

JNCC Report No: 516

Feasibility study and recommendations for the integration of the WFS network services into MPA database (taking into account INSPIRE implementation)

Alberto Telletxea

June 2014

© JNCC, Peterborough 2014

ISSN 0963 8901

For further information please contact:

Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY www.jncc.defra.gov.uk

This report should be cited as:

Alberto Telletxea. 2014. Feasibility study and recommendations for the integration of the WFS network services into MPA database (taking into account INSPIRE implementation). *JNCC report* No. 516.

Summary

This document will comprise the feasibility study and recommendations for the integration of the Web Feature Services (WFS) network services into the Marine Protected Area (MPA) database (taking into account INSPIRE implementation. The source WFS have been derived from the Environment Agency's portal known as "Datashare"

http://www.geostore.com/environment-agency/. We have focussed mainly on Marine Conservation Zones (MCZs)(one of the source layers available from Datashare). Various methods of linking to these WFS are evaluated. The results obtained will serve as a feasibility study for the potential future use of WFS to feed data to databases owned by JNCC.

Contents

1	Introduction	1
	1.1 Data sources	
2	Software	2
	2.1 QGIS (2.0.1 Dufour)	
	2.1.1 QGIS WFS visualisation and conversion to end user format (e.g. shapefiles)	
	2.2 ESRI ArcGIS (ArcCatalog+Data Interoperability extension)	5
	2.2.1 Configure an access point from an ArcCatalog for visualisation in ArcMap	5
	2.2.2 Export from WFS to SQL Server Spatial	7
	2.3 Use of GDAL/OGR for export to SQL Spatial	8
3		
4	Conclusions	

1 Introduction

This document will describe the technical procedures for the population of a SQL Server Spatial database with data provided by third party Web Feature Services (WFS), taking into account INSPIRE specifications. The results obtained will serve as a feasibility study for future use of WFS by JNCC to provide data to databases at JNCC. The WFS used for this report are published by the Environment Agency¹ on behalf of the Defra Network as part of the Datashare portal http://www.geostore.com/environment-agency/.

1.1 Data sources

The following information sources were considered when generating the information presented in the current report:

- Catalogue of WFS services available at the Environment Agency. The WFS can be found here: <u>http://www.geostore.com/environment-agency/WebStore?xml=environmentagency/xml/inspireDataWfs.xml</u>
- The WFS for Marine Conservation Zones. . Marine Conservation Zones (MCZs) are designated under the Marine and Coastal Access Act 2009. MCZs protect nationally important marine wildlife, habitats, geology and geomorphology in English inshore waters and offshore waters next to England, Wales and Northern Ireland. The lead organisation for this WFS is Natural England. The WFS can be found here: http://www.geostore.com/OGC/OGCInterface?SERVICE=WFS&UID=UDATAGOV20

11&PASSWORD=datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=1.1 .0&LC=800000000000

• WFS: Marine Plan Areas

There are 10 sub-areas corresponding to the 'English inshore and offshore marine planning regions'. The marine plan authority (the Secretary of State ifor the Environment, Food and Rural Affairs) is responsible for preparing marine plans for these 10 plan areas with responsibility for plan development delegated to The Marine Management Organisation. This dataset provides details of the spatial extent of each marine plan area as defined in the Marine and Coastal Access Act 2009. The WFS can be found here:

http://www.geostore.com/OGC/OGCInterface?SERVICE=WFS&UID=UDATAGOV20 11&PASSWORD=datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=1.1 .0&LC=8000000000000

- WFS: Special Protected Areas (SPAs)
 A Special Protection Area (SPA) is classified under Directive 79/409 on the Conservation of Wild Birds. The WFS can be found here: <u>http://www.geostore.com/OGC/OGCInterface?SERVICE=WFS&UID=UDATAGOV20</u> <u>11&PASSWORD=datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=1.1</u> .0&LC=800000000000
- WFS: RAMSAR England

¹ <u>http://www.environment-agency.gov.uk</u>

A Ramsar site is the land listed as a Wetland of International Importance under the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the Ramsar Convention) 1973. <u>http://www.geostore.com/OGC/OGCInterface?SERVICE=WFS&UID=UDATAGOV20</u> <u>11&PASSWORD=datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=1.1</u> .0&LC=800000000000

2 Software

This section will describe the different software packages that can be used for coupling WFS with an SQL Server Spatial (2008 R2-2012) database. WFS provides an HTTP hyperlink that allows remote access to geo-registered vector source data (points, lines and polygons) that can be displayed directly in your GIS software or other compatible applications.

The technologies that can be used are:

- QGIS (no license required): This can be used for data visualisation and conversion to an end user data format.
- ArcGIS Desktop Data Interoperability Extension (license required): This can be used for data visualisation and conversion to an end user data format.
- OGC/OGR library (no license required): This can be used for WFS conversion into a SQL Server database.

Further information on these software is provided below:

2.1 QGIS (2.0.1 Dufour)

QGIS (previously known as "Quantum GIS") is a cross-platform free and open source desktop geographic information systems (GIS) application that provides data viewing, editing, and analysis capabilities. QGIS is distributed as a software package for installation purposes in MS Windows systems by the OSGeo4W project. OSGeo4W includes GDAL/OGR, GRASS, MapServer, OpenEV, uDig, and QGIS as well as many other packages (over 150 in number). This project is under the umbrella of the Open Source Geospatial Foundation².

2.1.1 QGIS visualisation of WFS and conversion to end user format (e.g. shapefiles):

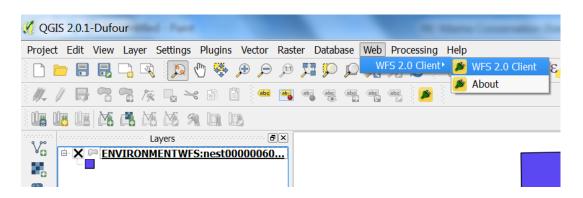
To trial the use of QGIS to visualise WFS and convert the data to an end user format, the WFS for Marine Conservation Zones and Marine Plan Areas (MPAs) provided by the Environment Agency (see Data Sources above). The actions that should be taken are described below:

i. The Environment Agency uses the schema version 2.0.0 for the WFS, and so a plugin must be installed on QGIS from the menu bar by selecting **Plugins\Manage** and install plugins\

The plugin is called WFS 2.0 Client

ii. From the QGIS menu bar go to **Web\ WFS 2.0 Client** (this is illustrated in the screengrab below):

² http:/www.osgeo.org/



iii. Insert the connection properties required to access the WFS services catalogue and select the specific GML/feature of interest (e.g. marine related data) to be loaded for the visualisation.

This is the URL for openly available WFS provided by the Environment Agency:

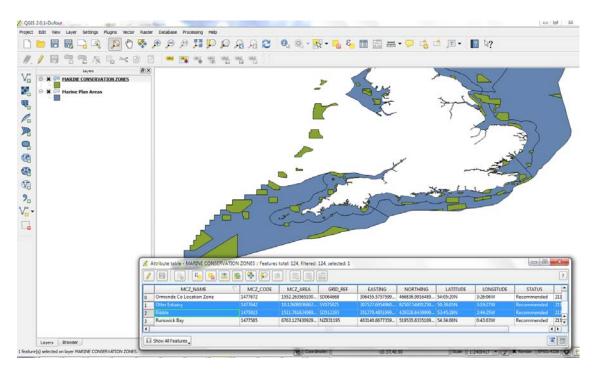
http://www.geostore.com/OGC/OGCInterface?UID=UDATAGOV2011&PASSWORD= datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=2.0.0

Note: The WFS schema version to be used must to be 2.0.0.

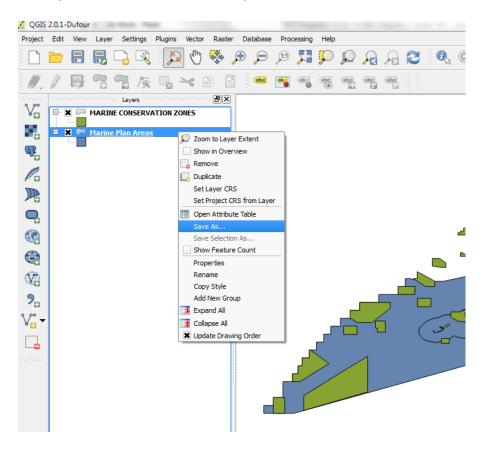
The screen grab below shows the window for connecting to the WFS catalogue:

WFS 2.0 OnlineResource □=UDATAGOV2011&PASSWORD=datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=2.0 □ Authentication required Save URL as default □ List FeatureTypes List StoredQueries FeatureTypes ENVIRONMENTWFS:nest0000060_inspire Marine Conservation Zones (England) Show Extent		/ersion 0.9.1 beta			2	23
Authentication required Save URL as default List FeatureTypes List StoredQueries FeatureTypes Marine Conservation Zones (England) Marine Conservation Zones (England) Show Extent	WFS 2.0 OnlineR	esource				
List FeatureTypes ENVIRONMENTWFS:nest00000060_inspire Marine Conservation Zones (England) Show Extent	=UDATAGOV2011	&PASSWORD=datagov2011&INTERFACE=ENVIRG	DNM	ENTWFS&VERS	ON=2.	0.0
FeatureTypes ENVIRONMENTWFS:nest0000060_inspire Marine Conservation Zones (England) Show Extent Use current Extent as Bounding Box Filter	Authentication	required		Save URL as d	efault	
ENVIRONMENTWFS:nest00000060_inspire Metadata Marine Conservation Zones (England) Show Extent Use current Extent as Bounding Box Filter	List FeatureTy;	List StoredQueries				
Marine Conservation Zones (England)		Supert0000060 inchire	-	Motod		
Use current Extent as Bounding Box Filter	ENVIRONMENTW	3. Testo 000000_inspire		metada	ild	
	Marine Conservati	on Zones (England)		Show Ex	tent	
Featurel imit]		
				J		
um:ogc:def:cfs:EP56::4326	FeatureLimit	1000]		
GetFeature(s) 0%	FeatureLimit SRS	1000 urn:ogc:def:crs:EPSG::4326]		
	SRS	urn:ogc:def:crs:EPSG::4326				

iv. The GML (Geographic Mark up language – an open standard for holding spatial coordinates) features can then be loaded for visualisation of spatial and attributes information, as illustrated in the screen grab below



v. The features imported from WFS visualised can be exported as Shapefiles by right clicking on the feature and selecting "Save as", as illustrated below.



💋 QGIS	2.0.1-0	ufour	-		- 1991			-			1000		1000	1.000		- 100	Content -
Project	Edit	View	Layer	Settings	Plugins	Vector	Raster	Database	Processing	Help							
				-) I	, p	2 🖑		D	JI 🎵	ړ 🔍	Q ,		8	R 🔍 -	× 🖓 🕶 🛛	3 👩	
а. <i>Ш</i> .,		Ŋ		2 /9				abc		(abc)	ibc (abc	abc					
V.				Layers CONSER			· B×			ſ	🛒 Save	e vector lay	er as			2	
			Marine	Plan Area	5		_				Format	t	ESRI Sha	pefile	-		•
¶.											Save a	s				Bro	wse
Po										- 1	Encodir	ng	System				•
										- 1	CRS		Layer CR	5			-
Q										- 1			WGS 84			Bro	wse
(- 1		logy export	No symbo	logy			-
										- 1	Scale	creation op	1:50000				÷
V										- 1		(10000) (P	00115				— T
2										- 1	Data	source					
V										- 1							
									کر		Laye	er					
								_			s	Skip attribut	e creation				
												Add saved fi	ile to map				
										- 1				ок	Cancel	н	elp
										Ļ	_	_			_		

The screen grab below shows the window for exporting the shapefile:

2.2 ESRI ArcGIS (ArcCatalog+Data Interoperability extension)

ESRI ArcGIS can also be used to access WFS services and export them to an end user format (e.g. Shapefiles, ESRI Geodatabases or SQL Server Spatial). For this feasibility study, the export to SQL Server Spatial was the format of interest, as JNCC wishes to explore storing spatial datasets in SQL Server 2008 or 2012 relational databases.

The advantage of these capabilities is that these ETL (Extract Transform and Load) processes can be automated using the ArcGIS Model Builder or Python script.

Note that the main issue encountered when using WFS was that the Environment Agency is currently using version 2.0 (version 1.0 is not currently supported) as the WFS schema. This version is only supported by the ArcGIS 10.2 Data Interoperability Tool.

2.2.1 Configure an access point from an ArcCatalog for visualisation in ArcMap

To configure an access point from an ArcCatalog for visualisation of WFS data in ArcMap, the following steps need to be undertaken:

i. Enable the use of the Data Interoperability extension, through the menu toolbar by selecting: Customize/Extensions...: This is illustrated in the screen grab, below.

Extensions		23
Select the extensions you want to use. 3D Analyst O Data Interoperability Geostatistical Analyst Publisher Schematics Spatial Analyst Tracking Analyst		
Description: 3D Analyst 10.1 Copyright ©1999-2012 Esri Inc. All Rights Reserved Provides tools for surface modeling and 3D visualization.	Close	

ii. Add an Interoperability connection and provide the following WFS URL (provided by the Environment Agency) as the dataset parameter:

http://www.geostore.com/OGC/OGCInterface?UID=UDATAGOV2011&PASSWORD= datagov2011&INTERFACE=ENVIRONMENTWFS&VERSION=2.0.0

This is illustrated in the screen grab below:

ArcCatalog - Add Interoperability Connection	
File Edit View Go Geoprocessing Customize Windows	He
🚹 🔛 📾 👘 🛍 🗙 🔠 🏥 🏥 🖽 🍳 🕼 🧊 🚳 🗖	þa
Interoperability Connections Add Interoperability Connection	
Catalog Tree 🛛 🕹 🗸	1
Big Tooleoxes Database Servers Database Servers My Hosted Services (European Environment Agency) My Hosted Services (European Environment Agency) My Hosted Services (European Environment Agency) Sinteroperability Connection Add Interoperability Connection Big Connection (1) - EA Inspire WFS Server WFS.fdl Big Connection (2) - EA Inspire WFS Server WFS.fdl	
Interoperability Connection	
Reader Format: WFS (Web Feature Service) Dataset: http://www.geostore.com/OGC/OGCInterface?UID=UDA Parameters Coord. System: Help OK Cancel	View Go Geoprocessing Customize Windows He View Go Geoprocessing Customize Windows He View Go Geoprocessing Customize Windows He View Go Geoprocessing Connection View Go Geoprocessing Connection View Go Geoprocessing Connection View Go Geoprocessing Connection View Go Geoprocessing Customize Connection Connection (1) - EA Inspire WFS Server WFS.fdl Connection (2) - EA Inspire WFS Server WFS.fdl Connection (2) - EA Inspire WFS Server WFS.fdl Connection View Geostore.com/OGC/OGCInterface7UID-UDA meters Coord. System: Read from source customize

iii. Select the features of interest of the WFS (e.g. marine related features) as illustrated in the screen grab below.

WFS Connection			000000000000000000000000000000000000000	
URL:	1150NTERFACE -EWITRONMENT	WPS	• #	
Prefer HTTP Post, if Available:	No	•		
WFS Version:	1.1.0	•	Preview Description	
Use HTTP Authentication				
HTTP Username	cunused>			
HTTP Passenierd				
HTTP Authentication	clinused>			
Use Proxy Server		0	Select Feature Types	
Proxy Address:	<unuted></unuted>		🔄 ea-wfs-caicaew00170001 (Marine Management Organisation Marine Areas)	
Proxy Ports	<unused></unused>	- 1	ea-wfs-ealeaew00170002 (Marine Management Organisation Office Locations) ea-wfs-ealeaew00170003 (Marine Management Organisation Socio-Economic Typologies of Coastal Communities)	
Proxy Usemane:		- 1	ea-wfs-ealeaew00170007 (Marine Management Organisation Legacy Marine Consents (Point))	
Proxy Pataword:			ea-wfs-eaieaew00120008 (Marine Management Organisation Legacy Marine Consents (Line)) ea-wfs-eaieaew00120009 (Marine Management Organisation Legacy Marine Consents (Polygon))	
Proxy Authentication:	dinards		ea-wfs-ealeaew00170010 [Marine Management Organisation Legacy Marine Licences (Point)]	
chema Attributes			es-wfs-caicaew00120011 [Marine Management Organisation Legacy Marine Licences (Line)] es-wfs-caicaew00120012 [Marine Management Organisation Legacy Marine Licences (Polygon)]	
Additional Attributes to Expose:	tin dame selected		ea-wfs-ealeaew00170013 (Marine Management Organisation Legacy Aggregate Dredging Licences)	
		(m)	ea-wfs-mmo_marine_plan_areas_inspire (Marine Plan Areas) ea-wfs-nest00000060_inspire (Marine Conservation Zones (England))	
onstraints				
Feature Types:			Piter: Nave	Select
Max Features:	30000			Cancel
WFS Output Format:		•		Gente
XML Filter Expression:				
oplication Schema				
Application Schema:				
Numeric Identifier Attribute:				
15 Pacameters				
SRS Axis Order:	[• .		
Help Defaults -	os lui	Cancel		

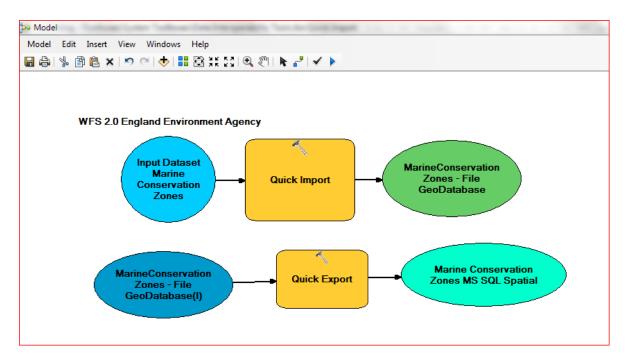
2.2.2 Export from WFS to SQL Server Spatial

As mentioned above, the main issue underpinning the use of WFS is the version of the WFS used. This is because only ArcGIS 10.2 can read WFS version 2.0 (previous versions cannot read WFS). The ArcGIS Data Interoperability tool allows you to export WFS data into an intermediate format (a File Geodatabase) and then export it to an SLQ Server database. See the screen grab below which illustrates the menu for accessing the import function in the Data Interoperability tools:

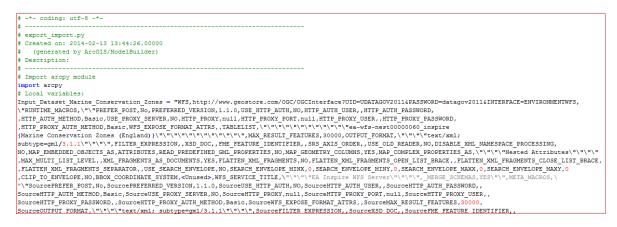
Data Interoperability Tools.tbx Quick Export
Quick Import

The recommendation is to use the ArcGIS Model Builder to establish the work flow. This has the benefit of allowing the process to be automated by a script in Python.

The diagram below shows the required dataflow in the Model Builder, using the Data Interoperability extension.



The dataflow can be exported into a Python script for further automatisation. See below an extract of it:



2.3 Use of GDAL/OGR for export to SQL Spatial

This section explores the use of geospatial data formats that are released under an X/MIT style Open Source license by the Open Source Geospatial Foundation. This library is continuously being extended and provides a development environment for the automatisation of data acquisition, integration and data transfer procedures that can be built using a variety of programming languages including:

- Python
- Java
- C# / .Net

See below the list of formats that can be managed by this library.

C:\Users\atelletxea\Desktop>ogr2ogrformats
Supported Formats:
-> "FileGDB" (read/write)
-> "FileGDB" (read/write) -> "OCI" (read/write)
-> "UGI" (read/write)
-> "ESRI Shapefile" (read/write)
-> "MapInfo File" (read/write)
-> "UK .NTF" (readonly)
-> "SDTS" (readonly)
-> "TIGER" (read/write)
- "\$57" (read/write)
\rightarrow "DGN" (read/unite)
\rightarrow "UDT" (mandon lu)
\rightarrow YDECY (mondon lu)
-/ REG (reautily)
-> "nemory" (read/write)
-> "BNH" (read/write)
-> "CSV" (read/write)
-> "NAS" (readonly)
-> "GML" (read/write)
-> "GPX" (read/write)
-> "KML" (read/write)
-> "GeoJSON" (read/write)
-> "GMT" (read/write)
-> "SQLite" (read/write)
- "ODBC" (wead/uwite)
\rightarrow "PCeo" (weadon lu)
-> "MCCOLEmatial" (word (unita)
\rightarrow YOCDIY (meader lu)
-> "Postgresul" (read/write)
-> "MySyL" (read/write)
-> "PCIDSR" (read/write)
-> "XPlane" (readonly)
-> "AVCBin" (readonly)
-> "AVCEOO" (readonly)
-> "DXF" (read/write)
-> "Geoconcept" (read/write)
-> "GeoRSS" (read/write)
-> "GPSTrackMaker" (read/write)
-> "VFK" (readonly)
-> "PGDump" (read/write)
-> "OSM" (readonlu)
-> "GPSBabel" (read/write)
- "SIIA" (readon] u)
- "Openfin" (readon]u)
- "PDS" (readon lu)
- "WES" (meadon lu)
\rightarrow WITEV (needed lu)
-7 mir (readonly)
-/ Heronavrine (readonly)
-/ "Geomedia" (readonly)
-> "EDIGEO" (readon Ly)
-> "GFI" (read/write)
-> "SVG" (readonly)
-> "CouchDB" (read/write)
-> "Idrisi" (readonly)
-> "ARCGEN" (readonly)
-> "SEGUKOOA" (readonly)
-> "SEGY" (readonly)
-> "XLS" (readonly)
- "ODS" (read/write)
- "XLSX" (read/write)
<pre>G:\Users\atelletxea\Desktop}ogr2ogrformats Supported Formats:</pre>
- "PDF" (read/write)



The use of scripts using this library allows the user to transform data from WFS into MSSQLSpatial. A sample of transformation using this library is: ogr2ogr -overwrite -f MSSQLSpatial

"MSSQL:server=oiz;database=EJN_TEST;UID=sa;PWD=hellfire" MarineConservationZones WFS:

"http://www.geostore.com/OGC/OGCInterface?UID=UDATAGOV2011&PASSWORD=datag ov2011&INTERFACE=ENVIRONMENTWFS&VERSION=2.0.0" ea-wfsnest00000060_inspire

3 WFS compliancy with INSPIRE metadata specifications

We have looked at the metadata for Marine Conservation Zones.

The INSPIRE metadata can be requested through a web service call under OGL (Open Government License) licensing. See below an extract of the INSPIRE metadata XML provided for Marine Conservation Zones.

🔐 w:vi	ICC_	tests/WFS/England Marine Zones/eymczshpi/Warine Conservation Zones (England).xml - Notepad++ 🛛 😨 🕱
File E	lit :	Search View Encoding Language Settings Macro Run Plugins Window ? X
Co 🖬		1 🗈 🕞 🖧 🛝 🛍 💭 🖨 🖆 🖄 🗐 🧐 🤹 🕄 🔀 🖬 🔢 💌 🗉 🗵 🖼 🐨
📄 Mari	ne Co	nnservation Zones (England).xml
1	<	?xml version="1.0" encoding="UTF-8"?>
2	- <	gmd:MD_Metadata xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:gsr="http://www.isotc211.org/2005/gsr" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gss="http://www
3	Ė.	<gmd:fileidentifier xmlns:gml="http://www.opengis.net/gml" xmlns:srv="http://www.isotc211.org/2005/srv"></gmd:fileidentifier>
4		<pre><gco:characterstring>8c7a5e42-ff6a-4199-9b7d-934307fDa5ad</gco:characterstring></pre>
5	-	
6	白	<gmd:language></gmd:language>
7		<gmd:languagecode codelist="http://www.loc.gov/standards/iso639-2/php/code list.php" codelistvalue="eng">eng</gmd:languagecode>
8	-	
9	Ė.	<gmd;hierarchylevel></gmd;hierarchylevel>
10		<pre><gmd:md codelist="http://standards.iso.org/ittf/PubliclyAvailableStandards/ISO 19139 Schemas/resources/Codelist/gmxCodeLists.xml#MD ScopeCode" codelistvalue<="" pre="" scopecode=""></gmd:md></pre>
11	-	
12	ŧ	<pre><gmd:contact></gmd:contact></pre>
61	±٦	<gmd:datestamp></gmd:datestamp>
64	±٦	<pre><gmd:referencesysteminfo></gmd:referencesysteminfo></pre>
81	由	<gmd:identificationinfo></gmd:identificationinfo>
293	±	<gmd:distributioninfo></gmd:distributioninfo>
394	±	<gmd:dataqualityinfo></gmd:dataqualityinfo>
443	1	/gmd:MD Metadata>
		-

The metadata catalogue service for Natural England INSPIRE metadata is accessible through the web site at: http://data.gov.uk/data/search

See below a screen grab of the website:

C fi data.gov.uk/dataset/natural-england-inspire-con		
Aplicaciones 🗋 Taskman 🧧 Inbox - Outlook We., 👔 Traductor de Google	📽 Calendario iCloud 🗿 Projects Forum 🕲 Biodiversity Informa 📋 Natura Demo Viewer 🧿 BIO ref portal 🥖 Consultoria y servici » 🦲	Otros marcadores
DATA.GOV.UK	Home Data Apps Interact Search for data.	
Datasets Map Search Data Requests Pu	Publishers Public Roles & Salaries OpenSpending Spend Reports Site Analytics	
🗰 / Datasets / Natural England INSPIRE comp	ipliant metadata	
Natural England INSPIRE	compliant metadata 🛛 🔤 💔	
Published by Natural England. Licensed under Openness rating: 大大文介	OGL Open Government Licence. Do More With This Data	
Provider: Department for Environment, Food and	d Rural Affairs • Share your app # • Request new data #	
Pavement Orders (England); Local Nature Reserve:	s of Outstanding Natural Beauty (England): Biosphere es (England): Marine Conservation Zones (England): Na s of Special Scientific Interest (England): Special Areas S of Special Scientific Interest (England): Special Areas Net Apr://apr/2/rest/package/natural-england-inspire- compliant-metadata-dec2010 Read more about this site's CKAN API »	
[File] bfea5144-4c1a-4b2d SML [File] bfea5144-4c1a-4b2d	d-9ccf-	
ADDITIONAL INFORMATION		
Added to data gov.uk	03/12/2010	
Modified on data.gov.uk	22/12/2010	
Theme	Environment	
Update frequency	monthly	

The metadata XML files can be downloaded under request of a web service, see below the URL request to obtain Natural England INSPIRE metadata: http://data.gov.uk/api/2/rest/package/natural-england-inspire-compliant-metadata-dec2010

See below a capture of the files that can be downloaded:

rchivo Órdenes Herramientas Favoritos Opciones	Ayuda					
Añadir Extraer en Comprobar Ver Eliminar Br	iscar Asistente Ir	nformación Bu	uscar virus Co	mentario auto extraí	ble	
NE_INSPIREmetadata9Dec2010_tcm6-24077.zip	archivo ZIP, tamañ	o descomprimid	o 225.463 bytes			
ombre		Tamaño	Comprimido	Tipo	Modificado	CRC32
				Carpeta de archivos		
Special Protection Areas (England).xml		20.308	3.923	Documento XML	09/12/2010 17:37	18C1F35F
Special Areas of Conservation (England).xml		20.408	3.964	Documento XML	09/12/2010 17:36	2E21196B
Sites of Special Scientific Interest (England).xml		20.551	3.983	Documento XML	09/12/2010 17:36	9D91A5D0
Ramsar (England).xml		20.489	3.926	Documento XML	09/12/2010 17:35	71541E6C
National Parks (England).xml		20.440	3.968	Documento XML	09/12/2010 17:35	FB2035B4
National Nature Reserves (England).xml		20.359	3.895	Documento XML	09/12/2010 17:35	F444636B
Marine Conservation Zones (England).xml		20.351	3.923	Documento XML	09/12/2010 17:34	2447BE11
Local Nature Reserves (England).xml		21.008	4.242	Documento XML	09/12/2010 17:34	E4F15105
Limestone Pavement Orders (England).xml		20.731	4.126	Documento XML	09/12/2010 17:32	DE8064B0
Biosphere Reserves (England).xml		20.447	3.981	Documento XML	09/12/2010 17:32	BCAE7D83
Areas of Outstanding Natural Beauty (England).xml		20.371	3.919	Documento XMI	09/12/2010 17:31	4B7AE677

The metadata is not fully compatible with the INSPIRE profile defined for Protected Areas (The INSPIRE Guidelines on Data Specification on Protected Sites is available at: http://inspire.jrc.ec.europa.eu/documents/Data Specifications/INSPIRE DataSpecification P_s_v3.0.pdf)

For example the XML for the MD_Keywords attribute is:

<gmd:descriptiveKeywords> <gmd:MD_Keywords> <gmd:keyword> <gco:CharacterString>Protected sites</gco:CharacterString> </gmd:keyword>

The Marine Conservation Zones XML metadata has been validated against the JRC INSPIRE validator (see: <u>http://inspire-geoportal.ec.europa.eu/validator2/</u>) and it has given just one inconformity. See below the response given by the JRC validator v2:

Inspire Validation Issues

The metadata element "Conformity" is missing, empty or incomplete but it is required (see documentation)

Relevant documentation:

Commission Regulation (EC) No 1205/2008 of 3 December 2008 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards metadata

There are some attributes specific to Protected Sites that are not included as the:

- Attribute: siteDesignation
 - Value type: DesignationType
 - o Definition: The designation (type) of Protected Site.
 - Description: At least one designation is required, but designations may be available using a number of different designation schemes, all of which can be accommodated in the DesignationSchemeValue codelist.
 - o Multiplicity: 1..*

A very important aspect to be mentioned is that the metadata has not been encountered together with the WFS. In principle the metadata should be delivered in the same resource as WFS.

4 Conclusions

The exercise of looking at the capabilities of integrating data from WFS published by the Environment Agency has proved that this way of providing information is still not mature enough to design robust routines of data management through Extract Transform and Load processes (ETL).

These are the main obstacles that we see in these technologies:

- The GIS software available to read and export from WFS is behind in terms of the different versions supported by the OGC for WFS (version 1.0 and 2.0).
- The IT server infrastructures of the orgnisations that publish WFS do not always provide high availability and in many cases are not functioning effectively or do not give the required performance the interchange of geometry features over the Internet needs.
- The metadata is not always together with the spatial data and other resources are required to be explored to acquire the metadata.
- Not all the WFS versions are compliant with INSPIRE.

These are the benefits that have been identified with these technologies:

• WFS is a good format to interchange geospatial data on the Internet through machine to machine routines, avoiding manual jobs.