

Database including spatial data on ecosystem services and (anthropogenic) pressures

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Deliverable 3.2

BONUS SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION



BONUS BASMATI Database including spatial data on ecosystem services and (anthropogenic) pressures

June 2019

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BONUS BASMATI in Brief

BONUS call 2015:

Blue Baltic **Project coordinator:** Henning Sten Hansen, Aalborg University, Denmark **Project partners:** Aalborg University, Denmark (AAU) Aarhus University, Denmark (AU) Finnish Geospatial Research Institute, Finland (FGI) Latvian Institute of Aquatic Ecology, Latvia (LIAE) Leibniz Institute for Baltic Sea Research Warnemünde, Germany (IOW) Nordregio, Sweden (Nordregio) University of Turku, Finland (UTU) **Duration:** 3 years, 7/2017 - 6/2020 Kev theme addressed: Theme 4.3 Maritime spatial planning from local to Baltic Sea region scale Subthemes:

Theme 2.3 Integrated approaches to coastal management and Theme 4.1 Governance structures, policy performance and policy instruments <u>https://www.bonusportal.org/projects/blue_baltic_2017-2020</u>

Project abstract:

Maritime Spatial Planning (MSP) requires a spatially explicit framework for decision-making, and on that background the overall objective of BONUS BASMATI is to develop integrated and innovative solutions for MSP from the local to the Baltic Sea Region scale. This is to be realised through multilevel governance structures and interactive information technology aiming at developing an ecologically and socio-economically sound network of protected marine areas covering the Baltic Sea. Based on the results of former MSP projects, the BONUS BASMATI project sets out to analyse governance systems and their information needs regarding MSP in the Baltic Sea region in order to develop an operational, transnational model for MSP, while maintaining compliance with existing governance systems. It also develops methods and tools for assessments of different plan-proposals, while including spatially explicit pressures and effects on maritime ecosystem services in order to create the Baltic Explorer, which is a spatial decision support system (SDSS) for the Baltic Sea region to facilitate broad access to information. During the project running until 2020, new data will be produced and tested in assessments corresponding to policy goals. The data will support the combined analysis of the three elements of the concept of ecosystem services: the capacity, flow and benefit of provisioning, regulating and cultural services. A central aim of the project is to facilitate cross-border collaboration, and the project is carried out in close cooperation with relevant stakeholders in the BSR. The impact of the project will be facilitated and assessed in transnational case studies, where integrated solutions are required. The local scale will consist of case study areas in the South-West Baltic, the Latvian territorial and EEZ waters including open part of the Baltic Sea and the Gulf of Riga, and across the region, a pan-Baltic case study will be performed.

Report Summary

The Baltic Sea Atlas (http://bio-50.io-warnemuende.de/iowbsa/index.php) was implemented to store and share marine spatial planning data and datasets from the BONUS BASMATI project. Data are used in the project's case studies. Additional datasets were included to provide examples on what kind of data can be used in marine spatial planning to account for ecosystem services. Data categories, data properties and metadata information follow the recommendations of Deliverable 3.1. The Baltic Sea Atlas is based on the open source webGIS framework kvwmap. The application is hosted at the Institute for Baltic Sea Research Warnemünde, Germany and connected to the metadata portal of the institute. The application provides simple visualisation including basic operation tools. The access via login and password allows data sharing with the project partners and other interested users, while ensuring basic licence agreements.

1 Introduction

1.1 Purpose and scope

The database Baltic Sea Atlas (BSA) was implemented to provide Marine Spatial Planning (MSP) data and datasets gathered and created within the BONUS BASMATI project. The aim was to create and store project data in a structured, harmonised and traceable way in order to facilitate usage within the project itself and possibly beyond. BSA datasets follow the projects recommendations on data categories, data properties and metadata (Deliverable 3.1, Schiele et al. 2018). In this way, project data are easily available to the Baltic Explorer as well as to the MSP community. Data are used in the project's case studies. Additional datasets were included to provide examples on what kind of data can be used in marine spatial planning to account for ecosystem services.

This report gives an overview on technical aspects regarding the database BSA. It lists agreements and procedures concerning data management within the database and provides examples on how data and datasets are created and administered in the BSA. A list of the BONUS BASMATI project data is included.

1.2 Interaction with other work packages

WP3 datasets stored in the BSA are used in the project's case studies (WP6). Additional data on ecosystem services are created and allocated to the categories provisioning services, regulating and maintenance services and cultural services as defined in WP4. All data are assessable for input to the Baltic Explorer (WP5).

2 Baltic Sea Atlas

Good data and metadata are the key for successful MSP. A sophisticated data management will guarantee the long-term availability of data and metadata and will allow easy data search and retrieval. To support data exchange and to provide data products for scientific, political, sectoral and public stakeholders the WebGIS application Baltic Sea Atlas (BSA, Figure 1) was implemented at the Institute for Baltic Sea Research in Warnemünde, Germany (IOW). The BSA was launched in 2014 under the patronage of the BMBF (Federal Ministry for Education and Science) project SECOS (Service of Sediments in German Coastal Seas). Within the BONUS BASMATI project WP3 major technical enhancements were conducted (e.g. user-friendly interface, download and WMS-function). Templates for data categorisation and metadata, including license agreements were developed, adapted and distributed to project partners before data acquisition (Attachment A and B).

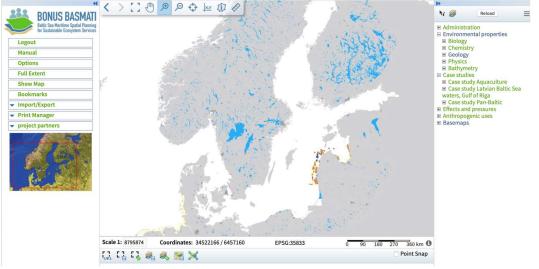


Figure 1: WebGIS application Baltic Sea Atlas (available at: http://bio-50.iowarnemuende.de/iowbsa/index.php)

The focus of the web application is the storage and the visualisation of geographical data gathered during the project. Therefore, the concept of the BSA is a simple and easy to operate user interface with a large map window and basic operation tools (left-hand side legend, Figure 1) to allow the access for GIS experts as well as non-experienced users. The BSA is not meant to be an analysing tool.

The BSA functions as a test bed for the implementation of data requirements (D 3.1, Schiele et al. 2018) for Marine Spatial Planning (MSP) in a database on a small scale. Therefore, the organisation and wording as well as categorisation (see also chapter 2.2) of data and datasets follow the classification of the ecosystem service framework after the Common International Classification of Ecosystem Services (CICES; D 4.1, von Thenen et al., 2018).

The BSA allows data exchange depending on a licence agreement.

Data assembled in the BSA are additionally linked to the IOWMeta database, a second database of the IOW organising metadata in general at the IOW. Data and metadata follow the requirements set by international data management agreements of the INSPIRE Directive (Infrastructure for spatial Information in Europe, 2007\2\EG, 2013).

The BSA can be accessed via the link: http://bio-50.io-warnemuende.de/iowbsa/index.php, via the host and homepage of the IOW: https://www.io-warnemuende.de/data-portal.html and via the website of the working group Marine Planning of the IOW: https://www.io-warnemuende.de/bio-ag-marine-planning.html.

2.1 Technical aspects of the Baltic Sea Atlas

The technology stack of the software follows modern web standards. The BSA is based on the open source webGIS framework kvwmap (Korduan & Christoph, 2005). The application is implemented in PHP5. The map source material is provided by an UMN-MapServer. An apache-webserver executes the PHP application and manages the communication with the client and the storage of raster data. Vector data are stored in a PostgreSQL-database with a postGIS extension. Additional information such as user-management is stored in a MySQL-database. The user interface is accessed by a modern web browser (Rahn & Korduan, 2008).

2.2 Data acquisition from case studies

Emphasis was put on a common procedure for data categorisation, data properties and metadata to ensure compatibility of project data. Therefore, all project participants received a step-by-step template and short instructions on how to create and prepare datasets and metadata for the Baltic Sea Atlas (see attachment A and B) using the ArcCatalog by ArcGIS®. The template and instructions include the request on which of the following categories is the most suitable for the dataset:

- Administration
- Environmental properties
 - o Biology
 - o Chemistry
 - o Geology
 - o Physics
 - o Climate data
 - o Bathymetry
- Ecosystem services
 - Provisioning services
 - o Regulating and maintenance services
 - Cultural services
- Anthropogenic uses
 - Case study Aquaculture (Danish-German case study)
 - Case study Riga Bay (Latvian case Study)
 - o Pan-Baltic case study
- Effects and Pressures
- Future scenarios

The categorisation reflects the right-hand legend of the Baltic Sea Atlas (Figure 1). In order to keep the legend clear, a theme will appear within the legend, when at least one dataset can be assigned to it.

2.3 Access and availability of data

All project partners have access to the Baltic Sea Atlas via personalised identification and password. Interested users and practitioners beyond the project community receive access upon request and will also receive a personalised identification and password after the project end. During the project phase, interested external users can get access upon request via lotta.maack@io-warnemuende.de.

Data of the database are available depending on the license agreement (Table 1). Data with the agreement *open* can be viewed and downloaded via the data export function of the database. Datasets with the agreement *restricted* contain contact information within the metadata, how this data can be received.

License agreement	Description for Baltic Sea Atlas
Open	View and download file
Restricted I	View file
Restricted II	View file, download only on enquiry at author
Restricted III	View file, download only on enquiry at author, with fee
Restricted IV	View file, download only on enquiry at author, data are open after three years from the day data was submitted to the Baltic Sea Atlas

Table 1: License agreement

3 Creation of data

In the following section the methodical creation of data is described for the three case studies. The different working approaches with data and information in each case study reflects the diversity of data handled in marine spatial planning processes. Further, examples of data that are suitable to derive ecosystem services are given. Each dataset can be assigned to one of the different categories of ecosystem services: provisioning services, regulating and maintenance services and cultural services.

3.1 Danish-German case study

The case study uses a GIS suitability analysis to identify potential mussel farm sites in the southwestern Baltic Sea. Two different categories of data are used: environmental conditions and maritime activities. Both categories are essential for potential mussel farming sites: 1) mussels only strive when certain environmental conditions prevail 2) other maritime activities restrict the available area. Data layers for both categories were converted to raster files and a parameter-specific suitability function (PSSF) was identified (Longdill, Healy, & Black, 2008) that describes the parameter's suitability on a scale between 0 and 1 (unsuitable-suitable, see example Figure 2). Following this approach, the comparison of criteria from different data sources and with different units is possible.

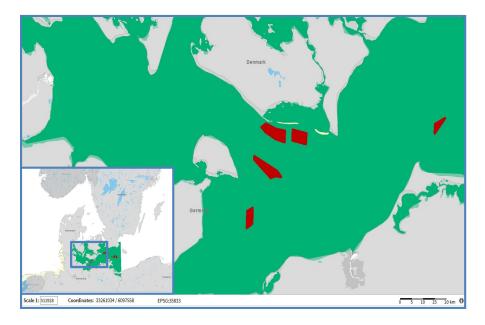


Figure 2: Results of suitability analysis "windparks" of the BSA from the southern Baltic Sea. Red areas are unsuitable for mussel farms, green areas are suitable for mussel farms regarding the parameter wind park.

Suitable environmental conditions for mussel growth can be found in the literature (Andersson, Eriksson, & Olofsson, 2013; Davaasuren, Brunel, Bolman, Jak, & Corso, 2013; Krost & Mühl, 2014; Lindahl, 2013; Lindahl et al., 2005; Schadach, 2013). For the suitability analysis, the criteria water depth, chlorophyll, dissolved oxygen and currents (both bottom and surface) were selected. The data for these criteria were derived from the ERGOM-GETM model. The NetCDF files were converted to raster files using a resolution of 50 m. The workflow in GIS included the reclassification of the raster layers and the rescaling using a linear function. All parameters were subsequently combined into one layer using the geometric mean with the raster calculator. Two combined layers were created to show

the less and more restrictive thresholds of the environmental parameters retrieved from the literature.

The case study furthermore includes data on maritime activities, i.e. wind parks, shipping, cables and pipelines, extraction and dumping sites, coastal recreation and Natura 2000 sites. Data sources include the HELCOM Map and Data Service, the environmental GIS ('Miljøgis') from the Danish Nature Agency and the GeoSeaPortal from the Federal Maritime and Hydrographic Agency. In the GIS analysis, the first step was the creation of buffer zones around some features to indicate official security zones that restrict other activities. The security zones were obtained from official documents or guidelines from other EU MSP projects. As a next step, the vector layers were converted to raster layers with values of 0 and 1 and a resolution of 50 m. The 0 values in the raster represent areas where maritime activities already occur and areas with a value of 1 are available options, in the sense that none of the selected maritime activities take place there. The different raster layers of the maritime activities were also overlain using raster calculator and two scenarios were created: the first one encompasses maritime activities and those with an unknown status or no longer in use. The combined layers of environmental parameters and maritime activities were overlain to show the overall suitability of the case study area for mussel farming.

3.2 Latvian case study

The Latvian case study addresses the need for the assessment and comparison of environmental impacts, costs, and benefits of alternative sea use options/scenarios in relation to the designation of Marine Protected Areas (MPA) to provide support for discussions with stakeholders and political decision-making for Maritime Spatial Planning (MSP). The Latvian case study utilizes environmental data from the Latvian Institute of Aquatic Ecology national monitoring program as well as HELCOM Map and Data Service, geological data from the Latvian Environment, Geology and Meteorology Centre and maritime activities data from Latvian Maritime Spatial Plan 2030 developed by the Ministry of Environmental Protection and Regional Development of the Republic of Latvia.

The available geological information of the Latvian coastal and off-shore waters shows that the seafloor is covered by mixed substrates of boulders, stones, sand and mud (Latvian Environment, Geology and Meteorology Centre, 1996). The hard, compact substrata on solid and soft bottoms, which arise from the Baltic sea floor are called reefs. Reefs may support a zonation of benthic communities of algae and animal species (HELCOM, 2013) and as biodiversity hot spots are to be protected under the Natura 2000 Habitats Directive. In the Latvian case study, reefs are areas where the proportion of seabed stone cover reaches 60%. The Latvian marine benthic habitats are classified according to the HELCOM Underwater Biotope and Habitat (HELCOM HUB) classification system (HELCOM, 2013) which defines the detailed Baltic habitats/biotopes and biotope complexes for the HELCOM area.

The data layers with geological information and underwater biotopes were processed using interpolation methods and combined to create underwater biotopes maps. Processing of the substrate data was done using the ArcGIS Inverse distance weighting (IDW) interpolation method to calculate the weighted average of point information that was obtained from video survey data and geological bottom sediment map. Interpolated data were portrayed in all surveyed areas in the Latvian Baltic Sea waters.

The produced information on spatial distribution of the benthic habitats (macroalgae and mussel stands on hard substrate) is used in the socio-economic assessment of their provided ecosystem services (ES). The map of benthic habitats provides spatial characterisation of the ecosystem's capacity to provide the ES. As part of the socio-economic assessment, types of socioeconomic benefits and values from these ES are specified. Indicators for each benefit and value are developed to provide quantitative and, where possible, monetary estimates on these benefits and values. Spatial distribution of the benefits and values will be assessed using various data and information with the aim to provide spatially-explicit assessment (including maps) of the benefits from the ES.

In addition to the above mentioned data sources, the case study also uses data from official, national level documents for long-term maritime spatial planning. These data layers provide information of potential oil extraction sites, modelled wind speed information in the Baltic Sea at the 100 m height and potentially suitable areas for wind park development in Latvian Baltic Sea waters. Areas of potential oil extraction sites and potentially suitable areas for wind parks are in vector data type – polygon data. The wind speed data are represented in raster data type.

3.3 Pan-Baltic case study

The Pan-Baltic case study produces information about stakeholder involvement practises in countries around the Baltic Sea. In addition, it aims to gather understanding about the perceptions and requirements of the business sector stakeholders concerning their involvement in the MSP process. The study is conducted by interviews and questionnaires. The data produced in the case study is information derived from the respondents and interviewees and is therefore based on expert knowledge. The results do not contain anything in spatial format. Moreover, the case study has not included any GIS analyses so far.

Expert knowledge in this case example represents non-spatial data. To be able to include such data in the Baltic Sea Atlas, a spatial shapefile was created. The shapefile was based on country borders derived from the HELCOM Map and Data Service. Here, in the spatial representation of countries, an attribute column was added to inform about the availability of interviews from the respective countries. Coding 0 was selected when no interviews were available, and coding 1 was selected when a planner from the country in question had given an interview for the case study purposes.

The availability of interviews can be illustrated on a map based on the attribute coding as proposed in Deliverable 3.1. The map should be interpreted as a visual means to provide the list of countries where interviews have been conducted. The metadata related to the shapefile includes basic information about the interviews. However, if further information about the content of the dataset is wanted, the Baltic Sea Atlas user needs to contact the data collector to discuss the possibilities to collaborate with the data. The direct outcomes of the interviews (i.e. audio recordings, written notes, etc.) are not publicly available due to confidentiality reasons. The shapefile itself can be freely downloaded by all users.

3.4 Ecosystem services data

The concept of ecosystem services (ES) can provide valuable input to marine planning and management. Still, data on ES are scarce and hardly used in MSP so far. The BSA includes additional datasets beyond the case studies of the project in order to show exemplarily which kind of data can be used to derive ecosystem services. One example for each type of ecosystem service is explained here in more detail.

3.4.1 Regulating and maintenance services

Regulating and maintenance services are provided by e.g. regulating the quality of water, air and soil or by providing flood and disease control.

Oxygen concentration is an indication on the regulative self-functioning of the Baltic Sea ecosystem. Information on the mean value of bottom water oxygen concentrations can be useful to derive regulating and maintenance services provided by the ecosystem (Figure 3). Oxygen levels can be an indicator for the bio-remediation potential of a marine area (amount of oxygen consumed to decompose organic material). Oxygen concentrations can therefore be uses as indication for water quality or reduction of eutrophication.

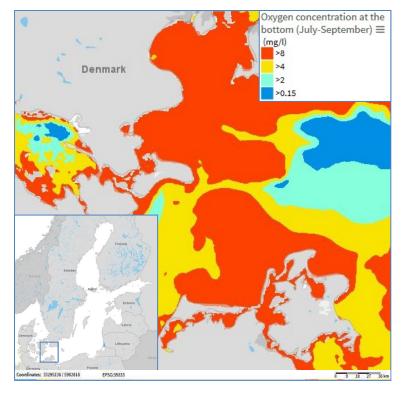


Figure 3: Mean bottom water oxygen concentrations in the southern Baltic Sea (June-September, modelling period 2006–2014).

Oxygen concentration was modelled with the ERGOM-GETM model for the period 2006-2014 (values are in mg/I). The dataset provides essential information for the suitability analysis of the Danish case study. The original NetCDF file was converted to raster format in ArcGIS and was subsequently resampled to a resolution of 50 m, using bilinear interpolation.

3.4.2 **Provisioning services**

Provisioning services describe the material or energy outputs from ecosystems. They include food, water and other resources.

The GIS data layer (Figure 4) shows buffers (red) of 400 metres around sand and gravel extraction sites (black) in the Baltic Sea Region. The dataset is based on HELCOM shapefile "Extraction gravel sand" (HELCOM HOLAS II Dataset: Extraction of sand and gravel (2017)) obtained from the HELCOM data portal.

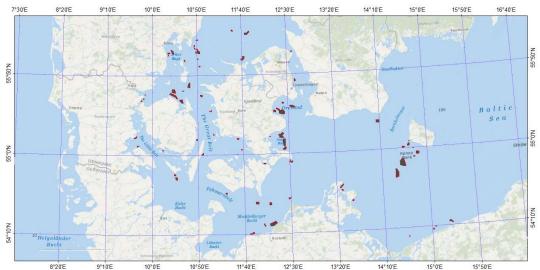


Figure 4: GIS data layer of extraction sites of gravel and sand (black) in the BSR with a 400 m buffer (red) where distribution of sediment plumes are likely to impact the surrounding marine environment.

Sand and extraction sites in the HELCOM shapefile are based on extraction activities during 2011–2015. The dataset contains sites of sand and gravel extraction in the Baltic Sea Region. Based on literature, buffers of 400 metres (Korpinen et al. 2017) were generated around the extraction sites representing an estimate of the extent of sediment in the water column that are likely to impact the surrounding marine environment.

3.4.3 Cultural services

Cultural services include the non-material benefits people obtain from ecosystems: aesthetic inspiration, cultural identity, sense of place, and spiritual experience related to the natural environment. Opportunities for tourism and for recreation are also considered within the cultural services.

The marine environment as aesthetic landscape and inspiration affects the intellectual and representative interaction of human well-beings with the sea. Within the CICES-framework a free horizon is valued and classified within the range of cultural services. Marine infrastructures such as wind turbines may have visual impact on people at the coastline (living at the coast or tourism) as well as at the sea (fishing, cargo transfer, ferries). Despite the advantage of orientation, it can impact the safety of ships (danger of collision) or it may impact the aesthetic value of a place. Illustrating the visibility range of wind turbines in a GIS-system is therefore important for MSP in order to evaluate the visual impact of such marine infrastructures. Figure 5 shows the area around a wind turbine (red) where one is likely to see a wind mill in the Baltic Sea. The wind turbine location map was obtained from the HELCOM data portal for the implementation process.

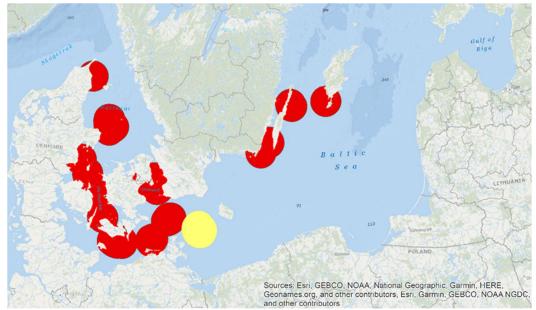


Figure 5: GIS-data layer of visibility field of wind turbines in the Baltic Sea with red areas for existing wind parks and yellow areas for wind parks which are still under construction.

The dataset contains the locations of wind turbines in the Baltic Sea Region, both existing (red) and under construction (yellow). The visual impact of a wind turbine varies with weather conditions, altitude above sea level (e.g. observer stands on steep coast or beach, on sailing boot or cruise liner) and the altitude of the wind turbine itself. Taking the variabilities into account, Bishop (2002) estimates a distance of 30 km where the visual impacts of wind turbines can be felt. Hence, a buffer of 30km was created around the wind turbines to determine areas of visual impacts as an estimation (elevation of the land is not considered here).

An intersect of the areas of visual impacts with the coastline of the Baltic Sea was done to determine the impacted coastline (Figure 6).



Figure 6: GIS data layer of impacted coastline (red) of the Baltic Sea and where one is likely to see wind turbines.

The red parts in Figure 6 illustrate the areas of the coastline, where wind turbines are most likely visible from the coastline (land elevation not considered).

4 Baltic Sea Atlas project data

The BSA hosts 61 datasets from the BONUS BASMATI project as of 30 June 2019.

			2. data	case	data	License
No	Name of dataset	data category	category	study	provider	agreement
		Environmental				
1	benthic biotopes	properties	biology		IOW	Restricted II
	Chlorophyll-a					
	levels (June-	Environmental				
2	August)	properties	biology		IOW	Open
	Important areas					
	for marine	Environmental				
3	mammals	properties	biology		IOW	Open
	Important areas	Environmental				
4	for avifouna	properties	biology		IOW	Open
		Environmental				
5	Biotopes	properties	biology	Latvia	LIAE	Restricted II
	Oxygen					
	concentration at					
	the bottom (Jul-	Environmental				
6	Sep)	properties	chemistry	DK-GER	IOW	Open
	Substrate	Environmental				
7	(Latvia)	properties	geology	Latvia	LIAE	Restricted II
	Wind speed at	Environmental				
8	100m hight	properties	physics	DK-GER	IOW	Restricted II
	surface currents	Environmental				
9	(Dec-Feb)	properties	physics	DK-GER	IOW	Open
	bottom currents	Environmental				
10	(June-Aug)	properties	physics	DK-GER	IOW	Open
		Environmental				
11	Bathymetry	properties	bathymetry		IOW	Open
	Exclusion					
	criterion bottom		Case study			
12	nets	Case studies	aquaculture	DK-GER	IOW	Open
	Potential mussel					
	farm location		Case study			
13	(DK)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion eider		Case study			
14	duc abundances	Case studies	aquaculture	DK-GER	IOW	Open
	Proposed fish					
	farm locations		Case study			
15	(DK)	Case studies	aquaculture	DK-GER	IOW	Open
	Harbour 10 km		Case study			
16	radius	Case studies	aquaculture	DK-GER	IOW	Open

Table 2: List of BONUS BASMATI datasets included in the Baltic Sea Atlas

			2. data	case	data	License
No	Name of dataset	data category	category	study	provider	agreement
	Suitability				p	-8
	analysis scenario		Case study			
17	4	Case studies	aquaculture	DK-GER	IOW	Open
	Suitability					·
	analysis scenario		Case study			
18	3	Case studies	aquaculture	DK-GER	IOW	Open
	Suitability					
	analysis scenario		Case study			
19	2	Case studies	aquaculture	DK-GER	IOW	Open
	Suitability					
	analysis scenario		Case study			
20	1	Case studies	aquaculture	DK-GER	IOW	Open
	Suitability					
	criterion					
	environmental		Case study			
21		Case studies	aquaculture	DK-GER	IOW	Open
	Suitability					
	criterion					
22	environmental	Casa studios	Case study			Onen
22		Case studies	aquaculture	DK-GER	IOW	Open
	Suitability criterion oxygen					
	levels (threshold:		Case study			
23	4 mg/l)	Case studies	aquaculture	DK-GER	IOW	Open
25	Suitability		aquaculture	DR GER	10 10	open
	criterion					
	chlorophyll-a					
	levels (threshold:		Case study			
24	-	Case studies	aquaculture	DK-GER	IOW	Open
	Suitability					·
	criterion					
	chlorophyll-a					
	levels (threshold:		Case study			
25	2ug/l)	Case studies	aquaculture	DK-GER	IOW	Open
	suitability					
	criterion bottom					
	currents					
	(threshold:2		Case study			
26	cm/s)	Case studies	aquaculture	DK-GER	IOW	Open
	suitability					
	criterion surface					
	currents					
27	(threshold:5-15	Coco atualia -	Case study			Onor
27	cm/s)	Case studies	aquaculture	DK-GER	IOW	Open
	suitability criterion surface					
	criterion surface currents					
	(threshold:3-20		Case study			
28	cm/s)	Case studies	aquaculture	DK-GER	IOW	Open
20	511737		aquaculture		10 10	Open

			2. data	case	data	License
No	Name of dataset	data category	category	study	provider	agreement
	suitability					
	criterion		Case study			
29	bathymetry	Case studies	aquaculture	DK-GER	IOW	Open
	exclusion					
	criterion					
	windparks (in					
	use, under					
	construction,					
20	planned, unkown		Case study		1014	0
30	status)	Case studies	aquaculture	DK-GER	IOW	Open
	exclusion					
	criterion					
	windparks (in		Casa study			
21	use, under	Case studies	Case study			Onen
31	construction) Exclusion	Case studies	aquaculture	DK-GER	IOW	Open
	criterion					
			Case study			
32	shipping routes (in use)	Case studies	aquaculture	DK-GER	IOW	Open
52	Exclusion	Case studies	aquaculture	DK-GEK	10 10	Open
	criterion					
	maritime uses					
	(present,		Case study			
33	planned, past)	Case studies	aquaculture	DK-GER	IOW	Open
55	Exclusion		aquacantare	DR GER		open
	criterion					
	maritime uses		Case study			
34		Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					0000
	criterion					
	restricted areas		Case study			
35	(DK)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion			_		
	criterion					
	pipelines (in use,					
	planned, unkown		Case study			
36	status)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion		Case study			
37	pipelines (in use)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion Natura		Case study			
38	2000 areas	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion					
	extraction sites					
	(in use, planned,		Case study			
39	out of use)	Case studies	aquaculture	DK-GER	IOW	Open

			2. data	case	data	License
No	Name of dataset	data category	category	study	provider	agreement
	Exclusion				•	
	criterion					
	extraction sites		Case study			
40	(in use)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					-
	criterion					
	dumping sites (in		Case study			
41	use, out of use)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion					
	dumping sites (in		Case study			
42	use)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion coastal		Case study			
43	buffer (500m)	Case studies	aquaculture	DK-GER	IOW	Open
	Exclusion					
	criterion cables					
	(in use under		Case study			
44	construction)	Case studies	aquaculture	DK-GER	IOW	Open
			Case study			
	Potentially		Latvian			
	suitable areas for		Baltic Sea			
	wind parks		waters, Gulf			
45	(Latvia)	Case studies	of Riga	Latvia	LIAE	Restricted II
			Case study			
	Determination of		Latvian			
	Potential oil		Baltic Sea			
10	extraction sites	Casa studios	waters, Gulf	Latria		
46	(Latvia)	Case studies	of Riga	Latvia	LIAE	Restricted II
	Pan Baltic					
	interviews:					
	stakeholder		Casa study	Don		
47	integration in	Case studies	Case study Pan-Baltic	Pan- Baltic	UTU	Onon
47	MSP processes	Case studies		Dallic	010	Open
	Visual impact on coastline by wind	Effects and				
48	farms	pressures			iow	Open
-+0	visual impact on	μιεσσάιεσ			10 10	
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49	farms	pressures			IOW	Open
	Extraction of	p. 0000100				
	gravel and sand					
	with 400 m	Effects and				
50	buffer	pressures			IOW	Open
	-	Anthropogenic			-	I
51	Wreck dive sites	uses			IOW	Open
	Dive sites	Anthropogenic			_	I
52	Fehmarn	uses			IOW	Open
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			2. data	case	data	License
No	Name of dataset	data category	category	study	provider	agreement
	fisheries Baltic					
	Sea Data					
	Average 2012-	Anthropogenic				
53	2018	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
54	Sea Data 2018	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
55	Sea Data 2017	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
56	Sea Data 2016	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
57	Sea Data 2015	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
58	Sea Data 2014	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
59	Sea Data 2013	uses			IOW	Restricted II
	Fisheries Baltic	Anthropogenic				
60	Sea Data 2012	uses			IOW	Restricted II
	Status of marine	Anthropogenic				
61	spatial plans	uses			IOW	Restricted II

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Attachments

- A: Template for metadata information Baltic Sea Atlas web application
- B: Checklist for Data delivery to the BSA





Attachment A:

Template for metadata information Baltic Sea Atlas web application

..........

Internal document





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		ocedure	



1 Introduction

Metadata information is fundamentally important as it provides background information on the dataset such as copy rights. Data security, proof of source and scope of use of a dataset should always be given great attention. Regarding the Baltic Sea Atlas, metadata is stored in IOWMeta. The Baltic Sea Atlas accesses the IOWMeta to retrieve metadata. IOWMeta links to WebGIS.

An example (see below "DK_KriegersFlak") on how to fill in metadata in ArcCatalog is provided for vector data (e.g. shapefile of ESRI, the XML-based formats such as GML and KML). The same procedure as described in this template can be used for raster data formats (e.g. JPEG, GeoTIFF, PNG). Please make sure you fill in as much information as you have and avoid to leave fields empty.

In case there is no licence for ArcCatalog, please use the template metadata which will be provided to you as a Word document upon request (contact lotta.maack@io-warnemuende.de).

Vector data format: Polygon shapefile "DK_KriegersFlak" (displayed with ArcGIS). Coordinate system: ETRS_1989_UTM_Zone_33N.





2 Get started

Option 1: I want to create new metadata information. Start on page 5.

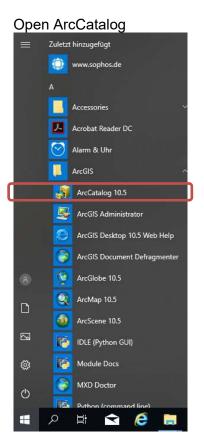
Option 2: I have a similar dataset of which I want to import the metadata information to the new dataset. Start on page 54.

In case of questions, further information or help needed please contact Lotta Maack (Institute for Baltic Research Warnemünde, Germany): lotta.maack@io-warnemuende.de



3 Option 1: I want to create new metadata information

3.1 **Previous steps**



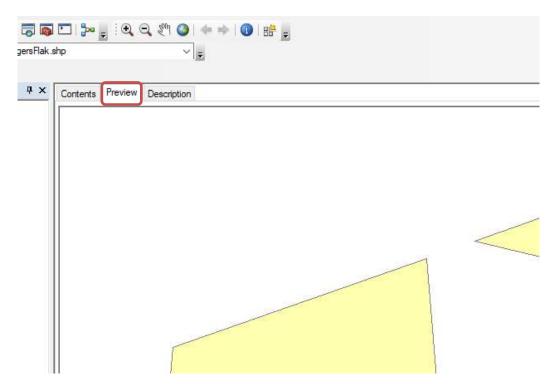
Choose "INSPIRE Metadata Directive"

<u>G</u> eoproce	MARCH .	<u>C</u> ustomize <u>T</u> oolbars <u>E</u> xtensio	5	Help	Q Q 2	0					
	д х [Manager ize Mode								
	*	ArcCatal	log Options.								
lata.201509 ArcCatalog General			Modify	ArcCatalo Metadata		s Raster	CAD				
Metad The st	data Styl		adata is viewe	d, exporte	d, and	- instru					

Go to "Description". You will notice that no information is filled in so far and there is no thumbnail available.

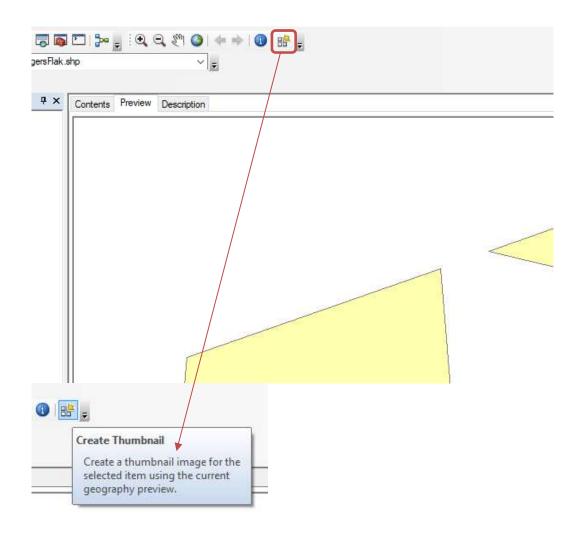


Create a thumbnail (the thumbnail will not appear in the WebGIS application but it still has to be created): Go to "Preview"



Click on the icon "Create Thumbnail"





Go back to "Description" and see the thumbnail you have just created.



Edit metadata information. Go to "Description" and click on "Edit".



Contents Preview Description	
Print 📝 Edit 🕞 Validate 💽 Export	📑 Import

You will see the classes which you can edit. The ones indicated in red circles will be of importance for the Baltic Sea Atlas. Please fill in as much information as you have about the dataset. Avoid empty spaces wherever possible.

3.2 Structure heading explained

The categories of the structure heading which will be important for the Baltic Sea Atlas include "**Overview**" and "**Resource**". Each contains further subcategories. The important subcategories that have to be filled in are indicated by red circles.

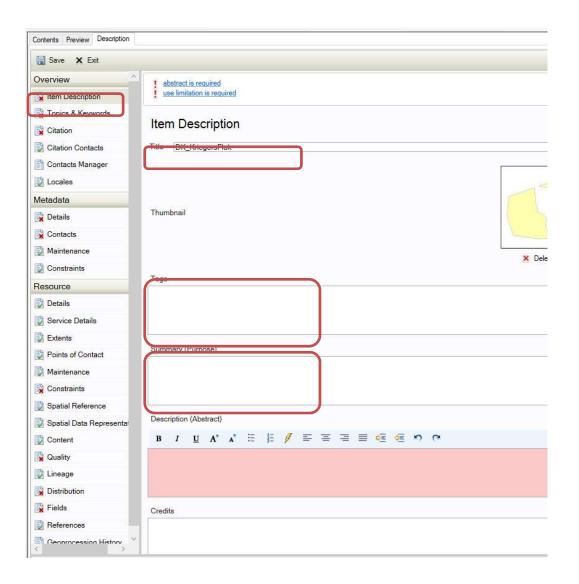


Contents Preview Description		
🔚 Save 🗙 Exit		
Overview	abstract is required	
Item Description	use limitation is required	
🙀 Topics & Keywords	Item Description	
Citation	Item Description	
Citation Contacts	Title DK_KriegersFlak	
Contacts Manager		[·
Docales		
Metadata		
Details	Thumbnail	
Contacts		
Maintenance		× Delete
🗊 Constraints	-	
Resource	Tags	
〕 Details		
Service Details		
Extents		
Points of Contact	Summary (Purpose)	
Maintenance		
Constraints		
Spatial Reference		
💱 Spatial Data Representa	Description (Abstract)	
Content	B I ∐ A* A* ⊟ ∰ ∮ ≣ ≣ ≡ ≡ ቀ≣ ቀ≣ ቀ⊂ ∾	
🙀 Quality		
🗊 Lineage		
Distribution		
🙀 Fields	Credits	
References		
Geoprocessing History		

3.3 Structure heading "Overview"

In the structure heading "**Overview**" fill in all categories indicated with red circles. Start with "Item Description".

3.3.1 Item description



Title (chose concise title) → DK_KriegersFlak

Tags/Keywords (search item, project, period, geographic area, ...) → windpark, human activities, uses, Baltic Sea, MSP

Summary (short). Attention! Do not insert a "<" sign here.

➔ The dataset contains information on Kriegers Flak Offshore Wind Farm (under construction) in the Baltic Sea. The dataset was redrawn from https://ens.dk/sites/ens.dk/files/Vindenergi/kriegers_flak_offshore_wind_fa rm_offshore_technical_project_description_october_2015.pdf) for visualization and analysis purposes in ArcGIS. Background information is available at at Energinet.dk's webpage: www.energinet.dk.

Contents Preview Description	
🔚 Save 🗙 Exit	
Overview	abstract is required
Item Description	use limitation is required
🙀 Topics & Keywords	Summary (Purpose)
Citation	
Citation Contacts	
Contacts Manager	
Docales	
Metadata	Description (Abstract)
Details	BIUA'A' EEF FEE EEE EE O
Contacts	
Maintenance	
Constraints	
Resource	Credits
Details	
Service Details	
Extents	
Points of Contact	📲 New Use Limitation
Maintenance	Appropriate Scale Range
Constraints	
Spatial Reference	
🔋 Spatial Data Representa	
Content	Globe 1:150,000,000
🙀 Quality	Bounding Box
Lineage	West 12.746635
B Distribution	East 13.139510
Fields	South 54.966767
References	North 55.099807
Geoprocessing History	Extent contains the resource?

"Description" (*The user sees this text first, so formulate meaningful*). Content, method of data collection, purpose.

Important: please fill in information on data properties as well. Data properties here include: spatial dimension, time frame and origin of data. (For the spatial dimension include information on the vertical and horizontal dimension. For the time frame include frequency, temporal resolution and time line. For the origin of data choose only one class from the table below).

category time frame	class	description
temporal occurrence		
	absent	applicable e.g. for species, which are not present anymore in a region or for lack of data
	one-time event	can be applied for disastrous events like a ships average or oil leak on an oil rick

	1	
	irregular	applicable for activities, which follow no pattern like dredging events, which depend on weather conditions, supply and demand and administrative authorizations
	regular	applicable e.g. cargo shipping or
	static	permanent and ongoing status like residence opinions gathered via interview, maritime infrastructures
	not applicable	no characteristic temporal occurrence can be applied to the data in a meaningful way
	unknown	applicable, when the information is not available to the user
temporal frequency		frequently and regularly occurring events
	daily	event, that repeat approximately every day, like a daily ferry between two harbors
	monthly	event, that occurs approximately once a month, e.g. service trips to wind park
	seasonal	event, that occurs e.g. during spring season like an algae bloom or bird migration or the blockade of a shipping route with floating ice in
	annual	events, that occur during a specific time of the year e.g. the annual updates of socioeconomic statistics
	decadal	reoccuring events on a long, at times irregular frequency like fresh water inflows in the Gotland Basin of the Baltic Sea or extreme
	other period	can be chosen, to describe unique frequency patterns, which differ strongly from the listed classes above
	not applicable	no characteristic temporal frequency can be applied to the data in a meaningful way
	unknown	applicable, when the information is not available to the user
time line		
	past	e.g. historical data or data of outdated marine spatial plans like historic port facilities or historic coastlines

re	ecent	data, which are taken in the past but describe the most current situation, applicable for e.g. environmental data or model derived data
р	resent	data on existing uses or present state, e.g. activities taking place currently, existing (mariculture) facilities or legally adopted documents like the INSPIRE
fu	uture	applicable for planned infrastructures or future scenarios, e.g. a planned wind park or sea level rise predictions
n	ot applicable	no characteristic time line can be applied to the data in a meaningful way

spatial dimension	class	description
vertical		
	air column	air column above the sea, e.g. bird migration routes
	surface water	no defined depth description available, describes the upper water column
	water column	whole water column e.g. aquacultures or wave energy infrastructures, wind energy infrastructures
	bottom water	no defined depth description available, describes the near water body above the seafloor
	seafloor	describes the solid ground and sediment of the marine environment, e.g. for pipelines and cable infrastructures or seagrass
	entire column	describes the seafloor, the water column and the air above, e.g. wind energy infrastructures, bridges
	coastal region	describes the near shore, coastline and coastal area, where maritime induced activity and infrastructures dominate like lighthouses, hotels, diving schools

	unknown	applicable, when the information is not available to the user
	not applicable	no characteristic vertical dimension can be applied to the data in a meaningful way
horizontal		
	point	coordinates available, e.g. ship wreck
	local	small spatial scale, a few km or km2 e.g. protected area or dredging plume
	regional	spatial scale reflecting e.g. ecological, historical, political, climate or morphological zone like an estuarine
	national	administrative boundary like state borders or exclusive economic zone
	basin wide	spatial scale follows morphological characteristics of sea basins e.g. Bornholm Basin
	Baltic wide	spatial scale reflects the whole geographic elongation of the Baltic Sea
	EU	e.g. applicable for policies and agreements of the European Union

origin of data	definition/description
measurements/observations	scientific based, independent measurements
official documents	e.g. national or regional reporting
expert knowledge	assumption by acknowledged experts in the topic
models	interpolations and calculations based on modelled or in-situ data
historical records	historical data and reports
reports by locals, individuals	historical or recent reports of locals or other individuals
assumptions by "source"	no solid data foundation, name data source
by authorities	data provided by authorities
user data by companies	data provided by companies, list sector (e.g.shipping industry)

For the sample dataset:

- ➔ The windpark (under construction) at Kriegers Flak in Denmark. The dataset is based on available public sources (https://ens.dk/sites/ens.dk/files/Vindenergi/kriegers_flak_offshore_wind_f arm_offshore_technical_project_description_october_2015.pdf).
- → Spatial dimension (vertical): water column
- → Spatial dimension (horizontal): point
- → Time frame (frequency): irregular
- → Time frame (temporal resolution): daily
- → Time frame (time line): present
- ➔ Origin of data: official documents

"Credits" (Who collected the data? (Person(s), Institution(s), ...)

➔ e.g. Miriam von Thenen, Leibniz Institute for Baltic Sea Research Warnemuende, Germany

Below "Credits" click on "+ New Use Limitation"

Extents Points of Contact	ervice Details ktents pints of Contact Limitation
Service Details Extents Points of Contact Use Limitation	Attents pints of Contact
Points of Contact	bints of Contact •• New Use Limitation
	Limitation
	Limitation
B I U A* A* 🗄 🗐 🖉 📰 🚍 🗮 🚾 🐗 🦘 😋	

"Use Limitation" (how can the data be used? Always or just on request or by stating the copyright). Copyright.

- → Data was redrawn from https://ens.dk/sites/ens.dk/files/Vindenergi/kriegers_flak_offshore_wind_fa rm_offshore_technical_project_description_october_2015.pdf)
- ➔ Data can be used freely given that the source is cited. The source should be cited as: "(name)"
- ➔ (Data from IOW: "Data originator: Leibniz Institute for Baltic Sea Research Warnemuende, Germany")

In the structure heading "**Overview**" go to "**Topics and Keywords**" and fill in all categories indicated with red circles.

3.3.2 Topics and Keywords

🔚 Save 🗙 Exit	
Overview	topic category is required
🖌 Item Description	
👷 Topics & Keywords	Topics and Keywords
Citation	
Citation Contacts	Topic Categories
Contacts Manager	Farming Military & Intelligence
Cocales	Biota Inland Waters
/etadata	Boundaries Location
🔓 Details	Atmospheric Sciences Oceans
Contacts	Economy Planning & Cadastral
Maintenance	Elevation Society Environment Structure
Constraints	Health Utilities & Communication
Resource	☐ Imagery & Base Maps
Details	
Service Details	Content Type Downloadable Data
Extents	
Points of Contact	🕂 New Theme Keywords
Maintenance	
Constraints	+ New Place Keywords
Spatial Reference	
🕽 Spatial Data Representa	🕂 New Temporal Keywords
Content	
Quality	+ New Discipline Keywords
🕽 Lineage	
Distribution	+ New Stratum Keywords
Fields	
Y Fields	New Other Keywords
References	T How one Reywords

opic Categories	
Farming	Military & Intelligence
🔲 Biota	Inland Waters
Boundaries	Location
Atmospheric Sciences	Oceans
Economy	Planning & Cadastral
Elevation	Society
Environment	Structure
Geoscientific	Transportation
🖂 Health	Utilities & Communication

"Topics and Keywords" (*Multiple choice desired*)

→ Oceans, Structure

"Content Type" (make only one selection, do not choose Empty if possible). Click on the drop-down list which currently says "Downloadable Data" and choose one option.

Content Type	Downloadable Data
Content Type	Downloadable Data
🕂 New Theme	Empty Live Data and Maps Downloadable Data Offline Data
🕂 New Place K	Static Map Images Other Documents Applications Geographic Services
+ New Tempor	Clearinghouses Map Files Geographic Activities

→ Live Data and Maps

In the structure heading "**Overview**" go to "**Citation**" and fill in all categories indicated with red circles.

3.3.3 Citation

Contents Preview Description				
Save 🗙 Exit				
Overview 🛆	1 at least one date is requir	ed		
🙀 Item Description	identifier code is required			
Topics & Keywords	Deseurs Ottatio	240		
Citation	Resource Citatio	n		
Citation Contacts	Titles: DK_KriegersFlak			
Contacts Manager	Title	Title DK_KriegersFlak		
Docales	Alternate Title			
Metadata	Collective Title			
🙀 Details				
Contacts	Presentation Form		Digital Map	
Maintenance	FGDC Geospatial Data F	Presentation Form	Empty	
Constraints	New Identifier			
Resource				
Details	ISBN			
Service Details	ISSN			
Extents	(→ Dates			
Points of Contact				
Maintenance	Edition			
Constraints				
Spatial Reference	Series			
🔋 Spatial Data Representa				
Content	Other Details			
🙀 Quality				
Dineage				
🙀 Distribution				
Fields				
References				
Geoprocessing History				

"Presentation Form" Click on the drop-down list which currently says "Digital Map" and choose one option.



Presentation Form	Digital Map
FGDC Geospatial Data Presentation Form	Empty Digital Document Hardcopy Document
+ New Identifier	Digital Image Hardcopy Image
3	Digital Map
ISBN	Hardcopy Map Digital Model Hardcopy Model Digital Profile
ISSN	Hardcopy Profile Digital Table
Dates	Hardcopy Table Digital Video Hardcopy Video

➔ Digital Map

"Dates" (enter at least one date) Click on the drop-down list of "Dates" and insert dates.

 Dates 	
Created	15
Published	15
Revised	15

→ Created 2018-06-01

In the structure heading "**Overview**" go to "**Citation Contacts**" and fill in all categories indicated with red circles.



3.3.4 Citation contacts

Contents Preview Description	
🔚 Save 🗙 Exit	
Overview	Resource Citation Contacts
🙀 Item Description	Resource citation contacts
🙀 Topics & Keywords	Load a contact:
Citation	
Citation Contacts	+ New Contact
Contacts Manager	
Docales	
Metadata	

Contact(s), absolutely necessary. Click on "+ New Contact" and fill in information. *For the field "Role": make only one selection, do not choose* Empty *if possible)*

Contact: (Un	known)	
Name		
Organizati	on	
Position		
Role		
Position		



0	ontact: (Author)	
00		
	Name	
	Organization	
	Position	
	Role	Author
6) Contact Informa	ation
	Email	
	+ New Online I	Resource
	Address Ty	pe Empty
	Address	
	City	
	State	
	Postal Code	»
	Country	Empty
	Phone	
	Fax	
	Instructions	5
		2
	Hours	

Click on "New Contact Information" and fill in information.

→ Example: Miriam von Thenen, IOW, Email

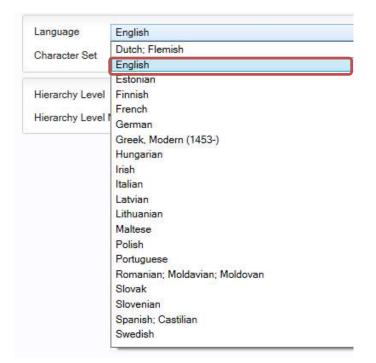
Go to the structure heading "**Resource**" and fill in all categories indicated with red circles.

3.4 Structure heading "Resource"

In the structure heading **"Resource"** fill in all categories indicated with red circles. Start with **"Details"**.

Contents Preview Description	
🔚 Save 🗙 Exit	
Overview ^	Resource Details
Rem Description	
🙀 Topics & Keywords	New Status
Citation	
Citation Contacts	+ New Credit
Contacts Manager	
Docales	Languages
Metadata	Language
🙀 Details	Character Set utf8
Contacts	Spatial Representation Type Vector
Maintenance	Scale Resolution
Constraints	Distance Resolution Empty v
Resource	
Details	New Browse Graphic
Service Details	Processing environment Version 6.2 (Build 9200) ; Esri ArcGIS 10.5.0.6491
Extents	Version 0.2 (build 9200), ESITAICAIS 10.5.0.0491
Points of Contact	New Usage
Maintenance	
Constraints	Supplemental Information
Spatial Reference	
〕 Spatial Data Representa	
Dontent	
🙀 Quality	
🛐 Lineage	+ New Resource Format
Bistribution	
🙀 Fields	
References	
Geoprocessing History	

"Language", choose the language.



→ English

"Scale Resolution" (if available)

Scale Resolution

"Distance Resolution" (with unit)

Distance Resolution	Empty -	
+ New Browse Graphic	Empty length: Ångström Ao length: astronomic unit AU length: cicero (Didot's pica) [cicero] length: didot (Didot's point) [didot]	
Processing environment Microsoft Windo	length: fathom [fth_us] length: fathom [fth_br] length: foot [ft_i]	III
🕂 New Usage	length: foot [ft_us] length: foot [ft_br] length: furlong [fur_us] length: Gunter's chain [ch_br]	
Supplemental Information	length: Gunter's chain (Surveyor's chain) [ch_us] length: inch [in_i] length: inch [in_us]	
	length: inch [in_br] length: light-year [ly] length: ligne (French line) [ligne] length: line [lne] length: link for Gunter's chain [lk_us]	
+ New Resource Format	length: link for Gunter's chain [lk_br] length: link for Ramden's chain [rlk_us]	
T new nesource Format	length: mil [mil_i] length: mil [mil_us] Jength: mile [mil_us]	+

In the structure heading "**Resource**" go to "**Points of Contact**" and fill in all categories indicated with red circles.



3.4.1 Points of Contact

Contents Preview Description	
Save X Exit	
Overview ^	name, organization or position is required for the responsible party. organization name is required email address is required
Citation	Contacts
Citation Contacts	
Contacts Manager	Contact: (Unknown)
Docales	Name
Metadata	Organization Position
🙀 Details	Role Originator
🙀 Contacts	New Contact Information
Maintenance	
Constraints	
Resource	Load a contact:
Details	New Contact
Service Details	
Extents	
Points of Contact	
Maintenance	
🙀 Constraints	
Spatial Reference	
💱 Spatial Data Representa	
Content	
Quality	

Contact(s), can be copied from "Citation Contacts" (see below the structure heading "Overview").



Click on "+ New Contact Information" and fill in information.

🔚 Save 🗙 Exit	
Overview Item Description Topics & Keywords	name, organization or position is required for the responsible party, organization name is required email address is required
Citation	Contacts
Contacts Manager	Contact: (Unknown)
🛃 Locales	Name
Metadata	Organization
🙀 Details	Position Role Originator
🙀 Contacts	New Contact Information
Maintenance	
🔋 Constraints	
Resource	Load a contact:
Details	+ New Contact
Service Details	
Extents	
Points of Contact	
Maintenance	



Name	
Organization	
Position	
Role	Originator
Contact Inform	nation
Email	
	97.
🕂 New Online	Resource
Address Ty	ype Empty
Address	
City	
State	
Postal Cod	Je
Country	Empty
Phone	
Fax	
	8
Instructions	S
Hours	

→ Miriam von Thenen, IOW, Email

OR load a contact by clicking on "Load a contact"

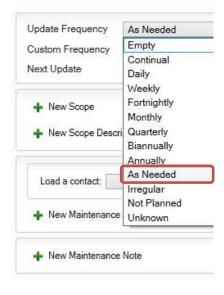
Load a contact: (
-------------------	--

In the structure heading "Resource" go to "Maintenance" and fill in all categories indicated with red circles.

3.4.2 Maintenance

🔚 Save 🗙 Exit	
Overview	Resource Maintenance
Item Description	Resource Maintenance
🙀 Topics & Keywords	Update Frequency As Needed
Citation	Custom Frequency
Relation Contacts	Next Update 15
Contacts Manager	
🛃 Locales	+ New Scope
Metadata	+ New Scope Description
Details	
Contacts	Load a contact:
Maintenance	New Maintenance Contact
Constraints	
Resource	+ New Maintenance Note
Details	
Service Details	
Extents	
Points of Contact	
Maintenance	

"Update frequency" (make only one selection, do not choose Empty if possible)



➔ As needed

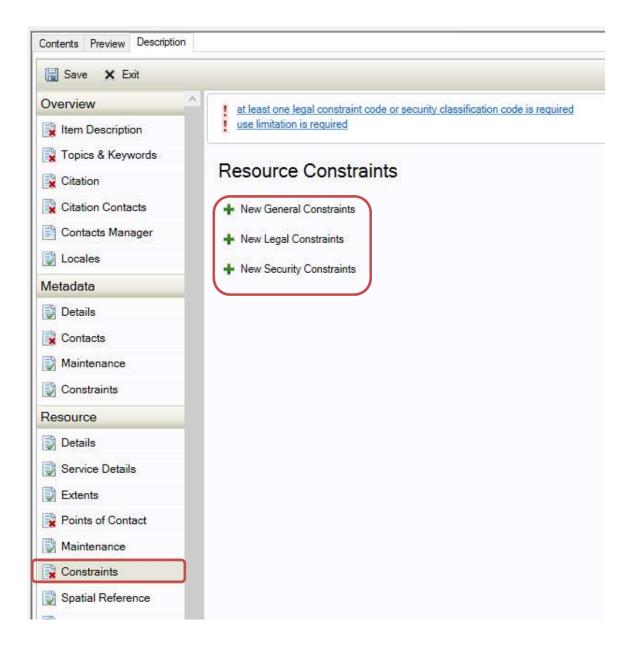
"Next update" (if known)

Next Update

In the structure heading **"Resource"** go to **"Constraints"** and fill in all categories indicated with red circles.



3.4.3 Constraints





Click on **"+ New General Constraints**", then click on **"+** New Use Limitation". Fill in information and choose one of the options from the table below.

	onstr	aints					
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Choose one option to fill in manually:

	o mini manaany.
License	Description for Baltic Sea Atlas
agreement	
Open	View and download file
Restricted I	View file
Restricted II	View file, download only on enquiry at author
Restricted III	View file, download only on enquiry at author, with fee
Restricted IV	View file, download only on enquiry at author, data are open after
	three years from the day data was submitted to the Baltic Sea Atlas

Click on "**+ New Legal Constraints**" and chose one option from the drop-down list (*choose 'copyright' unless data can be used freely*).

 Legal Constraints 		
 Legal Constraints 		
New Use Limita		
Thew Use Limita	lion	
Access Constraints	Copyright	
Use Constraints	Copyright	
	Empty	
🕂 New Other Con	Copyright	
	Patent	
	Patent Pending	
New General Constrai	Trademark.	
	Licence	
New Legal Constraints	Intellectual Property Rights	
	Restricted	
New Security Constrai	Other Restrictions	

Click on "+ New Other Constraints". Fill in further information.

🕂 New Use Limitatio	on
Access Constraints	Copyright
Jse Constraints	Copyright



Legal Constraints		
🕂 New Use Limitatio	n	
Access Constraints	Copyright	
Use Constraints	Copyright	
Other Constraints		
		J

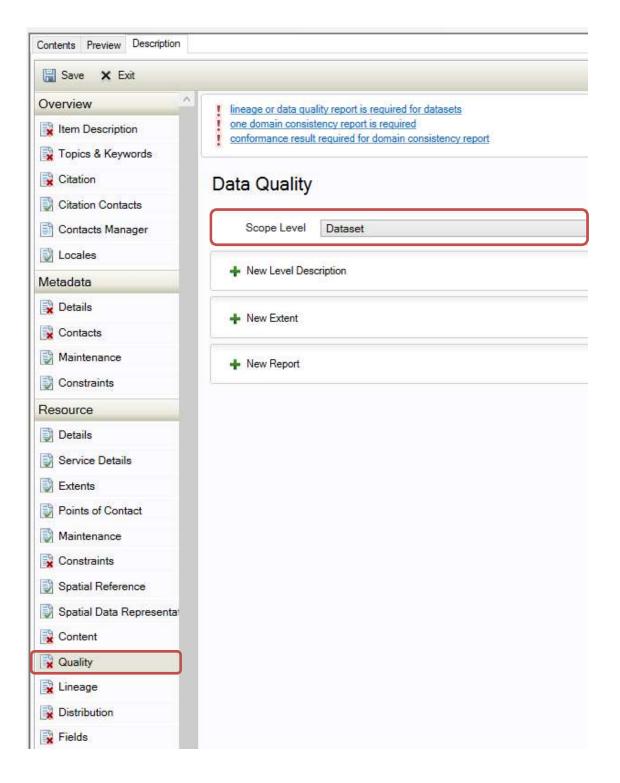
Click on "**+ New Security Constraints**" and chose one option from the dropdown list (choose 'restricted' unless data can be used freely).

ssification	Restricted	
ssification System	Empty	
er Note	Unclassified	
	Restricted	
Indling Description	Confidential	
	Secret	
	Top Secret	
General Constraints		
Legal Constraints		

In the structure heading **"Resource"** go to **"Quality"** and fill in all categories indicated with red circles.

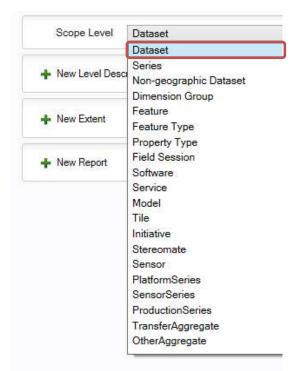


3.4.4 Quality





Click on the drop-down list of "Scope Level" and choose one option.

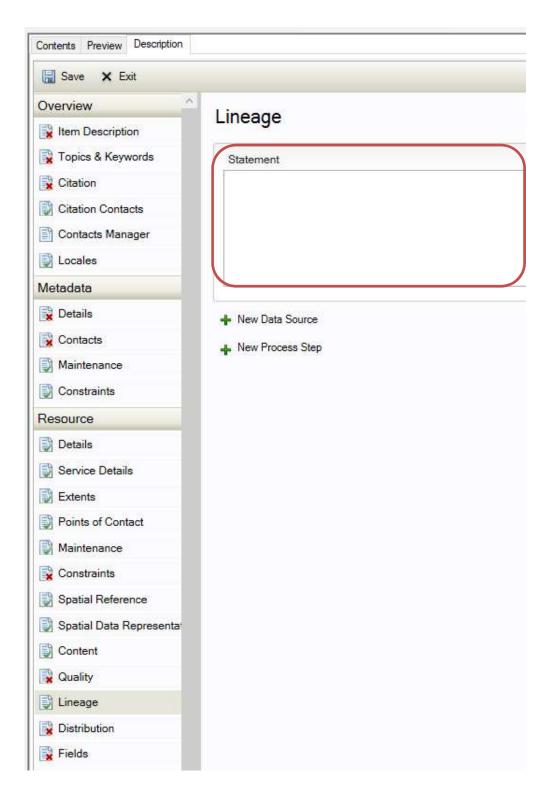


➔ Dataset

In the structure heading **"Resource"** go to **"Lineage"** and fill in all categories indicated with red circles.



3.4.5 Lineage



"**Statement**", here you can enter information about the origin of the data (*Methods, Description in detail, unit, ... You can enter process steps (What?, Who?, When?, Source?).* Shortly list the attribute fields of the dataset you can



find in the attribute table and give a short explanation what the field indicates (examples: "Time_f" = time frequency. "Spatial_h" = spatial dimension horizontal)

*

→ The dataset was created based on digitization ...

Click on "**New Data Source**" – if available. Data source can be described by text, as citation, with reference system and extent (for geodata).

Data Source	1
Source Description	
)
r	
Medium Name Empty	
Medium Name Empty Scale Denominator	
Scale Denominator	

Process Step – if desired. Click on "**New Process Step**", here work steps can be enumerated individually.

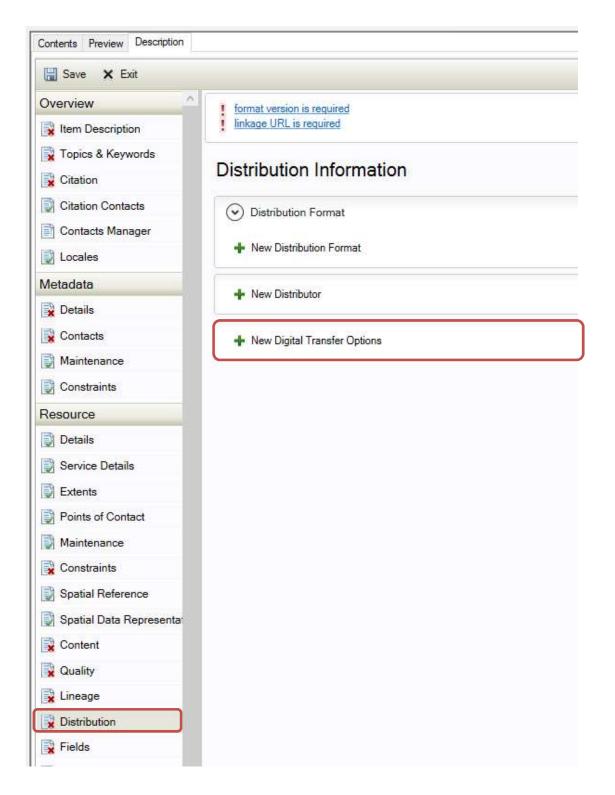
- What was done?
- When was the process step executed?
- Who executed the process step?
- Which data source belongs to the process step?

Process Step	
Process Description	
Rationale	
Process Step Date 15	
Load a processor:	
+ New Processor	
+ New Data Source	

In the structure heading **"Resource"** go to **"Distribution**" and fill in all categories indicated with red circles.



3.4.6 Distribution



Click on "New Digital Transfer Options", then click on "+ New Online Resource". Fill in "**Linkage**"

Units of Dist	tribution	
Transfer Siz	:e	
🕂 New Online I	Resource	
Offline Med	ium	
J		

Units of Distributi Transfer Size	on	
 Online Resource 		
Linkage		
Protocol		
Profile		
Name		
Description		
Function	Empty	
	411 - 1955A	
Function		

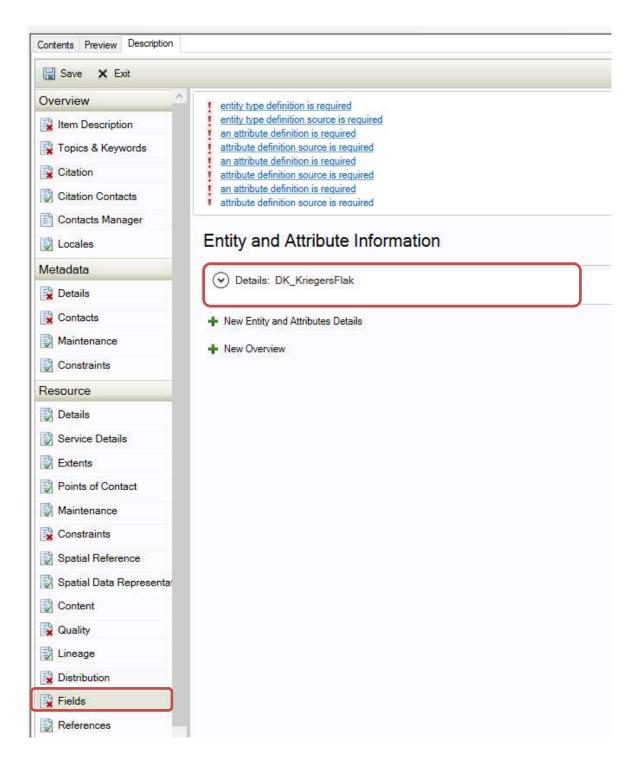


 Digital Transfer Option 	ons
 Digital Transfer Option 	ons
Units of Distributi	on
Transfer Size	
Online Resource	
Linkage	https://bonusbasmati.eu/about-the-project/bb_es/
Protocol	WWW:LINK
Profile	
Name	Baltic Sea Atlas
Description	Download and links
Function	Information
 New Online Resource Offline Medium 	irce 2
🕂 New Digital Transfer C	ptions

An example to fill in "Linkage" could be the following:

In the structure heading "**Resource**" go to "Fields" and fill in all categories indicated with red circles.

3.4.7 Fields



NOTE: Attribute fields – only necessary for vector data (for raster data, the units should be mentioned in the "Item Description" of the dataset and "Lineage".) Attribute name alias: *not absolutely necessary*. Definition: *short explanation of what is in the column, such as units of measure, abbreviations etc.*



Click on "Details: DK_KriegersFlak" and you will see the different types of information you can edit. Click on each drop-down button and edit as much information as you have about the dataset.

 Entity Type 	
Attribute: FID	
Attribute: Shape	
Attribute: Id	
Attribute: Status	
Attribute: Name	
Attribute: Country	
Attribute: Source	
Attribute: Spatial_v	
(→) Attribute: Spatial_h	

Entity and Attribute Information



0	Attribute: Tin	ne_tr		
0	Attribute: Tin	ne_tl		
0	Attribute: Ori	igin		
4	New Attribute			

Label DK_I	GriegersFlak	
 Entity Type 		
Object	Feature Class	
Count	2	

Label	FID
Alias	FID
	Internal feature number.
Definition	
Definition Source	Esri
Туре	OID
Width	4
Precision	0
Scale	0
Indexed	
Value Explanation	
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
New Enumerated Domain	
New Range Domain	
New Codeset Domain	
Unrepresentable Domain	



Label	Shape
Alias	Shape
Definition	Feature geometry.
Definition Source	Esri
Туре	Geometry
Width	0
Precision	0
Scale	0
Indexed	
Value Explanation	
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
New Enumerated Domain	
🖡 New Range Domain	
New Codeset Domain	
Unrepresentable Domain	



Label	Spatial_v
Alias	Spatial_v
Definition	
Definition Source	
Туре	String
Width	50
Precision	0
Scale	0
Indexed	
Value Explanation	
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
New Enumerated Domain	
🕂 New Range Domain	
New Codeset Domain	
New Unrepresentable Domain	

→ spatial dimension vertical; list all categories (incl. definitions if available)

Label	Spatial_h
Alias	Spatial_h
Definition	
Definition Source	
Туре	String
Width	50
Precision	0
Scale	0
Indexed	[
Value Explanation	[
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
New Enumerated Domain	
New Range Domain	
New Codeset Domain	
New Unrepresentable Domain	

→ spatial dimension horizontal; list all categories (incl. definitions if available)

Label	Time_0
Alias	Time_0
Definition	
Definition Source	
Туре	String
Width	50
Precision	0
Scale	0
Indexed	
Value Explanation	
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
🕂 New Enumerated Domain	
🕂 New Range Domain	
New Codeset Domain	
🕂 New Unrepresentable Domain	

→ time occurrence; list all categories (incl. definitions if available) heat production

70/88

Label	Time_f
Alias	Time_f
Definition	
Definition Source	
Туре	String
Width	50
Precision	0
Scale	0
Indexed	
Value Explanation	
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
New Enumerated Domain	
New Range Domain	
New Codeset Domain	
New Unrepresentable Domain	

→ time: temporal frequency; list all categories (incl. definitions if available)



Label	Time_tl	
Alias	Time_tl	
Definition		
Definition Source		
Туре	String	
Width	50	
Precision	0	
Scale	0	
Indexed		
Value Explanation		
Value Accuracy		
Value Measurement Frequency	Empty	
Beginning Date of Values	15	
Ending Date of Values	15	
New Enumerated Domain		
🕂 New Range Domain		
+ New Codeset Domain		
🕂 New Unrepresentable Domain		

→ time: time line; list all categories (incl. definitions if available)



Label	Origin
Alias	Origin
Definition	
Definition Source	
Туре	String
Width	50
Precision	0
Scale	0
Indexed	
Value Explanation	
Value Accuracy	
Value Measurement Frequency	Empty
Beginning Date of Values	15
Ending Date of Values	15
New Enumerated Domain	14
New Range Domain	
New Codeset Domain	
New Unrepresentable Domain	

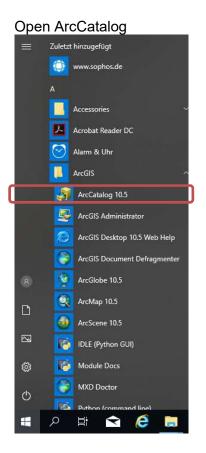
→ origin: origin of data; list all categories (incl. definitions if available)

Save and Exit



4 Option 2: I have a similar dataset of which I want to import the metadata information to the new dataset

4.1 Procedure



Search in your ArcCatalog Tree for the folder with the shapefile of which you want to use the metadata information and choose the respective shapefile.



Go to "Description".





Go to "Export". ***Attention**! Read the following before you continue with the export.



*Attention:

If you have an entry for an online resource (in the structure heading **"Resource"** go to **"Distribution"** and check for an entry) which is a weblink such as "https://bonusbasmati.eu/about-the-project/bb_es/" the link will not be saved properly in your .xml file. To avoid this, simply remove the "s" from "https" and then continue to export.

 Digital Transfer Option 	ons
 Digital Transfer Optic 	ons
Units of Distribut	ion
Transfer Size	
Online Resource	
Linkage	https://bonusbasmati.eu/about-the-project/bb_es/
Protocol	WWW:LINK
Profile	
Name	Baltic Sea Atlas
Description	Download and links
Function	Information

Change "https" into "http".

 Digital Transfer Option 	ons
Units of Distributi	on
Transfer Size	
Online Resource	
Linkage	http://bonusbasmati.eu/about-the-project/bb_es/
Protocol	WWW:LINK
Profile	
Name	Baltic Sea Atlas
Description	Download and links
Function	Information



Now you can continue with the export. Go to "Export".

Choose the location of your output file by clicking on the folder icon.

🛚 Export Metadata	×
Source Metadata D:\/Maack\BASMATI\/Miriam Daten_WebGIS\Lotta\DK_KriegersFlakCopy.shp Translator C:\Program Files (x86)\ArcGIS\Desktop 10.5\/Metadata\Translator\ArcGIS2ISO 19139.xml Cutput File (optional) D:\/Maack\BASMATI\/Miriam Daten_WebGIS\Lotta\DK_KriegersFlakCopy_xslttran1.xml	Output File (optional) A stand-alone XML file that will be created containing the converted metadata.
OK Cancel Environments << Hide Help	Tool Help

Save the file with as .xml file.



Speichem in:	Lotta		
Æ	Name	Änderungsdatum	Тур ^
X	DK_KriegersFlak.cpg	20.09.2018 11:35	CPG-D
Schnellzugriff	DK_KriegersFlak.dbf	20.09.2018 11:35	DBF-D
	DK_KriegersFlak.prj	15.05.2018 10:53	PRJ-Da
	DK_KriegersFlak.sbn	20.09.2018 11:35	SBN-D
	DK_KriegersFlak.sbx	20.09.2018 11:35	SBX-Di
Desktop	DK_KriegersFlak.shp	20.09.2018 11:35	SHP-D
	DK_KriegersFlak.shp	29.10.2018 10:53	XML-C
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	DK_KriegersFlakCopy.CPG	20.09.2018 11:35	CPG-D
Bibliotheken	DK_KriegersFlakCopy.dbf	20.09.2018 11:35	DBF-D
	DK_KriegersFlakCopy.prj	15.05.2018 10:53	PRJ-Da
	DK_KriegersFlakCopy.sbn	20.09.2018 11:35	SBN-D
~	DK KriegersFlakConv shy	20.09 2018 11-35	SRX-D: Y
Arbeitsplatz BIO-62 (maack)	<		,
and on (money)	Dateiname: DK_KriegersFlakCopy.xml	~	Speichem
	Dateityp: All Files		Abbrechen

Check your entry and click "OK".

Source Metadata	Output File (optional)
D: \Waack\BASMATI\Wiriam Daten_WebGIS\Lotta\DK_KriegersFlakCopy.shp	
Translator	A stand-alone XML file that will be created containing
C: \Program Files (x86) \ArcGIS \Desktop 10.5 \Metadata \Translator \ArcGIS2ISO 19139.xml	the converted metadata.
Dutput File (optional)	
D: \Maack\BASMATI\Miriam Daten_WebGIS\Lotta\DK_KriegersFlakCopy.xml	

Wait for the process to be completed and close the dialog.

Completed	_
<< Deta	ils
Close this dialog when completed successfully	
<pre>\Lotta\DK_KriegersFlakCopy_xslttran.xml" # Start Time: Mon Oct 29 11:10:11 2018 Succeeded at Mon Oct 29 11:10:11 2018 (Elapsed Time: 0,03 seconds) Executing (Export ArcGIS Metadata): ESRITranslator "D:\Maack\BASMATI\Miriam Daten_WebGIS\Lotta DK_KriegersFlakCopy_xslttran.xml" "C:\Program Files (x86)\ArcGIS\Desktopl0.5\Metadata\Translator \ArcGIS\Desktopl0.5\Metadata\Translator \ArcGIS\Desktopl0.5\Metadata\Translator Dte_WebGIS\Lotta\DK_KriegersFlakCopy_xslttran.ing" Start Time: Mon Oct 29 11:10:14 2018 Succeeded at Mon Oct 29 11:10:17 2018 (Elapsed Time: 0,48 seconds) Succeeded at Mon Oct 29 11:10:17 2018 (Elapsed Time: 6,76 seconds)</pre>	~

Search for the location you have saved the .xml file.

DK_KriegersFlakCopy.shp	29.10.2018 11:13	XML-Dokument	17 KB



Open the file: Right click on the file and open with "Editor".

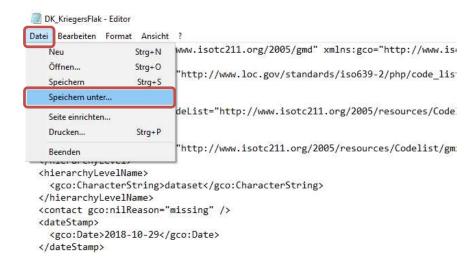
DK_KriegersFlakCopy.sbx	20.09.2018 11:35	SBX-Datei	1 KB	
DK_KriegersFlakCopy.shp	20.09.2018 11:35	SHP-Datei	1 KB	
DK_KriegersFlakCopy.shp	29.10.2018	10.0.5.1	-475.005	1
 DK_KriegersFlakCopy.shx DK_KriegersFlakCopy DK_KriegersFlakCopy_esritran 	20.09.2018 29.10.2018	Ö ffnen Bearbeiten Freigabe		
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HELCOM_windparks_new.prj	27.04.2018	/lit Sophos Anti-Virus über	prüfen	Editor
HELCOM_windparks_new.sbn		Atempo Live Navigator	>	Firefox
HELCOM_windparks_new.sbx HELCOM_windparks_new.shp	27.04.2018 27.04.2018	/orgängerversionen wieder	herstellen	Internet Explorer Aircosoft Edge
HELCOM_windparks_new.shp	20.09.2018 9	Senden an	>	Word 2016
HELCOM_windparks_new.shx	15.05.2018	Ausschneiden		🖉 WordPad
OWP_Ostsee_update.cpg	15.05.2018	(opieren		Store durchsuchen Andere App auswählen
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📋 OWP_Ostsee_update.sbn	27.04.2018 L	Jmbenennen		
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OWP_Ostsee_update.shp	15.05.2018 10000	or in - Dater	7.60	-
OWP_Ostsee_update.shp	18.09.2018 14:42	XML-Dokument	38 KB	

The file will look similar to the following:

Jet Estates Formst Anicht !
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Click on the top left icon ("File/Option"). Click on "Save as" and search for the location you want to save the file.





Save the file under the name of the new shapefile. Attention: Write .xml behind the name.

Dateiname:	DK_KriegersFlak.xml	
		-

Now you can make small changes in the file directly. There is no need to import the .xml file again in the ArcCatalog. The most important file for metadata information is the .xml file as this will be used in IOWMeta.



Go to "Edit" and click on "Search".

Datei	Bearbeiten	Format A	nsicht ?	
MD_N	Rückgi	ingig	Strg+Z	sotc211.org/20
<la <</la 	Aussch	ineiden	Strg+X	://www.loc.gov
1</td <td>Kopier</td> <td>en</td> <td>Strg+C</td> <td></td>	Kopier	en	Strg+C	
<cł< td=""><td>Einfüg</td><td>en</td><td>Strg+V</td><td></td></cł<>	Einfüg	en	Strg+V	
<td>Lösche</td> <td>n</td> <td>Entf</td> <td>t="http://www.</td>	Lösche	n	Entf	t="http://www.
<hi< td=""><td>Sucher</td><td>1</td><td>Strg+F</td><td></td></hi<>	Sucher	1	Strg+F	
	Weiter	suchen	F3	//www.isotc21
<td>Ersetze</td> <td>n</td> <td>Strg+H</td> <td></td>	Ersetze	n	Strg+H	
<	Wechs	eln Sie zu	Strg+G	
٢</td <td>Alles n</td> <td>arkieren</td> <td>Strg+A</td> <td></td>	Alles n	arkieren	Strg+A	
<cc <da< td=""><td>Uhrzeit</td><td>/Datum</td><td>F5</td><td>в" /></td></da<></cc 	Uhrzeit	/Datum	F5	в" />
<td>ateStamp:</td> <td></td> <td>29<td>)ate></td></td>	ateStamp:		29 <td>)ate></td>)ate>

You can now search for metadata information you want to change from the old file for the new one. Such information includes for example the title and keywords. Also if you have a weblink which you have previously changed from "https" into "http" you can now add the missing "s" again. Example: in the search field search for "title".



IN DK_KriegersFlak - Editor

Datei Bearbeiten Format Ansicht ?

```
<MD_Metadata xmlns="http://www.isotc211.org/2005/gmd" xmlns:gco
  <language>
    <LanguageCode codeList="http://www.loc.gov/standards/iso639
  </language>
  <characterSet>
    <MD_CharacterSetCode codeList="http://www.isotc211.org/2005</pre>
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  </hi Suchen nach:
  <hie
                             Suchrichtung
                                            Abbrechen
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  </hi
      Groß-/Kleinschreibung
                            Nach unten
  <con
  <dateStamp>
    <gco:Date>2018-10-29</gco:Date>
  </dateStamp>
  <metadataStandardName>
    <gco:CharacterString>INSPIRE Metadata Implementing Rules: T
  </metadataStandardName>
  <metadataStandardVersion>
    <gco:CharacterString>V. 1.2</gco:CharacterString>
  </metadataStandardVersion>
  <spatialRepresentationInfo>
    <MD_VectorSpatialRepresentation>
      <topologyLevel>
        <MD TopologyLevelCode codeList="http://www.isotc211.org
      </topologyLevel>
      <geometricObjects>
        <MD GeometricObjects>
          <geometricObjectType>
            <MD GeometricObjectTypeCode codeList="http://www.is
          </geometricObjectType>
          <geometricObjectCount>
            <gco:Integer>2</gco:Integer>
          </geometricObjectCount>
        </MD GeometricObjects>
      </geometricObjects>
    </MD VectorSpatialRepresentation>
  </spatialRepresentationInfo>
  <referenceSystemInfo>
    <MD ReferenceSystem>
```

<

You can now change the title. The previous title is written in between the brackets greater than and smaller than. >DK_KriegersFlak< Make changes only within these brackets.

_KriegersFlak -	Editor			
Bearbeiten F	ormat Ansio	:ht ?		
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After you have completed the changes, you can save the file and make sure you send it together with the files of your dataset to the IOW so it can be included in the Baltic Sea Atlas.







Attachment B:

Checklist data delivery to IOW

1 1 1

TTT

Internal document





Task	Description			Comments	Task check	
1		lled out the req log as describe				
2	I have provided information about the use and license of the dataset. Choose from the options below.					
	check	License agreement	Description for Baltic Sea Atlas			
		Open	View and download file			
		Restricted I	View file			
		Restricted II	View file, download only on enquiry at author			
		Restricted	View file, download only on			
			enquiry at author, with fee			
		Restricted IV	View file, download only on enquiry at author, data are open after three years from the day data was submitted to the Baltic Sea Atlas			
	below.	Database stru	ucture Baltic Sea Atlas			
		Administratio				
		Environmental properties				
		- Biology				
		- Chemistry				
	- Geology					
	Physics Physics Climate data Bathymetry					
		Ecosystem services				
		- Provisioning services				
		 Regulating and maintenance services Cultural services 				
		Anthropogenic uses				
			study Aquaculture			
			study Riga Bay			
		- Pan-Baltic case study				
		Effects and pressures				
		Future scenarios				

4	I have collected all files in a zip folder which has to be submitted to the Institute for Baltic Sea Research (IOW) in order to be implemented in the Baltic Sea Atlas. Files include all shapefile information and respective files, or raster data files and can include additional files such as excel files, text documents, pdf, png or others.	
5	I have submitted all required information and data files to the IOW.: lotta.maack@io-warnemuende.de	

In case of questions, further information or help needed please contact Lotta Maack (Institute for Baltic Research Warnemünde, Germany): lotta.maack@io-warnemuende.de













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