully invest to arrest the nitrogen pollution that contributes to eutrophication. Throughout its 29 years since coming into effect, the convention has served as the touchstone for the 22 Member States to hold themselves and each other accountable for establishing the institutional mechanisms required on the national level to implement the provisions of the instrument, for combining scientific, technical, and technological resources, and for sharing information across the region. Certainly the process took time, but if the Barcelona Convention could manage to achieve the results it has in such a complex and diverse environment, it is only logical that the same or similar regional hard law approach be used around the globe. Fortunately, that is exactly what happened in 17 other regions, each with its own unique set of circumstances and challenges.

74. *MAP’s Action to De-Pollute the Mediterranean Endorsed at Cairo Ministerial Environmental Conference*, MAP for Barcelona Convention, UNEP, *News and Action*, Nov. 20, 2006, <http://www.unepmap.eu/index.php?module=news&action=detail&id=9> (last visited Feb. 22, 2008).

75. MSSD, A Framework for Environmental Sustainability and Shared Prosperity, UNEP(DEC)/MED IG.16/7 (June 27, 2005), available at [http://www.mzopu.hr/doc/Mediterranean\\_str\\_28022006.pdf](http://www.mzopu.hr/doc/Mediterranean_str_28022006.pdf).

76. *Id.* at 3.

77. *Id.*

### B. The UNEP GPA and RSP—Partnership Coordination Platforms

Perhaps an even more important consideration than the underlying MEAs are the partnership platforms and non-binding frameworks, such as action plans, that facilitate implementation of the instruments. Thus, this section evaluates two such partnership coordination programs created by UNEP GPA and the RSP.

UNEP, an international organization with relationships with all of the U.N. national governments as well as many nongovernmental bodies, is the umbrella and macro-coordination organization that provides the infrastructure for both the GPA and the RSP. From October 23 to November 3, 1995, an Intergovernmental Conference composed of 108 States and the European Commission convened in Washington, D.C., to address how to regulate the estimated 80% of marine pollution that was derived from human activities on land.<sup>78</sup> After several days of discussion and negotiation, the Members of the Conference adopted the UNEP GPA on November 3, 1995.<sup>79</sup> The GPA provides a series of objectives and recommendations around which governmental, nongovernmental, and private-sector entities could partner on the national, regional, and international levels to tackle marine pollution from LBS.<sup>80</sup> Thus, the GPA is a uniquely and specifically designed platform for arresting LBS pollution—pollution that includes increasingly more nitrogen that contributes to eutrophication.

The UNEP GPA has engaged in formal self-evaluation twice since 1996—the First Intergovernmental Review Meeting of the GPA (IGR-1) held in Canada in 2001, and most recently at the Second Intergovernmental Review Meeting of the GPA (IGR-2) held in China in 2006.<sup>81</sup> IGR-1<sup>82</sup> indicated that the implementation of the GPA resulted in significant positive effects in the global process of cleaning up the oceans. Significant strides were made in working with representatives of global conventions such as the Convention on Biological Diversity (CBD) to prevent needless overlapping of efforts.<sup>83</sup> The UNEP GPA and RSP provided the much-needed communication vehicle for advanced regional conventions in longer established regional programs to assist the less-developed regimes and their individual Member States to jointly develop and integrate their

78. Intergovernmental Conference to Adopt the Global Programme of Action for the Protection of the Marine Environment From Land-Based Activities, *Global Programme of Action for the Protection of the Marine Environment From Land-Based Activities*, UNEP(OCA)/LBA/IG.2/7 (Dec. 5, 1995), available at [http://www.gpa.unep.org/documents/full\\_text\\_of\\_the\\_english.pdf](http://www.gpa.unep.org/documents/full_text_of_the_english.pdf) (last visited Feb. 4, 2008).

79. *Id.*

80. *Id.* See GPA, UNEP, *GPA Programmes*, <http://www.gpa.unep.org/content.html?id=188&ln=6> (last visited Feb. 22, 2008); RSP, UNEP, *Key Issues*, [http://www.unep.org/regionalseas/Issues/Land\\_Based\\_Activities/default.asp](http://www.unep.org/regionalseas/Issues/Land_Based_Activities/default.asp) (last visited Feb. 22, 2008) (click on “Land-Based Activities” section).

81. GPA, UNEP, *Intergovernmental Review*, <http://www.gpa.unep.org/content.html?ln=6&id=344> (last visited Feb. 22, 2008). The IGR-2 was held Oct. 16-20, 2006, in Beijing, People’s Republic of China.

82. *Report for the First Intergovernmental Review Meeting on the Implementation of the Global Programme of Action for the Protection of the Marine Environment From Land-Based Activities*, UNEP/GPA/IGR.1/9 (Dec. 22, 2001), available at [http://www.gpa.unep.org/documents/igr1\\_official\\_report\\_english.pdf](http://www.gpa.unep.org/documents/igr1_official_report_english.pdf). The meeting was held in Montreal, Canada, Nov. 26-30, 2001.

83. *Id.* at 15-16.

domestic policies.<sup>84</sup> The clearinghouse,<sup>85</sup> though very resource-intensive, was identified as a particularly useful innovation that many of the regional programs were adopting at their level to better share information between their Member States and stakeholder partners.<sup>86</sup> In terms of nitrogen, the clearinghouse could serve as a useful forum for regions to share new fertilizing methods to reduce agricultural runoff, cost-effective approaches for treating municipal and industrial waste, and monitoring tools for recording airborne emissions and point source effluent. The sharing of information and ideas is integral in the overall scheme to successfully address nitrogen pollution.

IGR-1 also identified several reasons why the GPA had not been as successful as partners had hoped. The primary reasons were the lack of international awareness and information flow about the program and its partnerships, the lack of will to implement politically and economically challenging policy, the lack of financial resources, and the lack of a unified front between some States to collectively attack marine pollution.<sup>87</sup> Specifically dealing with nitrogen, the report stated that States needed to work toward phasing out subsidies for fertilizers and work more aggressively to arrest nitrogen and phosphorous pollution.<sup>88</sup>

In 2006, IGR-2 indicated that many of the challenges that slowed the GPA transition from planning to action in its first five years were overcome by the concerted efforts of all GPA partners following IGR-1.<sup>89</sup> One of the greatest accomplishments identified was the GPA Coordination Office's development and coordination of a number of new partnerships.<sup>90</sup> The 19 partnership workshops reported that partnerships were effectively promoting, inter alia, the engaging of stakeholders in their respective regions, exchanging of information, facilitating collaboration, and increasing political support.<sup>91</sup>

There were several significant challenges that needed attention going forward, but three in particular were of note. First was the need to continue developing additional global, regional, and national legal instruments and policy frameworks. While many regions already benefit from successful conventions, plans of action, and partnerships, other regions are just beginning.<sup>92</sup> Second was the need to clarify the connection from marine pollution to human health and economic activity so that States and regions could better justify

the need for financial resources from governments and other partner organizations.<sup>93</sup> Third was the need for States within their respective regions to better account for some of the differences between the Member States in order to negotiate more effective legal instruments and plans of action. Examples of differences that merited particular attention were cultural values, geographic sizes and amount of coastal property, and the domestic administrative mechanisms available to the respective governments.<sup>94</sup> As discussed earlier in the Article, if States do not take the time to understand the limitations, capabilities, and motivations of the other States in their region before negotiating instruments, implementation of the mechanisms and attainment of the goals is sure to be difficult.

The second program this section evaluates, the RSP, is the platform or umbrella for coordinating partnerships that has been referred to as the "jewel in the crown"<sup>95</sup> of UNEP. In fact, the IGR-1 report stated that "the revitalized regional seas programmes were the pillar for improved ocean governance."<sup>96</sup> Established in 1974 in response to the 1972 Stockholm Convention, the RSP was originally developed to generally coordinate regional approaches that would address degradation of the oceans and coastal areas.<sup>97</sup> Its mission would later expand to "provide an important platform for co-ordinated regional implementation of the GPA, among other global initiatives, programs and Multilateral Environmental Agreements."<sup>98</sup> Today the RSP supports 140 countries participating in 18 different regional programs,<sup>99</sup> which function pursuant to a combination of 18 plans of action,<sup>100</sup> 12 conventions,<sup>101</sup> and 32 protocols.<sup>102</sup> In the six regions where plans of action alone serve as the framework for the Member States, the RSP continues to facilitate negotiation of binding instruments. As discussed in Part I, operating with an underlying MEA is the preferred method because legally binding frameworks generally include useful enforcement mechanisms to encourage compliance among the States. The personnel and resources to assist the Member States in preparing for negotiations and for overseeing implementation of the programs in each Regional Sea are located at Regional Coordination Units (RCUs). These RCUs are often aided by Regional Activity Centres (RACs), which assist with the implementation and operation of key provisions of the regional action plans such as responding to marine emergencies, information management, and pollution monitoring.<sup>103</sup>

84. *Id.* at 16-17.

85. GPA, UNEP, *Clearing House Mechanism*, <http://www.gpa.unep.org/content.html?id=298&ln=6> (last visited Feb. 22, 2008).

86. UNEP/GPA/IGR.1/9, *supra* note 82, at 14, 35, 39.

87. *Id.* at 9.

88. *Id.* at 45.

89. IGR-2, *Key Outcomes*, at 5, [http://www.gpa.unep.org/documents/igr2\\_key\\_outcomes\\_english.pdf](http://www.gpa.unep.org/documents/igr2_key_outcomes_english.pdf) (last visited Feb. 22, 2008); *Report of the Second Session of the Intergovernmental Review Meeting on the Implementation of the Global Programme of Action for the Protection of the Marine Environment From Land-Based Activities*, UNEP/GPA/IGR.2/7 (Oct. 23, 2006), available at [http://www.gpa.unep.org/documents/igr-2\\_final\\_meeting\\_report\\_english.pdf](http://www.gpa.unep.org/documents/igr-2_final_meeting_report_english.pdf) (last visited Feb. 4, 2008).

90. UNEP/GPA/IGR.2/7, *supra* note 89, at 7, 14-18. See GPA, UNEP, *Partners*, <http://www.gpa.unep.org/content.html?id=318&ln=6> (last visited Feb. 22, 2008). This website provides links to all of the GPA's partners.

91. *Id.* at 7. For the output documents from each workshop, see IGR-2, *Workshop Outputs*, <http://www.gpa.unep.org/content.html?id=343&ln=6> (last visited Feb. 22, 2008).

92. *Id.* at 6.

93. *Id.*

94. *Id.*

95. Bharat H. Desai, *UNEP: A Global Environmental Authority*, 36 ENVTL. POL'Y & L. 137, 137, 139 (2006), available at [http://www.environmentalgovernance.com/docs/Desai\\_UNEP\\_Article.pdf](http://www.environmentalgovernance.com/docs/Desai_UNEP_Article.pdf).

96. UNEP/GPA/IGR.1/9, *supra* note 82, at 17.

97. See RSP, *Key Dates*, [http://www.unep.org/regionalseas/About/Background/Key\\_Dates/default.asp](http://www.unep.org/regionalseas/About/Background/Key_Dates/default.asp) (last visited Feb. 22, 2008).

98. See GPA, UNEP, *GPA Programmes*, *supra* note 11.

99. RSP, UNEP, *Home*, *supra* note 11.

100. RSP, UNEP, *Regional Action Plans*, [http://www.unep.org/regionalseas/Programmes/Action\\_Plans/default.asp](http://www.unep.org/regionalseas/Programmes/Action_Plans/default.asp) (last visited Feb. 22, 2008).

101. RSP, UNEP, *Conventions*, <http://www.unep.org/regionalseas/Programmes/Conventions/default.asp> (last visited Feb. 22, 2008).

102. RSP, UNEP, *RSP Programmes*, <http://www.unep.org/regionalseas/Programmes/default.asp> (last visited Feb. 22, 2008).

103. *Id.*

The RSP has also conducted multiple self-evaluations since its creation.<sup>104</sup> The most recent evaluation was conducted in October 2006 at the 8th Global Meeting of the Regional Seas Conventions and Action Plans.<sup>105</sup> In order to identify the strengths and weaknesses of the RSP and to evaluate its effectiveness as a coordination and facilitation platform for addressing nitrogen pollution as it relates to eutrophication, this section will assess key points from the 7th Global Meeting Final Report (7th Final Report)<sup>106</sup> and the 8th Global Meeting Final Report (8th Final Report).<sup>107</sup>

The 7th Final Report indicates that the RSP and UNEP GPA were facilitating significant advances in reducing estuarine and coastal pollution.<sup>108</sup> The report specifically discusses the experiences of several of the regional programs that have amended their conventions and action plans in order to strengthen their approaches to prioritization of long-term strategies and effecting change through immediately implemented projects and practices.<sup>109</sup> The report also discusses specific methods of leveraging more and longer lasting funding, engaging in additional public-private partnerships, and implementing MBIs.<sup>110</sup> Obviously, funding is particularly important for the implementation phase, as even the most well-intentioned States cannot realize their goals without financial support. In terms of nitrogen, many of the Mediterranean States need funding for designing and building sewage treatment facilities in order to reduce nutrient loading that leads to eutrophication. Other regions such as the Wider Caribbean are particularly concerned with funding to research and implement better ways to fertilize crops in an effort to reduce nitrogen-rich agricultural runoff. And still other regions, particularly across Asia, where populations are rapidly expanding, funding is needed to address stationary and mobile source emissions that contribute a significant volume of nitrous oxide and other greenhouse gases.

While the 8th Final Report provided a concise summary of many RSP successes in addressing coastal pollution by the platform itself and by individual regions, there were five points in particular that merit brief discussion here. First, the launch of the Regional Seas Database Manager (RSDM) was a significant accomplishment for the RSP.<sup>111</sup> The RSDM is a harmonizing mechanism, where all the information pertaining to major conservation and management partners and actors in the various regions is consolidated. This provides the fairly new or developing regional programs with up-to-date information, increasing efficiency, and

overall effectiveness. Second, the RSP Strategic Directions for 2004-2007, discussed later in this section, have been integrated by several of the regional programs.<sup>112</sup> For example, the Caribbean Environment Programme (CEP) adopted the Outline of the Strategy to Enhance the Caribbean Environment Programme for 2005-2009. The five-year program uses the strategic directions as indicators to assess progress throughout the Caribbean. Moreover, regions integrating the Strategic Directions indicate that stakeholders are focused on realizing change and see the products from RSP as useful tools and not just documents with theoretical goals. Third, the report noted that the Member States of the Tehran Convention were already negotiating four protocols.<sup>113</sup> The fact that a region is in the process of developing protocols within a year of its framework convention coming into force further validates the effectiveness of the RSP in helping developing regions capitalize on the experience of other regions and their MEAs. Fourth, the Mediterranean was lauded for its development and adoption of the MSSD.<sup>114</sup> Other strategies and partnerships developed in the Mediterranean were also highlighted by the RSP Coordinating Office, which further underscores how much influence the Barcelona Convention has had on the global approach to addressing marine pollution. Finally, many regions were identified as having secured additional funding for current and future activities through partners such as the Global Environment Facility (GEF), the World Bank, and others.<sup>115</sup> Securing funding is obviously one of the most important aspects of addressing pollution; otherwise, even the greatest plans, strategies, and MEAs are hollow and accomplish little.

Overall, probably the single most important reason the RSP and the GPA should be the platforms used to focus on marine nitrogen pollution with respect to eutrophication in coastal waters is because of the partnerships both programs coordinate that specifically deal with land-based pollution. For example, the National Implementation of the LBA Protocols, in partnership with the Regional Seas Conventions and Action Plans (RSCAP), aim to work extensively with Regional Seas to facilitate sharing data and technical information, lessons learned from the development and implementation of land-based source and activities (LBSA) Protocols, and ideas for the future. The partnership, along with the UNEP GPA Coordination Office, assists the Regional Seas with developing, revising, and implementing their LBSA Protocols.<sup>116</sup> Six of the Regional Seas have LBSA Protocols, one is in the process of revising its LBSA Protocol, three are in the process of developing their protocols, and two other regions have LBSA provisions incorporated in their conventions.<sup>117</sup> These protocols are the ideal regional instruments in which states should incorporate aggressive mechanisms for dealing with agricultural nonpoint source runoff, industrial and residential point source runoff, and nitric acid deposition from fossil fuel combustion and biomass burning. As discussed earlier, 80% of reactive ni-

104. See RSP, UNEP, *Global Meetings*, [http://www.unep.org/regional\\_seas/RS\\_Global\\_Meetings/default.asp](http://www.unep.org/regional_seas/RS_Global_Meetings/default.asp) (last visited Feb. 22, 2008).

105. 8th Global Meeting of the Regional Seas Conventions and Action Plans, 13-14th October 2006, Beijing, People's Republic of China. The 9th Global Meeting is scheduled for October 29-31, 2007, in Jeddah, Kingdom of Saudi Arabia.

106. *Report for the 7th Global Meeting of the Regional Seas Conventions and Action Plans*, UNEP(DEC)/RS.7 (Oct. 2005), available at [http://www.gpa.unep.org/documents/7th\\_global\\_regional\\_seas\\_english.pdf](http://www.gpa.unep.org/documents/7th_global_regional_seas_english.pdf). The 7th Global Meeting was held October 18-20, 2005, in Helsinki, Finland.

107. *Report for the 8th Global Meeting of the Regional Seas Conventions and Action Plans*, UNEP(DEC)/RS.8 (Oct. 2006), available at [http://www.unep.org/regionalseas/Publications/8th-Global-Meeting/final\\_8thmeeting\\_report.pdf](http://www.unep.org/regionalseas/Publications/8th-Global-Meeting/final_8thmeeting_report.pdf).

108. UNEP(DEC)/RS.7, *supra* note 106, at 3.

109. *Id.* at 3-5.

110. *Id.* at 4-5.

111. UNEP(DEC)/RS.8, *supra* note 107 at 2.

112. *Id.* at 3.

113. *Id.*

114. *Id.*

115. *Id.*

116. GPA, UNEP, *Land-Based Sources and Activities*, <http://www.gpa.unep.org/content.html?ln=6&id=280&ln=6> (last visited Feb. 22, 2008).

117. *Id.*

trogen loaded into the estuaries and coastal regions comes from these LBSA.

The Regional Seas Strategic Directions for 2004-2007<sup>118</sup> direct that the RSP and its partners continue their traditional work of contributing on the regional level to sustainable development, including the incorporation of new elements in existing or developing programs. With the vision provided in this strategic directive and the proven capacity of the RSP to assist Regional Seas in developing, negotiating, and revising their framework MEAs to address emerging issues, the RSP platform is ready, willing, and able to embrace the fight against eutrophication and land-based nitrogen pollution.

What all of this means is that many of the existing MEAs and RSP action plans are already part of cooperative and sometimes binding regional frameworks, many of the challenges for those agreements and plans have already been addressed and overcome, and the partnerships and facilitating platforms are well versed in supporting the MEAs and their missions. Not only would it take significant monetary and political resources to develop new or different regional and global approaches, but moreover, it would take more time.

As eutrophication is primarily the result of LBSA, and many of the MEAs now have LBSA protocols that are assisted in implementation by the UNEP GPA and the RSP that have themselves been assessed and adjusted multiple times in order to make the platforms more efficient and effective, the GPA and RSP are the vehicles to use to support LBSA instruments and strategies. Technical adjustments may need to take place in order for nitrogen to become more of a focus in certain regions, but those regions, such as the Mediterranean, for example, are well aware of the immediate attention that must be paid to eutrophication. The sharpened focus on arresting nitrogen pollution in coastal regions can be realized by working within the flexibility of the already existing framework, amending the conventions or the protocols, creating additional and more specialized protocols, or simply developing new strategies and supporting partnerships. Ultimately the real hurdle, as is usually the case, will be implementation of the domestic policy in each individual Member State so that the regional commons can reap the collective benefit.

The critical self-evaluation used by both the GPA and RSP, combined with both programs' ability to quickly improve where they identify weaknesses and to build on their strengths, is in great part what makes the GPA and RSP such effective programs. It has successfully coordinated a whole host of broad-reaching partnerships and facilitated the development of multiple action plans and legal instruments to address marine pollution from land-based sources. The GPA and the RSP are the ideal platforms to use for coordinating and assisting individual states at the regional level to most efficiently and effectively address nitrogen pollution in the marine context.

### III. Transboundary Air Pollution and Climate Change

Nitrogen is also a major contributor to transboundary air pollution (TAP) and climate change. Developing states like China and India, which only a decade ago contributed very little to TAP and global climate change, now emit immense

amounts of air pollution along with developed States, affecting not only their immediate neighbors but also countries on the other side of the globe.<sup>119</sup> As the global community now more than ever looks for the silver bullet of instruments to effectively address TAP and climate change, this Article argues that the LRTAP<sup>120</sup> regime should be used as the model program for addressing reactive nitrogen in both contexts.<sup>121</sup> Further, a partnership platform modeled on the RSP should be formed to coordinate the regional LRTAP regimes to realize maximum global impact.

#### *A. The LRTAP, the Protocol Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes, and the Protocol to Abate Acidification, Eutrophication, and Ground-Level Ozone*

There are three particularly effective features of the LRTAP regime which contributed to the significant reductions in air pollution in Canada, the EU, and the United States that make the LRTAP an attractive model: (1) the critical loads standards and the multi-effect, multi-pollutant (MEMP) approach; (2) the collaborative working groups with technical and scientific expertise; and (3) the monitoring and evaluation programs.<sup>122</sup> These features were incorporated into the regime primarily through two of the LRTAP Protocols: (1) the 1988 Protocol Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes (Sofia Protocol)<sup>123</sup>; and (2) the 1999 Protocol to Abate Acidification, Eutrophication, and Ground-Level Ozone (Gothenburg Protocol).<sup>124</sup>

119. Richard Read, *China's Dirty Exports: Mercury and Soot*, THE OREGONIAN, Nov. 24, 2006, available at <http://www.usconservation.org/china/china%20pollution.htm>.

120. The United Nations Economic Commission for Europe (UNECE) 1979 Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, 18 I.L.M. 1442, available at <http://www.unece.org/env/lrtap/full%20text/1979.CLRTAP.e.pdf> [hereinafter LRTAP]. The LRTAP entered into force March 16, 1983. The United States signed the LRTAP on Nov. 13, 1979, and ratified the convention on Nov. 30, 1981.

121. The LRTAP is not the only regional MEA or program that could serve as a model, however, it is the most comprehensive and readily applicable model for use on a global scale. For discussion of two other interesting programs, see Jonathan Iversen, *Transboundary Air Pollution: Moving Toward International Consensus*, 2001 COLO. J. INT'L ENVTL. L. & POL'Y 161 (discussing the Clean Air for Europe Program (CAFÉ), EU directives, LRTAP, and other agreements). See also Agreement Between the Government of the United States of America and the Government of Canada on Air Quality, Mar. 13, 1991, 30 I.L.M. 676 [hereinafter U.S.-Canada Air Quality Agreement].

122. See Megan V. Brachtel, *Capitalizing on the Sources of the Long-Range Transboundary Air Pollution Regime to Address Global Transboundary Air Pollution*, at 2, [http://www.pon.org/downloads/en14\\_3Brachtel.pdf](http://www.pon.org/downloads/en14_3Brachtel.pdf) (last visited Feb. 4, 2008); see also Atsushi Ishii, *Merging the EU Acidification Strategy: Evaluating the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication, and Ground-Level Ozone*, 10 REV. OF EUR. COMMUNITY & INT'L ENVTL. L. 210, 213 (2001).

123. 1988 Protocol Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes, Oct. 31, 1988, 28 I.L.M. 212, available at <http://www.unece.org/env/lrtap/full%20text/1988.NOX.e.pdf> (last visited Feb. 4, 2008) [hereinafter Sofia Protocol]. Entered into force on Feb. 14, 1991. The United States signed on Nov. 1, 1988 and accepted on July 13, 1989.

124. 1999 Protocol to Abate Acidification, Eutrophication, and Ground-Level Ozone, Nov. 30, 1999, available at <http://www.unece.org/env/lrtap/full%20text/1999%20Multi.E.Amended.2005.pdf> (last visited Feb. 4, 2008) [hereinafter Gothenburg Protocol]. The protocol was signed Nov. 30, 1999 and entered into force May

118. RSP, UNEP, *A New Global Strategy*, [http://www.unep.org/regional\\_seas/About/Strategy/default.asp](http://www.unep.org/regional_seas/About/Strategy/default.asp) (last visited Feb. 22, 2008).

The Sofia Protocol, which came into force Feb. 14, 1991, sought to “stabilize nitrogen oxide emissions or their transboundary fluxes at the 1987 level by 1994” in Canada, the participating EU States, and the United States.<sup>125</sup> This protocol, while resulting in significant reductions of NO<sub>x</sub> emissions, was perhaps even more successful in that it provided the foundation for introduction of the “critical load, effects-based regulation, best available technology approach”<sup>126</sup> that was central to negotiation of the 1994 Protocol on Further Reduction of Sulfur Emissions (Oslo Protocol).<sup>127</sup> The critical load, effects-based approach to regulation was defined as “a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur.”<sup>128</sup> Scientists and technicians gather in working groups to identify critical loads for each of the pollutants across the Member States, which are then synthesized along with emission sources, atmospheric transportation, and the effects and costs of abatement technologies and policies in the Regional Acidification Information Simulation (RAINS) integrated assessment model.<sup>129</sup> The RAINS model calculates the “least-cost distribution of emission reductions among the European countries, and the associated costs for each country and pollutant.”<sup>130</sup> The results provide each state with optimized plans from which the states can negotiate revised or follow-up protocols. The critical loads, effects-based approach, in concert with using the RAINS model, would be used again in the negotiation of the Gothenburg Protocol.

A newer and more comprehensive instrument that came into force May 17, 2005, the Gothenburg Protocol, appears to provide the greatest potential for reducing nitrogen pollution that leads to eutrophication, TAP, and global climate change. The reason that the Gothenburg Protocol is so innovative is because of its MEMP approach.<sup>131</sup> The MEMP approach is supposed to be a cost-effective and politically effective strategy because it uses the critical load, effects-based approach, with goals set using RAINS, but integrates four different air pollutants (NO<sub>x</sub>, ammonia (NH<sub>3</sub>), volatile organic compounds (VOCs), and sulfur dioxide (SO<sub>2</sub>)) in an effort to simultaneously address three different environmental problems (acidification, eutrophication, and ozone).<sup>132</sup>

The obvious theoretical benefit of the Gothenburg Protocol is the environmental benefit of attacking multiple problems by simultaneously regulating four different air pollutants. However, Member States also hope the MEMP approach will facilitate political- and private-sector support

for implementing the protocol because of the availability of multiple reduction strategies and flexibility.<sup>133</sup> To strive to meet the emission ceilings set in the Gothenburg Protocol, the contracting Parties have the flexibility to focus on different pollutants, at different times, to varying extents, using a variety of reduction strategies to affect multiple problems. Some critics argue that the new ceilings are not low enough and the reduction goals set for attainment by 2010 are too low.<sup>134</sup> Thus, the argument continues, even if each of the States meet the standards, the environment still suffers because the standards are not strict enough. It is too early for the Gothenburg Protocol to be assessed for its overall effectiveness,<sup>135</sup> but given the significant success of the nitrogen and sulfur reductions from the Sofia and Oslo Protocols as discussed immediately below in the trends portion, there is little doubt that the MEMP framework will yield even greater reductions at a lower cost and with more efficiency.

The third particularly effective feature of the LRTAP regime is the provision for monitoring and reporting emissions. The 25 EU Member States<sup>136</sup> are requested to annually submit their emissions for SO<sub>2</sub>, nitrogen dioxide (NO<sub>2</sub>), NH<sub>3</sub>, non-methane VOCs (NMVOCs), carbon monoxide (CO), heavy metals (HMs), persistent organic pollutants (POPs), and particulate matter (PM). The report indicates that from 1990 to 2004, when there were only 15 EU Member States in the LRTAP,<sup>137</sup> all measured emissions were reduced. Specifically, NO<sub>2</sub> emissions decreased by 31%,<sup>138</sup> CO decreased by 50%,<sup>139</sup> NMVOC decreased by 45%,<sup>140</sup> SO<sub>2</sub> decreased by 70%,<sup>141</sup> and NH<sub>3</sub> decreased by 12%.<sup>142</sup> The report goes on to provide tables and statistics for each of the recorded pollutants, from key source categories—road transportation, public electricity, and heat production, inter alia.<sup>143</sup>

Finally, the report provides several recommendations that, if acted on, would provide a more comprehensive and transparent picture of air pollution trends, the primary emitters, and primary source categories. It recommends that the Member States develop a more formal quality assurance and quality control mechanism for assessment of the submitted data, that the Secretariat and Member States encourage all Member States to timely submit their emissions data, and that the States develop uncertainty estimates to account for the emissions when Member States do not provide data.<sup>144</sup>

17, 2005. The United States signed on Dec. 1, 1999, and ratified on Nov. 22, 2004.

125. Atsushi Ishii, *supra* note 122, at 212.

126. See Gothenburg Protocol, *supra* note 124, art. 1.12; see also 1994 Protocol on Further Reduction of Sulfur Emissions, June 14, 1994, 33 I.L.M. 1540, art. 1.8, available at <http://www.unece.org/env/lrtap/full%20text/1994.Sulphur.e.pdf> (last visited Sept. 18, 2007) (definition and explanation of critical load) [hereinafter Oslo Protocol].

127. Oslo Protocol, *supra* note 126.

128. *Id.* art. 1.8; Gothenburg Protocol, *supra* note 126, art. 1.12.

129. Atsushi Ishii, *supra* note 122, at 211-16.

130. *Id.* at 211.

131. Gothenburg Protocol, art. 2.

132. Atsushi Ishii, *supra* note 122, at 213.

133. *Id.*

134. *Id.* at 217.

135. See *A Proposed Outline for the Task Force on Hemispheric (HTAP) 2007 Interim Report to the Review of the Gothenburg Protocol*, [http://www.cleanairmet.org/caiasia/1412/articles-70764\\_report.pdf](http://www.cleanairmet.org/caiasia/1412/articles-70764_report.pdf) (last visited Feb. 4, 2008).

136. ELISABETH RIGLER ET AL., ANNUAL EUROPEAN COMMUNITY LRTAP CONVENTION EMISSION INVENTORY 1990-2004, at 7 (2006), available at [http://reports.eea.europa.eu/technical\\_report\\_2006\\_8/en/technical\\_report\\_2006\\_8.pdf](http://reports.eea.europa.eu/technical_report_2006_8/en/technical_report_2006_8.pdf).

137. *Id.* Many of the 10 additional EU Member States submitted data, which are captured in the tables of the report, but which was not included in the 1990-2004 overall trends.

138. *Id.* at 15.

139. *Id.* at 16.

140. *Id.* at 17.

141. *Id.* at 18.

142. *Id.* at 19. The 12% decrease only represents sufficient data submitted in 1990 and 1995-2002.

143. *Id.* at 20-40.

144. *Id.* at 54.

Using the same criteria to evaluate the success of the Barcelona Convention, clearly the LRTAP has been a successful MEA for addressing TAP. First, the LRTAP provided a legal framework from which eight protocols evolved and many European directives evolved. The Gothenburg, Oslo, and Sofia Protocols were the critical instruments that introduced or facilitated operation of the monitoring and evaluation programs, the collaborative working groups with technical and scientific expertise, and the critical loads standards and the MEMP approach.

Second, the reductions of NO<sub>2</sub>, CO, NH<sub>3</sub>, NMVOC, and SO<sub>2</sub> as noted above provide concrete evidence that the LRTAP regime produces results. While it is certainly fair to say that the majority of the Member States are developed States and that they had the legal, administrative, and economic institutions in place that facilitated rapid implementation of national legislation, the fact remains that significant reductions were realized even by the newly arrived eastern European States. The legally binding LRTAP regime provided the foundation that these States needed to develop new technological advancements, new legislation, and higher standards.

Third, the LRTAP regime had the capability of developing new and more efficient instruments, mechanisms, and strategies to attain the desired standards. In addition to setting the conditions for each of the protocols, the LRTAP integrated the RAINS model into the negotiating process, facilitated development of the MEMP approach, and encouraged data-sharing and standard-setting relationships with directors of the European directives and the EU Acidification Strategy (AS). Finally, the LRTAP regime paved the way for bilateral agreements such as the Air Quality Agreement in 1991, and provided additional encouragement for the explosive development of national legislation across all of the Member States.

The LRTAP regime, much like the Barcelona Convention and its various protocols, is an example of a successful regional, hard law regime that should be a model for other regions working to reduce nitrogen pollution.

### *B. Adoption of the LRTAP Regime in Other Regions*

Adapting the LRTAP model to regions beyond Canada, the EU, and the United States does not come without challenges. The expense of funding such an intense knowledge infrastructure is a potential concern for some regions, particularly those regions that consist mainly of developing States.<sup>145</sup> Also, regions that would be composed of or would be carved out of Africa and Asia, in particular, may not have as robust a legal and administrative infrastructure in place as some developed States such as the United States or western European States, because the States have not previously depended upon such a style of governance. Many regions will not have the luxury of operating with the infrastructure and experience that the EU has accrued through not only the LRTAP but also other programs and strategies such as the EU AS and multiple EU directives.<sup>146</sup>

Additionally, in regions like the Caribbean, Latin America, and South Asia, programs must be developed to deal with nitrogen released from the clearcutting and burning of

enormous sections of forested land. Clearcutting and large-scale burning is an emerging problem that is a double-edged sword for many developing States. These traditionally agrarian countries that are striving to break into the international market need to burn forests to expand for crop fields, grazing pastures, and industrial infrastructure, but the global community that imports the products from those fields brings increasing pressure on them to reduce or stop burning because of the nitrogen released into the atmosphere during burning and the destruction of the “sinks,” which help to naturally store nitrogen in the natural cycle. While the LRTAP does not have provisions intended to fully address biomass burning, some recently developed partnerships and research facilities<sup>147</sup> should be enlisted to provide the technical insight to develop the appropriate provisions and then, where appropriate, serve as partners in facilitating implementation.

### *C. Partnership Platform to Support and Coordinate Multiple LRTAP Regimes*

The TAP regimes need a platform like the RSP to coordinate the regional LRTAP regimes, facilitate implementation of the regimes at the national level, and develop partnerships. One commentator, Megan Brachtl, recently presented three options for addressing TAP.<sup>148</sup> Each option used the LRTAP as the springboard because of its demonstrated success for the past 26 years. She first proposed that the LRTAP could open its membership to nations beyond the EU and North America and allow the new Member States to join the existing convention and protocols. Second, Brachtl proposed an alternative that would have the United Nations Economic Commission for Europe (UNECE) create and support non-binding cooperative projects based on the LRTAP model. Brachtl’s third proposal, which she assessed as the best option and with which the author of this Article agrees, is for UNEP to sponsor a coordination platform under which LRTAP and other similarly created regional MEAs would partner to address global TAP.<sup>149</sup> This Article goes one step further and argues that the LRTAP model can and should also incorporate addressing NO<sub>x</sub> as it contributes to climate change.

The evaluation of the RSP demonstrated that regional MEAs, partnered with the RSP in an effort to provide additional communication and negotiation forums and technical resources, effectively address marine pollution on a global scale. Moreover, using GPA and RSP as implementation tools specifically for LBS further assisted in pollution reduction. Following the RSP and GPA concept, the LRTAP regime should be set as the first regional convention with other regions negotiating MEAs similar to the LRTAP, all

147. See National Aeronautics & Space Administration (NASA) Biomass Burning and Global Change website, [http://asd-www.larc.nasa.gov/biomass\\_burn/biomass\\_burn.html](http://asd-www.larc.nasa.gov/biomass_burn/biomass_burn.html) (last visited Feb. 4, 2008); see also NASA, BIOMASS BURNING FACTSHEET (2001), available at [http://www.nasa.gov/centers/langley/pdf/70869main\\_FS-2001-02-56-LaRC.pdf](http://www.nasa.gov/centers/langley/pdf/70869main_FS-2001-02-56-LaRC.pdf) (in part describing the partnership between NASA Langley Research Center and the U.S. Department of Agriculture’s U.S. Forest Service to develop and field instruments for measuring fires; also discussing research conducted and models designed to better understand the contributions of biomass burning to global climate change).

148. Brachtl, *supra* note 122, at 2.

149. *Id.* at 1.

145. *Id.* at 216.

146. *Id.* at 222-23.

coordinated under a partnership platform. The strength of this approach is threefold. First, the LRTAP itself remains intact with its participating Member States and carefully crafted protocols, while serving as an example for other independently created MEAs.<sup>150</sup> Second, the new MEAs would have the advantage of learning from the LRTAP's mistakes, capitalizing on its successes, and with near total autonomy, crafting its own protocols to address the specific problems in its own regions.<sup>151</sup> Third, the newly devised UNEP sub-entity, analogous to the RSP, would serve as the bridge between the regional MEA regimes to address reactive nitrogen on a global scale.

Certainly there are some drawbacks to coordinating otherwise self-sufficient MEAs under a new level of U.N. bureaucracy.<sup>152</sup> For example, some development processes may initially run slower because of time taken for coordination and negotiation between regions and individual States, or friction and animosity may develop between States due to regions having different emission reduction standards. Also, administrative requirements are likely to increase in order to take advantage of all of the NGOs and public and private industries and entities that are part of such complex partnership platforms. However, as the RSP illustrates, the advantages and benefits of participating in a regional program coordinated under an international umbrella that facilitates a global approach, far outweigh the disadvantages or frustrations.

An additional benefit of having UNEP umbrellas over regional marine and TAP MEAs is that a proven network would already be in place to address much of the emission pollution that leads to global climate change.<sup>153</sup> A discussion of effective instruments and mechanisms to address N<sub>2</sub>O as it contributes to global warming and climate change is deserving of its own robust Article; however, it is worth briefly addressing in this Article how an LRTAP regime and partnership platform could complement current climate change initiatives.

The UNFCCC<sup>154</sup> and the Kyoto Protocol<sup>155</sup> are the only international hard law instruments in existence that focus strictly on global warming. Although one should not prematurely assess how much the Kyoto Protocol has done or will do to address greenhouse gas (GHG) emissions and global warming, it certainly is missing some key States that are major contributors of GHGs. With the protocol entering into force Feb. 16, 2005, without Australia or the United States as ratifying States and with countries like China and India having ratified the Kyoto Protocol while cloaked in the "common but differentiated responsibility"<sup>156</sup> disclaimer, it is highly unlikely that the goals of the instrument will be met.<sup>157</sup> Moreover, in terms of nitrogen pollution, the Kyoto

Protocol does not even list N<sub>2</sub>O as one of the six targeted GHGs despite its persistent and potent nature.<sup>158</sup> The time is rapidly approaching for the Member States to assess the success of the first phase of implementation and determine how to amend the Kyoto Protocol or devise new strategies expanding on it. Therefore, the time is right to consider integrating the LRTAP models and regional partnership platforms as complementary approaches in the climate change scheme to bring more States to the negotiating table, develop goals tailored to regional abilities but on par with international needs, and then assist in implementing the plan at the national level.

Some may argue that regional approaches are not sufficient because of the transboundary nature of lower atmosphere air pollution that leads to conditions such as acid rain or upper atmosphere GHG pollution that leads to climate change. However, merely because the negative effects of air pollution tend not to be as localized as conditions such as eutrophication, that does not mean that regional instruments are not an effective means to bring States together to negotiate effective standards, develop appropriate mechanisms based on the capabilities and limitations of the States in the region, and to partner for global effect via a RSP-type platform.

The LRTAP regime's general framework, its associated technological mechanisms, and its supporting partnership tools have already proven successful for Canada, the EU, and the United States. With such great success yielded by the LRTAP Convention and its eight protocols, most importantly the Sofia and the Gothenburg Protocols, the rest of the world should take the opportunity to capitalize on the time and resources already invested. The conclusion is inescapable that the global community should consider the LRTAP regime, with appropriate modifications to properly address the particularities of each specific region, as the initial building block in the creation of a global TAP partnership.

#### IV. Conclusion

In sum, as the global community searches for the silver bullet to most effectively address nitrogen pollution, this Article demonstrates that we need not look far. First, in an effort to more effectively address nitrogen pollution in the marine context, states should use regional hard law instruments like the Barcelona Convention, in concert with partnership coordination platforms like the RSP and the UNEP GPA. The partnership platforms work jointly in an already existing regionally based framework to facilitate the implementation of legal instruments negotiated at the regional level and to coordinate supporting partnerships between states, NGOs, and a whole host of public and private entities.

Second, in addressing nitrogen as it contributes to TAP and climate change, the global community should adopt the LRTAP regime as the model from which other regions can develop regional air pollution regimes. The regional MEAs should then be coordinated through a regional partnership

150. *Id.* at 8-9.

151. *Id.* at 9.

152. *Id.* at 10.

153. *Id.* at 9-10.

154. May 9, 1982, reprinted in 31 I.L.M. 849 (1992), available at <http://unfccc.int> (last visited Feb. 4, 2008).

155. Dec. 10, 1997, reprinted in 37 I.L.M. 22 (1998), available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.

156. *Id.* art. X.

157. See Nina E. Bafundo, *Compliance With the Ozone Treaty: Weak States and the Principle of Common But Differentiated Responsibility*, 21 AM. U. INT'L L. REV. 461 (2006) (assessing the Montreal

Protocol and its incorporation of the principle of common but differentiated responsibility). David W. Childs, *The Unresolved Debates That Scorched Kyoto: An Analytical Framework*, 13 U. MIAMI INT'L & COMP. L. REV. 233, 251-53 (2005).

158. Kyoto Protocol, *supra* note 155, Annex A.

coordination platform analogous to the RSP and the UNEP GPA. Further, States should consider using these new regional MEAs and the supporting partnership platform as instruments and tools that can actively complement the UNFCCC and the Kyoto Protocol, or serve as enablers for implementing provisions of the UNFCCC regime.

The global community has the opportunity to capitalize on the success of the discussed regional MEAs and partnership platforms that have been tried, tested, and improved upon at the regional level. Now is the time to aggressively address nitrogen in air and water by using these effective regional approaches.