

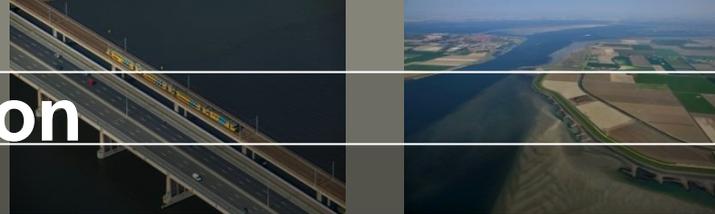


Delft-FEWS

Water Quality Configuration Course - Exercises
Deltares, Delft, November 2017



Exercise 0: Open the application



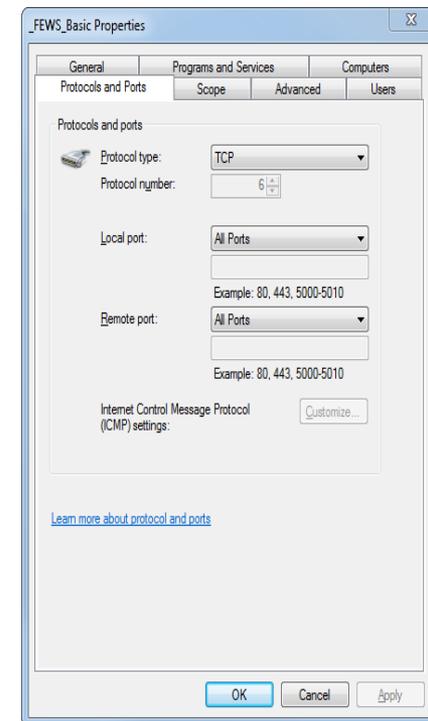
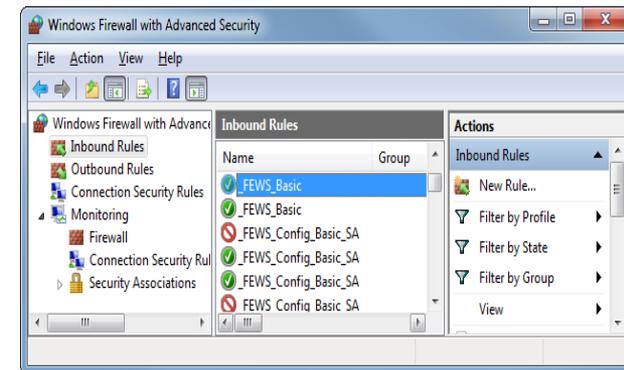
Make sure the Basic Course application `fews_basic_windows.zip` and the Water Quality Course application `fews_waterquality_windows.zip` is unzipped on your computer!! This is explained in steps 1 to 4 on the download page

1. Navigate to `..\fews\FEWS_WaterQuality\` and open the application by starting the FEWS executable [_FEWS_WaterQuality.exe](#)

Exercise 0: Preparations (Windows Firewall settings)

Windows Firewall Settings may have to be changed

- If you run into problems (no data visible) in step 5 of exercise 1 (“Importing data” on the next slide) your port settings may have to be adjusted
- Go to windows firewall settings / advanced security
- Check the inbound rule for **_FEWS_WaterQuality.exe**
- Make sure for the **TCP protocol** ports **21** or **22** are open
- Apply changes



Exercise 1a: Register telemetry import module

In this exercise you will register the telemetry import into the configuration.

1. Copy the `Import_Telemetry.xml` from the exercise folder to `/ModuleConfigFiles/Import/`
2. Register the module instance in the `/RegionConfigFiles/ModuleInstanceDescriptors.xml`

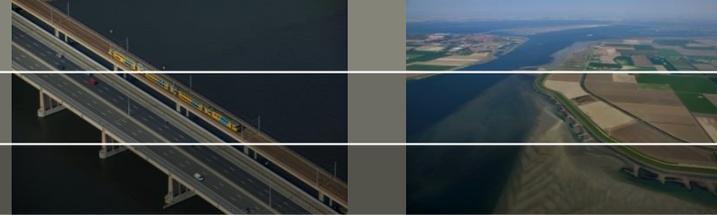
```
</moduleInstanceDescriptor>  
<moduleInstanceDescriptor id="Import_Telemetry">  
  <moduleId>TimeSeriesImportRun</moduleId>  
</moduleInstanceDescriptor>
```

3. Add the module instance to the import workflow `/WorkflowFiles/Import_Data.xml`

```
<activity>  
  <runIndependent>true</runIndependent>  
  <moduleInstanceId>Import_Telemetry</moduleInstanceId>  
</activity>
```

4. Reload the application with F5
5. Check for errors or warnings in the log window
6. Check in the Workflow Navigator (Ctrl-W) if the new moduleInstance is part of the Import_Data workflow

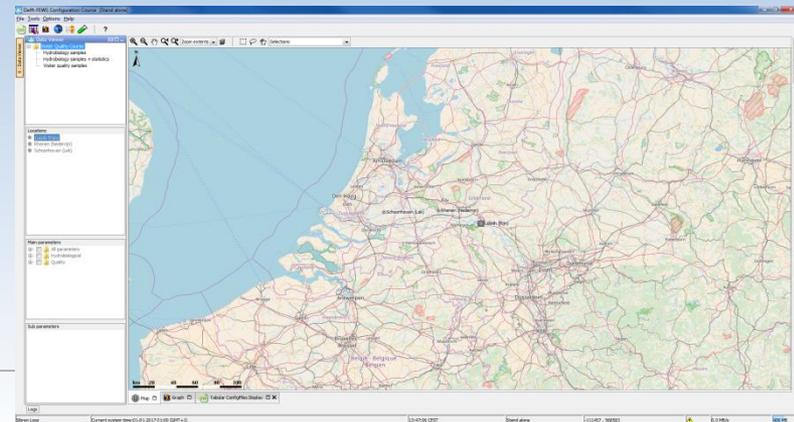
Exercise 1b: Add location



In this exercise you will add 1 measurement station **Lobith (Rijn)** to the location CSV file

| LOCATIONCODE | LOCATIONNAME | XCOORD | YCOORD | WATERTYPE | MORPHOLOGY | Note | NAMESPACE | PROGRAMHISTORY |
|--------------|--------------------|--------|--------|-----------|------------|---------|-----------|----------------------|
| loc_1 | Schoonhoven (Lek) | 117800 | 439313 | M6b | line shape | on land | NL11 | HYBI / FyCHEM |
| loc_2 | Rhenen (Nederrijn) | 167941 | 440510 | M5 | line shape | on land | NL11 | HYBI |
| loc_3 | Lobith (Rijn) | 207642 | 428811 | M6b | line shape | on land | NL11 | HYBI / FyCHEM / QUAN |

1. Open the `\MapLayerFiles\location.csv` file in a Text editor or EXCEL
2. Add the location and attributes as presented in the table above to the CSV file
3. Restart the FEWS-Basic application or press F5
4. Select the filter Water Quality Course in the Data Viewer
5. Open the Map display to check the added station



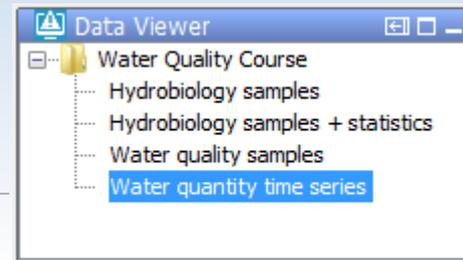
Exercise 1c: Add filter

In this exercise you will add a filter for Water quantity.

1. Open the `/RegionConfigFiles/Filters.xml` file
2. Add the following water quantity filter to the main filter tree:

```
<filter id="Water Quality Course">
  <child foreignKey="Hydrobiology_withoutStats"/>
  <child foreignKey="Hydrobiology_withStats"/>
  <child foreignKey="Water_quality"/>
  <child foreignKey="Water_quantity"/>
</filter>
<filter id="Water_quantity" name="Water quantity time series">
  <timeSeriesSet>
    <moduleInstanceld>Import_Telemetry</moduleInstanceld>
    <valueType>scalar</valueType>
    <parameterId>Q</parameterId>
    <locationSetId>location</locationSetId>
    <timeSeriesType>external historical</timeSeriesType>
    <timeStep unit="day" timeZone="GMT+1"/>
    <relativeViewPeriod start="-104" end="0" unit="week"/>
    <readWriteMode>read only</readWriteMode>
  </timeSeriesSet>
</filter>
```

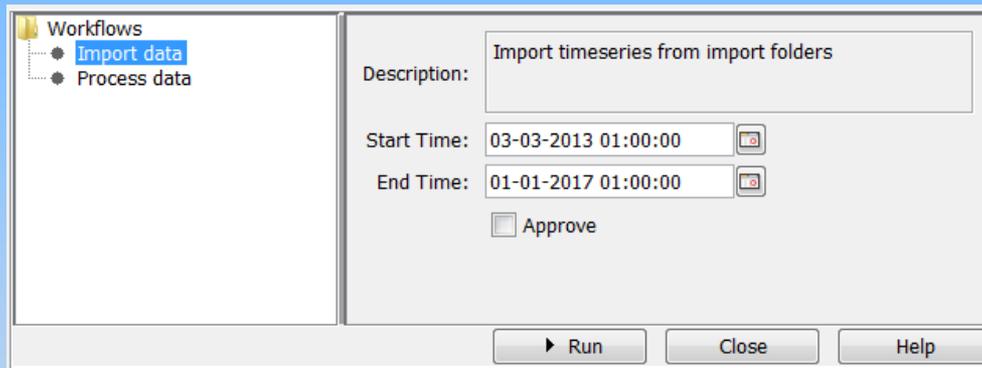
3. Update the application with F5
4. Check if your new filter is present in the DataViewer.



Exercise 1d: Run task and check results

In this exercise you will run the import task and check the results

1. Go to the Task window in the FEWS application ( -button)
2. Select the **Import data** task and click on Run



3. Select the water quantity filter, location Lobith, and parameter Flow rate.
4. Open the graph window ( -button) and inspect the data.
Use the  -button to zoom to the timespan of the imported data

Exercise 1e: FEWS Explore Tabs

In this exercise you will add a new display to the FEWS Explorer.

1. Open the `\SystemConfigFiles\Explorer.xml` file in XML spy or a text editor.
2. Go to the `explorerTasks` section and add a new task.
3. Set name to *Interval Statistics*
4. Set `predefinedDisplay` to *interval statistics*
5. Set `toolbarTask` to *true*
6. Set `menubarTask` to *true*
7. Set `loadAtStartup` to *false*
8. Save the edited file and restart the FEWS-WAQ application or press F5
9. Click on the new button *Interval Statistics* in the buttonbar.
10. Try this feature: Select one or more timeseries from the Data Viewer Panel (location + parameter). Enter a start / end date, select an interval and a statistic, press the 'Apply' button.

Exercise 2a: Import Sample Data

Study the example data import in [/Config/ModuleConfigFiles/Import/Import_SampleData.xml](#).

1. How many import tasks are there?
2. Which file does it import?
3. From which folder does it import files?

Study the two files in the [/Import/SampleData/](#) folder.

4. Which file will be imported with the current [Import_SampleData.xml](#)?
5. Inspect the [Import_SampleData.xml](#) from the *exercise* folder and copy this file to your application.
6. Update the application by pressing F5.
7. Run the Import data task.
8. Click on the -icon (Sample Viewer) and inspect the data. Do you miss data?

Exercise 2b: Reimport rejected data

As you might have seen in the previous exercise, part of your data was rejected and is missing in the database. In this exercise you will fix this issue.

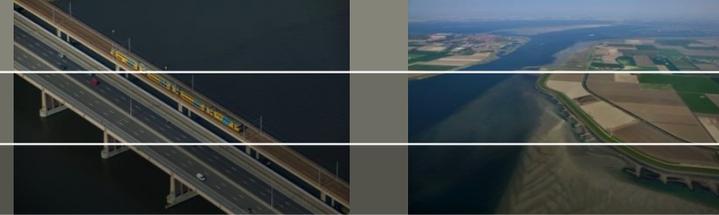
1. Try to correct the rejected import file (placed in the FailedFolder) with help of the logmessage in the log file and place the corrected file in the import folder

Hint: you can find the list of possible biotaxon names in `\Config\MapLayerFiles\Qualifiers\biotaxon.csv`

(The corrected import file is available in your exercise folder)

2. Clean the `\ImportFailed\SampleData\` folder
3. Rerun the data import task
4. Check if the `\ImportFailed\SampleData\` folder is empty this time; if not, fix the remaining error(s)
5. Check the (corrected) results in the Sample Viewer

Exercise 2c: limitSymbol



Water quality data can contain measurements below the detection limit depending on the measurement range of the used sensor. In this case these records are usually reported with a less-than symbol < .

In this exercise you will import the limit symbols of the nutrient data.

1. Open the `/ModuleConfigFiles/Import/Import_SampleData.xml` file
2. Go to the table section in the **nutrient data** import part and add the `limitSymbolColumn` element according to example below:

The screenshot shows an XML configuration window for nutrient data import. It features a tree view on the left and a table on the right. The tree view shows a hierarchy: 'sampleIdColumn' (name=sampleid), 'propertyColumn' (4), 'limitSymbolColumn', and 'valueColumn' (name=value). The 'limitSymbolColumn' is selected and expanded, showing a table with two columns: 'name' and 'limitsymbol'.

| name | limitsymbol |
|------|-------------|
| | |

3. Load the configuration change with F5.
4. Check in the `\Import\SampleData\Samples_Nut_20132015.csv` file which records have a (detection) limit symbol
5. Run the import data task once more.
6. Check if you can see the changed records in the Sample Viewer.

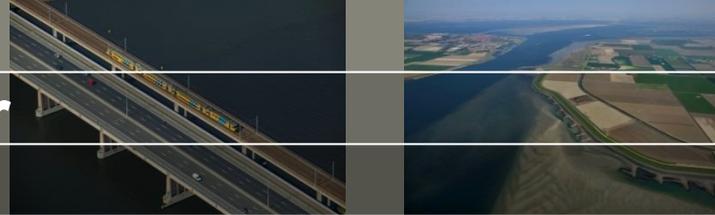
Exercise 2d: edit Sample Data (Edit Display)

Try to Edit some of the imported samples records

1. Check which filters are editable in the **Filters.xml** `<editable>true</editable>`
2. Open the Edit table display 
3. Make sure the display is updated when selecting locations/parameters in the DataViewer panel by unlocking the edit display  → 
4. Try to edit the data
 - Editable records will have a white background
 - Non-editable records will have a grey background

| | A | B |
|------------------|--|--|
| GMT+1 | Nitrogen Mass (kg/d) Interpolated Lobith (Rijn) loc_3 Calculate_Loads | Nitrogen Mass (kg/d) Lobith (Rijn) loc_3 Calculate_Loads |
| 09-11-2016 00:00 | 280627.2 | |
| 10-11-2016 00:00 | 293596.2 | |
| 11-11-2016 00:00 | 316439.7 | 316439.7 |
| 12-11-2016 00:00 | 333344.2 | |

Exercise 3: Add GroupBy filter



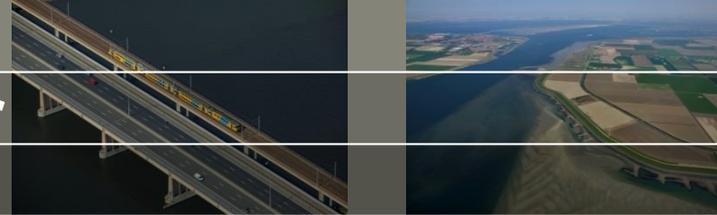
In this exercise you will add a filter based on the GroupBy element.

1. Go to the [/RegionConfigFiles/Filters.xml](#)
2. Add a filter
3. Set *id* to “FilterGroupBy”
4. Set *name* to “Grouped By Parameter”
5. Set *relativeViewPeriod*, with *start* “-104”, *end* “0”, and *unit* “week”
6. Set *editable* on “true”
7. Set *groupBy* and its *parameterAttributeId* on “Category”.



8. Load this configuration with F5.
9. Check the Data Viewer for the added filter.

Exercise 4: Add Attribute filter



1. Add the explorerTask Attribute filter to the `/SystemConfigFiles/Explorer.xml` according to the following example:

```
<explorerTask name="Attribute Filter">  
  <predefinedDisplay>attribute filter</predefinedDisplay>  
  <toolbarTask>false</toolbarTask>  
  <menubarTask>false</menubarTask>  
  <toolWindow>true</toolWindow>  
  <loadAtStartup>true</loadAtStartup>  
</explorerTask>
```

Attribute Filter

2. Reload config using F5
3. Drag the Attribute Filter to the right side of your GUI and save this layout by clicking File > Save Layout from the Menu-bar
4. Select the Filter Hydrobiology samples in the DataViewer
5. Open the *AttributeFilter display* and Select the Checkbox for watertype M5 and open the Map-display
6. Which location(s) belong to this watertype?
7. Select this location and Open the *Tabular Config Files Display* (📄); Can you find watertype M5 in the shown csv file?

Exercise 5. Using the Filter tree

In this exercise you will change the qualifier labels in the Data Viewer.

This feature is handy e.g. for switching between local name and scientific Latin name

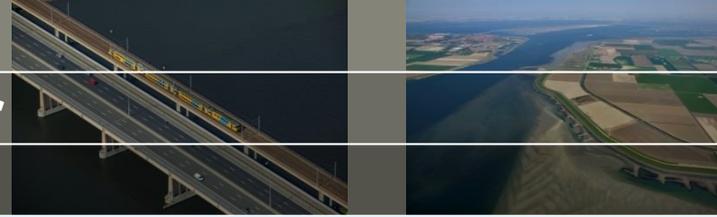
1. Open the Data Viewer.
2. Select the Water Quality Course Filter.
3. Select a Qualifier Group 'Taxa' in the Sub-parameter panel, open the folder-tree and select one of the 'leaves'; right click and select *Choose qualifier labels*. The label picker box will pop up.
4. Remove all labels and make your own label selection. You can determine the order and the amount of labels. When you are done click on OK and examine the result of your choice.

Exercise 6. Working with the Sample Viewer

In this exercise you will be working with the *Sample Viewer*.

1. Select in *Hydrobiology Samples* in the *Data Viewer*.
2. Select all 3 location by clicking on them while pressing down the shift button *or* using the Ctrl-A combination.
3. Open the Sample Viewer ( - button).
4. How many samples are available @Schoonhoven?
5. Select all samples in the toppanel, how many records are available?
6. Try to filter in the lower panel of the sample viewer so that only *Ambramis brama* (Common bream) is visible. How many records are visible?

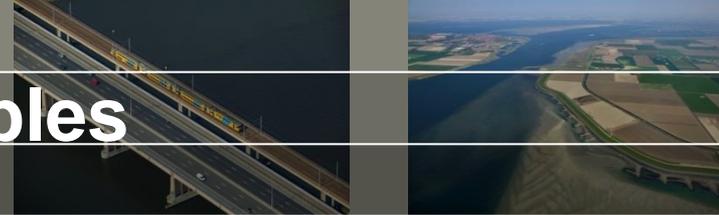
Exercise 7: The Spatial Viewer



1. Examine the [/Config/DisplayConfigFiles/SpatialDisplay.xml](#)
2. Open the Spatial Viewer
3. Select Nitrogen concentration
4. Check what the Last Value button does.

Use the timeslider with and without the Last Value button checked

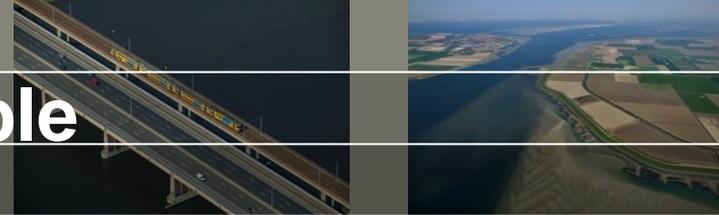
Exercise 8: Querying the samples



Try to answer the following questions, by using the available displays.

1. What is the maximum discharge value of Lobith in 2015?
2. What is the total biomass of fish at Rhenen?
3. In which samples does *Abramis brama* occur?
4. At which location is the highest number of *Abramis brama* sampled in the highest length class (class 4)?
5. What is the total biomass of fish at this location for this length class?
6. Which waterplant has the highest plantcover at location Lobith?
7. To which group does this plant belong?
8. What is the Dutch name of this plant?

Exercise 9a: Exporting a sample



In this exercise you will make an export of sample 2, via the sample viewer

1. Open the *Sample Viewer*
2. Select sample 2
3. Right click and select *Export Time Series..*
4. Call the file *sample2_export*, select *Export hydrobiological data as csv file* as file format and click on *OK*.
5. Check if your **sample2_export.csv** file resembles your selection in the *Sample Viewer*.

Exercise 9b: Exporting conform Aquo standard

In this exercise you will execute an export of a water quality export using an output format that matches the Aquo standard

1. Examine the following files:
 1. \Config\ModuleConfigFiles\Export\Export_Aquo.xml
 2. \Config\IdMapFiles\IdExport_UMAquo.xml

Note that dedicated aquo binaries (\FEWS-WAQ\Modules\umaquo-bin) are used to export the data records in the right format

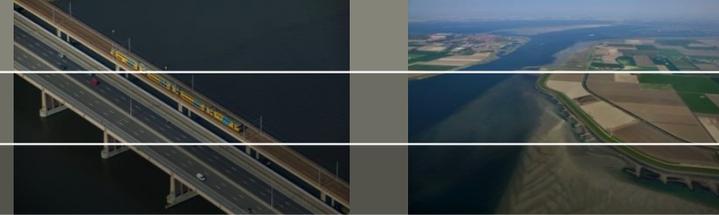
2. Run the workflow Export data from the Task display 
3. Check the content of \FEWS-WAQ\Export\UmAquo\CSV\
4. Is the exported data similar to what you see in your FEWS application?

Exercise 10: On-the-fly summation

In this exercise you will use the on-the-fly summation feature.

1. In the *Data Viewer* select the *Plants* parameter and location *Lobith*.
2. Look at the underlying data by opening the table (F7) in the Graph-display
 - > Which plant species are present?
 - > What is the coverage for each species?
3. Open the Taxa folder in the *Sub parameter* box
4. Click on the folder *All taxa* and see how the summation character (Σ) appears.
5. Look at the data table again. What do you see?

Exercise 11. Aggregation



In this exercise you will add your own aggregation to the process data task.

1. Open `/ModuleConfigFiles/Processing/Process_Samples.xml`
2. Run the *Process data* task (). Check in the Data Viewer if a new Qualifier Group has been added to the 'Sub parameters' panel. Examine the calculated statistics.
3. Add a new transformation in this xml file that calculates **minimum** weight of observed fish similar to the available example for maximum weight (Qualifier for 'minimum' = ST_1).

Note: Think of an input timeseries, an output timeseries, and a transformation.

4. Load the configuration changes into the application by pressing F5.
5. Re-run the *Process data* task. Check whether the calculated timeseries is added to the database and is visible.

Exercise 12a. Calculating loads

Preparation step:

Copy “[Exercise 12\Preparation\Config\SystemConfigFiles\DisplayGroups.xml](#)” from the Exercise folder to your configuration and reload the application (F5)

Check the predefined graph (Graph Display, -button + use ) and notice the two lower plots are empty

In this exercise you will calculate the Nitrogen load...

1. Examine [/ModuleConfigFiles/Processing/Calculate_Loads.xml](#)
Which new qualifierGroup is used in this transformation?
2. Add [Calculate_Loads.xml](#) to the [Process_Data.xml](#) workflow.
Hint: Exercise 1a.
3. Run the *Process data* workflow from the *TaskRun* display.
4. Check the added results in the predefined
5. Now re-run *Process_Data* workflow for year 2015 and check the graph once more
Hint: change the start and endtime

Exercise 12b. Calculating loads

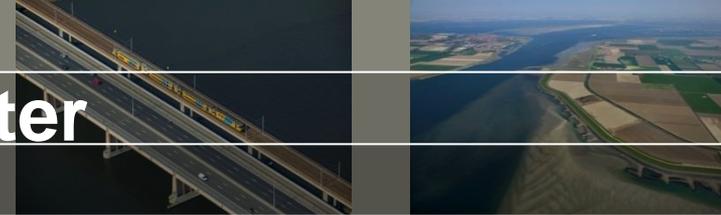
In this exercise you will...

1. Add the new Qualifier Group (see exercise 12a) as a new Qualifier node in the **Qualifier.xml**

| | | | | |
|---|------------|---------------|--------------|---------------------|
| 7 | Statistics | ▼ constraints | | |
| 8 | Method | ▲ constraints | ▲ idContains | |
| | | | contains | CM_ |
| 9 | Taxa | | | ▼ qualifierNode (3) |

2. Check results in the DataViewer

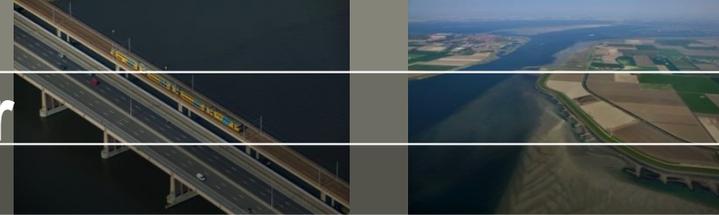
Exercise 13. Adding a parameter



In this exercise you'll add the parameter phosphate (Ptot) to your import.

1. Check out the new nutrient data import file in the exercise folder (`\Exercise 13\Import\SampleData\Samples_Nut_20132015.csv`).
2. Replace the old nutrient data file in the import folder (`\FEWS-WAQ\Import\SampleData\`) with the new nutrient data file.
3. Add the parameter phosphate to the `\MapLayerFiles\Parameters\parameterid.csv` according to the example in your exercise folder.
4. Reload the configuration with F5.
5. Rerun the *Import data* task.
6. Check the results in the different viewers.

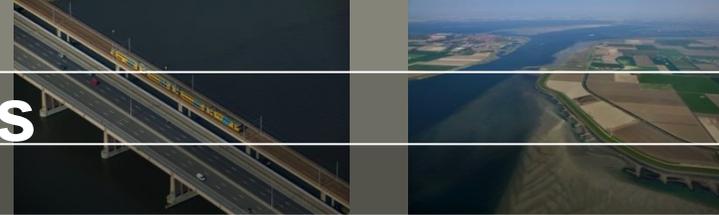
Exercise 14. Adding a qualifier



In this exercise we will add the qualifier fish gender to the hydrobiological import and reimport the data.

1. Check the gender column in [Import/SampleData/Samples_Bio_May2016.csv](#).
2. Check the [/MapLayerFiles/Qualifier/gender.csv](#) file.
3. Add the qualifier column “gender” to the [/ModuleConfigFiles/Import/Import_SampleData.xml](#). Give it the prefix “GE_”.
4. Add the qualifier gender.csv file to [RegionConfigFiles/Qualifier.xml](#).
Hint: use the quantity.csv definition as an example.
5. Reload the configuration.
6. Rerun the import.
7. Check the adjusted sample in the Sample Viewer.

Exercise 15. Sample properties



In this exercise you will change the sample properties.

1. Open the Sample Viewer and look at the employee names.
2. Go to the folder `/MapLayerFiles/Samples/` and examine the files within this folder.
3. Open `Employee.csv`
4. Rename Sampler A to “Willem de Bruin”.
5. Reload the configuration in the application.
6. Open the Sample Viewer and look at the employee names.

Exercise 16. Reorganize Qualifier Tree

In this additional exercise you will reorganize the data...

Try to organize the plant records according to:

1. Red list species
2. Other (common) species

by adding additional Qualifier nodes in the Sub Parameter panel

What file(s) do you need to adjust?

Hint: Check the biotaxon.csv for the available attributes