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# OPTIONS FOR BLUE CARBON WITHIN THE INTERNATIONAL CLIMATE CHANGE FRAMEWORK

by Gabriel Grimsditch\*

## INTRODUCTION

The concept of “Blue Carbon,” or atmospheric carbon captured by coastal ecosystems, has recently been the focus of reports by the United Nations Environment Programme (“UNEP”) and the International Union for the Conservation of Nature (“IUCN”).<sup>1</sup> The international community is increasingly interested in exploring the potential of conserving coastal ecosystems for their role in climate change mitigation, reflected in the Manado Oceans Declaration signed by countries in 2009 which recognizes that “healthy and productive coastal ecosystems, already increasingly stressed by land-based and sea-based sources of pollution, coastal development, and habitat destruction, have a growing role in mitigating the effects of climate change on coastal communities and economies in the near term”<sup>2</sup> and “invite[s] the scientific community/institutions to continue developing reliable scientific information on the roles of coastal wetlands, mangrove, algae, seagrass, and coral reef ecosystems in reducing the effects of climate change.”<sup>3</sup>

## BLUE CARBON IN THE CLIMATE CONTEXT

The 2009 UNEP “Blue Carbon” report noted that fifty-five percent of atmospheric carbon captured by living organisms is captured by marine organisms and between fifty to seventy-one percent of that is captured by ocean vegetated habitats (e.g. mangroves, salt marshes, seagrasses, seaweed), which account for less than 0.5% of the seabed.<sup>4</sup> The report states that coastal vegetated habitats sequester between 114 and 328 teragrams (“Tg”) of carbon per year, or 1.6 to 4.6% of total anthropogenic emissions (7,200 Tg per year).<sup>5</sup> Furthermore, the report found that between two and seven percent of these marine and coastal ecosystems are lost annually<sup>6</sup>—one of the highest rates of loss amongst all ecosystems.<sup>7</sup> Because of their high carbon sequestration potential, there is a growing interest in exploring the potential of including Blue Carbon in existing and emerging climate change frameworks.<sup>8</sup> However, considerable uncertainty surrounds these estimates and the level of understanding of carbon storage in coastal ecosystems.

Several opportunities for Blue Carbon exist within the United Nations Climate Change Framework (“UNFCCC”). The UNFCCC is an international environmental treaty with a goal of the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic<sup>9</sup> interference with the climate system.”<sup>10</sup> The UNFCCC includes coastal and marine ecosystems in Article 4(d), which states that all parties shall “promote sustainable management, and promote and cooperate in the conservation and enhancement, as

appropriate, of sinks and reservoirs of all GHG not controlled by the Montreal Protocol, including . . . oceans as well as other . . . coastal and marine ecosystems.”<sup>11</sup> However, the current UNFCCC processes does not include adequate measures for protection and restoration of Blue Carbon ecosystems as a climate change mitigation strategy, and this represents a missed opportunity in our global portfolio of options for combating climate change.

Countries that have signed the UNFCCC are obligated to submit annual National Inventory Submissions (“NIS”); these inventory submissions record the country’s greenhouse gas emissions from anthropogenic activity, as well as sequestration from land use and forestry, based on guidance from the Intergovernmental Panel on Climate Change (“IPCC”).<sup>12</sup> Within the NIS, there is a section on Land Use, Land-Use Change and Forestry (“LULUCF”) that accounts for the carbon budget (i.e. emissions and reductions) due to the management of terrestrial ecosystems including forests, peatlands, grasslands, and agricultural wetlands.<sup>13</sup> In this section, only the carbon sequestered or emitted due to direct human management of ecosystems can be included.<sup>14</sup> However, unmanaged ecosystems are not accounted for.<sup>15</sup> Blue Carbon ecosystems—whether managed or not—are not accounted for under LULUCF and thus, not included in the UNFCCC.<sup>16</sup> The IPCC should amend their guidance on LULUCF in order to include Blue Carbon ecosystems under LULUCF and UNFCCC processes. Moreover, management of coastal and wetland ecosystems should be defined as an activity under LULUCF. The IPCC operates based on peer-reviewed science and therefore, the current scientific gaps in knowledge regarding carbon fluxes,<sup>17</sup> need to first be addressed in the peer-reviewed literature. In order for Blue Carbon ecosystems to be included in the wider UNFCCC and Kyoto Protocol processes, an important step would be to have Blue Carbon ecosystems fully embedded and accounted for in the LULUCF process.

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## EXISTING INTERNATIONAL CLIMATE CHANGE MITIGATION FRAMEWORKS

Although the UNFCCC is legally non-binding, the Kyoto Protocol (“Protocol”) adopted in 1997 commits industrialized countries to reduce emissions of the greenhouse gases, carbon dioxide, methane, nitrous oxide, and sulfur hexafluoride by at least five percent from 1990 levels.<sup>18</sup> The Protocol includes flexible mechanisms such as emissions trading and offsets for industrialized countries, known as the clean development mechanism (“CDM”), which allows the nation to meet its emission reductions obligations by funding carbon capture in developing countries.<sup>19</sup> Blue Carbon projects could potentially become an offset category for CDM projects and—although presently standardized—UNFCCC-approved methodologies do not exist for establishing project baselines and monitoring results.<sup>20</sup> UNFCCC criteria would have to be amended to include Blue Carbon projects under the CDM in the form of protection or rehabilitation of coastal ecosystems. However, as discussed above, appropriate methodologies would have to be developed and approved.

In addition to the CDM, under the 2009 Copenhagen Accord, developing countries agreed to report Nationally Appropriate Mitigation Actions (“NAMAs”) to the UNFCCC every two years; such mitigation actions are monitored domestically.<sup>21</sup> NAMAs refer to a set of policies and actions countries undertake as part of a commitment to reduce greenhouse gas emissions, recognizing that various countries may engage in different actions based on equity, and in accordance with their respective responsibilities and capabilities.<sup>22</sup> Presently, NAMAs include, for example, investments in alternative energy or in reducing illegal logging, but not Blue Carbon projects.<sup>23</sup> There is potential to expand NAMAs to include protection and restoration of Blue Carbon ecosystems, but as discussed previously, an international standard approved by the UNFCCC needs to be developed and applied to Blue Carbon.

Furthermore, the Reducing Emissions from Deforestation and Forest Degradation (“REDD”) program within the UNFCCC presents another opportunity for Blue Carbon ecosystem protection. This program aims to create financial incentives to reduce forest destruction and degradation, thus reducing emissions and maintaining sequestration.<sup>24</sup> REDD+ is a program defined under the Cancun Agreement as including activities such as “(a) Reducing emissions from deforestation; (b) Reducing emissions from forest degradation; (c) Conservation of forest carbon stocks; (d) Sustainable management of forest[s]; [and] (e) Enhancement of forest carbon stocks.”<sup>25</sup> REDD+ carbon credits would allow funding from industrialized countries to reduce deforestation and rehabilitate degraded forests in developing countries.<sup>26</sup> After the decision in Cancun at the Sixteenth Session of the Conference of the Parties to the UNFCCC, it is clear that mangroves are eligible for REDD+<sup>27</sup> funding,<sup>28</sup> yet their full potential has not yet been realized by countries. Again, standardized protocols for measurement, reporting, and verification (“MRV”) and monitoring of carbon sequestration and carbon emissions due to habitat degradation need to be developed and approved by appropriate international bodies, such as the

Voluntary Carbon Standard (“VCS”).<sup>29</sup> Pilot projects exploring the feasibility of mangroves under REDD+, are currently being developed by non-governmental organizations and national governments in REDD countries around the world.<sup>30</sup>

## NEW OPPORTUNITIES FOR BLUE CARBON IN CLIMATE FRAMEWORKS

While opportunities exist, for Blue Carbon to be included in any of these UNFCCC frameworks certain preconditions need to be met. First, the science has to be robust, and adequate peer-reviewed evidence must exist to make a compelling case for the IPCC or the UNFCCC to amend their guidelines. This includes the development of standardized and internationally approved methodologies for MRV of carbon sequestration and emissions from habitat degradation. Additionally, an adequate level of understanding of carbon fluxes and their response to management in and around Blue Carbon ecosystems is necessary for the IPCC to include the coastal ecosystems in their Assessment Reports. The evidence is mounting that Blue Carbon ecosystems are an important part of the global carbon cycle, and that their destruction releases dangerous amounts of greenhouse gases into the atmosphere.<sup>31</sup> Secondly, Blue Carbon projects need to demonstrate “additionality” (the project must demonstrate that the reduction in greenhouse gas emissions through the protection or rehabilitation of Blue Carbon ecosystems would not have happened without the sale of Blue Carbon offsets),<sup>32</sup> “minimal leakage” (the decrease in greenhouse gas emissions by the Blue Carbon project does not cause an equivalent increase in emissions by another entity),<sup>33</sup> and “permanence” (minimizing the risk that greenhouse gas emissions will occur after the Blue Carbon project has been sold as a carbon offset).<sup>34</sup> Finally, the third precondition for the success of Blue Carbon projects and acceptance under the UNFCCC and other international climate frameworks is a feasible economic model, which actually generates revenue from the Blue Carbon project. The revenue generated by carbon credits sold in the carbon markets must be higher than the cost of protecting or restoring the Blue Carbon ecosystems. Economic feasibility studies need to be undertaken which examine the total revenue from carbon sequestered (including carbon fluxes), the total value of ecosystem services associated with Blue Carbon ecosystems, the total direct costs of protection or rehabilitation of Blue Carbon ecosystems, and the total opportunity costs associated with the project (e.g. loss of revenue from lost coastal development opportunities).

## CONCLUSION

The fact that Blue Carbon ecosystems such as mangroves, sea grass, salt marsh, and seaweed are currently largely overlooked by the UNFCCC, CDM, and other international climate frameworks represents a missed opportunity in our global portfolio for mitigating climate change through ecosystem management. The UNFCCC does provide appropriate frameworks and opportunities to include Blue Carbon in the global climate change debate, and a growing community of UN agencies, non-governmental organizations, research institutions, civil society

groups, and national governments are forwarding the agenda for this change to occur. Crucial steps include the development and standardization of MRV protocols in order to monitor the success of pilot Blue Carbon projects, as well as the continued amassing of evidence and understanding of the role of Blue Carbon ecosystems in the global carbon cycle, including the effects of anthropogenic management on their greenhouse

gas sequestration or emissions. This peer-reviewed evidence should be presented to the IPCC and be used to drive changes in guidelines so that Blue Carbon ecosystems are included in the NIS and LULUCF processes and thus, into the wider UNFCCC framework. The potential of Blue Carbon is clear; it is now a matter of expediting this process in international frameworks before we lose even more of these precious ecosystems. 

## Endnotes: Options for Blue Carbon within the International Climate Change Framework

<sup>1</sup> See, e.g., UNITED NATIONS ENVTL. PROGRAMME, BLUE CARBON: THE ROLE OF HEALTHY OCEANS IN BINDING CARBON (Christian Nellemann et al. eds., 2009) [hereinafter Nellemann], [http://www.unep.org/pdf/BlueCarbon\\_screen\\_english.pdf](http://www.unep.org/pdf/BlueCarbon_screen_english.pdf).

<sup>2</sup> World Ocean Conference, Manado, Indon., May 11-14, 2009, *Manado Ocean Declaration 2* (May 14, 2009), <http://www.cep.unep.org/news-and-events/manado-ocean-declaration>.

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

<sup>4</sup> Nellemann, *supra* note 1.

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

<sup>6</sup> *Id.*

<sup>7</sup> *Id.* at 7.

<sup>8</sup> See generally INT'L UNION FOR THE CONSERVATION OF NATURE, THE MANAGEMENT OF NATURAL COASTAL CARBON SINKS (Dan Laffoley & Gabriel Grimsditch eds., 2009), <http://data.iucn.org/dbtw-wpd/edocs/2009-038.pdf>.

<sup>9</sup> *Anthropogenic*, MERRIAM-WEBSTER DICTIONARY ONLINE, <http://www.merriam-webster.com/dictionary/anthropogenic?show=0&t=1296266491> (last visited Feb. 5, 2011).

<sup>10</sup> United Nations Framework Convention on Climate Change art. 2, May 9, 1992, 1771 U.N.T.S. 107, <http://unfccc.int/resource/docs/convkp/conveng.pdf>.

<sup>11</sup> *Id.* art. 4.

<sup>12</sup> *Land Use, Land-Use Change and Forestry (LULUCF)*, UNITED NATIONS FRAMEWORK ON CLIMATE CHANGE, [http://unfccc.int/methods\\_and\\_science/lulucf/items/3060.php](http://unfccc.int/methods_and_science/lulucf/items/3060.php) (last visited Feb. 5, 2011).

<sup>13</sup> See, e.g., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, LAND USE, LAND-USE CHANGE AND FORESTRY (Robert T. Watson et al. eds., 2000), [http://www.grida.no/publications/other/ipcc\\_sr/?src=/climate/ipcc/land\\_use/index.htm](http://www.grida.no/publications/other/ipcc_sr/?src=/climate/ipcc/land_use/index.htm).

<sup>14</sup> See generally U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2007, at 7-1 (2009), [http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/application/zip/usa\\_2009\\_nir\\_13apr.zip](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/usa_2009_nir_13apr.zip).

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

<sup>17</sup> Defining "carbonflux" as "the net difference between carbon removal [sequestration] and carbon addition [(e.g. from emissions due to habitat degradation) in Blue Carbon ecosystems] . . ." See CARBONFLUX, <http://www.carbonflux.co.uk> (last visited Mar. 10, 2011).

<sup>18</sup> Kyoto Protocol to the United National Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22, <http://unfccc.int/resource/docs/convkp/kpeng.pdf>.

<sup>19</sup> *Id.*

<sup>20</sup> *Methodologies and Tools*, UNITED NATIONS FRAMEWORK ON CLIMATE CHANGE, [http://unfccc.int/methods\\_science/redd/methodologies/items/4538.php](http://unfccc.int/methods_science/redd/methodologies/items/4538.php) (last visited Feb. 5, 2011).

<sup>21</sup> Conference of the Parties Fifteenth Session, Copenhagen, Den., Dec. 7-18, 2009, *Copenhagen Accord*, U.N. Doc. FCCC/CP/2009/L.7 (Dec. 18, 2009), <http://unfccc.int/resource/docs/2009/cop15/eng/107.pdf>.

<sup>22</sup> United Nations Framework Convention on Climate Change, Bali, Indon., Dec. 3-15, 2007, *Dec. 1/CP.13 Bali Action Plan*, in *Rep. of the Conf. of the Parties on its thirteenth sess.*, U.N. Doc. FCCC/CP/2007/6/ Add.1 (Dec. 2007), <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf>.

<sup>23</sup> See *ENB on the Side: A Special Report on Selected Side Events at the Cancun Climate Change Conference*, INT'L INST. FOR SUSTAINABLE DEV., Dec. 2, 2010, at 1, <http://www.iisd.ca/climate/cop16/enbotts/pdf/enbotts1290e.pdf>.

<sup>24</sup> UN-REDD PROGRAMME, <http://www.un-redd.org> (last visited Feb. 5, 2011).

<sup>25</sup> United Nations Framework Convention on Climate Change, *Outcome of the Work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention*, U.N. Doc. FCCC/AWG/LCA/2010/L.7 (Oct. 10, 2010) [hereinafter AWG-LCA], <http://unfccc.int/resource/docs/2010/awglca13/eng/107.pdf>.

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

<sup>27</sup> REDD+ is a program going beyond REDD in the valuation of carbon stored forests. It includes conservation, enhancement of carbon stocks, and the sustainable management of forests. See *About REDD+*, UN-REDD PROGRAMME, <http://www.un-redd.org/AboutREDD/tabid/582/Default.aspx> (last visited Feb. 5, 2011).

<sup>28</sup> See AWG-LCA, *supra* note 25.

<sup>29</sup> *VCS Methodology Approval*, VOLUNTARY CARBON STANDARD (2005), <http://www.v-c-s.org/docs/VCS%20Methodologies%20FINAL.pdf>.

<sup>30</sup> Steve Zwick & Hannah Kett, *Conservationists Endorse Plan to Fold Mangroves into REDD+ Talks*, ECOSYSTEM MARKETPLACE, Dec. 2, 2010, [http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page\\_id=7868&section=home](http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=7868&section=home).

<sup>31</sup> INT'L UNION FOR CONSERVATION OF NATURE, THE MANAGEMENT OF NATURAL COASTAL CARBON SINKS 53 (Dan Laffoley & Gabriel Grimsditch eds., 2009), <http://data.iucn.org/dbtw-wpd/edocs/2009-038.pdf>.

<sup>32</sup> Roger Ullman, Vasco Bilbao & Gabriel Grimsditch, *Factors For Inclusion of Blue Carbon in Climate Frameworks*, in OCEAN AND COASTAL MANAGEMENT (forthcoming Oct. 2011).

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*