



Australian Government

Bureau of Meteorology

HyFS 2017 to 2021 – The new HyFS version is about to go live!

Wen Wang

Community Services Group | Environmental Prediction - Water
Australian Bureau of Meteorology





Australian Government
Bureau of Meteorology

What is new and what is to come in HyFS 2022

- ✓ Improved Functionality
- ✓ Improved Performance
- ✓ Improved Security
- ✓ Improved User Support
- ✓ Improved Documentation

National Operations Centre
Bureau of Meteorology
MSLP Analysis (hPa)
Valid: 0000 UTC 22 Mar. 2021
11am AEDT 22/Mar./2021

The Bureau uses JIRA and GIT and Source Tree to manage the FEWS Configuration

195 Issues in version

181 Issues done

4 Issues in progress

10 Issues to do

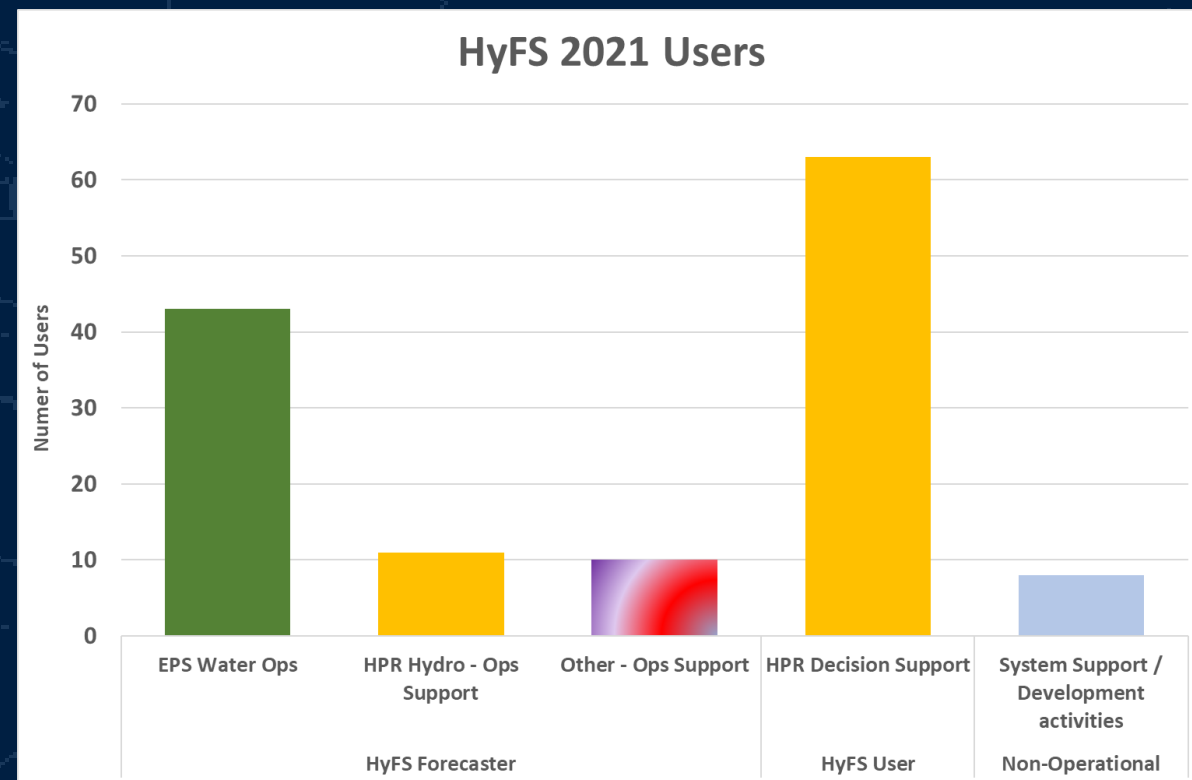
1-195 of 195

P	T	Key	Summary
⏮	⚡	HYFS-4928	HyFS Defects
⏮	⚡	HYFS-4935	HyFS Front End Display
⏮	⚡	HYFS-5128	HyFS Features Removed
⏮	⚡	HYFS-5130	Data Import and Processing (QPF)
⏮	⚡	HYFS-5132	HyFS Web Browser
⏮	⚡	HYFS-5133	Data Imports and Processing (Obs)
⏮	⚡	HYFS-5143	Hydrological Modelling
⏮	⚡	HYFS-5152	Admin Interface
⏮	⚡	HYFS-5160	DELWP project (2021.01-1.0.0)
⏮	⚡	HYFS-5201	HyFS User Guides (2021.01-1.0.0)
⏮	⚡	HYFS-5212	HyFS User Training (2021.01-1.0.0)
⏮	⚡	HYFS-5221	HyFS System Changes (2021.01-1.0.0)
⏮	⚡	HYFS-5222	PAT Improvements
⏮	⚡	HYFS-5301	HyFS Clients for 2021.01
⏮	⚡	HYFS-5304	Macintyre Model Review (2021.01-1.0.0)
⏮	⚡	HYFS-5311	Standard FEWS 2021 Features
⏮	🔴	HYFS-5474	Some Catchment Rainfall Not Being Processed
⏮	⚡	HYFS-5526	Comms for GoLive



Welcome New HyFS Users

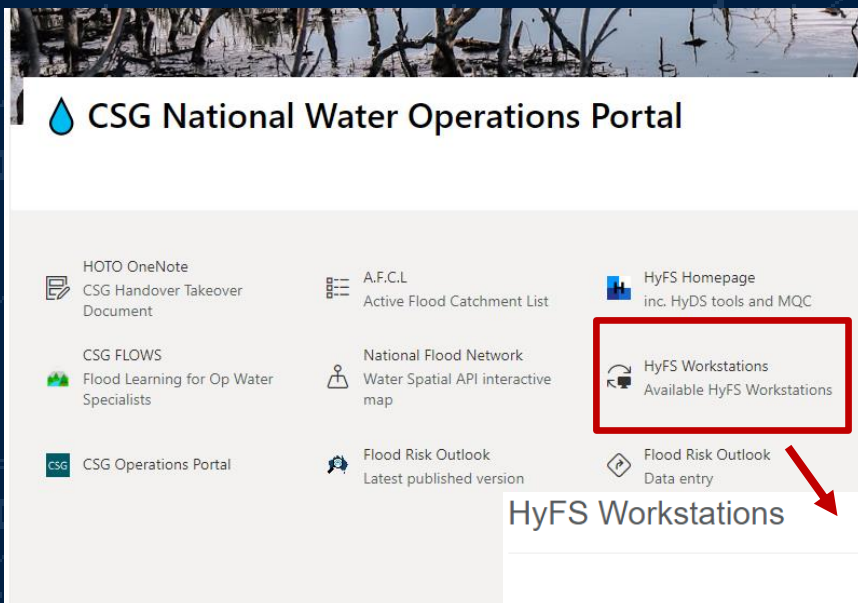
- Implemented a new user profiles so we now have:
 - **HyFS Forecaster** (for staff in Water Ops and Water Ops Support roles)
 - access to all functionalities
 - **HyFS User** (for staff in Decision Support Roles)
 - access to basic functionalities



More than doubled the number of HyFS Users from around 60 to over 130.



How to access HyFS 2021 – HyFS Workstations



Check Workstation
Availability via the CSG
Water Ops Portal

- The workstations are for using HyFS (not because you want to use a fast computer).
- Workstations are allocated by usage and will soon be updated to include a dedicated set of workstations for customer decision support.

HyFS Workstations

	Computer	Location	Usage	Availability	User	Access	Updated
1	B029399	Melbourne L18 Comms Room	Water Operations	Occupied	nweragal	Remote	25 second(s) ago
2	B029401	Melbourne L18 Comms Room	Water Operations	Occupied	cmccusks	Remote	25 second(s) ago
3	B029405	Melbourne L18 Comms Room	Water Operations	Occupied	christ	Remote	25 second(s) ago
4	B029408	Melbourne L18 Comms Room	Water Operations	Available		Remote	25 second(s) ago
5	B029410	Melbourne L18 Comms Room	Water Operations	Occupied	bnawarat	Remote	26 second(s) ago
6	B029417	Melbourne L18 Comms Room	Water Operations	Available		Remote	26 second(s) ago
7	B029419	Melbourne L18 Comms Room	Water Operations	Available		Remote	26 second(s) ago
8	B029423	Melbourne L18 Comms Room	Water Operations	Available		Remote	26 second(s) ago
9	B029426	Melbourne L18 Comms Room	Water Operations	Occupied	akabir	Remote	26 second(s) ago
10	B029431	Melbourne L18 Comms Room	Water Operations	Available		Remote	26 second(s) ago
11	B029438	Melbourne L18 Comms Room	Water Operations	Occupied	bgeorge	Remote	26 second(s) ago

The new version of HyFS will not run on your laptop!

Move from VDI to real desktops (64MB to 10s Cores – 64 Bit)

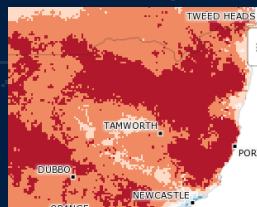


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HyFS – Operational System (HyFS_PROD/PROD-DR)

HyFS (HyDS)

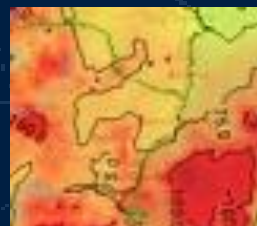
Catchment
Wetness from
AWRA-L



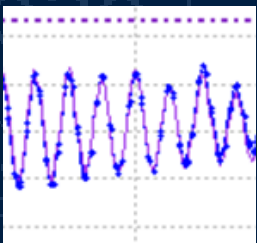
Rainfall and
River
Observations



Rainfall
Forecasts



Tide and
Storm Surge
Forecasts



Hydrological Forecasting

Control and analysis of and
observations and model
runs. Analysis of results and
development of forecasts.

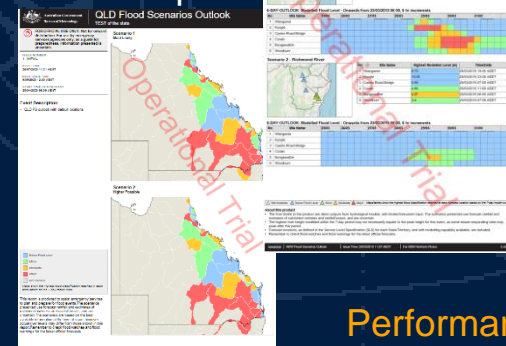


SWIFT

RTC-Tools

Product Generation

Flood
Scenarios
Model Reports

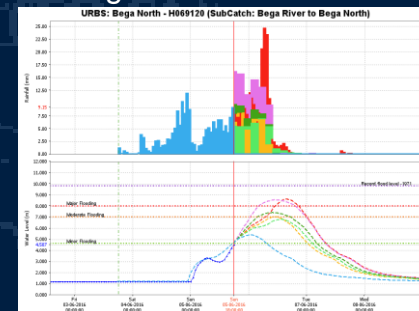


Performance
Analysis

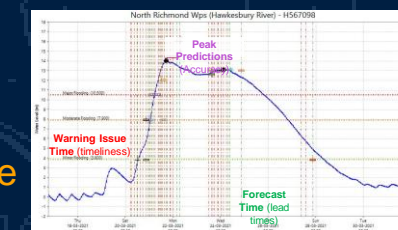
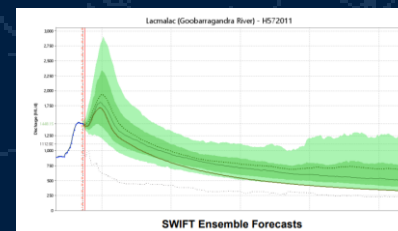
HyFS (Delft-FEWS)

Visualisation

Situational Awareness, analysis
of observations and forecasts,
briefing customers

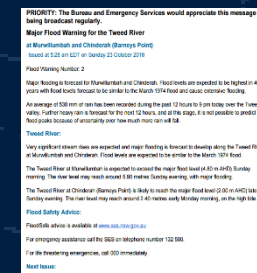


SDF Forecasts



HyFS (Services)

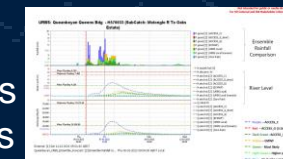
Flood
Warnings
and
Watches



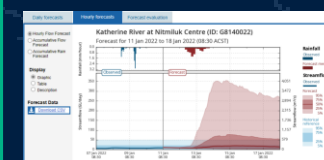
Flood
Outlook



PowerPoint
Presentations
for customers



Seven Day
Streamflow
Forecasting
Service



Automated
Performance
Reporting





HyFS – and there is more

(HyFS_UAT/UAT-DR, HyFS-DEV, HyFS-GIT, HyFS-Archive, HyFS-SA, HyFS-WC)

- HyFS has a set of live and off-line systems to support training, testing and continuous improvement, as well as post-event model testing and analysis.
- **HyFS-UAT** - Training and acceptance testing
- **HyFS-DEV** - Live development system
- **HyFS-GIT** - Offline development system
- **HyFS-SA** - Offline analysis using data from the HyFS archive
- **HyFS-WC** - Water Coach for training using historical flood events.



National Operational Hydrology
Bureau of Meteorology
Improvements to HyFS-WC will be implemented in
release 1b

MSLP Analysis (hPa)

Valid: 0000 UTC 22 Mar. 2021

11am AEDT 22/Mar./2021



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Spatial Display

The new user guide provides descriptions of all the rainfall forecasts in HyFS

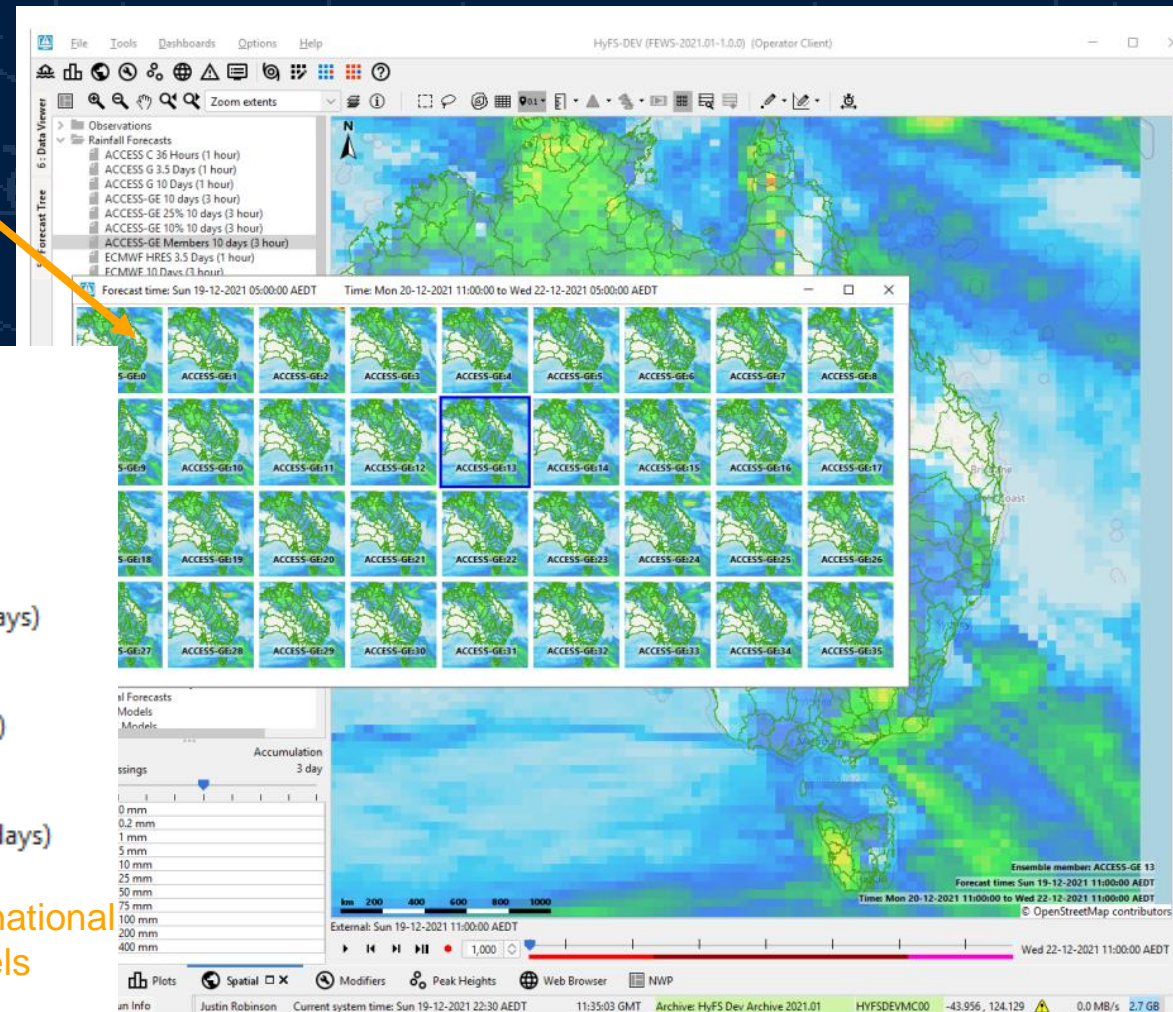
Ensemble
Thumbnail
Viewer

Rainfall Forecasts

- ACCESS C (1.5 days)
- ACCESS G (3.5 days)
- ACCESS G (10 days)
- ACCESS-GE Mean (10 days)
- ACCESS-GE 25% (10 days)
- ACCESS-GE 10% (10 days)
- ACCESS-GE Members (10 days)
- ECMWF HRES (3.5 days)
- ECMWF (10 days)
- ECMWF-EPS Mean (10 days)
- ECMWF-EPS 25% (10 days)
- ECMWF-EPS 10% (10 days)
- ECMWF-EPS Members (10 days)
- USGFS (10 days)
- CMC (10 days)
- JMA (10 days)
- PME (10 days)
- ADFD Daily 50% (7 days)
- ADFD Mean (7 days)
- ADFD Daily 25% (7 days)
- ADFD Daily 10% (7 days)

New
International
Models

The NexGen forecasts are now called ADFD, and HyFS now uses the daily percentile forecasts.





Ensemble Rainfall Comparison

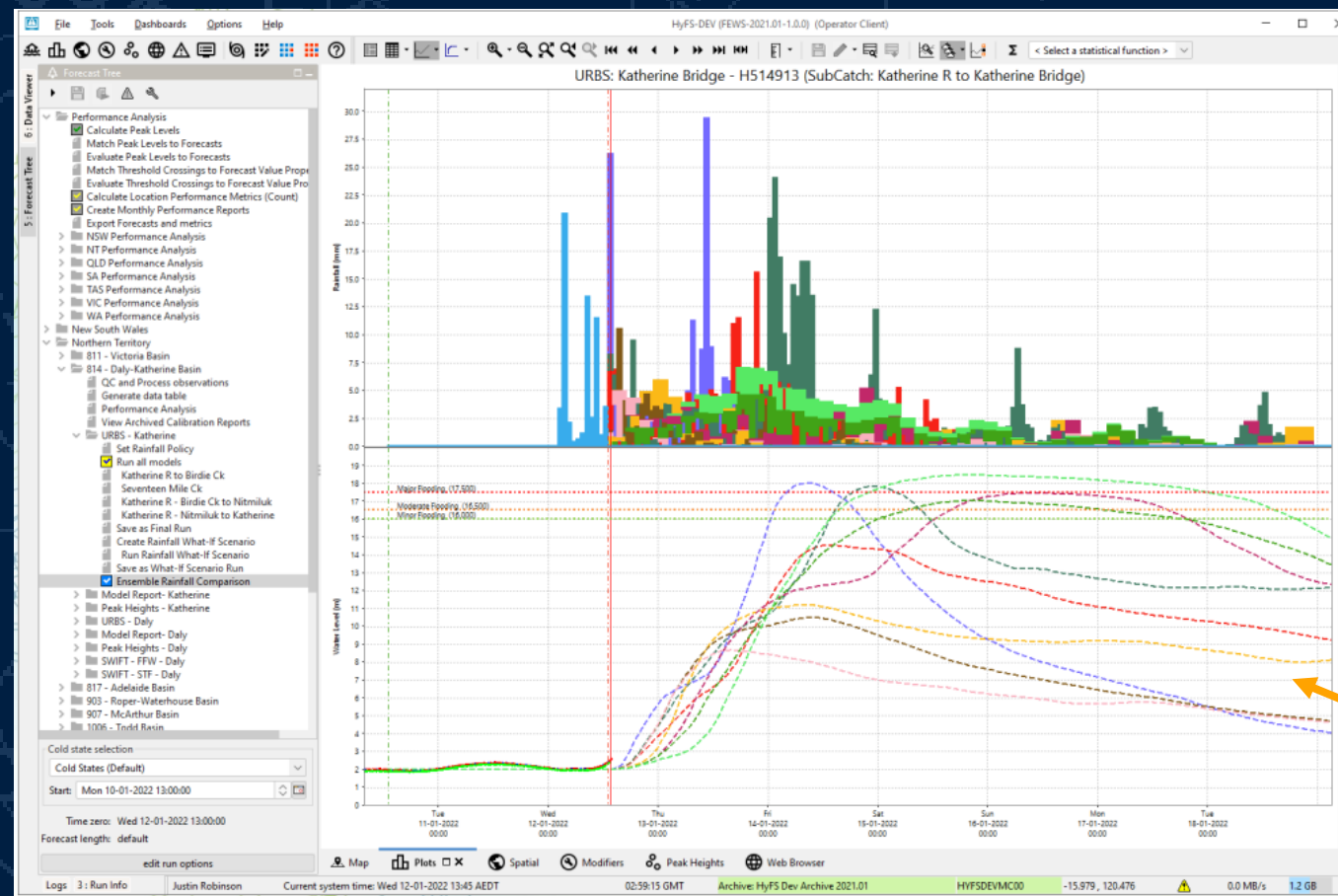
The default rainfall policies are the ADFD Mean and the ADFD_25pct ("What-if")

Gridded rainfall forecast

attribute	Brunswick
Source	ADFD_Mean
Multiplier	ACCESS_C
Delay (hr)	ACCESS_G_short

NWP Rainfall Source

The ADFD_50, ADFD_25, and ADFD_10pct forecasts



Includes –
ACCESS C and G,
ECMWF-HRES,
JMA, CMC,
USGFS

NexGen now called ADFD
and now use the daily
percentile forecasts
(disaggregated using the 3-
hourly mean)

Aiming to include ACCESS
and ECMWF ensembles in
future

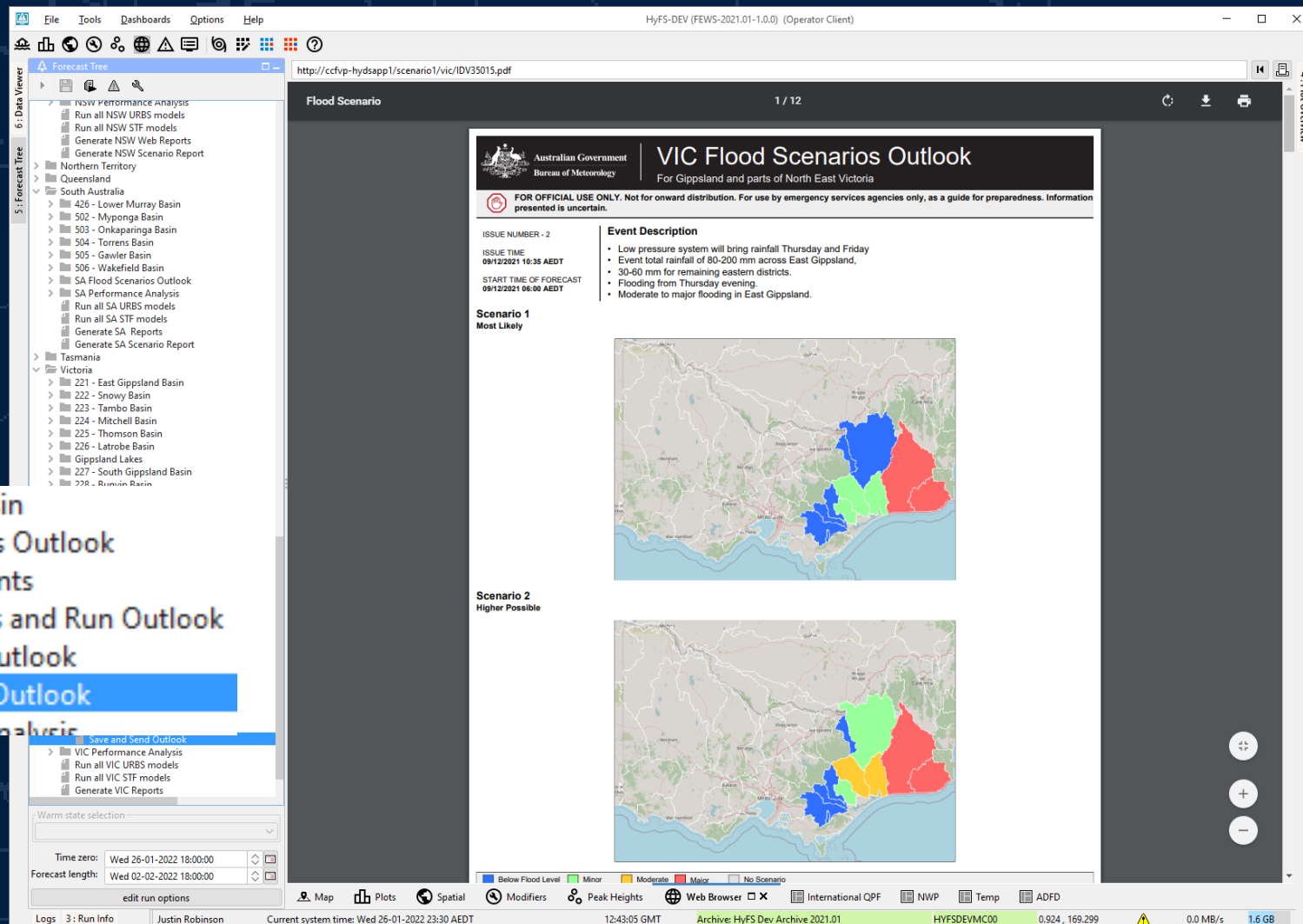
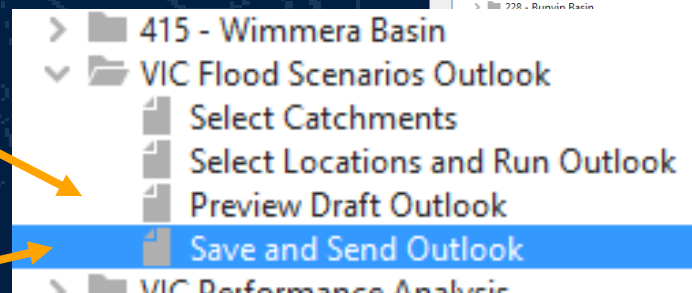


Web Viewer – Flood Scenario Outlook

- The new web viewer is linked to the forecast tree and is used to view pdf and html reports created by HyFS

View Preview

View Latest
Issued
Outlook



View of the flood scenario outlook on the web viewer (linked to the forecast tree)



Web Viewer - Calibration Reports

HyFS-DEV (FEWS-2021.01-1.0.0) (Operator Client)

file:///C:/Users/justinr/HyFS_DEV/Reports/archived_calibration_index/richmond.html

NSW Richmond - Wilsons Calibration Reports

Name	Description	StartDate	EndDate	CreationDate	Area	Attachments
Feb 2001	Richmond - Major	2001-01-30 01:00:00	2001-02-06 01:00:00	2015-03-17 22:47:50	NSW Richmond - Wilsons	richmond_catchment_calibration_20010131.pdf
Jan 2008	Richmond - Moderate To Major	2007-12-29 13:00:00	2008-01-11 01:00:00	2015-03-17 22:48:39	NSW Richmond - Wilsons	richmond_catchment_calibration_20080101.pdf
Jan 2013	Richmond - Minor To Moderate	2013-01-24 01:00:00	2013-02-05 01:00:00	2015-03-17 22:49:23	NSW Richmond - Wilsons	richmond_catchment_calibration_20130124.pdf
Feb 2013	Richmond - Minor To Moderate	2013-02-16 01:00:00	2013-02-28 01:00:00	2015-03-17 22:50:09	NSW Richmond - Wilsons	richmond_catchment_calibration_20130218.pdf

Calibration reports are now available from the forecast tree

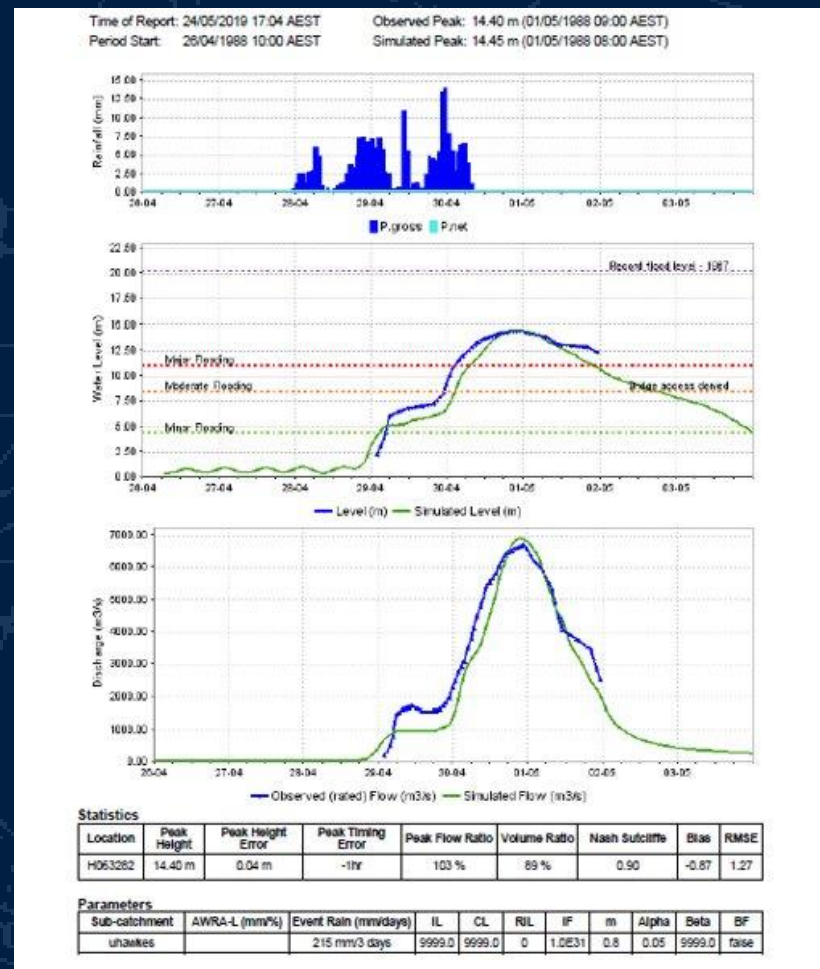
Forecast Tree

- TAS Performance Analysis
- VIC Performance Analysis
- WA Performance Analysis
- New South Wales
 - 201 - Tweed River Basin
 - 202 - Brunswick Basin
 - QC and Process observations
 - Generate data table
 - Performance Analysis
 - View Archived Calibration Reports
 - URBS - Brunswick
 - PROTOTYPE URBS - Brunswick (Ens)
 - 203 - Richmond-Wilsons River Basin
 - QC and Process observations
 - Generate data table
 - Performance Analysis
 - View Archived Calibration Reports
 - URBS - Richmond - Wilsons
 - Set Tide Forecast
 - Set Rainfall Policy
 - Run Rainfall models
 - Wilsons River to Woodlawn
 - Leycester Creek to Tunccaster
 - Wilsons River to Lismore
 - Richmond River to Wangaree
 - Richmond River to Kyogle
 - Richmond River to Casino
 - Richmond River to Coraki
 - Richmond River to Bungawalbyn
 - Richmond River to Woodburn
 - Save as Final Run
 - Create Rainfall What-If Scenario
 - Run Rainfall What-If Scenario
 - Save as What-If Scenario Run
 - Ensemble Rainfall Comparison
 - Peak Heights - Richmond Wilsons
 - 204 - Clarence River Basin
 - 205 - Belling and Nambucca River Basin
 - 206 - Macleay River Basin
 - 207 - Hastings and Camden Haven River Basin
 - 208 - Manning River Basin

Cold state selection
Cold States (Default)
Start: Mon 24-01-2022 22:00:00
Time zero: Wed 26-01-2022 22:00:00
Forecast length: default
edit run options

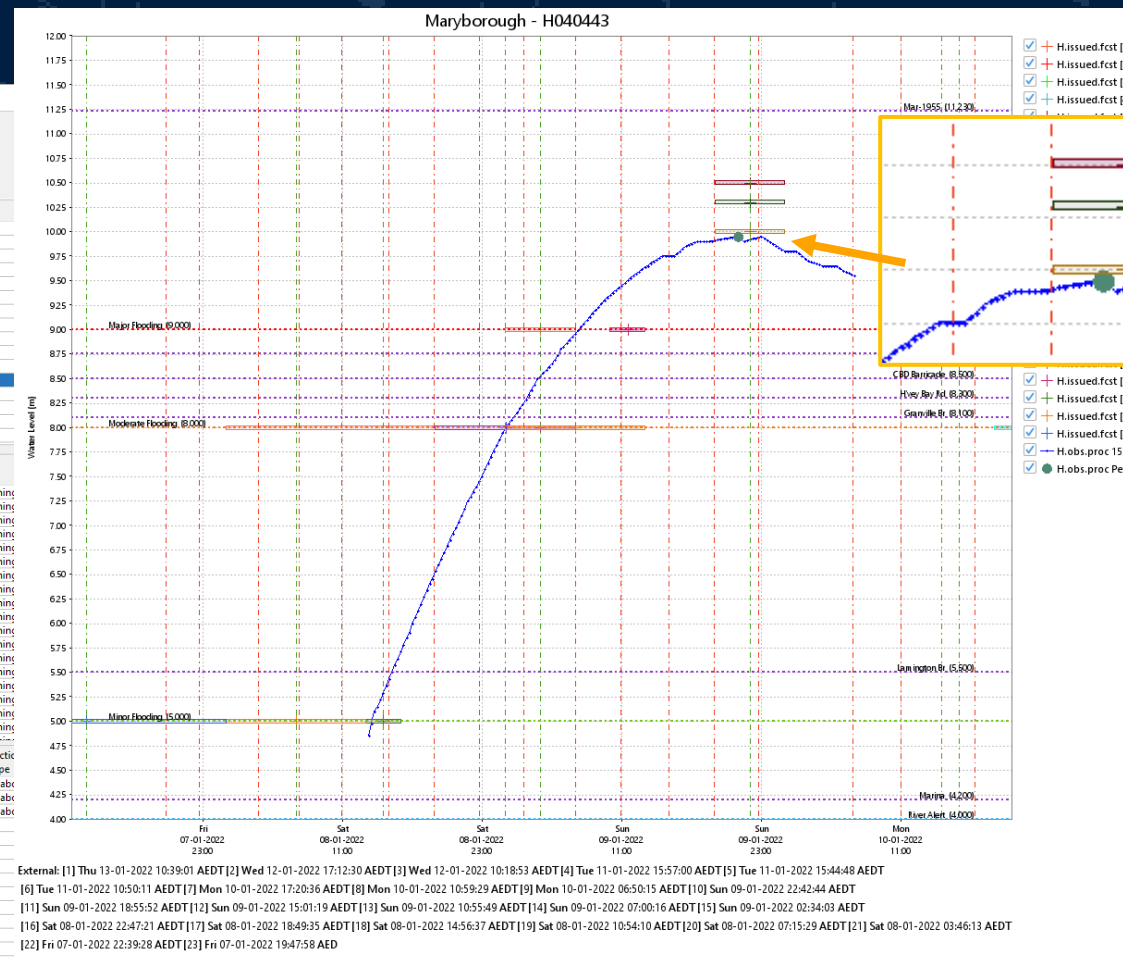
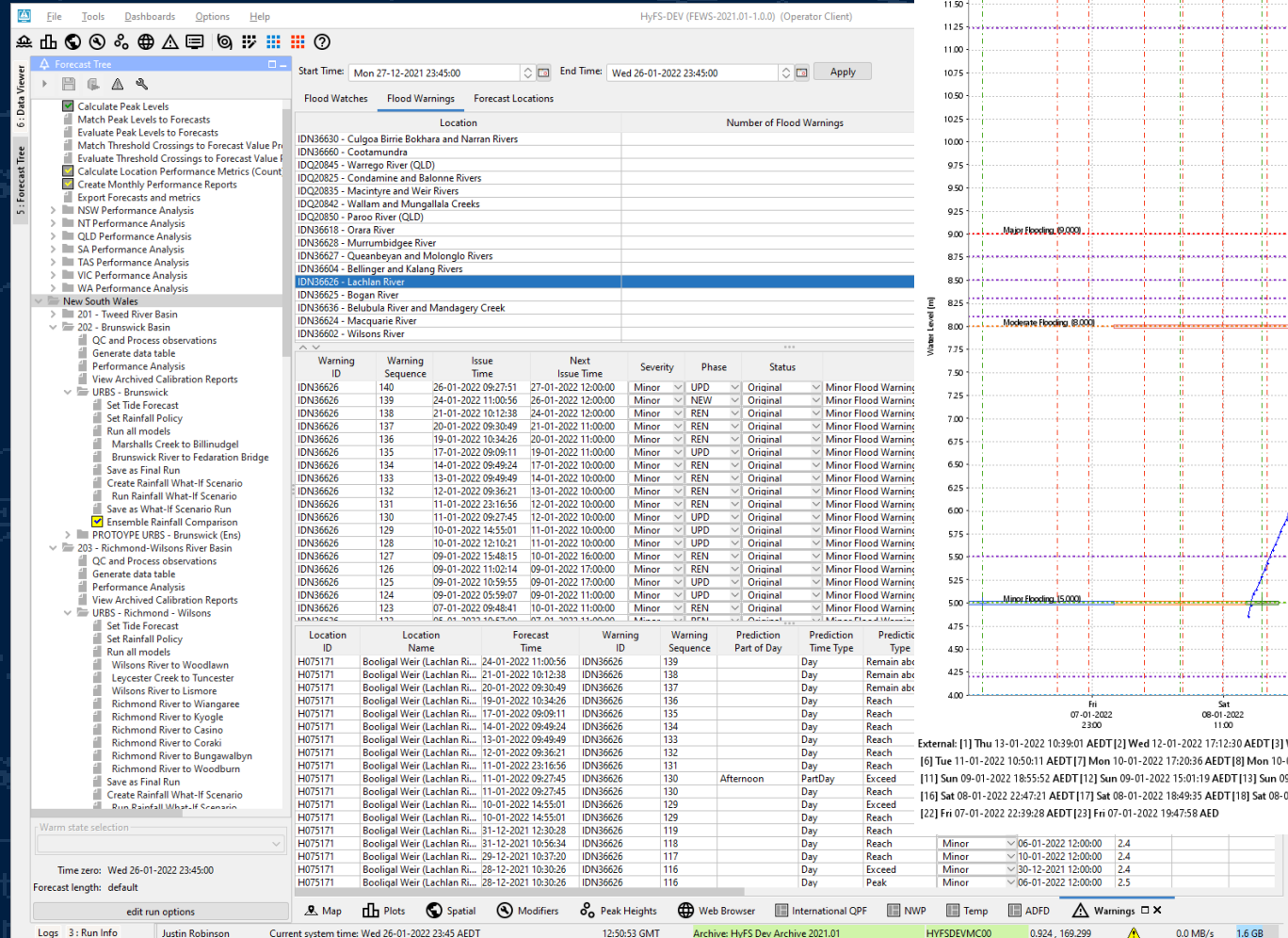
Logs 3: Run Info Justin Robinson Current system time: Wed 26-01-2022 22:15 AEDT 11:28:07 GMT Archive: HyFS Dev Archive 2021.01 HYFSDVMC00 -0.232, 95.031 0.4 MB/s 947 MB

New release includes improved HyFS Post Event
Calibration and Reports (found in the Forecast Tree)





Warnings Display



Automatic Peak Identification

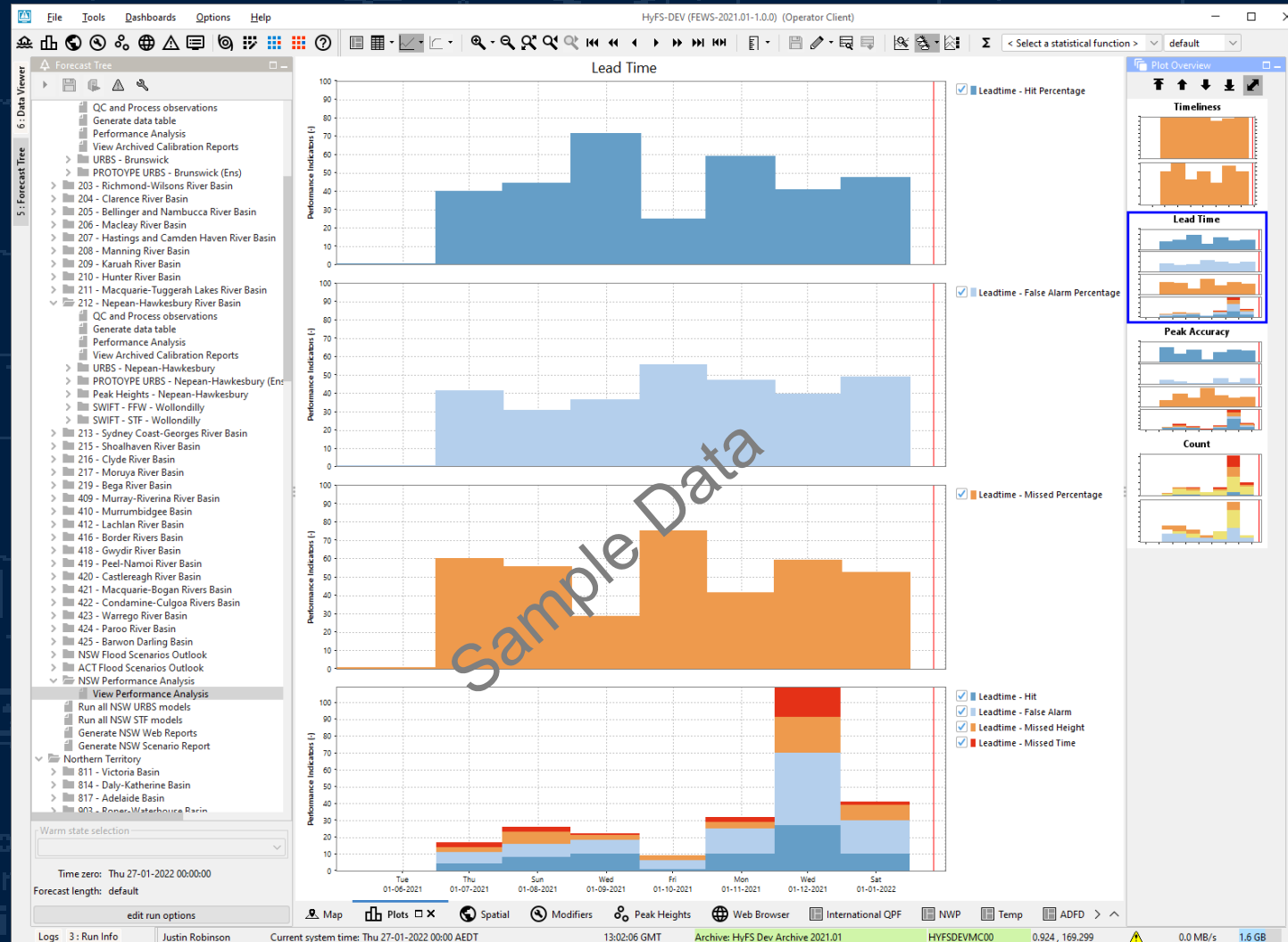
View issued forecasts and warnings on the plots display

View issued forecasts and warnings. Also used for quality control for the performance analysis tool (PAT)



Performance Analysis

View
Performance
KPIs at the
State/Territory
and Basin
Scale



Automatically calculates
performance KPIs for each month
(still requires quality control via
Warnings Display)

KPIs of Timeliness,
Lead Time, Peak
Accuracy as well as
the number of
warnings



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Bureau of Meteorology

The help icon
provides support
information

Improved Documentation



HyFS uses a tiered support model based on service impacts. The Flood Forecasting and Warning Service has Category 1 support and the Seven Day Streamflow Forecasting Service has Category 3 (business hours) support.

The IT Command Centre is the first point of call for incidents. They will triage the incident to the relevant support teams for resolution.

Call the IT Command Centre on [redacted] and provide:

1. Name and Phone Number
2. Service Impact
3. Description of incident
4. You may need to log a Cherwell ticket.

If there is limited or no service impact the incident will be addressed during business hours.

Easy HyFS Fixes - Try this first

1. Read [HyFS User Guide](#) or ask a colleague for support - it might be a user error.
2. Restart HyFS - Always good to see if restarting HyFS fixes your problem.

When to switch to PROD-DR?

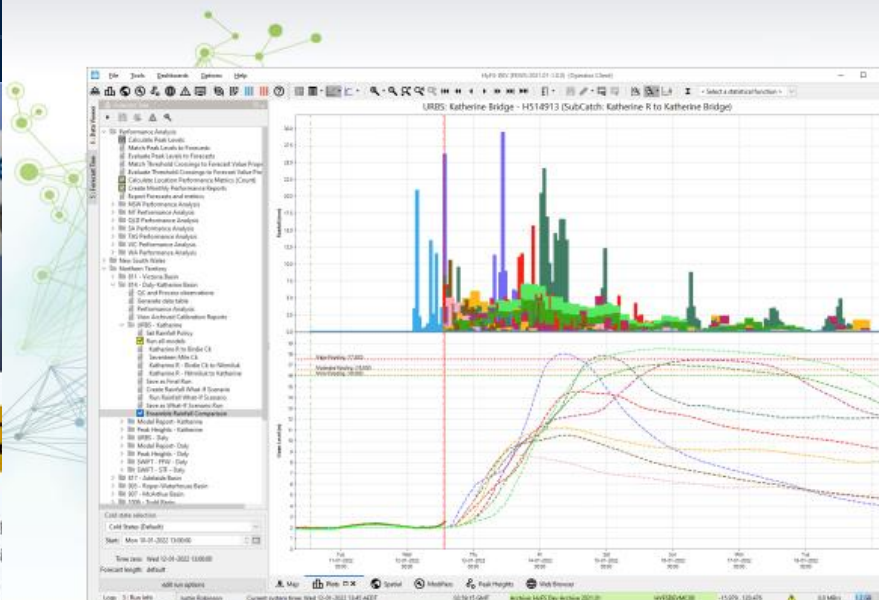
There are two instances of HyFS. You will normally use the HyFS-PROD system. Use the HyFS-PROD-DR (Disaster recovery system) when:

The PROD system status is **red** and the client is unable to connect to the PROD server

When the PROD system status is **orange** which indicates that HyFS has failed over to HyFS-PROD



HyFS User Guide 2021



80+ Pages all about
HyFS. The guide
will be updated after
each release



The **purpose** of this course is to provide an overview of the changes to HyFS from February 2022 with the release of HyFS 2021.01.

If you have any questions or issues please email us at floodwings@bom.gov.au

Completion Progress

☒ NOW

☒ Consolidate your learning QUIZ
Not completed

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The HyFS workstations are for water operations
Please read the [Operational Notice 3/2022](#) on
acceptable usage.

Remote Access and Usage

HyFS Service Management Guide




Improved User Support – Cherwell Guide


- Contact the EPS-Water (Forecasting Capability) via Cherwell

Request Access	Request Support	Request Access, Installation, Support
MQC	HyFS	HyMM
Request Access	Request Access, Support	Request Access, Support
Green Analysis (OSA)	Panther	PAOBS Generator
Request Access, Installation,	Request Access, Functionality,	Request Access, Installation,


- Or via email hyfs_help@bom.gov.au



Cherwell Guide for Flood and Water Staff

 Ask Cherwell

Cherwell tickets are resolved by real people. **Please ensure that all requests are written with the same respect you would use in an email or teams message.**




HyFS

The **IT Command Centre (03 9669 4010)** is the first point of call for **HyFS incidents that impact services** - see the [HyFS Support Page](#)

Technology ⇒ "Something is broken" / "I want something" ⇒ Weather and Forecasting Services ⇒ HyFS

- ⇒ Request **access to HyFS** including the Training System
- ⇒ Request a **new feature in HyFS**
- ⇒ Report **bugs or defects**
- ⇒ Report problems with **rating curves**
- ⇒ Report problems with **URBS models**
- ⇒ Report problems with **metadata**
- ⇒ Change to a **sensor preference**




Flood Warning Network

Technology ⇒ "Something is broken" ⇒ Observing Systems and Operations ⇒ Flood Warning Network

Check these first before entering any Cherwell Tickets


1. If you do not know how to check if a rainfall or river station is working "normally" check with someone on the NWOT who does. **Do not send tickets for sites that are working.**
2. Confirm that any data delays are greater than 6 hours' duration. **A delay of 3-6 hours is considered normal for many gauges.** ERTS/ALERT gauges typically send a check signal every 3 hours and missing one check signal is not unusual.
3. **Confirm if the data quality is consistently of poor quality.** A couple of suspect values is not unusual and should be fixed using MQC.



Water Services Team


The EPS Water-Services team is the key point of contact for Decision Support Services. Please email waterservices@bom.gov.au for requests related to:

- ⇒ Changes to **flood classifications**
- ⇒ New **flood warnings services**
- ⇒ **Performance statistics**
- ⇒ Questions about flood warning services
- ⇒ Questions about the [7-day streamflow forecasting service](#)

 **Warning Entry Tool (WET)**


Technology ⇒ "Something is broken" / "I want something" ⇒ Weather and Forecasting Services ⇒ Content Reviewer






Send a Cherwell ticket to **access to Content Reviewer (aka WET)**

 **About Cherwell**

Cherwell is the Bureau's enterprise system for managing and servicing requests and incidents. **Remember: Cherwell is not a fully automated system. If a ticket is not routed correctly, it may not be resolved.**

For general non-urgent enquires or comments about this page you may contact the EPS-Water Forecasting Capability Team via HyFS_Help@bom.gov.au or our [Teams Channel](#). Also, check the [HyFS Support Page](#).

 **Links & Guides**

-  HyFS Support Page
-  HyFS User Guide
-  Water Ops Training on BOM Learn
-  HyMM Training Material
-  EAMS



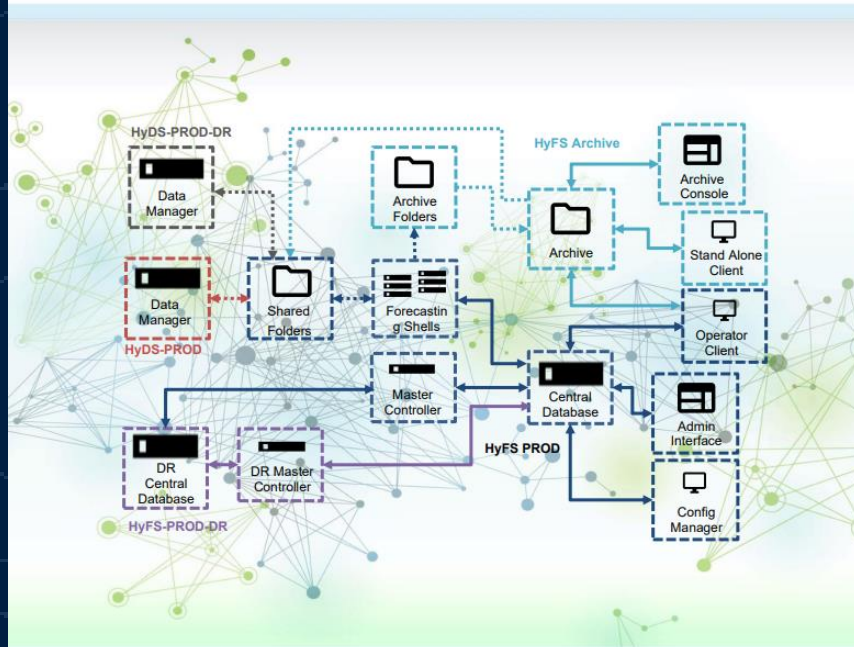
Australian Government
Bureau of Meteorology

Improved User Support – Documentation



60+ Pages to learn
more about HyFS.

HyFS 2021.01-1.0.0 Support Guide



HyFS and HyDS - Flood and Water Operational Systems – IT

Command Centre SOP

System Name: Hydrological Fore

Title: HyFS and HyDS - Flood and

SOP Document No.:

Document Author

Title:

Name:

Contact Details:

System Owner¹

Title:

Name:

Contact Details:

A/H Details:

System Custodian

Title:

Name:

Contact Details:

A/H Details:

Pre-Requisites:

1. Functional email access or
2. Access to a device connect

High-level requirements for I

The primary responsibility of the IT Hydrological Forecasting System i through:

1. The ITCC must monitor the incidents reported by users.
2. Should an incident occur the the National Water Operation For Priority 2 incidents a bric Operations (EPS-Water) and actions to resolve the incident include Linux Systems, Data (contactable during business For Priority 2 incidents the IT Water Operations Manager (For Priority 3 and Priority 4 it to Flood Operations (EPS-W for HyDS incidents.

Category/SLA: Category 1 ☒

Although the Bureau's Flood Warr most notably the HyFS Forecaste support) as there are work around

HyFS -



HyFS IT Ops Support Guide

SOP No.

HyFS- Flood and Water Operational Systems –

Priority: High

HyFS is the enterprise hydrological forecasting syste Forecasting and Warning and 7-days Streamflow Fo

End User Services are responsible for the provision Workstations located in Brisbane, Sydney, Melbour located in Sydney and Melbourne.

Purpose:

To provide procedures for End User Services to supp Workstations as well as provide guidance on how to applications used for Flood and Water operations th

Scope:

To respond to user requests from staff that use or related other applications.

Pre-Requisites:

- Functional email access or a working phone.
- Access to web browser connected to the Bureau
- Appropriate access level to Cherwell service m

Responsibilities:

The primary responsibility of end user support is en HyFS Workstations as well as packaging of the HyFS not covered in this SOP. The responsibilities include

- Provision of User Access the HyFS Workstations
- Removal of User Access to HyFS Workstations
- Addressing Faults with HyFS Workstations

Roles and responsibilities of End-User Support and c the [HyFS Services Management Guide](#)

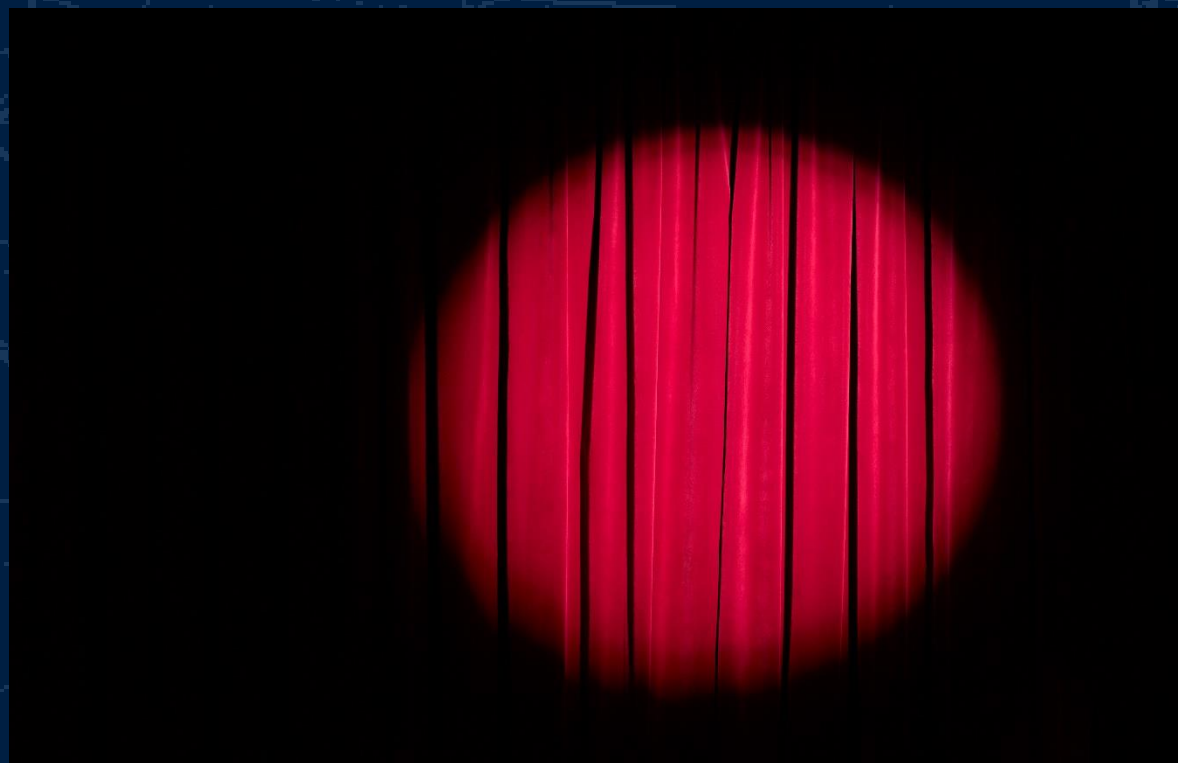
SLA/Category: Category 1/3 ☒

Updated Guides for End User
Support, IT Command Centre, and
Flood Application Support



What is next – Ready, Set – Go Live

- Final testing, documentation and getting ready for operational transition.
- Security testing
- Change Advisory Board (CAB) Approval
- Communication to Users
- Operational Cutover is likely to occur **first week of September**
- **The operational cutover is complex, multi-step process but no outage**
 - Will bring all the operational data from the old 2017 version under Oracle to 2021 running PostGres





Future Improvements

- Release 1a

New version of URBS – 64 bit Windows and Linux

Parallel workflows for URBS

Archive Improvement

Rating curves managed in config

PET from AWRA

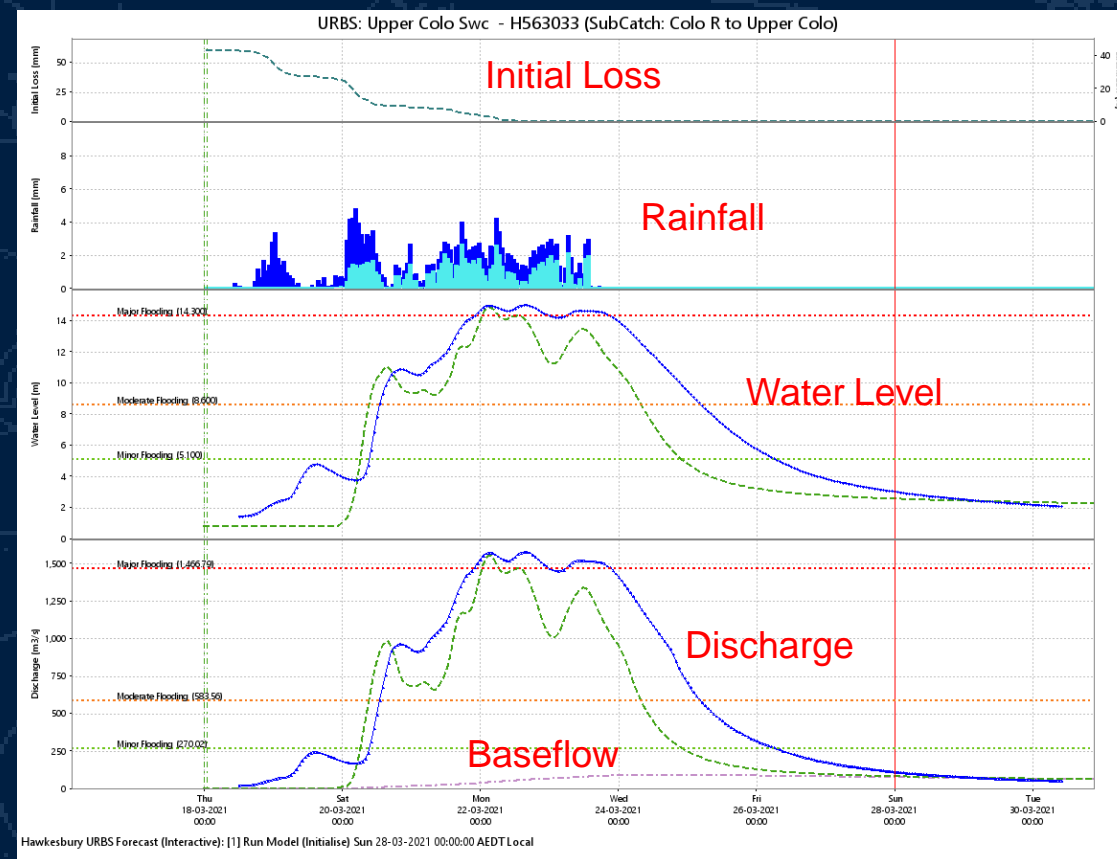
- Release 1b

New version of URBS – All URBS models

Parallel workflows – all URBS models

Automated peak heights identification

HyFS WaterCoach Improvements





Australian Government

Bureau of Meteorology

Thank you

Any questions?

Wen Wang: wen.wang@bom.gov.au