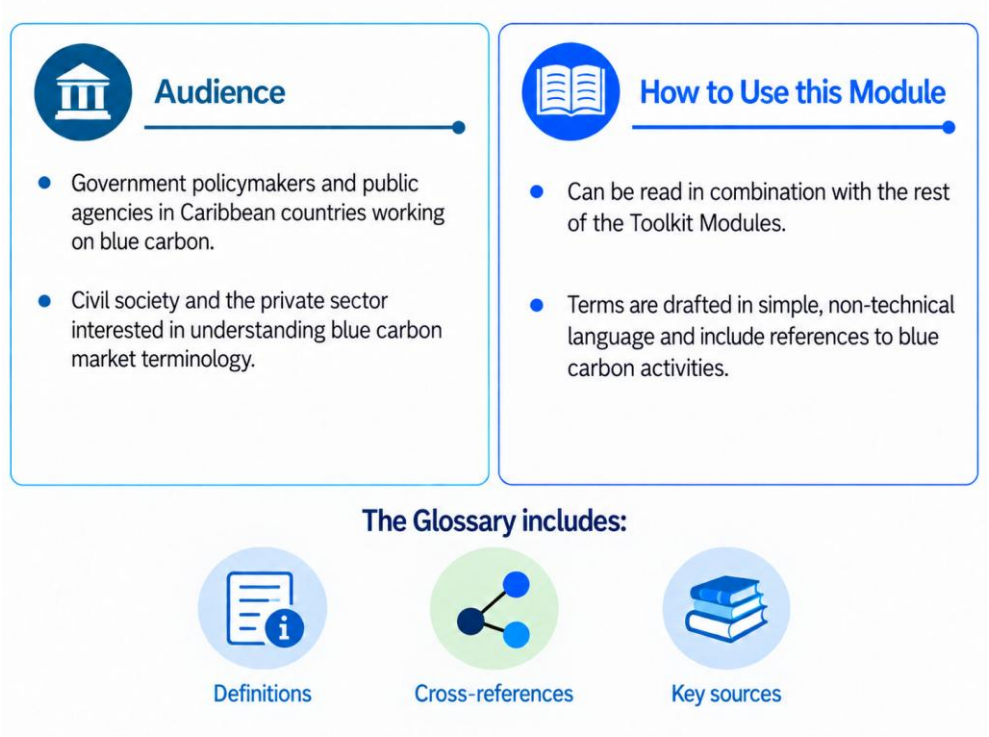
Blue Carbon Toolkit (2026)

Glossary

The Blue Carbon Toolkit (2026) is designed to support CARICOM countries in advancing legal, regulatory, and institutional readiness for blue carbon market participation.



This Glossary provides stakeholders with a common reference for understanding the key blue carbon terms and concepts used across the different modules of the Blue Carbon Toolkit. It is aligned with the terms and concepts used by the Intergovernmental Panel on Climate Change (IPCC) and the 2022 High-Quality Blue Carbon Principles and Guidance.

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1 Glossary of Terms

KEY CONCEPT

Blue Carbon

Carbon captured and stored through biological processes in coastal and marine ecosystems. In the context of coastal blue carbon, the term generally refers to carbon sequestered and stored by mangroves, tidal marshes and seagrass meadows, particularly in their biomass, soils and sediments.

Intergovernmental Panel on Climate Change (IPCC) concept

According to the IPCC, all biologically-driven carbon fluxes and storage in marine systems that are amenable to management can be considered as blue carbon. Coastal blue carbon focuses on rooted vegetation in the coastal zone, such as tidal marshes, mangroves and seagrasses. These ecosystems have high carbon burial rates on a per unit area basis and accumulate carbon in their soils and sediments. They provide many non-climatic benefits and can contribute to ecosystem-based adaptation. If degraded or lost, coastal blue carbon ecosystems are likely to release most of their carbon back to the atmosphere. There is current debate regarding the application of the blue carbon concept to other coastal and non-coastal processes and ecosystems, including the open ocean.[1]



See also UNESCO, the Blue Carbon Initiative, and Ocean Panel.

[1] IPCC 2022. https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/10_SROCC_AnnexI-Glossary_FINAL.pdf

FULL LIST



Actionable Blue Carbon Ecosystems

Actionable blue carbon ecosystems are those that **can generate carbon credits**. They are coastal/ intertidal ecosystems that meet basic readiness conditions for carbon markets: they have **proven mitigation potential**, long-term carbon storage, identifiable threats, feasible conservation or restoration actions, and enough scientific knowledge to support monitoring, reporting and verification (MRV) cycles. Currently, the actionable ecosystems are limited to **mangroves, tidal marshes, and seagrasses**.[2]

Other marine, coastal, and ocean carbon ecosystems, such as **macroalgae, mudflats, seabed sediments or open-ocean carbon**, are not deemed *blue-carbon-actionable*, because the readiness conditions are not yet met (mostly for lack of scientific knowledge and of robust methodological accounting methods). Work is underway, however, to expand the list of *actionable* blue carbon ecosystems (cf. Verra's Ocean Carbon Working Group, the Ocean Vision Network, and others). Then, there are marine and coastal ecosystems, such as **coral reefs**, that have high climate relevance – coastal resilience, biodiversity, healthy seascapes, and more – but generally do not generate carbon credits because they do not provide significant, measurable, long-term net carbon sequestration under existing carbon accounting frameworks.[3] Though they may leverage other streams of blue finance. *See also blue carbon.*

Additionality

Emissions reductions and/or removals are considered additional when **carbon finance plays a decisive role** in instigating the project activity and intervention.[4] In simple terms, a project is additional if carbon revenue is a decisive factor that helps make the activity happen.

Additionality has multiple elements to be demonstrated by blue carbon project proponents, including ***barriers, common practice, regulatory additionality, and financial additionality***. Different carbon standards have their own specific procedures to demonstrate additionality, which includes the implementation of multiple assessments and using specific tools.

What are the different types of additionality tests?

[2] Ocean Panel. Schindler Murray, L., Milligan, B. et al. 2023. "The blue carbon handbook: Blue carbon as a nature-based solution for climate action and sustainable development." Report. London: High Level Panel for a Sustainable Ocean Economy. https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook-1.pdf

[4] Conservation International, Salesforce, ORRAA, The Nature Conservancy, World Economic Forum Friends of Ocean Action, and Meridian Institute. 2022. High-Quality Blue Carbon Principles and Guidance: A Triple-Benefit Investment for People, Nature, and Climate. https://oceanriskalliance.org/wp-content/uploads/High-Quality-Blue-Carbon-PG_FINAL_11.9.2022.pdf

 **Regulatory additionality**	 **Financial additionality**	 **Barriers**	 **Common practice**
Evidence that the activity is not already legally required by law, permit, court order, management plan, or enforceable government policy.	Evidence that the activity is not already financially viable without carbon revenues.	Evidence that the project faces barriers that would prevent, delay, or significantly limit the activity without carbon finance. These may include financial, technical, legal, institutional, operational, social, or capacity-related barriers.	Evidence that similar activities are not already widely implemented in comparable areas (in terms of geography, ecosystem type, size, activities, legal context, etc).

Regulatory additionality, also called regulatory surplus rules, provide greater flexibility for **developing countries.** Under the ICVCM Core Carbon Principles legal requirements – e.g., the designation of a protected area – are always presumed to be enforced in **high-income countries**, meaning that activities required by law – e.g., conservation in a protected area – cannot generally be considered additional. By contrast, in non-high-income countries, evidence that a legal requirement is not effectively enforced may be taken into account. This approach recognizes that, particularly in developing countries, a gap may exist between legal requirements and their effective enforcement. A similar approach is contained in the definition of regulatory surplus under the VCS.

In the context of **blue carbon activities**, the fact that a project, for instance, mangrove conservation or mangrove restoration, is implemented within an existing legally **protected area** does not necessarily prevent it from being additional. Where mangrove conservation or restoration is already ***required by law,*** but those requirements are ***not enforced in practice***, blue carbon activities may still be regulatory additional if they deliver conservation or restoration outcomes that would not plausibly occur in the absence of the project. For example, in a marine protected area (MPA) where mangrove extraction rules are not enforced (e.g., there are records of historical and ongoing degradation). *This flexibility currently* ***does not apply for credits under Article 6*** *of the Paris Agreement yet.*[5]

Moreover, **co-funding** can affect the assessment of **financial additionality**, because it may reduce the extent to which carbon revenues are needed for the activity to proceed. It does not necessarily make a blue carbon project non-additional, but project proponents should demonstrate that, even with public or private funding, **carbon finance remains material to the project's viability, scale, timing, or continued implementation**. Where public funding would already be sufficient to deliver the same mitigation activity, the case for financial additionality may be significantly weakened.

[5] See Additionality Standard: https://unfccc.int/sites/default/files/resource/A6.4-SBM015-A11.pdf

Article 6 of the Paris Agreement

Article 6 of the Paris Agreement has two **market mechanisms** relevant for blue carbon activities — cooperative approaches (**Article 6.2**) and the Paris Agreement Crediting Mechanism (PACM) (**Article 6.4**) — as well as a **non-market mechanism** under **Article 6.8**.

Article 6.2 allows countries to cooperate to meet their Nationally Determined Contributions (NDC), which are voluntary targets submitted to United Nations Framework Convention on Climate Change (UNFCCC). Emission reductions or removals here are known as internationally transfer mitigation outcomes or **ITMOs,** which are carbon credits authorized and transferred between countries in order to meet the NDCs or other international mitigation purposes, such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) or even to be used in the VCM. **Article 6.4** establishes the **Paris Agreement Crediting Mechanism (PACM)**, supervised by the UNFCCC Article 6.4 Supervisory Body, which is tasked with developing and supervising the requirements and processes needed to operationalize it. This includes developing and/or approving methodologies, registering activities, accrediting third-party verification bodies, and managing the Article 6.4 Registry.[6]

Article 6.8 supports cooperation without trading blue carbon credits or transferring mitigation outcomes (non-market approach). Art. 6.8 is not a market mechanism but allows countries to work together through finance, technology transfer, capacity-building and technical assistance.

Blue carbon activities that can obtain carbon finance through the **market mechanisms** (**Article 6.2 and 6.4**) can include, for example, avoiding the conversion or degradation of mangroves and tidal marshes; restoring mangroves, seagrass meadows and tidal marshes; rewetting drained coastal wetlands; and improving the conservation and management of blue carbon ecosystems to maintain or increase carbon stocks. Currently, only **Article 6.2** pathway is feasible. For **Article 6.4**, the Supervisory Body is yet to approve a methodology for blue carbon.[7]

For **Article 6.8,** the Conference of the Parties (CMA) of the Paris Agreement expressly refer to “blue carbon” as an example of potential “focus areas” that may be facilitated under the framework”.[8] Cooperation that can be provided include, for example, technology transfer, finance, capacity-building and technical assistance, which can support activities such as blue carbon ecosystem mapping, GHG inventory development, improved monitoring systems and community capacity-building that do not directly generate carbon credits.

See NDC and Mitigation Outcome (MO).

*[Please check Module on Article 6: **hyperlink**]*

Baseline Scenario

The baseline scenario is the “projected level of greenhouse gas emissions in the absence of the carbon offset project”.[9] In simple terms, it is the **“without project” scenario** used to compare what would likely happen without the intervention against what happens with the project. In **blue carbon**, the baseline may include

[6] https://unfccc.int/news/un-carbon-market-approves-first-ever-issuance-of-credits-under-the-paris-agreement
[7] See: https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/methodologies . Accessed 03 September 2026.
[8] Decision 4/CMA.3, para. 6(b). https://unfccc.int/sites/default/files/resource/cma2021_10a01E.pdf
[9] Conservation International, Salesforce, ORRAA, The Nature Conservancy, World Economic Forum Friends of Ocean Action, and Meridian Institute. 2022. High-Quality Blue Carbon Principles and Guidance: A Triple-Benefit Investment for People, Nature, and Climate. https://oceanriskalliance.org/wp-content/uploads/High-Quality-Blue-Carbon-PG_FINAL_11.9.2022.pdf

continued mangrove loss, seagrass degradation, wetland conversion, erosion of carbon-rich sediments, or an area remaining degraded instead of being restored.

Benefit Sharing

Benefit sharing refers to the **mechanisms and arrangements** through which benefits generated by a nature-based carbon project are **transparently and equitably distributed** among relevant stakeholders and rights holders. In **blue carbon,** benefits can include revenue, improvement of jobs, livelihood alternatives, fisheries recovery, coastal protection, training, equipment, community infrastructure and participation in governance. Benefits are usually distributed among communities, government, land or sea rightsholders, implementers and other stakeholders.

*[Please check Module on Benefit Sharing: **hyperlink**]*

Blue Carbon Pricing

Blue carbon pricing refers to the **value or price attached to blue carbon credits**. In carbon markets, prices are usually not set by governments or carbon standards; they are negotiated between project developers, sellers, buyers, brokers, on marketplaces, or through auctions. Prices depend on supply and demand, project type, methodology, vintage, location, standard, buyer preferences, perceived integrity, removal/conservation attributes, durability risk, and biodiversity, community, and coastal-resilience benefits.

Blue carbon credits, especially mangrove credits, often trade at a premium compared with many other nature-based credits, but public price transparency remains limited. Recent market data indicate mangrove restoration credits around **US$26/tCO$_2$e** in 2023, reported trades around **US$32/tCO$_2$e** in 2024,[10] and some recent (2025/26) blue carbon/mangrove price references above **US$50/tCO$_2$e**.[11] *(All figures here are indicative – prices vary).*

See High Integrity or Quality Carbon Credits.

Blue Carbon Standards

Blue carbon standards are carbon-crediting programmes, standards, and methodologies **that set rules for whether and how a blue carbon activity can generate carbon credits**. They usually cover eligibility, project boundary, baseline, additionality, quantification, leakage, permanence/durability, monitoring, validation, verification, issuance, and registry requirements. There are several Standards with methodologies applicable to blue carbon projects with different levels of usage (market uptake) and market acceptance (integrity).

The **Integrity Council for the Voluntary Carbon Market (ICVCM),** an independent body that "establishes and maintains the highest standards of ethics, sustainability, and transparency for the global voluntary carbon

[10] Simpson S, Smart LS, Landis E, Van Laere S, Kibria ASMG, Albot O, Beeston M, Lovelock CE, McDonald RI, Moyer RP, Worthington TA, Maxwell TL, Stewart-Sinclair P and Spalding M (2025) The Blue Carbon Cost Tool – understanding market potential and investment requirements for high-quality coastal wetland projects. Front. Mar. Sci. 12:1622255. doi: 10.3389/fmars.2025.1622255

[11] Senken 2026. Carbon Credit Prices in 2026: What Companies Actually Pay. Last updated: June 17, 2026. Available at: https://www.senken.io/academy/understanding-carbon-markets/carbon-credit-price

market"[12] has created the Core Carbon Principles (CCP). It is currently reviewing and accessing many methodologies and has already issued CCP-labels (or approvals) for some. *See High Integrity or Quality Carbon Credits.*

Globally, what are the Standards and methodologies applicable to blue carbon?

VERRA / VCS

Verra, the host of the **Verified Carbon Standard (VCS) v5.0,** ccurrently has two methodologies applicable to blue carbon ecosystems:
VM0033 – Tidal Wetland and Seagrass Restoration (v2.1) and VM0007 – REDD+ Methodology Framework (v1.8)

VM0033 covers tidal wetland and seagrass restoration. VM007 covers mangrove REDD+, where mangroves meet forest definitions. The VM0033 methodology is currently undergoing revisions to become the go-to tidal wetland methodology for both restoration and conservation, incorporating the recent revisions to the VCS procedures for avoided unplanned deforestation.

MARKET UPTAKE	Established: multiple active blue-carbon projects; includes large-scale projects (e.g., Delta Blue)
ICVCM / CCP	Program: CCP-Eligible Methodology - VM0033 v2.1: Under assessment

PLAN VIVO

Plan Vivo, a Standard best suited for small scale projects led by local communities, currently has one overarching methodology for forestry and agricultural projects (conservation and restoration), in theory including mangroves (but this methodology does not follow best practices for tidal wetlands).

However, a Coastal Blue Carbon Methodology is in its Pipeline, released for public comment in November 2025[13]. This methodology will cover mangroves only first, with seagrasses to be covered later.[14]

MARKET UPTAKE	Established/ niche: a few certified community-led mangrove projects (using overarching methodology)
ICVCM / CCP	Program: CCP-Eligible Coastal Blue Carbon Methodology: In pipeline / not yet assessed

GOLD STANDARD

Gold Standard released its new Methodology for Sustainable Management of Mangroves (v1.0) in 2024.

MARKET UPTAKE	Emerging: first project using the mangrove methodology was registered in 2026.[15,16]
ICVCM / CCP	Program: CCP-Eligible Mangrove methodology v1.0: Under assessment

ISOMETRIC

Isometric has a Mangrove Restoration Protocol v1.0 launched in 2025.

MARKET UPTAKE	Early: limited deployment compared with established standards
ICVCM / CCP	Program: CCP-Eligible Mangrove Restoration methodology v1.0: CCP-approved but v2.0 under review by ICVCM

[12] ICVCM. 2026. https://icvcm.org/
[13] https://carbon-pulse.com/462962/
[14] https://www.planvivo.org/projects/certify-a-project/pvclimate/methodologies/pipeline
[15] https://carbon-pulse.com/486585/
[16] https://www.linkedin.com/pulse/global-mangrove-trust-registers-first-blue-carbon-jo3zc/

CERCARBONO

Cercarbono recently launched a Methodology CM-LU-CW-001 Blue Carbon Methodology for Mitigation of Climate Change in Coastal (v1.1) with a public comment session ending in January 2026.[17] It which covers both mangroves, seagrasses and salt marshes.

MARKET UPTAKE	Early: methodology just launched
ICVCM / CCP	Program: CCP-Eligible Blue Carbon Methodology: Not yet CCP-approved

BIOCARBON

BioCarbon Standard (Rules v4.1) has a Blue Carbon Methodology BCR0012 (v1.0), applicable to mangroves, tidal marshes and seagrass meadows. The methodology covers conservation, restoration and sustainable management activities and was approved in November 2025.

MARKET UPTAKE	Early: Standard/ methodology just launched
ICVCM / CCP	Program: CCP-Eligible Blue Carbon Methodology: Not yet CCP-approved

ART-TREES

ART-TREES (Architecture for REDD+ Transactions - The REDD+ Environmental Excellence Standard) currently v3.0 is the most used standard for jurisdictional REDD+ programs - relevant to forests and mangroves that are classified as forests. It has three "**crediting approaches"** that can include mangrove forests:

1. the TREES Crediting Level Approach for emission reductions from reduced deforestation and forest degradation
2. the High Forest, Low Deforestation (HFLD) Crediting Approach; and
3. the Removals Crediting Approach for reforestation and forest restoration.

MARKET UPTAKE	REDD+ Jurisdictional - implemented in very large areas (mangroves); blue carbon ecosystems not separately tracked
ICVCM / CCP	Program: CCP-Eligible Methodology: TREES non-HFLD(v2.0): CCP-Approved; HFLD and Removals (v2.0) subject to remedial action

*This content is updated as of 07 September 2026 (including CCP status; for CCP updates please visit: https://icvcm.org/assessment-status/). **Note:** from this list, we excluded the American Carbon Registry (ACR), Climate Action Reserve (CAR) and Verra's Jurisdictional & Nested Redd+ Framework(JNR) since their methodologies are not yet applicable to blue carbon in the Caribbean region.*

Carbon Rights

Carbon rights are commonly understood as the rights — arising under statute, regulation, property law, administrative authorization, contract, or a combination thereof — to **claim, manage, transfer, or benefit from** greenhouse gas emission reductions or removals, including, where applicable, the right to **generate and transfer carbon credits**.[18]

[17] https://cercarbono.com/wp-content/uploads/2026.03.18-ResponsePublicConsultation_BC-methodology.pdf
[18] 2026 World Bank. Legal & regulatory reform toolkit for high-integrity carbon markets. https://openknowledge.worldbank.org/server/api/core/bitstreams/0e85bf42-447a-4a43-b536-1392eca73e1f/content

They cover **three legal dimensions**: **a)** the right to i**mplement** activities generating emission reductions or removals (ERRs); **b)** the right to **transfer and commercialize** the resulting carbon credits; and **c)** the right to **receive and distribute** the benefits derived from their generation and use.[19]

In **blue carbon areas**, these rights can be difficult to identify because projects often take place in areas where several rights and authorities overlap. Mangroves, salt marshes, seagrasses may be located in foreshore areas, seabeds, fisheries zones, protected areas, public trust areas, leases, customary use, and community access rights, all of which may be governed by different laws or institutions.

In many countries, coastal and marine areas, including submerged lands (such as seagrass habitats) are treated as public land or public resources. At the same time, other actors may historically use these areas, often with tenure not always recognized in formal title records. This includes local communities, fishers, customary users, private landholders, tourism operators, or protected-area managers that have long-standing use, access, or management interests. For this reason, carbon rights in blue carbon should be assessed by looking at both who controls the underlying land, coastal area, marine area, or ecosystem, and who has legal authority to carry out the mitigation activity. Where rights are unclear, they may need to be clarified through legislation, permits, concessions, leases, management agreements, community agreements, project approvals, or other legal instruments.

*[Please check Module on Carbon Rights: **hyperlink**]*

Corresponding Adjustment (CA)

Under Article 6, countries use corresponding adjustments to **avoid double counting** when mitigation outcomes are authorized and transferred internationally. In simple terms, a corresponding adjustment is an **accounting adjustment made by the host country** to show that the transferred mitigation outcome should not also be counted toward its own NDC (avoid double counting). Double counting occurs when the same emission reduction or removal is counted, claimed, issued, transferred, or used more than once. In blue carbon, this could happen, for example, if the same mangrove, seagrass, or salt-marsh mitigation outcome is claimed simultaneously by the host country and the buyer to achieve both NDCs.

See Article 6 of the Paris Agreement . See Mitigation Outcome (MO).

Emissions Reductions and Removal (ERR)

Emissions reductions and removals are the **quantified climate benefits** generated by a blue carbon activity, **measured against a baseline scenario**. They may include **emission reductions**, such as avoided greenhouse gas emissions from preventing degradation or loss of mangroves, tidal marshes, or seagrasses, and **removals**, such as additional carbon dioxide captured and stored in biomass, soils, or sediments through restoration or improved management.

Blue carbon ecosystems can hold particularly large **carbon stocks**, especially in their soils and sediments. On a per-area basis, the soils of mangroves, tidal marshes and seagrass meadows can store substantially more carbon than many terrestrial ecosystems, while mangroves are among the most carbon-rich tropical

[19] 2026 World Bank. Legal & regulatory reform toolkit for high-integrity carbon markets. https://openknowledge.worldbank.org/server/api/core/bitstreams/0e85bf42-447a-4a43-b536-1392eca73e1f/content

forests.[20] Restoration can therefore generate **removals** by re-establishing vegetation and natural processes that increase carbon stocks over time—for example, through growth of mangrove biomass and the continued accumulation of organic carbon in soils and sediments. **ERRs are the basis for carbon credits**. For carbon crediting, however, only the **additional increase in carbon stocks or avoided emissions relative to the baseline** can be credited, rather than the ecosystem's entire existing carbon stock.

See Baseline Scenario.

Environmental and Social Safeguards (ESS)

ESS are **rules and processes used to avoid, reduce, manage, and remedy environmental and social risks**. They may be established through **national laws, regulations, or policies**, and are also commonly defined/ required by **carbon standards**, which set safeguards and stakeholder-engagement requirements that projects must meet to be registered and issue credits.

In **blue carbon**, safeguards should protect ecosystem integrity, biodiversity, local and Indigenous community rights, tenure and resource-use interests, participation, livelihoods, gender considerations, and fair benefit sharing. In practice, **social safeguards** may include obtaining free, prior and informed consent (FPIC) when local communities and indigenous peoples (IPCL) rights exist, inclusive and ongoing participation in project design and governance, recognition of customary tenure and resource rights,[21] accessible grievance and feedback mechanisms, transparent benefit-sharing, and community-led or co-management arrangements. **Environmental safeguards** may include avoiding harm to intact ecosystems, applying science-based ecological restoration practices, maintaining key ecological processes such as hydrological connectivity, sediment supply and water quality, and monitoring and adapting to unintended impacts.[22]

The High Quality Blue Carbon Principles and Guidance further emphasizes that practitioners must implement social and environmental safeguards to protect and enhance community rights, knowledge, leadership, and equitable access to the carbon market.

GHG Inventories

A national greenhouse gas (GHG) inventory is the **official accounting of a country's GHG emissions and removals.** Under the Paris Agreement, inventories are reported through Biennial Transparency Reports (BTRs) (previously Biennial Update Reports/ BURs) and help countries track progress toward their nationally determined contributions (NDCs). In countries with REDD+ frameworks or experience, **mangroves** may also be reflected in a Forest Reference Emission Level or Forest Reference Level (FREL/FRL) where they fall within the national forest definition.

For blue carbon, this means accounting for emissions and removals from managed mangroves, tidal marshes, and seagrass meadows, in accordance with **relevant guidance**, especially from the

[20] Schindler Murray, L., Milligan, B. et al. 2023. "The blue carbon handbook: Blue carbon as a naturebased solution for climate action and sustainable development." Report. London: High Level Panel for a Sustainable Ocean Economy.
[21] Lawless, S., Cohen, P.J., Dudayev, R. *et al.* Respecting tenure and the bundle of rights in blue carbon guidance. *Nat. Clim. Chang.* **16**, 843–853 (2026). https://doi.org/10.1038/s41558-026-02651-8
[22] Schindler Murray, L., Milligan, B. et al. 2023. "The blue carbon handbook: Blue carbon as a naturebased solution for climate action and sustainable development." Report. London: High Level Panel for a Sustainable Ocean Economy.

Intergovernmental Panel on Climate Change (IPCC), which is the United Nations body that assesses science related to climate change. Specifically, that refers to the **2013 Wetlands Supplement to the 2006 IPCC Guidelines**.

In practice, **blue carbon** is still underreported or only partially reported. Mangroves are more often included in GHG inventories and accounting but not always disaggregated from terrestrial forests. In this case, accounting may focus mainly on above-ground (AGB) and below-ground biomass (BGB), while neglecting soil organic carbon (SOC), even though much of the carbon stored in blue carbon ecosystems is found in soils and sediments.

Improving blue carbon inventory coverage usually requires better maps of ecosystem extent, baseline data, field measurements, soil and sediment carbon data, country-specific emission factors, and technical/ financial capacity to monitor changes over time. The 2013 IPCC Wetlands Supplement offers default values for countries to calculate emissions from blue carbon ecosystems even in the absence of complete data.

High Integrity or High-quality Carbon Credit

High-integrity or high-quality carbon credits are credits that represent **real, additional, permanent and robustly quantified emission reductions or removals**, are not double counted, and are generated under credible governance, transparency, independent verification and environmental and social safeguards. The Core Carbon Principles (CCPs) developed by the ICVCM provide a global benchmark for identifying such high-integrity credits. **For blue carbon**, the High-Quality Blue Carbon Principles and Guidance complement general carbon-market integrity principles by emphasizing benefits for **climate, nature and people**, through five principles: safeguarding nature, empowering people (especially Indigenous Peoples and local communities - IPCLs), using best practices, operating locally and contextually, and mobilizing high-integrity capital.

See Blue Carbon Standards and Corresponding Adjustment (CA)

Under Article 6, countries use corresponding adjustments to **avoid double counting** when mitigation outcomes are authorized and transferred internationally. In simple terms, a corresponding adjustment is an **accounting adjustment made by the host country** to show that the transferred mitigation outcome should not also be counted toward its own NDC (avoid double counting). Double counting occurs when the same emission reduction or removal is counted, claimed, issued, transferred, or used more than once. In blue carbon, this could happen, for example, if the same mangrove, seagrass, or salt-marsh mitigation outcome is claimed simultaneously by the host country and the buyer to achieve both NDCs.

See Article 6 of the Paris Agreement . See Mitigation Outcome (MO).

Emissions Reductions and Removal (ERR).

High-Quality Blue Carbon Project

In addition to generating **high-quality blue carbon credits**, high-quality blue carbon projects deliver **biodiversity, social, and economic benefits** that often have more immediate relevance to local communities. Benefits for local and Indigenous communities, ecosystem integrity, and biodiversity are integral elements of a high-quality blue carbon project. Carbon projects that provide measurable reductions or that

prioritize these positive outcomes are (1) designed with participation from Indigenous Peoples and local communities, (2) adaptively managed, and (3) verified under established standards.[23]

See High Integrity or High-quality Carbon Credit and Blue carbon pricing refers to the **value or price attached to blue carbon credits**. In carbon markets, prices are usually not set by governments or carbon standards; they are negotiated between project developers, sellers, buyers, brokers, on marketplaces, or through auctions. Prices depend on supply and demand, project type, methodology, vintage, location, standard, buyer preferences, perceived integrity, removal/conservation attributes, durability risk, and biodiversity, community, and coastal-resilience benefits.

Blue carbon credits, especially mangrove credits, often trade at a premium compared with many other nature-based credits, but public price transparency remains limited. Recent market data indicate mangrove restoration credits around **US$26/tCO$_2$e** in 2023, reported trades around **US$32/tCO$_2$e** in 2024, and some recent (2025/26) blue carbon/mangrove price references above **US$50/tCO$_2$e**. *(All figures here are indicative – prices vary).*

See High Integrity or Quality Carbon Credits.

Blue Carbon Standards.

Mitigation Outcome

Blue carbon mitigation outcomes are **emission reduction or removal resulting from a mitigation activity** such as restoring, conserving or sustainably managing mangrove forests, seagrass meadows or tidal marsh areas. Under article 6 of the Paris Agreement, the terms can be defined as follows:

- Mitigation Outcome (MO): an emission reduction or removal resulting from a mitigation activity that may, where it meets the applicable Article 6.2 requirements and is authorized for international use, be transferred as an ITMO. It is 1 tonne of CO2 equivalent (also known as carbon credit). [24]
- Internationally Transferred Mitigation Outcome (ITMO): real, verified and additional emission reductions and removals, measured in tCO$_2$e or other non-GHG metrics, that are internationally transferred and authorized for use towards an NDC and/or for other.[25]

Monitoring, Reporting and Verification (MRV)

MRV means the processes used to **measure or estimate, report and independently verify** the climate benefits generated by a carbon project. MRV processes may include monitoring carbon stocks (soils and biomass) and ecosystem condition using field measurements, sediment sampling, remote sensing. **Co-benefits**, such as water quality improvement or support to livelihoods (e.g., crab culture), can also be tracked by MRV approaches.

At a **project level**, MRV is used to quantify and monitor **ERRs (mitigation benefits)** against the project baseline and provide the basis for issuing carbon credits under applicable carbon standards.

[23] Conservation International et al 2022.
[24] Authors, with reference to Decision 4/CMA.6 , Decision 2/CMA.3 and UNFCCC, *Article 6.2 Reference Manual*.
[25] Authors, with reference to Decision 4/CMA.6 , Decision 2/CMA.3 and UNFCCC, *Article 6.2 Reference Manual*.

At the **national level**, MRV helps connect the results of individual carbon activities with a country's wider emissions tracking and carbon-market accounting. It supports national crediting approaches by providing reliable information on **where mitigation occurs and how much has been achieved**. This is particularly important for carbon crediting under **Article 6 of the Paris Agreement**, where countries need systems to track mitigation outcomes that are authorized and transferred internationally.

Note on blue carbon: MRV can be particularly complex because i) significant carbon stocks are stored in **soils and sediments** which are much harder to observe and quantify than carbon in vegetation; and ii) because coastal ecosystems can **shift in extent and condition over time**. Robust MRV may therefore require a combination of field sampling, ecosystem mapping and remote sensing, as well as repeated monitoring of changes in ecosystem extent and carbon stocks.

See Emissions Reductions and Removal (ERR), Baseline Scenario, Article 6 of the Paris Agreement.

Nationally Determined Contributions (NDC)

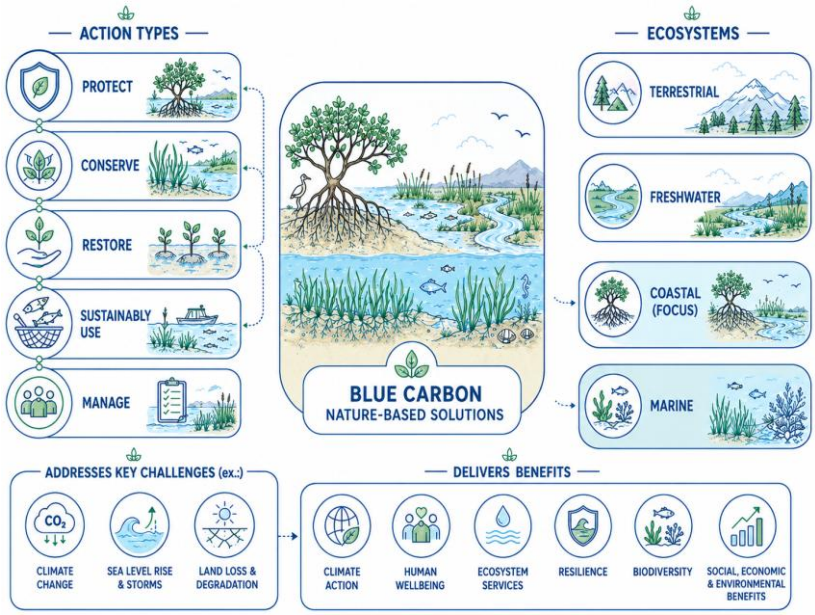
Nationally Determined Contributions (NDCs) are countries' **national (voluntary) climate commitments under the Paris Agreement**. Blue carbon may support both **mitigation**, by reducing emissions or enhancing removals, and **adaptation**, by strengthening coastal resilience, biodiversity, fisheries, and livelihoods. For blue carbon, an NDC can include targets or actions to conserve, restore, sustainably manage, map, monitor, or account for mangroves, seagrasses, tidal marshes, and other coastal ecosystems. Inclusion in an NDC is important for national climate planning and reporting, including Article 6.2 transactions under the Paris Agreement.

Nature-based Solutions (NbS)

Nature-based solutions are defined as "actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits". [26]

In the context of **blue carbon and carbon markets**, NbS can generate climate benefits by avoiding emissions and enhancing carbon sequestration and storage in coastal and marine ecosystems. These benefits may be quantified as **ERRs** and, where applicable, credited under carbon standards.

[26] "United Nations Environment Assembly Agrees Nature-Based Solutions Definition." Nature. 2022. Resolution 5/5 of 2 March 2022. See: https://www.unep.org/about-un-environment/intergovernmental-consultations-nbs



See Emissions Reductions and Removal (ERR).

Permanence/ Durability

The assurance that **emissions reductions or removals** generated by a mitigation activity are **not subsequently reversed** over **more than 100 years**. A stock's durability depends on political, social, environmental, management, financial, and other factors, which can stem from direct or indirect anthropogenic impacts (e.g., natural disturbances associated with climate change).[27] A **reversal** event is an event or process that causes previously achieved blue carbon emission reductions or removals to be lost, reduced, or released back to the atmosphere. In **blue carbon** projects, reversals may result from marine-specific and climate-related risks, including sea level rise or fall, extreme storms, ocean temperature change, erosion, ecosystem degradation, or other changes that affect the durability of stored carbon.[28] Approaches to mitigate risks can include, for example, taking a landscape, seascape, or "**ridge-to-reef"** approach. This means protecting and restoring neighboring ecosystems, to enhance the resilience of the blue carbon ecosystem. For example, a healthy coral reef can protect a seagrass bed or mangrove forest. Likewise, a healthy upland forest and watershed can enhance the resilience of a mangrove forest downstream.[29]

For blue carbon, **sea-level rise is also an important non-permanence risk, but its effects are not always negative**. Rising seas can drown wetlands, erode carbon-rich sediments or change conditions such as salinity and light. [30] However, where sediment supply, hydrology and space for inland migration are maintained, mangroves and tidal marshes may **move inland or establish in new areas**. This can create opportunities to protect future migration areas and restore land that may become suitable for blue carbon ecosystems over time.

[27] Conservation International et al 2022.
[28] Conservation International et al 2022.
[29] Conservation International et al 2022.
[30] Catherine E. Lovelock, Ruth Reef, Variable Impacts of Climate Change on Blue Carbon, One Earth, Volume 3, Issue 2, 2020, Pages 195-211, ISSN 2590-3322, https://doi.org/10.1016/j.oneear.2020.07.010.

Carbon accounting therefore needs to recognize that these ecosystems and their boundaries can change over time. Moreover, carbon standards usually require project proponents (blue carbon) to demonstrate that these risks are dealt with. The VCS provides an example: under the current VM0033 methodology, sea-level rise must be treated as a non-permanence risk (dealt with in its **Non-permanence Risk Tool/ NPRT**), including the risk of erosion and submergence, and the project area may change during the crediting period to accommodate landward migration.[31]

Tenure

Tenure refers to the **formal or informal rights, rules, and relationships that determine who can access, use, manage, control, transfer, or benefit from land, waters/ sea, and natural resources**.[32] *Land* tenure usually means the property and natural resource rights of individuals or communities, protecting their access to and management of the land on which they reside and the resources they use. [33]

In blue carbon, tenure should be understood broadly to include **land, sea/ marine, coastal, and resource tenure**, because blue carbon ecosystems may include submerged or intertidal areas, such as seagrass beds, mangroves, and salt marshes. **Mangroves and salt marshes** may fall on public or private land, protected areas, leasehold land, customary/community-use areas, or intertidal public trust areas**. Seagrasses** are often located in public marine areas, such as the foreshore, seabed, marine protected areas, fisheries-managed zones, or other areas subject to public authority and local use rights.

Voluntary Carbon Market (VCM)

The VCM is a **marketplace for carbon credits** that are not purchased for the purpose of meeting regulatory emissions requirements. Instead, they deliver independently verified and additional emissions reductions on a global scale.[34] To date, blue carbon crediting has taken place mainly through the VCM, especially under independent crediting mechanisms such as the Verified Carbon Standard (hosted by Verra) or Plan Vivo.

See Blue carbon pricing refers to the **value or price attached to blue carbon credits**. In carbon markets, prices are usually not set by governments or carbon standards; they are negotiated between project developers, sellers, buyers, brokers, on marketplaces, or through auctions. Prices depend on supply and demand, project type, methodology, vintage, location, standard, buyer preferences, perceived integrity, removal/conservation attributes, durability risk, and biodiversity, community, and coastal-resilience benefits.

Blue carbon credits, especially mangrove credits, often trade at a premium compared with many other nature-based credits, but public price transparency remains limited. Recent market data indicate mangrove restoration credits around **US$26/tCO$_2$e** in 2023, reported trades around **US$32/tCO$_2$e** in 2024, and some recent (2025/26) blue carbon/mangrove price references above **US$50/tCO$_2$e**. *(All figures here are indicative – prices vary).*

See High Integrity or Quality Carbon Credits.

[31] [31] VCS. 2025. Guidance on Sea-Level Rise Risk Assessment Using the Non-permanence Risk Assessment Calculator, V4.2. https://verra.org/wp-content/uploads/2025/03/SLR-Risk-Assessment-Guidance-Final-APR-2025.pdf
[32] FAO. 2022. *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security*. First revision. Rome.
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Blue Carbon Standards.

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