

Project Title: AQUACOSM: Network of Leading European AQUATIC MesoCOSM Facilities
Connecting Mountains to Oceans from the Arctic to the Mediterranean

Project number: 731065

Project Acronym: AQUACOSM

Proposal full title: Network of Leading European AQUATIC MesoCOSM Facilities
Connecting Mountains to Oceans from the Arctic to the Mediterranean

Type: Research and innovation actions

Work program topics addressed: H2020-INFRAIA-2016-2017: Integrating and opening research infrastructures of European interest

Deliverable No 4.5: Metadatabase, accessible through the website

Due date of deliverable: 31 December 2018

Actual submission date: 31 December 2018

Version: v1

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This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 731065

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Project ref. number	731065
Project title	AQUACOSM: NETWORK OF LEADING EUROPEAN AQUATIC MESOCOSM FACILITIES

Deliverable title	Metadatabase, accessible through the website
Deliverable number	D4.5
Deliverable version	V1.0
Contractual date of delivery	31 December 2018
Actual date of delivery	31 December 2018
Document status	D
Document version	1.0
Online access	Yes
Diffusion	PUBLIC
Nature of deliverable	Other
Workpackage	4
Partner responsible	NIOO, BLIT
Author(s)	Kathryn Keeble, Simon Keeble, Lisette de Senerpont Domis, Sven Teurlincx
Editor	Katharina Makower, Jens Nejstgaard
Approved by	Jens Nejstgaard
EC Project Officer	Agnès Robin

Abstract	<p>A Mesocosm Metadata Catalogue has been developed and launched to facilitate standardised and centralised data discovery and sharing. The Mesocosm Metadata Catalogue is a bespoke Metadatabase for recording all types of metadata describing data collected using Mesocosms (http://aquacosm.eu/geonetwork/srv/eng/catalog.search#/home).</p> <p>Since the catalogue was launched in June 2018, 25 metadata records have been entered by TA users and providers. The catalogue is available to the public via the AQUACOSM website (https://www.aquacosm.eu) and will be disseminated widely through a range of communication channels to promote data discovery, uptake, sharing and standardisation.</p>
Keywords	Mesocosm, Metadata



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1. Executive summary

A Mesocosm Metadata Catalogue has been developed and launched to facilitate standardised and centralised data discovery and sharing. The Mesocosm Metadata Catalogue is a bespoke Metadatabase for recording all types of metadata describing data collected using Mesocosms (<http://aquacosc.eu/geonetwork/srv/eng/catalog.search#/home>).

The catalogue is built using the GeoNetwork application (<https://geonetwork-opensource.org>). The Metadata template uses standard metadata vocabulary defined by the Ecological Metadata Language (EML) standards (<https://knb.ecoinformatics.org/external/emlparser/docs/eml-2.1.1/index.html>). The standard conforms to the ISO standards 19115 (Geographic Information Standard) and 8601 (Data and Time Standard).

Entering the metadata into the Mesocosm Metadata Catalogue from completed experiments carried out under AQUACOSM transnational access (TA) is a mandatory requirement of the TA process. Users are supported in providing their metadata in the required format by a set of guidance notes for uploading data to the Metadata Catalogue and a dedicated support team.

Since the catalogue was launched in June 2018, 25 metadata records have been entered by TA users and providers. The catalogue is available to the public via the AQUACOSM website (<https://www.aquacosc.eu>) and will be disseminated widely through a range of communications channels to promote data discovery, uptake, sharing and standardisation.

At the end of the AQUACOSM project, the Mesocosm Metadatabase will migrate to <http://mesocosm.eu> to ensure its continued availability. This is in line with the AQUACOSM Data Management Plan (DMP) and will be part of the AQUACOSM legacy.

2. Introduction

The Overall aim of WP4 is to provide the basis for more effectively, measure, share and utilise mesocosm data between science infrastructures and for further open use across Europe and beyond. To facilitate data sharing a centralised metadatabase has been set up and made accessible through the website developed in WP5 (Figure 1).

Building on existing metadata and data visualisation portals, GeoNetwork OpenSource was used as a basis for setting up the AQUACOSM Metadatabase (<http://aquacosc.eu/geonetwork/srv/eng/catalog.search#/home>). This is a web-based mapping platform that is used as a cataloguing service for spatially referenced data, and for generating and managing metadata. GeoNetwork supports various metadata standards used for geographic data ISO19115 and for open data portals (Dublin Core). It also has a schema-plugin for implementing Ecological Metadata Language (EML) standard and since it has its own API, it can be harvested for interacting with other systems. EML is a metadata specification developed by the ecology discipline and for the ecology discipline (<https://knb.ecoinformatics.org/external/emlparser/docs/eml-2.1.1/index.html>).

In the AQUACOSM Mesocosm Metadata Catalogue, accessible from AQUACOSM website (www.aquacosc.eu), the EML was adopted as the metadata standard, with options to extend if required to accommodate future ISO standards. Upon completion of experiments carried out under AQUACOSM, metadata are being entered in the Metadata Catalogue, as part of the Transnational Access requirements.

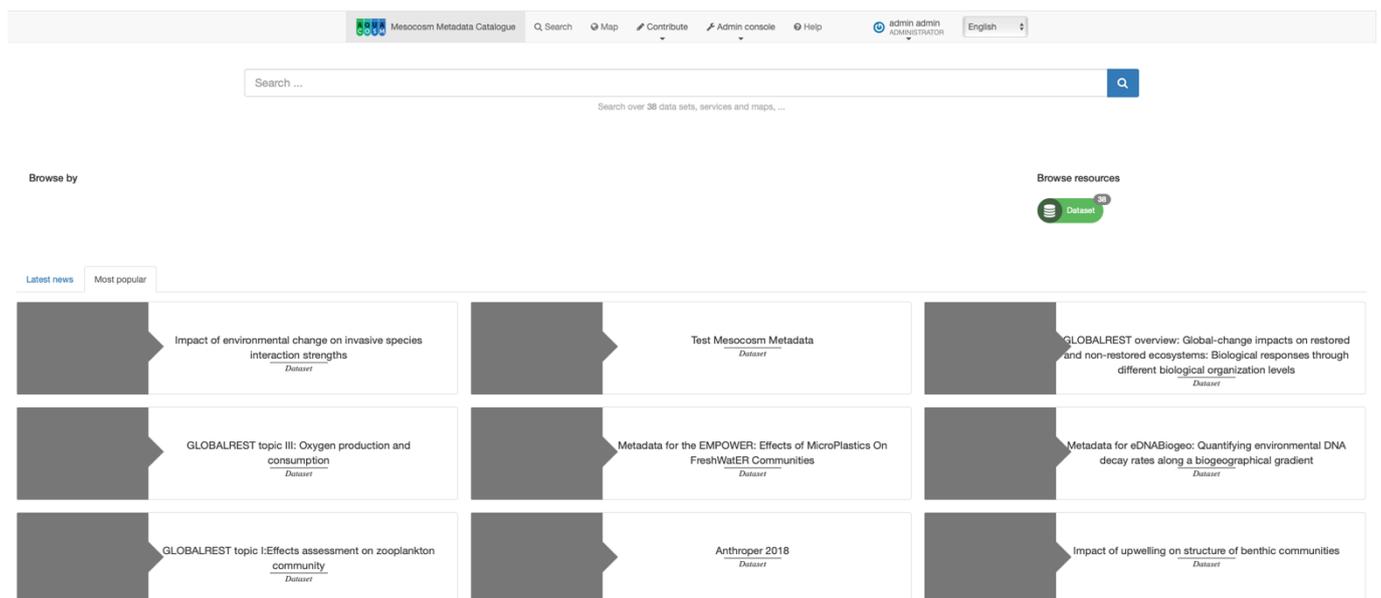


Figure 1. Screenshot of the Mesocosm Metadata Catalogue Homepage

3. Support and Guidance for Users

Entering the metadata into the Mesocosm database from completed experiments carried out under AQUACOSM is a requirement of the TA process. The TA user and provider are given a set of guidelines on how to register, access and use the online Metadata Catalogue (Appendix i). These support and guidance measures have been established to ensure that users are able to provide their metadata in compliance with the standard formats adopted. The guidelines contain a complete Glossary of Terms for all of the fields contained in the data entry form. Each of the fields conforms to the EML standard. The complete set of guidelines, including the Glossary of Terms are given in Appendix i.

In addition, a technical and data support team has been set-up and can be contacted through a dedicated email address (metadata@aquacosc.eu). The team usually respond to requests within 1-2 working days.



4. Metadata Collected

Since the Mesocosm Metadata Catalogue was launched in June 2018, 25 mesocosm metadata records have been entered by TA providers and users who have completed experiments under AQUACOSM (<http://aquacosm.eu/geonetwork/srv/eng/catalog.search#/search?facet.q=type%2Fdataset>).

5. Future Work

The Mesocosm Metadata Catalogue will continue to collect metadata from experiments completed under the AQUACOSM TA programme.

The Metadata Catalogue will be disseminated widely through the AQUACOSM website and promoted through the AQUACOSM community, their extended networks, social media, project newsletters, conferences and events to facilitate data discovery, uptake, sharing and standardisation.

At the end of the AQUACOSM project, the Mesocosm Metadatabase will migrate to <http://mesocosm.eu> to ensure its continued availability. This is in line with the AQUACOSM Data Management Plan (DMP) and will be part of the AQUACOSM legacy.



6. Dissemination activities related with the Deliverable

Contribution of metadata into the Mesocosm Metadata Catalogue has been made a mandatory part of the AQUACOSM TA process. Under AQUACOSM, TA will be provided in 2018-2020. All experiments completed under AQUACOSM TA will provide metadata to the catalogue.

So far, 25 entries have been collected in the catalogue, which was launched in June 2018 (reflecting the experiments carried out under TA 2018,). The catalogue is available to the public through the data section on the AQUACOSM website homepage and will be disseminated widely through the project consortium, extended networks, conferences and events, project newsletters and Social Media channels during the next phase of the project.



7. Appendix i. Guidance notes for uploading metadata to the Mesocosm Metadata Catalogue.

GUIDANCE NOTES ON UPLOADING METADATA TO THE MESOCOSM METADATA CATALOGUE.

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7.1 Introduction

The Mesocosm Metadata Catalogue is a bespoke Meta-database for recording all types of metadata describing data collected using Mesocosms.

The catalogue is built using the GeoNetwork application (<https://geonetwork-opensource.org>). The Metadata template uses standard metadata vocabulary defined by the Ecological Metadata Language (EML) standards. The standard conforms to the ISO standards.

7.2 Accessing the Mesocosm Metadata Catalogue

The first step is to register and request editor access to the Mesocosm Metadata Catalogue:

1. Go to <http://aquacosm.eu/data> and click on “Sign in” located top-right (Figure 1)
2. Next, click on “Create an account (Figure 2)
3. Fill in your details to create your account and select “Editor” from the “Requested profile” dropdown box. Then click register (Figure 3). Users with Editor privileges are permitted to enter and edit data.
4. You will receive an email containing your login details and you will be granted “Registered User” status on the site. An email will also be sent to the administrator notifying them that you have requested an Editor user profile. The administrator will be required to upgrade your account to grant you Editor User privileges before you are able to input any data. The administrator will email you once your request has been granted.
5. Once you have been approved as an Editor, you will have permission to enter and edit datasets.

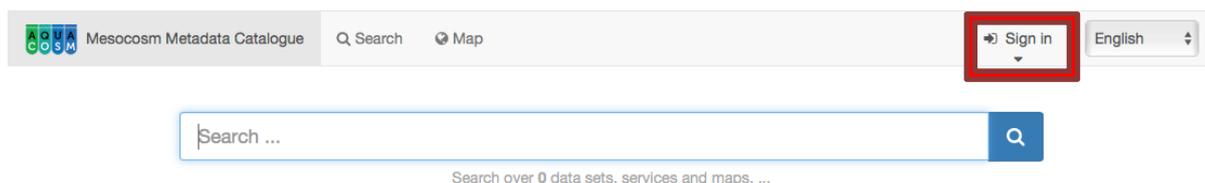


Figure 1. Go to <http://aquacosm.eu/data> and click on the “Sign in” icon shown in the red box.

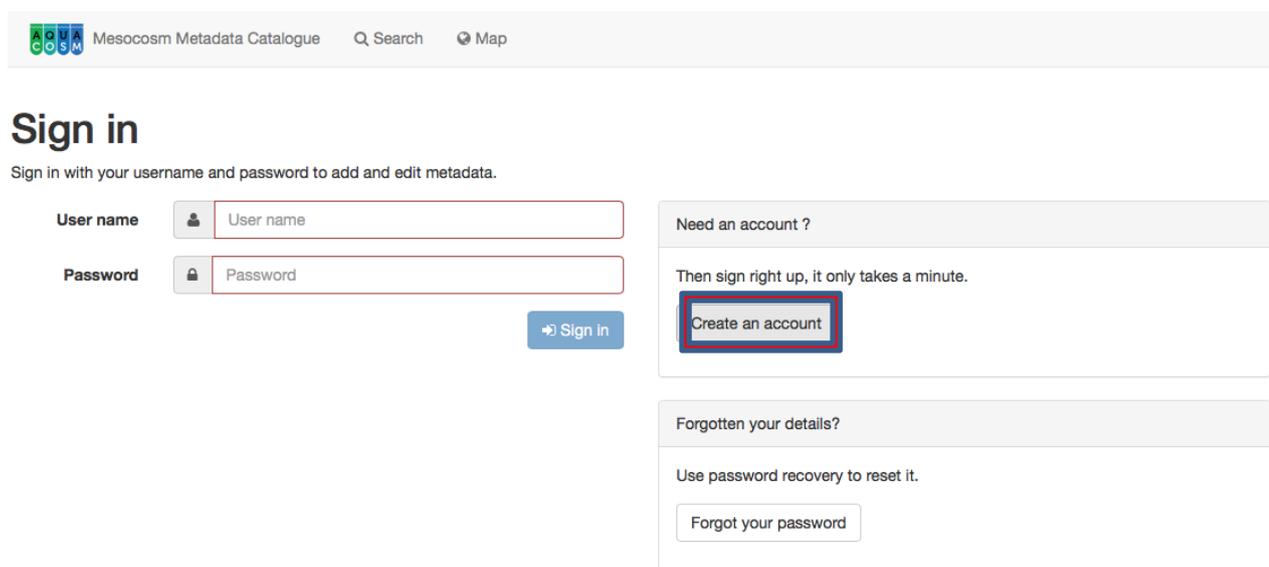


Figure 2. Select “Create an account” by clicking on the “Create an account” button shown in the red box.

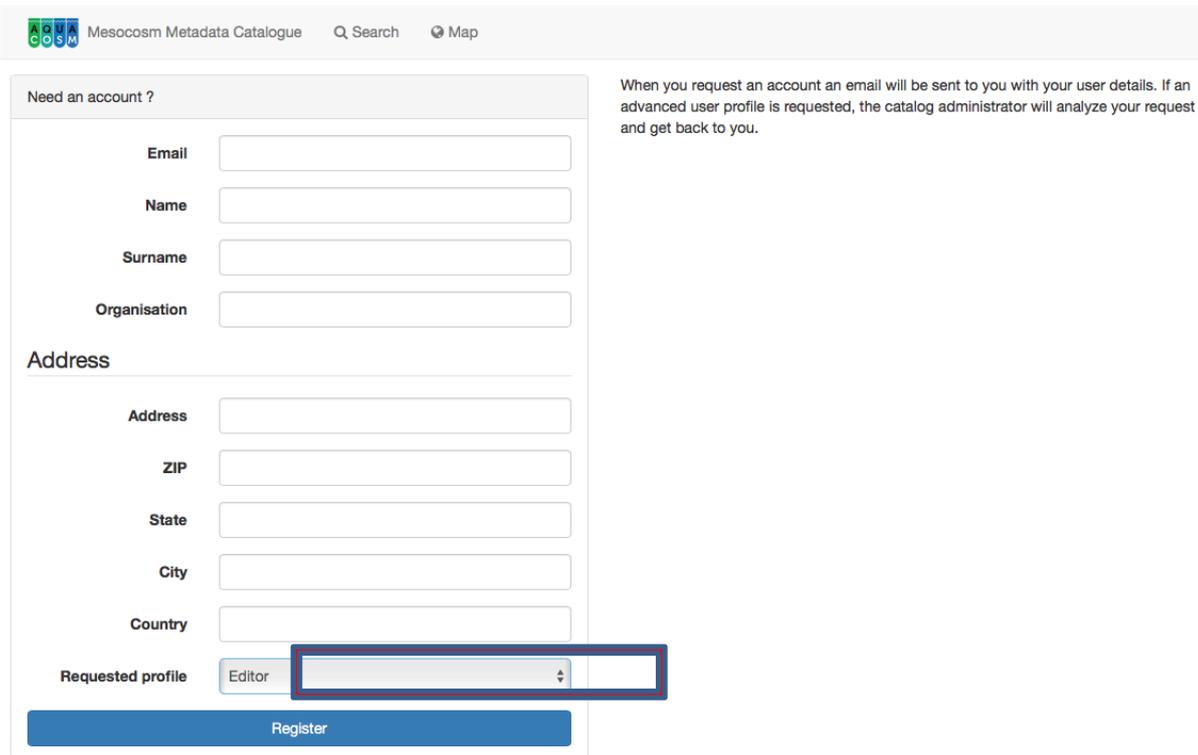


Figure 3. Create an account form. Complete the details, select “Editor” from the “Requested profile” dropdown list (highlighted in red) and click “Register”. You will shortly receive an email with your login details. The Administrator will also receive an email notifying them that you have requested an “Editor” user profile.

7.3 Creating a new record

This section guides you through the process of adding new metadata records with associated data and/or services into the catalogue.

From the home page, go to the *contribute* section or directly click on add new record menu (Figure 4).

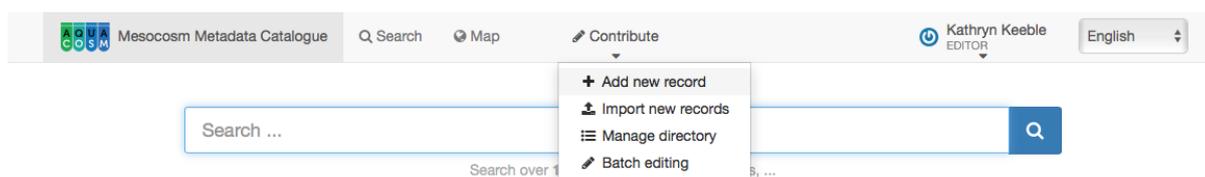


Figure 4.

Shows how to select “Add new record” from the “Contribute” menu.

Then choose “Create a Dataset” and the “Template for EML” (both will be selected by default) and click “Create” (Figure 5).

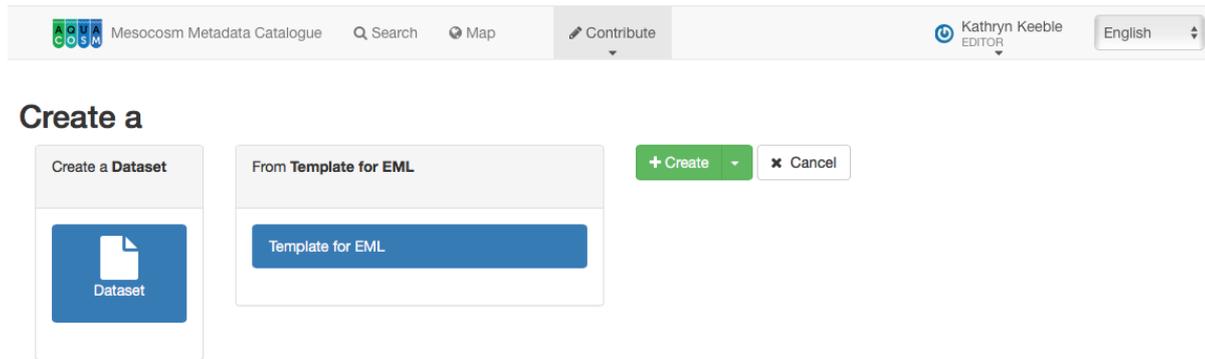


Figure 5. Shows the next screen with “Create a Dataset” and “Template from EML” selected. Click the green “Create” button to the right of the screen to open the form.

This will open the template.

The next step is to fill out as completely as possible the fields provided by default in the template.

7.4 Notes for filling out the Template

The elements of the AQUACOSM metadatabase are categorised as follows:

Dataset (resource)

General Keywords

Coverage

Methods

Project

Intellectual property rights

Additional metadata

For each of these elements more detailed information needs to be provided. In the “glossary of terms” section below all elements and subfields are defined. In addition, visit <https://github.com/gbif/ipt/wiki/GMPHowToGuide> for additional information.

Use the Validation button to check that all mandatory fields (indicated by an asterisk (*)) have been completed.

Save your data regularly!

7.5 Getting Help

For additional technical queries or queries relating to the metadata template, please contact us at metadata@aquacosm.eu.



7.6 Glossary of terms:

7.6.1 Dataset (resource)

The dataset field has elements relating to a single dataset (resource). Keep in mind that data (primary data) and metadata require separate details that need to be filled in. Although data and metadata providers may be the same person, this is not necessarily so.

This section contains the following elements:

Alternate identifier: Primary key generated by the web filing system.

Title: A description of the resource that is being documented that is long enough to differentiate it from other similar resources. Multiple titles may be provided, particularly when trying to express the title in more than one language (use the "xml:lang" attribute to indicate the language if not English/en). E.g. Vernal pool amphibian density data, Isla Vista, 1990-1996.

Publication date: The date that the resource was published. The format should be represented as: CCYY, which represents a 4 digit year, or as CCYY-MM-DD, which denotes the full year, month, and day. Note that month and day are optional components. Formats must conform to ISO 8601. E.g. 2010-09-20.

Resource language: The language in which the resource (not the metadata document) is written. This can be a well-known language name, or one of the ISO language codes to be more precise. Recommendation is to use the ISO language code (<http://vocabularies.gbif.org/vocabularies/lang>). E.g., English.

Additional info: Information regarding omissions, instructions or other annotations that resource managers may wish to include with a dataset. Basically, any information that is not characterized by the other resource metadata fields.

Url: The URL of the resource that is available online.

Abstract: A brief overview of the resource that is being documented

7.6.1.1 Dataset Creator

The dataset creator field contains subfields detailing information on the organization and/or person that is associated with the primary data of the resource.

Organization name: The full name of the organization that is associated with the resource. This field is intended to describe which institution or overall organization is associated with the resource being described. E.g., National Center for Ecological Analysis and Synthesis.

Given name: The given name field can be used for the first name of the individual associated with the resource, or for any other names that are not intended to be alphabetized (as appropriate). E.g., Jonny

Surname: The surname field is used for the last name of the individual associated with the resource. This is typically the family name of an individual, for example, the name by which s/he is referred to in citations. E.g. Carson

Position name: The position that the individual associated with the resource holds, i.e. PhD, Postdoc, Professor, Senior Scientist/Faculty

7.6.1.2 ADDRESS

This address field contains detailed information on the professional address that is associated with the dataset creator.



Delivery point: Subfield of the address field that describes the physical or electronic address of the responsible party for a resource. The delivery point field is used for the physical address for postal communication. E.g., GBIF Secretariat, Universitetsparken 15.

City: Subfield of the address field that describes the city of the responsible party for a resource.

Administrative area: Subfield of the address field that describes the administrative area of the responsible party for a resource.

Country: Subfield of the address field that describes the country of the responsible party for a resource.

Phone: Subfield of the address field that describes the phone number of the responsible party for a resource.

Email: Subfield of the address field that describes the email of the responsible party for a resource.

Online URL: A link to associated online information, usually a web site. When the party represents an organization, this is the URL to a website or other online information about the organization. If the party is an individual, it might be their personal web site or other related online information about the party. E.g., <http://www.yourdomain.edu/~doe>.

7.6.1.3 *Metadata Provider*

The metadata provider field contains subfield detailing information on the organization and/or person that is associated with the metadata of the resource.

Organization name: The full name of the organization that is associated with the resource. This field is intended to describe which institution or overall organization is associated with the resource being described. E.g., National Center for Ecological Analysis and Synthesis.

Given name: The given name field can be used for the first name of the individual associated with the resource, or for any other names that are not intended to be alphabetized (as appropriate). E.g., Jonny

Surname: The surname field is used for the last name of the individual associated with the resource. This is typically the family name of an individual, for example, the name by which s/he is referred to in citations. E.g. Carson

7.6.1.4 ADDRESS

This address field contains detailed information on the address that is associated with the dataset creator.

Delivery point: Subfield of the address field that describes the physical or electronic address of the responsible party for a resource. The delivery point field is used for the physical address for postal communication. E.g., GBIF Secretariat, Universitetsparken 15.

City: Subfield of the address field that describes the city of the responsible party for a resource.

Administrative area: Subfield of the address field that describes the administrative area of the responsible party for a resource.

Country: Subfield of the address field that describes the country of the responsible party for a resource.

Phone: Subfield of the address field that describes the phone number of the responsible party for a resource.

Email: Subfield of the address field that describes the email of the responsible party for a resource.

Online URL: A link to associated online information, usually a web site. When the party represents an organization, this is the URL to a website or other online information about the organization. If the party is an individual, it might be their personal web site or other related online information about the party. E.g., <http://www.yourdomain.edu/~doe>.



7.6.1.5 *Associated Party*

An associated party is another person or organisation that is associated with the resource. These parties might play various roles in the creation or maintenance of the resource, and these roles should be indicated in the "role" element.

Organization name: The full name of the organization that is associated with the resource. This field is intended to describe which institution or overall organization is associated with the resource being described. E.g., National Center for Ecological Analysis and Synthesis.

Given name: The given name field can be used for the first name of the individual associated with the resource, or for any other names that are not intended to be alphabetized (as appropriate). E.g., Jonny.

Surname: The surname field is used for the last name of the individual associated with the resource. This is typically the family name of an individual, for example, the name by which s/he is referred to in citations. E.g. Carson.

Phone: Subfield of the address field that describes the phone number of the responsible party for a resource.

Role: Use this field to describe the role the party played with respect to the resource. E.g. technician, reviewer, principal investigator, etc.

7.6.1.6 *Dataset contact*

The contact field contains contact information for this dataset. This is the person or institution to contact with questions about the use, interpretation of a data set.

Organization name: The full name of the organization that is associated with the resource. This field is intended to describe which institution or overall organization is associated with the resource being described. E.g., National Center for Ecological Analysis and Synthesis.

Given name: The given name field can be used for the first name of the individual associated with the resource, or for any other names that are not intended to be alphabetized (as appropriate). E.g., Jonny.

Surname: The surname field is used for the last name of the individual associated with the resource. This is typically the family name of an individual, for example, the name by which s/he is referred to in citations. E.g. Carson.

7.6.1.7 ADDRESS

This address field contains detailed information on the address that is associated with the dataset creator.

Delivery point: Subfield of the address field that describes the physical or electronic address of the responsible party for a resource. The delivery point field is used for the physical address for postal communication. E.g., GBIF Secretariat, Universitetsparken 15.

City: Subfield of the address field that describes the city of the responsible party for a resource.

Administrative area: Subfield of the address field that describes the administrative area of the responsible party for a resource.

Country: Subfield of the address field that describes the country of the responsible party for a resource.

Phone: Subfield of the address field that describes the phone number of the responsible party for a resource.

Email: Subfield of the address field that describes the email of the responsible party for a resource.

Online URL: A link to associated online information, usually a web site. When the party represents an organization, this is the URL to a website or other online information about the organization. If the party is



an individual, it might be their personal web site or other related online information about the party. E.g., <http://www.yourdomain.edu/~doe>.

7.6.2 General Keywords

The keyword fields contain elements for both the keywords and keywords thesaurus elements, both of which are required together.

Keyword: A keyword or key phrase that concisely describes the resource or is related to the resource. Each keyword field should contain one and only one keyword (i.e., keywords should not be separated by commas or other delimiters). The keywords should reflect the experimental treatments (manipulation of independent parameters) being applied in the mesocosm studies, e.g. browning, climate warming, microplastics.

Thesaurus: The name of the official keyword thesaurus from which the keywords were derived. If an official thesaurus name does not exist, please keep a placeholder value such as "N/A" instead of removing this element as it is required together with the keyword element to constitute a keywordSet. E.g., IRIS keyword thesaurus.

7.6.3 Coverage

Describes the extent of the coverage of the resource in terms of its spatial extent, temporal extent, and taxonomic extent.

7.6.3.1 *Geographic extent*

A container for spatial information about a resource; allows a bounding box for the overall coverage (in lat long), and also allows the user to draw the spatial extent of the dataset.

Geographic description: A short text description of a dataset's geographic areal domain. A text description is especially important to provide a geographic setting when the extent of the dataset cannot be well described by the "bounding box". E.g., "Manistee River watershed", "extent of 7 1/2 minute quads containing any property belonging to Yellowstone National Park".

7.6.3.2 Bounding box

Bounding box: Draw the spatial extent or enter the coordinates in the boxes provided. The coordinates will be saved to the XML file.

7.6.3.3 *Temporal extent*

This field allows coverage to be a single point in time, multiple points in time, or a range of dates.

Begin date: A single time stamp signifying the beginning of the experimental period. The calendar date field is used to express a date, giving the year, month, and day. The format should be one that complies with the International Standards Organization's standard 8601. The recommended format for EML is YYYY-MM-DD, where Y is the four digit year, M is the two digit month code (01 - 12, where January = 01), and D is the two digit day of the month (01 - 31). This field can also be used to enter just the year portion of a date. E.g. 2010.

End date: A single time stamp signifying the end of the experimental period. The calendar date field is used to express a date, giving the year, month, and day. The format should be one that complies with the International Standards Organization's standard 8601. The recommended format for EML is YYYY-MM-DD, where Y is the four digit year, M is the two digit month code (01 - 12, where January = 01), and D is the two digit day of the month (01 - 31). This field can also be used to enter just the year portion of a date. E.g. 2010.



7.6.3.4 Taxonomic extent

This field contains taxonomic information about a resource. It includes a list of species names (or higher level ranks) from one or more classification systems. Please note the taxonomic classifications should not be nested, just listed one after the other.

General Taxonomic Coverage: A description of the range of taxa addressed in the data set or collection. Use a simple comma separated list of taxa. E.g., "All vascular plants were identified to family or species, mosses and lichens were identified as moss or lichen."

Taxonomic rank value: The name representing the taxonomic rank of the taxon being described. E.g. *Daphnia* would be an example of a genus rank value, and *pulex* would be an example of a species rank value, together indicating the common name of red maple. It is recommended to start with Kingdom and include ranks down to the most detailed level possible.

7.6.4 Methods

This field documents scientific methods used in the collection of the resource. It includes information on items such as tools, instrument calibration and software. Importantly, this element should reflect the parameters measured.

Method step: This field allows for repeated sets of elements that document a series of procedures followed to produce a data object. These include text descriptions of the standard operating procedures followed, relevant literature, software, instrumentation, and source data. E.g. AQUACOSM zooplankton SOP, sedimentation method (Uthermöhl, 1958), Determination of phosphorus according to Murphy (1962).

Study extent: This field allows for a textual description of the specific sampling area, the sampling frequency (temporal boundaries, frequency of occurrence), and the response variables measured (e.g. organism groups, such as macrofauna, phytoplankton, and physical-chemical parameter such as pH, Phosphorus). The field "Study extent" represents both the specific parameters measured and the sampling frequency (temporal boundaries, frequency of occurrence).

Sampling description: The "sampling description" field allows for a text-based/human readable description of the sampling procedures used in the research project. The content of this element would be similar to a description of sampling procedures found in the methods section of a journal article.

Quality control: The quality control field provides a location for the description of actions taken to either control or assess the quality of data resulting from the associated method step.

7.6.5 Project

The project field contains information on the project in which this dataset was collected. It includes information such as project personnel, funding, study area, project design and related projects.

Title: This field should contain both the official TA project title (if applicable as well as a descriptive title for the research project. E.g. Globalrest: Global-change impacts on restored and non-restored ecosystems: Biological responses through different trophic levels

7.6.5.1 Personnel

Surname: The surname field is used for the last name of the individual associated with the project in which this dataset was collected. For TA projects this would be the project leader of the TA proposal. This is typically the family name of an individual, for example, the name by which s/he is referred to in citations. E.g. Carson.

Role: Use this field to describe the role the party played with respect to the resource. E.g. technician, reviewer, principal investigator, etc.



Funding: The funding field is used to provide information about funding sources for the project such as: grant and contract numbers; names and addresses of funding sources. Here, users do not only state AQUACOSM as a funding source, but also any additional funding received to carry out the research

Study area description: The “study area description” field documents the physical area associated with the research project. It can include descriptions of the geographic, temporal, and taxonomic coverage of the research location and descriptions of domains (themes) of interest such as climate, geology, soils or disturbances.

Design description: The field design description contains general textual descriptions of research design. It can include detailed accounts of goals, motivations, theory, hypotheses, strategy, statistical design, and actual work. Literature citations may also be used to describe the research design.

7.6.6 Intellectual property rights

Intellectual property rights: A rights management statement for the resource, or reference a service providing such information. Rights information encompasses Intellectual Property Rights (IPR), Copyright, and various Property Rights. In the case of a data set, rights might include requirements for use, requirements for attribution, or other requirements the owner would like to impose. E.g., Copyright 2001 Regents of the University of California Santa Barbara. Free for use by all individuals provided that the owners are acknowledged in any use or publication.

Purpose: A description of the purpose of this dataset.

7.6.7 Additional metadata

Data stamp: The date time the metadata document was created or modified. E.g., 2002-10-23T18:13:51.235+01:00. This is automatically generated.

Citation: The citation for the work itself. This field reflects how the dataset should be cited. E.g. Peter B. Adler, William R. Tyburczy, and William K. Lauenroth. 2007. Ecological Archives E088-161-D1

URL: URL associated with a resource. E.g., <http://esapubs.org/archive/ecol/E088/161/metadata.htm>