

HEC-RAS Mapper v.5.0.7 Setup in the FEWS

January 2021

Setup of the HEC-RAS-Mapper adapter for FEWS

The RAS Mapper module in the HEC-RAS software processes the 1-D and 2-D HEC-RAS unsteady flow results to spatially visualize and output maps of inundation extent, water depth, water surface elevation (WSE) and other hydraulic parameters. The RasMapper/FEWS adapter makes these capabilities accessible to the FEWS.

The output formats of the HEC-RAS Mapper program are polygon shapefiles for inundation extent and GeoTIFF format for raster data of water depth and water surface elevation. The shapefile outputs can be imported directly into the FEWS database. The raster GeoTIFF files require conversion to NetCDF format for import back to the FEWS.

The steps required to setup and configure the generation of raster output (e.g. WSE) and polygon inundation in the FEWS are generalized below:

- 1) Configure the HEC-RAS unsteady run to save output results for mapping
- 2) Using the RAS Mapper GUI, setup a *.rasmap file to be used as the template for creating raster and polygon result output for a FEWS forecast run.
- 3) Configure FEWS files for the RasMapper adapter and RasMapper compute.

1.0 Setup in HEC-RAS GUI

HEC-RAS GUI, Unsteady Compute

To allow the creation of raster WSE and polygon inundation in the RasMapper program, the HEC-RAS plan file for an Unsteady Flow compute must be setup to save the data to the result *.hdf file. This is done with the “Mapping Output Interval” setting in the Unsteady Flow Analysis dialog shown in Figure 1.

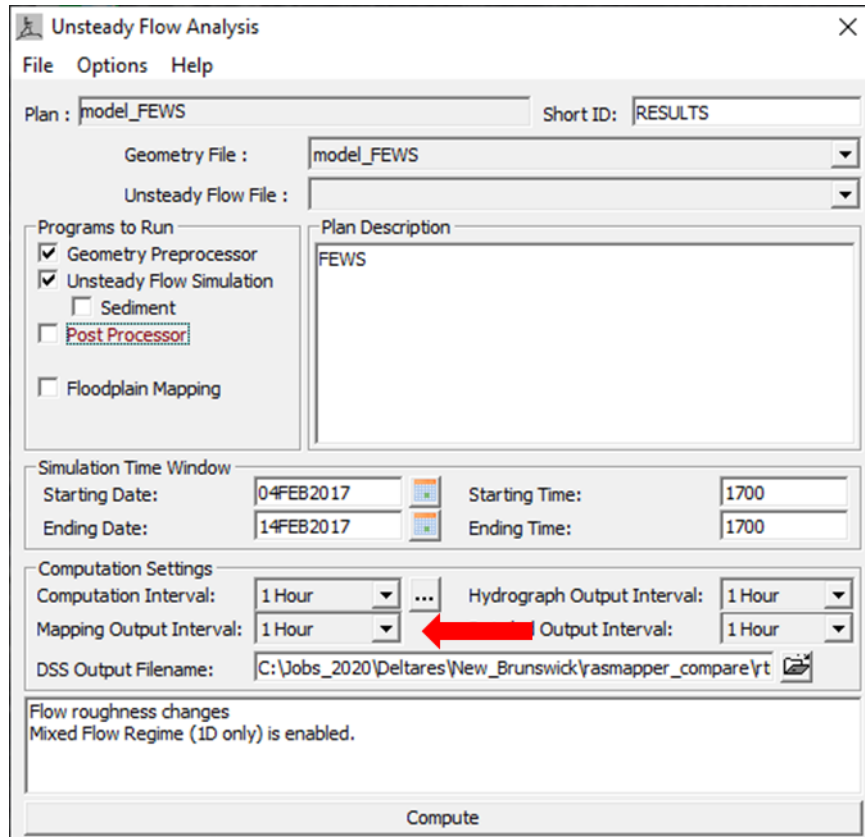


Figure 1 HEC-RAS GUI Unsteady Flow compute dialog. The “Mapping Output Interval” controls the available unsteady flow results for the RAS Mapper result display.

From the HEC-RAS 5.0 Users Manual:

Mapping Output Interval. This field is used to enter the interval at which the user will be able to visualize mapping output within HEC-RAS Mapper. A limited set of output is written to a separate HDF5 output file that corresponds to the Plan file. For example, if you are running Plan 1, the Plan filename will be something like “filename.p01”. An output file will be written out by the unsteady flow computational program, with the name “filename.p01.hdf”. This file will contain results from the unsteady flow simulation, written out at the interval the user defines for the **Mapping Output Interval**. The user will then be able to visualize spatial mapping output in HEC-RAS Mapper based on this time interval.

The significant point is to set the “Mapping Output Interval” in the HEC-RAS plan file in the HEC-RAS /FEWS ModuleDataSetFiles.

2.0 Setup in the RAS Mapper GUI

Figure 2 displays the RAS Mapper GUI showing computed results for the Muncie 1D - 2D model from the HEC-RAS example project set. The setup information for the dialog (Result sets, Geometries, terrain maps, plot options) is stored in the Muncie.rasmap file (Figure 3).

The RasMapper/FEWS adapter requires the *.rasmap file from the HEC-RAS GUI project to serve as a template file for creating the raster and polygon output from the RasMapper/FEWS run. The RAS Mapper GUI for the simple FEWS test case is presented in Figure 4. The important elements to note are:

- 1) Terrain DEM
- 2) WSE, depth and velocity raster result maps and Inundation Boundary polygon map
- 3) The raster and polygon maps for creation in FEWS are marked as “stored” (📁).
- 4) The “RESULTS” plan ID for the output mapping

There should be a “stored” map for each desired output type (raster WSE, raster Depth, raster velocity magnitude, and the Inundation polygon). However, the output interval (Hourly, Daily, Max) in the FEWS will be controlled by the RasMapper/FEWS adapter. That is the “WSE (Max)” map shown in the RAS Mapper Results node will serve as a template for both the Max and time interval (the desired output interval) raster output generation in the RasMapper run in the FEWS.

NOTE! There should be only one stored map of each desired output type. A stored WSE map for the “Max” profile and some hourly profiles would result in duplication in the RasMapper/FEWS run. However, “dynamic” result maps are ignored by the RasMapper/FEWS adapter.

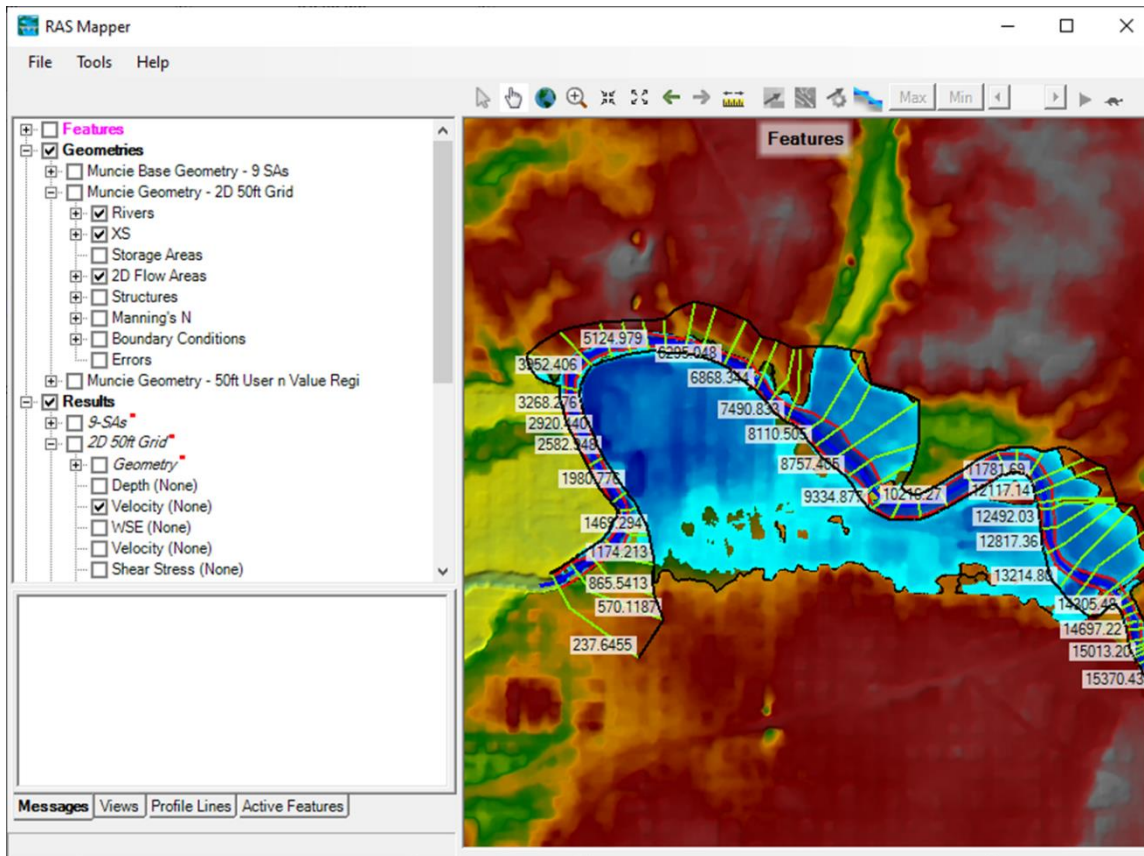


Figure 2 RAS Mapper GUI showing the Muncie 1D - 2D project from the HEC-RAS example set.

```

Muncie.rasmap
2 <RASMapper>
3 <Version>2.0.0</Version>
4 <RASProjectionFilename Filename=".\\GIS_Data\\Muncie_TA_Clip.prj" />
5 <Features>
6 <Layer Name="Profile Lines" Type="PolylineFeatureLayer" Filename=".\\Features\\Profile Lines.shp">
7 <LabelFeatures Checked="True" Center="False" rows="1" cols="1" r0c0="Name" Position="3" Color="-1677216" />
8 </Layer>
9 </Features>
10 <Geometries Checked="True" Expanded="True">
11 <Layer Name="Muncie Base Geometry - 9 SAs" Type="RASGeometry" Filename=".\\Muncie.g01.hdf">
12 <Layer Type="RASRiver" Checked="True" />
13 <Layer Type="RASBankLines" Checked="True" />
14 <Layer Name="XS" Type="RASXS" Checked="True" />
15 <Layer Name="River Edge Lines" Type="RASEdgeLines" Checked="True" />
16 </Layer>
17 <Layer Name="Muncie Geometry - 2D 50ft Grid" Type="RASGeometry" Expanded="True" Filename=".\\Muncie.g02.hdf">
18 <Layer Type="RASRiver" Checked="True" />
19 <Layer Type="RASBankLines" Checked="True" />
20 <Layer Name="XS" Type="RASXS" Checked="True">
21 <LabelFeatures Checked="True" Center="False" rows="1" cols="1" r0c0="River Station" Position="0" Color="-1677216" />
22 </Layer>
23 <Layer Name="River Edge Lines" Type="RASEdgeLines" Checked="True" />
24 <Layer Type="RAS2DFlowArea" Checked="True" />
25 <Layer Name="Manning's n Regions" Type="RasLandCoverRegions">
26 <LabelFeatures Checked="False" Center="False" rows="1" cols="1" r0c0="FID" Position="0" Color="-1677216" />
27 </Layer>
28 </Layer>
29 <Layer Name="Muncie Geometry - 50ft User n Value Regi" Type="RASGeometry" Filename=".\\Muncie.g04.hdf">
30 <Layer Type="RASRiver" Checked="True" />

```

Figure 3 Partial listing of the Muncie.rasmap file.

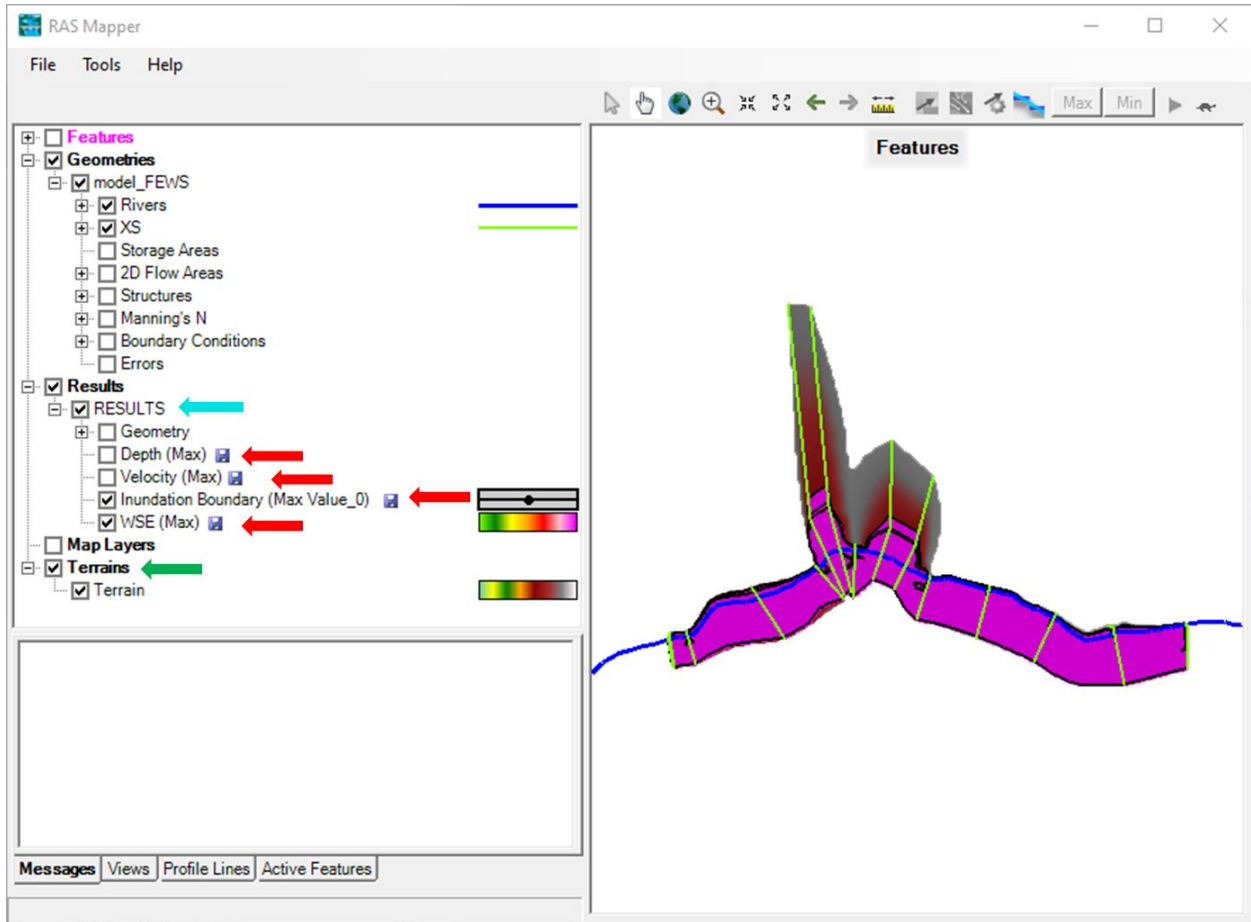



Figure 4 RAS Mapper GUI for the simple FEWS HEC-RAS test case. The red arrows highlight the  icon indicating a “stored” map, necessary the generation of raster and inundation maps for export to the FEWS. The green arrow highlights the terrain file, required for computing the maps. The cyan arrow highlights the “RESULTS” plan ID, the plan ID assigned to all FEWS HEC-RAS runs.

The result maps are set to “stored” by right-clicking on the map tree node (Figure 5). This brings up the “Results Map Parameters” dialog. On the right side of the dialog are radio buttons for selecting the “Map Output Mode”. Select the appropriate radio button under the “Stored (saved to disk)” heading. Note in Figure 5 the “Unsteady Profile” selection either as “Maximum”, “Minimum” or a selected profile time. The “Unsteady Profile” type selected is not important for setting up the rasmap template file for the FEWS. The type will be overridden by FEWS parameters in the RAS Mapper run. It is important to only have one “stored” map for each “Map Type” – Water Surface Elevation”, “Depth”, “Velocity” or “Inundation Boundary” (the current set of supported types in the RasMapper/FEWS adapter).

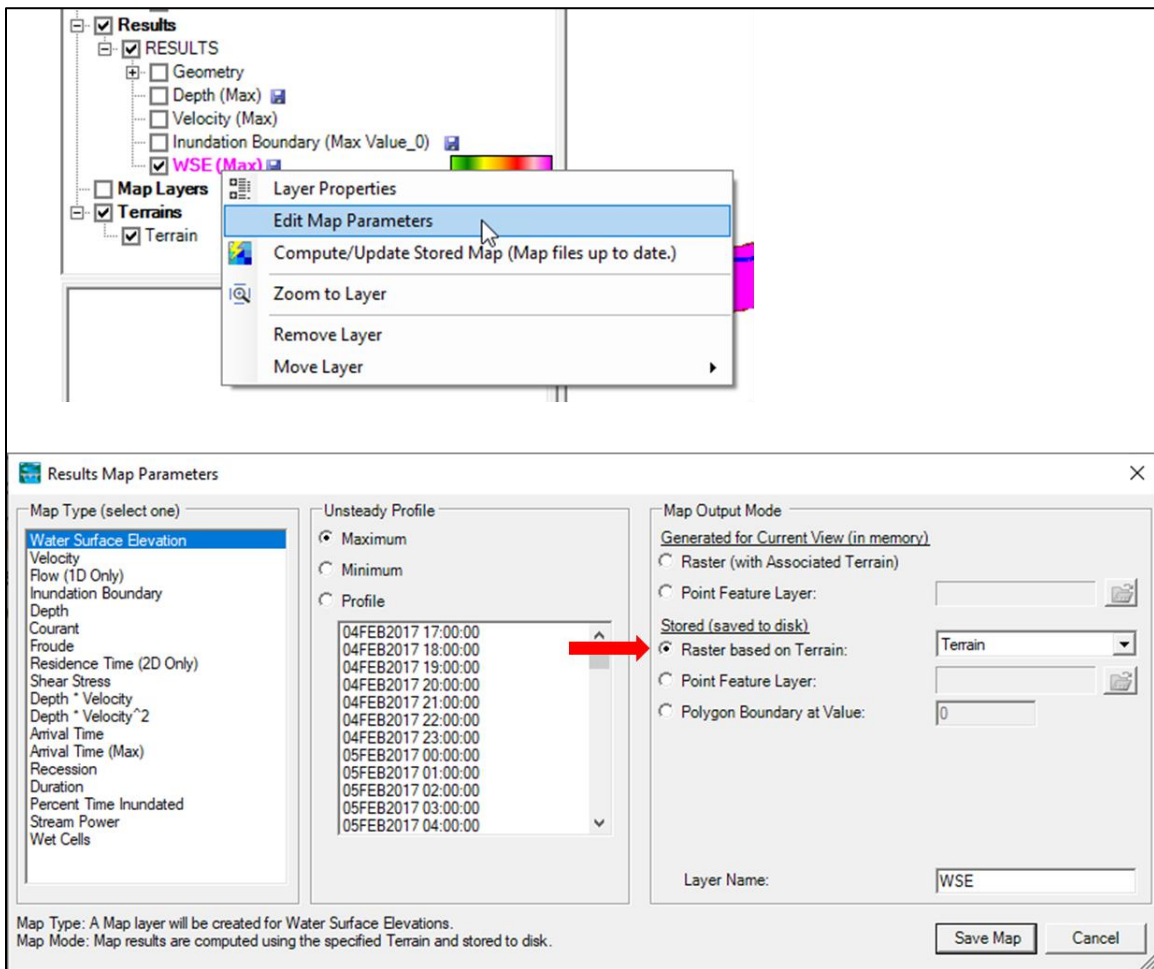


Figure 5 Setting results Map Output Mode as “Stored”.

Before a raster or polygon result map can be generated, a terrain DEM must be included in the RAS Mapper project. If a terrain DEM is not currently available, for 1-D systems one can be created from the 1-D cross-section geometry (Figure 6). Right-click on the plan geometry node (under “Geometries”). Select the “Export Layer->Create Terrain Geo Tiff from XS’s” menu. See the HEC-RAS User’s Manual section, “Export Terrain from Geometry”, for detailed instructions on the process. **NOTE! The resolution of the raster and polygon result maps is controlled by the resolution of the terrain DEM. A 10 ft x 10 ft terrain resolution yields a WSE raster result map of the same 10 ft x 10 ft resolution.**

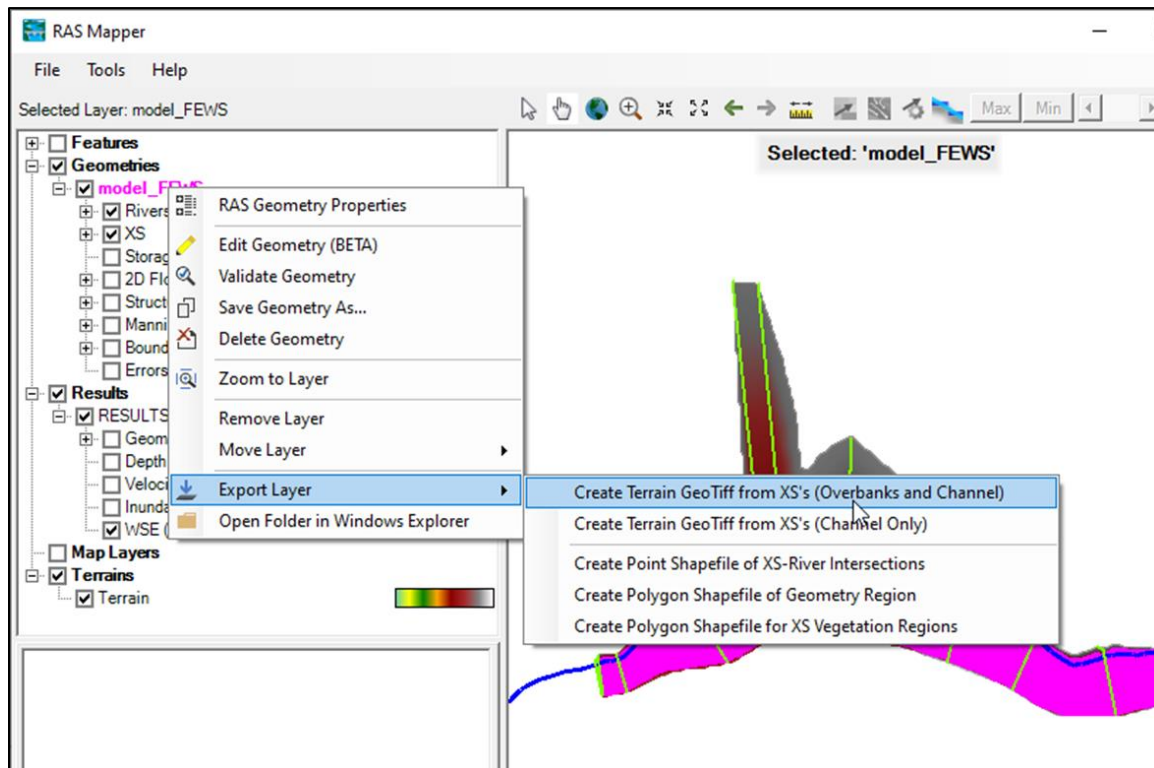


Figure 6 Step to create terrain DEM for RAS Mapper Terrain from a 1-D channel geometry.

After the terrain layer has been assigned and the stored raster and polygon maps setup, close the RAS Mapper dialog to save the *.rasmap file to be used as the template in the RasMapper/FEWS adapter map generation.

The output results Plan ID for a HEC-RAS compute in FEWS is “RESULTS”. The RAS Mapper setup for the FEWS will need to have this Plan ID. A simple method to ensure this is to open the workflow from a HEC-RAS compute in FEWS with the HEC-RAS GUI and use those model files to setup the *.rasmap template with the RAS Mapper dialog.

In general, the RAS Mapper configuration should be kept as basic as possible, such as limiting drawing options and multiple plans and geometries. The RasMapper adapter parses the rasmap file and may not be implemented to expect all the possible setting and options.

While in the HEC-RAS Mapper GUI, a user can generate “stored” raster WSE as GeoTIFF files and polygon inundation files in ESRI shapefile format. These result maps are stored in a sub-folder in the HEC-RAS project directory identified by the Plan Short ID (Figure 7). The computational program which performs the actual raster and polygon generation is “RasComputeMaps.exe”. For the example HEC-RAS project in Figure 7, the command line execution would be:

RasComputeMaps.exe ./model.p01.hdf model.rasmap

The RasMapper/FEWS adapter creates a *.rasmap file from the template *.rasmap file for selected raster and polygon output and launches the above command. The output inundation shape files can be readily imported into the FEWS system for display. However the raster format result type for the FEWS is the NetCDF regular grid type. In this case the raster GeoTIFF files are converted by RasMapper/FEWS adapter to the NetCDF file format.

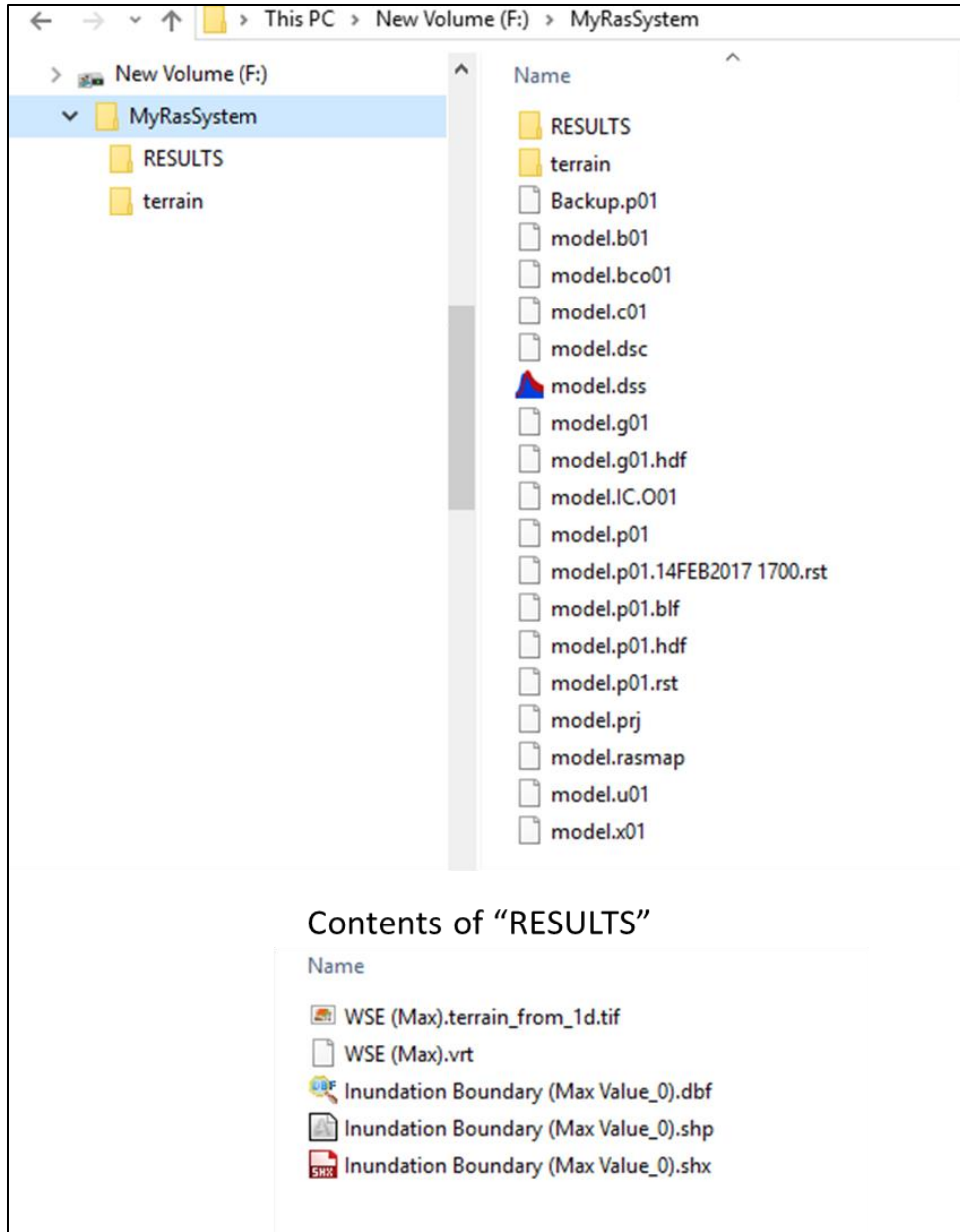


Figure 7 Directory and file structure of a HEC-RAS GUI project.

3.0 Setup in the FEWS

This sections presents the setup of the RasMapper in FEWS. The instructions cover the update/modification for an existing HEC-RAS river system in FEWS. The steps for adding the RasMapper in FEWS are:

- 1) Addition or update of some HEC-RAS and RAS Mapper model files to the FEWS ../ModuleDataSetFiles.
- 2) Configuration of the RasMapper GA and other xml files in FEWS
- 3) Adding the RasMapper/FEWS adapter to the Model/HEC-RAS/bin directory.

The function of the RasMapper/FEWS adapter is to setup a *.rasmap file and run the RasComputeMaps.exe command line as shown in the previous section. The RasMapper adapter then processes the resulting raster GeoTIFF files into NetCDF format for import back to the FEWS datastore.

The discussion of the update of the HEC-RAS in FEWS for the new RasMapper adapter is presented for the simple standalone HEC-RAS system shown in Figure 8. The full directory structure for the HEC-RAS/FEWS example is presented in Figure 9.

The RasMapper java jar files and required *.dll files are located in the ../Models/HEC-RAS/bin/rasmapper_adapter_v507 directory (Figure 10). The two new jar files developed to implement the RasMapper/FEWS adapter are the “module-adapter-rasmapper.jar” and “rasmapper.jar”. The remaining *.jar files and *.dll files are supporting third party libraries: Deltares, HDF5, geotools and NetCDF.

Update of HEC-RAS model input files and add RasMapper model input file

The first step in the RasMapper/FEWS configuration is to update the HEC-RAS model input files in the Config/ModuleDataSetFiles/HEC-RAS.zip. The contents of the HEC-RAS.zip are shown in Figure 11. The update applies to the /terrain files generated in the HEC-RAS Mapper GUI program as presented in the previous section. A RasMapper.zip file is added to the Config/ModuleDataSetFiles directory. The RasMapper.zip contains the *.rasmap template file (Figure 12) that provides the controls and information for outputting the raster and polygon files in the RasMapper/FEWS.

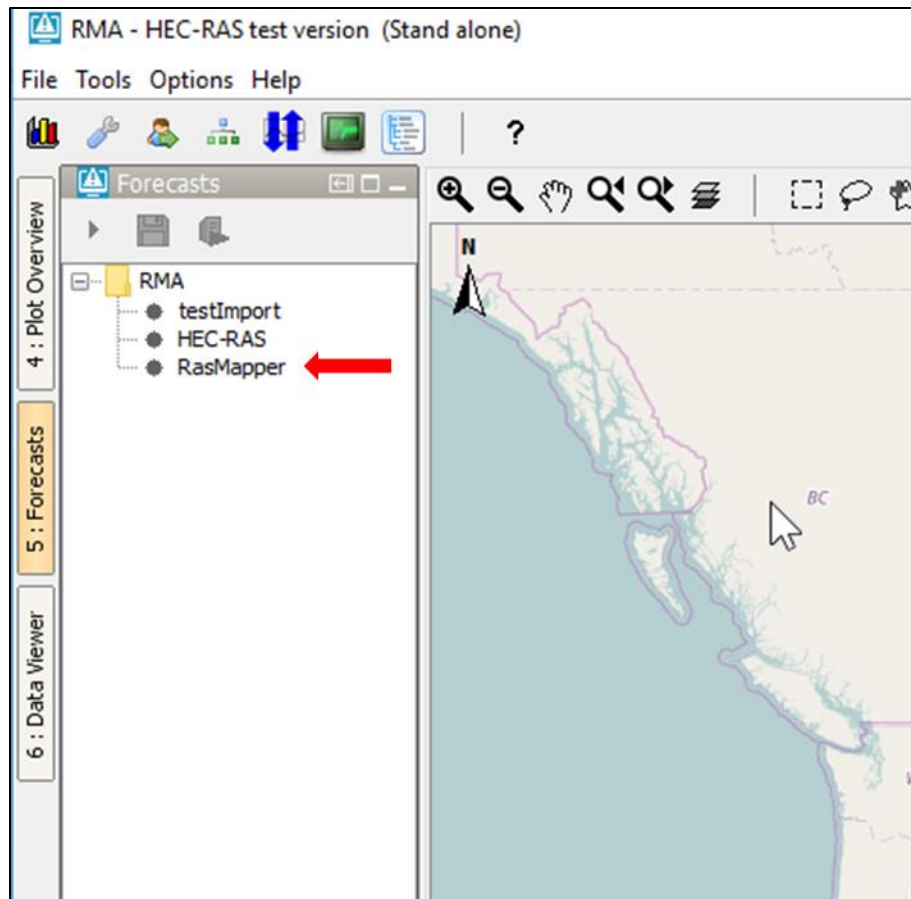


Figure 8 Standalone HEC-RAS in FEWS example for new RasMapper adapter.

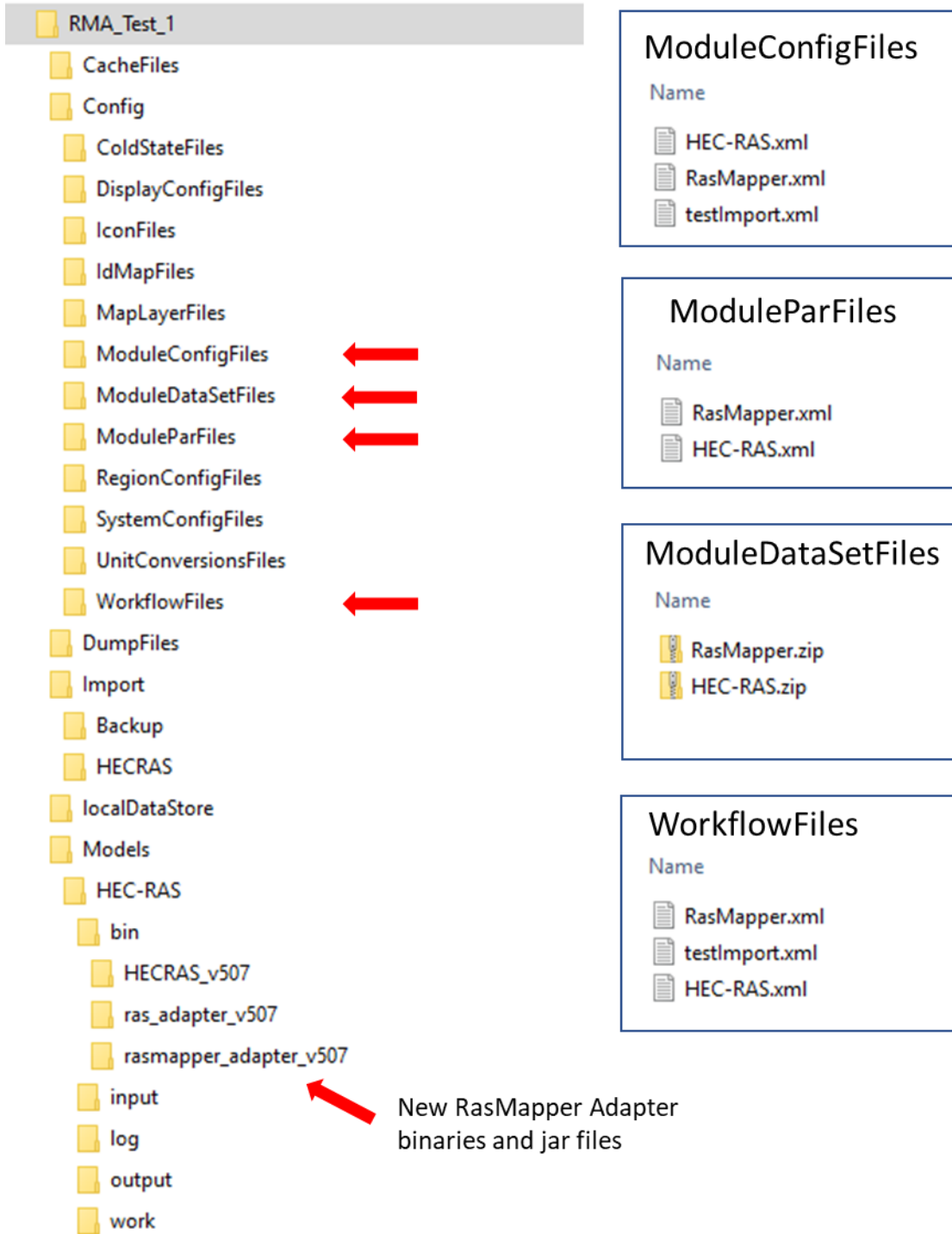


Figure 9 HEC-RAS in FEWS directory structure showing new files for implementing the RasMapper in FEWS.

HEC-RAS Mapper v.5.0.7 Setup in the FEWS

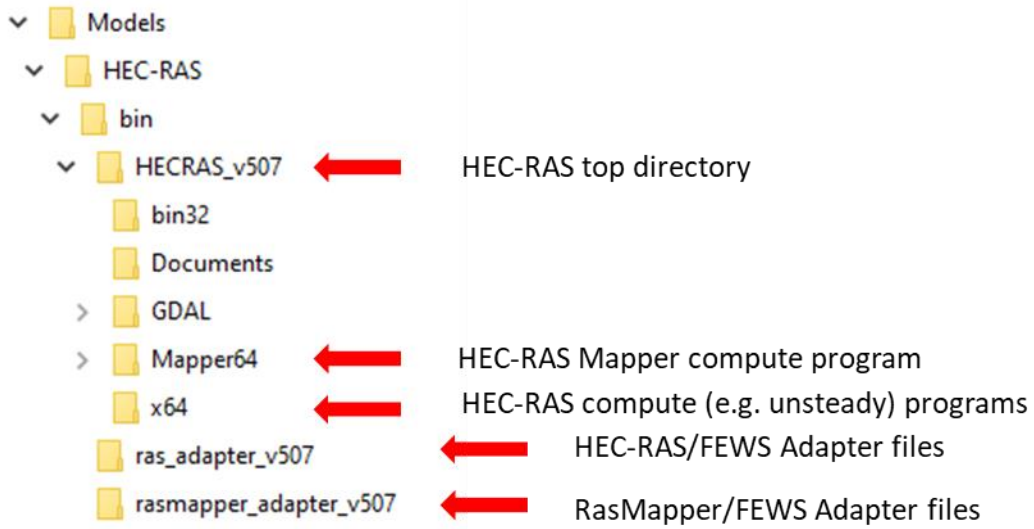
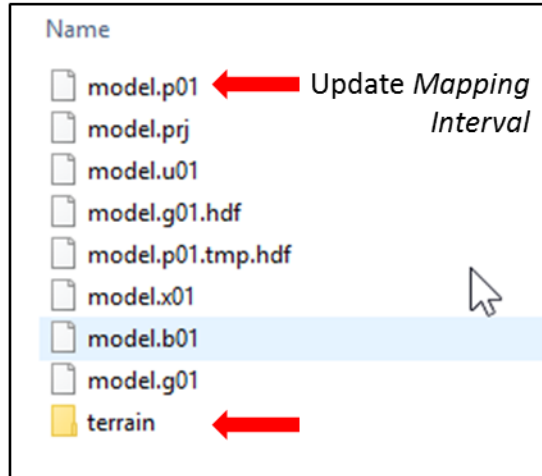


Figure 10 Location of the RasMapper/FEWS adapter and HEC-RAS Mapper executable program and libraries. The contents of the HECRAS_v507 and sub folders represent the program installation of the HEC-RAS v.5.0.7 from the USACE Hydrologic Center.

HEC-RAS.zip



Terrain folder

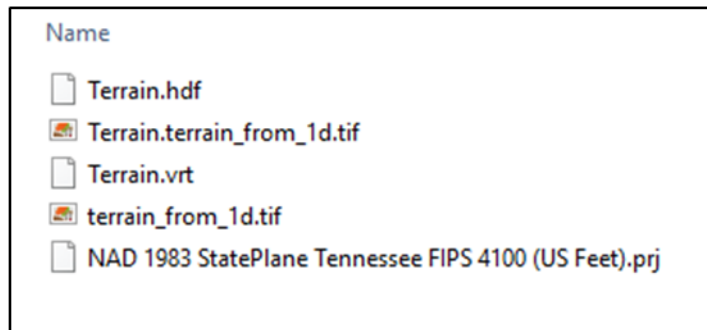


Figure 11 Update of HEC-RAS model input files for the RasMapper in FEWS. Note the inclusion of the terrain data directory.

RasMapper.zip

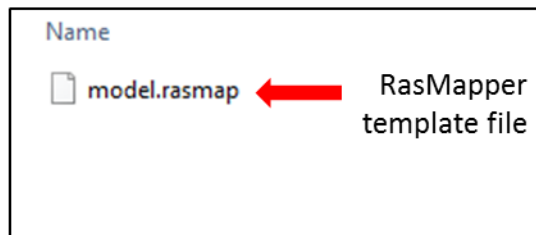


Figure 12 RasMapper model input file

Add FEWS Configuration files for the RasMapper

The FEWS “sa_global.properties” may need to be for the RasMapper adapter:

```
GA_DUMPFILEDIR=%REGION_HOME%/DumpFiles
HECRASBINDIR=%REGION_HOME%/Models/HEC-RAS/bin
CACHE_DIR=%REGION_HOME%/CacheFiles
DEFAULT_EXPIRY_DAYS=30
T0=02-14-2017 17:00:00 GMT
localDatastoreFormat=firebird
JREDIR=G:/FEWS_NB/FEWS_2019_02/fews-stable-201902-96724-bin/windows/jre
```

The HECRASBINDIR should be in the sa_global.properties file if not currently present. The RasMapper/FEWS adapter and HEC-RAS Mapper compute program will be in subdirectories of this directory. **NOTE! Use only forward slashes in the directory paths.** The RasMapper adapter post process step will need to run in its own JVM. Launching the post process through the usual FEWS executeActivity can result in a conflict with the geotools libraries already loaded by the FEWS. A path to the JVM is needed.

The RasMapper adapter is added to the FEWS Workflow as other module adapters. Discussion is presented for the addition of a RasMapper General Adapter in ModuleConfigFiles and RasMapper parameters file in ModuleParFiles (Figure 9).

RasMapper General Adapter and Model Adapter for the FEWS

The RasMapper General Adapter file, RasMapper.xml, resides in the ModuleConfigFiles directory. The RasMapper GA performs the following tasks:

- 1) Setup the working environment for the RasMapper model adapter.
- 2) Create the run_info and parameter input files.
- 3) Copy over the base *.rasmap template file from the ModuleDataSetFiles/RasMapper.zip to the HEC-RAS/work directory.
- 4) Run the RasMapper model adapter to produce inundation polygons and raster WSE outputs. Run the model adapter to convert these output formats to FEWS compatible formats.
- 5) Import the polygon shapefiles and NetCDF raster files.

The HEC-RAS unsteady compute results reside in the Models/HEC-RAS/work directory and which the RasMapper adapter will post-process for new output. The directory and subdirectory structure for the RasMapper processing is the same as for the HEC-RAS/FEWS adapter, and the RasMapper GA is configured as such. That is the ROOT_DIR in the GA is set to the “/Models/HEC-RAS” directory. The RasMapper model adapter requires its own run_info.xml run file. The run_info file for controlling the RasMapper model adapter is set to “run_info_rasmapper.xml” so to not overwrite the “run_info.xml” file from the HEC-RAS GA. Similarly exported RasMapper parameter input file is exported to the “params_rasmapper.xml” file.

Running the RasMapper model adapter is a three step process. The RasMapper model adapter is run three separate times with the proper argument type for selecting the “preprocess”, “compute”, and “postProcess” steps.

- 1) preProcess – read the *.rasmap template file and write out an updated file with the desired polygon and raster output times.
- 2) compute – run the RasComputeMaps.exe to produce the HEC-RASMapper inundation polygons (shapefile format) and raster (WSE, depth & velocity magnitude) files in GeoTIFF format.
- 3) postProcess – move the polygon shapefiles to the FEWS import directory and convert the raster GeoTIFF files to NetCDF format.

Figure 13 shows the section of RasMapper GA setting up the run_info_rasmapper.xml properties and the executeActivity for RasMapper adapter preProcess step. Note the hecRasBinDirectory set to the location HEC-RAS Mapper compute programs and libraries. The ShapefileImportDirectory is the location for the FEWS import of the computed inundation polygon shape files.

Figure 14 shows the section of RasMapper GA for the RasMapper adapter postProcess step. The postProcess step uses geotools and netcdf libraries that conflict with the libraries loaded by the FEWS. For this reason the postProcess adapter is run in a separate instance of the JVM.

```

<exportActivities>
  <exportDataSetActivity>
    <moduleInstanceId>RasMapper</moduleInstanceId>
  </exportDataSetActivity>
  <exportParameterActivity>
    <fileName>params_rasmapper.xml</fileName>
    <moduleInstanceId>RasMapper</moduleInstanceId>
  </exportParameterActivity>
  <exportRunFileActivity>
    <exportFile>%ROOT_DIR%/run_info_rasmapper.xml</exportFile>
    <properties>
      <string key="logLevel" value="DEBUG"/>
      <string key="hecRasBinDirectory" value="$HECRASBINDIR$/HECRAS_v507/Mapper64"/>
      <string key="hecRasProjectFile" value="%ROOT_DIR%/work/model.prj"/>
      <string key="ShapefileImportDirectory" value="%ROOT_DIR%/output"/>
    </properties>
  </exportRunFileActivity>
</exportActivities>
<executeActivities>
  <executeActivity>
    <command>
      <className>nl.wldelft.fews.adapter.rasmapper.HecRasMapperAdapter</className>
      <binDir>$HECRASBINDIR$/rasmapper_adapter_v507</binDir>
    </command>
    <arguments>
      <argument>%ROOT_DIR%/run_info_rasmapper.xml</argument>
      <argument>preProcess</argument>
    </arguments>
    <timeOut>600000</timeOut>
  </executeActivity>

```

HEC-RAS/RAS Mapper executable directory

Inundation shapefiles imported here

Execute adapter, preProcess step

Figure 13 Setup in RasMapper GA for the run_info_mapper.xml properties and the executeActivity for the RasMapper adapter preProcess step.

```
<!--RasMapper Post Process only.
Run in separate JRE due to conflict with some fews java libraries
-->
<executeActivity>
  <command>
    <className>nl.wldelft.fews.adapter.rasmapper.HecRasMapperAdapter</className>
    <binDir>${HECRASBINDIR}/rasmapper_adapter_v507</binDir>
    <customJreDir>${JREDIR}</customJreDir>
    <!-- <jvmArg>-mx1024m</jvmArg> -->
  </command>
  <arguments>
    <argument>%ROOT_DIR%/run_info_rasmapper.xml</argument>
    <argument>postProcess</argument>
  </arguments>
  <!-- for loading the netcdf c library -->
  <environmentVariables>
    <environmentVariable>
      <name>path</name>
      <value>%PATH%;${HECRASBINDIR}/rasmapper_adapter_v507;</value>
    </environmentVariable>
  </environmentVariables>
  <timeOut>60000</timeOut>
</executeActivity>
</executeActivities>
```

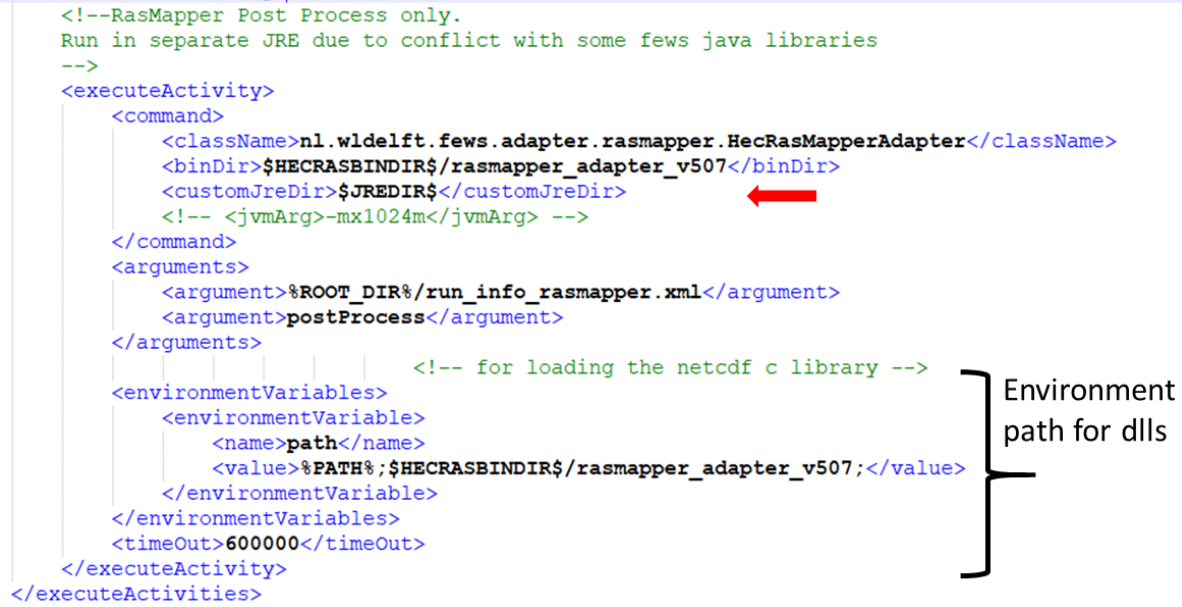


Figure 14 Setup in RasMapper GA for the postProcess step invoking a new JVM. This is done to avoid conflicts with the geotools and netcdf libraries loaded in the FEWS.

```

97 <!-- import NetCDF time series -->
98 <importNetcdfActivity>
99   <importFile>%ROOT_DIR%/output/output_raster.nc</importFile>
100   <timeSeriesSets>
101     <timeSeriesSet>
102       <moduleInstanceId>RasMapper</moduleInstanceId>
103       <valueType>grid</valueType>
104       <parameterId>water_surface_elevation</parameterId>
105       <locationId>model</locationId>
106       <timeSeriesType>simulated forecasting</timeSeriesType>
107       <timeStep unit="hour" multiplier="1"/>
108       <readWriteMode>add originals</readWriteMode>
109     </timeSeriesSet>
110     <timeSeriesSet>
111       <moduleInstanceId>RasMapper</moduleInstanceId>
112       <valueType>grid</valueType>
113       <parameterId>depth</parameterId>
114       <locationId>model</locationId>
115       <timeSeriesType>simulated forecasting</timeSeriesType>
116       <timeStep unit="hour" multiplier="1"/>
117       <readWriteMode>add originals</readWriteMode>
118     </timeSeriesSet>
119     <timeSeriesSet>
120       <moduleInstanceId>RasMapper</moduleInstanceId>
121       <valueType>grid</valueType>
122       <parameterId>velocity</parameterId>
123       <locationId>model</locationId>
124       <timeSeriesType>simulated forecasting</timeSeriesType>
125       <timeStep unit="hour" multiplier="1"/>
126       <readWriteMode>add originals</readWriteMode>
127     </timeSeriesSet>
128   </timeSeriesSets>
129 </importNetcdfActivity>
130 <!-- import NetCDF max value raster-->
131 <importNetcdfActivity>
132   <importFile>%ROOT_DIR%/output/output_raster_max.nc</importFile>
133   <timeSeriesSets>
134     <timeSeriesSet>
135       <moduleInstanceId>RasMapper</moduleInstanceId>
136       <valueType>grid</valueType>
137       <parameterId>water_surface_elevation</parameterId>
138       <locationId>model</locationId>
139       <timeSeriesType>simulated forecasting</timeSeriesType>
140       <timeStep unit="hour" multiplier="1"/>
141       <readWriteMode>add originals</readWriteMode>
142     </timeSeriesSet>
143     <timeSeriesSet>
144       <moduleInstanceId>RasMapper</moduleInstanceId>
145       <valueType>grid</valueType>
146       <parameterId>depth</parameterId>
147       <locationId>model</locationId>
148       <timeSeriesType>simulated forecasting</timeSeriesType>
149       <timeStep unit="hour" multiplier="1"/>
150       <readWriteMode>add originals</readWriteMode>
151     </timeSeriesSet>
152     <timeSeriesSet>
153       <moduleInstanceId>RasMapper</moduleInstanceId>
154       <valueType>grid</valueType>
155       <parameterId>velocity</parameterId>
156       <locationId>model</locationId>
157       <timeSeriesType>simulated forecasting</timeSeriesType>
158       <timeStep unit="hour" multiplier="1"/>
159       <readWriteMode>add originals</readWriteMode>
160     </timeSeriesSet>
161   </timeSeriesSets>
162 </importNetcdfActivity>
163 <importShapeFileActivity>

```

Figure 15 ImportActivities in the RasMapper GA for raster import of water_surface_elevation, depth and velocity.

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</importNetcdfActivity>
<importShapeFileActivity>
  <shapeFileImportDir>${ROOT_DIR}/output</shapeFileImportDir>
  <fileDateTimePattern>'Inundation Boundary ('ddMMMyyyy HH mm ss' Value_0).shp'</fileDateTimePattern>
  <geoDatum>EPSG:102736</geoDatum>
  <timeSeriesSet>
    <moduleInstanceId>RasMapper</moduleInstanceId>
    <valueType>polygon</valueType>
    <parameterId>inundation_boundary</parameterId>
    <locationId>model</locationId>
    <timeSeriesType>simulated forecasting</timeSeriesType>
    <timeStep unit="hour" multiplier="1"/>
    <readWriteMode>add originals</readWriteMode>
  </timeSeriesSet>
</importShapeFileActivity>
<importShapeFileActivity>
  <shapeFileImportDir>${ROOT_DIR}/output</shapeFileImportDir>
  <fileDateTimePattern>'Inundation Boundary (Max Value TO 'ddMMMyyyy HH mm ss').shp'</fileDateTimePattern>
  <geoDatum>EPSG:102736</geoDatum>
  <timeSeriesSet>
    <moduleInstanceId>RasMapper</moduleInstanceId>
    <valueType>polygon</valueType>
    <parameterId>max_inundation_boundary</parameterId>
    <locationId>model</locationId>
    <timeSeriesType>simulated forecasting</timeSeriesType>
    <timeStep unit="nonequidistant"/>
    <readWriteMode>add originals</readWriteMode>
  </timeSeriesSet>
</importShapeFileActivity>
</importActivities>

```

Figure 16 ImportActivities in the RasMapper GA for import of the inundation polygons.

The output of the RasMapper adapter inundation shapefiles and NetCDF format raster files of water surface elevation (WSE), depth of water and velocity magnitude. Figure 15 and Figure 16 list the section of RasMapper GA for the import of the raster map files and inundation shapefiles into the FEWS database. The results maps are group into the maximum case and time series interval case (e.g. every 2880 minutes). The output_raster.nc is the composite of the time interval raster maps and form a time series sequence of raster results, for example depth of water every 12 hours. The output_raster_max.nc contains the max value of WSE, Depth and/or Velocity for the HEC-RAS run. The result maps on the *.nc files contain their time information. For the inundation shape file the time of the result is coded in the shape file title, and matches the format specified in the “fileDateTimePattern”.

The sum of the runfile properties section and the importActivities section of the GA result In the run_info_rasmapper.xml file shown in Figure 17.

```

1  <?xml version="1.0" encoding="UTF-8"?>
2  <Run xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.wldelft.nl/fews/PI" xsi:schemaLocation="ht
3  <timeZone>0.0</timeZone>
4  <startDateTime date="2017-02-14" time="17:00:00"/>
5  <endDateTime date="2017-02-14" time="17:00:00"/>
6  <time0 date="2017-02-14" time="17:00:00"/>
7  <workDir>G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\work</workDir>
8  <inputParameterFile>G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\input\params_rasmapper.xml</inputParameterFile>
9  <outputDiagnosticFile>G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\log\rasMapperadapter.xml</outputDiagnosticFile>
10 <outputNetcdfFile>G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\output\output_raster.nc</outputNetcdfFile>
11 <outputNetcdfFile>G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\output\output_raster_max.nc</outputNetcdfFile>
12 <properties>
13   <string key="logLevel" value="DEBUG"/>
14   <string key="hecRasBinDirectory" value="G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\bin\HECRAS_v507\Mapper64"/>
15   <string key="hecRasProjectFile" value="G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\work\model.prj"/>
16   <string key="ShapefileImportDirectory" value="G:\FEWS_2019_02\RMA_Test_1\Models\HEC-RAS\output"/>
17 </properties>
18 </Run>

```

Figure 17 run_info_rasmapper.xml file for the simple FEWS test case.

RasMapper Adapter input parameter file

The compute and output of inundation polygons and raster maps set in the FEWS rasmapper run parameters dialog accessible in the FEWS GUI (Figure 18). The parameters are described below:

ComputationInterval - Output interval for time series inundation polygons and/or raster maps.
Interval time is in minutes.

StartIntervalOutput - Time of day (GMT) for starting interval offset computes.

computeMaxExtentProfile - Select to compute the maximum inundation polygon.

computeMaxGridProfile - Select to compute the maximum raster maps (e.g. maximum WSE).

computeExtentIntervalProfiles - Select to compute inundation polygons at regular time intervals.

computeGridIntervalProfiles - Select to compute raster maps at regular time intervals.

WSE, Depth, Velocity - Select parameters for raster map output.

The top screenshot shows the 'WorkflowNavigator Custom Viewer' window for 'G:\FEWS_NB'. It displays a table of parameters for 'rasmapper run parameters':

Parameter Name	Value / Status
ComputationInterval	2,880
computeMaxExtentProfile	<input checked="" type="checkbox"/>
computeMaxGridProfile	<input checked="" type="checkbox"/>
computeExtentIntervalProfiles	<input checked="" type="checkbox"/>
computeGridIntervalProfiles	<input checked="" type="checkbox"/>
WSE	<input checked="" type="checkbox"/>
Depth	<input type="checkbox"/>
Velocity	<input type="checkbox"/>

The bottom screenshot shows the XML file 'params_rasmapper.xml' with the following content and annotations:

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <parameters xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.wildelft.nl/fews/PT" xsi:schemaLocation:
3 <modifierType>RasMapper</modifierType>
4 <group id="rasmapper run parameters" name="rasmapper run parameters" readonly="false" modified="false">
5   <parameter id="ComputationInterval" name="ComputationInterval">
6     <description>Computation interval in minutes. Does not change interval of output data.</description>
7     <intValue>2880</intValue>
8   </parameter>
9   <parameter id="computeMaxExtentProfile" name="computeMaxExtentProfile">
10    <description>
11      Sets the "computeMaxExtentProfile" flag for the RasMapper general adapter, which
12      if TRUE will compute polygon output for the Max Stage profile
13    </description>
14    <boolValue>true</boolValue>
15  </parameter>
16  <parameter id="computeMaxGridProfile" name="computeMaxGridProfile">
17    <description>
18      Sets the "computeMaxGridProfile" flag for the RasMapper general adapter, which
19      if TRUE will compute raster output for the Max Stage, depth, etc. profile
20    </description>
21    <boolValue>true</boolValue>
22  </parameter>
23  <parameter id="computeExtentIntervalProfiles" name="computeExtentIntervalProfiles">
24    <description>
25      Sets the "computeExtentIntervalProfiles" flag for the RasMapper general adapter, which
26      if TRUE will compute bounding polygon output for the time interval specified by
27      the Computation interval
28    </description>
29    <boolValue>true</boolValue>
30  </parameter>
31  <parameter id="computeGridIntervalProfiles" name="computeGridIntervalProfiles">
32    <description>
33      Sets the "computeGridIntervalProfiles" flag for the RasMapper general adapter, which
34      if TRUE will compute raster output for the time interval specified by
35      the Computation interval
36    </description>
37    <boolValue>true</boolValue>
38  </parameter>
39  <parameter id="WSE" name="WSE">
40    <description>
41      switch for computing WSE raster grid.
42    </description>
43    <boolValue>true</boolValue>
44  </parameter>
45  <parameter id="Depth" name="Depth">
46    <description>
47      switch for computing Depth raster grid.
48    </description>
49    <boolValue>false</boolValue>
50  </parameter>
51  <parameter id="Velocity" name="Velocity">
52    <description>
53      switch for computing Velocity raster grid.
54    </description>
55    <boolValue>false</boolValue>
56  </parameter>
57 </group>
58 </parameters>
  
```

Annotations in the XML view include:

- Red arrow pointing to line 7: **Output Interval (minutes)**
- Red arrow pointing to line 10: **Inundation shapefile, Max**
- Red arrow pointing to line 16: **Raster (*.nc), Max**
- Red arrow pointing to line 23: **Inundation shapefile, Interval (time series)**
- Red arrow pointing to line 31: **Raster (*.nc), Interval (time series)**
- Red arrow pointing to line 39: **Raster Grid param types** (grouped with lines 45 and 51)

Figure 18 (top) FEWS parameter table dialog for controlling the production of inundation polygons and raster maps. (bottom) The RasMapper input/params_rasmapper.xml file. The Config/ModuleParFile/RasMapper.xml sets up the dialog properties table and base setting.