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# Alien Invasion! An Ocean Picture Coming to a Sea Near You: An Analysis of International Frameworks for Aquatic Invasive Species Control

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## STUDENT NOTES/COMMENTS

### **Alien Invasion! An Ocean Picture Coming to a Sea Near You: An Analysis of International Frameworks for Aquatic Invasive Species Control**

Kelly Cox\*

*Aquatic invasive species are marine, estuarine, or fresh-water organisms that adversely impact ecosystems they are not native to. Such impacts include long-lasting or permanent damage to habitats, ecosystem balance, and biodiversity. These impacts have a cascading effect on local economies dependent on these natural resources by impeding recreational and commercial activities. Moreover, aquatic invasive species control and management is both complex and challenging due to the lack of physical barriers in aquatic environments to abate or contain the spread of these nuisance species. The Wider Caribbean Region has been notably impacted by the introduction of the non-native lionfish (*Pterois volitans*) which has devastated native fish populations and reef communities. Because of the regional nature of this issue, several international frameworks have sought to address the aquatic invasive species problem. This article conducts a comparative analysis of the provisions employed to address aquatic invasive species within the Convention on Biological Diversity, the International Maritime Organization's Ballast Water Management Convention, and the Cartagena Convention's Specially Protected Areas and Wildlife Protocol. Further, this article assesses the efficacy of these international legal frameworks and the various control and enforcement mechanisms they require. Climate change is dynamically impacting the distribution of native species and*

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\* 3L at the University of Miami pursuing a joint J.D./M.P.S. in Marine Conservation. I am deeply grateful to Susie Cox, Daniel Parobok, Billy Cox, Professor Bernard Oxman, and Casey McCormack for their support and guidance in developing this paper. Many thanks to the editorial board and dedicated staff of the Inter-American Law Review for their hard work. This paper is dedicated to my late father Tim Cox: lionfish slayer and hanger of the moon.

*fundamentally altering important aquatic ecosystem components such as temperature, rainfall, sea level, and salinity. These changing conditions coupled with the introduction of dominant and aggressive invasive species are changing the face of aquatic ecosystems. It is more important than ever to discuss the future of these ecosystems and how we can protect them.*

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## I. INTRODUCTION

The scene is set in the romantic sub-tropics of South Florida. Sunshine, clear skies, a warm ocean breeze, and the feeling of sand between your toes makes the bright blue water seem enticing and refreshing. From the shore, it is impossible to tell, but as each day passes, an alien invasion grows stronger. Their forces have been slowly creeping up the Eastern Seaboard and infectiously spreading throughout the Caribbean.<sup>1</sup> They are aggressive in claiming new territory, they destroy the areas they do claim, and they kill silently without remorse.<sup>2</sup> Their invasions are lethal and not even the United States has been able to stop them. Identified as one of the top fifteen emerging global environmental issues,<sup>3</sup> the lionfish invasion has had a devastating impact on the health and biodiversity of our coral reefs.<sup>4</sup> Their alarmingly unabated spread is changing the Western Atlantic aquatic ecosystem as we know it.

Aquatic invasive<sup>5</sup> species are a very real threat to the unique and fragile tropical coral reef ecosystems of the Western Atlantic.<sup>6</sup> In the

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<sup>1</sup> Ricardo Betancur-R. et al., *Reconstructing the Lionfish Invasion: Insights into Greater Caribbean Biogeography*, 38 J. BIOGEOGRAPHY 1281, 1282 (2011).

<sup>2</sup> Craig A. Layman & Jacob E. Allgeier, *Characterizing Trophic Ecology of Generalist Consumers: A Case Study of the Invasive Lionfish in the Bahamas*, 448 MARINE ECO. PROG. SER. 131, 132 (2012).

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

<sup>4</sup> Mark A. Albins & Mark A. Hixon, *Worst Case Scenario: Potential Long Term Effects of Invasive Predatory Lionfish (*Pterois volitans*) on Atlantic and Caribbean Coral Reef Communities*, 96 ENVTL. BIO. OF FISHES 1151, 1153-54 (2013).

<sup>5</sup> The term 'invasive' refers to a species that is nonindigenous to a specific area or habitat and that may have a detrimental impact on that area. See Robert I. Colautti & Hugh J. MacIsaac, *A Neutral Terminology to Define 'Invasive' Species*, 10 BIODIVERSITY RESEARCH 135, 136 (2004) (explaining that invasive species, both terrestrial and aquatic, may be referred to as a number of characterizations including alien, exotic, foreign, introduced, noxious, nuisance, or transplanted species).

<sup>6</sup> Matthew W. Johnston & Samuel J. Purkis, *Spatial Analysis of the Invasion of Lionfish in the Western Atlantic and Caribbean*, 62 MARINE POLLUTION BULLETIN 1218, 1218 (2011).

past decade, the lionfish threat has become more apparent and concerning to local and national governments within the region.<sup>7</sup> Lionfish have had a dramatic impact<sup>8</sup> on reef biodiversity<sup>9</sup> and native fish populations,<sup>10</sup> going so far as to draw noticeable attention from

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<sup>7</sup> Jonathan Randall & Jesse Schram, Policy and Management Options for Invasive Indo-Pacific Lionfish in U.S. Waters (May, 2011) (unpublished M.S. Thesis, Duke University) (on file with author).

<sup>8</sup> “The invasion of lionfish (*Pterois miles* and *P. volitans*) may prove to be one of the greatest threats of this century to warm temperate and tropical Atlantic reefs and associated habitats. As the first marine reef fish invasive species to this region, lionfish are changing the culture of how reef managers view invasive species, the regional connectivity of marine reefs, and their vulnerability to marine invasions. The term “lionfish” is now as notorious as the other major invaders of the last century, such as Asian carp, kudzu, zebra mussels, and sea lamprey. Originally imported into the United States as a popular aquarium fish, the lionfish is now one of the most abundant top-level predators of many reefs. Lionfish pose a threat to the integrity of the reef food web and are capable of impacting commercial fisheries, tourism, and overall coral reef health.” JAMES A. MORRIS JR. ET. AL., *INVASIVE LIONFISH: A GUIDE TO CONTROL AND MANAGEMENT* 1 (James A. Morris Jr. ed., 2012). “Lionfish may trigger cascading impacts through their disruption of the food web [ . . . ] Lionfish may also compete for resources — principally food and space — with economically important species, such as snapper (*Lutjanids*) and grouper (*Epinephelids*). It is uncertain if stock-rebuilding efforts will be able to return reef fish stocks to pre-lionfish abundance levels. Lionfish could also affect the recovery of species of concern, such as the Nassau grouper (*Epinephelus striatus*), Warsaw grouper (*E. nigrurus*), and speckled hind (*E. drummondhayi*). These species are critically low in abundance and might not recover quickly under the additional predation mortality imposed by lionfish. Lastly, it is the interaction of the lionfish invasion with existing reef stressors that poses the greatest concern. Coral reefs of the Atlantic are already highly stressed from bleaching events, climate change, ocean acidification, overfishing, and pollution. The additional stress of this invasive species could accelerate and compound the degradation of coral reef ecosystem health in profound and unexpected ways.” *Id.* at 2. Because of their broad diet and habitat preferences, “lionfish have the potential to affect the structure and function of many Atlantic marine communities — from the sea surface to depths exceeding 300 meters, and across habitats ranging from coral and hardbottom to artificial reefs, mangroves, and seagrass beds.” *Id.* at 1.

<sup>9</sup> See James Adiel Morris, Jr., *The Biology and Ecology of the Invasive Indo-Pacific Lionfish* (2009) (unpublished Ph.D. Dissertation, North Carolina State University) (on file with author).

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

regulating authorities because of their adverse impact on local economies through both the fishing<sup>11</sup> and tourism<sup>12</sup> industries. Due to the transnational<sup>13</sup> nature of this issue, countries across the globe<sup>14</sup> and in the Western Atlantic in particular, have turned to international accords and conventions<sup>15</sup> to identify potential solutions for mitigating and controlling the radical spread of lionfish, and other harmful aquatic invasive species, through regulatory frameworks.

Three conventions in particular have been especially impactful within the Wider Caribbean Region. These include the International Maritime Organization's Ballast Water Management Convention, the Convention on Biological Diversity, and the Cartagena Convention's Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region ("SPAW Protocol").<sup>16</sup>

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<sup>11</sup> Amelia Moore, *The Aquatic Invaders: Marine Management Figuring Fishermen, Fisheries, and Lionfish in the Bahamas*, 27 *CULTURAL ANTHROPOLOGY* 667, 668 (2012).

<sup>12</sup> Morris, *supra* note 9, at 26-27.

<sup>13</sup> "Lionfish are fully established throughout the Southeast United States, the Caribbean Sea, and much of the Gulf of Mexico." Morris, *supra* note 9 at 1.

<sup>14</sup> The United Nations Convention on the Law of the Sea (UNCLOS) is "the most comprehensive and significant document to date dealing with the prevention of marine pollution, among other matters concerning the world's oceans." Briony MacPhee, Comment, *Hitchhikers' Guide to the Ballast Water Management Convention: An Analysis of Legal Mechanisms to Address the Issue of Alien Invasive Species*, 10 *J. INT'L WILDLIFE L. & POL'Y* 29, 36 (2007). UNCLOS dedicates Article 196 to the control and introduction of alien species. United Nations Convention on the Law of the Sea art. 196(1), Dec. 10, 1982, 1833 U.N.T.S. 479 ("States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto."). Article 196 establishes the context within which the international community has addressed aquatic alien species in subsequent agreements. Suzanne Bostrom, *Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species*, 39 *ENVTL. L.* 867, 880 (2009) [hereinafter Bostrom].

<sup>15</sup> On defining protocols, treaties, and conventions, see *Definitions of Key Terms Used in the United Nations Treaty Collection*, UNITED NATIONS TREATY COLLECTION, [https://treaties.un.org/Pages/overview.aspx?path=overview/definition/page1\\_en.xml#conventions](https://treaties.un.org/Pages/overview.aspx?path=overview/definition/page1_en.xml#conventions) (last visited Feb. 16, 2015).

<sup>16</sup> The Cartagena Convention is a regional agreement for the protection and development of the marine environment in the Wider Caribbean Region. *About*

Specifically, the Caribbean Environment Programme,<sup>17</sup> a part of the United Nations Environment Programme's<sup>18</sup> Regional Seas Programme,<sup>19</sup> was instituted to protect marine resources in the Caribbean.

This article will address the issue of aquatic invasive species spread in the Wider Caribbean Region through a comparative regime analysis. Part II of this piece will outline the background of lionfish as an aquatic invasive species and will highlight its detrimental impacts on Western Atlantic reefs. Part II will also describe the individual regulatory frameworks, both multilateral and regional, created at the international level and will illustrate how these frameworks have created control mechanisms to address aquatic invasive species concerns. Additionally, Part II will briefly describe the role of the United States in a regulatory context and will outline the laws that the United States has adopted and implemented concerning this issue.

Part III of this analysis will look at the structure of each convention and compare the differing theoretical and structural approaches to addressing the threat and impact of aquatic invasive species. Part III will also look at the recommendations of each framework and assess the efficacy of its implementation, application, and enforcement mechanisms. Finally, Part IV will discuss options for future mitigation and control of aquatic invasive species, suggesting modeling based upon which regulatory frameworks and agencies have had the most success in the enactment and execution of their respective programs, laws, and monitoring institutions.

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*the Cartagena Convention*, CARIBBEAN ENV'T PROGRAMME, <http://www.cep.unep.org/cartagena-convention> (last visited Oct. 27, 2014). The Cartagena Convention should not be confused with the Cartagena Protocol on Biosafety, an international agreement on the safe handling, transport and use of "living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity." *The Cartagena Protocol: About the Protocol*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://bch.cbd.int/protocol/background/> (last visited Feb. 16, 2015).

<sup>17</sup> See generally CARIBBEAN ENVIRONMENT PROGRAMME, <http://www.cep.unep.org/> (last visited Oct. 27, 2014).

<sup>18</sup> See generally UNITED NATIONS ENVIRONMENT PROGRAMME, <http://www.unep.org/> (last visited Oct. 27, 2014).

<sup>19</sup> See generally *Wider Caribbean*, UNEP REGIONAL SEAS PROGRAMME, <http://www.unep.org/regionalseas/programmes/unpro/caribbean/> (last visited Oct. 27, 2014).

## II. BACKGROUND- AQUATIC INVASIVE SPECIES: NO BARRIER TO ENTRY

An aquatic invasive species, or aquatic nuisance species, is defined in the United States as “a nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural or recreational activities dependent on such waters.”<sup>20</sup> Invasive species are organisms that cause harm to an area that they are not native to.<sup>21</sup> Internationally, the term is applied more broadly as “a species which may pose threats to human, animal and plant life, economic and cultural activities and the aquatic environment.”<sup>22</sup>

Aquatic invasive species are especially troublesome because they are very difficult to contain, making aquatic environments particularly vulnerable to harmful invasions.<sup>23</sup> These non-native marine species do not recognize national borders and they are often mobile in nature, moving with currents, marine debris, and human transportation.<sup>24</sup> An absence of terra firma barriers within the marine environment facilitates aquatic invasive species spread.<sup>25</sup> Countries have recognized that in order to control aquatic invasive species, collaborative legal frameworks must be adopted in the interest of addressing the trans-national objective of abatement, eradication, and control.

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<sup>20</sup> Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 16 U.S.C.A. § 4701 (1996).

<sup>21</sup> *What is an Invasive Species?*, NATIONAL OCEAN SERVICE, <http://oceanservice.noaa.gov/facts/invasive.html> (last visited Nov. 17, 2014).

<sup>22</sup> *Biofouling*, International Maritime Organization, <http://www.imo.org/en/OurWork/Environment/Biofouling/Pages/default.aspx> (last visited Jan. 6, 2016).

<sup>23</sup> Allegra Cangelosi, *Blocking Invasive Aquatic Species*, 19 ISSUES IN SCIENCE AND TECHNOLOGY 69, 73 (2002); MAJ DE POORTER IUCN INVASIVE SPECIES SPECIALIST GROUP, MARINE MENACE: ALIEN INVASIVE SPECIES IN THE MARINE ENVIRONMENT 3, 15 (2009); Clare Shine et al., *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species*, IUCN ENVTL. LAW CENTRE 43 (2000).

<sup>24</sup> See CHRIS BRIGHT, LIFE OUT OF BOUNDS: BIOINVASION IN A BORDERLESS WORLD (1998).

<sup>25</sup> DE POORTER, *supra* note 23, at 15.

### III. SUMMARY OF RELEVANT LAW

#### A. *Conventions and Legislation: A Regulatory Approach to a Regional Problem*

##### 1. Convention on Biological Diversity

The Convention on Biological Diversity (“CBD”) is a multilateral treaty that was opened for signature at the 1992 United Nations Conference on the Environment and Development (Rio Earth Summit).<sup>26</sup> The goals of this convention include ensuring the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.<sup>27</sup> The Convention on Biological Diversity is “the only globally applicable, legally binding instrument to address generally alien species introduction, control and eradication across all biological taxa and ecosystems.”<sup>28</sup> The Conference of the Parties (“COP”) is the primary implementation organ of the Convention on Biological Diversity.<sup>29</sup> The COP is tasked with adopting protocols,<sup>30</sup> amending the text of the convention or protocols,<sup>31</sup> and adopting or

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<sup>26</sup> *History of the Convention*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/history/> (last visited Oct. 27, 2014).

<sup>27</sup> Convention on Biological Diversity Preamble, June 5, 1992, 31 I.L.M. 818 (1992).

<sup>28</sup> Clare Shine et al., *supra* note 23, at 14.

<sup>29</sup> J. Eli Makagon, *Analyzing the Binding Nature of COP Decisions Through the Convention on Biological Diversity*, 2012 NATURAL JUSTICE 5 (2012).

<sup>30</sup> Convention on Biological Diversity art. 28, June 5, 1992, 31 I.L.M. 818 (1992).

<sup>31</sup> Convention on Biological Diversity art. 29, June 5, 1992, 31 I.L.M. 818 (1992).

amending annexes.<sup>32</sup> The COP issues decisions<sup>33</sup> to address a myriad of topics such as creating procedural rules or guidelines, but “they do not appear to be binding in a formal sense.”<sup>34</sup>

Additionally, the CBD requires National Biodiversity Strategies and Action Plans (“NBSAPs”) to be integrated into planning and activities of all government sectors that have an impact on biodiversity; they are the “principal instruments for implementing the Convention at a national level.”<sup>35</sup> A majority<sup>36</sup> of Caribbean nations are parties to the Treaty and have likewise adopted NBSAPs.<sup>37</sup> During the 2002 COP, parties agreed that invasive alien species present an

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<sup>32</sup> Convention on Biological Diversity art. 30, June 5, 1992, 31 I.L.M. 818 (1992).

<sup>33</sup> The legal weight given to COP decisions within the Convention on Biological Diversity is considered varied and often ambiguous. Makagon, *supra* note 29, at 8-9 (“Under traditional treaty law analysis, the actions of the COP which most closely approximate traditional treaty formation – adoption and ratification – will constitute hard law. Thus, amendments to the CBD, protocols, and amendments to protocols, which require express consent from Parties before they are bound, should constitute hard law. Annexes and amendments thereto deviate from the traditional treaty-law formation in that they require opting out in order to avoid being bound.”).

<sup>34</sup> Jutta Brunnée, *COPing with Consent: Law Making Under Multilateral Environmental Agreements*, 15 LEIDEN J. INT’L L. 1, 32 (2002).

<sup>35</sup> *National Biodiversity Strategies and Action Plans*, CONVENTION ON BIOLOGICAL DIVERSITY, <https://www.cbd.int/nbsap/> (last visited on Oct. 27, 2014).

<sup>36</sup> The United Nations Environment Programme’s Wider Caribbean Region (“WCR”) contains 28 participating states. *Regional Profile: Wider Caribbean Region*, UNITED NATIONS ENVIRONMENT PROGRAMME, [http://www.unep.org/regionalseas/programmes/unpro/caribbean/instruments/r\\_profile\\_car.pdf](http://www.unep.org/regionalseas/programmes/unpro/caribbean/instruments/r_profile_car.pdf) (last visited Feb. 13, 2015). The participating island and continental states include Antigua and Barbuda, Bahamas, Barbados, Belize, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Netherlands Antilles, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Trinidad and Tobago, Venezuela, and the United States of America. *Id.* Of the states in the Wider Caribbean Region, the United States of America is the only one that is not a party to the Convention on Biological Diversity. *List of Parties*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/information/parties.shtml> (last visited Feb. 13, 2015).

<sup>37</sup> *List of Parties*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/information/parties.shtml> (last visited on Oct. 27, 2014).

urgent threat to ecosystems, habitats, and other species.<sup>38</sup> Specifically, COP 6<sup>39</sup> encouraged the International Maritime Organization, the Food and Agricultural Organization of the United Nations, and the parties to the Convention on Wetlands to collectively develop an international initiative that will address aquatic invasive species management, identification, and control.<sup>40</sup>

## 2. International Maritime Organization: Ballast Water Management

In 2004, the International Maritime Organization hosted the International Conference on Ballast Water Management (“BWM”).<sup>41</sup> The purpose of this conference was to address the use and transport of water as ballast<sup>42</sup> over the past few decades and to account for increased international shipping traffic.<sup>43</sup> For over a century, ballast

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<sup>38</sup> *Meeting Documents: Sixth Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 6)*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/doc/?meeting=cop-06> (last visited Feb. 13, 2015).

<sup>39</sup> COP 6 Decision VI/23, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/decision/cop/default.shtml?id=7197> (last visited Oct. 27, 2014).

<sup>40</sup> *Id.*

<sup>41</sup> BWM Convention, INT’L MARITIME ORG., <http://www.imo.org/OurWork/Environment/BallastWaterManagement/Pages/BWMConvention.aspx> (last visited on Oct. 27, 2014).

<sup>42</sup> For more information on ballast water, see *Ballast Water Defined*, TRANSPORT CANADA, <https://www.tc.gc.ca/eng/marinesafety/oep-environment-ballastwater-defined-249.htm> (“Ballast is defined as any solid or liquid that is brought on board a vessel to increase the draft, change the trim, regulate the stability or to maintain stress loads within acceptable limits. Prior to the 1880s, ships used solid ballast materials such as rocks and sand, which had to be manually shoveled into cargo holds, and similarly discharged when cargo was to be loaded on board. If not properly secured, solid ballast was prone to shifting in heavy seas causing instability. With the introduction of steel-hulled vessels and pumping technology, water became the ballast of choice. Water can be easily pumped in and out of ballast tanks, requires little manpower, and as long as tanks are kept full, poses little to no stability problems.”).

<sup>43</sup> International Convention for the Control and Management of Ship’s Ballast Water and Sediments, INT’L MARITIME ORG., [http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-\(BWM\).aspx](http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-(BWM).aspx) (last visited on Oct. 27, 2014).

water has been pumped into large steel hulled ships to increase stability and maneuverability while at sea.<sup>44</sup> The International Convention for the Control and Management of Ships' Ballast Water and Sediments, a multilateral treaty which the BWM Conference adopted, created standards and procedures for monitoring and controlling the introduction of exotic species through ballast water to new environments through management of the international shipping pathway.<sup>45</sup> Specifically, the Convention sought to prevent the spread of harmful species from one region to another through policy instruments such as management plans and strict record keeping.<sup>46</sup> The BWM Convention has been ratified<sup>47</sup> by a number of Caribbean nations, but has noticeably not been ratified by the United Kingdom, the United States, or other major flag states<sup>48</sup> such as Panama.<sup>49</sup>

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<sup>44</sup> *Ballast Water Management*, INT'L MARITIME ORG., <http://www.imo.org/OurWork/Environment/BallastWaterManagement/Pages/Default.aspx> (last visited Oct. 27, 2014).

<sup>45</sup> International Convention for the Control and Management of Ships' Ballast Water and Sediments, art. 4. Feb. 16, 2004, *available at* [http://www.bsh.de/de/Meeresdaten/Umweltschutz/Ballastwasser/Konvention\\_en.pdf](http://www.bsh.de/de/Meeresdaten/Umweltschutz/Ballastwasser/Konvention_en.pdf). [hereinafter BWM Convention].

<sup>46</sup> *Ballast Water Management*, *supra* note 44.

<sup>47</sup> The BWM Convention has not yet been entered into force due to the failure to achieve the requisite tonnage represented by states that have consented to be bound. *IMO's Environment Committee Addresses Implementation Issues as Ballast Water Management Treaty Nears Entry Into Force*, INTERNATIONAL MARITIME ORGANIZATION (Oct. 20, 2014), <http://www.imo.org/MediaCentre/PressBriefings/Pages/33-mepc-67-bwm.aspx#.VOYi1PnF8mM> ("The BWM Convention will enter into force 12 months after ratification by 30 States which collectively represent 35 per cent of world merchant shipping tonnage. Recent accessions by Turkey and Japan have brought this tantalizingly close. The number of ratifying states (43) states is already sufficient but, at 32.54 per cent, their collective share of world merchant shipping tonnage is not quite sufficient to trigger entry into force. However, it is anticipated that the entry-into-force criteria will be met shortly as a number of States have indicated they are making arrangements to deposit their instruments of accession very soon.").

<sup>48</sup> A Flag State is the state in which a vessel is registered and, in many circumstances, the state that has jurisdiction over the vessel. See JOHN N.K. MANSELL, *FLAG STATE RESPONSIBILITY: HISTORICAL DEVELOPMENT AND CONTEMPORARY ISSUES* 19 (2009).

<sup>49</sup> *Status of Conventions*, INT'L MARITIME ORG., <http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx> (last visited Oct. 27, 2014).

### 3. The Cartagena Convention and The Specially Protected Areas and Wildlife Protocol

The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region, more commonly known as the Cartagena Convention, entered into force in 1986.<sup>50</sup> It is the only treaty that focuses on the protection and development of the Wider Caribbean Region's ("WCR") marine environment.<sup>51</sup> The Convention is bolstered by three technical protocols, of which, the Specially Protected Areas and Wildlife Protocol ("SPAW") concerns aquatic invasive species control and management.<sup>52</sup> The Cartagena Convention has been ratified by twenty-five WCR United Nations Member States and the SPAW Protocol has the same number of Contracting Parties.<sup>53</sup> The SPAW Protocol, in particular, serves to assist the Caribbean region with meeting the goals of the Convention on Biological Diversity.<sup>54</sup> Article 12 of the SPAW Protocol specifically calls for the prohibition and regulation of non-indigenous species that may be harmful to the natural flora, fauna, or other features of the WCR.<sup>55</sup>

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<sup>50</sup> *About the Cartagena Convention*, *supra* note 16.

<sup>51</sup> *UNEP-CEP: Protecting Our Caribbean Sea & Securing Our Future*, CARIBBEAN ENV'T PROGRAMME, <http://www.cep.unep.org/about-us> (last visited Oct. 27, 2014).

<sup>52</sup> *About the Cartagena Convention*, *supra* note 16.

<sup>53</sup> *Id.*

<sup>54</sup> *Overview of the SPAW Protocol*, CARIBBEAN ENV'T PROGRAMME, <http://www.cep.unep.org/cartagena-convention/spaw-protocol> (last visited Oct. 27, 2014).

<sup>55</sup> Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region art. 12, Jan. 18 1990, available at <http://www.cep.unep.org/pubs/legislation/spaw.html> [hereinafter SPAW Protocol].

#### 4. The United States: International Player and Legislating Machine

The United States has signed and ratified several regional<sup>56</sup> and global<sup>57</sup> conventions in an effort to curb the unintentional importation of invasive species and to prevent their unmitigated spread. In particular, the United States has ratified the Cartagena Convention,<sup>58</sup> but has not ratified the Convention on Biological Diversity<sup>59</sup> or the BWM Convention.<sup>60</sup> However, the United States, on its own, has implemented a significant amount of legislation with respect to the control of invasive species, and aquatic invasive species more narrowly.<sup>61</sup> Namely, in 1990, the United States Congress passed the Nonindigenous Aquatic Nuisance Prevention and Control Act (“NANPCA”) in an effort to prevent and control the spread of aquatic invasive species.<sup>62</sup> In 1996, Congress passed the National Invasive Species Act which amended NANPCA to mandate preventive regulations for the transportation of invasive species through ballast water.<sup>63</sup> In 1999, Executive Order 13112 was signed by President Clinton to establish the National Invasive Species Council.<sup>64</sup> The National Invasive Species Council consists of thirteen government agencies and departments that collectively make recommendations for invasive species control and management, both domestically and internationally.<sup>65</sup>

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<sup>56</sup> *International Laws and Regulations: Regional Conventions*, USDA NAT'L INVASIVE SPECIES INFO. CTR., <http://www.invasivespeciesinfo.gov/laws/intlregconv.shtml> (last visited Oct. 27, 2014).

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

<sup>58</sup> *About the Cartagena Convention*, *supra* note 16.

<sup>59</sup> Robert F. Blomquist, *Ratification Resisted: Understanding America's Response to the Convention on Biological Diversity, 1989-2002*, 32 GOLDEN GATE U. L. REV. 493, 493 (2002) [hereinafter Blomquist, *Ratification Resisted*].

<sup>60</sup> *Status of Conventions*, *supra* note 49.

<sup>61</sup> See generally Robert B. McKinstry Jr. et al., *Legal Tools That Provide Direct Protection for Elements of Biodiversity*, 16 WIDENER L.J. 909 (2007).

<sup>62</sup> 16 U.S.C. § 4701 (1996).

<sup>63</sup> National Invasive Species Act of 1996, 110 Stat. 4073 (1996).

<sup>64</sup> Exec. Order No. 13,112, 64 Fed. Reg. 25 (Feb. 8, 1999).

<sup>65</sup> *Id.*

#### IV. ANALYSIS

In his opening statement for the International Conference on Ballast Water Management for Ships in 2004, Secretary-General Mitropoulos of the International Maritime Organization identified the introduction of harmful aquatic organisms to new environments as one of the four greatest threats to the world's oceans.<sup>66</sup> Secretary-General Mitropoulos articulated the very serious concern that invasive aquatic species present for the international shipping industry, coastal nations, and conservationists alike. This statement was not a novel revelation at the time. In fact, the unintentional transport of unwanted species in the ballast water of ships was an issue first wrestled with in 1988 by the Marine Environment Protection Committee ("MEPC").<sup>67</sup> Similarly, the importance of conservation of biological diversity and sustainable development was recognized for the first time in 1988 by the United Nations Environment Programme ("UNEP").<sup>68</sup> This foundational recognition of similar transnational concerns led to the development of international conventions which outline different approaches and mechanisms to resolve the issue of the spread of aquatic invasive species.

##### A. *Convention on Biological Diversity*

Heralded as the "main international instrument for addressing biodiversity issues," the Convention on Biological Diversity "provides a comprehensive and holistic approach to the conservation of biological diversity, the sustainable use of natural resources, and the fair and equitable sharing of benefits deriving from the use of genetic resources."<sup>69</sup> The Convention on Biological Diversity contains several convention bodies which serve to create the structure through which the objectives of the convention are met. These bodies include the Conference of the Parties, the Subsidiary Body on Scientific, Technical, and Technological Advice ("SBSTTA"), and

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<sup>66</sup> *Opening Statement by the Secretary General*, INTERNATIONAL CONFERENCE ON BALLAST WATER MANAGEMENT FOR SHIPS, <http://www.imo.org/OurWork/Environment/BallastWaterManagement/Documents/INF-8.pdf> (last visited Feb. 9, 2014).

<sup>67</sup> BWM Convention, *supra* note 45.

<sup>68</sup> Convention on Biological Diversity, *supra* note 27.

<sup>69</sup> Cartagena Protocol on Biosafety Introduction, May 15, 2009, 39 I.L.M. 1027 (2000).

several ad hoc working groups that are created as specific issues arise.<sup>70</sup>

The Conference of the Parties is the Convention's governing body which meets every two years.<sup>71</sup> This is a decision-making body that advances the implementation of the Convention on Biological Diversity.<sup>72</sup> The SBSTTA was established through Article 25 of the Convention and serves to scientifically assess the status of biological diversity, evaluate the measures taken to implement the Convention, and act as an advisory body for the COP.<sup>73</sup> The Convention also permits the formation of ad hoc working groups to address specific issues. The current working groups include the Working Group on Access and Benefit Sharing, the Working Group on Article 8(j), the Working Group on Protected Areas, the Working Group on the Review of Implementation of the Convention, and the Open-Ended Ad Hoc Committee on the Nagoya Protocol for Access and Benefit Sharing.<sup>74</sup>

The Convention on Biological Diversity identifies several mechanisms for implementation to ensure the success of the Convention. Article 18 establishes the Clearing-House and resource sharing mechanism which uses the internet to exchange technical and scientific information between countries.<sup>75</sup> Articles 20 and 21 outline financial resources and funding mechanisms.<sup>76</sup> This ensures that developing countries have the economic means to implement the Convention on Biological Diversity.<sup>77</sup> Article 26 requires national re-

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<sup>70</sup> *About the Convention*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/convention/bodies/intro.shtml> (last visited Feb. 19, 2015).

<sup>71</sup> *Conference of the Parties (COP)*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/cop/default.shtml> (last visited Feb. 19, 2015).

<sup>72</sup> *Id.*

<sup>73</sup> *Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA)*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/sbstta/default.shtml> (last visited Feb. 19, 2015).

<sup>74</sup> *About the Convention*, *supra* note 70.

<sup>75</sup> *Mechanisms for Implementation*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/convention/mechanisms/intro.shtml> (last visited Feb. 19, 2015).

<sup>76</sup> Convention on Biological Diversity, *supra* note 27 at art. 20 & 21.

<sup>77</sup> *Mechanisms for Implementation*, *supra* note 75.

porting by the various member countries in order to oversee the effectiveness of the implementation of the Convention.<sup>78</sup> The Convention on Biological Diversity also calls for cooperation among parties in Article 5.<sup>79</sup> This theme of collaboration is apparent throughout the Convention; the Secretariat and the COP have developed partnerships with a variety of United Nations agencies as a result of this cooperation requirement.<sup>80</sup> The last mechanism for implementation is the Strategic Plan for Biodiversity 2011-2020.<sup>81</sup> This plan was passed by COP 10 in 2010 and includes a framework for biodiversity for the United Nations system, including specific biodiversity targets as a metric for effective implementation of the Convention goals.<sup>82</sup>

In 2002, the sixth ordinary meeting of the Conference of the Parties (“COP 6”) to the Convention on Biological Diversity first addressed the adverse impacts on biodiversity by invasive alien species.<sup>83</sup> COP 6 identified fourteen guiding principles to assist parties in “developing effective strategies to minimize the spread and impact of invasive alien species,”<sup>84</sup> while also creating goals for each individual country to strive for despite their unique circumstances with invasive species. The guiding principles included adopting the

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<sup>78</sup> *National Reports*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/reports/> (last visited Feb. 19, 2015).

<sup>79</sup> Convention on Biological Diversity, *supra* note 27 at art. 5.

<sup>80</sup> *Cooperation and Partnerships*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/cooperation/default.shtml> (last visited Feb. 19, 2015).

<sup>81</sup> *Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/sp/default.shtml> (last visited Feb. 19, 2015).

<sup>82</sup> *Key Elements of the Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/sp/elements/#IV> (last visited Feb. 15, 2015).

<sup>83</sup> COP 6 Decision VI/23, *supra* note 39.

<sup>84</sup> *Id.*

precautionary approach,<sup>85</sup> the three-stage hierarchical approach,<sup>86</sup> and the ecosystem approach.<sup>87</sup> The principles also encouraged active state participation, research and monitoring, education and public awareness, border control and quarantine measures, exchange of information, and cooperation and capacity building.<sup>88</sup> Finally, the above guiding principles provided guidance on intentional and unintentional introductions, as well as mitigating strategies for impacts, eradication, containment, and control.<sup>89</sup>

In terms of structure, the Convention on Biological Diversity is relatively comprehensive. The Convention outlines broad goals, delegates authority to a decision-making body,<sup>90</sup> emphasizes collaboration and information sharing, and articulates mechanisms for implementation of strategies. Various articles of the Convention encourage collaboration between the parties for the purposes of technical and scientific advancement.<sup>91</sup> Moreover, the Convention creates a funding mechanism so that its goals may be met even in developing nations where economic resources are limited.<sup>92</sup> The Convention contains a reporting requirement which calls for national reports to be submitted to the COP by each state in order to evaluate implementation progress by the parties.<sup>93</sup> Overall, this Convention

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<sup>85</sup> Rio Declaration on Environment and Development, Annex 1, princ. 15, 31 I.L.M. 874, 879 (“[W]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”); see John S. Applegate, *The Taming of the Precautionary Principle*, 27 WM. & MARY ENVTL. L. & POL’Y REV. 13 (2002).

<sup>86</sup> For information on the three-stage hierarchical approach, see Piero Genovesi & Clare Shine, *European Strategy on Invasive Alien Species*, 137 NATURE AND ENVIRONMENT 9 (2004).

<sup>87</sup> COP 6 Decision VI/23, *supra* note 39.

<sup>88</sup> *Id.*

<sup>89</sup> *Id.*

<sup>90</sup> *Id.*

<sup>91</sup> Convention on Biological Diversity, *supra* note 27 at art. 12 & 25.

<sup>92</sup> For more information on the funding mechanism in the Convention on Biological Diversity, see Paul Roberts, *International Funding for the Conservation of Biological Diversity: Convention on Biological Diversity*, 10 B.U. INT’L L.J. 303, 341-2 (1992).

<sup>93</sup> On the importance of required reporting mechanisms in the Convention on Biological Diversity, see Robert F. Blomquist, *Protecting Nature “Down Under”: An American Law Professor’s View of Australia’s Implementation of the Convention on Biological Diversity—Laws, Policies, Programs, Institutions and*

is flexible and adaptive. It recognizes the economic and social differences of the parties, and yet still prioritizes collaboration and partnership in pursuing an objective of biological diversity. This framework is part of the reason why this convention has been so successful<sup>94</sup> and so widely adopted across the globe.

### B. *Ballast Water Management Convention*

The International Convention for the Control and Management of Ships' Ballast Water and Sediments was adopted concurrently with four resolutions in 2004.<sup>95</sup> The framework of the convention contains several articles and regulations which call for the development and adoption of guidelines<sup>96</sup> to facilitate the implementation

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*Plans, 1992-2000*, 9 DICK. J. ENVTL. L. & POL'Y 227, 249 n. 29 (2000); Convention on Biological Diversity, *supra* note 27 at art. 26.

<sup>94</sup> For examples of the success of the Convention on Biological Diversity, see *Success Stories*, CONVENTION ON BIOLOGICAL DIVERSITY (Jan. 24, 2011), <http://www.cbd.int/2010/stories/>; *Helping Islands Adapt: A Workshop on Regional Action to Combat Invasive Species on Islands to Preserve Biodiversity and Adapt to Climate Change* ("The workshop was held from 11 to 16 April 2010, in Auckland, New Zealand. Hosted by the Government of New Zealand with support from a number of partner organizations and countries, the meeting was welcomed in Decisions under the Convention on Biological Diversity (CBD) relating to invasive alien species and island biodiversity, and builds on efforts under the Cooperative Islands Initiative, a partnership launched at the World Summit for Sustainable Development and the CBD's 6th Conference of the Parties in 2002. Eighty-two participants from 24 countries and territories, and 29 national, regional and international organizations attended the workshop, which focused on four major island regions—the Caribbean, the Coral Triangle, the Indian Ocean and the Pacific—as well as on international support by organizations and networks.") *Proceedings of the Helping Islands Adapt workshop*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/invasive/doc/proceedings-workshop-helping-island-en.pdf> (last visited Jan. 5, 2016).

<sup>95</sup> BWM Convention, *supra* note 45 at iv.

<sup>96</sup> The guidelines set forth in the BWM Convention are legally binding on the parties to the Convention. Bostrom, *supra* note 15. ("To ensure compliance with the Ballast Water Convention's requirements, the Convention creates a binding obligation on vessels to keep detailed records of the ship's ballast water operations and for each ship to develop a Ballast Water Management plan detailing how the ship will implement the Convention's provisions. The Convention also authorizes parties to inspect the ship's ballast water certificate and record book, and to sample the ship's ballast water. When a state finds a ship is in violation of the Convention's requirements, the Ballast Water Convention authorizes the state to take multiple actions. First, the state under whose authority the ship is operating must

of the instrument conceived from the Convention. By 2005, the MEPC had created and expanded a program to develop guidelines and procedures for the implementation of the Ballast Water Convention.<sup>97</sup> The last of the 14 separate sets of guidelines was adopted in 2008.<sup>98</sup>

The Ballast Water Management Convention's introduction begins by noting preexisting authorities on ballast water management. The authorities include the United Nations Convention on the Law of the Sea, the Convention on Biological Diversity, the United Nations Conference on Environment and Development, the Rio Declaration on Environment and Development, and the World Summit on Sustainable Development.<sup>99</sup> The substantive portion of the text, including the regulations, is heavily technical and specific with respect to monitoring,<sup>100</sup> inspection,<sup>101</sup> management,<sup>102</sup> and control.<sup>103</sup> However, the Ballast Water Management Convention does permit the formation of several guidelines that aid in the implementation of these technical standards and requirements. The guidelines for the Ballast Water Management Convention serve to ensure the uniform implementation of the Convention.<sup>104</sup>

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establish sanctions for violations. If a state finds a ship in its waters to be in violation of the Convention, the state may then bring proceedings in its own court, or may furnish information and evidence to the flag state to show how the ship violated the Convention. Any sanctions imposed 'shall be adequate in severity to discourage violations of this Convention wherever they occur.' In addition to sanctions, the flag or port state may 'warn, detain, or exclude the ship,' and may prohibit the ship from discharging ballast water until the removal of any threats. By authorizing states to test ballast water and bring enforcement actions for violations of the Convention, the Ballast Water Convention has the potential to maintain compliance among vessels.'").

<sup>97</sup> *Ballast Water Management*, *supra* note 44.

<sup>98</sup> *Id.*

<sup>99</sup> BWM Convention, *supra* note 45 at art. 1.

<sup>100</sup> *Id.* at art. 6 & 7.

<sup>101</sup> *Id.* at art. 9.

<sup>102</sup> *Id.* at art. 10.

<sup>103</sup> *Id.* at art. 4.

<sup>104</sup> *Ballast Water Management*, *supra* note 44; The 14 guidelines include guidelines for sediment reception facilities, ballast water sampling, ballast water management equivalent compliance, ballast water management and the development of ballast water management plans, ballast water reception facilities, ballast water exchange, risk assessment, procedure for approval of ballast water manage-

Structurally, the Ballast Water Management Convention is very technical and scientific. It focuses primarily on the vectors of transport for invasive species in ballast water of ships and ways that this unwanted transport can be abated and controlled. This Convention outlines directed industry specific monitoring, management, and control techniques to contain the spread of aquatic invasive species through a ship's ballast water. While there is no required reporting mechanism, there are compliance mechanisms listed in the guidelines.<sup>105</sup> The Ballast Water Management Convention also encourages cooperation among parties to ensure the proper disposal of ballast water, in addition to the sharing of any new technical or technological developments in the field.<sup>106</sup> The Convention highlights the necessity of addressing this global problem through a uniform approach lined with common standards for all parties.

### C. Cartagena Convention and SPAW Protocol

The Convention for the Protection and Development of the Marine Environment Programme in the Wider Caribbean Region<sup>107</sup> ("Cartagena Convention") is a regional convention enacted under the Action Plan for the Caribbean Environment Programme.<sup>108</sup> The Cartagena Convention is divided into three protocols which serve to address specific areas of concern through technical agreements.<sup>109</sup> These protocols include the 1983 Oil Spills Protocol, the 1990 Specially Protected Areas and Wildlife Protocol ("SPAW"), and the 1999 Land-based Sources of Marine Pollution Protocol.<sup>110</sup> The SPAW Protocol in particular provides a structural framework through which the Wider Caribbean Region may manage "areas and ecosystems that require protection in order to safeguard their special value, threatened or endangered species of flora and fauna and their

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ment systems, approval and oversight of prototype ballast water treatment technology programs, ballast water exchange design and construction standards, design and construction to facilitate sediment control on ships, measures regarding ballast water management including emergency situations, and designation of areas for ballast water exchange. BWM Convention, *supra* note 45 at 55-234.

<sup>105</sup> See Bostrom, *supra* note 14 at 887.

<sup>106</sup> BWM Convention, *supra* note 45 at art. 14.

<sup>107</sup> Bostrom, *supra* note 14 at 887.

<sup>108</sup> *About the Cartagena Convention*, *supra* note 16.

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

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

habitat, and species, with the objective of preventing them from becoming endangered or threatened.”<sup>111</sup> Specifically, the SPAW protocol calls for regulation and management of non-indigenous species that may threaten the integrity of the native ecosystems of the Wider Caribbean Region.<sup>112</sup>

The SPAW framework expressly established a ‘sub-programme’ to assist regional governments in the implementation of the protocol requirements.<sup>113</sup> This sub-program is the tool employed to pursue the management goals outlined in the protocol.<sup>114</sup> There are four program elements that serve as mechanisms to assist in reaching the objectives of the SPAW protocol. These elements include the strengthening and management of protected areas in the Wider Caribbean Region, the development of guidelines for the management of protected areas and species, the conservation of threatened and endangered species, and the conservation and sustainable use of marine and coastal ecosystems.<sup>115</sup> Through reporting requirements,<sup>116</sup> the establishment of uniform guidelines,<sup>117</sup> and the creation of a scientific and technical advisory committee,<sup>118</sup> the SPAW Protocol outlines specific compliance requirements for parties to the agreement. The Protocol also calls for adherence to the Caribbean Environment Programme’s Action Plan<sup>119</sup> so as to assist with the implementation of strategies for the protection and management of the critical species and habitat in the Wider Caribbean Region.<sup>120</sup>

The SPAW Protocol is structured in a way that is intended for regional application. The substantive content of the protocol is a more technical and specified offshoot of the Cartagena Convention. The mechanisms for implementation are consolidated in a regional

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<sup>111</sup> See SPAW Protocol, *supra* note 55.

<sup>112</sup> *Id.* at art. 12.

<sup>113</sup> SPAW-Specially Protected Areas and Wildlife, CARIBBEAN ENVIRONMENT PROGRAMME, <http://www.cep.unep.org/content/about-cep/spaw> (last visited Feb. 19, 2015); SPAW Protocol, *supra* note 55 at art. 7.

<sup>114</sup> SPAW Protocol, *supra* note 55 at art. 6.

<sup>115</sup> SPAW - Specially Protected Areas and Wildlife, *supra* note 113.

<sup>116</sup> SPAW Protocol, *supra* note 55 at art.19.

<sup>117</sup> *Id.* at art. 21.

<sup>118</sup> *Id.* at art. 20.

<sup>119</sup> *About the Cartagena Convention*, *supra* note 16.

<sup>120</sup> SPAW Protocol, *supra* note 55 at art. 11.

framework that uses a top down approach for compliance<sup>121</sup> – deriving standards from the Cartagena Convention and using preexisting regional organizations and entities to ensure cooperation and implementation of the requirements set forth in both the Convention and the protocol. The standards that the protocol endeavors to meet are altogether less scientific and more policy-based solutions to the issue of preserving and protecting specially protected areas and wildlife with a special emphasis on invasive species. The protocol encourages cooperation and collaboration among parties as part of its accountability metric for effective implementation.<sup>122</sup> Because of the regional nature of this agreement, the SPAW protocol is area-specific, yet still contains a reporting requirement for all parties.

#### D. *Convention Comparison*

The overarching theme that we see in the decades that encompass the development of these three agreements is that nations collectively strive to preserve, protect, and manage their natural resources in a way that is most beneficial to their respective country's economic and social needs. The conventions examined here take a variety of approaches at addressing this same issue. More specifically, each convention or agreement addresses the threat of invasive species with a different standard, mechanism, or policy technique. These varying approaches are all effective at meeting the goals set forth in the accords, however this analysis will evaluate the approaches and examine their application to the niche issue of aquatic invasive species management.

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<sup>121</sup> Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region art. 24, Mar. 24, 1983, 22 I.L.M. 240 [hereinafter *Cartagena Convention*].

<sup>122</sup> The Cartagena Convention and SPAW Protocol have been effective in the Wider Caribbean Region. See MOSES KAIRO ET AL., *INVASIVE SPECIES THREAT IN THE CARIBBEAN REGION* (2011), available at <http://www.ciasnet.org/wp-content/uploads/2011/01/IAS-Threat-to-the-Caribbean.pdf>. These agreements, coupled with the CBD, have led to the development of the Caribbean Challenge Initiative, a collaborative effort among Caribbean states to conserve and manage 20% of the Caribbean marine and coastal environment by 2020. CARIBBEAN CHALLENGE INITIATIVE, <http://www.caribbeanchallengeinitiative.org/> (last visited Feb. 17, 2015).

### 1. Collaborative Framework

While there are structural differences in each of the agreements, there are several similarities that are common throughout each convention. The first and arguably most prolific theme in the agreements is the presence of a collaborative framework. There is a “fundamental tension” in international environmental law between a state’s interest in protecting its sovereignty, its right to exploit natural resources, and the understanding that certain problems may only be solved with an ethic of collaboration.<sup>123</sup> In the Convention on Biological Diversity, the essence of cooperation is first captured in Article 5.<sup>124</sup> Article 5 mandates cooperation with other Contracting Parties and relevant international organizations in the interest of biological diversity.<sup>125</sup> The Convention on Biological Diversity expounds upon the idea of cooperation throughout the text of the Convention, as seen in Article 18 in particular.<sup>126</sup>

Article 18 calls for collaborative technical and scientific efforts among the Contracting Parties in the fields of sustainable development and biological diversity.<sup>127</sup> This provision may result in collaborative investigations to the benefit of nations, which are, by nature of their geography, more susceptible to aquatic alien species invasions.<sup>128</sup> This is especially so in the case of developing nations that may have limited resources to invest in scientific or technical developments in the field.<sup>129</sup> Article 18 also establishes the Clearing-house information sharing mechanism within the Convention on Biological Diversity.<sup>130</sup> This is an internet network that permits ease of access to important scientific and technical information so that all

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<sup>123</sup> ROUTLEDGE HANDBOOK OF ENVIRONMENTAL POLITICS, 130 (Paul G. Harris ed., 2013).

<sup>124</sup> Convention on Biological Diversity, *supra* note 27 at art. 5.

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

<sup>126</sup> *Id.* at art. 18.

<sup>127</sup> *Id.*

<sup>128</sup> The Wider Caribbean Region is highly susceptible or vulnerable to aquatic alien species invasions due to its geographic location. Betancur-R et al., *supra* note 1 at 1282. A majority of the nations in this region are developing and would therefore benefit from collaborative scientific or technical studies and investments that arise from the Convention on Biological Diversity. *See generally* Moore, *supra* note 11.

<sup>129</sup> Convention on Biological Diversity, *supra* note 27 at art. 18.

<sup>130</sup> *Id.*

parties may have equitable access to this information in their collective efforts to manage and protect valuable biological resources in their respective jurisdictions.

The theme of collaboration is seen throughout the Ballast Water Management Convention as well. In particular, Article 13 outlines the need for technical assistance and regional cooperation for ballast water management.<sup>131</sup> Article 13 highlights the likelihood of transporting aquatic alien species through ballast water because countries may be within regional proximity to one another, but simultaneously boast very disparate climates, habitats, or species. Article 14 furthers the idea of cooperation by requiring communication and information sharing, yet not in the same way that the Convention on Biological Diversity does.<sup>132</sup> Article 14 of the Ballast Water Management Convention calls for notification of laws, procedures, and other ballast water disposal requirements,<sup>133</sup> so as to keep parties abreast of country-specific procedural changes they may encounter upon entering waters of another country.

Further, collaboration as a theme extends to the Cartagena Convention and throughout the SPAW Protocol. Article 13 of the Cartagena Convention follows closely with the framework set out in the Convention on Biological Diversity.<sup>134</sup> Article 13 calls for scientific and technical information sharing and collaborative efforts among member states; it goes so far as to suggest coordination of research and monitoring programs.<sup>135</sup> The Cartagena Convention also calls for cooperation with relevant international organizations in the interest of environmental management and protection.<sup>136</sup>

The SPAW Protocol is based heavily on the theme of collaboration among parties due to its regional focus. This is evidenced through Articles 7, 10, 11, 18, and 22, where the agreement outlines the myriad of ways that parties should anticipate collaborative efforts should they become signatories to the SPAW protocol. Article 7 calls for the establishment of a cooperation program for the listing

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<sup>131</sup> BWM Convention, *supra* note 45 at art. 13.

<sup>132</sup> *Id.* at art. 14.

<sup>133</sup> *Id.*

<sup>134</sup> Cartagena Convention, *supra* note 121 at art. 13.

<sup>135</sup> *Id.*

<sup>136</sup> *Id.*

of protected areas.<sup>137</sup> Article 10 suggests that the parties to the Protocol should coordinate with non-party states with regard to species that transcend jurisdictional boundaries, such as migratory species.<sup>138</sup> Article 11 requires the formation of cooperation programs within the framework of the Cartagena Convention and the Caribbean Environment Program Action Plan to protect and manage species within the Wider Caribbean Region.<sup>139</sup> Article 18 of the SPAW protocol requires parties to give assistance to those parties that require it in the form of educational, scientific, technical, managerial, and design advice in the interest of protected areas and species within the region.<sup>140</sup> Finally, Article 22 places an institutional requirement on the Secretariat to cooperate and coordinate with both regional and international organizations in the interest of advancing the protection of critical habitat areas and species.<sup>141</sup>

Each agreement makes special provisions for collaboration amongst their parties. The Convention on Biological Diversity, the Cartagena Convention, and the SPAW Protocol take very similar approaches. These agreements call for information sharing, providing assistance to countries in need, and requiring coordination with outside international or regional organizations where those efforts are appropriate in advancing the goals of the Conventions. In contrast, the Ballast Water Management Convention is less collaborative in nature. The only provision dedicated to this cooperative mentality is present for the purpose of compliance with laws within each jurisdictional area. Here, coordination is not used as a mechanism to elevate signing parties to the same prevention and control capacity. Similarly, the Ballast Water Management Convention seeks to set uniform standards, but does not necessarily provide mechanisms for reaching those standards in the way that the Convention on Biological Diversity or the Cartagena Convention do.

A collaborative framework is particularly important to contain the spread of aquatic invasive species.<sup>142</sup> As is the case in the Wider

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<sup>137</sup> SPAW Protocol, *supra* note 55 at art. 7.

<sup>138</sup> *Id.* at art. 10.

<sup>139</sup> *Id.* at art. 11.

<sup>140</sup> *Id.* at art. 18.

<sup>141</sup> *Id.* at art. 22.

<sup>142</sup> Clare Shine et al., *supra* note 23 at 3 (“For legal purposes, the concept of “invasive” must be treated independently of sectoral or jurisdictional boundaries.

Caribbean Region with the harmful spread of the lionfish, aquatic invasive species may have adverse effects that impact an entire region.<sup>143</sup> Because the impacts are regional, so must be the legal mechanisms to address them. The CBD and the Cartagena Convention actively encourage cooperation to address mitigation and control of invasive species in this regard. The BWM Convention takes a different approach, but uses uniform standards to ensure regional compliance.

## 2. Scientific and Technical Information

Another recurring theme that is seen throughout these agreements is the prioritization of scientific and technical data and developments. The Convention on Biological Diversity places enough weight on scientific and technical information to establish the Subsidiary Body on Scientific, Technical, and Technological Advice, a body that informs, advises, and assesses the basis of scientific methodology, principles, and data with respect to the Convention.<sup>144</sup> Because biological diversity is an evolving concept, so must be the mechanism which the Convention employs to protect it. This is why the SBSTTA must report regularly<sup>145</sup> to the COP with respect to new developments or advancements in technology, methods, or research which may allow the COP to better serve the interests of conservation of biological diversity.

In the Ballast Water Management Convention, scientific and technical information is essential to the premise of the agreement. The entire framework of the Convention is based heavily on scientific, technical, and industry-specific information. The language of

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An alien species that becomes invasive will not necessarily stay within the spatial or political unit into which it was introduced. This means that prohibitions on introducing alien species into protected areas and habitats, though important and possibly adequate in certain cases, should only form one component of prevention and control regimes. Secondly, because vulnerable ecosystems may straddle political boundaries, legal frameworks must provide a basis for transboundary cooperation and, where possible, harmonised prevention/mitigation measures.”)

<sup>143</sup> For discussion on regional impacts of the invasive lionfish species in the Caribbean, see J.E. Arias-González et al., *Predicted Impact of the Invasive Lionfish *Pterois volitans* on the Food Web of a Caribbean Coral Reef*, 111 ENVTL RESEARCH 917, 918 (2011).

<sup>144</sup> Convention on Biological Diversity, *supra* note 27 at art. 12 & 25.

<sup>145</sup> *Id.*

the Convention and the subsequent regulations, resolutions, and guidelines are heavily technical and scientific in nature. It is very specific with respect to the uniform standards it creates and the techniques to be employed for ballast water management monitoring purposes. In particular, Article 6 of the Convention calls for joint research and monitoring of ballast water management among the parties, as well as the provision of technical measures and their effectiveness to parties to the Convention upon their request.<sup>146</sup>

Similarly, Article 13 of the Cartagena Convention calls for scientific and technical cooperation.<sup>147</sup> This provision calls for direct cooperation among Contracting Parties to ensure their collective advancement in scientific and technical research.<sup>148</sup> The Convention encourages parties to engage in the scientific community and actively participate in areas of research that are relevant to the objectives of the Convention.<sup>149</sup> The Convention's SPAW Protocol furthers the importance of scientific and technical information in the Wider Caribbean Region by establishing the Scientific and Technical Advisory Committee in Article 20.<sup>150</sup> This article requires appointment of scientific experts to a committee which then assumes an advising role for Contracting Parties on scientific and technical matters relating to the protocol.<sup>151</sup>

Throughout these respective Conventions, we see a substantial and warranted reliance on scientific and technical information. Each Convention sets its roots in the biological sciences and builds the text of the agreement around the understanding that this field is evolving each day. The Convention on Biological Diversity and the Cartagena Convention both establish bodies through which regular reporting and advising can be done with respect to scientific advancements, developments, and research. While the Ballast Water Management Convention did not create a separate advisory body, it does encourage collaborative efforts among scientists in much the same way as the Convention on Biological Diversity and the Carta-

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<sup>146</sup> BWM Convention, *supra* note 45 at art. 6.

<sup>147</sup> Cartagena Convention, *supra* note 121 at art. 13.

<sup>148</sup> *Id.*

<sup>149</sup> *Id.*

<sup>150</sup> SPAW Protocol, *supra* note 55 at art. 20.

<sup>151</sup> *Id.*

gena Convention. However, the Ballast Water Management Convention places heavy reliance on scientific and technical data throughout the entirety of the Convention, whereas the Convention on Biological Diversity and the Cartagena Convention turn to more policy-based instruments for much of the agreement. Needless to say, each agreement shows a dependence on scientific and technical information and each prioritizes and encourages scientific and technical collaboration and advancement in the interest of advancing their individual objectives.

Scientific and technical considerations are vital to creating effective multilateral agreements that will be successful in controlling the spread of aquatic invasive species.<sup>152</sup> These conventions seek to create responsibilities for states based upon scientific and technical data. Because the body of scientific knowledge on this subject is rapidly evolving, the legal mechanisms and obligations created through these conventions must be able to evolve as well. The spread of lionfish in the Wider Caribbean Region serves as a prime example. Scientific assessment and inquiry determined over time that the source of the lionfish invasion was the Florida aquarium trade.<sup>153</sup> Spatial analysis of the distribution and establishment of the lionfish throughout the region provided insight on their resiliency and adaptability to the waters of the Western Atlantic.<sup>154</sup> If these conventions were drafted in a fixed manner without any regard for scientific or technical information or developments, they would be improperly and ineffectively regulating a living species that has the ability to adapt, evolve, and move – doing a complete disservice to the idea of biodiversity and protection of marine environments.

### 3. Financial Mechanisms

Due in part to the collaborative nature of these conventions, financial support mechanisms are commonplace to ensure that all parties have the economic means to meet the often rigorous standards

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<sup>153</sup> Dianna K. Padilla & Susan L. Williams, *Beyond Ballast Water: Aquarium and Ornamental Trades as Sources of Invasive Species in Aquatic Ecosystems*, 2 FRONTIERS IN ECOLOGY AND THE ENV'T 131, 131 (2004).

<sup>154</sup> Ricardo Bentacur-R et al., *supra* note 1 at 1282.

set forth in the text of the agreement.<sup>155</sup> The Convention on Biological Diversity alludes to financial support mechanisms in Articles 8, 9, 20, 21, and 39.<sup>156</sup> Established through Articles 20 and 21,<sup>157</sup> the financial mechanism of the Convention on Biological Diversity requires more economically stable countries to assist in funding programs in developing nations which seek to protect and manage biological diversity.<sup>158</sup> These provisions also call for a specific institutionalized structure created by the COP to determine the eligibility for and distribution of funds in furtherance of biological diversity programs.<sup>159</sup>

The Cartagena Convention also calls for a type of financial structure in Article 20.<sup>160</sup> However, the breadth of financial commitment that the Convention expects is explained further through the SPAW Protocol. Articles 6 and 18 of the SPAW Protocol suggest that Contracting Parties should anticipate adopting financial mechanisms to ensure the funding, development, and management of protected areas in addition to providing financial assistance for programs in countries of need.<sup>161</sup>

It is interesting to note the differences in the financial frameworks of these agreements. Their mere presence is in stark contrast to the Ballast Water Management Convention, which lacks a financial provision altogether. However, the BWM Convention provisions expect member states to institute national policies and strategies to address the threat of aquatic invasive species spread within their economic capabilities.<sup>162</sup> Meanwhile the Convention on Biological Diversity and the Cartagena Convention's SPAW Protocol

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<sup>155</sup> ROUTLEDGE HANDBOOK OF ENVIRONMENTAL POLITICS, *supra* note 124 at 417 (“Following negotiation of the 1990 Montreal Protocol, global environmental agreements are widely expected to include mechanisms to provide financial and technical assistance to help developing countries in implementing their obligations. Such assistance is seen by developing countries as an operational manifestation of the principle of common but differentiated responsibilities.”).

<sup>156</sup> Convention on Biological Diversity, *supra* note 27 at art. 8, 9, 20, 21, & 39.

<sup>157</sup> *Id.* at art. 20 & 21

<sup>158</sup> *Id.*

<sup>159</sup> *Id.*

<sup>160</sup> Cartagena Convention, *supra* note 121 at art. 20.

<sup>161</sup> SPAW Protocol, *supra* note 55 at art. 6 & 18.

<sup>162</sup> The BWM Convention framework requires ship owners and operators to comply with flag state, port state, and coastal state regulations that are created in

call for a type of institutional equity in their financial mechanism requirements. If all Contracting Parties are to be held to the same standard, then they must also have the financial and institutional resources to reach those standards.

With respect to lionfish in the Wider Caribbean Region, equitable financial means are nearly essential to prevent the spread of this harmful invasive species because local control is one of the most effective means of lionfish eradication.<sup>163</sup> Common eradication methods for lionfish in the Caribbean include spearfishing, handnetting, trapping, hook and line removal, containment, and natural controls.<sup>164</sup> These localized methods are very intensive and therefore very costly. Financial equity mechanisms ensure that all parties have the same means to engage in the most effective removal methods for the lionfish that are overwhelming native species and destroying tropical reef biodiversity in the Wider Caribbean Region.

#### 4. Reporting Mechanisms

Reporting requirements are often an essential element to ensure compliance with listed standards and to determine the effectiveness of procedures and programs listed in international agreements. The Convention on Biological Diversity establishes required reporting through Article 26.<sup>165</sup> This article specifically requires periodic updates on the status of implementation of the Convention and the effectiveness of those measures which have been implemented.<sup>166</sup> Similarly, the Cartagena Convention requires ‘transmission of information’ through Article 22.<sup>167</sup> This article creates a reporting mechanism through which Contracting Parties must submit the measures of the Convention which they have implemented and the success of

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an effort to satisfy the provisions of the convention. See BWM Convention, *supra* note 45 at art. 4(2).

<sup>163</sup> Andrew B. Barbour et al., *Evaluating the Potential Efficacy of Invasive Lionfish (*Pterois volitans*) Removals*, 6 PLOS ONE 1, 5 (2011).

<sup>164</sup> *Invasive Lionfish: A Guide to Control and Management*, GULF AND CARIBBEAN FISHERIES INSTITUTE 30-38 (James A. Morris Jr. ed., 2012).

<sup>165</sup> Convention on Biological Diversity, *supra* note 27 at art. 26.

<sup>166</sup> *Id.*

<sup>167</sup> Cartagena Convention, *supra* note 121 at art. 22.

these measures.<sup>168</sup> The SPAW Protocol in particular requires periodic reporting through Article 19.<sup>169</sup>

This provision solicits specific scientific, geographic, and legal information with respect to the status of protected areas within the Wider Caribbean Region.<sup>170</sup> The Ballast Water Management Convention contains a type of reporting mechanism in Article 8.<sup>171</sup> This Article describes the procedure for reporting with respect to violations of the Convention.<sup>172</sup> The Ballast Water Management Convention's violation-based reporting is more of a policing mechanism than a progress update as we see with both the Convention on Biological Diversity and the Cartagena Convention. Where the Convention on Biological Diversity and the Cartagena Convention are more concerned with effectiveness of strategies, programs, and implementation techniques, the Ballast Water Management Convention is more concerned with compliance to standards of operation.

### 5. Invasive Species Provisions

The primary purpose for this analysis and one of the most apparent cross-cutting themes seen throughout the text of all three agreements is that each contains a provision to account for the harmful spread of invasive species. The content of the Convention on Biological Diversity is built around the idea of protecting biological diversity and eliminating threats to it. Specifically in Article 8(h), the Convention calls for Contracting Parties to “prevent the introduction of, control, or eradicate those alien species which threaten ecosystems, habitats, and species.”<sup>173</sup> Soon after the Convention, COP 4 outlined the urgent need to address the threat of invasive alien species and their impacts.<sup>174</sup> COP 6 enacted a specific invasive species policy through decision VI/23.<sup>175</sup> This decision outlines guiding

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<sup>168</sup> *Id.*

<sup>169</sup> SPAW Protocol, *supra* note 55 at art. 19.

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

<sup>171</sup> BWM Convention, *supra* note 45 at art. 8.

<sup>172</sup> *Id.*

<sup>173</sup> Convention on Biological Diversity, *supra* note 27 at art. 8(h).

<sup>174</sup> *Fourth Ordinary Meeting of the Conference of the Parties to the Convention on Biological Diversity (COP 4)*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/doc/?meeting=cop-04> (last visited Feb. 19, 2015).

<sup>175</sup> COP 6 Decision VI/23, *supra* note 40.

principles for combating the adverse effects of invasive alien species. COP 7 expanded the evaluation of invasive species impacts and identified regulatory gaps that exist in global, regional, and national frameworks which permit invasive species to spread.<sup>176</sup> COP 8 addressed management of invasive species pathways for parties, governments, and relevant agencies and organizations.<sup>177</sup>

There are many other relevant COP decisions<sup>178</sup> with respect to containing, controlling, eradicating, and preventing invasive alien species spread, however, the most recent tool that the Convention on Biological Diversity has implemented on the issue has developed as a result of the 2011-2020 Strategic Plan. Aichi Target 9 of the Strategic Plan inspired the creation of the Inter-Agency Liaison Group on Invasive Alien Species.<sup>179</sup> This group aims to identify regulatory gaps and inconsistencies, promote cooperation in the eradication and control of invasive alien species, and to raise awareness as to the adverse effects that these species may have and the current best management practices for addressing them.<sup>180</sup>

While the Cartagena Convention does not specifically elicit a call to action against invasive alien species in the text of the agreement, the SPAW protocol does. The Cartagena Convention is committed to the protection of the marine environment within the Wider Caribbean Region; this includes the implied protection from invasive species in native habitats. Article 12 of the SPAW protocol articulates the expectation that Contracting Parties must regulate and prohibit the introduction of non-indigenous species.<sup>181</sup> To comply with Article 12 and to further address the issue of invasive aquatic species as the framework for the Cartagena Convention suggests,

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<sup>176</sup> *Invasive Alien Species Programme: Background*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/invasive/background.shtml> (last visited Feb. 19, 2015).

<sup>177</sup> *Id.*

<sup>178</sup> *Invasive Alien Species: COP Decisions*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/invasive/cop-decisions.shtml> (last visited Feb. 19, 2015).

<sup>179</sup> *Inter-agency Liaison Group on Invasive Alien Species*, CONVENTION ON BIOLOGICAL DIVERSITY, <http://www.cbd.int/invasive/lg/default.shtml> (last visited Feb. 19, 2015).

<sup>180</sup> *Id.*

<sup>181</sup> SPAW Protocol, *supra* note 55 at art. 12.

the UNEP's Caribbean Regional Coordinating Unit<sup>182</sup> ("CAR/RCU") commissioned the Caribbean and Latin America Regional Center of CAB International<sup>183</sup> to "produce a compilation of information on national and regional capacities and experiences on marine invasive species management programmes in the Wider Caribbean, including ballast water management."<sup>184</sup> This inquiry produced a comprehensive report in 2006 which outlined specific ecosystem characteristics, threats, resource management, monitoring, and enforcement.<sup>185</sup>

The Ballast Water Management Convention is premised on the idea of controlling the impact of harmful aquatic organisms that may be inadvertently transported through the ballast water of a ship. This objective is spelled out specifically in Article 4 of the Convention.<sup>186</sup> Article 4 requires that each Contracting Party to the Convention abide by all of the requirements set forth in the Convention, including scientific and technical industry standards.<sup>187</sup> This article further calls for the parties to the Convention to develop their national laws and policies with respect to ballast water management around the framework laid out in the Convention. This demand for strict compliance to the Convention's provisions elucidates the seriousness with which the International Maritime Organization views the problem of invasive aquatic species and their unintentional transfer.

Each of these conventions has illustrated a dedication to protecting biological diversity through preventing and controlling the

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<sup>182</sup> *UNEP-Caribbean Regional Coordinating Group*, CARIBBEAN ENVIRONMENT PROGRAMME, <http://www.cep.unep.org/content/about-cep/unep-car-rcu/unep-caribbean-regional-coordinating-unit> (last visited Feb. 19, 2015).

<sup>183</sup> *About CABI in Trinidad and Tobago*, CABI, <http://www.cabi.org/about-cabi/cabi-centres/trinidad-and-tobago/> (last visited Feb. 19, 2015).

<sup>184</sup> *Marine Invasive Species*, CARIBBEAN ENVIRONMENT PROGRAMME, <http://www.cep.unep.org/publications-and-resources/marine-and-coastal-issues-links/invasive-species> (last visited Feb. 19, 2015).

<sup>185</sup> *National and Regional Capacities and Experiences on Marine Invasive Species, Including Ballast Waters, Management Programmes in the Wider Caribbean Region - A Compilation of Current Information*, UNITED NATIONS ENVIRONMENT PROGRAMME, [http://www.icmyl.unam.mx/pdf/GRAMED/Assessments\\_Delivery-Item-1/New%20Assessments/New\\_Assessments\\_pdf\\_support%20information/National%20and%20Regional%20Capacities%20and%20Experiences.pdf](http://www.icmyl.unam.mx/pdf/GRAMED/Assessments_Delivery-Item-1/New%20Assessments/New_Assessments_pdf_support%20information/National%20and%20Regional%20Capacities%20and%20Experiences.pdf) (last visited Feb. 19, 2015).

<sup>186</sup> BWM Convention, *supra* note 45 at art. 4.

<sup>187</sup> *Id.*

spread of invasive alien species. The Ballast Water Management Convention is built entirely around this concept, while the Convention on Biological Diversity and the Cartagena Convention both view this issue as central to achieving their overarching purposes. The SPAW protocol illustrates how much is still unknown about aquatic invasive species, while the Ballast Water Management Convention creates extensive standards for the industry based upon what is known. While the Ballast Water Management Convention does not call for the institution of external programs in the way that the Cartagena Convention or the Convention on Biological Diversity do, the strategies employed in each agreement aim to address the same problem; however, some measures require more scrutiny and accountability than others.

## 6. Contracting Parties

Contracting Parties often determine whether or not international conventions succeed or fail. The internal structure of these international agreements regularly depends upon not just participation, but ratification or acceptance of the agreement by developed nations. These nations provide the economic framework through which the agreements gain momentum and force from theory to implementation. In particular, recognition from members of the European Union and the United States fortifies both the application of the agreement and the accountability of the Contracting Parties who choose to sign it. The long-term efficiency of strategies, mechanisms, and techniques relies heavily on active participation and engagement from all Contracting Parties.

With this in mind, it is interesting to note that two of the conventions in this analysis lack support from many influential developed countries. The United States is not party to the Convention on Biological Diversity<sup>188</sup> and the Ballast Water Management Convention,<sup>189</sup> while the United States has both signed and ratified the Cartagena Convention.<sup>190</sup> Other influential developed nations may voice hesitations in lieu of ratification due to the financial equity mechanisms that are in place in both the Convention on Biological

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<sup>188</sup> Blomquist, *Ratification Resisted*, *supra* note 59, at 493.

<sup>189</sup> *Status of Conventions*, *supra* note 49.

<sup>190</sup> *About the Cartagena Convention*, *supra* note 16.

Diversity and the Cartagena Convention. Nations may also experience less effective implementation of convention provisions due to limited financial capabilities coupled with the stringent international standards of compliance set forth in many of these agreements. Financial equity provisions or convention clauses that qualify implementation standards pursuant to national capabilities are both methods that may incentivize convention ratification by developing countries.

In terms of aquatic invasive species management and control, the most important consideration is that parties to the agreement adopt similar standards for compliance. Due to the extreme difficulty of containing the spread of aquatic invasive species, states must be regionally aware of adverse impacts and eradication strategies. The lionfish invasion in the Western Atlantic and through the Wider Caribbean Region highlights the necessity of this type of transboundary collaboration. It is important to note that while the United States is not party to the Convention on Biological Diversity, this is not necessarily a reflection on its level of compliance with CBD standards for invasive species. The United States works through national legal mechanisms and through the Cartagena Convention and SPAW Protocol to address regional spread of the lionfish. Countries do not necessarily have to be party to a convention to meet, or exceed, the standards set forth in the agreement.

## 7. Legal Obligations

International environmental conventions create specific legal obligations for the states that become party to the agreement.<sup>191</sup> Legal obligations are classified in degrees of hardness or softness depending on the extent to which a party is bound to the agreement.<sup>192</sup> A state must demonstrate its consent to be bound by the terms of the

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<sup>191</sup> ROUTLEDGE HANDBOOK OF ENVIRONMENTAL POLITICS, *supra* note 123 at 125.

<sup>192</sup> The term ‘hard’ refers to “to legally binding obligations that are precise (or can be made precise through adjudication or the issuance of detailed regulations) and that delegate authority for interpreting and implementing the law.” Kenneth W. Abbott & Duncan Snidel, *Hard and Soft Law in International Governance*, 54 INT’L ORGANIZATION 421, 421 (2000). The term ‘soft’ refers to legal arrangements that are “weakened along one or more of the dimensions of obligation, precision, and delegation.” *Id.* at 422.

agreement through affirmative steps.<sup>193</sup> However, a state is not obligated to comply with a treaty until the agreement has been ratified and entered into force.<sup>194</sup> Hard legal obligations need not exist in the principles and concepts of a treaty in order for it to be effective in reaching its purpose.<sup>195</sup> Many multilateral environmental agreements adopt broader convention frameworks and later adopt protocols or amendments which impose “tighter controls with specific obligations” on the contracting parties to the agreement.<sup>196</sup> The benefits to softer legal obligations include increased flexibility for states to implement the objectives of an agreement in a way that is most suitable to their national capacities.<sup>197</sup> This flexibility comes at the cost of enforcement of hard legal obligations and standards.<sup>198</sup>

The Convention on Biological Diversity and the Cartagena Convention have no hard legal obligations. These agreements establish a broad framework within which parties are expected to meet more generalized goals. Instead of hard legal obligations, these agreements create reporting requirements in an effort to determine whether states are meeting objectives. A good example of the “framework/protocol” approach is the Cartagena Convention.<sup>199</sup> The Convention adopts broad principles and then turns to the SPAW protocol to articulate more specific obligations. In this case, the Cartagena Convention calls for the protection and development of the marine environment in the WCR, while the SPAW protocol elicits a call to action on aquatic invasive species in particular.<sup>200</sup>

In contrast to the soft law approach of the CBD and Cartagena Convention, the BWM Convention contains hard legal obligations for all parties. These hard legal obligations manifest in Article 8 where violations of the convention are explicitly prohibited.<sup>201</sup> The BWM Convention calls for sanctions, arguably punitive in nature,

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<sup>193</sup> ROUTLEDGE HANDBOOK OF ENVIRONMENTAL POLITICS, *supra* note 123 at 126.

<sup>194</sup> *Id.*

<sup>195</sup> *Id.* at 130.

<sup>196</sup> *Id.* at 126.

<sup>197</sup> Abbott, *supra* note 192 at 445-46.

<sup>198</sup> *Id.* at 446.

<sup>199</sup> ROUTLEDGE HANDBOOK OF ENVIRONMENTAL POLITICS, *supra* note 123 at 126.

<sup>200</sup> SPAW Protocol, *supra* note 55 at art. 12.

<sup>201</sup> BWM Convention, *supra* note 45 at art. 8.

to be placed on any party that violates any condition of the convention to a severity such that future violations of the same type will be discouraged.<sup>202</sup> Hard legal obligations such as these are useful for enforcement purposes because they “increase credibility where non-compliance is difficult to detect.”<sup>203</sup>

The softer legal obligations of the CBD and the Cartagena Convention create a certain flexibility that allows for the convention conditions to be more adaptable when faced with future uncertainties.<sup>204</sup> The continuously evolving nature of the global environment coupled with our incomplete understanding of the impacts of climate change may make soft law in international treaties a more appealing legal instrument. Moreover, soft law creates a platform for compromise and cooperation among nations with different priorities in the management of their biological resources.<sup>205</sup> However, the soft law of these conventions lacks the strict enforcement mechanisms of the BWM Convention. In assessing the effectiveness of aquatic invasive species prevention and control, the hard legal obligations of the BWM Convention seem to be more successful than the soft legal frameworks because they create accountability among nations while establishing penalties for noncompliance.

#### E. *The Role of the United States*

The United States, while domestically progressive in its invasive species policy, has been hesitant to ratify international agreements on the subject for a number of reasons. In 1994, President Clinton presented the Convention on Biological Diversity to the United States Senate for consideration.<sup>206</sup> With this presentation came his infamous “seven understandings” from the Convention that he urged the Senate to consider when determining whether the United States should become a Contracting Party or not.<sup>207</sup> The first of these understandings is that Article 3 of the Convention permits the United

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<sup>202</sup> *Id.* at art. 8(3).

<sup>203</sup> Abbott, *supra* note 192 at 429.

<sup>204</sup> Abbott, *supra* note 192 at 423.

<sup>205</sup> *Id.*

<sup>206</sup> William J. Snape, *Joining the Convention on Biological Diversity: A Legal and Scientific Overview of Why the United States Must Wake Up*, 10 SUSTAINABLE DEV. LAW & POLICY 6, 11 (2010).

<sup>207</sup> *Id.* at 11.

States to implement its own policies and resources to meet the demands of the Convention.<sup>208</sup> This central theme of autonomy is one of the reasons that the United States chose not to follow the framework of the Convention. At the time of the Convention on Biological Diversity, the United States already possessed a complex, and arguably effective, state and federal system for protecting and conserving biological diversity within the country.<sup>209</sup>

Furthermore, the United States recognized that some of the provisions laid out in the Convention on Biological Diversity may violate preexisting property rights, including intellectual property and freely transmitted access to information.<sup>210</sup> The United States also articulated an understanding regarding spending limits and the financial mechanism laid forth in the Convention on Biological Diversity.<sup>211</sup> The United States asserts that the Contracting Party, and not the Convention, defines the amount of aid to be distributed to countries in need.<sup>212</sup>

The reason for the United States' resistance to adopt the Ballast Water Management Convention is a little more unclear. The United States had several laws and regulations in place prior to the drafting of the Ballast Water Management Convention which may suggest the hesitation. The United States Coast Guard is charged with ballast water management oversight as granted through the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990<sup>213</sup>, the National Invasive Species Act of 1996,<sup>214</sup> and the Federal Water Pollution Control Act.<sup>215</sup> However, it is interesting to note that in 2012, the United States Coast Guard issued a final rule<sup>216</sup> regarding the standards for living organisms in ships' ballast water that are discharged in United States waters. This rule is intentionally consistent

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<sup>208</sup> *Id.*

<sup>209</sup> *Id.*

<sup>210</sup> *Id.*; S. REP. NO. 103-10, at 8-9 (1994).

<sup>211</sup> Snape, *supra* note 206 at 12.

<sup>212</sup> *Id.*

<sup>213</sup> Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, 16 U.S.C. § 4713 (1990).

<sup>214</sup> *Id.*

<sup>215</sup> Federal Water Pollution Control Act (Clean Water Act), 33 U.S.C. §§ 1251-1376 (1977).

<sup>216</sup> Standards for Living Organisms in Ships' Ballast Water Discharged in U.S. Waters, 77 Fed. Reg. 17254 (2012).

with the standards put forth in the Ballast Water Management Convention.<sup>217</sup>

In contrast to these agreements, the Cartagena Convention boasts the United States as a Contracting Party. The United States has also ratified all three of the protocols accompanying the Cartagena Convention, including the SPAW protocol.<sup>218</sup> The reasons for this choice ratification are also unclear. The United States did not express any open opposition to the financial mechanisms within the SPAW protocol nor did they oppose the cooperation clauses which call for sharing of scientific and technical data or research.<sup>219</sup> Perhaps the United States enjoys a type of diplomatic superiority in the Wider Caribbean Region or perhaps they understand that marine ecosystems do not recognize jurisdictional boundaries—making a regional Convention on environmental more significant for the United States given its proximity to the Wider Caribbean Region.

Moreover, the United States has a very extensive preexisting environmental framework which is subject to strict scrutiny by agencies, the court system, and Congress at both the state and federal level. In particular, the Nonindigenous Aquatic Nuisance Prevention and Control Act, the National Invasive Species Act, the Federal Water Pollution Control Act, and President Clinton's Executive Order 13112 are relevant to this discussion. Collectively, these laws create a framework within which the United States operates in its efforts to combat the adverse effects of invasive species, both aquatic and otherwise. To sign multiple, and sometimes conflicting, international agreements with respect to the same topic can create unnecessary confusion, unintentional noncompliance, and dissonance among Contracting Parties. The United States may suggest that they are better left to their own devices in managing for biological diversity and control of invasive species domestically.

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<sup>217</sup> *Ballast Water: U.S. Federal Management*, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, [http://www.gc.noaa.gov/gcil\\_ballast\\_federal.html](http://www.gc.noaa.gov/gcil_ballast_federal.html) (last visited Feb. 19, 2015).

<sup>218</sup> *About the Cartagena Convention*, *supra* note 16.

<sup>219</sup> *Cartagena Convention*, *supra* note 121 at art. 13.

## V. CONCLUSION

In summary, the three international agreements examined in this analysis illustrate the gravity of the threat of aquatic invasive species. In reflection, a collaborative framework may prove to be the ideal way to combat invasive aquatic species in the most comprehensive manner possible because our planet is indisputably interdependent with respect to ecology and biodiversity.<sup>220</sup> The type of Convention structure that is seen in the Convention on Biological Diversity is self-sustaining. It allows for collaborative information sharing so that all parties may be privy to the same information, it creates a funding mechanism so that programs have some type of economic support, it establishes reporting mechanisms to permit the regular evaluation of its programs, and it calls for continued scientific research and monitoring. This structure is effective because working groups may be created to address pertinent issues for certain periods of time, without devoting unnecessary resources for extended periods of time.

It can be argued that subsidiary regional conventions may draw away from the effectiveness of larger global convention frameworks, but it seems that a regional focus may be effective on its own merits. This is evidenced through the effectiveness of the Cartagena Convention in the Wider Caribbean Region, and more specifically, through the success of the SPAW Protocol. It would be interesting to see an amended version of the Convention on Biological Diversity that absorbs regional programs and makes them mandatory for Contracting Parties. Another interesting addition to the Convention on Biological Diversity would be the inclusion of specific standards such as those set forth in the Ballast Water Management Convention. The specificity of technical and scientific language in this Convention is of substantive value in creating uniform standards. This is particularly important in the context of aquatic invasive species because of their mobile and often transitory nature. Inclusion of such standards in a broader convention would provide more guidance for Contracting Parties to abide by, without requiring a separate treaty ratification.

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<sup>220</sup> ROUTLEDGE HANDBOOK OF ENVIRONMENTAL POLITICS, *supra* note 123 at 131.

The soft law flexibility offered through the CBD and the Cartagena Convention allows for implementation of convention objectives within the capabilities of each individual party. This type of flexibility in legal obligations is important when regulating the mitigation and control of aquatic invasive species because the marine environment, and the species that inhabit it, are in constant flux. Hard legal obligations, such as those in the BWM Convention, create binding conditions for parties which are also effective at initiating immediate control measures for aquatic invasive species, especially on a regional level. A combination of these approaches is the most desirable method for managing the spread of aquatic invasive species.

Consider the nearly unabated spread of the lionfish throughout the Wider Caribbean Region. The soft legal mechanisms of the CBD and the Cartagena Convention's SPAW Protocol call for the protection of biodiversity, the prohibition of invasive species, and the eventual removal of those species. In application, this framework allows marine managers to employ different approaches in their efforts to protect the unique tropical coral reef ecosystems of the WCR and to control the impacts of the lionfish.<sup>221</sup> The harder legal obligations of the BWM create a sense of accountability through sanctions while establishing uniform priorities for measures to control invasive aquatic species spread. As the scientific body of knowledge expands on lionfish and other invasive aquatic species, the legal mechanisms must evolve as well.<sup>222</sup>

The future of biological diversity and the role of invasive species in uncertain. Climate change and a rapidly increasing global population will continue to place a heavy demand on marine resources.<sup>223</sup> The line will quickly be blurred as to which species are native and

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<sup>221</sup> Jessica L. Diller, et al., *Coping with the Lionfish Invasion: Can Targeted Removals Yield Beneficial Effects?*, 20 REVIEWS IN FISHERIES SCIENCE 185 (2012); *Harvest Incentives: A Tool for Managing Aquatic Invasive Species*, INVASIVE SPECIES ADVISORY COMMITTEE (2014).

<sup>222</sup> Nicholas Bax et al., *Marine Invasive Alien Species: A Threat to Global Biodiversity*, 27 MARINE POLICY 313, 321-22 (2003).

<sup>223</sup> Eric V. Hull, *Climate Change and Aquatic Invasive Species: Building Coastal Resilience through Integrated Ecosystem Management*, 25 GEO. INT'L ENVTL. L. REV. 51 (2012).

which are not as seas warm and habitat ranges extend.<sup>224</sup> The relentless spread of the lionfish mirrors these changes.<sup>225</sup> Marine biodiversity can be protected through international accords, but the influence of external factors on biodiversity begs the question of how long can native species truly be protected and their natural habitats sustained? Will climate change impact ecosystems such that the line is inevitably blurred as to which species are endemic and which are foreign? What can really be done to keep invasive species out, and is this an insurmountable obstacle or a pointless enterprise? This author believes that dynamic policies, mechanisms, and instruments, coupled with collaborative approaches and methodologies, can be effective in controlling the alien invasion. This analysis is a very limited comparison of regimes, accords, solutions, and conditions. There is pressing need for continued examination of this issue.

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<sup>224</sup> Rebecca M. Bratspies, *Lionfish as a Metaphor for Governance in an Era of Climate Change*, 58 N.Y.L. SCH. L. REV. 829 (2014).

<sup>225</sup> *Id.*