

Section 3: Components and Industries

From established powerhouses like tourism and fisheries to emerging high-value sectors driving the Caribbean Blue Economy transition

Learning Objectives



01

Categorize Industries

Categorize Caribbean marine industries into established (tourism, fisheries) and emerging sectors (biotech, renewables).



02

Evaluate Challenges

Evaluate sustainability challenges facing traditional sectors and identify transition pathways for tourism and fisheries.



03

Identify Potential

Identify the economic potential and technological requirements of ocean-based renewables, marine biotechnology, and mariculture.

Industry Overview: Established vs. Emerging



Established Industries



Coastal & Maritime Tourism

Largest economic sector; requires shift from mass tourism to sustainable models.



Fisheries & Aquaculture

Traditional livelihood source facing overexploitation; needs stock recovery.



Maritime Transport

Vital for trade connectivity; transition needed towards Green Ports and efficiency.



Emerging Industries



Ocean-Based Renewables

Offshore wind, wave, and OTEC potential to replace imported fossil fuels.



Marine Biotechnology

Bioprospecting for pharmaceuticals and cosmetics using marine biodiversity.



Regenerative Mariculture

Sustainable farming like sea moss cultivation for food security and export.

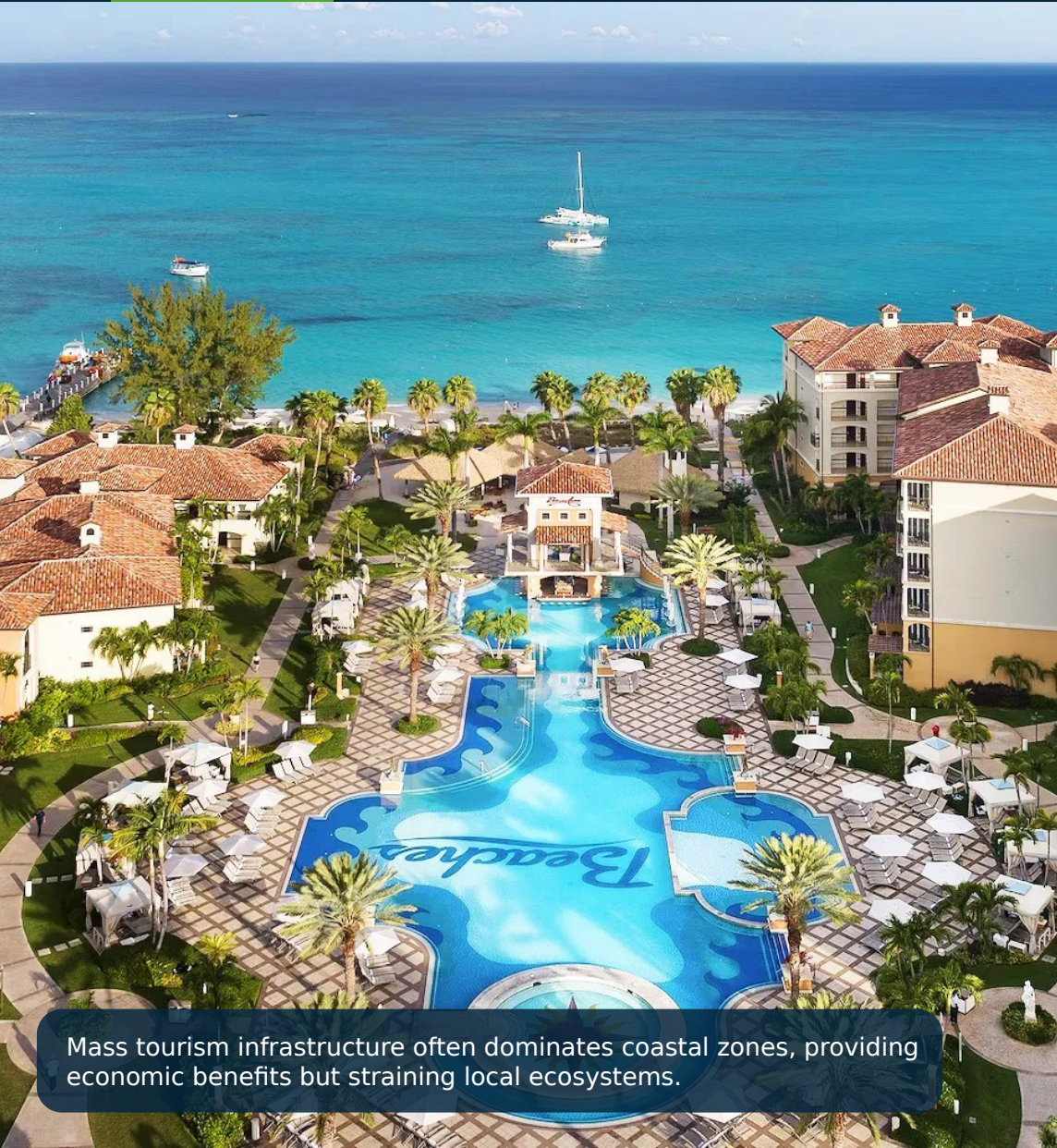


The Blue Transition Goal

To balance economic output with ecosystem health and social inclusion, ensuring long-term sustainability across all sectors.

Coastal and Maritime Tourism: Current Status

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Mass tourism infrastructure often dominates coastal zones, providing economic benefits but straining local ecosystems.



Dominant Economic Driver

Impact: Tourism is the largest ocean-based sector in the Caribbean, contributing over **US\$60 billion** to regional GDP and supporting approximately **13.4% of all jobs**.



Sustainability Challenges

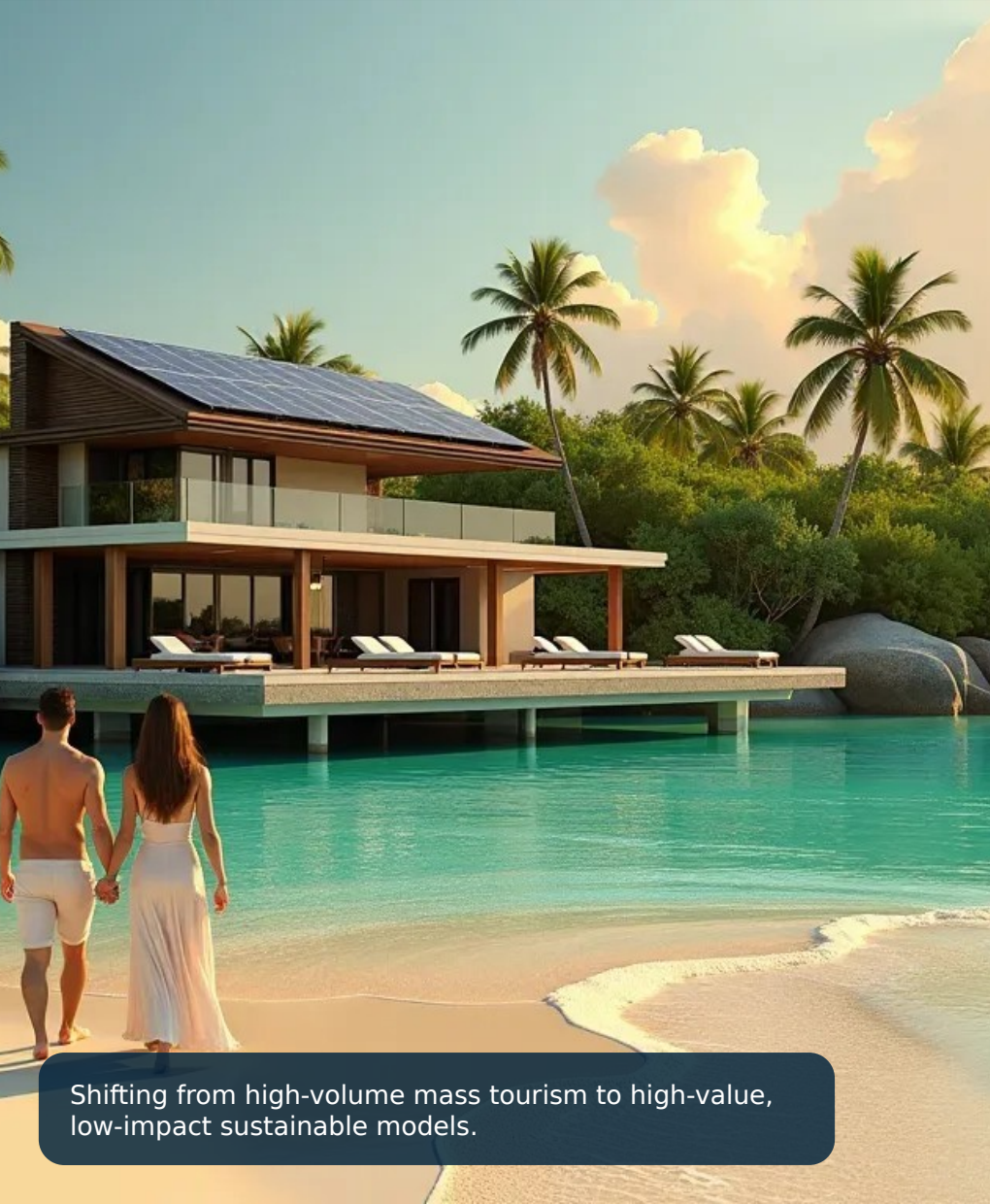
The traditional **mass tourism model** has led to "over-tourism," frequently exceeding the carrying capacity of island destinations.

Consequences: Severe damage to critical marine habitats including coral reefs, mangroves, and seagrass beds due to pollution, physical destruction, and coastal development.



Strategic Imperative

Transitioning to a model that manages **carrying capacity** effectively and ensures greater **local value retention** is essential for long-term viability.



Shifting from high-volume mass tourism to high-value, low-impact sustainable models.

A Sustainable Path Forward

The Blue Economy demands a transition away from extractive mass tourism models toward practices that regenerate ecosystems, empower local communities, and deliver authentic experiences.



Shift to Blue & Ecotourism

Moving beyond "sun, sea, and sand" to nature-based experiences like reef diving and mangrove kayaking that value biodiversity.



Community-Centric Models

Ensuring revenue stays local through community-owned enterprises and supply chains, reducing economic leakage.



Standards & Certifications

Adopting rigorous frameworks (e.g., Green Globe, Blue Flag) for waste management, water use, and reef-safe operations.

Goal: Decouple tourism growth from environmental degradation while increasing the economic benefit retained by island nations.

Fisheries and Aquaculture Overview

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Sea moss farming on ropes in Saint Lucia: A sustainable livelihood that relieves pressure on wild stocks.

Fisheries are a cornerstone of Caribbean livelihoods and food security, yet the sector faces critical sustainability challenges that require immediate intervention and innovative solutions.



Economic Value

Provides stable jobs to roughly 350,000 people across 17 Caribbean countries, with production valued at over US\$500 million annually.



Overexploitation Pressure

Caribbean fisheries are among the most overexploited globally, with 55% of commercial fishing sites classified as overexploited due to IUU fishing and data gaps.



Co-Management Needs

Success requires shifting to co-management models involving fishers in decision-making and improving data collection for science-based quotas.



Opportunity: Sustainable aquaculture and mariculture can complement wild catch, enhancing food security and reducing ecological strain.



Traditional fishing vessels represent local livelihoods and the scale of artisanal operations.

Current Status: Critical Pressure



~55% of commercial fishing sites in the Caribbean are classified as overexploited.



Opportunity: Stock Recovery

Management Tools: Closed seasons, Marine Protected Areas (MPAs), and selective gear restrictions.

Value Chain: Upgrading processing to capture more value from less catch.



Alternative: Sustainable Mariculture

Diversification: Shifting pressure away from wild stocks.

Species: Focus on low-trophic species like sea moss and shellfish which improve water quality.

Maritime Transport: Strategic Importance

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Maritime transport handles over 90% of global trade volume.

For Small Island Developing States (SIDS), maritime transport is not just an industry but a critical lifeline connecting economies to global markets.



Economic Backbone 90% Trade Volume

Over 90% of all goods imported and exported move by sea, making efficient ports essential for economic survival and cost competitiveness.



Green Ports Transition

Shifting towards low-emission operations through electrification, alternative fuels, and waste management systems to decarbonize the supply chain.



Logistics Efficiency

Digitalization of port operations to reduce turnaround times, lower costs, and enhance connectivity for regional hub-and-spoke networks.



Strategic Goal: Transform ports from transit points into sustainable,



Offshore wind farms harness stronger, more consistent ocean winds to generate clean electricity without using scarce land resources.

Powering the Blue Economy

Transitioning to ocean-based renewables is critical for Caribbean energy independence, reducing reliance on volatile fossil fuel imports while cutting carbon emissions.



Untapped Potential

Massive capacity for Offshore Wind, Wave energy, Tidal power, and Ocean Thermal Energy Conversion (OTEC).



Strategic Rationale

Replaces expensive imported diesel, stabilizes electricity costs, and drastically reduces national carbon footprints.



Current Status

Technologies are in prototype or early commercial phases globally; regionally requires policy frameworks and financing.

Insight: For SIDS, ocean energy isn't just about climate change—it's about economic survival by cutting the region's highest operating cost: energy.



Scientists explore marine biodiversity for medical and industrial breakthroughs.

Unlocking Ocean Potential

An emerging high-growth sector focused on discovering and using marine bioresources to develop pharmaceuticals, cosmetics, food, and industrial products.



The Bioprospecting Concept

Systematic search for genes, molecules, and organisms in the marine environment with potential commercial value.



High-Value R&D

Requires significant investment in research and technology to translate marine discoveries into viable products.



Biodiversity Access & Benefit Sharing

Ensuring equitable frameworks where local communities and nations benefit from the commercial use of their genetic resources.

Regenerative Ocean Farming

Sea moss (*Eucheuma cottonii*) mariculture represents a model "Blue Economy" industry—it produces food and income while actively improving the marine environment, requiring no freshwater, feed, or fertilizer.



Sea moss farming requires minimal infrastructure and provides sustainable income for coastal communities.



Low-Input Economic Opportunity

Requires low capital investment, making it accessible for MSMEs. Offers income diversification for fishers and creates value-added product opportunities (gels, drinks, cosmetics).



Water Quality Improvement

Seaweed absorbs excess nutrients (nitrogen/phosphorus) from the water, combatting eutrophication, and sequesters carbon dioxide, locally mitigating ocean acidification.



Support Needs for Growth

Industry scaling requires technical training, access to climate-resilient strains, processing infrastructure, and clear tenure rights for farming plots.

Strategic Value: Transitioning from wild harvest to farming relieves pressure on natural stocks while creating a scalable, exportable Caribbean product.

Industry Status Summary

Industry	Status	Primary Blue Economy Goal
 Tourism	Established	Shift from mass to blue/ecotourism and retain local value.
 Fisheries	Established	Recover wild stocks; expand sustainable aquaculture.
 Maritime Transport	Established	Improve efficiency and decarbonization (Green Ports).
 Renewable Energy	Emerging	Replace imported fossil fuels with offshore wind/wave/OTEC.
 Biotechnology	Emerging	Harness marine biodiversity for high-value innovation.

Resource: Mapping Ocean Wealth (TNC)

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The Nature Conservancy's interactive tool visualizes the economic value of marine ecosystems.

Visualizing Hidden Value

Mapping Ocean Wealth (MOW) is a groundbreaking initiative that quantifies and visualizes the value of ecosystem services, transforming how we understand ocean assets.



Visualize Services

Maps the economic value of coastal protection, fisheries production, and tourism revenue generated by reefs and mangroves.



Inform Investment

Provides data to guide sustainable development decisions, justifying investments in nature-based solutions over grey infrastructure.



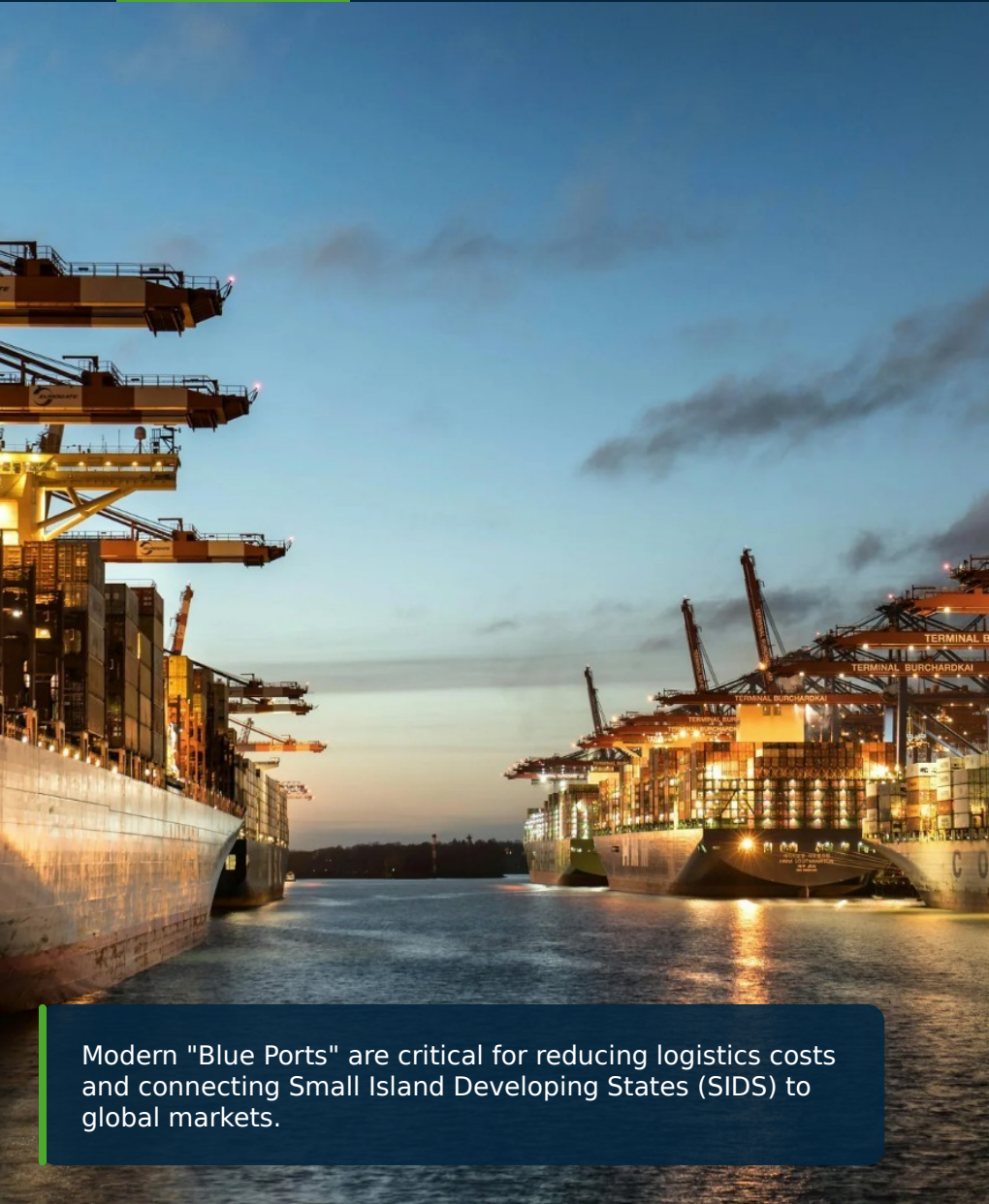
Siting & Planning

Supports Marine Spatial Planning by identifying high-value natural capital areas that require protection or careful management.



Access the tool: <https://oceanwealth.org>

Resource: Creating Sustainable Ports (World Bank) Module 1.4



Modern "Blue Ports" are critical for reducing logistics costs and connecting Small Island Developing States (SIDS) to global markets.

A Blueprint for Blue Ports

The World Bank's framework emphasizes transforming Caribbean ports from simple transit points into resilient, eco-friendly engines of sustainable development.



Digitization

Modernizing logistics chains to improve efficiency, reduce wait times, and enhance transparency.



Infrastructure Resilience

Strengthening physical assets to withstand climate shocks like hurricanes and sea-level rise.



Alternative Fuels

Adopting shore power and low-carbon fuels to cut emissions and create "Green Ports."

Strategic Value: For Caribbean islands, efficient ports are a lifeline. Decarbonizing this sector not only protects the environment but also lowers long-term import/export costs.

Further Reading - Section 3

Module 1.4



CAPRI (2023)

Sea of Opportunity: Developing Jamaica's Blue Economy

A contemporary case study examining Sustainable Fisheries and Ecotourism, focusing on artisanal fishers and Blue Finance potential.



Climate Analytics (2022)

Charting the Course to Net-Zero: Caribbean SIDS

Provides modelling for Grenada and Saint Lucia, demonstrating how offshore wind and ocean energy can drive 100% renewable targets.



IRENA / ETIP Ocean (2022)

Ocean Energy in Islands and Remote Coastal Areas

Technical outlook evaluating the theoretical potential of wave, tidal, and OTEC technologies specifically for SIDS energy transitions.



The Nature Conservancy

Mapping Ocean Wealth (MOW) Portal

Interactive tool visualizing the economic value of ecosystem services, linking reef health directly to tourism revenue and coastal protection.



World Bank Blogs (2023)

Creating Sustainable Ports in the Caribbean

Detailed analysis introducing the 'Blue Port' concept, assessing infrastructure resilience and logistics across key Caribbean nations.

These resources offer deeper technical insights into the specific industries driving the Blue Economy transition.