GOOS BioEco portal data loading

Pieter Provoost

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This is an updated version of the original notebook which aims to export data for import into GeoNode.

Configuration

```
geonode_url <- "https://geonode.goosocean.org"
database_host <- "geonode.goosocean.org"
```

Load packages

```
library(ggplot2)
library(sf)
library(mapview)
library(rnaturalearth)
library(dplyr)
library(geojsonio)
library(DBI)
library(lubridate)
library(stringr)
library(tidyr)
library(readr)
library(smoothr)
library(xlsx)
library(purrr)
library(glue)
library(geojsonsf)
library(jsonlite)
```

Original dataset

Read and combine CSV files

Read and combine the two CSV files provided by Erin. Parse dates and recode temporal frequency. Some records have GeoJSON geometries, these are stored in the `geometry_geojson` column which will be used later on for export as shapefile.

```r
df_source_2 <- read.csv("data/2InfoDataProviderswoSpatialInfo_Final_420_7302020_FINAL_toshare.csv") %>%
  select(
    ErinSpatialGeoJSON,
    name = prog_name,
    contact_firstname = resp_firstname,
    contact_lastname = resp_lastname,
    contact_email = resp_email
  ) %>%
  mutate_all(list(~na_if(., ""))) %>%
  rename(geometry_geojson = ErinSpatialGeoJSON)
```

```r
df_source_4 <- read.csv("data/4Updated_Spatial_Survey_420_8132020_FINAL_toshare.csv")
```

```r
df_initial <- df_source_4 %>%
  select(
    name = prog_name,
    abstract = prog_name,
    abbreviation = prog_abbrev,
    url = prog_url,
    start_date = duration_start_year,
    end_date = duration_end_year,
    temporal_resolution = freq_interval,
    eov_birds = Birds,
    eov_hardcoral = Hard_Coral,
    eov_fish = Fish,
    eov_macroalgae = Macroalgae,
    eov_mangroves = Mangroves,
    eov_microbes = Microbes,
    eov_oceansound = Ocean_Sound,
    eov_phytoplankton = Phytoplankton,
    eov_seagrass = Seagrass,
    eov_seaturtles = Sea_Turtles,
    eov_zooplankton = Zooplankton,
    eov_benthicinvertebrates = Benthic_Invertebrate,
    eov_mammals = Marine_Mammals
  ) %>%
  left_join(df_source_2, by = "name") %>%
  mutate_at(vars(matches("eov")), ~ifelse(is.na(.), FALSE, TRUE)) %>%
  mutate(
    url = str_trunc(url, 200),
    source = "initial",
    start_date = as.Date(parse_date_time(start_date, orders = "y")),
    end_date = ceiling_date(as.Date(parse_date_time(end_date, orders = "y")), "year") - days(1),
    temporal_resolution = recode(
      temporal_resolution,
      "Sub-daily" = "sub_daily",
      "Daily" = "daily",
      "Monthly (12x per year)" = "monthly",
      "Quarterly (4x per year)" = "quarterly",
      "2x per year" = "twice_per_year",
      "1x per year" = "annually",
      "1x every 2 to 5 years" = "every_2_to_5_years",
      "1x every 6-10 years" = "every_6_to_10_years",
```

```
      "1x every >10 years" = "every_10_years_or_more",
      "Opportunistically/highly irregular intervals" = "opportunistically"
    )
  ) %>%
  as_tibble()

df_initial
```

```
## # A tibble: 371 x 25
##    name    abstract   abbreviation url    start_date end_date   temporal_resolu~
##    <chr>   <chr>      <chr>        <chr>  <date>     <date>     <chr>
##  1 Abunda~ Abundance~ <NA>         <NA>   2003-01-01 NA         quarterly
##  2 ACCOBA~ ACCOBAMS ~ ASI          accob~ 2018-01-01 2018-12-31 sub_daily
##  3 Acoust~ Acoustic ~ ARFSA        <NA>   2005-01-01 NA         sub_daily
##  4 Acoust~ Acoustic ~ ATAP         https~ 2011-01-01 NA         sub_daily
##  5 Aerial~ Aerial Su~ <NA>         https~ 1979-01-01 NA         annually
##  6 Agulha~ Agulhas B~ <NA>         <NA>   1988-01-01 NA         annually
##  7 Aleuti~ Aleutian ~ <NA>         <NA>   NA         NA         <NA>
##  8 ALGAL ~ ALGAL FOR~ AFRIMED      <NA>   2019-01-01 NA         annually
##  9 ALTER-~ ALTER-Net  ALTER-Net    http:~ NA         NA         <NA>
## 10 Annual~ Annual Mo~ SAV          http:~ NA         NA         <NA>
## # ... with 361 more rows, and 18 more variables: eov_birds <lgl>,
## #   eov_hardcoral <lgl>, eov_fish <lgl>, eov_macroalgae <lgl>,
## #   eov_mangroves <lgl>, eov_microbes <lgl>, eov_oceansound <lgl>,
## #   eov_phytoplankton <lgl>, eov_seagrass <lgl>, eov_seaturtles <lgl>,
## #   eov_zooplankton <lgl>, eov_benthicinvertebrates <lgl>, eov_mammals <lgl>,
## #   geometry_geojson <chr>, contact_firstname <chr>, contact_lastname <chr>,
## #   contact_email <chr>, source <chr>
```

Fix missing network/EOV links

```
df_initial$eov_benthicinvertebrates[which(df_initial$name == "Aleutian Islands Benthic Habitat Survey")]
```

EuroSea data

A second dataset has been provided by EuroSea. Read the Excel file.

```
df_source_eurosea <- read.xlsx("data/EuroSea.xlsx", 1)

df_eurosea <- df_source_eurosea %>%
  select(
    country = Country,
    organization = Organisation,
    name = Program.name,
    location = Programs.Location,
    time = Time.period,
    frequency = Frequency,
    eov_birds = Birds,
    eov_hardcoral = Hard.coral,
```

```
    eov_fish = Fish,
    eov_macroalgae = Macroalgae,
    eov_mangroves = Mangrove,
    eov_microbes = Microbes,
    eov_phytoplankton = Phytoplankton,
    eov_seagrass = Seagrass,
    eov_seaturtles = Turtles,
    eov_zooplankton = Zooplankton,
    eov_benthicinvertebrates = Benthic.invertebrates,
    eov_mammals = Mammals,
    url = Website,
    lat = Lat,
    lon = Lon
  ) %>%
  filter(!is.na(name)) %>%
  as_tibble()

df_eurosea
```

```
## # A tibble: 367 x 21
##    country organization  name   location time  frequency eov_birds eov_hardcoral
##    <chr>   <chr>         <chr>  <chr>    <chr> <chr>     <chr>     <chr>
##  1 Belgium University o~ PHYTO~ <NA>     1979~ 2 x a we~ <NA>      <NA>
##  2 Belgium Research Ins~ Breed~ Belgian~ 1997~ <NA>      x         <NA>
##  3 Belgium Research Ins~ Belgi~ Belgian~ 2005~ <NA>      x         <NA>
##  4 Belgium Institute fo~ Fish ~ Belgian~ 1973~ Annual (~ <NA>      <NA>
##  5 Belgium Institute fo~ Fish ~ Belgian~ 1973~ Annual (~ <NA>      <NA>
##  6 Belgium Royal Belgia~ Mamma~ Belgian~ 1995~ 2x per y~ <NA>      <NA>
##  7 Belgium Royal Belgia~ Mamma~ Belgian~ 1995~ Continua~ <NA>      <NA>
##  8 Belgium Institute fo~ Benth~ Belgian~ 1979~ Annual    <NA>      <NA>
##  9 Belgium Institute fo~ Epibe~ Belgian~ 1985~ Annual    <NA>      <NA>
## 10 Belgium Royal Belgia~ Ecolo~ Belgian~ 2005~ <NA>      x         <NA>
## # ... with 357 more rows, and 13 more variables: eov_fish <chr>,
## #   eov_macroalgae <chr>, eov_mangroves <lgl>, eov_microbes <chr>,
## #   eov_phytoplankton <chr>, eov_seagrass <chr>, eov_seaturtles <chr>,
## #   eov_zooplankton <chr>, eov_benthicinvertebrates <chr>, eov_mammals <chr>,
## #   url <chr>, lat <chr>, lon <chr>
```

Convert boolean columns:

```
df_eurosea <- df_eurosea %>%
  mutate_at(vars(matches("eov")), ~ifelse(!is.na(.) & . == "x", TRUE, FALSE))
```

The `time` column contains dash separated start and end years (or `current`). Split into separate columns and convert to numeric.

```
df_eurosea <- df_eurosea %>%
  separate(time, c("start_date", "end_date")) %>%
  mutate(across(c("start_date", "end_date"), as.numeric)) %>%
  mutate(across(c("start_date", "end_date"), as.character)) %>%
  mutate(
    start_date = as.Date(parse_date_time(start_date, orders = "y")),
```

```
    end_date = ceiling_date(as.Date(parse_date_time(end_date, orders = "y")), "year") - days(1)
  )
```

Recode temporal frequency:

```
df_eurosea <- df_eurosea %>%
  mutate(
    temporal_resolution = recode(
      frequency,
      "2 x a week since 2005" = "weekly",
      "Annual (Sept)" = "annually",
      "Annual (Aug - Sept)" = "annually",
      "2x per year" = "twice_per_year",
      "Continually" = "sub_daily",
      "Annual" = "annually",
      "Monthly" = "monthly",
      "Daily" = "daily",
      "Quarterly" = "quarterly",
      "Spring/Summer" = "twice_per_year",
      "Once in 3 years" = "every_2_to_5_years",
      "Once in 6 years" = "every_6_to_10_years",
      "4x per year" = "quarterly",
      "Once in 2 years" = "every_2_to_5_years",
      "Varies" = "opportunistically",
      "Every 6 months" = "twice_per_year",
      "A" = "annually",
      "Annually in May" = "annually",
      "Annually" = "annually",
      "Annually in March/April" = "annually",
      "Annually in July/August" = "annually",
      "6-8y interval (1987, 1989, 1995, 2001, 2007,2015)" = "every_6_to_10_years",
      "Annually in March" = "annually",
      "Annually in August" = "annually",
      "Annually in September" = "annually",
      "Every 3 years" = "every_2_to_5_years",
      "1x per year" = "annually",
      "weekly" = "weekly",
      "2x per month" = "monthly",
      "4x per month" = "weekly",
      "1x per month" = "monthly",
      "Year round" = "opportunistically",
      "Seasonal" = "quarterly",
      "10 minutes" = "sub_daily",
      "Seconds" = "sub_daily",
      "Once per summer (cruise) + autonomous instruments throughout the year" = "sub_daily",
      "Annual or Seasonal" = "annually",
      "Weekly" = "weekly",
      "Monthly to biannually" = "opportunistically",
      "May and June " = "twice_per_year",
      "Monthly to bimonthly" = "monthly",
      "Seasonally" = "quarterly",
      "Weekly from May to October" = "opportunistically",
      "June-Sept" = "opportunistically",
```

```
      "Summer" = "annually",
      "weekly or bi-weekly " = "weekly",
      "All year round but mostly from April to October" = "opportunistically",
      "8-10x month" = "weekly",
      "March - November" = "opportunistically",
      "once in 2 years" = "every_2_to_5_years",
      "once prt year" = "annually",
      "once in 6 year period" = "every_6_to_10_years",
      "Every 3 months" = "quarterly",
      "Every 2 years" = "every_2_to_5_years",
      "Once a month" = "monthly",
      "April - October (weather dependent)" = "opportunistically",
      "Once per summer" = "annually",
      "Varies/Daily " = "opportunistically",
      "4 - 10 times a year" = "quarterly",
      "3 - 6 times a year" = "quarterly",
      "3 - 4 times a year" = "quarterly",
      "Twice a month" = "monthly",
      "Opportunistic" = "opportunistically",
      "4 times a year" = "quarterly",
      "Every 10 days in spring/summer and monthy in winter" = "monthly",
      "Annualy" = "annually",
      "4 per year (1 per season)" = "quarterly",
      "6-8 x per year (1 mission of 2 months length approx.)" = "quarterly",
      "4 x per year" = "quarterly",
      "24 x per year" = "monthly",
      "10x per year" = "monthly",
      "Planned with 3 years intervals" = "every_2_to_5_years",
      "Biannual" = "every_2_to_5_years",
      "Annual/Biannual" = "every_2_to_5_years",
      "2-4 times per year" = "annually",
      "Bi-monthly" = "monthly",
      "2 weekly / monthly" = "monthly"
    )
  ) %>%
  select(-frequency)
```

The latitude and longitude columns contain variety of formats, for now I'm only parsing singular decimal degrees values. Geometries are stored in `geometry_geojson`.

```
df_eurosea <- df_eurosea %>%
  mutate(across(c("lon", "lat"), as.numeric)) %>%
  mutate(
    lon = ifelse(is.na(lat), NA, lon),
    lat = ifelse(is.na(lon), NA, lat)
  ) %>%
  mutate(geometry_sfc = st_as_sfc(ifelse(!is.na(lon), paste0("POINT(", lon, " ", lat, ")"), "POINT EMPT
```

Merge by network:

```
concat <- function(x, collapse = ";") {
  x <- gsub("\\s+", " ", trimws(unique(x[!is.na(x)])))
  if (length(x) == 0) return(NA)
```

```
  return(paste0(x, collapse = collapse))
}

frequencies <- c(
  "sub_daily",
  "daily",
  "monthly",
  "quarterly",
  "twice_per_year",
  "annually",
  "every_2_to_5_years",
  "every_6_to_10_years",
  "every_10_years_or_more",
  "opportunistically"
)

df_eurosea <- df_eurosea %>%
  filter(!is.na(name)) %>%
  mutate(temporal_resolution = factor(temporal_resolution, levels = frequencies)) %>%
  group_by(organization, name) %>%
  summarize(
    start_date = min(start_date, na.rm = TRUE),
    end_date = max(end_date, na.rm = TRUE),
    eov_birds = as.logical(max(eov_birds)),
    eov_hardcoral = as.logical(max(eov_hardcoral)),
    eov_fish = as.logical(max(eov_fish)),
    eov_macroalgae = as.logical(max(eov_macroalgae)),
    eov_mangroves = as.logical(max(eov_mangroves)),
    eov_microbes = as.logical(max(eov_microbes)),
    eov_phytoplankton = as.logical(max(eov_phytoplankton)),
    eov_seagrass = as.logical(max(eov_seagrass)),
    eov_seaturtles = as.logical(max(eov_seaturtles)),
    eov_zooplankton = as.logical(max(eov_zooplankton)),
    eov_benthicinvertebrates = as.logical(max(eov_benthicinvertebrates)),
    eov_mammals = as.logical(max(eov_mammals)),
    url = concat(url, collapse = "; "),
    abstract = concat(c(organization, name), collapse = " - "),
    temporal_resolution = levels(temporal_resolution)[min(as.numeric(temporal_resolution), na.rm = TRUE)
    geometry_geojson = as.character(sfc_geojson(st_union(geometry_sfc)))
  ) %>%
  ungroup() %>%
  mutate(
    source = "eurosea",
    url = str_trunc(url, 500),
  )

df_eurosea
```

```
## # A tibble: 256 x 21
##    organization      name   start_date end_date eov_birds eov_hardcoral eov_fish
##    <chr>             <chr>  <date>     <date>   <lgl>     <lgl>         <lgl>
##  1 "Archipelago Res~ "Long~ 1967-01-01 NA       FALSE     FALSE         TRUE
##  2 "Asociacion Turs~ "Bale~ 2003-01-01 NA       FALSE     FALSE         FALSE
```

```
##  3 "AWI"             "LTER~ 1999-01-01 NA       FALSE     FALSE         FALSE
##  4 "AWI"             "Nort~ 1962-01-01 NA       FALSE     FALSE         FALSE
##  5 "AZTI"            "AZTI~ 1986-01-01 NA       FALSE     FALSE         FALSE
##  6 "AZTI"            "Basq~ 1995-01-01 NA       FALSE     FALSE         TRUE
##  7 "Balearic Island~ "Cana~ 2014-01-01 NA       FALSE     FALSE         FALSE
##  8 "Balearic Island~ "Cana~ 2010-01-01 NA       FALSE     FALSE         FALSE
##  9 "Balearic Island~ "Ocea~ 2015-01-01 NA       FALSE     FALSE         FALSE
## 10 "Balearic Island~ "Turt~ 2010-01-01 NA       FALSE     FALSE         FALSE
## # ... with 246 more rows, and 14 more variables: eov_macroalgae <lgl>,
## #   eov_mangroves <lgl>, eov_microbes <lgl>, eov_phytoplankton <lgl>,
## #   eov_seagrass <lgl>, eov_seaturtles <lgl>, eov_zooplankton <lgl>,
## #   eov_benthicinvertebrates <lgl>, eov_mammals <lgl>, url <chr>,
## #   abstract <chr>, temporal_resolution <chr>, geometry_geojson <chr>,
## #   source <chr>
```

Combine data

```
df_combined <- bind_rows(df_initial, df_eurosea) %>%
  mutate(id = row_number(), has_shapefile = FALSE)
```

Assign identifiers

```
shorten_identifier <- function(identifier) {
  if (nchar(identifier) > 58) {
    return(paste0(substring(identifier, 1, 29), substring(identifier, nchar(identifier) - 28, nchar(ide
  } else {
    return(identifier)
  }
}

make_identifier <- function(name) {
  name %>%
    tolower() %>%
    str_replace_all("[()\":\',&/\\.;]", "") %>%
    str_trim() %>%
    str_replace_all("[\\s--]+", "_") %>%
    iconv(from = "UTF-8", to = "ASCII//TRANSLIT") %>%
    str_replace_all("[()\":\',&/\\.^`]", "") %>%
    purrr::map(shorten_identifier) %>%
    unlist()
}

df_combined <- df_combined %>%
  mutate(identifier = make_identifier(name))

df_combined
```

```
## # A tibble: 627 x 29
##    name    abstract   abbreviation url    start_date end_date   temporal_resolu~
```

```
##    <chr>   <chr>      <chr>        <chr>  <date>     <date>     <chr>
##  1 Abunda~ Abundance~ <NA>         <NA>   2003-01-01 NA         quarterly
##  2 ACCOBA~ ACCOBAMS ~ ASI          accob~ 2018-01-01 2018-12-31 sub_daily
##  3 Acoust~ Acoustic ~ ARFSA        <NA>   2005-01-01 NA         sub_daily
##  4 Acoust~ Acoustic ~ ATAP         https~ 2011-01-01 NA         sub_daily
##  5 Aerial~ Aerial Su~ <NA>         https~ 1979-01-01 NA         annually
##  6 Agulha~ Agulhas B~ <NA>         <NA>   1988-01-01 NA         annually
##  7 Aleuti~ Aleutian ~ <NA>         <NA>   NA         NA         <NA>
##  8 ALGAL ~ ALGAL FOR~ AFRIMED      <NA>   2019-01-01 NA         annually
##  9 ALTER-~ ALTER-Net  ALTER-Net    http:~ NA         NA         <NA>
## 10 Annual~ Annual Mo~ SAV          http:~ NA         NA         <NA>
## # ... with 617 more rows, and 22 more variables: eov_birds <lgl>,
## #   eov_hardcoral <lgl>, eov_fish <lgl>, eov_macroalgae <lgl>,
## #   eov_mangroves <lgl>, eov_microbes <lgl>, eov_oceansound <lgl>,
## #   eov_phytoplankton <lgl>, eov_seagrass <lgl>, eov_seaturtles <lgl>,
## #   eov_zooplankton <lgl>, eov_benthicinvertebrates <lgl>, eov_mammals <lgl>,
## #   geometry_geojson <chr>, contact_firstname <chr>, contact_lastname <chr>,
## #   contact_email <chr>, source <chr>, organization <chr>, id <int>, ...
```

Let's check if there are any duplicate datasets:

```
duplicates <- df_combined[duplicated(df_combined$identifier) | duplicated(df_combined$identifier, fromLa
duplicates %>%
  select(id, name, source, abstract, url, start_date, end_date, temporal_resolution, contact_email, orga
  arrange(identifier) %>%
  knitr::kable()
```

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact_email	organization	identifier
26	Balearic Sperm Whale Project	initial	Balearic Sperm Whale Project	www.asociaciontursiops.org	2003-01-01	NA	quarterly	tursiops@asociaciontursiops.org	NA	balearic_sperm_wha
373	Balearic Sperm Whale Project	eurobis	Asociacion Tursiops and Dr Luke Rendell of the University of Saint Andrews - Balearic Sperm Whale Project	https://synergy.st-andrews.ac.uk/balearicspermwhales/	2003-01-01	NA	annually	NA	Asociacion Tursiops and Dr Luke Rendell of the University of Saint Andrews	balearic_sperm_wha
30	Basque monitoring network for the ecological status assessment	initial	Basque monitoring network for the ecological status assessment	NA	1995-01-01	NA	quarterly	NA	NA	basque_monitoring_

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
377	Basque monitoring network for the ecological status assessment	eurobis	AZTI - Basque monitoring network for the ecological status assessment	https://www.uragentzia.euskadi.eus/informacion/ultimos-informes/u81-0003342/es/	1995-01-01	NA	every 2 years	NA	AZTI	basque_monitoring_
31	Bathing Water Monitoring Programme	initial	Bathing Water Monitoring Programme	https://environment.data.gov.uk/bwq/profiles/	1976-01-01	NA	opportunistically	katrina.smith.ems@environment-agency.gov.uk	NA	bathing_water_mon
613	Bathing Water Monitoring Programme	eurobis	Bathing Water Monitoring Programme	NA	NA	NA	NA	NA	NA	bathing_water_mon
39	Biodiversity, extreme environment and global change	initial	Biodiversity, extreme environment and global change	http://lecob-chaire.obs-banyuls.fr/	2010-01-01	NA	annually	NA	NA	biodiversity_extreme
456	Biodiversity, extreme environment and global change	eurobis	Foundation Total, Univérsite Pierre et Marie Curie, CNRS - Biodiversity, extreme environment and global change	http://lecob-chaire.obs-banyuls.fr/index.php/en-us/partnerships.html	2015-01-01	NA	annually	NA	Foundation Total, Univérsite Pierre et Marie Curie, CNRS	biodiversity_extreme
385	CASCAIS-WATCH	eurobis	Centre of Marine Sciences (CCMAR) - CASCAIS-WATCH	https://www.st.nmfs.noaa.gov/copepod/time-series/pt-30201/	1996-01-01	NA	monthly	NA	Centre of Marine Sciences (CCMAR)	cascais_watch
512	CASCAIS-WATCH	eurobis	Instituto Portuguěs do Mar e da Atmosfera (IPMA) - CASCAIS-WATCH	https://www.st.nmfs.noaa.gov/copepod/time-series/pt-30101/	2005-01-01	NA	NA	NA	Instituto Portuguěs do Mar e da Atmosfera (IPMA)	cascais_watch

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
54	CEMP Long term Benthos	initial	CEMP Long term Benthos	NA	1997-01-01	NA	annually	ukt.service@afbini.gov.uk	NA	cemp_long_term_b
614	CEMP Long term Benthos	eurobis	CEMP Long term Benthos	NA	NA	NA	NA	NA	NA	cemp_long_term_b
61	Cetacean Sanctuary Research	initial	Cetacean Sanctuary Research	https://whalesanddolphins.tethys.org/cetacean-sanctuary-research/	1990-01-01	NA	daily	NA	NA	cetacean_sanctuary_
591	Cetacean Sanctuary Research	eurobis	Tethys Research Institute - Cetacean Sanctuary Research	https://whalesanddolphins.tethys.org/wp-content/uploads/tethys_public_docs/CSR_ExpeditionBriefing_EN.pdf	1990-01-01	NA	opportunistically	NA	Tethys Research Institute	cetacean_sanctuary_
68	Coastal biodiversity in rocky shores across the Atlantic coast of Europe	initial	Coastal biodiversity in rocky shores across the Atlantic coast of Europe	NA	2003-01-01	NA	every_10_years_or_more	fpl.mayes@gmail.com	NA	coastal_biodiversity_
615	Coastal biodiversity in rocky shores across the Atlantic coast of Europe	eurobis	Coastal biodiversity in rocky shores across the Atlantic coast of Europe	NA	NA	NA	NA	NA	NA	coastal_biodiversity_

id	name	source	abstract	url	start_date	end_date	temporal_coverage	contact	organization	identifier
76	Deep-Sea Research Program	initial	Deep-Sea Research Program	NA	2009-01-01	NA	opportunistically	jmurdaugh@hawaii.edu	NA	deep_sea_research_
610	Deep-Sea Research Program	europa	Deep-Sea Research Program	NA	NA	NA	NA	NA	NA	deep_sea_research_
80	Dogger Bank long-term monitoring programme	initial	Dogger Bank long-term monitoring programme	NA	1991-01-01	NA	annually	NA	NA	dogger_bank_long_
574	Dogger Bank long-term monitoring programme	europa	Senckenberg Society for Nature Research - Dogger Bank long-term monitoring programme	No website due to restructuring (see email from Moritz Sonnewald on the 12th of October 2020) but there is a research paper: Sonnewald and Türkay (2012) Journal of Sea Research	1991-01-01	NA	annually	NA	Senckenberg Society for Nature Research	dogger_bank_long_
89	eOceans	initial	eOceans	www.eOceans.co	2013-01-01	NA	sub_daily	dmistry@eoceans.co	NA	eoceans
617	eOceans	europa	eOceans	https://www.eoceans.co/home	2011-01-01	NA	opportunistically	NA	NA	eoceans
93	Estonian National Monitoring Program	initial	Estonian National Monitoring Program	NA	1993-01-01	NA	monthly	Ain.Pollumae@ut.ee	NA	estonian_national_r
533	Estonian National Monitoring Program	europa	Ministry of the Environment of the Republic of Estonia, Estonian Environment Agency, - Estonian National Monitoring Program	NA	1993-01-01	NA	annually	NA	Ministry of the Environment of the Republic of Estonia, Estonian Environment Agency,	estonian_national_r

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
534	Estonian National Monitoring Program	eurobis	Ministry of the Environment of the Republic of Estonia, Estonian Environment Agency, Estonian Marine Institute of University of Tartu (UT EMI), Marine Systems Institute of the Tallinn University of Technology (TalTech MSI), Estonian Ornithological Society (EOS), Estonian University of Life Sciences (ULS), NPA Pro Mare - Estonian National Monitoring Program	NA	1957-01-01	NA	annually	NA	Ministry of the Environment of the Republic of Estonia, Estonian Environment Agency, Estonian Marine Institute of University of Tartu (UT EMI), Marine Systems Institute of the Tallinn University of Technology (TalTech MSI), Estonian Ornithological Society (EOS), Estonian University of Life Sciences (ULS), NPA Pro Mare	estonian_national_m
97	Eutrophication Monitoring & SmartBuoy in situ marine monitoring	eurobis	Eutrophication Monitoring & SmartBuoy in situ marine monitoring	https://www.cefas.co.uk/cefas-data-hub/smartbuoys/	2001-01-01	NA	sub_monthly	devlin@cefas.co.uk	NA	eutrophication_mon
383	Eutrophication Monitoring & SmartBuoy in situ marine monitoring	eurobis	Centre for Environment, Fisheries and Aquaculture Science (Cefas) - Eutrophication Monitoring & SmartBuoy in situ marine monitoring	http://data.cefas.co.uk	1985-01-01	NA	opportunistically	NA	Centre for Environment, Fisheries and Aquaculture Science (Cefas)	eutrophication_mon
459	Greenland Ecosystem Monitoring	eurobis	Greenland Institute of Natural Resources - Greenland Ecosystem Monitoring	https://gcrc.gl/research-projects/greenland-ecosystem-monitoring-marinebasis-nuuk/	2005-01-01	NA	NA	NA	Greenland Institute of Natural Resources	greenland_ecosysten

id	name	source	abstract	url	start_date	end_date	temporal_resolution	data_format	organization	identifier
460	Greenland Ecosystem Monitoring	eurosea	Greenland Institute of Natural Resources - Greenland Ecosystem Monitoring	https://gcrc.gl/research-projects/greenland-ecosystem-monitoring-marinebasis-zackenberg/	2002-01-01	NA	NA	NA	Greenland Institute of Natural Resources	greenland_ecosystem
393	Infrastructure de Recherche Littorale et Côtière (ILICO): PHYTOBS	eurosea	CNRS, Ifremer, RDF, IGN, Shom, French Ministry of Higher Education, Research and Innovation (MESRI), BGRM, AFB and CEREMA - Infrastructure de Recherche Littorale et Côtière (ILICO): PHYTOBS	https://www.ir-ilico.fr/Les-reseaux-elementaires/Fiches-d-identite-des-reseaux-elementaires/PHYTOBS	1987-01-01	NA	monthly	NA	CNRS, Ifremer, RDF, IGN, Shom, French Ministry of Higher Education, Research and Innovation (MESRI), BGRM, AFB and CEREMA	infrastructure_de_r
394	Infrastructure de Recherche Littorale et Côtière (ILICO): PHYTOBS	eurosea	CNRS, Ifremer, RDF, IGN, Shom, French Ministry of Higher Education, Research and Innovation (MESRI), BGRM, AFB and CEREMA - Infrastructure de Recherche Littorale et Côtière (ILICO): PHYTOBS	NA	1987-01-01	NA	monthly	NA	CNRS, Ifremer, RDF, IGN, Shom, French Ministry of Higher Education, Research and Innovation (MESRI), BGRM, AFB and CEREMA	infrastructure_de_r
141	Ionian Dolphin Project	initial	Ionian Dolphin Project	NA	1991-01-01	NA	daily	NA	NA	ionian_dolphin_proj
592	Ionian Dolphin Project	eurosea	Tethys Research Institute - Ionian Dolphin Project	https://www.ioniandolphinproject.org	1991-01-01	NA	opportunistic	NA	Tethys Research Institute	ionian_dolphin_proj
142	Israel Marine Mammal Research & Assistance Center	initial	Israel Marine Mammal Research & Assistance Center	http://immrac.org	1994-01-01	NA	daily	NA	NA	israel_marine_mam

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
604	Israel Marine Mammal Research & Assistance Center	eurosea	University of Haifa - Israel Marine Mammal Research & Assistance Center	http://immrac.haifa.ac.il/english/introduction.html	1993-01-01	NA	monthly	NA	University of Haifa	israel_marine_mam
144	IT14-Marine ecosystems of Sardinia - Italy	initial	IT14-Marine ecosystems of Sardinia - Italy	https://deims.org/28407ba7-6efe-45f4-8ecf-efb514e9182b	1992-01-01	2014-12-31	monthly	Ludovica Addabbo@uniss.it	NA	it14_marine_ecosyst
609	IT14-Marine ecosystems of Sardinia - Italy	eurosea	University of Sassari - IT14-Marine ecosystems of Sardinia - Italy	https://deims.org/1c9f9148-e8dc-4b67-ac13-ce387c5a6a2f; https://deims.org/3178d0fb-0789-4992-9c51-1ddb50b7e871; https://deims.org/d5071d21-9c8f-47cc-b534-1b1162a5e09c; https://deims.org/3aecddfd-36e2-40ec-b89f-808607264657; https://deims.org/6f7581f0-e663-4681-bf9d-4668d6c3f2ba	1990-01-01	NA	quarterly	NA	University of Sassari	it14_marine_ecosyst
599	Kongsfjorden Rijpfjorden Observatory Program - Kongsfjorden Marine Observatory (KROP)	eurosea	UiT The Arctic University of Norway until 2026 in collaboration with the Scottish Association for Marine Science (SAMS) - Kongsfjorden Rijpfjorden Observatory Program - Kongsfjorden Marine Observatory (KROP)	https://www.researchinsvalbard.no/project/8985	2002-01-01	NA	daily	NA	UiT The Arctic University of Norway until 2026 in collaboration with the Scottish Association for Marine Science (SAMS)	kongsfjorden_rijpfjo

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
600	Kongsfjorden Rijpfjorden Observatory Program - Rijpfjorden Marine Observatory (KROP)	eurobis	UiT The Arctic University of Norway until 2026 in collaboration with the Scottish Association for Marine Science (SAMS) - Kongsfjorden Rijpfjorden Observatory Program - Rijpfjorden Marine Observatory (KROP)	https://www.researchinsvalbard.no/project/8986	2007-01-01	NA	daily	NA	UiT The Arctic University of Norway until 2026 in collaboration with the Scottish Association for Marine Science (SAMS)	kongsfjorden_rijpfjo
153	Laboratory of Marine Ecology, Sozopol	initial	Laboratory of Marine Ecology, Sozopol	NA	2009-01-01	NA	quarterly	NA	NA	laboratory_of_mari
473	Laboratory of Marine Ecology, Sozopol	eurobis	Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences - Laboratory of Marine Ecology, Sozopol	http://www.iber.bas.bg/?q=en/node/111	2009-01-01	NA	quarterly	NA	Institute of Biodiversity and Ecosystem Research at the Bulgarian Academy of Sciences	laboratory_of_mari
154	LifeWatch Biodiversity Observatory- Belgium	initial	LifeWatch Biodiversity Observatory- Belgium	www.lifewatch.be	2012-01-01	NA	monthly	NA	NA	lifewatch_biodiversit
618	LifeWatch Biodiversity Observatory- Belgium	eurobis	LifeWatch Biodiversity Observatory- Belgium	NA	NA	NA	NA	NA	NA	lifewatch_biodiversit
165	Long-term environmental monitoring: Archipelago Sea	initial	Long-term environmental monitoring: Archipelago Sea	https://sites.utu.fi/seili/en/title/	1960-01-01	NA	monthly	NA	NA	long_term_environm

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
372	Long-term environmental monitoring: Archipelago Sea	eurosea	Archipelago Research Institute - Long-term environmental monitoring: Archipelago Sea	https://sites.utu.fi/seili/en/station/research/	1967-01-01	NA	monthly	NA	Archipelago Research Institute	long_term_environm
166	Long-Term Monitoring Program “Muddy-sandy intertidal flats in Kandalaksha Bay (White Sea)”	initial	Long-Term Monitoring Program “Muddy-sandy intertidal flats in Kandalaksha Bay (White Sea)”	NA	1987-01-01	NA	quarterly	Andrey Sukhotin@zin.ru	NA	long_term_monitori
619	Long-Term Monitoring Program “Muddy-sandy intertidal flats in Kandalaksha Bay (White Sea)”	eurosea	Long-Term Monitoring Program “Muddy-sandy intertidal flats in Kandalaksha Bay (White Sea)”	no website. See email from Nikolay Usov	1987-01-01	NA	quarterly	NA	NA	long_term_monitori
171	Lorn Pelagic Observatory	initial	Lorn Pelagic Observatory	https://www.sams.ac.uk/science/time-series/lorn-pelagic-observatory/	1970-01-01	NA	monthly	NA	NA	lorn_pelagic_observ

id	name	source	abstract	url	start_date	end_date	temporal_resolution	organization	identifier
596	Lorn Pelagic Observatory	eurobis	The Scottish Association for Marine Science (SAMS) - Lorn Pelagic Observatory	https://www.sams.ac.uk/science/time-series/lorn-pelagic-observatory/	1970-01-01	NA	monthly	The Scottish Association for Marine Science (SAMS)	lorn_pelagic_observ
173	LTER Ebro Delta	initial	LTER Ebro Delta	http://www.lter-spain.net/portfolio-lter/delta-del-ebro/	1981-01-01	NA	annually	NA	lter_ebro_delta
418	LTER Ebro Delta	eurobis	Ebro Delta Natural Park - LTER Ebro Delta	https://deims.org/abd23957-60f1-491f-8529-fab05d681f5a	1983-01-01	NA	opportunistically	Ebro Delta Natural Park	lter_ebro_delta
181	LTER: Gulf of Trieste - Slovenia/National monitoring of the ecological and chemical status of the Slovenian sea	initial	LTER: Gulf of Trieste - Slovenia/National monitoring of the ecological and chemical status of the Slovenian sea	NA	1984-01-01	NA	monthly	NA	lter_gulf_of_trieste
521	LTER: Gulf of Trieste - Slovenia/National monitoring of the ecological and chemical status of the Slovenian sea	eurobis	LTER Europe -> LTER Slovenia - LTER: Gulf of Trieste - Slovenia/National monitoring of the ecological and chemical status of the Slovenian sea	https://deims.org/f2ce5ae3-8873-4a8b-abad-d56d5d6da164	1989-01-01	NA	opportunistically	LTER Europe -> LTER Slovenia	lter_gulf_of_trieste

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
176	LTER North Sea Benthos Observatory	initial	LTER North Sea Benthos Observatory	www.ilter.network	1970-01-01	NA	annually	vicky.kroencke@senckenberg.de	NA	lter_north_sea_ben
575	LTER North Sea Benthos Observatory	eurosea	Senckenberg Society for Nature Research - LTER North Sea Benthos Observatory	https://www.senckenberg.de/en/institutes/senckenberg-am-meer/marine-research/marine-research-divisions/marine-biology/marine-biology-research/	1978-01-01	NA	annually	NA	Senckenberg Society for Nature Research	lter_north_sea_ben
190	Marine Environment Integrated Monitoring Program	initial	Marine Environment Integrated Monitoring Program	NA	1990-01-01	NA	twice a year	valeria.alpha@rmri.ro	NA	marine_environment
539	Marine Environment Integrated Monitoring Program	eurosea	National Institute for Marine Research and Development “Grigore Antipa” (NIMRD), Constanta, Romania - Marine Environment Integrated Monitoring Program	NA	NA	NA	NA	NA	National Institute for Marine Research and Development “Grigore Antipa” (NIMRD), Constanta, Romania	marine_environment
195	Marine monitoring programme	initial	Marine monitoring programme	NA	1993-01-01	NA	quarterly	ikauniece@lhei.lv	NA	marine_monitoring_
517	Marine monitoring programme	eurosea	Latvian Institute of Aquatic Ecology, University of Daugavpils - Marine monitoring programme	http://www.lhei.lv/images/saturs/docs/Juras_monitoringa_programma_2014_2020.pdf	1973-01-01	NA	annually	NA	Latvian Institute of Aquatic Ecology, University of Daugavpils	marine_monitoring_

id	name	source	abstract	url	start_date	end_date	temporal_resolution	data_contact_organization	identifier
546	Marine Monitoring Programme	eurosea	Natural Resource Wales - Marine Monitoring Programme	NA	1982-01-01	NA	opportunistically	Natural Resource Wales	marine_monitoring_
197	Marine Research Station “Zmiinyi island”	initial	Marine Research Station “Zmiinyi island”	no	2004-01-01	NA	monthly	NA	NA	marine_research_sta
558	Marine Research Station “Zmiinyi island”	eurosea	Odessa National I. I. Mechnikov University - Marine Research Station “Zmiinyi island”	https://deims.org/ff4a25df-809d-46b6-ae68-a5dccc5f34ab	2003-01-01	NA	opportunistically	Odessa National I. I. Mechnikov University	marine_research_sta
210	Monitoring and Conservation of Black Sea Cetaceans	initial	Monitoring and Conservation of Black Sea Cetaceans	www.delfini.ro	2010-01-01	NA	monthly	NA	NA	monitoring_and_co
620	Monitoring and Conservation of Black Sea Cetaceans	eurosea	Monitoring and Conservation of Black Sea Cetaceans	NA	NA	NA	NA	NA	NA	monitoring_and_co
220	National Biodiversity Data Centre	initial	National Biodiversity Data Centre	http://www.biodiversityireland.ie/	2007-01-01	NA	opportunistically	data@biodiversityireland.ie	NA	national_biodiversity
537	National Biodiversity Data Centre	eurosea	National Biodiversity Data Centre	https://www.biodiversityireland.ie	2007-01-01	NA	opportunistically	NA	National Biodiversity Data Centre	national_biodiversity

id	name	source	abstract	url	start_date	end_date	temporal_resolution	data_contact	organization	identifier
223	National Research Infrastructure - Norwegian Marine Data Centre	initial	National Research Infrastructure - Norwegian Marine Data Centre	www.nmdc.no	1980-01-01	NA	opportunistically	NA	NA	national_research_i
621	National Research Infrastructure - Norwegian Marine Data Centre	eurosea	National Research Infrastructure - Norwegian Marine Data Centre	NA	NA	NA	NA	NA	NA	national_research_i
247	Ocean Tracking Network	initial	Ocean Tracking Network	http://oceantrackingnetwork.org/	2008-01-01	NA	sub_daily	Jeremy Bajona@dal.ca	NA	ocean_tracking_net
622	Ocean Tracking Network	eurosea	Ocean Tracking Network	NA	NA	NA	NA	NA	NA	ocean_tracking_net
248	Ocean Weather Station M	initial	Ocean Weather Station M	NA	1948-01-01	NA	quarterly	NA	NA	ocean_weather_stat
603	Ocean Weather Station M	eurosea	University of Bergen - Ocean Weather Station M	http://www.fixo3.eu/parameter/ https://www.uib.no/en/rg/fysos/57998/station-m https://folk.uib.no/ngfso/owsm/woce_newsletter_5_fig_c.html	1948-01-01	NA	daily	NA	University of Bergen	ocean_weather_stat

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact_email	contact_organization	identifier
252	On the tracks of great pelagic marine animals (whales, dolphins, sea turtles, swordfish and tunas)	initial	On the tracks of great pelagic marine animals (whales, dolphins, sea turtles, swordfish and tunas)	NA	2020-01-01	NA	twice_a_year	NA	NA	on_the_tracks_of_
516	On the tracks of great pelagic marine animals (whales, dolphins, sea turtles, swordfish and tunas)	eurosea	KYMA sea conservation & research - On the tracks of great pelagic marine animals (whales, dolphins, sea turtles, swordfish and tunas)	https://kyma-sea.org/en/187/kyma-expeditions/	2020-01-01	NA	opportunistically	NA	KYMA sea conservation & research	on_the_tracks_of_
253	ORCA	initial	ORCA	https://www.orcaweb.org.uk/	1995-01-01	NA	monthly	hdv.babey@orcaweb.org.uk	NA	orca
623	ORCA	eurosea	ORCA	NA	NA	NA	NA	NA	NA	orca
264	Phytoplankton monitoring programme Romanian Black Sea waters	initial	Phytoplankton monitoring programme Romanian Black Sea waters	NA	2000-01-01	NA	twice_a_year	bopeneaalpha.rmri.ro	NA	phytoplankton_mon

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
624	Phytoplankton monitoring programme Romanian Black Sea waters	initial	Phytoplankton monitoring programme Romanian Black Sea waters	NA	NA	NA	NA	NA	NA	phytoplankton_mon
269	Porcupine Abyssal Plain Sustained Observatory	initial	Porcupine Abyssal Plain Sustained Observatory	https://projects.noc.ac.uk/pap/	1985-01-01	NA	annually	NA	NA	porcupine_abyssal_
540	Porcupine Abyssal Plain Sustained Observatory	eurosea	National Oceanography Centre (NOC) - Porcupine Abyssal Plain Sustained Observatory	https://projects.noc.ac.uk/pap/about	1984-01-01	NA	annually	NA	National Oceanography Centre (NOC)	porcupine_abyssal_
275	RadeZOO	initial	RadeZOO	http://www.obs-vlfr.fr/data/view/	1966-01-01	NA	daily	NA	NA	radezoo
389	RadeZOO	eurosea	CNRS / Sorbonne Université - RadeZOO	http://rade.obs-vlfr.fr/RadeZoo/RadZoo/Accueil.html	1966-01-01	NA	daily	NA	CNRS / Sorbonne Université	radezoo
276	Reef Life Survey	initial	Reef Life Survey	www.reeflifesurvey.com	2008-01-01	NA	quarterly	tstuart@utas.edu.au	NA	reef_life_survey
562	Reef Life Survey	eurosea	Reef Life Survey	https://reeflifesurvey.com/frequency-explorer/	2010-01-01	NA	opportunistically	NA	Reef Life Survey	reef_life_survey
281	Romanian Marine Monitoring Program (Black Sea) - zooplankton	initial	Romanian Marine Monitoring Program (Black Sea) - zooplankton	NA	2000-01-01	NA	twice per year	f_peneva@alpha.rmri.ro	NA	romanian_marine_m

id	name	source	abstract	url	start_date	end_date	temporal_resolution	contact	organization	identifier
625	Romanian Marine Monitoring Program (Black Sea) - zooplankton	eurobis	Romanian Marine Monitoring Program (Black Sea) - zooplankton	NA	NA	NA	NA	NA	NA	romanian_marine_m
283	Rothera time series	initial	Rothera time series	NA	1997-01-01	NA	monthly	sdp@bas.ac.uk	NA	rothera_time_series
284	Rothera Time Series	initial	Rothera Time Series	https://www.bas.ac.uk/project/rats/	1997-01-01	NA	daily	NA	NA	rothera_time_series
308	SeagrassNet - Global Monitoring Program	initial	SeagrassNet - Global Monitoring Program	SeagrassNet.org	2001-01-01	NA	quarterly	fred.short@unh.edu	NA	seagrassnet_global_
573	SeagrassNet - Global Monitoring Program	eurobis	SeagrassNet - SeagrassNet - Global Monitoring Program	http://www.seagrassnet.org/participants	2001-01-01	NA	opportunistically	NA	SeagrassNet	seagrassnet_global_
309	Small Cetacean Abundance in the European Atlantic and North Sea	initial	Small Cetacean Abundance in the European Atlantic and North Sea	https://synergy.st-andrews.ac.uk/scans3/ (also http://biology.st-andrews.ac.uk/scans2/)	1994-01-01	NA	every_10_years_or_more	NA	NA	small_cetacean_abu

id	name	source	abstract	url	start_date	end_date	temporal_resolution	author	organization	identifier
626	Small Cetacean Abundance in the European Atlantic and North Sea	eurobis	Small Cetacean Abundance in the European Atlantic and North Sea	NA	NA	NA	NA	NA	NA	small_cetacean_abu
330	Swedish National monitoring	initial	Swedish National monitoring	https://www.smhi.se/en/about-smhi/what-we-do/observations-and-data-air-lakes-waterways-and-seas-1.83759	1986-01-01	NA	monthly	Marie Johansen@smhi.se	NA	swedish_national_m
590	Swedish National monitoring	eurobis	Swedish Meteorological and Hydrological Institute (SMHI) - Swedish National monitoring	https://www.smhi.se/en/about-smhi/what-we-do/observations-and-data-air-lakes-waterways-and-seas-1.83759	1985-01-01	NA	monthly	NA	Swedish Meteorological and Hydrological Institute (SMHI)	swedish_national_m
347	UK Grey and harbour seal abundance and distribution	initial	UK Grey and harbour seal abundance and distribution	http://www.smru.st-andrews.ac.uk/research-policy/scos/	1985-01-01	NA	every 2 to 5 years	NA	NA	uk_grey_and_harbo
627	UK Grey and harbour seal abundance and distribution	eurobis	UK Grey and harbour seal abundance and distribution	NA	NA	NA	NA	NA	NA	uk_grey_and_harbo

id	name	source	abstract	url	start_date	end_date	temporal_coverage	frequency	contact_name	contact_email	organization	identifier
356	Waddenmozaiek program	initial	Waddenmozaiek program	https://www.rug.nl/news/2019/02/project-waddenmosaic-starts-with-big-job-under-water	2008-01-01	NA	annually	NA	sally holthuijsen	holthuijsen@nioz.nl	NA	waddenmozaiek_pro
550	Waddenmozaiek program	curated	Netherlands Institute for Sea Research (NIOZ) nd the University of Groningen - Waddenmozaiek program	https://www.waddenmozaiek.nl (in dutch)	2019-01-01	NA	every 2 years	NA	NA	NA	Netherlands Institute for Sea Research (NIOZ) nd the University of Groningen	waddenmozaiek_pro
364	Wetland Bird Survey	initial	Wetland Bird Survey	www.bto.org/webs	1947-01-01	NA	monthly	NA	NA	NA	NA	wetland_bird_surve
382	Wetland Bird Survey	europa	Britist Trust for Ornithology - Wetland Bird Survey	https://www.bto.org/our-science/projects/wetland-bird-survey	1947-01-01	NA	monthly	NA	NA	NA	Britist Trust for Ornithology	wetland_bird_surve

A `_duplicate` suffix is being added to identifiers for datasets with duplicate names.

```
df_combined$original_identifier <- df_combined$identifier
df_combined$identifier <- make.unique(df_combined$identifier, sep = "_")
```

Process spatial data in the geojson column

This exports GeoJSON from the `geometry_geojson` column to shapefiles. Mixed geometries cannot be exported and are skipped.

```
for (i in 1:nrow(df_combined)) {
  identifier <- df_combined$identifier[i]
  if (!is.na(df_combined$geometry_geojson[i]) & df_combined$geometry_geojson[i] != "null") {
    output_folder <- glue("output/{identifier}/")
    if (!file.exists(output_folder)) dir.create(output_folder)
    filename_shapefile <- glue("output/{identifier}/{identifier}.shp")
    shape <- df_combined$geometry_geojson[i] %>%
      geojson_sf()
    if (length(unique(st_geometry_type(shape))) == 1) {
      shape %>%
        write_sf(filename_shapefile, layer = identifier)
      df_combined$has_shapefile[df_combined$identifier == identifier] <- TRUE
    }
  }
}
```

Process external spatial data sources

CSV files

For some records of the initial dataset, spatial information is provided in CSV files. Let's process these into shapefiles. Shapefiles are added by all datasets in case of duplicate names.

```
shapefile_from_points <- function(name, filename_csv, coords) {
  identifiers <- df_combined$identifier[which(df_combined$name == name)]
  for (identifier in identifiers) {
    df_combined$has_shapefile[df_combined$identifier == identifier] <<- TRUE
    output_folder <- glue("output/{identifier}/")
    if (!file.exists(output_folder)) dir.create(output_folder)
    filename_shapefile <- glue("output/{identifier}/{identifier}.shp")
    if (!file.exists(filename_shapefile)) {
      message(glue("Processing CSV file to {filename_shapefile}"))
      read.csv(filename_csv) %>%
        st_as_sf(coords = coords, crs = 4326, remove = FALSE) %>%
        filter(Latitude <= 90) %>%
        write_sf(filename_shapefile, layer = identifier)
    }
  }
}
```

```
shapefile_from_points("Aleutian Islands Benthic Habitat Survey", "data/largeCSVsites_final/Aleutian Isla
shapefile_from_points("Australian continuous plankton recorder survey (AusCPR)", "data/largeCSVsites_fi
shapefile_from_points("Cetacean Research Program", "data/largeCSVsites_final/Cetacean Research Program.
shapefile_from_points("Diversity of the Indo-Pacific Network", "data/largeCSVsites_final/Diversity of t
shapefile_from_points("eOceans", "data/largeCSVsites_final/eOceans.csv", c("Longitude", "Latitude"))
shapefile_from_points("Estacion Costera de Investigaciones Marinas", "data/largeCSVsites_final/Estacion
shapefile_from_points("Estación de Fotobiologia Playa Unión", "data/largeCSVsites_final/Estacion de Fot
shapefile_from_points("Global ARMS Program", "data/largeCSVsites_final/Global ARMS Program.csv", c("Lon
shapefile_from_points("IMOS ships of opportunity bioacoustics", "data/largeCSVsites_final/IMOS ships of
shapefile_from_points("Marine Biodiversity and Climate Change", "data/largeCSVsites_final/Marine Biodiv
shapefile_from_points("Movebank", "data/largeCSVsites_final/Movebank.csv", c("Longitude", "Latitude"))
shapefile_from_points("National Observatory System: Mammals as Ocean Samplers", "data/largeCSVsites_fina
shapefile_from_points("Ocean Tracking Network", "data/largeCSVsites_final/Ocean Tracking Network.csv", c
shapefile_from_points("Reef Life Survey", "data/largeCSVsites_final/Reef Life Survey.csv", c("Longitude
shapefile_from_points("SCAR Southern Ocean Continuous Plankton Recorder Survey", "data/largeCSVsites_fi
shapefile_from_points("Service National d'Observation CORAIL", "data/largeCSVsites_final/Service Nationa
shapefile_from_points("Synoptic Intertidal Benthic Survey", "data/largeCSVsites_final/Synoptic Intertida
shapefile_from_points("Tohoku National Fisheries Institute", "data/largeCSVsites_final/Tohoku National I
shapefile_from_points("Waddenmozaiek program", "data/largeCSVsites_final/Waddenmozaiek program.csv", c(
shapefile_from_points("Zooplankton Sample Collectionof Fisheries Research Agency", "data/largeCSVsites_f
```

Other spatial files

Ecological impact monitoring offshore windfarms

For this network a folder with several shapefiles was provided. Here I'm joining the shapefiles of type polygon into a single shapefile.

```r
gather_shapefiles <- function(name, folder) {
  files <- list.files(path = folder, pattern = ".shp$", recursive = TRUE)
  shapefiles <- file.path(folder, files) %>%
    purrr::map(read_sf) %>%
    purrr::keep(function(x) { st_geometry_type(x$geometry[1]) == "POLYGON" })
  shape <- bind_rows(shapefiles)
  identifiers <- df_combined$identifier[which(df_combined$name == name)]
  for (identifier in identifiers) {
    new_folder <- glue("output/{identifier}")
    dir.create(new_folder)
    write_sf(shape, glue("{new_folder}/{identifier}.shp"))
    df_combined$has_shapefile[df_combined$identifier == identifier] <<- TRUE
  }
}

gather_shapefiles("Ecological impact monitoring offshore windfarms", "data/eurosea_spatial/Ecological im
```

IUCN IMMA

Warning: these data are loaded from a version with topologies fixed using QGIS.

```r
copy_shapefile <- function(name, shapefile) {
  identifiers <- df_combined$identifier[which(df_combined$name == name)]
  for (identifier in identifiers) {
    new_folder <- glue("output/{identifier}")
    dir.create(new_folder)
    shape <- read_sf(shapefile)
    write_sf(shape, glue("{new_folder}/{identifier}.shp"))
    df_combined$has_shapefile[df_combined$identifier == identifier] <<- TRUE
  }
}

copy_shapefile("IUCN Marine Mammal Protected Areas Task Force", "data/eurosea_spatial/iucn-imma-layer-sh
```

Finland

Warning: the mapping between shapefiles and networks is unclear, this is just an attempt to map some of the files.

```r
copy_shapefile("Marine breeding birds", "data/eurosea_spatial/Finland/Finland biological monitoring sta
copy_shapefile("Coastal waters soft bottom fauna", "data/eurosea_spatial/Finland/Finland biological moni
copy_shapefile("Abundance and distribution of harbour porpoises", "data/eurosea_spatial/Finland/Finland
copy_shapefile("Coastal hard bottom macroalgae and blue mussel communities", "data/eurosea_spatial/Finla
copy_shapefile("Offshore soft bottom macrozoobenthos", "data/eurosea_spatial/Finland/Finland biological
copy_shapefile("Phytoplankton species composition and abundance", "data/eurosea_spatial/Finland/Finland
copy_shapefile("Sea trout", "data/eurosea_spatial/Finland/Finland biological monitoring stations/Seatrou
copy_shapefile("Zooplankton species composition and abundance", "data/eurosea_spatial/Finland/Finland bi
```

Spain

```
identifiers <- df_combined$identifier[which(df_combined$name == "Basque monitoring network for the ecol

for (identifier in identifiers) {
  new_folder <- glue("output/{identifier}")
  dir.create(new_folder)
  read_tsv("data/eurosea_spatial/Spain/Basque monitoring network for the ecological status assessment.ts
    st_as_sf(coords = c("x", "y"), crs = "EPSG:32630", remove = FALSE) %>%
    st_transform(crs = "EPSG:4326") %>%
    write_sf(glue("{new_folder}/{identifier}.shp"), layer = identifier)
  df_combined$has_shapefile[df_combined$identifier == identifier] <- TRUE
}
```

WESPAS 2020

```
identifiers <- df_combined$identifier[which(df_combined$name == "Western European Shelf Pelagic Acoustic

for (identifier in identifiers) {
  new_folder <- glue("output/{identifier}")
  dir.create(new_folder)
  read.xlsx("data/eurosea_spatial/WESPAS 2020_Positions.xlsx", 1) %>%
    st_as_sf(coords = c("Long.Deg", "Lat.Deg"), crs = 4326) %>%
    st_coordinates() %>%
    st_linestring() %>%
    st_sfc() %>%
    st_sf(crs = 4326) %>%
    write_sf(glue("{new_folder}/{identifier}.shp"), layer = identifier)
  df_combined$has_shapefile[df_combined$identifier == identifier] <- TRUE
}
```

Germany

This was not processed as the mapping is unclear.

Latvia

Not processed yet, coordinates need to be converted.

Missing spatial data

```
missing_spatial <-df_combined %>%
  filter(has_shapefile == FALSE)

missing_spatial %>%
  select(name, identifier, url) %>%
  arrange(identifier) %>%
  knitr::kable()
```

name	identifier	url
ACCOBAMS Survey Initiative	accobams_survey_initiative	accobams-survey.org
Accousic monitoring of marine mammals in a changing Arctic	accousic_monitoring_of_marine_mammals_in_a_changing_arctic	https://gcrf.ukri.org/research-projects/accoustic-monitoring-of-marine-mammals-in-a-changing-arctic/
Activities extracting living resources (fisheries including recreational, maerl, seaweed)	activities_extracting_living_resources_fisheries_including_recreational_maerl_seaweed	https://cdr.eionet.europa.eu/Publications/searchdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F611&years%3Aint%3Aignore_empty=&partofyear=&reportingdate_start%3Adate%3Aignore_empty=2020%2F01%2F01&reportingdate_end%3Adate%3Aignore_empty=&country=http%3A%2F%2Frod.eionet.europa.eu%2Fspatial%2F8&release_status=released&sort_on=reportingdate&sort_order=reverse&batch_size=
Aerial Survey of Arctic Marine Mammals	aerial_survey_of_arctic_marine_mammals	https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/aerial-surveys-arctic-marine-mammals
ALGAL FOREST RESTORATION IN MEDITERRANEAN SEA	algal_forest_restoration_in_mediterranean_sea	NA
Annual scientific expedition “Arctic: step by step”, RV Kartesh	annual_scientific_expedition_arctic_step_by_step_rv_kartesh	https://expedition.rcmrd.org/ship-research-vessel-step-rv-kartesh
ANTIDOT	antidot	NA
Applied California Current Ecosystem Studies	applied_california_current_ecosystem_studies	www.accessoceans.org
Arctic Marine Biodiversity Observing Network	arctic_marine_biodiversity_observing_network	https://arcticbon.org/
ASCOBANS	ascobans	www.ascobans.org
Asia-Pacific Marine Biodiversity Observation Network	asia_pacific_marine_biodiversity_observation_network	http://marinebiodiversity.org/apnet/pages/apnet.php
Assessment and commercial forecasting of fish and other hydrobionts resources of the Black Sea coast and inland waters of Georgia, biological monitoring, determination of the environmental status of the reservoirs. / Code - 4	assessment_and_commercial_forecasting_of_fish_and_other_hydrobionts_resources_of_the_black_sea_coast_and_inland_waters_of_georgia_biological_monitoring_determination_of_the_environmental_status_of_the_reservoirs_code_4	http://ramsar.org.ge/
Association of New Tools to Improve the understanding of the Dynamic Of Threatened marine turtles (ANTIDOT)	association_of_new_tools_to_improve_the_understanding_of_the_dynamic_of_threatened_marine_turtles_antidot	https://www.researchgate.net/publication/279187719_Association_of_News_Tools_to_Improve_the_understanding_of_the_Dynamic_Of_Threatened_marine_turtles_-_ANTIDOT?channel=doi&linkId=56e47ff208ae68afa110635c&showFulltext=true
Atlantic Deepwater Ecosystem Observatory Network	atlantic_deepwater_ecosystem_observatory_network	https://adeon.mbari.org/
Atlantic Puffin population monitoring program	atlantic_puffin_population_monitoring_program	NA
Atlantic Zone Off-shelf Monitoring Program	atlantic_zone_off_shelf_monitoring_program	http://www.bio.gc.ca/science/monitoring-monitorage/azomp-pmzao/azomp-pmzao-en.php
Australian Antarctic Data Centre	australian_antarctic_data_centre	https://data.aad.gov.au/
Australian BRUV network	australian_bruv_network	www.globalarchive.org
Australian Integrated Marine Observing System Southern Ocean Time Series	australian_integrated_marine_observing_system_southern_ocean_time_series	https://imos.org.au/facilities/deepwatermoorings/soots/

name	identifier	url
Autonomous Underwater Vehicle Benthic Monitoring Program	autonomous_underwater_vehicle_benthic_monitoring_program	NA
Balearic Islands ocean observing and monitoring network	balearic_islands_ocean_observing_and_monitoring_network	www.socib.es
Balearic Sperm Whale Project	balearic_sperm_whale_project	https://sperwhale.st-andrews.ac.uk/balearicspermwhales/
BALLT-D01_BirdsWinter	ballt_d01_birdswinter	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D01234_FishCoastal	ballt_d01234_fishcoastal	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D01234_FishOffshore	ballt_d01234_fishoffshore	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D01256_Macrozoobenthos	ballt_d01256_macrozoobenthos	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D0156_SeabedVegetation	ballt_d0156_seabedvegetation	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D024_Zoopl	ballt_d024_zoopl	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D025_Phyto	ballt_d025_phyto	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BALLT-D05_ChlA	ballt_d05_chla	https://cdr.eionet.europa.eu/Converters/run_conversion?file=lt/eu/msfd_art17/2020reporting/xmldata/envx4mshg/ART11_Programmes_LT.xml&conv=628&source=remote
BAS Ecosystems (long-term observation programme; multi-dataset))	bas_ecosystems_long_term_observation_programme_multi_dataset	https://www.bas.ac.uk/data/our-data/publication-search/?programme=teams/ecosystems/#project
Basin Scale Analysis and Integration	basin_scale_analysis_and_integration	http://eurobasin.noc.soton.ac.uk/eurobasin/index/
Basismonitoring Wadden	basismonitoring_wadden	basismonitoringwadden.nl
Bathing Water Monitoring Programme	bathing_water_monitoring_programme_1	NA
Beach Watch	beach_watch	https://beachwatch.farallones.org/
Beaufort Lagoon Ecosystems Long Term Ecological Research	beaufort_lagoon_ecosystems_long_term_ecological_research	https://beaufortlter.org/
Bedford Basin Monitoring Program	bedford_basin_monitoring_program	http://www.bio.gc.ca/science/monitoring-monitorage/bbmp-pobb/measurements-mesures-en.php
Belgian Marine Data Centre	belgian_marine_data_centre	www.bmdc.be

name	identifier	url
Belgian Offshore Wind Farm Environmental Monitoring Programme	belgian_offshore_wind_farm_enonmental_monitoring_programme	NA
Belgian Seabirds at Sea	belgian_seabirds_at_sea	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Benthic Dove Time Series	benthic_dove_time_series	http://www.noc.soton.ac.uk/nes/about/facilities/marinescience/dove/#dovetimeseries
Benthic fish populations	benthic_fish_populations	https://www.havochvatten.se/en/eu-and-international/international-cooperation/data-collection-framework-dcf.html
Benthic invertebrate abundance & distribution	benthic_invertebrate_abundance_distribution	NA
Benthic soft-sediment environmental impact monitoring programme	benthic_soft_sediment_environl_impact_monitoring_programme	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Benthic species - abundance and/or biomass	benthic_species_abundance_and_biomass	https://cdr.eionet.europa.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
Bermuda Atlantic Time-series Study	bermuda_atlantic_time_series_study	http://bats.bios.edu/
Biodiversity	biodiversity	https://cdr.eionet.europa.eu/Converters/run_conversion?file=cy/eu/msfd_art17/2020reporting/xmldata/envx8y7aq/ART11_CY_MONpro_v13.xml&conv=628&source=remote
Biodiversity, extreme environment and global change	biodiversity_extreme_environment_and_global_change	http://ecobrain.obs-banyuls.fr/
Biodiversity, extreme environment and global change	biodiversity_extreme_environment_and_global_change	http://ecobrain.obs-banyuls.fr/index.php/en-us/partnerships.html
Boknis Eck Time-Series Station	boknis_eck_time_series_station	www.boknis-eck.de
Breeding Seabirds in Belgium	breeding_seabirds_in_belgium	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
CAFFs Circumpolar Biodiversity Monitoring Program (CBMP)	caffs_circumpolar_biodiversity_monitoring_program_cbmp	http://www.caff.is/monitoring
California Cooperative Oceanic Fisheries Investigations	california_cooperative_oceanic_fisheries_investigations	https://calcofi.org/
California Current Ecosystem Moorings	california_current_ecosystem_moorings	http://mooring.ucsd.edu/index.html?CCE
California Current Ecosystem Long-Term Ecological Research site	california_current_ecosystem_ecological_research_site	http://ccelter.ucsc.edu/
Calvert Island Obervatory	calvert_island_obervatory	www.cioba.ca
Canales Endurance Lines SOCIB-canales seasonal cruise	canales_endurance_lines_socib_canales_seasonal_cruise	http://www.socib.eu
Canales glider endurance line missions	canales_glider_endurance_line_missions	NA
Caribbean-Wide Orca Project	caribbean_wide_orca_project	NA
CCAMLR ecosystem monitoring programme	ccamlr_ecosystem_monitoring_programme	https://www.ccamlr.org/en/science/ccamlr-ecosystem-monitoring-program-cemp
CEMP Long term Benthos	cemp_long_term_benthos_1	NA

name	identifier	url
Centre for Environment, Fisheries and Aquaculture Science (CEFAS)	centre_for_environment_fisherand_aquaculture_science_cefas	
Cetacean Sanctuary Research	cetacean_sanctuary_research	https://whalesanddolphins.tethys.org/cetacean-sanctuary-research/
Cetacean Sanctuary Research	cetacean_sanctuary_research_1	https://whalesanddolphins.tethys.org/wp-content/uploads/tethys_public_docs/CSR_ExpeditionBriefing_EN.pdf
CETUS Project - Cetacean monitoring in the Macaronesia	cetus_project_cetacean_monitoring_in_the_macaronesia	http://www2.uca.es/proyectos/cetus/index.php?idioma=en
Chair of the European North West Continental Shelf Operational Oceanographic System, 1 out of the 5 EuroGOOS regional systems	chair_of_the_european_northwest_continental_shelf_operational_oceanographic_system_1_out_of_the_5_eurogoos_regional_systems	http://eurogoos.eu/
Chlorophyll a	chlorophyll_a	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Climate Impacts on Top Predators (CLIOTOP)	climate_impacts_on_top_predators_cliotop	https://imbor.info/stations/regional-programmes/cliotop
Coastal and marine birds of Tasmania	coastal_and_marine_birds_of_tasmania	NA
Coastal biodiversity in rocky shores across the Atlantic coast of Europe	coastal_biodiversity_in_rocky_the_atlantic_coast_of_europe	NA
Coastal biodiversity in rocky shores across the Atlantic coast of Europe	coastal_biodiversity_in_rocky_the_atlantic_coast_of_europe_1	NA
Coastal fish gillnet survey	coastal_fish_gillnet_survey	NA
Coastal fish populations	coastal_fish_populations	https://www.havochvatten.se/overvakning-och-uppfoljning/miljoovervakning/marin-miljoovervakning/kustfisk.html
Coastal Observing System for Northern and Arctic Seas // Zooplankton Observatory	coastal_observing_system_for_seas_zooplankton_observatory	https://www.hzg.de/institutes_platforms/cosyna/index.php.en
Coastal sand and gravel bottoms	coastal_sand_and_gravel_bottoms	NA
Continuous Plankton Recorder (CPR) Survey	continuous_plankton_recorder_cpr_survey	https://www.mba.ac.uk/cpr https://www.mba.ac.uk/fellows/cpr-survey
DAERA	daera	https://www.daera-ni.gov.uk
Deep Sea Benthic Biodiversity	deep_sea_benthic_biodiversity	http://www.biodiversityobservationsystem.eu/information-system?module=dataset&dasid=6123&printversion=1&dropIMIStitle=1
Deep Sea Benthic Biodiversity (Multiple projects)	deep_sea_benthic_biodiversity_multiple_projects	
Deep-Sea Research Program	deep_sea_research_program	NA
Deep-Sea Research Program	deep_sea_research_program_1	NA
DEKOSIM Cruises	dekosim_cruises	https://dekosim.ims.metu.edu.tr/
DEKOSIM- Demersal Trawl Time Series	dekosim_demersal_trawl_time_series	https://dekosim.ims.metu.edu.tr/
DEKOSIM- Erdemli Time Series	dekosim_erdemli_time_series	http://dekosim.ims.metu.edu.tr/
Delfini del Ponente - Dolphin Research Project	delfini_del_ponente_dolphin_research_project	https://www.dolphincommunitynetwork.org/Volunteer-Conservation-Projects/Delfini-del-Ponente---Dolphin-Research-Project

name	identifier	url
Digital ZMT	digital_zmt	NA
Distributed Biological Observatory	distributed_biological_observatory	https://www.pmel.noaa.gov/dbo/; http://arctic.cbl.umces.edu/
Dogger Bank long-term monitoring programme	dogger_bank_long_term_monitoring_programme	NA
Dogger Bank long-term monitoring programme	dogger_bank_long_term_monitoring_programme_1	No website to monitoring programme (personal communication from Moritz Sonnewald on the 12th of October 2020) but there is a research paper: Sonnewald and Türkay (2012) Journal of Sea Research
Dove Time Series	dove_time_series	https://www.ncl.ac.uk/nes/about/facilities/marinescience/dove/#dovetimeseries
Drone Monitoring of Mexican Mangroves	drone_monitoring_of_mexican_mangroves	NA
Ecosystem Monitoring Program	ecosystem_monitoring_program	https://www.nefsc.noaa.gov/epd/oceanography/shelfwide.html
EMSO.MOOSE.ILICO	emsomooseilico	emso-eu.org; moose-network.fr; ir-ilico.fr
Engure marine site - Latvia	engure_marine_site_latvia	https://data.lv.lv/66431807-ebf1-477f-aa52-3716542f3378
Environmental Sample Processor network in Lake Erie	environmental_sample_processor_network_in_lake_erie	https://www.glerl.noaa.gov/res/HABs_and_Hypoxia/esp.html
Epibenthos and demersal fish environmental impact monitoring programme	epibenthos_and_demersal_fish_l_impact_monitoring_programme	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Estación Permanente de Estudios Ambientales	estacion_permanente_de_estudios_ambientales	NA
Estonian National Monitoring Program	estonian_national_monitoring_program_1	NA
Estonian National Monitoring Program	estonian_national_monitoring_program_2	NA
European ARMS program	european_arms_program	https://github.com/biomobst/ARMS/
European ARMS programme	european_arms_programme	https://www.assembleplus.eu/research/ARMS-MBON
Eutrophication Monitoring & SmartBuoy in situ marine monitoring	eutrophication_monitoring_smartbuoy_in_situ_marine_monitoring	https://www.cefas.co.uk/cefas-data-hub/smartbuoys/
Eutrophication Monitoring & SmartBuoy in situ marine monitoring	eutrophication_monitoring_smartbuoy_in_situ_marine_monitoring_1	http://data.cefas.co.uk
Ezemvelo KZN Wildlife Monitoring Programme	ezemvelo_kzn_wildlife_monitoring_programme	NA
Faroe Bank Channel Transport Mooring Array	faroe_bank_channel_transport_mooring_array	NA
Faroese Marine Ecosystem Observing System	faroese_marine_ecosystem_observing_system	NA
Finnish Inventory Programme for the Underwater Marine Environment	finnish_inventory_programme_for_the_underwater_marine_environment	https://www.ymparisto.fi/en-US/Water_and_the_Environment
Fish - Demersal Young Fish & Brown Shrimp Survey - Common Fisheries Policy	fish_demersal_young_fish_brown_shrimp_survey_common_fisheries_policy	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Fish - North Sea Beam Trawl Survey - Common Fisheries Policy	fish_north_sea_beam_trawl_survey_common_fisheries_policy	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
FISH-PRO III	fish_pro_iii	https://helcom.fi/helcom-at-work/projects/fish-pro-iii/

name	identifier	url
Fisheries data collection	fisheries_data_collection	NA
Fisheries-dependent observer-at-sea programme - Common Fisheries Policy	fisheries_dependent_observer_ramme_common_fisheries_policy	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Florida Coastal Everglades Long Term Ecological Research program	florida_coastal_everglades_long_term_ecological_research_program	https://fcelter.fiu.edu
Flukebook	flukebook	https://www.flukebook.org/
Food Standards Agency (FSS) Official Control Phytoplankton monitoring Programme	food_standards_agency_official_control_phytoplankton_monitoring_programme	https://www.foodstandards.gov.scot/business-and-industry/industry-specific-advice/shellfish/shellfish-results
Foodwebs - biodiversity, abundance	foodwebs_biodiversity_abundance	https://ices.dk/data/data-portals/Pages/Ecosystem-Data-in-Europe.aspx https://vocab.ices.dk/services/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
French Observation and Monitoring program for Phytoplankton and Hydrology in coastal waters	french_observation_and_monitoring_program_phytoplankton_and_hydrology_in_coastal_waters	http://envlit.ifremer.fr/surveillance/phytoplancton_et_phycotoxines
French Observation and Monitoring program for Phytoplankton and Hydrology in coastal waters (REPHY)	french_observation_and_monitoring_program_phytoplankton_and_hydrology_in_coastal_waters_rephy	http://envlit.ifremer.fr/surveillance/phytoplancton_et_phycotoxines
German Greenland Autumn Survey	german_greenland_autumn_survey	NA
Global Tropical Moored Buoy Array	global_tropical_moored_buoy_array	https://www.pmel.noaa.gov/gtmba/
GlobalHAB	globalhab	www.globalhab.info
Greenland Ecosystem Monitoring	greenland_ecosystem_monitoring	https://g-e-m.dk/research-projects/greenland-ecosystem-monitoring-marinebasis-nuuk/
Gulf of Maine North Atlantic Time Series	gulf_of_maine_north_atlantic_time_series	NA
Gulf of Mexico Coastal Ocean Observing System	gulf_of_mexico_coastal_ocean_observing_system	gcoos.org
Gulf of Mexico Dolphin Identification System	gulf_of_mexico_dolphin_identification_system	http://dolphinid.sefsc.noaa.gov/gomdis
Gulf of Mexico Research Initiative Information and Data Cooperative	gulf_of_mexico_research_initiative_information_and_data_cooperative	gridc.org
Gulf of Trieste Time series	gulf_of_trieste_time_series	http://mnf.inogs.it/ilter/GoTTs/en_index.html https://deims.org/96969205-cfdf-41d8-979f-ff881ea8dc8b
Gulf Watch Alaska	gulf_watch_alaska	gulfwatchalaska.org
Harbour porpoise Photo Identification Programme, Eastern Scheldt (Project Rugvin)	harbour_porpoise_photo_identification_programme_eastern_scheldt_project_rugvin	http://phocoena.nl/en/english/research-projects/rugvin-porpoises/
Hard substrate benthos - community characteristics	hard_substrate_benthos_community_characteristics	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Hawaii cetacean research program	hawaii_cetacean_research_program	http://www.cascadiaresearch.org/projects/hawaii
Herring Research and Monitoring program	herring_research_and_monitoring_program	NA

name	identifier	url
Icelandic Christmas Bird Count	icelandic_christmas_bird_count	https://en.nattis.is/greinar/icelandic-christmas-bird-count
Icelandic Storm-Petrel & Manx's Shearwater Population Monitoring Programme	icelandic_storm_petrel_manxs_pulation_monitoring_programme	NA
Icelanding nocturnal seabird monitoring program	icelanding_nocturnal_seabird_monitoring_program	NA
IMOS (Australian National Integrated Marine Observing System)	imos_australian_national_integrated_marine_observing_system	http://imos.org.au/
IMOS National Reference Stations monthly Biogeochemical sampling	imos_national_reference_stations_monthly_biogeochemical_sampling	http://imos.org.au/
Imposex in Marine Gastropods	imposex_in_marine_gastropods	https://marinegastropods.co.uk/pressures-from-human-activities/contaminants/imposex/
Initiative Française pour les Récifs Coralliens	initiative_francaise_pour_les_recifs_coralliens	http://ifrecor.fr/
Integrated Marine Observing System	integrated_marine_observing_system	http://imos.org.au/
Integrated Pollution Monitoring Programme (coastal and marine waters)	integrated_pollution_monitoring_programme_coastal_and_marine_waters	https://www.moe.go.jp/en/
Integrated Red tide Information System	integrated_red_tide_information_system	http://ocean.kisti.re.kr/projects/iris.html
Intercet	intercet	www.intercet.it
International Coastal Research Center, Atmosphere and Ocean Research Institute	international_coastal_research_center_atmosphere_and_ocean_research_institute	http://www.icrc.aori.u-tokyo.ac.jp/en/
Intertidal Protected Site	intertidal_protected_site	NA
Investigaciones Mexicanas de la Corriente de California (IMECOCAL)	investigaciones_mexicanas_de_la_corriente_de_california_imecocal	http://imecocal.cicese.mx/
IOC-WESTPAC Ocean Remote Sensing Project for Coastal Habitat Mapping	ioc_westpac_ocean_remote_sensing_project_for_coastal_habitat_mapping	http://ioc-westpac.org/ocean-remote-sensing/134-html
Ionian Dolphin Project	ionian_dolphin_project	NA
Ischia Dolphin Project	ischia_dolphin_project	http://www.oceanomaredelphis.org
Israel Marine Mammal Research & Assistance Center	israel_marine_mammal_research_assistance_center	http://marinemammals.org.il/
Israel Marine Mammal Research & Assistance Center	israel_marine_mammal_research_assistance_center_in_english_introduction	http://marinemammals.org.il/english/introduction.html
IT12-Northern Adriatic Sea - Italy ("Acqua Alta" research tower)	it12_northern_adriatic_sea_italy_acqua_alta_research_tower	https://data.lter-europe.net/deims/resource/75b087d7-231f-4f07-bd7e-6922e0c283fd
Italian Long-Term Ecological Research Network	italian_long_term_ecological_research_network	http://www.lteritalia.it/
K2 Time-series	k2_time_series	NA
Kalamos and Kastos sustainable development program	kalamos_and_kastos_sustainable_development_program	www.kastos-kalamos.org
Kongsfjorden Marine Observatory	kongsfjorden_marine_observatory	NA

name	identifier	url
La Perouse West Coast of Vancouver Island Plankton Monitoring Program	la_perouse_west_coast_of_vancd_plankton_monitoring_program	NA
La Planète revisitée/ Our reviewed Planet	la_planete_revisitee	https://www.our-reviewed-planet.org/fr
Latvia work plan for data collection in fisheries and aquaculture sectors	latvia_work_plan_for_data_collection_in_fisheries_and_aquaculture_sectors	https://datacollection.jrc.ec.europa.eu/wp/2020
LifeWatch Biodiversity Observatory- Belgium	lifewatch_biodiversity_observatory_belgium_1	NA
LifeWatchGreece	lifewatchgreece	https://www.lifewatchgreece.eu
Long Term Ecological Reseach (PELD) at the ILTER site Tamandaré - Spatial and temporal dynamics of marine ecosystems: connectivity, resilience and sustainable use in Southern Pernambuco.	long_term_ecological_research_peld_at_the_ilter_site_tamandare_spatial_and_temporal_dynamics_of_marine_ecosystems_connectivity_resilience_and_sustainable_use_in_southern_pernambuco	https://deims.org/b0604465-90c8-4d80-991d-02ba6e099e8f
Long-term environmental monitoring: Archipelago Sea	long_term_environmental_monitoring_archipelago_sea	https://sites.utu.fi/seatime/en/data/
Long Term Monitoring Program	long_term_monitoring_program	NA
Long-Term Monitoring Program	long_term_monitoring_program___in_kandalaksha_bay_white_sea	NA
“Muddy-sandy intertidal flats in Kandalaksha Bay (White Sea)”		
Long-term monitoring program of soft sediments in the Bay of Morlaix	long_term_monitoring_program_of_soft_sediments_in_the_bay_of_morlaix	http://www.sb-roscoff.fr/fr/observation/biodiversite/communautes/benthos/suivis-a-long-terme-des-substrats-meubles-en-baie-de-morlaix
Long-term Monitoring Program and Experiential Training for Students	long_term_monitoring_program_and_experiential_training_for_students	www.lorn.ac.uk
Long-term Monitoring, Tagging and In-situ Egg Incubation Research And Conservation Project for Sea Turtles at Chagar Hutang Turtle Sanctuary	long_term_monitoring_tagging_and_in_situ_egg_incubation_research_and_conservation_project_for_sea_turtles_at_chagar_hutang_turtle_sanctuary	http://seaturtletagging.org/
Long- term Observation and Research of the East China Sea	long_term_observation_and_research_of_the_east_china_sea	NA
Lorn Pelagic Observatory	lorn_pelagic_observatory	https://www.sams.ac.uk/science/time-series/lorn-pelagic-observatory/
LTER Ebro Delta	lter_ebro_delta	http://www.lter-spain.net/portfolio-lter/delta-del-ebro/
LTER Ebro Delta	lter_ebro_delta_1	https://deims.org/abd23957-60f1-491f-8529-fab05d681f5a
LTER: Gulf of Trieste - Slovenia/National monitoring of the ecological and chemical status of the Slovenian sea	lter_gulf_of_trieste_slovenial_status_of_the_slovenian_sea	NA
LTER: Gulf of Trieste - Slovenia/National monitoring of the ecological and chemical status of the Slovenian sea	lter_gulf_of_trieste_slovenia_status_of_the_slovenian_sea_1	https://deims.org/f2e5ae3-8873-4a8b-a0ad-56d5d6da164
LTER Italy	lter_italy	http://www.lteritalia.it/
LTER North Sea Benthos Observatory	lter_north_sea_benthos_observatory	www.benthosobservatory.nl

name	identifier	url
LTER North Sea Benthos Observatory	lter_north_sea_benthos_observatory	https://www.senckenberg.de/en/institutes/senckenberg-am-meer/marine-research/marine-research-divisions/marine-biology/marine-biology-research/
LTER Observatory Hausgarten	lter_observatory_hausgarten	https://www.awi.de/en/science/biosciences/deep-sea-ecology-and-technology/observatories/lter-observatory-hausgarten.html https://deims.org/f6d9ed12-6bc1-47fb-8e81-ef24e9579596
LTER Ria de Aveiro	lter_ria_de_aveiro	https://deims.org/dfc24538-730e-4e4b-9f04-8e84608b9999
LTER Transetto Senigallia-Susak and TeleSenigallia pylon	lter_transetto_senigallia_susak_and_telesenigallia_pylon	NA
Mammals – population abundance	mammals_population_abundance	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Mammals – strandings	mammals_strandings	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
MangroveWatch	mangrovewatch	www.mangrovewatch.org.au
Mapping and monitoring benthos communities	mapping_and_monitoring_benthos_communities	https://gcoos.org/research-projects/mapping-and-monitoring-benthos-communities-2/
Maracaibo Lake System: aquatic ecology unit (LUZ); Grupo de Trabajo en Tortugas Marinas del Golfo de Venezuela (GTTM-GV)	maracaibo_lake_system_aquaticel_golfo_de_venezuela_gttm_gv	NA
MARE-Madeira monitoring programs	mare_madeira_monitoring_programs	https://mare-madeira.pt/en
MareChiara	marechiara	https://deims.org/0b87459a-da3c-45af-a3e1-cb1508519411
Marine Animals Exploring the Ocean Pole-to-pole	marine_animals_exploring_the_ocean_pole_to_pole	NA
Marine biodiversity and climate change assessing and predicting the influence of climatic change using intertidal rocky shore biota	marine_biodiversity_and_climate_change_marclim	https://www.mba.ac.uk/research/impactstatements/marclim%C2%AE-project-time-series-data-contributes-national-monitoring
Marine Biodiversity and Climate Change (MarClim)	marine_biodiversity_and_climate_change_marclim	https://www.mba.ac.uk/research/impactstatements/marclim®-project-time-series-data-contributes-national-monitoring
Marine Biodiversity Observation Network Pole to Pole of the Americas	marine_biodiversity_observation_network_pole_to_pole_of_the_americas	https://meoss.org/p2p/
Marine Biodiversity Observing Network in the Northern California Current	marine_biodiversity_observing_network_northern_california_current	https://meoss.org/partners/us-california/
Marine Environment Integrated Monitoring Program	marine_environment_integrated_monitoring_program_1	NA
Marine invasive algae in the Mediterranean Sea	marine_invasive_algae_in_the_mediterranean_sea	NA
Marine monitoring programme	marine_monitoring_programme_1	http://www.gnra.it/images/saturs/docs/Juras_monitoringa_programma_2014_2020.pdf
Marine Monitoring Programme	marine_monitoring_programme_2	NA
Marine Research Station "Zmiinyi island"	marine_research_station_zmiinyi_island	NA
Marine Research Station "Zmiinyi island"	marine_research_station_zmiinyi_island_1	https://deims.org/ff4a25df-809d-46b6-ae68-a5dccc5f34ab
Marine Strategy	marine_strategy	http://www.db-strategiamarina.isprambiente.it/app/#/

name	identifier	url
Marine Strategy Monitoring Network in Greece	marine_strategy_monitoring_network_in_greece	NA
Marine wintering birds	marine_wintering_birds	NA
MarineGEO	marinegeo	marinegeo.si.edu
MeioChile	meiochile	meiochile.matthewlee.org
Mejillones Time Series at Northern Chile	mejillones_time_series_at_northern_chile	NA
METU - Monk Seal Research and Monitoring Programme	metu_monk_seal_research_and_monitoring_programme	www.marmed.org
Mid-Atlantic Bottlenose Dolphin Photo-identification Catalog	mid_atlantic_bottlenose_dolph_photo_identification_catalog	NA
Migratory fish populations	migratory_fish_populations	https://www.havochvatten.se/en/eu-and-international/international-cooperation/data-collection-framework-dcf.html
MIKAROKA (International Observatory of Coastal Marine Biodiversity and Uses in Madagascar)	mikaroka_international_observersity_and_uses_in_madagascar	not yet
MISE Zuno Junkan field surveys	mise_zuno_junkan_field_surveys	NA
Mobile species - abundance - birds breeding	mobile_species_abundance_birds_breeding	https://publication.emodnet-biology.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
Mobile species - abundance - birds wintering	mobile_species_abundance_birds_wintering	https://publication.emodnet-biology.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
Mobile species - distribution, abundance and/or biomass - Survey CODS_Q4 (CODS_Q4 - Cod survey)	mobile_species_distribution_abundance_and_or_biomass_survey_cods_q4	https://publication.emodnet-biology.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
Mobile species - distribution, abundance and/or biomass - Survey BITS (BITS - Baltic International Trawl Survey)	mobile_species_distribution_abundance_and_or_biomass_survey_bits	https://publication.emodnet-biology.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
Mobile species - distribution, abundance and/or biomass - Survey IBTS (IBTS - International Bottom Trawl Survey)	mobile_species_distribution_abundance_and_or_biomass_survey_ibts	https://publication.emodnet-biology.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote
Mobile species - distribution, abundance and or biomass - flatfish - Survey FFS (FFS - Flatfish survey)	mobile_species_distribution_abundance_and_or_biomass_flatfish_survey_ffs	https://publication.emodnet-biology.eu/Converters/run_conversion?file=dk/eu/msfd_art17/2020reporting/xmldata/envx4hz7q/ART11_DK_MONprog_v1.xml&conv=628&source=remote

name	identifier	url
Mobile species - population characteristics	mobile_species_population_characteristics	https://cdr.eionet.europa.eu/ReportekEngine/searchdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F611&years%3Aint%3Aignore_empty=&partofyear=&reportingdate_start%3Adate%3Aignore_empty=2020%2F01%2F01&reportingdate_end%3Adate%3Aignore_empty=&country=http%3A%2F%2Frod.eionet.europa.eu%2Fspatial%2F8&release_status=released&sort_on=reportingdate&sort_order=reverse&batch_size=
Modular Observing Solutions for Earth Systems (MOSES) and COSYNA (Coastal Observing Systems of the North Sea and Artic Oceans)	modular_observing_solutions_for_earth_systems_moses_and_cosyna	https://www.hzg.de/institutes_platforms/coastal_observations/underwater_node/index.php.en, http://www.moses-helmholtz.de, https://www.awi.de/en/science/biosciences/shelf-sea-system-ecology/main-rese…
Monitoreo de arrecifes coralinos del PNN Gorgona	monitoreo_de_arrecifes_coralinos_del_pnn_gorgona	NA
Monitoring and Conservation of Black Sea Cetaceans	monitoring_and_conservation_of_black_sea_cetaceans	www.cebisa.ro
Monitoring and Conservation of Black Sea Cetaceans	monitoring_and_conservation_of_black_sea_cetaceans_1	NA
Monitoring of beached seabirds	monitoring_of_beached_seabirds	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Monitoring of biodiversity (State monitoring) - Aviation accounts of seawater waterbirds	monitoring_of_biodiversity_aviation_counts_of_seawater_waterbirds	http://divewhite.lv/images/stories/Jura/monitoringa_programma_2014_2020.pdf
Monitoring of biodiversity (State monitoring) - coastal and inland wintering waterfowl surveys	monitoring_of_biodiversity_std_wintering_waterfowl_surveys	NA
Monitoring of seals on beaches/in harbours	monitoring_of_seals_on_beachesin_harbours	NA
Monitoring Sites 1000 Project-Coastal Area Survey	monitoring_sites_1000_project_coastal_area_survey	https://www.biodic.go.jp/moni1000/index.html
Monthly Oceanographic Monitoring program	monthly_oceanographic_monitoring_program	NA
Morris Khan Research Station	morris_khan_research_station	https://marine-station.haifa.ac.il/index.php/data-base
Multiagency Rocky Intertidal Network	multiagency_rocky_intertidal_network	http://marinedata.org/
Nanuit Itillinga National Wildlife Area	nanuit_itillinga_national_wildlife_area	NA
NaplesEcological REsearch for Augmented Observatories (NEREA)	naplesecological_research_foraugmented_observatories_nerea	NA
National Biodiversity Data Centre	national_biodiversity_data_centre	https://www.biodiversityireland.ie/
National Biodiversity Data Centre	national_biodiversity_data_centre_1	https://www.biodiversityireland.ie
National Research Infrastructure - Norwegian Marine Data Centre	national_research_infrastruct_norwegian_marine_data_centre	www.nmdc.no
National Research Infrastructure - Norwegian Marine Data Centre	national_research_infrastruct_norwegian_marine_data_centre_1	NA
Natural Geography in Shore Areas	natural_geography_in_shore_areas	http://www.shoreline.org/en/natural-geography-shore-areas-nagisa/

name	identifier	url
NDBP Ocean Observation Network	ndbp_ocean_observation_network	www
NERC Earth Observation Data Acquisition and Analysis Service	nerc_earth_observation_data_acquisition_and_analysis_service	www.neodaas.ac.uk
NERC National Capability UK grey seal long term data	nerc_national_capability_uk_grey_seal_long_term_data	NA
No dedicated observing network - but different locally based projects to monitor and mitigate threats to cetaceans	no_dedicated_observing_network_but_different_locally_based_projects_to_monitor_and_mitigate_threats_to_cetaceans	https://wwf.panda.org/what_we_do/endangered_species/cetaceans/ (note that this will soon include a map overview of all WWF cetacean work
NOAA NEFSC Ships of Opportunity Program Continuous Plankton Recorder Survey	noaa_nefsc_ships_of_opportuniuous_plankton_recorder_survey	NA
North Sea Cetacean monitoring programme (Project Rugvin)	north_sea_cetacean_monitoring_programme_project_rugvin	https://rugvin.nl/english/
North Sea ecological time series	north_sea_ecological_time_series	https://www.awi.de/en/science/long-term-observations/biology/north-sea.html https://www.awi.de/en/science/biosciences/functional-ecology/main-research-focus/ecosystem-functions/north-sea.html; https://www.awi.de/en/science/biosciences/shelf-sea-system-ecology/working-groups/long-term-observations-lto.html
Northeast U.S. Shelf Long Term Ecological Research	northeast_us_shelf_long_term_ecological_research	https://nes-lter.whoi.edu/
Northern Gulf of Alaska Long-term Ecological Reserach	northern_gulf_of_alaska_long_term_ecological_reserach	https://gulfwatchalaska.org/
Northern Territory Marine WildWatch	northern_territory_marine_wildwatch	http://www.nretas.nt.gov.au/wildwatch-core/nt-dlrm/home.htm
Northwest Pacific Action Plan	northwest_pacific_action_plan	www.unep.org/nowpap
Northwest Tropical Atlantic Station	northwest_tropical_atlantic_station	http://aplusbiology.org/currentprojects/NTAS/ntas.html
NRW Marine Monitoring Programme	nrw_marine_monitoring_programme	www.naturalresourceswales.gov.uk
Observations for the Kuroshio Transport and Variability	observations_for_the_kuroshio_transport_and_variability	NA
Observatorio Marino y Costero	observatorio_marino_y_costero	NA
Observatory of Coastal Marine Habitats of the Kerguelen Islandsvatory	observatory_of_coastal_marine_habitats_of_the_kerguelen_islandsvatory	www.protectedseas.net/kerguelen
Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations	ocean_biogeographic_information_system_spatial_ecological_analysis_of_megavertebrate_populations	http://seamap.env.duke.edu/
OCEAN IRS	ocean_irs	Only Intranet
Ocean Observatories Initiative	ocean_observatories_initiative	https://oceanobservatories.org/
Ocean Weather Station M	ocean_weather_station_m	NA
OceanGliders	oceangliders	https://www.oceangliders.org/
Oceanic Flux Program time series	oceanic_flux_program_time_series	https://www.imbl.edu/ecosystems/conte/ofp/
Oceanographic - meteorological buoy monthly sampling	oceanographic_meteorological_buoy_monthly_sampling	NA

name	identifier	url
Oceans and Coasts Programme	oceans_and_coasts_programme	NA
On the tracks of great pelagic marine animals (whales, dolphins, sea turtles, swordfish and tunas)	on_the_tracks_of_great_pelagia_turtles_swordfish_and_tunas	NA
ORCA	orca	https://www.orcaweb.org.uk/
ORCA	orca_1	NA
Ore estuary (Orefjarden), Umea Marine Sciences Centre (LTER) - Sweden	ore_estuary_umea_marine_sciences_centre_lter_sweden	https://deims.org/ore_estuary_umea_marine_sciences_centre_lter_sweden
Pacific Islands Ocean Observing System, PacIOOS	pacific_islands_ocean_observing_system_pacioos	www.pacioos.org
Pacific Islands Passive Acoustic Network	pacific_islands_passive_acoustic_network	NA
Palmer Antarctica LTER	palmer_antarctica_lter	http://pal.lternet.edu
Partnership for the Intediscplinary Study of Coastal OCeans	partnership_for_the_interdisciplinary_study_of_coastal_oceans	http://www.piscoweb.org/
Passive acoustic monitoring of marine mammals	passive_acoustic_monitoring_of_marine_mammals	NA
Passive Acoustic Monnitoring of Marine Mammals in Alaska	passive_acoustic_monitoring_of_marine_mammals_in_alaska	https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/passive-acoustic-monitoring-marine-mammals-alaska
Patagonian diving seabirds	patagonian_diving_seabirds	www.penguins.org
Pelagic fish populations	pelagic_fish_populations	https://www.havochvatten.se/en/eu-and-international/international-cooperation/data-collection-framework-dcf.html
Pelagic habitats - community characteristics	pelagic_habitats_community_characteristics	https://cdr.eionet.europa.eu/api/ReportekEngine/searchdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F611&years%3Aint%3Aignore_empty=&partofyear=&reportingdate_start%3Adate%3Aignore_empty=2020%2F01%2F01&reportingdate_end%3Adate%3Aignore_empty=&country=http%3A%2F%2Frod.eionet.europa.eu%2Fspatial%2F8&release_status=released&sort_on=reportingdate&sort_order=reverse&batch_size=
Pelagic monitoring of the west coast	pelagic_monitoring_of_the_west_coast	http://www.lansstyrelsen.se/Documents/publikationer/978-91-620-8388-5.pdf
PELD Habitats Bentonicos Costeiros/Brazilian LTER/PELD CNPq	peld_habitats_bentonicos_costeiros_brazilian_lter_peld_cnpq	http://bentos.ufes.br
Photo identification of Humpback Whales	photo_identification_of_humpback_whales	https://gcof.gh/research-projects/photoidentification-of-humpback-whales/
Phytoplankton monitoring	phytoplankton_monitoring	https://www.marine.ie/Home/site-area/areas-activity/marine-environment/phytoplankton-monitoring
Phytoplankton monitoring (Northern Ireland, England and Wales)	phytoplankton_monitoring_northern_ireland_england_and_wales	https://www.food.gov.uk/business-guidance/england-and-wales-phytoplankton-monitoring
Phytoplankton monitoring programme Romanian Black Sea waters	phytoplankton_monitoring_progmme_romanian_black_sea_waters_1	NA

name	identifier	url
Phytoplankton observations in the Belgian part of the North Sea – LifeWatch observatory data	phytoplankton_observations_inea_lifewatch_observatory_data	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/
Phytoplankton pigments	phytoplankton_pigments	NA
PILN; TURTLE MONITORING; MANGROVE MONITORING; Community based Integrated Mangroves and Natural Resources Co-Management with grassroots people; Environment Spatial Planning	piln_turtle_monitoring_mangro_environment_spatial_planning	NA
Pivers Island Coastal Observatory	pivers_island_coastal_observatory	NA
Plankton blooms (biomass, frequency)	plankton_blooms_indicators_frequency	https://domain-ef.eionet.europa.eu/ReportekEngine/searchdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F611&years%3Aint%3Aignore_empty=&partofyear=&reportingdate_start%3Adate%3Aignore_empty=2020%2F01%2F01&reportingdate_end%3Adate%3Aignore_empty=&country=http%3A%2F%2Frod.eionet.europa.eu%2Fspatial%2F8&release_status=released&sort_on=reportingdate&sort_order=reverse&batch_size=
Planktonic Time Series	planktonic_time_series	https://www.ncl.ac.uk/nes/about/facilities/marinescience/dove/#dovetimeseries
Polar Ocean Ecosystem Time Series - Western Core Box	polar_ocean_ecosystem_time_series_western_core_box	https://www.bas.ac.uk/project/pnetswcb/
Porcupine Abyssal Plain Sustained Observatory	porcupine_abyssal_plain_sustained_observatory	https://projects.noc.ac.uk/pap/
Porcupine Abyssal Plain Sustained Observatory	porcupine_abyssal_plain_sustained_observatory_1	https://projects.noc.ac.uk/pap/about
POSEIDON program Korea Institute of Ocean Science and Technology (KIOST)	poseidon_program_korea_institute_science_and_technology_kiost	NA
POSEIDON system	poseidon_system	https://poseidon-new.hcmr.gr
POSEIDON system Hellenic Centre for Marine Research (HCMR)	poseidon_system_hellenic_centre_for_marine_research_hcmr	www.poseidon.hcmr.gr
RadeZOO	radezoo	http://www.obs-vlfr.fr/data/view/
RFMO.FAO	rfmofao	www.seafo.org
Romanian Marine Monitoring Program (Black Sea) - zooplankton	romanian_marine_monitoring_program_black_sea_zooplankton_1	NA
Roscoff-ASTAN	roscoff_astan	http://www.sb-roscoff.fr/en/coastal-observatory/presentation
Rothera Time Series	rothera_time_series	https://www.bas.ac.uk/project/rats/
Royal Belgian Institute of Natural Sciences	royal_belgian_institute_of_natural_sciences	www.naturalsciences.be
Sagami Bay deep-sea observation (not regulary)	sagami_bay_deep_sea_observation_not_regulary	NA
Saint Lawrence Global Observatory	saint_lawrence_global_observatory	https://slgo.ca/
Sargassum Watch System	sargassum_watch_system	https://optics.marine.usf.edu/projects/saws.html

name	identifier	url
ScubbleBubbles	scubblebubbles	www.scubblebubbles.org
Seabed habitats - community characteristics	seabed_habitats	https://cdr.eionet.europa.eu/help/ReportekEngine/searchdataflow?dataflow_uris=http%3A%2F%2Frod.eionet.europa.eu%2Fobligations%2F611&years%3Aint%3Aignore_empty=&partofyear=&reportingdate_start%3Adate%3Aignore_empty=2020%2F01%2F01&reportingdate_end%3Adate%3Aignore_empty=&country=http%3A%2F%2Frod.eionet.europa.eu%2Fspatial%2F8&release_status=released&sort_on=reportingdate&sort_order=reverse&batch_size=
Seabird Tracking Database	seabird_tracking_database	www.seabirdtracking.org
Seagrass monitoring project in Alonnisos Marine park	seagrass_monitoring_project_in_alonnisos_marine_park	NA
Seagrass Watch	seagrass_watch	seagrasswatch.org
SeagrassNet - Global Monitoring Program	seagrassnet_global_monitoring_program	NA
SeagrassNet - Global Monitoring Program	seagrassnet_global_monitoring_program_participants	http://www.seagrassnet.org/participants
Seal abundance	seal_abundance	NA
SEFA Core Surveillance	sefa_core_surveillance	NA
Shorebird habitat use in the western Wadden Sea	shorebird_habitat_use_in_the_western_wadden_sea	https://www.nioz.nl/en/about/departments/ecosystem-studies/marine-animal-movement-ecology/shorebird-tracking/watlas-tracking-regional-movements
Shorebird survival	shorebird_survival	NA
Sistema de Información de Monitoreos de Calidad de Agua	sistema_de_informacion_de_monitoreos_de_calidad_de_agua	http://siam.invemar.org.co/redcam
Sistema de Información para la Gestión de los Manglares en Colombia	sistema_de_informacion_para_la_gestion_de_los_manglares_en_colombia	http://siam.invemar.org.co/manglares
Sistema de información pesquera de INVEMAR	sistema_de_informacion_pesquera_de_invemar	http://sipein.invemar.org.co/informacion/captura_estimada/externos/
SISTEMA DE INFORMACIÓN SOBRE BIODIVERSIDAD MARINA (SIBM) COMPONENTE CEPARIO BACTERIAS MARINAS	sistema_de_informacion_sobre_biodiversidad_marina_componente_cepario_bacterias_marinas	http://siam.invemar.org.co/siam/cepario/consultaPV1.jsp
Skomer Marine Nature Reserve	skomer_marine_nature_reserve	NA
Skomer Marine Nature Reserve.Marine Conservation Zone	skomer_marine_nature_reservemarine_conservation_zone	NA
Slovenian Dolphin Project	slovenian_dolphin_project	http://www.morigenos.org/en/slovenian-dolphin-project/
Small Cetacean Abundance in the European Atlantic and North Sea	small_cetacean_abundance_in_tropean_atlantic_and_north_sea	https://synergy.st-andrews.ac.uk/scans3/ (also http://biology.st-andrews.ac.uk/scans2/)
Small Cetacean Abundance in the European Atlantic and North Sea	small_cetacean_abundance_in_tropean_atlantic_and_north_sea_1	NA
Soft-bottom macrofauna	soft_bottom_macrofauna	https://faunaumu.se/en/umea-marine-sciences-centre/environmental-surveilence/soft-botom-macrofauna/
Soft bottom macrophytes	soft_bottom_macrophytes	NA

name	identifier	url
South African BRUVs (baited remote underwater video system) Observation Platform	south_african_bruvs	NA
South African Continuous Plankton Recorder Programme	south_african_continuous_plankton_recorder_programme	NA
South African Environmental Observation Network	south_african_environmental_observation_network	NA
South American Research Group in Coastal Ecosystems	south_american_research_group_in_coastal_ecosystems	https://www.geobon.org/publication/1329/412
South Atlantic Meridional Overturning Circulation	south_atlantic_meridional_overturning_circulation	https://www.aoml.noaa.gov/phod/SAMOC_international/
South East Atlantic Fisheries Organisation	south_east_atlantic_fisheries_organisation	www.seafo.org
South Florida Marine Biodiversity Observation Network	south_florida_marine_biodiversity_observation_network	http://marinebiodiversity.us
SouthEast Asia Time Series Study	southeast_asia_time_series_study	http://www.seats.ntu.edu.tw/seats/
Southeast Coastal Ocean Observing Regional Association	southeast_coastal_ocean_observing_regional_association	https://secoora.org
Southern California Coastal Ocean Observing System	southern_california_coastal_ocean_observing_system	http://sccoos.org/
Southern Ocean Hydrophone Network	southern_ocean_hydrophone_network	http://www.marinemammals.gov.au/sorp/antarctic-blue-whales-and-fin-whales-acoustic-program
Southern Ocean Network of Acoustics	southern_ocean_network_of_acoustics	https://www.soundofacoustics.com/project/sona/
Southern Ocean Research Partnership Blue and FIn Whale Acoustic Trends	southern_ocean_research_partnership_blue_and_fin_whale_acoustic_trends	http://www.marinemammals.gov.au/sorp/antarctic-blue-whales-and-fin-whales-acoustic-program
Suivi Coraux Nouvelle-Caledonie	suivi_coraux_nouvelle_caledonie	NA
Swedish National monitoring	swedish_national_monitoring	https://www.smhi.se/en/about-smhi/what-we-do/observations-and-data-air-lakes-waterways-and-seas-1.83759
Sylt Roads Observatory	sylt_roads_observatory	NA
Synoptic Intertidal Benthic Survey (SIBES)	synoptic_intertidal_benthic_survey	https://www.nioz.nl/en/research/projects/4126-0 https://www.nioz.nl/en/about/cos/coastal-dynamics/sampling-the-intertidal-macrofauna-with-SIBES%C2%A0
Tara Oceans	tara_oceans	https://oceans.taraexpeditions.org/en/m/about-tara/les-expeditions/tara-oceans/
Terra Nova Bay barCODoding and mEtabarcoding of Antarctic organisms from marine, terrestrial and limnetic environments	terra_nova_bay_barcododing_anial_and_limnetic_environments	NA
The Alaska Ocean Observing System	the_alaska_ocean_observing_system	www.aoos.org
The Dominica Sperm Whale Project	the_dominica_sperm_whale_project	https://www.thespermwhaleproject.org/
The Fixed Line Transect Mediterranean monitoring Network (FLT Med Net)	the_fixed_line_transect_mediterranean_monitoring_network	https://www.isprambiente.gov.it/en/activities/biodiversity/flt-mediterranean-monitoring-network-marine-species-and-threats

name	identifier	url
The Gulf of Riga littoral biodiversity	the_gulf_of_riga_littoral_biodiversity	https://littoral.lv/en/data-laboratories/marineecology/
The pelagic marine monitoring program	the_pelagic_marine_monitoring_program	https://www.marlin.ac.uk/organisation/marine-sciences-centre/environmental-surveilence/pelagic-monitoring/
The Scottish Coastal Observatory (SCObs)	the_scottish_coastal_observatory_scobs	https://dlw.gov.scot/binaries/content/documents/govscot/publications/factsheet/2019/11/marine-scotland-topic-sheets-ecosystems/documents/the-scottish-coastal-observatory-updated-february-2019/the-scottish-coastal-observatory-updated-february-2019/govscot%3Adocument/coastla-observatory.pdf
The Secchi Disk	the_secchi_disk	http://www.secchidisk.org
Toward Hydroacoustics and Ecology of Mid-trophic levels in Indian and SouThern Ocean	toward_hydroacoustics_and_eco_in_indian_and_southern_ocean	NA
TREE Foundation Sea Turtle Protection Force	tree_foundation_sea_turtle_protection_force	http://treefoundation.org
Tsitsikamma National Park Long term monitoring	tsitsikamma_national_park_long_term_monitoring	NA
Turtle Tracking	turtle_tracking	http://www.socib.eu
UK Grey and harbour seal abundance and distribution	uk_grey_and_harbour_seal_abundance_and_distribution	http://www.smru.st-andrews.ac.uk/research-policy/scos/
UK Grey and harbour seal abundance and distribution	uk_grey_and_harbour_seal_abundance_and_distribution_1	NA
United States Antarctic Marine Living Resources Program	united_states_antarctic_marine_living_resources_program	NA
UNIVERSITY OF HAIFA	university_of_haifa	NA
University of Toronto Laura Brown	university_of_toronto_laura_brown	NA
US National HAB Committee	us_national_hab_committee	https://www.whoi.edu/nationalhab/
USGS Research on San Francisco Bay	usgs_research_on_san_francisco_bay	https://sfbay.wr.usgs.gov/access/wqdata/
Virginia Coast Reserve Long-Term Ecological Research	virginia_coast_reserve_long_term_ecological_research	https://www.vcrlter.virginia.edu/home/
Virtual Antenna System /Virtual Buoy System	virtual_antenna_system_virtual_buoy_system	https://optics.marine.usf.edu/projects/vbs.html
Water Framework Directive monitoring programme in coastal and transitional waters	water_framework_directive_monitoring_programme_in_coastal_and_transitional_waters	https://dd.eionet.europa.eu/vocabulary/wise/WaterFramework/2.0
WCS global coral reef monitoring	wcs_global_coral_reef_monitoring	wcs.org/reef
Western Channel Observatory	western_channel_observatory	www.westernchannelobservatory.org.uk
Western European Pelagic Acoustic Survey	western_european_pelagic_acoustic_survey	NA
Wetland Bird Survey	wetland_bird_survey	www.wwt.org/webs
Wetland Bird Survey	wetland_bird_survey_1	https://www.bto.org/our-science/projects/wetland-bird-survey
Whales & Climate research program	whales_climate_research_program	www.researchwhalesandclimate.org
White Sea Hydrology and Zooplankton Time Series: Kartesh D1	white_sea_hydrology_and_zooplankton_time_series_kartesh_d1	NA
White tailed eagle breeding success	white_tailed_eagle_breeding_success	NA

name	identifier	url
Zooplankton monitoring in Bilbao and Urdaibai	zooplankton_monitoring_in_bilbao_and_urdaibai	NA
Zooplankton Monitoring Program	zooplankton_monitoring_program	NA
Zooplankton observations in the Belgian part of the North Sea - LifeWatch observatory data	zooplankton_observations_in_tea_lifewatch_observatory_data	https://odnature.naturalsciences.be/msfd/nl/monitoring/2020/

Generate empty spatial files

```
for (identifier in missing_spatial$identifier) {
  new_folder <- glue("output/{identifier}")
  dir.create(new_folder)
  st_sf(st_sfc(crs = 4326)) %>%
    write_sf(glue("{new_folder}/{identifier}.shp"), layer = identifier)
}
```

GeoNode spatial layer import

Before proceeding with the next section, import the spatial layers into GeoNode using `python manage.py importlayers`.

GeoNode metadata import

In this section we will import EOVs and users into GeoNode, and finally update the layer metadata.

EOVs

This exports EOVs in a format suitable for Django's `loaddata`.

```
eovs <- data.frame(
  name = c(
    "Phytoplankton biomass and diversity",
    "Zooplankton biomass and diversity",
    "Fish abundance and distribution",
    "Marine turtles abundance and distribution",
    "Marine birds abundance and distribution",
    "Marine mammals abundance and distribution",
    "Hard coral cover and composition",
    "Seagrass cover and composition",
    "Macroalgal canopy cover and composition",
    "Mangrove cover and composition",
    "Microbe biomass and diversity",
    "Invertebrate abundance and distribution"
  ),
  short_name = c(
```

```
    "Phytoplankton",
    "Zooplankton",
    "Fish",
    "Turtles",
    "Birds",
    "Mammals",
    "Hard coral",
    "Seagrass",
    "Macroalgae",
    "Mangrove",
    "Microbes",
    "Invertebrates"
  ),
  url = c(
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17507",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17509",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17510",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17511",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17511",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17511",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17512",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17513",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17515",
    "https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17514",
    NA,
    NA
  ),
  pk = seq(1, 12)
)

eovs_json <- eovs %>%
  split(f = seq(nrow(.))) %>%
  unname() %>%
  lapply(function(row) {
    list(model = "goos.eov", pk = row$pk, fields = list(name = row$name, short_name = row$short_name, d
  }) %>%
  jsonlite::toJSON(auto_unbox = TRUE)

writeLines(eovs_json, "output/eovs.json")
```

Users

This exports users in a format suitable for Django's `loaddata`.

```
users <- df_combined %>%
  filter(!is.na(contact_email)) %>%
  select(first_name = contact_firstname, last_name = contact_lastname, email = contact_email, username =
  mutate(
    is_superuser = FALSE
  ) %>%
  distinct(username, .keep_all = TRUE) %>%
  mutate(pk = 2000 + row_number())
```

```
df_combined <- df_combined %>%
  left_join(users %>% select(user_pk = pk, contact_email = username), by = "contact_email")

users
```

```
## # A tibble: 218 x 6
##    first_name last_name  email             username           is_superuser    pk
##    <chr>      <chr>      <chr>             <chr>              <lgl>        <dbl>
##  1 Caroline   RINALDI    evastropic@wanad~ evastropic@wanado~ FALSE         2001
##  2 Michelle   Schärer    michelle.scharer~ michelle.scharer@~ FALSE         2002
##  3 Taryn      Murray     t.murray@saiab.a~ t.murray@saiab.ac~ FALSE         2003
##  4 Amelia     Brower     amelia.brower@no~ amelia.brower@noa~ FALSE         2004
##  5 Jenny      Huggett    jenny.huggett@gm~ jenny.huggett@gma~ FALSE         2005
##  6 Michael    Kenner     mkenner@usgs.gov  mkenner@usgs.gov   FALSE         2006
##  7 Simonetta  Fraschetti simonetta.frasch~ simonetta.frasche~ FALSE         2007
##  8 Tyler      Kulfan     tscottkulfan@gma~ tscottkulfan@gmai~ FALSE         2008
##  9 Robert     Orth       jjorth@vims.edu   jjorth@vims.edu    FALSE         2009
## 10 Damien     CHEVALLIER damien.chevallie~ damien.chevallier~ FALSE         2010
## # ... with 208 more rows
```

```
users_json <- split(users, seq(nrow(users))) %>%
  purrr::map(function(x) {
    return(list(model = "people.profile", pk = x$pk, fields = as.list(x %>% select(-pk))))
  }) %>%
  unname() %>%
  jsonlite::toJSON(auto_unbox = TRUE)

writeLines(users_json, "output/users.json")
```

Layers

First get all the layers from the GeoNode API so we have a mapping between layer identifiers and primary keys.

```
layer_pks <- jsonlite::fromJSON(glue("{geonode_url}/api/v2/layers?page_size=10000"))$layers %>%
  select(pk, identifier = name) %>%
  mutate(pk = as.numeric(pk))

df_combined <- df_combined %>%
  left_join(layer_pks, by = "identifier")
```

```
con <- DBI::dbConnect(RPostgres::Postgres(), dbname = "geonode", host = database_host, port = 5432, use

update_layer <- function(row) {

  # title, abstract_en, maintenance_frequency, temporal_extent_start, temporal_extent_end, url

  RPostgres::dbSendQuery(con,
    "update base_resourcebase set title = $1, abstract = $2, maintenance_frequency = $3, temporal_exten
    list(row$name, row$abstract, row$temporal_resolution, row$start_date, row$end_date, row$pk)
  ) %>% dbClearResult()
```

```
  RPostgres::dbSendQuery(con,
    "update layers_layer set title_en = $1, abstract_en = $2, url = $3 where resourcebase_ptr_id = $4",
    list(row$name, row$abstract, row$url, row$pk)
  ) %>% dbClearResult()

  # eovs (layers_layer_eov)

  RPostgres::dbSendQuery(con,
    "delete from layers_layer_eovs where layer_id = $1",
    list(row$pk)
  ) %>% dbClearResult()

  eov_ids <- which(c(
    row$eov_phytoplankton,
    row$eov_zooplankton,
    row$eov_fish,
    row$eov_seaturtles,
    row$eov_birds,
    row$eov_mammals,
    row$eov_hardcoral,
    row$eov_seagrass,
    row$eov_macroalgae,
    row$eov_mangroves,
    row$eov_microbes,
    row$eov_benthicinvertebrates
  ))

  for (eov_id in eov_ids) {
    RPostgres::dbSendQuery(con,
      "insert into layers_layer_eovs (layer_id, eov_id) values ($1, $2)",
      list(row$pk, eov_id)
    ) %>% dbClearResult()
  }

  # contact (base_contactrole)

  RPostgres::dbSendQuery(con,
    "delete from base_contactrole where resource_id = $1 and role = 'pointOfContact'",
    list(row$pk)
  ) %>% dbClearResult()

  if (!is.na(row$user_pk)) {
    RPostgres::dbSendQuery(con,
      "insert into base_contactrole (resource_id, contact_id, role) values ($1, $2, 'pointOfContact')",
      list(row$pk, row$user_pk)
    ) %>% dbClearResult()
  }

}

for (i in 1:nrow(df_combined)) {
  message(i)
  if (!is.na(df_combined$pk[i])) {
```

```
    update_layer(df_combined[i,])
  }
}
```