Progress Report "Developing, Piloting and Implementing Ocean Accounts for Belize"

November 2025

Prepared by Global Ocean Accounts Partnership

Overview of project

1. Background

Belize's coastal and marine ecosystems are vital to both the country's ecological health and economic stability. Mangroves cover half of the mainland coast, while coral reefs protect two-thirds of the coastline, acting as natural barriers against storms and supporting the livelihoods of over 50% of the population. More than half of the population of Belize depends directly on marine activities, reflecting the importance of the oceans to Belizean communities. A great part of Belize population rely on income from tourism and fisheries, industries deeply intertwined with the health of these ecosystems. In recognition of this importance, Belize has positioned itself at the forefront of sustainable ocean management, demonstrating a long-standing commitment to building an inclusive, sustainable, and data-driven blue economy.

Key milestones in **Belize's journey toward sustainable ocean management** include:

- **The adoption of the Belize Integrated Coastal Zone Management Plan in 2016**, which operationalizes the integration of social, economic, and environmental sustainability by accounting for coastal community well-being and livelihoods.
- **The establishment of the Ministry of Blue Economy in 2020**, signaling a national commitment to ocean governance and sustainable development.
- **The issuance of the Belize Blue Bond for Ocean Conservation in 2021**, designed to measure whether conservation investments deliver tangible community benefits and local resilience.
- **The development of the Belize Blue Economy Plan in 2022**, which includes the **National Blue Economy Development Policy, Strategy and Implementation Plan (BEDPS) 2022–2027**. This plan identifies "inclusion, equity and poverty reduction" as a core value and strategic pillar, aiming to balance social, economic, and ecological outcomes.
- **The Maritime Economy Plan (2022)**, which advances the core principle of social inclusion by identifying who benefits from marine economic activity and where gaps remain.
- **The Belize Sustainable Ocean Plan (BSOP)**, which provides a science-based foundation for incorporating social and cultural dimensions into national marine spatial planning, serving as a roadmap for marine spatial planning and sustainable resource use while tracking social impacts over time.

These efforts align with the **Belize Medium-Term Development Strategy (2022–2026)**, which recognizes marine and coastal zones as central to national development and includes priorities around equitable access to ocean resources and livelihoods, supporting national development goals for inclusive and resilient growth.

Achieving these goals requires robust, standardized data frameworks capable of addressing data gaps, integrating dispersed datasets, and providing actionable insights. This is where **Ocean Accounting (OA)** plays a transformative role, **offering a framework to align environmental, social, and economic metrics and support evidence-based governance.**

Belize's collaboration with the Global Ocean Accounts Partnership (GOAP) formally began with its **first Ocean Accounting Workshop in August 2023.** This workshop introduced key stakeholders to the principles, methodologies, and tools of OA, emphasizing its potential to inform policy areas such as marine spatial planning, blue economy development, and climate resilience. The event also highlighted critical data challenges, setting the stage for deeper collaboration between GOAP and Belize.

Building on this momentum, the Ministry of Blue Economy and Disaster Risk Management (MBEDRM) worked with GOAP throughout 2024 to establish and commence Belize Ocean Accounts Pilot Project. This partnership was formalized through the first Project Steering Committee (PSC) meeting on August 20, 2024, and the **signing of a Memorandum of Understanding (MOU)** on November 6, 2024. The MOU established a two-year pilot project funded by the UK Government, with **key deliverables** including

- a Coral Reef Extent and Condition Account for Ambergris Caye and
- a National Ocean Economy Satellite Account (OESA) and Ocean Tourism Satellite Account (OTSA).

These accounts aim to provide robust data on ecosystem health and economic contributions, directly supporting the Belize Blue Economy Plan, BSOP, and broader national strategies.

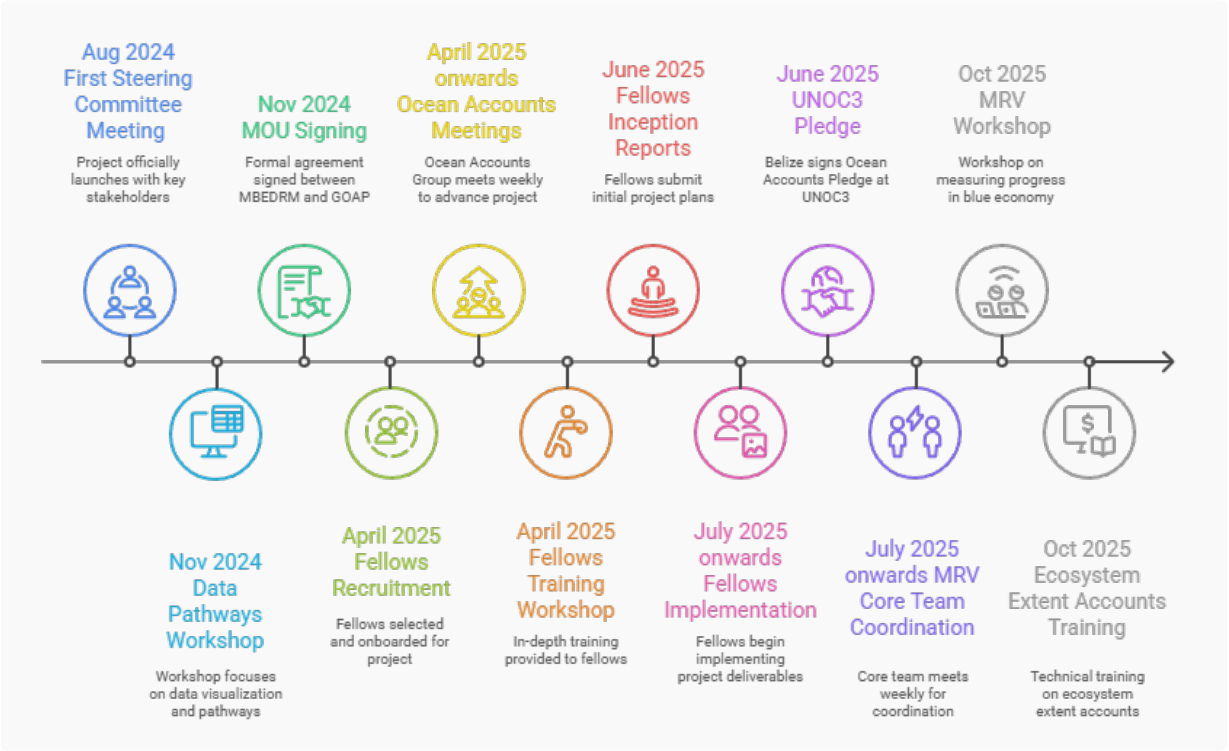
Project Objectives

The Belize Ocean Accounts Pilot Project is guided by three core objectives:

1. **Develop Ocean Accounts:** Deliver pilot accounts, such as the Coral Reef Extent and Condition Account and OTSA, to inform governance and economic strategies.
2. **Build National Capacity:** Strengthen Belize's technical expertise through the GOAP Fellows Program, ensuring long-term sustainability and local ownership of Ocean Accounting processes.
3. **Integrate Ocean Accounts into Governance:** Align Ocean Accounts with national priorities, including the Blue Economy Policy and the BSOP, fostering data-driven decision-making.

2. Timeline of Project Progress and Key Activities

Belize Ocean Accounts Project Key Activities (2024-2025)



August 2023: First Ocean Accounting Workshop

Belize's formal collaboration with GOAP began with an introductory workshop that brought together key stakeholders from across government, research institutions, and civil society. The workshop introduced ocean accounting principles, methodologies, and tools, emphasizing their potential to inform policy areas such as marine spatial planning, blue economy development, and climate resilience. Critically, the event highlighted data challenges facing Belize and set the stage for a structured partnership approach.

August 2024: First Project Steering Committee Meeting

Following a year of planning and consultation, the project was formally established through the inaugural PSC meeting on August 20, 2024. The governance structure was confirmed, with the Belize Blue Bond and Finance Permanence Unit (BBFP) designated as Chair and the Ministry of Blue Economy and Marine Conservation (MBEMC) as Co-chair. Members included representatives from CZMAI, SIB, UB ERI, Ministry of Economic Development, Hol Chan Marine Reserve, and GOAP. This meeting marked the transition from concept to implementation.

November 6, 2024: MOU Signing

The partnership between MBEMC (formerly MBEDRM) and GOAP was formalized through the signing of a Memorandum of Understanding on November 6, 2024. The MOU established a two-year pilot project framework (2024-2026) funded by the UK Government's Blue Planet Fund, with clearly defined deliverables, governance structures, and institutional responsibilities.

November 5-7, 2024: Ocean Accounts Data Pathways and Visualization Tools Workshop

Immediately following the MOU signing, GOAP conducted a pivotal three-day workshop that brought together 25+ participants from 10+ organizations. This workshop represented a critical needs assessment and planning exercise that would shape the entire project approach.

Workshop Objectives:

- Build capacity in Ocean Accounting principles and data requirements
- Streamline data flow and collaboration mechanisms among stakeholders
- Explore visualization tools and strategies for integrating OA into national frameworks

Key Activities and Findings: The workshop employed a diagnostic approach to map Belize's ocean data landscape comprehensively:

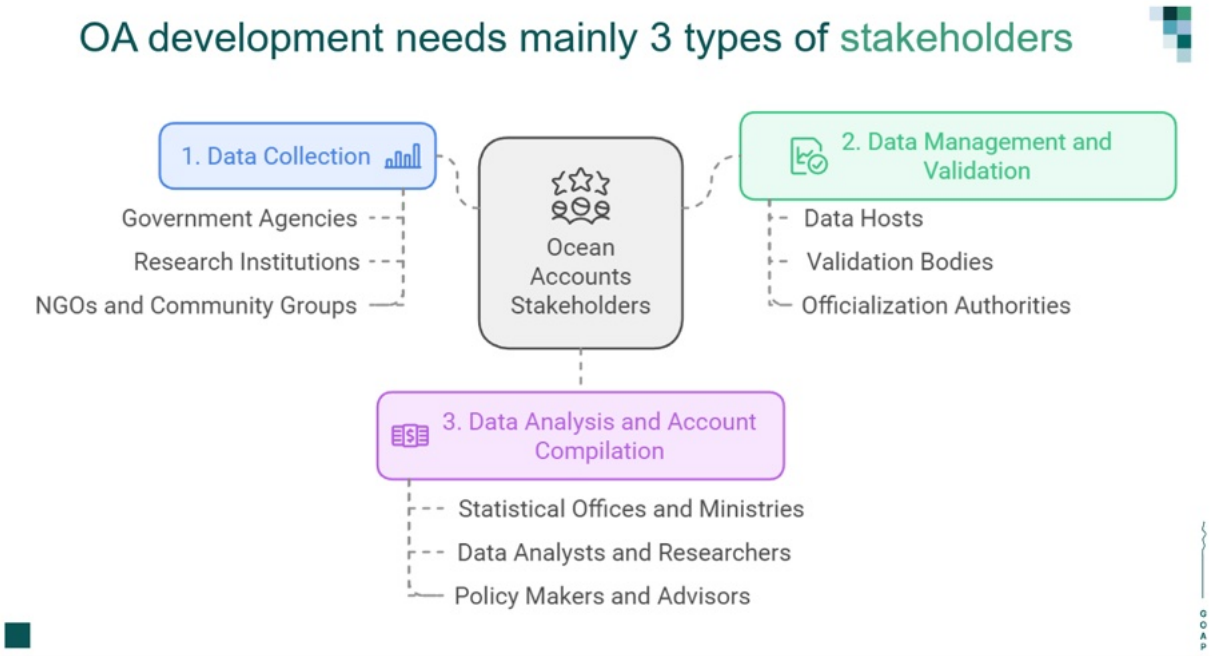
- **Data Requirements Assessment:** Participants identified and categorized key data types needed for ocean accounts (ecosystem extent, condition, services, economic data, social data, governance data), assessing feasibility, current collection status, priority gaps, and policy relevance.
- **Stakeholder Mapping:** A comprehensive mapping exercise identified contributors across the ocean accounting collaboration chain—from enablers (funding sources) and generators (field data collectors) to curators, validators, hosts, mapping producers, publishers, and users. This revealed the complex web of organizations involved in ocean data.
- **Data Quality and Validation Assessment:** An anonymous survey exposed critical challenges including inconsistent data formats and standards, variable validation processes, accessibility bottlenecks due to manual request systems, and fragmented datasets across institutions.
- **Data Flow Analysis:** Participants mapped existing communication pathways and data-sharing mechanisms, categorizing them as online open access, online tiered/request-based, peer-to-peer official, and peer-to-peer unofficial. The analysis revealed that while informal channels (like WhatsApp) were "easy" but unreliable, formal mechanisms were "medium" to "hard" to access due to bureaucratic layers.
- **Institutional Capacity Gaps Identified:** The diagnostic tool revealed challenges spanning policy clarity (unclear roles and responsibilities), limited stakeholder engagement, lack of strategic direction, insufficient institutional and technical capacity, inconsistent data standards, inadequate data access mechanisms, and resource constraints.

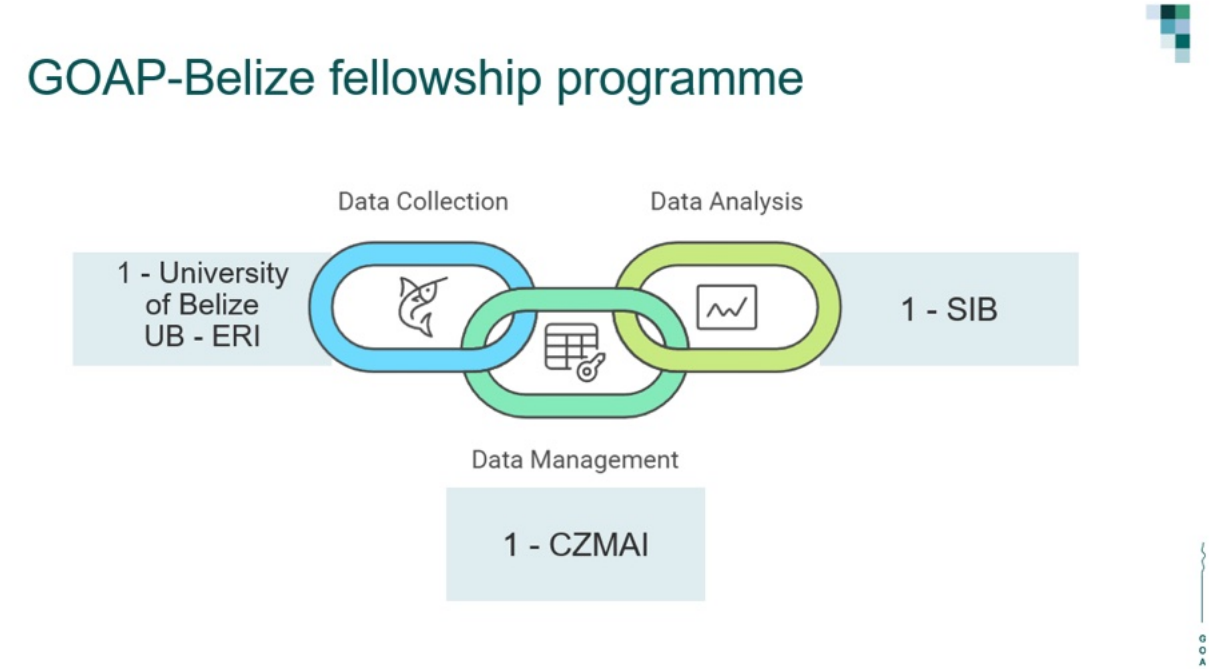
Critical Outcome: Fellows Program Design

The workshop findings directly informed the design and scope of the Ocean Accounts Fellows Program. Rather than a generic capacity-building approach, the Fellows Program was strategically designed to address the three critical bottlenecks identified:

1. **Data Collection Gap** → Fellow at UB ERI (data generation and protocol standardization)
2. **Data Management Gap** → Fellow at CZMAI (data hosting, validation, and sharing)
3. **Account Compilation Gap** → Fellow at SIB (data analysis and account production)

This targeted approach ensured that capacity building would be embedded within the institutions most critical to long-term ocean accounting sustainability, addressing systemic challenges rather than isolated technical needs.





[See Annex for complete workshop report with detailed findings and recommendations]

December 2024 - March 2025: Fellows Recruitment and Onboarding

Following the November workshop's clear identification of institutional needs, GOAP worked closely with MBEMC, CZMAI, SIB, and UB ERI to design position descriptions, conduct recruitment processes, and onboard the three Ocean Accounts Fellows. The recruitment process prioritized candidates with:

- Technical skills aligned with institutional needs (GIS, data management, field ecology, statistics)
- Commitment to long-term capacity building within their host institutions
- Understanding of SEEA and SNA frameworks or strong potential to develop this expertise

By April 2025, all three Fellows were in post:

- **Jefte Ochaeta** (Statistical Institute of Belize) - Account compilation and data analysis
- **Caisha Fermin** (Coastal Zone Management Authority & Institute) - Data management and hosting
- **Wilbert Castillo** (University of Belize Environmental Research Institute) - Data collection and protocol standardization

April 2025: In-depth Fellows Training

With the Fellows in place, GOAP conducted an intensive 4-day in-country training workshop tailored to each institution's specific role and deliverables within the ocean accounts framework.

Training Structure:

Day 1 - Ocean Economy and Tourism Satellite Accounts (SIB only):

- Ocean Economy Satellite Account (OESA) framework and methodology
- Step-by-step approach to Ocean Tourism Satellite Account (OTSA) development
- Transitioning from Belize's existing Tourism Satellite Account (TSA 2019) to OTSA format
- Hands-on activity: Classifying tourism activities as fully ocean-dependent, partially ocean-dependent, or not ocean-related
- Review of TSA tables for adaptation to OTSA requirements

Day 2 - Foundations of Environmental Accounting and Ecosystem Extent Accounts (All Fellows):

- Introduction to SEEA Central Framework (SEEA-CF) vs. SEEA Ecosystem Accounting (SEEA-EA)
- Integration between economic and environmental systems, stocks and flows
- Environmental accounting concepts exercise using SEEA EA structures
- Introduction to Ecosystem Extent Accounts—spatial distribution and change over time
- Practical activity: Compiling extent accounts and change matrices using sample data
- Applications for coastal/marine spatial planning and monitoring pressures

Day 3 - Ecosystem Condition Accounts and Pilot Area Planning (All Fellows):

- Revisiting SEEA EA framework and condition account structure
- Variables, indicators, and indices for ecosystem condition assessment
- Reference conditions (scientific, historical, political) and their application
- Case studies from Fiji and Indonesia on condition account compilation

- Strategic planning discussion: Dual-site pilot approach (Turneffe Atoll vs. San Pedro/ Ambergris Caye)
- Group activities: Data mapping exercises by ecosystem type, identifying existing datasets, collection methods, spatial/temporal resolution, and access conditions
- Institutional and technical gap identification
- Prioritization matrix exercise: Scoring datasets and gaps by cost, urgency, and implementation readiness

Day 4 - Ecosystem Services Accounting (All Fellows + TASA, BBFP):

- Introduction to SEEA EA framework for ecosystem services (provisioning, regulating, cultural)
- Logic chains methodology: Linking extent and condition to service supply and use
- Group exercise: Building logic chains for mangrove, coral, and seagrass services
- Valuation approaches: Replacement cost method (coastal protection), social cost of carbon (blue carbon)
- Hands-on valuation exercise for coastal protection and carbon sequestration
- Discussion of future applications for blue carbon finance and climate commitments

Key Training Outcomes:

- Fellows gained practical competency in SEEA EA and SNA frameworks
- Institutional roles clarified with concrete deliverables mapped to each Fellow
- Data gaps and opportunities identified for pilot account areas
- Foundation established for coordinated, systematic account development

[See Annex for detailed training report with day-by-day activities and outputs]

May - October 2025: Fellows Implementation and Regular Coordination

Following the intensive training, Fellows began implementing their work plans within their respective institutions. This period was characterized by:

Fellows' Deliverable Development:

- **May 2025:** All three Fellows completed and submitted inception reports outlining their detailed work plans, timelines, methodologies, data requirements, and coordination needs
- **Ongoing implementation:** Fellows progressed on their specific deliverables (see Section 4 for detailed progress updates)

Regular Coordination Mechanisms: To ensure alignment and address emerging challenges, multiple coordination mechanisms were established:

- **Bi-weekly Ocean Accounts Fellows Group Meetings (April 2025 - ongoing):** Fellows, hosting institution staff, MBEMC and GOAP technical team meet to share progress updates, troubleshoot technical challenges, coordinate data requests, and ensure methodological consistency.

- **MRV Core Team Coordination (July 2025 - ongoing):** As the alignment with the broader MRV system became formalized (see Section 3), weekly coordination calls were established bringing together GOAP, IDB, Stanford Natural Capital Project, and MBEMC to synchronize activities, prevent duplication, optimize resource allocation, and manage interdependencies.
- **Quarterly PSC Meetings:** High-level steering committee meetings provide strategic oversight, review major milestones, ensure policy alignment, and facilitate stakeholder coordination across government and partner organizations.

June 9-13, 2025: UNOC3 and Ocean Accounts Pledge Signing

Belize's delegation, led by Prime Minister Hon. John Briceño, participated in the third United Nations Ocean Conference (UNOC3) in Nice, France. This participation represented a major milestone for Belize's ocean accounts journey:

Major Commitment: Pledge to Advance Ocean Accounts by 2030

Belize joined 19 countries and 7 international organizations in signing the global Pledge to Advance Ocean Accounts by 2030. This public commitment:

- Affirms Belize's leadership role in ocean accounting globally
- Signals government commitment to institutionalizing ocean accounts beyond the pilot phase
- Creates accountability for continued investment in ocean accounting capacity
- Positions Belize as a model for other Small Island Developing States (SIDS)

High-Level Advocacy: Prime Minister Briceño delivered interventions at key events including "SIDS Coalition for Nature: Perspectives and Achievements on Ocean Action" and the "SIDS DOCK" side event, emphasizing:

> *"As a small developing nation, our valiant conservation efforts alone can't shield our oceans. The overarching, ever-reaching impacts of rising seas, warming temperatures and extreme weather of climate change dwarf our actions. We need concerted, coordinated global action to protect our oceans for the benefit of generations to come."*

Regional Leadership: Belize played a leadership role in launching "Actioning Blue: 30x30 Vision for the Ocean," a landmark political declaration by Caribbean nations committing to protect 30% of the region's marine ecosystems by 2030.
Partnership Engagement: The delegation held bilateral meetings with development partners including Gabon, The Nature Conservancy, WWF, and donor community representatives to discuss:

- Blue Bonds and ocean financing mechanisms
- Project Finance for Permanence progress and lessons learned
- Opportunities for regional collaboration on ocean accounting
- Technical cooperation and knowledge exchange

Institutional Recognition: The multi-institutional partnership supporting ocean accounts was highlighted, including GOAP, UNSW Centre for Sustainable Development Reform, MBEMC, CZMAI, SIB, and UB-ERI, demonstrating the coordinated approach driving success.

October 22, 2025: "Measuring Progress in Belize's Blue Economy: People and the Sea" Workshop

On October 22, 2025, the Blue Economy MRV Core Team delivered a workshop titled "Measuring Progress in Belize's Blue Economy: People and the Sea." This marked a pivotal moment of integration, demonstrating how the various workstreams and organizations working on natural capital accounting in Belize have converged to create a unified approach to measuring progress (see section 3 for more details).

The workshop was structured around four core activities:

1. **Present the 3P Project KPI framework** and show how KPIs and Ocean Accounts link to the Blue Economy MRV system and dashboard
2. **Work with participants to identify and prioritize** the most relevant KPIs for the Blue Economy MRV system across environmental, social, economic, and governance dimensions - with each KPI directly linked to specific Ocean Account components (ecosystem extent, condition, ecosystem services, ocean economy, and social accounts)
3. **Demonstrate how a robust MRV system** can be applied to access and manage results-based finance
4. **Introduce Ocean Accounting**, with particular emphasis on building the social dimension to ensure comprehensive tracking of people's relationships with marine resources

Key Workshop Activity: Building the Social Dimension of Ocean Accounts

Activity 4 focused on addressing a critical gap: what we don't know about people's relationship with the ocean in Belize. Participants explored ocean connections that are currently unmeasured through structured exercises:

- **Identifying invisible social conditions:** What social conditions shape coastal communities in Belize that are not currently captured in data systems?
- **Identifying invisible social activities:** What activities and relationships between people and the ocean remain unmeasured?
- **Co-creating a shared vision for Belize's Pilot Social Account:** Building consensus on what a comprehensive social account should capture to inform equitable blue economy development

This collaborative exercise revealed critical measurement gaps and built stakeholder consensus on the need for systematic social accounting to complement environmental and economic Ocean Accounts *(complete workshop report will be shared once prepared)*.

Critical Outcome: KPIs as Roadmap for Ocean Accounts

The prioritization of specific KPIs by stakeholders provided a strategic roadmap that demonstrates the potential value of Ocean Accounts as the systematic data foundation for the MRV system. Through collaborative KPI identification, the workshop revealed how specific policy priorities could be informed through corresponding Ocean Account components:

Potential connections between prioritized KPIs and Ocean Accounts:

- **Ecosystem health KPIs** (e.g., coral reef condition, mangrove extent) → could be systematically measured through **Ecosystem Extent and Condition Accounts**, providing consistent, transparent, and internationally comparable data on ecosystem change over time
- **Fisheries contribution to food security** → could be quantified through **Ocean Economy Satellite Accounts, Ecosystem Services Accounts and Social accounts**, measuring both economic value and provisioning ecosystem services alongside nutritional values
- **Coastal hazard protection** → could be assessed through **Ecosystem Services Accounts** using standardized valuation methods
- **Community well-being and equity** → could be tracked through **Social Accounts**, capturing livelihood dependencies, cultural connections, and distributional impacts

This workshop approach ensures that if Belize decides to adopt Ocean Accounts as the foundation of its MRV system, the development would be **demand-driven and directly responsive to policy priorities**. Rather than developing accounts based solely on data availability, the prioritized KPIs provide a clear strategic direction: when stakeholders identify specific outcomes they need to track (e.g., ecosystem extent, coastal protection, food security), the corresponding Ocean Accounts can be systematically developed and integrated into the national statistical system.

The workshop demonstrated that Ocean Accounts offer more than just data collection—they provide a **standardized, systematic, and internationally recognized framework** capable of transforming fragmented datasets into a coherent information system for blue economy governance and results-based finance.

[See Annex for workshop agenda, workshop report to be added]

October 23, 2025: Technical Training Workshop on Ecosystem Extent Accounts Compilation

Building on the workshop on the 22nd October, GOAP conducted a focused technical training session specifically for the GOAP Fellows and key institutional staff. This hands-on session provided:

- Overview of SEEA Ecosystem Accounting framework and extent accounts methodology
- Connection between extent accounts and environmental KPIs for the MRV system
- Step-by-step walkthrough: From spatial maps to change matrix tables
- Work-through of extent account compilation exercise using Belize ecosystem data
- Addressing data gaps and practical challenges in the Belize context
- Fellows progress presentations and troubleshooting sessions

- Q&A on data coordination priorities

This training reinforced the Fellows' technical capacity and ensured methodological consistency across their different institutional contexts.

[See Annex for workshop agenda and training materials]

3. Integration with 3Ps Project and MRV System Development

Recognition of Alignment Opportunity

As both the Ocean Accounts Pilot Project and the broader MRV system development activities (supported by IDB and Stanford Natural Capital Project) progressed through 2025, it became increasingly clear that these initiatives shared common goals, overlapping stakeholders, and complementary deliverables. Key areas of potential synergy included:

- **Dashboard development:** Both initiatives planned visualization platforms for ocean and blue economy data
- **Data protocols:** Both required standardized data collection and validation frameworks
- **Capacity building:** Both aimed to strengthen institutional capacity in similar areas
- **Stakeholder engagement:** Both needed to coordinate with the same government agencies, research institutions, and civil society organizations

Strategic Decision: Integration Rather Than Parallel Implementation

Rather than allowing these initiatives to proceed on parallel tracks - with risk of duplication, stakeholder fatigue, and missed opportunities for synergy - MBEMC led a strategic decision to formally integrate governance and coordination mechanisms.

Governance Integration: Merged Project Steering Committee

Key Decision (Q3 2025): The separate governance structures initially envisioned for Ocean Accounts and MRV system development were merged into a single, integrated Project Steering Committee with expanded mandate:

Integrated PSC Structure:

- **Chair:** Belize Blue Bond and Finance Permanence Unit (BBFP)
- **Co-chair:** Ministry of Blue Economy and Marine Conservation (MBEMC)
- **Members:** CZMAI, SIB, UB ERI, Ministry of Economic Development, Hol Chan Marine Reserve, GOAP, IDB, Stanford Natural Capital Project

Integrated PSC Mandate:

- Provide strategic oversight for both ocean accounts development and broader MRV system implementation
- Ensure alignment of deliverables across all partner-supported initiatives

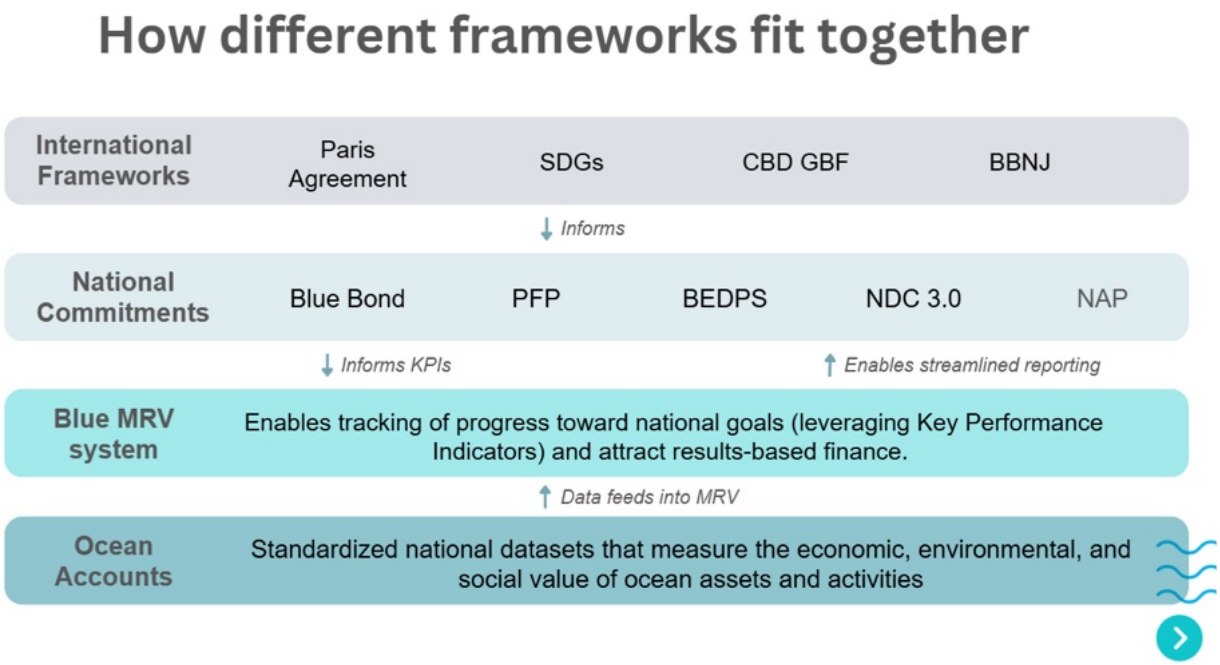
- Coordinate resource allocation to maximize efficiency and prevent duplication
- Monitor progress against integrated timelines and milestones
- Facilitate policy integration and stakeholder engagement

Conceptual Integration: Ocean Accounts as Foundation for MRV System

The integration was underpinned by a clear conceptual framework: **Ocean Accounts serve as the standardized database foundation for environmental, economic, and social KPIs tracked within Belize's Blue Economy MRV system.**

This framework establishes that:

1. **Ocean Accounts provide the data infrastructure:** Systematic, standardized, SEEA and SNA-compliant data collection and compilation processes managed by Fellows and their institutions (UB ERI, CZMAI, SIB).
2. **KPIs are derived from accounts:** The 35 KPIs across 5 sectors (Fisheries, Tourism, Climate, Conservation, Governance) draw from ocean accounts data, ensuring consistency, reliability, and international comparability.
3. **MRV system integrates accounts and KPIs:** The broader MRV framework -including dashboard, reporting mechanisms, and adaptive management protocols- is built on the foundation of robust ocean accounts.



This conceptual clarity transformed what could have been competing initiatives into a coherent, mutually reinforcing system architecture.

Operational Integration: Coordinated Activities and Deliverables

The integration is manifesting through practical coordination across key workstreams, where partners are exploring unified approaches rather than developing separate systems. This includes: developing a single integrated dashboard that combines ocean accounts data with KPI visualization (possibly led by SIB with support from GOAP, IDB, and NatCap); working toward unified data collection protocols that align SEEA standards with MRV requirements (building on the work from led by Wilbert Castillo, fellow at UBERI); coordinating training programs to reduce potential duplication from 8+ separate workshops to approximately 3 integrated sessions, minimizing stakeholder fatigue; and exploring a single data governance framework that addresses collection, validation, hosting, and sharing across multiple uses (building on the work from led by Caisha Fermin, fellow at CZMAI). This coordinated approach aims to avoid duplication, leverage complementary expertise across partners, and ensure that Fellows' work can support both ocean accounts compilation and broader MRV system objectives where relevant.

Resource Optimization and Efficiency Gains

This integration delivers tangible benefits:

- **Avoided duplication:** Single dashboard, single protocol framework, single data governance system instead of parallel efforts
- **Leveraged complementary expertise:** GOAP's SEEA technical depth + IDB's MRV system experience + NatCap's natural capital modeling = comprehensive approach
- **Maximized funding efficiency:** UK Blue Planet Fund (GOAP), IDB financing (3Ps Project), and other resources coordinated through integrated planning
- **Reduced stakeholder burden:** Government agencies, research institutions, and Fellows engage with one coordinated process rather than multiple separate initiatives
- **Enhanced coherence:** Single vision, unified messaging, consistent methodologies across all activities

Detailed Aligned Roadmap Gantt chart showing coordinated activities across all partners

4. Fellows Implementation Progress

Wilbert Castillo - University of Belize Environmental Research Institute (UBERI)

Primary Responsibilities

- **Ecosystem Data Collection and Standardization**: Lead field data collection efforts for coral reef ecosystem condition assessment, establishing standardized protocols aligned with SEEA EA requirements.
- **Data Validation Framework Development**: Design and implement systematic quality control procedures to ensure accuracy, completeness, and consistency of ecosystem data before analysis.

- **Indicator Development**: Develop and operationalize ecosystem condition indicators (Live Coral Cover, Macroalgal Cover, Recruit Density, Diversity, Rugosity) that effectively capture reef health and are sensitive to change over time.
- **Methodological Harmonization**: Work with existing data generators (Hol Chan, Healthy Reef Initiative) and the Fisheries Department to standardize data management practices and establish clear accessibility protocols across marine protected area managers and co-managers.

Progress to Date

Inception and Planning (May 2025):

- Comprehensive roadmap and inception plan developed and submitted
- Workflow for developing Belize's ecosystem condition accounts under SEEA EA framework defined
- Recognition that assessing ecosystem condition changes requires reliable baseline data established as foundation

Data Source Identification and Engagement:

- Formal data-sharing requests sent to Belize Fisheries Department to compile available datasets from key stakeholders (Hol Chan and Healthy Reef Healthy People)
- Atlantic and Gulf Rapid Reef Assessment (AGRRA) methodology identified as primary source of coral reef condition data for Belize
- AGRRA adopted as foundation for ecosystem condition assessment—this methodology is performed every two years by marine protected area co-managers and National Coral Reef Monitoring Networks partners across Belize
- AGRRA provides standard procedures for collecting data on coral community health conditions and structure, benthic cover, and reef fish abundance and biomass

Indicator Selection and Framework Development:

- Five SEEA EA-aligned condition indicators selected:
  - **Live Coral Cover**: Reflects overall reef health and structural functionality
  - **Macroalgal Cover**: Indicates coral:algae balance and water quality conditions
  - **Recruit Density**: Signals resilience and future recovery potential
  - **Diversity**: Captures species richness and evenness within the community
  - **Rugosity**: Measures structural complexity and reef's capacity to support healthy habitat and associated biodiversity
- Calculations developed and tailored to structure and attributes of AGRRA survey data
- Indicator metrics designed to be derived from survey data within study area and scalable across Belize for both historical and 2025 datasets
- Selected indicators relate to regulating, provisioning, cultural, and maintenance/support ecosystem services

Data Management Infrastructure:

- Standardized data cataloging and inventory template developed to organize and manage both shared and newly generated data
- Broader data validation framework designed to ensure accuracy, completeness, and consistency through systematic quality checks before data advances to analysis stage
- Foundation established for robust, transparent, and standardized approach to ecosystem condition assessment

Methodological Development:

- Rapid Ecological Assessment (REA) method under development as cost-effective approach to cover larger spatial extent of coral reef
- REA designed to link coral condition information to extent, supplementing AGRRA site-level data
- R-Studio scripts in development for validation and analysis automation

Key Challenges Identified

- **Baseline Data Gaps and Accessibility**: While main data generators within pilot area hold historical reef health data, datasets vary in format, completeness, and accessibility
- **Data Management Standardization**: Need for standardized data management practices and clear accessibility protocols across managers and co-managers
- **Data Structure Issues**: Most available coral condition data currently in summarized form; data in original structure needed for indicator calculations
- **Coordination Complexity**: Data generated by co-managers but held by Fisheries Department as custodians, requiring clear data-sharing protocols

Expected Deliverables & Timeline

- **Finalized Field Methodology and Validation Framework (December 2025)**: Complete field methodology documentation, data validation procedures, finalize data gathering from HRI, and complete development of R-Studio scripts for validation and analysis.
- **Preliminary Condition Account (January 2026)**: Apply developed validation framework to historical datasets (2023, 2025) to ensure data consistency and completeness using R-Studio scripts for automation. Analyze validated datasets to generate preliminary condition metrics for all five selected indicators.
- **Capacity Building Workshops (February 2026)**: Conduct workshops with data generators, curators, and hosts to strengthen shared understanding of validation procedures and analytical workflows, ensuring long-term sustainability of data management practices.
- **Field Data Collection (February 2026)**: Conduct field data collection using developed REA method to supplement AGRRA site-level data with broader spatial coverage.
- **Fieldwork and Data Validation Report (April 2026)**: Prepare comprehensive report documenting methodologies, quality control procedures, and results. Draft initial Ecosystem Condition Account Summary to feed into Belize's pilot Ocean Accounts.

- **Complete Validated Dataset Submission (May 2026)**: Compile and submit complete validated dataset for ecosystem extent and condition assessments. Ensure datasets properly cataloged and archived with appropriate metadata and validation records for transparency and traceability.

Key Dependencies: Access to historical AGRRA datasets from Fisheries Department and HRI; coordination with CZMAI (Caisha) for data hosting and management protocols; alignment with broader MRV system development and dashboard requirements; successful completion of field data collection in February 2026.

Caisha Fermin - Coastal Zone Management Authority & Institute (CZMAI)

Primary Responsibilities

- **Data Management Framework Development**: Design and implement standardized workflows and systems for curating, validating, and hosting Ocean Accounts datasets in formats compatible with SEEA requirements.
- **Enhanced Data-Sharing Mechanisms**: Integrate automated tools and templates into data-sharing processes to improve efficiency, accessibility, and responsiveness across multiple stakeholders.
- **GIS and Mapping Support**: Provide GIS-based technical support and cartographic products to Fellows and project partners to facilitate Ocean Accounts compilation and visualization.
- **Data Workflow Coordination**: Establish structured pathways for engaging with data collectors, curators, validators, and end-users to improve data flow and ensure long-term continuity of Ocean Accounts processes.

Progress to Date

Inception and Planning (May 2025):

- Comprehensive work plan developed outlining approach to data management, validation, and hosting infrastructure for Ocean Accounts
- Strategic alignment with CZMAI's Coastal and Marine Data Centre (CMDC) existing frameworks and international data standards

Data Management Framework Development:

- Investigated current data management practices and guidelines at CMDC, including review of "Geospatial Data Curation Guidelines for CZMAI's Coastal and Marine Data Centre"
- Conducted comprehensive research on international data standards and best practices for data management relevant to ocean accounting
- Collaborated directly with data collectors (UB ERI/Wilbert) and data validators to refine data standards and ensure alignment across the data chain
- Developed comprehensive data management framework specifically tailored for Ocean Accounts datasets, incorporating:

    - List of acceptable non-spatial data formats
    - Attribute table and metadata standards aligned with UB ERI's data collection methods and SIB's data validation criteria
    - Complex storage structure specifically designed for OA data organization
    - Data accessibility protocols for public data and project products
- Documented complete framework in formal report
- Submitted draft framework document to CZMAI leadership and GOAP secretariat for institutional review and technical feedback

Enhanced Data-Sharing Mechanisms:

- Received comprehensive one-to-one training on existing data request and sharing processes at CMDC
- Assessed suitability of existing CMDC mechanisms for Ocean Accounts-specific requirements
- Identified opportunities for automation and efficiency improvements in data request processing

GIS and Cartographic Support:

- Created initial map of proposed data collection points within Ambergris Caye pilot area with coral spatial extent layers (later adapted due to UB ERI methodology changes)
- Enrolled in and completed Esri MOOC (Massive Open Online Course) on Cartography to build technical capacity for generating high-quality maps and visualizations for project outputs

Framework Refinement Based on Feedback: Major feedback received on draft framework from CZMAI and GOAP technical reviewers:

- Create grading system for data quality assessment upon receipt or during completeness review (e.g., Grade A for excellent quality with minimum to no minor errors)
- Establish quarantined access area with formalized access logs within server storage infrastructure to enhance protection of sensitive data
- Enhance data validation process efficiency through R programming automation

Key Challenges Identified

- **Adapting to Evolving Methodologies**: Initial GIS products (data collection point maps) required revision when UB ERI adjusted field methodology and data collection approach, highlighting need for flexible, adaptive support
- **Balancing Standardization with Flexibility**: Framework must accommodate diverse data formats while maintaining rigorous standards for Ocean Accounts compilation
- **Capacity Gaps**: Need for R programming skills to automate validation processes and improve efficiency

Expected Deliverables & Timeline

- **Finalized Data Management Framework (December 2025)**: Incorporate feedback from CZMAI leadership and GOAP technical team into data management framework, including data quality grading system, quarantined access protocols, and R-based validation improvements.
- **Enhanced Data-Sharing Mechanisms Documentation (December 2025 - January 2026)**: Select and implement automated tool/software to streamline processing of data-sharing requests. Document new data-sharing mechanisms and protocols for institutional adoption.
- **Capacity Building in R Programming (December 2025 - February 2026)**: Complete training in basic R programming to support automated data validation and quality control processes.
- **Enhanced Data Workflow and Continuity Report (January 2026)**: Compile comprehensive report detailing complete data workflow for storage, management, and preparation of datasets for integration into Ocean Accounts, ensuring long-term institutional sustainability.
- **Stakeholder Collaboration Plan (January 2026)**: Develop structured plan outlining formal pathways for ongoing engagement with data collectors, curators, validators, and end-users to improve data flow and coordination across the Ocean Accounts ecosystem.
- **Ocean Accounts Dissemination Workshop (April 2026)**: Plan and host workshop for stakeholders focused on Ocean Accounts methodologies, preliminary results, and data accessibility protocols. Workshop will strengthen understanding of data management processes and promote wider institutional adoption.
- **Dashboard and Visualization Support (March - April 2026)**: Support design and implementation of user-friendly dashboards and maps for visualizing Ocean Accounts data, working in coordination with SIB and integrated MRV system development efforts.
- **CZMAI Website Integration (April - May 2026)**: Develop and publish dedicated Ocean Accounts page on CZMAI website to enhance public accessibility and transparency of Ocean Accounts data and outputs.
- **Final Outcomes Report (May 2026)**: Submit comprehensive reflective document including key findings, achievements, lessons learned, stakeholder feedback, and recommendations for sustaining and scaling Ocean Accounts processes beyond the pilot phase.

Key Dependencies: Completion of UB ERI field data collection and delivery of validated datasets; coordination with SIB on data validation criteria and account compilation requirements; institutional approval of data management framework and data-sharing protocols; alignment with broader MRV system dashboard development; technical support from GOAP on R programming and automation tools.

Jefte Ochaeta - Statistical Institute of Belize (SIB)

Primary Responsibilities

- **Ocean Accounts Compilation:** Apply international standards to compile Ocean Economy Satellite Account (OESA), Ocean Tourism Satellite Account (OTSA), and Coral Reef Extent and Condition Accounts, applying SEEA methodologies.
- **Data Analysis and Quality Assurance:** Ensure consistency, accuracy, and relevance of datasets used for compiling Ocean Accounts by collaborating with data providers, curators, and validators.
- **Visualization and Dissemination:** Explore visualization tools (dashboards, GIS-based platforms) to effectively communicate Ocean Accounts findings; prepare outputs in user-friendly formats and publish as part of national statistics.
- **Institutionalization:** Develop mechanisms to embed Ocean Accounts within SIB's regular operations and build internal capacity for sustainability.

Progress to Date

Inception and Planning (May 2025):

- Inception report and implementation plan completed
- Detailed work plan, timelines, and methodologies established
- Resource needs and stakeholder engagement strategy defined

Ocean Economy Satellite Account (OESA) Development:

- Comprehensive methodological document updated with spatial definitions and Marine Sustainable Plan alignment
- Classification framework developed linking ISIC Rev.4, CPC Ver.2, and OECD Ocean Economic Activities to Belize's National Accounts
- Detailed correspondence tables created for ocean-related industries (fishing, aquaculture, maritime transport, tourism, offshore extraction, ports, scientific research)
- "Level of engagement" classification established: Fully Ocean (100%), Partial Ocean (use of ocean space/resources, occurs on ocean, ocean-intended products, ocean interaction)
- Ratio methodology designed: direct from GVA for fully ocean industries; derived ratios using spatial/administrative data for partial industries

  Ocean Tourism Satellite Account (OTSA) Development:

  - OTSA compilation dependent on initial ocean economy mapping and ratio computation across industries

Proposed Rapid Assessment Tool:

- Questionnaire designed to validate and refine ocean engagement ratios for establishments in coastal zone
- Two approaches proposed: (1) Deterministic sample ($n \leq 150$) for Dec 2025-Jan 2026, or (2) Full survey ($n \geq 1{,}000$) for Feb-Mar 2026
- Budget and work plan developed
- Results will refine ratios and inform OTSA compilation (targeted March-April 2026)

Ecosystem Accounts Development:

- Collaboration with UBERI (Wilbert) and CZMAI (Caisha) to access spatial and ecosystem data
- Awaiting data delivery (expected Dec 2025-Feb 2026) to compile reef extent and condition accounts

Expected Deliverables & Timeline

- **Updated Methodological Document (Completed):** Comprehensive methodology for Ocean Economic Accounts including background of Marine Sustainable Plan, spatial definition of area of interest with accompanying maps, classification framework, and ratio computation approach.
- **Rapid Assessment Data Collection (December 2025 - March 2026):** Conduct assessment to validate ocean engagement ratios - under GOAP final revision. Deterministic sample (n≤150) feasible December 2025-January 2026; full survey approach (n≥1,000) would require extended planning and target February-March 2026.
- **Updated Ocean Economy Ratios (February 2026):** Refine ocean participation ratios based on rapid assessment results, improving accuracy of ocean economy contribution estimates across industries.
- **Ocean Tourism Satellite Account (March-April 2026):** Complete OTSA compilation building on TSA 2019 and incorporating refined ocean economy ratios. Development contingent on completion of initial ocean economy mapping across sectors.
- **Coral Reef Extent and Condition Accounts (March 2026):** Complete ecosystem account tables once data received from UBERI and CZMAI (expected delivery December 2025-February 2026).

Key Dependencies: GOAP approval and funding for rapid assessment tool to determine data collection approach and timeline; ecosystem data delivery from UBERI and CZMAI (Dec 2025-Feb 2026); completion of initial ocean economy mapping to inform OTSA; coordination with Tourism Board and Ministry of Tourism for OTSA data gaps.

ANNEX

Activities in Belize

- ***November 5–7, 2024: Ocean Accounts Data Pathways and Visualization Tools Workshop***

  Workshop Report: Ocean Accounts Data Pathways and Visualization Tools Workshop
  Download PDF Version: · GOAP_Workshop Report_OA-DataPathways.pdf · Overview of project · Ba...

- ***April 2025: In-depth Fellows Training***

  In-depth course with Fellows Report: Overview and key activities
  BZE Ocean Accounts Fellows In-depth workshop - April 2025.pdf · To explore the different sections...

- ***October 22, 2025: "Measuring Progress in Belize's Blue Economy: People and the Sea" Workshop***

Agenda MRV Workshop.pdf
PDF Document
313.0 KB

- ***October 23, 2025: Technical Training Workshop on Ecosystem Extent Accounts Compilation***

Technical Training Workshop on Ocean Accounts Compilation (ecosystem extent account focus)
PDF version: · TrainingOceanAccounts_Ecosystem extent_Oct25.pdf · 1. Background · Following the wor...

Workshop Report: Ocean Accounts Data Pathways and Visualization Tools Workshop

Download PDF Version:

GOAP_Workshop Report_OA-DataPathways.pdf
PDF Document

Overview of project

Background

Belize's coastal and marine ecosystems are vital to both the country's ecological health and economic stability. Mangroves cover half of the mainland coast, while coral reefs protect two-thirds of the coastline, acting as natural barriers against storms and supporting the livelihoods of over 50% of the population. A great part of Belize population rely on income from tourism and fisheries, industries deeply intertwined with the health of these ecosystems. Recognizing the importance of sustainable management, Belize has taken proactive steps to align its policies and practices with international best standards, ensuring the resilience of its blue economy.

Key milestones in **Belize's journey toward sustainable ocean management** include

- the adoption of the Belize Integrated Coastal Zone Management Plan in 2016,
- the establishment of the Ministry of Blue Economy in 2020, or
- the issuance of the Belize Blue Bond for sustainable development in 2021.
- These efforts culminated in the development of the Belize Blue Economy Plan in 2022 and the Belize Sustainable Ocean Plan (BSOP), which serves as a roadmap for marine spatial planning and sustainable resource use.

Achieving these goals requires robust, standardized data frameworks capable of addressing data gaps, integrating dispersed datasets, and providing actionable insights. This is where **Ocean Accounting (OA)** plays a transformative role, **offering a framework to align environmental, social, and economic metrics and support evidence-based governance.**

Belize's collaboration with the Global Ocean Accounts Partnership (GOAP) formally began with its **first Ocean Accounting Workshop in August 2023.** This workshop introduced key stakeholders to the principles, methodologies, and tools of OA, emphasizing its potential to inform policy areas such as marine spatial planning, blue economy development, and climate resilience. The event also highlighted critical data challenges, setting the stage for deeper collaboration between GOAP and Belize.

Building on this momentum, the Ministry of Blue Economy and Disaster Risk Management (MBEDRM) worked with GOAP throughout 2024 to establish and commence Belize Ocean Accounts Pilot Project. This partnership was formalized through the first Project Steering Committee (PSC) meeting on August 20, 2024, and the **signing of a Memorandum of Understanding (MOU)** on November 6, 2024. The MOU established a two-year pilot project funded by the UK Government, with **key deliverables** including

- a Coral Reef Extent and Condition Account for Ambergris Caye and
- a National Ocean Tourism Satellite Account (OTSA).

These accounts aim to provide robust data on ecosystem health and economic contributions, directly supporting the Belize Blue Economy Plan, BSOP, and broader national strategies.

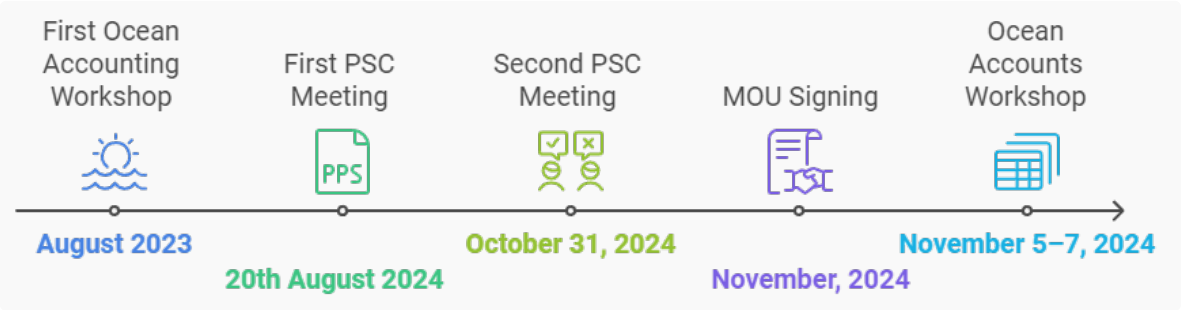
The **Ocean Accounts Data Pathways and Visualization Tools Workshop**, held from November 5–7, 2024, brought together +25 participants from +10 organizations. Over three days, participants:

- Gained an understanding of data requirements for `#OceanAccounting` and assessing current data gaps.
- Reviewed data collection protocols in Belize and mapped contributors and collaborators involved in the ocean accounting process.

- Developed strategies to strengthen data-sharing mechanisms and define roles to ensure sustainable ocean accounting processes.

Participants developed a comprehensive stakeholder map, which aligned the data needs for ocean accounting and highlighted critical gaps and opportunities for data. This progress is a vital step toward a data-driven, resilient ocean accounting framework that will guide Belize's sustainable blue economy.

Key events Belize Ocean Accounts Pilot Project



Project Objectives

The Belize Ocean Accounts Pilot Project is guided by three core objectives:

1. **Develop Ocean Accounts:** Deliver pilot accounts, such as the Coral Reef Extent and Condition Account and OTSA, to inform governance and economic strategies.
2. **Build National Capacity:** Strengthen Belize's technical expertise through the GOAP Fellows Program, ensuring long-term sustainability and local ownership of Ocean Accounting processes.
3. **Integrate Ocean Accounts into Governance:** Align Ocean Accounts with national priorities, including the Blue Economy Policy and the BSOP, fostering data-driven decision-making.

Overview of Workshop Agenda and Content

Workshop Objectives

The Ocean Accounts Data Pathways and Visualization Tools Workshop, held from November 5–7, 2024, aimed to enhance the understanding and application of Ocean Accounting (OA) in Belize. The workshop sought to:

- **Build Capacity in Ocean Accounting:** Equip participants with tools and knowledge to identify, standardize, and utilize key datasets for Ocean Accounts.
- **Streamline Data Flow and Collaboration:** Develop pathways to improve communication and data-sharing mechanisms among key contributors.
- **Promote Visualization and Institutionalization:** Explore visualization tools and strategies to integrate OA into national frameworks such as the Belize Sustainable Ocean Plan (BSOP) and Marine Spatial Planning (MSP).

To explore the different sections, click on the arrow next to each title, and the text will expand to reveal more details.

▼ Day-by-Day Content Overview

Day 1: Foundations of Ocean Accounting

- **Introduction to OA and SEEA Standards:** Participants learned the principles and methodologies of Ocean Accounting and its alignment with the System of Environmental-Economic Accounting (SEEA).
- **Data Needs and Gaps:** Presentation on Existing Data, Data Gaps, and Needs Assessment by CZMAI.
- **Interactive Mapping Activity:** Stakeholders mapped existing datasets and identified their alignment with OA requirements, emphasizing gaps in extent, condition, and ecosystem service data.

Day 2: Stakeholder Roles and Data Collaboration

- **Presentation by the OCPP Team:** The Ocean Country Partnership Programme (OCPP) team presented their findings from a comprehensive data review conducted across various Marine Protected Areas (MPAs) in Belize. The presentation highlighted key data on ecosystems, (including seagrass, mangroves, and coral reefs) and condition data of these ecosystems. The team also outlined the protocols and methodologies used for data collection in different MPAs, providing insights into existing practices and identifying opportunities for harmonization and standardization to support Ocean Accounts.
- **Defining Roles in OA:** Participants mapped contributors and collaborators in Belize, identifying key roles and aligning them with specific data needs.
- **Collaborative Data Workflows:** Activities focused on mapping data communication channels, assessing existing mechanisms, and exploring opportunities for more effective collaboration between contributors like UB ERI, CZMAI, and SIB.

Day 3: Data Flow and Long-Term Sustainability

- **Presentations by CZMAI and SIB:** The Coastal Zone Management Authority & Institute (CZMAI) presented their role in managing marine spatial data, emphasizing their work as the designated host of spatial data platforms, such as the Belize Sustainable Ocean Plan (BSOP). They outlined challenges in standardizing and validating data received from various contributors and shared strategies to improve data flow and accessibility. The Statistical Institute of Belize (SIB) provided an overview of their legal mandate for national statistics, focusing on their frameworks for data dissemination and integration.
- **Mechanisms for Data Sharing:** Participants examined current data-sharing practices, identifying inefficiencies and recommending solutions to improve accessibility and streamline workflows.
- **Institutional Collaboration:** Stakeholders developed pathways to ensure validated data flows smoothly between contributors, focusing on the roles of SIB, CZMAI, and UB ERI.

Workshop - Findings, Recommendations, and Way Forward

To explore the different sections, click on the arrow next to each title, and the text will expand to reveal more details.

▼ Activities Results and Observations

▼ Key Data Types Needed for Ocean Accounts

As part of the workshop, participants engaged in a collaborative exercise to identify and classify key data types needed to support the development of ocean accounts in Belize. This exercise aimed to map existing data, assess gaps, and prioritize data based on feasibility, current availability, policy relevance, and importance to sustainable marine management. The results provide valuable insights into the status and needs of data collection efforts for effective ocean accounting and governance.

Key Data Type	Examples	Feasibility	Currently Collected	Priority but Not Collected	Policy Relevance
Ecosystem Extent	Coral reef types, Mangrove types, Seagrass density, Wetlands, Flats	✓ (Mangrove types, coral reef types)	✓ (Reef extent, mangrove extent)	✓ (Seagrass density is noted but not fully collected)	✓ (Relevant for spatial planning and conservation strategies)
Ecosystem Condition	Biodiversity, Coral coverage, Fish abundance, Mangrove coverage	✓ (Live coral cover and biodiversity are feasible to monitor)	✓ (Partial coral health data actively collected)	✓ (Biodiversity metrics and mangrove health need more focus)	✓ (Supports habitat restoration and sustainability targets)
Ecosystem Services	Tourism (e.g., visitation), Carbon sink, Coastal protection value	✓ (Tourism visitation data feasible to collect with minimal adaptations)	✓ (Tourism revenue currently tracked)	✓ (Carbon sink and damage assessments not collected)	✓ (Critical for economic and environmental strategies)
Ocean Economy Data	Fisheries revenue, Tourism expenditures, Value-added products	✓ (Emerging industries feasible to explore)	✓ (Fisheries and tourism revenue tracked)	✓ (Data on value-added products incomplete)	✓ (Highly relevant for Blue Economy initiatives)
Flows to Environment	Water quality, Sediment concentration, Agricultural runoff	✓ (Water quality monitoring feasible)	✓ (Water quality and solid waste partially collected)	✓ (Microplastics, sediment concentration, agricultural runoff need attention)	✓ (Key for pollution and habitat management policies)
Social Data	Demographics (e.g., age, gender), Livelihoods, Heritage culture	✓ (Coastal demographics can be gathered from existing records)	✓ (Demographic data collected by various entities)	✓ (Livelihood vulnerability and cultural data are under-represented)	✓ (Relevant for SDG-linked social development policies)
Governance Data	Protected Area management plans, MSP, Fisheries regulations	✓ (National MPA plans feasible to gather)	✓ (MPA extents tracked)	✓ (Governance enforcement data remains incomplete)	✓ (Vital for compliance and regulatory frameworks)

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Preview of the page will be displayed here. Click to add content.

Observations

Feasibility:

- Many datasets are feasible to collect with slight modifications to existing processes. Examples include reef and mangrove types, tourism visitation data, and water quality indicators.
- Feasibility is reflected across most categories, signaling strong potential for data adaptation and enhancement.

Currently Collected:

- Actively collected data includes
  - Reef and mangrove extents.
  - Coral health (partially).
  - Tourism revenue and fisheries-related data.
  - Some water quality metrics (e.g., by DOE and Ministry of Health).

indicating an existing monitoring system that could be expanded for Ocean Accounts.

Priority but Not Collected:

High-priority gaps identified include:

- Biodiversity data (e.g., specific fish abundance, seagrass density).
- Carbon sink quantification and habitat recovery rates.
- Data on microplastics and sediment pollution.
- Livelihood vulnerability assessments.

Policy Relevance:

- Almost all identified data types have significant policy relevance, particularly for:
  - Marine Spatial Planning (MSP).
  - National sustainable development and ecosystem management.
  - Enforcement of protected area regulations and fisheries policies.

Key Insights:

1. **Strengthening Data Integration**:
   - While some data types are already collected, many high-priority gaps (red-starred) need urgent attention to support holistic decision-making.
2. **Existing Strengths**:

- Green-starred data shows that Belize already has strong monitoring systems for reef and mangrove extents, tourism revenue, and some water quality metrics, forming a solid baseline.

3. **High-Impact Gaps**:
   - Addressing red-starred gaps (e.g., seagrass density, biodiversity metrics, carbon sinks) is essential for building comprehensive Ocean Accounts that are both accurate and actionable.
3. **Policy Alignment**:
   - The strong overlap between blue-starred (policy-relevant) data and existing priorities underscores the alignment of these data types with Belize's national and regional policies.
   - Clear policy connections highlight the value of Ocean Accounts in strengthening governance frameworks, MSP, and the Blue Economy Plan
4. **Next Steps for Data Integration**:
   - Focus on building capacity to gather uncollected but high-priority datasets.
   - Leverage feasible data types (yellow) for short-term integration while addressing red gaps strategically.
5. **Actionable Recommendations**:
   - Leverage existing feasible data while building capacity and systems for high-priority data gaps.
   - Focus on establishing standardized protocols for uncollected but critical data like habitat alterations and microplastics.

▼ **Data Quality and Validation**

During the workshop, participants engaged in a live and anonymous survey on data quality and validation practices in Belize. The exercise aimed to identify key challenges, gaps, and opportunities for improvement in the collection, validation, and sharing of data relevant to Ocean Accounts. The results of this activity are summarized below.

Key Insights on Data Quality and Validation

1. **Inconsistencies in Data Formats and Standards**:
   - Contributors use diverse formats and standards, leading to integration challenges in Ocean Accounts.
   - Lack of standardized metadata and documentation limits data usability and collaboration across agencies.
2. **Validation Gaps**:
   - Validation processes vary significantly between contributors, resulting in uneven reliability of datasets.
   - Critical data, such as biodiversity metrics and sediment concentration, lack systematic validation frameworks.

3. **Accessibility Challenges**:
    - Actively collected datasets are not always easily accessible due to:
        - Manual, time-consuming data request processes.
        - Limited availability of centralized data-sharing platforms.
    - These challenges hinder timely decision-making and effective policy integration.
4. **Feasibility for Improvement**:
    - Yellow-starred data types, like seagrass extent and water quality, highlight feasible areas for improvement with minor adjustments to collection methods.
    - Opportunities exist for quick wins through targeted capacity-building and process optimization.
5. **Policy Relevance Alignment**:
    - Blue-starred data, such as coral reef extent and fisheries data, demonstrate high policy relevance for MSP and the Blue Economy Plan.
    - This reinforces the importance of focusing on data with direct policy impact for immediate integration.
6. **Priority Gaps**:
    - Red-starred data categories, including habitat restoration metrics and microplastics, are identified as critical but currently uncollected.
    - Addressing these gaps is vital for creating comprehensive Ocean Accounts.

Recommended Actions

1. **Standardization Efforts**:
    - Develop standardized guidelines for metadata, data collection, and validation to enhance consistency and reliability across datasets.
2. **Validation Framework**:
    - Establish a centralized validation framework to ensure data reliability before integration into Ocean Accounts, with key roles for UB ERI and CZMAI.
3. **Automation and Platforms**:
    - Introduce automated workflows and shared platforms to reduce manual data-sharing bottlenecks.
4. **Capacity Building**:
    - Conduct targeted training for stakeholders on best practices in data collection, validation, and curation.
5. **Policy Integration**:
    - Prioritize integration of blue-starred data to align with immediate policy needs while planning long-term solutions for addressing priority gaps.

▼ **Diagnostic tool - Challenges identified**

To better understand the challenges and opportunities for implementing Ocean Accounts (OA) in Belize, a diagnostic tool was employed during the workshop. This tool utilized insights from participants to identify key barriers, ranging from policy clarity to technical capacity and data accessibility. The findings, presented below, highlight the multifaceted issues that need addressing to ensure a robust and effective framework for utilizing marine data in governance and decision-making.

Summary of results

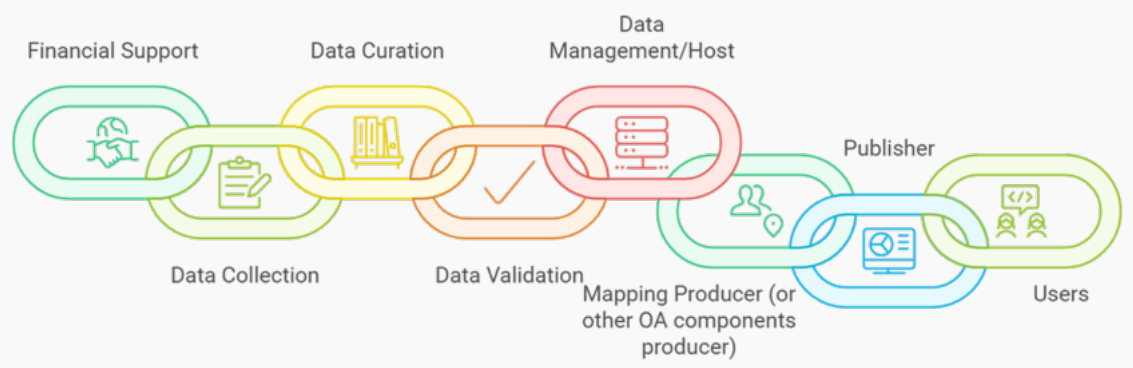
Policy Clarity	Limited scope and poorly defined policy outlining roles and responsibilities for data collection and sharing
Stakeholder Engagement	Need for stronger agreements and active engagement among stakeholders
Strategic Direction	Lack of a clear, strategic roadmap for Ocean Accounts (OA) implementation in Belize.
Institutional Capacity	Absorptive capacity of institutions involved in OA mandate is limited
Technical Capacity and Funding	Gaps in technical skills and insufficient funding for data collection and processing activities
Data Standards	Issues with data standards and data discrimination; data varies across organizations. Variability in data standards across organizations, leading to challenges in consistency and integration.
Data Access Mechanism	Need for a freedom-of-information-type mechanism to access data, which is easier to obtain in other countries
Data Collection and Research	Existing datasets require enhancement, and additional data collection efforts are needed to fill critical gaps
Resource Availability	Limited capacity and resources for data collection, sharing, processing, and continuity
Data Fragmentation	Data exists in isolated pockets across organizations, with issues in standardization, pooling, and data protection

Identifying contributors for the Ocean Accounts in Belize - Ocean Accounts collaboration chain

Ocean Accounts compilation require access to many types of data (e.g. biohysical, socioeconomic). The exercise mapped out potential contributors for Ocean Accounts (OA) in Belize by identifying organizations and entities that fit into specific categories within the OA collaboration chain. Each stakeholder was further associated with the types of data relevant to Ocean Accounts (OA) that they manage, produce, or interact with.

This exercise aimed to **identify stakeholders already contributing to the Ocean Accounts compilation process, the data flows required to connect their efforts, and the mechanisms currently in place to support these flows.** By mapping these roles and connections, participants evaluated whether existing systems are sufficient or if further coordination and infrastructure are needed to ensure effective data integration and account development.

Ocean Accounts Collaboration Chain



Types of contributors:

- ***Enablers****: Provides financial support for data collection and management.*
- ***Generators (in-situ)****: Collects on-site or field data.*
- ***Curators****: Preparing the data for sharing in the right format.*
- ***Validate or Verify data:*** *Conducts validation to ensure data quality*
- ***Host****: Manages the storage and repository of data.*
- ***Mapping*** *producer (or other OA component): Conducts mapping or analyzes in-situ data*
- ***Publisher****: Processes, keeps, and publishes the data or accounts*
- ***Users****: Organizations that use the data for policy, management, or research*

This mapping aimed to clarify **how contributions align across the Ocean Accounts framework and to visualize the existing communication channels between contributors**. Participants used arrows to indicate existing communication pathways and annotated these with mechanisms facilitating data exchange (e.g., forms, emails, reports, WhatsApp).

The resulting **visualization highlights both the flow of information and areas where data exchange processes or systems are underdeveloped or fragmented**. The mapped contributors and communication channels serve as a foundational understanding for strengthening collaboration and ensuring data compatibility for OA development in Belize.

Contributors matrix - filled in with information provided on Day 2. A completed matrix would be highly beneficial for multiple activities including planning data framework and platform design, as well as determining responsibilities among government agencies and other contributors.
https://docs.google.com/spreadsheets/d/1sJ6beSBRbZ_gSCZHja5claVMpHX3XgjNCu6hs2dJQfc/edit?usp=sharing

Contribution	Key Observations	Challenges/Issues
Funding/ Enablers	Project-based, varied sources.	Need for sustainable, long-term funding.
Data Generators	Data generation from many groups; extensive in-country data collection.	Some data stops at Dept. of Environment with unclear next steps or lack of flow to other stakeholders.
Curators	Fisheries Dept. curates much of the data but lacks streamlined processes.	Limited standardization and tedious formats make it difficult to manage and share data effectively.
Data Custody	Fisheries and AGRRA manage significant data.	Processes are tedious, non-standardized; methods can be outdated.
Validators	Few independent validators; much data stays within Fisheries or AGRRA without external validation.	Lack of clear, independent mechanisms for data validation.

Data Hosts	CZMAI hosts extensive data; FiD also receives a lot.	Limited connections to national/ local curators and generators. A lot of data reaches the host with no clear and independent mechanism for curation or validation
Data Accessibility	AGRRA receives a lot of Fisheries Dept data; however, accessibility and transparency are limited.	Hard to access data once hosted with AGRRA.
Alignment	Need to coordinate better with Forest Dept; they interact primarily within their own department.	Data rarely published or accessible outside Forest Dept? – not clear connections
Publishers	Main publishers include CZMAI, SIB, HRI, UB ERI.	Standardized formats and processes are needed for easier accessibility and streamlined data publication.

Summary of Results

- **Diverse Stakeholder Representation:** A wide range of contributors were identified across sectors, such as government, academia, NGOs, and community organizations. Examples include the Coastal Zone Management Authority and Institute (CZMAI), Fisheries Department, UB-ERI, WWF, and various Marine Protected Areas (MPAs).
- **Underutilized Collaboration Potential**: Despite the presence of multiple stakeholders with complementary roles, there is limited formalized collaboration, particularly between curators, validators, and hosts. This affects the seamless integration of data.
- **Communication Challenges**: Existing communication pathways are insufficient for ensuring sustained and coordinated data sharing.
- **Data Gaps and Silos:** Participants observed a lack of standardized methods for data collection and curation, resulting in fragmented datasets that do not consistently feed into central repositories or mapping tools.
- **Underutilized Data**: Some datasets generated by local organizations are not integrated into broader outputs.
- **Fragmented Data Systems**: While individual contributors actively generate and manage data, the lack of standardized processes and centralized hosting platforms results in inefficiencies and data silos.
- **Existing Communication Mechanisms:** While some communication channels exist, their use is inconsistent. Institutionalized mechanisms for sharing and validating data are minimal, leading to gaps in coordination.

- **Role Overlaps:** Some entities, such as CZMAI and the Fisheries Department, were identified under multiple categories (e.g., curators, hosts, publishers). This highlights their multifunctional roles but also the potential for inefficiencies or duplication of efforts.
- **Focus on Capacity Building:** The need for capacity building was emphasized, especially in roles related to data curation and validation.

Key Insights and Observations

1. **Underutilized Data**: Many datasets generated by local organizations are not being integrated into broader outputs or centralized repositories, limiting their impact and utility for ocean accounts.
2. **Strengthening Communication Channels**: Existing communication pathways between contributors are inconsistent and insufficient, emphasizing the need for formalized mechanisms to streamline data flows, enhance coordination, and avoid redundancy.
3. **Centralized Data Platforms:** Participants identified the importance of centralizing data hosting and management, with CZMAI seen as a potential hub for integrating various datasets.
4. **Role of Validation**: There is a lack of independent validators and standardized validation processes, resulting in limited data reliability. Strengthening the capacity and institutionalizing the role of validators are key priorities.
5. **Fragmented Data Systems**: The lack of standardized methods for data collection, curation, and accessibility has led to inefficiencies and fragmented datasets, limiting their use for comprehensive mapping and analysis.
6. **Alignment and Collaboration**: Despite the presence of diverse stakeholders (e.g., Fisheries, AGRRA, CZMAI, UB ERI, Forest Department), collaboration remains informal and fragmented, with overlapping roles creating inefficiencies. Greater alignment between entities is needed to ensure seamless data integration.
7. **Capacity Building**: Significant gaps in technical capacity, particularly for data curation and validation roles, were identified. Training and capacity building are essential to address these challenges.
8. **Integration with SEEA Framework**: Ensuring alignment with the SEEA framework is crucial to make the collected data suitable for use in accounting and policy-relevant outputs.
9. **Transparency and Accessibility**: Accessibility to curated and hosted data remains limited, with AGRRA and other hosts facing challenges in making their datasets open and transparent for other users.
10. **Funding and Sustainability**: Current data collection efforts are often project-based and rely on varied sources of funding, highlighting the need for sustainable, long-term financial support to maintain and expand data efforts.

▼ **Data sharing mechanisms in place**

This exercise expands on the earlier mapping by focusing on **data-sharing mechanisms and their accessibility,** identifying strengths and barriers to data sharing in Belize. Participants categorized mechanisms into *Online Open*, *Online Tiered/Request-Based*, *P2P Official*, and *P2P Unofficial* while rating accessibility as "hard," "medium," or "easy."

Key observations include:

Peer-to-Peer (Unofficial):

- Few data-sharing examples were identified under this mechanism, with WhatsApp being the most common platform for informal exchanges (e.g., MPA managers sharing data).
- Accessibility was mostly rated as "easy" (green), highlighting the quick communication nature of these informal channels. However, these mechanisms lack proper documentation and validation processes, raising concerns about data reliability and long-term management.
- These findings emphasize the heavy reliance on personal or professional relationships to facilitate data sharing, rather than standardized and centralized workflows.

Peer-to-Peer (Official):

- This mechanism had the most examples identified, as indicated by the large number of post-its. However, most of these were rated as "medium" (orange) or "hard" (red) to access.
- Bottlenecks in data-sharing mechanisms are evident, as formalized channels like CZMAI ↔ UB ERI or SIB ↔ Ministries involve manual processes and inefficiencies, often slowing the flow of data.
- The prevalence of this mechanism highlights the need to formalize these channels with streamlined workflows, templates, and standardized protocols to ensure consistency and reduce delays.

Online Platforms (Tiered/Request-Based):

- Examples such as Met Service and SIB archives were identified under this mechanism, with accessibility ratings predominantly "medium" (orange).
- While these platforms facilitate access, additional bureaucratic layers, such as formal requests or approvals, hinder timely and seamless data retrieval.
- Participants noted the need for improved user interfaces, as well as a clear and tiered access system that allows authenticated users to quickly retrieve datasets.

Online Open Access:

- This mechanism was associated with datasets like CZMAI's ecological data and SIB's rainfall and temperature data, which were predominantly rated as "easy" (green) to access.

- Open access platforms provide the most straightforward data-sharing mechanism but often lack metadata and quality assurance. These gaps reduce the usability of datasets for comprehensive analysis and decision-making.
- Improving metadata standards and ensuring quality controls could enhance the utility of these publicly accessible datasets for broader applications.

What is needed and who

This exercise aimed to decompose the data chain into its key components to identify Belizean groups best suited for **each role and determine what is needed** to enhance their effectiveness. Participants collaborated to assign responsibilities, highlight gaps, and propose actionable solutions to improve data-sharing mechanisms—not only for Ocean Accounts (OA) compilation but also for broader data management and policy-making objectives.

Findings by Category

Part	Who (Identified Groups)	What is Needed
Enabler → Generator (in-situ data)	WWF Resilient Bold Belize - Project Finance for Permanence (PFP), Blue Bond/Belize Fund, PACT/MPA Fee Structure, Public-Private partnership focused on long-term financing for marine and coastal resources	- Less short term and project based funding and more streamlined approach to allocate funds for data collection - Incentives to retain staff (official/national capacity building, train of trainers (resilience), structure for succession). - Low-interest loans - Coordination of national interests, consistent data collection, data management infrastructure (inc. archiving), connect to policy and adaptive management - Ensuring transparency and accessibility
Generator → **Curator →** **Validator**	MPAs (co-managers), Fisheries Dept (FiD) CZMAI, FiD LIC, Networks, Gov, UBERI, SIB	Generation and Curation: - Quality control mechanisms at the two stages - Training and capacity building on standardized methods and bookkeeping - Use of appropriate up-to-date technology to provide accurate data Curation and Validation: - Adaptive management of data (change in standards and protocols) to address future needs - Establishing validation protocols (in-country standards) - Communication and transparency within networks (data pathways and processes)

→ Host→	CZMAI, SIB, LIC, FiD, Forest Department, DOE, UBERI, NMS (National Meteorological Service - Weather/ Climate Data)	- Central Framework (BNSDI) - Centralized physical infrastructure with cloud-based backup - Attribution policy/guidelines (binding regulations) - Capacity building - Proper GC for automatic weather data and more marine climate data is needed
→ Generators of accounts (analysis) to **Publisher**	SIB	- Processing and analysis of data - Technical support, proper infrastructure - Additional personnel (fellow) - Clear guidelines (agreed upon by the PSC) on what to publish/display - Frequency of updates stipulated

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Key Needs and Improvements Identified:

1. **Financial Support and Sustainability**:
   - Move from short-term projects to sustainable, streamlined financial mechanisms (e.g., public-private partnerships, low-interest loans).
   - Allocate consistent funding for data collection and management.
2. **Capacity Building and Retention**:
   - Provide training programs on standardized methods, bookkeeping, and resilience (e.g., train-the-trainer models).
   - Build structures for succession planning and national-level capacity-building initiatives.
3. **Infrastructure and Technology**:
   - Centralize data management through physical and cloud-based infrastructure (e.g., BNSDI).
   - Enhance technological capabilities for automated data collection and data processing.
4. **Policy, Guidelines, and Protocols**:
   - Develop clear attribution policies, guidelines, and binding regulations for data sharing.
   - Establish validation protocols and adaptive management systems to address changing standards and future needs.
   - Define guidelines (e.g., PSC-agreed) for what data to publish and display.
5. **Quality Control and Validation**:

- Introduce quality control mechanisms at all stages of data flow.
- Strengthen independent validation processes and establish in-country standards for validation.

6. **Coordination and Communication**:
   - Align stakeholder roles and improve data-sharing pathways with formalized, transparent communication.
   - Streamline collaboration between overlapping roles (e.g., CZMAI, FiD, SIB).
7. **Accessibility and Transparency**:
   - Ensure data is accessible and displayed clearly for stakeholders and users.
   - Stipulate the frequency of updates for data publication and sharing.
   - Address bottlenecks in data-sharing pathways to avoid silos.

▼ Key Findings

1. Strengthening Data Collection and Integration

- **Current Status:** Belize has made significant progress in collecting ecosystem data (e.g., reef and mangrove extents), but many high-priority gaps remain, such as biodiversity metrics, habitat recovery rates, and socioeconomic indicators like livelihood vulnerability.
- **Challenges:** Data collection efforts are often fragmented, with inconsistencies in standards and limited coordination between contributors.
- **Recommendations:** Expand data collection efforts to address identified gaps, prioritize policy-relevant data, and implement standardized methodologies for consistency.

2. Enhancing Data Curation and Management

- **Current Status:** Data curation practices vary significantly, with some entities like CZMAI managing extensive datasets but lacking streamlined workflows.
- **Challenges:** Inefficiencies in data management processes, coupled with outdated methods and limited metadata standards, hinder the usability of curated data.
- **Recommendations:** Develop centralized infrastructure with cloud-based backups, introduce automated workflows, and refine data curation protocols to improve accessibility and reliability.

3. Improving Data Sharing and Collaboration

- **Current Status:** Mechanisms such as peer-to-peer sharing (both official and unofficial) are commonly used but often lack formalized pathways.
- **Challenges:** Informal channels (e.g., WhatsApp) are quick but lack validation, while formal mechanisms are bureaucratic and slow, creating bottlenecks.

- **Recommendations:** Formalize peer-to-peer sharing pathways with standardized templates and protocols, enhance online platforms with tiered access systems, and establish transparent communication channels.

4. **Building Capacity for Sustainable Data Practices**
   - **Current Status:** Capacity gaps exist across all stages of the data flow, particularly in roles like data validation and quality control.
   - **Challenges:** Limited resources and technical expertise impede the ability to collect, validate, and integrate data effectively.
   - **Recommendations:** Invest in training programs for standardized data management, build resilience through "train-the-trainer" models, and establish structures for long-term succession planning.

5. **Strengthening Validation and Quality Assurance**
   - **Current Status:** Validation frameworks are weak or non-existent, leading to variability in data reliability.
   - **Challenges:** Lack of independent validators and standardized quality control mechanisms undermine the credibility of collected data.
   - **Recommendations:** Develop in-country validation protocols, empower independent entities like UB ERI or CZMAI to lead validation efforts, and ensure metadata standards are adhered to.

6. **Ensuring Financial Sustainability**
   - **Current Status:** Many data-related efforts are project-based, with funding coming from varied, short-term sources.
   - **Challenges:** Reliance on temporary funding models limits the continuity and expansion of data collection and management systems.
   - **Recommendations:** Transition to sustainable financing mechanisms such as public-private partnerships and explore low-interest loans to support long-term initiatives.

7. **Fostering Policy Alignment and Institutional Collaboration**
   - **Current Status:** Ocean Accounts data is highly relevant to Belize's national strategies, such as the Blue Economy Plan, but institutional alignment remains fragmented.
   - **Challenges:** Overlapping roles and informal collaboration mechanisms create inefficiencies and redundancy.
   - **Recommendations:** Clearly define stakeholder roles, align institutional mandates with Ocean Accounts priorities, and strengthen collaboration through formalized agreements.

8. **Improving Data Accessibility and Transparency**
   - **Current Status:** Open-access platforms like CZMAI's ecological datasets are available but lack comprehensive metadata and quality assurance.
   - **Challenges:** Data silos, limited visibility of hosted datasets, and cumbersome access protocols hinder transparency and usability.

- **Recommendations:** Enhance metadata standards, adopt user-friendly interfaces for online platforms, and ensure data is easily accessible to all stakeholders.

Recommendations and focus areas identified

The workshop discussions and activities highlighted critical areas for strengthening data systems, processes, and institutional capacity for Ocean Accounts (OA) in Belize. Based on the findings, the following recommendations and focus areas were identified to guide future actions:

1. Data Collection

- **Standards and Protocols**: Develop and implement standardized methods for collecting and reporting ecosystem extent, condition, and ecosystem services data. These standards should align with international frameworks like SEEA while being adaptable to Belize's unique environmental and institutional contexts.
- **Training and Capacity Building**: Provide targeted training to data collectors, including MPA managers and field staff, on data collection methodologies, and metadata creation (following clear guidelines and formats).
- **Validation and Quality Assurance**: Establish validation protocols to ensure data accuracy and reliability. This is particularly critical for datasets derived from remote sensing or informal channels.
- **Integration of Local Knowledge**: Incorporate community-driven data collection efforts to fill gaps while ensuring these efforts align with standardized methods.

2. Data Hosting and Management

- **Centralized Data Repository**: Develop a centralized, secure data repository to host OA-related datasets. This system should allow for seamless data sharing between institutions and external stakeholders through tiered-access mechanisms.
- **Data Curation and Quality Control**: Improve curation practices by introducing metadata standards, data backups, and routine quality control processes. These steps will enhance the integrity and usability of hosted data.
- **Automated Data Retrieval Systems**: Invest in automated tools to streamline data submission, access, and retrieval processes, reducing reliance on time-consuming manual procedures.
- **Interoperability Across Institutions**: Facilitate collaboration between hosting organizations to ensure data systems are interoperable and support shared objectives.

3. Data Analysis and Accounts Compilation

- **Capacity Development for SEEA Frameworks**: Build technical capacity among key institutions to analyze and compile OA data following SEEA standards.
- **Institutional Integration**: Establish workflows that ensure OA compilation becomes part of the regular operations of national statistical systems, enhancing long-term sustainability.

- **Data Visualization and Communication**: Develop tools such as dashboards and GIS platforms to visualize OA data and communicate findings effectively to decision-makers and stakeholders.

4. Policy and Regulatory Recommendations

- **Clarify Roles and Responsibilities**: Clearly define and institutionalize roles across the OA data chain, from generators to publishers. This will reduce duplication of efforts and streamline workflows.
- **Regulatory Frameworks**: Introduce or update policies that mandate data-sharing standards, attribution guidelines, and reporting requirements, ensuring compliance across stakeholders.
- **Transparency and Accessibility**: Promote open data principles where feasible, ensuring that curated and validated datasets are accessible to stakeholders while maintaining data security and integrity.

Summary of Recommendations

This roadmap builds on workshop insights and highlights the need for:

- Standardized and validated data collection practices tailored to Belize's context.
- Secure and centralized systems for hosting, managing, and sharing data.
- Enhanced capacity for analyzing and compiling Ocean Accounts using SEEA frameworks.
- Strengthened regulatory frameworks to institutionalize and sustain the OA process.

By addressing these focus areas, Belize can establish a robust foundation for Ocean Accounts while advancing data-driven decision-making for sustainable ocean management and broader policy objectives.

▼ Conclusion

The workshop has successfully provided a comprehensive framework for strengthening Ocean Accounts (OA) in Belize, aligning data collection, management, and analysis with national and international priorities. Key achievements include the identification of critical data gaps, capacity-building needs, and actionable recommendations to enhance data-sharing mechanisms, quality assurance, and institutional collaboration. Through collaborative efforts, the workshop highlighted the importance of establishing standardized protocols, centralized hosting systems, and sustainable financing mechanisms to support a cohesive OA framework.

By emphasizing a data-driven approach, these findings have not only informed the immediate development of Ocean Accounts but also reshaped the focus of the fellows program under the Belize Ocean Accounts Project. This program will now prioritize addressing identified challenges in data collection, management, and analysis while ensuring alignment with SEEA standards and fostering long-term sustainability. These efforts collectively serve as a roadmap for advancing evidence-based decision-making in Belize's blue economy and ocean governance strategies.

Presentations

Day 1

GOAP-Intro OA.pdf
PDF Document
4.8 MB

GOAP-Data Mapping Activity.pdf
PDF Document
1.1 MB

GOAP-PracticalConsiderations.pdf
PDF Document
798.0 KB

Day 2

GOAP_Day2_OA.pdf
PDF Document
1.1 MB

GOAP_chain of contributors.pdf
PDF Document
1.1 MB

Day 3

GOAP_Day 3 and RecapDay1&2.pdf
PDF Document
1.7 MB

CZMAI_Data sharing and Accessibility in Belize.pdf
PDF Document
1.8 MB

SIB Surveys and Data Accessibility.pdf
PDF Document
826.0 KB

Photos


"Ocean Accounts
and Visualization

GOAP - prototype

Data-driven management –
GOAP spatial data platform

In-depth course with Fellows Report: Overview and key activities

PDF

BZE Ocean Accounts Fellows In-depth workshop - April 2025.pdf
PDF Document
9.5 MB

To explore the different sections, click on the arrow next to each title, and the text will expand to reveal more details.

▼ Day 1 – Introduction to Ocean Economy and OTSA Compilation with SIB

Participants:

Statistical Institute of Belize (SIB) only

Focus Theme:

Ocean Economy and Ocean Economy Satellite Accounts focusing on developing Belize's Ocean Tourism Satellite Account (OTSA) as part of Phase 1 of the Belize Ocean Accounts Project

Context and Objectives of Day 1

The opening day of the four-day workshop was designed exclusively for the Statistical Institute of Belize (SIB), the lead technical agency responsible for delivering the Ocean Tourism Satellite Account (OTSA) under Belize's ocean accounts framework. This focused session aimed to provide a deep dive into the structure and methodology of Ocean Economy Satellite Accounts (OESA), with a particular emphasis on how to adapt the existing 2019 Tourism Satellite Account (TSA) to an OTSA format tailored to Belize's coastal and marine economy.

The day focused on:

- Strengthen conceptual understanding of OESA and the OTSA.
- Begin technical discussions on methodological choices and data gaps.
- Introducing the conceptual and methodological steps needed for OTSA development.
- Review and plan adaptations of the existing Belize's TSA data tables for OTSA development.

Ocean Economy and OESA Framework

Using the OESA framework, participants explored how national accounts can be extended to better capture the contribution of marine and coastal tourism. The presentation clarified:

- The definition of ocean economy sectors and the challenges of classification.
- The relationship between core national accounts and environmental extensions.
- The role of partials in measuring the ocean share of tourism-related industries.

International examples helped highlight options for scope definition, sector boundaries, and estimating ocean-related contributions.

Transitioning from TSA to OTSA

This session presented a step-by-step approach to OTSA development in Belize. Participants reviewed the different phases of OTSA compilation—from scope setting to data compilation and validation—and discussed classification methods (location-based, activity-based, product-based) for ocean tourism. The group considered how these definitions could be tailored to Belize's context, including tourism related to coral reefs, mangroves, and cruise ports.

The goal was to ensure that OTSA methods align with Belize's data infrastructure and national planning priorities.

Hands-on Activity: Classifying Tourism Activities and Planning Table Adaptation

In a collaborative exercise, participants classified tourism-related activities from Belize's TSA as:

- Fully ocean-dependent
- Partially ocean-dependent (requiring a partial share)
- Not ocean-related

They also reviewed Belize's TSA 2019 Table 1 and Table 4 to identify which categories could be adapted directly for OTSA, which required assumptions, and which posed data challenges. This helped initiate a draft list of partials and a framework for adapting existing tables.

Key Takeaways from Day 1

- SIB has a strong foundation from its TSA 2019 work and is well-positioned to lead OTSA development.
- Several tourism activities in Belize are clearly ocean-dependent, while others require refinement through partial estimation.

- The OTSA process will rely on adapting existing tables and enhancing data specificity through strategic collaboration with other institutions (e.g., Ministry of Tourism, marine stakeholders).
- Immediate priorities include defining the OTSA scope and partials methodology.
- Collaboration with ministries, tourism stakeholders, and marine data providers will be essential.

Next Steps

- Finalize the list of ocean-dependent and partial tourism activities.
- Begin the process of tagging TSA entries with marine relevance (“marine” versus “non-marine” components).
- Identify relevant data sources to estimate partials, data needs and potential proxies for partial estimation.
- Engage fellows and data officers in coordinating with relevant ministries and sector agencies to begin data collection for pilot OTSA tables.
- Begin pilot adaptation of TSA Table 1 for the OTSA.

Day 2 – Foundations of Environmental Accounting and the Ecosystem Extent Account

Participants:

Representatives from the three fellow organizations—

1. Statistical Institute of Belize (SIB),
2. Coastal Zone Management Authority and Institute (CZMAI), and
3. University of Belize Environmental Research Institute (UB ERI).

Introduction to Environmental Accounting

The second day of the workshop expanded the training beyond the Statistical Institute of Belize, bringing together all three fellow institutions. The day began with a deep dive into the foundations of environmental accounting, setting the stage for understanding how environmental data is organized, interpreted, and applied within the System of Environmental-Economic Accounting (SEEA) frameworks.

The session focused on key distinctions between the SEEA Central Framework (SEEA-CF) and SEEA Ecosystem Accounting (SEEA-EA). Participants explored the integration between economic and environmental systems, including how stocks and flows are tracked, what constitutes physical versus monetary data, and how benefits and beneficiaries are defined. The role of SEEA in supporting national development planning and monitoring of ecosystem contributions was contextualized with international examples such as Canada's marine economy and Guatemala’s fisheries accounts.

Environmental Accounting Concepts Exercise

To consolidate the theoretical content, participants engaged in an applied exercise using the SEEA EA activity handout and answer sheets. The activity required each team to complete simplified diagrams representing flows between the environment and the economy, populate SEEA EA structures, and match core concepts with real-world examples.

The hands-on format allowed participants to discuss and reflect on:

- The role of natural inputs, products, and residuals.
- The meaning of ecosystem services within and outside the System of National Accounts.
- The differences between the SEEA-CF (focused on environmental assets and use) and SEEA-EA (focused on ecosystem condition, extent, and service flows).

Introduction to the Ecosystem Extent Account

Building on the morning concepts, the next session introduced the Extent Account—a foundational component of ecosystem accounting. Presentations explained how extent accounts document the spatial distribution of ecosystem types and how they change over time, offering insight into degradation, fragmentation, and implications for ecosystem services.

Participants learned how extent data can support:

- Coastal and marine spatial planning.
- Monitoring pressures such as urban expansion or habitat loss.
- Establishing baselines for other ecosystem accounts.

Case studies (e.g., Fiji and Sri Lanka) and real geospatial maps were used to illustrate classification changes, pixel counts, and conversion matrices over time. The group discussed challenges such as choosing classification schemes, accounting for spatial heterogeneity, and aligning temporal data.

Practical Activity: Compiling the Extent Account and Change Matrix

To apply the knowledge, participants worked in small groups to simulate the process of compiling an ecosystem extent account. Each group used data on ecosystem types across two time periods and:

- Completed extent account tables.
- Calculated net changes in area for each ecosystem.
- Built a transition matrix to track gains and losses between types (e.g., mangrove to urban).

This exercise served as an introduction to spatial data processing and set the groundwork for later tasks focused on Belize-specific data.

▼ Day 3 – Ecosystem Condition Accounts and Data Pathways: Refining Concepts and Planning the Pilot

Participants:

Statistical Institute of Belize (SIB), Coastal Zone Management Authority and Institute (CZMAI), and University of Belize Environmental Research Institute (UB ERI)

Focus Theme:

Revisiting foundational concepts and shaping the ecosystem extent and condition accounts for the selected pilot area(s)

Revisiting the Ocean Accounting Framework and Ecosystem Condition

The day began with a recap and conceptual consolidation. Participants revisited the distinctions between SEEA Central Framework and SEEA Ecosystem Accounting (EA), re-engaging with concepts such as environmental assets, spatial stock and flow accounts, and the structure of the SEEA EA model. This served to ground the group in the broader Ocean Accounts framework and reinforce how condition and extent accounts support the Belize project.

The condition account section focused on how to assess the state of ecosystems using indicators and reference conditions. Concepts such as variables, indicators, and indices were explained and applied through examples like canopy coverage, live coral cover, species richness, and water quality parameters.

Participants discussed:

- The structure and logic of condition accounts (opening, improvements, reductions, closing).
- How variables like biomass or turbidity can be normalized to indicators.
- The importance of spatial analysis and the need to define appropriate reference conditions (scientific, historical, political) for each ecosystem.

Case Examples and Tools for Condition Accounts

Drawing from international examples such as Fiji and Indonesia, the group explored how ecosystem condition variables have been structured elsewhere. These examples emphasized:

- Use of field-collected and remote-sensed data.
- Building composite indices from multiple variables.
- Visualizing condition across spatial units such as mangroves and coral reefs.

Participants appreciated the practical examples and how they could inform local approaches to coral, seagrass, and mangrove condition assessment in Belize.

Strategic Planning for the Pilot Area

A major part of Day 3 was dedicated to open discussion on the pilot area for extent and condition accounts. While San Pedro and Ambergris Caye is the original study area proposed, the team explored the value of including Turneffe Atoll as a comparative study site.

The discussion highlighted:

- **San Pedro/Ambergris Caye:** A data-limited yet socioeconomically important area where project efforts could focus on generating new baseline data and demonstrating the value of lifting data beyond MPAs.
- **Turneffe Atoll:** A data-rich site with historic records, regular monitoring, and existing ecosystem mapping. It offers the chance to demonstrate a fully compiled extent and condition account and contrast it with more data-constrained contexts.

Participants recognized the value in designing a dual-site pilot to showcase both:

- What is possible when data exist (Turneffe).
- The process and gaps revealed when data are missing (San Pedro), encouraging future investment in broader monitoring.

This proposal was marked as a recommendation to bring forward to the Project Steering Committee (PSC) for review.

Group Activities: Data Mapping and Prioritisation

Participants worked together to identify existing datasets for coral reefs, mangroves, and seagrass across both pilot areas. Key outputs from the mapping activities (as shown in the photos) included:

- Inventories of data owners, collection methods, spatial/temporal resolution, and access conditions.
- Identification of **data gaps** in San Pedro, especially around seagrass condition and coral health.
- Comparative summary tables showing Turneffe's robust monitoring history versus gaps in nearshore urban areas.
- Sticky-note matrices categorizing data readiness by cost, time, impact, and implementation feasibility.

Teams used this analysis to generate a prioritized list of data needs and explore who might support data acquisition or collaboration, aligning with governance and technical capacity in-country.

Key Takeaways from Day 3

- Participants gained clarity on how to assess and communicate ecosystem condition using spatially explicit data and structured indices.
- There is strong potential to design a **dual-site pilot** (Turneffe and San Pedro) to contrast data-rich and data-poor contexts.
- Strategic value lies in showcasing both good practices (Turneffe) and in lifting underreported ecosystems and urban marine areas (San Pedro).
- Data mapping exercises revealed key stakeholders, data accessibility gaps, and potential pathways for resource mobilisation.

Next Steps

- Share the dual-site pilot concept with the PSC for input and alignment.
- Begin scoping data integration and gap-filling opportunities for the selected areas.
- Prepare condition account templates and mapping approaches based on data availability in each site.
- Identify external collaborators and funding opportunities for future fieldwork or historical data retrieval.

▼ Supporting Outputs from Group Exercises

During Day 3, participants engaged in a structured sequence of collaborative exercises and case-based discussions, aimed at preparing for the development of ecosystem **extent and condition accounts** in Belize. These group activities were designed to reflect the theoretical principles introduced in the SEEA EA presentations and directly apply them to the national context.

The activities included:

- **Mapping coral monitoring responsibilities and data availability** across San Pedro and Turneffe to assess institutional involvement, methods, and spatial coverage.
- **Building an inventory of key ecosystem datasets** by ecosystem type, including information on ownership, spatial resolution, collection frequency, and access conditions.
- **Identifying institutional and technical gaps**, such as limited in-house GIS or SEEA capacity, lack of standard methodologies, and challenges in data sharing and validation.
- **Conducting a prioritisation matrix exercise**, scoring datasets and gaps based on cost, urgency, and implementation readiness.

The tables that follow transcribe these outputs in full, capturing the perspectives and institutional knowledge of the technical agencies participating in the workshop. They form a critical basis for the design of the pilot area(s), inform institutional alignment, and highlight areas requiring support to build a robust national accounting framework.

1. Ecosystem Monitoring Landscape

Table 1. Coral Ecosystem Monitoring – Actor Mapping for San Pedro vs Turneffe

Location	Contributors / Organizations	Data Types / Notes
San Pedro	HRI (biannual surveys) - Hol Chan - AGRRA method - UB ERI (non-lethal monitoring)	Coral nutrition and cover - Some recent and historic data, but patchy
	Some gaps in aggregation and consistency	
Turneffe	TASA (regular coral monitoring) - AGRRA + UB ERI - FOH (coral restoration)	Long-term and systematic monitoring - Involvement in reef restoration
	Global Coral Reef Monitoring Network (GCRMN) also contributes	

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2. Dataset Inventory by Location

Table 2. Data Inventory for Key Ecosystem Types – Turneffe Atoll

Ecosystem Type	Data Owner	Collection Method	Spatial Coverage	Frequency	Access	Notes
Coral	Healthy Reefs Initiative	Fieldwork & Monitoring	Glover's, Turneffe	Yearly	Public	Data-rich, regularly monitored
Coral	Univ. of South Florida	Satellite	National	Yearly	Public	Global mapping product
Seagrass	UB ERI	Fieldwork (AGSARA)	Turneffe	Yearly	Restricted	Gaps outside MPA areas
Mangrove	CZMAI	Remote Sensing	National	2001, 2008	Public	No frequency; includes canopy & biomass
Mangrove	CZMAI + UB	Fieldwork & Groundtruthing	Turneffe	2024	Restricted	Species diversity, biomass

Table 3. Data Inventory – San Pedro / Ambergris Caye Region

Ecosystem Type	Data Owner / Source	Collection Method	Spatial Coverage	Frequency	Access	Known Gaps/ Limitations
Coral	UB + HRI	Fieldwork + Observations	Reef edge zones	Some yearly	Public	Few data beyond protected areas
Seagrass	UB ERI	Field + Mapping	Patchy coverage	No frequency	Restricted	Not currently groundtruthed
Mangrove	CZMAI	Remote Sensing	Entire coastline	2008, 2024	Public	Based on 4 species only
All Ecosystems	CZMAI / ERI / UB	GIS + Satellite + Field	San Pedro / Ambergris	No standard	Mixed	Fragmented access, urban interface gaps

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3. Institutional Barriers and Needs

Table 4. Institutional Gaps and Capacity Needs Identified

Category	Specific Gaps and Issues
In-house capacity	Gaps in GIS, SEEA, data management, visualisation, web development
Restricted data	Limited access to some datasets across agencies
Standardisation needs	Methodology alignment, validation of collection processes, standard parameters
	Need for a shared framework to facilitate collaboration
Project coordination	Fragmented initiatives; low collaboration between different projects
Raw data validation	Lack of consistent verification and QA/QC protocols

Automated data sharing	No unified or automated data-sharing mechanisms
Sustainable funding	Requires coordination with other accessible funding streams
Accessibility	General challenges in accessing environmental and ecosystem datasets

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4. Prioritisation for Action

Table 5. Summary of Data Gaps and Recommendations

Category	Details
Data Gaps	Data sharing, coordination, standardisation
Recommendation	Mandate alignment of classification (e.g., CZMAI, UB ERI, HRI, Fisheries) - Standardise methods and frequencies
Cost	High, especially for quality and consistent data - Human and financial resources
Time	Time-consuming - Quicker if existing data is used - Urgent/important (flagged)
Implementation Readiness	Varies by institution; dependent on method coordination
Additional Notes	Infrastructure needs and licensing linkage - Emphasized need for flow collaboration framework

▼ Day 4 – Introduction to Ecosystem Services Accounting and Policy Relevance in Belize

Overview and Purpose of the Day

The final day of the workshop broadened the focus to include the **physical quantification and the monetary valuation of ecosystem services** in line with the **SEEA EA framework**, emphasizing its **policy relevance** for Belize. While **this component is *not* part of the current pilot project scope**, it was introduced due to the **growing national interest** in blue carbon and ecosystem services accounting more broadly. This session attracted participation from not only the three fellow institutions (SIB, CZMAI, and UB ERI), but also the **Turneffe Atoll Sustainability Association (TASA)** and the Belize **Blue Bond and Finance Permanence Unit (BBFP)**.
The intention was to **raise awareness of the SEEA EA standard's methodology** for calculating ecosystem services, particularly for services like **coastal protection** and **carbon sequestration**, and **introduce logic chains** as a tool for linking ecosystem assets to benefits.

Key Topics Covered

1. **SEEA EA Overview on Ecosystem Services**

Participants were introduced to the structure of ecosystem services accounting under the SEEA EA, distinguishing three key service types:

- **Provisioning** (e.g., harvested fish)
- **Regulating** (e.g., carbon sequestration, erosion prevention)
- **Cultural** (e.g., recreation, visual amenity)

The session highlighted how **services differ from benefits**, and how both are required to meaningfully value nature's contributions to the economy and human well-being.

2. **Logic Chains for Ecosystem Services**

Using the "Logic Chain" methodology from the SEEA, participants explored how to **link ecosystem extent and condition data to the supply and use of services**, and ultimately to **socioeconomic benefits**.

Each group built logic chains based on different ecosystem services, covering provisioning, regulating, and cultural categories. For example:

- **Mangrove ecosystems** were linked to carbon regulation, habitat provisioning, and recreation.
- Groups assessed **ecological supply factors** (like vegetation density or carbon content), **societal use factors** (like demand for coastal protection), and **metrics** (e.g., Mg of carbon sequestered).

This activity helped participants critically think through the **step-by-step connections from ecosystems to economic relevance**, aligning with SEEA EA's structured approach.

3. **Ecosystem Service Valuation Approaches**

The next session introduced **valuation methods** used in SEEA EA. This focused on:

- The **replacement cost method** for **coastal protection**, using examples from coral reefs and mangroves.
- The **social cost of carbon** approach for **blue carbon ecosystems** (mangroves and seagrasses).

These examples showed how physical service flows (e.g., wave energy reduction, carbon sequestration) can be **translated into monetary values** using standards and assumptions consistent with national accounts.
Participants engaged with calculation tables and scenarios from the valuation exercise, exploring real-world data needs and methodological choices.

Interactive Activities

Two practical exercises were conducted:

- **Activity 1: Logic Chain Construction**

  Groups created **logic chain tables** for one selected ecosystem service in each category (provisioning, regulating, cultural). This structured process helped clarify how ecosystem characteristics link to human and economic benefits, encouraging careful thinking about metrics and users.
- **Activity 2: Valuation Exercise**

  Participants worked through a simplified exercise estimating:
  - The **replacement cost** of coastal protection from coral reefs and mangroves.
  - The **carbon sequestration potential** of mangrove and seagrass areas.

    These were contextualized with Belize-specific discussions, especially regarding how these services may be of **future interest for policy, financing, and monitoring**.

Reflections and Takeaways

Although ecosystem services accounting is **not within the current scope of the Belize pilot project**, participants noted its **growing importance** in discussions about:

- **Blue carbon finance and climate commitments**
- **Ecosystem restoration and protection efforts**
- **Tourism, fisheries, and coastal resilience planning**

The session succeeded in building a foundational understanding of **how SEEA EA can measure services in a standardised, policy-relevant way**, laying the groundwork for **possible future work** in Belize on this component.

Technical Training Workshop on Ocean Accounts Compilation (ecosystem extent account focus)

PDF version:

TrainingOceanAccounts_Ecosystem extent_Oct25.pdf
PDF Document

1. Background

Following the workshop “Measuring Progress in Belize’s Blue Economy: People and the Sea” (October 22) organised by the Blue Economy MRV Core Team, this technical training workshop will provide hands-on capacity building for Ocean Accounts Fellows and key institutional staff. This activity responds to technical needs, particularly related to data flow and accounts compilation methodology.

2. Objective

Build practical capacity among Fellows and institutional staff to compile Ocean Accounts (specifically ecosystem extent accounts) that feed environmental KPIs into Belize's MRV system for Blue Economy.

3. Connection to MRV System

Ocean Accounts serve as the standardized database for MRV environmental KPIs, including:

- Ecosystem extent (coral reefs, mangroves, seagrass)
- Ecosystem condition (coral health, biodiversity metrics)
- Conservation effectiveness indicators

This training ensures Fellows can systematically compile these accounts following SEEA standards, providing the historical and comparable data required for robust KPI monitoring.

5. Agenda

Date: 23rd October

Delivery Method: In-person, hands-on technical training with practical exercises and progress review

Time	Session	Content
9:30 - 9:45 AM	Welcome and Introduction	Workshop objectives and overview - Participant introductions - Agenda review
9:45 – 11:00 AM	**Fellows Progress Reports and Challenges**	**Wilbert Castillo (UBERI)** - Data collection and field protocols (25 min) Caisha Fermin **(CZMAI) - Data manage**ment and hosting (25 min) Jefte Ochaeta (SIB) - Accoun**ts compilation (25** min)
11:00 - 11:15 AM	**Break**	
11:15 AM - 12:00 PM	**Ecosystem Extent Accounts - Methodology**	Overview of SEEA Ecosystem Accounting framework - What is an extent account and why it matters for MRV - Components: ecosystem types, spatial units, change matrices - Connection to environmental KPIs - Examples from other countries - Overview of compilation process
12:00 - 12:45 PM	**Lunch Break**	
12:45 - 2:30 PM	**Hands-On Exercise - Compiling an Extent Account**	Step-by-step walkthrough: from spatial maps to change matrix tables - Work through extent account exercise using Belize data (ecosystem data available either global or national) - Group work: Creating extent account - Addressing data gaps and practical challenges - Q&A and troubleshooting

2:30 - 2:45 PM	**Wrap-Up and Next Steps**	Summary of key learnings - Immediate next steps for Fellows - How this supports deliverables - Follow-up support needed - Brief discussion of data coordination priorities
	Workshop Concludes	

Key Notes

Participants should bring: Laptops for hands-on exercise

Fellows should prepare: 15-minute presentations on progress and challenges

- Wilbert Castillo (UBERI) - Data collection and field protocols
  - Progress on ecosystem data collection
  - Challenges with data access and standardization
  - Needs for accounts compilation
- Caisha Fermin (CZMAI) - Data management and hosting
  - Progress on data management framework
  - Challenges with data flows and coordination
  - Systems and infrastructure needs
- Jefte Ochaeta (SIB) - Accounts compilation
  - Progress on Ocean Economy Accounts methodology
  - Challenges with data integration
  - Needs for compilation and analysis

The workshop focuses on the core technical skill (extent account compilation) while creating space for Fellows to share their progress and challenges. The data management and coordination topics raised in Fellows' presentations can be addressed briefly in the wrap-up discussion, with more detailed follow-up handled separately if needed.

Activities

Activities: Developing an extent ocean account
We will focus on Activity 1 and 3, if we have time we will discuss "Belize Coral Reef Data Assessment for Oce...

Activities: Developing an extent ocean account

We will focus on Activity 1 and 3, if we have time we will discuss "Belize Coral Reef Data Assessment for Ocean Accounts"

Guidelines

B - WSM_GIS_training.docx
DOCX File
5.1 MB

Information sources

Activity 1.zip
ZIP File
836.0 KB

Activity 2.zip
ZIP File
13.7 MB

Activity3.xlsx
XLSX File
1.4 MB

Activity3_results.xlsx
XLSX File
2.3 MB

Optional - Step-by-step GIS Training for Ecosystem Accounting - Focusing on Coral Reefs

Guidelines

Training Materials_ Step-by-step GIS Training fo...tem Accounting - Focusing on Coral Reefs.docx
DOCX File

Belize Coral Reef Data Assessment for Ocean Accounts.docx
DOCX File

Information sources

exercise_data (1).zip
ZIP File