

National Plan for Bathymetry Data Acquisition

Workshop - 13 October 2016

Geoscience Australia, Canberra

Minutes & Action Items

Attendees

Daniel Ierodiaconou (Deakin University, Victoria), Tim Ingleton (Environment NSW), Michael Kinsela (Environment NSW), Alan Jordan (DPI NSW), Amelia Tandy (DoEE), Cameron Mitchell (GA – Energy Systems Branch), Guillaume Galibert (IMOS), Lawrence Ferns (DELWP Victoria), Adam Lewis (GA – National Marine and Earth Observations Branch), Andrew Coleman (Parks Australia, DoEE), Ursula Harris (AAD Data Centre), Chris Carson (GA – National Marine and Earth Observations Branch), Mark Case (AIMS), Ralph Talbot-Smith (WA DoT), Nick Lemon (AMSA), Luke Pugsley (AMSA), John McGannon (AHO), Tara Martin (MNF & CSIRO), Scott Nichol (GA - National Marine and Earth Observations Branch), Brendan Brooke (GA - National Marine and Earth Observations Branch), Andrea Cortese (GA - National Marine and Earth Observations Branch), Anna Potter (GA - National Land Information Branch), Stuart Minchin (GA – Chief of Division – Environmental Geoscience Division), Brett Brace (Hydrographer), Vanessa Lucieer (UTAS / IMOS), Chris Waterson (AHO), Kim Picard (GA - National Marine and Earth Observations Branch), Neville Barrett (UTAS)

Background

Early in 2016, three agencies (the AHO, IMOS and GA) began to discuss the growing need for improved national coordination of bathymetry data. From these initial discussions, a workshop was identified as the best means for progressing a national agenda for bathymetry. On 13 October 2016 GA facilitated this workshop at Geoscience Australia, hosting State and Commonwealth agencies to discuss the acquisition and management of this important national dataset. In particular, the objective of the workshop was to focus on development of a 'National Priority Map for Bathymetry Acquisition' as a first step to improve collaboration, and a way of targeting resources already available. The following summarises the workshop discussions and outcomes.

Presentations

Presentations from attending agencies were made providing information on:

- Bathymetry requirements - what do government agencies need/use bathymetry for?
- Agency-focussed priority areas, and why they were chosen as a priority.

Presentations were heard from:

- Australian Maritime Safety Authority (Luke Pugsley)
- Marine Biodiversity Hub (Neville Barrett)
- Geoscience Australia (Tanya Whiteway and Chris Carson)
- Australian Antarctic Division (Ursula Harris)
- DoTEE (Andrew Coleman and Amelia Tandy)

- NSW Office of Environment & Heritage (Tim Ingleton and Michael Kinsela)
- Australian Institute of Marine Science (Mark Case)
- Deakin University on behalf of Parks Victoria (Daniel Ierodionou)
- WA Department of Transport on behalf of Western Australian government agencies (Ralph Talbot-Smith)
- Australian Hydrographic Office (John McGannon)

Presentations are available from: Dropbox (link sent to shared users by email)

Introduction

There was agreement from workshop participants that there is a fundamental requirement for improved coordination of bathymetry acquisition and delivery at the national level to:

- Inform the allocation of resources for bathymetric data collection
- Increase coordination of survey effort
- Avoid duplication of survey effort
- Monitor progress of a national coverage of marine datasets such as bathymetric data, and be able to accurately communicate progress at a national level
- Build industry capability (e.g., skills and standards) for data capture according to required standards

There was broad interest in planning for a longer-term strategy to achieve a national coverage of bathymetry data. However, the workshop participants recognised that the first step in this process is to do more with the resources already available – for example, through opportunistically filling gaps in the national coverage. The national priorities map will provide information to support this process, and will also provide a means of improving collaboration between State and Commonwealth agencies to improve access to funding for important national priorities.

The workshop agenda originally focussed on the creation of a priority map for multibeam bathymetry acquisition to improve coordination. On the day, the workshop also touched on other matters that will improve the coordination process. These included Standard Operation Procedures for data acquisition and improved data flows.

Although not discussed in detail at this forum, the concept of Marine Spatial Planning was highlighted as a way in which governments might better accommodate the needs of a range of users – and that high resolution bathymetry data is an essential baseline for these initiatives.

Key Points of Discussion

Seven key themes were identified and discussed. For each of these themes action items and lead agencies have been identified below.

1. Why do government agencies need bathymetry data?

Prior to discussing how the marine community might prioritise bathymetry data acquisition, individuals from a number of agencies presented information on their agency's use of bathymetric data. This helped to build a shared understanding of the breadth of application of bathymetry data (and its associated datasets; backscatter and water column data). It also highlighted the complexity of creating a single national priority map. Attachment 2 captures some of these government uses.

Action 1: Create a list of ways in which bathymetry is used by government agencies. (closed)

During this session, and in the context of priorities for data capture, the coast emerged as a high-pressure, multiple-use area with incomplete coverage due to the difficulty of near-shore data capture and the (typically) narrower swath-width experienced in shallower waters. Work recently completed by the Marine Biodiversity Hub indicates that bathymetry data coverage on the shelf is approximately 5%¹ - much less than the 25% coverage of the much larger off-shelf area of Australia's Exclusive Economic Zone (EEZ). The Marine National Facility (MNF) vessel has acquired large swathes of data along the continental slope, where a single transit line can capture data in swaths some kilometres wide. The States' responsibility for coastal waters is leading to these waters being a focus for data capture by State government agencies using smaller craft and systems tailored to this need.

2. A prioritisation method and a draft priority map

One premise for the workshop was that improved coordination would be beneficial by discovering and exploiting opportunities to more efficiently capture data over areas of high importance. Although most data capture surveys are funded to address a specific need, the understanding that there exist many other uses for the data enhances the case for acquisition.

A major part of the workshop was allocated to discussing a method for developing a draft national priority map for bathymetry acquisition. The creation of such a map would greatly enhance the focus of government data acquisitions, improve direction for surveys of opportunity and highlight areas for national interest tests. A national priority map for bathymetry acquisition would also enhance the Hydrographers business case regarding an ongoing, funded bathymetry acquisition program for charting. The timeframe for contributions to these discussions is February when the Hydrographer meets to discuss the future of military and hydrographic data acquisition.

Action 2 & 3: Create and endorse a method for creating a national priority map.

The challenge in establishing a priority map is to frame priorities set at the agency level in a nationally consistent framework. Five teams workshopped the concept of a prioritisation method, and the majority of teams reached a position that a stepped process was required to create a representative map, but that all agencies must be allowed to establish their own priorities first.

Based on the workgroups, the following outlines a proposed **action plan** for developing a national priority map for bathymetry acquisition.

1. Each agency independently selects priority areas based on their needs. Some general guidelines (there may be others) for selecting a priority area include:
 - a. areas where more bathymetric data is required for safety of navigation
 - b. areas where there is a known pressure and baseline data is required to provide information to support an environmental assessment and monitoring
 - c. areas where there is resource competition and baseline data is required to support better understanding of the issues
 - d. areas where data is urgently required to support policy and government decisions
2. All agencies rank their priority areas 1, 2 and 3 based on urgency of the need for the data, and impact of the data.

	<i>Immediately / urgently (1-2 year)</i>	<i>Short to mid-term (2-5 year)</i>	<i>Mid to long-term (5-10 year)</i>
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¹ Source: V. Lucieer. Note that this is in waters inside of 160 m on the shelf, across all four tiers of data mapped by the NESP project.

Very High impact, high risk if not acquired	Priority 1	Priority 1	Priority 2
High -Moderate impact, moderate risk if not acquired	Priority 1	Priority 2	Priority 3
Moderate - low impact, low risk if not acquired	Priority 2	Priority 3	Priority 3

3. All agencies create a priority areas shapefile with the following information provided as attribution:
 - a. Name of the area (to describe location)
 - b. Area (km²)
 - c. Business needs for bathymetry in the area
 - d. Data quality required (refer to SOP's produced for Action item 8)
 - e. Timeframe in which the data is needed
 - f. Reason why the data is needed in this timeframe
 - g. Importance ranking of the data/impact (i.e. very high, high, moderate, low)
 - h. Description of why the selected importance ranking was given
 - i. Risk rating if the data is not acquired (i.e. high, moderate, low)
 - j. Reason why this risk rating was given (impact if the data is not acquired)
 - k. Requesting agency
 - l. Contact email for requesting agency
 - m. Any opportunities identified where the data may be able to be acquired
4. All agencies send their priority area shapefiles to the coordinating agency.
5. Coordinating agency compile all priority area shapefiles to create a draft "national priority map"
6. Draft national priority map sent to all agencies for review/discussion

The concept behind this priority selection process is to allow agencies to individually nominate areas, and make their own judgement of its importance.

Action 4: Create a national priority map.

3. Resourcing/aligning effort (hydro, environment, others)

A collaborative approach to bathymetry data acquisition will help to avoid duplication and to make the most of the infrastructure available. A clear national agenda and united plan is required prior to pursuing scarce government resources.

A number of concepts were discussed to improve collaborative effort and ensure the marine community is utilising resources to their full potential.

It was noted that Australia doesn't have a single point of truth to show where high-resolution bathymetry data exists in Australian waters. This fundamental dataset is essential as it establishes a baseline from which we can:

- a. Plan future surveys better and contribute towards a full EEZ coverage
- b. Monitor our progress towards a national coverage.

Action 5: Develop a national map of bathymetry coverage.

During the workshop it became clear that there are limited opportunities for stakeholders to exchange information on proposed, planned and active surveys. The AHO does email notification to listed stakeholders of survey. However, this is not a widespread practice and opportunities for collaborations are often missed, and there is no consistent way to avoid duplication of effort.

Action 6: Develop a national survey register.

It was noted that WA has already implemented a system similar to this that may be able to be applied to help develop this capability nationally.

Finally, the working group also identified that although there are diverse marine skills and marine equipment located in many government agencies, there was no central record of who and what these were, and how to access them. Managing capability and capacity better would ensure resources are fully utilised, and would help to avoid duplication of services within the government.

Additionally, in early 2017 AHO is having discussions within Defence regarding an ongoing, funded bathymetry acquisition program for charting. The AHO will be exploring the capability/capacity of industry to increase resourcing, and a suitable marine and capacity list that includes both private and government resources would be constructive in supporting the AHO business case.

Action 7: Develop a National Marine Capability and Capacity List.

4. Standard data capture procedures

To improve interoperability and encourage collection of datasets for multiple applications it is essential that clear standard data capture procedures are available and applied for every survey. The workshop participants recognise that the AHO already has standards in place to ensure quality charting products. There is however a general recognition that not all surveys will be undertaken with the same high quality requirements. As such, the group recommend that SOP's include a range of procedures to suit varied user requirements.

Action 8: Develop SOP's for bathymetry acquisition with flexibility for different requirements.

As per Action 6, ideally upcoming surveys would be notified to a national survey register. Along with information on the location of the survey, the register would also specify the SOP to be used. If another stakeholder requires data in that area, and requires that it is captured to a higher standard, they may wish to co-fund the survey to a higher level of data capture.

Note that the AHO welcomes submissions of any bathymetry data acquired, even if the data is not acquired to the highest AHO charting standard. In many areas there is no data, and even lower quality data is important to help identify possible shipping risks.

The importance of backscatter and water column data was noted. The applications for these products are varied and growing (seabed hardness, habitat mapping, oceanography etc) and these datasets should be acquired concurrently with bathymetry wherever possible. SOP's should also be developed for backscatter and water column data. Currently, water column data is easy to collect and more difficult to process, but in 5 years from now will be easy to process. As a result we should ensure SOP's include water column acquisition.

Action 9: Develop associated SOP's for backscatter and water column data.

There are already national and international activities that are creating SOP's for acquisition of these datasets, and a number of people from the workshop are involved in these initiatives.

- The NESP Marine Biodiversity Hub project includes work to develop Standard Operating Procedures for marine data acquisition. Much of the drafting will occur by the end of 2017.
- AIMS and GA are collaborating to establish an acoustics network which would include both Government and private industry representatives. The organisers of the Acoustics Network will ensure they liaise with the NESP program to help circulate proposed SOP's with industry partners.
- There is also an international acoustic workgroup associated with Geohab that is currently working on Backscatter SOP's, and this working group is planning on tackling Water column standards next year – contact Vanessa Lucieer for details.

As these initiatives take place, it was agreed that the members of this group would ensure that these SOP's be used to meet the National agenda.

5. Coordinated data flows

Capture and access (archive, clean, data policy, discovery, download)

It is crucial to coordinate bathymetry data acquisition and management so that data can be collected once and used many times. Repeatedly throughout the workshop it was noted that although there were avenues for submission of bathymetry data to the AHO and GA, there were no clear data flows for submission or access of the raw data, and also cleaned data and products. In particular a number of agencies highlighted that data curation and archive is only one step in the process, and that data accessibility and interoperability are equally important.

It was noted that WA has undertaken a successful process to bring together all WA Departments to collate and organise data. There is an immediate and essential need for a collaborative effort to undertake a similar process to create a national workflow for bathymetry data, including improved data accessibility options, noting that we could draw on the WA experience.

Action 10: Form a working group to create a plan for optimal management of bathymetry data.

6. Industry data

Access to industry bathymetry data was a well-discussed topic at the workshop. It was highlighted as an important source of data that is not exploited efficiently, and especially considering there may be duplication of effort over areas that have already been acquired by industry.

Ideally a regulatory approach to standardise data submission from industry would ensure all data was available for the national coverage. It was noted that all seismic and well data from the offshore petroleum industry is submitted to GA as a requirements under the OPGGSA, but other geophysical data such as bathymetry or sub-bottom profiles are not. Because it is not a standard submission, when it is provided, it often misses metadata or standards that make data easily ingestible.

Without a regulatory driver, the objective of the industry proponent is to acquire data in the cheapest and most-convenient fashion possible. As a result, bathymetry acquisition is usually sub-contracted. Companies give up the IP in exchange for a reduced rate, and the data is held by a third

party, such as the contractor. Hence, the data is available, but often at a cost – through the sub-contractor.

In the interim, there is an opportunity to change the way government agencies undertake surveys for industry proponents. If all agencies seek minimal or no confidentiality periods (at least in areas not directly around the drilling area) and IP that allows distribution, then the data would form a valuable national asset.

The EPBC Act is also a powerful instrument that may be used improve coordination of bathymetry across industry and government. There is an opportunity to encourage data sharing between the industry and decision-makers. Through management plans, there may be an opportunity to assist in data transfer from industry.

7. Governance

The governance of this working group was broadly discussed. The group could be established as an entity on its own, or alternatively become a group under the National Marine Science Committee. It was noted that there are many other national initiatives like this one, and if the group doesn't belong to something bigger, it may not get traction, or may be seen as insignificant. Also, this initiative could sit easily under the NMSC as an action item on the National Marine Science Plan 2015-2025, particularly in the National Marine Baselines section. From the states perspective, it will be easier to report to commonwealth-driven/run program.

To address the need for a national plan for bathymetry acquisition the workshop attendees agreed to form a working group;

Action 11: Establish a bathymetry working group and a Terms of Reference for the Group.

Initially GA will champion the working group, which will include all workshop attendees. However, further discussions regarding roles and responsibilities should be undertaken as resources become available. More detailed questions will be addressed through a Terms of Reference, including:

- What is expected from this group, and what does the group want to achieve?
- What are the roles and responsibilities of the group, and individuals?
- Who can progress this working group and who are we missing?

It was suggested and accepted that a web-portal for this working group would help ensure everyone could access and share information.

Action 12: Develop a web-portal for the group.

Attachment 1: List of Action Items

Item	Action Item	Contributors	Lead	Timing
1	<i>Create a list of ways in which bathymetry is used by government agencies</i>	All – via presentations	GA	Attachment 2 in minutes
2	<i>Create a method for creating a national priority map</i>	All	GA	With minutes for review
3	<i>Endorse a method for creating a national priority map</i>	All	GA	December 2016
4	<i>Create a national priority map</i>	All	GA	31/01/2017
5	<i>Develop a national map of bathymetry coverage</i>	All	GA	
6	<i>Develop of a National Survey Register</i>	All	GA	
7	<i>Develop a National Marine Capability and Capacity List</i>	All	GA	
8	<i>Develop SOP's for bathymetry acquisition with flexibility for different requirements</i>	NESP; Acoustic Network; AHO; MNF	NESP, Acoustic Network	
9	<i>Develop associated SOP's for backscatter and water column data</i>	NESP; Acoustic Network; AHO; MNF	NESP	
10	<i>Form a working group to create a plan for optimal management of bathymetry data</i>	AODN, IMOS, WA, GA, AHO, MNF, CSIRO	GA	
11	<i>Prepare at terms of reference for this Group</i>	All	GA	
12	<i>Develop a web-portal for the group</i>		GA	

Attachment 2: Government applications of Bathymetry data

- Navigational safety
- Port monitoring
- Asset and threat identification
- Anchorage disturbance
- Alternative Energy
 - o Wave energy site selection and assessment
- Fisheries management
 - o Habitat mapping
 - o Population studies
- Charting
- Maritime Boundaries
 - o Mapping offshore reefs/islands
 - o Mapping connection to ECS
 - o Effective demonstration of Antarctic sovereignty
- Groundwater monitoring/modelling
 - o indications of seeps
- Tsunami risk
 - o inundation modelling
 - o submarine landslide risk
- Coastal processes
 - o Hazard assessment/monitoring
 - o Coastal vulnerability
 - o Geomorphological mapping
- Marine geological resource management
 - o Selecting sampling locations
 - o Seepage identification
 - o Structural interpretation
 - o Modelling baseline
 - o Geohazards
 - o Seabed stability and geohazards
 - o Seabed hardness
- MPA /environmental management
 - o Geomorphological mapping
 - o Baseline data
 - o Habitat Mapping
 - o Seabed hardness
 - o Connectivity modelling
 - o Monitoring (Improving efficiency of biological sampling)