ExpeER
Distributed Infrastructure for EXPErimentation in Ecosystem Research

DELIVERABLE D3.4

Deliverable title: GeoPortal as CSW service

Abstract: The Geoportal developed in ExpeER provides a CSW-service for Metadata in INSPIRE compatible ISO19115 format.

Due date of deliverable: Month 48   Actual submission date: M49

Start date of the project: December 1st, 2010   Duration: 54 months

Organisation name of lead contractor: Finnish Environment Institute (SYKE)

Contributors: Saku Anttila, Yki Laine

Revision N°: V[5.0]

Dissemination level:

PU Public (must be available on the website)	**[X]**
PP Restricted to other programme participants (including the Commission Services)	**[ ]**
RE Restricted to a group specified by the consortium (including the Commission Services)	**[ ]**
CO Confidential, only for members of the consortium (including the Commission Services)	**[ ]**

Table of Content

Glossary

CSW	Catalog Service for the Web
DEIMS	Drupal Ecological Information Management System
EML	Ecological Metadata Language
HTTP	Hypertext Transfer Protocol
INSPIRE	Infrastructure for Spatial Information in the European Community
ISO/TS	International Organization for Standardization/Technical Specification
XML	Extensible Markup Language

1. Executive summary

During the project runtime the objectives of Task 3 in WP 3 were changedand the work plan was changed in order to adjust for the ongoing development of the DEIMS Metadata Platform[1] (Drupal Ecological Information System) and due to similar developments in EnvEurope project. By this SYKE was not participating in EnvEurope project and the related basic design of DEIMS.

The original WP3 plan involved the deployment of open source software (e.g. ESRI Geoportal), for both metadata management and demonstration of map services. These technical solutions would have overlapped with the revised objectives of the DEIMS system. Parallel development of two services would have lead to an unclear process in documenting datasets and confusion for users seeking to discover ExpeER datasets.

It was therefore decided to capitalize on the work that was already engaged at SYKE:

- to create the necessary interface to transform metadata between ISO19139 and EML standards (Deliverable D3.6) and

- to use SYKE's GeoPortal infrastructure to expose ExpeER metadata in an INSPIRE compliant way by using a Catalogue Service for the Web (CSW) service.

The Geoportal service created by SYKE is being used to demonstrate the feasibility of interaction between different metadata systems and more importantly, to provide a CSW-interface in an INSPIRE compliant format.

2. Background

2.1. Catalog Service for the Web a.k.a CSW services

Catalog Service for the Web a.k.a CSW-service provides a standard for exposing geospatial records and services on the Internet. CSW-services are mainly developed for the machine-to-machine interaction and are self-describing services that allow queries, updates and insertions of metadata records. CSW operates through requests in HTTP-format to the CSW web service and is one part of the OGC Catalog Service standard

(http://www.opengeospatial.org/standards/cat).

CSW does not restrict the format of metadata records which is defined only as XML. However, CSW requires a certain set of core fields from each record. These include: Title, Format, Type (e.g. Dataset, Dataset Collection or Service), Bounding Box, Coordinate Reference System and Association. All of these are naturally included in common metadata standards such as EML, Dublin Core or ISO19139.

CSW-services can be assessed with certain set of HTTP- requests. These can be used to retrieve information on the functionality of the service and to retrieve or describe records that service provides. CSW-services respond to the requests in xml-format.

---

[1] see http://data.lter-europe.net/deims/

The typical CSW-request includes:

GetCapabilities - returns the properties of requests that are accepted by the server

DescribeRecord - returns info about the structure of records

GetRecords - search for records, returning record IDs

GetRecordsById - returns records, specified by their ID

CSW also allow transactions to be performed with HTTP-requests, such as insert, delete or update of records. However, ExpeER Geoportal records will only be maintained by administrators that have access for the Geoportal application.

2.2. Geoportal

Geoportal is a free open source product by ESRI[2] (Environmental Systems Research Institute). The ESRI Geoportal was modified, tested and installed into an Internet server in order to respond to the needs of ExpeER WP3.

Geoportal enables the discovery and use of geospatial resources including datasets, rasters, and Web Services stored in various metadata standards. Geoportal can also provide CSW-service for the metadata records stored in its own database and also harvested (registered) auxilliary metadata sources.

3. CSW-service by ExpeER Geoportal

3.1. ExpeER Geoportal providing the CSW-service

ExpeER Geoportal is provided in following web address for users to browse the ExpeER metadata records: http://expeer.ymparisto.fi:8080/geoportal/catalog/main/home.page

ExpeER Geoportal includes metadata and service records provided by the SYKE as well as harvested from the EnvEurope DEIMS metadata discovery service (Fig. 1).

Figure 1. Screen capture from the ExpeER Geoportal

---

[2] Download at http://www.esri.com/software/arcgis/geoportal

3.2. End point for CSW-service by ExpeER Geoportal

The end-point for the CSW-service to allow machine-to-machine requests for metadata has the flowing web address:

http://expeer.ymparisto.fi:8080/geoportal/csw

Through provision of the end-point service, the ExpeER metadata can be included in a federated web services infrastructure as required for INSPIRE compliance. In order to use the service end-point, CSW-requests are required as shown in the the examples in the following chapter.

3.3. Example requests for the CSW-service

The chapter describes and lists examples on the different requests for the ExpeER CSW-service. The details of the CSW–service Geoportal as well as examples on its usage are comprehensively described in

https://github.com/Esri/geoportal-server/wiki/Catalog-Service

3.3.1. GetCapabilities

The CSW service can be asked to provide a description of itself, the human who administers it and other information through a GetCapabilities request. This form allows you to configure the CSW server and fill out some of the properties returned in response to a GetCapabilities request. A description of each of the fields in this form now follows:

Example request:

http://expeer.ymparisto.fi:8080/geoportal/csw?Request=GetCapabilities&Service=CSW&Version=2.0.2

Result set:

```
<csw:Capabilities xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:gml="http://www.opengis.net/gml" xmlns:ogc="http://www.opengis.net/ogc"
xmlns:ows="http://www.opengis.net/ows" xmlns:xlink="http://www.w3.org/1999/xlink"
version="2.0.2">
    <ows:ServiceIdentification>
        <ows:Title>
            ArcGIS Server Geoportal Extension 10 - OGC CSW 2.0.2 ISO AP
        </ows:Title>
        <ows:Abstract>
            A catalogue service that conforms to the HTTP protocol binding of the
OpenGIS Catalogue Service ISO Metadata Application Profile specification (version
2.0.2)
        </ows:Abstract>
...
```

See Annex I for the xml-response for the request.

3.3.2. DescribeRecord

CSW-service can be requested to describe the model of records with DescribeRecord – request.

Example request:

http://expeer.ymparisto.fi:8080/geoportal/csw?REQUEST=DescribeRecord&service=CSW&version=2.0.2

Example result:

```
<?xml version="1.0" encoding="UTF-8"?>
<csw:DescribeRecordResponse
    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2">
    <csw:SchemaComponent targetNamespace="http://www.opengis.net/cat/csw/2.0.2"
schemaLanguage="XMLSCHEMA">
        <xsd:schema targetNamespace="http://www.opengis.net/cat/csw/2.0.2"
version="2.0.2" id="csw:Record" elementFormDefault="qualified"
            xmlns:xsd="http://www.w3.org/2001/XMLSchema"
            xmlns:ows="http://www.opengis.net/ows"
            xmlns:dct="http://purl.org/dc/terms/"
            xmlns:dc="http://purl.org/dc/elements/1.1/">
            <xsd:import schemaLocation="rec-dcterms.xsd"
namespace="http://purl.org/dc/terms/"/>
...
```

See Annex I for the xml-response for the request.

3.3.3. GetRecords

GetRecords –request can be used to search for records with different specifications.

Example request:

http://expeer.ymparisto.fi:8080/geoportal/csw?request=getRecords&service=CSW&startPosition=1&maxRecords=10&resultType=results&elementSetName=full&outputFormat=application/xml&outputschema=http://www.isotc211.org/2005/gmd&constraintLanguage=Filter&Constraint=%3Cogc:Filter%3E%3Cogc:Overlaps%3E%3Cogc:PropertyName%3Eows:BoundingBox%3C/ogc:PropertyName%3E%3Cgml:Envelope%3E%3Cgml:lowerCorner%3E-90%20-180%3C/gml:lowerCorner%3E%3Cgml:upperCorner%3E90%2090%3C/gml:upperCorner%3E%3C/gml:Envelope%3E%3C/ogc:Overlaps%3E%3C/ogc:Filter%3E&namespace=xmlns(gml=http://www.opengis.net/gml),xmlns(ogc=http://www.opengis.net/ogc)

Example result:

```
<?xml version="1.0" encoding="UTF-8"?>
<csw:GetRecordsResponse
    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2">
    <csw:SearchStatus timestamp="2014-09-29T10:34:40+03:00"/> -
```

```
    <csw:SearchResults recordSchema="http://www.isotc211.org/2005/gmd"
numberOfRecordsReturned="10" numberOfRecordsMatched="52" nextRecord="11"
elementSet="full"> -
        <gmd:MD_Metadata
            xmlns:xlink="http://www.w3.org/1999/xlink"
            xmlns:srv="http://www.isotc211.org/2005/srv"
            xmlns:gml="http://www.opengis.net/gml"
...
```

See Annex I for the xml-response for the request.

3.3.4. GetRecordsById

GetRecordsById -request returns records that are specified by their IDs.

Example request:

http://expeer.ymparisto.fi:8080/geoportal/csw?REQUEST=GetRecordById&service=CSW&version=2.0.2&Id=%7B5772F326-6EF3-43B8-A407-27AAC54657AF%7D

Example result:

```
<?xml version="1.0" encoding="UTF-8"?>
-
<csw:GetRecordByIdResponse
    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:ows="http://www.opengis.net/ows"
    xmlns:dct="http://purl.org/dc/terms/"
    xmlns:dc="http://purl.org/dc/elements/1.1/"
    xmlns:gml="http://www.opengis.net/gml"
    xmlns:dcmiBox="http://dublincore.org/documents/2000/07/11/dcmi-box/"> -
    <csw:SummaryRecord>
        <dc:identifier scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:FileID">knb-lter-europe-
deims.13177.13471</dc:identifier>
        <dc:identifier scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:DocID">{5772F326-6EF3-43B8-A407-
27AAC54657AF}</dc:identifier>
        <dc:title>Aboveground Net Primary Production in Doñana National Park for
aquatic and terrestrial environments from MODIS NPP product</dc:title>
        <dc:type scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:ContentType">downloadableData</dc:
type>
        <dc:subject>annual net primary production</dc:subject>
        <dc:subject>MODIS NPP (MOD17)</dc:subject>
        <dc:subject>Environmental monitoring facilities</dc:subject>
...
```

See Annex I for the xml-response for the request.

4. Summary and outlook

Applying standardized methods to archieve shared environmental data have evident advantages. Use of standards promotes common, clear meanings for data that is often reused. They enable data retrieval by machines and humans in well understood terms, codes and data structures. Furthermore standards encourage and enable reuse of data and software for multiple purposes and also provide consistent results during data retrieval (EPA, 2014).

Currently, environmental data is managed through various standars. In Europe, INSPIRE-directive legislation by European Union set the most solid background for the common data management of geospatial data sets. At the same time, standards specifically for environmental data have been developed and promoted. These include at least EML (http://en.wikipedia.org/wiki/Ecological_Metadata_Language) and Darwin Core (http://rs.tdwg.org/dwc/index.htm).

Services connecting and presenting environmental data from various sources require standardized machine readable libraries for metadata. In D3.5 described here, we created and demonstrated an INSPIRE compliant library for ecological metadata and data sets that can be registered into other discovery services. Thus, this deliverable present one piece in the seamless networking of library services on which federated system can be build on.

5. References and further information

EPA, 2014. Improving the Quality of Environmental Data. Web site of the Environmental protection Agency, United states. Available at
http://ofmpub.epa.gov/sor_internet/registry/datastds/home/overview/home.do
(29.9.2014)

Further information

CSW-services:

http://en.wikipedia.org/wiki/Catalog_Service_for_the_Web

https://github.com/Esri/geoportal-server/wiki/Catalog-Service

Metadata standards

http://www.opengeospatial.org/standards

http://en.wikipedia.org/wiki/Geospatial_metadata

Esri Geoportal

http://www.esri.com/software/arcgis/geoportal

Annex I: Responses for the exemplar XML-requests

I.   GetCapabilities

Example   request:
http://expeer.ymparisto.fi:8080/geoportal/csw?Request=GetCapabilities&Service=CSW&Version=2.0.2

Result set:

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```
<!--
  See the NOTICE file distributed with
 this work for additional information regarding copyright ownership.
 Esri Inc. licenses this file to You under the Apache License, Version 2.0
 (the "License"); you may not use this file except in compliance with
 the License.  You may obtain a copy of the License at
     http://www.apache.org/licenses/LICENSE-2.0
 Unless required by applicable law or agreed to in writing, software
 distributed under the License is distributed on an "AS IS" BASIS,
 WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
 See the License for the specific language governing permissions and
 limitations under the License.
-->
<csw:Capabilities                    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
xmlns:gml="http://www.opengis.net/gml"        xmlns:ogc="http://www.opengis.net/ogc"
xmlns:ows="http://www.opengis.net/ows"   xmlns:xlink="http://www.w3.org/1999/xlink"
version="2.0.2">
    <ows:ServiceIdentification>
        <ows:Title>
            ArcGIS Server Geoportal Extension 10 - OGC CSW 2.0.2 ISO AP
        </ows:Title>
        <ows:Abstract>
            A catalogue service that conforms to the HTTP protocol binding of the
OpenGIS Catalogue Service ISO Metadata Application Profile specification (version
2.0.2)
        </ows:Abstract>
        <ows:Keywords>
            <ows:Keyword>ExpeER</ows:Keyword>
            <ows:Keyword>Experimentation</ows:Keyword>
            <ows:Keyword>Ecosystem</ows:Keyword>
            <ows:Keyword>Research</ows:Keyword>
            <ows:Keyword>Metadata</ows:Keyword>
        </ows:Keywords>
        <ows:ServiceType>CSW</ows:ServiceType>
        <ows:ServiceTypeVersion>2.0.2</ows:ServiceTypeVersion>
        <ows:Fees>unknown</ows:Fees>
        <ows:AccessConstraints>Free</ows:AccessConstraints>
    </ows:ServiceIdentification>
    <ows:ServiceProvider>
        <ows:ProviderName>Finnish        Environment        Institute,        ExpeER-
project</ows:ProviderName>
        <ows:ProviderSite
xlink:href="http://www.expeeronline.eu/index.php/participants#SYKE"/>
        <ows:ServiceContact>
            <ows:IndividualName>Saku Anttila</ows:IndividualName>
            <ows:PositionName>Researcher</ows:PositionName>
            <ows:ContactInfo>
                <ows:Phone>
                    <ows:Voice>voice</ows:Voice>
                    <ows:Facsimile>fax</ows:Facsimile>
                </ows:Phone>
                <ows:Address>
```

```
                    <ows:DeliveryPoint>Mechelininkatu 34a</ows:DeliveryPoint>
                    <ows:DeliveryPoint>P.O.Box 140</ows:DeliveryPoint>
                    <ows:City>Helsinki</ows:City>
                    <ows:AdministrativeArea>adminArea</ows:AdministrativeArea>
                    <ows:PostalCode>00260</ows:PostalCode>
                    <ows:Country>Finland</ows:Country>

<ows:ElectronicMailAddress>saku.anttila@ymparisto.fi</ows:ElectronicMailAddress>
                </ows:Address>
                <ows:OnlineResource xlink:href=""/>
            </ows:ContactInfo>
        </ows:ServiceContact>
    </ows:ServiceProvider>
    <ows:OperationsMetadata>
        <ows:Operation name="GetCapabilities">
            <ows:DCP>
                <ows:HTTP>
                    <ows:Get
xlink:href="http://kkexpeer.env.fi:8080/geoportal/csw/"/>
                    <ows:Post
xlink:href="http://kkexpeer.env.fi:8080/geoportal/csw/">
                        <ows:Constraint name="PostEncoding">
                            <ows:Value>XML</ows:Value>
                            <ows:Value>SOAP</ows:Value>
                        </ows:Constraint>
                    </ows:Post>
                </ows:HTTP>
            </ows:DCP>
            <ows:Parameter name="AcceptVersions">
                <ows:Value>2.0.2</ows:Value>
            </ows:Parameter>
            <ows:Parameter name="Sections">
                <ows:Value>ServiceIdentification</ows:Value>
                <ows:Value>ServiceProvider</ows:Value>
                <ows:Value>OperationsMetadata</ows:Value>
                <ows:Value>Filter_Capabilities</ows:Value>
            </ows:Parameter>
        </ows:Operation>
        <ows:Operation name="DescribeRecord">
            <ows:DCP>
                <ows:HTTP>
                    <ows:Get
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw"/>
                    <ows:Post
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw">
                        <ows:Constraint name="PostEncoding">
                            <ows:Value>XML</ows:Value>
                            <ows:Value>SOAP</ows:Value>
                        </ows:Constraint>
                    </ows:Post>
                </ows:HTTP>
            </ows:DCP>
            <ows:Parameter name="typeName">
                <ows:Value>csw:Record</ows:Value>
                <ows:Value>csw:SummaryRecord</ows:Value>
                <ows:Value>csw:BriefRecord</ows:Value>
            </ows:Parameter>
            <ows:Parameter name="outputFormat">
                <ows:Value>text/xml</ows:Value>
                <ows:Value>application/xml</ows:Value>
            </ows:Parameter>
            <ows:Parameter name="schemaLanguage">
                <ows:Value>XMLSCHEMA</ows:Value>
                <ows:Value>http://www.w3.org/TR/xmlschema-1/</ows:Value>
            </ows:Parameter>
        </ows:Operation>
        <ows:Operation name="GetRecords">
            <ows:DCP>
```

```
            <ows:HTTP>
                <ows:Get
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw"/>
                <ows:Post
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw">
                    <ows:Constraint name="PostEncoding">
                        <ows:Value>XML</ows:Value>
                        <ows:Value>SOAP</ows:Value>
                    </ows:Constraint>
                </ows:Post>
            </ows:HTTP>
        </ows:DCP>
        <ows:Parameter name="typeNames">
            <ows:Value>csw:Record</ows:Value>
            <ows:Value>gmd:MD_Metadata</ows:Value>
        </ows:Parameter>
        <ows:Parameter name="outputFormat">
            <ows:Value>application/xml</ows:Value>
            <ows:Value>text/xml</ows:Value>
        </ows:Parameter>
        <ows:Parameter name="outputSchema">
            <ows:Value>http://www.opengis.net/cat/csw/2.0.2</ows:Value>
            <ows:Value>http://www.isotc211.org/2005/gmd</ows:Value>
        </ows:Parameter>
        <ows:Parameter name="resultType">
            <ows:Value>results</ows:Value>
            <ows:Value>hits</ows:Value>
            <ows:Value>validate</ows:Value>
        </ows:Parameter>
        <ows:Parameter name="ElementSetName">
            <ows:Value>summary</ows:Value>
            <ows:Value>brief</ows:Value>
            <ows:Value>full</ows:Value>
        </ows:Parameter>
        <ows:Parameter name="CONSTRAINTLANGUAGE">
            <ows:Value>Filter</ows:Value>
        </ows:Parameter>
        <ows:Constraint name="SupportedCommonQueryables">
            <ows:Value>Subject</ows:Value>
            <ows:Value>Title</ows:Value>
            <ows:Value>Abstract</ows:Value>
            <ows:Value>AnyText</ows:Value>
            <ows:Value>Format</ows:Value>
            <ows:Value>Identifier</ows:Value>
            <ows:Value>Modified</ows:Value>
            <ows:Value>Type</ows:Value>
            <ows:Value>BoundingBox</ows:Value>
        </ows:Constraint>
        <ows:Constraint name="SupportedISOQueryables">
            <ows:Value>apiso:Subject</ows:Value>
            <ows:Value>apiso:Title</ows:Value>
            <ows:Value>apiso:Abstract</ows:Value>
            <ows:Value>apiso:AnyText</ows:Value>
            <ows:Value>apiso:Format</ows:Value>
            <ows:Value>apiso:Identifier</ows:Value>
            <ows:Value>apiso:Modified</ows:Value>
            <ows:Value>apiso:Type</ows:Value>
            <ows:Value>apiso:BoundingBox</ows:Value>
            <ows:Value>apiso:CRS.Authority</ows:Value>
            <ows:Value>apiso:CRS.ID</ows:Value>
            <ows:Value>apiso:CRS.Version</ows:Value>
            <ows:Value>apiso:RevisionDate</ows:Value>
            <ows:Value>apiso:AlternateTitle</ows:Value>
            <ows:Value>apiso:CreationDate</ows:Value>
            <ows:Value>apiso:PublicationDate</ows:Value>
            <ows:Value>apiso:OrganizationName</ows:Value>
            <ows:Value>apiso:HasSecurityConstraints</ows:Value>
            <ows:Value>apiso:Language</ows:Value>
```

```
                <ows:Value>apiso:ResourceIdentifier</ows:Value>
                <ows:Value>apiso:ParentIdentifier</ows:Value>
                <ows:Value>apiso:KeywordType</ows:Value>
                <ows:Value>apiso:TopicCategory</ows:Value>
                <ows:Value>apiso:ResourceLanguage</ows:Value>
                <ows:Value>apiso:GeographicDescriptionCode</ows:Value>
                <ows:Value>apiso:Denominator</ows:Value>
                <ows:Value>apiso:DistanceValue</ows:Value>
                <ows:Value>apiso:DistanceUOM</ows:Value>
                <ows:Value>apiso:TempExtent_begin</ows:Value>
                <ows:Value>apiso:TempExtent_end</ows:Value>
                <ows:Value>apiso:ServiceType</ows:Value>
                <ows:Value>apiso:ServiceTypeVersion</ows:Value>
                <ows:Value>apiso:Operation</ows:Value>
                <ows:Value>apiso:OperatesOn</ows:Value>
                <ows:Value>apiso:OperatesOnIdentifier</ows:Value>
                <ows:Value>apiso:OperatesOnName</ows:Value>
                <ows:Value>apiso:CouplingType</ows:Value>
            </ows:Constraint>
            <ows:Constraint name="AdditionalQueryables">
                <ows:Value>apiso:Degree</ows:Value>
                <ows:Value>apiso:AccessConstraints</ows:Value>
                <ows:Value>apiso:OtherConstraints</ows:Value>
                <ows:Value>apiso:Classification</ows:Value>
                <ows:Value>apiso:ConditionApplyingToAccessAndUse</ows:Value>
                <ows:Value>apiso:Lineage</ows:Value>
                <ows:Value>apiso:ResponsiblePartyRole</ows:Value>
                <ows:Value>apiso:SpecificationTitle</ows:Value>
                <ows:Value>apiso:SpecificationDate</ows:Value>
                <ows:Value>apiso:SpecificationDateType</ows:Value>
            </ows:Constraint>
        </ows:Operation>
        <ows:Operation name="GetRecordById">
            <ows:DCP>
                <ows:HTTP>
                    <ows:Get
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw"/>
                    <ows:Post
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw">
                        <ows:Constraint name="PostEncoding">
                            <ows:Value>XML</ows:Value>
                            <ows:Value>SOAP</ows:Value>
                        </ows:Constraint>
                    </ows:Post>
                </ows:HTTP>
            </ows:DCP>
            <ows:Parameter name="ElementSetName">
                <ows:Value>summary</ows:Value>
                <ows:Value>brief</ows:Value>
                <ows:Value>full</ows:Value>
            </ows:Parameter>
            <ows:Parameter name="outputFormat">
                <ows:Value>application/xml</ows:Value>
                <ows:Value>text/xml</ows:Value>
            </ows:Parameter>
            <ows:Parameter name="outputSchema">
                <ows:Value>http://www.opengis.net/cat/csw/2.0.2</ows:Value>
                <ows:Value>http://www.isotc211.org/2005/gmd</ows:Value>
                <ows:Value>original</ows:Value>
            </ows:Parameter>
        </ows:Operation>
        <ows:Operation name="Transaction">
            <ows:DCP>
                <ows:HTTP>
                    <ows:Post
xlink:href="http://expeer.ymparisto.fi:8080/geoportal/csw">
                        <ows:Constraint name="PostEncoding">
                            <ows:Value>XML</ows:Value>
```

```xml
                    <ows:Value>SOAP</ows:Value>
                </ows:Constraint>
            </ows:Post>
        </ows:HTTP>
    </ows:DCP>
</ows:Operation>
<ows:Parameter name="service">
    <ows:Value>CSW</ows:Value>
    <ows:Value>http://www.opengis.net/cat/csw/2.0.2</ows:Value>
</ows:Parameter>
<ows:Parameter name="version">
    <ows:Value>2.0.2</ows:Value>
</ows:Parameter>
<ows:Constraint name="PostEncoding">
    <ows:Value>XML</ows:Value>
</ows:Constraint>
<ows:ExtendedCapabilities>
    <ows:Constraint name="GPTVersion">
        <ows:Value>10</ows:Value>
    </ows:Constraint>
</ows:ExtendedCapabilities>
</ows:OperationsMetadata>
<ogc:Filter_Capabilities>
    <ogc:Spatial_Capabilities>
        <ogc:GeometryOperands>
            <ogc:GeometryOperand>gml:Envelope</ogc:GeometryOperand>
            <ogc:GeometryOperand>gml:Point</ogc:GeometryOperand>
        </ogc:GeometryOperands>
        <ogc:SpatialOperators>
            <ogc:SpatialOperator name="BBOX"/>
            <ogc:SpatialOperator name="Contains"/>
            <ogc:SpatialOperator name="Disjoint"/>
            <ogc:SpatialOperator name="Equals"/>
            <ogc:SpatialOperator name="Intersects"/>
            <ogc:SpatialOperator name="Overlaps"/>
            <ogc:SpatialOperator name="Within"/>
        </ogc:SpatialOperators>
    </ogc:Spatial_Capabilities>
    <ogc:Scalar_Capabilities>
        <ogc:LogicalOperators/>
        <ogc:ComparisonOperators>
            <ogc:ComparisonOperator>Between</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>EqualTo</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>GreaterThan</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>GreaterThanEqualTo</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>LessThan</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>LessThanEqualTo</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>Like</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>NotEqualTo</ogc:ComparisonOperator>
            <ogc:ComparisonOperator>NullCheck</ogc:ComparisonOperator>
        </ogc:ComparisonOperators>
    </ogc:Scalar_Capabilities>
    <ogc:Id_Capabilities>
        <ogc:EID/>
    </ogc:Id_Capabilities>
</ogc:Filter_Capabilities>
</csw:Capabilities>
```

II. DescribeRecord

Example request:
http://expeer.ymparisto.fi:8080/geoportal/csw?REQUEST=DescribeRecord&service=CSW&version=2.0.2

Example result:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!-- See the NOTICE file distributed with this work for additional information
regarding copyright ownership. Esri Inc. licenses this file to You under the Apache
License, Version 2.0 (the "License"); you may not use this file except in
compliance with the License. You may obtain a copy of the License at
http://www.apache.org/licenses/LICENSE-2.0 Unless required by applicable law or
agreed to in writing, software distributed under the License is distributed on an
"AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or
implied. See the License for the specific language governing permissions and
limitations under the License.-->
<csw:DescribeRecordResponse
    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2">
    <csw:SchemaComponent     targetNamespace="http://www.opengis.net/cat/csw/2.0.2"
schemaLanguage="XMLSCHEMA">
        <xsd:schema          targetNamespace="http://www.opengis.net/cat/csw/2.0.2"
version="2.0.2" id="csw:Record" elementFormDefault="qualified"
            xmlns:xsd="http://www.w3.org/2001/XMLSchema"
            xmlns:ows="http://www.opengis.net/ows"
            xmlns:dct="http://purl.org/dc/terms/"
            xmlns:dc="http://purl.org/dc/elements/1.1/">
            <xsd:import                      schemaLocation="rec-dcterms.xsd"
namespace="http://purl.org/dc/terms/"/>
            <xsd:import                        schemaLocation="rec-dcmes.xsd"
namespace="http://purl.org/dc/elements/1.1/"/>
            <xsd:import               schemaLocation="../../ows/1.0.0/owsAll.xsd"
namespace="http://www.opengis.net/ows"/>
            <xsd:element    id="AbstractRecord"    type="csw:AbstractRecordType"
name="AbstractRecord" abstract="true"/>
            <xsd:complexType   id="AbstractRecordType"   name="AbstractRecordType"
abstract="true"/>
            <xsd:element         type="csw:DCMIRecordType"        name="DCMIRecord"
substitutionGroup="csw:AbstractRecord"/>
            <xsd:complexType name="DCMIRecordType">
                <xsd:complexContent>
                    <xsd:extension base="csw:AbstractRecordType">
                        <xsd:sequence>
                            <xsd:group ref="dct:DCMI-terms"/>
                        </xsd:sequence>
                    </xsd:extension>
                </xsd:complexContent>
            </xsd:complexType>
            <xsd:element          type="csw:BriefRecordType"       name="BriefRecord"
substitutionGroup="csw:AbstractRecord"/>
            <xsd:complexType name="BriefRecordType" final="#all">
                <xsd:complexContent>
                    <xsd:extension base="csw:AbstractRecordType">
                        <xsd:sequence>
                            <xsd:element     ref="dc:identifier"    minOccurs="1"
maxOccurs="unbounded"/>
                            <xsd:element        ref="dc:title"       minOccurs="1"
maxOccurs="unbounded"/>
                            <xsd:element ref="dc:type" minOccurs="0"/>
                            <xsd:element    ref="ows:BoundingBox"     minOccurs="0"
maxOccurs="unbounded"/>
                        </xsd:sequence>
                    </xsd:extension>
```

```
                </xsd:complexContent>
            </xsd:complexType>
            <xsd:element       type="csw:SummaryRecordType"       name="SummaryRecord"
substitutionGroup="csw:AbstractRecord"/>
            <xsd:complexType name="SummaryRecordType" final="#all">
                <xsd:complexContent>
                    <xsd:extension base="csw:AbstractRecordType">
                        <xsd:sequence>
                            <xsd:element       ref="dc:identifier"       minOccurs="1"
maxOccurs="unbounded"/>
                            <xsd:element         ref="dc:title"         minOccurs="1"
maxOccurs="unbounded"/>
                            <xsd:element ref="dc:type" minOccurs="0"/>
                            <xsd:element        ref="dc:subject"        minOccurs="0"
maxOccurs="unbounded"/>
                            <xsd:element         ref="dc:format"        minOccurs="0"
maxOccurs="unbounded"/>
                            <xsd:element        ref="dc:relation"       minOccurs="0"
maxOccurs="unbounded"/>
                            <xsd:element        ref="dct:modified"      minOccurs="0"
maxOccurs="unbounded"/>
                            <xsd:element        ref="dct:abstract"      minOccurs="0"
maxOccurs="unbounded"/>
                            <xsd:element         ref="dct:spatial"      minOccurs="0"
maxOccurs="unbounded"/>
                            <xsd:element      ref="ows:BoundingBox"      minOccurs="0"
maxOccurs="unbounded"/>
                        </xsd:sequence>
                    </xsd:extension>
                </xsd:complexContent>
            </xsd:complexType>
            <xsd:element             type="csw:RecordType"             name="Record"
substitutionGroup="csw:AbstractRecord"/>
            <xsd:complexType name="RecordType" final="#all">
                <xsd:complexContent>
                    <xsd:extension base="csw:DCMIRecordType">
                        <xsd:sequence>
                            <xsd:element      type="csw:EmptyType"     name="AnyText"
minOccurs="0" maxOccurs="unbounded"/>
                            <xsd:element     ref="ows:BoundingBox"     minOccurs="0"
maxOccurs="unbounded"/>
                        </xsd:sequence>
                    </xsd:extension>
                </xsd:complexContent>
            </xsd:complexType>
            <xsd:complexType name="EmptyType"/>
        </xsd:schema>
    </csw:SchemaComponent>
    <!-- ISO AP schemas -->
    <csw:SchemaComponent         targetNamespace="http://www.isotc211.org/2005/gmd"
schemaLanguage="XMLSCHEMA">
        <xsd:schema               targetNamespace="http://www.isotc211.org/2005/gmd"
version="2.0.2" id="gmd:MD_Metadata" elementFormDefault="qualified"
            xmlns:xsd="http://www.w3.org/2001/XMLSchema"
            xmlns:ows="http://www.opengis.net/ows"
            xmlns:gmd="http://www.isotc211.org/2005/gmd">
            <!--            ===============================            Annotation
============================== -->
            <xsd:annotation>
                <xsd:documentation>This  file  was  generated  from  ISO  TC/211  UML
class diagrams == 01-26-2005 12:40:05 ======  </xsd:documentation>

<xsd:documentation>http://schemas.opengis.net/iso/19139/20060504/gmd/metadataApplic
ation.xsd </xsd:documentation>
            </xsd:annotation>
            <!--            ===============================            Imports
============================== -->
```

```
                <xsd:import
schemaLocation="http://schemas.opengis.net/iso/19139/20060504/gco/gco.xsd"
namespace="http://www.isotc211.org/2005/gco"/>
                <xsd:include schemaLocation="../gmd/metadataEntity.xsd"/>
                <!--
################################################################### -->
                <!--
################################################################### -->
                <!--            ================================            Classes
================================ -->
                <xsd:complexType name="AbstractDS_Aggregate_Type" abstract="true">
                    <xsd:annotation>
                        <xsd:documentation>Identifiable            collection            of
datasets</xsd:documentation>
                    </xsd:annotation>
                    <xsd:complexContent>
                        <xsd:extension base="gco:AbstractObject_Type">
                            <xsd:sequence>
                                <xsd:element            type="gmd:DS_DataSet_PropertyType"
name="composedOf" maxOccurs="unbounded"/>
                                <xsd:element            type="gmd:MD_Metadata_PropertyType"
name="seriesMetadata" maxOccurs="unbounded"/>
                                <xsd:element            type="gmd:DS_Aggregate_PropertyType"
name="subset" minOccurs="0" maxOccurs="unbounded"/>
                                <xsd:element            type="gmd:DS_Aggregate_PropertyType"
name="superset" minOccurs="0" maxOccurs="unbounded"/>
                            </xsd:sequence>
                        </xsd:extension>
                    </xsd:complexContent>
                </xsd:complexType>
                <!--
.............................................................. -->
                <xsd:element            type="gmd:AbstractDS_Aggregate_Type"
name="AbstractDS_Aggregate" abstract="true"/>
                <!--
.............................................................. -->
                <xsd:complexType name="DS_Aggregate_PropertyType">
                    <xsd:sequence minOccurs="0">
                        <xsd:element ref="gmd:AbstractDS_Aggregate"/>
                    </xsd:sequence>
                    <xsd:attributeGroup ref="gco:ObjectReference"/>
                    <xsd:attribute ref="gco:nilReason"/>
                </xsd:complexType>
                <!--
========================================================================= -->
                <xsd:complexType name="DS_DataSet_Type">
                    <xsd:annotation>
                        <xsd:documentation>Identifiable            collection            of
data</xsd:documentation>
                    </xsd:annotation>
                    <xsd:complexContent>
                        <xsd:extension base="gco:AbstractObject_Type">
                            <xsd:sequence>
                                <xsd:element            type="gmd:MD_Metadata_PropertyType"
name="has" maxOccurs="unbounded"/>
                                <xsd:element            type="gmd:DS_Aggregate_PropertyType"
name="partOf" minOccurs="0" maxOccurs="unbounded"/>
                            </xsd:sequence>
                        </xsd:extension>
                    </xsd:complexContent>
                </xsd:complexType>
                <!--
.............................................................. -->
                <xsd:element type="gmd:DS_DataSet_Type" name="DS_DataSet"/>
                <!--
.............................................................. -->
                <xsd:complexType name="DS_DataSet_PropertyType">
                    <xsd:sequence minOccurs="0">
```

```
                <xsd:element ref="gmd:DS_DataSet"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
======================================================================== -->
        <xsd:complexType name="DS_OtherAggregate_Type">
            <xsd:complexContent>
                <xsd:extension base="gmd:AbstractDS_Aggregate_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.......................................................................... -->
        <xsd:element  type="gmd:DS_OtherAggregate_Type"  name="DS_OtherAggregate"
substitutionGroup="gmd:AbstractDS_Aggregate"/>
        <!--
.......................................................................... -->
        <xsd:complexType name="DS_OtherAggregate_PropertyType">
            <xsd:sequence minOccurs="0">
                <xsd:element ref="gmd:DS_OtherAggregate"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
======================================================================== -->
        <xsd:complexType name="DS_Series_Type">
            <xsd:complexContent>
                <xsd:extension base="gmd:AbstractDS_Aggregate_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.......................................................................... -->
        <xsd:element         type="gmd:DS_Series_Type"         name="DS_Series"
substitutionGroup="gmd:AbstractDS_Aggregate"/>
        <!--
.......................................................................... -->
        <xsd:complexType name="DS_Series_PropertyType">
            <xsd:sequence minOccurs="0">
                <xsd:element ref="gmd:DS_Series"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
======================================================================== -->
        <xsd:complexType name="DS_Initiative_Type">
            <xsd:complexContent>
                <xsd:extension base="gmd:AbstractDS_Aggregate_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.......................................................................... -->
        <xsd:element     type="gmd:DS_Initiative_Type"     name="DS_Initiative"
substitutionGroup="gmd:AbstractDS_Aggregate"/>
        <!--
.......................................................................... -->
        <xsd:complexType name="DS_Initiative_PropertyType">
            <xsd:sequence minOccurs="0">
                <xsd:element ref="gmd:DS_Initiative"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
======================================================================== -->
        <xsd:complexType name="DS_Platform_Type">
```

```xml
            <xsd:complexContent>
                <xsd:extension base="gmd:DS_Series_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.................................................................... -->
        <xsd:element        type="gmd:DS_Platform_Type"        name="DS_Platform"
substitutionGroup="gmd:DS_Series"/>
        <!--
.................................................................... -->
        <xsd:complexType name="DS_Platform_PropertyType">
            <xsd:sequence minOccurs="0">
                <xsd:element ref="gmd:DS_Platform"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
===================================================================== -->
        <xsd:complexType name="DS_Sensor_Type">
            <xsd:complexContent>
                <xsd:extension base="gmd:DS_Series_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.................................................................... -->
        <xsd:element        type="gmd:DS_Sensor_Type"        name="DS_Sensor"
substitutionGroup="gmd:DS_Series"/>
        <!--
.................................................................... -->
        <xsd:complexType name="DS_Sensor_PropertyType">
            <xsd:sequence minOccurs="0">
                <xsd:element ref="gmd:DS_Sensor"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
===================================================================== -->
        <xsd:complexType name="DS_ProductionSeries_Type">
            <xsd:complexContent>
                <xsd:extension base="gmd:DS_Series_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.................................................................... -->
        <xsd:element                                type="gmd:DS_ProductionSeries_Type"
name="DS_ProductionSeries" substitutionGroup="gmd:DS_Series"/>
        <!--
.................................................................... -->
        <xsd:complexType name="DS_ProductionSeries_PropertyType">
            <xsd:sequence minOccurs="0">
                <xsd:element ref="gmd:DS_ProductionSeries"/>
            </xsd:sequence>
            <xsd:attributeGroup ref="gco:ObjectReference"/>
            <xsd:attribute ref="gco:nilReason"/>
        </xsd:complexType>
        <!--
===================================================================== -->
        <xsd:complexType name="DS_StereoMate_Type">
            <xsd:complexContent>
                <xsd:extension base="gmd:DS_OtherAggregate_Type"/>
            </xsd:complexContent>
        </xsd:complexType>
        <!--
.................................................................... -->
        <xsd:element        type="gmd:DS_StereoMate_Type"        name="DS_StereoMate"
substitutionGroup="gmd:DS_OtherAggregate"/>
```

```
            <!--
...................................................................... -->
            <xsd:complexType name="DS_StereoMate_PropertyType">
                <xsd:sequence minOccurs="0">
                    <xsd:element ref="gmd:DS_StereoMate"/>
                </xsd:sequence>
                <xsd:attributeGroup ref="gco:ObjectReference"/>
                <xsd:attribute ref="gco:nilReason"/>
            </xsd:complexType>
        </xsd:schema>
    </csw:SchemaComponent>
</csw:DescribeRecordResponse>
```

III. GetRecords

GetRecords –request can be used to search for records with different specifications.

Example request:

http://expeer.ymparisto.fi:8080/geoportal/csw?request=getRecords&service=CSW&startPosit
ion=1&maxRecords=10&resultType=results&elementSetName=full&outputFormat=applicatio
n/xml&outputschema=http://www.isotc211.org/2005/gmd&constraintLanguage=Filter&Constr
aint=%3Cogc:Filter%3E%3Cogc:Overlaps%3E%3Cogc:PropertyName%3Eows:BoundingBo
x%3C/ogc:PropertyName%3E%3Cgml:Envelope%3E%3Cgml:lowerCorner%3E-90%20-
180%3C/gml:lowerCorner%3E%3Cgml:upperCorner%3E90%2090%3C/gml:upperCorner%3
E%3C/gml:Envelope%3E%3C/ogc:Overlaps%3E%3C/ogc:Filter%3E&namespace=xmlns(gm
l=http://www.opengis.net/gml),xmlns(ogc=http://www.opengis.net/ogc)

Example result:

```
<?xml version="1.0" encoding="UTF-8"?>
-
<csw:GetRecordsResponse
    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2">
    <csw:SearchStatus timestamp="2014-09-29T10:34:40+03:00"/> -
    <csw:SearchResults             recordSchema="http://www.isotc211.org/2005/gmd"
numberOfRecordsReturned="10"       numberOfRecordsMatched="52"       nextRecord="11"
elementSet="full"> -
        <gmd:MD_Metadata
            xmlns:xlink="http://www.w3.org/1999/xlink"
            xmlns:srv="http://www.isotc211.org/2005/srv"
            xmlns:gml="http://www.opengis.net/gml"
            xmlns:gmd="http://www.isotc211.org/2005/gmd"
            xmlns:gco="http://www.isotc211.org/2005/gco"> -
            <gmd:fileIdentifier>
                <gco:CharacterString>{AF50F3DB-29AA-4C54-9A87-
F619C9D0BE6E}</gco:CharacterString>
            </gmd:fileIdentifier> -
            <gmd:language>
                <gco:CharacterString>en</gco:CharacterString>
            </gmd:language> -
            <gmd:hierarchyLevel>
                <gmd:MD_ScopeCode                        codeSpace="ISOTC211/19115"
codeListValue="dataset"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#MD_Scope
Code">dataset</gmd:MD_ScopeCode>
            </gmd:hierarchyLevel> -
            <gmd:contact> -
                <gmd:CI_ResponsibleParty> -
                    <gmd:organisationName>
                        <gco:CharacterString>Finnish                      Environment
Institute</gco:CharacterString>
                    </gmd:organisationName> -
                    <gmd:contactInfo> -
                        <gmd:CI_Contact> -
                            <gmd:address> -
                                <gmd:CI_Address> -
                                    <gmd:electronicMailAddress>
<gco:CharacterString>Saku.Anttila@ymparisto.fi</gco:CharacterString>
                                    </gmd:electronicMailAddress>
                                </gmd:CI_Address>
                            </gmd:address>
                        </gmd:CI_Contact>
                    </gmd:contactInfo> -
                    <gmd:role>
```

```
                <gmd:CI_RoleCode                          codeSpace="ISOTC211/19115"
codeListValue="pointOfContact"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI_RoleC
ode">pointOfContact</gmd:CI_RoleCode>
                </gmd:role>
            </gmd:CI_ResponsibleParty>
        </gmd:contact> -
        <gmd:dateStamp>
            <gco:Date>2013-08-22</gco:Date>
        </gmd:dateStamp> -
        <gmd:metadataStandardName>
            <gco:CharacterString>ISO        19139/19115        Metadata        for
Datasets</gco:CharacterString>
        </gmd:metadataStandardName> -
        <gmd:metadataStandardVersion>
            <gco:CharacterString>2003</gco:CharacterString>
        </gmd:metadataStandardVersion> -
        <gmd:identificationInfo> -
            <gmd:MD_DataIdentification> -
                <gmd:citation> -
                    <gmd:CI_Citation> -
                        <gmd:title>
                            <gco:CharacterString>Remote    sensing    chl-a    based
Ecological Quality Ratio for the Baltic Sea 2010-2011</gco:CharacterString>
                        </gmd:title> -
                        <gmd:date> -
                            <gmd:CI_Date> -
                                <gmd:date>
                                    <gco:Date>2013-08-16</gco:Date>
                                </gmd:date> -
                                <gmd:dateType>
                                    <gmd:CI_DateTypeCode
codeSpace="ISOTC211/19115"                                codeListValue="publication"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI_DateT
ypeCode">publication</gmd:CI_DateTypeCode>
                                </gmd:dateType>
                            </gmd:CI_Date>
                        </gmd:date> -
                        <gmd:identifier> -
                            <gmd:MD_Identifier> -
                                <gmd:code>
                                    <gco:CharacterString>{68D05124-8A82-4A17-
B662-5F514284BC79}</gco:CharacterString>
                                </gmd:code>
                            </gmd:MD_Identifier>
                        </gmd:identifier>
                    </gmd:CI_Citation>
                </gmd:citation> -
                <gmd:abstract>
                    <gco:CharacterString>Remote        sensing        based        weekly
chlorophyll a (chl-a) composite products from the summer months of 2010 and 2011
were used to calculate areal statistics for the specific open sea areas in the
Baltic Sea. A chl-a based Ecological Quality Ratio (EQR) classification for the
open sea areas were derived by using this data and ecological quality reference
conditions defined for each area separately. The coloers in the EQR classifacation
are as follows: Blue = high ecologica status Green = good ecological status Yellow
= moderate ecological status Orange = poor ecological status Red = bad ecological
status</gco:CharacterString>
                </gmd:abstract> -
                <gmd:pointOfContact> -
                    <gmd:CI_ResponsibleParty> -
                        <gmd:organisationName>
                            <gco:CharacterString>Finnish            Environment
Institution</gco:CharacterString>
                        </gmd:organisationName> -
                        <gmd:contactInfo> -
                            <gmd:CI_Contact> -
                                <gmd:address> -
```

```
                                      <gmd:CI_Address> -
                                          <gmd:electronicMailAddress>

<gco:CharacterString>saku.anttila@ymparisto.fi</gco:CharacterString>
                                          </gmd:electronicMailAddress>
                                      </gmd:CI_Address>
                                  </gmd:address>
                              </gmd:CI_Contact>
                          </gmd:contactInfo> -
                          <gmd:role>
                              <gmd:CI_RoleCode          codeSpace="ISOTC211/19115"
codeListValue="pointOfContact"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI_RoleC
ode">pointOfContact</gmd:CI_RoleCode>
                          </gmd:role>
                      </gmd:CI_ResponsibleParty>
                  </gmd:pointOfContact> -
                  <gmd:graphicOverview> -
                      <gmd:MD_BrowseGraphic> -
                          <gmd:fileName>

<gco:CharacterString>http://paikkatieto.ymparisto.fi/arcgis/services/Kaukokartoitus
/Expeer/MapServer/WmsServer?request=GetMap&service=WMS&version=1.3.0&layers=0&style
s=&crs=crs:84&bbox=13,53,30,66&&width=500&height=500&format=image%2Fpng</gco:Charac
terString>
                          </gmd:fileName>
                      </gmd:MD_BrowseGraphic>
                  </gmd:graphicOverview> -
                  <gmd:descriptiveKeywords> -
                      <gmd:MD_Keywords> -
                          <gmd:keyword>
                              <gco:CharacterString>Ecological    Quality    Ratio
EQR</gco:CharacterString>
                          </gmd:keyword> -
                          <gmd:keyword>
                              <gco:CharacterString>Chlorophyll
a</gco:CharacterString>
                          </gmd:keyword> -
                          <gmd:keyword>
                              <gco:CharacterString>Baltic
Sea</gco:CharacterString>
                          </gmd:keyword> -
                          <gmd:keyword>
                              <gco:CharacterString>Remote
Sensing</gco:CharacterString>
                          </gmd:keyword>
                      </gmd:MD_Keywords>
                  </gmd:descriptiveKeywords> -
                  <gmd:spatialRepresentationType>
                      <gmd:MD_SpatialRepresentationTypeCode
codeSpace="ISOTC211/19115"                             codeListValue="vector"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#MD_Spati
alRepresentationTypeCode">vector</gmd:MD_SpatialRepresentationTypeCode>
                  </gmd:spatialRepresentationType> -
                  <gmd:language>
                      <gco:CharacterString>en</gco:CharacterString>
                  </gmd:language> -
                  <gmd:topicCategory>
                      <gmd:MD_TopicCategoryCode>oceans</gmd:MD_TopicCategoryCode>
                  </gmd:topicCategory> -
                  <gmd:extent> -
                      <gmd:EX_Extent> -
                          <gmd:geographicElement> -
                              <gmd:EX_GeographicBoundingBox> -
                                  <gmd:westBoundLongitude>
                                      <gco:Decimal>-180</gco:Decimal>
                                  </gmd:westBoundLongitude> -
                                  <gmd:eastBoundLongitude>
```

```
                            <gco:Decimal>180</gco:Decimal>
                        </gmd:eastBoundLongitude> -
                        <gmd:southBoundLatitude>
                            <gco:Decimal>-90</gco:Decimal>
                        </gmd:southBoundLatitude> -
                        <gmd:northBoundLatitude>
                            <gco:Decimal>90</gco:Decimal>
                        </gmd:northBoundLatitude>
                    </gmd:EX_GeographicBoundingBox>
                </gmd:geographicElement>
            </gmd:EX_Extent>
        </gmd:extent>
    </gmd:MD_DataIdentification>
</gmd:identificationInfo> -
<gmd:distributionInfo> -
    <gmd:MD_Distribution> -
        <gmd:transferOptions> -
            <gmd:MD_DigitalTransferOptions> -
                <gmd:onLine> -
                    <gmd:CI_OnlineResource> -
                        <gmd:linkage>
<gmd:URL>http://paikkatieto.ymparisto.fi/arcgis/rest/services/Kaukokartoitus/Expeer
/MapServer</gmd:URL>
                        </gmd:linkage>
                    </gmd:CI_OnlineResource>
                </gmd:onLine>
            </gmd:MD_DigitalTransferOptions>
        </gmd:transferOptions>
    </gmd:MD_Distribution>
</gmd:distributionInfo> -
<gmd:dataQualityInfo> -
    <gmd:DQ_DataQuality> -
        <gmd:scope> -
            <gmd:DQ_Scope> -
                <gmd:level>
                    <gmd:MD_ScopeCode        codeSpace="ISOTC211/19115"
codeListValue="dataset"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#MD_Scope
Code">dataset</gmd:MD_ScopeCode>
                </gmd:level>
            </gmd:DQ_Scope>
        </gmd:scope> -
        <gmd:report> -
            <gmd:DQ_DomainConsistency> -
                <gmd:result> -
                    <gmd:DQ_ConformanceResult> -
                        <gmd:specification> -
                            <gmd:CI_Citation> -
                                <gmd:title>
                                    <gco:CharacterString>REMOTE   SENSING
BASED CHLOROPHYLL A EQR-CLASSIFICATION FOR THE BALTIC SEA</gco:CharacterString>
                                </gmd:title> -
                                <gmd:date> -
                                    <gmd:CI_Date> -
                                        <gmd:date>
                                            <gco:Date>2012-03-
08</gco:Date>
                                        </gmd:date> -
                                        <gmd:dateType>
                                            <gmd:CI_DateTypeCode
codeSpace="ISOTC211/19115"            codeListValue="creation"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI_DateT
ypeCode">creation</gmd:CI_DateTypeCode>
                                        </gmd:dateType>
                                    </gmd:CI_Date>
                                </gmd:date>
                            </gmd:CI_Citation
```

```
                                    </gmd:specification> -
                                    <gmd:explanation>
                                        <gco:CharacterString>Study for the Helsinki
Commission</gco:CharacterString>
                                    </gmd:explanation>
                                    <gmd:pass/>
                                </gmd:DQ_ConformanceResult>
                            </gmd:result>
                        </gmd:DQ_DomainConsistency>
                    </gmd:report> -
                    <gmd:lineage> -
                        <gmd:LI_Lineage> -
                            <gmd:statement>
                                <gco:CharacterString>GIS-data delineating different
open sea areas were used to extract pixels values from the remote sensing based
weekly chlorophyll a composite products from the summer months (Jun-Sep) of 2010
and 2011. Extracted pixel values were then used to calculate areal statistics
(including mean, median, minimum, maximum, standard deviation, coefficient of
variation and 10% and 90% percentiles) for each week and the open sea area. EQR-
index values were derived by dividing the area specific chl-a reference value with
the area-temporal mean of chl-a (mean of areal means from weekly chl-a products
from Jun-Sep and years 2010-2011).</gco:CharacterString>
                            </gmd:statement>
                        </gmd:LI_Lineage>
                    </gmd:lineage>
                </gmd:DQ_DataQuality>
            </gmd:dataQualityInfo>
        </gmd:MD_Metadata> -
        <gmd:MD_Metadata
            xmlns:srv="http://www.isotc211.org/2005/srv"
            xmlns:gml="http://www.opengis.net/gml"
            xmlns:gmd="http://www.isotc211.org/2005/gmd"
            xmlns:gco="http://www.isotc211.org/2005/gco"
xsi:schemaLocation="http://www.isotc211.org/2005/srv
http://schemas.opengis.net/iso/19139/20060504/srv/srv.xsd"
            xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"> -
        <gmd:fileIdentifier>
            <gco:CharacterString/>
        </gmd:fileIdentifier> -
        <gmd:language>
            <gmd:LanguageCode                                   codeListValue="eng"
codeList="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO_19139_Schema
s/resources/Codelist/ML_gmxCodelists.xml#LanguageCode">eng</gmd:LanguageCode>
        </gmd:language> -
        <gmd:hierarchyLevel>
            <gmd:MD_ScopeCode                           codeSpace="ISOTC211/19115"
codeListValue="service"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#MD_Scope
Code">service</gmd:MD_ScopeCode>
        </gmd:hierarchyLevel> -
        <gmd:contact> -
            <gmd:CI_ResponsibleParty> -
                <gmd:organisationName>
                    <gco:CharacterString>Finnish                        Environment
Institute</gco:CharacterString>
                </gmd:organisationName> -
                <gmd:contactInfo> -
                    <gmd:CI_Contact> -
                        <gmd:address> -
                            <gmd:CI_Address> -
                                <gmd:electronicMailAddress>
<gco:CharacterString>syke_rs_oper@ymparisto.fi</gco:CharacterString>
                                </gmd:electronicMailAddress>
                            </gmd:CI_Address>
                        </gmd:address>
                    </gmd:CI_Contact>
                </gmd:contactInfo> -
```

```
                    <gmd:role>
                        <gmd:CI_RoleCode                    codeSpace="ISOTC211/19115"
codeListValue="pointOfContact"
codeList="http://www.isotc211.org/2005/resources/Codelist/gmxCodelists.xml#CI_RoleC
ode">pointOfContact</gmd:CI_RoleCode>
                    </gmd:role>
                </gmd:CI_ResponsibleParty>
            </gmd:contact> -
            <gmd:dateStamp>
                <gco:Date>2012-03-20</gco:Date>
            </gmd:dateStamp> -
            <gmd:metadataStandardName>
                <gco:CharacterString>INSPIRE          Metadata          Implementing
Rules</gco:CharacterString>
            </gmd:metadataStandardName> -
            <gmd:metadataStandardVersion>
                <gco:CharacterString>Technical Guidelines based on EN ISO 19115 and
EN ISO 19119 (Version 1.2)</gco:CharacterString>
            </gmd:metadataStandardVersion> -
            <gmd:referenceSystemInfo> -
                <gmd:MD_ReferenceSystem> -
                    <gmd:referenceSystemIdentifier> -
                        <gmd:RS_Identifier> -
                            <gmd:code>
                                <gco:CharacterString>4326</gco:CharacterString>
                            </gmd:code>
                        </gmd:RS_Identifier>
                    </gmd:referenceSystemIdentifier>
                </gmd:MD_ReferenceSystem>
            </gmd:referenceSystemInfo> -
```

… Only first metadata record presented here. Apply the request with web browser to see the whole response

IV. GetRecordsById

Example request:

http://expeer.ymparisto.fi:8080/geoportal/csw?REQUEST=GetRecordById&service=CSW&version=2.0.2&Id=%7B5772F326-6EF3-43B8-A407-27AAC54657AF%7D

Example result:

```xml
<?xml version="1.0" encoding="UTF-8"?>
-
<csw:GetRecordByIdResponse
    xmlns:csw="http://www.opengis.net/cat/csw/2.0.2"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema"
    xmlns:ows="http://www.opengis.net/ows"
    xmlns:dct="http://purl.org/dc/terms/"
    xmlns:dc="http://purl.org/dc/elements/1.1/"
    xmlns:gml="http://www.opengis.net/gml"
    xmlns:dcmiBox="http://dublincore.org/documents/2000/07/11/dcmi-box/"> -
    <csw:SummaryRecord>
        <dc:identifier                                              scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:FileID">knb-lter-europe-
deims.13177.13471</dc:identifier>
        <dc:identifier                                              scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:DocID">{5772F326-6EF3-43B8-A407-
27AAC54657AF}</dc:identifier>
        <dc:title>Aboveground Net Primary Production in Doñana National Park for
aquatic and terrestrial environments from MODIS NPP product</dc:title>
        <dc:type                                                    scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:ContentType">downloadableData</dc:ty
pe>
        <dc:subject>annual net primary production</dc:subject>
        <dc:subject>MODIS NPP (MOD17)</dc:subject>
        <dc:subject>Environmental monitoring facilities</dc:subject>
        <dc:subject>Habitats and biotopes</dc:subject>
        <dc:subject>environment</dc:subject>
        <dct:modified>2013-09-27T15:06:35+03:00</dct:modified>
        <dct:abstract>Net    Primary    Production    of    aquatic    and    terrestrial
environments inside Doñana National Park for the year 2012.</dct:abstract>
        <dct:references                                             scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:Server">http://www.ntsg.umt.edu/proj
ect/mod17#data-product</dct:references>
        <dct:references                                             scheme="urn:x-
esri:specification:ServiceType:ArcIMS:Metadata:Document">http://expeer.ymparisto.fi
:8080/geoportal/csw?getxml=%7B5772F326-6EF3-43B8-A407-
27AAC54657AF%7D</dct:references>
        <dc:date>2012-01-01Z</dc:date>
        <dc:date>2012-12-31Z</dc:date>
    </csw:SummaryRecord>
</csw:GetRecordByIdResponse>
```