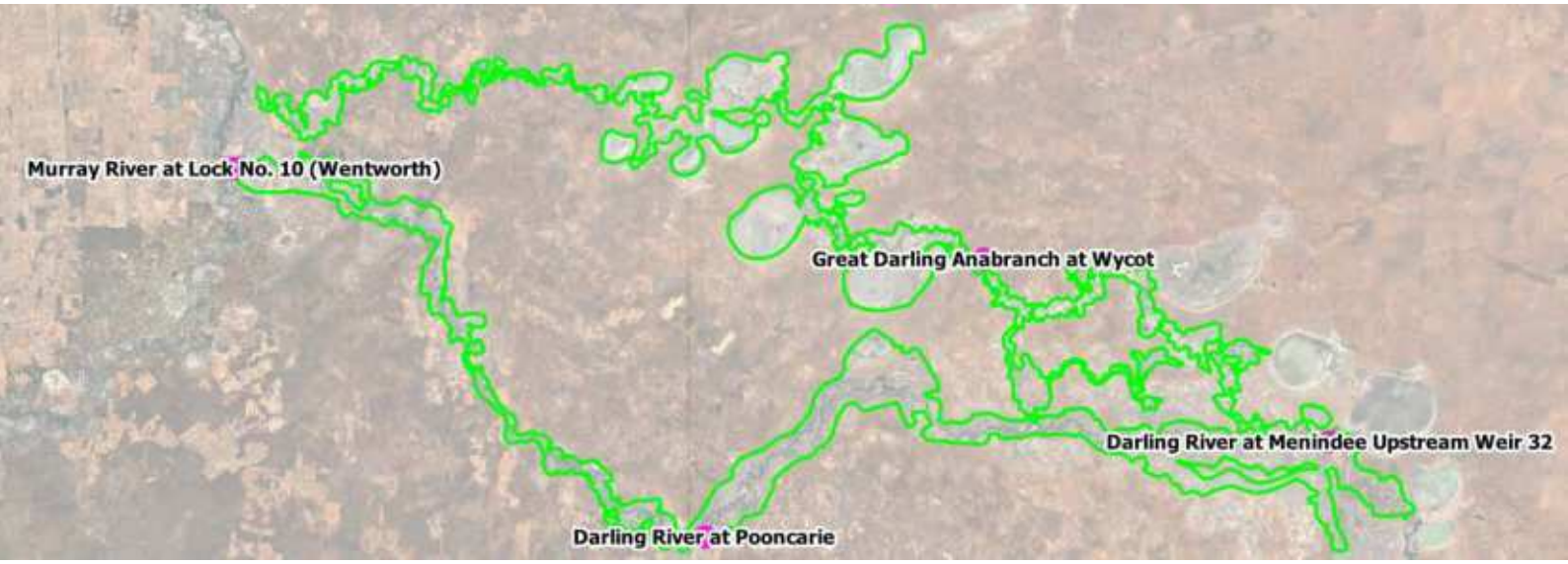

LOWER DARLING RIVER AND GREAT DARLING ANABRANCH VEGETATION INUNDATION MAPPING

Report MHL2932
April 2023

Prepared for:
Department of Planning and Environment, Water and
Commonwealth Environmental Water Holder

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Lower Darling River and Great Darling Anabranch Vegetation Inundation Mapping

Report MHL2932
April 2023

Matthieu Glatz
Team Leader Investigations
110b King Street
Manly Vale NSW 2093
T: 02 9949 0201
E: Matthieu.Glatz@mhl.nsw.gov.au
W: www.mhl.nsw.gov.au

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110B King Street
Manly Vale NSW 2093
T 02 9949 0200 **TTY** 1300 301 181
ABN 20 770 707 468 www.mhl.nsw.gov.au

Foreword

NSW government's professional specialist advisor, Manly Hydraulics Laboratory (MHL) was commissioned by the Water Group of the Department of Planning and Environment (DPE Water) and the Commonwealth Environmental Water Holder (CEWH) to undertake a vegetation inundation mapping exercise associated with control flow releases from Menindee Lakes. The outcome of this study will assist CEWH and DPE Water to understand the inundation extent of releases from Menindee Lakes along the Lower Darling River (LDR) between Lake Wetherell and Wentworth including the Great Darling Anabranch (GDA) to identify ecological communities that would be inundated for flow releases ranging between 18,000 ML/day and 30,000 ML/day as measured at Weir 32 gauge.

Executive summary

Environmental communities, habitat for waterbirds and aquatic life, stock production and irrigation in the Lower Darling River (LDR) and Great Darling Anabranch (GDA) areas are primarily dependent on water releases from Menindee Lakes. The Menindee Lakes are a series of modified water storage located southwest of New South Wales on the Darling River about 200 km upstream of the Darling River's junction with the River Murray. The Commonwealth Environmental Water Holder (CEWH) and the Department of Planning and Environment (DPE) Water are interested in understanding vegetation inundation due to releases from Menindee Lakes measured at Menindee Weir 32 gauge. Manly Hydraulics Laboratory (MHL) was engaged by DPE and CEWH to undertake this vegetation inundation mapping study. The findings of this study will help to identify ecological communities that can be benefited from flow releases measured at Weir 32 ranging between 18,000 ML/day and 30,000 ML/day.

For this purpose, a two-dimensional Lower Darling and Anabranch (LD&A) model was produced based on the hydraulic models previously developed by MHL for the Better Baaka Program. The LD&A hydraulic model covers LDR extending from Lake Wetherell to Wentworth and low-lying areas in the GDA. The LD&A hydraulic model was validated against the recent flow release measured at Weir 32 between May and August 2022. Validation shows a reasonable match between simulated and recorded data; therefore, the LD&A model is considered appropriate for the purpose of this study.

The validated LD&A hydraulic model was simulated for the release scenarios ranging between 18,000 ML/day and 30,000 ML/day at 1,000 ML/day increments assuming a steady-state flow at each release scenario. Each release scenario was simulated for wet and dry climate scenarios. The wet climate scenario corresponded to a climate of low evaporation and infiltration losses, and the dry climate corresponded to high evaporation and infiltration losses. To avoid extensive model simulation time, each steady state scenario was simulated for 12 weeks and produced inundation maps based on generated peak water levels in those 12 weeks. Model results were investigated to identify vegetation inundation extent for each flow release scenario. It is noted that the inundation extent may slightly vary should the model be simulated for more than 12 weeks.

Hydraulic model results indicate that only a small portion of the release from Menindee Lakes spills over the right bank of the LDR and contributes to the GDA system. The expected spill in the GDA system is 4% for 18,000 ML/day and 26% for the 30,000 ML/day release scenario (**Table E-1**). Hence, release from Lake Cawndilla can have a significant impact on the inundation extent in the GDA system.

Table E-1: Indicative spill (ML/day) from LDR in GDA system

Spill Location	18,000 ML/day Release Scenario	25,000 ML/day Release Scenario	30,000 ML/day Release Scenario
Tandou Creek Offtake	125*	990*	1,950*
GDA Offtake	~230 (220-250)*	~1,870 (1840-1900)*	~2,960 (2930-2990)*
Between GDA & Tandou Offtake	~340 (330-350)*	~1,410 (1390-1430)*	2,950 (2940-3010)*
Total Spill	695 (4% of release)	4,270 (17% of release)	7,860 (26% of release)

**Note: Values are approximate. Range shows expected spill in wet and dry climate scenario*

Vegetation inundation area can increase by 10-20% for a wet climate scenario compared to a dry climate scenario. In both climate scenarios, the total inundated area for 30,000 ML/day can be five times more than the inundated areas for 18,000 ML/day. Investigation shows that the total inundated area does not change linearly with an increase in the release. This is because internal lakes become activated at various water levels and withdraw a significant portion of released water from waterways. The inundation area for the flood-dependent woodland vegetation category appears to have a larger increase than other vegetation as release increases at Weir 32 (**Figure E-1**). However, inundated area for flood-dependent forest does not change significantly with the increase in release at Weir 32 as this vegetation type is located primarily along the main waterways.

It is noted that the LD&A hydraulic model would require further validation prior to being adopted to assess any flood impacts on townships as localised township flooding assessment may require a finer resolution model while the current vegetation inundation requires a coarser model to represent inundation over hundreds of kilometres of waterways.

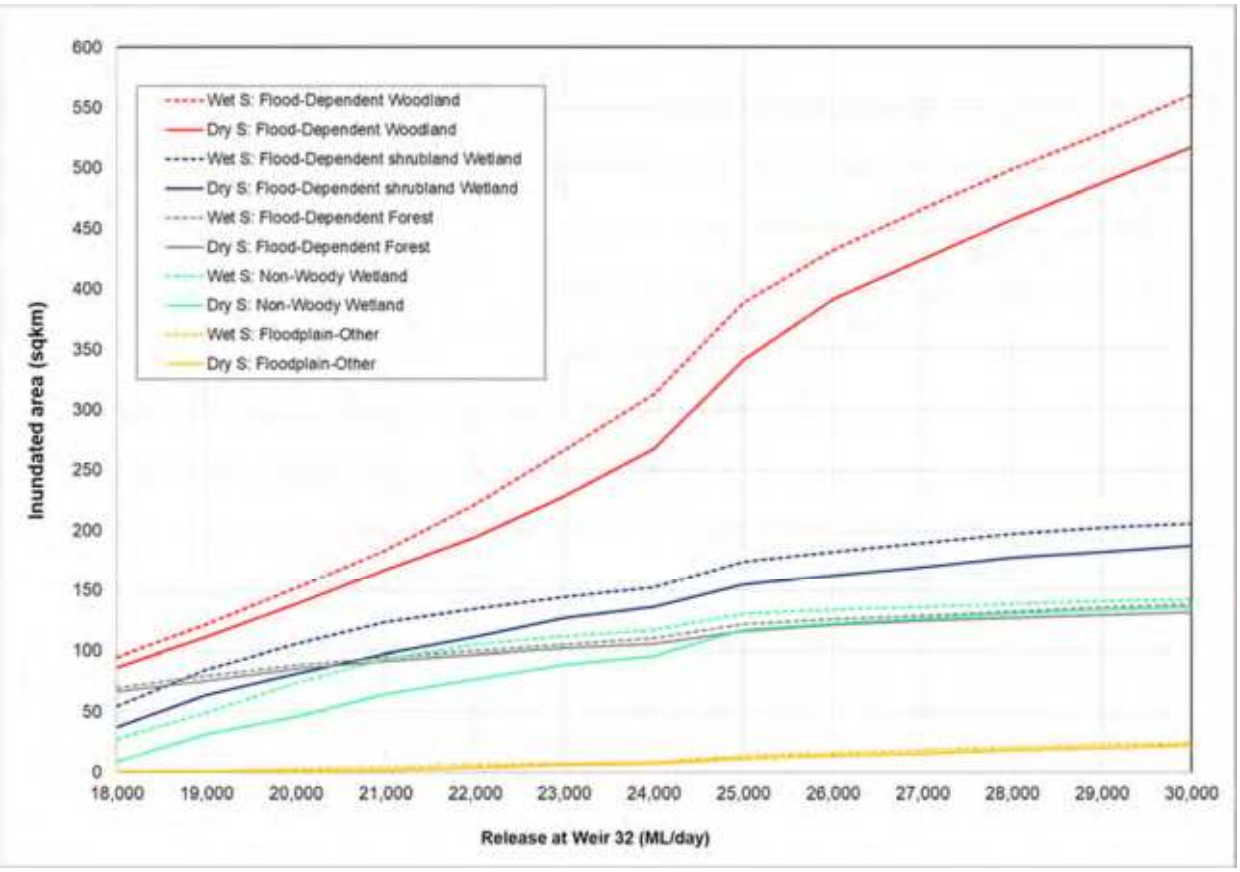

Figure E-1: Inundation area for various vegetation type for a range of release scenario

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1 Introduction

1.1 Background

The Menindee Lakes are located in south-west New South Wales on the Darling River, about 200 km upstream of the Darling River's junction with the River Murray. The Menindee Lakes were a series of shallow natural ephemeral lakes along the Darling River which were modified into water storage lakes in the 1960s (DPI, 2018). Those lakes were modified to provide water to the mining city of Broken Hill and release water for domestic, stock and irrigation purposes, to the Lower Darling River (LDR) and the Great Darling Anabranch (GDA). The Menindee Lakes also provide important habitat for waterbirds and aquatic life, as do the lakes associated with the ancestral branch of the river, the GDA.

Manly Hydraulics Laboratory (MHL) was engaged by the Department of Planning and Environment (DPE) to undertake this Lower Darling River vegetation mapping study. This study investigated the inundation extent due to releases from Menindee Lakes along the LDR between Lake Wetherell and Wentworth including the GDA. The understanding will help identify ecological communities that would be inundated for flow releases ranging between 18,000 ML/day and 30,000 ML/day as measured at Weir 32 gauge.

1.2 Study area

The present study covers an area of ~3,400 sq.km extending between Menindee Lakes and the Murray River near Wentworth (**Figure 1-1**). Downstream of the Menindee Lakes, the river has two large and distinct channels – its main channel, the Lower Darling River, and its ancestral channel, the GDA. The GDA has a number of overflow lakes that can hold water for prolonged periods of time following flood events. Two of the most defining hydrological characteristics of the study area are a highly variable flow and a very long flow travel time (MDBA, 2021).

The general topography of the catchment is flat, with elevations less than 100 m across most of the floodplain. The low gradient of the land to the north of Menindee means that flood peaks may take a long time to reach the Lower Darling River. At its confluence with the River Murray, the elevation of the Darling is less than 50 m.

The climate of the Lower Darling River catchment is semi-arid, with one of the lowest rainfall regions in New South Wales. Average annual rainfall ranges between 220 and 280 mm across the catchment. Low rainfall and high summer temperatures result in very high evaporation rates across the catchment. There is a very small amount of run-off within this catchment and nearly all the water flowing through the Lower Darling River comes from the rivers of southern Queensland and northern New South Wales through the Barwon–Darling river system (MDBA, 2021).

Releases into the Lower Darling River and GDA are made from Lake Menindee and Lake Wetherell/Lake Pamamaroo. A gauge downstream of Menindee at 'Weir 32' is used to measure the total release into the Lower Darling River. Releases can also be made from Lake Cawndilla to supply environmental flows along the GDA (MDBA, 2021).

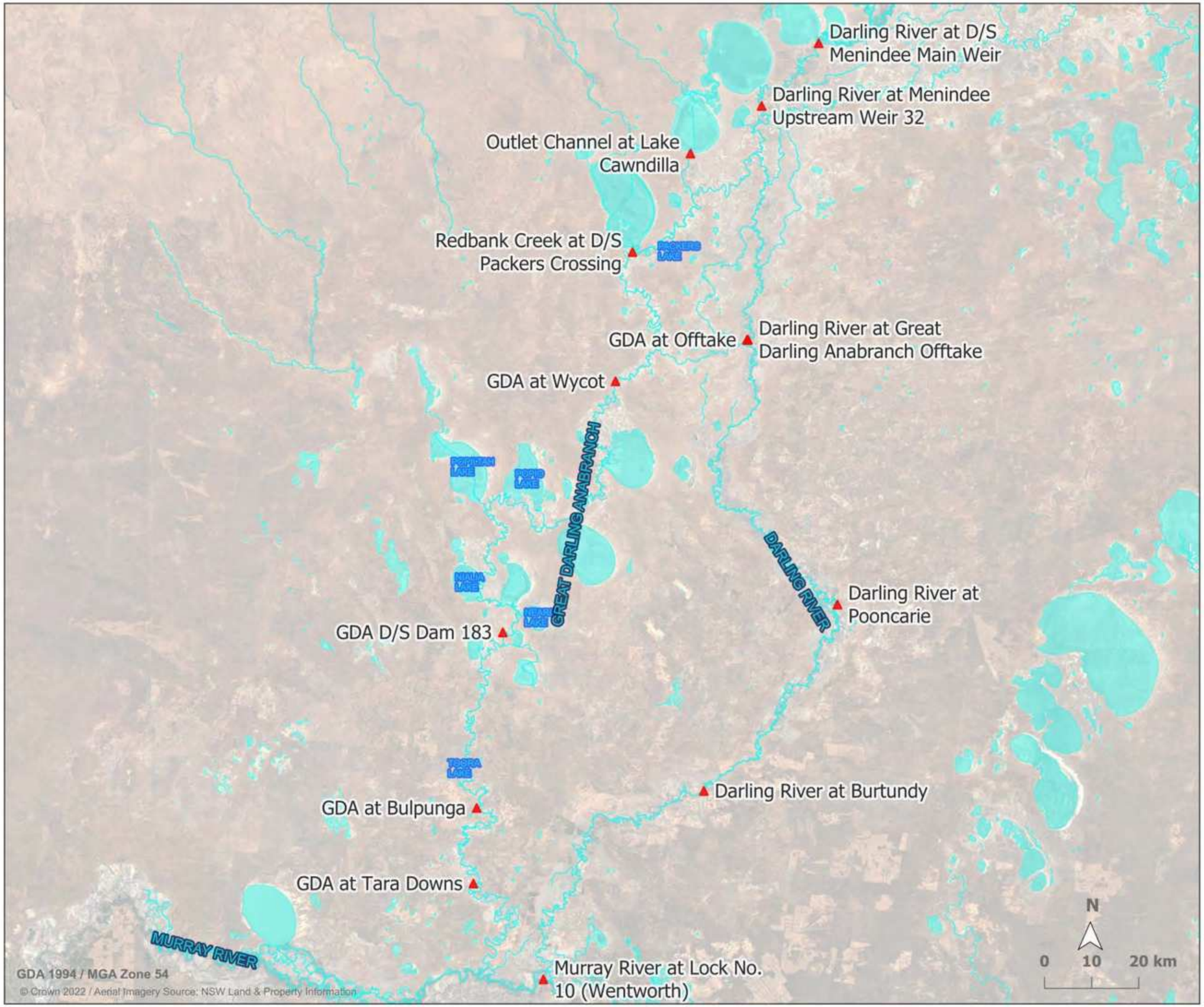

Figure 1-1: Study area

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

1.3 Scope of works

The scope of work of this study included the following tasks:

- Update existing LDR and GDA hydraulic models.
- Validate the updated models against the latest information obtained during the May to August 2022 flow release event.
- Run the model for release flows ranging between 18,000 ML/day and 30,000 ML/day at 1,000 ML/day increments as measured at Weir 32 gauge.
- Post-process results and map inundation extent along the LDR and GDA for each flow release.
- Identify ecological communities that would be inundated for each flow release using the vegetation maps supplied by the Environment and Heritage Group (EHG).

2 Available information

2.1 Previous studies

As part of the Better Baaka Program, Manly Hydraulics Laboratory (MHL) developed hydraulic models on behalf of the Department of Planning, Industry and Environment's (DPIE) Water cluster (now DPE Water). One hydraulic model was developed for the Lower Darling River (LDR) and another hydraulic model was developed for the Great Darling Anabranch (GDA) (Figure **2**.**1**).

The LDR hydraulic model is a 1D/2D hydraulic model that extends from Lake Wetherell to the Murray River near Wentworth. It was developed using TUFLOW Highly Parallelised Compute (HPC) with a 1D channel along the Lower Darling River with cross-sections at 50 m intervals and a 2D floodplain with a 20 m cell size. The model also uses the Sub-Grid Sampling (SGS) capability of TUFLOW that allows the representation of flow conveyance through the cell faces and volume within each cell using a finer resolution than the cell size. This model was calibrated for lower flow releases ranging between 9,000 and 17,000 ML/day (at Weir 32 gauge).

The GDA hydraulic model is a 2D TUFLOW hydraulic model that extends from the GDA offtake from the LDR to the Murray River. It was developed using TUFLOW HPC, SGS and the Quadtree capability of TUFLOW that allows the use of varying cell sizes where required. For this model, the majority of the model was developed using a 20 m cell size while the large flat lakes were modelled using a larger 40 m cell size and regions with complex topography or the surroundings of key infrastructures were modelled using a finer 10 m cell size. This model was calibrated for flows of approximately 1,400 ML/day at Lake Cawndilla and 10,000 ML/day at the Wycot gauge. It was noted that uncertainties along the GDA model increased with larger flows due to the numerous lakes and the limited information on the operation of each lake.
The LDR and GDA hydraulic models also included a number of hydraulic structures, levees, bend losses, evaporation and infiltration losses. Structures such as weirs, bridges and culverts within the study area were identified using a variety of data sources. Topography of the both models were primarily based on Light Detection and Ranging (LiDAR) data captured in 2019 and 2020 complemented by a number of bathymetric and structural surveys as well as other LiDAR data captured in 2009 and 2013.

The LDR and GDA hydraulic models were calibrated for the event October to December 2010. Recorded peak flow at Menindee Weir 32 for this event was approximately 17,000 ML/day. The calibrated model was validated for the event January – February 2012 and January – February 2010. More details on the LDR and GDA hydraulic model development can be found in the relevant reports.

The LDR and GDA hydraulic models were adopted as a base model for Lower Darling River Vegetation Assessment modelling.

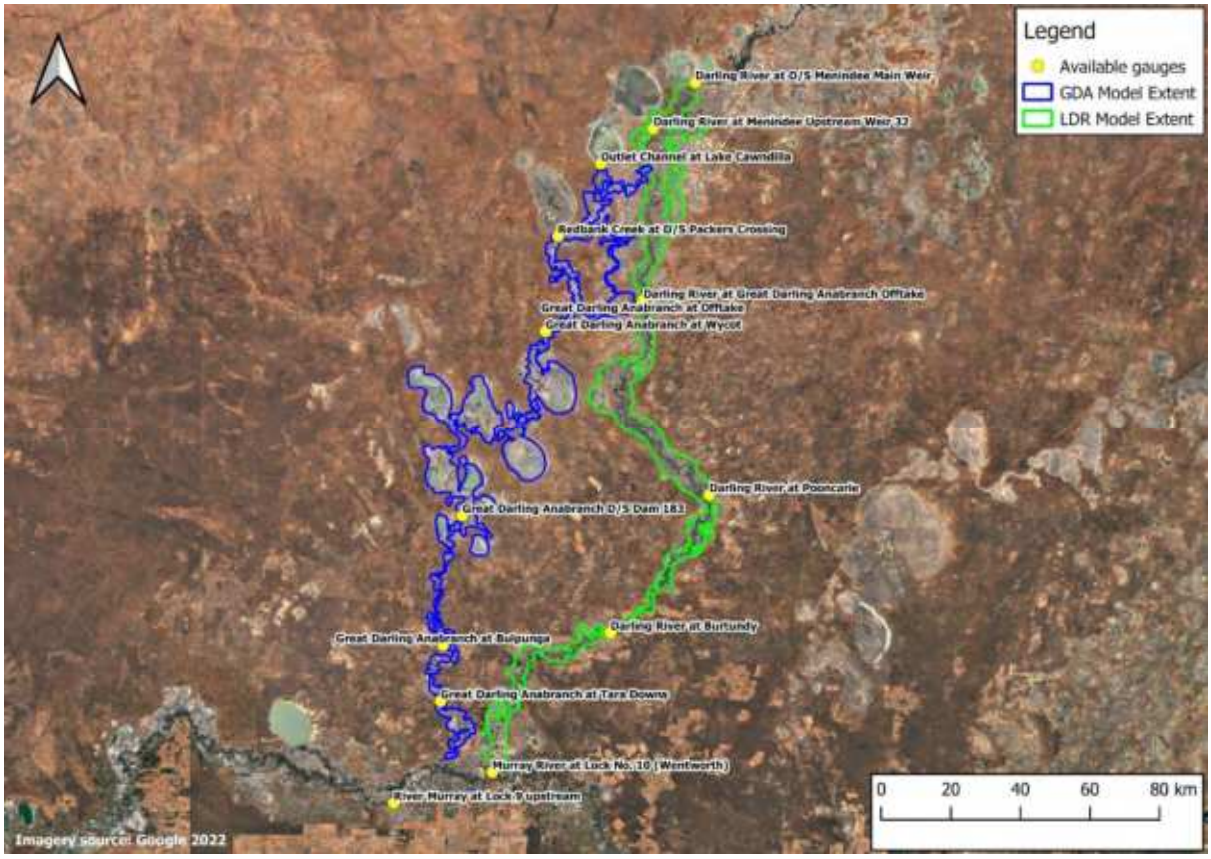

Figure 2.1: Models extents – previous studies

2.2 Gauging data

There are a number of water level and flow gauging stations (**Table 2-1**) that are located within the study area. Gauging data for those stations were sourced from WaterNSW. Flow and water level data from those stations were utilised as boundary conditions for the hydraulic model or to validate the hydraulic model for this study.

Table 2-1: Available gauging station within study area

Gauging Station	Station ID	Waterway	Comments
Menindee Weir 32	425012	LDR	Upstream boundary and model validation
GDA Offtake	425048	LDR	Model validation
Pooncarie	425005	LDR	Model validation
Burtundy	425007	LDR	Model validation
Wentworth	425010	Murray River	Downstream boundary
D/S Packers Crossing	425019	GDA	Model validation
Wycot	425013	GDA	Model validation
D/S Dam 183	425053	GDA	Model validation
Bulpunga	425011	GDA	Model validation
Tara Downs	425054	GDA	Model validation

2.3 Satellite images

Sentinel-2, LANDSAT 7 and LANDSAT 8 satellite imageries were downloaded. The hydraulic model was validated by comparing the modelled inundation extent to the extent identified on the satellite imagery.

2.4 Evapotranspiration and infiltration

Due to the prevailing climate of the study area evapotranspiration is very seasonal, with significantly more evapotranspiration over the hotter summer months than the colder winter months. Data for evapotranspiration was sourced from SILO of the Queensland Department of Environment and Science as agreed for this study. Point evapotranspiration data for Pooncarie Mail Agency (Station No. 47029) was adopted for this study. Evapotranspiration is a derived variable, as opposed to a primary variable such as rainfall which is physically measured, rather equations are used to calculate evapotranspiration based on primary variables. A range of different calculations and variables for evapotranspiration are available in the SILO data. In this study, Morton's point potential evapotranspiration was used.

For model validation, historic daily evapotranspiration data was adopted but for design scenarios, monthly average evapotranspiration was adopted in the model. Evapotranspiration was applied in model using TUFLOW's direct rainfall feature as negative rainfall which extracts water from the model.

Again, based on the findings of the previous study, an initial loss of 20 mm was used, along with a continuing loss of 0.04 mm/hr. Infiltration losses were applied uniformly across the model extent using the TUFLOW's Initial Loss/Continuing Loss system.

2.5 Lake operations

There are a number of lakes located within the study area. Storage capacity of some of the lakes are large enough to consume significant portions of the flow from the channel. Inlet and outlet of the lakes can be activated simultaneously. However, there was limited information on the configuration of inlet and outlet structures of those lakes as well as operation strategy of those lakes. For simplicity, configuration of inlet and outlet structures were identified based on LiDAR data and satellite images and included in the hydraulic model. It was also assumed that those lakes will be filled-up by gravitational flow.

2.6 Vegetation database

Vegetation data was provided by DPE named "*MurrayLD_Water_dependent_veg_final_v3*". The data was provided as geodatabase, which was imported in GIS software to investigate vegetation inundation extent and produce maps.

3 Methodology of assessment

3.1 Hydraulic model update

The previous LDR and GDA hydraulic models (**Section 2.1**) were developed for a different purpose than the present study. The existing models were calibrated for approximately 17,000 ML/day release from Weir 32, whereas the present study aims to investigate flow behaviour for release scenarios between 18,000 ML/day and 30,000 ML/day from Weir 32. This required further validation of the models for larger flows as a number of breakouts occur for flows larger than 17,000 ML/day.

The previous LDR and GDA hydraulic models cover a combined area of 3,400 sq. km. The models required a considerable time to simulate any scenario due to the size of the catchment. A significant number of model configurations were investigated to identify a reasonable size of model which ensure a reasonable run time without compromising output quality of the model. Existing model results shows extremely flat slope of water level surface, which is close to 0.00001 m/m. The hydraulic model can generate unrealistic water levels when applying very flat slope boundary conditions. Therefore, a Lower Darling & Anabranch (LD&A) combined model was found more appropriate to avoid any issues for the flat slope should the model be split halfway through the length of the river.

Moreover, due to the flat nature of the topography, flood behaviour within the study area can be significantly influenced by any levee or hydraulic structures. Even a low height levee can significantly alter flood behaviour within the study area. Therefore, additional levees were identified in the floodplains and were included in the TUFLOW model by modifying topography using Zsh lines.

Some locations within the LDR and GDA models were subject to instabilities during releases of large flows. Therefore, minor updates were made to structure configurations, missing or inappropriate levees and configuration of 1D side branches of Darling River.

The latest version of TUFLOW HPC with Quadtree features has been used for modelling (TUFLOW 2020-10-AE). TUFLOW HPC is a 2D fixed grid hydrodynamic solver that uses an explicit finite volume solution that is 2nd order in space and 4th order in time (TUFLOW, 2018). TUFLOW's Quadtree feature allows for finer resolution grids within the model domain. A grid resolution of 25 m X 25 m was adopted to define topography for most of the areas within the model domain including the main channel and immediate floodplains. A 12.5 m X 12.5 m finer resolution grid was used to define critical topography around inlet channels, key structures and levees. and additional topographic detail to be represented within the channel. Other areas were defined using a 50 m X 50 m grid resolution. A general configuration is presented in **Figure 3-1**.

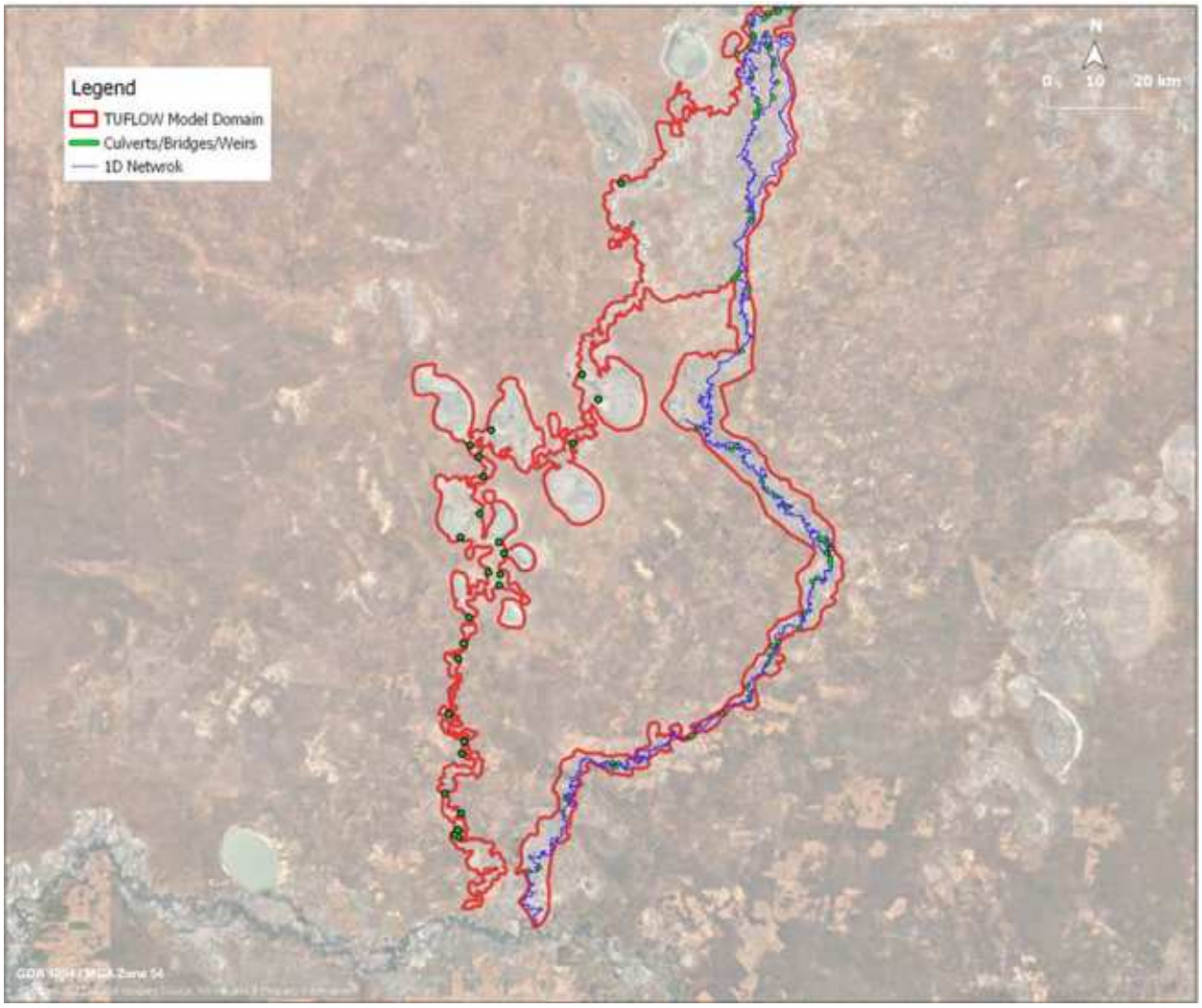

Figure 3-1 Schematic diagram LD&A TUFLOW hydraulic model

3.2 Model validation

The period between May and August 2022 (referred to as the August 2022 event hereafter) was selected as the validation event for the LD&A hydraulic model. At the time of this study, the 2022 event was the most recent major event which included 21,800 ML/day release at Menindee Weir 32 (**Figure 3-2**). There was also a constant release of 2,000 ML/day from Lake Cawndilla. Releases at Weir 32 and from Lake Cawndilla were incorporated into the hydraulic model to simulate an inundation map for the August 2022 event. Recorded water levels at Lock 10 were adopted for the downstream boundary for the Lower Darling River, and water levels at Lock 9 were adopted for the downstream boundary for the Great Darling Anabranch. The information provided by DPE on the operation of internal lakes was incorporated into the hydraulic model as time-varying conditions. SILO data at the Pooncarie Mail Agency station were utilised to assign evaporation and losses to the hydraulic model. However, there were some challenges in identifying precise details of lakes conditions such as configuration of inlet structures or initial capacity of the lakes. This limited information was accepted as a limitation of the model validation.

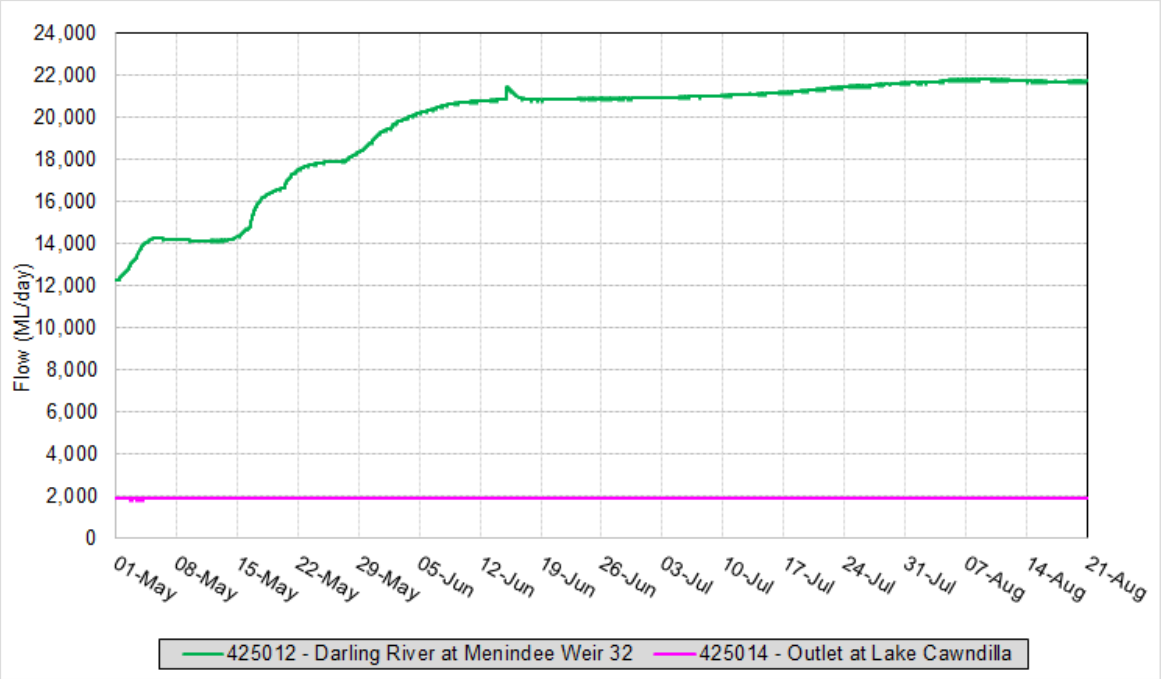

Figure 3-2 Upstream release from Menindee Lakes during the August 2022 validation event

A number of iterations were undertaken to match model results with observed data. Comparisons of simulated and recorded water level time series are included in **Appendix A** Figures show that generally simulated water levels are comparable with recorded data. Some differences were observed at the initial stage of simulation, but with progress of simulation, simulated water levels generated a fair match with recorded water levels. The early differences could be due to the initial state of hydrology and limitation in available information on initial conditions. Comparisons of simulated and recorded water levels on August 21, 2022, at key location within the study area are summarised in **Table 3-1**. These results also show a reasonable match.

Table 3-1: Summary of the comparison of simulated and recorded water levels on 21st August

Gauging Station	Simulated Water Level (mAHD)	Recorded Water Level (mAHD)	Comments on Water Level Differences
LDR - Menindee Weir 32	58.26	58.33	Good match
LDR - GDA Offtake	52.70	52.76	Good match
LDR - Pooncarie	44.88	44.57	Within acceptable limit
LDR - Burtundy	39.18	39.10	Good match
Murray River - Wentworth	30.42	30.42	Excellent match
GDA - D/S Packers Crossing	53.43	53.47	Excellent match
GDA - Wycot	49.46	49.70	Within acceptable limit
GDA - D/S Dam 183	39.51	45.50	Less confidence in the recorded data. 1 m LiDAR data indicated that the gauging station could be located away from the main channel as recorded water levels are not comparable with the terrain of the channel. However, simulated water levels appeared to be more realistic. In addition, the modelled inundation matched well with satellite images (Panel 24 in Figure A-11)
GDA - Bulpunga	33.72	33.41	Within acceptable limit
GDA - Tara Downs	30.37	30.11	Within acceptable limit

Simulated inundation on August 21, 2022 was extracted and compared with satellite images captured on the same date (**Appendix A**). Key findings of validation are listed below:

Validation for the areas between Menindee Weir, GDA Offtake and upstream of Wycot (Panel 1 to 5 and Panel 16 to 18 in **Figure A-11, Appendix A)**:

- The difference between observed and recorded water levels is less than 0.1 m.
- The simulated inundation extent is slightly wider than the one identified on the satellite imagery. This can be acceptable due to the model grid size and/or model uncertainties.
- Overall, there is a reasonable match between the simulated and recorded data.

Validation for the areas between downstream of GDA Offtake and downstream of Pooncarie (Panel 6 to 11 in **Figure A-11, Appendix A)**:

- The difference between observed and recorded water levels is around 0.3 m. This difference is consistent during the whole simulation period.
- The simulated inundation extent is wider than that identified by satellite images, especially around river bends.
- Those differences are considered within acceptable limits due to model grid resolution and/or model uncertainties as well as uncertainties in the recorded data.

Validation for the areas between Upstream of Burtundy and downstream boundary of LDR (Panel 12 to 15 in **Figure A-11, Appendix A)**:

- The difference between observed and recorded water levels is less than 0.1 m.
- The simulated inundation extent is slightly wider than that identified by satellite images. This can be acceptable due to model grid size and/or model uncertainties.
- Overall, there is a reasonable match between the simulated and recorded data.

Validation for the areas between Upstream of Wycot and downstream of Dam 183 (Panel 19 to 25 in **Figure A-11, Appendix A)**:

- Simulated water level does not match with recorded water levels at DAM 183. As discussed in **Table 3-1**, there is less confidence on gauging data at D/S Dam 183.
- The difference between observed and recorded water levels at Wycot is close to 0.3 m. A detailed investigation shows that the inundation extent of internal lakes does not match well around Wycot compared to satellite imagery. The model appears to underestimate the inundation extent within the lake when compared to satellite imagery. This is likely due to the lack of detail about the inlet structures of the various lakes. Therefore, the released water is expected to flow more towards the lake, thus lowering the channel's water level.
- The simulated and recorded water levels are generally in good agreement.

Validation for the areas between Upstream of Bulpunga and downstream boundary of GDA (Panel 26 to 28 in **Figure A-11, Appendix A)**:

- Difference between observed and recorded water level is around 0.3 m.

- There is good match between simulated inundation extent and the extent identified on satellite images.

Given the number of uncertainties including error margin in gauging data, extremely flat nature of topography and operation of lakes amongst others, those differences between simulated and observed data were found to be acceptable. Therefore, the LD&A hydraulic model is considered appropriate for the purpose of this study.

3.3 Sensitivity of model

The LD&A hydraulic model was simulated to investigate changes in flow behaviour due to:

i) All-Lakes Closed Scenario; and
ii) All-Lakes Open Scenario.

Lakes were artificially closed for the All-Lakes Closed scenario and lakes were allowed to fill up by gravity in the All-Lakes Open scenario. The model was simulated for 137 days for a release of 24,500 ML/day at Weir 32 combined with 2,000 ML/day release from Lake Cawndilla.

The sensitivity analysis shows that 15% more area can be inundated if all lakes are closed in the GDA compared to the All-Lakes Open scenario. Moreover, released water can travel about 50 km further along the GDA for the All-Lakes Close scenario. Therefore, in order to adopt a conservative approach, all lakes were assumed to be open in all design scenarios.

3.4 Design scenarios

This section highlights the assumptions and methodology adopted to undertake hydraulic modelling activities for the Lower Darling River and Great Darling Anabranch Vegetation Inundation Mapping.

- 28 design scenarios were selected for this study as documented in **Table 3-2**.
- Scenarios 1 and 2 were used to assess the progression of extents as the flow increases between 6,000 ML/day and 30,000 ML/day at a rate of 500 ML/day. Restart files were created every 1,000ML/day increases in flow (every second day) from 18,000ML/day (i.e. when flow reaches 18,000 ML/day, 19,000 ML/day, … , 30,000 ML/day). These restart files were used as the initial conditions for Scenarios 3-28 (**Table 3-2**) to avoid repetition of flow ramp-up from 6,000 ML/day for each release flow.
- A maximum simulation period of 3 months (2,016 hours) was assumed for Scenarios 3-28. This is equivalent to the period from 1 May to 31 July 2010 or from 1 February to 30 April 2012 as advised by DPE.
- For design scenarios, all the lakes were modelled as open as follows:
    - Topography of lakes and inlet channels are included in the hydraulic model based on LiDAR data. This allows the lakes to be filled at natural gradients.
    - No additional inflow structure for the lakes is included in the model as there is insufficient detail to identify the appropriate size and type of the structures.
- A 100 ML/day constant inflow from Talyawalka Creek into the study area was included to avoid backflow from the Lower Darling River into Talyawalka Creek. This

was assumed because there is no gauging data available for Talyawalka Creek to estimate inflows for each design flow.

- A constant release rate of 2,000 ML/day was proposed for Lake Cawndilla Lake for scenarios of release from 25,000 ML/day from Weir 32. For lower flows, no release from Lake Cawndilla was included. This was based on current knowledge of operation of Lake Cawndilla.
- Sample design inflows for the Scenario 1 listed in **Table 3-2** was represented on **Figure 3-3** and for the Scenario 3 was represented on **Figure 3-4.**
- The design evaporation was adopted as daily evaporation rates from SILO for Pooncarie Mail Agency (Station No. 47029) for the period 1 May to 31 July 2010 (**Figure 3-5**) and 1 Feb to 30 April 2012 (**Figure 3-6**).
- For simplicity, zero rainfall depth was adopted for all scenarios. This is a conservative approach.
- Downstream boundary conditions of the hydraulic model were based on the full-supply level of Lock 9 and Lock 10 at Murray River. Full supply level at Lock 10 (30.8 m AHD) was adopted for the downstream boundary of the Lower Darling River and full supply level at Lock 9 (27.4 m AHD) was adopted for the downstream boundary of the Great Darling Anabranch. These boundary conditions were applicable to all design scenarios.
- A 0.04 mm/hr continuing loss rate was incorporated for all design scenarios. A 20 mm initial infiltration loss was adopted for the 2012 (high evaporation/dry) conditions and a 0 mm initial infiltration loss was adopted for the 2010 (wet/saturated catchment/low evaporation) conditions. These values were based on previous projects experience and calibration results.
- Previous experiences and model validation indicated that a portion of flow can be lost along the Darling River due to a few breakouts occurring between Lake Wetherell and Weir 32. As the model upstream was located at Lake Wetherell, upstream model inflows were adjusted accordingly to ensure that the model appropriately simulated the design release flow rate at Weir 32, i.e. model upstream inflow = target release (e.g. 18,000 ML/day) + losses due to breakouts (e.g. 130 ML/day for a 18,000 ML/day flow, refer to **Table 3-3**).

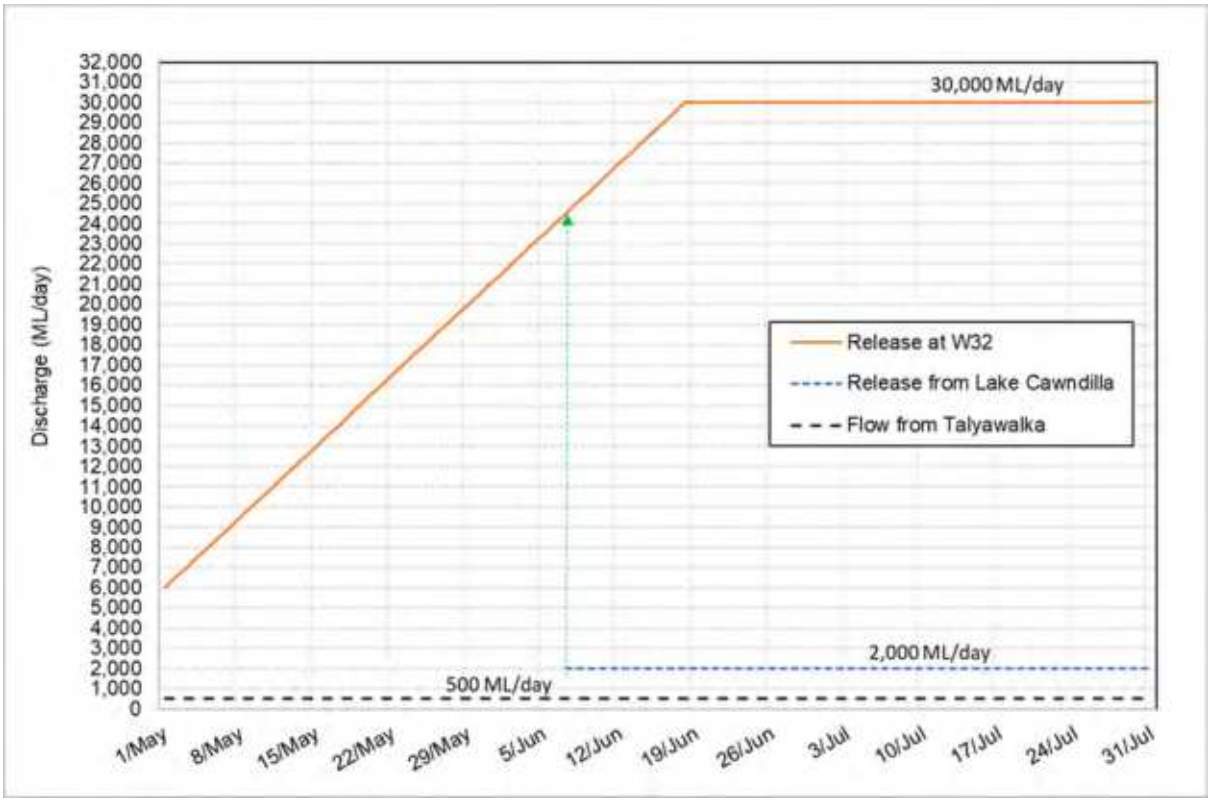

Figure 3-3: Sample design inflows for Scenario 1 - low evaporation climate scenario

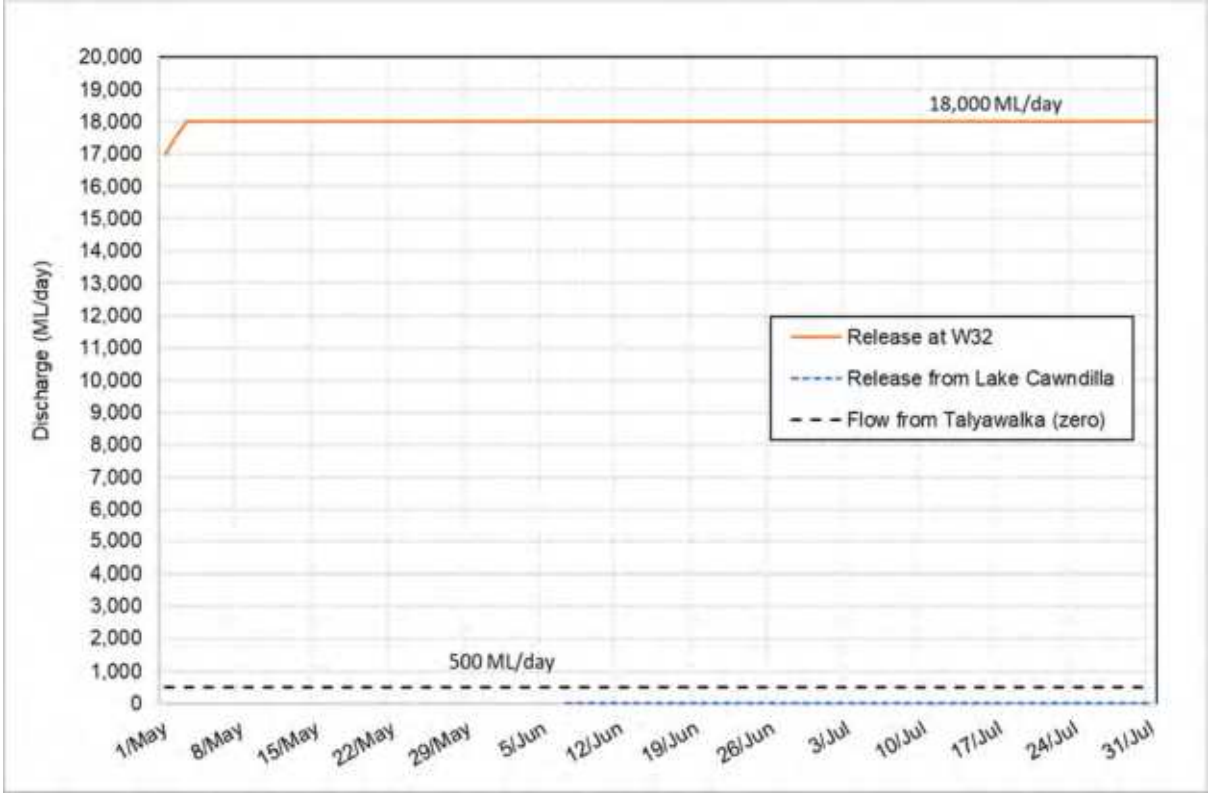

Figure 3-4: Sample design inflows for Scenario 3 - high evaporation climate scenario

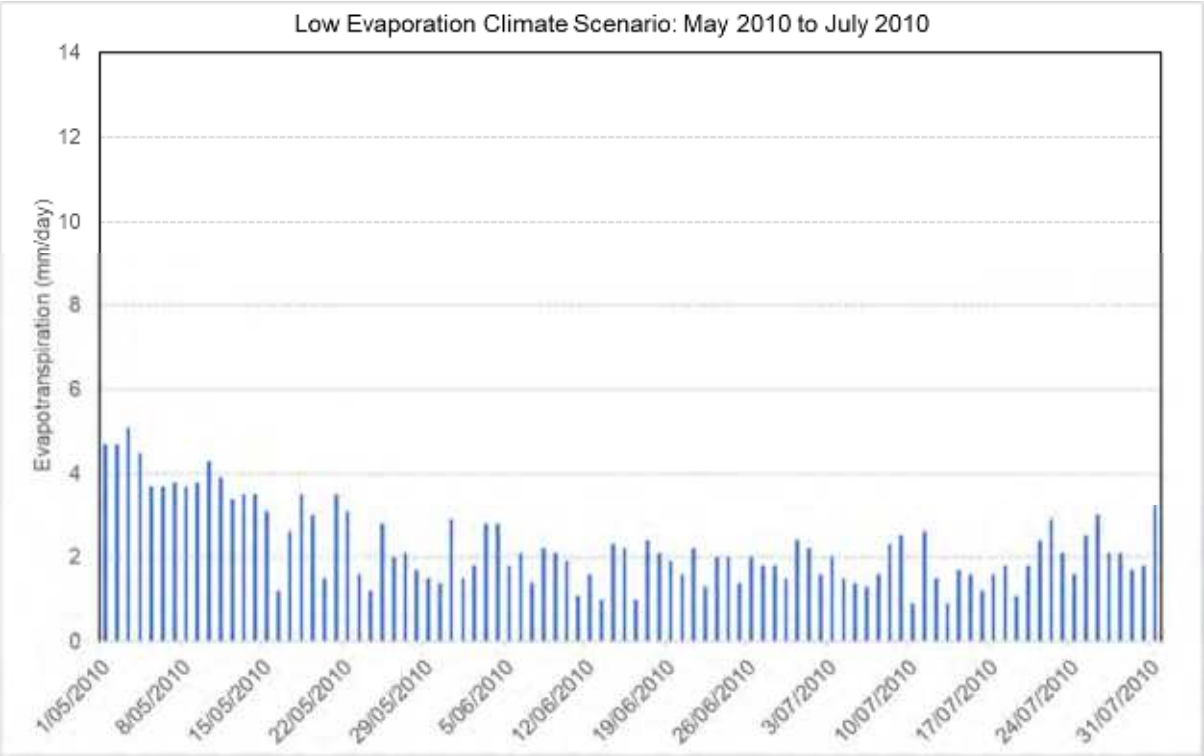

Figure 3-5: Rate of evapotranspiration for low evaporation climate scenario

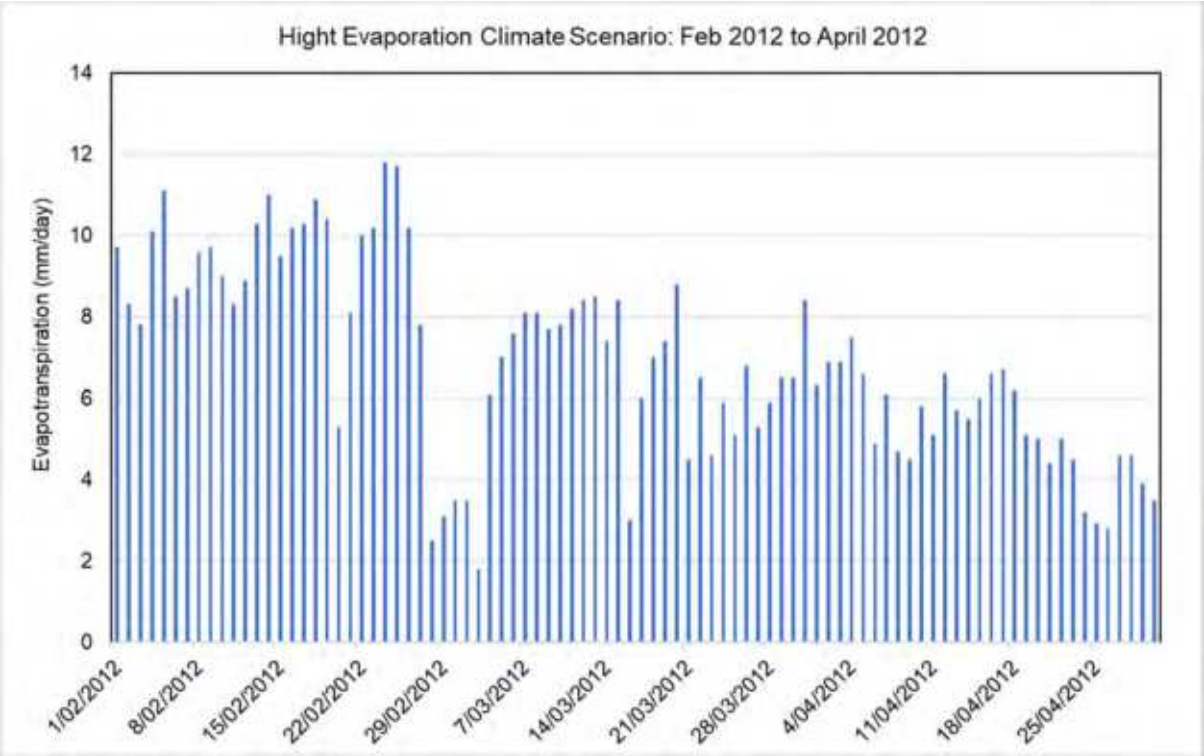

Figure 3-6: Rate of evapotranspiration for high evaporation climate scenario

Table 3-2: Proposed model scenarios and hydrologic conditions

Scenario number	Climate	Initial Condition correspond to (ML/d)*	Steady state rate @ Weir 32 (ML/d)#	Cawndilla release (ML/d)	Simulation period
1	Dry	6,000	30,000	2,000 (once rate at Weir 32 >=25,000 ML/Day)	1 May 2010 to 31 July 2010
2	Wet	6,000	30,000	2,000 (once rate at Weir 32 >=25,000 ML/Day)	1 Feb 2012 and 30 April 2012
3	Dry	18,000	18,000	0	1 May 2010 to 31 July 2010
4	Wet	18,000	18,000	0	1 Feb 2012 and 30 April 2012
5	Dry	19,000	19,000	0	1 May 2010 to 31 July 2010
6	Wet	19,000	19,000	0	1 Feb 2012 and 30 April 2012
7	Dry	20,000	20,000	0	1 May 2010 to 31 July 2010
8	Wet	20,000	20,000	0	1 Feb 2012 and 30 April 2012
9	Dry	21,000	21,000	0	1 May 2010 to 31 July 2010
10	Wet	21,000	21,000	0	1 Feb 2012 and 30 April 2012
11	Dry	22,000	22,000	0	1 May 2010 to 31 July 2010
12	Wet	22,000	22,000	0	1 Feb 2012 and 30 April 2012
13	Dry	23,000	23,000	0	1 May 2010 to 31 July 2010
14	Wet	23,000	23,000	0	1 Feb 2012 and 30 April 2012
15	Dry	24,000	24,000	0	1 May 2010 to 31 July 2010
16	Wet	24,000	24,000	0	1 Feb 2012 and 30 April 2012
17	Dry	25,000	25,000	2,000	1 May 2010 to 31 July 2010
18	Wet	25,000	25,000	2,000	1 Feb 2012 and 30 April 2012
19	Dry	26,000	26,000	2,000	1 May 2010 to 31 July 2010
20	Wet	26,000	26,000	2,000	1 Feb 2012 and 30 April 2012

Scenario number	Climate	Initial Condition correspond to (ML/d)*	Steady state rate @ Weir 32 (ML/d)#	Cawndilla release (ML/d)	Simulation period
21	Dry	27,000	27,000	2,000	1 May 2010 to 31 July 2010
22	Wet	27,000	27,000	2,000	1 Feb 2012 and 30 April 2012
23	Dry	28,000	28,000	2,000	1 May 2010 to 31 July 2010
24	Wet	28,000	28,000	2,000	1 Feb 2012 and 30 April 2012
25	Dry	29,000	29,000	2,000	1 May 2010 to 31 July 2010
26	Wet	29,000	29,000	2,000	1 Feb 2012 and 30 April 2012
27	Dry	30,000	30,000	2,000	1 May 2010 to 31 July 2010
28	Wet	30,000	30,000	2,000	1 Feb 2012 and 30 April 2012

**Note: initial condition includes corresponding water level, flow and velocity*
#Note: losses due to breakout at upstream of Weir 32 are presented in Table 3-3

Table 3-3: Summary of expected loss of flow at upstream of Weir 32

Targeted flow at Wier 32	Required release at Lake Wetherell	Loss in floodplain at US of Weir 32
18,000	18,130	130
19,000	19,160	160
20,000	20,210	210
21,000	21,330	330
22,000	22,430	430
23,000	23,640	640
24,000	24,850	850
25,000	25,950	950
26,000	27,390	1,390
27,000	28,450	1,450
28,000	29,600	1,600
29,000	30,740	1,740
30,000	31,850	1,850

4 Investigation of results

4.1 Key limitations of results

To avoid significant model simulation times, each release scenario was simulated for 2,016 hours, which corresponds to 12 weeks. Model results show that released flow does not reach downstream of the GDA in any of the simulated design scenarios. Released flow, however, might travel further downstream of the GDA if the hydraulic model was simulated for a much longer period of time. Therefore, the estimated inundated area in the downstream part of the GDA might be underestimated. However, the model indicates that the released flow travels downstream of the LDR in all of the design scenarios.

Again, due to several breakouts between the upstream boundary of the hydraulic model (Lake Wetherell) and Weir 32 as well as hydraulic characteristics of the topography, model simulated flows at Weir 32 are within ±150 ML/day of the targeted flow. For example, the targeted flow at Weir 32 is 18,000 ML/day but the simulated flow is 17,990 ML/day; the targeted flow at Weir 32 is 26,000 ML/day but the simulated flow is 26,142 ML/day; the targeted flow at Weir 32 is 30,000 ML/day but the simulated flow is 30,103 ML/day. This difference was assumed to be acceptable given the purpose of this study.

4.2 Overview of flow distribution

Hydraulic model results indicate that a significant portion of the release from Weir 32 runs along the LDR. Only a small portion of the released water spills over the right bank of the LDR and contributes to the GDA system. A further investigation of model results shows that only 695 ML/day flow (~4% of the release) spills into the GDA system, of which 230 ML/day spills at GDA offtake in the 18,000 ML/day release scenario. Amount of spill in GDA system becomes 7,860 ML/day (~26% of the release) in the 30,000 ML/day release scenario, which includes 2,960 ML/day spill at GDA offtake (**Table 4-1**). Release from Lake Cawndilla, therefore, can play a vital role in contributing to flow distribution in the GDA system.

Table 4-1: Indicative spill (ML/day) from LDR in GDA system

Spill Location	18,000 ML/day Release Scenario	25,000 ML/day Release Scenario	30,000 ML/day Release Scenario
Tandou Creek Offtake	125*	990*	1,950*
GDA Offtake	~230 (220-250)*	~1,870 (1840-1900)*	~2,960 (2930-2990)*
Between GDA and Tandou Offtake	~340 (330-350)*	~1,410 (1390-1430)*	2,950 (2940-3010)*
Total Spill	695 (4% of release)	4,270 (17% of release)	7,860 (26% of release)

**Note: Values are approximate. Range shows expected spill in wet and dry climate scenario*

4.3 Flow behaviour at reporting locations

Simulated time series of flow (ML/day) and water level (m AHD) were extracted from LD&A hydraulic model results at selected reporting locations for both wet and dry scenarios. The reporting locations are

i) Downstream of Weir 32;
ii) Great Darling Anabranch Offtake;

iii) Redbank Ck @ D/S Packers Crossing; and
iv) Burtundy.

Charts of time series for the reporting locations are included in **Appendix B** and key findings are summarised below:

- Rise in water level in the reporting locations is generally linear for each 1,000 ML/day increment of flow at Weir 32 for both wet and dry scenarios.
- Only 120 ML/day of water crosses the right bank of LDR and travels along Tandou Creek towards Cawndilla in the 18,000 ML/day scenario. With a constant release of 18,000 ML/day from Weir 32 and no release from Lake Cawndilla, spill from LDR does not reach Packers Crossing after three months of simulation time. Travel distance might change if the hydraulic model was run for more than three months.
- Once Lake Cawndilla's release is activated, significant changes in water level occur in GDA. The change in water level can be as high as 0.75 m at Packers Crossing due to 2,000 ML/day release from Lake Cawndilla.
- Simulated water levels at reporting locations in wet climate scenarios are generally higher than dry climate scenarios as evaporation and infiltration losses are higher for dry climate scenarios. Differences between water levels generated by wet and dry climate scenarios are within 0.1 m except at Burtundy where differences are within 0.2 m.
- Change in flow behaviour between wet and dry climate scenarios is also pretty similar to change in flood level. Simulated flow at reporting locations in wet climate scenario is slightly higher (within 200 ML/day) compared to dry climate scenario except at Burtundy. A wet climate can result in an increase of 1,200 ML/day flow at Burtundy compared to a dry climate.

4.4 Vegetation inundation mapping- flow ramp-up scenario

As documented earlier, the LD&A hydraulic model was simulated to assess the progression of extents as the flow increases between 6,000 ML/day and 30,000 ML/day with a rate of rise of 500 ML/day (**Table 4-2**). Weekly vegetation inundation extent was estimated and documented in **Figure 4-1**. The model shows that the weekly total inundated area increases linearly with the increase in flow, and the slope gets steeper from week 3. This could be due to the released water starting to spill onto the low-lying area around the main waterways.

Table 4-2: Adopted flow rate in hydraulic model for ramp-up scenario

Week No	Hour of Simulation	Peak flow at Start of Each Week (ML/day)	Rate of Increase (ML/day)
0	0	6,000	500
1	168	9,500	500
2	336	13,000	500
3	504	16,500	500
4	672	20,000	500
5	840	23,500	500
6	1008	27,000	500
7	1176	30,500	500

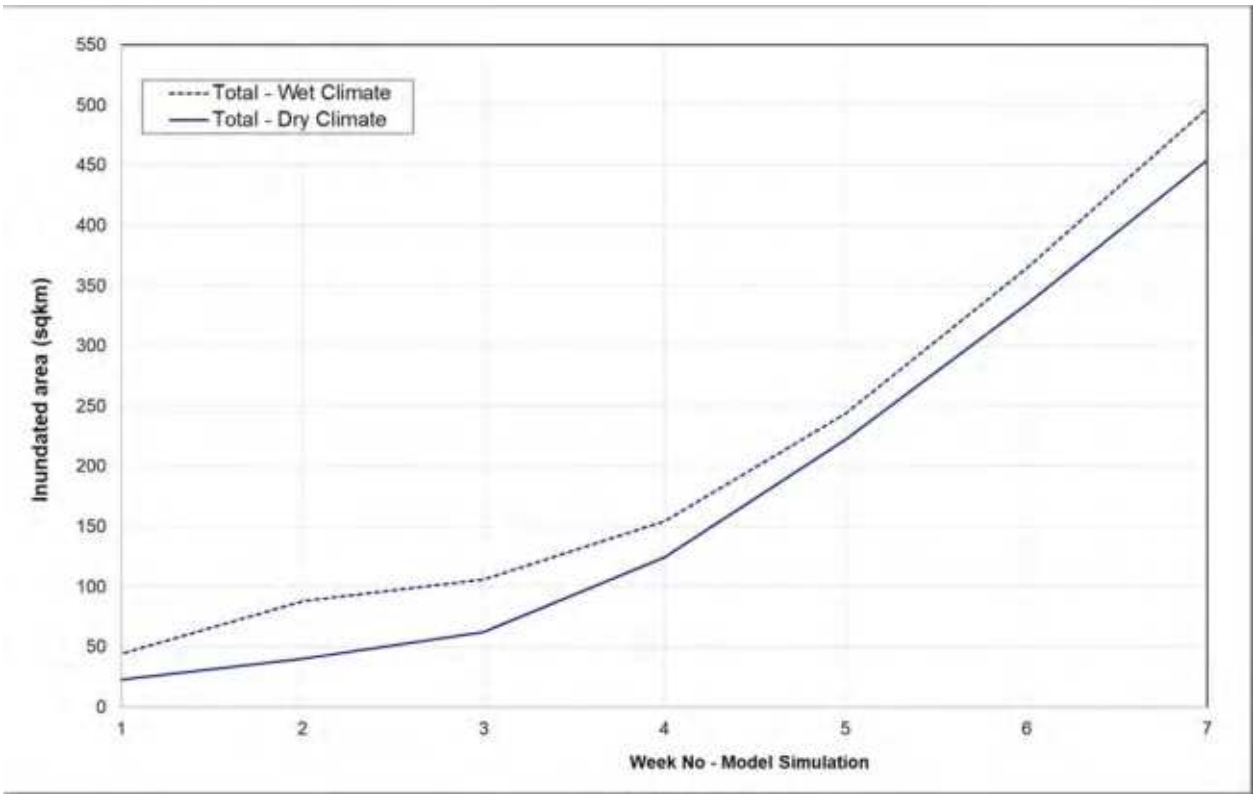

Figure 4-1: Weekly progress of total inundated vegetation

4.5 Vegetation inundation mapping- steady state scenario

Maximum inundation for each steady state release scenario was extracted to identify vegetation inundation extents. A zonal statistic was performed to determine the inundation area based on the vegetation layer provided by the Environment and Heritage Group (EHG). It can be noted that the maximum inundation indicates the maximum inundation extent in three months from the time of release at Weir 32. Inundation extent may change especially in the downstream section of the GDA, if the model was simulated for a period longer than three months.

There are a number of vegetation categories available in the vegetation layer. However, below are the broad categories adopted for the detailed investigation:

- Flood-dependent Woodland
- Flood-dependent shrubland Wetland
- Flood-dependent Forest
- Floodplain-other
- No-woody Wetland

Inundation extent maps for 18,000, 25,000 and 30,000 ML/day release scenarios are included in **Appendix C** Those scenarios have been selected as representative of the general progression and to minimise the number of maps. Inundation layer for other release scenarios will be provided as geographic information system (GIS) layer. A summary of the inundated areas is included in **Figure 4-2**, **Figure 4-3**, **Table 4-3** and **Table 4-4** and key findings are summarised below:

- Investigation shows that inundated area does not change linearly with an increase in release. This is because internal lakes become activated at various water levels and withdraw a significant portion of released water from waterways.
- The vegetation types along waterways are mainly flood-dependent forests. Therefore, inundation of flood-dependent forest area does not change significantly with the increase in release at Weir 32.
- Areas outside the main waterways are mainly covered by flood-dependent woodland vegetation. Therefore, inundated flood-dependent woodland appears to have a larger increase than other vegetation as release increase at Weir 32.
- Total inundated area for 30,000 ML/day can be five times larger than the inundated areas for 18,000 ML/day.
- The inundated area is approximately 10-20% larger in the wet climate scenario compared to dry scenario for any given release condition.
- Released water can travel 45 km or more along the GDA when wet climate scenarios are considered instead of dry scenarios.
- The release flow of 2,000 ML/day from Lake Cawndilla when flows exceed 24,000 ML/day at Weir 32 significantly increases the inundation area for all vegetation and this is particularly visible for the flood-dependent woodland being the main vegetation outside of the main channel.

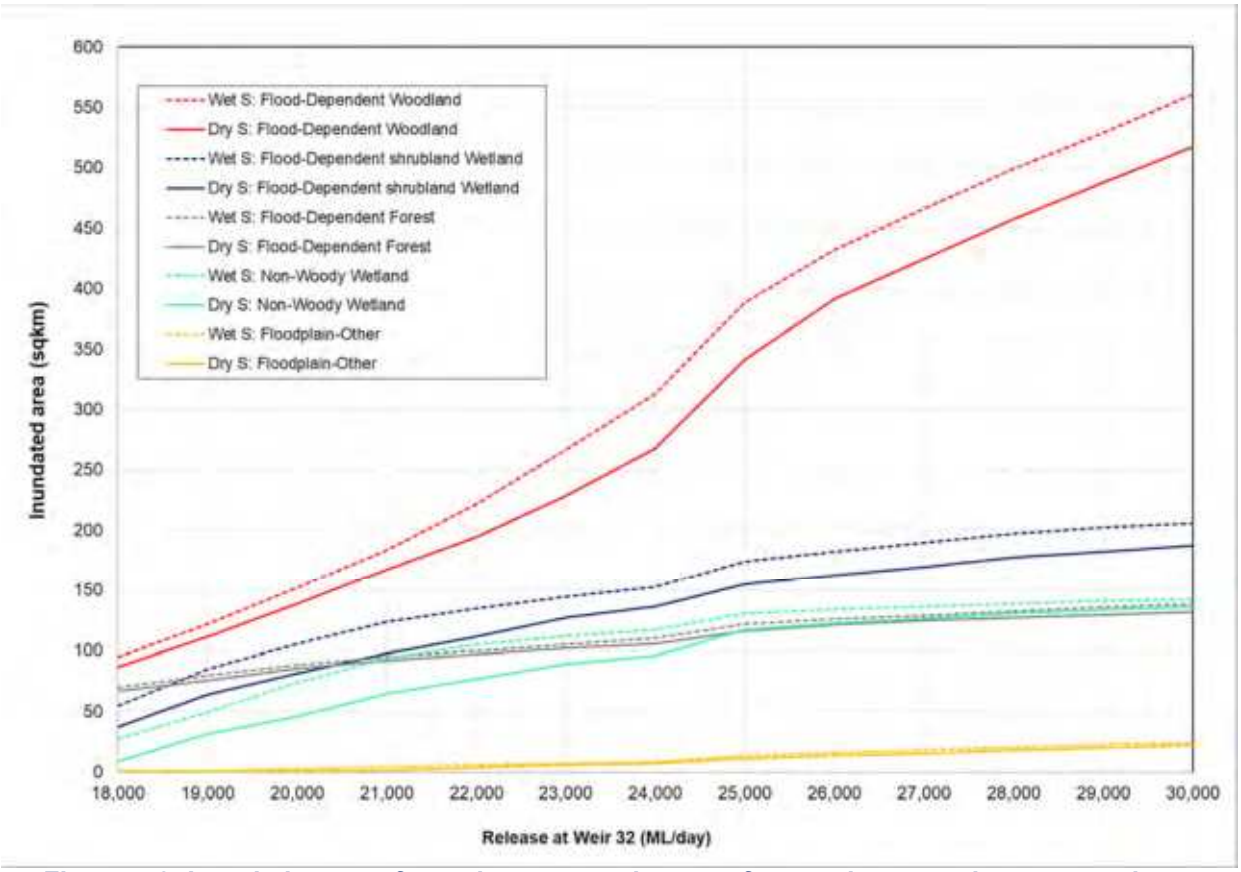

Figure 4-2: Inundation area for various vegetation type for steady state release scenarios

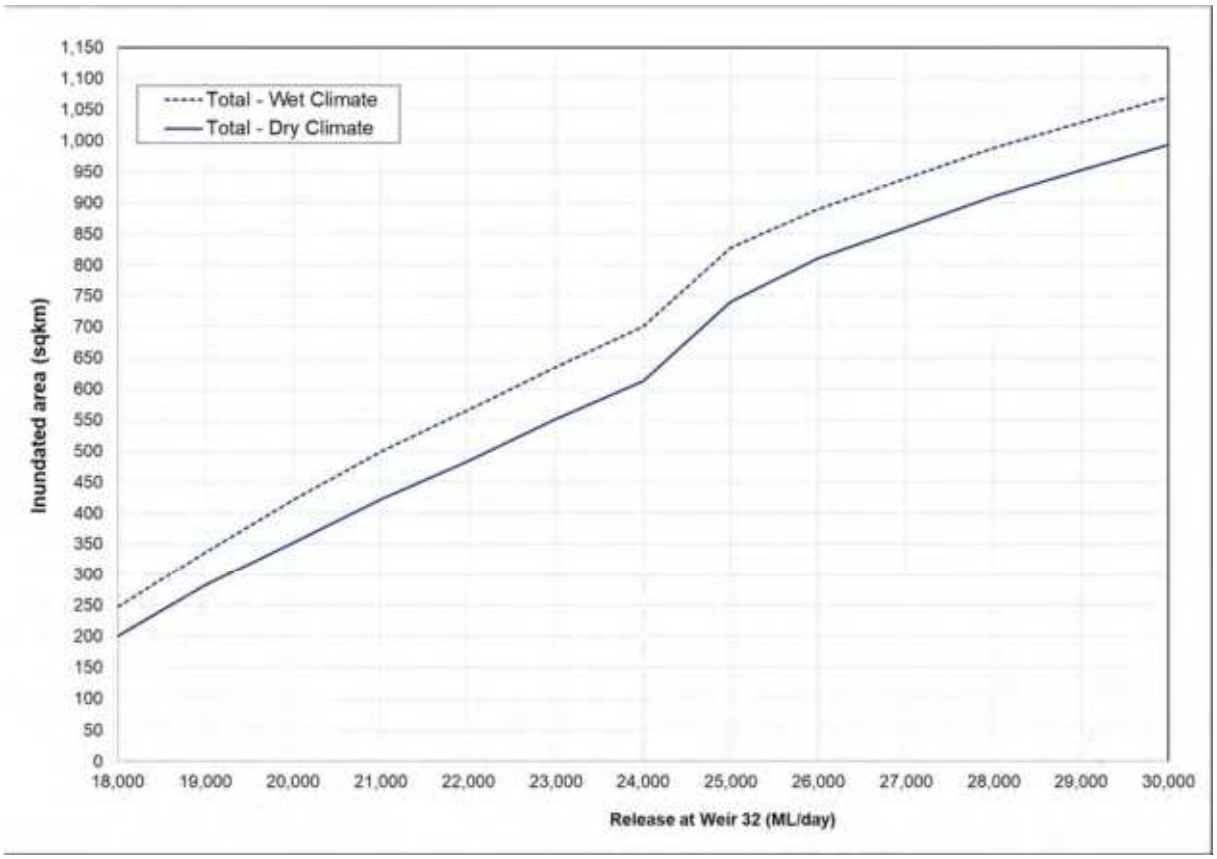

Figure 4-3: Total area of inundated vegetation for steady state release scenarios

Table 4-3: Area of inundated vegetation for dry climate scenario

Release Scenario	Inundated Area (sq.km.)					Total Inundated Area (sq.km.)
	Flood-Dependent Woodland	Flood-Dependent shrubland Wetland	Flood-Dependent Forest	Floodplain-other	Non-Woody Wetland	
18,000 ML/day	86	37	67	1	9	200
19,000 ML/day	111	64	76	1	32	283
20,000 ML/day	139	81	85	1	46	352
21,000 ML/day	167	98	92	2	64	422
22,000 ML/day	194	111	97	4	76	483
23,000 ML/day	228	127	102	6	89	551
24,000 ML/day	268	136	106	7	96	613
25,000 ML/day	341	155	116	11	117	741
26,000 ML/day	392	162	121	14	122	811
27,000 ML/day	424	169	124	15	126	859
28,000 ML/day	458	177	127	18	130	911
29,000 ML/day	488	182	129	20	133	953
30,000 ML/day	517	187	132	22	136	994

Table 4-4: Area of inundated vegetation for wet climate scenario

Release Scenario	Inundated Area (sq.km.)					Total Inundated Area (sq.km.)
	Flood-Dependent Woodland	Flood-Dependent shrubland Wetland	Flood-Dependent Forest	Floodplain-other	Non-Woody Wetland	
18,000 ML/day	94	55	70	1	28	247
19,000 ML/day	121	84	80	1	50	336
20,000 ML/day	152	105	88	2	74	421
21,000 ML/day	183	124	95	4	93	499
22,000 ML/day	221	135	100	6	105	566
23,000 ML/day	267	144	105	7	112	635
24,000 ML/day	313	152	110	8	117	701
25,000 ML/day	389	174	122	13	130	828
26,000 ML/day	432	182	126	16	134	890
27,000 ML/day	466	190	129	18	136	939
28,000 ML/day	499	197	132	20	139	988
29,000 ML/day	529	202	135	23	141	1,029
30,000 ML/day	561	206	138	24	142	1,070

5 Conclusion

Water dependent habitats in the low-lying area in LDR and GDA are primary depend on releases from Menindee Lakes. To identify ecological communities that can be benefited from Menindee Lakes releases, a two-dimensional Lower Darling and Anabranch (LD&A) model was produced for this present study. The LD&A hydraulic model was validated against a recent recorded event and simulated for a range of release scenarios ranging between 18,000 ML/day and 30,000 ML/day for both wet and dry climate scenarios.

Below are the key findings from this hydraulic modelling exercise:

- If all the lakes along the GDA are closed, it is estimated that around 15% more vegetation areas can be inundated compared to when all the lakes are open.
- The flow from the LDR spills into the GDA system at a few locations including Tandou Creek, the GDA offtake and other locations between Tandou Creek and the GDA offtake. The total spills from the LDR into the GDA system are approximately 630 ML/day, 4,170 ML/day, and 7,910 ML/day for a release scenario of 18,000 ML/day, 25,000 ML/day, and 30,000 ML/day, respectively.
- More specifically, the spill from:
  - the LDR into Tandou Creek is about 120 ML/day for a 18,000 ML/day release, increasing to 1,960 ML/day for a 30,000 ML/day release.
  - the LDR into the GDA offtake is about 200 ML/day for an 18,000 ML/day release, increasing to 3,000 ML/day for a 30,000 ML/day release.
  - the LDR between Tandou Creek and the GDA offtake is about 200 ML/day for 18,000 ML/day release, increasing to 2,950 ML/day for a 30,000 ML/day release.
- Release from Lake Cawndilla can have a significant impact on vegetation inundation in the GDA, particularly in the areas surrounding Tandou Creek and Redbank Creek. For instance, in a scenario with a release of 30,000 ML/day from Weir 32, the spill from the LDR into Tandou Creek (1,950 ML/day) is equivalent to the release from Lake Cawndilla (2,000 ML/day).
- A flow of 25,000 ML/day (the maximum flow rate for which impacts in Menindee township have been investigated to date) triples the area of floodplain vegetation inundated compared to 18,000 ML/day. A flow of 30,000 ML/day more than quadruples the area of floodplain vegetation inundated compared to 18,000 ML/day. Total inundated area for 18,000 ML/day is about 200 sq. km. which increase to 994 sq. km. for the 30,000 ML/day release for a dry climate scenario.
- Total inundation areas can vary depending on antecedent conditions of the catchment, and may be 10 – 20 % larger in wet conditions compared to dry conditions.
- Investigation shows that the total inundated area does not change linearly with an increase in the release flow. Vegetation inundation appears to increase slightly more rapidly as flow rates increase from 18,000 to 25,000, and then slow down as release increased from approximately 26,000 ML/day. Most of the lakes become active along the GDA and start filling up due to gravity when release is 26,000 ML/day or more.

Additional release above 26,000 ML/day mainly contribute to filling up the lakes along the GDA.

- It is important to note that the largest increase in inundation area between 24,000 and 25,000 ML/day is due to the commencement of the 2,000 ML/day flow release from Lake Cawndilla for release flows larger than 24,000 ML/day at Weir 32.
- All vegetation in the study area appears to be of environmental significance. The inundation area for the flood-dependent woodland vegetation category appears to have a larger increase than other vegetation as release flows increase at Weir 32.
- It should be noted that the inundation extent simulated by this study may change, should the model be simulated for more than 12 weeks. Release from Weir 32 does not reach the downstream end of the GDA in 12 weeks.
- This modelling exercise is designed to investigate vegetation inundation. Further validation should be completed if the model were to be used to assess flood impacts on townships.

6 References

BMT WBM, 2018. TUFLOW User Manual

Menindee Lakes Water Saving Project, NSW Department of Industry, 2018

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Appendix A Validation Plot

A.1. Comparison of simulated and observed water levels

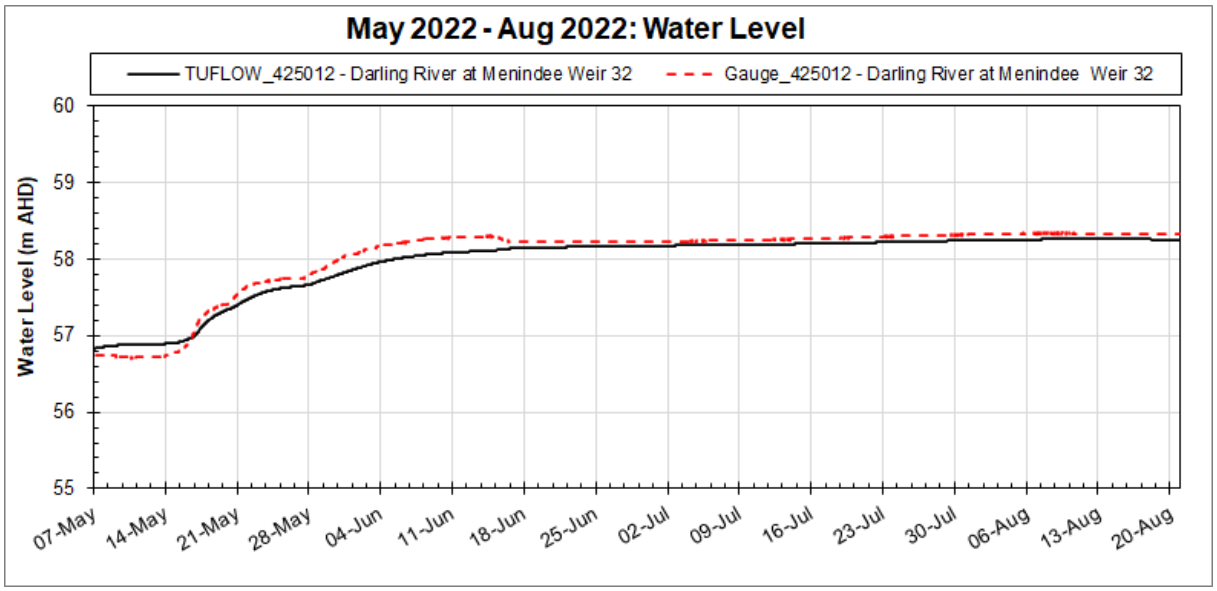


Figure A-1: Comparison of water level at Menindee Weir 32 (Lower Daring River)

Figure A-2: Comparison of water level at GDA offtake (Lower Daring River)

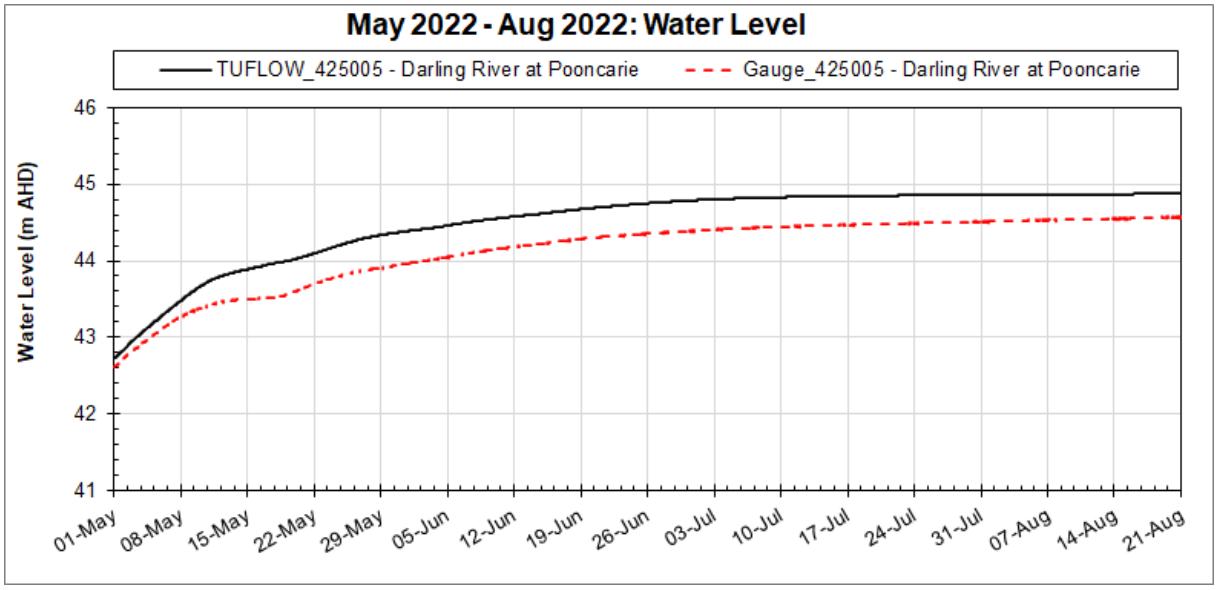


Figure A-3: Comparison of water level at Pooncarie (Lower Daring River)

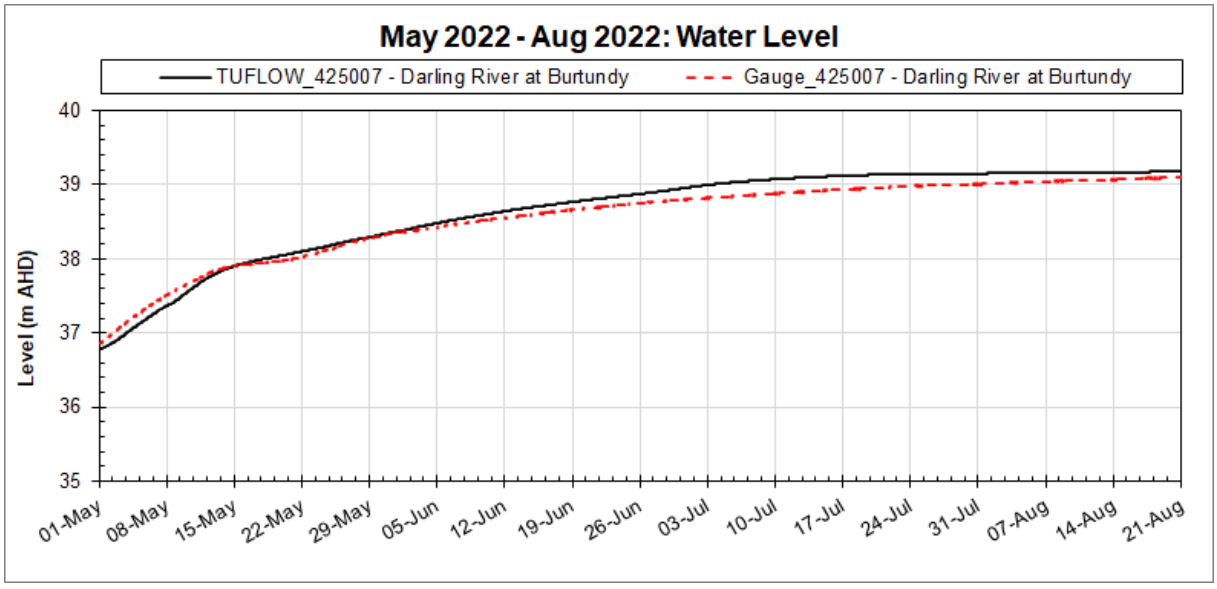


Figure A-4: Comparison of water level at Burtundy (Lower Daring River)

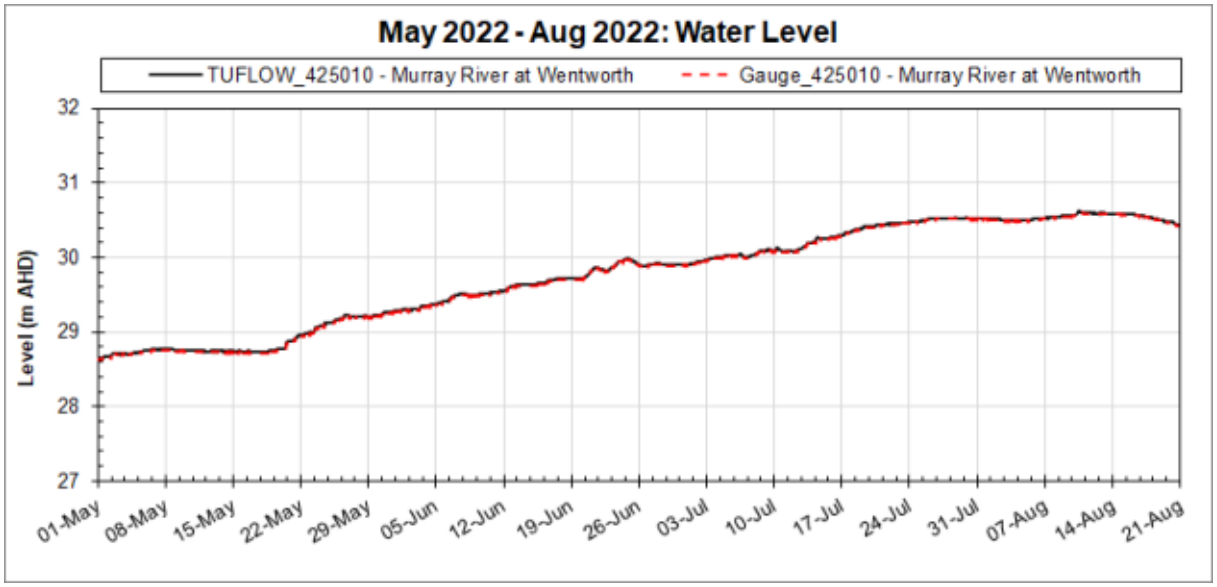


Figure A-5: Comparison of water level at Wentworth (Murray River)

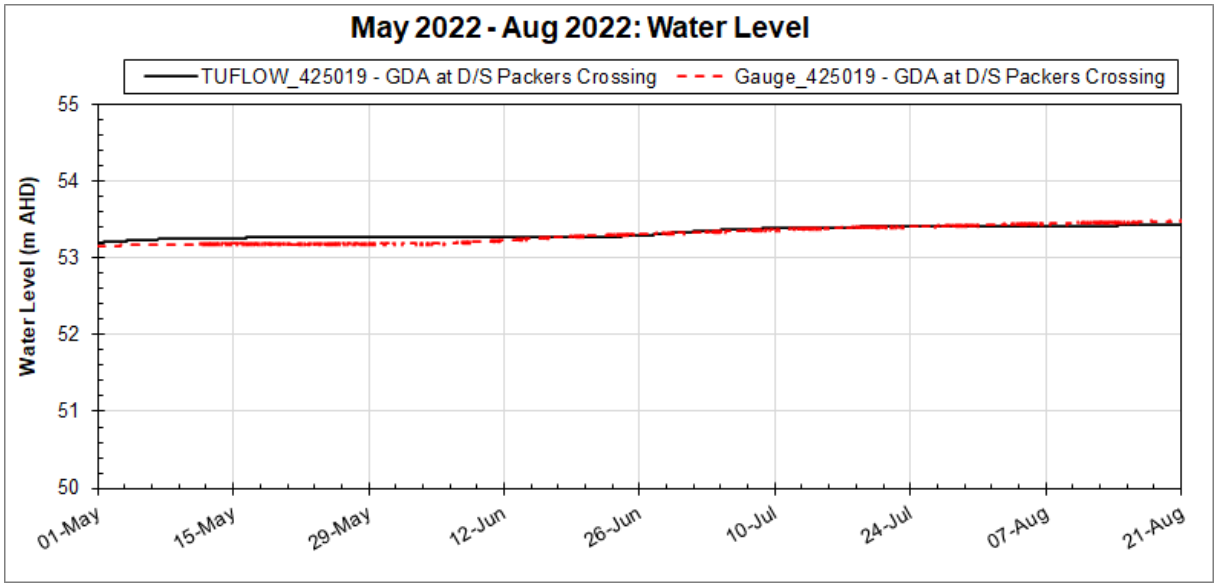


Figure A-6: Comparison of water level at Packers Crossing (GDA)

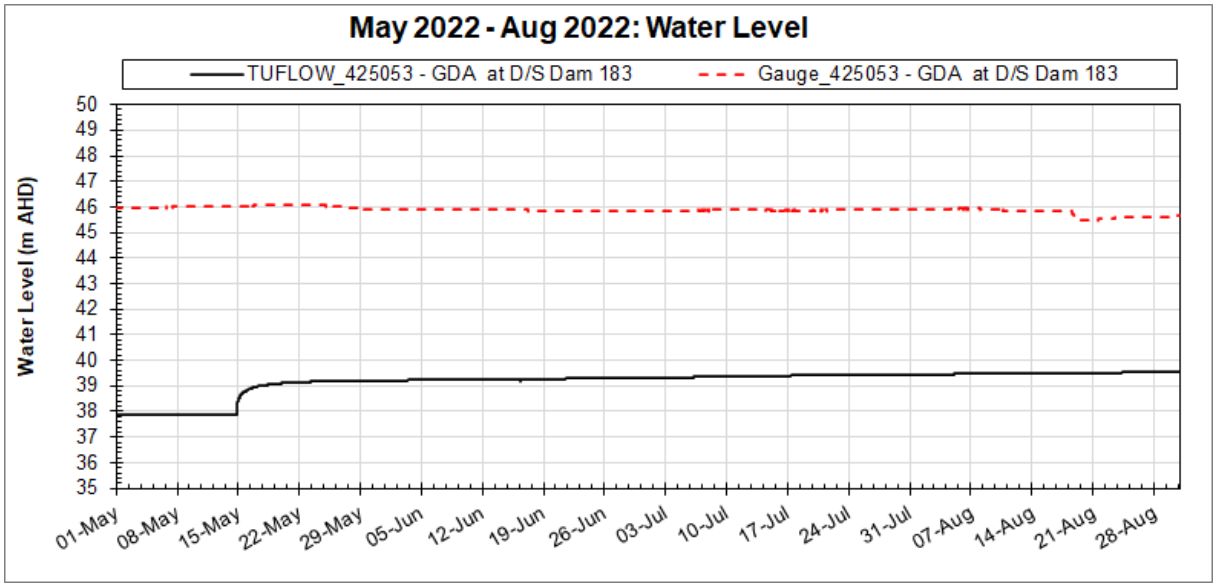


Figure A-7: Comparison of water level at D/S dam 183 (GDA)*

**Note: Less confidence in the recorded data. 1 m LiDAR data indicated that the gauging station could be located away from the main channel as recorded water levels are not comparable with the terrain of the channel. However, simulated water levels appeared to be more realistic. In addition, the modelled inundation matched well with satellite images (Panel 24 in Figure A-11)*

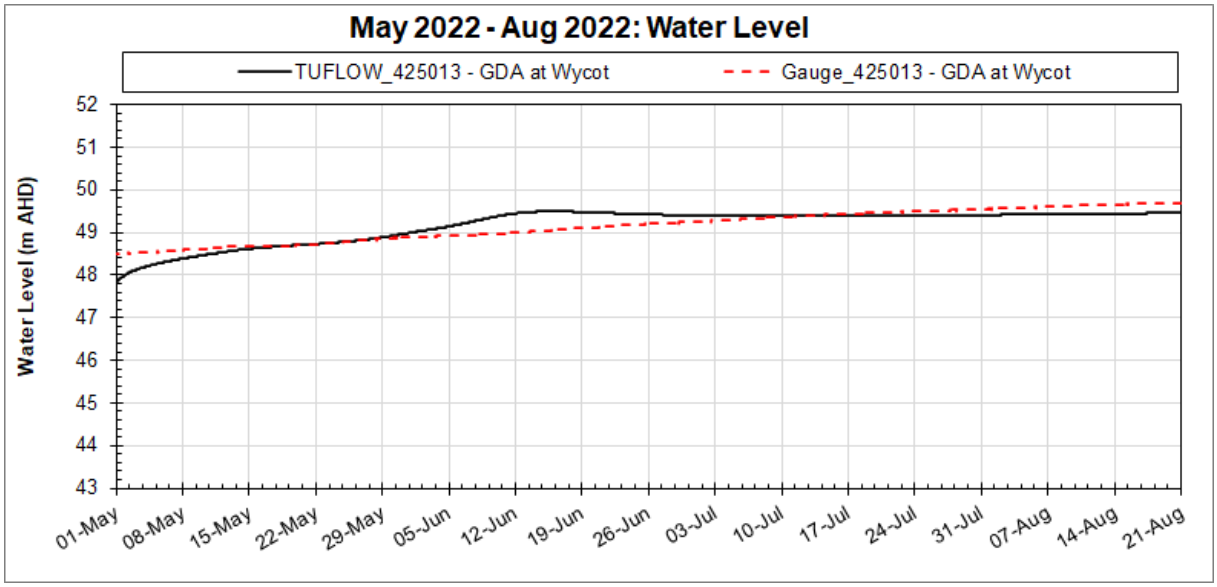


Figure A-8: Comparison of water level at Wycot (GDA)

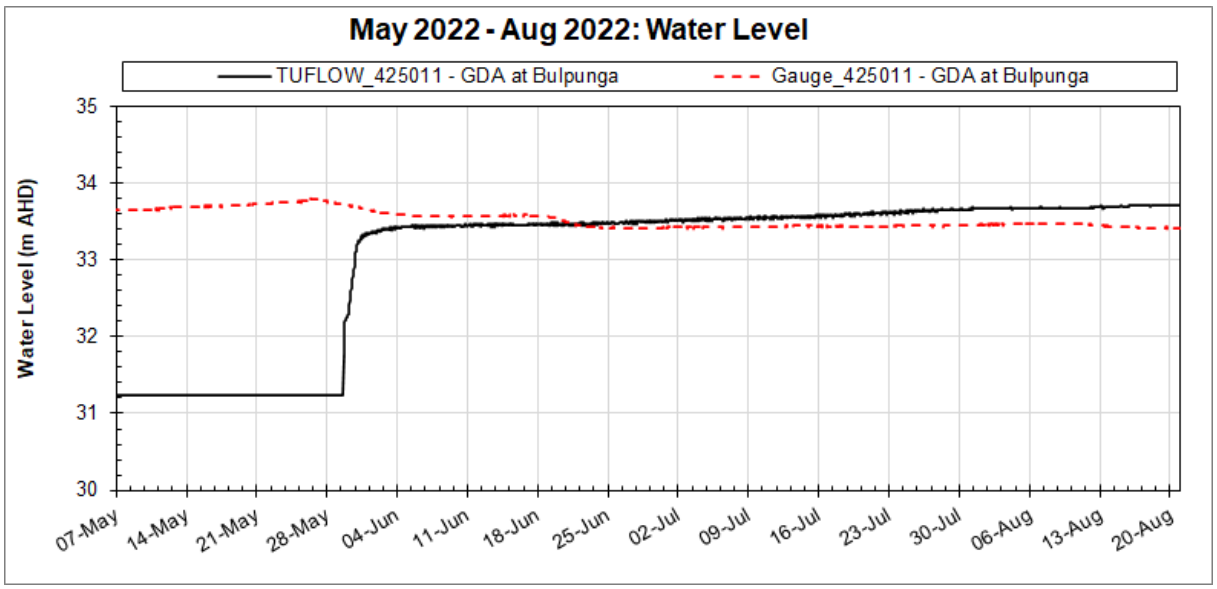


Figure A-9: Comparison of water level at Bulpunga (GDA)

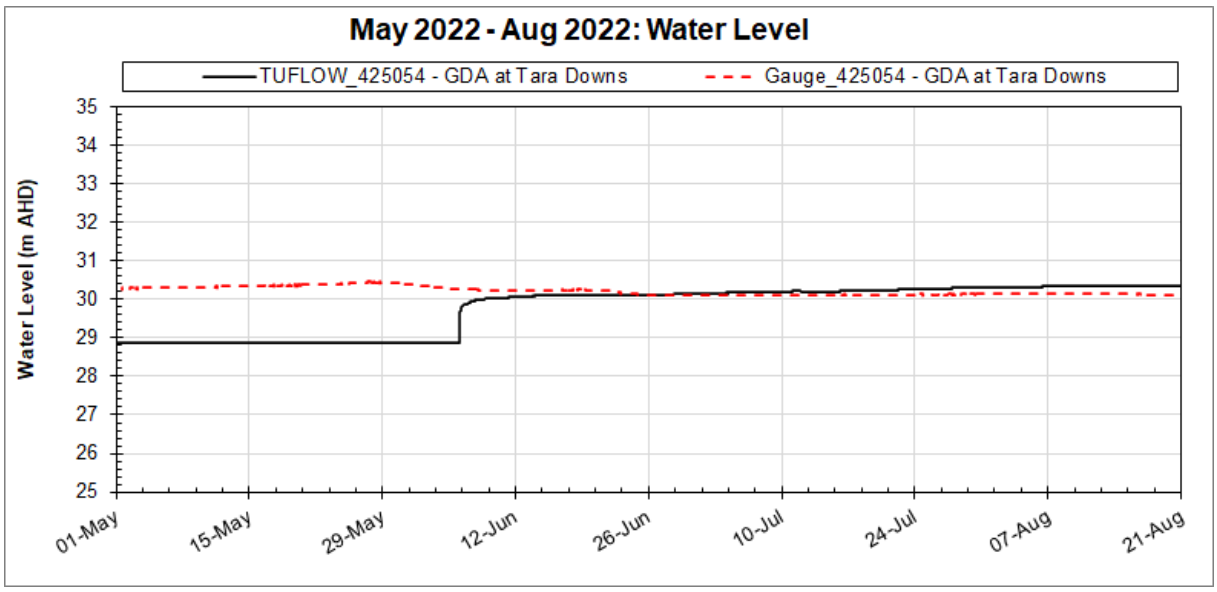
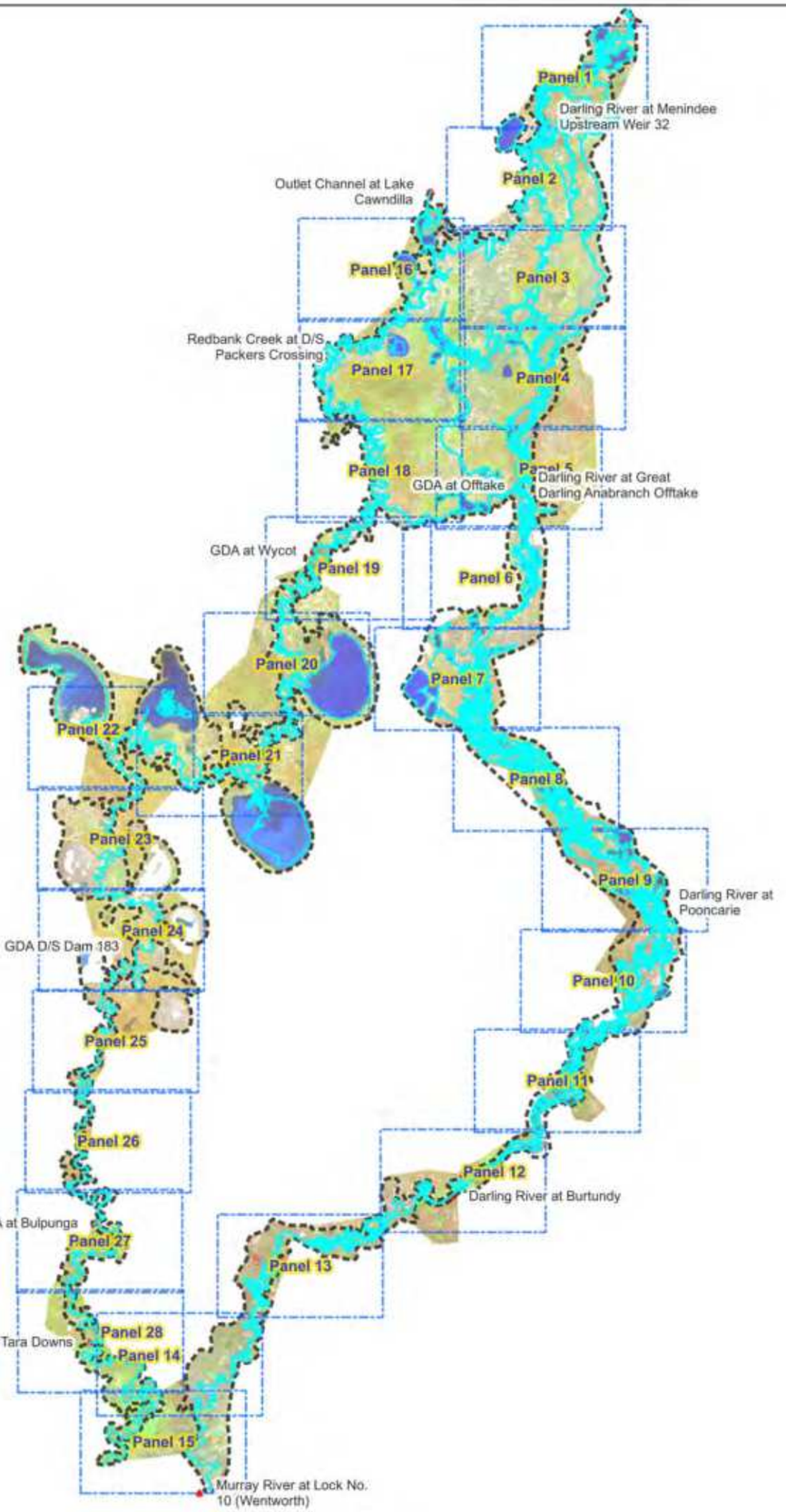


Figure A-10: Comparison of water level at Tara Downs (GDA)

A.2. Comparison of simulated extent with satellite images

Figure A-11: Comparison of modelled extent with August 21, 2022 satellite images

Overview Map



N

0 10 20 km

GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

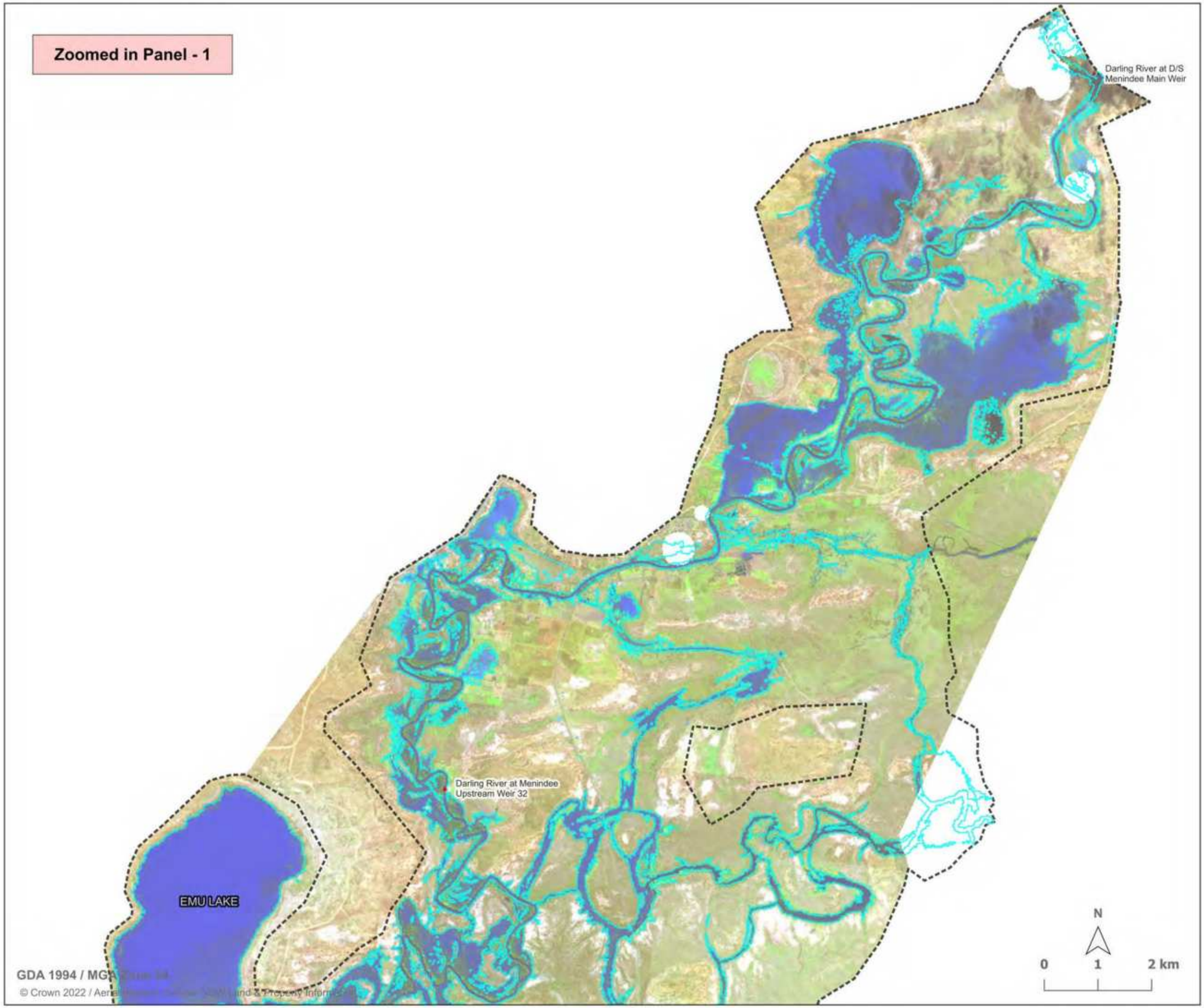
- Modelled inundation extent
- Hydraulic model extent

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 1



GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 2

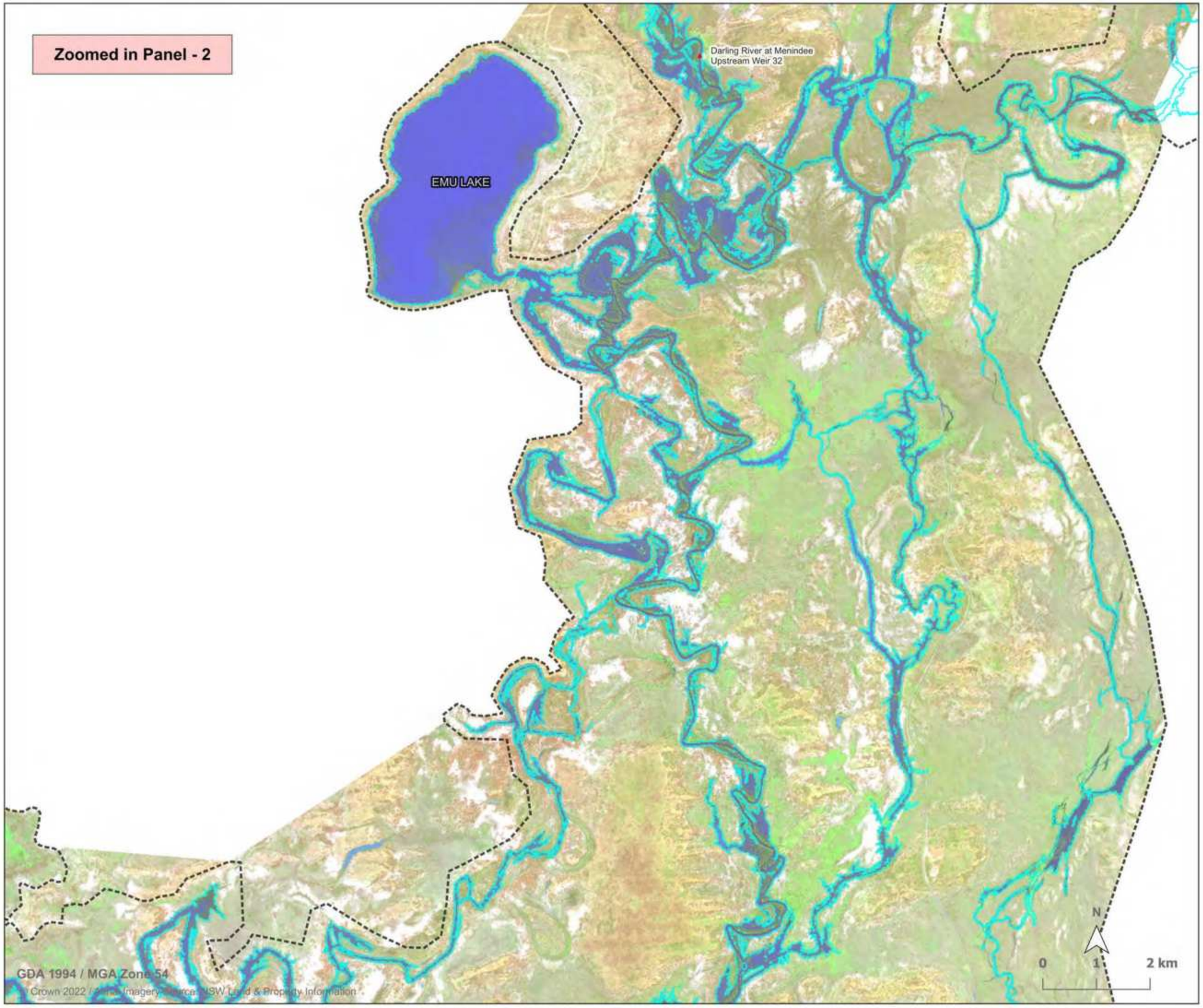
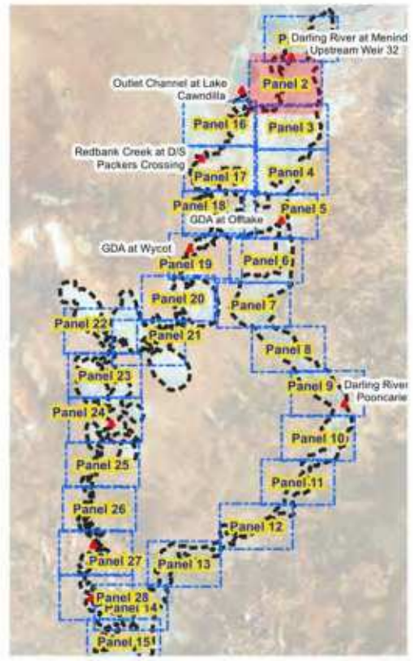


Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 3

BOBS LAKE

GDA 1994 / MGA Zone 54

N

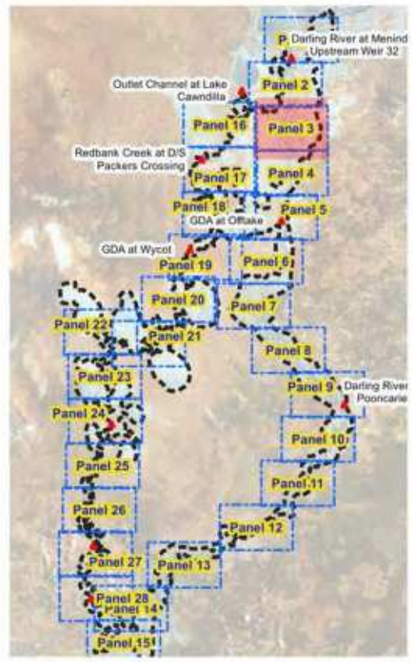
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 4

GDA 1994 / MGA Zone 54

N

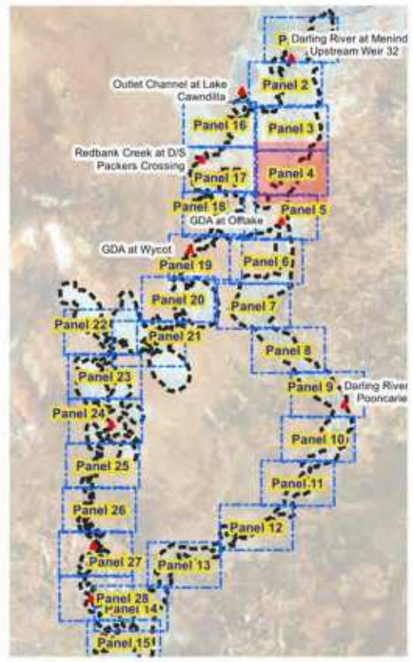
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 5

TRAVELLERS LAKE

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

GDA 1994 / MGA Zone 54

N

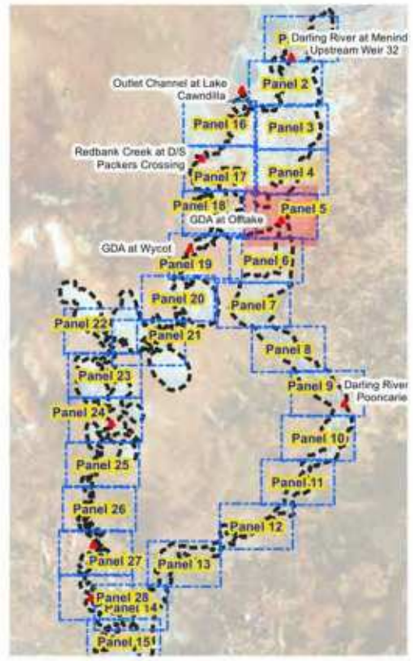
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 6

CUTHERO LAKE

GDA 1994 / MGA Zone 54

N

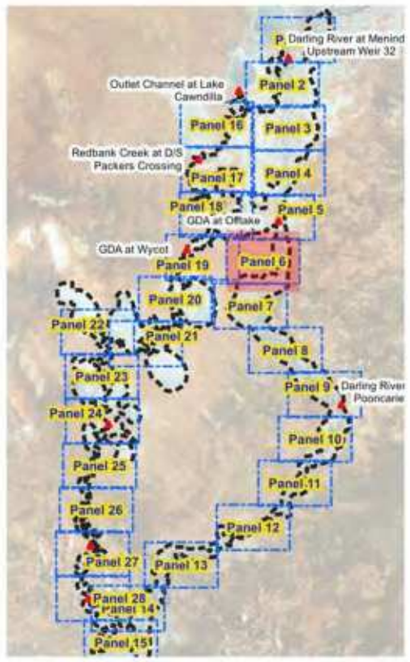
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 7

CUTHERO LAKE

YARTLA LAKE

N

0 1 2 km

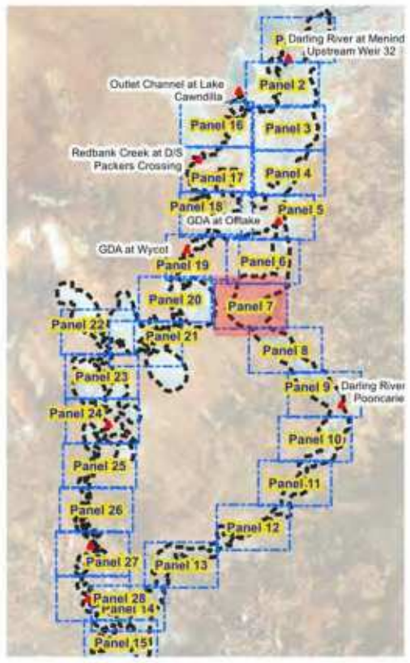
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 8

N

0 1 2 km

GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 9

Darling River at Pooncarie

PORTERS LAKES

N

0 1 2 km

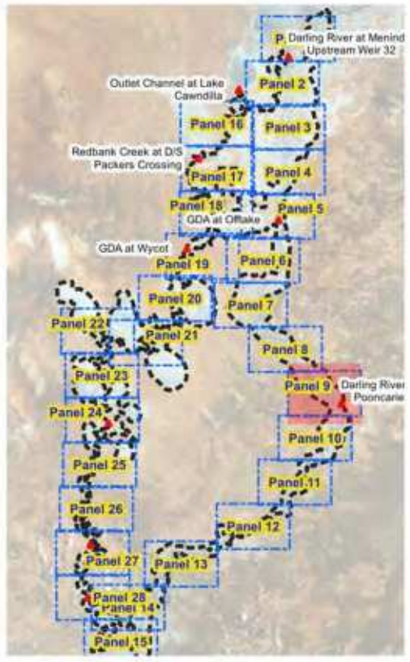
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 10

PORTERS LAKES

GDA 1994 / MGA Zone 54

0 1 2 km

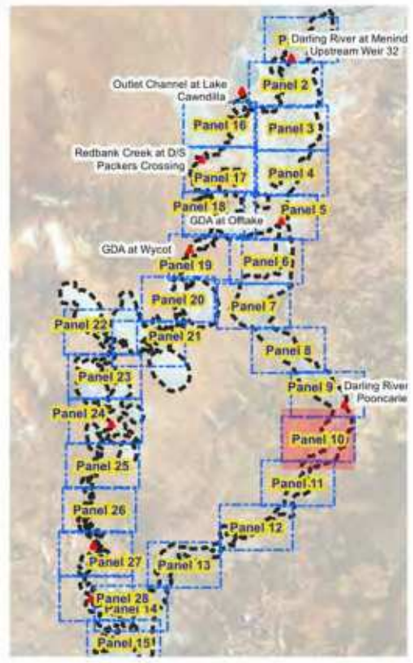
N

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

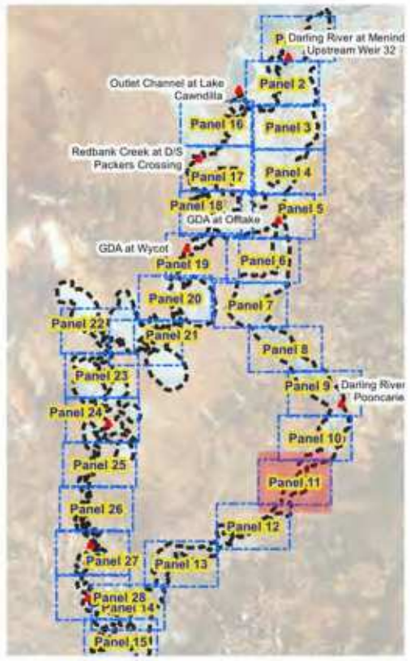
Zoomed in Panel - 11

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



GDA 1994 / MGA Zone 54

N

0 1 2 km

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 12

Darling River at Burtundy

GDA 1994 / MGA Zone 54

N

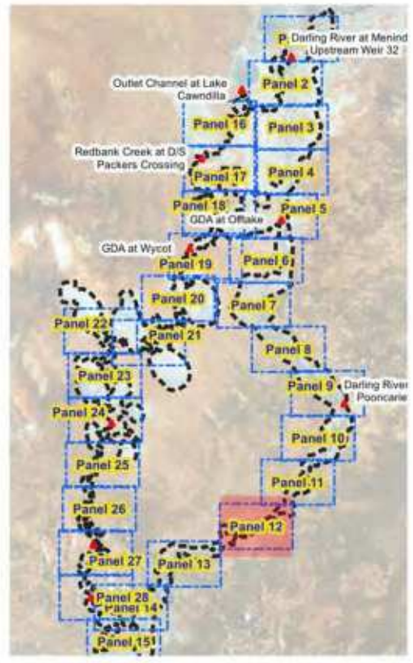
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 13

GDA 1994 / MGA Zone 54

N

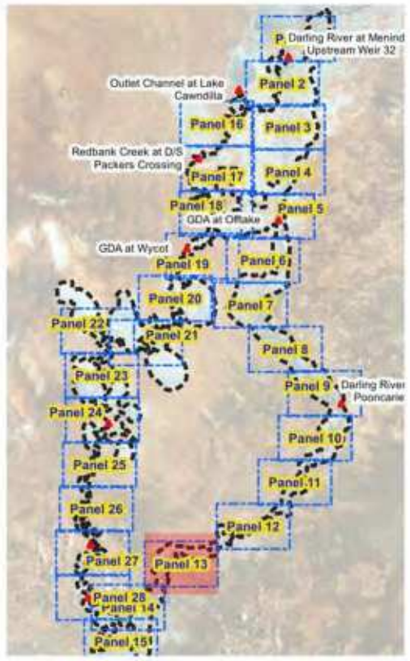
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 14

GDA 1994 / MGA Zone 54

0 1 2 km

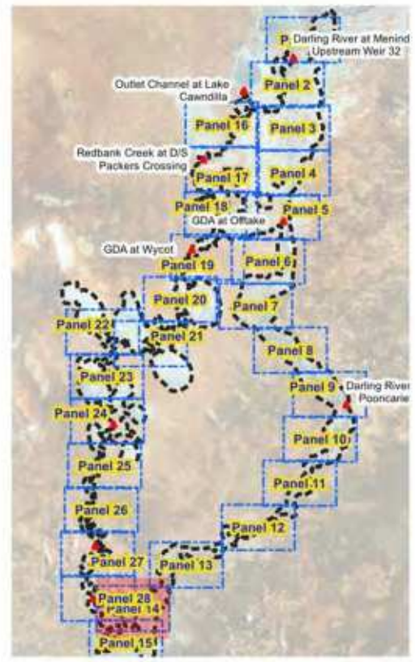
N

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 15

Murray River at Lock No. 10 (Wentworth)

N

0 1 2 km

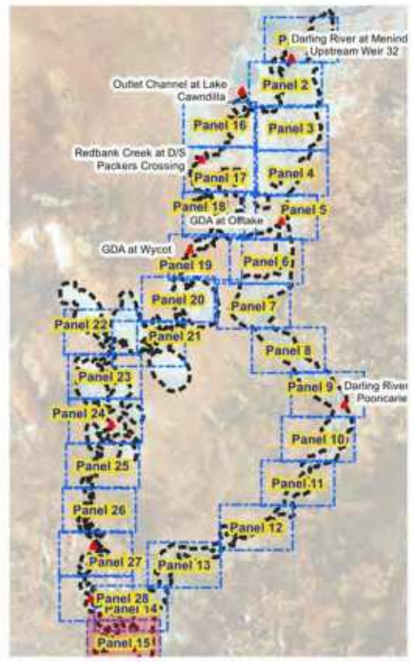
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 16

KANGAROO LAKE

PACKERS LAKE

N

1 2 km

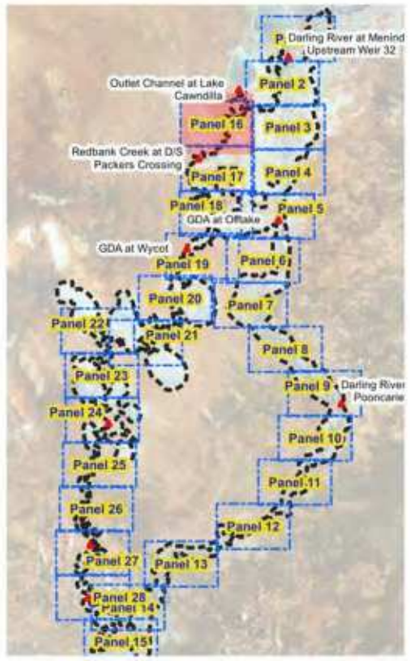
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 17

Redbank Creek at D/S Packers Crossing

PACKERS LAKE

COLLINS LAKE

PARADISE LAKE

REDBANK LAKE

N

0 1 2 km

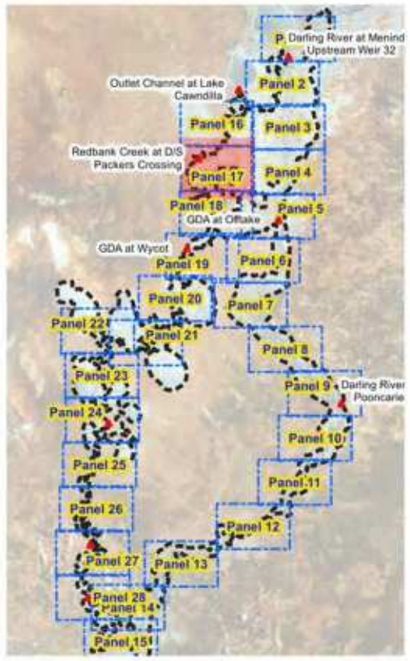
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW Government

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 18

PARADISE LAKE

REDBANK LAKE

BASIN LAKE

SHADBOLTS LAKE

LONG LAKE

TRAVELLERS LAKE

N

0 1 2 km

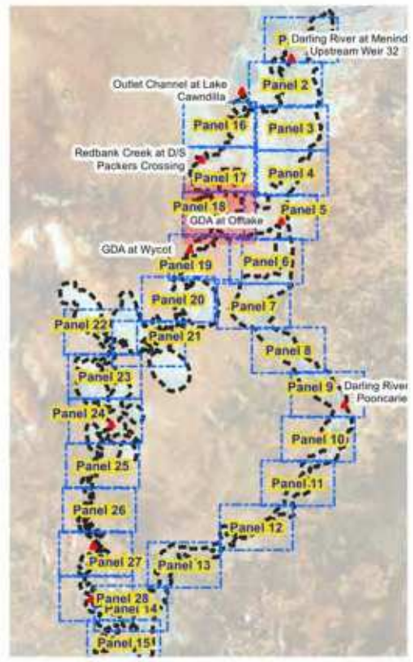
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 19

GDA at Wycot

GDA 1994 / MGA Zone 54

N

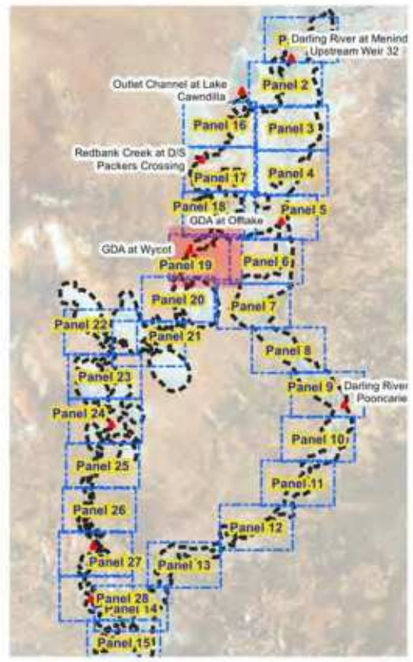
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 20

CHINAMANS LAKE

LITTLE LAKE

POPIO LAKE MGA Zone 54

N

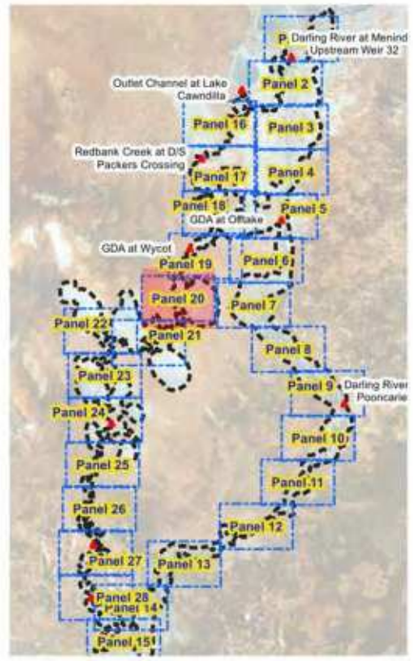
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

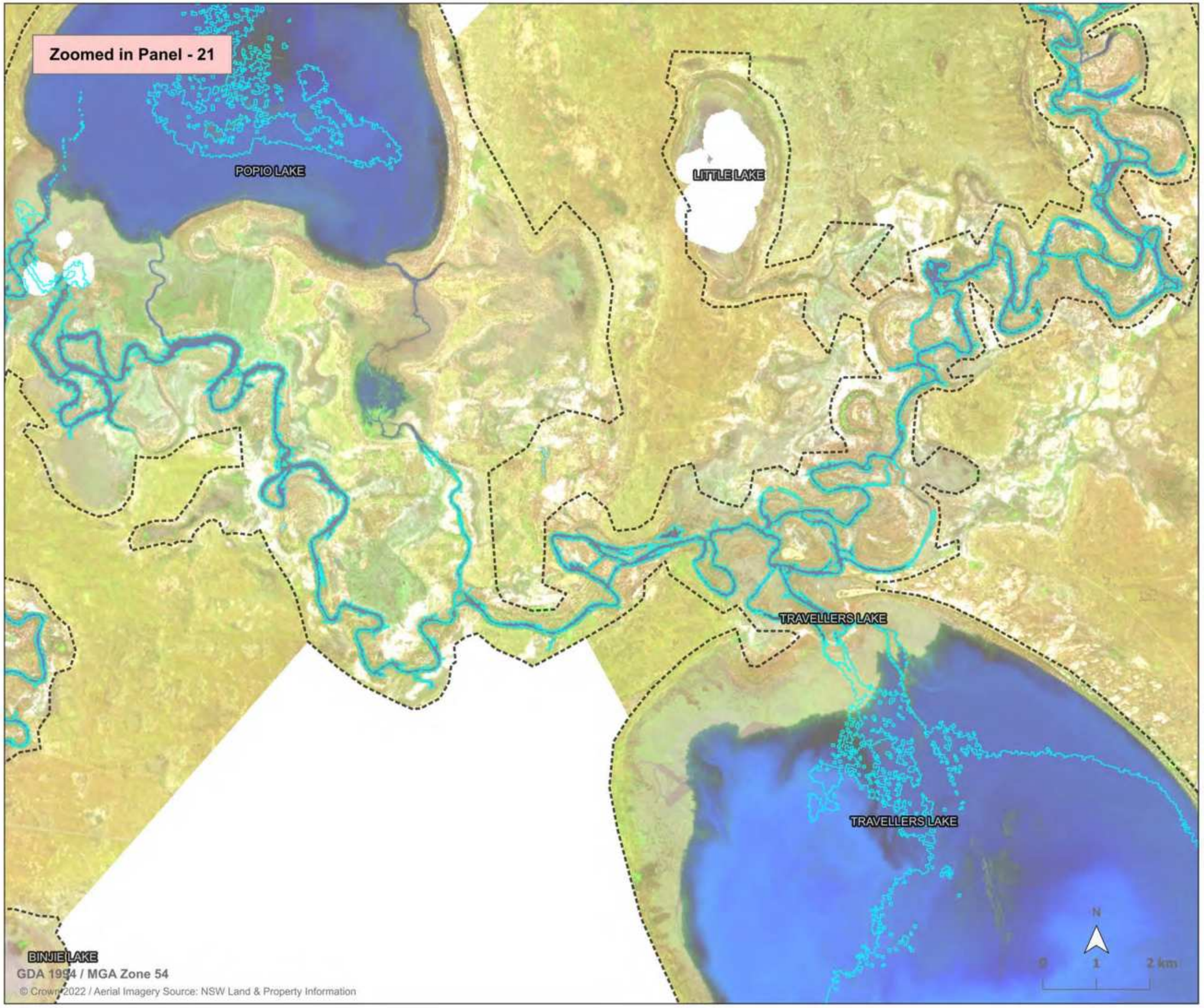
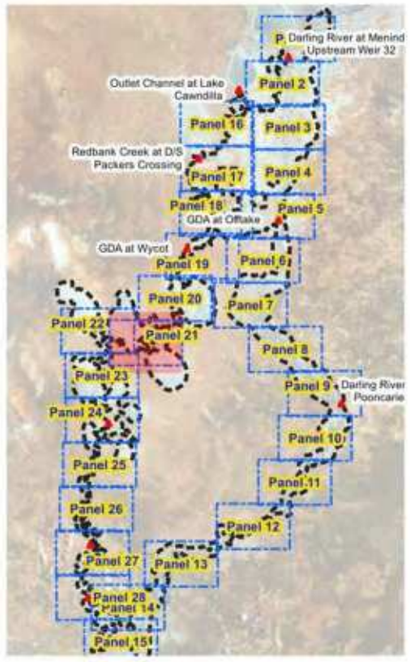


Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 22

POPILTAH LAKE

POPIO LAKE

PATAGORAH LAKE

PINE LAKE

GDA 1994 / MGA Zone 54

N

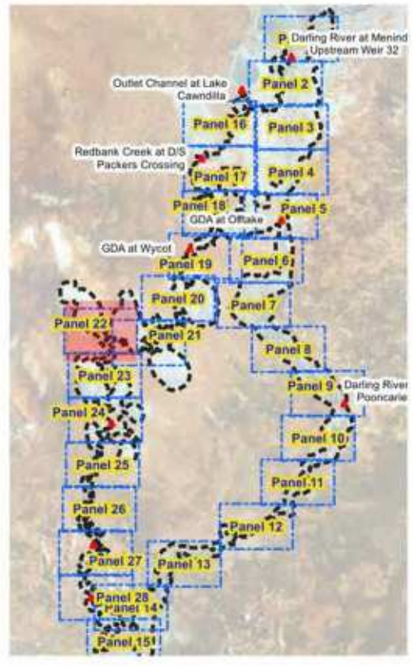
0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 23

PINE LAKE

ROTTEN LAKE

BLUE LAKE

BINJIE LAKE

NIALIA LAKE

YELTA LAKE

NEARIE LAKE

N

0 1 2 km

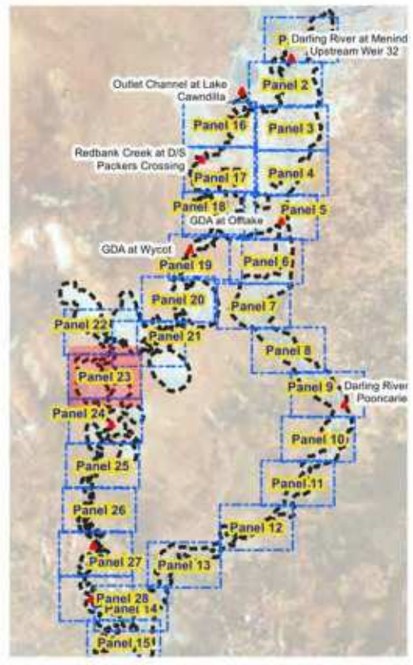
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 24

NIALIA LAKE

YELTA LAKE

WINDAMINGLE LAKE

NEARIE LAKE

GDA D/S Dam 183

NITCHIE LAKE

WARRAWENIA LAKE

N

0 1 2 km

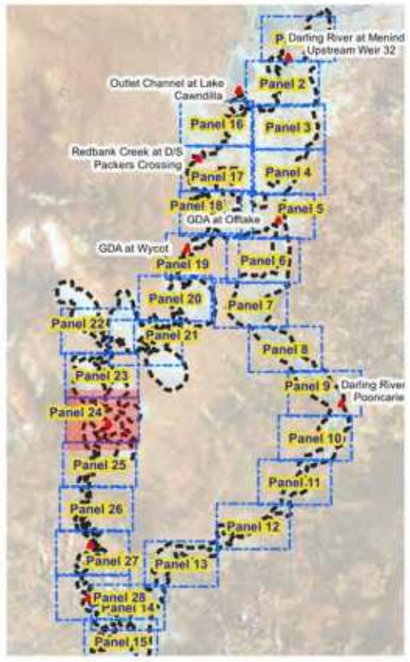
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 25

WARRAWENIA LAKE

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent

N

0 1 2 km

GDA 1994 / MGA Zone 54

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 26

TOORA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 27

GDA at Bulpunga

GDA 1994 / MGA Zone 54

N

0 1 2 km

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 28

GDA at Tara Downs

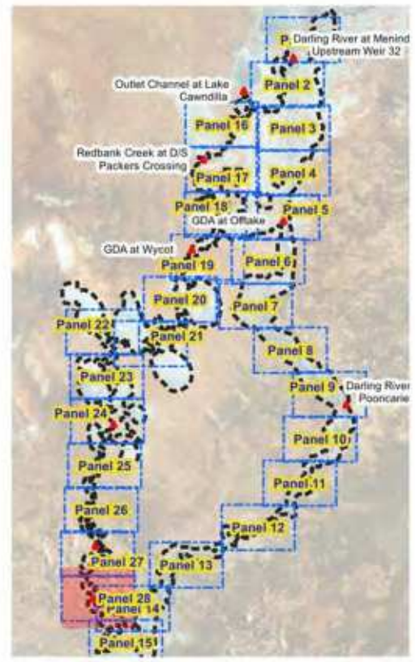
GDA 1994 / MGA Zone 54

Figure A-11: Comparison of modelled extent with 21th August 2022 event

Source of satellite image: Sentinel-2, LANDSAT 7 and LANDSAT 8

Legend

- Gauge stations
- Hydraulic model extent
- Modelled inundation extent



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Appendix B Results at reporting locations

B.1. Water level hydrographs for different release scenarios

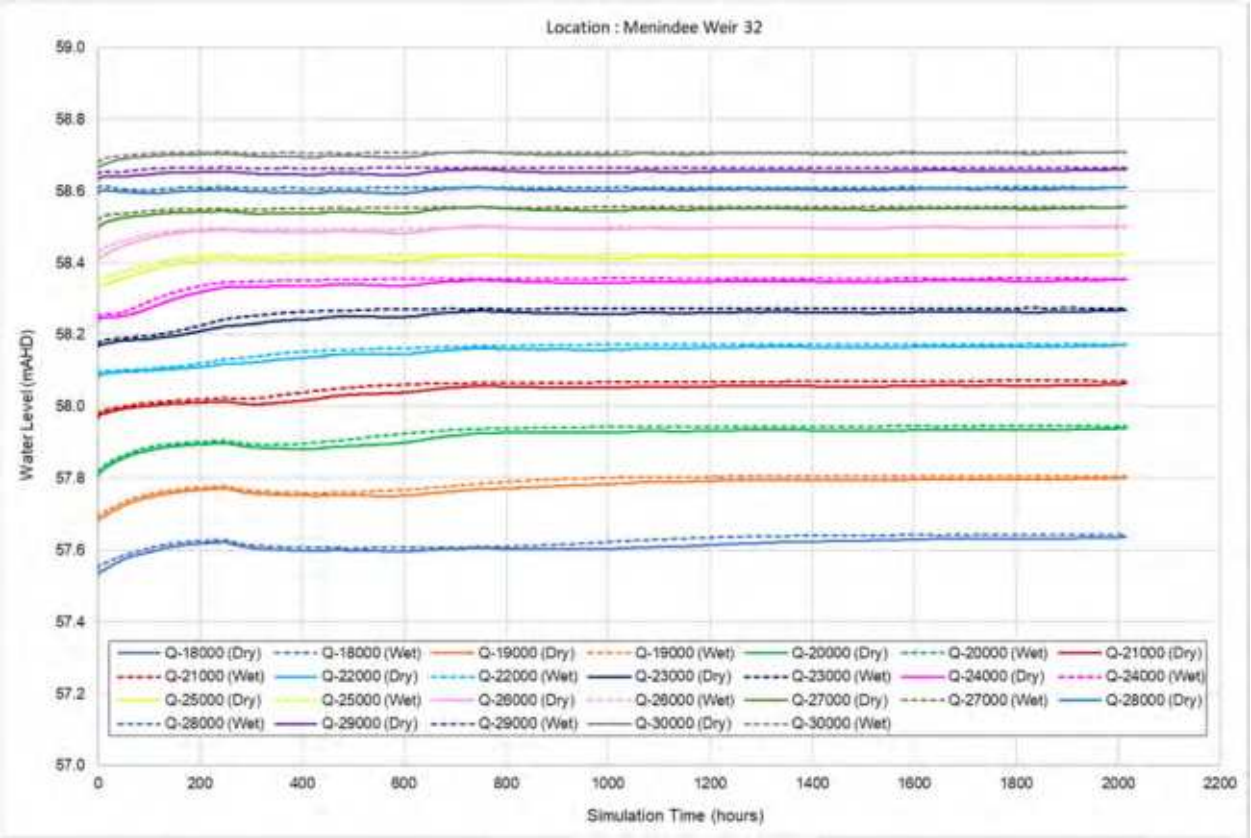


Figure B-1: Simulated water level time series at Weir 32

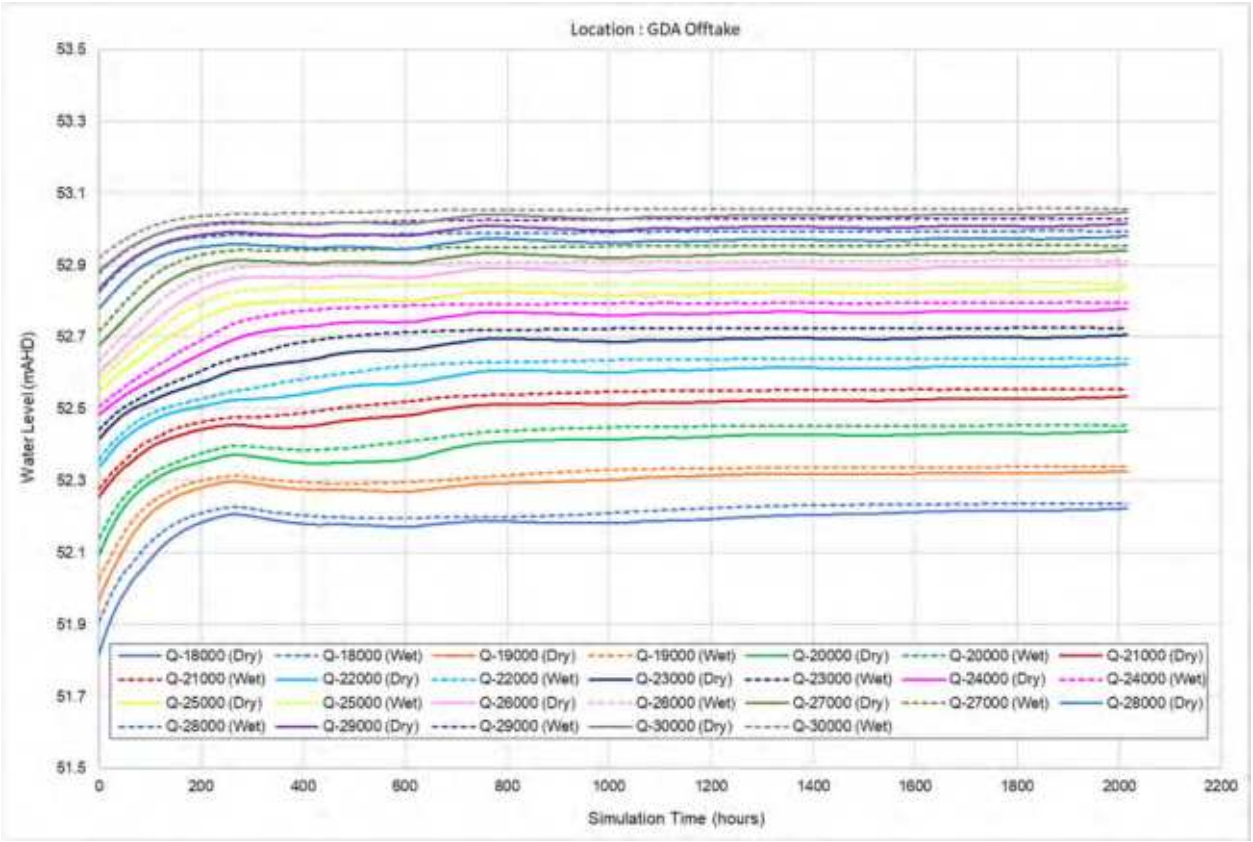


Figure B-2: Simulated water level time series at GDA Offtake

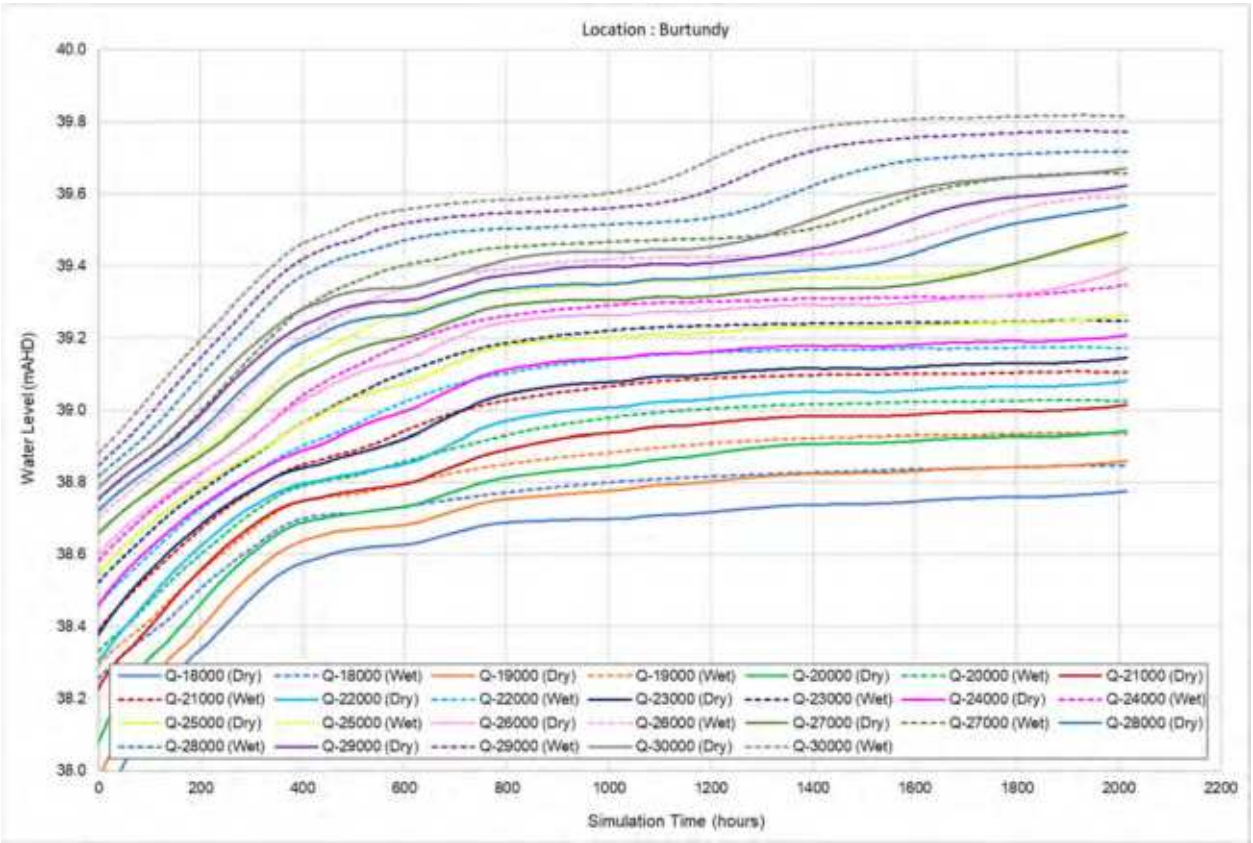


Figure B-3: Simulated water level time series at Burtundy

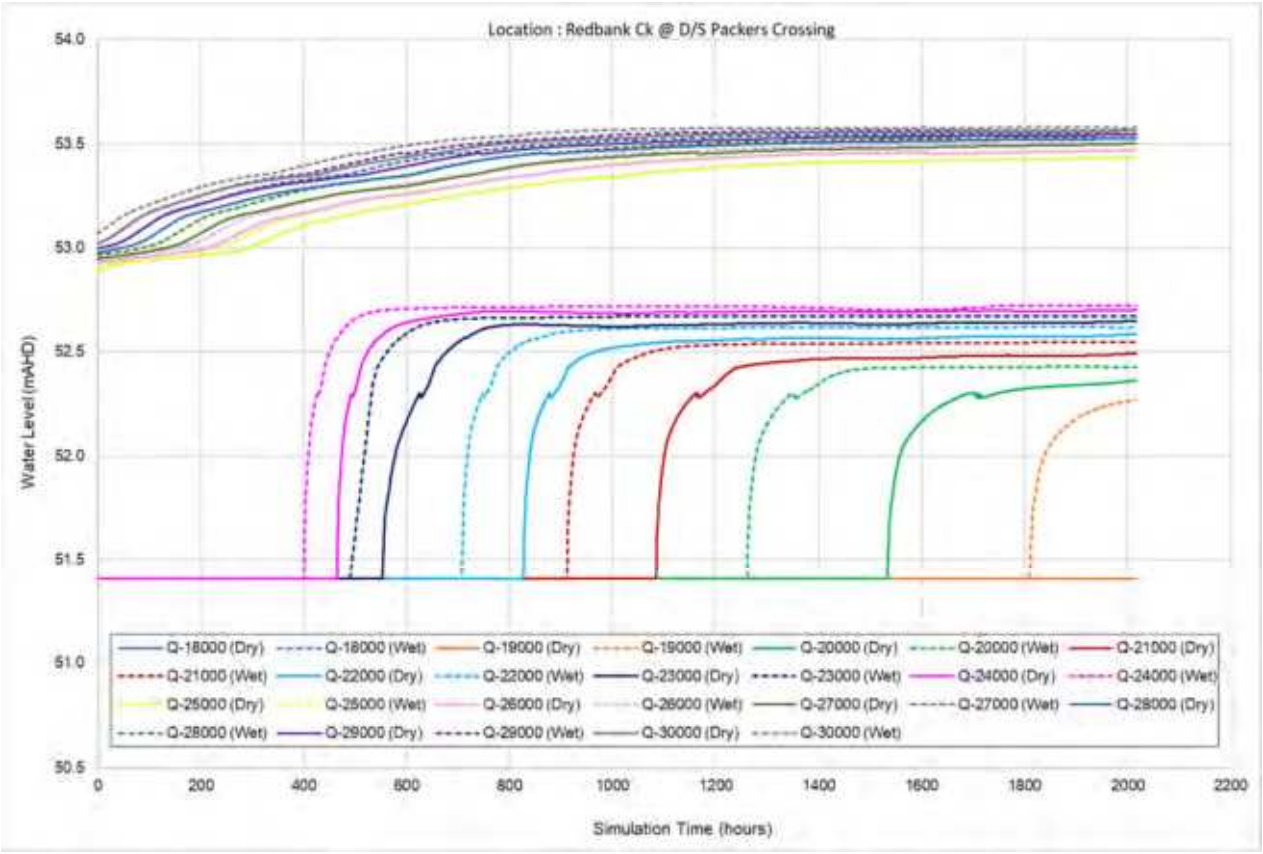


Figure B-4: Simulated water level time series at D/S Packers Crossing*

B.2. Flow hydrograph for different release scenarios

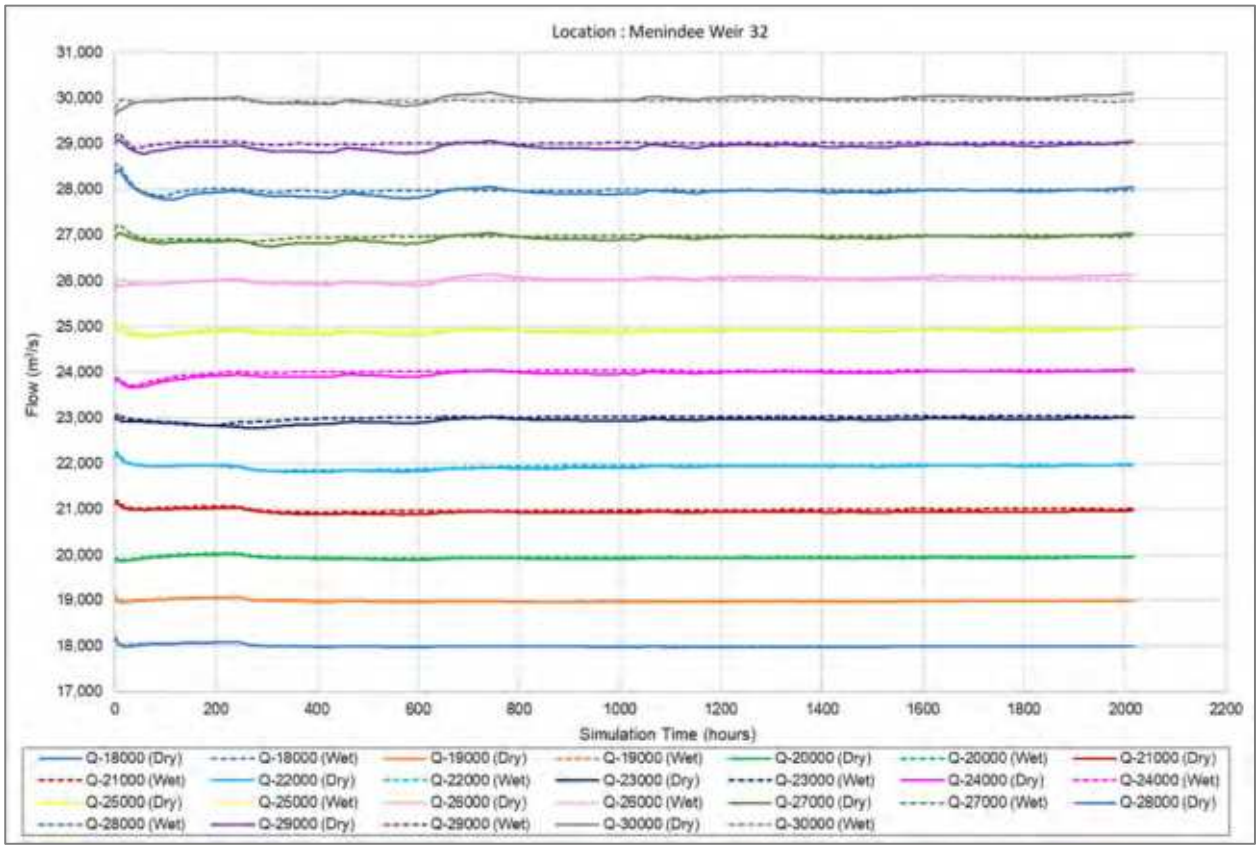


Figure B-5: Simulated flow hydrographs at Weir 32

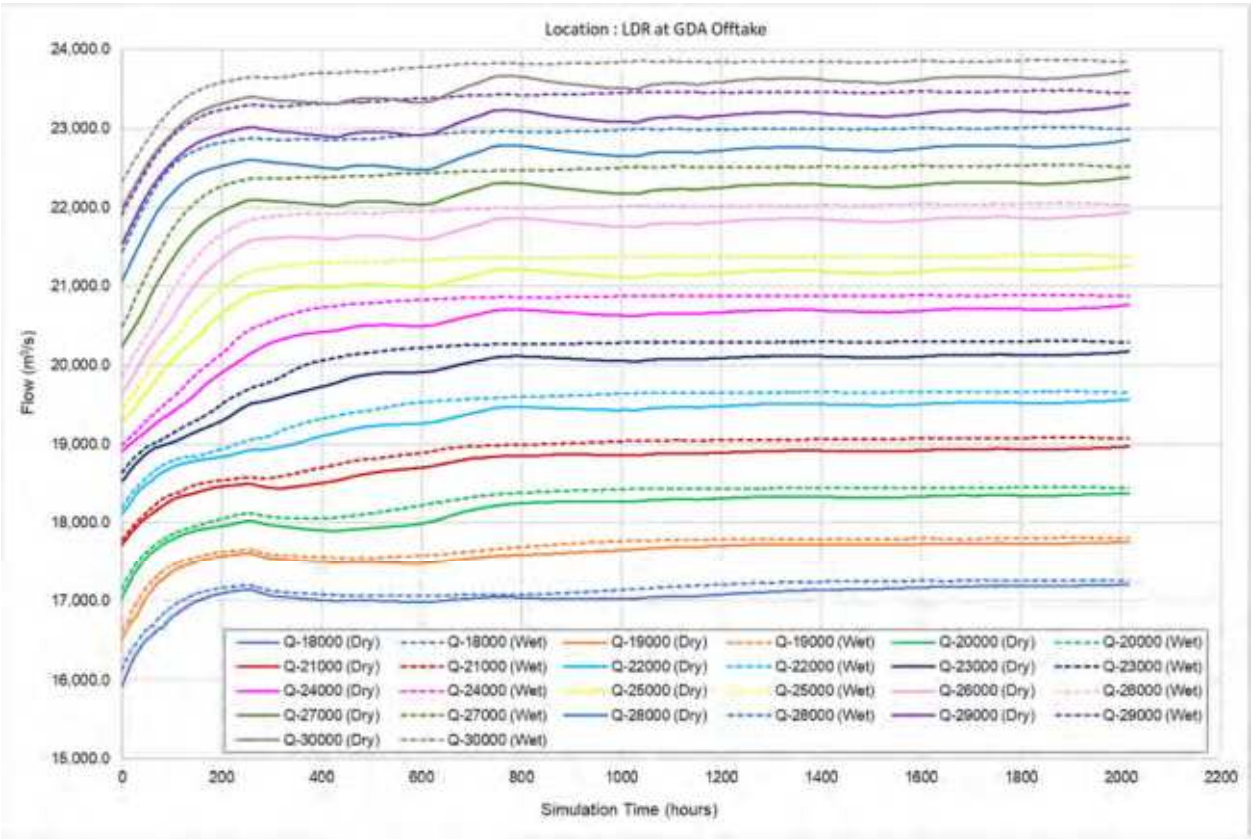


Figure B-6: Simulated flow hydrographs at GDA Offtake

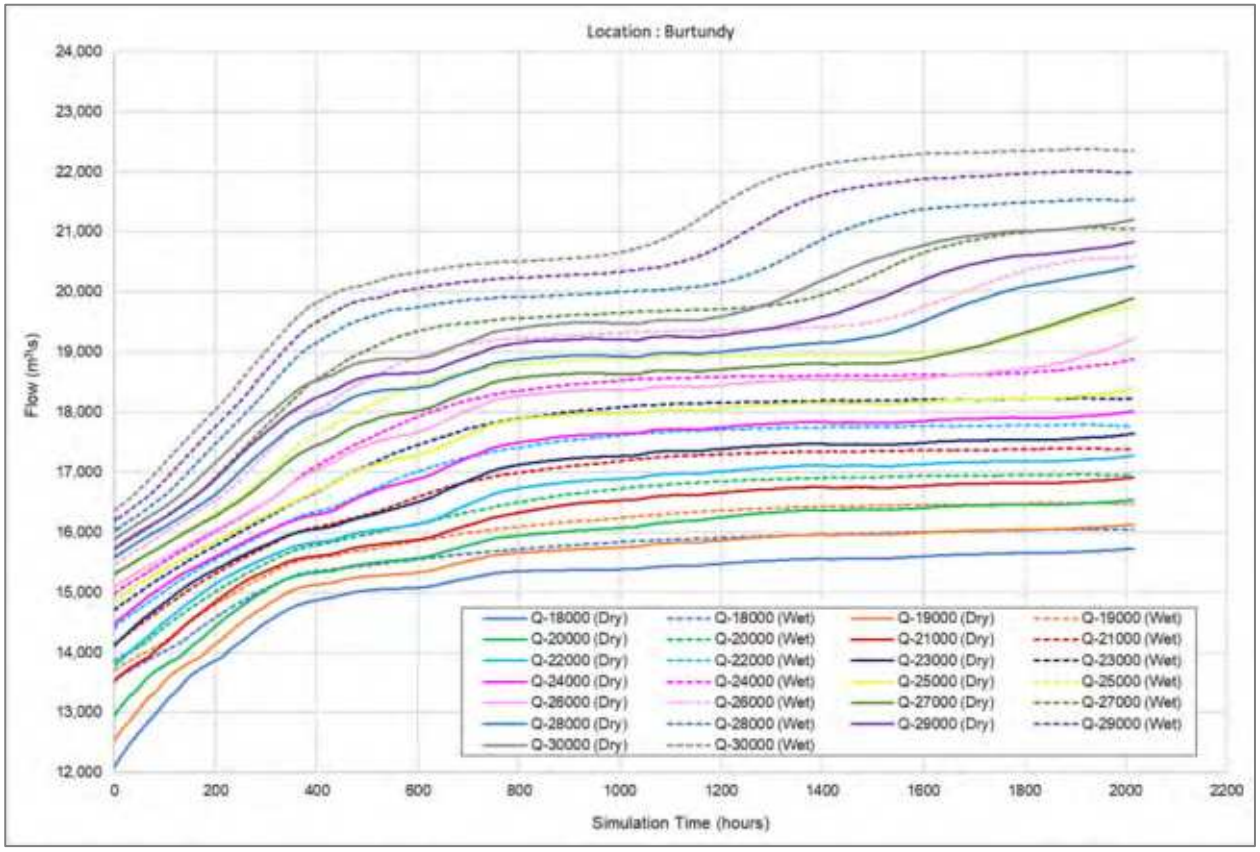


Figure B-7: Simulated flow hydrographs at Burtundy

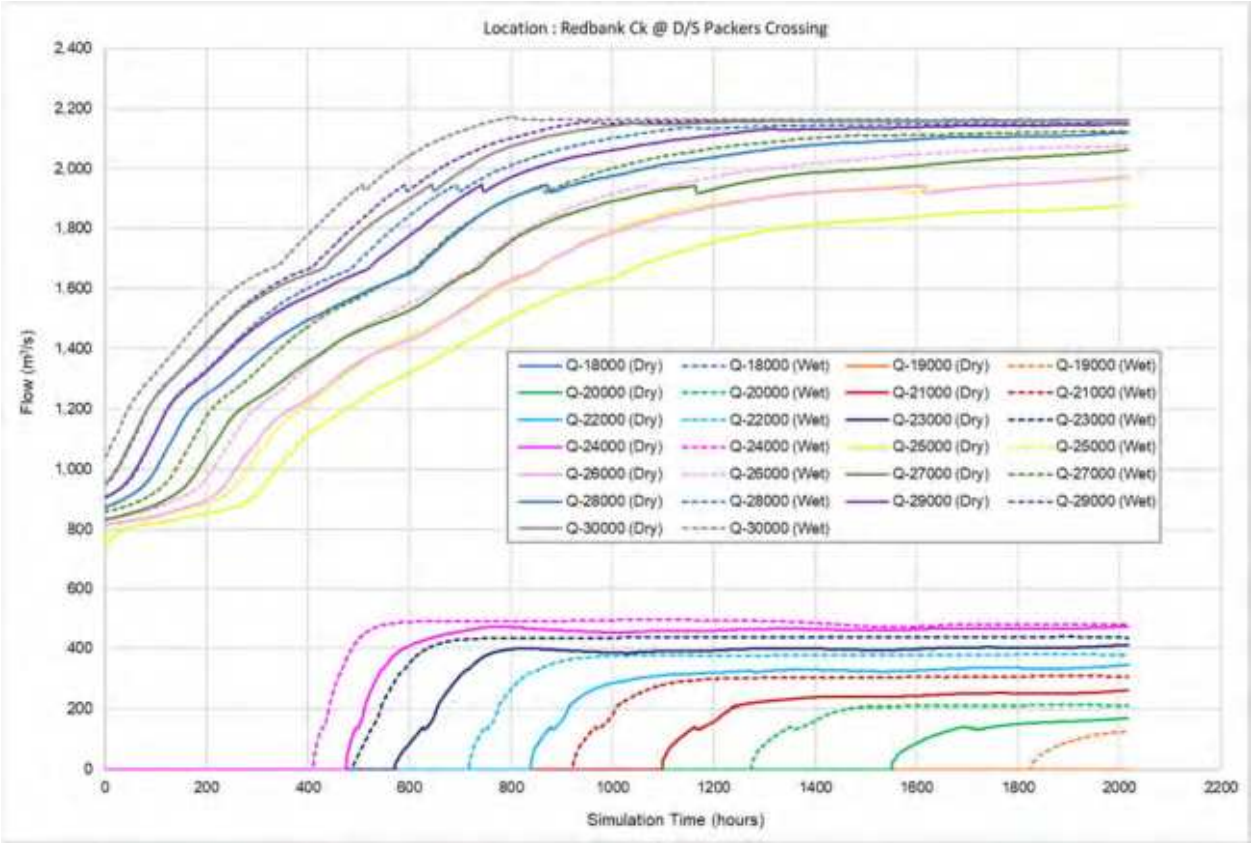


Figure B-8: Simulated flow hydrographs at D/S Packers Crossing

Appendix C Results- vegetation inundation mapping

Overview Map

Darling River at Menindee Upstream Weir 32

Outlet Channel at Lake Cawndilla

Redbank Creek at D/S Packers Crossing

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

GDA at Wycot

Darling River at Pooncarie

GDA D/S Dam 183

Darling River at Burtundy

GDA at Bulpunga

GDA at Tara Downs

Murray River at Lock No. 10 (Wentworth)

Panel 1
Panel 2
Panel 3
Panel 4
Panel 5
Panel 6
Panel 7
Panel 8
Panel 9
Panel 10
Panel 11
Panel 12
Panel 13
Panel 14
Panel 15
Panel 16
Panel 17
Panel 18
Panel 19
Panel 20
Panel 21
Panel 22
Panel 23
Panel 24
Panel 25
Panel 26
Panel 27
Panel 28

N

0 10 20 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 1

Darling River at D/S Menindee Main Weir

Darling River at Menindee Upstream Weir 32

EMU LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 2

EMU LAKE

Darling River at Menindee Upstream Weir 32

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Floodplain-other
- Non-woody wetland

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Zoomed in Panel - 3

BOBS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
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Vegetation group

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- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 4

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
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Vegetation group

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- Flood-dependent woodland
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- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 5

TRAVELLERS LAKE

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 6

CUTHERO LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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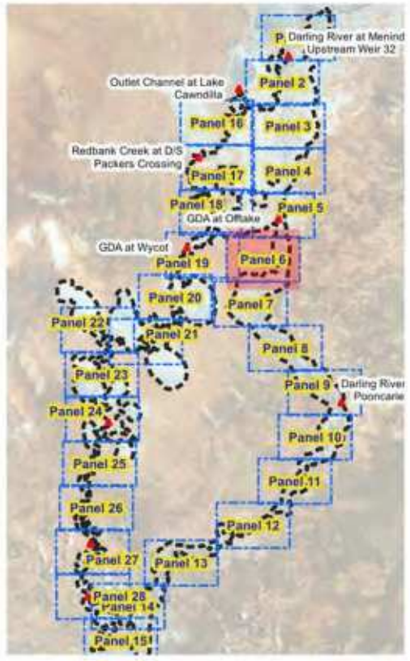
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 7

CUTHERO LAKE

YARTLA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 8

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 9

Darling River at Pooncarie

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 10

PORTERS LAKES

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
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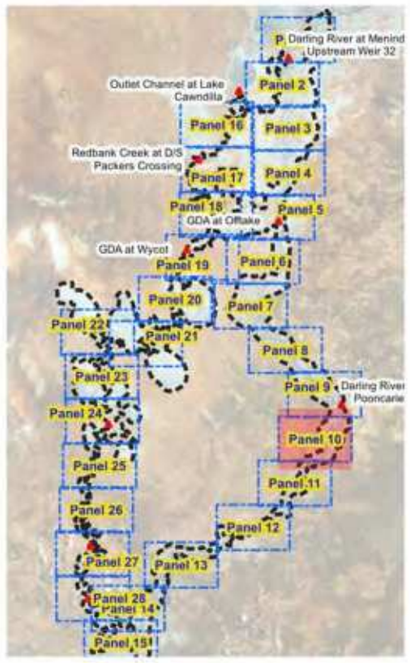

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 11

GDA 1994 / MGA Zone 54

N

0 1 2 km

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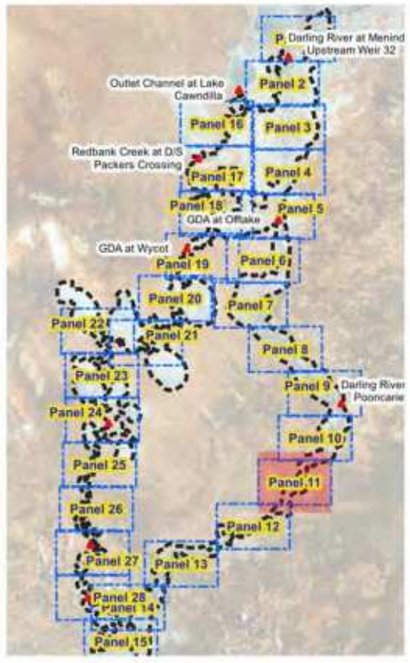
Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

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Darling River at Burtundy

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent shrubland wetland
- Floodplain-other
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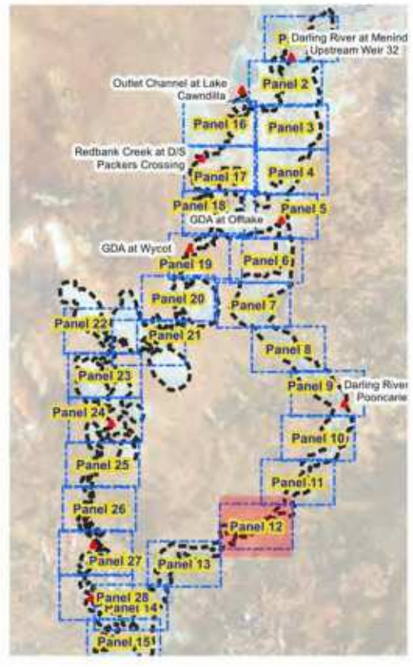

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Zoomed in Panel - 13

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 14

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Murray River at Lock No. 10 (Wentworth)

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
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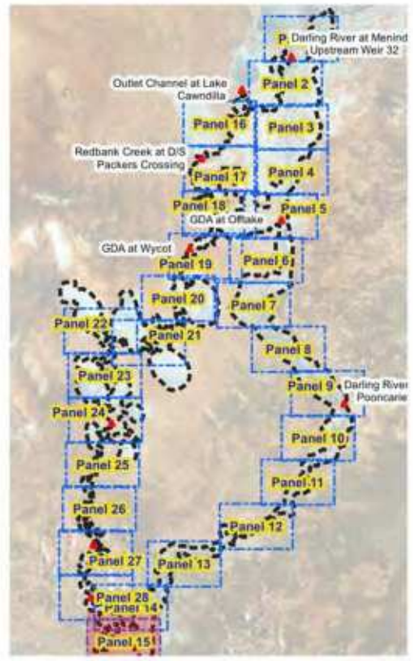

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 16

KANGAROO LAKE

PACKERS LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 17

Redbank Creek at D/S Packers Crossing

PACKERS LAKE

COLLINS LAKE

PARADISE LAKE

REDBANK LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

- Flood-dependent forest
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- Flood-dependent shrubland wetland
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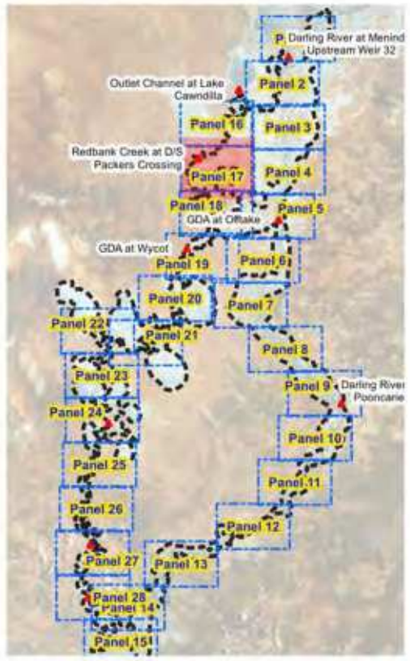
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 18

REDBANK LAKE

SHADBOLTS LAKE

PARADISE LAKE

BASIN LAKE

LONG LAKE

TRAVELLERS LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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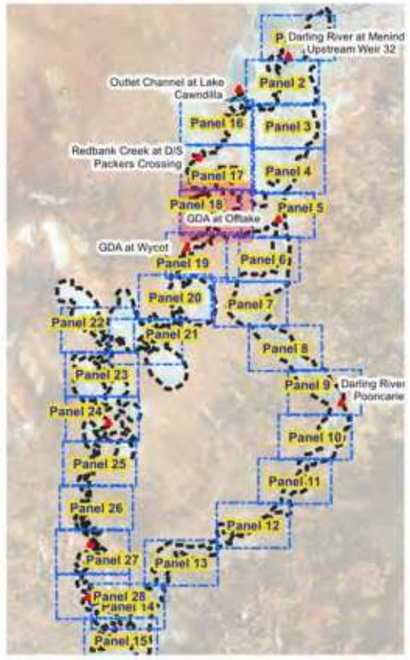

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 19

GDA at Wycot

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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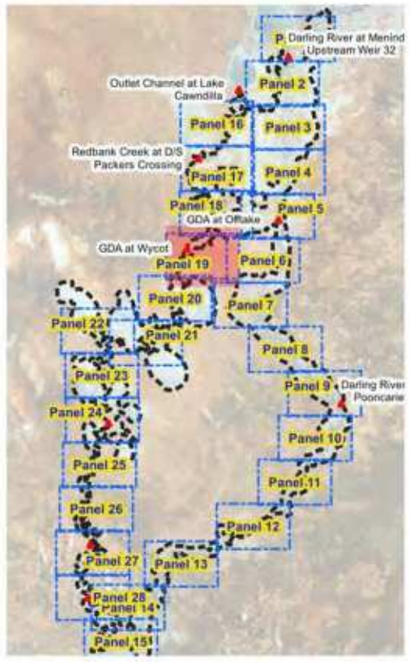
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 20

CHINAMANS LAKE

LITTLE LAKE

POPIO LAKE

MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 21

POPIO LAKE

LITTLE LAKE

TRAVELLERS LAKE

TRAVELLERS LAKE

BINJIE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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Vegetation group

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 22

POPILTAH LAKE

POPIO LAKE

PATAGORAH LAKE

PINE LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Floodplain-other
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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 23

PINE LAKE

ROTTEN LAKE

BLUE LAKE

NIALIA LAKE

BINJIE LAKE

YELTA LAKE

NEARIE LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Floodplain-other
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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 24

NIALIA LAKE

YELTA LAKE

WINDAMINGLE LAKE

NEARIE LAKE

GDA D/S Dam 183

NITCHIE LAKE

WARRAWENIA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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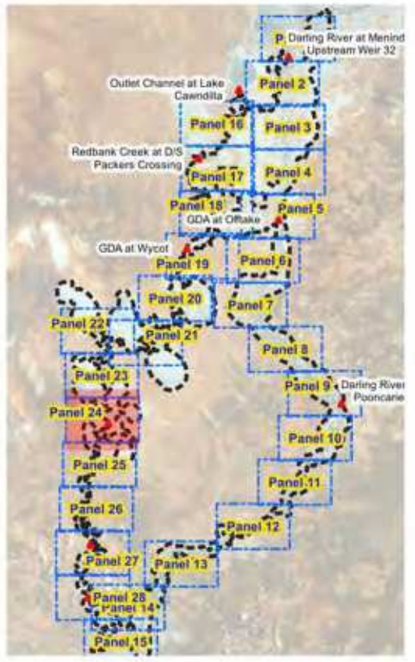

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 25

WARRAWENIA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 26

TOORA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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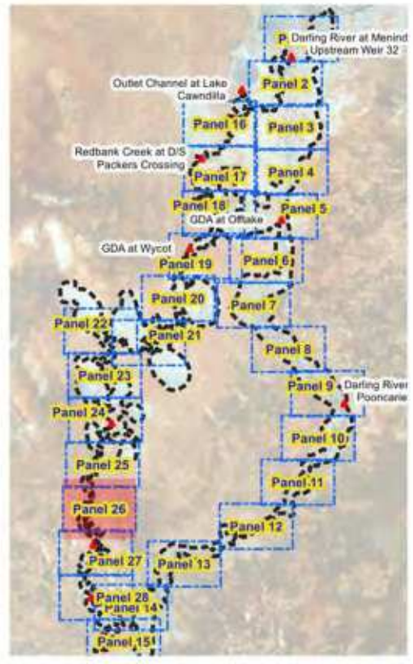
Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 27

GDA at Bulpunga

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 28

GDA at Tara Downs

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-1: Vegetation Inundation Extent for 18,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
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Commonwealth Environmental Water Holder

Overview Map

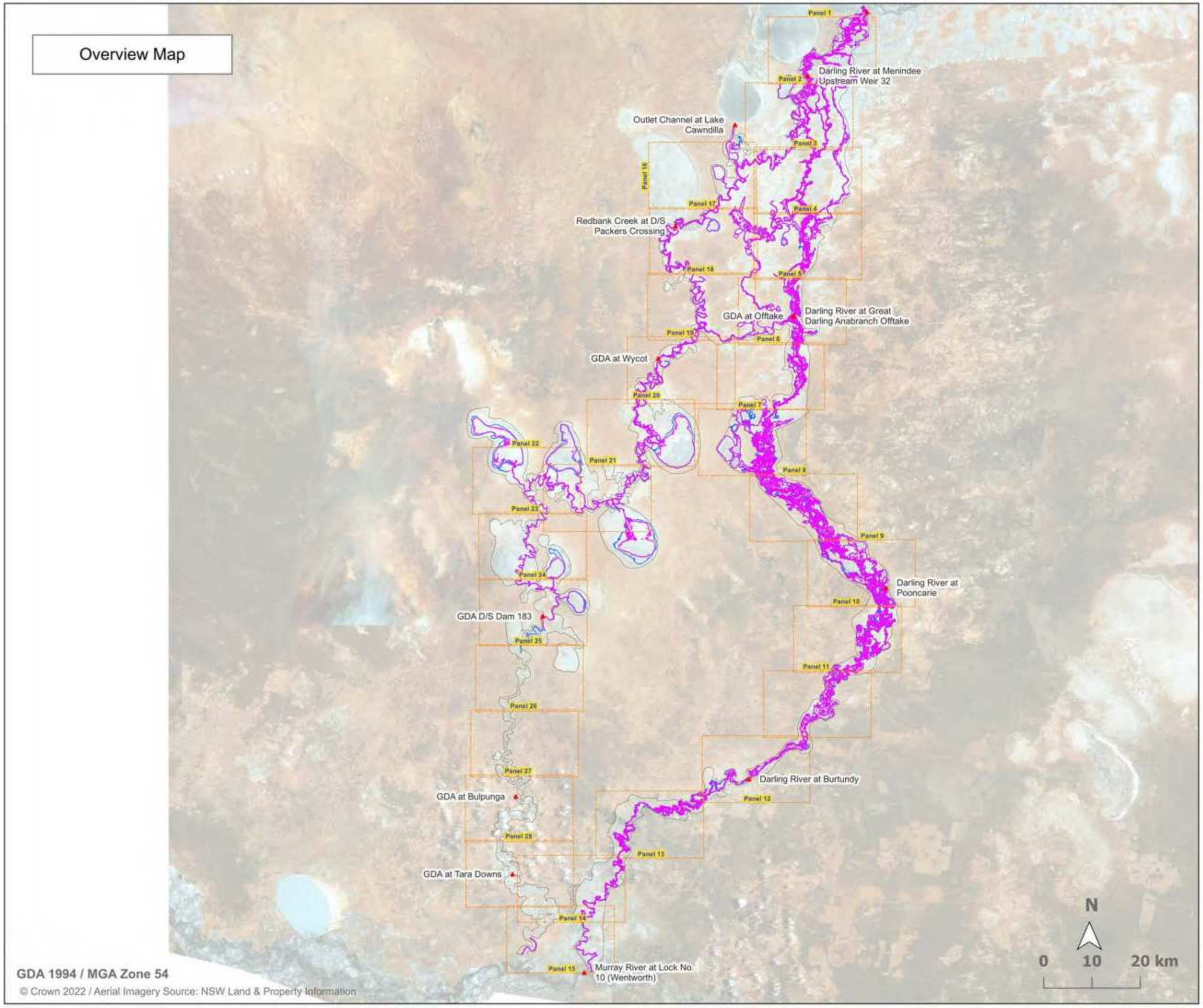

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 1

Darling River at D/S Menindee Main Weir

Darling River at Menindee Upstream Weir 32

EMU LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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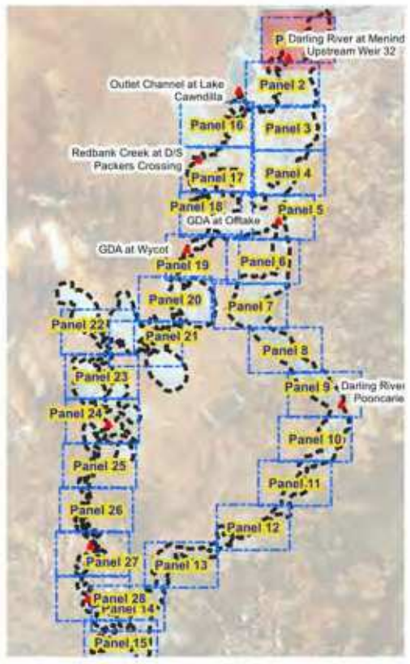
Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 2

EMU LAKE

Darling River at Menindee Upstream Weir 32

GDA 1994 / MGA Zone 54

0 1 2 km

N

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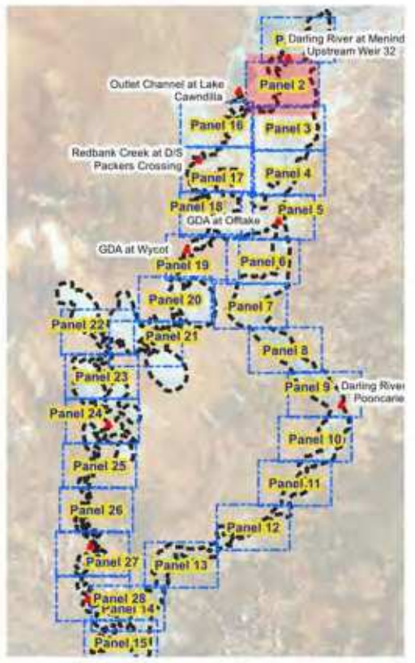
Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 3

BOBS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
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- Flood-dependent shrubland wetland
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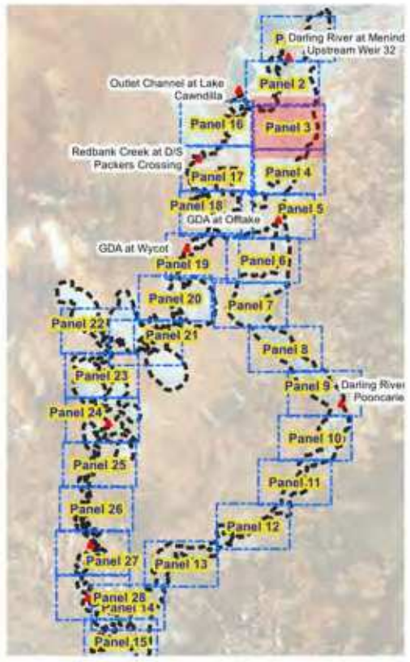

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 4

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
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- Floodplain-other
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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 5

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

TRAVELLERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
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Zoomed in Panel - 6

CUTHERO LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 7

CUTHERO LAKE

YARTLA LAKE

N

2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
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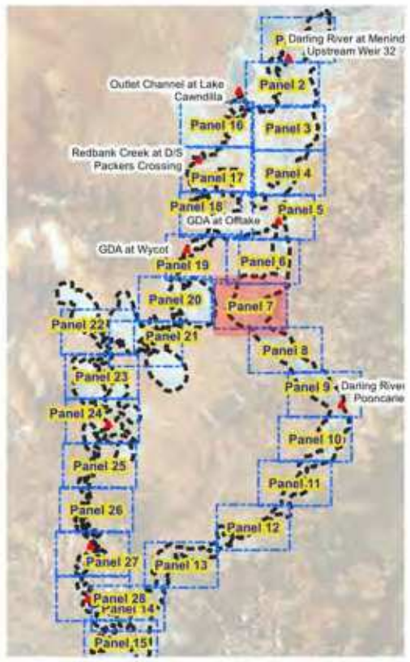

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 8

GDA 1994 / MGA Zone 54

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 9

Darling River at Pooncarie

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 10

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
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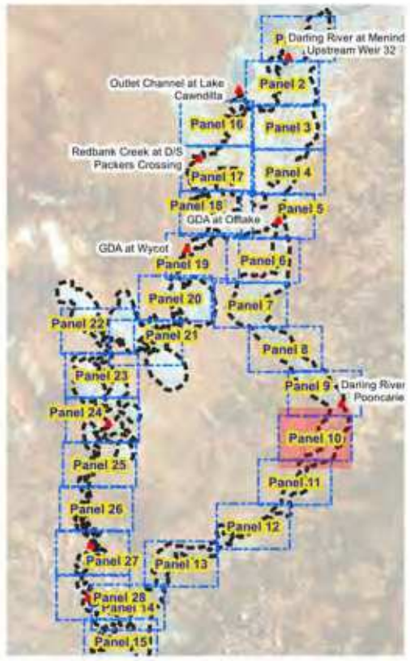
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 11

GDA 1994 / MGA Zone 54

N

0 1 2 km

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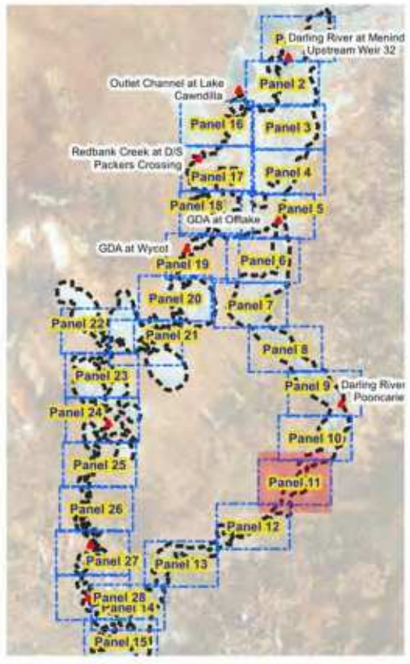
Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 12

Darling River at Burtundy

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
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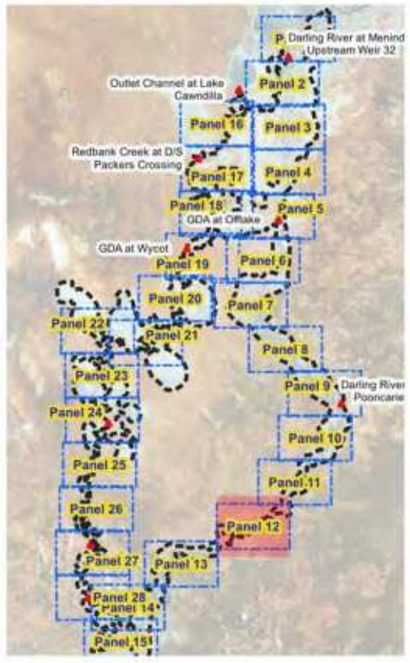
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 13

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
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GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 15

Murray River at Lock No. 10 (Wentworth)

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
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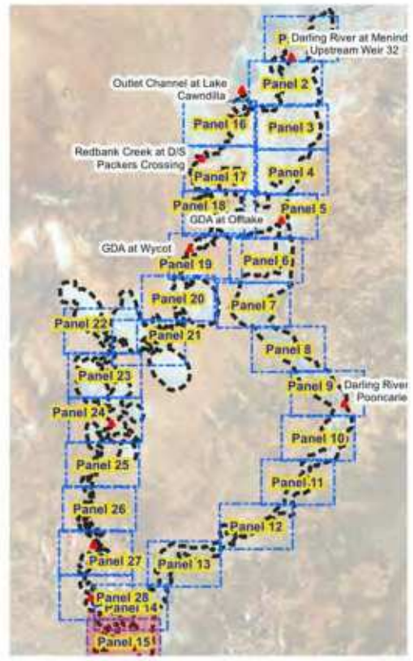

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 16

KANGAROO LAKE

PACKERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW Government

Australian Government
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Zoomed in Panel - 17

Redbank Creek at D/S Packers Crossing

PACKERS LAKE

COLLINS LAKE

PARADISE LAKE

REDBANK LAKE

GDA 1994 / MGA Zone 54

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Australian Government
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Zoomed in Panel - 18

PARADISE LAKE

REDBANK LAKE

BASIN LAKE

SHADBOLTS LAKE

LONG LAKE

TRAVELLERS LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Flood-dependent shrubland wetland
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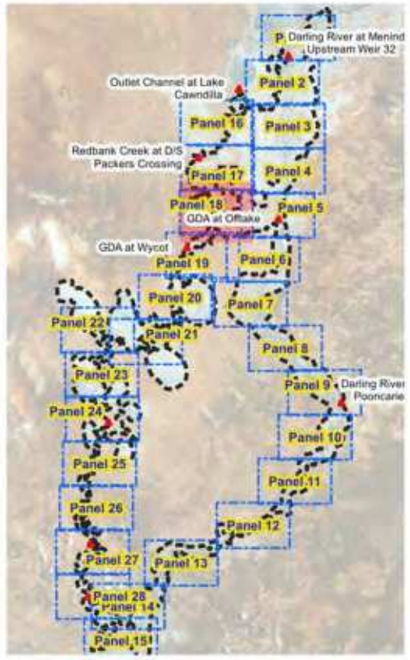

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 19

GDA at Wycot

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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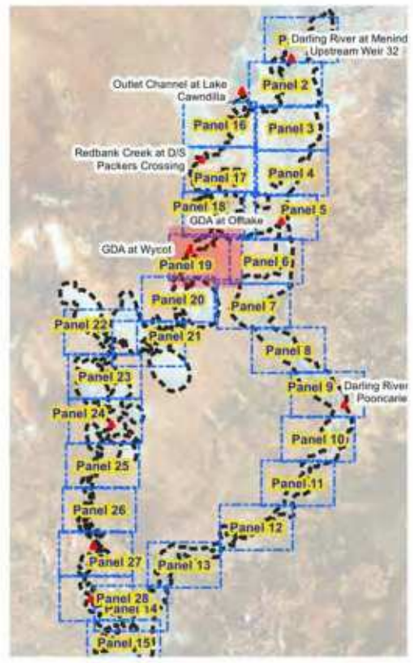

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 20

CHINAMANS LAKE

LITTLE LAKE

ROPIO LAKE

MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 21

POPIO LAKE

LITTLE LAKE

TRAVELLERS LAKE

TRAVELLERS LAKE

BINJIE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 Km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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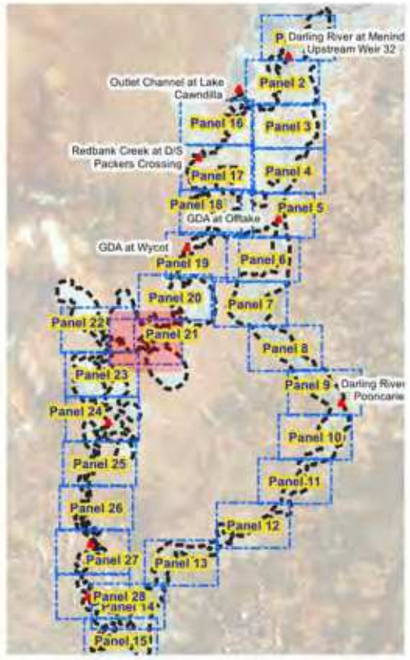

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW Government
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Zoomed in Panel - 22

POPILTAH LAKE

POPIO LAKE

PATAGORAH LAKE

PINE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
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Zoomed in Panel - 23

PINE LAKE

ROTTEN LAKE

BLUE LAKE

NIALIA LAKE

BINJIE LAKE

YELTA LAKE

NEARIE LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 24

NIALIA LAKE

YELTA LAKE

WINDAMINGLE LAKE

NEARIE LAKE

GDA D/S Dam 183

NITCHIE LAKE

WARRAWENIA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

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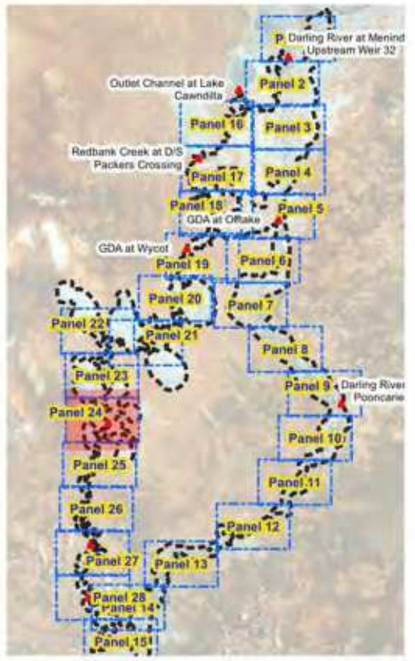

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Commonwealth Environmental Water Holder

Zoomed in Panel - 25

WARRAWENIA LAKE

GDA 1994 / MGA Zone 54

0 1 2 km

N

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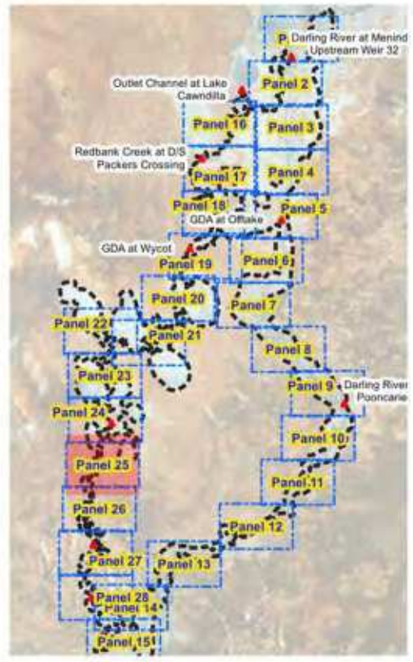
Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 26

TOORA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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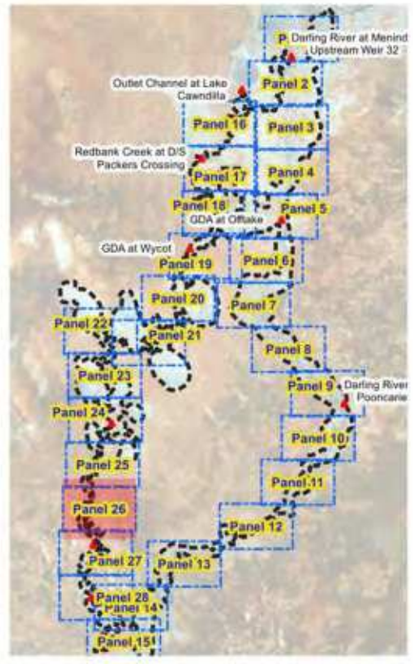
Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 27

GDA at Bulpunga

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 28

GDA at Tara Downs

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-2: Vegetation Inundation Extent for 24,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Overview Map

Darling River at Menindee Upstream Weir 32

Outlet Channel at Lake Cawndilla

Redbank Creek at D/S Packers Crossing

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

GDA at Wycot

Darling River at Pooncarie

GDA D/S Dam 183

Darling River at Burtundy

GDA at Bulpunga

GDA at Tara Downs

Murray River at Lock No. 10 (Wentworth)

Panel 1
Panel 2
Panel 3
Panel 4
Panel 5
Panel 6
Panel 7
Panel 8
Panel 9
Panel 10
Panel 11
Panel 12
Panel 13
Panel 14
Panel 15
Panel 16
Panel 17
Panel 18
Panel 19
Panel 20
Panel 21
Panel 22
Panel 23
Panel 24
Panel 25
Panel 26
Panel 27
Panel 28

N

0 10 20 km

GDA 1994 / MGA Zone 54

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 1

Darling River at D/S Menindee Main Weir

Darling River at Menindee Upstream Weir 32

EMU LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 2

EMU LAKE

Darling River at Menindee
Upstream Weir 32

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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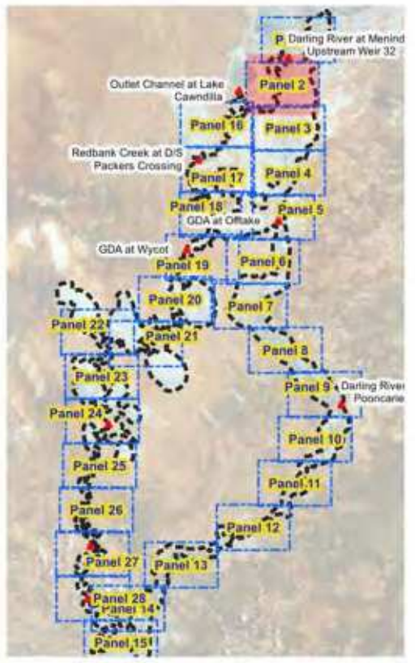
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 3

BOBS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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- Flood-dependent woodland
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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 4

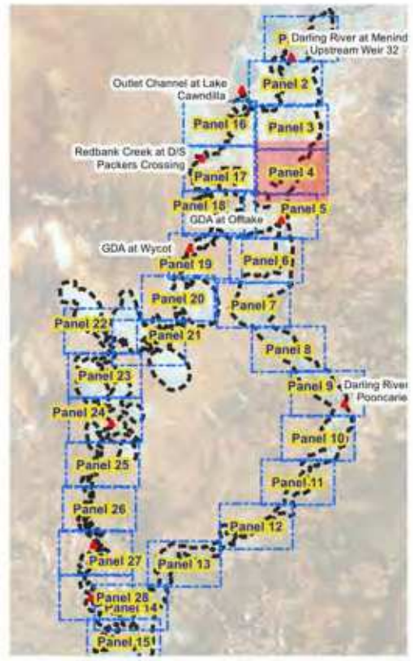
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Zoomed in Panel - 5

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

TRAVELLERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 6

CUTHERO LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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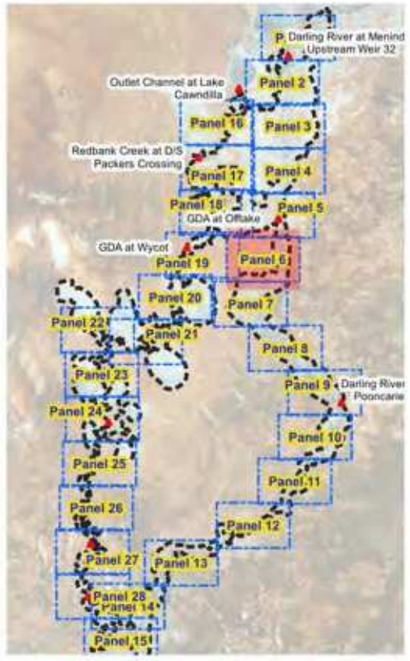
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 7

CUTHERO LAKE

YARTLA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
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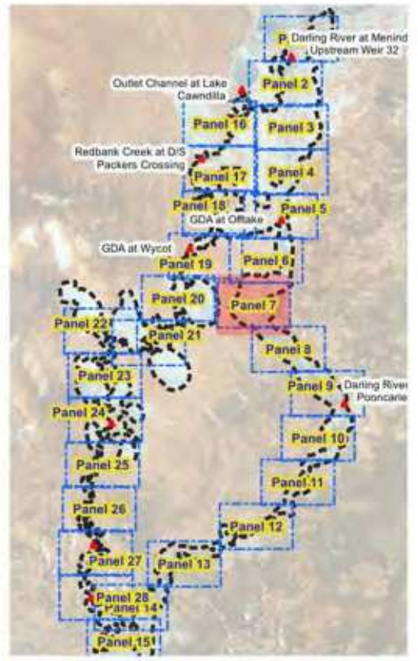

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Commonwealth Environmental Water Holder

Zoomed in Panel - 8

GDA 1994 / MGA Zone 54

0 1 2 km

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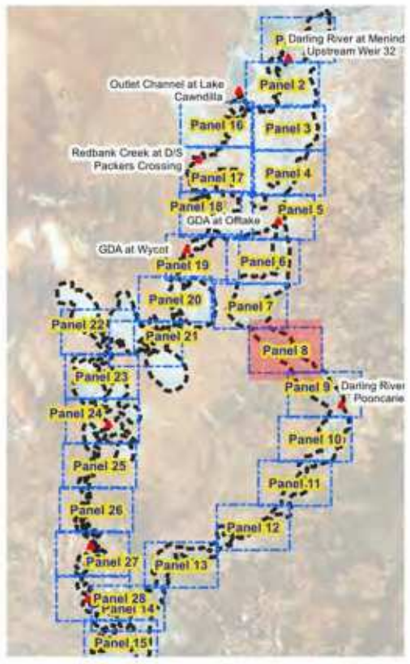
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Commonwealth Environmental Water Holder

Zoomed in Panel - 9

Darling River at Pooncarie

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 10

PORTERS LAKES

GDA 1994 / MGA Zone 54

N

0 1 2 km

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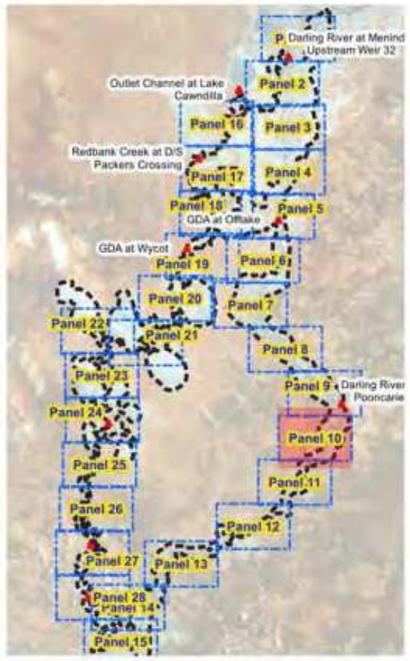
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Commonwealth Environmental Water Holder

Zoomed in Panel - 11

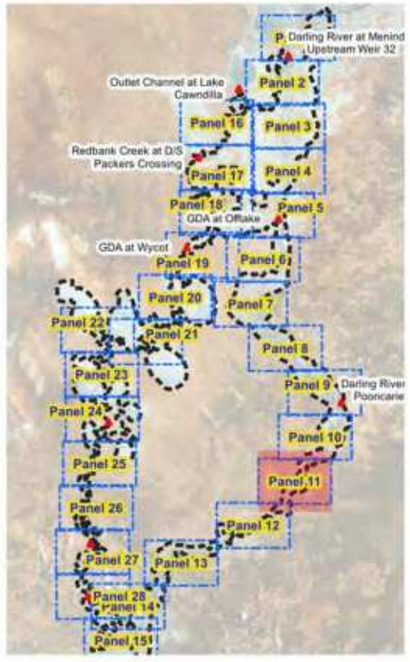
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Zoomed in Panel - 12

Darling River at Burtundy

GDA 1994 / MGA Zone 54

N

0 1 2 km

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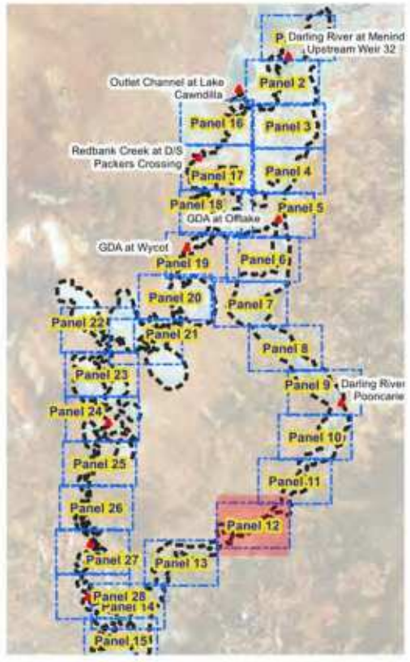
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 13

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
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Vegetation group

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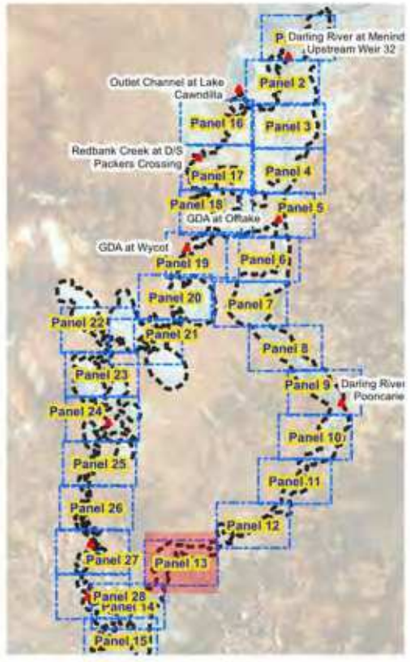
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 14

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 15

Murray River at Lock No. 10 (Wentworth)

N

0 1 2 km

GDA 1994 / MGA Zone 54

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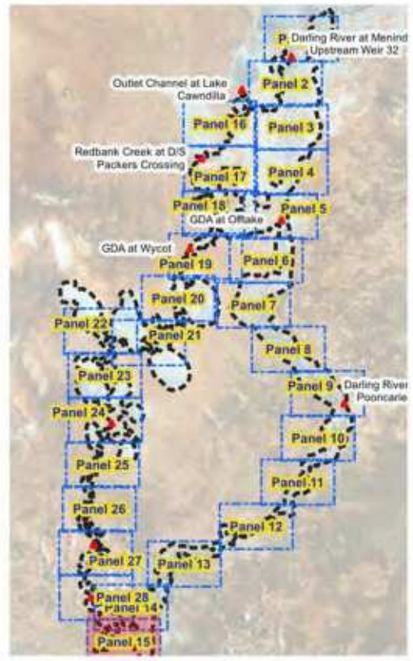
Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 16

KANGAROO LAKE

PACKERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
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- Floodplain-other
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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 17

Redbank Creek at D/S Packers Crossing

PACKERS LAKE

COLLINS LAKE

PARADISE LAKE

REDBANK LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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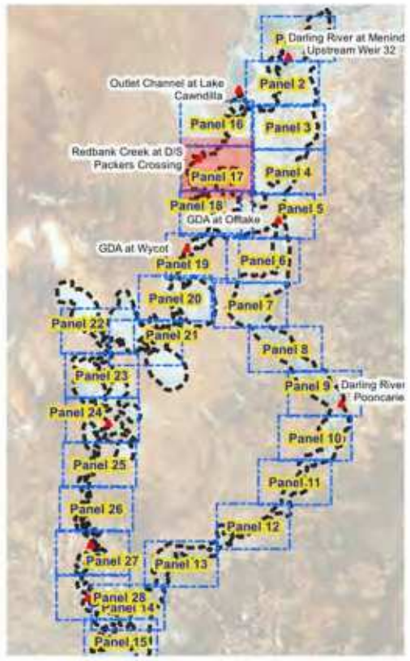

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 18

PARADISE LAKE

REDBANK LAKE

BASIN LAKE

SHADBOLTS LAKE

LONG LAKE

TRAVELLERS LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
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Vegetation group

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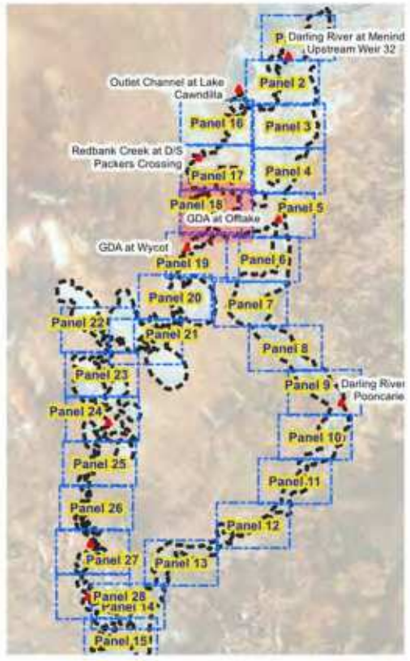

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 19

GDA at Wycot

GDA 1994 / MGA Zone 54

N

0 1 2 km

Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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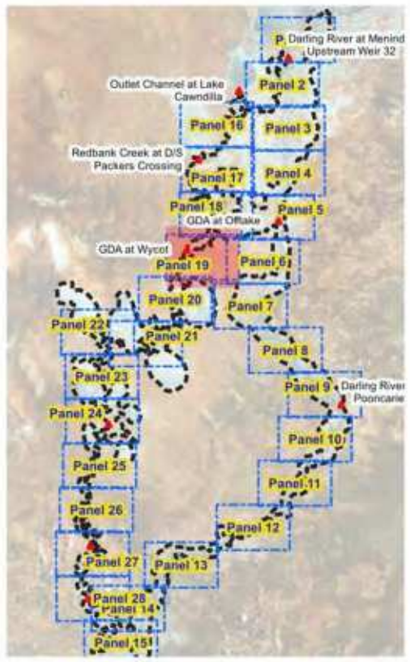

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 20

CHINAMANS LAKE

LITTLE LAKE

POPIO LAKE

MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 21

POPIO LAKE

LITTLE LAKE

TRAVELLERS LAKE

TRAVELLERS LAKE

BINJIE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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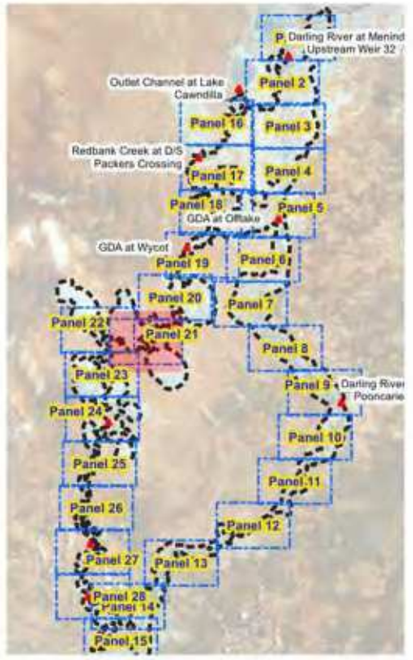

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 22

POPILTAH LAKE

POPIO LAKE

PATAGORAH LAKE

PINE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 23

PINE LAKE

ROTTEN LAKE

BLUE LAKE

NIALIA LAKE

BINJIE LAKE

YELTA LAKE

NEARIE LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

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Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 24

NIALIA LAKE

YELTA LAKE

WINDAMINGLE LAKE

NEARIE LAKE

GDA D/S Dam 183

NITCHIE LAKE

WARRAWENIA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 25

WARRAWENIA LAKE

Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

- Gauge stations
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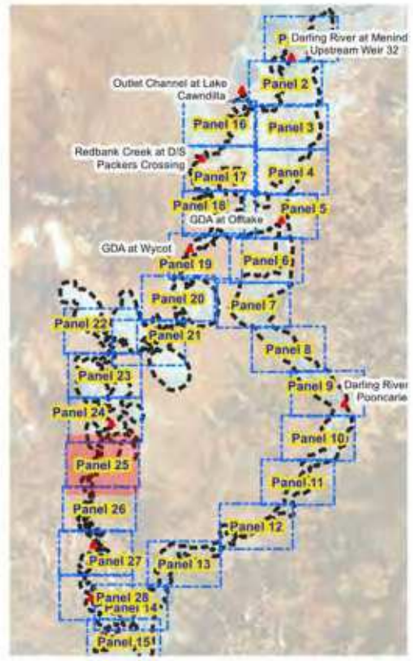

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Lower Darling and Great Darling Anabranch Inundation Mapping

N

0 1 2 km

GDA 1994 / MGA Zone 54

Australian Government
Commonwealth Environmental Water Holder

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Zoomed in Panel - 26

TOORA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

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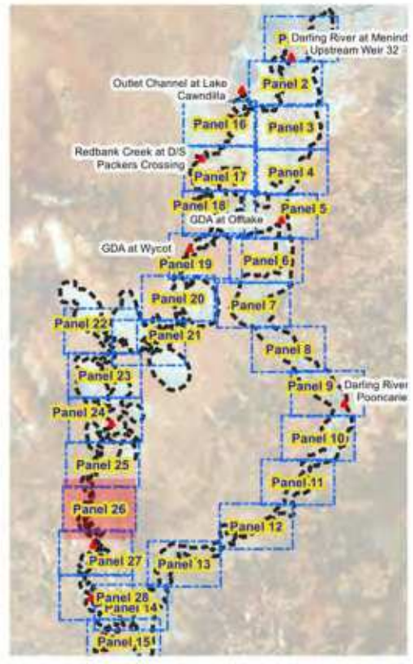

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 27

GDA at Bulpunga

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
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Vegetation group

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- Floodplain-other
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Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 28

GDA at Tara Downs

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-3: Vegetation Inundation Extent for 25,000 ML/Day Release at Weir 32

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Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
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Overview Map

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Darling River at Menindee Upstream Weir 32
Outlet Channel at Lake Cawndilla
Panel 3
Panel 16
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Redbank Creek at D/S Packers Crossing
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Panel 5
GDA at Offtake
Darling River at Great Darling Anabranch Offtake
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Darling River at Pooncarie
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GDA D/S Dam 183
Panel 25
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Panel 27
Darling River at Burtundy
GDA at Bulpunga
Panel 12
Panel 28
Panel 13
GDA at Tara Downs
Panel 14
Panel 15
Murray River at Lock No. 10 (Wentworth)

N
0 10 20 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 1

Darling River at D/S Menindee Main Weir

Darling River at Menindee Upstream Weir 32

EMU LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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Vegetation group

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- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 2

EMU LAKE

Darling River at Menindee
Upstream Weir 32

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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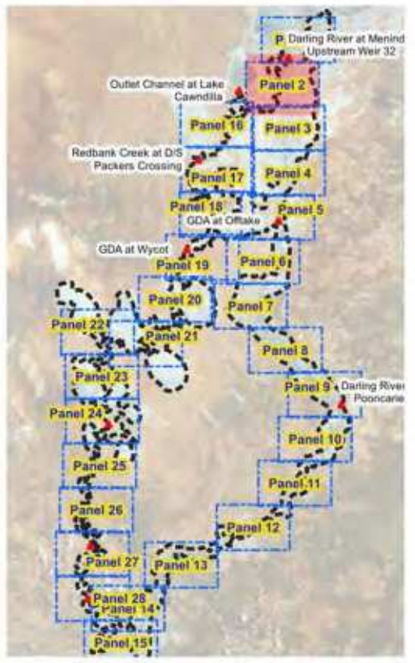

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 3

BOBS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 4

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 5

TRAVELLERS LAKE

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 6

CUTHERO LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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Vegetation group

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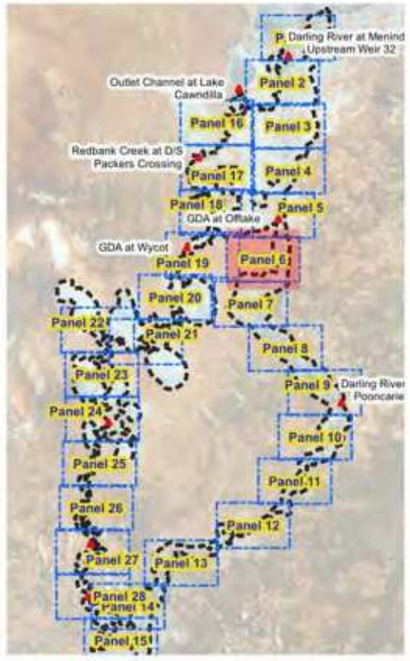
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 7

CUTHERO LAKE

YARTLA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 8

GDA 1994 / MGA Zone 54

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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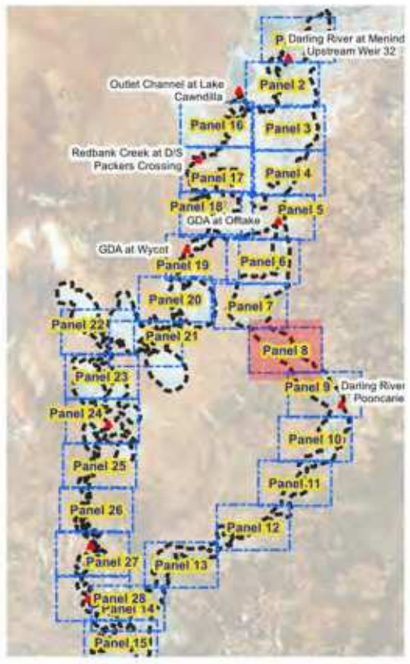

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 9

Darling River at Pooncarie

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 10

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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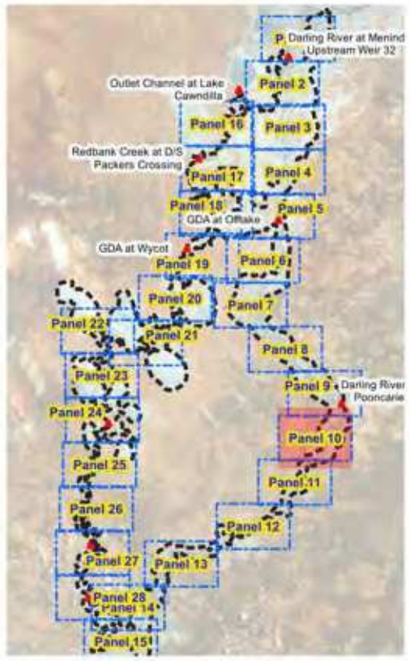

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 11

Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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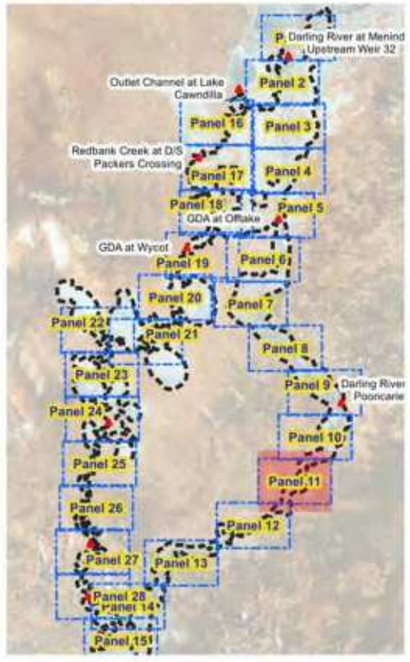

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Lower Darling and Great Darling Anabranch Inundation Mapping

N

0 1 2 km

GDA 1994 / MGA Zone 54

Australian Government
Commonwealth Environmental Water Holder

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Zoomed in Panel - 12

Darling River at Burtundy

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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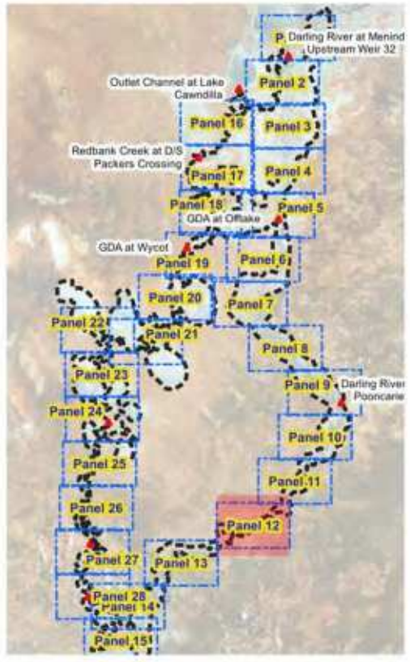

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Commonwealth Environmental Water Holder

Zoomed in Panel - 13

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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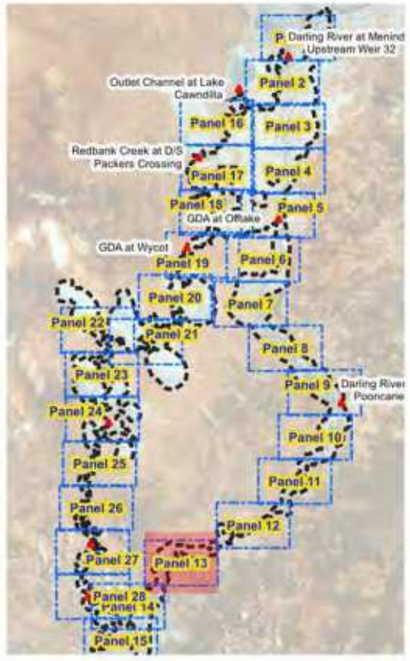

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 14

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 15

Murray River at Lock No. 10 (Wentworth)

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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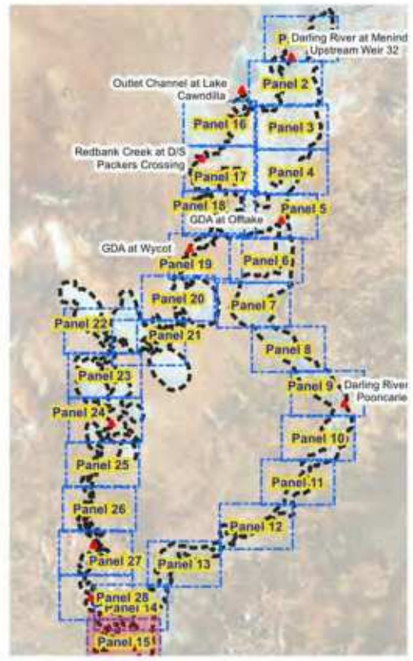

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 16

KANGAROO LAKE

PACKERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 17

Redbank Creek at D/S Packers Crossing

PACKERS LAKE

COLLINS LAKE

PARADISE LAKE

REDBANK LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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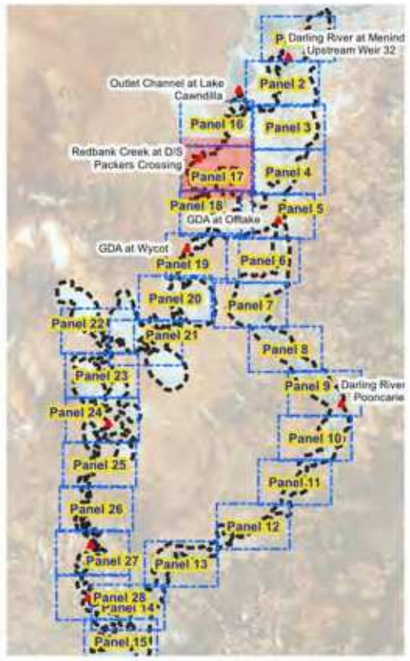

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 18

PARADISE LAKE

REDBANK LAKE

BASIN LAKE

SHADBOLTS LAKE

LONG LAKE

TRAVELLERS LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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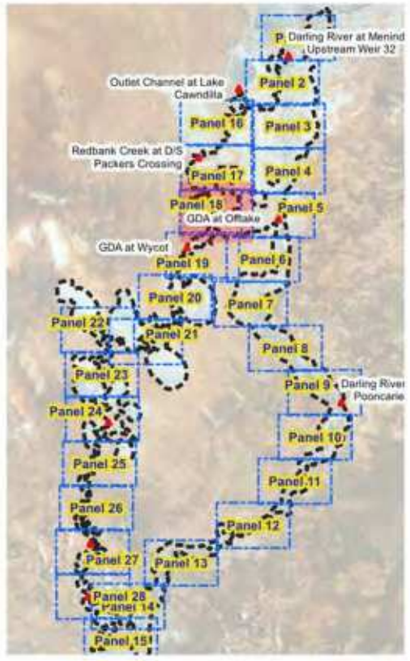

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 19

GDA at Wycot

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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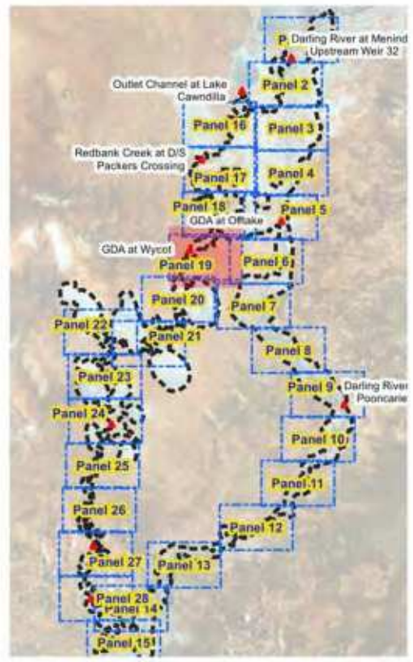
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 20

CHINAMANS LAKE

LITTLE LAKE

POPIO LAKE

MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 21

POPIO LAKE

LITTLE LAKE

TRAVELLERS LAKE

TRAVELLERS LAKE

BINJIE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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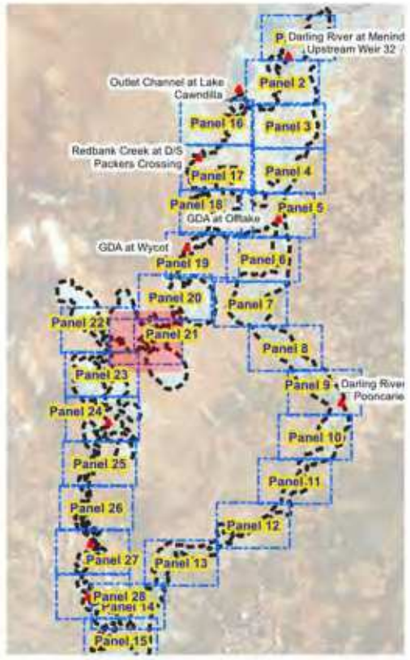
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 22

POPILTAH LAKE

POPIO LAKE

PATAGORAH LAKE

PINE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
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Zoomed in Panel - 23

PINE LAKE

ROTTEN LAKE

BLUE LAKE

NIALIA LAKE

BINJIE LAKE

YELTA LAKE

NEARIE LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 24

NIALIA LAKE

YELTA LAKE

WINDAMINGLE LAKE

NEARIE LAKE

GDA D/S Dam 183

NITCHIE LAKE

WARRAWENIA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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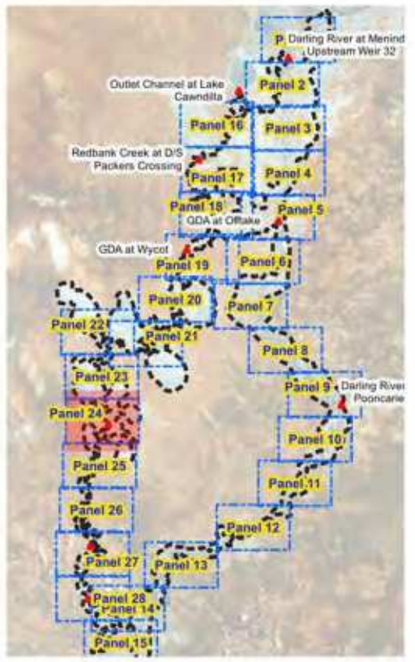
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 25

WARRAWENIA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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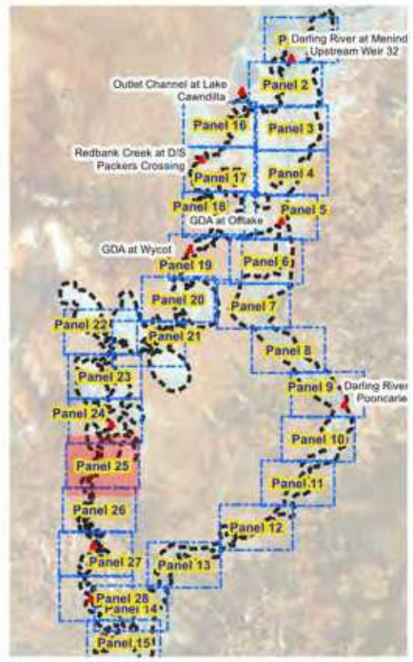
Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 26

TOORA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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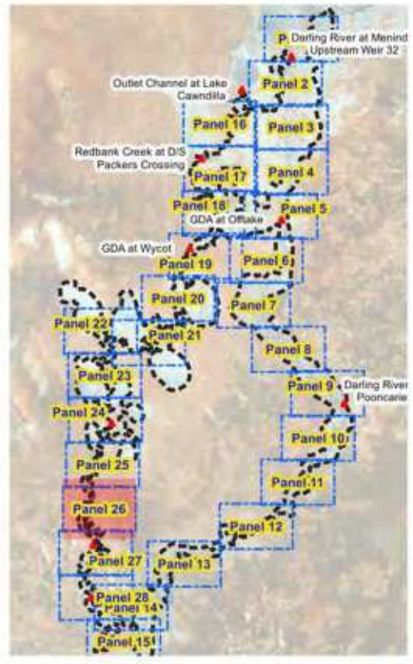
Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 27

GDA at Bulpunga

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

Report MHL2932

Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 28

GDA at Tara Downs

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-4: Vegetation Inundation Extent for 26,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Overview Map

Darling River at Menindee Upstream Weir 32

Outlet Channel at Lake Cawndilla

Redbank Creek at D/S Packers Crossing

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

GDA at Wycot

Darling River at Pooncarie

GDA D/S Dam 183

Darling River at Burtundy

GDA at Bulpunga

GDA at Tara Downs

Murray River at Lock No. 10 (Wentworth)

Panel 1
Panel 2
Panel 3
Panel 4
Panel 5
Panel 6
Panel 7
Panel 8
Panel 9
Panel 10
Panel 11
Panel 12
Panel 13
Panel 14
Panel 15
Panel 16
Panel 17
Panel 18
Panel 19
Panel 20
Panel 21
Panel 22
Panel 23
Panel 24
Panel 25
Panel 26
Panel 27
Panel 28

N

0 10 20 km

GDA 1994 / MGA Zone 54

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 1

Darling River at D/S Menindee Main Weir

Darling River at Menindee Upstream Weir 32

EMU LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 2

EMU LAKE

Darling River at Menindee Upstream Weir 32

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
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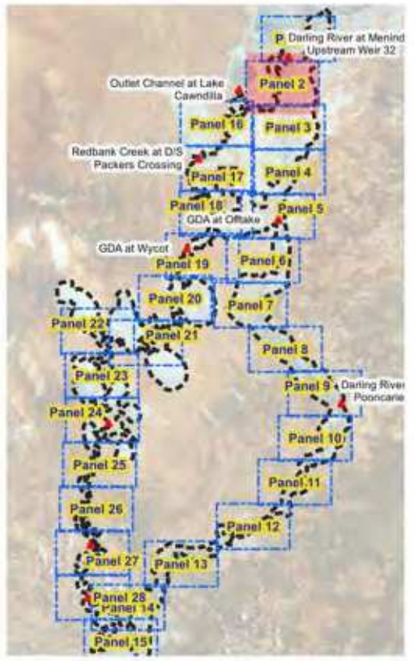

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 3

BOBS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
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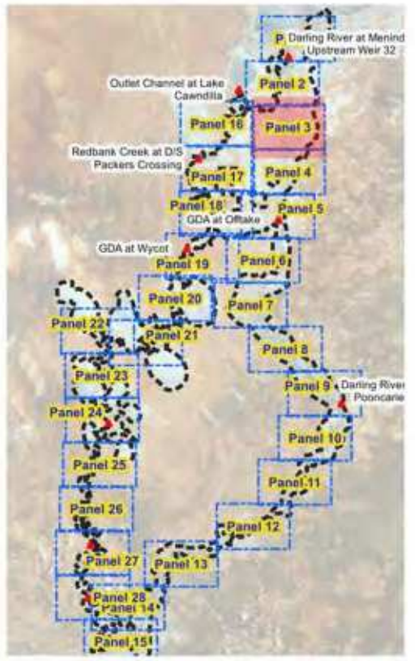

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 4

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
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Zoomed in Panel - 5

GDA at Offtake

Darling River at Great Darling Anabranch Offtake

TRAVELLERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT
Australian Government
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Zoomed in Panel - 6

CUTHERO LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 7

CUTHERO LAKE

YARTLA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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- Inundation extent- dry scenario
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Vegetation group

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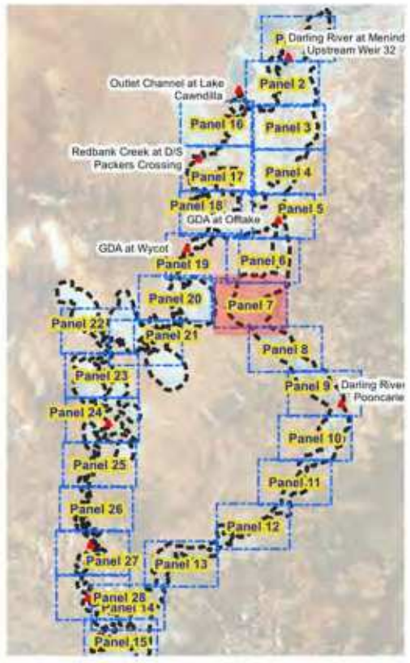

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 8

GDA 1994 / MGA Zone 54

0 1 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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Vegetation group

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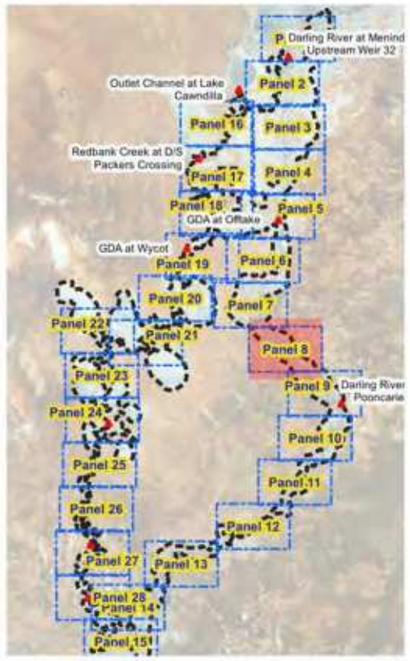

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Lower Darling and Great Darling Anabranch Inundation Mapping

Australian Government
Commonwealth Environmental Water Holder

Zoomed in Panel - 9

Darling River at Pooncarie

PORTERS LAKES

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 10

PORTERS LAKES

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 11

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

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Vegetation group

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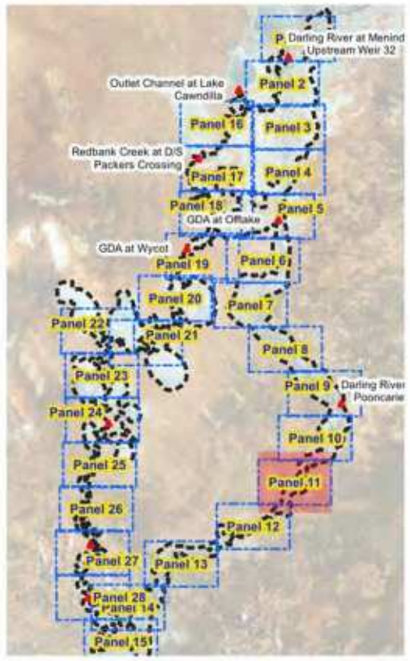

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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW Government

Australian Government
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Zoomed in Panel - 12

Darling River at Burtundy

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

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- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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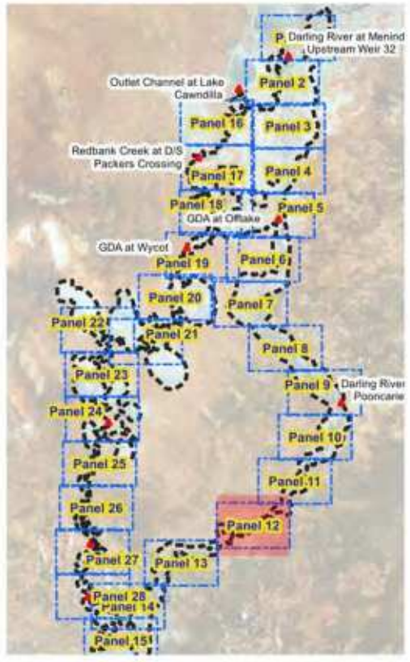

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 13

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 14

Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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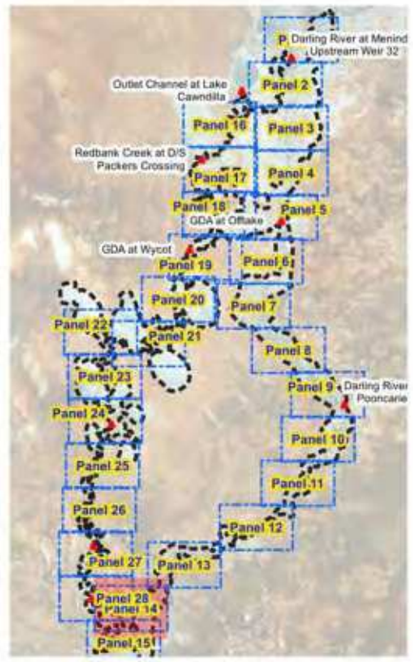

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Lower Darling and Great Darling Anabranch Inundation Mapping

GDA 1994 / MGA Zone 54

N

0 1 2 km

NSW GOVERNMENT

Australian Government
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Zoomed in Panel - 15

Murray River at Lock No. 10 (Wentworth)

N

0 1 2 km

GDA 1994 / MGA Zone 54

Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 16

KANGAROO LAKE

PACKERS LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
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Vegetation group

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 17

Redbank Creek at D/S Packers Crossing

PACKERS LAKE

COLLINS LAKE

PARADISE LAKE

REDBANK LAKE

GDA 1994 / MGA Zone 54

0 1 2 km

N

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 18

PARADISE LAKE

REDBANK LAKE

BASIN LAKE

SHADBOLTS LAKE

LONG LAKE

TRAVELLERS LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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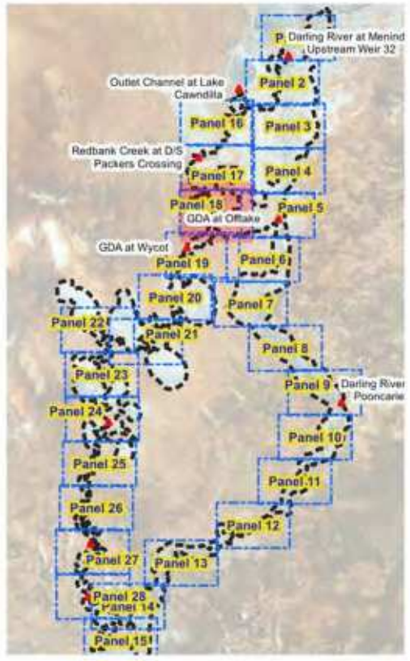
Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

Legend

- Gauge stations
- Hydraulic model extent
- Inundation extent- dry scenario
- Inundation extent- wet scenario

Vegetation group

- Flood-dependent forest
- Flood-dependent woodland
- Flood-dependent shrubland wetland
- Floodplain-other
- Non-woody wetland



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Lower Darling and Great Darling Anabranch Inundation Mapping

NSW GOVERNMENT

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Zoomed in Panel - 19

GDA at Wycot

GDA 1994 / MGA Zone 54

0 1 2 km

N

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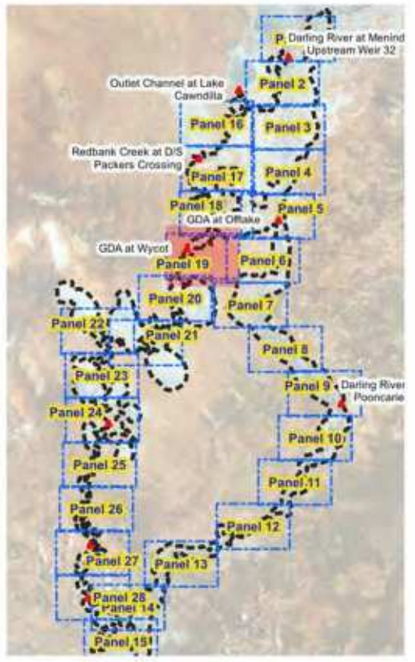

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Lower Darling and Great Darling Anabranch Inundation Mapping

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Zoomed in Panel - 20

CHINAMANS LAKE

LITTLE LAKE

POPIO LAKE

MGA Zone 54

N

0 1 2 km

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POPIO LAKE

LITTLE LAKE

TRAVELLERS LAKE

TRAVELLERS LAKE

BINJIE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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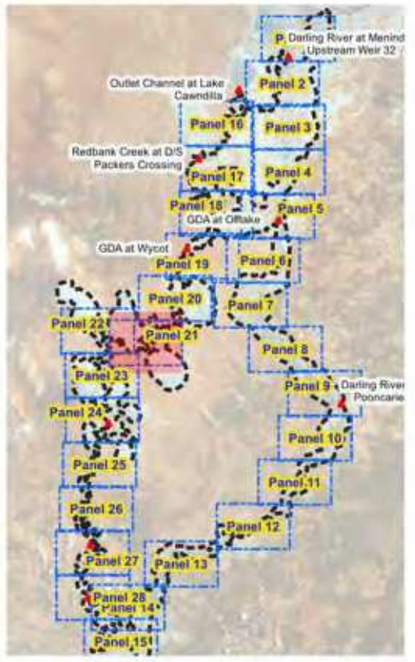

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POPILTAH LAKE

POPIO LAKE

PATAGORAH LAKE

PINE LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Zoomed in Panel - 23

PINE LAKE

ROTTEN LAKE

BLUE LAKE

NIALIA LAKE

BINJIE LAKE

YELTA LAKE

NEARIE LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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Zoomed in Panel - 24

NIALIA LAKE

YELTA LAKE

WINDAMINGLE LAKE

NEARIE LAKE

GDA D/S Dam 183

NITCHIE LAKE

WARRAWENIA LAKE

N

0 1 2 km

GDA 1994 / MGA Zone 54

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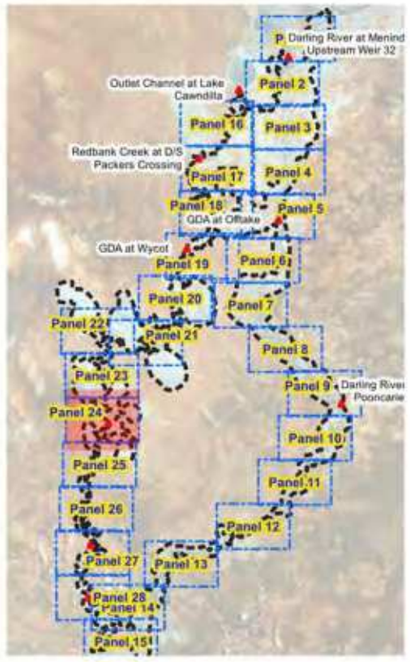

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Zoomed in Panel - 25

WARRAWENIA LAKE

Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

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N

0 1 2 km

GDA 1994 / MGA Zone 54

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Zoomed in Panel - 26

TOORA LAKE

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

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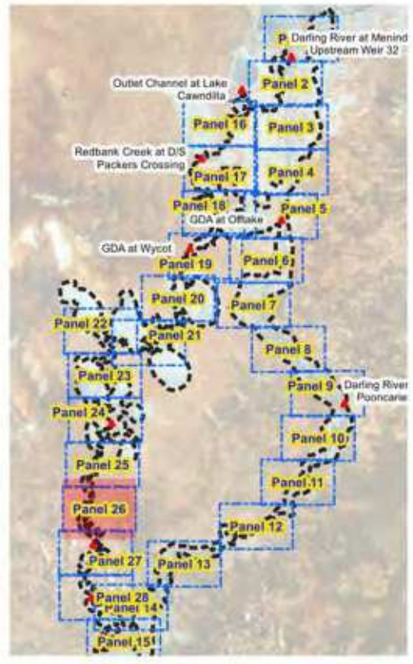

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Zoomed in Panel - 27

GDA at Bulpunga

GDA 1994 / MGA Zone 54

N

0 1 2 km

Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

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Zoomed in Panel - 28

GDA at Tara Downs

GDA 1994 / MGA Zone 54

N

0 1 2 km

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Figure C-5: Vegetation Inundation Extent for 30,000 ML/Day Release at Weir 32

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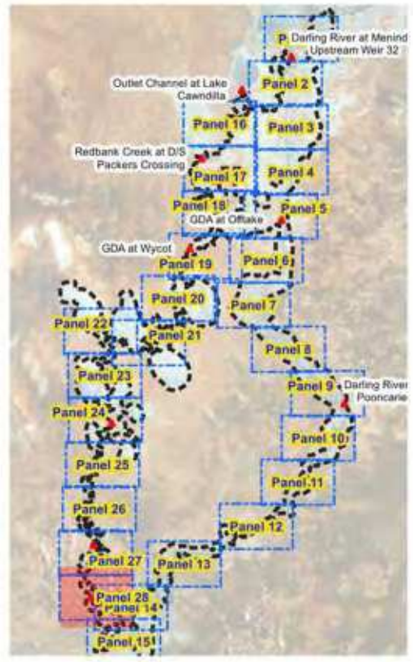

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110B King Street

Manly Vale NSW 2093