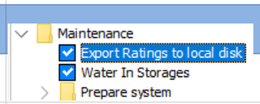
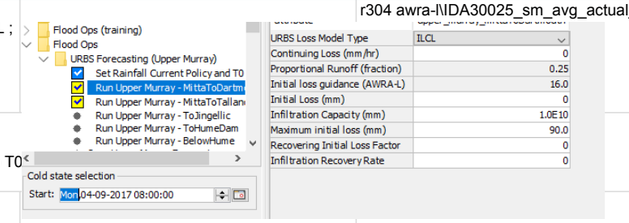
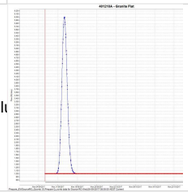
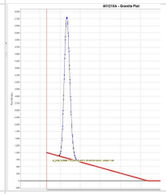
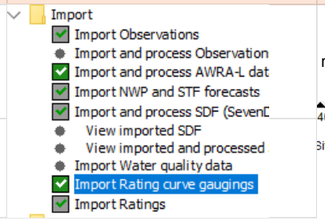
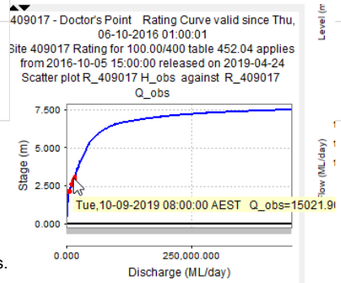
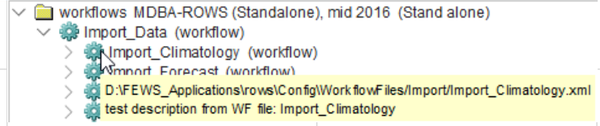
Id	Requirements	Implementation / release notes	Test script	Screenshots	Test_data/	Results
301	**FEWS-20301 Consume IOT sensor data from MQTT compatible message broker**		See tab for 2020.02 (to follow)			
302	**FEWS-20678 Rating and gauges**		See tab for 2019.02			
303	**Add xml tag or an attribute to rating header for rating table id**					
1	Add xml tag or an attribute to rating header for rating table id	The export-ratings functionality (from PI version 1.12) also exports the comment filed. Table id should be included in comment.	(import test file with comments); After testing, set <deleteImportedFiles> to true		r303 rating_tableId\ratings_tst.xml	
304	**FEWS-20619 Export rating curves with comments and table id**					
1	The rating table exported out of ROWS should contain comments and rating table id in the export.	The export-ratings already exports the comments, when used with PI version 1.12 or later. (2018.02)	export ratings (Workflows > Maintenance > Export Ratings) with comments			
2	Provide options to export all ratings in ROWS and to export only the latest rating tables.	The F-12 function exports all available rating curves.	F12 > T Export > rating curves			
305	**Operationalising AWRA-L data - Automate initial loss estimation for the 5 Upper Murray models**					
1	Calculate and display the calculated IL in the URBS modifiers		- T0=Wed,06-09-2017 08:00:00; - Copy file to $IMPORT_FTP_MDBA$/BOM_data/AWRA-L ; - Select in Workflows "Import > ... AWRA-L" - Open Plot Overview and inspect the graphs; After testing, set <deleteImportedFiles> to true		r304 awra-l\IDA30025_sm_avg_actual_2017.nc	
2	The IL still should be editable by the user		Flood Ops > URBS.. > Run .. > modifiers - Initial loss based on AWRA-L is given as guidance. -- Value is for Cold state selection (default 2 days prior to T0 - enter this value in the line below (Initial loss (mm)			
3	Check if the calculated IL matches the regression curve		Review the import and processed data: - Plot Overview (as before) - Spatial display > Observations (flood ops)> awra-L Regression curves can be found in: - Documents Overview > HowTo_URBS_Model_Initialization			
4	Use User-IL in URBS Model		Check the URBS_IL value used in appropriate ini file - \Modules\urbs\upper_murray\mittaToTallandoon\model\mittaToTallandoon.ini			
306	**FEWS-20673 Earth observation data to determine the extent of surface water during an environmental watering or a flood event**					
1	Should be able to use latest (freely available) satellite data from Sentinel.	Cost estimated is investigation of suitability of GA data as is (and implementing in Spatial Display if it is).	n/a			
2	The Sentinel data has a spatial resolution of 10-20 m. Output from processing has the same spatial resolution		n/a			
3	The Sentinel data creates data approx 2x per week (fly over). Output from processing has the same temporal resolution.		n/a			
4	The Sentinel data becomes available with a delay of approx xx days. The data is processed as it becomes available		n/a			
5	The processed satellite data can be displayed in ROWS spatial display and animated to show the changing extent of wetted area		T0 = now; Spatial > Observations (Flood ops) > Sentinel satellite data - data loads for today, data is in strips (as the satellite flies) - MDBA: to discuss this ndwi data feed with GA			
307	**FEWS-20620 EO - Web application can display the extent of surface water during an environmental watering or a flood event as determined by ROWS**					
1	The EO data is made available by ROWS through the PI-Webservice as WMS.	Basic WMS-T functionality is available since 2017.02 . A spatial display (plotID) can be visualized as a WMS layer, including legend/rendering details as the plot. It can be animated	n/a			
2	The EO data can be displayed as an animation in a standalone web application that is under development by MDBA. The web application requests data from ROWS through the PI-Webservice.	Performance/concurrent users of the WMS layer(s) might prove to be an issue when large number of (external) users request this WMS data. For now, developments to improve performance are not included.	n/a			
308	**Implement a Spatial display and modifiers to find and disable faulty rain gauges**					
1	Point observations of rain fall are transformed into a regular grid		T0=Wed,06-09-2017 08:00:00; - Copy file to $IMPORT_FTP_MDBA$/latest/ ; - Run Workflows > Import ratings (if needed); - Run Workflows > Import > Obs (FloodOps); After testing, set <deleteImportedFiles> to true		r308 disable rain gauge\latest*.csv	
2	User can compare point and gridded observed rain fall in a dedicated spatial display		- Open Spatial > Observvastions (Flood Ops) > Precipitation; - Identify faulty gauges (e.g. 082139 Hunters hill);			

Id	Requirements	Implementation / release notes	Test script	Screenshots	Test_data/	Results
3	User can easily identify suspicious rainfall stations and temporarily discontinue them by means of a modifier.		- Open Modifiers display, select Hunters hill gauge; - Apply (i.e. set to missing) and Re-run (redo nterpolation); - quickly go back to Spatial diplay, and see the effect of your modifier			
4	User can reactivate stations by de-activating modifiers		- Open Modifiers display and de-activate the modifier you created; - Apply and Re-run (redo nterpolation); - quickly go back to Spatial diplay, and to see the effect			
309	**Restructuring of OPO data generation transformation module instances**					
1	ModuleIntance templates accept location sets, parameters, qualifiers, and moduleInstanceIds as properties from the calling workflow. Current OPO processing tasks are redesigned making use of templates.		start with empty LDS; -T0=Wed,06-09-2017 08:00:00; - Copy / Extract (zip) files to $IMPORT$/ ; - Run Workflows > Import > Import Obs; - Run Workflows > Import ratings After testing, set <deleteImportedFiles> to true		r309 OPO/fromETL for OPO.zip; r309 OPO/fromHYDSTRA for OPO.zip	
a	Single template for EVAP fao and EVAP mlake	Processopo_templateEVAP				
b	Single template for EC, WT, AT, DO, Turb, ~~pH~~	Processopo_template	Note: pH does not fit the template			
c	Single template for WindDir, WindVel, GatesOpen	Processopo_templateSimple				
d	Single template for QDIV, QORD, QRL	Processopo_templateQ				
e	Template Qinflow, Qvalves, Qspill, Qtotal, QORDmdbc	Processopo_templateQqualifier				
2	Create various workflows with required properties to create OPO processing tasks	WF Process_Observed_Template	Compare results of old and new WF. Either run both WF as a whole, or run seperate tasks Note: do run all tasks, since there are a few dependencies - Select Manual Workflow> TEMPLATE_TEST * -- Select all tasks upto Evap processing to run; Run -- Select EVAP tasks to run; Run -- Select Manual Workflow> Process: Quality Control* -- Select EVAP fao and mlake tasks to run; Run -- DatabaseViewer > Compare results of both WFs - Repeat for the remaining tasks / parameters			
3	Clean up the existing OPO workflows/module configurations.		After testing: - Remove Process_Observed WF - Rename Process_Observed_Template to link it to Topology - Remove old moduleInstances that have been replaced			
4	The current moduleInstance Ids remain intact					
310	**FEWS-20708 Import and display the probabilistic streamflow forecasts from BOM**	**Update from MDBA: Waiting for example file of Seasonal forecast, so replace SSF to SDF (Seven Day Forecast for streamflow) for this requirement**				
1	The probabilistic STF provided by BoM as CSV files are imported (example files have been provided). This includes:	import obs, det, and ens, ignore rain (but leave config that already exists)	T0=Sun,03-11-2019 09:00:00; Fri,08-11-2019 10:00:00; - Copy files to $IMPORT$/ ; - Run Workflows > Import and process SDF (SevenDayForecast); After testing, set <deleteImportedFiles> to true		r310 SDF BoM/*.nc	
a/h	DARTMOUTH_TOT_reference / _forecast; idem for HUME_ ; KIEWA_ ; OVENS_	n/a with change to SDF	n/a			
2	Set up display groups to display the cumulative plots showing the below traces in a single plot display for each location. (i.e., Dartmouth, Hume, Kiewa, Ovens)		- Inspect results in displaygroup; - the sub-nodes link to displaygroups with ; -- raw imported data ; -- combined imported and processed data			
a/f	Median, 10%, 25%, 50%, 75%, 90% (reference, forecast)	n/a with change to SDF	n/a			
-	(new requirement with switch to SDF)	Replace STF with SDF in Q_comb for Source	River Operations > Prepare for Source > prepare Q_comb; - For Type select SDF for Biggara; - Resultig Q_comb uses (aggregated to daily) SDF for the first few days; - check results in displaygroup (or run WF with F12 > 6 keep temp timeseries); -- note: there is no seasonal info for Bigarra, so the min and AEP percentile series are the same			
311	**Prepare and generate the river operations weekly report in ROWS without dependency on Hydro**					
1	All the data required for the State Allocations in the weekly report is generated automatically.	data entry, processing, report	T0= n/a; -Workflows > OPO Processing > Daily > StateAllocations; - Update state allocations as required (manual entry); - Run workflow (on any node or level) to extrapolate to T0		manual data entry (see test script)	
2	The user can enter data for state Allocations (NSW, VIC and SA) in a similar way as other data entry (i.e. linked to a node in the workflow tree)	manual data input (add at OPO > weekly data entry)	- Update state allocations as required (manual entry);			
3	For each location, 4 different allocations are entered by the user. The parameters and qualifiers that needs to be created are: Parameter: Allocations Qualifiers: High Security, General Security, Low Reliability and High Reliability	The resulting time series will be: Allocations.HS.NSW Allocations.GS.NSW Allocations.HR.VIC Allocations.LR.VIC Allocations.HS.SA	- see displaygroups			

Id	Requirements	Implementation / release notes	Test script	Screenshots	Test_data/	Results
4	User will not 'type in' the state allocations values on a daily basis as it doesn't change daily. ROWS should copy the previous day's value to today. ROWS should also be able to block fill any gaps in the data before it's used in the report.		- Run workflow (on any node or level) to extrapolate to T0; -- module is part of process_observed and prepare weekly report; -- it looks back 4 weeks for a previous value -- Note: there is no automatic reset at start of water year; operator needs to manually modify the values to 0			
5	The weekly report generated by ROWS is as per example in the Appendix, based on the data available in ROWS (no dependency on Hydro)	if a dependency on Hydro remains, RS will change that (updated after chat with RS 2020-02-11)	- Run Workflows > Reporting > Export Weekly Report; - Inspect result: $EXPORT$/Reports/report_weekly.html; - Test_data folder holds copy of old weekly report; as well as marked up doc file indicating required changes		r311/weekly report.pdf	
312	**Weekly report - Evaporation on storage**					
1	Generate monthly evaporative losses from the MDBA storages (Evaporative loss from storage = surface area of storage * net evaporation depth) for both Morton Lake's Calculations and Pan evap calculations:	Modifiers, processing, report	T0=Wed,06-09-2017 08:00:00; - (Import and process observed if requried, see r309); - Run Workflows > Reporting > Generate montly data for Weekly report; - DisplayGroup shows timeseries used in report		r309 OPO/fromETL for OPO.zip; r309 OPO/fromHYDSTRA for OPO.zip	
a	Morton's lake: Net Evaporation depth = measured evaporation depth - rainfall.		- Inspect steps in Data Viewers > Debug_EVAP_loss filter			
b	Pan evap: Evaporation depth = pan factors and measured pan evaporation.	measured pan evap = evap_obs (without qualirfier mlake or fao)	- Inspect steps in Data Viewers > Debug_EVAP_loss filter			
2	Pan factors are included in the configuration as attributes		MapLayerFiles\attributes\ROWS_ewsource_evap_tables.csv			
3	Once a month, the monthly evaporation losses are included in the weekly report	add extra node in topology to create weekly report with evap, or add weekly report for evap only (to be copy pasted into a word document	- Run Workflows > Reporting > Export monthly input ..; - Inspect $EXPORT$/Reports/report_monthly.html; - https://www.mdba.gov.au/river-information/weekly-reports			
313	**Ensure threshold crossings are reviewed and comments are made by the user on a regular basis**					
1	Workflow node under Weekly Data entry to generate weekly threshold crossings report.		- Run Workflows > OPO .. > Weekly .. > Review ..; -- SOnO and RO nodes links to their (local) webreport; -- task include prepare and export threshold report (local)			
2	Display the weekly threshold crossings report in the embedded web browser display.	Linking either to local html file, or to the published url	Note: url reference in topology currently uses "official report" location: $EXPORT_FOLDER_REPORTS$			
314	**Exclude threshold crossings from being counted for user selected period**					
1	Create indicator timeseries for each location/parameter combination automatically on a daily basis with a default value "1".	PreprocessThresholdsMDBC_OPS.xml Create indicator ts: <variableId>H_thresh_excl</variableId> The transformation is set up to not overwrite any existing edits				
		<parameterId>Threshold_H_exclusion is an "enumeration" – to force only two options: 0 or 1.				
2	Indicator timeseries is integrated in the transformation counting the threshold crossings. If the indicator time series is 1, a breach at that time step is counted. If it is 0, any breach in that period will be excluded from the count	AssessThresholdsMDBC_OPS_SO.xml Indicator timeseries is integrated in the transformation counting the crossings: 1 = counted. 0 = excluded The *_threshold_4count ts are now created as a temporary. The Threshold_*_exclusion ts is used to determine exclusions				
3	Create "Review Threshold" node similar to "review telemetry" workflow node for each location that displays the timeseries and the indicator timeseries for the associated parameters.	TODO: AssessThresholdsMDBC_OPS_specials_SO.xml	T0 = Sat 12-01-2019 08:00; - (Import and process observed if requried, see r309); - Workflows > OPO > Weekly > Review > Exclude; -- review per parameter: e.g. H_review, go to plot 409030 - Gulpa, or; -- review per site: e.g. > Review > Gulpa Ck (R_409030) > Water Levels; - run workflow (prepare_thresholds), each threshold crossing since 5 Jan is counted		r309 OPO/fromETL for OPO.zip; r309 OPO/fromHYDSTRA for OPO.zip	
4	The user should be able to edit the indicator timeseries and set it to "0" for a selected period.		- change counted to NOT counted (0) for some timesteps; - save changes (floppy disc) and rerun WF (play); - the threshold count goes down			
5	The threshold crossing should not be counted when the indicator timeseries value is set to "0".		Please indicate which method of review is preferred (per parameter or per site) The option that is not preferred should be removed from TopologyGroup_ and DisplayGroups_*			
315	**Generate quarterly threshold crossings report**					
1	Workflow to generate and export quarterly threshold crossings report with count for the quarter.	WFs: Prepare_Thresholds_*.xml Module: ReportThresholdCrossingsCount_SOnO_quarter.xml	T0=Fri,30-08-2017 08:00:00; - Run Workflows > Reporting > Monthly > * - View resulting table in internal web viewer - html files are written locally to $EXPORT_FOLDER_REPORTS$			
2	No changes to the annual threshold crossing report. It should remain as is.	TimeSteps.xml; Qualifiers.xml; thresholdcrossingscount_*_template.html	There was no existing annual report which included counting.			
316	**Provide a tabular display for threshold alerts**					
1	Display past 7 days of alerts for DO (tabular overview)	Implemented using the system wide threshold display (see R_314), of which there can only be one instance. User can filter on all collumns to narrow down the list.	T0=Wed,06-09-2017 08:00:00; - (Import and process observed if requried, see r309); - Open Threshold display (Ctrl-E)		r309 OPO/fromETL for OPO.zip; r309 OPO/fromHYDSTRA for OPO.zip	
2	Display for past 7 days of RO threshold crossings and alerts (tabular overview)		- filter (double click) on Module Instance "AssessThresholds<>_RO" to only show RO crossings	add <predefinedActivity> "threshold event crossing" to all relevant WFs. Currently only done for Process observed.		
317	**Import and display BOM's HYFS forecast for Upper Murray**	**Prerequisite: Agreement with BoM to provide the relevant forecast data through ftp**				
1	Import the BOM's HYFS forecast into ROWS	Workflow for ingestion and displays for an example file	n/a			

Id	Requirements	Implementation / release notes	Test script	Screenshots	Test_data/	Results
2	Display the Upper Murray forecast from BOM in the background, along with MDBA's URBS forecast		n/a			
318	**Generate smooth hydrograph using gamma function for Ewater source data exports and Flood operations**					
1	User should be able to specify the time to peak and the peak value for selected locations to generate the hydrograph based on the gamma function.	Implemented Gamma Function (daily and hourly timestep) in PrepareewSourceRO_Qcomb. This needs further testing - specifically related to the units of the provided values:	T0=Wed,06-09-2017 08:00:00; - (Import and process observed if requried, see r309); - Run Workflows > River Ops > Prepare Source > Q_comb; - Modifiers > select Type Gamma for Hinnomunjie;		r309 OPO/fromETL for OPO.zip; r309 OPO/fromHYDSTRA for OPO.zip	
2	The gamma function option should be available in the modifiers for selected list of locations.	Phi_Alpha = (Qp * tp) / (Cv * A), with: Qp - peak flow rate (Gamma_peak_value) [cfs /inch] i.e. peak of unit hydrograph in cfs for a 1-inch rainfall A - drainage area [acres] tp - time to peak [hours] Cv - equals 1.008 for the units: volume [cfs * hrs], A [acres], and the unit storm of 1-inch.	- Peak Q, Peak timing and Area are now modifiable; - Change as desired, apply and Re-run (takes a minute); - Plot Overview > select Hinnomunjie to view Hydrograph -- Qp [ML/day], tp [days from T0] correspond to modifiers -- timeseries has daily timestep -- the hydrograph uses the last observed value as a base valu Note we have also developed a trafo where the hydrograph start from the observed value, but uses a recession function to go to zero (commented in current module). Depending on your preference, we can switch these.			
3	The Ewater source gamma function should use daily timestamp and the flood operations gamma function should use hourly timestamp.	It appears the provided value in the attributes are not representative - it is unclear how the conversion should take place of the provided Qp value. As it stands, with just a direct conversion from ML/day to cfs, the resulting value of Phi_Alpha is not of the right order, messing up the lookup for alpha.	There is a seperate (but very similar) module for hourly data - Currently this is included in the Source WF > where should this moduleInstance be run instead? > should these be based on the same (daily) modifier values? After testing, change ts type of intermediate to <temporary>			
319	**Use RTC tool to create water balance model for Hume**					
319a	**add optimisation to Hume RTC model**					
319b	**add ensemble mode to Hume RTC model**					
319c	**add RTC tool model for Dartmouth**					
319d	**add optimisation Dartmouth RTC model**					
319e	**add ensemble mode Dartmouth RTC model**					
1	Create RTCtool2 model for water balance Dartmouth Dam		See seperate test script in Documents\319 RTC-Tools-modelHumeDam_045.docx			
2	User can set the forecast release pattern for the dam		"			
3	The model should generate inflows, reservoir level, and storage volume for the user specified release pattern		"			
4	The model calculates spillway flows when the dam spills		"			
320	**Integrate ROWS-Flood with ROWS**					
1	Update workflow node structure:	Topology.xml	T0=Wed,06-09-2017 08:00:00; - Use a full LDS - Run Workflows > River Ops > Archiving > Archive all; -- Check Export\toARCHIVE folder for observed data - Run an URBS model (on server); -- Check Export\toARCHIVE folder for simulated data			
a	Meteo Grid (import, process) > scheduled activity	ready to be scheduled (by MDBA)	In a similar manner, check all data that is being archived through diverse moduleInstance files, see screenshot -> Note: fcst data is archived in the WF where it is created			
b	Meteo Grid (archive NWP and AWRA) > integrate with archiving in River Operations, should be scheduled activity	Done, MDBA to decide what to archive (grid size)				
c	Add task at archiving to tag events (so they are stored longer)	Topology.xml; How_To_				
d	Observations (import, process) > scheduled activitiy	ready to be scheduled (by MDBA)				
e	Observations (archiving) > integrate with archiving in River Operations	Topology.xml				
f	Flood Operations > rename to FloodSheets	Topology.xml				
g	Peak heights > integrate the 2 separate folders under Flood Ops	Topology.xml				
h	Hand Over > integrate with archiving in River Operations	Topology.xml				
i	Runoff forecasting > remove node	moved to Maintenance (can be deleted)				
321	**Review MDBA current archiving arrangement and implement a comprehensive archiving regime**					
1	Review and enable rolling barrel of the ROWS central database		In 2017.02, all MC Workflows (like rolling barrel), except MC_SystemAlerter, are internalized in the Master-controller and can no longer be scheduled.			SDK: overview of wiki pages and tips to get started
2	Review and update archive configuration, like expiry times, event types, areas, etc		• Removed FlownSal_Fcst, PME_min, PME-max, ADFD_higher from sources (overly specific), others are excellent • Single (mdba) areaid is excellent • eventTypes • expiryTimes			

Id	Requirements	Implementation / release notes	Test script	Screenshots	Test_data/	Results
3	Review current NWP archiving regime and extent	Modules and workflows to archive NWP	A lot more archiving module instances configured than solely for the FloodOps data. Some changes to existing config: • Separate out the archiving of the different NWP into separate moduleInstances / WFs • Is FloodOps archiving of NWP (on limited extent) still required? (remove MF ToArchive_FloodOps_NWP) • Remove the exportMessages activity from the archive module for OPO data (double) • Merged RiverOps and FloodOps archiving into a single WF			
4	Extent archiving regime for other data as required. This will include the reports generated by ROWS		added archive of output from rtc-tools added archive of in- and output from source cleaned up urbs, mdbc_ops			
5	User tag events to mark them for longer storage. Different event types are linked to different combination of datasets, which is all configured in the archive configuration (see above)		see ppt + how_to in Documentation			
6	How to documentation for archiving is up to date		new HowTo_Archive			
322	**Set up configuration of user permissions for editing data and running workflow**					
1	Implement a permissions model such that	Added 2 permission_ids: WorkflowRunners (Forecaster+Administrators) and DataEditors (Forecaster+DataEntry+Administrators).	Succesful tested with PR1; To be fine tuned by MDBA			
a	- Only the administrators and river operators are able to edit the data/comments.	Added valueEditorPermission, labelEditorPermission, commentEditorPermission in TimeSeriesDisplayConfig using DataEditors permission Id.	-			
b	- Only the administrators and river operators are able to run workflows.	Added RunPermission in WorkFlowDescriptors.xml for WorkflowRunners.	-			
2	All other users should be able to see the data but should not have permissions to edit the data/comments or run workflows.	There was some inconsistency in the use of Permissions/ UserGroups, where aggregation of Groups for certain permissions was not done in the Permissions file, but the UserGroups themselves. This has been rectified	-			
323	**FEWS-20621 Workflow Navigator improvements**		See tab for 2019.02			
324	**Changes to SOnO rules for Heywoods and Doctors**					
1	The dH rate of fall for Heywoods and Doctors Point needs to be calculated from hourly data (Currently it is calculated using daily 8am data).	wf: Prepare_Thresholds module: PreprocessThresholdsMDBC_OPS;	T0=Wed,06-09-2017 08:00:00; - (Import and process Fops observed if requried, see r308) - F-12 > 6 save temporary series Run Workflows > Reporting > Prepare Thresholds; - Database Viewer > open all PreprocessThresholdMDBC_OPS series for Heywoods in Plot		r308 disable rain gauge\latest*.csv	
2	Calculate the Maximum rate of fall within a 24 hour period. (the hourly data for the 24 hour period (8am - 7am) should be used)		- open r_324/*.xls > tab Test_data_FEWS - copy H values in column E (starting at 8am) - compare calculated steps in FEWS (plot) and in xls		see r324 xls for test calculations	
3	Calculate the 6 day rolling average of rate off fall	AssessThresholdsMDBC_OPS_specials_SO	- Database Viewer > add all AssessThresholdMDBC_OPS series for Heywoods in Plot - open r_324/*.xls > tab Rolling_Average -- copy Assess* (SO and 6days) and Preprocess* (24h dH_Fall max) to xls -- compare calculated steps in FEWS (plot) and in xls			
4	Heywoods Rule: a. Q (at 409017) < 25,000 ML/day, ΔH (rate of fall) > 0.225 m b. When Q (at 409017) < 25,000 ML/day, ΔH (rate of fall) (6 day rolling average) > 0.249m		- open r_324/*.xls > tab Threshold Heywood - copy the relevant series for Heywood to compare the calculated steps: -- Preprocess* (24h dH_Fall max), Q_calc Doctors -- Assess*, qualifiers: SO, 6days -- Assess*, qualifiers: SO, special, tmp*			
5	Doctors Point Rule: a.When Q < 25,000 ML/day, ΔH (rate of fall) > 0.225 m b.When Q < 25,000 ML/day, ΔH (rate of fall) (6 day rolling average) > 0.154 m		- open r_324/*.xls > tab Threshold Doctors - execute simlar steps to test Doctors point use 6days for weekly roling average? After testing, change ts type of intermediate to <temporary>			

Id	Requirements	Implementation / release notes	Test script	Screenshots	Test_data/	
301	**FEWS-20301 Consume IOT sensor data from MQTT compatible message broker**		To be implemented in 2020.02			
1	This functionality should be available in both standalone and client server modes.	Will be implemented as a dedicated import workflow that runs continuously on a light separate FSS.	The Steering Group of Delft-FEWS is positive to investigate the options to create this new way to ingest data into Delft-FEWS. This will be the first implementation of a subscription to data, which means there's no existing solution within the Delft-FEWS framework. For now, the Steering Group sees several options to implement this functionality, with the most promising way to be a dedicated import workflow to be run on a light FSS (in 2018.02 setup). This FSS would be continuously running but restarted every X hours. This method includes monitoring, is well testable, and does not require the installation of additional components. Of course, this solution needs to be further investigated and detailed.			Radhika: is working on a broker, will be used this season to get data from sensors (for now without FEWS)
2	ROWS should be able to subscribe to a MQTT broker.	This FSS will be restarted every X hours.				
3	ROWS should be able to import the messages received from the MQTT subscription (import the message payload (observations) directly into the database.)	This method includes monitoring, is well testable, and does not require the installation of additional components.				
4	ROWS should be able to publish messages to a MQTT broker.					
5	MQTT consumer client should be long running and should be listening to incoming messages from the broker	Method will be further investigated and detailed when activity commences				
302	**FEWS-20678 Rating and gauges**					
1	Workflow to Import the gaugings results into ROWS. The gauging result will contain following information: location id, date and time of measurement (or gauging), gauging number, stage (mean gauge height), flow measured and quality	Imports gauging as 2 series (H and Q), with qualifier gauging file format (test file gaugings_409017.csv) STN,MEAS_DATE,START_TIME,END_TIME,M_GH,FLOW,QUALITY 409017,23/08/1929,0000.00,0000.00,1.473,13248.199,90	T0=Fri,06-09-2019 08:00:00; - Copy import test file to Import/Gaugings - Run Workflows > Import Rating curve gaugings - Run Workflows > Import Ratings - Import and Process Observation if needed (see r309)		r302 Gaugings (2019.02)/gaugings_409017.csv	
2	User selectable option to display the gaugings results along with the current ratings curve.	Show observed Q/H values as dots on together with the current rating curve (toggle option in rating curve button to show these measurements), with tooltip above dot shows date of a measurement	- In Data Viewer > Telemetry (Real-Time), select -- Location 409017 (Doctor's Point) -- Parameters Flow observed and Water Level observed -- Qualifier opo - Open the rating curve display			
3	User should be able to interactively select (filter) the gauging result to display by time period.	filtering of gauging results is based on location and the time period as selected in the TSD	- select "ctrl-C Show ...scatter.." from Rating drop down menu - gaugings (that fall within zoom period) are shown in rating curve -- hover over the gaugings for tooltip with datetime and values Note: rating curve itself also has a tooltip (stage and discharge) -- change the zoom period in the plot to include more or less gaugings - When multiplie Q and H series are present in plot, by default the first Q and H are selected. User can overrule this by selecting a stage and discharge series in the legend. Note: selected series must be H and Q, ie from the same parameter group as the rating curve parameters. Other series selection will be ignored.			
323	**FEWS-20621 Workflow Navigator improvements**					
1	Display the descriptive elements of transformationModule (see below) on mouse over in the workflow navigator.	Added <description> for activities in workflow schema https://publicwiki.deltares.nl/display/FEWSDOC/06+Configuring+	- Uncomment description in WF Import_Data.xml; - In WorkflowNavigator hover over modules of Import_Data - Tooltip includes the description			
2	Modify the transformationModule schema to add an element to describe the moduleInstance (<transformationModule><description>)	Added <description> to individual transformations	- Uncomment description in ProcessAWRA.xml; - In WfNav hover over ImportAndProcess_AWRA_FloodOps > ProcessAWRA transformation - Tooltip includes the description (incl break lines)			
3	Modify the transformationModule schema to add an element to describe the transformation element (<transformation><description>)	https://publicwiki.deltares.nl/display/FEWSDOC/20+Transformation+Module+-+Improved+schema				