GEBCO Ten Year plan
Comments by Group 1

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The members of the GEBCO ten-year vision Group 1 felt that:
GEBCO is, and should continue to be, the most comprehensive global bathymetry dataset; assembled by an inclusive, international community of experts, who support the open sharing of data and expertise.

The goals of the IHO-IOC GEBCO Project are to:

- Develop and constantly improve the portrayal of global ocean depths;
- Act as the designated international authority for undersea feature names;
- **Promote** (~~advance~~) the development and application of seafloor mapping technology;
- Encourage and facilitate cooperation leading to the exchange and preservation of bathymetric data and associated metadata;
- Foster collaboration among individuals and organizations with established and developing expertise so as to assist local and regional mapping efforts to attain a global standard of quality;
- Identify oceanic areas that are poorly mapped and disseminate information to promote mapping of such areas
- Promote education and training in ocean mapping **as well as a public outreach component**
- Bring together the **international** ocean mapping community and users of bathymetry thereby leading to products that are more widely used;
- Establish, develop and promote the development of regional mapping projects.

- Need a way to keep track of usage of GEBCO for accreditation purposes.
- We should encourage people who use GEBCO products to reference them in a standard way in all publications, so we can track how and where GEBCO data are used in the (scientific) literature.

General consensus that GEBCO needs to work on outreach and general awareness of current state of seafloor data coverage

1. Limits --- we are bathymetry --- and other aspects of the seabed?

- GEBCO should continue to focus on bathymetry and compiling bathymetry.
  - There is plenty of work to do just on bathymetry and this should be our focus.
  - Combining data sets for a coherent picture
  - Include appropriate bathy products regardless of resolution

Group 1 suggests a possible dual role for GEBCO into the future both producing :

1) **a seamless grid of data including predicted and measured data and**
2) **grid of measured data only (supported by associated statistics)**

2. Users/Clients --- who are ours? Hydrographers, researchers, Defence, industry - oil and gas, mineral, fisheries, NGOs, international bodies e.g. UN, FAO?

How do we want GEBCO to be used?

- Basis for models and science applications such as Disaster Prevention/Management (i.e. Tsunami-propagation modeling)
- Law of the Sea
- Outreach/Education
- Media and Political Awareness (i.e. which could drive licensing revenue for GEBCO too)

Group 1 thought that identifying and tracking GEBCO data users into the future will be important in future planning undertakings and in the definition of GEBCO's ongoing role and vision.

3. Source Data – from satellites, ships (commercial, yachts, navy, hydrographic offices, universities, research), buoys, AUV, gliders, surface autonomous, HO charts and ENCs

Predicted vs. Measured Bathymetry?

- In addition to an integrated product, maybe GEBCO could also provide a separate product with measured bathymetry only.
- GEBCO should also try to provide more statistics about percentage of area mapped with direct measurements vs. predicted – possible source of ongoing citations)

Should generate maps of coverage, accuracy, etc.

Expand SID and plot it to help raise awareness.

Group 1 suggests a possible dual role for GEBCO into the future

4. Data forms – maps, grids variable nested, GIS

- GIS, Grids (prioritized), Maps & GEBCO High-Res
- Expand Web Services
- Need maps showing explicit coverage - produce overlays of additional information in GIS (e.g. SID) and *statistics* - GEBCO should be authoritative with stats about % ocean mapped, etc.
- Outreach
  - Paper maps (PDF) should be released & *promoted*.
  - Suggest that GEBCO identify open-source tools that display GEBCO products (e.g. GeoMapApp) to help democratize data and help with visualization.
  - Provide the GEBCO grid in other formats (Geotiff or ArcASCII grid format, kml, WCS etc.)
  - Take more advantage of social media such as Twitter, LinkedIn, and others to generate awareness and build brand identity

Again the suggestion is that GEBCO should produce authoritative sea-floor mapping statistics and produce this in a citable format – this should include online material showing data coverage etc.

5. Data storage-- centres, distributed, cloud, commercial, performance

- Data storage solutions should be different for GEBCO Products and Components.
- GEBCO Products

  Requirements:

  Long-term preservation plan, Data DOIs, Download Stats

  Ease of uploading and downloading

  Cost-effective
- GEBCO Components

  Not all data are necessary to preserve, but if in public domain raw data should be preserved at a long-term archive (e.g. NGDC or similar repositories)

  Not all data are intended for distribution at full resolution

  Workflow dependent

  OK in a local working environment if necessary

Clarify how we work and publish provided data – feeds back into possible creative commons license. This might enable the industry (and other contributors) to feel comfortable to where they put their data and how they will be used. Tracking of data usage therefore also more important.

6. Product channels --- web, cloud, phones etc, paper, books, "google/ facebook", social media, films

- GEBCO WebSite needs a facelift
- Recommend a GEBCO Image Gallery
  - Disseminate cool 3D images of seafloor to generate interest
- Social media should have a small group of people who can add content to promote GEBCO. Could also involve GEBCO scholars and include cultural aspect, really promote international nature of GEBCO.
  - promote publications here too
- Should leverage Google infrastructure and outreach - layers, showcase, YouTube. This is an important strategic partnership that we should pursue.
- Emphasis should be on digital formats = highest priority as widest market – more than in just GMT format?
- Education media - provide products to schools
- Generate a pretty book for outreach (coffee table book) similar to "**Atlas of Deep Water Seabed of Ireland**"

More active end outreach is needed

7. Funding – governments, charitable foundations, industry, wealthy people, NGOs, product sales

Group 1 recognizes that this is a topic that needs to be explored further at either GGC or sub-committee level – but that it is essential into the future

8. Capacity building – NF UNH, University scholarships, teach the teachers, IOC/IHO, special courses, remote teaching, projects, higher degrees. Education/Outreach

- Social media
  - Social media, engage Nippon Scholars, build networks
- Broader Community Engagement
  - Web Gallery
  - Propose GEBCO/mapping-focused sessions at international scientific meetings
  - Publish Papers, Books (scientific and educational)
- Education
  - Utilize other workshops (e.g IHO RHC meetings) attended to host one day training seminars

Need to establish a small active working group that focuses on all aspects of education and capacity-building in the future – and generation of educational material

9. Technology – what will be new?

- Computer resources (hardware/software) are improving and will likely improve dissemination pathways. Need to continue to advance GEBCO products to make use of modern technologies and ensure accessibility. Need to stay current with technology to ensure that GEBCO is relevant to global scientific community.
  - Cloud-based computing - so having content accessible via web services is very important.
- 3D printing - presents new opportunities for teaching and outreach

Keep on-track with technology into the future

10. Data gaps – how to identify? how to fill? what resolution?

- Provide maps showing where actual measured bathymetry data exist. Perhaps this is a direct product of the GEBCO Regional Projects & GEBCO-HiRes? Also need something that can be used at sea to help opportunistically fill gaps.
  - Coverage by time (decade?)
  - Coverage by system (SBES, MBES)
  - Animation showing evolution of mapping coverage/quality over time
- Distribute GEBCO grids/data in a variety of formats:
  - Develop and improve existing Web Map Services (Downloadable:
    - GIS shapefiles/grids (Geotiff and/or ArcASCII grids)
    - KML
  - Create a GoogleEarth Showcase

Development of a GEBCO coverage of measured data only with emphasis on highlighting data gaps (and importance of predicted bathymetry in these regions) and the associated statistics would start to highlight how little is known about the seafloor.

This feeds into improving awareness and perhaps assisting in new data collection

11. How do we manage ourselves and projects? and
12. Who will do the work?

- Formalize organizational structure for different subcommittees/working groups?
- Provides more justification for members to show home institutions.
- Perhaps will develop into status similar to SCUFN

Develop active working groups (with some kind of internal formal structure) and look to leveraging international students as a potential workforce (not only Nippon Foundation / GEBCO alumni) – provides scholars with experiences, skills and access to GEBCO networks.

13. How do we best leverage interest from Private Companies? (e.g. outreach? etc.)

- Leverage private company interest in bathymetric data to promote GEBCO. By promoting GEBCO content, we may inspire more contributions to GEBCO. Increase visibility of GEBCO.
- Add page on GEBCO site highlighting where GEBCO data are used for a variety of applications, provide case studies.
  - Important to show both the real-world importance of and applicability of GEBCO data.
  - Subcommittee/volunteers needed to help with this level of outreach.

Need to work on showing importance of and applicability of GEBCO data