



Financing Options for Blue Carbon Opportunities and Lessons from the REDD+ Experience

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December 2011



Nicholas Institute for Environmental Policy Solutions
Report
NI R 11-11
December 2011

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We gratefully acknowledge the financial support of the Linden Trust for Conservation, The Summit Foundation, Gregory Alexander, and Joseph Gleberman. The authors thank Melissa Edeburn and Paul Brantley for editing and publication support. Any opinions, errors, or omissions are the responsibility of the authors alone.



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Executive Summary

Human activities such as agriculture and aquaculture can degrade and destroy coastal habitats. When development pressures transform mangroves, seagrass, and coastal wetlands, carbon stored in their biomass and soil is released to the atmosphere as carbon dioxide (CO₂). One way to counter these pressures and thereby conserve the carbon stored in these habitats (referred to as *blue carbon*) is to provide payments for the environmental services provided by coastal habitats. Such payments require financing from a willing source.

This paper analyzes current and potential options for carbon mitigation payments as a source of blue carbon finance. With other work that has focused on the payments needed to secure blue carbon (see Murray et al. 2011), this paper can help stakeholders assess funding gaps and direct scarce resources to those activities that will provide the greatest blue carbon benefits.

Coastal habitats contain relatively high levels of soil carbon, and the drivers of their degradation are unique. Nevertheless, the possibilities for blue carbon financing mirror those that have emerged for forest-stored carbon in discussions of REDD+¹ financing, if at a different scale. One objective of this paper is to determine the extent to which this financing can serve as a platform for blue carbon financing, which has not yet materialized.

Like REDD+ financing, blue carbon financing could flow through three types of activity: national planning, development of pilot programs, and payments for verified emissions reductions. This paper analyzes 14 funding sources and the voluntary emissions reductions market to assess blue carbon finance potential in the present. Although no compliance markets exist, their potential to provide payments for blue carbon are also discussed.

The current REDD+ funding process suggests that the future financing of blue carbon will hinge on three key issues:

Incorporation of blue carbon in the REDD+ readiness process

As readiness plans evolve and more countries enter the readiness process, the applicability of blue carbon to that process can strongly define future funding for coastal habitat protection.

Inclusion of blue carbon in future REDD+ agreements

Unless future REDD+ protocols include soil carbon, achieving any scale on blue carbon investments may be difficult

Competitiveness of blue carbon sequestration with other land use mitigation activities

Blue carbon offsets will be required to compete not only with other REDD+ projects, but also with other carbon mitigation strategies as well.

This paper tracks the current funding process to discern gaps in future blue carbon financing opportunities. The REDD+ planning and capacity-building process offers several lessons in this regard. Of \$1,303 million committed to REDD+ through the analyzed funds, approximately \$1,069 million has been pledged towards planning and capacity building. The emphasis within the planning process stems from two sources: the World Bank's Forest Carbon Partnership Facility (FCPF) and the UN-REDD Programme. Both work with developing countries on development of national plans for REDD+ implementation.

Analysis of the REDD+ plans reveals both supporting and opposing evidence for the direct funding potential for blue carbon. Of the 25 countries with the highest potential for mangrove mitigation, an activity that may cross the bounds between blue carbon and REDD+, 12 countries, representing three quarters of mangrove habitat, have developed or are in the process of developing REDD+ readiness plans. Of these 12 countries, most mention mangroves with regard to deforestation and data collection needs. Some have changed their definition of forests to specifically include mangroves. However, few mention the collection of soil carbon data (a necessary component for inclusion of blue carbon in mitigation) or wetland data (necessary for coastal wetland mitigation). Absence of these data could substantially undercut the potential for blue carbon revenue (see Murray et al 2011).

1. Reduced emissions from deforestation and forest degradation (REDD), sustainable management of forests and enhancement of forest carbon stocks (+).

Countries also build REDD+ capacity through implementation of pilot mitigation projects. Such projects test assumptions and prove methodologies in an effort to build momentum for full implementation of projects. Among the funds analyzed, only one blue carbon pilot project exists, signifying a gap in project-level experience. This gap is not surprising given the nascence of blue carbon as a potential asset class, but it does point to the need for more effort in this area.

This analysis revealed a similar gap in potential purchases of emissions reductions for blue carbon projects. Most of this gap is attributable to the fact that current methodologies for measuring carbon sequestration do not include soil carbon. Moreover, current compliance regimes do not include carbon mitigation from avoided conversion,² a situation that negotiations on the United Nations Framework Convention on Climate Change may remedy. Hence, the only markets for REDD+ and blue carbon are voluntary. No projects relating to blue carbon protection exist in these markets, because no standards for including them exist. However, such standards are under development.³ Ultimately, financing for coastal habitat protection may come from sources outside the climate-carbon regime. Blue carbon supporters will note that coastal habitats provide ecosystem services beyond carbon sequestration. These services may usher in a subset of stakeholders willing to pay specifically for blue carbon. The size of such a niche market, which could prove essential for investment in blue carbon pilot projects, is difficult to predict.

Adaptation projects designed to protect coastal communities could also help protect blue carbon. Blue carbon is located along coastlines, where climate adaptation is of critical importance. The ability of promoters of blue carbon to leverage the additional assets provided by such projects may yet become blue carbon's greatest financing driver.

2. California's upcoming greenhouse gas regulations may be a notable near-term exception.

3. See the Baseline and Monitoring Methodology for Avoiding Planned Deforestation of Undrained Peat Swamp Forests At <http://www.v-c-s.org/methodologies/avoiding-planned-deforestation-undrained-peat-swamp-forests>.

Introduction

Coastal habitats play a critical role in the storage and sequestration of carbon. Mangroves, salt marshes, and seagrasses (collectively known as coastal blue carbon) remove carbon dioxide from the atmosphere and incorporate it, along with trapped plant materials, into their soils. In some cases, these habitats sit on as much as ten meters of carbon rich soils, sequestered over the course of thousands of years.

Mangroves are among the most carbon-rich systems in the tropics (Donato et al. 2011), storing as much as 3,100-4,400 metric tons¹ of carbon dioxide equivalent per hectare (t CO₂e/ha) in their biomass and the soil beneath them (Donato et al. 2011).² On average, coastal salt marshes store 362 to 2,012 t CO₂e/ha (Chmura et al. 2003). Seagrasses have little visible biomass but still maintain stores of soil carbon that range from 66 to 1,478 t CO₂e/ha (Mateo et al. 1997; Vichkovitten and Holmer 2005).

Carbon stored by mangroves, salt marshes, and seagrasses remains at risk. Habitat loss and destruction has released huge amounts of coastal blue carbon. The causes of habitat conversion include aquaculture, agriculture, forest exploitation, industry, and urban development (Giri and Muhlhausen 2008; Giri et al. 2008; Valiela, Bowen, and York 2001; Duke et al. 2007; FAO 2007). As a result, between 0.7% and 2% of coastal blue carbon habitats are lost annually (Duarte et al. 2008; Duke et al. 2007; FAO 2007).

Payment mechanisms to keep carbon in these habitats may help to reverse this loss. The bilateral funding arrangements and emissions markets that have been leveraged to pay for carbon sequestration and storage in forests could be harnessed to prevent coastal habitat loss. However, traditional sequestration projects and projects to conserve blue carbon differ in fundamental ways. The key is to identify and design financing mechanisms that will make carbon in coastal habitats eligible for payments.

This report examines the potential financing options for coastal blue carbon. It considers carbon payment mechanisms used for other habitats in light of the unique attributes of blue carbon that affect financial viability. By doing so, it highlights the major challenges that must be addressed for the development of robust financing mechanisms for coastal blue carbon.

Current State of Affairs: REDD+ Financing Mechanisms

The use of blue carbon for carbon mitigation has only recently entered the discussion of climate mitigation policy. Blue carbon is now (in 2011) where REDD+, the global effort to pay for emissions reductions from deforestation and degradation, was five years ago. Some blue carbon activity (namely that associated with mangroves) may be covered under REDD+ activity. Therefore, recent experience with REDD+ financing is a particularly good point of departure for discussing blue carbon potential.

Ecosystem services provided by coastal habitats extend beyond carbon. However, the protection of coastal systems for the purpose of carbon mitigation will almost certainly be viewed through the lens of the REDD+ regime.³ Identification of funding linkages between REDD+ and blue carbon will help policy makers determine the need for additional blue carbon funds. It will also help them effectively direct monies to coastal habitat protection efforts.

Just as the future of blue carbon's role in climate mitigation may be linked to REDD+ policy negotiations,⁴ so too blue carbon funding may be linked to REDD+ capacity building. Although conservation of forests and conservation of coastal habitats may differ in some important ways, both are aided by capacity building at the government level as well as stakeholder engagement and data collection. Both the public and private sectors have invested heavily in moving the REDD+ program forward.⁵ Blue carbon's close ties with the REDD+ process could mean that some of the REDD+ funding will ultimately benefit reduced emissions from conversion and degradation within coastal systems.

1. The term *ton* in this report refers to the metric ton. 1 metric ton (t) = 1 tonne = 1 megagram (Mg) = 1,000 kg. The abbreviation *Mt* refers to the megaton (1 million tons).

2. Donato's (2011) sample best categorizes Indo-Pacific mangrove region. Soil estimates should be downwardly adjusted for global estimates.

3. This protection includes both voluntary and compliance regimes.

4. For example, soil carbon measurements may be included in quantification of emissions reductions from REDD+.

5. No single funding agency dominates the financial flows through these phases. The REDD+ funding field is dominated by a variety of funding agencies, including the UNDP's UN-REDD Programme and the World Bank's Forest Carbon Partnership Facility

Funding proposal for REDD+

In 2010, a three-phased approach to the REDD+ financing process was adopted as the framework for REDD+ under the UNFCCC's Cancun Agreement. The phases account for the build up to verified emissions reductions through decreased deforestation and forest degradation and increased knowledge and government capacity at the national level (TFD 2010). The following timeline may ultimately define the financing options for blue carbon:

Phase 1: Preparation and readiness

Funding is provided for the development of national REDD+ strategies. Included in these strategies are a clarification of the drivers of deforestation, initial carbon monitoring, development of national reference level carbon stocks/emissions, legal and carbon rights assessments, and institutional development.

Phase 2: Policies and measures

Implementation of the policies and monitoring required for REDD+ results, including development of national REDD+ portfolios.

Phase 3: Performance-based payments

Payments for verified emissions reductions.

This report's categorization of finance opportunities for blue carbon reflects the three-phase approach of REDD+:

Planning and institutional capacity building

Activities funded in this category include preparation of readiness plans, stakeholder engagement, data collection, and implementation of new national policies. These activities span the entire first phase of funding as well as part of the second phase.

Pilots and projects

Funded activities include pilot demonstration projects and portfolio development. These activities demonstrate the feasibility of carbon emission reductions from protection and land management, and they build a suite of emissions reductions that can be transferred from developing countries to developed countries.

Verified emissions reductions

Funds in this category pay for performance-based actions—voluntary or compliance driven—to garner emissions reductions.

Our categorization combines elements of the first and second phases of financing in the “planning and institutional capacity building category”. Because both the first and second phase of financing include planning, distinguishing them adds little value to our analysis. Instead, consideration of planning and capacity as a joint activity allows for a more focused analysis of the “readiness” state of countries with blue carbon. These three categories of financing represent potential financing options for blue carbon.

Current status of REDD+ funding

General overview of funds available

REDD+ often competes for funding with other climate change mitigation strategies. Each fund researched for this study involves a pledge of at least \$90 million.⁶ Some funds are managed by a conglomerate of multilateral development banks and some, by individual countries. Some funds end in 2012, the termination date of the Kyoto agreement; others are geared to long-term REDD+ financing.

Since 2008, governments and the private sector have pledged or invested over \$4 billion on behalf of REDD+.⁷ They have done so through multilateral funding programs and major sovereign initiatives. Funds granted to REDD+ initiatives have predominately focused on preparation for the scaling up of REDD+.

(FCPF), Forest Investment Program, and BioCarbon Fund. The funds used in this analysis are described in the Appendix.

6. Decisions about the funds to include in this analysis were based on relevancy to REDD+ and blue carbon as well as on the availability of data on the funds' nature and use.

7. This figure does not include pledges through fast-start finance. The reason for this exclusion is that the majority of country

Of the 14 funds analyzed for this study that might be immediately relevant to blue carbon, the only two with no direct relationship with REDD+ are the Adaptation Fund of the Kyoto protocol and the Least Developed Countries Fund of the Global Environment Facility (GEF). These funds should not be discounted. They can be used to increase institutional capacity and develop pilot projects for habitat protection through coastal climate-change adaptation.

Again, this paper does not categorize blue carbon as a simple subset of REDD+. Indeed, the requirements for blue carbon do not perfectly match those for most REDD+ sites, such as inland forests. Moreover, the reasons for protecting coastal habitat could be dramatically different from those for protecting inland forests. However, blue carbon can be conserved within some REDD+ sites, notably, mangroves, and financing for REDD+ offers the best parallel platform for financing blue carbon. REDD+ investment defines both potential funding for and synergistic backing of blue carbon. Table 1 highlights 14 major international funding sources that deal with climate-related activity and that have the potential to finance blue carbon projects.

Table 1. Climate-related funds and allocations^a

Fund	Source	Pledged (\$ mil)	Currently committed ^b (\$ mil)	Remaining funds (\$ mil)	Committed to REDD+ (\$ mil)	REDD+ planning (\$ mil)
BioCarbon Fund	World Bank Carbon Finance Unit	90.4	30.5	59.9	2.66	0
Forest Carbon Partnership Facility (Readiness)	World Bank Carbon Finance Unit	232	105	127	105	105
Forest Carbon Partnership Facility (Carbon Fund)	World Bank Carbon Finance Unit	215	0	215	0	0
Forest Investment Program	Climate Investment Funds	577	420	157	420	420
International Forest Carbon Initiative	Australian Government	283.06	103	179.92	81.05	19.95
Congo Basin Forest Fund	Norway and England	156	93.85	50.14	93.85	4.3
UN-REDD Programme	UN	98.26	63.68	34.58	63.68	63.68
GEF Trust Fund	GEF	14,481	9,768	4,713	105	105
LDCF	UNFCCC	324	153	151.5	N/A	12.24
Adaptation Fund	Kyoto	249.92	75.35	174.57	N/A	N/A
Amazon Fund	Norway and Germany	1,027.93	140	887.93	133.3	60
International Climate Initiative	Germany	1,764	506.1	1,257.90	43.82	36.96
Hatoyama Initiative	Japan	15,000	6,300	8,700	158	158
International Climate and Forest Initiative	Norway	1,000	450	Variable	97	97

a. The Fund column shows the name of the fund used in the analysis. Source signifies the fund manager or, in the case of national efforts, the country(s) maintaining the revenue stream. Pledged monies indicate financing that has been promised though not committed to the fund. Currently committed funds are monies specifically committed to a project or a general program. Remaining funds are those yet to be committed by the funding source. REDD+ commitments are those monies dedicated to REDD+ planning, pilot projects, or emissions reductions. REDD+ planning includes monies specifically dedicated to the REDD+ planning process such as the development of national strategies.

b. Only a small portion of committed funds have actually been used (Guinea 2011b; IDEACarbon 2011).

Sources: AMA/DEFAM 2011b; Australia 2011; BioCF 2011; BMU 2011a, 2011b; Canada 2011; FCPF 2011a, 2011b; Finance 2011; FIP 2010a; GEF 2010a, 2010b, 2010c, 2010d, 2011b; ICFI 2010; IFCI 2011; Japan 2011; Norway 2011; ODI 2011; Switzerland 2011; UNDP 2011; UNFCCC 2011; UNITAR 2010; USA 2011; World Bank 2011a, 2011b, 2011c.

grants for such finance go to the exact funds analyzed in this study. This study could not analyze individual-project funding opportunities through fast-start finance, because the countries involved in REDD+ grant making have made little information on such opportunities available. This paper does analyze designated sovereign programs linked to fast-start finance, such as the Hatoyama Initiative of Japan. REDD+ commitments through fast-start finance total approximately \$4.5 billion (Schneck et al. 2011).

Planning and institutional capacity building

Of \$1,303 million currently committed to REDD+ through the analyzed funds, approximately \$1,069 million has gone to planning and capacity building. Almost all the studied funds in some way contribute to the phase 1 development process for REDD+. Thus, much of the funding has gone to planning for—not actual—capacity building.

Part of the phase 1 process involves the creation of national plans for REDD+ implementation. Indeed, a significant portion of the money pledged and committed so far has gone to the plan creation process. Notable efforts include the Forest Carbon Partnership Facility's readiness preparation proposal (R-PP), the UN-REDD Programme's National Programme process, and the Forest Investment Program's Investment Plan (FCPF 2011b; FIP 2010c; UN-REDD 2011). No completed or draft plans yet exist through the FIP.

These three efforts define the nature of future funding opportunities. The reason is that through guiding the planning process they define future project proposals and the eventual emissions reductions that will result from successful implementation of the plans. The four main uses of funds for capacity building are as follows:

Increased and improved governance

An important milestone in ensuring REDD+ readiness is creation and coordination of governance institutions on a national or subnational level to ensure proper development planning and permanence of REDD+ related projects. For example, one of the stated goals of the R-PP process is to define gaps in national capacity at the governance level (FCPF 2010a, 2010b, 2011b). Similarly, the Forest Investment Program supports “programmatic” change at the national level (FIP 2010a, 2010c).

Data collection/monitoring

Data collection and monitoring involve the gathering of baseline information regarding the state of forests within a country as well as the rate of deforestation and degradation. The UN-REDD Programme recognizes this task as crucial in implementing REDD+ (UN-REDD 2011). Areas adequately monitored and assessed will be more apt to receive funds for implementing REDD+ projects.

National stakeholder participation

Collaboration with indigenous communities and other stakeholders increases the future support and success of REDD+. Multiple planning initiatives call for stakeholder engagement. For example, the Global Environment Facility requires all funds related to REDD+ to ensure adequate indigenous community participation (GEF 2010c). The UN-REDD Programme has been working on a process for standardizing procedures for stakeholder engagement (UN-REDD 2011).

Global REDD+ development

Part of the planning process involves testing methodologies for future dissemination, building on science, and creating international support structures for the program (UN-REDD 2011). Norms generated and tested for the international level could influence future REDD+ projects and funding.

Funding for these four dimensions of REDD+ capacity building can and does substantially benefit blue carbon.

Funding for planning and capacity building

Forest Carbon Partnership Facility Readiness Fund: Readiness Preparation Proposals (R-PPs)

Amount used or dedicated to planning: \$105 million

The Readiness Fund has provided monies for the creation of readiness preparation proposals as well as the subsequent technical advising entailed by the review process for these proposals. According to FCPF documents, the purpose of the R-PPs is not to fund the direct actions required for preparation. Rather, the purpose is to partner developing countries with technical advisors in the development of REDD protocol.

As of July 2011, 26 of the 37 countries participating in REDD and the FCPF have prepared R-PPs. The main benefit of the R-PPs is that they convene parties to discuss land use. UN-REDD states that the formulation of roadmaps to REDD+ implementation helps clarify gaps in national capacity and thus necessary international intervention. To this end, the R-PPs may help define future international funding (FCPF 2010a, 2011a, 2011b, 2011c).

Congo Basin Forest Fund (CBFF)

Amount used or dedicated to planning: \$4.3 million

The CBFF maintains five investment priorities. One is general support for improved forest governance and increased institutional capacity. Additionally, the Fund supports monitoring, reporting, and verification improvements on a national level within Africa's Congo River Basin. At least one project currently funded by the CBFF involves expansion of deforestation monitoring at a country-wide level (CBFF Secretariat 2010).

UN-REDD Programme

Amount used or dedicated to planning: \$63.7 million

The UN-REDD Programme funds institutional capacity building through its National Programmes development process. Thirteen developing countries have received funding for the development of these REDD+-readiness plans. Between 2011 and 2015, an additional 20 countries will receive support.

The purpose of the National Programmes is to ensure integration of REDD+ strategy with national development processes. This task includes analyzing drivers of deforestation, strengthening forest conservation programs, conducting monitoring, assessing multiple benefits, and building governance capacity at the national level. REDD+ planning activities conducted by UN-REDD have remained focused on the first phase of REDD+ development (national strategies, measurements, and capacity building). Future capacity development can come from REDD+ phase 2 work involving implementation of national strategies and action plans.

UN-REDD develops REDD+ capacity across countries through the Global Programme. This program advances international REDD+ capacity building through stakeholder dialogue and technology transfer, with an emphasis on development of norms to facilitate REDD+ acceptance.

Expertise for both the Global and National Programmes stems from the three convening agencies of UN-REDD: the Food and Agriculture Organization (FAO), the United Nations Environment Programme (UNEP), and the United Nations Development Programme (UNDP). Between 2011 and 2015, the UN-REDD Programme has plans to increase work in six areas: monitoring, reporting, and verification (MRV); national governance; stakeholder engagement; realization of multiple benefits; transparent payment methods; and sector transformation.

UN-REDD has divided forms of support into two categories: national and global. National support includes continued work on readiness preparation as well as targeted support for specific needs. Global support involves dissemination of knowledge related to REDD+ and catalyzing of international policy development. The opportunities for synergy between these REDD+ actions and blue carbon remain high, because decisions on the specifics of actions—particularly MRV actions, which will affect identification and quantification of blue carbon habitat and will be essential for future blue carbon payments (UNDP 2011; UN-REDD 2008, 2011)—have not yet been made.

Global Environment Facility (GEF) Trust Fund

Amount used or dedicated to planning: \$105 million

The GEF Trust Fund distributes monies through set periods called *tranches*. The most recent (2007–2010) tranche (GEF-4) of \$105 million supported pilot programs and cross-sectoral cooperation. This work included enhancing institutional capacity in the Congo basin, establishing market mechanisms for REDD in Colombia, and supporting the Brazilian Forest Service in the Amazon. The major focus for GEF-5 funding is implementation of REDD+. GEF-5 encapsulates the most recent funding tranche of the program.⁸

As much as \$1 billion is available for REDD+ through the program. Funding priorities include forest policy formation, forest and carbon measurement, and the development of certification and payments for ecosystem services (PES) schemes for forests. Only under special circumstances will REDD+ readiness activities be funded (GEF 2010a, 2010b, 2010c).

8. The tranche includes \$250 million in GEF funds dedicated to REDD+ and an additional \$750 million available through incentive programs.

Least Developed Countries Fund (LDCF)

Amount used or dedicated to planning: \$12.2 million

The LDCF, part of the GEF, supports the planning process through national adaptation programs of action (NAPAs). These exist to assist developing countries in the planning for climate change adaptation. As of September 2011, 45 developing countries have completed NAPAs. Although such plans deal little with REDD+ directly, their development indirectly supports capacity building. For example, if the development of an NAPA requires the mapping of mangroves in a coastal region, this activity indirectly supports incorporation of blue carbon in the REDD+ process (GEF 2011b; UNITAR 2010).

The Amazon Fund

Amount used or dedicated to planning: \$60 million

Determining the precise use and classification of this fund is difficult. Approved projects total \$140 million in dedicated funds, approximately \$133 million of which has been spent on efforts seemingly related to REDD+ (i.e., not on reforestation). Of this sum, 45% may be approximated to be used for planning purposes, generally, monitoring of deforestation and improved governance (such as ecological and economic zoning) to facilitate proper land management (AMA/DEFAM 2011b; BNDES 2011).

International Forest Carbon Initiative (IFCI) (Australia)

Amount used or dedicated to planning: \$20 million

The Australian government's selective investments in REDD+ contribute moderately to planning and capacity building in Indonesia and Papua New Guinea. For example, the IFCI has contributed \$10 million to help Indonesia develop a national carbon accounting system. The initiative also invests in research to develop concept models for REDD+ (KFCP 2011).

International Climate Initiative (Germany)

Amount used or dedicated to planning: \$37 million

The vast majority of Germany's REDD+ contributions through fast-start financing deal with planning and go mainly to the Amazon Fund and the Forest Carbon Partnership Facility. Other contributions go to bilateral or multilateral programs aimed at improving capacity at a macro scale. Two examples are \$5 million for monitoring research in Brazil and \$9 million for improved national REDD+ planning in Peru (BMU 2011a).

Hatoyama Initiative

Amount used or dedicated to planning: \$158 million

According to Japan, its contribution to the phase 1 development process of REDD+ includes providing financing to the UN-REDD Programme and to 21 countries for data collection and planning. Total funding support through 2010 was \$307 million for REDD+. The majority of funds have gone to national efforts totaling \$158 million. Only \$3 million has gone to the UN-REDD Programme. Where the remaining funds have been invested is unclear (Japan 2011).

International Climate and Forest Initiative

Amount used or dedicated to planning: \$97 million

Funds listed by Norway through the ICFI include multilateral grants to UN-REDD Programme, the Forest Carbon Partnership Facility, and other efforts described above. Unique bilateral arrangements resulted in \$97 million in contributions in 2010. Two major country partnerships include assistance to Guyana and Tanzania for the development and implementation of a REDD strategy. Norway further funds REDD+ capacity building through nongovernmental institutions. In 2010, the ICFI through the Norwegian Agency for Development Cooperation (Norad) provided \$27 million to REDD+ efforts (ICFI 2010; Norway 2011).

Pilots and projects

Fewer funds related to the UNFCCC process have begun building institutional capacity and testing REDD+ development through pilot projects than have focused on the planning process. Because the REDD+ funding priority through 2012 is on planning and governance, this finding is unsurprising. Collectively, the 14 funds analyzed for this study show only \$233 million in current direct spending on or funding allocation for pilot projects and expansion of the REDD+ portfolio. Only three funds detailed here have contributed to pilot projects. Two of these funds are location specific (Amazon and Congo basins).

The Amazon Fund receives payments based on emissions reductions calculated from avoided deforestation in the Amazon. The only other fund that relates funding to such reductions is the BioCarbon Fund, which issues payments based on certified emissions reductions stemming from its sponsored projects. Unlike the Amazon Fund, which receives payments for reductions, the BioCarbon Fund *grants* payments for reductions. Only a portion of BioCarbon financing goes to REDD+ initiatives.

Much of the funding for REDD+ portfolio development may become defined in the post-2012 period. A large funding tranche not yet utilized for such development is the FCPF's Carbon Fund. Entities have pledged \$215 million to the fund.

Funding action for pilots and projects

BioCarbon Fund

Amount used or dedicated to pilots and projects: \$1.5 million

Technically, the BioCarbon Fund purchases emissions reductions, but the program also serves as a pilot project for REDD+ initiatives. As of September 2011, the fund has made two emissions reductions purchase agreements (ERPAs) relating to REDD+. One project, in Madagascar, works toward creation of a 425,000 hectare protected area. Another project, in Columbia, is establishing efficient and productive use of natural resources without degrading the coastal landscape. In total, the two projects have resulted in ERPAs worth approximate 677,000 t CO₂e. A separate project, in Kenya, in 2010 demonstrated how a soil carbon-driven project might work (BioCF 2011; Finance 2011).

Forest Carbon Partnership Facility: Carbon Fund

Amount used or dedicated to pilots and projects: \$215 million

As of the writing of this report, the FCPF has yet to allocate any funds. Part of the Carbon Fund's investment in portfolio development is to provide emissions reductions credits to contributing entities. Carbon Fund participants will maintain ownership of project emissions reductions funded by the program. REDD countries that are participants in the FCPF may submit project plans for funding. Part of the assessment of such plans hinges on the country's REDD readiness. Carbon Fund members will ultimately bear the burden of the risk of projects they approve. Valuation and pricing of emissions reductions stemming from these projects have yet to be determined (FCPF 2010b, 2011a, 2011b; World Bank Carbon Finance Unit 2011).

Amazon Fund

Amount used or dedicated to pilots and projects: \$73 million

Most of the money currently spent on REDD+ projects goes to conservation aimed at stemming deforestation. Projects aim to combine conservation with efforts to improve the indigenous population's livelihood. Only a small amount of funds go to combating land degradation in the Amazon (AMA/DEFAM 2011a, 2011b; BNDES 2010, 2011; ODI 2011).

International Forest Carbon Initiative

Amount used or dedicated to pilots and projects: \$61 million

The IFCI is investing in a significant REDD+ pilot program in the Kalimantan forest of Indonesia. The program aims to demonstrate credible emissions reductions through the protection of Indonesian peatland. This project could provide credible evidence for future projects that focus on the importance of soil carbon. Actions include peatland protection, buffer creation, monitoring, and development of payment mechanisms. A second pilot partnership, in the Sumatra forest, seeks to demonstrate REDD+ capabilities in different habitats (IFCI 2011; KFCP 2011).

Verified emissions reductions through the voluntary market

In the context of existing payments for REDD-related carbon credits, the voluntary market has been the only player. In 2010, the voluntary market purchased approximately 131.2 Mt CO₂e. Of this amount, 30.1 Mt CO₂e stemmed from forest carbon projects for a market value of \$178 million. Depending on the study referenced, REDD credits supplied between 17.8 and 19.5 Mt CO₂e to the voluntary market. The average price for a REDD credit in 2010 was \$5/t CO₂e; the average forest credit price was \$5.5, and the average voluntary credit price was \$6.⁹ The majority of voluntary credits as a percentage of the total market came from the Verified Carbon Standard (VCS). VCS prices average \$4/t CO₂e. Latin

9. The price range of all voluntary credits (including forest credits) remains extremely high. Prices in the voluntary market range from \$.01 to \$136.3/t CO₂e. Forest carbon credits in the voluntary market have a smaller range, with a high price of approximately \$34/t CO₂e.

America provided almost all (89%) of the REDD voluntary credits (Diaz, Hamilton, and Johnson 2011; Peters-Stanley et al. 2011; Linacre, Kossoy, and Ambrosi 2011).

Demand for voluntary REDD credits in 2010 significantly increased from that in the previous year. The higher demand had little to do with the funding currently being contributed by the international community in support of REDD readiness. According to Diaz, Hamilton, and Johnson (2011), it reflects three factors: recognition of REDD+ in the COP-16 in Cancun, VCS standards for RED, and pre-compliance speculation in California's cap and trade program.

VCS standards for REDD have helped mobilize projects. Recognition of REDD+ in future climate agreements and expectation that REDD will be part of California's compliance mechanism have served to stimulate pre-compliance demand. However, these three points also reflect the fact that demand for REDD carbon credits is difficult to predict and remains subject to pending regulations. Indeed, attempting to relate uptick in demand for REDD carbon credits since 2010 to future demand for blue carbon credits would be a highly speculative enterprise.

Current Blue Carbon Financing Opportunities through REDD+ Sources

Current funding for blue carbon may come from the three previously defined sources: international REDD+ readiness (planning), demonstration projects, and voluntary markets. But future blue carbon funding should not be viewed as restricted to these sources. Indeed, future funding sources could be tied to the inclusion of blue carbon as a recognized mitigation activity in compliance regimes such as UNFCCC, voluntary carbon markets, and for payment mechanisms tied to non-carbon-related ecosystem services provided by coastal habitat.

For the present, funding for the carbon benefits of coastal systems must come through the REDD+ international process or voluntary schemes that capture REDD+ (e.g., mangrove protection) and that also could incorporate more distinct blue carbon categories (e.g., coastal wetlands restoration).

Opportunities for REDD+ and blue carbon synergies occur on three levels: institutional capacity building and planning, data collection and monitoring, and national stakeholder participation (Table 2). If incorporated into the REDD+ planning process, blue carbon could be included in international REDD+ investments.¹⁰ If absent from the planning process, this method of carbon mitigation may find little support from REDD+ countries and thereby miss out on a significant amount of funding.

Table 2. Blue carbon and the REDD+ planning process

Capacity building	Possible synergies	Possible obstacles
Institutional capacity building and planning	Creating national REDD+ governance structures and funding mechanisms to facilitate REDD+	National governance that resides solely in government departments that have no domain over coastal issues could make blue carbon a second priority in a national REDD+ framework
Data collection and monitoring	Establishing baselines of vegetative areas, differentiating mangroves from other forests, measuring soil carbon, conducting wetland studies, and improving funding for data collection services	Failure to include coastal areas in data collection (for example, excluding mangroves from forest definition)
National stakeholder participation	Raising awareness of REDD+ nationally and establishing forums and norms for stakeholder engagement	Failure to include coastal communities in national stakeholder plans

REDD readiness plan analysis

Because current REDD+ protocols are limited to forests and definitions thereof, mangroves are the most likely blue carbon beneficiary of funding for capacity building. Murray et al. (2011) ranked the top 25 mangrove countries on the basis of total carbon mitigation potential. This analysis of REDD+ funding focuses on these countries.

Two forms of capacity building through planning have dominated the REDD+ field at the international level. These are the FCPF Readiness Preparation Proposal and the UN-REDD Programme's "National Programmes". Both initiatives attempt to help countries develop the framework—including national baselines, governance structure, and stakeholder

10. The \$4.5 billion attributable to REDD+ through fast-start financing commitments is closely tied to the planning process; efforts included in the planning process have more ready access to future funding than efforts not included in that process.

support—necessary for successful implementation of REDD+. Though both initiatives cooperate on REDD+, their work significantly overlaps (FCPF 2011b). Table 3 reflects the state of the REDD+ readiness plans for the 25 countries with the greatest potential to mitigate carbon through mangrove management.

Table 3. REDD+ readiness plans of top 25 mangrove countries

Country	Discounted mangrove mitigation potential (Mt CO ₂ /yr) ^a	FCPF: R-PP	UN-REDD	Mangrove data support	Wetland data support	Soil carbon data support	Coastal stakeholder support
Indonesia	34.1	Yes	Yes	Yes	No	Yes	Yes
Mexico	9.0	Yes	No	No	No	No	Yes
Papua New Guinea	5.1	No	Yes	Yes	Yes	No	Yes
Malaysia	4.6						
Vietnam	2.8	Yes	Yes	Yes	No	Yes	Yes
Colombia	2.5	Yes	No	Yes	Yes	Yes	Yes
Pakistan	2.3						
United States	2.2						
Guinea-Bissau	2.0						
Myanmar	2.0						
Philippines	2.0	No	Yes	Yes	Yes	No	Yes
Sierra Leone	1.9						
Gabon	1.8						
Honduras	1.8						
Madagascar	1.7	Yes	No	Yes	No	No	Yes
Senegal	1.5						
India	1.3						
Venezuela	1.2						
Panama	1.2	Yes	Yes	Yes	Yes	Yes	No
Brazil	1.0						
Tanzania	0.8	Yes	Yes	No	No	Yes	Yes
Cambodia	0.8	Yes	Yes	Yes	Yes	Yes	Yes
Ecuador	0.8		Yes	Yes	No	No	No
Nicaragua	0.7	Yes	No	No	No	No	Yes
Thailand	0.7						

a. These data come from Murray et al. 2011.

Notes: With regard to FCPF: R-PP and UN-REDD, “Yes” signifies that the country has a draft or finalized plan. Blank rows (highlighted in gray) signify non-participation in these initiatives. With regard to data collection and stakeholder engagement, “No” indicates *uncertainty* that a country will collect blue carbon data and engage with blue carbon stakeholders. Similarly, “Yes” indicates relative certainty that a country will undertake these activities.

Sources: Cambodia 2010, 2011; Carrión and Chiu 2011; Doens 2009; Forestal 2011; Guinea 2009, 2011a; Madagascar 2010; Masripatin 2009; Nam 2009; Nicaragua 2011; Ortega and Lagos 2011; Panama 2010; Philippines 2010; Schlichter and Kaimowitz 2011; Tanzania 2009, 2010b, 2010a; Wardojo et al. 2010.

On the assumption that governance capacity provides equal benefit to all forms of REDD-related projects, this analysis focused on readiness plans’ mention of stakeholder engagement and data collection. These two categories are important because they are location specific. Stakeholder engagement in inland forests does not necessarily help blue carbon

projects with stakeholders in coastal communities. Similarly, measurement of tree canopies does not necessarily assist blue carbon projects focused on soil carbon.

The analysis considered stakeholder engagement and data collection not only in relation to mangroves, but also in relation to soils and wetlands. Soils and wetlands were included because data collection on both could be critical to baseline development for and monitoring of projects involving salt marshes, tidal wetlands, and mangroves.

As Table 3 shows, the three countries with the most carbon mitigation potential have REDD readiness plans. Some of these plans are in draft form, and some are approved. Thirteen countries, representing approximately one quarter of mangrove mitigation potential, have no readiness plan.¹¹

Not all facets of the planning process are captured by R-PP and UN-REDD. In some cases, country partnerships support data collection and national capacity building. This is the case in Indonesia and Tanzania with investments by Norway and Australia (Australia 2011; Tanzania 2010a).

Additionally, the planning process is ongoing. Countries not now participating in REDD might do so in the future, and even if they never participate, they may still be eligible for some REDD funding. However, those countries advancing their REDD readiness plans have greater near-term access to carbon mitigation funds.

Governance

All countries with R-PPs and National Programme plans have considered the governance structures needed to implement a national REDD+ initiative. These structures generally include institutions that will separately implement, collect data for, and fund the national program. These REDD capacity-building institutions can benefit blue carbon projects. For example, a national REDD secretariat can support tropical forest protection and mangrove protection equally.

Development of governance structures has already benefited blue carbon through expansion of the definition of the term *forest*. Until international REDD+ standards include soil carbon, nations must define a coastal habitat as forest in order to directly benefit from REDD+. Some countries, such as Madagascar, have included mangroves in their definition of forest (Madagascar 2010).

Data collection

Data collection provisions in REDD+ readiness efforts can set the stage for future blue carbon efforts by providing the technical protocols and expertise for setting baselines and analyzing the drivers of deforestation.¹² Indeed, many countries involved in the REDD planning process provide such general support (Carrión and Chiu 2011; Madagascar 2010; Nicaragua 2011; Panama 2010; Tanzania 2009). However, information that will support a future blue carbon project is not always included in REDD+ data collection.

Soil carbon data are vital for future blue carbon projects. Only half of the countries with REDD+ plans reference collection of these data. Countries that mention soil carbon monitoring often do so in combination with tree canopy data, thereby excluding wetlands, or they mention it in relation to small pilot studies (Carrión and Chiu 2011; Madagascar 2010; Panama 2010; Tanzania 2009).

Nine of the 12 countries with REDD plans analyzed for this study mention mangrove forests in data collection processes. However, the priority given these forests in these processes varies. Some countries, such as Tanzania, intend to collect data on mangrove deforestation rates (Tanzania 2009). Others, such as Panama, include provisions to gradually include coastal land covers such as mangroves and salt marshes (Panama 2010) in data collection. Some countries merely mention the possibility of collecting data on mangroves (Carrión and Chiu 2011).

Almost no discussion of collecting data for wetland carbon exists. The lack of such data could lead to difficulty in generating international funding for tidal wetland- or marsh-related projects.¹³

11. One of these 13 countries, the United States, is ineligible for REDD planning funding.

12. One country, Nicaragua, notably excludes mangroves in its definition of areas facing deforestation. However, Nicaragua's R-PP remains in draft form, leaving open the possibility that mangroves could be included in this definition.

13. Panama does mention the eventual inclusion of salt marsh data (Panama 2010).

Stakeholder engagement

Because readiness plans tend to focus on the nature and extent of the governance structures supporting stakeholder engagement, determining how blue carbon projects will benefit from that engagement is difficult. One way these projects may benefit from stakeholder work is through engagement with the fishing communities. Although countries may not directly mention engagement with these communities, some readiness plans will note the importance of fishery management for the benefit of people and mangroves (Tanzania 2009). Some countries, such as Madagascar, identify fishermen as one of many groups of stakeholders in mangrove management (Madagascar 2010). Blue carbon projects will likely benefit through engagement with stakeholders in regions that include coastal areas.

Pilots and projects

As already noted, REDD+ projects outside of the voluntary market are not numerous. Although funding mechanisms such as the FCPF's Carbon Fund and the Forest Investment Program (FIP) may build project-level capacity in the near future, funds have yet to be dispersed. Consequently, three funds described in the previous section—the BioCarbon Fund, the Amazon Fund, and the Congo Basin Forest Fund—are left for analysis.

Of these funds, only one, the Congo Basin Forest Fund, has directly invested in a project related to blue carbon. This project examines alternatives to mangrove destruction in Cameroon (Secretariat 2010). The Amazon Fund and the BioCarbon Fund indirectly support blue carbon through REDD+ capacity building (AMA/DEFAM 2011b; BioCF 2011).¹⁴

Verified emissions reductions in the voluntary market

Because compliance standards do not yet account for REDD-related offsets, blue carbon finance through verified emissions reductions must come through the voluntary market. Although major voluntary offset creditors such as the Verified Carbon Standard and Climate Action Reserve have yet to approve any blue carbon projects, future projects could occur on the basis of current REDD standards.¹⁵ Additionally, the most recent version of the VCS Agriculture, Forestry and Other Land Use (AFOLU) requirements include peatland rewetting and conservation (VCS 2011a). Coastal lands with peat soils could be eligible for voluntary credits through these peatland requirements. Moreover, VCS is in the process of approving wetland mitigation standards that will likely include coastal habitats.

The current size and price of the voluntary REDD market can provide some insight into the payment potential for blue carbon, though total blue carbon mitigation potential is perhaps an order of magnitude smaller than REDD+ potential (Murray et al 2011). In 2010, REDD offsets accounted for up to 19.5 Mt CO₂e (Diaz, Hamilton, and Johnson 2011). The average price of a forest carbon credit was \$5.5/t CO₂e compared with \$5/t CO₂e for REDD, \$6/t CO₂e for voluntary credits generally, and \$4/t CO₂e for VCS credits (Diaz, Hamilton, and Johnson 2011). Norway is purchasing carbon credits from the Amazon Fund at an average price of approximately \$5/t CO₂e (AMA/DEFAM 2011b). A study of blue carbon economics by the Nicholas Institute developed first-order supply functions for carbon mitigation through mangrove management in the 25 countries identified in Table 3. At a credit price of \$5/t CO₂e, its estimate of mitigation potential is approximately 50 Mt CO₂e per year, which equates to a \$250 million market, with a range of 10 million to 80 Mt CO₂e (\$50–\$400 million) (Murray et al. 2011).

Blue Carbon Financing: Next Steps

On the basis of carbon mitigation potential alone, the future of blue carbon funding will hinge on the further incorporation of blue carbon into the REDD+ readiness process, the inclusion of blue carbon in voluntary and compliance markets, and the success of blue carbon demonstration projects.

Utilizing the planning process

REDD+ readiness planning and capacity building can define future funding for carbon offset payments. Two major funding sources for REDD+ projects, the Forest Investment Program and the FCPF Carbon Fund, require investments directly associated with on-the-ground projects to accord with national REDD+ plans (FCPF 2011c; FIP 2010c).¹⁶

14. One other mangrove-related project, also based in Cameroon, seeks to reduce deforestation through the construction of efficient fish smoke houses. However, the carbon credits are generated by reduced wood burning, not reduced deforestation. More information about the project may be found at the UNFCCC website: <http://cdm.unfccc.int/Projects/Validation/DB/GTXKS2V273EIIOXJ6M623RYD46V8K/view.html>.

15. This conclusion is based on a search of projects as of October 17, 2011, on <http://www.forestcarbonportal.com>.

16. The FCPF Carbon Fund retains a pledging total of \$215 million. For access to these funds, countries with approved R-PPs must

These two programs alone total \$792 million in project-based funding that is at least in part contingent on the planning process of funding mechanisms such as the FCPF Readiness Fund and UN-REDD Programme. Because the purpose of REDD+ planning is to define future REDD projects and investment, funding availability will likely hinge on the information within countries' national REDD+ readiness plans.

To be certain, blue carbon has already benefited from the REDD+ planning process. Establishment of national governance structures, monitoring schemes, and general stakeholder engagement advance the cause of coastal area protection for the sake of carbon mitigation. However, three gaps in the planning process may prevent blue carbon activity from fully benefiting from these efforts:

Key countries omitted

Of the top 25 mangrove countries, 13 have begun neither an FCPF R-PP or a UN-REDD National Programme. These 13 countries represent 27% of the estimated carbon mitigation potential of mangrove conservation in t CO₂/year.¹⁷ Unless these countries create REDD+ readiness plans, they may find themselves ineligible for a significant tranche of monies.¹⁸

Soil carbon and wetland monitoring predominately absent

Inclusion of soil carbon will be highly beneficial to future blue carbon projects (Murray et al. 2011). Indeed, one of the largest drivers of inclusion of blue carbon in a carbon mitigation strategy is the high level of carbon sequestered in coastal soils. However, the majority of plans include no examination of soil or wetland carbon. Half of the countries analyzed do not mention gathering of soil carbon data. The remaining countries plan soil data collection on a fairly limited basis. Four of the countries analyzed mention neither wetlands nor soil carbon.

Changes in policy to quantify soil carbon and wetland protection through REDD+ mechanisms could open the door for blue carbon projects with or without prior planning. Given the difficulty of broadly accounting for soil carbon, near-term establishment of baselines for carbon in soils could hasten creation of blue carbon projects (Bridgham et al. 2006).

Engagement with coastal stakeholders remains unclear

Only some readiness plans specifically express the intention to engage with coastal communities and stakeholders such as the fishing community. Failure to reach out to these communities and stakeholders may slow acceptance or limit the creation of blue carbon projects.

Challenges presented above do not universally exclude blue carbon from funding going forward. The worst-case scenario is that blue carbon activity outside of mangrove conservation efforts will not benefit from international project-based support from funds such as the FIP and FCPF Carbon Fund. The likely case is that blue carbon projects will benefit in some way from current investments in REDD capacity building. However, implementation of these projects may be delayed due to the need for additional data or improved stakeholder engagement.

Blue carbon stakeholders should be aware of the limitations countries may face with regard to adequate soil carbon data, stakeholder outreach, and geographic scope. Additional investment in blue carbon data may be required to fill the gaps left by the planning process. Similarly, project managers may be required to limit the geographic extent of blue carbon activity to only those countries with national REDD readiness plans.

Expanding pilot programs

Not surprisingly, given its nascence as a defined mitigation activity, conservation-based projects for blue carbon are limited. Only one active conservation project can be considered tied to blue carbon. A lack of similar projects conceivably raises two concerns for the future of blue carbon financing. The first is that blue carbon will fall behind established and

submit an emissions reduction program idea note (ER-PIN) to the Carbon Fund. The ER-PIN is required to accord with the R-PP. Thus, if blue carbon is not an option in the R-PP, funding for blue carbon projects could be rejected in the approval process for the ER-PIN. The Carbon Fund will approve approximately five emissions reductions purchase agreements.

17. This figure is not higher because Indonesia, which represents the majority of mangrove-related carbon mitigation potential, has developed readiness plans for both the FCPF and UN-REDD Programme.

18. The United States will be ineligible with or without a REDD readiness plan.

tested REDD+ projects. The second concern is that blue carbon will miss out on the data collection benefits provided by pilot REDD+ projects.

Existing REDD+ projects provide specific examples of how to utilize the opportunities and benefits provided by this form of carbon mitigation. Some knowledge garnered through these projects may be transferred to blue carbon projects. However, the latter are sufficiently differentiated from the former that funding efforts must focus on demonstrating the fungible nature of blue carbon credits. Specifically, these efforts must define proper ways to engage with coastal stakeholders, must establish the costs and benefits of blue carbon projects, and must ensure that these projects comply with sovereign legal frameworks.

The question remains whether streams of capital for REDD projects can be directed to blue carbon projects. An analysis of current funding mechanisms shows that they can be. Moreover, some REDD funds are more flexible than others to determine the nature and scope of eligible projects. Of the monies remaining available for REDD+ investment, no less than \$500 million¹⁹ from four major funders could be directed to blue carbon projects.

Since its inception in 2004, the BioCarbon Fund has invested approximately 5% of its monies in REDD projects. The fund has \$60 million in uncommitted monies that could support habitat protection related to coastal systems (BioCF 2011). Australia's International Forest Carbon Initiative invests in REDD+-style projects in Indonesia and Papua New Guinea, which have some of the highest mangrove-related carbon mitigation potential. The initiative retains \$157 million in uncommitted funds (Australia 2011; KFCP 2011).

The Congo Basin Forest Fund is the only fund to have invested in a REDD+ blue carbon project, and it maintains approximately \$50 million in uncommitted funds (Secretariat 2010). These funds could be targeted to blue carbon projects with huge carbon mitigation potential.²⁰

Finally, the GEF Trust Fund has dedicated \$250 million to REDD+ funding, and an additional \$750 million is potentially available for cofinancing (GEF 2010c). Any of this money could be used for blue carbon projects.

Voluntary and compliance markets

Currently, the only market option for blue carbon is the voluntary market. However, compliance market demand for blue carbon could emerge, depending on the outcomes of the UNFCCC process on REDD+, the use of REDD+ in compliance markets, and possible expansion of REDD+ to blue carbon.

Voluntary markets

The future of coastal habitat protection through the voluntary carbon market will rest, for now, on two factors: (1) the extent to which REDD projects in the voluntary markets can incorporate blue carbon, and (2) the development of blue carbon standards in the voluntary market. According to REDD methodology in the Verified Carbon Standard, project areas may include forested wetlands (including mangroves) as long as these wetlands contain no peat, which is dealt with separately by VCS (VCS 2011b). A search of the Forest Carbon Portal (forestcarbonportal.com) reveals no previous, current, or pipeline REDD projects involving forested wetlands.²¹

Coastal carbon projects involving peat soils could prove eligible for carbon credits under the VCS peatland rewetting and conservation (PRC) option under the most recent agriculture, forestry and other land use (AFOLU) standards (VCS 2011a). Specifically, the AFOLU standards in the VCS may prove useful in protecting habitats at risk of drainage activities due to agriculture.²² A methodology for peatland conservation is in development (TerraGlobalCapital 2011).

Distinct standards for blue carbon in the voluntary market may be established in a pending VCS wetland carbon methodology. Restore America's Estuaries has been leading the VCS wetlands technical working group established in March 2011. Its proposal for a wetland methodology (a draft of which is not yet publicly available) includes mention of coastal

19. This figure does not include dedicated fast-start finance investments, primarily in existing funds such as the FCPF, the UN-REDD Program, and the Congo Basin Forest Fund. FCPF and UN-REDD monies tied directly to the planning process are also not included.

20. For reference, eligible Congo Basin countries along the coast contained approximately 452,500 ha of mangroves in 2005. They have a discounted mangrove-related carbon mitigation potential of approximately 5.3 Mt CO₂e.

21. Analysis conducted through Forest Carbon Portal at <http://www.forestcarbonportal.com> (accessed 19 October 2011).

22. One of the eligible project activities includes conservation of undrained or partially drained peatlands.

habitats such as mangroves, salt marshes, and freshwater tidal marshes (RAE 2011). According to the proposal, the final VCS wetlands requirements should be submitted for approval in December 2011. Thus, a new venue for blue carbon in the voluntary market may soon exist. Whether demand for blue carbon voluntary credits can significantly stymie the loss of coastal habitat remains difficult to predict.

Compliance markets

Carbon offset payments at a scale sufficient to reverse habitat loss will likely have to come from a compliance regime. As yet, blue carbon offsets are recognized in neither global compliance markets, such as those in the UNFCCC process, nor national/state emissions trading systems. An analysis of existing and future regulatory schemes suggests that two compliance mechanisms hold the greatest financial potential for blue carbon: an international post-2012 UNFCCC protocol and California's Global Warming Solutions Act (AB32) (ARB 2010). Future financing through a post-2012 agreement is difficult to define, because it depends on negotiated carbon caps as well as protocols for offsetting emissions. By contrast, blue carbon financing potential under the California climate cap is much clearer.

According to a California Air Resources Board (ARB) staff report on AB32, the emissions reduction program allows up to 232 Mt CO₂e of offset credits through 2020 (ARB 2010). This figure represents all emissions allowed from all sources in California. However, only a small share of emissions commitments can be met by offsets of any one source. A regulated entity may use offsets to meet up to 8% of its compliance obligation. Blue carbon offsets may occur through a sector-based system with a baseline of and reduction goal for emissions from coastal habitat destruction in a certain area. Current ARB regulations limit sector-based reductions to between 25% and 50% of offsets during the different compliance periods (ARB 2010). Given that blue carbon has not been established as a viable offset category in California, even that small market may not be open to blue carbon, unless through REDD.

California has already signed memoranda of understanding with the states of Chiapas, Mexico, and Acre, Brazil, to establish a sub-national REDD offset protocol in these areas. Chiapas alone can provide up to 2 Mt CO₂e by 2020, and some of this offset could come from conservation of mangrove forests (Roosevelt 2010). Through the Governors' Climate and Forests Task Force (GCF), the state of California is collaborating with 11 other sub-national areas in three countries to develop REDD projects. Each of these three countries (Brazil, Indonesia, and Mexico) have significant carbon mitigation potential through the protection of mangroves (Murray et al. 2011).

Take-home Messages

Current REDD+ funding presents opportunities and road blocks for blue carbon

Current funding options under REDD+ mechanisms yield three potential financing pools for blue carbon: capacity building, pilot projects, and carbon markets. Through the UN-REDD Programme and the World Bank's FCPF, funders have allocated approximately \$200 million to planning (FCPF 2011a; Guinea 2011b; UN-REDD 2011).²³ The current planning process through REDD+ increases the feasibility of blue carbon projects through improved data collection and governance. However, insufficient study of soil carbon and unspecified engagement with coastal stakeholders may make such projects less palatable than other carbon mitigation options involving habitat preservation.

Because blue carbon as a distinct class of carbon mitigation activity is new, financial flows in the voluntary market as well as through government-backed pilot programs for coastal habitat protection have not yet emerged. Although this activity benefits from the momentum of REDD+ initiatives, it loses in not yet being incorporated in REDD+ demonstration projects. That is, investors are apt to choose projects already proven to succeed.

These issues do not preclude financing of blue carbon projects. Indeed, this analysis shows that significant monies pledged by the international community could help protect coastal habitats. However, the analysis serves as a reality check regarding blue carbon's role in carbon mitigation. Blue carbon is one of many carbon mitigation options in a field relatively stifled by limited demand at the regulatory level. Any blue carbon project will have to compete against other carbon mitigation strategies. Supporters of blue carbon projects could advance their cause by filling the gaps in the current funding scheme; specifically, they could focus on data collection and the development of pilot projects.

23. Only a small fraction of this money has actually been spent.

Future funding: Defining predictability

With the details of a post-2012 international climate agreement undecided, future financing for blue carbon remains difficult to predict. Ultimately, blue carbon funding within the carbon regime may be defined by three issues:

Incorporation of blue carbon in the REDD readiness process

Incorporation of blue carbon in REDD readiness plans and entry of additional countries in the readiness process can stimulate future funding for coastal habitat protection.

Inclusion of blue carbon in future REDD+ agreements

Previous Nicholas Institute studies have shown the importance of soil carbon in the financial viability of blue carbon supply (Murray et al. 2011). Unless future efforts, whether related to REDD+ mechanisms or distinctly set up for blue carbon, address soil carbon measurement, blue carbon investments on a large scale may be difficult to achieve.

Competitiveness of blue carbon sequestration with other land use mitigation activities

Blue carbon offsets will be required to compete not only with other REDD+ projects, but also with other carbon mitigation strategies. The competitiveness and marketability of blue carbon will greatly influence its future financing.

Proponents of blue carbon can promote coastal habitat protection in several ways. First, they can tap the niche market potential of blue carbon—that is, capitalize on the capacity of blue carbon to serve a public good beyond carbon sequestration. Conserving coastal habitat not only mitigates carbon emissions, it preserves biodiversity, protects coastal communities, and appeals to those who care deeply about coastal ecosystems. If stakeholders wish to protect blue carbon for these ancillary benefits, or simply to realize coastal habitats' existence value, they need not look only to the carbon market for financing.

Protecting coastal communities from climate change may involve protecting coastal habitats, making blue carbon projects eligible for monies dedicated to climate change adaptation. For example, the Kyoto Protocol's Adaptation Fund has sponsored 12 adaptation projects at a sum of \$60 million (World Bank 2011a). One of these projects, located in Senegal, involves the restoration of degraded mangroves. The adaptation benefits, in addition to carbon mitigation potential, of blue carbon projects may advance coastal habitat protection projects in the carbon offset community.

Blue carbon ultimately faces the challenge confronting all other forms of carbon mitigation: an uncertain regulatory environment leading to unpredictable demand for carbon offsets. Needed changes in offset requirements and unclear benefits from the REDD+ planning process further obscure the financial future of coastal habitat protection for carbon mitigation. Recognizing that coastal habitats provide a multitude of ecosystem services, not just carbon mitigation, may be the key to raising demand and generating large-scale blue carbon finance in the future.

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Appendix

Fund	Relevance to blue carbon
BioCarbon Fund	<p>The BioCarbon Fund opened in May 2004 to foster investment in land use, land use change, and forestry (LULUCF) and in the Kyoto Protocol's Clean Development Mechanism (CDM). Projects aim to sequester/conservate carbon in forests and farming. The primary focus of the fund is afforestation/reforestation, not protection. Many of the projects are in sub-Saharan Africa and Latin America. The program has two funding tranches. Tranche 1 closed in 2005 and raised \$53.4 million. Tranche 2 closed in 2007 and raised \$36.6 million. Both funding sources have public and private sector contributors.</p> <p>As of 2010, Tranche 1 has committed approximately \$25 million to active and pipeline projects. Tranche 2 has committed approximately \$15 million. Assuming that pipeline projects are implemented, \$21 million remains available for future projects.</p> <p>The BioCarbon Fund experiments with REDD+ programs and therefore could consider preservation of mangroves. As of 2010, REDD+ projects represented 7% of Tranche 1 and 4% of Tranche 2 distributed project funding. Of the 22 projects conducted by the BioCarbon Fund, 1 involves the restoration of wetlands. This project was unrelated to REDD+ (BioCF 2011; Finance 2011).</p>
Forest Carbon Partnership Facility	<p>The Forest Carbon Partnership Facility (FCPF) consists of two funds, the Readiness Fund and the Carbon Fund. The Readiness Fund, which became operational in 2008, helps countries develop national policies and strategies for emissions reductions through REDD. The Carbon Fund provides payments for verified emissions reductions through REDD+. Emissions reductions projects supported by this fund must meet UNFCCC and REDD+ compliance standards.</p> <p>Funding for the FCPF comes from public and private sources. As of July 2011, \$232 and \$215 million have been committed or pledged to the Readiness and Carbon funds, respectively. The Readiness Fund has allocated \$105 million to programs, leaving \$127 in additional resources. As of November 2011, the FCPF has used none of the \$215 million in the Carbon Fund, making the nature of the fund's investments difficult to determine.</p> <p>The Readiness Fund could realize blue carbon protection potential by helping countries develop plans relevant to the safeguarding of mangroves, which are already reflected in REDD+ standards. Whether projects relevant to tidal wetlands or seagrass would be eligible for grants through this fund is unclear. Grants through the Carbon Fund would only be available for mangrove protection. However, a goal of this fund is project diversity. Thus, experimentation with other blue carbon options could be feasible, assuming flexible UNFCCC protocols (FCPF 2011c, 2011a, 2011b).</p>
Forest Investment Program	<p>The Forest Investment Program (FIP) supports REDD+ planning and implementation in developing countries. Currently, FIP supports eight countries in the process of creating plans for reducing deforestation and forest degradation. Generally, FIP takes a national, programmatic approach to REDD+. FIP grants are made in response to an investment strategy prepared by a country in partnership with a development bank.</p> <p>As of June 2011, \$577 million has been pledged to FIP. The eight countries have \$304 million in proposed grant allocations and \$116 million in concessional financing. Over \$150 million remains in reserve.</p> <p>FIP's relevance to blue carbon resides in REDD+ policy regarding mangroves and future policy regarding soil carbon. Only two countries have submitted their investment strategies; neither mentions mangroves or oceans (FIP 2010b, 2010a, 2010c).</p>
Amazon Fund	<p>The Amazon Fund was created in 2008. Financing for the Amazon Fund comes from \$1 billion pledged by the Norwegian government and \$28 million pledged by the German government. BNDES, the Brazilian Development Bank, manages the Fund. Project support focuses on capacity building, government regulation, conservation, and reforestation. As of August 2011, the fund has approved 19 projects totaling \$140 million. It is unclear whether the \$140 million solely reflects Amazon Fund financial assistance or includes multi-institutional support is unclear. Funding lasts through 2015.</p> <p>All donations to the Amazon Fund come with a certificate of emissions reductions corresponding to the donation amount. For Norway's 2009 contribution, certificate ratios were equivalent to \$5 per ton of CO₂ (AMA/DEFAM 2011a, 2011b; BNDES 2010, 2011).</p>

Fund	Relevance to blue carbon
International Forest Carbon Initiative	<p>The International Forest Carbon Initiative, which expires in 2012, is administered by the Australian government. Its purpose is to build capacity and support for inclusion of REDD+ in post-2012 UNFCCC negotiations. Its programs focus on developing market-based approaches to REDD and on scaling up developing countries' monitoring and accounting practices for forest carbon. Thus, the initiative focuses more on planning than on verified emissions reductions.</p> <p>The Australian government has made approximately \$278 million available to the initiative; over \$100 million has been committed. Indonesia and Papua New Guinea, which have high blue carbon potential (2,900,000 ha of mangroves exist in Indonesia alone), receive the vast majority of the funding. The geographical focus of the initiative presents an opportunity to direct funds to planning for blue carbon projects (Australia 2011; KFCP 2011).</p>
Congo Basin Forest Fund	<p>Created in 2008, the Congo Basin Forest Fund (CBFF) has the dual purpose of alleviating poverty and reducing deforestation in the Congo Basin. The fund is tied to capacity building for REDD+ with a stated objective to enhance monitoring, reporting, and verification capabilities. However, the fund is not strictly associated with REDD. Projects are not required to accord with UNFCCC protocols.</p> <p>The governments of Norway and England pledged a combined total of £100 million to the CBFF. This figure equates to \$156 million at the average 2009 exchange rate. So far, the fund has dispersed a total of €70,564,474 or \$93.85 million. Staffing and implementation costs are 7.7% of costs associated with the fund. Thus, only approximately \$50 million is left for future projects.</p> <p>High percentage losses of mangroves in the Congo Basin make this region's blue carbon potential substantial. Of the 35 projects currently funded by the CBFF, exactly 1 deals with blue carbon. This project provides approximately \$0.4 million over three years to find alternatives to mangrove destruction in Cameroon (Secretariat 2010).</p>
UN-REDD Programme	<p>The UN-REDD Programme helps developing countries construct REDD+ strategies and monitor emissions from deforestation and degradation. Thus, the fund does not directly pay for verified emissions reductions. However, emissions reductions could result from funds disbursed to developing countries. Countries wishing to receive UN-REDD Programme funding must create a REDD plan, called a national programme.</p> <p>As of August 2011, over \$98 million had been donated to the fund; almost \$64 million has been dispersed and \$80 million has been allocated. The amount donated to the fund has increased over time. Thus, the \$98 million currently available is not a cap.</p> <p>Between 2011 and 2015, the UN-REDD Programme will maintain a new financial modality called Tier 2, which is expected to distribute \$350–\$400 million. This new funding option will be available to activities that contribute to overall REDD+ strategy. These activities include development of REDD readiness plans for 20 countries.</p> <p>As of August 2011, the UN-REDD Programme was funding National Programmes in 13 developing countries. Of these countries, only two (Indonesia and Papua New Guinea) are among the top ten mangrove countries. Some National Programmes (including those of Cambodia, Indonesia, and Vietnam) mention the need to stem the loss of mangrove forests. However, protection of blue carbon will be achieved solely in the context of national planning (UNDP 2011; UN-REDD 2008, 2011).</p>
Global Environment Facility (GEF) Trust Fund	<p>The Global Environment Facility Trust Fund is the general financial arm of the Global Environment Facility (GEF). Allocation of funds by the GEF occurs under seven subsections, which include climate change and land degradation. Only recently has the GEF Trust Fund allocated specific funds to REDD+. GEF has no funding tranche devoted to marine habitats. However, the most recent replenishment program for the fund promises \$250 million in direct REDD+ financing. This financing could lead to some blue carbon financing opportunities. Additionally, the fund's climate change and land degradation foci could lead to some blue carbon investment.</p> <p>Between 1991 and March 2011, \$14,481 million was invested in the GEF Trust Fund. Of this amount, \$11,061 million has been allocated and thus is not available for blue carbon protection funding. Of this money, \$9,913 million has been granted to projects and project preparations (68.5% of total budget). Of the amount spent on projects (\$9,768 million), \$3,142 million (32%) has been allocated to climate change-related projects. Multi-focal area funding has totaled \$1,373 or 14.1% of project commitments. Only \$372 million (3.8%) of project funding has focused on land degradation.</p> <p>Projects related to REDD+ and blue carbon may technically encompass any of the above mentioned project categories. GEF has reported that 350 of its projects (\$1.6 billion in GEF investment) have been directly related to forest initiatives. A program directly related to REDD+ is an incentive program called the Tropical Forest Account that provided \$40 million to tropical forest protection. For the next funding period, GEF has offered \$250 million to REDD+. However, through an incentive mechanism whereby countries are encouraged to use other GEF dollars for REDD+ purposes, up to \$1 billion in funding may be available between 2012 and 2016 (GEF 2005, 2010a, 2010b, 2010c, 2010d, 2011a; World Bank 2011c).</p>

Fund	Relevance to blue carbon
Least Developed Countries Fund	<p>Parties of the UNFCCC established the Least Developed Countries Fund to finance preparation and implementation of national adaptation programs of action (NAPAs). The NAPAs prioritize developing countries' commitments to adaptation. As of March 2011, \$324 million has been pledged by 23 countries. Between 2001, the fund's inception, and March 2011, \$153 million in net funding decisions were made (\$136 million for projects and preparation, \$14 million for fees, \$3.5 million for administration). On the basis of current projected revenues, approximately \$151.5 million is estimated to remain for additional projects. Just over \$12 million of the accumulated used funds deal with NAPA preparation, leaving the majority for project implementation. Because NAPA preparation should be complete by the end of 2011, the majority of the remaining funds (not counting administration expenses) will likely be used for project implementation.</p> <p>Adaptation programs could include provisions to protect or restore coastal habitats. The blue carbon potential reflected in NAPAs for least developed countries is unclear. Of the 45 projects approved as of April 2011, 9 deal explicitly with coastal adaptation issues and have \$30.75 million in funding (representing 20% of funding for project decisions) (Ortiz 2011; UNITAR 2010).</p>
Adaptation Fund	<p>The Adaptation Fund uses money from certified emissions reductions (CERs) to finance adaptation projects in developing countries. An adaptation project must focus on addressing risks and impacts of climate change. Funding decisions account for a country's vulnerability and risk as well as possible co-benefits from a mitigation project. Through June 2011, the Adaptation Fund has financed 12 projects for a combined sum of over \$60 million.</p> <p>The Adaptation Fund receives money through a 2% levy on proceeds from CERs related to the Kyoto Protocol as well as individual country donations. A World Bank report indicated that almost \$250 million was available to the fund as of June 2011. The program has allocated over \$60 million in project funding. Including administrative budgets, almost \$175 million remains for future programs.</p> <p>The Adaptation Fund only distantly considers protection of carbon stocks and specifically blue carbon. Most projects funded by the Adaptation Fund focus on food and water security. One project in Senegal deals with adaptation to coastal erosion. This project specifies a plan of action that includes restoration of degraded mangroves. Thus, blue carbon has relevance in the Adaptation Fund (Adaptation Fund Board 2008; DEEC 2010; World Bank 2011a).</p>
International Climate Initiative (Germany)	<p>The German government's International Climate Initiative is the funding arm of the country's fast-start finance commitment. As with other fast-start commitments, the funding for this program ends in 2012. In an effort to improve monitoring, reporting and verification (MRV) capacity, the government supports long-term planning, pilot projects, and emissions data collection. Overall, the fund expects to contribute \$1.7 billion in projects relating to adaptation, mitigation, and REDD+ (BMU 2011a, 2011b).</p>
Hatoyama Initiative	<p>The Hatoyama Initiative is Japan's fast-start financing funding arm. In 2009, the country pledged \$15 million to fast-start financing—exactly half of the global total of \$30 billion originally pledged through the fast-start program. As of March 2011, Japan had committed \$6.3 billion to the cause. The majority of this financing has gone to mitigation activities outside of the REDD+ program. Japan has committed \$307 million to REDD+ (Japan 2011).</p>
International Climate and Forest Initiative	<p>Norway established the International Climate and Forest Initiative (ICFI) in 2007 to combat emissions from deforestation and forest degradation. The initiative has three goals: promote conservation to maintain carbon storage capacity, build capacity for a post-2012 agreement, and work toward inclusion of REDD+ in a post-2012 agreement. To this end, the ICFI predominately works on capacity building in developing countries through research, monitoring, and planning. Norway concurrently lists much of the ICFI-funded programs with its fast-start initiatives (Norway 2011).</p>

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