The Institute of Marine Affairs Marine Biodiversity Hub

Programme: BID
Project ID: BID-CA2020-004-INS
Project lead organization: Institute of Marine Affairs
Project implementation period: 1/7/2021 - 30/6/2023
Report approved: 21/6/2022

Narrative Midterm report

Executive Summary

The Institute of Marine Affairs (IMA) started the project on June 1st, 2021. IMA held several meetings with internal and external stakeholders to introduce the project. We met and surveyed 82 persons across all groups from July – September 2021. IMA representative, Ms Alana Jute, took part in the BID Capacity Enhancement virtual Workshop, to build our capacity in data mobilisation strategies. This activity ended in the award of a basic badge in biodiversity data mobilisation. Using feedback from the stakeholder meetings, we began inventory digitization and marine data cataloguing of priority datasets. This included converting the Marine Reference Collection (MRC) and published marine biodiversity data to Darwin-Core standards. For this, an Associate Professional, Cherisse Persad, was brought into the IMA to assist with this activity. This resulted in the publication of the IMA Species Checklist on GBIF in May 2022. In September 2021, IMA began the procurement process for a Geospatial Developer for the construction of the MBH. While the procurement process took longer than anticipated, a suitable developer was selected in February and the start date for construction is May 31st. This activity should still be completed by August 31st, 2022. Inventory Design activities were initiated based on the survey results of the stakeholders and will be completed once work starts in the MBH construction. Interface structure and branding activities were initiated in February 2022 and are near completion. The team met with the IMA management at least every three months to discuss project components and submitted an internal progress report to the managers at the end of the first six months. The core team has weekly meetings to manage activities and monitor progress.

Progress against milestones

Has your project published at least one dataset through GBIF.org?: Yes

Dataset published:

Dataset	DOI
Institute of Marine Affairs Species Checklist	https://doi.org/10.15468/yv8g62

Has at least one member of your project team received certification following the BID capacity enhancement workshop?: Yes

Name of the workshop participant: Alana Jute

Certification obtained: Basic Badge

Report on Activities

Activity progress summary

1. **Identification of stakeholders and engagement (*July 1st to September 10th*)**

Status: Completed

Personnel involved: The Marine Reference Officer, Data Officer, GIS Officer, Research Officer, Project Manager and On the Job Trainee (Hannah Lochan)

Our first engagement activities were conducted internally with IMA staff. Apart from the Manager's project kick-off meeting, two introductory meetings were held with (1) the research staff who are the primary users of the MBH and (2) the staff at the Information Centre, who communicated externally the outputs of the research reports Both groups completed User Needs Assessments, in the form of interviews and surveys which were designed by the Geomatics Team to provide information on the type of data collected in their research, the formats for the collection and the research themes that their research data falls under. Researchers and their corresponding technicians were also interviewed by the project team for specific knowledge on their data types and the spatial capabilities in data visualisation and manipulations. Information gathered through the meeting and the interviews gave insight into the design framework of the MBH, and the level of training needed by the staff to use the MBH. A total of seven staff from the IC attended and completed the survey, while a total of 22 researchers and technicians attended the meeting and were interviewed. Outcomes of the engagement process were highlighted, and a summary of the interviews were shared by email with the research staff, titled: *IMA_MBHIntro_Results_Researchers.docx*.

The second component of this activity involved conducting external stakeholder engagements over six weeks in August and September 2021. A total of six introductory meetings and data gathering meetings with external government partners, collaborators, and data users were held. With respect to government partners, there were 29 attendees across nine partner government institutions. Outcomes of the engagement process were highlighted, and a summary of the surveys conducted were shared by email to the stakeholders, titled: *IMA_MBHIntro_Results_GovPartners.pdf*.

With respect to potential data users of IMA's biodiversity data, there were 18 attendees over the five sessions representing ten different institutions of marine data users, largely consisting of NGOs, educational institutes, the National Library, environmental consultancies, and individuals. Outcomes of these meetings and the surveys were also reported in:

IMA_MBHIntro_Results_Marine.Data.Users.pdf.

2. BIDCA Data Mobilisation Workshop and online activities (*July 19th - September 12th):*

Status: Completed

Personnel involved - The Marine Reference Officer - Alana Jute (NOTE: only one allowed to attend).

This course built the capacity of participants to plan and implement biodiversity data mobilisation efforts effectively using accepted community standards. Topics included project management, data capture, data management and data publishing. The course consisted of video instruction, paired with quizzes and practical exercises. Online, self-learning exercises were carried out 19-30 July 2021 in preparation for the four-day virtual workshop (3-6 August 2021). The self-learning entailed learning about GBIF and how data is collated from around the world and how this data is processed, managed, and used. The zoom sessions had participants from the Caribbean region who were awarded grants. An online card game was used to provide a better understanding of how to plan projects by looking at goals, tasks, stakeholders, roles, and stages. Data capture and standardisation using the Darwin Core Templates to input our data for publishing were also discussed. The three main data types (Checklists, Occurrence and Events) were covered. There were discussions about the type of data each organisation had, retro georeferencing and the importance of documenting the data management process. Modules taught how to check and clean the data before it is published using the Open Refine Tool and how to use the Integrated Publishing Tool (IPT) to publish the data onto GBIF. The workshop was followed up with assignments on all of the above which were submitted for certification online, via self-paced certification exercises (9 August - 12 September 2021). After the grading and evaluation period (1-31 October 2021), a digital Basic badge was awarded March 11, 2022.

Attendance of additional training courses:

BID Data Processing training course Module (16th Dec 2021)

Personnel involved: The Marine Reference Officer (Alana Jute) and Associate Professional (Cherisse

Persad)

A three-hour zoom session focussed on navigating the GBIF website; how to use the site to find data, use various filters, and download the data. It also looked at common data quality issues and the use of the API to further find and filter data, and the use of R software to locate data on GBIF and analyse it.

***Biodiversity Data Use: Assessing the Conservation Status of a Species*(17th February 2022)**

Personnel involved: The Marine Reference Officer (Alana Jute)

In this 3-hour session, the development of an IUCN Status for a species was reviewed.

BID Data Use Training: Ecological Niche Modelling (5th April 2022)

Personnel involved: The Marine Reference Officer (Alana Jute) and Associate Professional (Cherisse Persad)

This three-hour zoom session was an introductory training course on Species Distribution Modelling (SDM). The leader of the course began with an explanation of the general workflow required for data collection and cleaning, prior to a SDM being made. Dr Owens discussed some examples of the post-processing involved such as suitability maps and the statistics that are applied based on the SDMs created. After a brief overview, the participants were split into breakout rooms for a modelling exercise using Wallace. For this exercise, Cherisse shared her screen and performed the exercise with the guidance of the group lead for the remainder of the participants to follow. All attendees will be awarded certificates of participation.

3. Inventory digitization and marine data cataloguing*(September 1st 2021 – May 31st 2022)*

Status: Incomplete

Personnel involved - Marine Reference Officer (Alana Jute), Associate Professional (Cherisse Persad), GIS Officer (Nikia Gooding), Data Officer (Paul Nelson).

The primary dataset to be worked on for the mid-term milestone is the IMA's Marine Reference Collection (MRC). The previous data catalogue for the MRC consisted of an Excel spreadsheet containing the scientific names (for the most part) of the preserved specimens collected, along with locality information, specimen preparation information and general comments on the species, including species' measurements and additional background information.

To meet the Darwin Core (DwC) Standards, the catalogue had to be edited to reflect the DwC terms and the accepted terminology therein. One example was the locality information which had to be scanned for errors or changes in names over time, specifically with data collected in the 1980's and 1990's. For this information, historical manuscripts were located to determine site locations so that coordinate information could be added to the relevant specimen. Coordinate uncertainty measurements were also added to give a better gauge of the area where the species was collected. The species information had to be checked for any updated taxonomic classifications. To ensure that names were of an accepted Name Usage, GBIF's Species Name Matching Tool was used. Based on the above alterations made, a data dictionary for biodiversity data was established for the IMA. This activity involved the standardisation of historical biodiversity datasets to follow institutional standards and the Darwin Core standards, thus any additional terminology and standardisation protocols used were reflected in the data dictionary.

The latest version of the MRC is in its final stages of data quality checking and is to be uploaded to the GBIF website by the end of May 2022. The next step for the Marine Reference Collection is the data digitization of the specimens and this is expected to start in June 2022 and will continue to August 31st 2022. There were some delays in the procurement of the camera, but this is in the final stages with the money committed for the purchase of the camera.

All protocols and standards for the Marine Reference Collection are logged in the first draft of the Marine Biodiversity Hub Data Manual. This first version will continue to be edited for this activity, as well as the inclusion of subsequent activities with review. Attached is a draft version of the MBH manual that only includes the activities completed to date:

IMA_MarineBiodiversityHub_Manual_DRAFT.pdf

An additional forty-five biodiversity datasets, in the form of scientific manuscripts, were standardised with some updates to be made ahead of publishing. Of these, six of the manuscripts have been compiled into the Institute of Marine Affairs Species Checklist which was published on GBIF's website on May 13###sup/sup### 2022. The remaining manuscripts are compiled either as a sampling event list or occurrence list. The team will continue to work with researchers over the next two months for dataset deliverables. Attached is a list of citations of the datasets that were digitised, standardised and catalogued:

IMA_Citations_DigitisedCatalogued_BiodiversityData.pdf

4. Inventory Design *(December to present)*

Status: Ongoing

Personnel involved - GIS Officer (Nikia Gooding), Data Officer (Paul Nelson).

The GIS and Data Officers conducted interviews with researchers and collated an inventory of biodiversity data for the purpose of outlining a geodatabase schema. The geographic information was then organised into data themes, i.e. layers of biodiversity data, which can be integrated into a location or subject area. The Data Themes used will identify the contents and features represented in each thematic layer and thus, the current management will be briefly described as it feeds into the MBH's design. ArcGIS Enterprise and Online Data Models will be consulted, to identify the appropriate data model and channels suitable for the efficient import of data into the constructed MBH. Finally, a wireframe structure of the MBH would then be illustrated, as suggested by the data needs surveys results from the stakeholder engagement activity and recommendations from the developer. This activity is ongoing and will be completed during the initial assessments when the geospatial developer is brought on board, as the Team's input would be heavily required.

5. **Construction and Development of Marine Biodiversity Hub (MBH)*(October 2021 to present)***

Status: Incomplete

Personnel involved - Marine Reference Officer (Alana Jute), Research Officer (Anjani Ganase), GIS Officer (Nikia Gooding), Data Officer (Paul Nelson).

The procurement process for services was initiated three months before the planned start date of the development of the MBH (January 1, 2022). IMA's procurement processes adhere to best practice and is aligned to the draft procurement legislation of Trinidad and Tobago. This process extended to the end of February 2022, as bids were above the budgeted allocation and funding for the project required approval by the IMA's Board of Governors. A successful geospatial developer was selected in April 2022. IMA has contracted GeoTech Vision to carry out the construction and development of the Marine Biodiversity Hub (MBH). We have committed USD $19,450.84 with a payment schedule of 50 % down payment and 50 % upon completion. Despite this activity being delayed by four months, the development and deployment should still be completed by the end of August 2022, as the proposed MBH development timeframe of a month and subsequent database population is still achievable within the proposal deadline.

6. **Interface Structure and Branding *(January 2022 to present)***

Status: Incomplete

Personnel involved - Marine Reference Officer (Alana Jute), Research Officer (Anjani Ganase), GIS Officer (Nikia Gooding), Data Officer (Paul Nelson), Graphics Artist (Karl Doyle)

The core team has submitted a specific list of requirements and imagery to the internal graphical artist to create graphics in congruence with the IMA Branding / Logo Policy. The core team reviewed similar geospatial database sites including the National Biodiversity Data Catalogue (Trinidad and Tobago Biodiversity Information System) for design elements which would create appeal as well as aligned with IMA Branding. Specifications for the icons, graphics, images and other content were outlined and supplied to the Graphic Artist. The interface aspects were considered for both the MBH Website (Data Catalogue) and the GeoPortal (Portal for ArcGIS for GIS data manipulation). The graphic artist has created an initial wireframe with a contemporary look and feel for the website and the MBH geo-portal

and comments and feedback were relayed. A second draft of the theme and design is being prepared for review and comment, and once approved, will be given to the geospatial developer for consideration and implementation.

7. Mid-term Report (May 2022)

Status: Complete

Personnel involved - Team lead/ Research Officer (Anjani Ganase), Marine Reference Officer (Alana Jute),GIS Officer (Nikia Gooding), Data Officer (Paul Nelson), Associate Professional (Cherisse Persad), Project Manager (Lester Doodnath)

The narrative and financial mid-term report was drafted using the guidelines of the GBIF. The report includes a summary of activities to date, any adjusted timeline for activities and mitigations for successful completion. The progress report includes proof of publishing at least one dataset through GBIF.org, proof of certification at BID Capacity Enhancement Workshop and explanation of project management issues. The report was reviewed internally by the IMA management team and approved for submission on May 31st, 2022.

Completed activities

Activity: Identification of stakeholders and engagement

Description: Stakeholder meeting to introduce the MBH project and to conduct needs-based assessment survey to determine the requirements of data users and priority biodiversity datasets.
Start Date - End Date: 1/7/2021 - 10/9/2021
Verification Sources: Report Attachments:
IMA_MBHintro_Results_IC.pdf
IMA_MBHIntro_Results_Researchers.docx, IMA_MBHIntro_Results_GovPartners.pdf, IMA_MBHIntro_Results_Marine.Data.Users.pdf

Activity: BID Capacity Enhancement Workshop

Description: Workshop was attended by one representative. It assisted the team in building capacity in data mobilisation strategies accompanied by a series of online workshops and remote learning activities between July 19th and 12th September 2021. After the workshop and throughout all the activities, Alana the main team member who attended the workshop shared all the information with the team and provided updates during our weekly meetings.
Start Date - End Date: 3/8/2021 - 6/8/2021
Verification Sources: Report Attachment: IMA_BID_BasicBadge_Jute.pdf

Activity: Midterm Report

Description: Write up, review, and submit all activities in the first year of funding. Also, include the mitigation and re-evaluation of delayed or prolonged activities.
Start Date - End Date: 1/5/2022 - 31/5/2022
Verification Sources: Submission of the Midterm Report to GBIF

Report on Deliverables

Deliverables progress summary

Dataset deliverables:
The following datasets were prioritised for the submission on the GBIF website and the Trinidad and Tobago Biodiversity Information System (TTBIS) website:
• IMA Marine Species Reference Collection - The MRC catalogue currently has ~1300 specimen entries that follow the Darwin Core Standard. This represents approximately 70% of the specimens contained in the MRC. Currently, this dataset is in its final draft form and upon a last data quality check, it will be published on GBIF's website. This dataset experienced delays because of standardisation issues with regards to the spatial information of the species as well as the absence of unique catalogue numbers for each species. Further meetings will be held among relevant team members to assess the introduction of a new cataloguing system. This system will be well documented in the Data Dictionary to ensure that further specimen additions follow the same naming protocol.
• Coral Reef Biodiversity Data - This data consists of ten manuscripts that have been entered into an event spreadsheet. Further data entry is needed to reflect more recent monitoring information. Upon its

completion, a compilation of the data will be uploaded onto GBIF's website where it will be labelled as part of IMA's continued coral reef monitoring program.
• Benthic Biodiversity Data - This species information has already been entered into a general occurrence spreadsheet. Further work is to be done to get it to reflect the best practices of the DwC based on more recent meetings regarding the standardisation process.
• Distribution of Invasive species Perna viridis - This species distribution information has been compiled into a general occurrence spreadsheet. Further work is to be done to get it to reflect the best practices of the DwC based on more recent meetings regarding the standardisation process.
• Seagrass species occurrence - This information, derived from five research reports, has been compiled into a general occurrence spreadsheet. The data, however, needs to be extracted and additional spatial information is to be added. This is to allow for the data to be shared as part of IMA's Seagrass Monitoring Dataset that will be updated as required.
• Seagrass faunal community in William's Bay - This species information has been compiled and is to be sorted into the relevant Monitoring programme folder. Further work is to be done to get it to reflect the best practices of the DwC based on more recent meetings regarding the standardisation process.
• Checklist of Marine Polychaetous Annelids for Gulf of Paria, Trinidad - The specimens are contained within the MRC and would be reflected within this dataset.
• Species Composition of Coastal Demersal Fish Stock - This species information has been compiled and is to be sorted into the relevant file folders for standardisation and upload onto GBIF's website.

Additional Datasets
There are approximately twenty other manuscripts that have species information compiled but have yet to be sorted into assessment categories. These datasets are yet to undergo the final standardisation procedures for upload as the compilations were done prior to more recent meetings regarding the DwC terms. See attached Bibliography with the additional datasets.

Other Deliverables
Following the stakeholder meetings, an initial list of Intended Marine Data Users was established and will be updated following our training workshops and public seminar (please see attached). All the remaining deliverables are due in the second year of the project after the completion of the Marine Biodiversity Hub (MBH). This includes: the MBH, the MBH manual for best practices, two training workshops on the MBH, a seminar - public demonstration of accessing marine data on TTBIS/ GBIF, 'How To Videos' for the general public / external stakeholders for access marine data on the TTBIS, progress report indicators, report to assess the effective use of the MBH. The deadlines for these activities and accompanying deliverables have not changed despite delay in the start of the construction of the MBH.

Progress towards deliverables

Dataset deliverables

Institute of Marine Affairs Species Checklist
Dataset type: Checklist
Dataset scope: This datasets consists of biodiversity data derived from six scientific manuscripts produced by Researchers at the Institute of Marine Affairs. The research projects associated with these manuscripts covered a wide array of marine species including, but not limited to, Sponges of Class Demospongiae from Trinidad and Tobago; Octocorals from Trinidad and Tobago; and ahermatypic shallow-water corals of Trinidad. There is also marine biodiversity data derived from ecological surveys done around the reefs of Tobago.
Number of records: 431
Data holder: IMA
Data host institution: MBH/TTBIS/GBIF
% complete: 100%
Status update: This dataset was first published to GBIF on Friday May 13th, 2022. Since the initial publication, two updates have been made to the dataset to provide more precise bibliographic citations and study extents for the scientific manuscripts that were utilized in the compilation of biodiversity data.
DOI: https://doi.org/10.15468/yv8g62
Expected date of publication:

Institute of Marine Affairs' Marine Reference Collection
Dataset type: Occurrences
Dataset scope: The Institute of Marine Affairs' Marine Reference Collection (MRC) houses a wide array of marine specimens across many different classes and genera. The specimens in the MRC were collected between the years 1977-2022 and continues to grow as scientific research continues at the Institute.
Number of records: 1,295
Data holder: IMA
Data host institution: MBH/TTBIS/GBIF
% complete: 70%
Status update: The preliminary catalogue of the Marine Reference Collection is 70% complete and is currently under a final data quality review with a GBIF BID Regional Support Team Member before its

first publication can be made to the GBIF website. The re-cataloguing process of the Marine Reference Collection is currently underway. In this process, the specimens will be divided into more specific collections and images will be taken of each specimen to attach to the Occurrence Sheet.
DOI:
Expected date of publication: 2022-06-15

Institute of Affairs' Coral Reef Monitoring
Dataset type: Sampling Event
Dataset scope: The Institute of Marine Affairs performs annual coral reef assessments of sample station sites at reefs around Trinidad and Tobago. This dataset consist of the biodiversity information collected during these assessments
Number of records: 1,198
Data holder: IMA
Data host institution: MBH/TTBIS/GBIF
% complete: 75%
Status update: This dataset consists of the biodiversity data from collected from 2010 to 2019. Thus, the inclusion of the data from more recent assessments is to be compiled and added to this compilation.
DOI:
Expected date of publication: 2022-07-01

Other deliverables

Events

IMA: Marine Biodiversity Hub, Project Introduction to IC staff of IMA

Dates: 2021-07-09 - 2021-07-09
Organizing institution: Institute of Marine Affairs
Country: Trinidad and Tobago
Number of participants: 7
Comments: Online meeting because of COVID
Website or sources of verification: PDF of meeting summary titled: IMA_MBHintro_Results_IC.pdf

Events

IMA: Marine Biodiversity Hub, Project Introduction to Research and Technical Staff of IMA

Dates: 2021-07-23 - 2021-07-23
Organizing institution: Institute of Marine Affairs
Country: Trinidad and Tobago
Number of participants: 22
Comments: Online meeting because of COVID
Website or sources of verification: PDF of meeting summary titled: IMA_MBHIntro_Results_Researchers.pdf

Events

IMA: Marine Biodiversity Hub, Project Introduction to Government Partners

Dates: 2021-08-19 - 2021-08-20
Organizing institution: Institute of Marine Affairs
Country: Trinidad and Tobago
Number of participants: 29
Comments: Nine institutions attended. Two online meetings because of COVID. One on each day
Website or sources of verification: PDF of meeting summary titled: IMA_MBHIntro_Results_GovPartners.pdf

Events

IMA: Marine Biodiversity Hub, Project Introduction to Data Users

Dates: 2021-08-26 - 2021-09-10
Organizing institution: Institute of Marine Affairs
Country: Trinidad and Tobago

Number of participants: 18
Comments: Nine institutions attended. Three online meetings: Aug 26th, 27th and Sept 10th.
Website or sources of verification: PDF of meeting summary titled: IMA_MBHIntro_Results_Marine.Data.Users.pdf

Events

IMA:Marine Biodiversity Hub, Project. Internal meeting on metadata standards (Darwin Core)

Dates: 2022-03-14 - 2022-03-17
Organizing institution: Institute of Marine Affairs
Country: Trinidad and Tobago
Number of participants: 11
Comments: Two online meeting with research staff and technicians
Website or sources of verification: PDF of meeting summary titles: IMA_MBHUpdate_MetadataStandards_Researchers.pdf

Communications and visibility

There are three levels of communication and visibility: Core team communication, internal IMA communication, and external communication with partners and data users. Much of the communications in the first year of the project has been focussed on introducing the project and gaining information based on users' needs with respect to types of data and data discoverability. For all introductory meetings, minutes were taken and summarised along with the survey results which were shared with stakeholders. All documents are also stored on the IMA's Server for easy accessibility by all. There was welcomed enthusiasm with respect to the ease at which the IMA would be able to share biodiversity data. In May 2022, the team published the Institute of Marine Affairs', species checklist dataset to the GBIF website, while the publication of IMA's Marine Reference Collection is in the final stages of approval (currently in test mode) for publishing on GBIF's website. Once this is confirmed, IMA will send an email notification to the list of marine data users. A bulletin on the data publication will also be placed on IMA's webpage, shared on IMA's social media, and linked to IMA's project page on the GBIF website.

Monitoring and evaluation

Monitoring and evaluation findings

On the relevance of the project, stakeholders overall shared interest and enthusiasm on the possibility of easy data access and sharing capabilities. In discussions with managers and researchers, concerns on long-term sustainability of the MBH, maintaining data uploads and usages by researchers were brought up. One solution proposed is including the process of data standardisation and upload to the MBH as part of the IMA workplan and staff Key Performance Indicator (KPI). Another suggestion for sustainability was the inclusion of a session on data management best practices as part of the orientation process for new research staff Another recommendation is to increase the capacity of users and shareability through sourcing of additional funds to increase the licensing capacity of the MBH. Discussions on amending the IMA's data policy to include the sustainability of the MBH is on-going.

With respect to the management of the project and delivery of the datasets, the team was well supported by the project manager, research and technical staff, IT staff and IMA library in providing datasets for publication. The IMA was also well supported by the BID Regional Project Support Team, Mr Leonardo Buitrago, who was prompt in assisting with any queries we had in the publication process.

With respect to efficiency and potential weaknesses upon the implementation of the project, the lack of foreign exchange in the country, resulted in delays in the payment of ArcGIS licence for both IMA and the Trinidad and Tobago Biodiversity Information Service hosted by our government partner, the Environmental Policy and Planning Division. To circumvent the issue in the future, IMA plans to request the money for the subscription a whole year in advance to ensure no lag in the subscription.

Impact of COVID-19 pandemic on project implementation

The project implementation has been moving along at medium pace because of COVID restrictions in the latter half of 2021. This affected many activities, such as having all our stakeholder engagements online and therefore spanning several dates to get a sizeable audience. Additionally, the procurement

process was delayed because deadlines for submitting proposals were extended because of the pandemic.

GBIF leads the Biodiversity Information for Development (BID), a programme funded by the European Union. The programme provides supplementary support for activities addressing the needs of regional researchers and policymakers through mobilization and use of biodiversity data.