

Citizen science to monitor the diversity and distribution of cetaceans in Vietnam

Programme:BIFA

Project ID: BIFA5_027

Project lead organization:Center for Biodiversity Conservation and Endangered Species

Project implementation period:13/7/2020 - 31/12/2022

Report approved: 7/6/2023

Narrative Final report

Executive Summary

Our project has established a comprehensive database on cetacean occurrence in Vietnam. We have located 207 whale temples along the Vietnamese coast and visited 49 of those whale temples. A dataset of 847 cetacean specimens has been identified and catalogued during those visits. In parallel to whale temple data, the project was also able to consolidate cetacean stranding and encountering data from social networks and citizen science apps (iNaturalist and Google AppSheet platforms). We have established a cetacean stranding database with 222 records and a cetacean encountering database with 55 records so far. These valuable data have significantly narrowed the gap in information regarding marine mammals in Vietnam, thus assisting scientific research and decision makings. Our data are now being used by the Research Institute for Marine Fisheries to develop The National guideline for marine mammal rescue and the Directorate of Fishery of Vietnam to address marine mammal bycatch issue. Through the project, our team also learnt about the cultural aspects of whale temples, the process of collecting data from social networks and the challenge of using mobile apps to collect cetacean data. Using mobile apps to collect cetacean encountering data from the public is particularly challenging due to the rare nature of the event and the disinterest of local fishermen in using iNaturalist. As the result, cetaceans encountering data collected from mobile apps were limited. Besides 02 published papers from the data acquired by this project, our team is working to publish more research papers in the upcoming time. We also plan to visit more temples in the Nghe An, Ha Tinh and Thanh Hoa provinces (the 03 coastal provinces that we were unable to visit during the project timeframe).

Progress against milestones

Has your project completed all planned activities?: Yes

Has your project produced all deliverables?: Yes

Report on Activities

Activity implementation summary

IT expense: we have acquired a workstation grade computer (WorkStation Dell Precision 7920 Tower XCTO Base 42PT79D001 and 16TB of HDD) to store the project data. The workstation PC was also used to process and store multiple 3D scans of cetacean skulls that we examined during the whale temple visits.

Travel to mobilise data: through various information sources, we have located a total of 207 whale temples along the Vietnamese coast. CBES team visited 102 temples from December 2020 to December 2022, but 33 of those do not have marine mammals remaining anymore(e.g. skulls lost to the Vietnamese war, cremated to save space or being stolen). 20 of those temples have cetacean remains, but the materials were buried under concrete tombs/enclosures that cannot be assessed. We

have examined 847 marine mammal skulls from the remained 49 whale temples. This most comprehensive database of marine mammal specimens stored in the Vietnamese whale temples is now available in GBIF (DOI: 10.15468/y6jdpk). Due to a large amount of data, species identification from skull measurements and photographs took time. Various specimens were damaged and difficult to identify.

The COVID-19 pandemic delayed our travelling plans. Visiting whale temples was not possible until the travelling curfew was lifted in Vietnam in March 2022. The project's collaborators were unable to visit Vietnam until July 2022. As the result, we have not visited all the whale temples that were located. We plan to continue to visit those remained whale temples (particularly in Thanh Hoa, Nghe An and Ha Tinh provinces) after this project end. The timing of this post-project was from February 2023 to December 2023.

Develop a citizen-science app: We originally plan to develop a sister app of iNaturalist to suit the project's needs. After various attempts, we found the Google AppSheet platform allowed us to develop and distribute mobile apps quickly and simply. Various testing versions of our app called *Nghênh ông* (English translation can be "Welcoming whale gods", to make use of the cultural bond between Vietnamese and cetacean) have been finished and tested among our network of marine enthusiasts (mainly staff of marine protected areas and journalists in Vietnam). The app collected 58 live encounter records of marine mammals in Vietnamese water from 2019 to 2022. During the project's progress, the iNaturalist app has also been translated into Vietnamese and met most of our requirements (having a Vietnamese interface and being simple enough for Vietnamese enthusiasts with basic knowledge). Therefore, we also focused on making the iNaturalist more appealing to Vietnamese via social media posts and workshops. Now, there are 02 citizen science platforms to that locals can contribute their opportunistic sighting of live marine mammals. While iNaturalist is a strong platform, the simplicity of Google AppSheet allows us to collaborate with staff from marine protected areas and Vietnamese enthusiasts better (e.g. review the coordinates of their records, share data across the network, keep data in our offline storage for quick access). Nonetheless, data from both platforms are now available in GBIF database (DOI: 10.15468/wvkr7d)

Data mining: We found that citizen science apps are not appealing to fishermen in general. Fishermen perceived iNaturalist or our "*Nghênh Ông*" app as "too scientific". Fishermen prefer to share their cetacean encounters on Facebook, Youtube or Ticktock, where they can get "like", followers and potential benefits from those platforms. Those data were extracted through our data mobilization process and mobilized with the "CBES Marine mammal stranding data in Vietnam 2004-now (DOI: 10.15468/47bckh). We will continue these activities after the project end to update the GBIF dataset annually (for 2023, data mining activities are from January to December).

Outreach: We have published multiple social media and website posts to attract public interest in cetacean diversity in Vietnam and to promote our project and iNaturalist. We also hold 01 workshop with staff from 12 marine protected areas in Vietnam to introduce "*Nghênh Ông*" app.

Data communication: In this project, we have conducted 03 online workshops (for University of Science – Ho Chi Minh city, staffs of Con Dao, Nui Chua and Cu Lao Cham national parks and Da Nang University for Education), 02 offline workshops (for the Research Institute for Marine Fisheries and Directorate of Fishery of Vietnam and IUCN Vietnam) and 08 meetings with those relevant stakeholders. The cetacean data from our project are now being used by the Research Institute for Marine Fisheries to develop The National guideline for marine mammal rescue and the Directorate of Fishery of Vietnam to address marine mammal bycatch issue.

Publication: 02 papers have been published from the data acquired by this project (DOI: 10.26107/PBZ-2021-0066 and DOI:10.1578/AM.46.4.2020.395). We could not publish a new paper in 2022 because we want to analyse the data better and come up with more robust insights on the diversity and distribution of marine mammals in Vietnam. We planned to submit our new papers in April 2023.

Completed activities

Activity name: IT expense

Description: We bought 01 WorkStation Dell Precision 7920 Tower XCTO Base 42PT79D001 and 16TB of HDD to store and upload the project data.

Start Date - End Date: 28/7/2021 - 28/7/2021

Verification Sources: The receipt for this purchase is attached (Receipt#1).

Activity name: Travel to mobilizing data

Description: Travel to whale temples in 28 coastal provinces of Vietnam to mobilizing the data and information accumulated in these temples.

By the end of the project, we have located 207 whale temples along the Vietnamese coast. We have carefully examined specimens stored in 49 of those whale temples. For each whale temple, we have a dataset of temples' coordinates, photographs and a list of specimens found inside. We have not been rejected admission into visited temples in any of those temples. The temple visiting task was delayed due to the COVID-19 pandemic and the following-up travelling restrictions in Vietnam. In addition, contacting people who are in charge of whale temples was challenging as many old temple keepers had to pass away during the pandemic and the responsibilities had not been clearly defined within the local communities. Despite that, we have successfully visited 49 whale temples that represent the coast of Vietnam, from Thua Thien-Hue to Kien Giang province. A dataset of 847 cetacean specimens has been identified and catalogued during those visits.

Start Date - End Date: 15/12/2021 - 31/8/2022

Verification Sources: Marine mammal specimen from whale temple in Vietnam (2022)
(DOI: <https://doi.org/10.15468/y6jdpk>)

Receipt#2

Activity name: Develop citizen-science app

Description: Translate the iNaturalist platform into Vietnamese, then promoting the app and the project to general public

Start Date - End Date: 1/5/2021 - 1/1/2022

Verification Sources: iNaturalist in Vietnamese (mobile app version) can be found here:

<https://crowdin.com/project/inaturalistios>

Data reported: <https://doi.org/10.15468/wvkr7d>

<https://crowdin.com/project/inaturalistios/vi>

Activity name: Outreach

Description: Promoting campaign to attract public interest on the project, the cetacean diversity in Vietnam and the iNaturalist as the robust citizen-science platform.

Start Date - End Date: 2/1/2022 - 22/12/2022

Verification Sources: Our social media posts attached followers and public engagement (e.g. average 100 like on each 1000 reach).

<https://www.facebook.com/www.vnmarinemegafauna.org>

Activity name: Data communication

Description: In this project, we have conducted 03 online workshops (for University of Science – Ho Chi Minh city, staffs of Con Dao, Nui Chua and Cu Lao Cham national parks and Da Nang University for Education), 02 offline workshops (for the Research Institute for Marine Fisheries and Directorate of Fishery of Vietnam and IUCN Vietnam) and 08 meetings with those relevant stakeholders. The cetacean data from our project are now being used by the Research Institute for Marine Fisheries to develop The National guideline for marine mammal rescue and the Directorate of Fishery of Vietnam to address marine mammal bycatch issue

Start Date - End Date: 1/9/2022 - 1/12/2022

Verification Sources: List of online workshops participants (Report Attachment # 3)

List of offline workshops participants co-organized with IUCN (Report Attachment # 4)

Workshop with Research Institute of Marine Fishery (RMIF): web article from RMIF at: <http://www.rimf.org.vn/bantin/chitiet/hoi-thao-khoa-hoc-tham-van-chuyen-gia-ve-cac-du-thao-quy-trinh-ky-thuat-cuu-ho-cac-loai-%C4%91ong-vat-co-vu-o-bien-viet-nam>

Activity name: Publication

Description: 02 papers have been published from the data acquired by this project

Start Date - End Date: 1/1/2021 - 1/9/2022

Verification Sources: DOI: 10.26107/PBZ-2021-0066 <https://lknhm.nus.edu.sg/wp-content/uploads/sites/10/2021/11/RBZ-2021-0066.pdf>

DOI:10.1578/AM.46.4.2020.395

Production of Deliverables - Summary

Whale temple dataset: A dataset of 846 marine mammal specimens stored in 49 whale temples along the Vietnamese coast has been made available in GBIF. This is the most comprehensive dataset on marine mammal specimens stored in whale temples in Vietnam. It is still 84.7% of the expected 1000 cetacean occurrence that we expected. Many temples we visited do not have marine mammals remaining anymore, or the materials were buried under concrete tombs/enclosures that cannot be assessed. We plan to continue to visit those remaining whale temples (particularly in Thanh Hoa, Nghe An and Ha Tinh provinces) after this project end. The timing of this post-project was from February 2023 to December 2023. We will update our dataset each time whenever new marine mammal skulls (from new temples) were examined and identified.

Cetacean occurrence from citizen science app: a dataset of 58 marine mammal encounters within Vietnamese EEZ has been published on GBIF. The number of records was small, as the citizen science apps only work for enthusiasts with a basic technical background. Fishermen, the group that has the highest possibility of encountering marine mammals in Vietnamese water, do not find the citizen science app appealing. Fishermen prefer to share their cetacean encounters on Facebook, Youtube or Ticktock, where they can get "like", followers and potential benefits from those platforms. These data would be extracted by our data mining activities.

Cetacean occurrence from data mining: we have mined 228 cases of cetacean (and dugong) from social media and local news. This is beyond our expectations (200 records by the end of the project). However, we will continue the data mining process to further update this dataset.

Production of deliverables

Title: Whale temple database

Type: Dataset

Status update: Published

Dataset scope: Cetacean historical occurrence}

Expected number of records: 846

Data holder: Center for Biodiversity conservation and Endangered Species (CBES)

Data host institution: TAIBIF

Sampling method: Skull morphological and measurements, photographs.

% complete: 100

DOI: <https://doi.org/10.15468/y6jdpk>

Expected date of publication:

Title: Cetacean occurrence from citizen science app

Type: Dataset

Status update: Published version 1

Dataset scope: Data of cetacean occurrence in Vietnamese waters}

Expected number of records: 58

Data holder: Center for Biodiversity conservation and Endangered Species (CBES)

Data host institution: TAIBIF

Sampling method: Data from iNaturalist was searched and extracted through iNaturalist website using provided search tool on this webpage. Data from Google Appsheet: Custom Google Appsheet forms (in Vietnamese) were developed and distributed to 20 marine protected areas staff via an offline workshop in Phu Quoc. Those staff used those forms to record marine mammal encounters in the respected areas. Data (coordinates, date and time, photographs) were automatically synchronized to a Google Sheet file. CBES staff and collaborators verified each record and contacted the reporters whenever necessary.

% complete: 100

DOI: <https://doi.org/10.15468/wvkr7d>

Expected date of publication:

Title: Cetacean occurrence from data mining

Type: Dataset

Status update: Published version 1.2 on GBIF

Dataset scope: Data of cetacean occurrence (stranding) along Vietnamese coast}

Expected number of records: 228

Data holder: Center for Biodiversity conservation and Endangered Species (CBES)

Data host institution: TAIBIF

Sampling method: The data mining process was conducted manually using Google search and in-website search tools, using different search terms that represent the cetacean and stranding phenomenon. Searchings were conducted in Vietnamese.

% complete: 100

DOI: <https://doi.org/10.15468/47bckh>

Expected date of publication:

Title: Research papers: Whale temples are unique repositories for understanding marine mammal diversity in Central Vietnam

Type: Other

Description: Author(s): McGowen, Michael R. ; Vu, Long ; Potter, Charles W. ; Tho, Truong Anh ; Jefferson, Thomas A. ; Kuit, Sui Hyang ; Abdel-Raheem, Salma T. ; Hines, Ellen

Journal: Raffles Bulletin of Zoology

Volume: 69

Date Published: 15 November 2021

Sources of verification: <https://lkcnm.nus.edu.sg/wp-content/uploads/sites/10/2021/11/RBZ-2021-0066.pdf>

Title: Research paper: New Records of Fraser's Dolphin (*Lagenodelphis hosei*) from the Whale Temples and Fishing Communities of Vietnam

Type: Other

Description: Author: Long Vu, Michael R. McGowen, Charles W. Potter, Truong Anh Tho, Sui Hyang Kuit, Salma T. Abdel-Raheem, and Ellen Hines

Type: Short Note

Journal: Aquatic Mammals

Volume: 46, Issue: 4

Page Numbers: 395-401

Sources of verification: <https://doi.org/10.1578/AM.46.4.2020.395>

Impact of COVID-19 pandemic on project implementation

Our project suffers from multiple delays due to travel restrictions and social distancing. We have changed our schedule according to the pandemic development. Most of the travelling only starts after March 2022, when COVID-19 was not an issue anymore in Vietnam. Most of our planned workshops became online workshops, and they achieved reasonable results.

Events

Workshop for marine protected area staff

Dates: 2022-11-16 -

Organizing institution: CBES, IUCN Vietnam

Country: Vietnam

Number of participants: 20

Comments:

Website or sources of verification:

Events

Whale temple talks

Dates: 2022-03-02 - 2022-03-02

Organizing institution: CBES and MARECET

Country: Vietnam

Number of participants: 22

Comments: This is an online talk that has been broadcast via Facebook

Website or sources of verification: <https://fb.watch/jCsk-eSigo/>

Communications and visibility

Our project has produced 02 papers so far. We plan to publish another 03 articles in 2023 after we can confirm the identification of various unusual species we documented from whale temples. Our project has been covered by the international magazine (<https://hakaimagazine.com/features/whales-in-the-temple/>).

Monitoring and evaluation

Final Evaluation

The project has finished most of its proposed activities and delivered its planned outputs. The databases resulting from this project have narrowed the gap of information regarding the diversity, distribution and abundance of cetaceans in Vietnam. The datasets produced by the project will be built on and updated after the project implementation period. A network of data providers (e.g. whale temple keepers, local fishermen, and staff of marine protected area) has been established by the project and they are ready to provide new data in the future.

The project implementation faced multiple challenges from COVID-19 and its long-lasting impacts. International and domestic travellings were strongly restricted from 2021 to the first quarter of 2022. Even after all restrictions were lifted, organizing meetings with whale temple keepers (who are sensitive elders) took much longer than expected. The GBIF Secretariat has greatly supported the project by allowing some activities (travels, workshops) to be postponed according to real-life situations.

The development of the proposed citizen science mobile (translate iNaturalist into Vietnamese) and promote it among local Vietnamese is unsuccess. Too few Vietnamese people are interested in the app, despite its interface. The creation of the cetacean project on iNaturalist and invitations do not appeal to fishermen and tourists, who the project targeted during its planning.

Best Practices and Lessons Learned

The project has taken much longer time than its plan due to the combination of the pandemic, the intense schedule of team members and the situation in Vietnam (e.g. pressure from the Vietnamese government on NGO <https://news.mongabay.com/2023/02/vietnams-environmental-ngos-face-uncertain-status-shrinking-civic-space/>). The PI of the project do not have enough the necessary skill to managing the project after many changes. The main lessons from the project experience are to maintain expectations and time managing correctly. Managing an international team with busy schedules from different time zone requires patience and compromise.

Post Project Activity(ies)

Continue to promote the iNaturalist for tourists and wildlife enthusiasts in Vietnam so it can reach more people.

Continue to distribute the Google Appsheet forms to the more marine protected areas and potentially fishermen.

Continue to monitor social media for more information on cetaceans and marine mammals in Vietnam
Visit whale temples in 03 provinces Thanh Hoa, Nghe An and Ha Tinh.

Sustainability plans

The team member of this project will publish associated papers on materials and specimens documented in the visited whale temple in quarter 3/2023. The hosting organisation, CBES, is suffering from difficulties now and may be disbanded, but it will help maintain and update the 03 databases resulted from this project while it still can.

GBIF leads the Biodiversity Information Fund for Asia (BIFA), a programme funded by the Ministry of the Environment, Government of Japan. The programme provides supplementary support for activities addressing the needs of regional researchers and policymakers through mobilization and use of biodiversity data.

