

THE NIPPON FOUNDATION-GEBCO SEABED 2030 PROJECT

PROGRAM OF WORK, 2018-2019
SUBMITTED BY SATINDER BINDRA, PROJECT DIRECTOR, AUGUST 2018.



Figure 1: From Left Satinder Bindra, Project Director NF-GEBCO Seabed 2030; Mitsuyuki Unno, Executive Director, The Nippon Foundation; Prof. Martin Jakobsson, Co-head Seabed 2030 Arctic and North Pacific Ocean Regional Center; Rear Admiral Shin Tani, Chair GEBCO; Bjorn Jalving, Executive Vice-President, Kongsberg Maritime; Dr. Vicki Ferrini, Head Seabed 2030 Atlantic and Indian Oceans Regional Center; David Millar, Director, FUGRO at the launch of the operational phase of the Project. Feb 20, 2018, Tokyo.



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1 BACKGROUND

NF-GEBCO Seabed 2030 is a global, collaborative project between the Nippon Foundation and the General Bathymetric Chart of the Oceans (GEBCO) to produce the definitive, high resolution bathymetric map of the entire ocean floor by 2030. Both GEBCO and Seabed 2030 operate under the joint auspices of the Monaco-based International Hydrographic Organization (IHO) and UNESCO'S Intergovernmental Oceanographic Commission (IOC). After a brief "Establishment Phase", which lasted from Aug 2017 to February 2018, the project became operational at a press conference held in Tokyo on 20 February, 2018. At the event, which was attended by over 50 journalists, the Chairman of The Nippon Foundation, Mr. Yohei Sasakawa, appealed to the global maritime community to back its ambitious agenda.

The Project, for which the Nippon Foundation has pledged approximately \$2 million a year as seed money, supports the UN's Sustainable Development Goal #14 and the UN Decade of Ocean Science for Sustainable Development (2021-2030). It is driven by the motivation to step up scientific research, enhance policy making and improve the sustainable management of our oceans.

Seabed 2030 has established a network of **four Regional Centers** and one **Global Center**. Each Regional Centre will be the focus for gathering and assembling all available bathymetric data from the region and producing a regional grid. The Global Center will merge the regional grids to produce and distribute the global GEBCO products. The areas covered by these centers and their heads are as follows:

- ➔ The **Southern Ocean Regional Data Center** at The Alfred Wegener Institute (AWI), Germany, headed by Dr. Boris Dorschel.
- ➔ The **South and West Pacific Ocean Regional Data Center** at the National Institute of Water and Atmospheric Research (NIWA), New Zealand headed by Dr. Geoffroy Lamarche.
- ➔ The **Atlantic and Indian Oceans Regional Data Center** at the Lamont Doherty Earth Observatory, Columbia University, USA, headed by Dr. Vicki Ferrini.
- ➔ The **North Pacific and Arctic Ocean Regional Data Center** at Stockholm University, Sweden and University of New Hampshire, USA jointly headed by Prof. Martin Jakobsson and Prof. Larry Mayer.
- ➔ The **Global Data Center** at the National Oceanography Centre, UK headed by Dr. Helen Snaith.

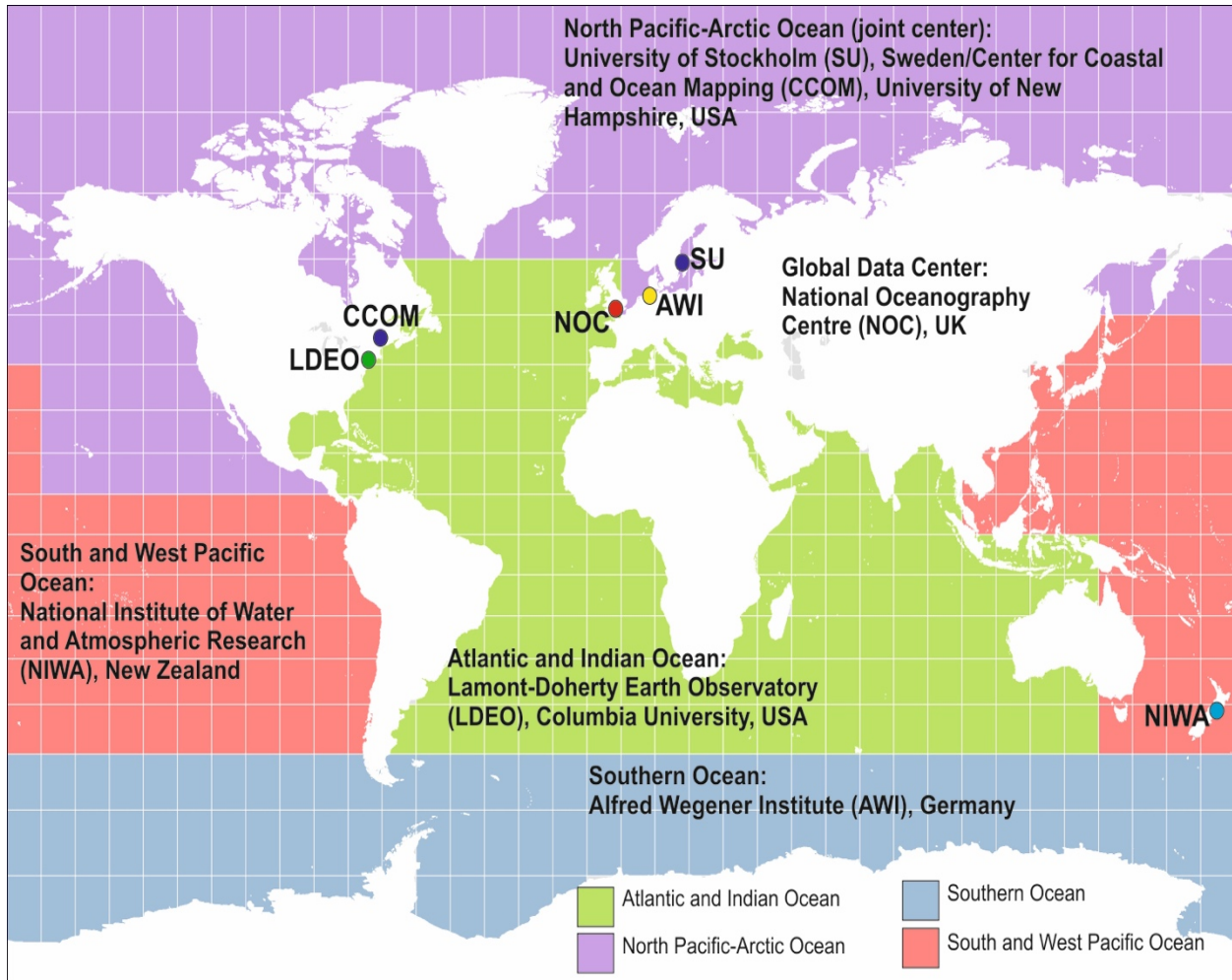


Figure 2: NF-GEBCO Seabed 2030's Regional Centers and areas of the ocean they cover. The Global Center is based in the National Oceanography Centre, UK.

NF-GEBCO Seabed 2030 is led by a Director, Satinder Bindra, who manages the project and is accountable to the GEBCO Guiding Committee (GGC) for delivering all project goals. Each year the Project Team will report on progress to the GGC by submitting an Annual Report. It will also submit to the GGC, for its endorsement, next year's Program of Work.

2 EXECUTIVE SUMMARY

The NF-GEBCO Seabed 2030 project's unifying goal has captured tremendous international interest. Approximately 40 international organizations are already part of the initiative and many others have expressed interest in contributing to the effort. With a network that currently extend across almost 50 countries, the project is taking on the shape of a truly global movement. The international excitement and support for Seabed 2030 was best captured in a recent article in Hydro International by Rear Admiral Shepard Smith, director of NOAA's Office of Coast Survey and the US national representative to the International Hydrographic Organization (IHO): "*Seabed 2030 is an excellent opportunity to reinvigorate and communicate ocean mapping efforts in common cause with other maritime nations*".

During its second year (August 2018- July 2019) the project will continue to build on its **core mission** to:

1: **Integrate and process existing data** that are currently in publicly available databases. This includes not only multibeam sonar data, but also single beam data, crowd-sourced bathymetry data and all other direct measurements of seafloor depth that can be accessed.

2: **Identify data gaps (regions of the ocean where no bathymetric measurements exist)** to inform and optimize mapping missions and crowdsourced bathymetry efforts (including surveying companies, fishing boats, ocean going carriers and recreational vessels) to collaboratively and efficiently fill the gaps.

3: **Promote the open sharing of data and encourage the contribution of existing data sources** that are not yet in the public domain.

4: **Create new bathymetric data products**, which will be released on GEBCO's website in late 2018 to create a global common good.

5: **Investigate new means to utilize remote sensing and other innovative techniques** to derive bathymetry in remote areas.

As noted by Mr. Sasakawa at the Tokyo press conference in Feb 2018, IHO, IOC, Seabed 2030, GEBCO and The Nippon Foundation cannot map the entire ocean floor by themselves: "It is crucially important that the global maritime community comes together to achieve this important goal".

Seabed 2030 will stay committed to this vision of building a global community by co-operating and communicating effectively with all its stakeholders.



Figure 3: The GEBCO-Nippon Foundation Alumni Team is felicitated after reaching the final of the Shell Ocean Discovery XPRIZE. From left to right: Dr Alan Leonardi, Director, NOAA Office of Ocean Exploration and Research; Max Brouwers, Vice President of Exploration, Europe, Russia and the Caspian, Royal Dutch Shell; Yulia Zarayskaya, GEBCO-NF Alumni Team; Ben Simpson, Managing Director, Hushcraft Ltd; Hadar Sade, GEBCO-NF Alumni Team; and Dr Jyotika Virmani, Senior Director of Planet and Environment, XPRIZE.

Seabed 2030 will, in 2018-2019, continue championing, developing and nurturing technical and human capacity to complete its mission by 2030. In this connection, the project will develop operational synergies within the international GEBCO community. The GEBCO Nippon Foundation Training Program, which has so far trained 84 mid-career scientists and hydrographers from 37 countries at the Center for Coastal and Ocean Mapping at the University of New Hampshire, USA is a key element of this capacity building. The skillset and global distribution of the alumni can help achieve the initial four-year goal of Seabed 2030 to discover, process and

merge existing data. Given such a scenario, Seabed 2030 will continue working with all stakeholders to enhance the development of the alumni as a powerful group for ocean stewardship.



Figure 4: The USV Maxlimer is a remotely controlled surface vessel built by Hushcraft in the UK and is part of the GEBCO-Nippon Foundation Alumni Team's entry for the Shell Ocean Discovery XPRIZE. It has the ability to remotely launch and recover an Autonomous Underwater Vehicle (AUV) thereby reducing costs for obtaining high quality bathymetric data.

In a potent demonstration of their future ocean mapping potential, a GEBCO-NF alumni team recently advanced to the finals of the Shell Ocean Discovery XPRIZE. Their entry showcased an unmanned surface vessel (USV) called SEA-KIT Maxlimer with the ability to remotely launch and recover an Autonomous Underwater Vehicle (AUV). More recently, given that an MBES system has been purchased and installed on the SEA-KIT, the project will evaluate the costs and potential feasibility of deploying autonomous or remote controlled technology to map the ocean floor.

Finally, over the coming several months Seabed 2030 will invest in strong administrative and governance structures. The governance aspect of the project's work will cross cut its three other priorities namely data, building a global community and investing in technical and human resource capacity. Effective governance of the project will ensure Seabed 2030 has appropriate legal, partnership and fundraising frameworks to attract further support.

Since it became operational in February 2018, the Project Team has determined that, according to its varied resolution targets at different depth ranges, only six percent of the World ocean floor is constrained by bathymetric measurements stored in the databases underlying the most recently released GEBCO_2014 grid. This six percent is now a baseline figure for the project team since the Seabed 2030 project started with the bathymetric data used to compile the GEBCO_2014 grid.

In December 2018, the Global Data Center will merge regional products to compile a new version of the GEBCO global bathymetric grid at 15 arc-second resolution and accompanying metadata about underlying data sources. We aim to increase bathymetric data coverage of the ocean floor from 6 percent to at least 9 percent. The global center will also develop layers for the GEBCO Web Map Services (WMS) based on the new GEBCO grid.

By the second release of an updated GEBCO grid scheduled for December 2019, the bathymetric data coverage of the ocean floor is targeted to increase to 12 percent. This means that **in the first two years of its operation, the project target is to gather as much data as GEBCO has collected over 115 years.**

For the second year of its operations (1st Aug 2018-31st July 2019), the project has sought and received funding support of \$1,615,000 from The Nippon Foundation.

KEY FOCUS AREAS



Figure 5: SEABED 2030 PROGRAM OF WORK 2018-2019

3 PROGRAM OF WORK GOALS

3.1 DATA AND MANAGEMENT

- 3.1.1 Process and integrate existing data.
- 3.1.2 Discover new data that are currently not publicly available through effective mobilization of Regional Mapping Committees and the Strategic Advisory Group.
- 3.1.3 Continue to define the required standards for data and metadata being contributed to Seabed 2030.
- 3.1.4 Identify data gaps where no data have been acquired and encourage new data acquisition through mapping campaigns.
- 3.1.5 Develop a scheme for funding expeditions to map identified data gaps.
- 3.1.6 Scale up crowdsourced bathymetry from partners such as surveying companies, fishing boats, ocean going carriers and recreational vessels, e.g. through a newsletter or getting a partner to organize a forum at a convenient date.
- 3.1.7 Create bathymetric data products which will be shared with the public on Seabed 2030's official website in late 2018.
- 3.1.8 Enhance data access and visualization tools for effective delivery of the data products.

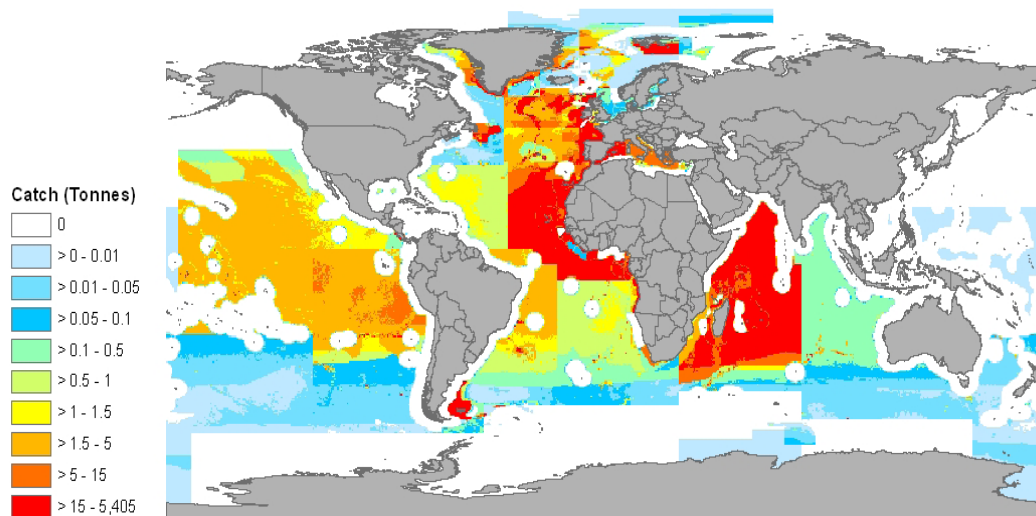


Figure 6: It is estimated that there are 1.3 million fishing vessels and over 85% of them are in Asia, making them a critical crowdsourcing asset.



3.2 BUILDING A GLOBAL COMMUNITY FOR SUPPORTING AN OCEAN MAPPING MOVEMENT

- 3.2.1 Continue to “map” stakeholders and encourage the entire project team to expand Seabed 2030’s “master list” of contacts from 1,200 to approximately 3,000 names.
- 3.2.2 Grow the scientific community that benefit and contribute to seafloor mapping.
- 3.2.3 Create a Seabed 2030 logo with a tag line of “Mapping the ocean floor” to showcase the project’s mission, energize GEBCO supporters and consolidate global support.
- 3.2.4 Produce riveting content such as films, news releases, website copy, brochures and distribute them across a variety of networks such as traditional media, social media etc.
- 3.2.5 Build a thought leadership profile by writing and placing op ed columns (opposite editorial in newspaper) with Project Syndicate – the largest distributor of such columns in the world.
- 3.2.6 Promote Seabed 2030 at all relevant maritime community events and develop a “crowdsourcing” newsletter with a view to organizing a forum or workshop.
- 3.2.7 Appoint patrons or goodwill ambassadors to amplify Seabed 2030’s messaging.
- 3.2.8 Obtain strong internal buy in for a communications, partnership and fundraising strategy.

3.3 CONSOLIDATING TECHNICAL AND HUMAN CAPACITY

- 3.3.1 Explore feasibility of potentially using the SEA-KIT to undertake an ocean floor mapping trail or pilot for Seabed 2030.
- 3.3.2 Collaborate with industry to explore new technological approaches to seafloor mapping that enhance coverage and reduce costs.
- 3.3.3 Examine synergies and work in close tandem with The Nippon Foundation’s DeSET project, which is incubating and supporting three companies to develop seabed mapping technology.
- 3.3.4 Work with stakeholders to increase the data processing ability of alumni for their future roles as ocean stewards.
- 3.3.5 Build a “Knowledge Center” so stakeholders, academics and researchers can find all relevant research, press releases, presentations, pictures and videos related to the project in one place.

3.4 CORPORATE GOVERNANCE, MEASUREMENT AND ORGANIZATIONAL CULTURE

- 3.4.1 Strengthen internal communications by routinely sharing memos, best practice and holding regular meetings to create a stronger and more cohesive project team.
- 3.4.2 Consult extensively and formalize consensus for the most efficient administrative work flows for Seabed 2030.
- 3.4.3 Create the requisite legal and administrative framework to raise funds.
- 3.4.4 Write agreements with a first list of partners.
- 3.4.5 Measure all activities to evaluate what's working/can work better and to ensure best return on donor dollar.
- 3.4.6 Engage with the GEBCO community, including its subcommittees, throughout the year.

4 DATA AND MANAGEMENT

Through its second year budget cycle, Seabed 2030 will deploy a phased approach to data gathering at a regional level and enhance that by strong corporate-level support. All Regional Centers will assemble their own regional grids from cleaned data sources for handover to the Global Center for final assembly into global products. As per current projections, it is expected that the new data products will be shared with the wider public in December 2018.

At a regional level, all Regional Centers will, by the end of Year 2, leverage all the work done towards establishing Regional Mapping Committees (RMC) to formalize such structures. This will build a community of bathymetric mappers and data providers across different sectors such as industry, academia, government, etc. Within each region, the Regional Centers will include a range of point and gridded data products and metadata describing underlying data sources and contributors. This work will rely heavily on work done during Year 1 to identify and prepare key data sources and will allow the project to test, refine and align its initial technical data-integration and attribution procedures and workflows. Data contributions from existing archiving and assembly efforts such as US National Centers for Environmental Information (NCEI) which serves as the IHO Data Center for Digital Bathymetry (DCDB), the efforts of the US-Canada-EU Atlantic Ocean Research Alliance (AORA), contributions of international institutions and individual researchers, the Global Multi-Resolution Topography (GMRT) and the European Marine Observation and Data Network (EMODnet) will help support Seabed 2030’s mission.

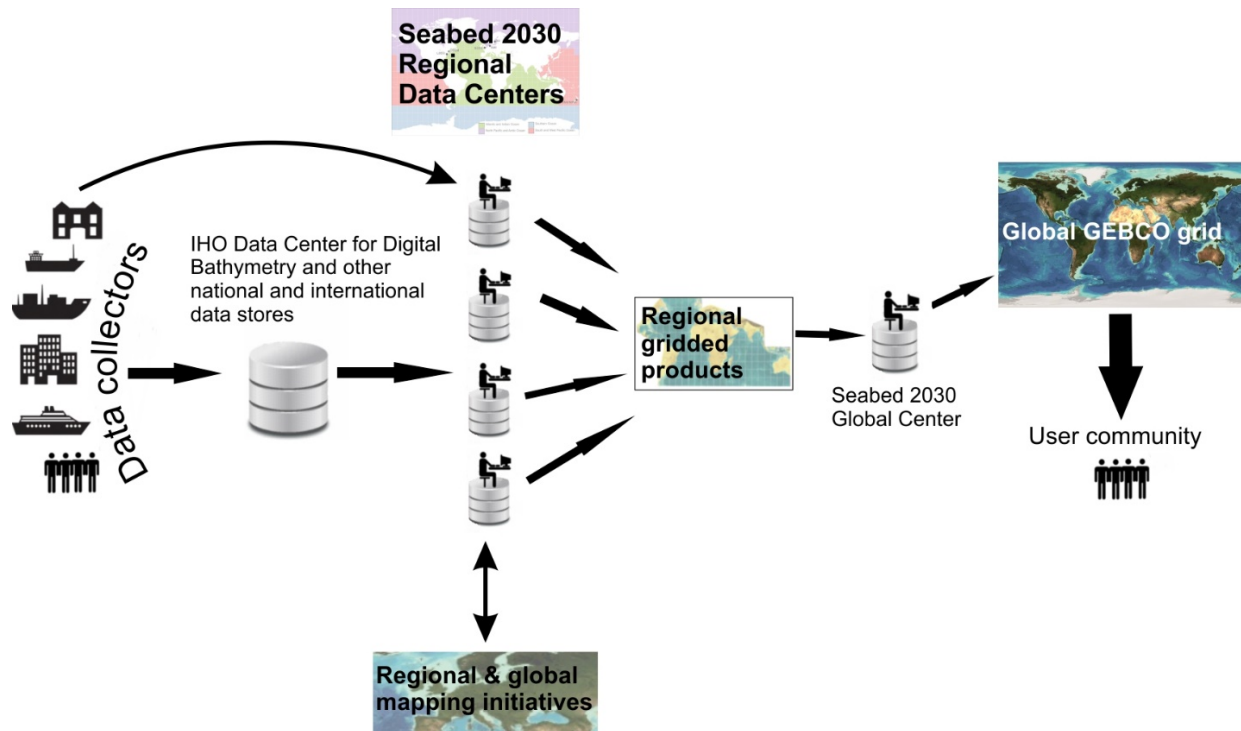


Figure 7: The NF-GEBCO Seabed 2030 workflow showing how data is collected, deposited, converted into regional gridded products and a final global grid.

Care will be taken to develop, nurture and build personal relationships that will last the duration of the project. Given that none of the Regional Centers are neither equipped nor can take on the role of becoming data repositories, a work flow will be set up so that Seabed 2030 will recommend that source data contributed to the project will flow to the IHO-DCDB. This is the recognized IHO repository for all deep ocean bathymetric data (deeper than 100m) collected by hydrographic, oceanographic and other vessels. Jennifer Jencks, Director of the IHO-DCDB and others will be invited to and play a prominent role in these discussions, which will ensure that all data submitted to the project will be easily accessible to the public and preserved in perpetuity.

Key regional mapping events will be held as follows:

Seabed 2030 Arctic – Antarctic – North Pacific Mapping Meeting, 2018 October 8-10, 2018:

The Arctic-Antarctic and North Pacific Mapping Community, will be invited to this event which will formally establish a Regional Mapping Board for each of the regions: Arctic Ocean, North Pacific Ocean and Southern Ocean consisting of representatives from relevant countries and organizations. The RMCs will work closely with the editorial boards of the International Bathymetric Chart of the Arctic Ocean (IBCAO) and the International Bathymetric Chart of the Southern Ocean (IBCSO) and in many cases will include the same people. The Committees will identify new bathymetric data sources and coordinate upcoming mapping expeditions. The event will be hosted by Stockholm University, the University of New Hampshire and the Alfred Wegener Institute which manage the North Pacific the Arctic and Southern Ocean.

2018 Atlantic/Indian Regional Mapping Committee Meeting, week of October 29, 2018:

The Atlantic/Indian RMC meeting is currently scheduled for the week of October 29 and will be held at the Lamont-Doherty Earth Observatory in Palisades, NY. Several Alumni of the GEBCO-Nippon Foundation Training Program were invited to be a part of the RMC, and all responded enthusiastically. This meeting is being planned in coordination with colleagues at the National Oceanic and Atmospheric Administration (NOAA), who are eager to work within and across several US federal agencies to further contributions from US coastal waters to Seabed 2030. The meeting is also planned to coincide with the AORA Atlantic Seabed Mapping International Working Group, which has already been working for several years to coordinate international mapping activities in the North Atlantic among the EU, US and Canada.

2019 South and West Pacific Regional Mapping Committee Meeting, first quarter 2019:

The first meeting of the RMC for the South and West Pacific Regional Center will occur during the first quarter of 2019. This meeting will be held in Wellington, New Zealand. The members of the RMC, the center's Technical Management Committee, and other key people will be invited and encourage to attend. This could include Alumni of the GEBCO-Nippon Foundation Training Program. This first meeting will be critical to (1) establish solid trusting relationships between all countries within the "jurisdiction" of the RDACC, (2) identify new bathymetric data sources, and (3) initiate the coordination of upcoming mapping expeditions. The heads of the other RDACCs will be invited as well as the Seabed 2030 Director.



Data assembly tools, common software and standards will be developed by all Centers, which will also curate appropriate metadata to attribute the sources of the data sets they have acquired and integrated. The Centers will work together to develop and utilize standard techniques for regional grid assembly and data attribution. Additionally, web-based data visualization and delivery tools will be developed with partners such as NOAA and appropriate Web and Apps based technology will be built to give users easy and interactive access to high resolution bathymetric maps.

Efforts will be made to map the gaps by presenting information about data gaps and to help guide future mapping expeditions at all levels. Work done at the IHO-DCDB lays the groundwork for an integrated map viewer to facilitate this. Several groups have already sought this information to ensure that data they acquire can most effectively fill data gaps.

At a corporate level, the Project Team will showcase global best practice, as exemplified by the US academic research community which has already submitted raw multibeam data from nearly 2,000 research cruises to the IHO-DCDB, and the US Federal Government Fleet which has made data available from ~600 additional cruises. Since the early 1990s, data from the US Academic Research Fleet has been processed, curated and integrated into the GMRT Synthesis at Lamont-Doherty Earth Observatory, which has been part of the GEBCO grid since the 2014 release. The most recent public release of GMRT (v. 3.5) includes data from over 1,000 cruises covering an estimated 30,130,308 km² which is being supplied to Regional Centers for integration into forthcoming data products.

Given the evolving consensus within the team, and more widely in the community, of the requirement to fund expeditions for mapping identified gaps, the NF-GEBCO Seabed 2030 project will submit a paper to highlight this important area.

With an international fleet of potential contributors including approximately 700 research vessels, 1.3 million fishing vessels, 50,000 container ships, 350 cruise ships and over one million kilometers of submarine cables, crowd sourced bathymetry presents a huge opportunity. To leverage this opportunity the project will work in tandem with the IHO's Working Group on Crowdsourced Bathymetry to collate data for the project collected by other ongoing crowdsourcing initiatives.

More recently, Seabed 2030 has cultivated very strong partnerships with surveying companies, Fugro and Ocean Infinity, who have already contributed a combined total of 225,000 km² of data – roughly half the size of the landmass of the United Kingdom. **Ocean Infinity has committed to contributing 125,000 km² of data from its recent search for missing Malaysian airliner MH-370, making it the single largest contributor of commercially-acquired data to the project.** The project has been promised other survey and transit data from Ocean Infinity and it will continue to work very closely with the company, which will soon be recognized as the leading contributor of industry data in a “Roll of Honor” on the Seabed 2030 website.



Figure 8: Ocean Infinity's AUV's being prepared to autonomously map the ocean floor, aboard Seabed Constructor

Fugro has displayed exemplary corporate ocean responsibility by acquiring data while its survey vessels transit between projects and contributing that raw multibeam data to the IHO-DCDB. Thanks to innovations in its technology platform, these ships are able to collect data without dedicated staff on board. Fugro has already contributed around 100,000 km² of data and has just doubled the number of vessels working on the project to four. The company plans to eventually roll out the approach to its entire deep-water global survey fleet.

Recently, Fugro has announced it is also working with its clients to investigate how proprietary data might be shared with Seabed 2030. Given that some datasets contain sensitive information, Fugro is planning to protect the integrity of client-owned data by requesting a reduction in the resolution of the datasets. The Project Team will work closely with Fugro and its clients, including oil companies to obtain such data for the project.



Figure 9: David Millar, Fugro's Director for the Americas, is playing a pivotal role in obtaining vital data for Seabed 2030.

In recent months, Kongsberg Maritime has also developed into a strong partner and the company has expressed great willingness to help reach out to its multibeam sonar users from around the world. To take this growing partnership forward the project team will participate in the **2018 Kongsberg User Conference to be held in Bordeaux, France, in September, 2018.** The first presentation of the conference, to be delivered by Dr. Vicki Ferrini, will describe the Seabed 2030 Project and will call on conference participants, and their professional networks, to join the effort by contributing existing data and helping to acquire new data whenever possible. The Project Team attaches great importance to its participation in this event.

INMARTECH Meeting, October 2018: The 11th International Marine Technicians Symposium, INMARTECH 2018, will be held in October 2018 in the US. This meeting is a forum organized as part of the International Research Ship Operators (IRSO) Organization to facilitate the exchange of knowledge and experience among sea-going technicians from research vessels worldwide. Dr. Ferrini attends this meeting routinely as part of related projects, and as in past years, will be co-organizing a multibeam sonar training event during this year's meeting. During the multibeam training session, and throughout the meeting efforts will be made to raise awareness about the

Seabed 2030 Project among research vessel technicians to help extend our global community and identify new sources of data.

Given that several other private sector companies have shown great interest in the project, the team will continue to work energetically in this space and engage explorers such as Microsoft co-founder Paul Allen for data. Section 4 will describe in some detail how the project will recognize the data contributions and support of various collaborating organizations and institutions.

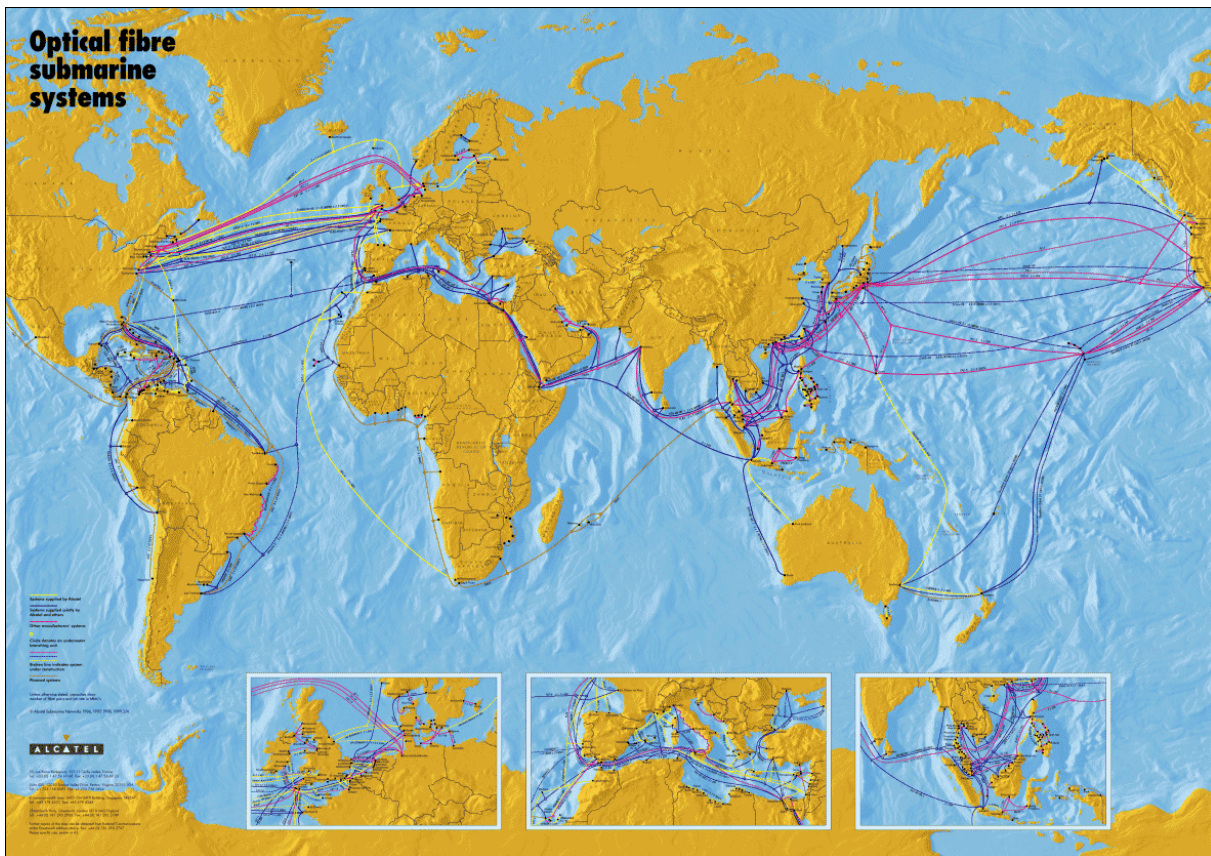


Figure 10: The map above showcases the approximately one million kilometers of submarine fiber-optical cables, making submarine cable companies a key crowdsourcing ally. Google has just announced it will also be laying three new cables in 2019.

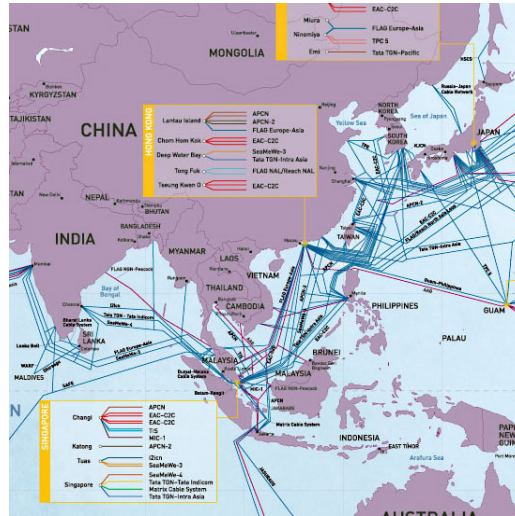


Figure 11: Submarine cable networks are highly developed in Asia, particularly China, Japan, South Korea, Malaysia and the Philippines.

To scale up crowdsourcing efforts, the Project Team will send a newsletter to hundreds of companies that are already part of a corporate ocean responsibility program, called “Smart Ocean Smart Industries”, with the World Ocean Council. An appropriate workshop or forum will be held during the projects second year of operations.

The Project Director, after obtaining requisite guidance from the IHO’s working group on crowdsourced data, will lead efforts to work with commercial companies to define the required processes, standards and protocols to facilitate the easy integration of crowdsourced data into the Seabed 2030 products.

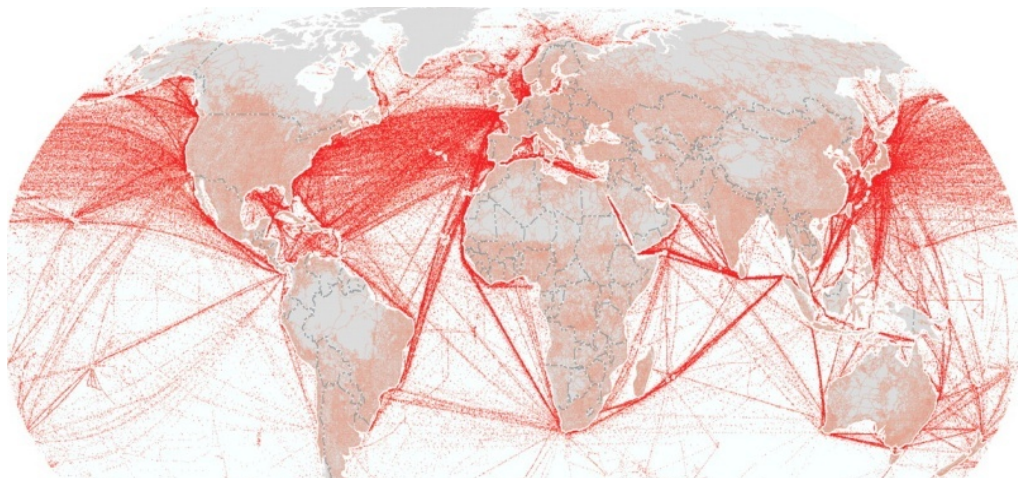


Figure 12: The global shipping network has over 50,000 ships. Containerized ship traffic has been increasing 10 percent annually since 1985.

Encouraging hydrographic organizations to share data, will be an initiative championed by the Project Director and for which appropriate guidance and assistance will be sought from the IHO. Initial focus will be placed on a few select countries that might yield positive results to create a global domino effect.

The web application for delivering the new GEBCO global grid and accompanying metadata will be upgraded through a two-stage process:

Stage 1:

Modify the existing application in order to be able to deliver the new GEBCO grid.

Stage 2:

Re-design of the application for delivering the GEBCO grid, to include:

- ➔ Simplifying the mechanism for accessing and downloading the data sets.
- ➔ Enhancements to the map display of the GEBCO grid and inclusion of additional map layers.
- ➔ Display and query of the coverage of the source data sets included in the GEBCO grid.



5 BUILDING A GLOBAL COMMUNITY

In its first operational phase, NF-GEBCO Seabed 2030 made very significant progress towards building a motivated international community to support the project's ambitious goal. In its second full year of operations, the project will continue to build on this mission, but it will take effective strategy, time, effort and seamless execution from the Seabed 2030 Project Team to succeed.

Seabed 2030's community or stakeholders are those who share our goal of mapping the entire ocean floor by 2030. Currently this community consists of international organizations, GEBCO-NF alumni, hydrographers, environmentalists, research and academic institutions, as well as the private sector (fisheries, shipping, data companies, etc). The stronger this community the easier it will be for Seabed 2030 to accomplish its key goals, especially crowdsourcing data. WWF, the global environmental organization, has set standards for such a practice by maintaining a list of over 6 million supporters, who support WWF campaigns, apply public policy pressure and also financially support the organization.

Following best practice or the mantra of always maintaining a master list, all Regional Centers and the Project Director will continuously map and study the project's audiences. They will also constantly input names into a master list that will be maintained by the Global Center. Seabed 2030's website will have a section on "Get Involved", which should also generate many names. Budgetary provisions have already been made to scale up the master list of names from 1,200 to approximately 3,000 in 2018-19. They will all be accumulated in a data base or even on the website so they can easily be accessed by the entire project team. Throughout the year, the project director will send communicues or direct messages to these key stakeholders so they remain energized and can eventually also be used to "crowd fund" resources for expeditions.

Energizing Seabed 2030's community through a logo: A logo is a potent symbol of what an organization, project or community stands for and can energize and enfranchise people around an important cause. Logos are also prerequisites to campaign, for instance around making contributions of any kind, to attract partners, find funding, grow as a global movement and build a rock-solid brand in this space. There has been some discussion around a logo for Seabed 2030 and a decision needs to be made quickly so the issue does not potentially become divisive and before the initial foundation energy of Seabed 2030 dies down. The Seabed 2030 Project Team will ensure this issue is resolved to the satisfaction of all stakeholders very early in its 2018-2019 work cycle.

Engaging Seabed 2030's community with good content is a logical next step. Communities do rally around good logos, but to constantly get them to support the goals of a movement they have to be connected to and motivated by its "messaging" or content strategy such as films, website posts etc. In 2018-2019 Seabed will produce at least four films, some of them in partnership with key allies like Fugro and Ocean Infinity. The joint productions help in rewarding allies whose main motivation for supporting Seabed 2030 is because they value the currency of recognition we offer.

Good content needs to be channelized through various distribution channels to justify production costs and staff time. Both content and distribution are important and this is perhaps best summed up in the phrase: “Content is King, but Distribution is God”. The following will be some key Seabed2030 distribution channels:

Webpage or presence: Seabed 2030’s web presence will be the primary medium for keeping the global community together and informed of events, achievements and what the movement stands for. The Global Center will take the initiative for upgrading the project’s current website by engaging an external consultant. Various initiatives such as tabs for “Organizational Structure”, “Frequently Asked Questions”, “Resources for the Media”, “Get Involved” and a “Roll of Honor” for data donors will be completed early in the 2018-2019 budget cycle. All together these will showcase Seabed 2030 as a communication savvy, influential and forward looking movement.

Media and social media: In its operational phase, the project team has invested heavily in regular meetings and interactions with the global media. This practice will continue in the project’s second year cycle to bring the needed attention to partners and showcase key achievements, data contributions, partnerships new cruises and technological developments. Traditional media operations will be reinforced by a robust social media presence (Facebook, Twitter and LinkedIn) which will not merely inform, but engage stakeholders in lively discussion and debates

Science meetings: The engagement of the science community, still primary data suppliers for Seabed 2030, is key to the continuing development of new mapping initiatives. During 2018-2019, the project team will continue to present the work of Seabed 2030 at key scientific meeting, such as AGU. The focus will be on Keynote addresses wherever possible, highlighting the science drivers and encouraging collaboration through sharing of data.

Outreach events: As part of its 2018-2019 work plan, the project team will list all key maritime community forums in a shared work space so decisions can be made as to who would be most suited to attend and promote Seabed 2030 at such forums. The project will organize one media interaction to announce its 2018 map.

Thought Leadership: Since Seabed 2030’s primary goal is to build a global common good in support of the UN’s SDG14, op ed or opinion pieces will be written and distributed through Project Syndicate, the world’s largest and most influential syndication service in this space. It feeds 500 major global newspapers and the audience segment we would reach through this initiative would be policy makers, intellectuals and environmental/development gurus.

Patrons, Goodwill Ambassadors and other force multipliers: At this stage in its life journey Seabed 2030 would greatly benefit from the support of a “patron”, whose global standing would catalyze nation states and the entire global maritime community to support this ambitious and visionary initiative. Projects and campaigns frequently make such appointments to protect or champion the project’s cause. This is done by using a patron’s image, issuing quotes and news releases approved by a focal point appointed by the patron. Patrons also make speeches, engage in



international advocacy and diplomacy, and participate in events, including press conferences and make recommendations for strengthening the project. Such relationships need careful management to ensure an already very busy patron does not feel over-burdened.

All press coverage will be monitored, assessed and shared with key stakeholders as a standard operating procedure. All media interviews and coverage obtained from staging press conferences will be carefully collated in a data base to examine audiences reached and impact. Based on such analytics the project will prioritize working relationships with select news organizations and journalists. All social media will also be carefully monitored for analytics and have set goals. For instance, by the end of the second year budget cycle, Seabed 2030's Twitter feed should have an estimated 750 high profile followers.

Institutions and individuals who work with Seabed 2030 will be recognized as follows:

- International organizations, academic institutions, governments, NGO's, private sector and industry groups that are actively participating in program and policy development, program promotion will be given the status of "Partners".
- Entities that use their networks to obtain data from other sources will be acknowledged as "Supporters".
- Fishing boats, fishing companies, fishing associations, maritime shipping companies, survey companies and other vessel owner/operators who provide crowdsourced data will be listed as "Data Donors".
- Organizations that sponsor a workshop or make financial donations will be given the title of "Sponsors".
- Those who provide in kind services will be recognized as "Contributors".
- Individuals and organizations who amplify the movement's messages through speeches, social media, blogs and op eds will be tagged as "Promoters".

Currently Seabed 2030 has 42 recognized partners. It is expected that on-going discussions with at least 8 other organizations will bear fruit in 2018-19. All partners, their key contacts and their exact status will be listed in the project's common work space. The Director will lead this initiative with support from the Global Center.



6 CONSOLIDATING TECHNICAL AND HUMAN CAPACITY

While many technological innovations to map the ocean floor are already underway, Seabed 2030 will continue during 2018-2019 to identify technological gaps and will explore initially through workshops and collaboration with industry, new approaches to seafloor mapping as well as computing technologies, web services and cloud storage that will enhance efficiency and coverage.

Seabed 2030 will continuously explore synergies the GEBCO-NF Alumni team for the Shell Ocean XPRIZE whose technology of using a remotely controlled surface vehicle which can autonomously launch and recover an AUV has brought significant potential benefits over traditional mapping missions. Such systems typically require large research ships with full scientific crews on board, resulting in costs of tens of thousands of US dollars per day. The USV/AUV model has demonstrated that high-quality bathymetric data can be obtained relatively inexpensively with little, to no human involvement at sea, thereby demonstrating the importance of autonomous technology for meeting Seabed 2030 goals. Given the truly disruptive and game changing nature of technology, the Seabed 2030 project will in this budget cycle examine the merits of potentially deploying the SeaKit for a trial pilot or mapping mission.

The project will interact closely with Nippon Foundation's DeSET project, which in coordination with Leave a Nest Company is developing seabed mapping technology. Currently DeSET is financially supporting three technology startups with \$450,000 each to convert their ideas into reality. Over the coming months, Seabed 2030 will interact, advise and support these companies to keep an eye on evolving technology for meeting its goals and to also ensure a reduction in technological barriers for ocean mappers.

Seabed 2030 will support technical innovation by appropriate messaging on its website and deploy its media and social media channels to amplify such solutions. Further, it will champion and prototype innovative solutions on Seabed 2030 mapping expeditions.

Crowdsourcing data in deeper waters by fishing, merchant vessels and cruise ships and evolving a strategy in this area will be another deliverable for the budget cycle (This area has been covered in depth in earlier sections and will not be expanded upon here.)

The Capacity Development Review initially planned for 2017-18, has been deferred to the 2018-2019 program of work to allow the project team to focus on priorities in the first six months of the operational phase of the project. The review will focus on the future capacity needs to achieve Seabed 2030 goals and will review existing capacity and capacity development programs, including the GEBCO-Nippon Foundation Training Program at the University of New Hampshire.

7 CORPORATE GOVERNANCE AND ADMINISTRATION

Seabed 2030's ambition, vision and passion to map the entire ocean floor by 2030 will be matched in 2018-19 by governance standards, team spirit and flawless execution of operational strategies.

Due to the globally dispersed nature of the project, the Project Director and the Global Center will invest energy in consolidating internal communications by ensuring all relevant documents such as Annual Reports, budget submissions, the project's Program of Work (POW), Back-to-Office reports, financial procedures etc are duly uploaded onto the project's common work space. Such practices should ensure a much needed common understanding, the development of strong relationships, and build an organizational culture which will emphasize co-operation and co-ordination. The project team remains confident such practices will soon be the envy of the global maritime community.

Seabed 2030's internal communications culture will stress regular project team meetings thereby enabling the Regional and Global Center to better understand the 2018-19 Program of Work, its budgeting parameters and all accompanying deadlines. The project team will meet remotely in cyber space to collectively formulate operational strategies, standard operating procedures and to brainstorm solutions for sensitive and pressing issues. These meetings will be organized with ample notice period by the Global Center in consultation with the Project Director and have set agendas. All key actions will be recorded and shared in a common work space to create a culture of efficiency and transparency. The Project Team will meet at least once in person during the 2018-2019 budget cycle and the meeting will include a team building exercise. The project director will participate in at least two key stakeholders meetings in the current budget cycle to strengthen relationships and avoid any potential communication misunderstandings.

An administrative framework for Seabed 2030 needs to be formalized so the movement can effectively raise funds. To enhance confidence in Seabed 2030 it will be imperative to sign agreements or MOU's with key partners to avoid potential misunderstandings and legal risks. During the second year of its budget cycle, new agreements will also have to be signed with all regional centers and the global center. Given such a workload, legal and accounting advice as well as some secretarial services will be required to support the Project Director and for the continued strengthening of the project.

Knowledge will be recognized as a core value by the project team and it will be very important to both store and build on this asset for both the success of the project and to ensure its legacy. As mentioned earlier in this document, the Global Center will help build a knowledge center which will benefit all project team members because they would find all necessary and available research such as key articles, presentations, pictures, future assessments and press releases in one place thereby reducing time, effort and energy in preparing research and academic papers. The knowledge center could later (with adequate resources) be converted into a knowledge repository for the benefit of the entire global mapping community, science and humanity.



Baselines and targets will be set and measured to gauge efficiency. This will allow the project team to assess what's working well and course correct as necessary. It will also ensure a culture of accountability both to the Nippon Foundation and GEBCO Guiding Committee.

Adapting global best practices. Seabed 2030 cannot function in isolation and will thereby always consult its three principal stakeholders, the Strategic Advisory Group, other partners and international organizations on management and administrative best practices. Training will be offered to staff as necessary and to ensure they have the requisite skill sets to deliver their tasks efficiently and on deadline.

8 CONCLUSION AND RISK MANAGEMENT

- With the above program of work, the project will continue to provide The Nippon Foundation a very meaningful and high return on investment.
- The project team will deliver a global grid in December 2018 based on source data covering **9 percent of the ocean floor** and gather enough data for producing a global grid in December 2019 with source data covering **12 percent of the ocean floor**.
- As the project grows there is an urgent requirement to build trust by continuously strengthening communication among the three key stakeholders.
- All stakeholders need to recognize that some environmentalists and the media remain skeptical of the project because they believe a map of the ocean floor can only lead to greater “exploitation” of the oceans and harm marine life.
- The Project Team will work to refine and enhance data integration and attribution processes and workflows to ensure efficiency and scalability of operations.
- The project needs to constantly strive for operational efficiencies and work with all key stakeholders to reduce high administrative overheads.
- Given the administrative, legal and accounting workload of the Director, he needs to be adequately supported in these areas.
- The 2018-2019 Program of Work document will guide the team in achieving targets and will be uploaded onto the team’s common work space.