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Keywords

Water Framework Directive, Basque Country, Monitoring Network, Fish, Phytoplankton, Water bodies, Nervion Catchment, Ecological Status, Macroinvertebrates, Macroalgae

Short description of the dataset/summary

This database comes from different sources (monitoring programmes) aiming to create an information system on the state of water environment in the Basque Country. This information includes environmental (water, sediment) and biological (benthic macroinvertebrates, fish, phytoplankton, macroalgae, macrophytes) elements obtained from sampling stations placed in rivers, estuarine and coastal zones.

General information

dataset entry ID:	MARS_11
name of the dataset:	
full name of the dataset:	Nervion catchment (Spain)
dataset short name:	Nervion
type of dataset:	species (taxonomic group) per site database including environmental information
data type:	point data/observation data
science keywords according to GCMD:	
topic:	Biological Classification, Oceans, Terrestrial Hydrosphere
keywords:	OCEANS: salinity, conductivity, water temperature, estuaries, rocky coasts, sediment composition, sediment textures, nitrate, nitrite, nitrogen, nutrients, organic matter, oxygen, phosphate, pH, turbidity TERRESTRIAL HYDROSPHERE: surface water, rivers/stream, water quality/water chemistry, benthic index, chlorophyll, conductivity, nutrients, organic matter, oxygen, pH, phosphorous compounds, turbidity, water temperature BIOLOGICAL CLASSIFICATION: animals/vertebrates, fish,

	animals/invertebrates, echinoderms, worms, arthropods, crustaceans, mollusks, cnidarians, sponges, plants, angiosperms, macroalgae, plankton
ISO topic category according to ISO 19115:	
	Biota, Environment, Inland Waters, Oceans

Technical and administrative specifications

data format:	Access
others/details:	information downloadable in MS Excel, CSV, XML
operating system:	all Windows systems
data language:	Spanish
specify:	and also Basque
current availability:	restricted access, internal
web address (URL):	http://www.uragentzia.euskadi.net/informacion-del-agua/siae/u81-000372/es/
currently available through GBIF:	no
exchange planned:	no
comments:	Currently under testing, restricted use, under permission. In the future, public access, with no fees, only permission.
update level:	continously updated
documentation:	
type:	internal description
language:	Spanish
Do you plan to publish the data on the BioFresh data portal:	
	no
media for data delivery:	web service, online internet (HTTP), e-mail
web address:	http://www.uragentzia.euskadi.net/informacion-del-agua/siae/u81-000372/es/
contact details:	
metadata contact person:	
first, last name:	Angel Borja
phone:	+34 667 174 430
email:	aborja@azti.es
institution:	AZTI
address:	Herrera kaia, portualdea z/g
postal code, city:	20110 Pasaia
province, state:	Gipuzkoa
country	Spain
web address:	www.azti.es
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first, last name:	Angel Borja
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email:	aborja@azti.es
scientific contact person:	
first, last name:	Angel Borja
phone:	+34 667 174 430
email:	aborja@azti.es

Intellectual property rights and citation

dataset publisher: URA - Agencia Vasca del Agua

dataset creator (data compiler):

contact name: Alberto Manzanos
contact email: amanzanos@uragentzia.net
contact institution: URA - Agencia Vasca del Agua

data contributors to/owners of this dataset:

multiple
number: 5

data contributor/owner 1:

contact name: Ángel Borja
contact email: aborja@azti.es
contact institute: AZTI
criteria for using this part of the dataset:
Other/Additional criteria
other/additional criteria: The dataset needs to be requested from dataset creator before its use. Unknown specific conditions of use.
comments: Data corresponding to transitional and coastal waters.

data contributor/owner 2:

contact name: Alberto Manzanos
contact email: amanzanos@uragentzia.net
contact institute: Laboratorios Tecnológicos de Levante
criteria for using this part of the dataset:
Other/Additional criteria
other/additional criteria: The dataset needs to be requested from dataset creator before its use. Unknown specific conditions of use.
comments: Data corresponding to wetlands.

data contributor/owner 3:

contact name: Begoña Gartzia de Bikuña
contact email: bgbikuna@anbiotek.com
contact institute: Anbiotek
criteria for using this part of the dataset:
Other/Additional criteria
other/additional criteria: The dataset needs to be requested from dataset creator before its use. Unknown specific conditions of use.
comments: Data corresponding to rivers (biology).

data contributor/owner 4:

contact name: Alberto Manzanos
contact email: amanzanos@uragentzia.net
contact institute: Labaqua & Ondoan
criteria for using this part of the dataset:
Other/Additional criteria
other/additional criteria: The dataset needs to be requested from dataset creator before its use. Unknown specific conditions of use.
comments: Data corresponding to rivers (chemistry).

data contributor/owner 5:

contact name: Alberto Manzanos
contact email: amanzanos@uragentzia.net
contact institute: Telur

criteria for using this part of the dataset:
Other/Additional criteria
other/additional criteria: The dataset needs to be requested from dataset creator before its use. Unknown specific conditions of use.
comments: Data corresponding to groundwaters.

citation of this dataset:
author(s): URA - Agencia Vasca del Agua
title: SIAE - Sistema de Información del Agua de Euskadi
year: 2014

citation of the metadata:
author(s): Borja A. & Garmendia J.M.
title: Nervion catchment (Spain)
year: 2015
doi: http://dx.doi.org/10.15504/fmj.2015.4

General data specifications

regional coverage of the dataset:
scale of the dataset: regional

spatial extend (bounding coordinates):
southernmost latitude [°]: 42.9167
northernmost latitude [°]: 43.3383
westernmost longitude [°]: -3.15
easternmost longitude [°]: -2.50
minimum altitude: 0 metres
maximum altitude: 1026 metres
countries: Europe: Spain

world climatic regions according to Köppen:
Group C: temperate/mesothermal climates

freshwater ecoregions of the world (FEOW) according to WWF:
Europe: Cantabric Coast - Languedoc

European ecoregions according to Illies (WFD):
Iberic-Macaronesian Region (ER1)

ecosystem type: rivers, wetlands, groundwater, coastal areas
covered timeframe: 1993 - 2014

Site specifications

coordinate system/grid data: projected, UTM
datum (e.g. WGS84): ETRS89
grid data available: no

ecosystem type classification:
rivers (classification according to WFD):
altitude typology
mid-altitude: 200 to 800 m, lowland: <200 m
size typology based on catchment area
large: 1000-10000 km²
geology
calcareous

wetlands (classification according to GLWD):
wetland type
freshwater marsh, floodplain
groundwater:
altitude typology
mid-altitude: 200 to 800 m, lowland: <200 m
site coding available: yes, alphanumerical
example: E-BI10
number of sites: <100
exact number of sites: 79
comments: - The site coding is not fixed, thus the number of digits is variable ("0" is not true).
- Sampling sites: 32 for rivers; 11 for groundwaters; 7 for wetlands (lakes); 29 for transitional and coastal waters.
This does not mean that there are 79 fixed stations. Some stations have e.g. samples for water and sediment, but others for fish or macroalgae, etc.

Climate and environmental data

climate related data:
spatial resolution of the data (if not catchment/site related):
10 km
available parameters per site:
mean annual temperature January, July
data source: EUSKALMET, AEMET
mean annual temperature for each month
data source: EUSKALMET, AEMET
minimal, maximal and mean winter and summer temperatures
data source: EUSKALMET
daily air temperatures
data source: EUSKALMET
mean annual precipitation
data source: EUSKALMET
winter and summer precipitation
data source: EUSKALMET
comments: In the following two web pages a complete information on the study area is available:
http://www.euskalmet.euskadi.net/s07-5853x/es/meteorologia/climatologia.apl?e=5
http://www.aemet.es/en/serviciosclimaticos
EUSKALMET: Regional Meteorology Agency (Basque Country)
AEMET: National Meteorology Agency (Spain)

environmental data:
available parameters per catchment:
catchment size
data source: URA (Basque Water Agency), Diputación Foal de Bizkaia (DFB)
catchment geology
data source: URA (Basque Water Agency), Diputación Foal de Bizkaia (DFB)
catchment land cover/land use

data source: URA (Basque Water Agency), Diputación Foal de Bizkaia (DFB)

presence of barriers/dams/reservoirs (fragmentation)

data source: URA (Basque Water Agency), Diputación Foal de Bizkaia (DFB)

hydrological regime/flow regime

data source: URA (Basque Water Agency), Diputación Foal de Bizkaia (DFB)

available parameters per site: information on groundwater level and amplitude

data source: URA (Basque Water Agency)

information on riparian vegetation (incl. information on modification)

data source: URA (Basque Water Agency)

river length

data source: URA (Basque Water Agency)

altitude

data source: URA (Basque Water Agency)

current velocity

data source: URA (Basque Water Agency)

maximum depth

data source: URA (Basque Water Agency)

substrate composition

data source: URA (Basque Water Agency)

information on instream habitat (incl. information on modification)

data source: URA (Basque Water Agency)

comments: URA (Basque Water Agency) is in charge of the water quality assessment in the Basque Country: it compiles and publishes a yearly report for rivers, groundwater, wetlands and transitional-coastal water masses.

physico-chemistry data: total P, ortho P, nitrate, nitrite, total N, ammonium, TOC (total organic carbon), oxygen content, water temperature, pH, conductivity, chlorophyll, colour, Secci disc depth, suspended solids, substrate, sediment/soil parameters

availability of physico-chemical data, if there is more than one sample per site:

per sample

stressors influencing the sites:

reference sites available: yes

stressor	restored sites available	data before/after restoration available	stressor gradient available	comments
eutrophication	yes	yes	yes	water treatment plants
hydromorphological degradation	no		no	dam construction
organic pollution	yes	yes	yes	water treatment plants
toxic stress	yes	yes	yes	water treatment plants
socio-economic stress	no		no	industrial and urban activity, discharges
other stressors	no		no	invasive species

Biological data

biological data origin: from sampling
- specify project: different networks for water quality monitoring in the Basque Country (URA, Basque Water Agency)
- organism group addressed: fish, macro-invertebrates (Mollusca, Crayfish, Crabs, Ephemeroptera, Odonata, Plecoptera, Coleoptera, Trichoptera, Chironomidae), phytoplankton, macroalgae, macrophytes
- comments: All macroinvertebrate groups are addressed.

Sample specifications/sample resolution

fish:

sample information:
- covered timeframe: 1989 - 2014
- historical data: no
- palaeo data: no
- season: summer, autumn
- temporal resolution/frequency of sampling: yearly/biannual (depending on the water type)
- time series data: yes
- comments: - Rivers, transitional and coastal waters: yearly.
  - Wetlands: biannual.

taxonomic resolution:
- level: genus, species
- percentage of species level data: 95
- comments: In principle all taxa are identified to species level: only difficult ones (e.g. some Pomatochistus) are not.

taxonomic coding:
- taxalist according to: NODC
- reference(s): Only used for fish in transitional waters:
  http://www.nodc.noaa.gov/General/CDR-detdesc/taxonomic-v8.html
  http://www.marbef.org/data/erms.php
- coding system: numerical, based on taxonomic relationships
- example: 884701810100

sample specifications:

type: quantitative (abundance data)
replicate samples: yes
number of samples: 47
specification of method(s) used for sampling and sorting:
- Transitional and coastal water: trawling, using a 1.5 m wide beam trawl with a tickler chain; net has 8 mm mesh size cod end; and towed for 10 min at w1.5 knots.
- Rivers: electric fishing.
- Wetlands: electric fishing and nets.

reference(s):
- Uriarte, A., Garmendia, J.M., Rodríguez, J.G., Muxika, I., Borja, A., 2013. Caracterización y variabilidad de las comunidades demersales en los estuarios del País Vasco y su respuesta a presiones humanas. Revista de Investigación Marina, AZTI-Tecnalia 20(8): 103-148.

Similar methodologies:
- Elliott, M., Hemingway, K.L. (Eds.), 2002. Fishes in Estuaries. Blackwell Publishing Ltd., Oxford, 658 pp.
- Johnson, D.D., Rotherham, D., Gray, C.A., 2008. Sampling estuarine fish and invertebrates using demersal otter trawls: effects of net height, tow duration and diel period. Fisheries Research 93: 315-323.
- Selleslagh, J., Amara, R., 2008. Environmental factors structuring fish composition and assemblages in a small macrotidal estuary (eastern English Channel). Estuarine, Coastal and Shelf Science 79: 507-517.

Wetlands:
- UNE-EN 14011. 2003. Calidad del agua. Muestreo de peces con electricidad.
- UNE-EN 14757. 2006. Calidad del agua. Muestreo de peces mediante redes de agalla con diferente luz de malla.

- For references on all water categories: http://www.uragentzia.euskadi.net/informacion/ultimos-informes/u81-0003342/es/

specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):
transect, demersal
comments: Variable number sites/water body depending on water type and water body.
- Coastal/transitional waters: 8 sites, 3 replicates (hauls) per site (trawl lines), 2 water bodies (6 and 2 sampling sites).
- Rivers: 32 sites in 26 water bodies, 1-2 sites per water body.
- Wetlands: 7 sites and 1 water body (some of them are not considered as water body).

macro-invertebrates:

sample information:

covered timeframe: 1989 - 2014
historical data: no
palaeo data: no
season: spring, summer, autumn, winter
temporal resolution/frequency of sampling:
yearly/biannual
time series data: yes
comments: Depending on water type, sampling in different seasons.
- Rivers: biannual.

- Wetlands, transitional and coastal waters: yearly.

taxonomic resolution:

level: family, species, other
other taxonomic levels: Phylum
percentage of species level data: 90
comments: Depending on water type, different identification levels:
- Rivers and wetlands: almost all to family.
- Transitional and coastal waters: almost all to species. It could be variable, but most of the groups are at species level. Only some complicated groups (e.g. oligochaete, nemerteans, nematodes) are at higher level. We have estimated 90%.

taxonomic coding:

taxalist according to: NODC
reference(s): This refers only to transitional and coastal waters:
http://www.nodc.noaa.gov/General/CDR-detdesc/taxonomic-v8.html
http://www.marbef.org/data/erms.php
coding system: numerical, based on taxonomic relationships
example: 500144012500

sample specifications:

type: quantitative (abundance data)
replicate samples: yes
number of samples: 44
specification of method(s) used for sampling and sorting:
- Rivers and wetlands: fording water edge with nets, sorting 0,25 mm mesh.
- Transitional and coastal waters: sampling bottom with Van Veen grab, sorting 1 mm mesh.

reference(s): Transitional and coastal water:
- Borja, A., I. Muxika, J. Franco, 2006. Long-term recovery of soft-bottom benthos following urban and industrial sewage treatment in the Nervión estuary (southern Bay of Biscay). Marine Ecology Progress Series 313: 43-55.

Wetlands:
- Procedure PI-LTL-06-300, acredited by ENAC (Entidad Nacional de Acreditación).
- Ministerio de Agricultura, Alimentación y Medio Ambiente. 2012. Protocolo de muestreo y laboratorio de invertebrados bentónicos en lagos. Código: ML-L-I-2012.

- For references on all water categories:
http://www.uragentzia.euskadi.net/informacion/ultimos-informes/u81-0003342/es/

specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):
benthic
comments: Variable number sites/water body depending on water type and water body.
- Coastal/transitional waters: 5 sites, 3 replicates (grabs) per site, 2 water bodies (3 and 2 sampling sites).
- Rivers: 32 sites in 26 water bodies, 1-2 sites per water body. No replicates.
- Wetlands: 7 sites and 1 water body (some of them are not considered as water body). No replicates.

phytoplankton:

sample information:

covered timeframe: 1994 - 2014

historical data: no
season: spring, summer, autumn, winter
temporal resolution/frequency of sampling:
seasonally or biannual, depending on the water type and sampling station
time series data: yes
comments: Depending on water type, sampling in different seasons.
- Wetlands: summer and autumn.
- Transitional and coastal waters: euhaline sites quarterly;
oligohaline-mesohaline-polyhaline sites spring and summer.

taxonomic resolution:

level: order, family, species
comments: Percentage of species level data is variable, depending on the difficulty of the families or genus present.

taxonomic coding:

taxalist according to: NODC
reference(s): This is for transitional and coastal waters:
http://www.nodc.noaa.gov/General/CDR-detdesc/taxonomic-v8.html
http://www.marbef.org/data/erms.php
http://www.algaebase.org
coding system: numerical, based on taxonomic relationships
example: 070301060100

sample specifications:

type: quantitative (abundance data)
replicate samples: no
number of samples: 14
specification of method(s) used for sampling and sorting:
plastic recipient, surface water
reference(s): Transitional and coastal waters:
- Revilla M., Á. Borja, G. Chust, A. Fontán, J. Franco, M. González, S. Novoa, Y. Sagarminaga, V. Valencia, 2012. Estudio de la clorofila, elemento clave para la Estrategia Marina Europea y la Directiva Marco del Agua. Informe elaborado por AZTI-Tecnalia para la Agencia Vasca del Agua. 102 pp.
- UNE-EN 15204. 2007. Calidad del agua. Guía para el recuento de fitoplancton por microscopía invertida (técnica de Utermöhl).
Wetlands:
- Procedure PI-LTL-06-305, acredited by ENAC (Entidad Nacional de Acreditación).
- Ministerio de Agricultura, Alimentación y Medio Ambiente. 2013a. Protocolo de muestreo de fitoplancton en lagos y embalses. Código: M-LE-FP-2013.
- For references on all water categories:
http://www.uragentzia.euskadi.net/informacion/ultimos-informes/u81-0003342/es/
specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):
surface water
comments: Variable number sites/water body depending on water type and water body.
- Coastal/transitional waters: 7 sites, no replicates, 3 water bodies (3, 2 and 2 sampling sites).
- Wetlands: 7 sites and 1 water body (some of them are not considered as water body). No replicates.

macroalgae:

sample information:

covered timeframe: 2002 - 2014
historical data: no
season: spring, summer
temporal resolution/frequency of sampling:
every three years
time series data: yes

taxonomic resolution:

level: family, genus, species
comments: In principle, near all of them are at species level, excepting some difficult genus (e.g. Ceramium sometimes).

taxonomic coding:

taxalist according to: NODC
reference(s): http://www.nodc.noaa.gov/General/CDR-detdesc/taxonomic-v8.html
http://www.marbef.org/data/erms.php
coding system: numerical, based on taxonomic relationships
example: 161104020900

sample specifications:

type: semi-quantitative, qualitative
replicate samples: no
number of samples: 13
specification of method(s) used for sampling and sorting:
Description and distribution along river-estuary bank (9 areas). Transect profiles on the coast (4 transects).
reference(s): - For references on all water categories:
http://www.uragentzia.euskadi.net/informacion/ultimos-informes/u81-0003342/es/

- For macroalgae in coast:
Díez, I., M. Bustamante, A. Santolaria, J. Tajadura, N. Muguerza, A. Borja, I. Muxika, J. I. Saiz-Salinas, J. M. Gorostiaga, 2012. Development of a tool for assessing the ecological quality status of intertidal coastal rocky assemblages, within Atlantic Iberian coasts. Ecological Indicators 12: 58-71.
specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):
benthic, intertidal
- Estuary: bank
- Coastal: rocky shore transect
comments: In rivers and wetlands, macroalgae are addressed into the macrophyte group.

macrophytes:

sample information:

covered timeframe: 1994 - 2014
historical data: no
palaeo data: no
season: spring, summer
temporal resolution/frequency of sampling:
yearly oor biannualy
time series data: yes
comments: - Wetlands: 7 sampling stations, yearly
- Rivers: 32 sampling stations, biannualy

taxonomic resolution:

level: genus, species

comments: Species level identification variable: approx. 10-25%.

taxonomic coding:

coding system: numerical, based on taxonomic relationships

example: 330608020300

sample specifications:

type: semi-quantitative

replicate samples: no

number of samples: 39

specification of method(s) used for sampling and sorting:

Non destructive visual sampling, in situ identification.

reference(s): - For references on all water categories:
http://www.uragentzia.euskadi.net/informacion/ultimos-informes/u81-0003342/es/

CEDEX. 2010. Selección de métricas para la evaluación del estado ecológico de las masas de agua de la categoría ?Lagos? basadas en el elemento de calidad ?Composición y abundancia de otro tipo de flora acuática?, en aplicación de la Directiva Marco del Agua. Centro de Estudios y Experimentación de Obras Públicas. Madrid.

Ministerio de Agricultura, Alimentación y Medio Ambiente. 2013. Protocolo de muestreo de otro tipo de flora acuática (Macrófitos) en lagos. Código: M-L-OFM-2013.

specific sample location (e.g. littoral, profundal, transect, shoreline, hyporheic zone, etc.):

- Wetlands: 7 sampling stations.
- Rivers: 32 sampling stations.
Transects and quadrats description, by foot (shoreline) and in boat.

Other specifications

GIS layers, shapes related to the dataset:

hydrological information (as HydroSHEDS)
catchments, river-sub-basins
land use
protected areas

others (specify): We know that there is information on dams and barriers, but not available at this dataset. It is necessary to investigate other datasets and contact their owners.

availability of photos: no

availability of maps: yes

quality control procedures:

Were any quality control procedures applied to your dataset?

yes

quality control protocols and comments:

It is based upon the INSPIRE directive.
Water parameter assessment carried out by certified centres.
Protocols recommended by AENOR (Spanish Association for Normalization and Certification) following European regulation (UNE-EN).
Basque Government has adapted these protocols and has recently written some documents for rivers, marine waters and wetlands:
http://www.uragentzia.euskadi.eus/u81-000334/es/contenidos/informacion/pr

reference:	otocolos_estado_aguas/es_def/index.shtml http://www.uragentzia.euskadi.eus/u81-000334/es/contenidos/informacion/protocolos_estado_aguas/es_def/index.shtml

Acknowledgements

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References

Borja, A., I. Muxika, J. Franco, 2006. Long-term recovery of soft-bottom benthos following urban and industrial sewage treatment in the Nervión estuary (southern Bay of Biscay). Marine Ecology Progress Series 313: 43-55. http://dx.doi.org/10.3354/meps313043

CEDEX, 2010. Selección de métricas para la evaluación del estado ecológico de las masas de agua de la categoría "Lagos" basadas en el elemento de calidad "Composición y abundancia de otro tipo de flora acuática", en aplicación de la Directiva Marco del Agua. Centro de Estudios y Experimentación de Obras Públicas. Madrid. 56 pp.

Díez, I., M. Bustamante, A. Santolaria, J. Tajadura, N. Muguerza, A. Borja, I. Muxika, J.I. Saiz-Salinas, J.M. Gorostiaga, 2012. Development of a tool for assessing the ecological quality status of intertidal coastal rocky assemblages, within Atlantic Iberian coasts. Ecological Indicators 12: 58-71. http://dx.doi.org/10.1016/j.ecolind.2011.05.014

Elliott, M., K.L. Hemingway (Eds.), 2012. Fishes in Estuaries. Blackwell Publishing Ltd. Oxford. 658 pp. http://dx.doi.org/10.1002/9780470995228

Johnson, D.D., D. Rotherham, C.A. Gray, 2008. Sampling estuarine fish and invertebrates using demersal otter trawls: effects of net height, tow duration and diel period. Fisheries Research 93: 315-323. http://dx.doi.org/10.1016/j.fishres.2008.05.012

LTL, 2013. Procedure PI-LTL-06-300, accredited by ENAC (National Accreditation Organization of Spain). Internal procedure of Laboratorios Tecnológicos de Levante.

LTL, 2013. Procedure PI-LTL-06-305, accredited by ENAC (National Accreditation Organization of Spain). Internal procedure of Laboratorios Tecnológicos de Levante.

MAGRAMA, 2013. Protocolo de muestreo de fitoplancton en lagos y embalses. Código: M-LE-FP-2013. Ministerio de Agricultura, Alimentación y Medio Ambiente. Spanish Government. 18 pp.

MAGRAMA, 2013. Protocolo de muestreo de otro tipo de flora acuática (Macrófitos) en lagos. Código: M-L-OFM-2013. Ministerio de Agricultura, Alimentación y Medio Ambiente. Spanish Government. 38 pp.

MAGRAMA, 2012. Protocolo de muestreo y laboratorio de invertebrados bentónicos en lagos. Código: ML-L-I-2012. Ministerio de Agricultura, Alimentación y Medio Ambiente. Spanish Government. 20 pp.

Revilla M., A. Borja, G. Chust, A. Fontán, J. Franco, M. González, S. Novoa, Y. Sagarminaga, V. Valencia, 2012. Estudio de la clorofila, elemento clave para la Estrategia Marina Europea y la Directiva Marco del Agua. Informe elaborado por AZTI-Tecnalia para la Agencia Vasca del Agua. 102 pp.

Selleslagh, J., R. Amara, 2008. Environmental factors structuring fish composition and assemblages in a small macrotidal estuary (eastern English Channel). Estuarine, Coastal and Shelf Science 79: 507-517. http://dx.doi.org/10.1016/j.ecss.2008.05.006

UNE-EN 14011, 2003. Calidad del agua. Muestreo de peces con electricidad. European Standard EN 14011 - Water quality - Sampling of fish with electricity. 20 pp.

UNE-EN 14757, 2006. Calidad del agua. Muestreo de peces mediante redes de agalla con diferente luz de malla. European Standard EN 14757 - Water quality - Sampling of fish with multi-mesh gillnets. 32 pp.

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