



# COMPASS

COLLABORATIVE  
OCEANOGRAPHY  
AND MONITORING  
FOR PROTECTED  
AREAS AND SPECIES

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## D2.2.1 “Report on ‘Current Practices in Data Management Workshop’”

*“The views and opinions expressed in this document do not necessarily reflect those of the European Commission or the Special EU Programmes Body (SEUPB).”*

## Executive Summary

On Tuesday 13<sup>th</sup> and Wednesday 14<sup>th</sup> a February 2018 workshop was held to highlight the current state of data management across the partners in the COMPASS project. This document aims to report on the activity of the workshop and summarise the state-of-the-art in terms of data management at each of the partner institutions.

The workshop was jointly coordinated by two of the European data coordinating groups for the marine: the European Marine Observation and Data Network (EMODnet) and the European Global Ocean Observing System (EuroGOOS). The Data Management work package of the COMPASS project will try to further the relationship between the project and these groups in order to broaden the impact of the data collected by the network of buoys established by the project.

A number of actions arose from the workshop – centered on communicating progress in the data management work package for the project. Following the workshop, monthly work package update teleconferences will be arranged in order to keep all partners up to date and to discuss the implementation of the proposed data architecture for the project, which was detailed in D2.1.1.

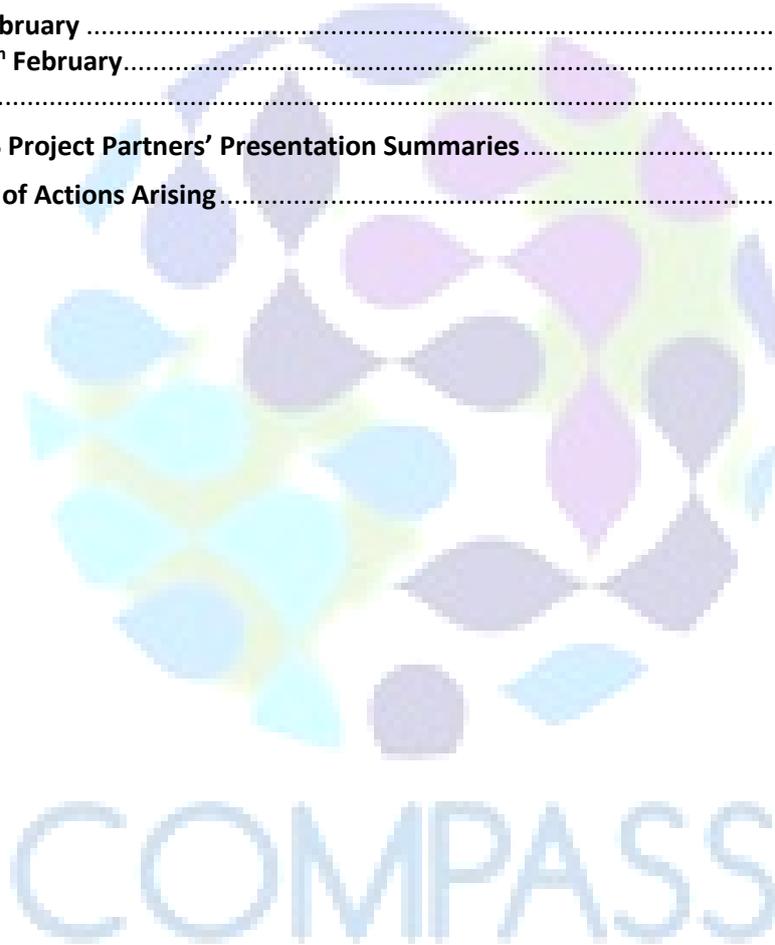
This report will be revisited later in the project as a baseline from which advancement in data management practice at the institutions in the project can be measured.



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## 1. Introduction

Task 2.2 of the COMPASS project involves an inward look at the current state of the data management processes in all partner organisations (that is to assess the processes of the implementation communities in the parlance of the IOC report). This document is a report of a collaborative workshop, which was held where areas of common practice were identified and areas for development, in light of the requirements and standards choices in Deliverable 2.1.1, were highlighted. This workshop included representatives from the relevant NODCs, and from European-wide initiatives including EMODnet and EuroGOOS, in order to provide guidance where necessary, creating an expert team from both within and external to the project. Later in the project, this task will document the relevant data management processes. This documentation should be of high standard and suitable for submission to the International Oceanographic Data and Information Exchange's Quality Management Framework. All work carried out will be reviewed at a second collaborative data management workshop. The review and revision of the processes should also address the sustainability of the data management network and any applications following the lifetime of the project. This sustainability should be achievable through making appropriate reuse of existing data management pathways and integrating a common suite of tools.

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## 2. Workshop agenda

Tuesday 13th February

- 09:30 Arrival and registration in the Brendan the Navigator Room  
09:45 Welcome, overview and introductions

### Session 1: The European Perspective

- 10:00 European Data Landscape  
10:20 EMODnet Physics  
10:40 EMODNet Ingestion  
10:50 Discussion  
11:00 *Tea and coffee*

### Session 2: National data management infrastructure

- 11:20 Introduction to Erddap  
11:30 Ireland's Digital Ocean  
12:00 COMPASS Project  
12:20 MEDIN  
  
12:30 *Lunch in the MI canteen - meal options starting from around €5.*

### Session 3: National ocean physical data generators

- 13:30 Commissioners of Irish Lights (CIL)
  - Navigation buoys and lighthouses  
14:00 NUIG, Earth & Ocean Sciences
  - Galway Bay Time-series  
14:15 Office of Public Works (OPW)
  - Tide gauges  
14:30 Marine Institute (MI)
  - ARGO floats
  - Glider data  
14:45 SMART Bay
  - Galway Bay Observatory
  - Wave buoys

15:00 *Tea and coffee*

### Session 4: COMPASS project data generators

- 15:20 Marine Scotland Science (MSS)  
15:30 Scottish Association for Marine Science (SAMS)  
15:40 Agro Fisheries and Biosciences Institute (AFBI)

15:50 Marine Institute (MI)

#### Discussion

- 16:00 Summary discussion and wrap up.  
17:00 Workshop close

#### Wednesday 14<sup>th</sup> February

- 09:00 Check in at Marine Institute reception, meeting in the "Rockall" conference room.
- *Ensure all attendees participating remotely are set-up via video conferencing.*
- 09:30 Introductions followed by a discussion on the state of the COMPASS project.
- *Buoy deployment dates & timelines by institution.*
- 10:00 Status of the data management work package by institution.
- *Procurement status?*
  - *Are data management/acquisitions systems in place and operational?*
  - *Blockages or other issues?*
- 10:40 Data dissemination.
- *ERDDAP progress by institution.*
  - *Any issues or support required can be raised here.*
- 11:00 Metadata
- *How ERDDAP can be set-up and used to output MEDIN metadata.*
- 11:20 Future Actions
- Establish a mechanism for more timely and regular discussion between the different participants. Monthly calls to act as a forum for issues and/or progress reports.
  - Arrange for the next call and propose deliverables before that date.

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## 4. Workshop minutes

Tuesday 13<sup>th</sup> February

Following a general welcome and introduction to the day, an overview of the European marine data landscape was given by representatives from EuroGOOS and EMODnet Physics. Through the EMODnet Ingestion project, facilitated by the National Oceanographic Data Centres, or NODCS, (the British Oceanographic Data Centre and the Marine Institute are the relevant NODCs for the COMPASS project) there exists an opportunity to connect data collected by the network of buoys established by the COMPASS project to these networks. Ensuring this connection from the project, through the NODCs to the wider European marine data landscape should become a long-term goal of the data management work package.

The next session was devoted to a discussion of the existing data management infrastructures in the UK and Ireland. Whilst this is primarily focused on the function of the NODCs, as laid out by UNESCO's Intergovernmental Oceanographic Commission through its International Oceanographic Data and Information Exchange, there are other key pieces to the puzzle. Within the UK, the NODC is the British Oceanographic Data Centre (BODC), based at the National Oceanography Centre and part of the Natural Environment Research Council's Data Centre network. BODC also sponsors the Marine Environmental Data and Information Network (MEDIN), which promotes sharing of and improved access to marine data. MEDIN is an open partnership of government departments, research institutions and private companies. As the Agri-Food and Biosciences Institute are also on the MEDIN sponsors board, and Marine Scotland Science have been heavily involved in the technical side of MEDIN it will make sense to use these connections and the Network as the facilitator for the COMPASS project to submit data to the European Data networks through BODC. Within Ireland, the Marine Institute hosts the National Oceanographic Data Centre. This role is currently evolving somewhat, but is now focused around Ireland's Integrated Digital Ocean platform and a partnership approach similar to MEDIN which will formalize during 2018. A key piece of the software infrastructure for the Digital Ocean platform is the Erddap data server which is supplied from the United States National Oceanic and Atmospheric Administration. Erddap is a useful technology as it can act as a broker from multiple input sources and formats to give a coherent, web-address based method of accessing environmental data. The Marine Institute have developed a number of features which have been included within the main Erddap code, the latest of which allows Google to index metadata served from Erddap directly as dataset metadata which is envisaged as support "rich snippets" for datasets in the near-future. It is proposed that a number of COMPASS project specific features could also be included, such as export of MEDIN compliant metadata directly from Erddap.

Due to the nature of the workshop, the Tuesday being co-hosted by: EMODnet Physics; EuroGOOS; and the COMPASS Project, the next session saw an overview of data provision from a number of Irish organisations. Many of these are not of direct relevance to the geographic area of interest to the Interreg-Va programme. However, as the Commissioners of Irish Lights operate on an all-Ireland basis, met-ocean data from some of their cardinal marks and buoys does cover the region. Acquisition and integration of these data will be considered for the project's final data dissemination portal as they are of contextual interest.

The final session was dedicated to the COMPASS project partners active in the Data Management work package presenting their current data management activities. Prior to the workshop, a list of questions had been circulated to them which they answered within their presentations:

1. Remit of your institute.
2. Locations of platforms and sensors (or geographic coverage of datasets)
3. Range of parameters collected with temporal resolution
4. Does your institute have an official data policy and if so what is it?
5. Availability of data (restrictions on use or embargo periods)?
6. What in house data management is currently in place (levels of processing and quality control)?
7. How your data are served (web download, emailed request etc.)?
8. Is the data routinely provided to any international projects, partners or infrastructure?
9. Any issues or problems experienced that others in the group may have encountered?

These COMPASS project presentations are summarised in Annexe 1.

### Wednesday 14<sup>th</sup> February

The Wednesday workshop was devoted entirely to the COMPASS project's data management work package. As a result, a smaller panel of data experts representing each of the partners were gathered together to share the progress each institution had made with respect to the technical deployment and data management.

As hosts, the Marine Institute opened proceedings – describing in excruciating detail the institute's work to date on the project and short-to-medium term plans for the future.

#### *Marine Institute*

The Marine Institute had suffered some minor blockages to the deployment of its single project buoy at the Maze Head locations. These blockages stemmed from supply chain issues with vendors for propriety technologies and services, such as sensors and sea fittings, which were deemed unfortunate but unavoidable by the Marine Institute's technical personnel. However, the Maze Head buoy was on course to be deployed and operational by the beginning of April 2018.

On the data management front, the Marine Institute would be using on board Campbell transmission devices to relay aggregated telemetry from the buoy site back to an email inbox at the Marine Institute's Galway campus. The received telemetry would be parsed through software before being stored in a SQL database, from where it could be distributed internally and eventually federated through the Erddap distribution server to external services as necessary.

It was finally revealed that, following deployment, there would be fortnightly site visits by Marine Institute technical and scientific staff for scientific sampling as well as to ensure device integrity. As a result of that process, there would be the option of taking the on-board drives back to the Marine Institute for inspection and to further confirm the integrity of the transmitted telemetry data.

#### *Agri-Food and Biosciences Institute*

Multiple representatives from AFBI presented an in-depth appraisal of their data management efforts to date, beginning with updates on the procurement of hardware.

All remaining tenders had been issued, with the final spend expected to take place in March 2018. These tenders included some final parts for on-board devices (e.g. pCO<sub>2</sub> sensor) as well as new server installations to facilitate data storage. Following the tender process, the hope was expressed that all

hardware would be available for use within a month of purchase.

On the point of procurement, AFBI confirmed that they had discovered that no financial advantage had been gained from group purchasing with the different partners. While pursuing this strategy no doubt delayed the procurement process, it offered a good template for information sharing between AFBI, the Marine Institute and Marine Scotland Science.

The primary mooring will be in the Western Irish Sea in an isolated sea area, offering a unique maritime environment for analysis, where mixing is limited due to stratification. The platform itself is already established but is now being refreshed with updated and improved sensors. This includes 2 CTD's for near surface measurements, a wave sensor (specifically not a wave rider – instead a modern accelerometer), a rest sampler, a PCO<sub>2</sub> sensor, as well as acoustic recorders and capabilities for fish tracking. With all of those, an Iridium acquisition system will be used to transmit telemetry from the platform back to shore.

AFBI have nominated July 2018 as the target for the commissioning of the fully operational buoy. It was acknowledged however that there may be a more progressive rollout, so the timeline may vary beyond the July deadline. Regardless of the mooring progress, the Belfast Lough Observatory would be brought in to augment data flow for the COMPASS project in the event of delays.

AFBI also raised several issues which were of material concern to the project. The first concerned power supply management of the platforms, a known risk of the project. The second and more pressing concern to the work package related to the security implications of implementing an ERDDAP server solution. As per their security policies, external computers could not have unlimited access to any server sitting inside the AFBI network. As such, a public facing ERDDAP system could not link directly into source databases. A proposed solution to this issue would be the establishment of a DMZ server to store mirror copies of internal network databases, which would act as an extra dividing layer, thereby insulating the AFBI network from any outside influence. Though accepted as a plausible solution, further issues were raised regarding the long term funding of such a DMZ as well as the associated processing overhead stemming from copying large volumes of data to it routinely. Although it was agreed that the use of ERDDAP would be continued and offer great utility for internal data dissemination, further discussions would be required before the system was ready for federation between the partners as well as public use.

#### *Marine Scotland Science*

MSS confirmed many details about the strategy the institution had in place for data management on the COMPASS project.

MSS had already deployed smaller devices to support the different work packages but the primary mooring itself was to be deployed start of March (now completed). Despite some standard procurement and device issues (PCO<sub>2</sub> issues specifically mentioned), it was expected that the mooring would be fully operational in time for an early March deployment. The mooring location is at the Loch Ewe coastal monitoring site which forms part of the Scottish Coastal Observatory and standard monitoring has been occurring at this site weekly since 2002.

Regarding data management, no telemetry system had been developed for any moorings so data itself was going to be retrieved manually on a quarterly basis. While not set in stone, the first recovery is planned for June 2018. MSS' existing processes will be used to manage that data and load it onto internal data servers.

Similar to other partners, the possible security issues previously raised by AFBI and which may exist for any UK-based partners, were acknowledged. As a result, there is a risk that additional procurement could be required for servers to facilitate a DMZ solution.

A specific cause for concern raised by MSS was the unknown interoperability of the ERDDAP server solution with their existing DKAN-based data catalogue system. Though discussed and not believed to have a material impact on MSS' current system, it was agreed to revisit the issue in more depth at future gatherings to assess fully.

#### *Scottish Association for Marine Science:*

The work package was updated on the progress made by SAMS for the work package and the whole project in general.

Multiple locations are being used as data gathering points. These consist of both existing and new sites. Platforms at existing sites possess already operational sensors and data acquisition systems which have been seconded into the COMPASS project. All sensors relating to the Marine Mammals work package have already been deployed and are collecting data.

For the new deployments, data management is still awaiting final deployment timelines but telemetry should be available without much delay.

Regarding data dissemination, SAMS have experience with ERDDAP prior to this project and have had already had some success in customizing it for their needs, including having a public accessible ERDDAP service.

Following these updates, conversation shifted to other matters impacting the work package. This included issues experienced with early deployments of Erddap as well as potential uses of the distribution platform. The most impressive of which was the ease at which the standard schema output of the Erddap system could be adapted to produce MEDIN-standard compliant metadata. A demonstration of how this could be achieved was presented to the group by the Marine Institute. While the MEDIN-standard is not yet a statutory requirement for all of the project partners, its importance for the UK-based partners in particular is only increasing. As such, the adoption of an Erddap system could significantly aid those institutions in abiding by their regulatory demands in future.

## 5. Action Plan

Following the two days of extensive discussions between the project partners, a series of actions were agreed upon. With this, additional means of control and communication were acknowledged to be necessary. The adoption of this was to ensure that the work package itself, as well as any cross-institute cooperation, could be effectively monitored on a regular basis. The aim of which was to avoid the potential for any blockages suffered by a single institution to go unnoticed and thereby having a negative impact upon the project as a whole.

Given this rationale, the first action noted by the group was an agreement to conduct regular (at least monthly) work-package specific calls with all partners to discuss progress and/or any blockages suffered. The first such meeting would be scheduled to occur by the end of March 2018.

The second action, influenced heavily by the first, was to set the agenda for the first group of work-package specific calls. That agenda was to ensure that the work package would be made aware of the specific database structures implemented by each partner as deployment occurred and data began to flow. This would include, but not be limited to vocabularies, standards and meta-data standards used. Dr Adam Mellor would aid in expediting this action as it would require participation from members of all work packages.

The third action sought to engage further with, the minor partner, Inland Fisheries Ireland to understand their plans for fish tagging as it related to the project as a whole and clarify what support, if any, could be provided by the data management work package. It was settled that the scientist on the salmonid work package from AFBI would make the necessary contact and report back to the group.

Building on the previous action, the fourth action saw AFBI agree to liaise with his colleagues in the Salmonid work package to facilitate a teleconference to confirm any additional requirements that work package may desire for the flow of data.

The fifth and sixth actions were an agreement of further expertise sharing between the Marine Institute and the other partners. Firstly, quality control process maps generated by data coordinators in-situ at the Marine Institute would be offered to the partners in order to help those institutions devise and augment their own efforts in the field of excellence. It was agreed that AFBI would have further discussions with data administrators in the Marine Institute about data strategy and infrastructure implementation respectively.

The seventh action was ongoing and was to continue to discuss and explore possible solutions for using the ERDDAP server technology as a means of data distribution while still adhering to each partner's internal security policies. This is not limited to the UK partner's network restrictions but also to MSS's DKAN concerns.

The final action, which would be ongoing, would be for each partner institution to continue in their present deployment and data management plans, as set out in the previous section. Updates would then be provided to the group on any significant deviations if they were to occur. The reasoning behind such an action was again to bolster understanding and cooperation between the partners. It would also give the work package leader confidence in the successful implementation and interoperability of the agreed data distribution platform (Erddap).

As always, any actions would be tracked for completion by the work package leader, Adam Leadbetter.

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## Annexe 1. COMPASS Project Partners' Presentation Summaries

Question	Agri-Food and Biosciences Institute, Northern Ireland, UK	Marine Institute, Ireland
<b>Remit of your institute</b>	The Agri-Food & Biosciences Institute (AFBI) carries out high technology research and development, statutory, analytical, and diagnostic testing functions for the Department of Agriculture, Environment and Rural Affairs of the Northern Ireland Government and other Government departments, public bodies and commercial companies.	The Marine Institute was set up under the Marine Institute Act 1991: <i>"to undertake, to coordinate, to promote and to assist in marine research and development and to provide such services related to research and development, that in the opinion of the Institute, will promote economic development and create employment and protect the marine environment."</i>  The Institute is the State agency responsible for marine research, technology development and innovation in Ireland. We provide scientific and technical advice to Government to help inform policy and to support the sustainable development of Ireland's marine resource.
<b>Locations of platforms and sensors</b>	In the waters of and near Northern Ireland	The waters around Ireland. A new deployment for the COMPASS project is due at Mace Head in March 2018.
<b>Range of parameters collected with temporal resolution</b>	Standard oceanographic and water quality parameters	A wide array of physical and chemical oceanographic parameters, with fortnightly in-situ samples also to be collected at Mace Head.
<b>Institutional data policy</b>	A corporate data sharing guidance document exists.	Available on-line <sup>1</sup> Data made openly available where possible, in line with the Department of Public Expenditure and Reforms Open Data policy.
<b>Availability of data</b>		Many data are freely available to download online.
<b>In-house data</b>	Graphical web publication; Email requests; Routine	A central Data Management team, supported by Data

<sup>1</sup> <https://www.marine.ie/Home/sites/default/files/MIFiles/Docs/DataServices/Marine%20Institute%20Data%20Policy%202017.pdf>

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<b>management</b>	automated reporting; Web Publication of selected datasets (commercial)	Coordinators in each scientific directorate, are overseeing the implementation of the Marine Institute's data policy.
<b>How are data served</b>	Data-sources come from a diverse range of unstructured, or semi-structured sources. Manual (human) intervention required to deliver data towards the structured data environment. Highly structured and secure data repositories which are compliant with gov't security standards QC is applied ad-hoc, with both automated gross error detection accompanied by routine calibration and in-situ reference programmes.	<ul style="list-style-type: none"> <li>• Erddap data server software</li> <li>• Esri Arc server products and REST services</li> <li>• THREDDS</li> </ul>
<b>Routine data provision to infrastructures, projects, programmes</b>	Data are submitted to the UK national Marine Environment Monitoring and Assessment National database (MERMAN) and OSPAR to deliver parts of the NI contribution for the UK's marine monitoring strategy  Operational and Data integration Data, data standards, and some operations are integrated across a number of partnered UK laboratories providing the opportunity for partnerships, integrated outputs and mutual support.	Routine submissions to SeaDataNet, and thereby on to EMODnet.  MI is the National Oceanographic Data Centre, so does not need to submit to another NODC.
<b>Issues / Problems</b>		

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Question	Marine Scotland Science, Scotland, UK	Scottish Association for Marine Science, Scotland, UK
<b>Remit of your institute</b>	<p>Deliver a more integrated evidence base that allows us to understand the functioning of marine ecosystems and the impact both individually and cumulatively of human activities</p> <p>Develop effective tools and resources, for developing a Marine Plan and, in particular, for making choices between uses, recognising the economic, environmental and cultural impacts</p>	<p>The Scottish Association for Marine Science (SAMS) was founded in 1884 by Sir John Murray. SAMS is committed to promoting, delivering and supporting high-quality independent research and education in marine science. It is focused on multidisciplinary research questions from Scottish coastal waters to the Arctic Ocean and Antarctic</p>
<b>Locations of platforms and sensors</b>	<p>West coast of Scotland</p> <ul style="list-style-type: none"> <li>• 6 passive acoustic monitoring deployments</li> <li>• Scottish Coastal Observatory (Lch Ewe mooring)</li> </ul> <p>Scottish shelf seas</p> <ul style="list-style-type: none"> <li>• Modelling</li> </ul>	<p>SAMS generally samples the North-East Atlantic region, with data also available from the rest of the North Atlantic; the Arctic Ocean and from the Southern Ocean (in particular focused around the Scotia Sea and the Antarctic Peninsula). Gliders are often deployed in the Atlantic and Arctic Oceans.</p> <p>Three stations are of interest to the COMPASS project – the Tíree mooring; the SAMS pontoon mooring; and the Loch Creran mooring. Gliders will also be deployed on the main shelf; and seven locations have Passive Acoustic Monitoring data which will contribute to the project.</p>
<b>Range of parameters collected with temporal resolution</b>	<p>PAM/CPOD</p> <ul style="list-style-type: none"> <li>• Hourly – Daily <ul style="list-style-type: none"> <li>○ Detection positive hours/days by species group</li> </ul> </li> </ul> <p>Ecosystem monitoring</p> <ul style="list-style-type: none"> <li>• Weekly <ul style="list-style-type: none"> <li>○ Temperature (Reversing Thermometer)</li> <li>○ Salinity (water bottle)</li> <li>○ Nutrients &amp; dissolved oxygen (water bottle)</li> <li>○ Phytoplankton (lund tube)</li> </ul> </li> </ul>	<p>In total (not at all moorings / sites / deployments):</p> <ul style="list-style-type: none"> <li>• Temperature</li> <li>• Salinity</li> <li>• Pressure</li> <li>• Current speed</li> <li>• pH</li> <li>• pCO2</li> <li>• Dissolved Oxygen</li> <li>• Fluorescence</li> <li>• Backscatter</li> <li>• Passive Acoustic Monitoring (PAM)</li> </ul>

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	<ul style="list-style-type: none"> <li>○ Zooplankton (bongo net)</li> </ul> <p>Loch Ewe Mooring</p> <ul style="list-style-type: none"> <li>● Half hourly – few times daily             <ul style="list-style-type: none"> <li>○ Current speeds and direction (Aanderaa Seaguard)</li> <li>○ Temperature, pressure and salinity (SBE 37 microcat)</li> <li>○ Met. Data (met station)</li> <li>○ pCO2</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● Click detection</li> </ul>
<b>Institutional data policy</b>	Contribution to open data networks	SAMS' current data policy has been in place since 2001. Since a replacement is needed, the University of the Highlands and Islands data policy is being adopted.
<b>Availability of data</b>	<ul style="list-style-type: none"> <li>● UK Open Government License (CC-by)</li> <li>● Minimum level of 3-star Open Data</li> </ul>	Generally, SAMS place an embargo period of 2 to 3 years on their data. However, data may be made available before this period for certain projects and purposes.
<b>In-house data management</b>	<ul style="list-style-type: none"> <li>● Standard Operation Procedures             <ul style="list-style-type: none"> <li>○ Quality Control                 <ul style="list-style-type: none"> <li>▪ Internal discovery / re-use                     <ul style="list-style-type: none"> <li>● Interoperability / accessibility / external re-use</li> </ul> </li> </ul> </li> </ul> </li> </ul>	
<b>How are data served</b>	<ul style="list-style-type: none"> <li>● Download + Service             <ul style="list-style-type: none"> <li>○ GIS: Interface, WMS, WFS</li> <li>○ Data: Interface, Download, API</li> </ul> </li> </ul>	Data are served through the British Oceanographic Data Centre (BODC). A subset of data can be accessed directly from SAMS via e-mail or FTP; downloaded from the SAMS Erddap instance or GeoServer; and in future from a THREDDS Data Server instance.
<b>Routine data provision to infrastructures, projects, programmes</b>	<ul style="list-style-type: none"> <li>● Routine Metadata to             <ul style="list-style-type: none"> <li>○ MEDIN – FishDAC mainly</li> </ul> </li> <li>● Routine submissions to national/international bodies             <ul style="list-style-type: none"> <li>○ BODC</li> <li>○ ICES</li> </ul> </li> </ul>	Data are archived for the long-term with BODC – this is not just for natural Environment Research Council funded projects, which many submissions to BODC are limited to.

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<p><b>Issues / Problems</b></p>	<ul style="list-style-type: none"> <li>• ERDDAP is completely new to us             <ul style="list-style-type: none"> <li>○ Will take a little time to get familiar</li> <li>○ External facing deployment uncertain (procurement, will it be part of our long term solution?)</li> </ul> </li> <li>• Data Volumes             <ul style="list-style-type: none"> <li>○ External server/system capacity – e.g. aggregate data products versus raw data.</li> </ul> </li> <li>• Dependency on other work packages?</li> </ul>
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## Annexe 2. Summary of Actions Arising

Action.	Summary	Responsible Partner	Due date
1.	Initiate regular, work package specific teleconferences	MI	March 2018 (& ongoing)
2.	Set out agenda for initial calls	MI / Afbi	March 2018
3.	Engage with Inland Fisheries Ireland on data requirements	Afbi	August 2018
4.	Confirm, via teleconference, additional data requirements for the salmonids work package	Afbi	September 2018
5.	Share quality control process flows with other partners	MI	June 2018
6.	Initiate data strategy / infrastructure discussions	MI / Afbi	June 2018
7.	<i>Ongoing:</i> Discussions about Erddap deployments and integration with, e.g. DKAN	All	March 2018 -
8.	<i>Ongoing:</i> Updates from all partners on data management work package progress	All	March 2018 -



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