Guideline DISPLACE version 0.9.0 2016, Sept. 30th

The DISPLACE Object Editor for producing formatted input files –

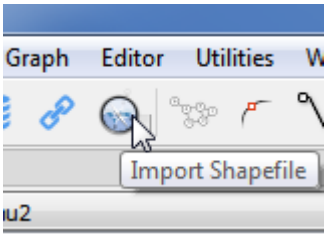
(Francois Bastardie & Federico Fuga)

An illustrative dataset called 'testexample' is given at https://github/frabas/DISPLACE_input_gis so that any user can scrutinize and run the parameterisation from these raw files using the DISPLACE Objects Editor. If the user wants to start from scratch then the point 1. below (build a graph) will be required, otherwise the user can skip and go directly to point 2.

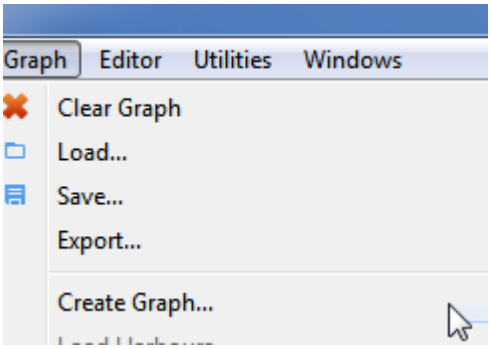
1- First of all, create a graph of nodes for your own fishing region...

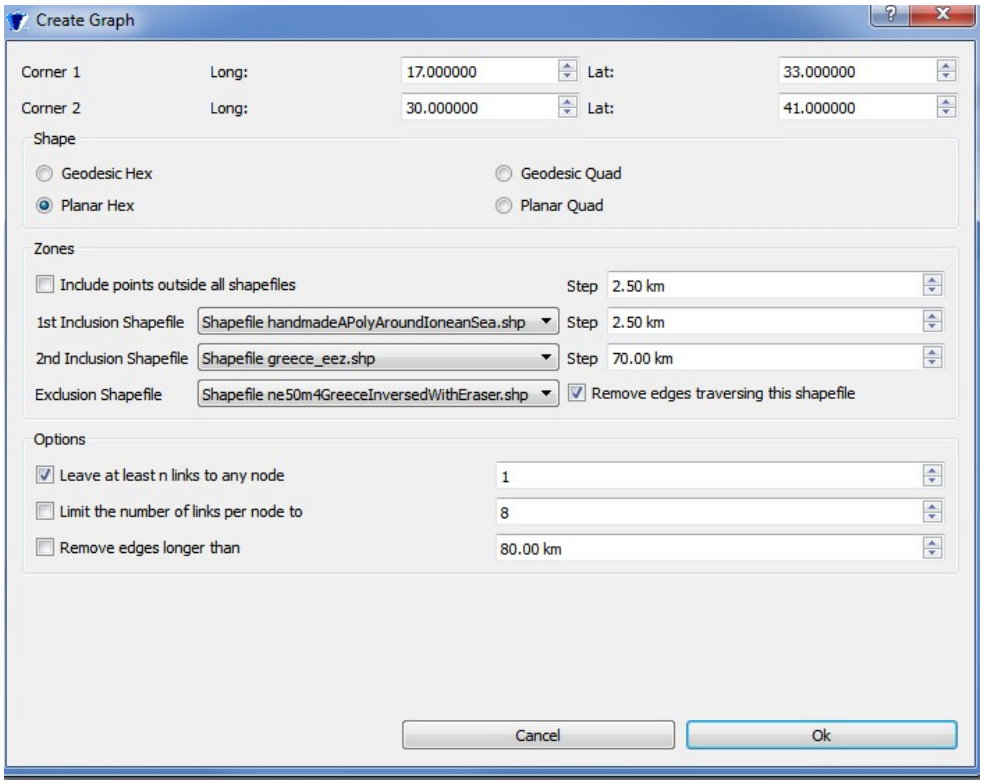
(Go to section 2 if you already have it or if you want to start from the one given in the example dataset)

You´ll need some GIS shape files defining the marine space delineating the DISPLACE graph building e.g. handmadeAPolyAroundIoneanSea.shp and co, ne50m4GreeceInversedWithEraser.shp and co, greece_eez.shp and co



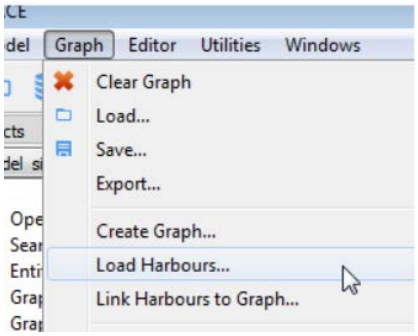
Then the graph of nodes is built through the DISPLACE graphical interface under Graph>Create Graph, with settings (for example):

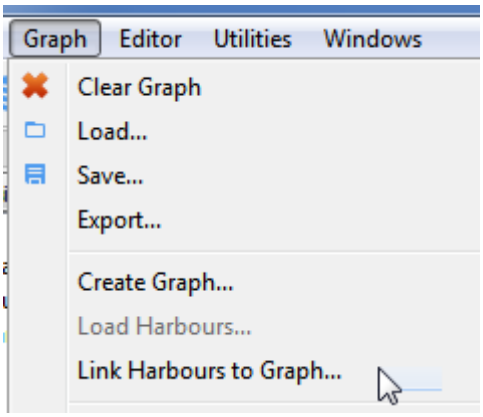




And a list of all harbours/positions with landings also needed to connect to the graph of nodes:

```
x;y;idx.port
ANCONA;13.499299999999485;43.621600000000434;1
BARI;16.859320728454833;41.135061427521549;2
BARLETTA;16.285200000000223;41.325000000008763;3
BELLARIA;12.454499999999816;44.160299999999523;4
BISCEGLIE;16.505400000000122;41.247400000000312;5
BRINDISI;17.967699999999233;40.654399999999399;6
CAORLE;12.880199999999634;45.596900000000488;7
CATTOLICA;12.749599999999232;43.970699999999852;8
CERVIA;12.359099999999716;44.268099999999322;9
CESENATICO;12.402899999999176;44.207200000000753;10
CHIOGGIA;12.298300000000365;45.219399999999951;11
CIVITANOVA MARCHE;13.733700000000718;43.311700000000194;12
FANO;13.015699999999923;43.853600000000355;13
GIOVINAZZO;16.672500000000625;41.190199999999066;14
GIULIANOVA;13.973900000000897;42.754999999999207;15
GORO;12.294700000000395;44.843300000000497;16
GRADO;13.382400000000464;45.674300000000564;17
ISOLE TREMITI;15.500000000000000;42.116667000000000;18
Izola;13.657499999999516;45.538300000000277;19
Koper;13.729900000000384;45.550199999999734;20
LESINA;15.350000000000000;41.866667000000000;21
LEUCA;18.363400000000183;39.795700000000608;22
MANFREDONIA;15.914800000000499;41.624999999999972;23
MARANO LAGUNARE;13.169167000000000;45.766388999999997;24
```





2- ...then, the object editor can be used....

In essence, the steps are:

a- **Generate Populations Features** (from specs 1 and 3; producing the stock_names file)
(calling the GeneratePopulationFeatures.R routine producing N at size group, Maturity, M, SSB-R, Growth transition matrix, etc. All output in \popsspe)

b- **Generate Pop Avail from Surveys** (using Pop Specs 2 and the designated graph)
This is an optional step i.e. the user could actually come up with his own ready polygon shape files defining the pop spatial distribution per species per size category (put in a folder called /POPULATIONS/spatialLayers and we expect a table attribute called 'GRIDCODE' for this GIS layer and we expect the naming of the files to be consistent with those given for the testexample app i.e. contourXX_YY_ZZ-ZZ-ZZ with XX the index of pop i.e. 0, 1 etc.; YY in 'small', 'medium', 'large'; ZZ the corresponding size group) that will appear in the Pop Specs

c- **Generate Populations Avail GIS Layers** (stored in SpatialLayers folder)
Again, this is an optional step provided that it links to the previous step.

d- Generate Populations Config Files
This step creates the config files from gathering all the infos from previous steps in one file per pop. This is done by parsing the files contained in the /POPULATIONS/SpatialLayers folder (so you´ll need first to close these files in case they are opened in your GIS engine!).
This is actually an optional step provided that the config files (one per pop) could be written by hand if wished (in a folder named /POPULATIONS/pops_config_files).

e- Run Populations Config Files
This is an extensive step for linking the shape files defining the pop spatial distribution to the DISPLACE graph of nodes by dispatching a piece of the total pop availaibility depending on the level of density provided by the GRIDCODE attribute contained in these GIS layers.

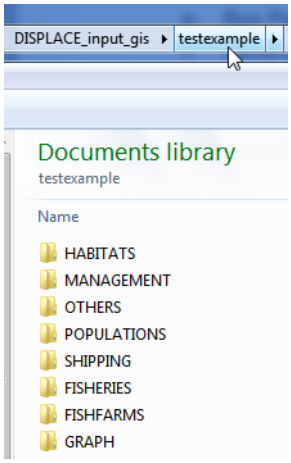
f- Generate Populations Interaction Matrix File
Contribution of one species to the others in the natural mortality (=0 if the pops do not overlap in space) given as a proportion of the total natural mortality set in M_at_szgroup. This step generates a default matrix with nb row= nb column = nb pop and diagonal filled in with 1

g- Generate Populations Various Files

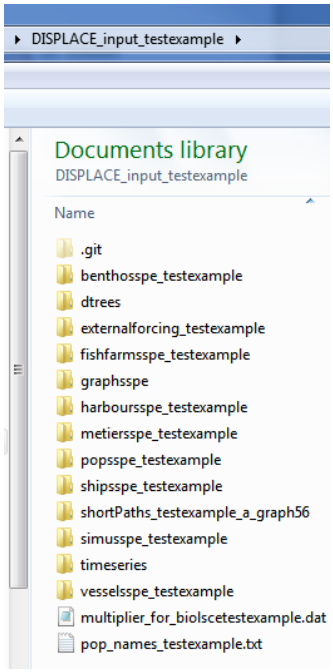
Some steps are actually optional because the user could start from existing files e.g. some GIS layers created by other means, etc.

An example dataset is provided together with the Object Editor so that any user can run the parameterisation and produce the required DISPLACE input files.

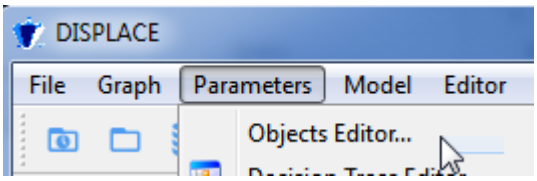
The example dataset (called ’testexample’) is structured like this:



....while all the DISPLACE input files produced by the parameterisation should create a hierarchy of folder like this:

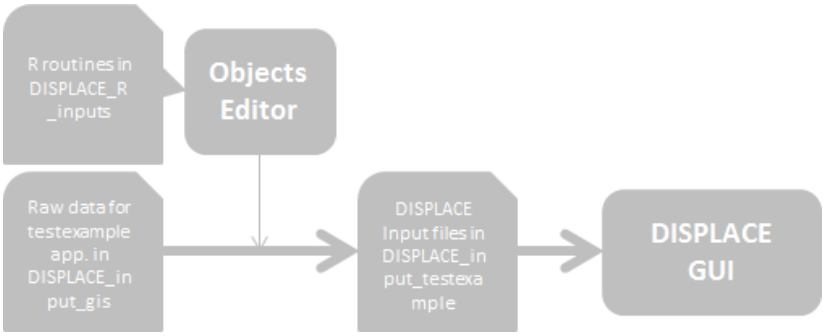


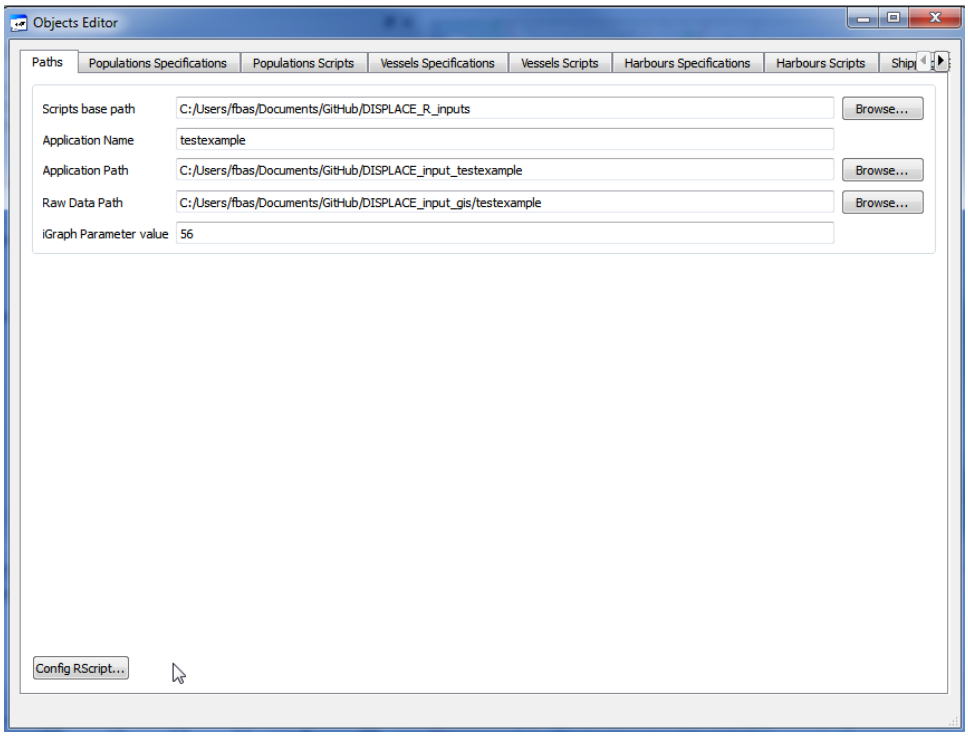
So, to start:



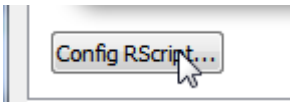
The ui is giving some support for running the R scripts (usually located in DISPLACE_R_inputs) producing the DISPLACE input files.

In brief, the parameterization is producing the DISPLACE input files that fits DISPLACE:

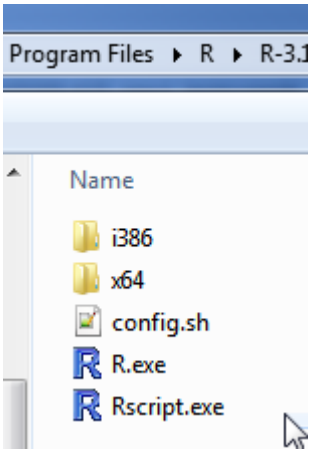




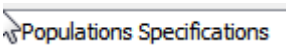
You also need to have R pre-installed (https://cran.r-project.org/) and the path set for it:

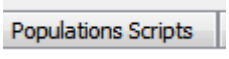


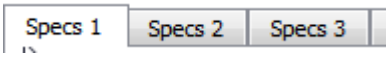
For example:



On the Objects Editor main menu, we have:

Specifications pages 

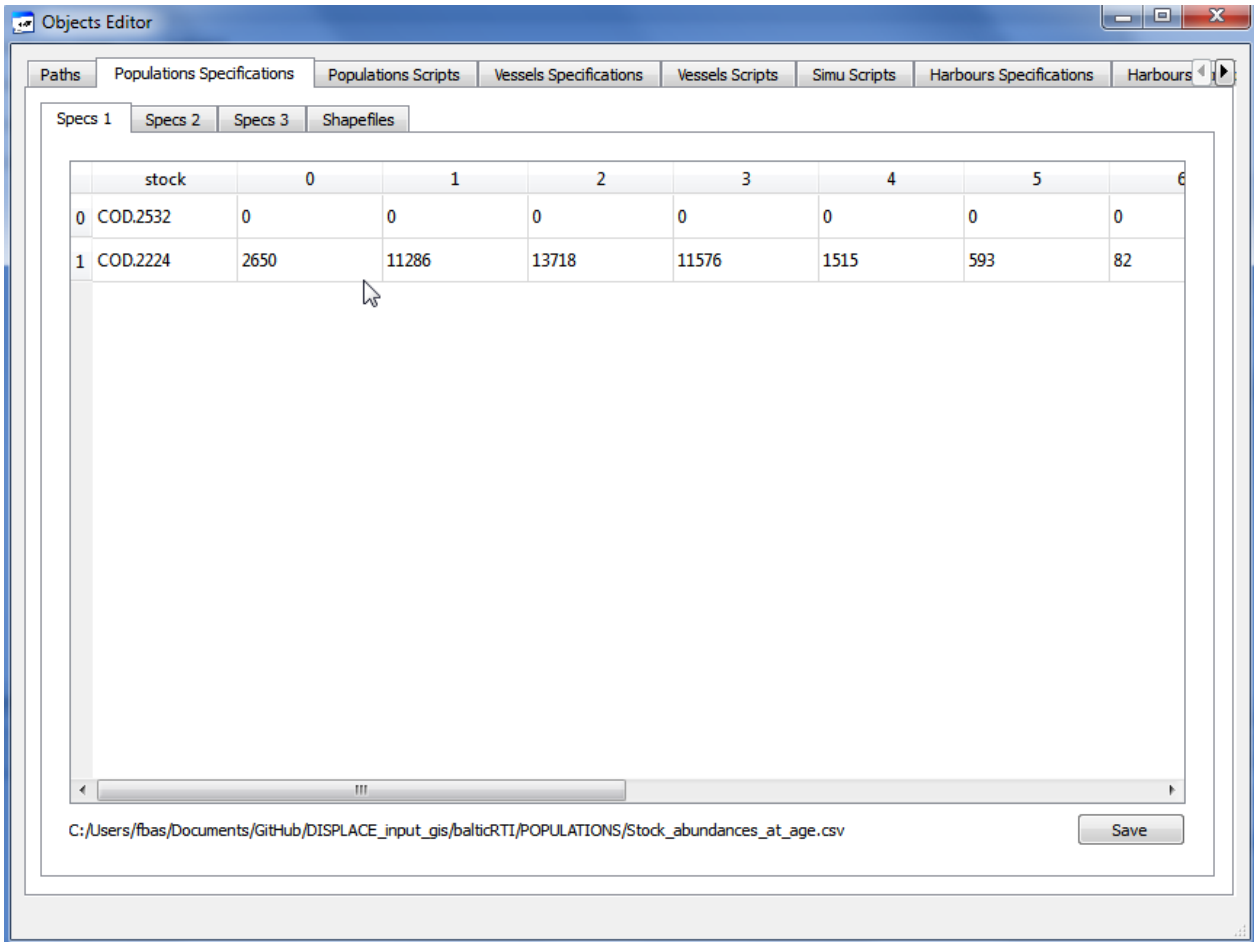
separated from the R scripts 

for each type of objects. Specifications can related to several files: 

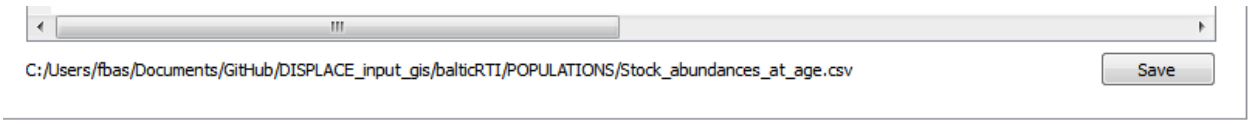
Using R scripts should provide enough flexibility for the user to adapt them when required, which should work as long as the input file format to DISPLACE is not changed.

Note that some R scripts are likely to fail if some of the required R packages are not installed. This is not a big problem; just install them in your R console by typing: install.packages(”a_package_name”).

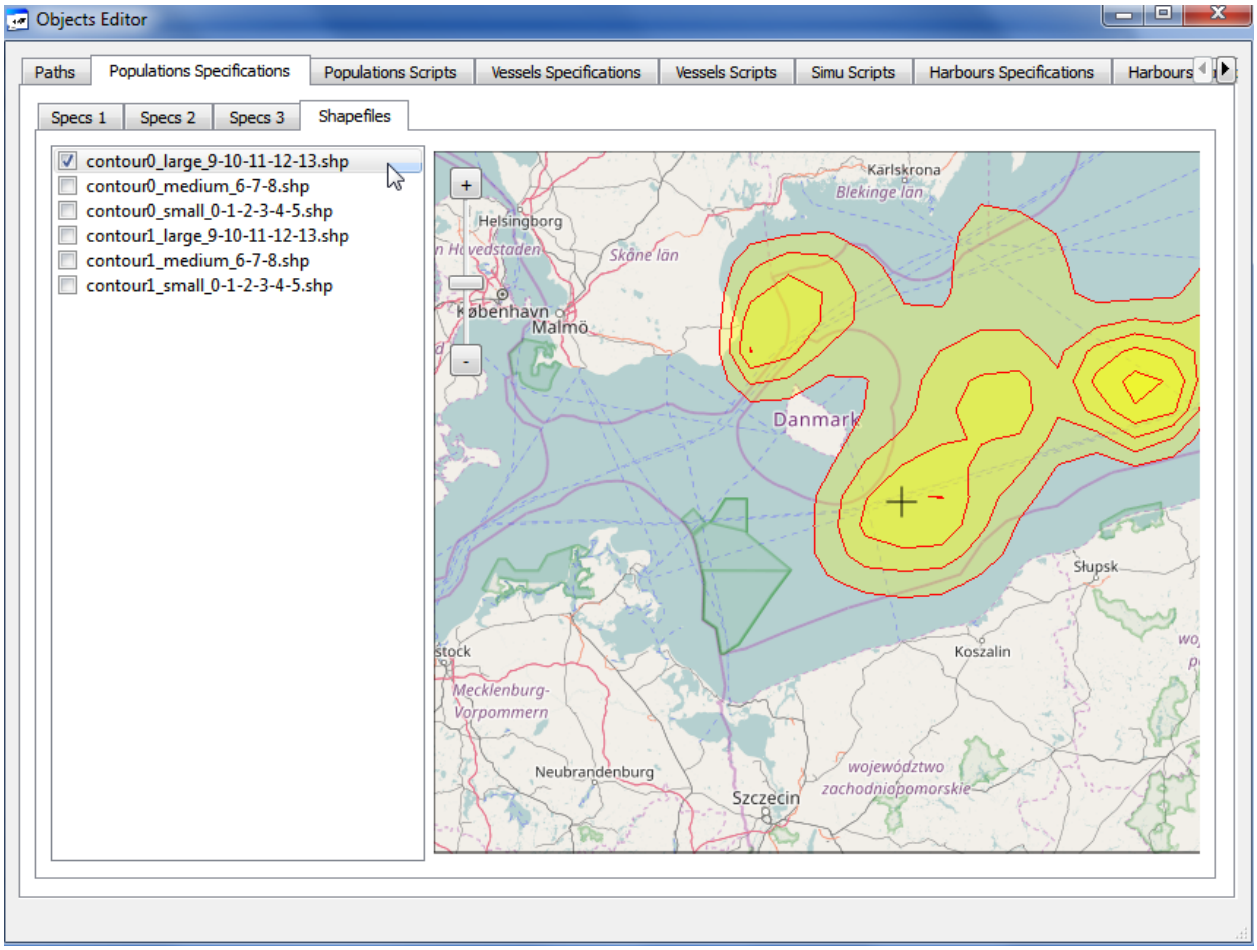
For Population-related files



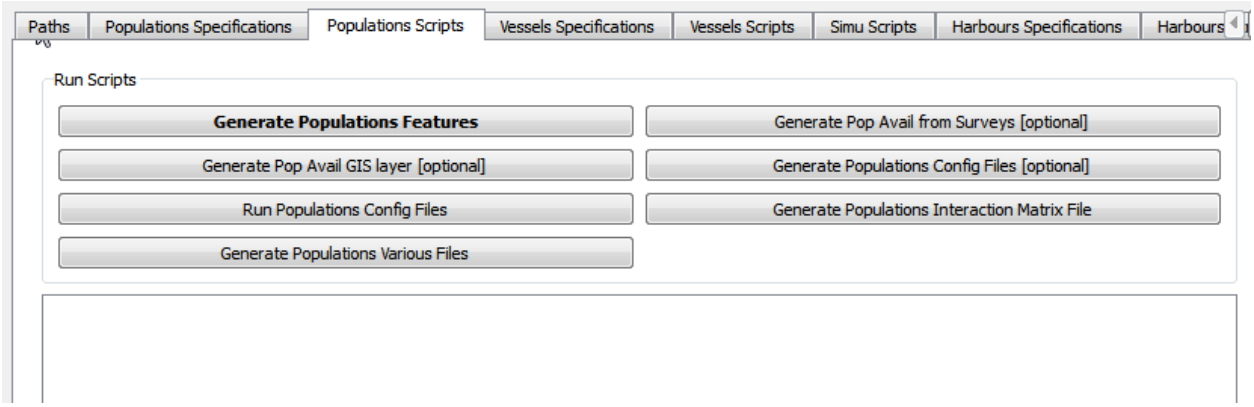
Giving the file location to help the user figuring it out:



There is a map viewer for the GIS layer specifications related to the spatial distribution of fish per size category:



Then the R scripts are all behind the buttons of the ui:

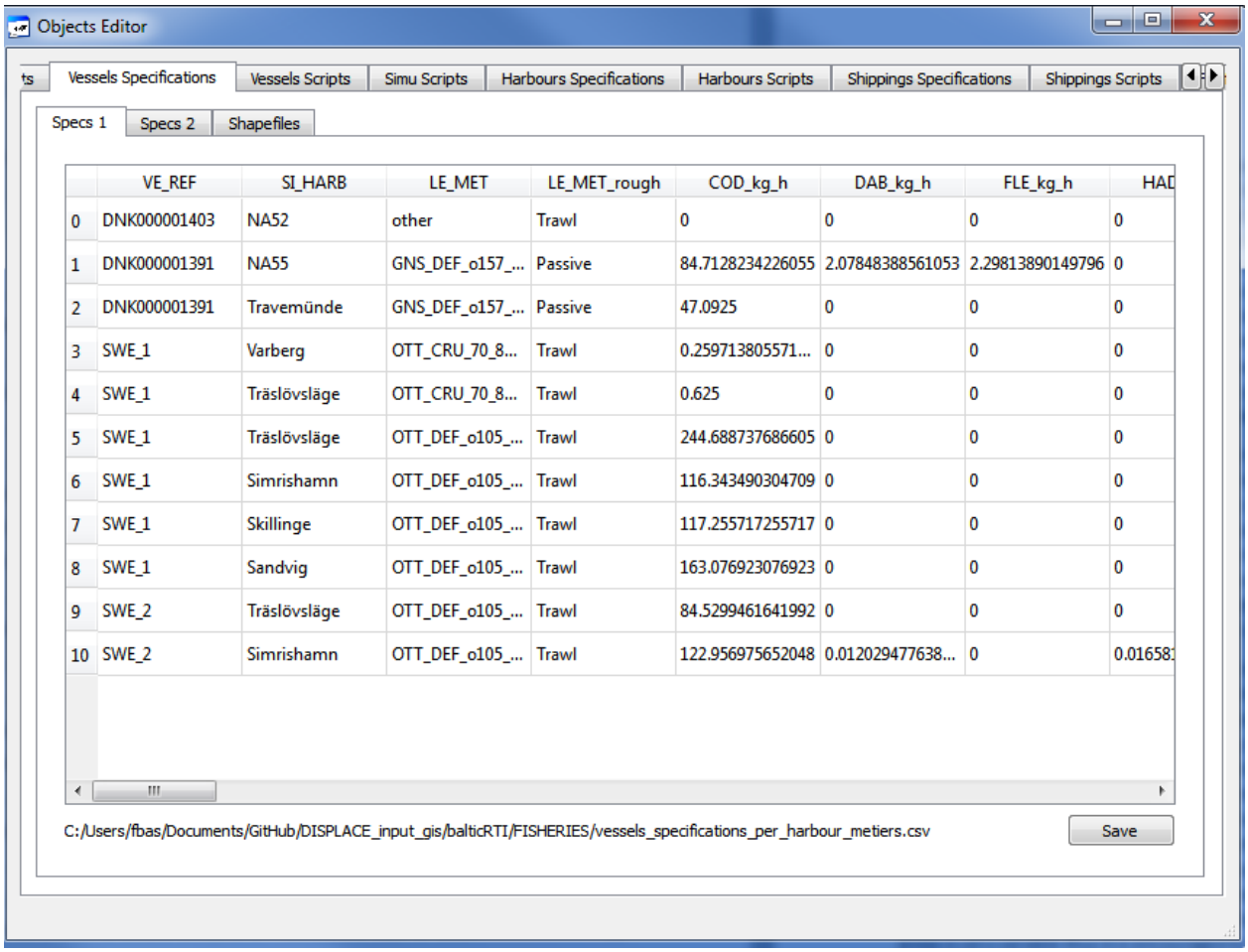


For Vessels & Metiers related files

In essence, the steps are:

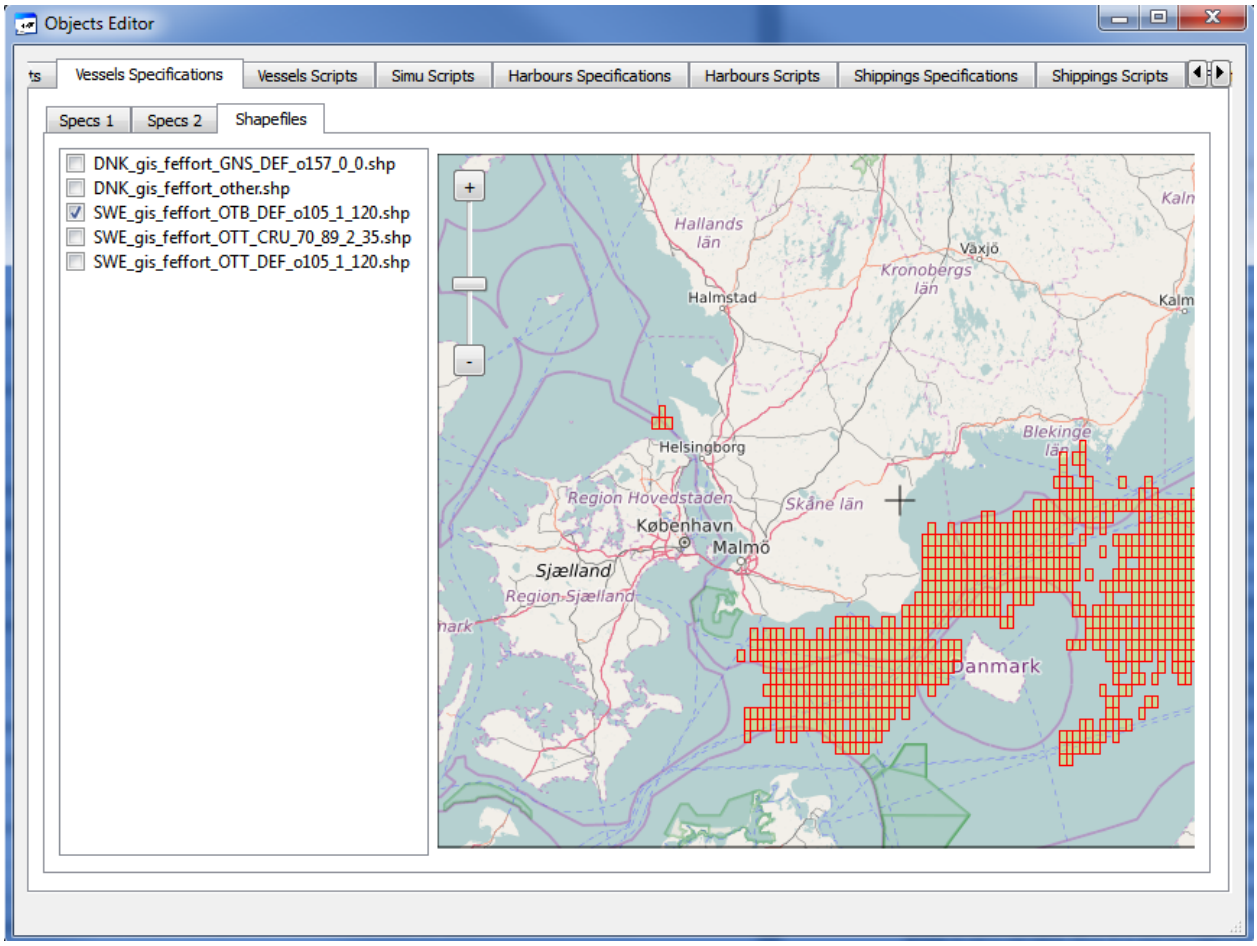
a- Generate Vessels Config Files
b- Generate Vessels Fishing Effort GIS Layers
c- Run Vessels Config Files
d- Generate Metiers Selectivity per Stock Files
e- Generate Metiers Various Files
f- Generate Other Catches On Nodes
g- Overwrite Catch Equation Parameters (optional – overwrite some ”Run Pop Config Files” parameters)

Generate Vessels config files will be done from the vessels specifications:

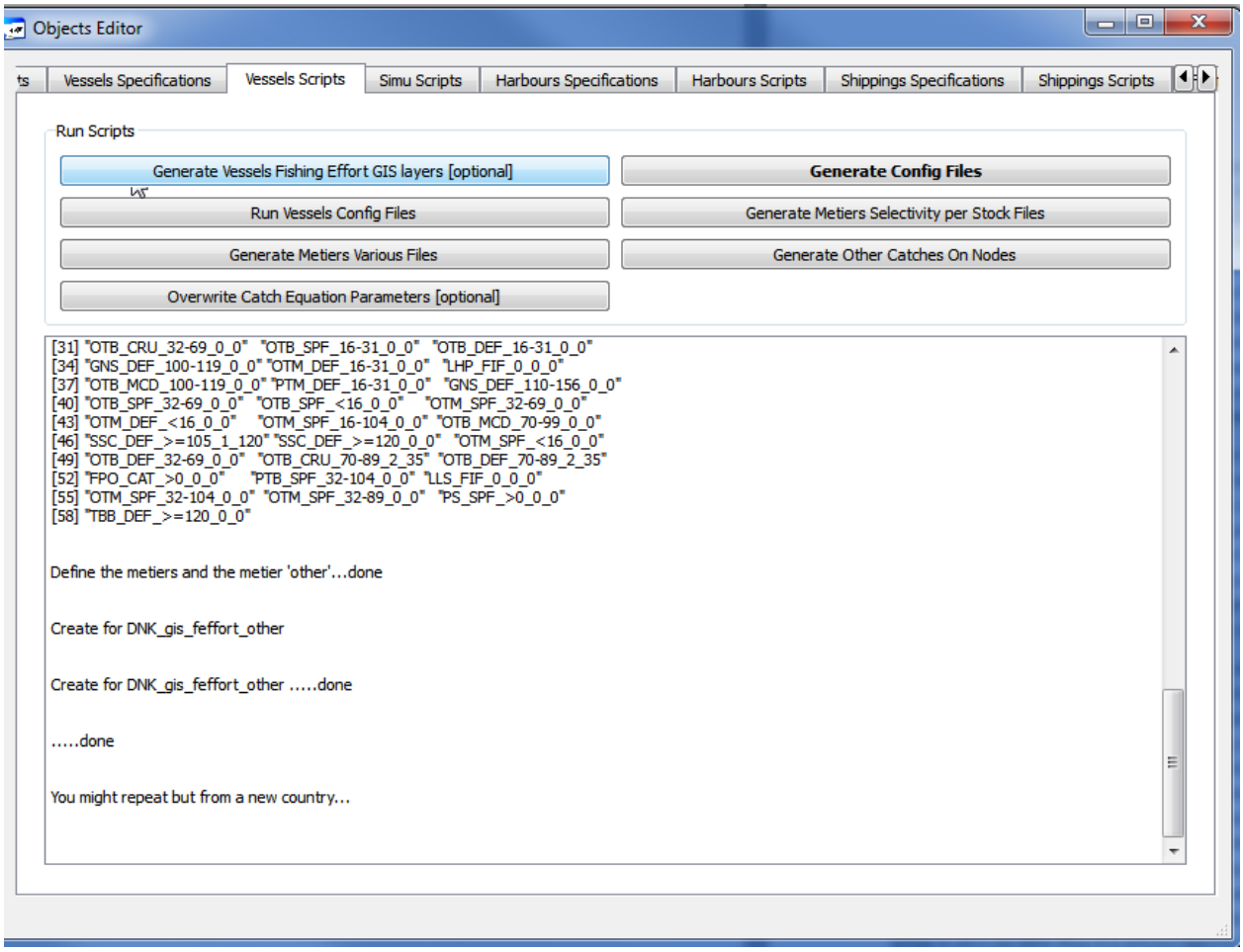


	VE_REF	SI_HARB	LE_MET	LE_MET_rough	COD_kg_h	DAB_kg_h	FLE_kg_h	HAD
0	DNK000001403	NA52	other	Trawl	0	0	0	0
1	DNK000001391	NA55	GNS_DEF_o157_...	Passive	84.7128234226055	2.07848388561053	2.29813890149796	0
2	DNK000001391	Travemünde	GNS_DEF_o157_...	Passive	47.0925	0	0	0
3	SWE_1	Varberg	OTT_CRU_70_8...	Trawl	0.259713805571...	0	0	0
4	SWE_1	Träslövsläge	OTT_CRU_70_8...	Trawl	0.625	0	0	0
5	SWE_1	Träslövsläge	OTT_DEF_o105_...	Trawl	244.688737686605	0	0	0
6	SWE_1	Simrishamn	OTT_DEF_o105_...	Trawl	116.343490304709	0	0	0
7	SWE_1	Skillinge	OTT_DEF_o105_...	Trawl	117.255717255717	0	0	0
8	SWE_1	Sandvig	OTT_DEF_o105_...	Trawl	163.076923076923	0	0	0
9	SWE_2	Träslövsläge	OTT_DEF_o105_...	Trawl	84.5299461641992	0	0	0
10	SWE_2	Simrishamn	OTT_DEF_o105_...	Trawl	122.956975652048	0.012029477638...	0	0.01658

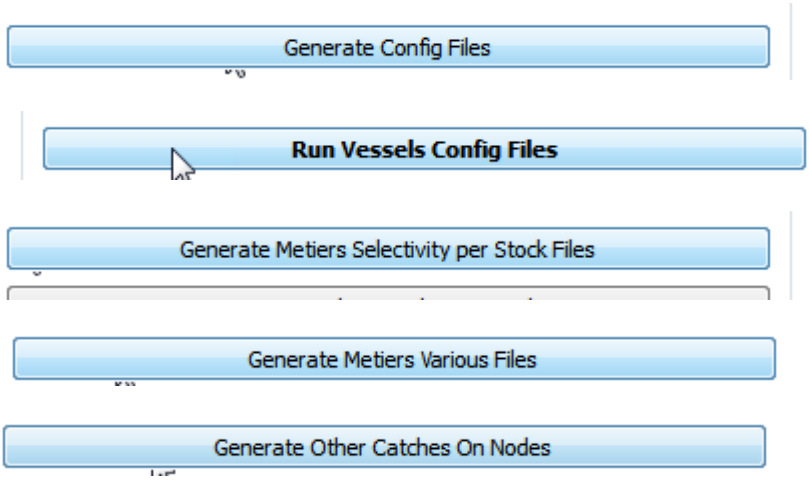
....including some spatial layers concerning the fishing effort spatial distribution per type of activity:



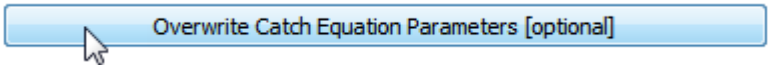
If you don´t have them from the start, these layers will be produced by the 'Generate Vessels Fishing Effort GIS layers' R routine:



Then go step by step, running each routine sequentially:



The last one is trickier:



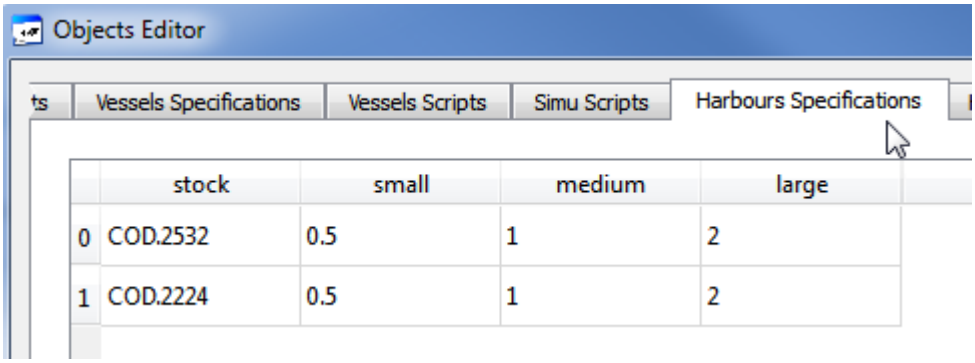
Would probably need you to think about how to adapt it to your own case....but for now it should work wil the set given as example.

Once it is all done then you have all the input files informed in the /vesselsspe and /metiersspe folders for the creation of the set of vessels in DISPLACE.

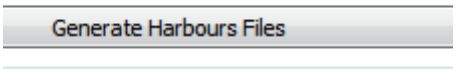
But DISPLACE will not work until all the input files are created for all types of objects. So:

For Harbours related files

Giving the price in euro per kilo per stock per commercial category – In this case it will be the same for all harbours.

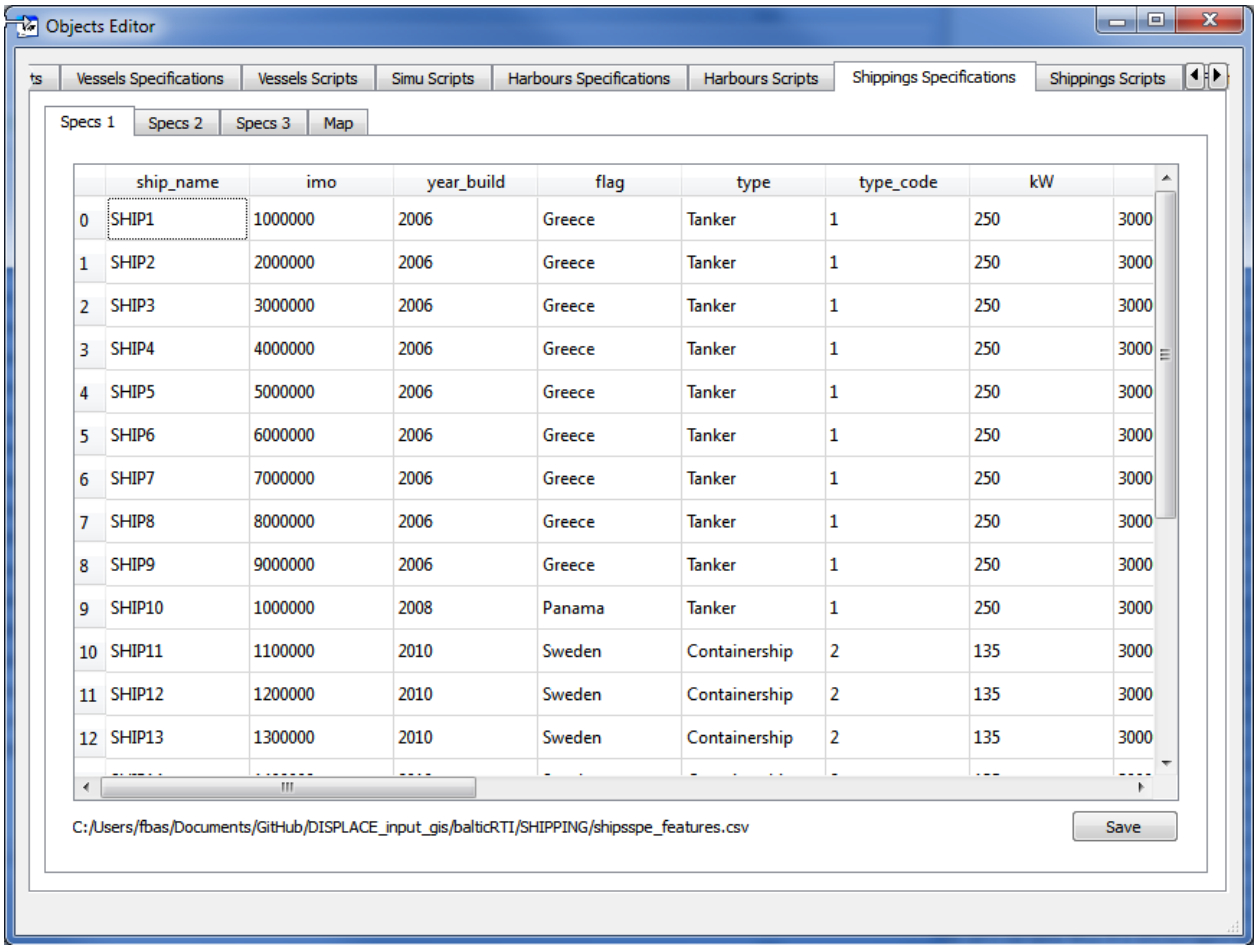


Then run the R script:

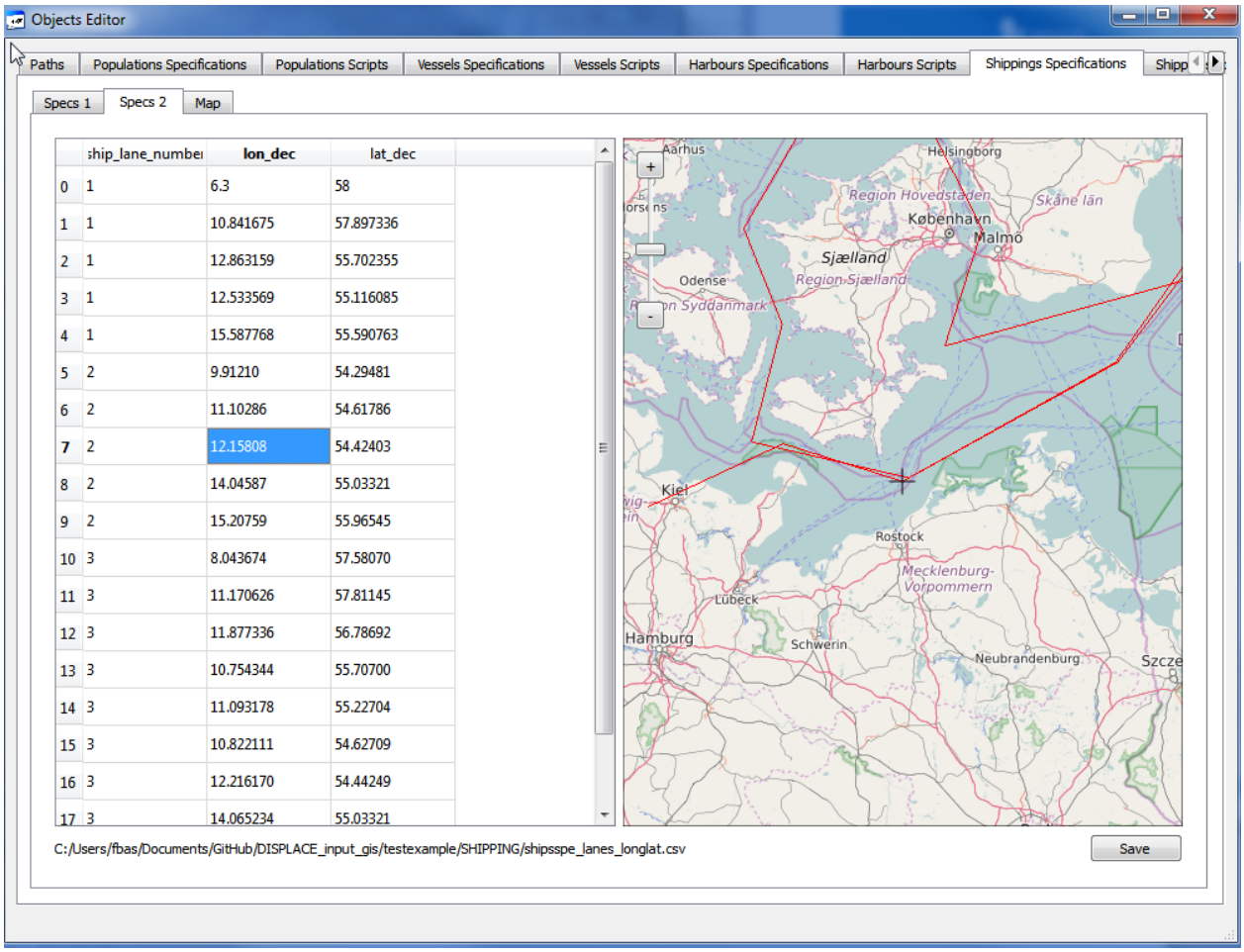


If alternative price settings is wished then the R script would need to be adapted by the user on that purpose.

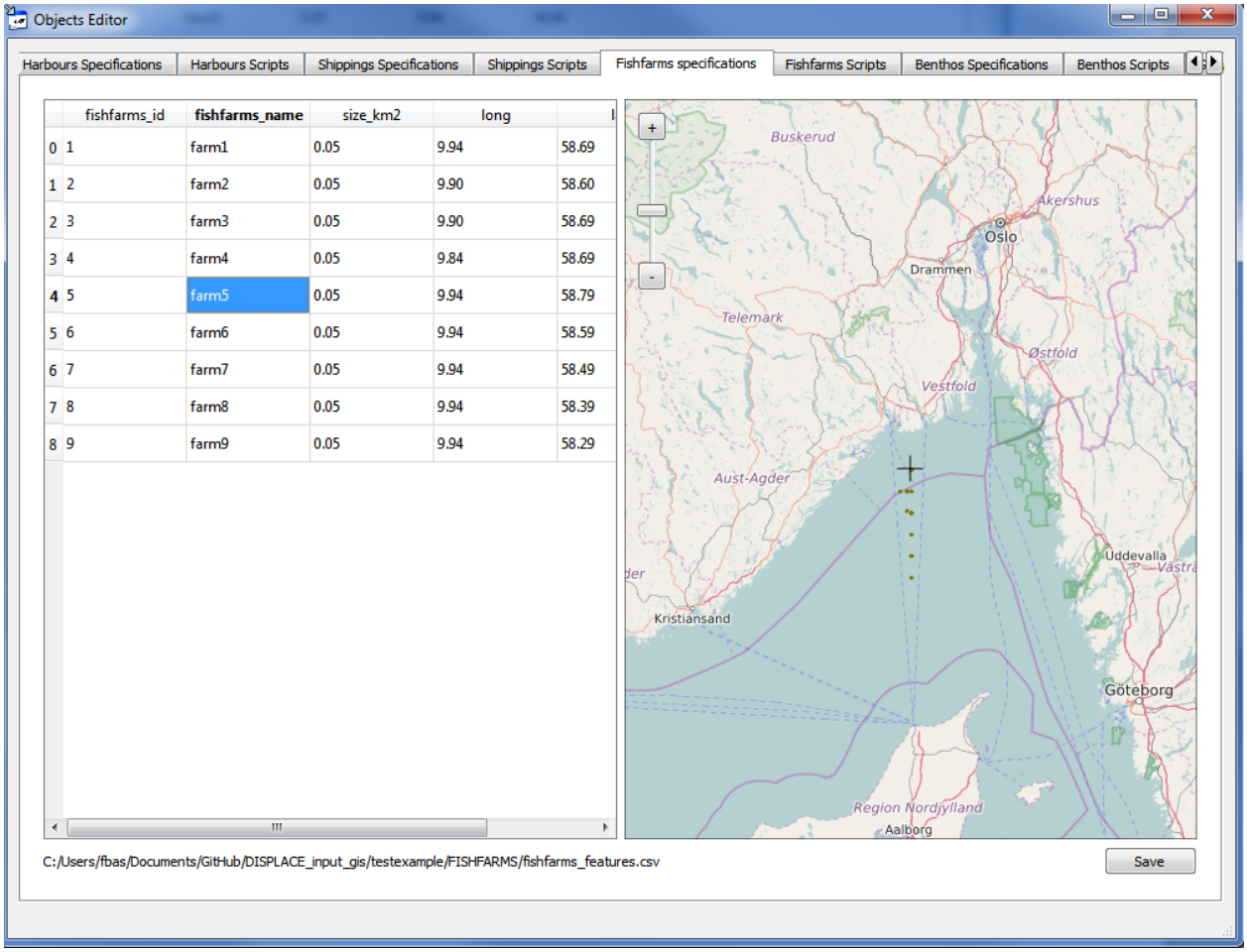
For Shipping related files



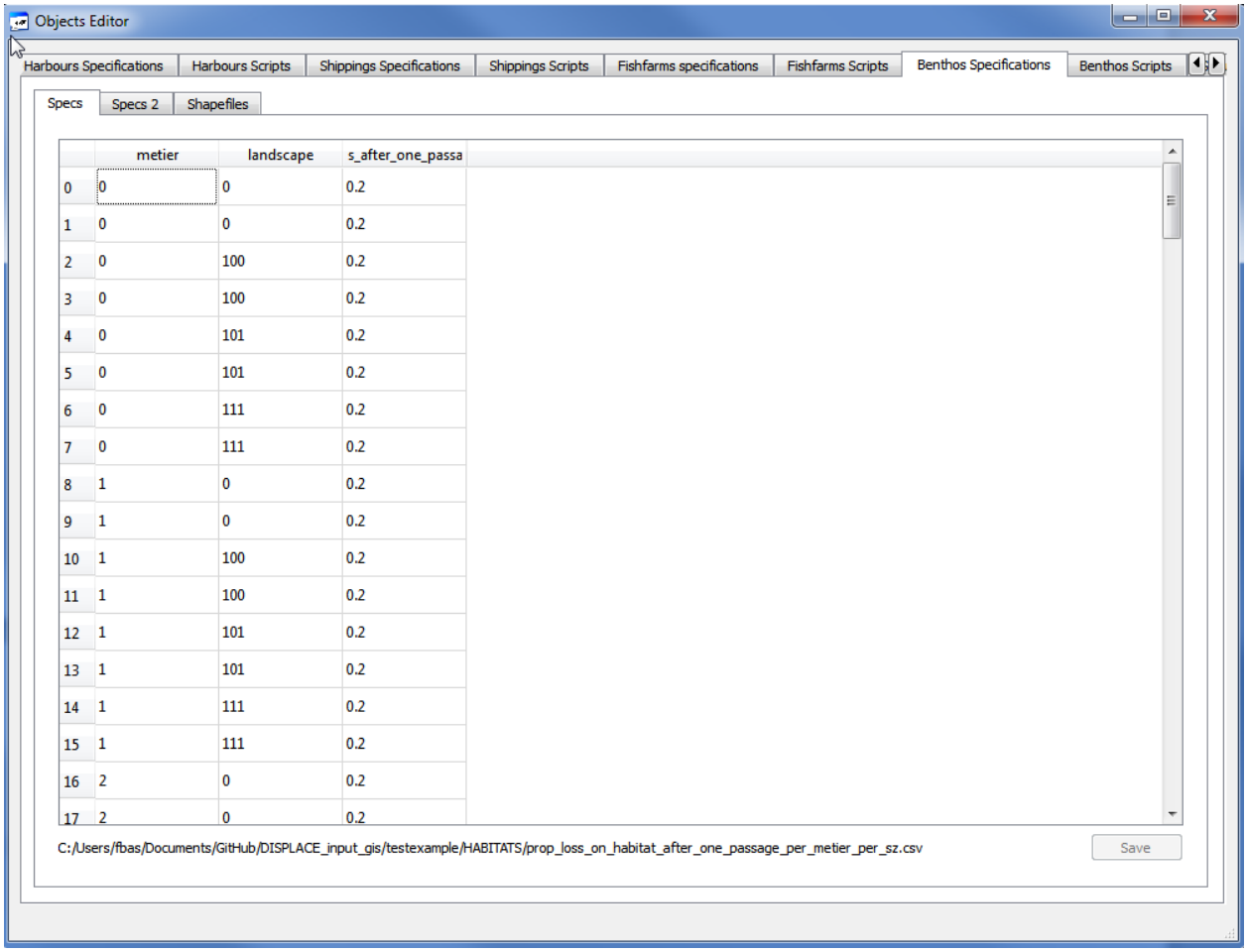
	ship_name	imo	year_build	flag	type	type_code	kW	
0	SHIP1	1000000	2006	Greece	Tanker	1	250	3000
1	SHIP2	2000000	2006	Greece	Tanker	1	250	3000
2	SHIP3	3000000	2006	Greece	Tanker	1	250	3000
3	SHIP4	4000000	2006	Greece	Tanker	1	250	3000
4	SHIP5	5000000	2006	Greece	Tanker	1	250	3000
5	SHIP6	6000000	2006	Greece	Tanker	1	250	3000
6	SHIP7	7000000	2006	Greece	Tanker	1	250	3000
7	SHIP8	8000000	2006	Greece	Tanker	1	250	3000
8	SHIP9	9000000	2006	Greece	Tanker	1	250	3000
9	SHIP10	1000000	2008	Panama	Tanker	1	250	3000
10	SHIP11	1100000	2010	Sweden	Containership	2	135	3000
11	SHIP12	1200000	2010	Sweden	Containership	2	135	3000
12	SHIP13	1300000	2010	Sweden	Containership	2	135	3000

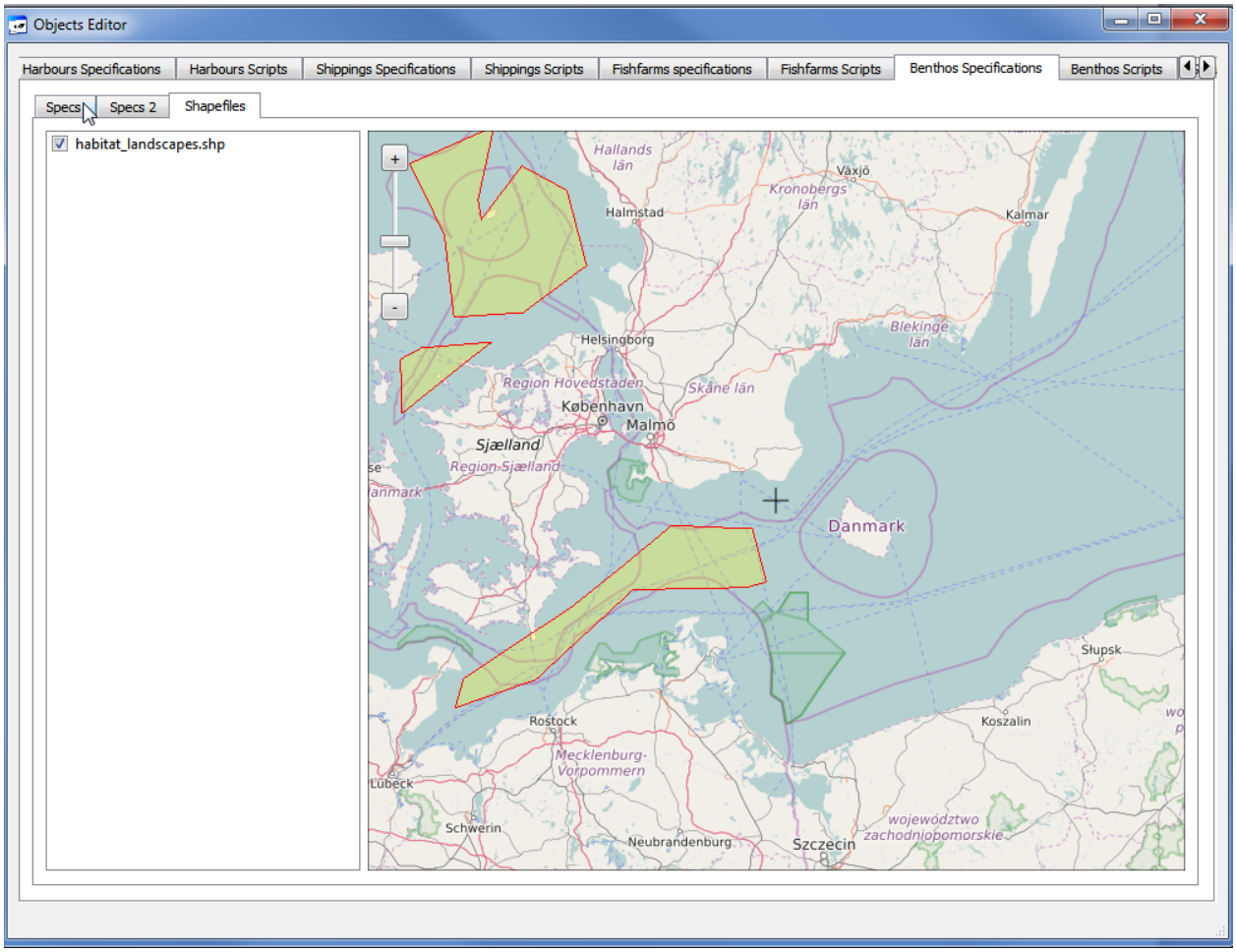

Objects Editor
Paths
Populations Specifications
Populations Scripts
Vessels Specifications
Vessels Scripts
Harbours Specifications
Harbours Scripts
Shippings Specifications
Shipp
Specs 1
Specs 2
Map
ship_lane_numbe
lon_dec
lat_dec
0 1 6.3 58
1 1 10.841675 57.897336
2 1 12.863159 55.702355
3 1 12.533569 55.116085
4 1 15.587768 55.590763
5 2 9.91210 54.29481
6 2 11.10286 54.61786
7 2 12.15808 54.42403
8 2 14.04587 55.03321
9 2 15.20759 55.96545
10 3 8.043674 57.58070
11 3 11.170626 57.81145
12 3 11.877336 56.78692
13 3 10.754344 55.70700
14 3 11.093178 55.22704
15 3 10.822111 54.62709
16 3 12.216170 54.44249
17 3 14.065234 55.03321
Aarhus
Helsingborg
Region Hovedstaden
Skåne län
København
Malmö
Sjælland
Region Sjælland
Odense
Kiel
Rostock
Mecklenburg-
Vorpommern
Lübeck
Hamburg
Schwerin
Neubrandenburg
C:/Users/fbas/Documents/GitHub/DISPLACE_input_gis/testexample/SHIPPING/shipsspe_lanes_longlat.csv
Save

For Fishfarms related files



For Benthos related files




Objects Editor
Harbours Specifications
Harbours Scripts
Shippings Specifications
Shippings Scripts
Fishfarms specifications
Fishfarms Scripts
Benthos Specifications
Benthos Scripts
Specs
Specs 2
Shapefiles
habitat_landscapes.shp
Hallands län
Växjö
Kronobergs län
Halmstad
Kalmar
Blekinge län
Helsingborg
Region Hovedstaden
Skåne län
København
Malmö
Sjælland
Region Sjælland
Danmark
Słupsk
Rostock
Koszalin
Mecklenburg-Vorpommern
Lübeck
Schwerin
Neubrandenburg
Szczecin
województwo zachodniopomorskie