Scope of a Natural Capital Assessment in the British Virgin Islands

Funded by UK Government

JNCC
Joint Nature Conservation Committee

WOLFS COMPANY
NATURE BY NUMBERS

April 2017

Contents

1 Introduction

The BVI is one of the most tourism dependent economies in the world. Travel and tourism contribute to almost 80% of the GDP of the islands (wttc.org) and tourism is one of the "twin pillars" (along with financial services) of the local economy. The main attractions in the BVI include dive tourism, boating services and yacht charters, all of which directly benefit from services provided by local ecosystems such as coral reefs, sea grass beds and mangroves.

In addition to supporting the important tourism sector, the BVI's ecosystems provide recreational opportunities for the local population, serve as hurricane shelters for vessels, protect coastal and inland infrastructure, prevent soil and beach erosion and provide research opportunities, among other benefits to the local economy. In the context of the proposed study, these and other benefits provided by ecosystems are referred to as ecosystem services (MA, 2005).

Notwithstanding the importance of nature for the subsistence and prosperity of the BVI, local ecosystems face numerous threats, such as natural hazards, climate change, invasive species, water and terrestrial pollution, land reclamation and conversion, sand mining and onshore developments. As a result of natural and human induced threats, such as the abovementioned phenomena, beaches in the BVI have narrowed by an average of one meter, with extreme cases of up to three meters (De Bettencourt and Imminga-Berends, 2015). At the same time, extreme events in the region (e.g. high surface water temperatures in 2005) have resulted in the loss of over 40% of coral due to bleaching processes (Eakin *et al.*, 2010).

Given the socioeconomic importance of the BVI's ecosystems, the UK Joint Nature Conservation Committee (JNCC) -in partnership with the BVI Government and supported by the UK Conflict, Stability and Security Fund (CSSF)- has commissioned Wolfs Company to determine the scope of a Natural Capital Assessment in consultation with local stakeholders. The proposed study aims to provide insight into the socio-economic value of ecosystem services to be used as input for the refinement and implementation of existing and proposed policy instruments that support environmental management in the BVI.

To complete the Natural Capital Assessment, a set of economic valuation techniques will be used to assess the current supply of ecosystem services. Furthermore, a framework with indicators to monitor changes in the supply of these services will be developed in support of key fiscal planning and environmental management instruments of the BVI Government (Box 1).

The proposed study will be organized in two phases: the first one to be conducted between April 2017 and March 2018, and the second between April 2018 and March 2019. Based on input provided by the BVI's stakeholders during the scoping visit, this report suggests a preliminary scope for the study, describes the data collection process and provides a feasible planning for the proposed study.

The proposed scope for the study is defined according to the most relevant ecosystems and ecosystem services identified by local stakeholders and the expected application of the project to policy and decision making. As part of the proposed application of the study, special attention is given to the framework for the selection of suitable indicators to monitor natural capital in the context of relevant policy instruments in the BVI.

2 Scoping visit

To determine the extent of the activities to be considered in the two project phases and potential applications of the study, a scoping visit to the BVI was conducted in February, 2017. During the visit, an environmental consultant from Wolfs Company held strategic meetings with representatives of the Ministry of Natural Resources, the Central Statistics Office and the Macro Fiscal Unit to identify the policies and instruments to be supported by the study (see Box 1). Furthermore, a half-day workshop with stakeholders served to identify the main threats, ecosystems, ecosystem services and most relevant applications that should be considered in the Natural Capital Assessment (see Annex I). The availability of data to support the study was preliminarily analysed during meetings at the Department of Disaster Management, Department of Conservation and Fisheries and National Parks Trust.

This section describes the outcomes of the stakeholder workshop and meetings. This information is used as the basis to propose a detailed scope for the Natural Capital Assessment in Section 3.

Figure 1 - Workshop participants discussing potential applications of the proposed Natural Capital Assessment (February 2017)

2.1 Ecosystems and ecosystem services identified by stakeholders

During the plenary session of the workshop (see Annex I), stakeholders identified relevant ecosystems and ecosystem services in the BVI's context. Figure 2 presents the list of ecosystems and ecosystem services identified during this session. Marine and coastal, and terrestrial ecosystems are respectively listed in the blue and green boxes on the left side of the figure. The ecosystem services proposed during the workshop are grouped in the main categories of provisioning, regulating and cultural services, as defined by the Millennium Ecosystem Assessment (MA, 2005) and the Economics of Ecosystems and Biodiversity (TEEB) framework (de Groot et al., 2010).

To ensure the comparability with other studies, the identified ecosystem services are furthermore adapted to the terminology used in the TEEB framework (de Groot et al., 2010) and the Common International Classification of Ecosystem Services (CICES) developed by Haines-Young and Potschin (2013).

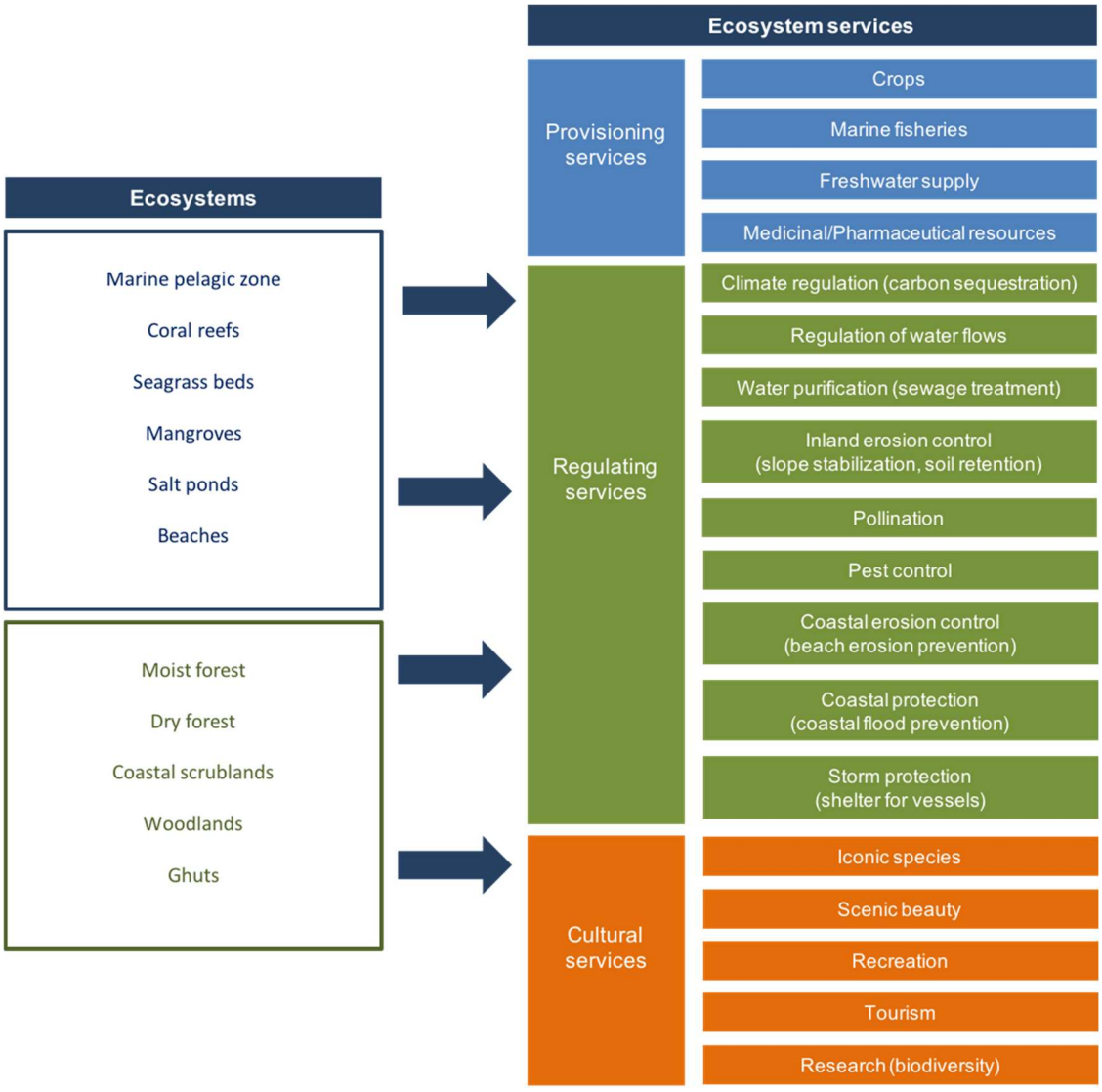

Figure 2- Relevant ecosystems and ecosystem services identified by stakeholders in the BVI

From the full list of ecosystem services identified by stakeholders, transport infrastructure for maritime commerce, renewable energy and habitat are not included in Figure 2. Both, renewable energy and maritime commerce are excluded from the list because they depend on tides, winds and processes that occur at geographical scales that extend beyond the BVI's territory. Habitat is not included in the revised list of ecosystem services, as this service supports the provision of various other services that are already considered in the analysis, e.g. iconic species, research, fisheries, medicinal and pharmaceutical products, etc.

It is important to note that section 3 recommends a subset of ecosystem services to be considered in the Natural Capital Assessment. The selection of a more limited group of ecosystem services is based on their relevance for the proposed scope and the feasibility of their valuation during the study timeframe.

2.2 Potential applications of the Natural Capital Assessment to policy and decision making

As stated by stakeholders during the workshop, the BVI face threats such as climate change, diverse extreme events, poorly controlled development, marine and land based pollution, invasive species, vessels' groundings and anchoring, and overfishing. Given that all these threats affect ecosystem health, and consequently the supply of ecosystem services, a Natural Capital Assessment can help decision makers deal with local issues in diverse ways.

To inform the definition of the scope of the Natural Capital Assessment, stakeholders identified possible applications of this study to policy and decision making during group assignments as part of the workshop. After the presentation of the results per group, each stakeholder voted for the type of application they perceived as the main priority to tackle threats on ecosystems and ecosystem services in the BVI.

Table 1 presents the type of possible application of the study in the BVI's context, together with the examples and score given by stakeholders participating in the workshop. The categories of possible applications given as guidance to workshop participants and presented in the table are adapted from Waite et al. (2014).

From the different categories of applications proposed, 'inform natural capital accounting' had the highest number of votes as the main priority for the study. At a broad scale, stakeholders highlighted the potential of the study to provide environmental statistics and indicators to be incorporated in existing fiscal planning instruments. Examples of relevant ecosystems and ecosystem services to be included in an economic valuation to support Natural Capital accounting included coral reefs and fisheries.

The potential contribution of the project to 'evaluate, justify, inform or advocate policies' was the second most voted priority by stakeholders. Examples of this type of application provided during the workshop focused on the potential of the study to help justify improved environmental management, and to inform the implementation of policy instruments and regulations.

Other potential applications presented in the table below received a relatively even number of votes from stakeholders. These applications included the potential use of the study to assess specific environmental issues, increase long-term funding for nature management, sensitize the local population and inform spatial planning.

Table 1 – Possible applications of the Natural Capital Assessment identified during stakeholder workshop

Potential application of the Natural Capital Assessment	Examples provided by stakeholders	No of times selected as main priority
Inform natural capital accounting	• Developing environmental statistics and indicators to inform the BVI Government's budget • Estimating the value of fisheries and reefs	6
Evaluate, justify, inform or advocate policies	• Justifying and supporting increased environmental enforcement • Advocating policies to ensure preservation and marine spatial planning • Informing licensing and regulations for vessels, polluter and user fees, catch limits, and penalties	5
Compare costs and benefits for decision support	• Analyzing impacts of sewage disposal and runoff on environmental value • Comparing development and conservation scenarios • Developing sustainable development models	3
Sustainable financing	• Creating or adapting financing mechanisms for nature management (e.g. environmental tax, fees for mooring and penalties) • Creating financial models to prioritize, increase or divert funding	3
Damage assessment	• Determining environmental costs of damage caused by ship groundings, oil spill, invasive species or other threats to the environment • Determining penalties to environmental damage	3
Awareness raising	• Creating educational and sensitization material about the value of natural resources and the importance of environmental policy	2
Spatial planning	• Community planning • Spatial planning of marine recreation and transportation uses	2

The priority applications presented in

Table 1 were further discussed and refined in the context of existing and proposed policies during strategic meetings with representatives of the Ministry of Natural Resources, the Central Statistics Office and the Macro Fiscal Unit of the BVI Government. The outcome of these follow-up meetings is used as the basis for the scope recommended in the next section of this report.

3 Proposed scope of the study

The study to be conducted in the BVI is one of the first steps to incorporate the socio-economic value of the natural resources of the territory into policy and decision making. This study does not intend to cover all the ecosystems, ecosystem services and possible applications identified by stakeholders during the workshop and meetings. However, it is expected that the close collaboration between international and local experts will contribute to knowledge transfer and capacity building to follow up on the use of the results and continue the analysis of additional ecosystem services beyond the life of the project. Further capacity building activities on this topic and at the local level are expected to be carried out in the context of complementary projects.

The scope proposed in the next section focuses on the potential of the study to support policies and instruments selected in consultation with key stakeholders during strategic meetings to follow up on the outcomes of the workshop. Based on this information, the following sections give recommendations on the priority ecosystem services to be part of the assessment and define the approach to identify and operationalize natural capital indicators to inform the policies and instruments of interest.

3.1 Application to policy and decision making

Based on the outcome of the workshop, the potential application of the Natural Capital Assessment in the BVI was narrowed down to the support of existing fiscal planning instruments and instruments to be proposed in the Environmental Bill (see Box 1). These instruments were selected during the meetings with representatives of the Ministry of Natural Resources, the Central Statistics Office and the Macro Fiscal Unit of the BVI Government.

In agreement with the two main priorities defined by stakeholders during the workshop, the use of the assessment in the context of the selected instruments will serve to inform natural capital accounting and the implementation of policies, such as the Environmental Bill. Additionally, it will support spatial planning and will potentially contribute to damage assessment, awareness raising and future comparisons of costs and benefits for decision support.

Box 1 – Policies and instruments to be supported by the proposed Natural Capital Assessment

Fiscal planning instruments: The documents described below are currently utilized by the Government of the BVI to guide the strategic development of the territory.

- Medium Term Fiscal Plan: This document presents the development and fiscal objectives of the BVI Government for a three-year period, assesses the fiscal macroeconomic performance of the Virgin Islands and provides the foundation for the Medium Term Budget. The achievement of the vision of the development strategy for the territory is outlined under Social, Economic, Environmental and Direction/Governance (SEED) goals.

Box 1 – Policies and instruments to be supported by the proposed Natural Capital Assessment

- Budget: This document presents aggregate figures for revenue, expenditure and debt over a three-year period. For each Government's Programme, the budget framework establishes key performance indicators. Output Indicators are defined to monitor "*the quantity of output or services delivered by each programme*", and Outcome Indicators serve to assess *"impacts of the programme and/or effectiveness in achieving programmes objectives*".

Environmental Bill: Currently in the drafting phase, the new Environmental Bill will regulate institutional and functional aspects of the Ministry of Natural Resources and Labour. Among other preliminary modifications, the Department of Conservation and Fisheries could be divided in the Department of Fisheries and the Department of Environment and Climate Change. Under this change, the latter would be responsible for the issuance of Natural Resources Inventories and the elaboration and implementation of an Environmental Sensitivity Index, as described below. The drafting phase for the Environmental Bill is expected to be completed by 2018.

- Natural Resources Inventories (NRIs): This environmental management instrument is envisioned as a collection of streams of data to regularly inform about the status and state of the BVI's ecosystems. The information contained in the NRIs should serve as an input for the Environmental Sensitivity Index and the assessment of future developments.
- Environmental Sensitivity Index (ESI): The devising of an ESI based on ecological and socioeconomic indicators has been proposed to, for example, inform the evaluation of certificates of environmental clearance.

In relation to the **fiscal planning instruments** described in the box above, the study will support the definition and communication of relevant Natural Capital Indicators to monitor the achievement of SEED goals (Medium Term Fiscal Plan) and the performance of Government's programmes in environmental aspects (BVI Government's Budget).

In the context of the **Environmental Bill**, the economic valuation proposed in this study will provide a baseline of the socioeconomic contribution of priority ecosystem services to the BVI's economy. The baseline estimates will be supported by spatial information and complemented by a subset of Natural Capital Indicators and appropriate protocols to monitor changes in priority ecosystem services. This information is expected to become part of the NRIs and support the implementation of the ESI.

Recommendations on the priority ecosystem services and the framework for Natural Capital Indicators to inform the selected policies and instruments are provided in the subsequent sections.

3.2 Priority ecosystem services to support policy and decision making

3.2.1 Priority ecosystem services

From the full list of ecosystem services identified by stakeholders, this section presents a selection of priority ecosystem services to inform fiscal planning instruments and the implementation of the Environmental Bill. The selection of this subset of ecosystem services is based on their potential applicability to the intended use of the study, their importance for the local economy and the feasibility of their valuation during the given timeframe (Figure 3).

Ecosystem services such as fisheries, freshwater, carbon sequestration, water purification, coastal erosion control, coastal protection and storm protection, are selected as a priority based on their suitability for Natural Capital accounting. Cultural services, on the other hand, are selected because their analysis, together with the valuation of the previous ones, would help obtain an approximation to the total economic value provided by ecosystems such as mangroves, coral reefs and beaches.

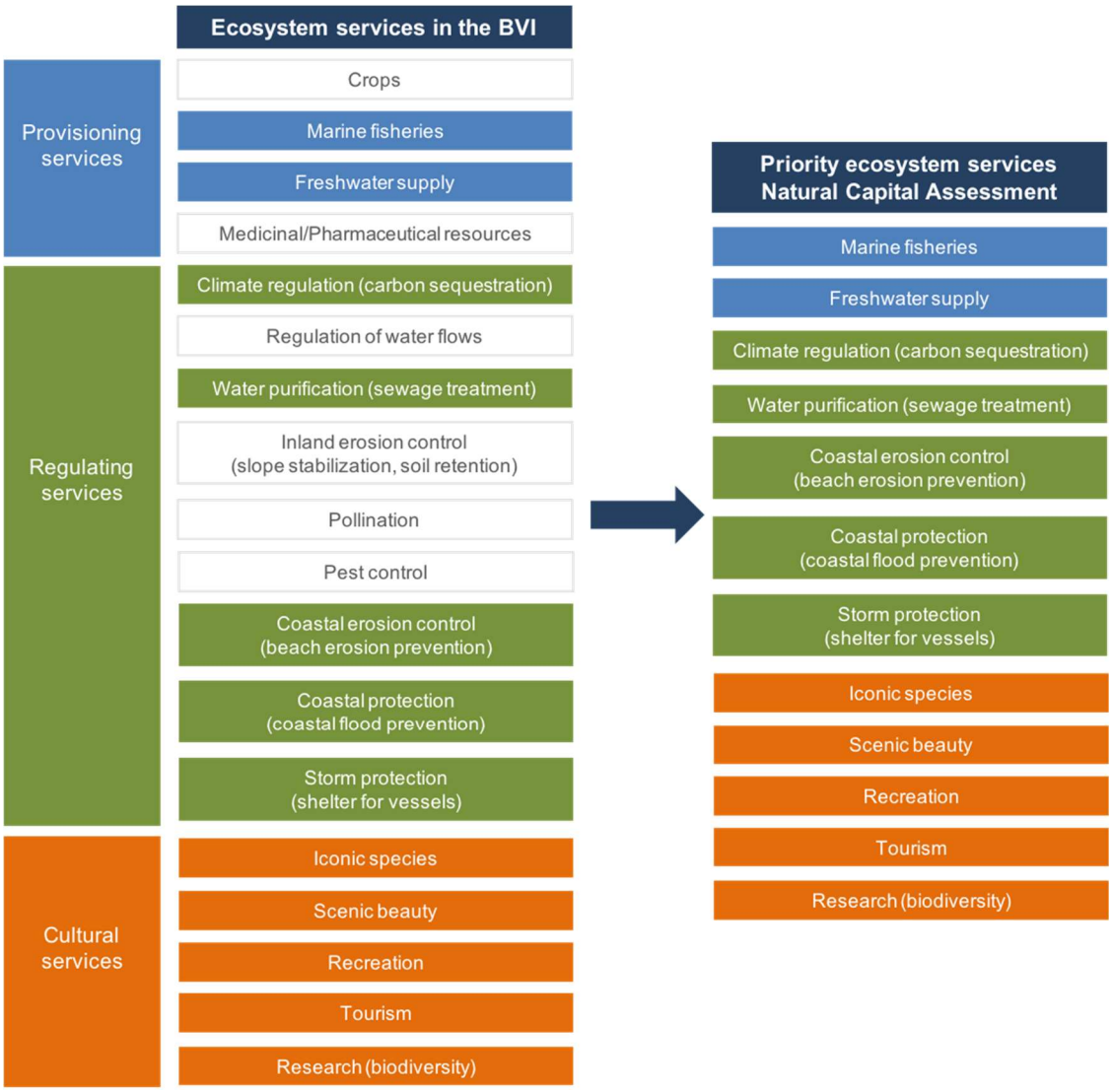

Figure 3 - Priority ecosystem services for the Natural Capital Assessment in the BVI

Ecosystem services, such as crops, medicinal resources, inland erosion control, pollination and pest control, have not been included as a priority either because of their limited applicability within the proposed scope or significant data gaps preliminarily identified during the scoping visit to the BVI.

It is important to note that the list of priority ecosystem services is still subject to validation with key stakeholders and the feasibility of conducting an economic valuation of some of these services requires further confirmation based on the available data.

3.2.2 Usage of the economic valuation of Natural Capital to support the implementation of environmental policy

In this study, the economic valuation of priority ecosystem services will mainly focus on supporting the implementation of the instruments included in the Environmental Bill, as described in Box 1.

In relation to the **Natural Resources Inventories**, the economic valuation of priority ecosystem services will provide baseline figures and appropriate procedures to report on the current state of ecosystems in relation to human well-being. Therefore, the methods and results of the valuation will serve as the reference for the updating of the inventories (Figure 4).

In addition to the information to be included in the Natural Resources Inventories, the economic valuation of priority ecosystem services will result in spatial information about the socio-economic value of ecosystems. These outputs, together with other indicators selected by the BVI Government, should serve as input to evaluate socioeconomic costs of interventions through the **Environmental Sensitivity Index** (Figure 4).

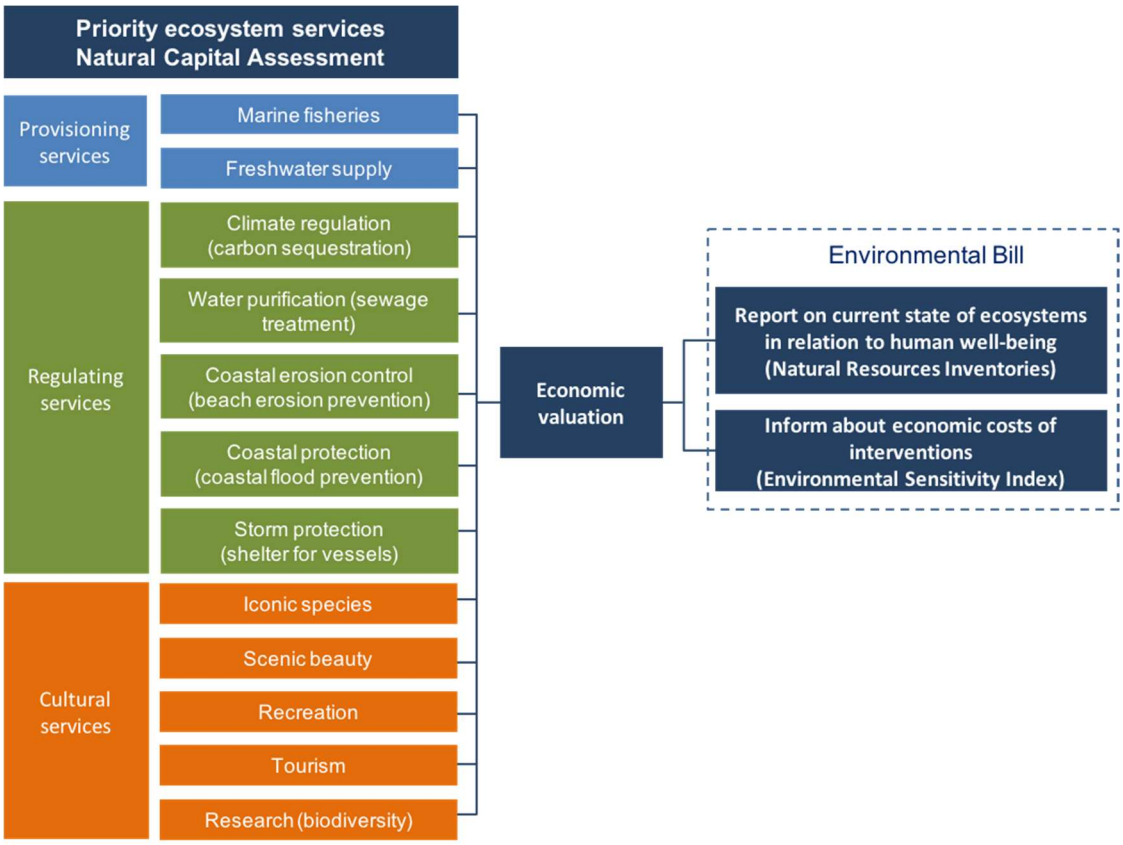

Figure 4 - Proposed usage of the economic valuation of ecosystem services to support relevant policy instruments

3.3 Natural Capital Indicators to support policy and decision making

3.3.1 Proposed framework for the definition of Natural Capital Indicators

In this project, indicators will be used to inform different phases of environmental policy and decision making, *i.e.* monitoring the implementation of actions and achievement of policy goals,

and supporting the implementation of instruments defined in the environmental policy. Relevant indicators will be jointly defined and/or selected with the BVI government to most suitably address their policy requirements. These indicators will comply with the following SMART criteria (Table 2):

Table 2 - SMART criteria for indicators (UNDP 2009)

SMART Indicators
Specific: Is the indicator specific enough to measure progress towards the results?
Measurable: Is the indicator a reliable and clear measure of results?
Attainable: Are the results in which the indicator seeks to chart progress realistic?
Relevant: Is the indicator relevant to the intended outputs and outcomes?
Time-bound: Are data available at reasonable cost and effort?

The indicators to assess BVI Natural Capital will be selected and grouped according to the framework proposed in Figure 5 and further described in

Table 3. This framework provides a structure to link the evaluation of changes in ecosystems and biodiversity (**ecosystems' stock**) to changes in human well-being (**ecosystem service flows**), and to the performance/effectiveness of policy and decision-making (**responses**).

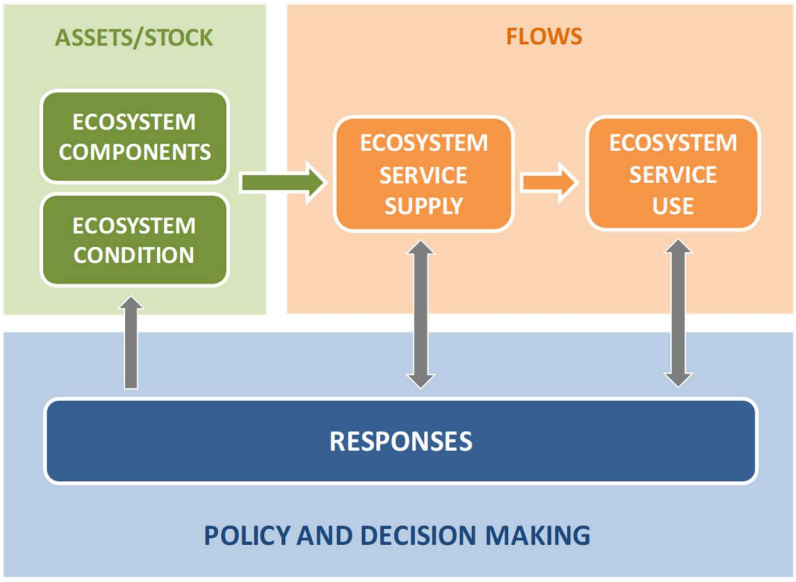

Figure 5 - Proposed framework to assess and account for changes in the BVI's Natural Capital

The framework presented in the figure above is based on the TEEB approach (de Groot et al. 2010), and incorporates the most recently agreed Natural Capital Accounting approaches from the System of Environmental-Economic Accounting, SEEA (UN, EC, FAO, et al. 2014; UN, EC, OECD, et al. 2014; UNEP-WCMC 2015).

Table 3 - Operationalization of stocks and flows utilized in Natural Capital Accounting

		DEFINITION
STOCK	Ecosystem components	'Ecosystem components: the abiotic and biotic components such as plants, animals and soil that make up ecosystem assets' (UNEP-WCMC 2015, p. 11). 'Ecosystem asset accounts for components include: the land, the biodiversity, the carbon and the water accounts'. (Hein et al. 2015)
	Ecosystem condition	'Ecosystem condition indicators reflect the main factors influencing the state and functioning of an ecosystem asset including key ecosystem components and processes. Specific elements of biodiversity (including genetic, species, or ecosystem diversity), which are relevant for the functioning (including resilience) of the ecosystem, may be included as indicators in the condition account (for instance, abundance or diversity of pollinator species, or genetic variability of commercial timber or fruit species). In many cases, however, the relation between biodiversity and ecosystem functioning is complex and not fully understood in quantitative terms.' (Hein et al. 2015, p.4)
FLOW	Ecosystem service supply	'The Ecosystem services supply account reflects the supply of ecosystem services from the different land cover / ecosystem units to the economy and society, and this flow can be expressed in both physical and monetary indicators. Where ecosystem service flows are estimated or attributed in terms of flows per fine level spatial unit (e.g. per pixel), these service flows can be aggregated for different statistical units, for example in terms of the flow of a specific ecosystem service generated per spatial unit'. (Hein et al. 2015, p.5)
	Ecosystem service use	'Links ecosystem services to users of these services. Users may be classified by sector (e.g. households or government) and/or by economic activity. This account allows the detailed analysis of the effects of ecosystem change on different stakeholders.' (Hein et al. 2015, p.5)

Table 4 presents examples of indicators to assess the different elements of the framework described above. Natural Capital Indicators, as those presented in the table, will de designed jointly with the BVI government to support relevant instruments for fiscal planning and environmental policy in the ways described in the next section.

Table 4 – Example of stock and flow indicators

	ASSETS/STOCKS		FLOWS	
	ECOSYSTEM COMPONENTS	ECOSYSTEM CONDITION	ECOSYSTEM SERVICE SUPPLY	ECOSYSTEM SERVICE USE
Examples of indicators	- Area of relevant ecosystems (ha) - Species richness and abundance - Stock of carbon, water or other assets.	- Parameters to measure ecosystem quality, e.g. nutrient load as indicator of water quality - Species composition - Population structure, e.g. for relevant fish species - Biomass (kg/ha)	- Total harvest or catch (kg, $ per species) - Number of users of relevant ecosystems, e.g. for tourism or recreation - Expenditure in ecosystem based activities, e.g. recreation - Economic value of ecosystem service	- Employment in relevant sectors depending on ecosystem services, e.g. fisheries or tourism - %GDP of relevant sectors depending on ecosystem services - Ecosystem service value per sector or stakeholder

3.3.2 Usage of indicators to support and inform fiscal planning instruments and the implementation of environmental policy

In this Natural Capital Assessment, the definition of stock and flow indicators will be limited to supporting and informing the policy and fiscal planning instruments described in Box 1 (Figure 6).

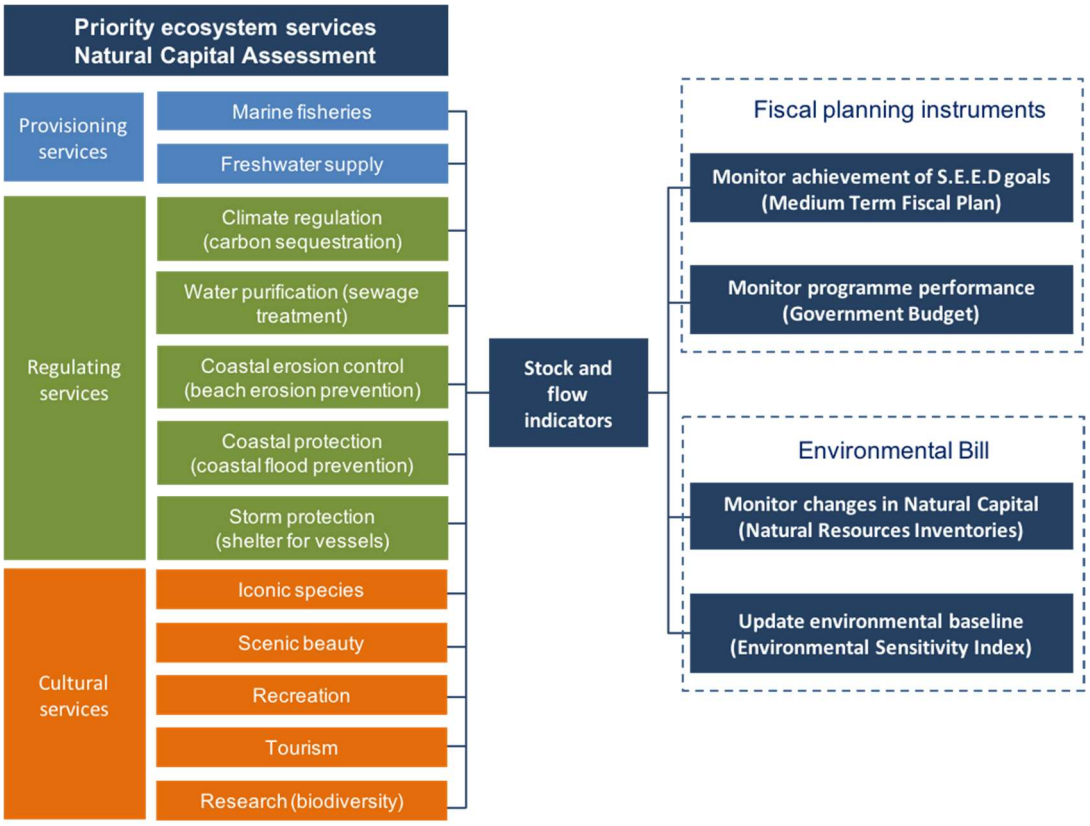

Figure 6 - Proposed usage of Natural Capital Indicators to support relevant policy instruments

In relation to fiscal planning instruments, the use of indicators will support the following aspects (Figure 6):

The **Medium Term Fiscal Plan** will be supported by the identification and selection of appropriate stock and flow Natural Capital Indicators with potential to inform relevant Sustainable Development Goals (SDG) indicators, and hence, to monitor the achievement of SEED goals set by the BVI Government. The indicators to be proposed will be aligned with the SDG's indicators of main interest for the Macro Fiscal Unit and the Ministry of Natural Resources and Labour of the BVI Government. Stock and flow indicators of Natural Capital can be selected as an input to measure SDG's Indicators that are broad in their definition or can provide supplementary information about the achievement of SEED goals, depending upon the Government needs.

The set of indicators proposed as input for the Medium Term Fiscal Plan will provide the foundation for the definition of a set of Natural Capital Indicators to monitor performance in the **Government Budget**. These indicators will provide specific information about the effectiveness of relevant government programmes in managing Natural Capital and will be selected on the basis of their potential to complement or substitute existing outcome indicators in the Budget.

In the context of the Environmental bill, the Natural Capital Assessment will provide the support and information described below (Figure 6):

By providing a comprehensive set of stock and flow indicators of Natural Capital, this study will inform the future development of **Natural Resource Inventories (NRIs)**. This set of indicators and the baseline information on the economic value of ecosystem services will facilitate decisions and monitoring of changes in Natural Capital over time. To support data management and communication of findings, an outline for a dashboard with relevant indicators will be proposed. Additionally, this information will serve as input for the **Environmental Sensitivity Index**, which will be considered to select the most appropriate framework.

Accompanying these outputs, guidelines to define, measure and interpret the proposed Natural Capital Indicators will be outlined in consultation with the BVI Government.

4 Data collection

4.1 Preliminary outline of data available

During the scoping visit, the general data requirements for the Natural Capital Assessment were discussed with representatives of the Ministry of Natural Resources and Labour, Department of Disaster Management, Department of Conservation and Fisheries, and National Parks Trust. In each meeting, experts gave insight into the data managed by their respective government bodies and the overall structure and responsibilities to manage environmental data within the BVI Government.

This first overview of potentially available data allows the identification of ecosystem services that might not be feasible to analyse to a full extent within the study timeframe. Examples of these services are medicinal and pharmaceutical resources, pollination and pest control. Based on the lack of suitable data and the limited potential applicability of their economic valuation

within the proposed scope of the study, these services have been preliminarily excluded from the list of priority services.

Furthermore, the data overview obtained during the scoping visit is used as a reference to determine the ecosystem services for which the analysis can start during the first phase of the study. This is the case of fisheries, for which the Department of Conservation and Fisheries holds significant information that can be complemented with information about the supply chain to be collected through brief questionnaires for experts or stakeholders in the supply chain. Data obtained from visitors' surveys are also likely to be ready available to update existing figures on the value of ecosystems for local tourism, and hence, this analysis is also a potential service to be analysed in an early stage of the study.

The overview of general secondary data requirements has been submitted to the Ministry of Natural Resources and Labour as part of the steps for the data collection process described in the subsequent section.

4.2 Data collection process

The data collection process will be organized in the following three steps:

1. Secondary data collection:
   The first step in this process will be to complete the general overview of data available in the BVI. A matrix with secondary data requirements for Natural Capital Assessments on small islands economies has already been provided to the Ministry of Natural Resources and Labour to be circulated among relevant stakeholders. This overview is expected to be completed by the third month of the first phase of the study, to enable Wolfs Company to identify any critical data gaps that could entail changes in the approach to conduct the economic valuation of ecosystem services.
2. Data gap analysis:
   Subject to the completion of the overview of data available in the BVI, the gap analysis will identify critical data requirements. Based on this information, the need for primary data collection will be determined. Data gaps that cannot be addressed through primary data collection will be addressed either through benefit transfer or with the use of surrogate secondary data. If none of these options is possible, the corresponding ecosystem services might be excluded from the analysis.
3. Primary data collection in the BVI:
   It is expected that limited information is available to analyse ecosystem services that are relevant for the local population of the BVI. Although secondary information should be available on environmental goods that are sold in the market, own consumption is not recorded. Also, the cultural importance of ecosystems is unlikely to be sufficiently described in existing literature. To overcome this likely data gap, a household survey within the BVI will be developed to assess the importance of these non-marketed ecosystem services for local households.

4.3 Data requirements

In general, the information specified in the matrix with data requirements for the Natural Capital Assessment covers the following aspects:

- Provisioning services:
  - **Production data (mainly provisioning services)**: several ecosystem services are either directly or indirectly traded in markets (e.g. fish catch). To determine the economic value of these ecosystem services, the study will rely on information about the costs of production, quantity produced and market prices.
  - **Data on Livelihoods:** to assess the importance of ecosystem services for livelihoods of households, data on the consumption of these services need to be collected. For example, a fisherman might sell some of its catch, but keeps a part of his catch for his own consumption. To estimate the total value of fisheries in the BVI, an indication of the own consumption by fishermen is required.
- Regulating services:
  - **Avoided damage / replacement costs:** most regulating services (e.g. coastal protection and erosion prevention) are not traded in markets. However, economic costs will increase if these regulating services disappear. To estimate the increase in costs as a result of disappearing ecosystem services, historical data on the costs of extreme events need to be collected (e.g. costs of flood or storms).
- Cultural services:
  - **Stated preference on cultural / recreational values:** cultural and recreational ecosystem services are often not traded in markets. To assess their values, information about the Willingness to Pay for these services needs to be collected. If available, the information can be taken from existing reports, but it is likely that primary data needs to be collected.
- Other data:
  - **Data / reports on threats:** to estimate the effects of environmental threats on the provision of ecosystem services, quantitative information on these has to be gathered.
  - **Socioeconomic data:** to extrapolate ecosystem service valuation results to the entire BVI's territory, socioeconomic data, such as population size and demographics are necessary for the entire study area.

Time series and spatial data: to support the analysis, data need to be both spatially and time specific. Time series are required to assess trends in the supply of ecosystem services. Furthermore, because environmental changes differ spatially, it is necessary to link the ecosystem services data to different areas in the territory.

5 Overall planning

For a more detailed planning of activities, please refer to the financial proposal for the two phases of the project to be conducted by Wolfs Company between April 2017 and March 2019. This planning might be subject to changes.

Phases	Planning
Phase I.	*Apr '17 – Mar '18*
1. Validate frameworks and approaches in consultation with stakeholders	*To be determined*
2. Socio-economic valuation – first part: updated tourism, fisheries, cultural and recreational values	*To be determined*
3. Framework for indicators to support fiscal planning instruments	*To be determined*
Phase II.	*Apr '18 – Mar '19*
4. Update, adapt and validate frameworks and approaches in consultation with stakeholders	*To be determined*
5. Socio-economic valuation – second part: freshwater supply, coastal protection, coastal erosion prevention and other values	*To be determined*
6. Framework for indicators to support Environmental Bill	*To be determined*

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Annex I. Minutes of Natural Capital Assessment Stakeholder Workshop

The minutes presented in this annex have been prepared by the Ministry of Natural Resources and Labour – Department of Conservation and Fisheries.

NATURAL CAPITAL ASSESSMENT STAKEHOLDER WORKSHOP

TRAINING DIVISION CONFERENCE ROOM

1ST FEBRUARY, 2017, 9:00 a.m.

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BVI CCHA – BVI Chamber of Commerce and Hotel Association
CFD – Conservation and Fisheries Department
DDM – Department of Disaster Management
FSIU - Financial Services Implementation Unit
HLSCC – H. Lavity Stoutt Community College
MRNL – Ministry of Natural Resources and Labour
NPVI – National Parks of the Virgin Islands
VISR – Virgin Islands Shipping Registry

AGENDA

- General context of the workshop
- Introduction to Natural Capital Assessments
- Break
- Guided Discussion about scope of the Natural Capital Assessment
- Discussion about possible uses of the Natural Capital Assessment (in groups)
- Presentations per group
- Break
- Synthesis of priority issues
- Conclusions

OPENING (General Context of the Workshop)

The meeting opened at 9:15 am with the viewing of a short documentary on the *Natural Treasures of Bonaire* produced by the Wolfs Company. The documentary highlighted the economic value of nature in Bonaire and the importance of healthy ecosystems to the island economy.

Mr. Smith Abbott, Deputy Secretary, Ministry of Natural Resources and Labour provided the general context of the workshop. He pointed out the environment's contribution to the tourism economy as that of a major input, yet with little understanding of its economic contribution. He referenced a prior study on the "*Tourism Value of Nature in the British Virgin Islands*" conducted by the Wolfs Company, which determined that beaches are valued highly among visitors (many recurrent) to these shores. He emphasised beaches' interdependence with other habitats such as salt ponds and coral reefs and the need to ensure their sustainable management.

He further described the purpose of the workshop as a scoping exercise to start to define the programme of activities to facilitate a Natural Capital Assessment of the Virgin Islands and to make it available for wider discourse. The assessment is to take place in two phases over the next two years in partnership with Vrije Universiteit (VU University), Amsterdam with support from the Joint Nature Conservation Committee (JNCC) through the UK Conflict Stability and Security Fund (CSSF). Research will commence in April, but details on how the phases will be rolled out are still to be determined.

As part of the scoping exercise, Mr. Smith-Abbott suggested that participants think about study priorities in terms of specific ecosystems and or sectors.

Importantly, he noted that outputs from the assessment/study will help to inform the Natural Resources and Climate Change Bill and its regulations that are currently being worked on. Specifically the outputs will help assess the status of critical habitats, inform indicators for monitoring and facilitate a number of key processes envisaged under the Bill to improve environmental management. The assessment will also feed into wider discussions on development planning throughout the Territory.

INTRODUCTION TO NATURAL CAPITAL ASSESSMENTS

By Amilcar Guzman, Wolfs Company (works closely with VU University in Amsterdam)

- The purpose of Wolfs Company research is to support small island economies through:
    - TEEB (Total Economics of Ecosystems and Biodiversity) Studies
    - Sustainable financing
    - Decision support – e.g. Cost/Benefit Analysis
    - Business transformation (e.g. understanding dependencies on natural resources and how they can minimize impacts)
    - Communication

Valuing Ecosystem Services

- Ecosystem services are the benefits that people derive from nature.

- The TEEB approach is used to estimate the value of these ecosystem services.
- An estimation of value is not a goal in itself, but serves as a basis (a tool) to address specific issues.
- Applications
    - **Raise awareness** – e.g. Results of Tourism Value of Nature in BVI, Anguilla and Bonaire showed that more than 60% of tourism expenditure in these islands can be attributed to nature. The BVI Tourism and Nature study example showed that a high percentage of tourists would not return to the VI if the environment is degraded. The value of nature was identified as a critical element of the tourism industry.
    - **Cost benefit analysis** – **environmental** costs and benefits are weighed as opposed to the traditional approach of weighing **financial** costs and benefits.
    - **Spatial Planning** – eg. In Saba the forested terrestrial areas of highest economic value were displayed spatially. This was overlaid on a map showing the protected areas in Saba and it was found that some of the more valuable areas were not protected.
    - **Sustainable Financing** – eg. Results of a survey to determine the non-use value of nature in Bonaire to people in the Netherlands showed that people were willing to pay $50 million/year for the protection of nature. As a result the WWF added more money to their budget for the protection of nature in Bonaire and the Dutch Ministry of Economic Affairs invested more in nature to aide towards poverty alleviation.

Examples of ecosystem values (used in Total Economic Value Study in Bonaire)

- Non-use value – value of the environment in Bonaire to Dutch citizens (in Netherlands)
- Tourism
- Recreational and cultural
- Carbon sequestration
- Research and education
- Fishery
- Medicinal and pharmaceutical
- Art
- Coastal protection

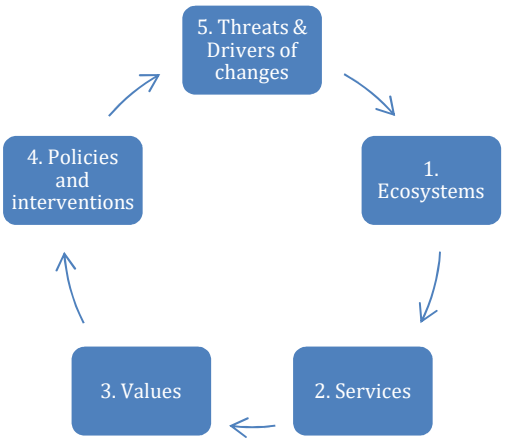
Success factors for Natural Capital Assessment

- Clearly define and agree on issues to address
- Identify most relevant ecosystems and services
- Identify key local interests and stakeholders
- Collect primary data tailored to local issues
- Make sure the results support existing decision making issues
- Combine local research team with international expertise
- Effective communication (eg. documentary, policy briefs, presentations etc.)

NATURAL CAPITAL ASSESSMENT SCOPE – INTRODUCTION TO EXERCISE

Ecosystems and their services

Framework



1. **Threats and Drivers** (eg. soil and beach erosion, extreme weather events)
2. **Ecosystems** (affected by threats) and support **services**
3. **Services** have a particular value that society attaches to them (eg. tourism, fisheries etc.)
4. **Policies and interventions** can be put in place to manage the **threats and drivers**.

GUIDED DISCUSSION ABOUT SCOPE OF THE NATURAL CAPITAL ASSESSMENT

Threats and Drivers

1. Hurricanes (background threat exasperated by climate change)
2. Ground seas (i.e. winter swells)
3. Coral bleaching (exasperated by climate change)
4. Climate change, including increased instances of drought
5. Pollution – marine and land based, including solid waste
6. Poor development practices – driven by high costs to develop properly, a "don't care" mindset/mentality and the attitude, support and capacity surrounding enforcement of legislation
7. Erosion
8. Overfishing
9. Vessel groundings / anchoring
10. Invasive species (e.g. Lion Fish), including from ballast water
11. Overuse of resources, i.e. exceeding ecosystem carrying capacity
12. Poverty
13. Lack of awareness / education
14. Poor policies
15. Pervasive powers of ministerial discretion in laws

Ecosystems

1. Coral reefs
2. Seagrass beds
3. Mangroves

4. Salt ponds
5. Beaches
6. Forests (Moist and Dry), Woodlands and Coastal Scrub
7. Ghuts
8. Ocean (pelagic zone), including the entire Exclusive Economic Zone (EEZ)

Ecosystem Services/Values

1. Fish provisioning
2. Habitat
3. Coastal protection
4. Recreation e.g. sailing
5. Tourism value
6. Maritime commerce
7. Hurricane shelters for vessels
8. Research
9. Soil retention, water regulation, sewage treatment
10. Potable water supply (through desalination)
11. Traditional medicine
12. Slope stabilization and flood risk mitigation
13. Agriculture
14. Renewable energy
15. Landscapes and seascapes (amenity value)
16. Climate regulation
17. Pollination and other specific services provided by biodiversity/species
18. Attraction value of iconic species, e.g. Anegada Rock Iguana
19. Cultural values

GROUP PRESENTATIONS ON POSSIBLE USES OF THE NATURAL CAPITAL ASSESSMENT

Participants were divided into five groups to discuss and brainstorm priorities (from their perspective) for a natural capital assessment. The discussions are summarized below;

Group 1

- Focused on raising awareness and policy development

The study/assessment would be beneficial as:

- Having a cost attached to ecosystems/nature would help people understand its value, empowering citizens to put pressure on governments to create positive change.
- The information could be used to create educational materials for schools and the wider community.
- Raised awareness
    - would enhance legislation and public buy in to legislation
    - could increase access to funding
    - could help us understand the cost of current solid waste / pollution disposal methods/practices and inform levying of appropriate fines
    - would help to prioritize use of resources / public expenditure

Group 2

- Focused on how study could justify new ways to fund protection of our resources – e.g. environmental tax
- Study can inform penalties under the Draft Environment and Climate Change Bill.
- Study can justify need for regulations to support laws and new legislation to govern development and on-going operations
- Study can inform "Polluter Pay" and "User Pay" fees and policies e.g. justification for increased fees for moorings buoys
- Valuing the environment can help strengthen the case for more research that would inform the need for certain legislation (e.g. studying the threats of ballast water to determine if laws are needed to control it)
- Study can help justify need for investment in development models and supporting toolkits to facilitate sustainable development.
- Study can inform why research is needed in the marine environment (EEZ) to inform catch limits and licenses
- Study can inform zoning of marine recreation use and navigation

Group 3

Evaluate

Marine pollution sources, sewage, runoff

Spatial Planning

- Lack of zoning, evaluation of carrying capacity of yachts
- Increase of mooring buoys

Damage Assessment

- Damage to reefs by groundings, anchor damage

Awareness Raising

- Understanding economic value of natural resources

National Accounting

- Added fees/fines to protect environment – ties to sustainable financing

Decision Support

Group 4

- *Awareness* – education campaign to sensitize public on economic value of the environment and thus the benefits of adhering to policy
- *Spatial Planning* – needs marine/vessel zoning policy; creation of green spaces/zones in every community
- *Damage Assessment* - higher penalties for environmental damage, post disaster risk assessment, assess the damages caused by invasive species, coastal impacts from sedimentation/dumping
- *Cost/Benefit Analysis* – Value of sailing in the Virgin Islands water; value of the exclusive economic zone; expansion of moorings system for coral reef protection;
- *National Accounting* – increase user fees (at anchorages, park access); economic value of the Virgin Islands fish Stock; assessment of the EEZ; measure the contribution of the yachting sector

Group 5

- Focused on green national accounting
- Requires understanding the international definitions regarding environmental statistics, information sharing and capacity building for environmental statistics and indicators e.g. Sustainable Development Goals
- Development of core environmental statistics at local level (being done by Central Statistics Office)
- Review / develop indicators for SEED (Social, Economic, Environment and Development) Governance / BVI Budget
- Enhance the institutional framework for collaboration within BVI Government for data collection/capture/sharing

CONCLUSION

Based on the discussions, participants were asked to indicate from the following categories, their preference for the use of a natural capital assessment in the VI:

Possible Application of the Assessment	No. of Stakeholders Prioritising Application
Green National Accounting	6
Evaluate/Support/Inform Policy	5
Decision Support	3
Sustainable Financing	3
Damage Assessment	3
Awareness Raising	2
Spatial Planning	2

National accounting and evaluation/support/informing policy were ranked highest.

The meeting concluded at approximately 1:00 pm.