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# MITIGATING GLOBAL CLIMATE CHANGE: DESIGNING A DYNAMIC CONVENTION TO COMBAT A DYNAMIC RISK

PHILLIP M. KANNAN\*

*Some risks are plainly acceptable and others are plainly unacceptable.*<sup>1</sup>

## INTRODUCTION

The risk of an event which can cause harm is defined as the probability that the event will occur and cause harm multiplied by the magnitude of the harm;<sup>2</sup> this can be formally represented as: Risk = (Probability of Occurrence of Harm) x (Magnitude of Harm).<sup>3</sup> As both of these factors increase, the risk tends to move into the “plainly unacceptable” category. If, for a particular risk, the probability of harm is beyond reasonable doubt, and the magnitude of harm is greater than that caused by any natural disaster in recorded history, that risk is plainly unacceptable. The risk created by the current and projected concentrations of greenhouse gases in the atmosphere resulting from anthropogenic emissions is the product of just such a probability multiplied by just such a magnitude.<sup>4</sup>

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<sup>1</sup> Indus. Union Dep’t, AFL-CIO v. Am. Petroleum Inst., 448 U.S. 607, 655 (1980) (plurality opinion).

<sup>2</sup> This definition of risk was used by Judge Learned Hand in his famous opinion in the *Carroll Towing* case. United States v. Carroll Towing Co., Inc., 159 F.2d 169, 173 (2d Cir. 1947) (stating that, “[the allocation of liability for a breakaway barge] is a function of three variables: (1) The probability that she will break away; (2) the gravity of the resulting injury, if she does; (3) the burden of adequate precautions. Possibly it serves to bring this notion into relief to state it in algebraic terms: if the probability be called P; the injury, L; and the burden, B; liability depends upon whether B is less than L multiplied by P: i.e., whether B less than PL”).

<sup>3</sup> See EPA, RISK ASSESSMENT: BASIC INFORMATION, available at <http://www.epa.gov/riskassessment/basicinformation.htm>. See also Celia Campbell-Mohn and John S. Applegate, *Learning from NEPA: Guidelines for Responsible Risk Legislation*, 23 HARV. ENVTL. L. REV. 93, 95 (1999) (describing risk assessment as a “process for calculating the probability and magnitude of identified adverse effects”).

<sup>4</sup> See *infra* notes 22–26 and accompanying text.

Merely proclaiming that a particular risk is unacceptable does not lessen it. To mitigate a risk, the factors that compose it must be reduced; this can be done by reducing both of them or by reducing one in a way that overcompensates for any increase in the other.<sup>5</sup> Thus, to mitigate the risk created by greenhouse gas emissions one must reduce the probability of the harm they create or the magnitude of that harm. The concentration of greenhouse gases can be decreased by reducing the rate of greenhouse gas emissions or by increasing the rate of their removal.<sup>6</sup> Either or both of these actions will allow the concentration to go down over time, and that will reduce both the probability and the magnitude of the harm associated with greenhouse gas emissions. Tragically, the states of the world have not succeeded in developing and implementing a regime to reduce the concentration of greenhouse gases in the atmosphere.<sup>7</sup> The purpose of this article is to explore means that can lead to such a regime.

This article proceeds as follows. Section I outlines the data demonstrating both the probability of harm and the magnitude of harm caused by past, current, and projected anthropogenic greenhouse gas emissions. Section II gives an overview of the efforts the international community has made to date to control this risk. It includes a discussion of the strengths and weaknesses of these efforts and their likelihood of success. Sections III and IV analyze the approach taken by the international community to protect a different global commons, namely, straddling fish stocks and highly migratory fish stocks in the high seas. Section V turns the same analytical focus applied to the regime to protect these fish stocks to the one adopted by the international community to protect the ozone layer in the atmosphere from ozone depleting chemicals. Section VI argues that some, but not all, of the innovative approaches taken in treaties intended to protect straddling fish stocks and highly migratory fish stocks in the high seas and the ozone layer in the atmosphere can be adapted to produce a regime for reducing the concentrations of greenhouse gases in the atmosphere and the risk they pose. It includes *pro forma* treaty language as

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<sup>5</sup> Keith J. Crocker, *Risk and Risk Management*, in *THE ECONOMICS OF RISK* 9, 13 (Donald J. Meyer, ed., 2003).

<sup>6</sup> Detlef P. van Vuuren et al., *Stabilizing Greenhouse Gas Concentrations at Low Levels: An Assessment of Reduction Strategies and Costs*, 81 *CLIMATIC CHANGE* 119, 120 (2007), available at <http://igitur-archive.library.uu.nl/chem/2008-0422-200652/NWS-E-2007-29.pdf>; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: THE PHYSICAL SCIENCE BASIS, in *CLIMATE CHANGE 2007: WORKING GROUP I: THE PHYSICAL SCIENCE BASIS*, available at [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/faq-10-3.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/faq-10-3.html).

<sup>7</sup> See *infra* Part II (describing the international response to climate change since 1994).

suggestions for actually implementing these adaptations. The Conclusion includes closing suggestions.

## I. GLOBAL CLIMATE CHANGE: THE THEORY AND EVIDENCE

The sun emits energy in the form of short wavelengths called ultraviolet radiation.<sup>8</sup> This form of energy might either pass through the earth's atmosphere or be reflected by the earth's atmosphere.<sup>9</sup> If it passes through the atmosphere, it can either be reflected by the earth or absorbed by the earth's surface.<sup>10</sup> If it is absorbed, it warms the earth's surface and the lower atmosphere.<sup>11</sup> The earth's surface then emits energy into the atmosphere in the form of infrared radiation, some of which is absorbed in the atmosphere and re-emitted in all directions by chemical compounds called greenhouse gases.<sup>12</sup> Re-emission of this infrared radiation further warms the earth's surface and the lower atmosphere.<sup>13</sup>

The most important greenhouse gases are water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).<sup>14</sup> Greenhouse gases are also referred to as heat-trapping gases.<sup>15</sup> Anthropogenic emissions of these gases have increased sharply since pre-industrial times.<sup>16</sup> The increase has been particularly large in recent times; for example, the increase was seventy percent between 1970 and 2004.<sup>17</sup> In that period, "global emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>, weighted by their global warming potential ("GWP"), have increased by 70% (24% between 1990 and 2004), from 28.7 to 49 gigatonnes of carbon

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<sup>8</sup> *The Sun and Its Energy*, CARNEGIE MELLON UNIV., <http://telstar.ote.cmu.edu/enviro/m3/s2/02sun.shtml> (last visited Jan. 30, 2012).

<sup>9</sup> EPA, FREQUENTLY ASKED QUESTIONS ABOUT GLOBAL CLIMATE CHANGE: BACK TO BASICS, available at [http://www.epa.gov/climatechange/downloads/Climate\\_Basics.pdf](http://www.epa.gov/climatechange/downloads/Climate_Basics.pdf).

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> UNION OF CONCERNED SCIENTISTS, THE CAUSES OF GLOBAL WARMING, available at [http://www.ucsusa.org/global\\_warming/science\\_and\\_impacts/science/global-warming-faq.html](http://www.ucsusa.org/global_warming/science_and_impacts/science/global-warming-faq.html).

<sup>16</sup> EPA, ATMOSPHERE CHANGES, available at <http://www.epa.gov/climatechange/science/recentac.html>.

<sup>17</sup> INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS, in CLIMATE CHANGE 2007: MITIGATION: CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE IPCC 3, available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf>.

dioxide equivalents (GtCO<sub>2</sub>-eq).<sup>18</sup> Atmospheric concentrations of these greenhouse gases have increased as a result of these rising emission rates. In 2009, the U.S. Global Climate Change Research Program reported: "As a result of human activities, the present carbon dioxide concentration of about 385 ppm [parts per million] is about 30 percent above the highest level over at least the last 800,000 years."<sup>19</sup> The Environmental Protection Agency ("EPA") estimates this concentration is increasing by approximately 1.9 parts per million per year.<sup>20</sup> The increased atmospheric concentrations of greenhouse gases result in more infrared radiation being absorbed and re-emitted into the atmosphere by these gases.<sup>21</sup>

Re-emission of infrared radiation by greenhouse gases is occurring at an increased rate, and the global average temperature is increasing as a result. The United States Global Change Research Program issued a report to the President and to the Congress on behalf of the National Science and Technology Council entitled *Global Climate Change Impacts in the United States* which stated:

Observations show that warming of the climate is unequivocal. The global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases. These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with important contributions from the clearing of forests, agricultural practices, and other activities. Warming over this century is projected to be considerably greater than over the last century. The global average temperature since 1900 has risen by about 1.5° F. By 2100, it is projected to rise another 2° F to 11.5° F.<sup>22</sup>

The same conclusion was reached by the Intergovernmental Panel on Climate Change, which stated that "[w]arming of the climate system is unequivocal . . ."<sup>23</sup> and that "[t]here is very high confidence that the net

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<sup>18</sup> *Id.*

<sup>19</sup> U.S. GLOBAL CHANGE RESEARCH PROGRAM, GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES 13 (Thomas R. Karl et al. eds., 2009), available at <http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf>.

<sup>20</sup> EPA, ATMOSPHERE CHANGES, available at <http://www.epa.gov/climatechange/science/recentac.html>.

<sup>21</sup> *Id.*

<sup>22</sup> U.S. GLOBAL CHANGE RESEARCH PROGRAM, *supra* note 19, at 9.

<sup>23</sup> INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SYNTHESIS REPORT, in CLIMATE CHANGE 2007: SYNTHESIS REPORT, 30, available at [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf).

effect of human activities since 1750 has been one of warming.”<sup>24</sup> Thus, based on the best scientific analyses and opinions, the probability of harm from the current and projected levels of greenhouse gas emissions is unequivocal, that is, beyond reasonable doubt.

The Intergovernmental Panel on Climate Change has employed computer models to project the impacts these global average temperature changes will produce.<sup>25</sup> Some of these projections of the magnitudes of the harm that will result from the current and expected levels of greenhouse gas emissions are as follows:

1. WATER—“Hundreds of millions of people exposed to increased water stress”;
2. ECOSYSTEMS—“Up to 30% of species at increasing risk of extinction” and “Widespread coral mortality” and “Increasing species range shifts and wildfire risk”;
3. FOOD—“Productivity of all cereals decreases in low altitudes”;
4. COASTS—“Increased damage from floods and storms” and “About 30% of coastal wetlands lost” and “Millions more people could experience coastal flooding each year”; and
5. HEALTH—“Increasing burden from malnutrition, diarrheal, cardio-respiratory and infectious diseases” and “Increased morbidity and mortality from heat waves, floods and droughts” and “Changed distribution of some disease vectors.”<sup>26</sup>

The countries of the international community understand that they are facing a risk that is virtually certain to occur and cause harm of unprecedented magnitude.<sup>27</sup> They understand that collective action is required to mitigate this risk.<sup>28</sup> They understand that the objective of the collective action must be the reduction of the concentration of greenhouse gases in the atmosphere through reduced emission and increased

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<sup>24</sup> *Id.* at 5.

<sup>25</sup> *See id.* at 45 (“Advances in climate change modeling now enable best estimates and *likely* assessed uncertainty ranges to be given for projected warming for different emissions scenarios.”).

<sup>26</sup> *Id.* at 10.

<sup>27</sup> *Id.*

<sup>28</sup> *Id.* at 62.

absorption.<sup>29</sup> Yet, as the next section demonstrates, they have failed to agree on a means to achieve that end.

## II. THE INTERNATIONAL RESPONSE TO THE RISKS POSED BY GLOBAL CLIMATE CHANGE AND ITS PROSPECTS FOR SUCCESS

The first direct action taken by the international community to mitigate the risk created by global climate change was to negotiate and bring into force on March 21, 1994 the United Nations Framework Convention on Climate Change.<sup>30</sup> This treaty has had broad acceptance, with 195 parties as of June 20, 2011.<sup>31</sup>

The universal embrace of the treaty reflects its basic approach, which can be characterized as a velvet glove with no fist, iron or otherwise, inside.<sup>32</sup> The use of this metaphor, however, should not be understood to imply that UNFCCC was or is inconsequential. It articulated the axioms for the diplomatic process aimed at achieving the collective action necessary to reduce the threat of global climate change.<sup>33</sup> After UNFCCC came into force, future negotiations regarding global climate change could not start with a clean slate.<sup>34</sup>

Article 2 states the objective of the treaty and the diplomatic process it sets in motion to be the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”<sup>35</sup> It thereby accepts a pragmatic goal rather than the idealistic one of returning to pre-industrial revolution concentrations of greenhouse gases.

Article 3 adopts a strong version of the principle of common but differentiated responsibility by calling on developed Parties to take the

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<sup>29</sup> See *supra* note 6 and accompanying text.

<sup>30</sup> United Nations Framework Convention on Climate Change, May 9, 1992, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 107, 31 I.L.M. 849 [hereinafter UNFCCC]; see also Ranee Khooshie Lal Panjabi, *Can International Law Improve the Climate? An Analysis of the United Nations Framework Convention on Climate Change Signed at the Rio Summit in 1992*, 18 N.C. J. INT'L L. & COM. REG. 491 (1993) (discussing the history of the negotiations leading to the UNFCCC and analyzing its main provisions).

<sup>31</sup> *Status of Ratification*, UNFCCC, [http://unfccc.int/essential\\_background/convention/status\\_of\\_ratification/items/2631.php](http://unfccc.int/essential_background/convention/status_of_ratification/items/2631.php) (last visited Jan. 30, 2012).

<sup>32</sup> See Panjabi, *supra* note 30, at 528 (describing the obligations under the UNFCCC as “unfortunately so vague as to be almost without substance”).

<sup>33</sup> UNFCCC, *supra* note 30, preamble, at 1–3.

<sup>34</sup> *Status of Ratification*, UNFCCC, *supra* note 31 (noting that 194 states and one regional economic integration organization are parties to the Convention).

<sup>35</sup> UNFCCC, *supra* note 30, at art. 2.



lead in combating global climate change.<sup>36</sup> The common but differentiated responsibility principle has been adopted extensively in international environmental law and policy.<sup>37</sup> It is justified as follows in the Rio Declaration on Environment and Development:

In view of the different contribution to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.<sup>38</sup>

One way this principle is implemented in UNFCCC is by dividing states into Annex I Parties, which are the forty-one most economically developed states, and non-Annex I Parties.<sup>39</sup> Both categories of parties must pursue the common objective stated in article 2; however, Annex I Parties “should take the lead in combating climate change and the adverse effects thereof.”<sup>40</sup> Each developed party agrees to “adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs.”<sup>41</sup> In addition, Annex I Parties must submit detailed information on their policies “with the *aim* of returning individually or jointly to their 1990 levels [of greenhouse gas emissions].”<sup>42</sup> These subsections of UNFCCC clearly do not set binding limits on greenhouse gas emissions, but they are the strongest

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<sup>36</sup> *Id.* at art. 3(1) (“The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.”). In fact, the obligations of developing parties are dependent upon “the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology . . .” *Id.* at art. 4(7).

<sup>37</sup> See Christopher D. Stone, *Common but Differentiated Responsibility in International Law*, 98 AM. J. INT’L L. 276 (2004) (providing a discussion of the adoption of the common but differentiated responsibility principle in environmental conventions).

<sup>38</sup> U.N. Conference on Environment and Development, June 3–14, 1992, Rio Declaration on Environment and Development, princ. 7, U.N. Doc. A/CONF.151/5/Rev. 1 (June 14, 1992).

<sup>39</sup> *Id.* at Annex I.

<sup>40</sup> UNFCCC, *supra* note 30, at art. 3(1).

<sup>41</sup> *Id.* art. 4(2).

<sup>42</sup> *Id.* art. 4(2)(b) (emphasis added).



provisions in the treaty on this critical point. Annex II Parties, which are the Annex I Parties except those that are undergoing the process of transition to a market economy, are required to "provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1."<sup>43</sup>

All parties are required to compile and submit to the Conference of Parties a national inventory of anthropogenic sources and sinks of all greenhouse gases listed in the treaty, adopt plans to mitigate greenhouse gas emissions, and develop plans for coastal zone management.<sup>44</sup> Annex II parties are obligated to assist non-Annex I Parties that are "particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation" and also to assist non-Annex I parties to obtain environmentally sound technologies that will assist them in complying with UNFCCC.<sup>45</sup>

In 1995 in Berlin, the Conference of Parties at its first meeting agreed on a plan aimed at imposing binding caps on the greenhouse gas emissions of some parties.<sup>46</sup> The strategy to accomplish this objective was contained in a document known as the Berlin Mandate.<sup>47</sup> This strategy sharpened and institutionalized the differentiation between Annex I and non-Annex I Parties by adopting explicit provisions stating what would be required of Annex I Parties and what could not be required of non-Annex I Parties.<sup>48</sup> First, it established the objective of strengthening the commitments of Annex I Parties to include "quantified limitations and reduction objectives within specified time-frames."<sup>49</sup> This was to be achieved through a protocol that imposed binding limits on greenhouse gas emissions on a stated schedule for all Annex I Parties.<sup>50</sup> Second, the Berlin Mandate included the requirement that the protocol could "[n]ot introduce any new commitments for [non-Annex I] Parties . . . ."<sup>51</sup>

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<sup>43</sup> *Id.* art. 4(3).

<sup>44</sup> *Id.* art. 4(1)(a), (b), (e).

<sup>45</sup> *Id.* art. 4(4)–(5). The list of Annex II parties consists of those Annex I parties that are not undergoing the transition to a market economy. *See id.* at Annex I and Annex II.

<sup>46</sup> Clare Breindenich et al., *The Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 92 AM. J. INT'L. L. 315, 318 (1998).

<sup>47</sup> *Id.*

<sup>48</sup> Conclusion of Outstanding Issues and Adoption of Decisions, U.N. Doc. FCCC/CP/1995/L.14 ¶ 2(a)–(b) (April 7, 1995) [hereinafter Berlin Mandate].

<sup>49</sup> *Id.* ¶ 2(a).

<sup>50</sup> *Id.* ¶ 4.

<sup>51</sup> *Id.* ¶ 2(b).

The Kyoto Protocol to the United Nations Framework Convention on Climate Change<sup>52</sup> was negotiated and opened for signatures in 1998 as a step in the process outlined in the Berlin Mandate.<sup>53</sup> The most significant new component of the Kyoto Protocol is the inclusion of binding limits on greenhouse gas emissions for industrialized parties.<sup>54</sup> These limits are imposed in a way that fulfills the two basic promises in the Berlin Mandate. As for the first one, article 3 requires Annex I Parties to “ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitations and reduction commitments inscribed in Annex B . . . .”<sup>55</sup> Thus, a state that becomes a party to the Kyoto Protocol and is listed in Annex B has a binding cap on its greenhouse gas emissions. As for the second promise in the Berlin Mandate, article 10, when establishing obligations for all parties, states that these obligations are created “without introducing any new commitments for Parties not included in Annex I . . . .”<sup>56</sup>

The principle of common but differentiated responsibility in the international community’s response to global climate change was born in the UNFCCC, memorialized in the Berlin Mandate, and given substance in the Kyoto Protocol. This success in negotiating, however, has proven to be a barrier to achieving the objective of stabilizing greenhouse gas concentrations as stated in the UNFCCC.<sup>57</sup> The differentiation became so great that the common responsibility could not be met.<sup>58</sup> Inclusion of this version of common but differentiated responsibility meant that the Kyoto Protocol failed to be a means of marshaling collective action. The United States, which was the largest emitter of greenhouse gases until 2005 or 2006, when it was surpassed by China,<sup>59</sup> refused to become a party. First, on July 25, 1997, the U.S. Senate passed a non-binding resolution sponsored by Senator Robert Byrd recognizing this failure: “. . . [T]he

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<sup>52</sup> Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22 (entered into force Feb. 15, 2005) [hereinafter Kyoto Protocol].

<sup>53</sup> See Breidenich, *supra* note 46, at 315–19 (summarizing the negotiations leading to the Kyoto Protocol).

<sup>54</sup> *Id.* at 315.

<sup>55</sup> Kyoto Protocol, *supra* note 52, at art. 3(1).

<sup>56</sup> *Id.* art. 10.

<sup>57</sup> See *infra* notes 73–84 and accompanying text (describing the lack of emissions cap for emerging industrial powers such as China and India).

<sup>58</sup> See *id.*

<sup>59</sup> JANE A. LEGGETT ET AL., CONG. RESEARCH SERV., RL 34659, CHINA’S GREENHOUSE GAS EMISSIONS AND MITIGATION POLICIES 5, 8 (2008), available at <http://www.fas.org/sgp/crs/row/RL34659.pdf>.

exemption for Developing Country Parties is inconsistent with the need for global action on climate change and is environmentally flawed . . . .”<sup>60</sup> The resolution stated as the sense of the Senate that the United States should not be a party to any protocol that set emission limits and schedules for Annex I Parties unless limits and schedules were also set for non-Annex I Parties.<sup>61</sup> Then, the Bush administration repudiated the Kyoto Protocol in 2001.<sup>62</sup> The political leaders of the United States viewed the Kyoto Protocol as institutionalizing free rider status.<sup>63</sup>

When the Berlin Mandate and the Kyoto Protocol prohibited the international community from imposing caps on greenhouse gas emissions for all non-Annex I Parties, the drafters ignored the reality that the global economy is a dynamic system.<sup>64</sup> These prohibitions were an attempt to impose fixed points in that constantly changing system; this was unrealistic. Consider China, for example. In 1990 when the UNFCCC was being negotiated, China was considered a developing state and thus not an Annex I Party.<sup>65</sup> At that time, this was a reasonable decision. But the Chinese economy has expanded dramatically in the past twenty-one years. During that period, China's economy has expanded at an average annual rate of over 9.3%.<sup>66</sup> Applying the formula for computing doubling time,<sup>67</sup> this would mean that in this twenty-one-year time period, China's economy doubled, then doubled a second time, and then doubled a third time. This means that at the end of this twenty-one-year period, China's economy was approximately eight times, that is 800%, the size it was at the beginning. This industrial growth was paralleled by urbanization beyond

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<sup>60</sup> S. Res. 98, 105th Cong. (1997), 143 CONG. REC. S8138-39 (daily ed. July 25, 1997) (enacted).

<sup>61</sup> *Id.*

<sup>62</sup> Jutta Brunnée, *Europe, the United States, and the Global Climate Regime: All Together Now?*, 24 J. LAND USE & ENVTL. L. 1, 4 (2008) (discussing the decision of President Bush to reject the Kyoto Protocol and the consequences of that decision). See also Andrew C. Revkin, *Climate Talks Will Shift Focus From Emissions*, N.Y. TIMES, Oct. 23, 2002, at A8.

<sup>63</sup> See, e.g., 143 CONG. REC. S8117 (daily ed. July 25, 1997) (statement of Sen. Robert Byrd, criticizing the Protocol as giving developing states a “free pass”).

<sup>64</sup> Breidenich, *supra* note 46, at 326.

<sup>65</sup> UNFCCC, *supra* note 30, at Annex I.

<sup>66</sup> *Background Note: China*, U.S. DEP'T OF STATE (Sept. 6, 2011), <http://www.state.gov/r/pa/ei/bgn/18902.htm> (“[China] has sustained average economic growth of over 9.3% since 1989.”); see also LEGGETT ET AL., *supra* note 59, at 1 (“Between 1979 and 2007, the Chinese economy grew at an average annual rate of 9.8%.”).

<sup>67</sup> *Understanding Exponential Growth*, UNIV. OF OREGON, <http://zebu.uoregon.edu/2003/es202/lec06.html> (last visited Jan. 30, 2012) (stating and deriving the formula: doubling time = 70/n where n = percent of growth rate). For China in the twenty-one-year period in which its annual economic growth rate was approximately ten percent, the formula is 70/10 = 7, which means the economy doubled approximately every seven years.

any seen in human history.<sup>68</sup> China has become the world's second-largest economy.<sup>69</sup> China is the world's largest emitter of greenhouse gases.<sup>70</sup> Moreover, "China's . . . emissions are projected to grow compared to current levels by about 45 percent . . . by 2020."<sup>71</sup> Taking into account the factors that justify differential treatment, namely, pressure placed on the global environment and technologies and financial resources,<sup>72</sup> it is no longer reasonable to exclude China from Annex I. The differentiated responsibility for China is no longer consistent with the objectives of the UNFCCC and the Kyoto Protocol, and yet, because a static subsystem was created in a dynamic system, China has treaty rights to non-Annex I status.

Because of the way the common but differentiated responsibility principle was implemented in the Kyoto Protocol, China, which emitted approximately seventeen percent of the total amount of greenhouse gases in 2005,<sup>73</sup> has no cap.<sup>74</sup> It is free to continue to bring online two coal-fired power plants per week.<sup>75</sup> These same rights exist for the other nation with a billion-plus population, India,<sup>76</sup> which was the third-largest emitter of greenhouse gases in 2005;<sup>77</sup> its greenhouse gas emissions are projected to increase by forty-seven percent over today's level by

<sup>68</sup> Thomas J. Campanella, *Megacities: China's Urban Challenges*, BBC NEWS (June 20, 2011), <http://www.bbc.co.uk/news/mobile/world-asia-pacific-13799997> ("Three decades of sustained economic growth, concentrated along the booming coast, has lured millions from the impoverished Chinese countryside. This great migration—unprecedented in human history—has put 46 Chinese cities over the one million mark since 1992, out of a national total of 102.").

<sup>69</sup> *China Overtakes Japan as World's Second Biggest Economy*, BBC NEWS (Feb. 14, 2011), <http://www.bbc.co.uk/news/business-12427321>.

<sup>70</sup> Keith Bradsher, *Power vs. Profit*, N.Y. TIMES, May 25, 2011, at B1 (" . . . China is already the world's largest emitter [of greenhouse gases].").

<sup>71</sup> PEW CTR. ON GLOBAL CLIMATE CHANGE, CLIMATE CHANGE 101: UNDERSTANDING AND RESPONDING TO GLOBAL CLIMATE CHANGE: OVERVIEW 6 (2011), available at <http://www.pewclimate.org/docUploads/climate101-overview.pdf>.

<sup>72</sup> Rio Declaration on Environment and Development, *supra* note 38, at princ. 7.

<sup>73</sup> LEGGETT ET AL., *supra* note 59, at 8.

<sup>74</sup> See Breidenich, *supra* note 46, at 325–26 (noting that the Berlin Mandate precluded the introduction of new commitments for developing countries in the Kyoto Protocol).

<sup>75</sup> Roger Harrabin, *China Building More Power Plants*, BBC NEWS (June 18, 2007), <http://news.bbc.co.uk/2/hi/6769743.stm>. Compare this to the rate at which the United States brings coal-fired power plants on line; the Department of Energy reported that as follows: "6,682 MW (11 plants) have become operational during 2010 as of December 2010; this is the highest level of coal-fired plants *Commissioned* in 25 years (since 1985)." ERIK SHUSTER, U.S. DEP'T OF ENERGY, TRACKING NEW COAL-FIRED POWER PLANTS, 2010 (2011), available at <http://www.netl.doe.gov/coal/refshelf/ncp.pdf>.

<sup>76</sup> *India Census: Population Goes up to 1.21 Bn*, BBC NEWS (Mar. 31, 2011), <http://www.bbc.co.uk/news/world-south-asia-12916888>.

<sup>77</sup> LEGGETT ET AL., *supra* note 59, at 8.

2020.<sup>78</sup> These rights also exist for other major economies such as Indonesia, Brazil, Mexico, Vietnam, and South Korea.<sup>79</sup> Because China and other states with significant levels of greenhouse gas emissions have no caps, the United States, which emitted approximately seventeen percent of the total global greenhouse gases in 2005,<sup>80</sup> has refused to agree to limit its greenhouse gas emissions. For the United States, the common but differentiated responsibility provision and the Berlin Mandate were the poison pill for the global climate change regime.<sup>81</sup> Saddled with the current version of the common but differentiated principle, the UNFCCC and the Kyoto Protocol have little chance of achieving their goal of “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”<sup>82</sup> In fact, the International Energy Agency reported that CO<sub>2</sub> emissions were at a record level of 30.6 gigatonnes in 2010, increasing by five percent above the previous record set in 2008, before the global recession.<sup>83</sup> This makes the probability of holding the temperature increase to two degrees Celsius, the limit of stabilization, unlikely.<sup>84</sup>

The voluntary goals set by the parties to the UNFCCC in the Copenhagen Accord,<sup>85</sup> even if carried out, will not achieve the desired stabilization. This was the conclusion of the United Nations Environmental Programme<sup>86</sup> and Congressional Research Service.<sup>87</sup> The same conclusion

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<sup>78</sup> PEW CTR. ON GLOBAL CLIMATE CHANGE, *supra* note 71, at 6.

<sup>79</sup> BBVA RESEARCH, CROSS-COUNTRY EMERGING MARKETS ANALYSIS: ECONOMIC WATCH 1 (2010), *available at* [http://www.bbva.com/BBVA/Research/EM\\_Watch\\_151110\\_i\\_rev\\_260711\\_tcm348-235907.pdf](http://www.bbva.com/BBVA/Research/EM_Watch_151110_i_rev_260711_tcm348-235907.pdf).

<sup>80</sup> LEGGETT ET AL., *supra* note 59, at 8.

<sup>81</sup> *See supra* note 62 and accompanying text.

<sup>82</sup> UNFCCC, *supra* note 30, at art. 2.

<sup>83</sup> *Prospect of Limiting Global Increases in Temperature to 2°C is Getting Bleaker*, INT'L ENERGY AGENCY (May 30, 2011), [http://www.iea.org/index\\_info.asp?id=1959](http://www.iea.org/index_info.asp?id=1959).

<sup>84</sup> *Global Carbon Emissions Reach Record, Says IEA*, BBC NEWS (May 30, 2011), <http://www.bbc.co.uk/news/science-environment-13595174> (quoting Faith Birol of the International Energy Agency: “The world has edged incredibly close to the level of emissions that should not be reached until 2020 if the 2C target is to be attained.”).

<sup>85</sup> Copenhagen Accord, Decision -/CP.15 (Dec. 18, 2009), *available at* [http://unfccc.int/files/meetings/cop\\_15/application/pdf/cop15\\_cph\\_auv.pdf](http://unfccc.int/files/meetings/cop_15/application/pdf/cop15_cph_auv.pdf).

<sup>86</sup> UNITED NATIONS ENVTL. PROGRAMME, THE EMISSIONS GAP REPORT: ARE THE COPENHAGEN ACCORD PLEDGES SUFFICIENT TO LIMIT GLOBAL WARMING TO 2°C OR 1.5°C? TECHNICAL SUMMARY (2010), *available at* [http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS\\_GAP\\_TECHNICAL\\_SUMMARY.pdf](http://www.unep.org/publications/ebooks/emissionsgapreport/pdfs/EMISSIONS_GAP_TECHNICAL_SUMMARY.pdf) (“If the lowest-ambition pledges were implemented in a ‘lenient’ fashion, emissions could be lowered slightly to 53 GtCO<sub>2</sub>e (range 52–57 GtCO<sub>2</sub>e) leaving a significant gap of 9 GtCO<sub>2</sub>e.”).

<sup>87</sup> LARRY PARKER ET AL., CONG. RESEARCH SERV., RL 30023, U.S. GLOBAL CLIMATE CHANGE POLICY: EVOLVING VIEWS ON COST, COMPETITIVENESS, AND COMPREHENSIVENESS 12, 15

holds for the reduction targets and actions adopted by the parties in the Cancun Agreements.<sup>88</sup>

Even though the UNFCCC, the Kyoto Protocol, the Copenhagen Accord, and the Cancun Agreements taken together are unlikely to achieve the stabilization set as the objective in 1992, they must not be abandoned. Each of these agreements can result in a significant reduction in global greenhouse gas emissions, which cumulatively can slow the rate of global climate change.<sup>89</sup> The benefit of slowing the pace of this harm was recognized in *Massachusetts v. Environmental Protection Agency*.<sup>90</sup> In that case, the Supreme Court considered whether EPA's refusal to regulate greenhouse gas emissions from new vehicles under the Clean Air Act contributed to the injuries to Massachusetts caused by global climate change.<sup>91</sup> EPA argued that its decision not to regulate these emissions contributed insignificantly to these injuries:

For the same reason, EPA does not believe that any realistic possibility exists that the relief petitioners [Massachusetts] seek would mitigate global climate change and remedy their injuries. That is especially so because predicted increases in greenhouse gas emissions from developing nations, particularly China and India, are likely to offset any marginal domestic decrease.<sup>92</sup>

The Court rejected EPA's argument: "Nor is it dispositive that developing countries such as China and India are poised to increase greenhouse gas emissions substantially over the next century: A reduction in domestic

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(2011), available at <http://www.fas.org/sgp/crs/misc/RL30024.pdf> ("[The Copenhagen Accord] . . . set a goal of reducing global emissions 'so as to hold the increase in global temperature below 2 degrees C' . . . . [I]t remains to be seen what the Copenhagen agreement will lead to; just as it remains to be seen what the world's two largest emitters, China and the United States, will do—whether the goals that they have submitted under the Copenhagen agreement will be met.").

<sup>88</sup> *What Governments Will Do in 2011*, UN Framework Convention on Climate Change, Cancun Agreements, <http://cancun.unfccc.int/what-governments-will-do-in-2011/> (last visited Jan. 30, 2012) ("It is also important to keep in mind that, as UN analysis shows, the emissions reduction targets and actions announced in Cancun, although they are the most ambitious global efforts to date, are inadequate in the longer term to keep the world under the agreed maximum global temperature rise of two degrees.").

<sup>89</sup> *Greenhouse Gases & Climate Change*, MASS. DEP'T OF ENVTL. PROT., <http://www.mass.gov/dep/air/climate> (last visited Jan. 30, 2012).

<sup>90</sup> *Mass. v. Env'tl. Prot. Agency*, 549 U.S. 497, 525 (2007).

<sup>91</sup> *Id.* at 523.

<sup>92</sup> *Id.* at 523–24.



emissions would *slow the pace* of global emissions increases, no matter what happens elsewhere.”<sup>93</sup>

The slowing of the pace of greenhouse gas emissions that is possible under the UNFCCC, the Kyoto Protocol, the Copenhagen Accord, and the Cancun Agreements will give the international community more time to devise a more effective collective response. The regime created by these agreements, however, will not achieve its stated objective because these treaties ignore the ecological reality created by the economic reality of the explosive growth of China, India, and other major economies.<sup>94</sup> The challenge is to strengthen the mechanisms in the existing regime, which only slow the pace of harm, so that they become collective actions that, in fact, mitigate global climate change and achieve the objective of “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”<sup>95</sup> Help in meeting this challenge can be found in other treaties that are designed to prevent tragedies from befalling other commons.<sup>96</sup> To that end, the next section explores approaches taken in treaties to protect global commons consisting of various fish stocks that occur in the high seas. This analysis will show that this regime, like the existing one for global climate change, is flawed because it does not bind all states that have the economic and technical resources to cause the collapse of the commons. However, included in the treaties to conserve fish stocks in the high seas are approaches that could be adopted in the fight against global climate change.

### III. CONSERVATION OF FISH STOCKS IN THE HIGH SEAS

The high seas are classic examples of commons; no state claims sovereignty over them.<sup>97</sup> The various species of living marine resources that spend some of their lives in the high seas are also commons.<sup>98</sup> Without effective collective action, these commons will be at high risk of suffering

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<sup>93</sup> *Id.* at 525–26 (emphasis added).

<sup>94</sup> See *supra* notes 71–92 and accompanying text.

<sup>95</sup> UNFCCC, *supra* note 30, at art. 2.

<sup>96</sup> See *infra* notes 97–121 and accompanying text.

<sup>97</sup> Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243, 1245 (1968) (lamenting that maritime nations “respond automatically to the shibboleth of the ‘freedom of the seas’”).

<sup>98</sup> See *id.* (explaining how treating various ocean species, including fish and whales, as commons brings them closer to extinction).



the tragedy that threatens all commons.<sup>99</sup> The data from the U.N. Food and Agriculture Organization (“FAO”) suggest that too often, the threat has become reality. Based on the 2005 FAO report, “Review of the State of World Marine Fisheries Resources,” the FAO concluded: “Of the 600 marine fish stocks monitored by FAO: 3% are underexploited, 20% are moderately exploited, 52% are fully exploited, 17% are overexploited, 7% are depleted, and 1% are recovering from depletion.”<sup>100</sup> Each of these fish stocks is a commons; seventy-seven percent of these 600 commons will end in tragedy unless exploitation of them is reduced and controlled.<sup>101</sup> Attempts to impose necessary controls, however, conflict with the principle of *mare liberum*, the freedom of the high seas.<sup>102</sup> The resolution of this conflict requires the curtailing of the principle of *mare liberum*, and thus, the limiting of the sovereignty of all states that engage in fishing on the high seas.<sup>103</sup> This conflict can be envisioned as one between sustainable development of the fish stocks and *mare liberum*.<sup>104</sup> The United Nations Convention on the Law of the Sea (“UNCLOS”)<sup>105</sup> provides the means for resolving this conflict.<sup>106</sup>

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<sup>99</sup> *Id.* at 1244.

<sup>100</sup> U.N. FOOD AND AGRIC. ORG., GENERAL SITUATION OF WORLD FISH STOCKS [hereinafter FAO], available at <http://www.fao.org/newsroom/common/ecg/1000505/en/stocks.pdf>. For a more detailed analysis, see Jorge Csirke, U.N. FOOD & AGRIC. ORG., FAO MARINE RES. SERV., FISHERY RES. DIV., REVIEW OF THE STATE OF THE WORLD MARINE FISHERY RESOURCES, FAO FISHERIES TECHNICAL PAPER 457 11 (2005), available at <ftp://ftp.fao.org/docrep/fao/007/y5852e/Y5852E00.pdf>.

<sup>101</sup> *Id.* at 1.

<sup>102</sup> Rebecca Bratspies, *Finessing King Neptune: Fisheries Management and the Limits of International Law*, 25 HARV. ENVTL. L. REV. 213, 213–14 (2001) (“This Article starts from the premise that resolution of the straddling stock dilemma necessarily involves recognition of the conflict between the demands of environmental stewardship and *mare liberum*.”).

<sup>103</sup> Chad J. McGuire, *UNCLOS and the High Seas: Problems and Suggested Solutions to the Creation of a Common Pool*, in SELECTED WORKS OF CHAD J. MCGUIRE (2003), available at [http://works.bepress.com/cgi/viewcontent.cgi?article=1009&context=chad\\_mcguire](http://works.bepress.com/cgi/viewcontent.cgi?article=1009&context=chad_mcguire) (last visited Jan. 30, 2012).

<sup>104</sup> See, e.g., Bratspies, *supra* note 102.

<sup>105</sup> United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397, 21 I.L.M. 1261, available at [http://www.un.org/Depts/los/convention\\_agreements/texts/unclos/unclos\\_e.pdf](http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf) [hereinafter UNCLOS].

<sup>106</sup> Candace L. Bates, *U.S. Ratification of the U.N. Convention on the Law of the Sea: Passive Acceptance Is Not Enough to Protect U.S. Property Interests*, 31 N.C. J. INT’L L. & COM. REG. 745, 788 (2006) (discussing the negotiations leading to UNCLOS and its benefits).

UNCLOS recognizes the general principle of the freedom of the high seas and the right of all states to fish on the high seas,<sup>107</sup> but imposes restraints on that right:

All States have the right for their nationals to engage in fishing on the high seas subject to: (a) their treaty obligations; (b) the rights and duties as well as the interests of coastal States provided for, *inter alia*, in article 63, paragraph 2, and articles 64 to 67; and (c) the provisions of this section [section 2 (Articles 116–120)].<sup>108</sup>

One of the most important of these obligations imposed on all states in section 2 of UNCLOS is “the duty to take, or to co-operate with other States in taking, such measures for their respective nations as may be necessary for conservation of the living resources of the high seas.”<sup>109</sup> This duty includes the obligation to “cooperate to establish subregional or regional fisheries organizations to this end,”<sup>110</sup> and to set allowable catch limits.<sup>111</sup>

The exclusive economic zone (“EEZ”) is defined as a 200 nautical mile breadth as measured from the coastal baseline.<sup>112</sup> The coastal state has sovereignty and jurisdiction over this area; it is no longer part of the high seas.<sup>113</sup> In its EEZ, the coastal state has conservation and management duties including setting allowable catch limits<sup>114</sup> and preventing over-exploitation of living resources.<sup>115</sup>

For fish stocks that occur in more than one EEZ, UNCLOS recognizes the need for cooperation by all of those coastal states in protecting such fish stocks, which are called straddling fish stocks. Using language that imposes a procedural rather than a substantive obligation, UNCLOS requires all of these states to “seek . . . to agree upon the measures necessary to coordinate and ensure the conservation and development of such stocks without prejudice to the other provisions of this Part.”<sup>116</sup>

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<sup>107</sup> UNCLOS, *supra* note 105, at art. 87 (specifically requiring that the right to fish “be exercised by all States with due regard for the interest of other States in their exercise of the freedom of the high seas . . .”).

<sup>108</sup> *Id.* art. 116.

<sup>109</sup> *Id.* art. 117.

<sup>110</sup> *Id.* art. 118.

<sup>111</sup> *Id.* art. 119.

<sup>112</sup> *Id.* art. 57.

<sup>113</sup> UNCLOS *supra* note 105, at art. 56(1)(a).

<sup>114</sup> *Id.* art. 61(1).

<sup>115</sup> *Id.* art. 61(2).

<sup>116</sup> *Id.* art. 63(1).

UNCLOS also attempts to allocate authority to regulate fish stocks, called highly migratory species, which occur in both the EEZ of a state and in the adjacent high seas.<sup>117</sup> The coastal states and the states fishing these stocks are obligated to “seek . . . to agree upon the measures necessary for the conservation of these stocks in the adjacent area.”<sup>118</sup>

In UNCLOS articles regarding straddling fish stocks and highly migratory fish stocks quoted in the previous two paragraphs, UNCLOS is struggling with the threat to commons that arises because of sovereignty and the rights of sovereigns.<sup>119</sup> This is analogous to the challenge the international community is facing today regarding global climate change, in which sovereign states claim that, included in their sovereignty, is the right to emit greenhouse gases unconstrained by international law.<sup>120</sup> The initial approaches taken by the international community in mitigating these problems are, like the problems themselves, analogous. As a first step in both cases, procedures are put in place and voluntary efforts are encouraged to mitigate the environmental harm. In UNCLOS in the sections quoted in the two preceding paragraphs, the states are to “seek to agree” on necessary conservation measures; however, there are no substantive requirements or standards. In the UNFCCC, the analogous provisions are found in article 4. There are found the core mitigation and adaptation commitments by non-Annex I Parties:

Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimize adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change.<sup>121</sup>

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<sup>117</sup> *Id.* art. 63(2).

<sup>118</sup> *Id.*

<sup>119</sup> Daniel Hollis, *United Nations Convention on Law of the Sea (UNCLOS), 1982*, THE ENCYCLOPEDIA OF EARTH (June 22, 2010, 12:00 AM), [http://eoeearth.org/article/United\\_Nations\\_Convention\\_on\\_Law\\_of\\_the\\_Sea\\_\(UNCLOS\)\\_1982](http://eoeearth.org/article/United_Nations_Convention_on_Law_of_the_Sea_(UNCLOS)_1982); see UNCLOS, *supra* note 105, at preamble (“[r]ecognizing the desirability of establishing through this Convention, with due regard to the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communications, and will promote the peaceful uses of the seas and oceans . . .”).

<sup>120</sup> See *supra* notes 57–61 and accompanying text.

<sup>121</sup> UNFCCC, *supra* note 30, at art. 4(1)(f).

For Annex I Parties, the commitment is to provide information on policies “with the aim of returning” to 1990 levels of anthropogenic greenhouse gas emissions.<sup>122</sup> The phrases “to the extent feasible,” “with a view,” and “with the aim” demonstrate the same lack of substance as does the “seek to agree” provision in UNCLOS.

There are some important differences between the approaches taken in these treaties. First, the provisions quoted from UNCLOS in the preceding paragraphs do not include the principle of common but differentiated responsibility; however, UNCLOS does provide favorable treatment to developing, geographically disadvantaged states and to coastal states whose economies are overwhelmingly dependent on the resources in their EEZ.<sup>123</sup> This favorable treatment does not exempt the states from limits and does not extend to the high seas, and thus, it is *consistent* with the overall conservation goals of the treaty.<sup>124</sup> In addition, UNCLOS articles purport to bind all states, not just parties.<sup>125</sup> The UNFCCC, however, includes the principle of common but differentiated responsibility in a form that is *inconsistent* with the treaty’s purpose,<sup>126</sup> and it purports to bind only parties.<sup>127</sup>

The differences between UNCLOS and UNFCCC discussed in the previous paragraphs were made sharper in the next level of agreements. For UNCLOS the next treaty is the Agreement for the Implementation of the Provisions of the United Nations Convention of the Law of the Sea of 10 December 1982, Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks,<sup>128</sup> and for the UNFCCC it is the Kyoto Protocol. It is the thesis of this article that some of the innovative approaches taken in UNCLOS and the UNFSA could be adapted to strengthen the global climate change regime to make it more likely that the objective stated in UNFCCC of “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”<sup>129</sup> will be achieved.

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<sup>122</sup> *Id.* art. 4(2)(b).

<sup>123</sup> UNCLOS, *supra* note 105, art. 62(3).

<sup>124</sup> *Id.* art. 70.

<sup>125</sup> *Id.* art. 87.

<sup>126</sup> *See supra* notes 36–88 and accompanying text.

<sup>127</sup> UNFCCC, *supra* note 30, at art. 23.

<sup>128</sup> Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, Aug. 4, 1995, 2167 U.N.T.S. 3 [hereinafter UNFSA].

<sup>129</sup> UNFCCC, *supra* note 30, at art. 2.

The following section analyzes the innovative approaches of the UNFSA and explores their viability under international law for adaptation in a global climate change regime.

#### IV. INNOVATIVE APPROACHES IN UNFSA TO PREVENT A TRAGEDY OF THE COMMONS

The objective of UNFSA “is to ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks . . . .”<sup>130</sup> As the following discussion demonstrates, UNFSA adopts some unconventional means to achieve this objective. The preamble itself presages some of these progressive methods, which are fleshed out and included in the articles of the treaty. Consider the following provision in the preamble: “Calling for more effective enforcement by flag States, port States and coastal States of the conservation and management measures adopted for such stocks . . . .”<sup>131</sup> This provision anticipates two themes that are developed and adopted in articles of the treaty. The first is that enforcement of treaty requirements will be a major mechanism for achieving collective action.<sup>132</sup> The second is that the once exclusive authority of flag states over ships flying their flags on the high seas<sup>133</sup> will now be shared with port states and coastal states.<sup>134</sup>

UNFSA defines “States Parties” as “States which have consented to be bound by this Agreement and for which the Agreement is in force.”<sup>135</sup> The treaty, however, specifies some important obligations and rights in terms of “States” rather than “States Parties.” For example, when stating the general principles of the treaty, it is States, not States Parties, that are required to “adopt measures to ensure long-term sustainability of straddling fish stocks and highly migratory fish stocks and promote the objective of their optimum utilization.”<sup>136</sup> The term “States Parties” is

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<sup>130</sup> UNFSA, *supra* note 128, at art. 2.

<sup>131</sup> *Id.* at preamble.

<sup>132</sup> *Id.* at preamble, art. 20–21.

<sup>133</sup> See, e.g., UNCLOS, *supra* note 105, at art. 92(1) (“Ships shall sail under the flag of one State only and, save in exceptional cases expressly provided for in international treaties or in this Convention, shall be subject to its exclusive jurisdiction on the high seas.”); Bratspies, *supra* note 102, at 213 (“The flag state enjoys exclusive sovereignty and jurisdiction over its vessels, and a ship navigating the seas may sail only under the flag of the nation in which it is registered.”) and references cited therein.

<sup>134</sup> See *infra* notes 163–165 and accompanying text.

<sup>135</sup> UNFSA, *supra* note 128, at art. 1(2)(a).

<sup>136</sup> *Id.* art. 5(a).

not used in the article at all. The same is true of the article implementing the "precautionary principle."<sup>137</sup> This choice of language was deliberate; it evidences an unarticulated premise on which UNFSA is based: namely, that treaties can bind non-parties. This unarticulated assumption is the basis for articles in the treaty that are necessary to accomplish its objective, which is "to ensure the long-term conservation and sustainable use of straddling fish stocks and highly migratory fish stocks . . . ." <sup>138</sup>

The first article based on this unarticulated assumption that treaties can bind non-parties is article 3, which states in part: "[T]his Agreement applies to the conservation and management of straddling fish stocks and highly migratory fish stocks beyond areas under national jurisdiction . . . ." <sup>139</sup> Giving effect to this provision would mean that these fish stocks are no longer an unregulated commons as they were under the freedom of the seas doctrine that was incorporated into UNCLOS as follows: "No State may validly purport to subject any part of the high seas to its sovereignty."<sup>140</sup> Article 3 of UNFSA, thus, is an attempt by the Conference of Parties to claim a power which none of its members possess. Without this power, UNFSA cannot achieve its objective unless all states that fish the high seas become parties.

The next critical article based on the unarticulated assumption that treaties can bind non-parties is article 7, which prescribes the conservation and management measures to be applied to these fish stocks.<sup>141</sup> All states, both coastal and those fishing on the high seas, are to be regulated as follows: "Conservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety."<sup>142</sup> This compatibility is to be achieved by conforming the conservation and management measures for the high seas to those of the coastal states: "States shall . . . ensure that measures established in respect of such stocks for the high seas do not undermine the effectiveness of [coastal

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<sup>137</sup> *Id.* art. 6; see Phillip M. Kannan, *The Precautionary Principle: More than a Cameo Appearance in United States Environmental Law?*, 31 WM. & MARY ENVTL. L. & POL'Y REV. 409, 409–10 (2007) (describing the precautionary principle as "a risk management theory that elaborates on the simple command 'show me'").

<sup>138</sup> *Id.* art. 2.

<sup>139</sup> *Id.* art. 3.

<sup>140</sup> UNCLOS, *supra* note 105, at art. 89.

<sup>141</sup> UNFSA, *supra* note 128, at art. 7.

<sup>142</sup> *Id.* art. 7(2).

states' conservation and management] measures.”<sup>143</sup> If the States are unable to agree on compatible measures, any concerned State may invoke the dispute settlement procedure.<sup>144</sup> This procedure makes the dispute-settlement provisions of Part XV of UNCLOS applicable to parties of UNFSA even if such parties are not parties to UNCLOS.<sup>145</sup>

Article 8 is also based on the unarticulated premise that treaties can bind non-parties. It requires coastal States and other States that fish for straddling fish stocks and highly migratory fish stocks to pursue cooperation through either a regional fisheries management organization or a direct agreement.<sup>146</sup> To encourage this collective action, a high price is put on failure to reach an agreement: “Only those States which are members of such an organization or participants in such an agreement, or which agree to apply the conservation and management measures established by such organization or arrangement, shall have access to the fishery resources to which those measures apply.”<sup>147</sup> This provision is intended to assure that all States that fish for these fish stocks are bound by the same conservation and management measures. The provision is implemented by an injunction to all states:

A State which is not a member of a subregional or regional fisheries management organization or is not a participant in a subregional or regional fisheries management arrangement, and which does not otherwise agree to apply the conservation and management measures established by such organization or arrangement . . . shall not authorize vessels flying its flag to engage in fishing operations for the straddling fish stocks or highly migratory fish stocks which are subject to the conservation and management measures established by such organization or arrangement.<sup>148</sup>

When this mandate is coupled with the requirements of article 7, discussed above (that those measures must be compatible to those of the coastal states),<sup>149</sup> the result is, in effect, to make coastal states' conservation

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<sup>143</sup> *Id.* art. 7(2)(a).

<sup>144</sup> *Id.* art. 7(4).

<sup>145</sup> *Id.* art. 30(2).

<sup>146</sup> UNFSA, *supra* note 128, at art. 8(1).

<sup>147</sup> *Id.* art. 8(4).

<sup>148</sup> *Id.* art. 17(2).

<sup>149</sup> See *supra* notes 142–145 and accompanying text.



and management measures the collective response to the risk of over-exploitation of these fish stocks. By use of the term "States" rather than "Parties" in these articles, the treaty purports to bind non-parties. One commentator summarized the effects of these articles as follows:

When read together, Articles 8 and 17 of the Agreement purport to impose conservation obligations on all vessels—even those whose flag state is party to neither the Straddling Stock Agreement nor the RFO [Regional Fisheries Organization] under which the conservation obligations arise. Any vessels that refuse to comply with obligations its flag state has not assumed (and may even be presumed to have rejected) on their behalf will be excluded from the fisheries.<sup>150</sup>

As the discussion above demonstrates,<sup>151</sup> fundamental provisions in UNFSA rest on the unarticulated premise that a treaty can be made to bind non-parties. If that premise is valid under international law, it could be a powerful means to include in treaties to control global climate change. However, the legal validity of the premise is highly doubtful.

The premise that treaties can be binding on non-parties is a deviation from usual principles of international law. For example, the Vienna Convention on the Law of Treaties states: "A treaty does not create either obligations or rights for a third State without its consent."<sup>152</sup> This principle is referred to as the *pacta tertiis* rule.<sup>153</sup> The premise in UNFSA also appears to be inconsistent with the intent of UNCLOS, which is, as reflected in the following article, to leave the high seas beyond the control of all sovereigns: "No State may validly purport to subject any part of the high seas to its sovereignty."<sup>154</sup>

Professor Erik Franckx, Director of the Center for International Law, Vrije Universiteit Brussel, after noting that the *pacta tertiis* rule is a well-established principle of international law, thoroughly analyzed the provisions in UNFSA that arguably could be in conflict with this rule. For

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<sup>150</sup> Bratspies, *supra* note 102, at 239.

<sup>151</sup> See *supra* notes 135–147 and accompanying text.

<sup>152</sup> Vienna Convention on the Law of Treaties, art. 34, May 23, 1969, 1155 U.N.T.S. 331 (entered into force on Jan. 27, 1980).

<sup>153</sup> See, e.g., Erik Franckx, *Pacta Tertiis and the Agreement for the Implementation of the Straddling and Highly Migratory Fish Stocks Provisions of the United Nations Convention on the Law of the Sea*, 8 TUL. J. INT'L & COMP. L. 49, 53 (2000).

<sup>154</sup> UNCLOS, *supra* note 105, at art. 89.

example, regarding article 8(4) which purports to restrict access to fishery resources as discussed above,<sup>155</sup> Professor Franckx concluded: “Because of [article 8(4)’s] novel character, this provision appears to reflect progressive development rather than codification of present day international law. As a consequence, even though the Article in question only uses the term ‘States,’ its application remains restricted to the parties to the 1995 Agreement [UNFSA].”<sup>156</sup> After his analysis of the novel provisions in UNFSA, Professor Franckx concluded:

This Article cannot but reach the conclusion that the 1995 Agreement [UNFSA] as a violation of the *pacta tertiis* rule appears not totally convincing. On the contrary, a careful analysis seems to demonstrate that this Agreement does not create obligations for third states, but only for states parties, i.e., those states which have consented to be bound by the 1995 Agreement and for which this document entered into force.<sup>157</sup>

The attempt in article 8(4) of UNFSA to bind non-parties failed because it was not based on customary international law and was not the implementation of any provision in UNCLOS. However, the drafters of UNFSA were more successful in binding non-parties in article 21. It is the approach used there that holds promise for use in the regime to prevent global climate change.

Article 21 reflects a process Professor Geoffrey Palmer calls prolepsis.<sup>158</sup> The word “prolepsis” means: “Anticipation as [for example] the representation or assumption of a future act or development as if presently existing or accomplished.”<sup>159</sup> Professor Palmer explains the possibility of using prolepsis to change the unanimous consent rule for creating norms, which is customary international law, as follows:

Procedures for the creation of norms are agreed upon.  
Those procedures include a provision that in respect of

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<sup>155</sup> See *supra* note 147 and accompanying text.

<sup>156</sup> Franckx, *supra* note 153, at 63.

<sup>157</sup> *Id.* at 71–72.

<sup>158</sup> Geoffrey Palmer, *New Ways to Make International Environmental Law*, 86 AM. J. INT’L L. 259, 273 (1992).

<sup>159</sup> MERRIAM-WEBSTER DICTIONARY, available at <http://www.merriam-webster.com/dictionary/prolepsis>.

certain rules or in certain circumstances unanimous consent is not required. The norms created by using the procedures did not necessarily receive unanimous consent but are binding on any nation that did not consent because they were created by agreed procedures. Nations thus consent in advance to be bound by norms whose content is unknown at the time of the consent.<sup>160</sup>

The key concept in Palmer's definition of prolepsis is that states agree on "procedures for the creation of norms."<sup>161</sup> This reflects the idea included in the definition of prolepsis of anticipation of future development. Once the norm-creating procedure is agreed to by states, when it is applied to create a norm, all states that consented to the procedure are bound by the norm, whether or not they agree with it.

Article 21 of UNFSA illustrates the theory of prolepsis. Article 21 anticipates that certain areas of the high seas will be subject to agreements under subregional or regional fisheries management organizations or equivalent arrangements.<sup>162</sup> The parties to UNFSA concluded that, to enforce conservation and management measures in these agreements, it would be necessary that these agreements include a procedure that authorized parties to these agreements to board and inspect vessels on the high sea flagged to parties to UNFSA whether or not the flag state was a party to the subregional or regional fisheries management organization or equivalent arrangement.<sup>163</sup> Article 21 then requires the following: "States shall establish, through subregional or regional fisheries management organizations or arrangements, procedures for boarding and inspection pursuant to [article 21(1)]."<sup>164</sup> Thus, parties to UNFSA through article 21(1) agreed, in advance of the existence of agreements under the subregional or regional fisheries management organization or equivalent arrangement, to be bound by the boarding and inspection provisions such agreements

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<sup>160</sup> Palmer, *supra* note 158, at 273.

<sup>161</sup> *Id.* The Administrative Procedure Act provides an analogue in U.S. law in which rule-making is the counterpart to norm making. See 5 U.S.C. §§ 551–59 (2006); see also Phillip M. Kannan, *The Logical Outgrowth Doctrine in Rulemaking*, 48 ADMIN. L. REV. 213, 213–14 (1996) (analyzing rule-making procedures under the Administrative Procedure Act). Rules, which are within an agency's delegation from Congress, have the force and effect of law if issued in accordance with the Administrative Procedure Act. *Chevron U.S.A. v. Natural Res. Def. Council*, 467 U.S. 837, 843–44 (1984).

<sup>162</sup> UNSFA, *supra* note 128, at art. 21.

<sup>163</sup> *Id.* art. 21(1).

<sup>164</sup> *Id.* art. 21(2).

contain whether or not they agree with them. Professor Franckx arrived at this same conclusion regarding article 21(1):

The fact remains that states, party to the 1995 Agreement [UNFSA] will nevertheless be bound by regional measures to which they have not agreed. But how can one pretend to violate a basic principle of international law [i.e., *pacta tertiis*] if one has voluntarily agreed beforehand to change that very same principle?<sup>165</sup>

In summary, the lessons learned from the above analysis of the regime to protect straddling fish stocks and highly migratory fish stocks on the high seas are the following: first, a treaty provision that purported to impose binding greenhouse gas emission limits on states that are not parties to the treaty probably would not be enforceable. This follows from the analysis of article 8(4) of the UNFSA.<sup>166</sup> Second, introduction of the concept of prolepsis into the global climate change regime could convert the static common but differentiated responsibility provision in the global climate change regime into a dynamic process adequate to respond to the dynamic nature of the economic, ecological, and social forces causing the problem.<sup>167</sup>

To facilitate the application of the second of these lessons learned to the problem of global climate change resulting from greenhouse gas pollution, this article explores the use of prolepsis to mitigate the environmental harm of a different air pollutant, namely, ozone depleting substances.

#### V. THE USE OF PROLEPSIS IN THE MONTREAL PROTOCOL TO PREVENT A TRAGEDY OF THE COMMONS

Ultraviolet radiation (“UV-B”) from the sun enters the Earth’s atmosphere in the stratosphere.<sup>168</sup> Some of the ultraviolet radiation is absorbed there by ozone.<sup>169</sup> This absorption destroys the ozone molecule, but under normal conditions the destruction is offset: “An equilibrium is maintained, however, by a series of chemical reactions that create ozone

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<sup>165</sup> Franckx, *supra* note 153, at 65 (internal citations omitted).

<sup>166</sup> See *supra* notes 153–157 and accompanying text.

<sup>167</sup> See *supra* notes 163–165 and accompanying text.

<sup>168</sup> *Ozone Layer Protection Glossary*, EPA, <http://www.epa.gov/ozone/defns.html> (last visited Jan. 30, 2012).

<sup>169</sup> DAVID HUNTER ET AL., *INTERNATIONAL ENVIRONMENTAL LAW AND POLICY* 527–28 (2d ed. 2002).

as a counterbalance to the ozone destroyed through absorption of UV-B radiation.”<sup>170</sup> If the concentration of ozone in the stratosphere is reduced, the equilibrium is upset and less ultraviolet radiation will be absorbed there, and more of it will reach the lower atmosphere and the Earth’s surface.<sup>171</sup> Such increases in UV-B radiation cause harm to human health and to the environment.<sup>172</sup> The adverse effects on human health are “increased skin cancers, cataracts and sunburns” and the “suppress[ion of] the immune systems in humans with respect to some diseases.”<sup>173</sup> Also, UV-B radiation reduces plants and marine phytoplankton; these effects ripple through ecosystems to produce further harm.<sup>174</sup>

A group of chemicals called ozone depleting substances, including, for example, chlorofluorocarbons (“CFCs”), can cause the destruction of ozone in the stratosphere.<sup>175</sup> If these substances are emitted into the atmosphere, they can travel to the ozone layer and interfere with the equilibrium discussed in the previous paragraph, which will lead to the harm discussed there. To mitigate this risk, the international community negotiated the Vienna Convention for the Protection of the Ozone Layer, which set up an administrative structure for scientific studies, data collection, and technology development, but which imposed no limits on the emission of ozone depleting substances.<sup>176</sup> The Montreal Protocol on Substances that Deplete the Ozone Layer was negotiated for that purpose.<sup>177</sup>

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<sup>170</sup> *Id.* at 528.

<sup>171</sup> *Id.* at 528–29.

<sup>172</sup> *Benefits of the CFC Phase Out*, EPA, <http://www.epa.gov/ozone/geninfo/benefits.html> (last visited Jan. 30, 2012) [hereinafter *Benefits of the CFC Phase Out*]. For an exhaustive analysis of the costs and benefits of the U.S. ozone protection program, including the health and environmental effects, see EPA, STRATOSPHERIC OZONE ASSESSMENT, APPENDIX G, G-16 (for example, estimating: “melanoma and non-melanoma skin cancers—6.3 million lives saved from skin cancer between 1990 and 2165”), available at [http://www.epa.gov/cleanairactbenefits/1990-2010/ch\\_apg.pdf](http://www.epa.gov/cleanairactbenefits/1990-2010/ch_apg.pdf).

<sup>173</sup> HUNTER ET AL., *supra* note 169, at 530–31.

<sup>174</sup> *Id.* at 531.

<sup>175</sup> *Benefits of the CFC Phase Out*, *supra* note 172.

<sup>176</sup> Vienna Convention for the Protection of the Ozone Layer, Mar. 22, 1985, T.I.A.S. No. 11,097, 1513 U.N.T.S. 293 [hereinafter Vienna Convention].

<sup>177</sup> Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, 26 I.L.M. 1550 [hereinafter Montreal Protocol], available at [http://ozone.unep.org/Ratification\\_status/montreal\\_protocol.shtml](http://ozone.unep.org/Ratification_status/montreal_protocol.shtml). Many of the ozone depleting substances controlled by the Montreal Protocol are powerful greenhouse gases. For an analysis of the Montreal Protocol and how it might be used directly to mitigate global climate change, see Mark W. Roberts & Peter M. Grabel, *A Window of Opportunity: Combating Climate Change by Amending the Montreal Protocol to Regulate the Production and Consumption of HFCs and ODS Banks*, 22 GEO. INT’L ENVTL. L. REV. 99 (2009).

The Montreal Protocol set limits on the production and consumption of a broad group of ozone depleting substances; they are called controlled substances in the protocol.<sup>178</sup> For example, for the year beginning seven months after the protocol entered into force, parties could not exceed their 1986 level of consumption of a specified group of controlled substances, and by July 1, 1993 they could not exceed eighty percent of their 1986 levels for these substances.<sup>179</sup> Article 2 includes the following procedure, which applies prolepsis, to reduce the limits if scientific analysis demonstrates that adjustments are necessary:

The Parties may decide whether . . . adjustments and reductions of production or consumption of the controlled substances . . . should be undertaken and, if so, the scope, amount and timing . . . . In taking such decisions, the Parties shall make every effort to reach agreement by consensus. If all efforts at consensus have been exhausted, and no agreement reached, such decisions shall, as a last resort, be adopted by a two-thirds majority vote of the Parties present and voting [representing a majority of developed and developing Parties].<sup>180</sup>

In this article, the parties to the Montreal Protocol agreed to a procedure that would bind all parties, including those that disagreed, to new limits on the production and consumption of controlled substances.<sup>181</sup> Through this process, adjustments were made that ultimately resulted in the phasing out of production and consumption of the substances controlled by the Montreal Protocol.<sup>182</sup>

To appreciate how far the international community had progressed in its understanding that each state must agree to limit its

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<sup>178</sup> Montreal Protocol, *supra* note 177, at art. 1 and 2.

<sup>179</sup> *Id.* at art. 2(1) and 2(3). The original text of the Montreal Protocol is available at [http://ozone.unep.org/new\\_site/en/Treaties/treaty\\_text.php?treatyID=8](http://ozone.unep.org/new_site/en/Treaties/treaty_text.php?treatyID=8).

<sup>180</sup> *Id.* at art. 2(9)(a) and (c).

<sup>181</sup> *Id.* at art. 2.

<sup>182</sup> *Ozonaction: Building on the Montreal Protocol's Success and Facing the Challenges Ahead*, UNITED NATIONS ENV'T PROGRAMME, available at [http://www.unep.fr/ozonaction/information/mmcfiles/3139-e-OASIO9\\_2010andThen.pdf](http://www.unep.fr/ozonaction/information/mmcfiles/3139-e-OASIO9_2010andThen.pdf); see also EDITH BROWN WEISS ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 566–73 (2d ed. 2007) (giving a chronology of the 1990 London Adjustments and Amendments and the Copenhagen Adjustments and Amendments of 1992 to the Montreal Protocol that ultimately led to the phase out).

sovereignty in order to protect global commons, consider article 10 in the Vienna Convention. Here, the parties agreed that annexes were limited to scientific, technical, and administrative matters.<sup>183</sup> For the Vienna Convention, annexes could be adopted by a two-thirds majority,<sup>184</sup> and for any protocol under the Vienna Convention, they could be adopted by a three-fourths majority.<sup>185</sup> However, in both cases, any party that did not agree with an annex adopted under these procedures could opt out.<sup>186</sup>

The inclusion of the proleptic provision in article 9 of the Montreal Protocol with no opt out possibility reflects the ecological reality that one party can act as a spoiler and negate the efforts and achievements of all the other parties.<sup>187</sup> The prolepsis in article 9 makes the Montreal Protocol a dynamic agreement that can make real time adjustments in standards when data and scientific analysis indicate a need. It enables the parties to continue the precautionary approach that they embraced when they negotiated mandatory limits on CFCs even though the scientific evidence was incomplete.<sup>188</sup> This, in turn, enables the parties to prevent harm, not merely react to it. It is exactly this power that is absent from the global climate change regime.<sup>189</sup> It allows spoilers to arise and even guarantees their right to continue to be spoilers.<sup>190</sup>

The Montreal Protocol is proof that the international community can develop universal norms when it recognizes that it faces a risk that can be mitigated only by binding all states. The challenge is to introduce that reality into the global climate change regime. As the discussion regarding straddling fish stocks and highly migratory fish stocks as well as the analysis of the convention and protocol for protecting the ozone layer illustrate, this can be accomplished by adopting the proleptic approach.

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<sup>183</sup> Vienna Convention, *supra* note 176, at art. 10(1).

<sup>184</sup> *Id.* art. 10(2)(a).

<sup>185</sup> *Id.* art. 9(3).

<sup>186</sup> *Id.* art. 10(2)(b).

<sup>187</sup> See Montreal Protocol, *supra* note 177, at art. 9.

<sup>188</sup> See Phillip M. Kannan, *The Precautionary Principle: More than a Cameo Appearance in United States Environmental Law?*, 31 WM. & MARY ENVTL. L. & POL'Y REV. 409, 429 (2007) ("[T]he parties to [the Montreal Protocol] did not wait for scientific certainty that several chemicals were causing the depletion of the ozone layer before accepting binding obligations to eliminate their production and consumption.").

<sup>189</sup> See UNFCCC, *supra* note 30, at art. 3 (omitting this type of constraint in its principles provision).

<sup>190</sup> See *id.*



## VI. MAKING THE GLOBAL CLIMATE CHANGE REGIME DYNAMIC

The global climate change regime has been on a collision course with itself from the beginning. First, it adopted the objective of “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”<sup>191</sup> but failed to impose an overall limit on greenhouse gas emissions or individual limits on all emitters.<sup>192</sup> Second, it incorporated the precautionary principle<sup>193</sup> but renounced the authority to take necessary action in the face of threats of serious or irreversible damage by adopting the Berlin Mandate which guaranteed non-Annex I Parties that emission limits for greenhouse gases would not be imposed on them.<sup>194</sup> This section explores ways to resolve these internal inconsistencies and make the regime dynamic, responsive, and effective in achieving its stated objective.

The first step that must be taken to eliminate these internal inconsistencies is to repeal the Berlin Mandate and its implementation in the Kyoto Protocol. Three benefits would be realized from this. First, it would provide operational freedom to respond to economic and ecological changes.<sup>195</sup> This would increase the probability that greenhouse gas emissions actually will be reduced.<sup>196</sup> Second, it would remove a major political obstacle impeding U.S. support. The argument that any reduction in greenhouse gas emissions would be offset by increased emissions from China and India would be taken away.<sup>197</sup> Finally, it would deprive opponents of the United States accepting a binding limit on greenhouse gas emissions of the argument that doing so would put the United States at an economic disadvantage relative to China, India, and other states with large, rapidly expanding economies.<sup>198</sup>

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<sup>191</sup> *Id.* at art. 2.

<sup>192</sup> *See generally id.* at art. 3.

<sup>193</sup> *Id.* at art. 3(3); *see also* Kannan, *supra* note 137.

<sup>194</sup> *See supra* notes 48–82 and accompanying text.

<sup>195</sup> *See, e.g.,* PARKER ET AL., *supra* note 87, at 6–8 (noting the Bush Administration’s criticism of the Kyoto Protocol as being costly, inflexible, and, due to its exemption of China and other developing countries from its provisions, lacking comprehensiveness).

<sup>196</sup> *See id.* at 8–9 (noting President Bush’s outline for a new approach to climate change, including focus on global participation along with the promotion of economic growth).

<sup>197</sup> *See, e.g.,* Mass. v. EPA, 549 U.S. 497, (2007) (stating “[the EPA took the position that] predicted increases in greenhouse gas emissions from developing nations, particularly China and India, [were] likely to offset any marginal domestic decrease [resulting from regulating new vehicle greenhouse gas emissions]”).

<sup>198</sup> *See, e.g.,* PARKER ET AL., *supra* note 87, at 7 (“In a June 11, 2001 speech on global climate change, the President stated that the Kyoto Protocol was ‘fatally flawed in fundamental

The next step is to use the freedom created by repealing the Berlin Mandate to negotiate an amendment to the UNFCCC that makes the global climate change regime dynamic. An article incorporating the prophetic principle should be added. In this article the parties would specify the conditions under which a non-Annex I Party would be reclassified as an Annex I state and the conditions under which a reclassified state would become an Annex B state under the Kyoto Protocol.<sup>199</sup> These conditions would include quantitative standards; for example, they could include a stated number of tons of greenhouse gases emitted in a year or a percentage of the total global emissions for a year which would trigger reclassification. The quantitative threshold would have to be set at a level that assured that the cumulative effect of all the emissions below the threshold would not pose a significant risk to the global climate.<sup>200</sup> To put this condition in other terms, the threshold must be set so that if the greenhouse gas emissions of all non-Annex I Parties approached the threshold, the cumulative effect would not be significant.

This new article would also give the Conference of Parties<sup>201</sup> the power to set implementation schedules, to decide whether there would be sources to help fund the costs of implementing the cap, to decide whether there would be subsidized technology transfers, to establish the percentage increase or decrease of greenhouse gas emissions to be achieved, and to establish base years from which the increases or decreases must be measured. All of the decisions, including the listing actions, would be made based on a procedure spelled out in the amendment. One element of the procedure would be that all parties agreed to be bound by a super majority standard, not a unanimous vote standard.

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ways.' A primary flaw outlined by the President was the exemption of China and other developing countries from its provisions. This 'comprehensiveness' concern was closely followed by 'cost' and 'competitiveness concerns . . .').

<sup>199</sup> The Kyoto Protocol would have to be amended to reflect the amendments to the UNFCCC. It would have a provision specifically granting the Conference of Parties of the UNFCCC authority to set the reduction limits on greenhouse gas emissions for Annex B parties.

<sup>200</sup> This requirement is analogous to the following prerequisite to the issuance of general permits under the Clean Water Act: "[T]he Secretary may . . . issue general permits . . . for any category of activities involving discharges of dredged or fill material if the Secretary determines that the activities in such category are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effect on the environment." 33 U.S.C. § 1344(e) (2006).

<sup>201</sup> See *supra* notes 44–51 and accompanying text.

Using as a model article 2 of the Montreal Protocol, the amendment could include a first paragraph developed from the following *pro forma* version:

(a) The Parties are hereby authorized to decide whether a non-Annex I Party is to be added to Annex I to the UNFCCC and Annex B of the Kyoto Protocol. If a non-Annex I Party emitted at least X tonnes of greenhouse gases in either of the two most recent calendar years or if such party's greenhouse gas emissions in either of those years was greater than Y% of the total global greenhouse gas emissions, the non-Annex I Party shall be included as an Annex I Party at the first meeting of the Conference of Parties of the UNFCCC after such data becomes known to the Secretary and an Annex B party at the first meeting of the Conference of Parties of the Kyoto Protocol after such data becomes known to the Secretary. If the Conference of Parties decides to add a non-Annex I Party to these two annexes, it will decide all issues directly related to such listings, including, but not limited to, setting implementation schedules, deciding whether there will be sources to help fund the costs of implementing the cap, deciding whether there will be subsidized technology transfers, establishing the percentage increase or decrease of greenhouse gas emissions to be achieved, and setting base years from which the increases or decreases must be made. In taking any decision under this article, including adding a non-Annex I Party to Annex I and Annex B, the Parties shall make every effort to reach agreement by consensus. If all efforts at consensus have been exhausted, and no agreement reached, such decision shall, as a last resort, be adopted by a two-thirds majority vote of the Annex I parties, present and voting, and a two-thirds majority vote of the non-Annex I Parties, present and voting.

Some other issues that might be relevant to the reclassification of a party under the amendment proposed above could include a schedule for ending eligibility of the party under consideration to benefit from clean

development mechanisms,<sup>202</sup> the date on which the reclassified party could begin trading emission reduction units,<sup>203</sup> the date at which eligibility for funding under the funding mechanism would end, and the date on which contribution to the funding mechanism would begin,<sup>204</sup> and issues regarding technology transfer.<sup>205</sup> All such decisions would have to be taken in accordance with the procedure given in the proposed article.

The next paragraph in the article in the proposed amendment would specify a mandatory dispute settlement procedure. This provision would also be based on prolepsis. It would be modeled on the dispute settlement procedures in UNCLOS and UNFSA; however, instead of a limited scope of application, it would have an expansive jurisdictional reach.

UNFSA specifically adopts and incorporates the procedures of the settlement of disputes in UNCLOS.<sup>206</sup> The operative provision in UNCLOS is the following: "Subject to section 3, any dispute concerning the interpretation or application of this Convention shall, where no settlement has been reached by recourse to section 1, be submitted at the request of any party to the dispute to the court or tribunal having jurisdiction under this section."<sup>207</sup> Parties to the convention must have selected "the court or tribunal having jurisdiction" when they signed, ratified, or acceded to UNCLOS.<sup>208</sup> The limitations imposed by section 3, which are explicitly adopted in UNFSA,<sup>209</sup> limit the compulsory binding dispute settlement procedure in UNFSA to the narrow set consisting of disputes pertaining

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<sup>202</sup> Under this mechanism, an Annex I Party can invest in an emission reduction project to be carried out in a non-Annex I state. Some percentage of the certified emission reductions that result from the project can be applied by the Annex I Party toward complying with its cap. Kyoto Protocol, *supra* note 52, at art. 12; see Breidenich et al., *supra* note 46, at 325 (discussing the history of article 12 and its use).

<sup>203</sup> Kyoto Protocol, *supra* note 52, at art. 6. See also David M. Driesen, *Free Lunch or Cheap Fix?: The Emissions Trading Idea and the Climate Change Convention*, 26 B.C. ENVTL. AFF. L. REV. 1, 31 (1998) (discussing emissions trading and some of the complexity it creates).

<sup>204</sup> See UNFCCC, *supra* note 30, at art. 11 (discussing financial mechanisms for UNFCCC).

<sup>205</sup> *Id.* art. 4(1)(c); Kyoto Protocol, *supra* note 52, at art. 11(2)(b); see also Lorelyn Hall, *Technology Transfer under United Nations Framework Convention on Climate Change*, 17 COLO. J. INT'L ENVTL. L. & POL'Y 59 *passim* (2005 Yearbook) (discussing technology transfer obligations).

<sup>206</sup> UNFSA, *supra* note 128, at art. 30(1) ("The provisions relating to the settlement of disputes set out in Part XV of the [UNCLOS] apply *mutatis mutandis* to any dispute between States Parties to this Agreement concerning the interpretation or application of this Agreement, whether or not they are also Parties to the [UNCLOS].").

<sup>207</sup> UNCLOS, *supra* note 105, at art. 286.

<sup>208</sup> *Id.* art. 286, 287(1).

<sup>209</sup> UNFSA, *supra* note 128, at art. 32.

to high seas fisheries.<sup>210</sup> Limiting the scope of the procedure to a narrow set of disputes would not be included in the proposal given below for adaptation in the global climate change regime.

The second paragraph of the article to be adopted in the amendment to UNFCCC would provide for compulsory procedures for binding decisions. The following is a *pro forma* version of the second paragraph:

(b) Any dispute (choose one of the following for the scope of this provision): [arising from or related to], [directly resulting from], or [listed in Appendix W<sup>211</sup> regarding] the interpretation or application to paragraph (a) of this article will be resolved according to the following procedure:

Any such dispute, where no settlement has been reached within 30 days, shall be submitted at the request of any party to the dispute to the court or tribunal having jurisdiction under this article. When signing, ratifying, or acceding to this Amendment, a State must choose by means of written declaration one or more of the following means for the settlement of disputes: (1) the International Court of Justice or (2) an arbitral tribunal constituted in accordance with Appendix Z.<sup>212</sup> If the parties have accepted different means of dispute settlement, they hereby agree to submit the dispute to an arbitral tribunal constituted in accordance with Appendix Z.

In paragraph (b) as in paragraph (a) the parties agree to limit their sovereignty by accepting a procedure and binding themselves to the outcome that results when the procedure is engaged even if they disagree with the outcome. They accept norm-producing procedures whose norms are binding on all parties to the treaties.

Including in the climate change regime the dynamics reflected in the above discussion will be a difficult task. It is evident from the discussion of the UNFSA that merely including in a treaty an article that purports to

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<sup>210</sup> Franckx, *supra* note 153, at 79–80.

<sup>211</sup> Appendix W would contain a list of disputes the parties had accepted as the scope of this provision. If this approach were taken, the article would provide that a two-thirds majority vote would suffice to make additions and deletions to Appendix W.

<sup>212</sup> Appendix Z would define the process for constituting an arbitral tribunal and specify its rules of procedure.

bind non-parties will not be effective.<sup>213</sup> However, including it in a treaty to which all states that can pose a significant threat to the global climate are parties can be effective. The Montreal Protocol provides a model for achieving such acceptance.

The basic mechanism in the Montreal Protocol for achieving acceptance can be summarized as follows: Reward parties and penalize non-parties. Developing parties are rewarded by having their full incremental costs paid from a fund,<sup>214</sup> by receiving the best available technology to facilitate compliance,<sup>215</sup> by being granted extended compliance schedules,<sup>216</sup> by being allowed to increase their production and consumption of ozone depleting substances by a stated percentage during these extended periods,<sup>217</sup> and by being a party to protected import-export markets in ozone depleting substances and possibly products containing ozone depleting substances<sup>218</sup> or manufactured using ozone depleting substances.<sup>219</sup> Non-parties who do not agree to implement the substantive requirement of the Montreal Protocol are penalized by being frozen out of these import-export markets.<sup>220</sup>

The proposed amendment, discussed above,<sup>221</sup> to the global climate change regime should include the Montreal Protocol's approach of rewarding parties and penalizing non-parties. The kernels of some of these features are included in the current regime; for example, UNFCCC calls for full incremental costs payment to developing parties for compliance<sup>222</sup> and establishes a fund from which such payments will be made.<sup>223</sup> The clean development mechanism process in the Kyoto Protocol is a technology transfer process.<sup>224</sup> What is missing from the current global climate

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<sup>213</sup> See *supra* notes 152–157 and accompanying text.

<sup>214</sup> Montreal Protocol, *supra* note 177, at art. 10.

<sup>215</sup> *Id.* art. 10A.

<sup>216</sup> *Id.* arts. 2, 5.

<sup>217</sup> *Id.*

<sup>218</sup> Examples of products that might contain ozone depleting substances include automobiles, trucks, refrigerators, scientific equipment, and industrial equipment. Examples of products that might be manufactured using ozone depleting substances include computers.

<sup>219</sup> Montreal Protocol, *supra* note 177, at art. 4 (prohibiting this trade between parties and non-parties who do not agree to be bound by the provisions of the Montreal Protocol, but not between parties).

<sup>220</sup> *Id.*

<sup>221</sup> See *supra* notes 199–212 and accompanying text.

<sup>222</sup> UNFCCC, *supra* note 30, at art. 4(3).

<sup>223</sup> *Id.* art. 12.

<sup>224</sup> Kyoto Protocol, *supra* note 52, at art. 12.



change regime is the other half of the Montreal Protocol formula, namely, penalizing non-parties.<sup>225</sup>

The penalty half of the formula should be modeled after that in the Montreal Protocol; that is, through import and export restrictions that disadvantage non-parties and reward parties with economic benefits.<sup>226</sup> To implement this approach, the parties should agree on a list of products that parties are prohibited from importing from non-parties. This might include solar panels, wind turbines, and other equipment used to generate renewable energy; this would leave such products for use by the nonparty. The list might include electric energy generated by a nonparty. It could include vehicles produced by non-parties. There would be a second list of products that parties could not export to non-parties. This list might include coal and coal-burning technology that did not meet a best available technology standard. It might include electric energy generated by non-renewal technology and vehicles that are not the lowest greenhouse emitters. Both of these lists would be developed and supplemented by a vote in the Conference of Parties and would not require a unanimous consent. In other words, the proleptic principle would be adopted so as to implement a norm-producing procedure binding on all the parties. This economic pain to non-parties combined with the economic benefits to parties should produce by consent what cannot be accomplished by fiat, namely, universal acceptance of the proposed amendment to the global climate change regime.

## CONCLUSION

The current system attempts to mitigate global climate change by confronting a dynamic problem with a static response. The climate systems and the economic systems are constantly changing in complex ways; the mitigation response is tied to the conditions and assumptions of the late 1980s and early 1990s.<sup>227</sup> This presents a fundamental incompatibility between the causes of the risk and the responses of the international community. The only resolution of this conflict is to adopt a different response.

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<sup>225</sup> Compare Kyoto Protocol, *supra* note 52, with Montreal Protocol, *supra* note 177.

<sup>226</sup> See Lakshman Guruswamy, *The Promise of the United Nations Convention on the Law of the Sea (UNCLOS): Justice in Trade and Environment Disputes*, 25 *ECOLOGY L.Q.* 189 (1998) (discussing the use of trade penalties in international environmental agreements).

<sup>227</sup> RICHARD SJ TOL, COPENHAGEN CONSENSUS CENTER, AN ANALYSIS OF MITIGATION AS A RESPONSE TO CLIMATE CHANGE 5 (2009), (discussing early climate change impact statements), available at <http://fixtheclimate.com/component-1/the-solutions-new-research/mitigation> (downloadable PDF located under “Analysis Paper”).



The first step in changing the response is to make it dynamic. It must be freed from the ossification based on an impractical version of sovereignty that empowers any state with significant and sharply increasing levels of greenhouse gas emissions to foil the collective action of the other states of the world. It must be *continuously* changed and *continuously* improved; freezing it to the conditions in the 2010s would be just as flawed as freezing it to the 1980s and 1990s. The proleptic principle is the tool that can make the response dynamic and nimble, that can give it the power of continuous improvement, and that can give it a chance to succeed.

Substantive standards, such as the caps imposed by Annex B of the Kyoto Protocol, are critical. Just as critical is the global acceptance of a norm-making procedure whose norms are binding on all states. This is a strategy based on prolepsis. The resulting norms often will be substantive. This procedure will require a super majority vote, but not unanimity. This procedure can be used to determine which states will be added to the Annex B of the Kyoto Protocol, what their caps will be, and all other consequences of this listing. It can be used also to adjust the caps for states currently in Annex B.

The fatal flaw in the current collective action strategy for mitigating global climate change is that some major economies, which emit significant levels of greenhouse gases, have no cap on those emissions. Today, China and India are examples.<sup>228</sup> In ten years it might be Brazil<sup>229</sup> and Indonesia,<sup>230</sup> and in twenty years, Mexico.<sup>231</sup> A norm-making procedure as developed in this article and summarized in the preceding paragraph provides the flexibility to adjust the response to fit the changing economic and scientific realities.

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<sup>228</sup> Chris Buckley, *China Says Emissions Goal Already Tough, No Cap for Now*, REUTERS (Sept. 29, 2010), available at <http://www.reuters.com/assets/print?aid=USTRE68S0V720100929>; *India Gives Cold Shoulder to U.S. on Climate Change Emission Caps*, ABC NEWS (July 19, 2009), available at <http://abcnews.go.com/International/story?id=8122633&page=1>.

<sup>229</sup> *The Business Case for Climate Change: Brazil*, ERNST & YOUNG, <http://ey.mobi/GL/en/Services/Specialty-Services/Climate-Change-and-Sustainability-Services/The-business-case-for-climate-change---Brazil> (last visited Nov. 12, 2011).

<sup>230</sup> *Fact Sheet Indonesia, Norway-Indonesia Partnership REDD+*, NORWAY—THE OFFICIAL SITE IN INDONESIA (May 25, 2010), <http://www.norway.or.id/PageFiles/404362/FactSheetIndonesiaGHGEmissionMay252010.pdf>.

<sup>231</sup> Alex Morales, *Mexico Plans Carbon Market for Pemex, Power, Cement Companies*, BLOOMBERG NEWS (Apr. 9, 2009), <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aKYM6lkFL70g>.

In the classic Humphrey Bogart movie *Casablanca*,<sup>232</sup> the strategy of Captain Renault of rounding up the usual suspects<sup>233</sup> has two flaws that guarantee its futility; first, innocent parties will be rounded up, and second, guilty parties will intentionally not be rounded up. The common but differentiated responsibility strategy in the current global climate change regime most definitely does not have the first flaw; however, over time it has developed a fatal case of the second flaw. Unlike Captain Renault's effort, which was intended to fail, the global climate change regime was intended to succeed. To give it a chance of achieving success, it must be modified to make it a dynamic system that will round up *all likely suspects*. Integrating the principle of prolepsis into that regime offers this possibility.

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<sup>232</sup> CASABLANCA (Warner Bros. 1942).

<sup>233</sup> See Janet H. Murray, *Here's Looking at Casablanca*, <http://www.dm.gatech.edu/~murray/casablancaNEHmagazine.pdf> (last visited Jan. 30, 2012); *Usual Suspects*, THE PHRASE FINDER, <http://www.phrases.org.uk/meanings/the-usual-suspects.html> (last visited Jan. 30, 2012).