

16 April 2024

Mr Yohei Sasakawa
The Chairman
The Nippon Foundation
1-2-2 Akasaka, Minato-ku
Tokyo, Japan

Dear Mr Sasakawa

I respectfully submit the proposal for Year 8 of The Nippon Foundation – GEBCO Seabed 2030 Project for your consideration.

Yours sincerely

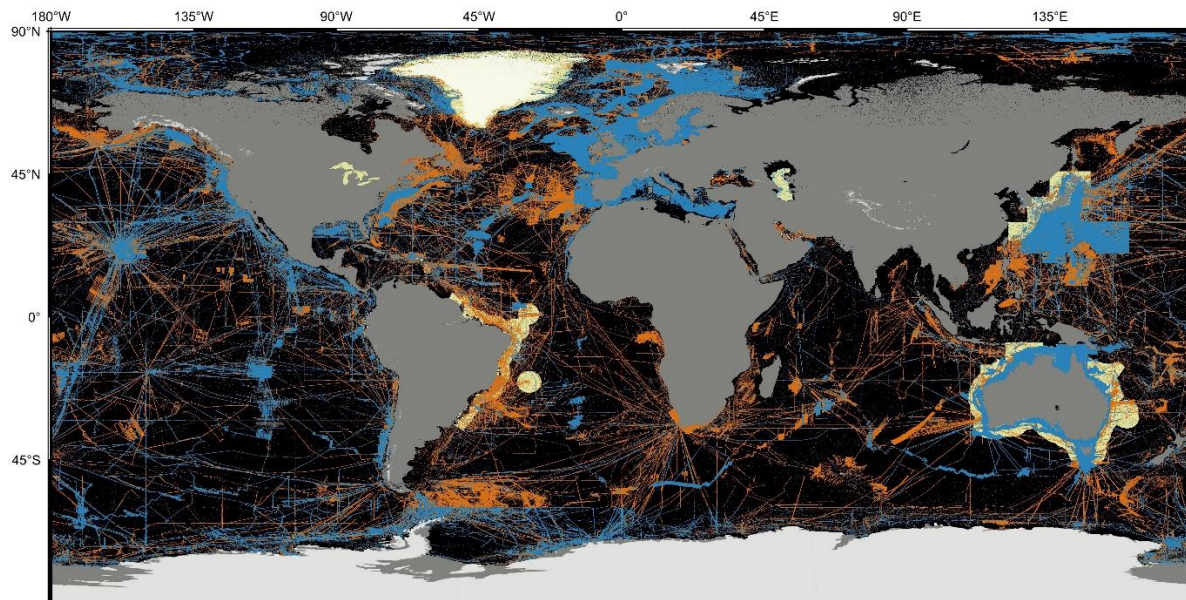


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THE NIPPON FOUNDATION-GEBCO SEABED 2030 PROJECT

Year 8 Programme of Work
Application to The Nippon Foundation

Submitted by
Jamie McMichael-Phillips, Project Director
16 April 2024



*Figure 1: GEBCO Grid 2024
courtesy of Martin Jakobsson, Stockholm University*

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1. EXECUTIVE SUMMARY

The application for Year 8 funds for The Nippon Foundation GEBCO Seabed 2030 Project (Seabed 2030) is for the period 1 August 2024 to 31 July 2025. As is the norm, the proposed activities are structured into 5 Work Packages that broadly conform to Seabed 2030 Business Plan.

The budget plan is based on supporting the core Project Team and 5 Centers in delivery against ongoing and new Work Package deliverables, continuation of a number of Special Projects carried forward from previous years, and introduction of a new Special Project for:

- **Generic Sensor Format (GSF)** translation capabilities in MBES systems that will enhance data acquisition initiatives.

Year 8 activity will run in parallel with any entirely separate bidding and grant processes for Ocean Frontier Mapping. Subject to availability of funding, the latter being to identify candidate science expeditions during which we may consider funding extra mapping days and/or using placing alumni onboard to augment data gathering and processing activities.

The total amount of funds requested for Year 8 is **US\$3,2000.00**

2. PROGRAMME OF WORK

The Programme of Work (POW) is presented as a summary table in Appendix II. The Year 8 activities are structured into 5 Work Packages (WP).

2.1. WP 1: Data

WP1 focuses on continued ingestion of data into the GEBCO Ocean Map and the publication of the next version of the product: GEBCO 2025. Incorporated within the GEBCO global product are two key regional maps, namely the latest versions of: the International Bathymetric Chart of the Arctic Ocean (IBCAO) and the International Bathymetric Chart of the Southern Ocean (IBCSO). Close collaboration with the BedMachine project team will continue for ingestion of under-iceshelf topography into IBCAO and IBCSO. A workshop on “BedMachine – IBCSO integration” will be planned for 2024 Q3.

The area of transition from offshore seabed to sub-ice shelf topography, the ice sheet grounding zone, and the sub-ice sheet topography is of central importance for ice sheet stability, ice mass budgets, and the predictions of ice sheet stability for the future developments of the Antarctic ice sheets.

In this area, sea ice and ice shelves pose difficulties to the conventional collection of bathymetric data by echosounder, and several methods are applied for the collection of bathymetric and sub-ice topographic data e.g. ice radar and gravity analyses.

The challenges of the integration of these different datasets will be addressed at a dedicated workshop to produce the most coherent topographic model for the transition zone

Work is planned to publish updates to existing versions of the IBCSO and IBCAO products. Also work will begin on IBCSO 2025. Subject to timings, changes will be included within the 2025 GEBCO Grid where possible with the aim to announce publication of GEBCO_2025 by media release on 21 June 2025.

Also, in Year 8, the Project Team will continue to engage with the widest possible community to seek additional data contributions. This will include leverage via the Ocean Decade, and also the IHO and IOC communities.

2.2. WP 2: System and Tools

WP2 focuses on with the technical tools, systems and processes required to build and publish the GEBCO Ocean Map. Building on previous years' activity, the Project Team will continue to enhance the statistics system, used in calculating the area of seabed mapped at any moment in time. Under Special Project 5, we will continue work on discrete research and development of an automated process of updating regional grids for inclusion in the final GEBCO grid.

As increasing quantities of data are received on an increasingly frequent basis, the ability to update regional grids regularly is of increasing importance. Achieving this through automation will reduce the burden on already busy Regional Center teams and allow them to focus on other mission-critical activities.

Frequent updates will also allow more frequent calculation of coverage statistics and allow identification/rectification of data file errors in a more effective manner.

We will also continue our work with the University of New Hampshire (UNH) on the GapFiller tool that helps expedition planners identify gaps in the GEBCO grid this will include investigation of automated compilation of Data/No-Data Coverage Maps. Here we will research best practices for creating and maintaining a global dataset of where the hydrographic community does, or does not have quality bathymetric data coverage. This will involve creating scripts that automatically scrape data sources (e.g. GEBCO, NCEI, GMRT, DCDB) on a regular basis to discover new coverage, and performing data quality checks where needed. Such coverage data will be compiled into a high-resolution binary data layer (Data/No-Data) for gap filling and survey planning purposes, and a data source layer (bitwise presence in each database) for evaluation and research purposes.

We will continue to develop an online, web-based version of GapFiller. This includes replacing the existing manual map tile update process with automated compilation, in order to have more-timely updates, with fewer errors. It will also provide higher resolution coverage maps and assimilate additional bathymetric data sources beyond just GEBCO. Current development goal is to replicate all of the existing gap filling and survey planning functionality of the desktop version, with future development goals being to add new functionality. A transit function will allow text entry of starting and ending ports, with automatic calculation of a great circle route modified to fill gaps where convenient, with interactive refinement/guidance.

The GapFiller tool has been developed by Colin Ware at UNH/CCOM-JHC. It is a standalone Windows based software package that is designed for to support Seabed 2030 by providing tools which allow for efficient seafloor mapping during both transit and area mapping. It can be used to easily (just a few key strokes) to plan transits or survey and is designed to show all existing data sets (including data sets yet to be included in the GEBCO Grid as published yearly). so that as transits or surveys are planned, we can assure that we optimize new coverage rather than go over areas already mapped. Routes can be planned by hand or automatically to optimize new coverage. As routes are planned it shows the estimated coverage based on general knowledge (from predicted bathymetry) of the water depths so that overlap between lines is predicted and coverage can be optimized.

It has the ability to automatically adjust transit lines to overlap, by a set amount, with existing data from the GEBCO grid and to then give estimates of time and data coverage from the proposed lines. It also has the ability to generate survey patterns designed to fill polygons provided by the user. It makes route planning onboard much easier, encouraging mariners and scientists, much more easily, to plan work in areas of gaps and gather bathymetry for Seabed 2030 whilst also avoiding duplication of effort by re-mapping areas previously mapped. It has already been used for planning for gap filling missions for the GEBCO 2022 and 2023 grids

This freely available software will be further developed, refined and improved based on user feedback and it is available to all.

See: Ware, C., Mayer, L.A., and Johnson, P., 2023, BathyGlobe GapFiller: A Planning Tool to Help fill the Gaps in World Bathymetry, International Hydrographic Review, Vol. 29, no. 2, pp. 16-27. <https://doi.org/10.58440/ihr-29-2-a19>

We are seeing an upward trend in volunteers who wish to help us with Crowd Sourced Bathymetry (CSB) and we will continue to host, at the Global Center, the Seabed 2030 Trusted Node (data recipient) for those contributors that are not part of larger organized networks. We will also work with our MOU partner, the International Seakeepers Society who will engage with leisure vessels through their DISCOVERY Yacht Program, thus leveraging the private marine industry's unique potential to contribute to our monumental task.

We will continue to work with the wider GEBCO network of expertise in the continued development of a multi-resolution grid and to operationalize this new generation GEBCO product as detailed in the Seabed 2030 RoadMap.

The need for a multi-resolution approach was set out in the Seabed 2030 paper published in 2018 in the *Geosciences* journal¹.

Our goals are to implement a solution that meets the needs of our users and our vision while minimizing impact on existing workflows and processes. The ESRI platform offers out-of-the-box functionality that can be used to deliver data at multiple resolutions on demand to our user community. The two Polar regions have developed their custom gridding routines in order to, as well, deliver multiple resolution grids. Each Seabed 2030 Regional Center will deliver raster-format data at the appropriate resolutions based on water depth wherever submitted data can support the resolution goals. Data will be assembled into a mosaic data set using ESRI out-of-the box functionality and will then be made available through the project's ESRI Online portal managed by the Global Center. Some customization will be necessary to enable user requests of data at particular resolutions and to optimize performance for this very large dataset. This will be more easily achieved by engaging with a contractor who will work with the team to build the necessary enhancements. ROM cost of this work \$25K

Details of implementation will be established by the Atlantic/Indian, South and West Pacific and North Pacific Centers, all of whom currently use the ESRI technology as part of their workflows. Once details are sorted out they will be distributed and reviewed by the broader technical team to ensure that all requirements are met.

This will not add data to the Grid, per se, but it will significantly improve the ability of users to extract data at higher resolutions and so meets our stated objective of bringing "together all available bathymetric data to produce the definitive map of the world ocean floor by 2030 and make it available to all."

In addition, we will enhance and develop the GEBCO grid download application to provide access to data from GEBCO's global and polar grids for user-defined geographic areas and through the same application, provide access for download and visualisation of GEBCO's multi-resolution gridded data sets. We will investigate the inclusion of additional layers on the map display, such as the GEBCO gazetteer of undersea feature names. Also, we will investigate the delivery of GEBCO's grids for user-defined areas using the Open Geospatial Consortium (OGC) Coverages API, allowing users to access GEBCO's grids directly in their own systems using a recently developed open standard.

We will continue our strong collaboration with Scripps Institution for Oceanology (SIO) for production of SRTM15+ yearly updates that form the base layer of the GEBCO Grid. This

¹ <https://www.mdpi.com/2076-3263/8/2/63> : The Nippon Foundation—GEBCO Seabed 2030 Project: The Quest to See the World's Oceans Completely Mapped by 2030

remains an essential time-saver. The yearly SRTM update cycle provides a new base version to be used by Seabed 2030, negating the need to remove the same inaccurate data from the GEBCO Grid year-on-year. The inclusion of sparse data (including CSB) is easier. Combined this improves the GEBCO product quality. Noting its importance, this aspect of the bid was previously elevated to an enduring core Project Team Activity.

We will continue to improve work on web services for visualization of our data sets. This is a valuable application, particularly for QC and planning purposes. In Year 8, we plan to investigate further the use of Esri products in the delivery of web services and will scope development of a web coverage service for the GEBCO global grid.

Working across the Centers, we will work on the development of a web map to allow the visualization of the coverage of the source data sets included in the GEBCO grid.

The further use and development of web services will provide additional means for users to access and interact with GEBCO's data sets and help with interoperability with other/external systems and services.

Web Map functionality would allow us to provide further information to users of the GEBCO grid on the origin of the source data sets used in its compilation. In addition, it will help as a mechanism to provide credit/attribution for data set contributors.

We are also planning other innovation within our system and tools with the design and development of machine learning pipelines for area based error flagging for spatially tiled datasets.

The identification of erroneous depth values is a time-consuming task that creates backlogs and binds significant resources during the production of regional grids. To optimise the production of regional grids, new approaches will be tested and develop for an increased automation of area-based error flagging in spatially arranged data tiles.

2.3. WP 3: Technology innovation

WP3 focuses on technological innovation as a key enabler in the acceleration of seabed mapping (from data collection, to processing and to product creation).

We will continue our collaboration with MOU partner, Kongsberg Maritime (KM) in the following areas:

- Subject to separate funding arrangements, further operationalize SeaKoMap (Seabed 2030-Kongsberg Maritime Cloud Processing) that was used successfully during the Tonga Eruption Site Mapping mission. This will allow us the potential to use this cloud technology to tackle any major data back-logs.

SeaKoMap is a solution for 3rd party operators to process backlogs of data using Kongsberg's Blue Insight platform to provide a cloud-based, modular platform for the secure visualization, processing and sharing of ocean data. There are 2 "virtual processing terminals" accessed by authorised operators anywhere in the world. It will be loaded with software from MOU partner QPS and will be managed by Seabed 2030 for:

- Remote data processing via a web-based solution
- Generation of cleaned bathymetric surfaces for transfer to the Regional Centers for ingestion in the GEBCO Grid.

Our colleagues at Stockholm University (SU) will also continue refinement of their own Data Uploader tool that can be used by other (non-KM system) donors.

Alongside partners from IHO's Crowd Sourced Bathymetry Working Group (CSBWG) and UNH, we will continue to support global CSB activity and technology developments; and we will also collaborate with other partners to increase autonomous data collection and to support a core level of activity.

As part of our work to empower the growing community of ocean mapping stakeholders, we will work to improve software tools that they may use.

We will work to harden and improve usability of some of the distributable open-source software tools used for SDB and multibeam prep - to further empower the community to process/review/prepare data for integration. This will include supporting relevant workshops.

We will also contribute expertise to TSCOM-led initiatives for Generic Sensor Format (GSF) translation capabilities in MBES systems that will enhance data acquisition initiatives.

Our MOU partner Seatrec has conducted a successful first deployment of their "Infinity" floats in the deep Pacific as part of Project NEMO (Novel Echosounder to Map the Ocean). The deployment which lasted several weeks and had several hundred ascents and descents of the floats, demonstrated the ability of the float to harvest energy, charge its batteries, profile ocean properties, and communicate with the satellites. The echo-sounder has also been

completed and tested and they will be mated in the coming months and the entire package deployed and tested in mid 2024. Seabed 2030 will benefit from the data.

Seatrec, a MOU partner, has brought together an interdisciplinary team of scientists and engineers to develop an autonomous profiling float with an echosounder to map the seafloor. The novel thermally recharging echosounder float (called NEMO) is the integration of three technology breakthroughs over recent years: autonomous profiling floats as demonstrated by the Argo programme; the innovative echosounder designed by Airmar Technologies in collaboration with Innomar Technologies; and the transformative ocean thermal energy harvesting technology developed by Seatrec.

Leading Project NEMO is seafloor mapping pioneer Prof Larry Mayer, Director of the Center for Coastal and Ocean Mapping at the University of New Hampshire and also co-Head of Seabed 2030's Arctic and North Pacific Data Center. (Through the latter role, Seabed 2030 will be a collaborator in the project.)

Data from deployed floats will be provided to Seabed 2030. It is too early to estimate the coverage we expect them to generate.

Successfully deploying technology that can accurately and inexpensively map the most remote point in the ocean will help us chart a way forward to the world's first high-resolution map of the seafloor.

The Regional Center at SU will continue development of statistic calculation algorithms using cloud computing through Amazon Web Services (AWS) as well as automatic gridding directly from bathymetric data provided through an uploader.

2.4. WP 4: Mapping Activities (formerly Mapping the gaps)

As stated in previous years, the combined efforts of the entire global mapping community to fill the gaps in our existing bathymetric coverage remains paramount. Governments and industry have the potential to contribute from existing data repositories and these two sectors, alongside citizen science, philanthropy and academia have the potential to be a major driving force to achieving our mission by 2030. The UN Decade of Ocean Science continues to provide leverage with mapping and CSB projects that wish to align with Seabed 2030.

Other data gathering and contribution efforts are underway with a number of missions leaders, explorers and citizens keen to support bathymetric data gathering in our Ocean Frontiers. Our CSB partners in South Africa, Palau and Greenland continue to engage with their local communities to generate interest in data gathering and the International Seakeepers Society, our MOU partner, continues to inspire citizen science amongst their extensive global

membership. Our Pacific Center will be working with local communities in the world's more remote regions to increase the quantity and quality of ocean mapping data.

As an empowering and engagement tool, we will work to optimise bathymetry acquisition for those local communities that currently have a low ocean mapping capacity.

We will continue the collaborative completion of SDB mapping in Jamaica and Haiti by their respective national mapping authorities – detailed in this bid as Special Project 7. We will also explore work in Wave Kinematic Bathymetry, via applied SDB methodologies, for areas where the water is too turbid for standard SDB techniques. This has the opportunity to provide extensive coverage in areas such as part of the southern Meso-American and Caribbean region.

Wave Kinematic Bathymetry Mapping (WKB) is a proven satellite-derived solution for persistently turbid areas with consistent wave action.

WKB may reveal continental shelf bathymetry in water depth of up to 100m and whilst the vertical accuracy may be coarser than that of traditional surveying, it is perfectly sufficient for the GEBCO Grid and may be gathered at 100m horizontal resolution.

We will also work with stakeholders on initiatives to improve Marine Geospatial Information (MGI) for the Southern Ocean. An important forum is the Antarctic Treaty Consultative Meeting (ATCM) of the Parties to the Antarctic Treaty and other interested organisations. Via IHO, we will provide technical support for recommendations to ATCM47 for improved MGI management.

The publication "Marine Geospatial Information Management, PRINT ISBN: 9789210031004, PDF ISBN: 9789213588284, Publisher: United Nations" clearly states the need for improved marine geospatial data and information management with references to the FAIR principles (Wilkinson MD, et al., The FAIR Guiding Principles for scientific data management and stewardship, Scientific Data 2016, 3(1), 160018, <https://doi.org/10.1038/sdata.2016.18>). Improvements of the Marine Geospatial Information (MGI) management in the Southern Ocean will be suggested as a recommendation for the IHO Report to ATCM47 (2025).

We will also strengthen our liaison with the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) to explore opportunities to acquire bathymetric data from fishing vessels.

Engaging with CCAMLR may foster collaboration with fishery boards and organisation that oversee activities in the Southern Ocean.

2.5. WP 5: Management

WP5 focuses on delivery of the operational and strategic management aspects of the project.

2.5.1. WP 5.1 Operational management

Seabed 2030 funds will continue to be managed through the IHO Secretariat bank account. The Seabed 2030 Director will be responsible for shadow financial management, project status reporting to The Nippon Foundation, Seabed 2030 Sponsors and the GEBCO Guiding Committee (GGC).

There remains an increasing external interest in collaborating in ocean mapping activities from CSB to full ocean mapping. Noting that the majority of Center staff are engaged in time consuming technical activity, there remains a need for a bolstered support within the Project core. Some of this may be delivered through contracted technical support via the NF-GEBCO alumni corps. We will also work with the International Seakeepers Society who will engage with leisure vessels through their DISCOVERY Yacht Program.

2.5.2. WP 5.2 Strategic direction

Project Team work continues apace and we continue to enjoy the support of a growing number of wider supporters/contributors across all sectors. We also benefit from our status as a flagship programme of the Ocean Decade, where we remain a focus for global bathymetric mapping in support of achieving UN Sustainable Development Goal 14 (Life below water). . Our mission deadline aligns with that of Ocean Decade outcomes and we are a pillar of “the science we need for the ocean we want” which increases our visibility and underscores the importance of bathymetry as a foundation layer for all ocean science. This was clearly evidenced at the 1st UN Ocean Decade Conference held in Barcelona in April 2024. We anticipate that the tempo of Year 8 activity will remain high, raising both our profile and our workload.

As highlighted in the previous Proposal, there remains a pressing and enduring need to provide justification to senior officials and potential contributors to encourage them to provide data to Seabed 2030 and also to better define user priorities for mapping. Our *Wind in the Sails* project is ongoing and continues to seek user views that will allow the Project to better collate and quantify the value and benefits of seabed mapping and to identify user-defined priority areas. This complex work is moving to the next stages of development with community engagement to facilitate a Global Priority List which will be the first of its kind.

A body of evidence already exists that supports the relationship between ocean floor shape and the many ocean and climate processes/issues that are touched on above. That said, while much of this is open source, it is not all in one place. We started the Seabed 2030 project with a strong commitment to avoid duplication and instead work towards fostering a close collaboration for the most efficient use of global resources. In that spirit, we are launching a piece of work, named *Wind in the Sails* (WITS), with Blue Economy solutions company NLA International (MOU partner) to start to gather this evidence together.

The more data we acquire about the details of seabed shape, the more we recognize that the ocean and its floor are more dynamic than we ever thought. By cataloguing models used to help quantify the environmental, social and economic values and benefits of seabed mapping, we will be in a much better position to articulate the areas in greatest need of being surveyed – and, crucially, why government, industry, academia and philanthropy should support such activity.

WITS supports the Seabed 2030 Project by providing empirical evidence to enable the development of a prioritised targeted survey strategy. The ultimate aim of this three phase project is to unite the global hydrographic community and operators within the maritime domain around a global seabed mapping priority list, underpinned by a robust evidence base that articulates the true need and value of mapping the seabed in its entirety to a gridded depth variable resolution.

The findings within this report cover Phase 1 and Objective 1 of the overall recommended three phase approach. Before a strategy can be developed there is a need to understand the baseline of extant global survey work and activity that will support and may contribute to Seabed 2030 and, also, which users want hydrographic data, what type of data is wanted and where should Seabed 2030 surveys be focused and prioritised.

This is a challenging piece of work in both scale and complexity and has not been undertaken anywhere before (there have been smaller scale studies of some national waters but these are very localised and do not necessarily join up with prioritization of adjacent national waters or areas beyond national jurisdiction nor do they involve all global ocean stakeholders)

Project work began in May 2020 (Seabed 2030 Y3) and has continued in Y4 and Y5 thus:

- Y3/4 -Phase 1 – Rapid Evidence Review & Fast Action Priority List
 - Obj1 – Collate Known Mapping Needs (inc Online Survey#1)
 - Obj 2 – Fast Action Priority List
 - Online Survey #2

- Y5 Phase 2 – Detailed modelling, benefit extrapolation & need
 - Obj 3 – Catalogue premium models
 - Obj 4 – Model potential global benefit
 - Obj 5 – Develop final model (best fit model from those at Obj 4).
- Y6 Phase 3 – Detailed modelling, benefit extrapolation & need
 - Obj 6 - Seabed 2030 Benefits analysis / review key areas
 - Obj 8 - Targeted community engagement
 - Obj 7 – Seabed 2030 Prioritisation *[conducted after Obj 8]*

It is proposed that another objective is now undertaken in Year 8 as follows:

- **Obj 9 - Produce the Seabed 2030 Interactive Priority Action Map**
 - ***Prioritisation Assessment of Ocean Areas with Evidenced-based reporting***
 - ***Conduct strategic assessment analysis & visualisation of global ocean areas [to enable baseline ‘Prioritisation Grid Scoring for ocean areas seabed mapping] with strategic evidence-based documentation.***
 - ***This Seabed 2030 mapping prioritisation model provides users with a Prioritisation Assessment Model that provides “overview” strategic level assessment analysis and visualisation to inform prioritisation for all ocean areas.***
 - ***This is proposed to operate on a grid score basis with use benefit-driven weighting applied to each grid cell/area.***
 - ***Use/benefit weighting will determine areas/potential uses for the seabed mapping and be corroborated by previous WITS objectives outputs.***
 - ***Outputs/deliverables:***
 - ***9.1 Produce a global grid score (baseline) seabed mapping prioritisation reference map.***
 - ***9.2 Assess & review the baseline seabed mapping prioritisation reference map and document the outputs in the format of a strategic intelligence report for Seabed 2030***
 - ***Focusing on recommended prioritised areas for seabed mapping enablement.***
 - ***9.3 Produce an evidence-based justification case for the enablement of the recommended prioritised areas for seabed mapping***
 - ***focusing on the areas identified in 9.1 and 9.2 above.***

Ultimately, we will demonstrate on a global scale the priorities and benefits of ocean mapping, and we can more strongly encourage politicians and decision makers in government, industry, academia and philanthropy to facilitate mapping of these areas

2.5.3. WP 5.3 Communication

The implementation and execution of the new communications strategy will be the central focus of Seabed 2030’s communications activity as we move into Year 8 of the Project. At the time of writing, the strategy is in its final stages of development following a series of workshops.

In developing the new strategy, we have identified and refined Seabed 2030's target audience, and also carried out an analysis from which we are able to identify the best approach for achieving the Project's overarching organisational objective – to ensure we have a definitive map of the ocean floor.

Our approach is a highly targeted engagement programme (with a focus on government and Seabed 2030's partners) which will be executed in tandem alongside a multimedia profile raising campaign. These two strands of activity strengthen Seabed 2030's value proposition, which is centred on generating awareness and recognition for our partners, in order to secure new and existing data. It will also raise awareness of the Project's mission, and the critical importance of seabed mapping

We are formulating a targeted calendar of events, which the wider team, including Center Heads, will feed into. This will inform our communications outreach activities for Year 8. This is central to ensuring that Seabed 2030 has a presence at notable events with our key target audience, and especially in target regions and countries which are essential in helping us realise our goal. The most notable event will be participation

2.5.4. WP 5.4 Capacity development

The Nippon Foundation – GEBCO Alumni community consist of over 110 people in 43 countries who are a hugely valuable potential resource for Seabed 2030 and, more generally, for stewardship of the oceans. They will be more effective if they are organized to facilitate communication with themselves, with others, and if we enlist them in projects. Contracting in support for Engagement and Development services provides this vital link and to coordinate alumni across discrete capacity development activities that support Seabed 2030.

3. BUDGET NARRATIVE

3.1. Centers

As reported in previous years, the salary component of the center budgets approximately equates to 13.5 Full Time Equivalent positions. Due to significant input from host institutions, at their own cost, the true number of staff contributing to Seabed 2030 activities across all centers is the region of 32 people. However, it is essential to retain and enhance output activities whilst countering downward budgetary pressures on these host institutions that, in the manner described, have traditionally cross-subsidised the Seabed 2030 budget in the operation of the Centers. Extraordinary global events continue to drive global inflation however costs have been capped with no increase for Year 8.

3.2. Special Projects & Events

We propose to run a series of 8 series of Special Projects (SP) in Year 8 as follows:

- SP1: Greenland Crowd Source Bathymetry (CSB) continuation - see Section 2.4 above
- SP2: Global Crowd Source Bathymetry (CSB) continuation – see Section 2.4 above
- SP3: Media Content Generation continuation - see Section 2.5.3 above
- SP4: Use Cases – Objective 9 – see Section 2.5.2 above
- SP6: Regional Grid Updating R&D continuation – see Section 2.2 above
- SP7: SDB & Open Source Activity continuation – see Section 2.2 above
- SP8: Generic Sensor Format (GSF) initiative – see Section 2.3 above

3.3. Project Team & Alumni Coordination

The core Project Team budget includes fees (salaries/overhead/other support) for: Director, Project Administrator and functional areas, delivered through contracting in support, thus:

- Engagement and Development
- Partnerships

Project Team activities (activities that are not Center-specific or undertaken by Director, functional areas and Administrator) constitute the second component of the Project Team budget. These include: travel, meetings and communication activities. These amounts are based on nil-inflation-adjusted values for personnel costs.

The IHO Secretariat acts as the repository for annual Project Funds which are deposited in its Monaco bank account. All payments/receipts are managed through this facility for which we are grateful. Due to increasing Project Activity year on year, and a concomitant increase in transactions, it has been necessary for the Secretariat to allocate dedicated rechargeable resource as follows:

- 0.1 FTE Finance Administration Officer at USD\$15,000 per annum
- 0.3 FTE Accounting Administration Assistant at USD\$32,000 per annum

The total of USD\$47,000 appears a fair and reasonable charge for financial management services offered.

4. APPENDIX I – YEAR 8 BUDGET DETAILS

See separate Word document: The Nippon Foundation - GEBCO Seabed 2030 Year 8 Budget APPENDIX I

5. APPENDIX II – Year 8 PROGRAMME OF WORK SUMMARY

See separate Word document: The Nippon Foundation - GEBCO Seabed 2030 Project Year 8 POW Summary APPENDIX II

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