2015–16 Basin-scale evaluation of Commonwealth environmental water – Ecosystem Diversity

Prepared by: Shane Brooks

Final Report

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2015–16 Basin-scale evaluation of Commonwealth environmental water — Ecosystem Diversity

Report prepared for the Commonwealth Environmental Water Office by The Murray–Darling Freshwater Research Centre

This report was prepared by The Murray–Darling Freshwater Research Centre (MDFRC). The aim of the MDFRC is to provide the scientific knowledge necessary for the management and sustained utilisation of the Murray–Darling Basin water resources. The MDFRC is a joint venture between La Trobe University and CSIRO. Additional investment is provided through the University of Canberra.

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The Murray–Darling Freshwater Research Centre offices are located on the land of the Latje Latje and Wiradjuri peoples. We undertake work throughout the Murray–Darling Basin and acknowledge the traditional owners of this land and water. We pay respect to Elders past, present and future.

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Abbreviations

ANAE	Australian National Aquatic Ecosystem (classification)
CEWO	Commonwealth Environmental Water Office
GIS	geographical information system
ha	hectare
LTIM	Long Term Intervention Monitoring
M&E Providers	Monitoring and Evaluation Providers
MDBA	Murray–Darling Basin Authority
MDFRC	Murray–Darling Basin Freshwater Research Centre

1 Introduction

A wide variety of ecosystem types occur in the Basin; from arid salt flats and clay pans to lush vegetated wetlands, from open grasslands to dense riparian forests; from dry ephemeral creeks to the large permanent channels and tributaries of the Murray River. Considered together, the range of different ecosystem types within a specified area defines the ecosystem diversity for that area. Ecosystem diversity defines patterns of natural variability that shape species distribution and abundance, resilience, and natural ecosystem functioning (Junk et al. 1989, Poff 1997, Thorp et al. 2006). As such, ecosystem diversity is an important component of biodiversity together with species diversity, genetic diversity and diversity of ecosystem function (Geist 2011).

Why focus on Ecosystem Diversity in the LTIM project?

Principles of ecosystem management suggest that protecting or restoring ecosystems also preserves valued species, habitats, and critical processes within them in addition to critical ecosystem services that they may provide. Evaluating the extent to which water-dependent ecosystem types have been supported by Commonwealth environmental water therefore contributes to assessing the contribution of Commonwealth environmental water to biodiversity in the Basin as outlined in the Commonwealth Environmental Water Outcomes Framework (CEWH 2013).

Developing understanding for how and why environmental watering outcomes differ among ecosystem types will also inform adaptive management by (1) fine tuning expected outcomes from the delivery of environmental water in different ecosystems, and (2) ultimately improving the efficiency, effectiveness and impact of the use of Commonwealth environmental water in the Basin.

The output of the Ecosystem Diversity evaluation provides a template for extrapolating observed outcomes at monitoring sites within the Basin (in LTIM Selected Areas) to similar ecosystem types in areas that are not monitored, thereby facilitating a Basin-scale evaluation of the impact of Commonwealth environmental water.

The detailed ecological or hydrological outcomes within each ecosystem are the subject of other LTIM Basin matter and Selected Area reports (refer Gawne *et al.* 2014).

Primary output from this evaluation

Environmental watering supports the maintenance of ecosystem diversity via the provision of water to maintain aquatic habitats, which in turn support a mosaic of water-dependent flora and fauna. This evaluation catalogues the different ecosystem types that received Commonwealth environmental water during the 2015–16 water year. It quantifies the physical area of each ecosystem type within the Basin that is inundated or influenced by Commonwealth environmental water compared to the known distribution for each type.

Additional Context

This is the second evaluation within the Long Term Intervention Monitoring (LTIM) project (see Brooks 2016a for the 2014–15 year).

This evaluation is concerned with identifying the range and distribution of ecosystem types that receive Commonwealth environmental water rather than documenting change in landscape ecosystem diversity through time. Delivery of environmental water has the potential to change physical landscape diversity through geomorphological processes (Figure 1), but in practice the frequency and volumes of Commonwealth environmental water that are delivered are constrained by storage volumes, infrastructure and land use to volumes that complement natural hydrological regimes rather than creating wholesale hydrological regime change with potential to restructure

landscapes. Large changes to the distribution and abundance of ecosystem types in the Basin are not expected within the duration of the LTIM project (5 years).

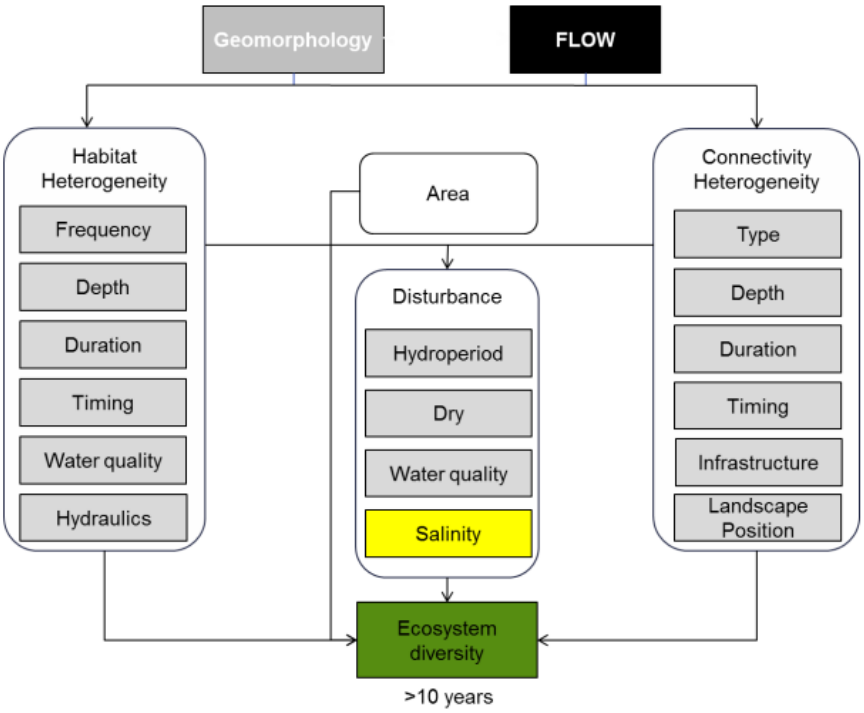

Figure 1. Cause-and-effect diagram depicting the influence of flow on landscape ecosystem diversity (from MDFRC 2013).

2 Method

For the purpose of defining ecosystem diversity we use the interim Australian National Aquatic Ecosystem (ANAE) Classification Framework to identify distinct ecosystem types and their location in the Basin. The ANAE framework was prepared by the Australian Government Aquatic Ecosystems Task Group (AETG) to provide a consistent ecosystem type classification that can inform cross-jurisdictional adaptive management of aquatic ecosystems (AETG 2012). It uses three levels of attribute data to classify ecosystem types (Figure 2). Level 1 attributes include national and regional data related to national climate, landform and hydrological patterns. Level 2 attributes are similar to Level 1 attributes but applied at sub-catchment scales. Level 3 attributes are applied to individual aquatic ecosystems. The ANAE classification was applied to the best available jurisdictional mapping for Basin wetlands, floodplains and rivers by Brooks *et al.* (2014) to produce the interim Murray-Darling Basin Aquatic Ecosystem Classification data set (hereafter referred to as the Basin ANAE classification). This data set provides the LTIM project with a baseline map that quantifies the distribution and extent of different aquatic ecosystem types, providing a relevant and contemporary means for defining ecosystem diversity in the Basin.

Overlaying a map of the Commonwealth environmental water that was delivered in the Basin can then identify which ecosystem types received Commonwealth environmental water to answer the following short-term (1-year) and long-term (5-year) Basin-scale evaluation question:

1. What did Commonwealth environmental water contribute to ecosystem diversity?

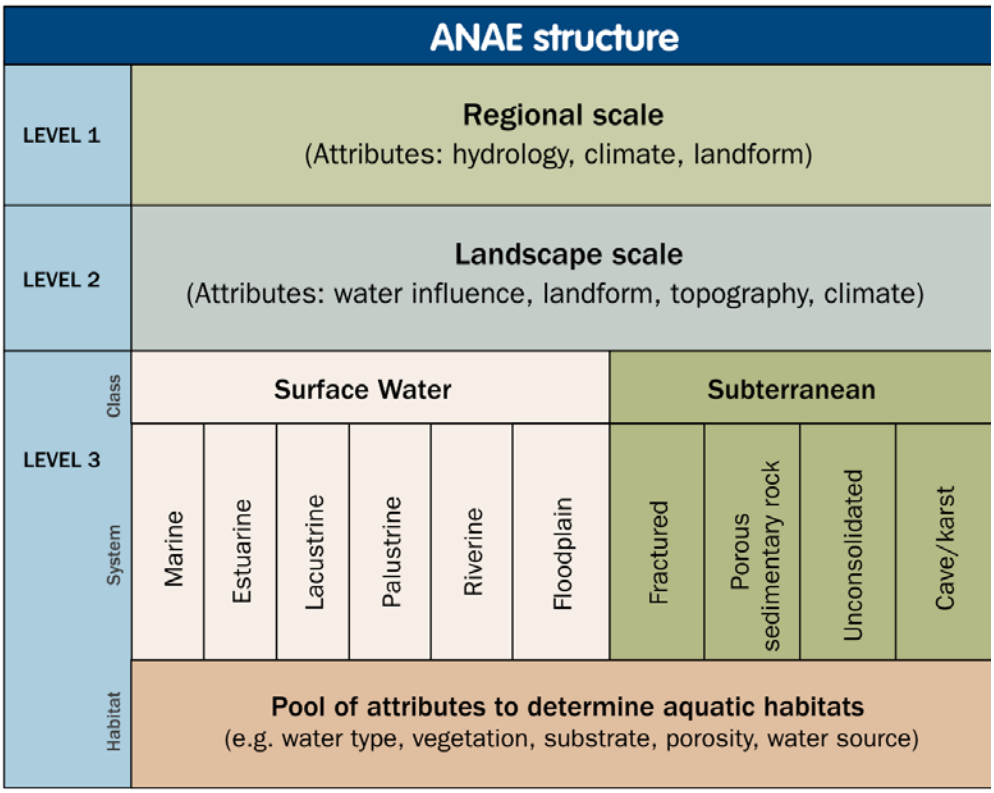

Figure 2. Structure and levels of the Interim Australian National Aquatic Ecosystem Classification Framework (AETG 2012).

2.1 Data

Data inputs to the evaluation of ecosystem diversity include:

- The Basin ANAE data set (Brooks et al. 2014) (Figure 3). A significant update of the classification in the Basin is currently underway to improve confidence and consistency in the ANAE mapping and classification (Annex A). There will be significant changes to the numbers and extent of wetlands in areas of NSW that received Commonwealth environmental water in 2016–17 (e.g. the Central Murray Forests, Macquarie Marshes, Lowbidgee and Gwydir Wetlands). This evaluation of the 2015–16 contribution of Commonwealth environmental water to ecosystem diversity in the Basin and that of last year (2014–15) are therefore interim assessments that will be updated in 2018 using the revised classification. Substantive comparison between years is deferred to that time.
- Commonwealth environmental water Inundation 2015–16 — a spatial representation of watering extent for Commonwealth environmental water delivered in the 2015–16 (Stewardson & Guarino 2017) (Figure 4). Improvements in the mapping of inundation extent this year led to the inclusion of the Coorong and Lakes Alexandria and Albert and the longitudinal extent of influence of Commonwealth environmental water in river channels.
- LTIM valleys — a spatial layer developed for the LTIM project evaluation that subdivides the Basin into the major river valleys (Figure 5). These boundaries were derived from the Sustainable Rivers Audit (SRA) catchment boundaries with a modification to separate the Edward-Wakool Catchment from the Central Murray. The boundaries were adjusted slightly for this current evaluation in comparison to last year to improve the assignment of wetlands near valley boundaries to the watersheds in which managers and Commonwealth environmental water accounting allocate them. Mostly this effects the Central Murray area with a widening along the Murray River corridor to encompass fringing wetlands and the Gunbower and Barmah forests, and southern expansion of the Murrumbidgee valley to include Yanco Creek within the Murrumbidgee (the previous boundary roughly followed the creek line placing parts of Yanco Creek in the Murrumbidgee and other parts in the Central Murray). Areas inundated in 2014–15 were not in these affected areas so the evaluation of ecosystems inundated in 2014–15 and 2015–16 are comparable despite the boundary change.

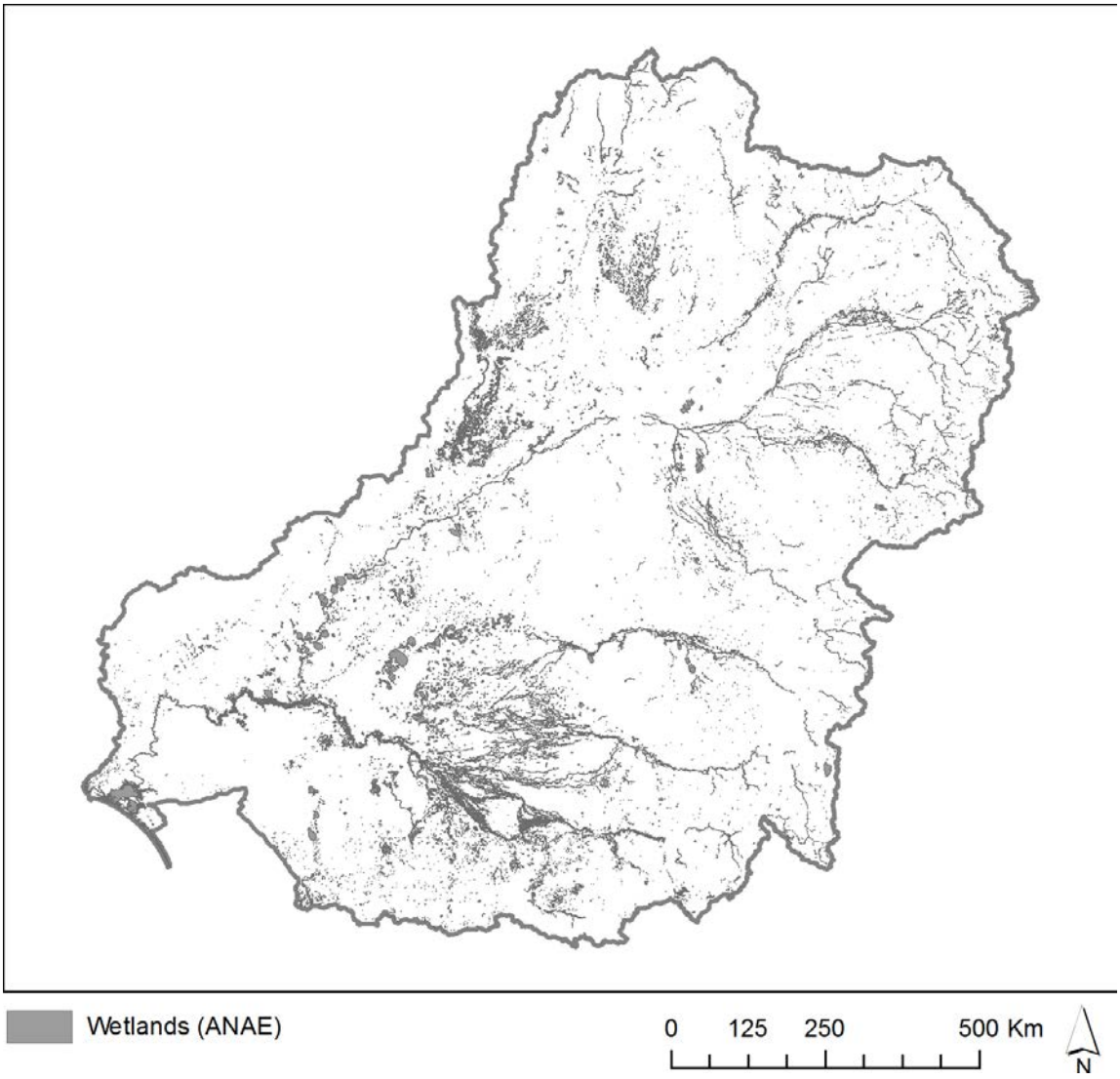

Figure 3. The Basin ANAE wetlands.

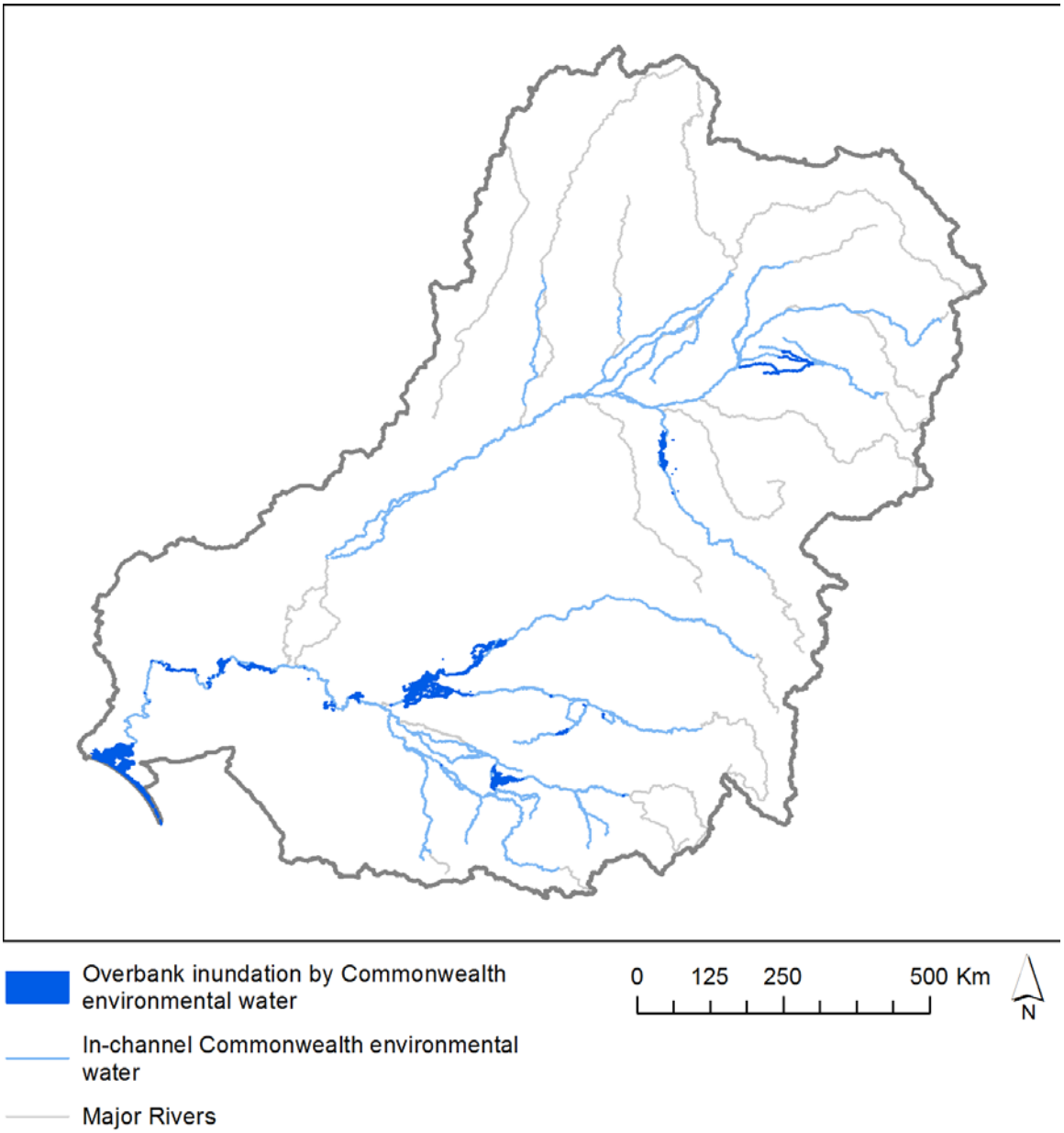

Figure 4. Inundation by Commonwealth environmental water 2015–16.

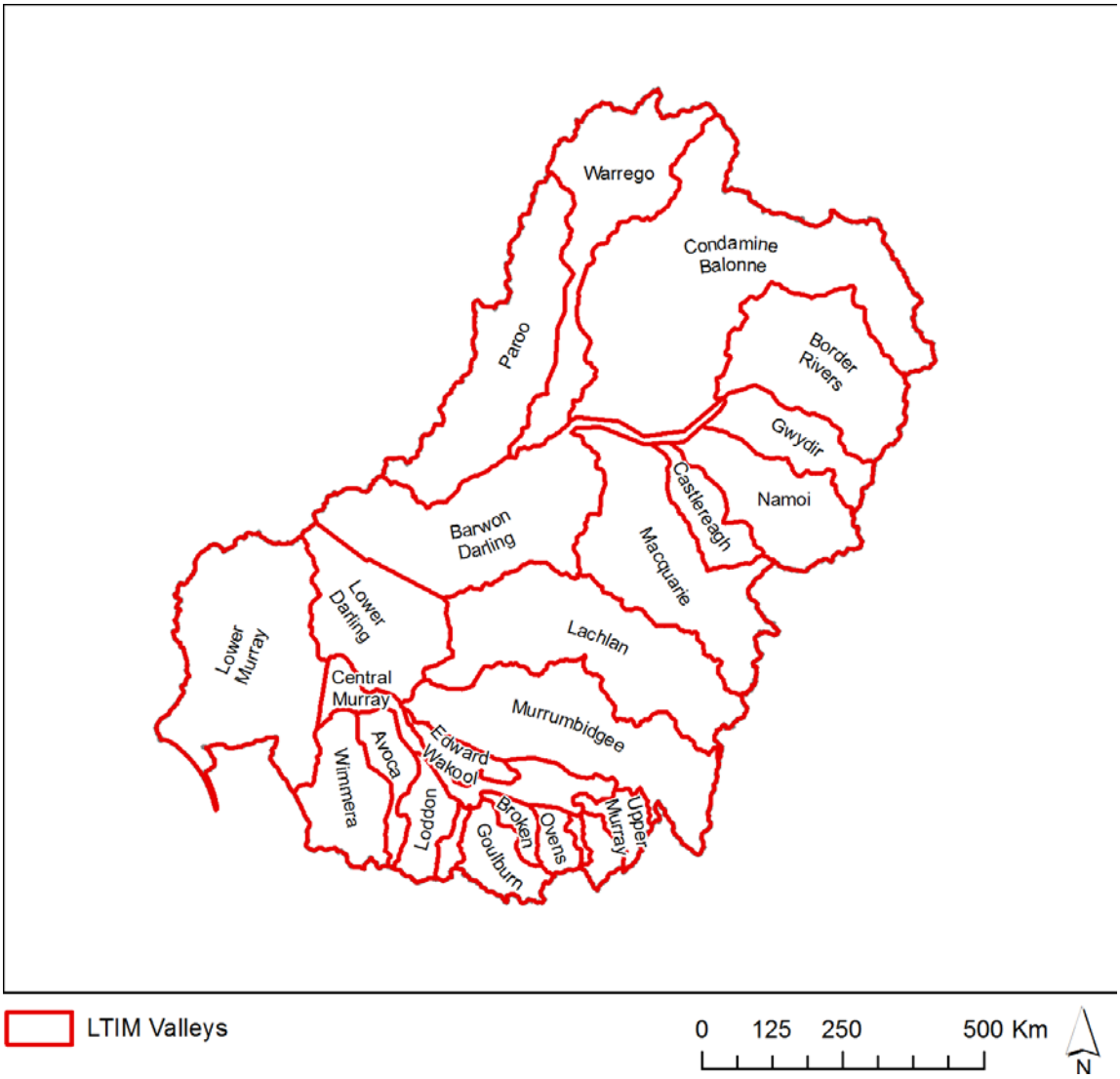

Figure 5. Valley boundaries within the Murray–Darling Basin used in this evaluation.

As for the previous year, two different approaches were used to quantify the area of different ecosystem types that received Commonwealth environmental water:

1. Area inundated by Commonwealth environmental water = the sum of only the inundated areas of each wetland type, excluding the areas of wetlands that were not inundated.
2. Area influenced by Commonwealth environmental water = the sum of the all wetland areas that received water even if the inundation mapping showed that only a portion of the wetland was inundated.

The area *inundated* by Commonwealth environmental water is a 'literal' definition that represents the minimum contribution of Commonwealth environmental water in the landscape. The area *influenced* by Commonwealth environmental water acknowledges that aquatic ecosystems are complex interconnected systems and delivering water to part of a wetland contributes benefits to the entire wetland system. For example, filling a wetland depression may raise local water tables and benefit fringing vegetation, or provide feeding habitat for waterbirds that roost elsewhere in the wetland vegetation that was not inundated.

For wetlands, the total area *influenced* by Commonwealth environmental water is the appropriate measure of the contribution of Commonwealth environmental water to ecosystem diversity.

For floodplains, the area *inundated* by Commonwealth environmental water is used to measure the contribution of Commonwealth environmental water to ecosystem diversity. This more conservative measure is used for floodplains because: 1) there is low confidence in the MDBAv2 data set used by the Basin ANAE to map floodplain ecosystems (see discussion in Brooks *et al.* 2014); and 2) the mapping includes some very large floodplain areas mapped as single ecosystems that span thousands of square kilometres that would unduly distort the apparent contribution of Commonwealth environmental water.

GIS methodologies for calculating these areas are provided in Section 2.2.

The spatial representation of watering extent for Commonwealth environmental water delivered in 2015–16 includes all watering actions that resulted in inundation beyond the river channel (Stewardson & Guarino 2017). River reaches that received in-channel pulses, freshes and passing flows are also identified (Figure 4), but the mapping is not of sufficient resolution to identify inundation of river banks and fringing habitats along the channels.

Observations of increased inundation in the Coorong, Lake Alexandrina, Lake Albert and the Murray Mouth from Commonwealth environmental water were not made during 2015–16 but inundation extent was modelled from the hydrograph and detailed elevation models and bathymetry.

2.2 GIS Workflows

All spatial layers are based on the 1994 Geocentric Datum of Australia (GDA94). Areas in this report are in hectares and have been calculated in the Australia Albers Equal Area Conic projection to report accurate area measurements across the Basin.

Area of wetlands inundated by Commonwealth environmental water

GIS Workflow:

1. Intersect:
    a. The Basin ANAE Wetlands;
    b. Inundation15/16; and
    c. LTIM Valleys
2. Calculate polygon area in hectares using equal area GDA94 Australian Albers projection.
3. Sum the area of each ANAE wetland type per valley.

Area of wetlands influenced by Commonwealth environmental water (Commonwealth environmental water overlaps any portion of the wetland polygon)

GIS Workflow:

1. Select by location all wetland polygons that intersect with the Inundation 15/16.
2. Intersect the selected wetlands with the catchment boundaries.
3. Calculate polygon area in hectares using equal area GDA94 Australian Albers projection.
4. Sum the area of each ANAE wetland type per valley.

Area of floodplains inundated by Commonwealth environmental water (inundated area only within the ANAE floodplain)

GIS Workflow:

1. Intersect:
    a. The Basin ANAE Floodplains (MDBAv2)
    b. Inundation 15/16
    c. LTIM Valleys

2. Calculate polygon areas in hectares using equal area GDA94 Australian Albers projection.
3. Calculate summary statistics to sum areas of each ANAE floodplain type per valley.

Length of waterways influenced by Commonwealth environmental water

River length measurement is highly dependent on the resolution of the mapping with higher resolution mapping capturing more twists and turns in the river that increase the measured river length along the flow path between two points. The Basin ANAE waterway mapping compiles state data that varies in resolution from 1:25 000 to 1:100 000.

GIS Workflow:

1. Intersect:
    a. The Basin ANAE Waterways
    b. Inundation 15/16 (waterways)
    c. LTIM Valleys
2. Calculate the river length inundated for each ecosystem type in kilometres using equal area GDA94 Australian Albers projection.
3. Calculate summary statistics to sum the length of each river ecosystem type per valley.

3 Ecosystem Diversity Basin-scale evaluation

3.1 Highlights

In the 2015–16 water year:

- More than 200,000 ha of wetlands and floodplains and 20,000km of river were inundated by Commonwealth environmental water.
- Wetland and floodplains in four LTIM Selected Areas received Commonwealth environmental water with substantial areas also inundated in the Macquarie and Central Murray valleys
- A high diversity of ecosystem types received Commonwealth environmental water with 64% of the different wetland ecosystem types present in the Basin and 89% of floodplain ecosystem types being represented in the areas inundated by Commonwealth environmental water. For 10 ecosystem types, substantial areas (> 25% of their individual footprints in the basin) were inundated; these include, permanent and temporary lakes, permanent saline lakes, permanent and temporary tall marshes and intermittent river red gum floodplain swamps. Much of the lake area and many of the marshes are associated with Lakes Alexandrina and Albert and their fringing wetlands.
- Approximately 40% of the wetland and floodplain areas that received Commonwealth environmental water were classed as temporary or intermittent ecosystem types. These areas can be hot-spots for diversity if they support different suites of species in the dry and wet phases.
- Commonwealth environmental water contributed to all of the estuarine ecosystem types in 2015–16 as flows passed through to the Murray Mouth and Coorong. This is likely also true in 2014–15 although these areas were not included in the evaluation for that year.

Comparing 2015-16 to 2014-15 there was:

- Decreased inundation of intermittent river cooba swamp and permanent floodplain grass marshes in the Macquarie Marshes.
- Increased inundation of intermittent river red gum floodplain swamp in Barmah Forest.
- Increased inundation of permanent saline wetlands, temporary swamps, permanent streams and temporary streams associated with anabranches and connected billabongs between the South Australian border downstream to Morgan an also in the Central Murray associated with the Barmah Forest.
- Decreased inundation of permanent floodplain grass marshes and permanent floodplain wetland associated with the Macquarie Marshes and Mulcra Island (Lower Murray) in 2015–16.
- Decreased inundation of temporary sedge/grass/forb floodplain marsh in 2015–16, because Commonwealth environmental water from the Warrego River was not used to water the Western Floodplain in 2015–16 as was done in 2014–15.
- Increase in the amount of permanent floodplain lakes and temporary tall emergent marsh temporary saline swamp and permanent salt marsh associated with marginal areas of the Lakes Alexandrina and Alberta and Coorong. This is an artefact of these areas not being included in the 2014–15 evaluation.

3.2 Basin-scale evaluation 2015–16

This evaluation does not consider the details of individual watering events, and is ignorant of the specific timing and duration of Commonwealth environmental water in different areas of the landscape. The inundation map (Figure 4) collapses the maximum wetted extent of all watering

actions during 2015–16 that included Commonwealth environmental water. The area inundated in each valley, and the length of river channels influenced by Commonwealth environmental water is presented in Table 1.

The contribution of Commonwealth environmental water to maintaining ecosystem diversity at the Basin-scale is contained in Table 2 (wetlands), Table 3 (floodplains), Table 4 (estuarine ecosystems) and Table 5 (river channels). Results are sorted by the area influenced or inundated by Commonwealth environmental water from most to least.

Table 1. Area of each LTIM catchment inundated by Commonwealth environmental water (excluding in-channel flows) in 2015–16, including both floodplain and wetland ecosystem types.

Catchment name	Selected Area	Wetland and Floodplain Area inundated (ha)	Length of waterways influenced (km)
Avoca		–	–
Barwon Darling		–	3 458
Border Rivers		–	1 836
Broken		–	276
Campaspe		–	175
Castlereagh		–	–
Central Murray		16 172	2 508
Condamine Balonne		–	2 335
Edward–Wakool	Edward–Wakool river system	–	1 049
Goulburn	Goulburn River	–	537
Gwydir	Gwydir river system	2 322	1 127
Kiewa		–	–
Lachlan	Lachlan river system	20 912	1 597
Loddon		–	560
Lower Darling		–	–
Lower Murray	Lower Murray River*	130 791	991
Macquarie		9 902	829
Mitta Mitta		–	–
Murrumbidgee	Murrumbidgee river system	22 316	1 875
Namoi		–	–
Ovens		–	544
Paroo		–	–
Upper Murray		–	–
Warrego	Junction of the Warrego and Darling rivers	–	493
Wimmera		–	–
Total area inundated (excluding channels)		**202 415**	**20 190**

* includes the Coorong, Lakes Alexandrina and Albert and the Murray Mouth.

Commonwealth environmental watering actions contributed to the inundation of a wide range of ecosystem types within the Basin that included approximately 64% of the different wetland types and 89% of the different floodplain types, and all (100%) of the river channel and estuarine ecosystem types.

A more detailed breakdown by valley is provided in Annex B (wetlands and estuarine ecosystems), Annex C (floodplains) and Annex D (river channels).

Table 2. Contribution of Commonwealth environmental water to ecosystem diversity of wetlands at the basin-scale. Ecosystem types are sorted by the area influenced by Commonwealth environmental water.

Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Inundated*		Influenced*	
		Area (ha)	% of total	Area (ha)	% of total
Lp2.1: Permanent floodplain lakes	137 406	84 637	61.6	84 964	61.8
Pt1.1.1: Intermittent River red gum floodplain swamp	63 396	8 541	13.5	27 357	43.2
Pp4.1: Permanent floodplain wetland	42 004	6 938	16.5	21 525	51.2
Rp1.4: Permanent lowland rivers and streams	74 534	5 199	7.0	14 326	19.2
Pt2.1.2: Temporary tall emergent marsh	18 381	7 368	40.1	7 470	40.6
Pt4.1: Temporary floodplain wetland	122 885	855	0.7	7 066	5.8
Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	51 081	4 645	9.1	6 510	12.7
Pp2.1.1: Permanent floodplain tall emergent marshes	7 809	2 625	33.6	4 276	54.8
Pt3.1.2: Clay pans	51 074	901	1.8	3 265	6.4
Lt2.1: Temporary floodplain lakes	198 459	1 128	0.6	2 597	1.3
Lst2.1: Temporary saline floodplain lakes	10 636	1 253	11.8	2 338	22.0
Pt3.1.1: Floodplain clay pans	49 329	1 831	3.7	2 267	4.6
Psp4: Permanent saline wetland	3 965	1 862	47.0	2 221	56.0
Pst1.1: Temporary saline swamp	17 020	1 824	10.7	2 119	12.5
Lt1.1: Temporary lakes	306 351	865	0.3	2 082	0.7
Lsp1.1: Permanent saline lakes	8 225	327	4.0	2 079	25.3
Rt1.4: Temporary lowland rivers and streams	223 362	782	0.4	1 925	0.9
Pt1.2.1: Intermittent Black box floodplain swamp	33 916	498	1.5	1 299	3.8
Pst4: Temporary saline wetland	11 912	303	2.5	973	8.2
Pt1: Temporary swamps	3 766	608	16.1	706	18.7
Pt2.2.2: Temporary sedge/grass/forb marsh	30 527	563	1.8	655	2.1
Pst2.2: Temporary salt marsh	8 575	76	0.9	412	4.8
Rp1: Permanent Streams	1 428	297	20.8	406	28.4
Pt1.6.1: Temporary woodland floodplain swamp	179 804	253	0.1	395	0.2
Lp1.1: Permanent lakes	47 669	130	0.3	334	0.7
Pt2.1.1: Temporary tall emergent floodplain marsh	50 687	121	0.2	180	0.4
Pt2.3.1: Floodplain freshwater meadow	11 138	126	1.1	166	1.5
Pst3.2: Salt pans and salt flats	13 186	39	0.3	163	1.2
Rt1.3: Temporary low energy streams	712	9	1.3	163	22.9
Rt1: Temporary Streams	294	70	23.8	99	33.7
Pt4.2: Temporary wetland	130 760	52	<0.1	92	0.1
Pt1.2.2: Intermittent Black box swamp	16 470	54	0.3	88	0.5
Rt1.2: Temporary transitional zone streams	5 957	10	0.2	33	0.6
Pp2.1.2: Permanent tall emergent marshes	134	31	23.1	31	23.1
Rp1.3: Permanent low energy streams	286	25	8.7	26	9.1
Pp2.3.1: Permanent floodplain grass marshes	431	10	2.3	25	5.8
Pp4.2: Permanent wetland	22 388	18	0.1	18	0.1
Pt1.7.1: Intermittent Lignum floodplain swamp	27 356	4	<0.1	11	<0.1
Pp2.3.2: Permanent grass marshes	183	7	3.8	7	3.8
Lst1.1: Temporary saline lakes	12 759	2	<0.1	4	<0.1
Pt1.3.1: Intermittent Coolibah floodplain swamp	5 173	<1	<0.1	3	0.1

Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Inundated*		Influenced*	
		Area (ha)	% of total	Area (ha)	% of total
Pt1.7.2: Intermittent Lignum swamps	17 967	1	<0.1	3	<0.1
Psp2.1: Permanent salt marsh	3	<1	<0.1	2	66.7
Rp1.2: Permanent transitional zone streams	3 652	<1	<0.1	<1	<0.1
Lp1.2: Permanent lakes with aquatic beds	1 197	0	0	0	–
Lp2.2: Permanent floodplain lakes with aquatic beds	1 868	0	0	0	–
Lsp1.2: Permanent saline lakes with aquatic beds	18	0	0	0	–
Lsp2.1: Permanent saline floodplain lakes	13 178	0	0	0	–
Lst1.2: Temporary saline lakes with aquatic beds	1 905	0	0	0	–
Lst2.2: Temporary saline floodplain lakes with aquatic beds	391	0	0	0	–
Lt1.2: Temporary lakes with aquatic beds	804	0	0	0	–
Lt2.2: Temporary floodplain lakes with aquatic beds	2 520	0	0	0	–
Pp1.1.2: Permanent paperbark swamps	1	0	0	0	–
Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	2 275	0	0	0	–
Pp2.2.2: Permanent sedge/grass/forb marshes	2 564	0	0	0	–
Pp2.4.1: Permanent floodplain forb marshes	157	0	0	0	–
Pp2.4.2: Permanent forb marshes	32	0	0	0	–
Pp3: Peat bogs and fen marshes	173	0	0	0	–
Pps5: Permanent springs	130	0	0	0	–
Psp1.1: Saline paperbark swamp	137	0	0	0	–
Psp3.1: Permanent seagrass marshes	16 328	0	0	0	–
Pt1.1.2: Intermittent River red gum swamps	8 480	0	0	0	–
Pt1.3.2: Intermittent Coolibah swamp	1 019	0	0	0	–
Pt1.4.1: Intermittent River Cooba floodplain swamp	3	0	0	0	–
Pt1.4.2: Intermittent River Cooba swamp	104	0	0	0	–
Pt1.5.1: Temporary paperbark floodplain swamp	32	0	0	0	–
Pt1.5.2: Temporary paperbark swamp	89	0	0	0	–
Pt1.6.2: Temporary woodland swamp	44 406	0	0	0	–
Pt2.3.2: Freshwater meadow	14 780	0	0	0	–
Pu1: Unspecified wetland	1 768	0	0	0	–
Rp1.1: Permanent high energy streams	9 662	0	0	0	–
Rt1.1: Temporary high energy streams	13 853	0	0	0	–
Ru1: Unspecified river (landform unknown)	3	0	0	0	–

* Area inundated/influenced by Commonwealth environmental water: see Section 2.1 for definitions.

Table 3. Contribution of Commonwealth environmental water to ecosystem diversity of floodplains at the Basin-scale, sorted by the area inundated.

Australian National Aquatic Ecosystem (ANAE) floodplain type	Total area (ha)	Inundated area (ha)	% of total
F2.2: Lignum shrubland floodplain	200 821	6 155	3.1
F1.2: River red gum forest floodplain	268 820	5 432	2.0
F1.4: River red gum woodland floodplain	225 106	4 438	2.0
F1.10: Coolibah woodland and forest floodplain	1 762 948	559	<0.1
F2.4: Shrubland floodplain	341 713	327	0.1
F1.8: Black box woodland floodplain	242 434	117	<0.1
F1.9: Upland coolibah woodland and forest floodplain	2 765	110	4.0
F1.12: Woodland floodplain	521 659	33	<0.1
F1.7: Upland black box woodland floodplain	1 375	33	2.4
F2.1: Upland lignum shrubland floodplain	482	9	1.9
F2.3: Upland shrubland floodplain	1 500	9	0.6
F1.1: Upland river red gum forest floodplain	767	5	0.7
F3.2: Sedge/forb/grassland floodplain	1 140 832	5	<0.1
F1.3: Upland River red gum woodland floodplain	2 511	4	0.2
F4: Floodplain with unspecified vegetation	433 042	4	<0.1
F1.6: Black box forest floodplain	192 212	3	<0.1
F3.1: Upland sedge/forb/grassland floodplain	2 412	2	0.1
F1.11: River cooba woodland floodplain	150	0	–
F1.5: Upland black box forest floodplain	112	0	–

Table 4. Contribution of Commonwealth environmental water to ecosystem diversity of estuarine areas in the Basin sorted by the area influenced by Commonwealth environmental water.

Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Inundated*		Influenced*	
		Area (ha)	% of total	Area (ha)	% of total
Ewd1.3.2: Coastal lagoon	20 923	20 793	99.4	20 923	100.0
Etd1.3.3: Tide dominated estuary	2 189	2 188	100.0	2 189	100.0
Etd1.2.1: Tide dominated saltmarsh	350	334	95.4	350	100.0
Ewd1.2.3: Intertidal saltmarsh	166	29	17.5	166	100.0
Ewd1.2.4: Intertidal mudflats and sand bars	131	124	94.7	131	100.0
Etd1.2.2: Tide dominated mudflats and sandbars	64	64	100.0	64	100.0
Etd1.2.3: Tide dominated forests	19	19	100.0	19	100.0
Etd1.1.1: Tide dominated rocky shoreline	7	7	100.0	7	100.0

Table 5. Contribution of Commonwealth environmental water to ecosystem diversity within river channels of the Basin sorted by the area influenced by Commonwealth environmental water.

Australian National Aquatic Ecosystem (ANAE) waterway type	Length (km)
Rp1.4: Permanent lowland rivers and streams	14 069
Rt1.4: Temporary lowland rivers and streams	4 082
Rp1.1: Permanent high energy streams	928
Rp1.2: Permanent transitional zone streams	654
Rp1.3: Permanent low energy streams	212
Rt1.1: Temporary high energy streams	160
Rt1.3: Temporary low energy streams	43
Rt1.2: Temporary transitional zone streams	42

3.3 Cumulative Basin-scale evaluation (2014–16)

Commonwealth environmental water contributed to inundation of the Gwydir wetlands, Macquarie Marshes and Lower Murrumbidgee (Lowbidgee) in both 2014–15 and 2015–16 water years. In 2014–15 these three valleys alone comprised 90% of the area inundated, although the real figure would be lower if hydrology to assess inundation of the Coorong and Lower Lakes had been available in 2014–15. In 2015–16 substantial areas along the Murray River between Morgan and the S.A Border, Barmah Forest and the Lachlan River also received Commonwealth environmental water and the Coorong, Lakes Alexandrine and Albert and the Murray Mouth were added.

The comparison presented in Table 6 should be viewed as indicative only as there are some differences in the way inundation extents were mapped in each year to date. The 2014–15 inundation likely over-estimates the extent of Commonwealth environmental water in the Macquarie Marshes, Gwydir wetlands and Lowbidgee due to poor discrimination of Commonwealth environmental water from other water in satellite imagery. Improvements to the data assembly process increased the accuracy and confidence in the inundation mapping in 2015–16 and the comparison can be revisited if those improvements can be applied retrospectively to the 2014–15 data. Estuarine areas were excluded as they were not included in the 2014–15 evaluation.

The evaluation compares the area of each ecosystem type influenced by Commonwealth environmental water (i.e. the whole wetland area if part of the wetland was inundated). Commonwealth environmental water has influenced more than 5% of the area of 21 wetland ecosystem types (=28.8% of the wetland ecosystem types present in the basin) in at least one year of the last two with a further 28 wetland ecosystem types (38.3%) having only small areas inundated that influenced between 0 and 1% of their basin area in at least one year. Twenty four wetland types (=32.9% of the wetland ecosystem types present in the basin) have not had Commonwealth environmental water delivered to them within the two years of LTIM. Some of these areas may be included in areas targeted for watering by or other state-based delivery partners but it is currently beyond the scope of this evaluation to evaluate Commonwealth environmental water in the context of all other environmental water.

Comparing 2015–16 to 2014–15 there was:

- Decreased inundation of intermittent river cooba swamp and permanent floodplain grass marshes in the Macquarie Marshes.
- Increased inundation of intermittent river red gum floodplain swamp in Barmah Forest.
- Increased inundation of permanent saline wetlands, temporary swamps, permanent streams and temporary streams associated with anabranches and connected billabongs between the South Australian border downstream to Morgan an also in the Central Murray associated with the Barmah Forest.
- Decreased inundation of permanent floodplain grass marshes and permanent floodplain wetland associated with the Macquarie Marshes and Mulcra Island (Lower Murray) in 2015–16.
- Decreased inundation of temporary sedge/grass/forb floodplain marsh in 2015–16, because Commonwealth environmental water from the Warrego River was not used to water the Western Floodplain in 2015–16 as was done in 2014–15.
- Increase in the amount of permanent floodplain lakes and temporary tall emergent marsh temporary saline swamp and permanent salt marsh associated with marginal areas of the Lakes Alexandrina and Alberta and Coorong. This is an artefact of these areas not being included in the 2014–15 evaluation.

Table 6. Comparison of the contribution of Commonwealth environmental water to ecosystem diversity of wetlands in the first two years of the LTIM project sorted by the magnitude of the difference between the two years. Ecosystem types with more than 5% of their total Basin area inundated in at least one year are shaded blue. Ecosystem types that have not received Commonwealth environmental water in the two years of LTIM to date are shaded red.

Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	% area influenced 2015–16	% area influenced 2014–16	Difference (%)
Pt1.4.2: Intermittent River Cooba swamp	104	0	97.1	-97.1
Psp2.1: Permanent salt marsh	3	66.7	0	66.7
Lp2.1: Permanent floodplain lakes	137406	61.8	0.5	61.3
Psp4: Permanent saline wetland	3965	56	4	52
Pp2.3.1: Permanent floodplain grass marshes	431	5.8	50.3	-44.5
Pt2.1.2: Temporary tall emergent marsh	18381	40.6	0	40.6
Rt1: Temporary Streams	294	33.7	1.7	32
Rp1: Permanent Streams	1428	28.4	0	28.4
Pt1.1.1: Intermittent River red gum floodplain swamp	63396	43.2	15.8	27.4
Lsp1.1: Permanent saline lakes	8225	25.3	0	25.3
Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	51081	12.7	35.6	-22.9
Rt1.3: Temporary low energy upland streams	712	22.9	0	22.9
Rp1.4: Permanent lowland streams	74534	19.2	5.2	14
Pt1: Temporary swamps	3766	18.7	7.4	11.3
Pst1.1: Temporary saline swamp	17020	12.5	3.2	9.3
Pp2.1.1: Permanent floodplain tall emergent marshes	7809	54.8	45.6	9.2
Lst2.1: Temporary saline floodplain lakes	10636	22	13	9
Pst4: Temporary saline wetland	11912	8.2	0.9	7.3
Pp4.1: Permanent floodplain wetland	42004	51.2	44.4	6.8
Pst2.2: Temporary salt marsh	8575	4.8	0	4.8
Pt4.1: Temporary floodplain wetland	122885	5.8	1.3	4.5
Pt3.1.2: Clay pans	51074	6.4	4.1	2.3
Pp2.4.1: Permanent floodplain forb marshes	157	1.9	0	1.9
Pt1.7.2: Intermittent Lignum swamps	17967	<0.1	1.8	-1.8
Pt2.2.2: Temporary sedge/grass/forb marsh	30527	2.1	0.3	1.8
Pt2.3.1: Floodplain freshwater meadow	11138	1.5	2.9	-1.4
Pt3.1.1: Floodplain clay pans	49329	4.6	3.2	1.4
Pst3.2: Salt pans and salt flats	13186	1.2	0	1.2
Lt2.1: Temporary floodplain lakes	198459	1.3	0.3	1
Pt1.1.2: Intermittent River red gum swamps	8480	0.1	1.1	-1
Pt1.3.2: Intermittent Coolibah swamp	1019	0	0.9	-0.9
Pt1.7.1: Intermittent Lignum floodplain swamp	27356	<0.1	0.7	-0.7
Rp1.3: Permanent low energy upland streams	286	9.1	8.4	0.7
Rt1.2: Temporary transitional zone streams	5957	0.6	0	0.6
Pt1.2.2: Intermittent Black box swamp	16470	0.5	<0.1	0.5
Lp1.1: Permanent lakes	47669	0.7	0.3	0.4
Pt2.1.1: Temporary tall emergent floodplain marsh	50687	0.4	0.1	0.3
Pt1.2.1: Intermittent Black box floodplain swamp	33916	3.8	3.5	0.3
Pp2.2.2: Permanent sedge/grass/forb marshes	2564	0	0.2	-0.2
Pt1.6.1: Temporary woodland floodplain swamp	179804	0.2	<0.1	0.2
Lt1.1: Temporary lakes	306351	0.7	0.5	0.2
Pp4.2: Permanent wetland	22388	0.1	0.2	-0.1
Pt4.2: Temporary wetland	130760	0.1	0	0.1
Lst1.1: Temporary saline lakes	12759	<0.1	<0.1	0
Pp2.1.2: Permanent tall emergent marshes	134	23.1	23.1	0
Pp2.3.2: Permanent grass marshes	183	3.8	3.8	0

Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	% area influenced 2015–16	% area influenced 2014–16	Difference (%)
Pt1.3.1: Intermittent Coolibah floodplain swamp	5173	0.1	0.1	0
Pt1.6.2: Temporary woodland swamp	44406	0	<0.1	0
Rt1.4: Temporary lowland streams	223362	0.9	0.9	0
Lp1.2: Permanent lakes with aquatic beds	1197	0	0	0
Lp2.2: Permanent floodplain lakes with aquatic beds	1868	0	0	0
Lsp1.2: Permanent saline lakes with aquatic beds	18	0	0	0
Lsp2.1: Permanent saline floodplain lakes	13178	0	0	0
Lst1.2: Temporary saline lakes with aquatic beds	1905	0	0	0
Lst2.2: Temporary saline floodplain lakes with aquatic beds	391	0	0	0
Lt1.2: Temporary lakes with aquatic beds	804	0	0	0
Lt2.2: Temporary floodplain lakes with aquatic beds	2520	0	0	0
Pp1.1.2: Permanent paperbark swamps	1	0	0	0
Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	2275	0	0	0
Pp2.4.2: Permanent forb marshes	32	0	0	0
Pp3: Peat bogs and fen marshes	173	0	0	0
Pps5: Permanent springs	130	0	0	0
Psp1.1: Saline paperbark swamp	137	0	0	0
Psp3.1: Permanent seagrass marshes	16328	0	0	0
Pt1.4.1: Intermittent River Cooba floodplain swamp	3	0	0	0
Pt1.5.1: Temporary paperbark floodplain swamp	32	0	0	0
Pt1.5.2: Temporary paperbark swamp	89	0	0	0
Pt2.3.2: Freshwater meadow	14780	0	0	0
Pu1: Unspecified wetland	1768	0	0	0
Rp1.1: Permanent high energy upland streams	9662	0	0	0
Rp1.2: Permanent transitional zone streams	3652	0	0	0
Rt1.1: Temporary high energy upland streams	13853	0	0	0
Ru1: Unspecified river (landform unknown)	3	0	0	0

3.4 Adaptive management

There are a number of avenues by which the Ecosystem Diversity evaluation can foster improvements in Commonwealth environmental water management and evaluation. Namely:

1) Improving confidence in the evaluation of the contribution of Commonwealth environmental water to Ecosystem Diversity within LTIM. This second year evaluation is already benefiting from greatly improved knowledge and mapping of the spatial extent of Commonwealth environmental water in the Basin. The anticipated improvements to the Basin ANAE mapping and classification will further improve the accuracy and comparability for determining the ecosystem types, particularly in areas of NSW that are a focus for Commonwealth environmental water delivery (e.g. the Lowbidgee, Macquarie Marshes, Gwydir wetlands and Central Murray Forests).

2) Improving understanding of the landscape context at monitoring sites to inform extrapolation of observed outcomes to unmonitored sites. Understanding how biotic and functional responses vary among ecosystem types that are monitored within Selected Areas will permit extrapolation of Selected Area and Basin matter outcomes to watering events in the same ecosystem types located in other areas of the Basin.

3) Developing watering objectives and expected outcomes for different ecosystem types. Understanding how key ecosystem types influence Basin biodiversity, resilience, ecosystem function and ecosystem services paves the way towards delivering Commonwealth environmental water for ecosystem objectives that move beyond counting ecosystem watering targets. For example, shaping flow regimes to preserve patterns of spatio-temporal variability along a river, or delivering water at critical times to maintain life forms or processes *because* they characterise ecosystem types that are to be preserved or improved. Managing to prevent or promote ecosystem turnover to new types may require long-term management frameworks with institutional memory and conviction to stay the course over decadal time scales. The Commonwealth currently does not have 1-year or 5-year expected outcomes for ecosystem diversity but it is hoped that within the LTIM project we can develop thinking towards an appropriate approach to develop draft ecosystem objectives. Current planning that links ecosystem types to water availability scenarios, e.g. directing water to maintain permanent water systems in dry years, and augmenting over-bank flows to the floodplain in wet years may be a good starting point that is already implicitly considering ecosystem diversity, albeit often without explicit ecosystem objectives.

4) Reducing the risks of implementing inappropriate watering regimes. Too much water, too frequently or consistently missing particular ecosystems types are all scenarios that are potentially deleterious to Basin biodiversity. Improving understanding of watering requirements at the ecosystem level should complement and enhance existing understanding that often focuses on the requirement s of focal species or communities. Through LTIM, we are assembling a library of basin wide watering frequencies from Commonwealth environmental water. Ecosystems types (and locations) that are consistently not watered, or watered with too much regularity, can then be identified and an informed assessment of risks can then take place to determine if there is a need and capability to adjust management planning to ensure Basin Plan objectives are met.

4 Contribution to achievement of Basin Plan objectives

The Ecosystem Diversity component of the Basin evaluation contributes to the Basin Plan objective for Biodiversity under Section 8.05 of the Basin Plan and contributes indirectly to additional Basin Plan objectives by informing the evaluation of the Vegetation and Generic Diversity matters within the LTIM project (Capon and Campbell 2016, 2017, Hale 2016, 2017).

As for the previous year, the Commonwealth does not yet have 1-year or 5-year expected outcomes for ecosystem diversity (Table 7) and water is not currently delivered with direct understanding of the contribution of Commonwealth environmental watering to ecosystem diversity at the Basin-scale. However, this evaluation provides a foundation from which expected outcomes for ecosystem diversity may be developed in the future. Improvements to the Basin ANAE mapping and classification that are currently under way will alter the view of the contribution of Commonwealth environmental water to ecosystem diversity in the coming year. Once complete, the new classification will be retrospectively applied to LTIM project inundation data to provide for consistent multi-year comparison to facilitate the development of appropriate, achievable 1–5-year expected outcomes for ecosystem diversity.

Table 7. Commonwealth Environmental Outcomes framework for ecosystem diversity.

Basin Plan objectives	Basin outcomes	5–year expected outcomes	1–year expected outcomes
Biodiversity (Basin Plan S. 8.05)	Ecosystem diversity	None identified	None identified

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Annex A. Updating the Basin ANAE classification

Confidence in the accuracy of mapping and the Basin ANAE classification was examined in the previous LTIM ecosystem diversity evaluation (Brooks 2016a) and in the development of the classification (Brooks et al. 2014). Confidence in the mapping and classification varies throughout the Basin with the highest confidence in Queensland and Victoria, and the lowest confidence in New South Wales (NSW) (Brooks et al. 2014) (Figure A1). In South Australia ANAE ecosystem types were manually ascribed to wetlands and riverine reaches along full length of the Murray River to improve confidence and alignment of the classification to ecosystem types used by SA wetland managers above that produced by the ANAE classification methodology. Some additional limitations of the ANAE classification in South Australia that influence the findings in this report are noted in Miles and Eckert (2013) and include farms dams classified as natural wetland ecosystems, temporary wetlands to the south east of the south lagoon of the Coorong being classified as permanent, and wetland boundaries adjacent to the Lake Alexandrina that encompass multiple ecosystem types. These errors are mainly associated with wetland types around Lake Alexandrina and the Coorong (Miles *pers. comm.* 2017) but similar examples can be found in all states in areas where fundamental hydrological data and vegetation mapping are limited.

There was generally good agreement between the ecosystem types identified by the Basin ANAE classification when ground-truthed at sampling sites by LTIM Selected Area teams (Brooks 2016a). Most discrepancies were related to inaccuracies in the mapping of wetland boundaries rather than fundamental disagreement with the ANAE classification itself. The poorest representation of ecosystem types by the ANAE classification was in the Lachlan river system, Gwydir river system and Junction of the Warrego and Darling rivers Selected Areas (Brooks 2016a).

A significant update of the Basin ANAE classification is currently underway and scheduled to be completed mid-2017. The update is incorporating new data sets to increase confidence in the ANAE classification throughout the Basin with significant advances to the wetland and vegetation mapping in NSW in particular that will improve cross-jurisdictional consistency at the Basin-scale (Brooks 2016b). There will be significant changes to the number and extent of wetlands in areas of NSW that have been a recent focus for Commonwealth environmental water delivery in 2014-15 and again in 2015-16, namely: the Central Murray forests, the Macquarie Marshes, Lachlan River and to a lesser extent the Lowbidgee. This evaluation of the 2015-16 contribution of Commonwealth environmental water to ecosystem diversity in the Basin and that of last year (2014-15) are therefore interim assessments that will be updated in 2018 using the revised ANAE classification.

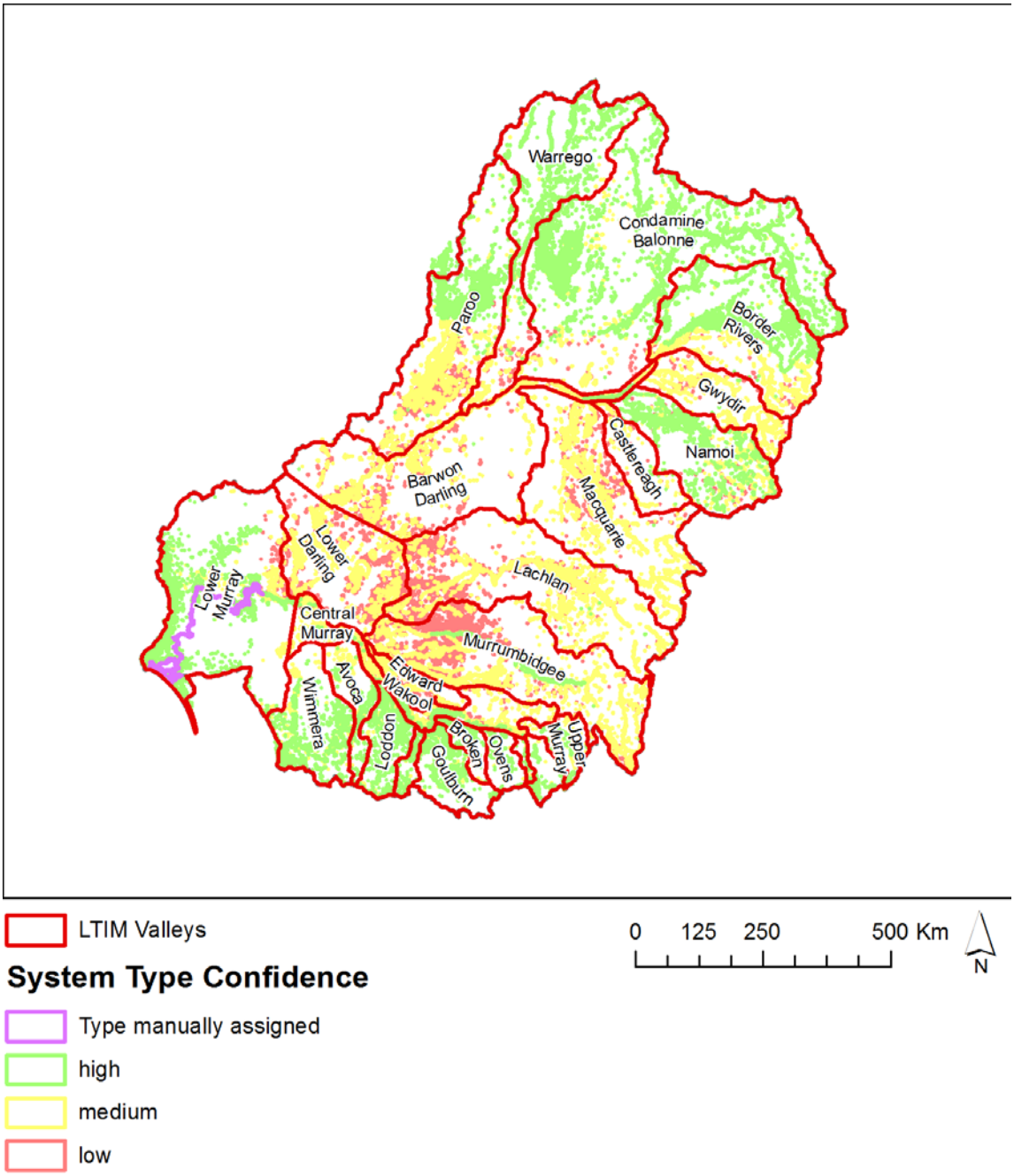

Figure A1. The Basin ANAE classification confidence in the System Type attribute for wetland feature mapping (Brooks *et al.* 2014).

Annex B. ANAE wetland types influenced by Commonwealth environmental water by valley

Wetland types influenced by Commonwealth environmental water are represented by the entire wetland when any portion of the wetland was recorded as having been inundated. The contribution of Commonwealth environmental water to supporting wetland ecosystem diversity within each valley is presented below in Table B1.

Table B1. Area of each wetland ecosystem type and the contribution of Commonwealth environmental water to supporting wetland ecosystem diversity within each valley, sorted by the area influenced with inundation highlighted in blue (includes riverine areas that are within the inundated areas but excludes in-channel flows presented in Annex D).

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Avoca	Psp3.1: Permanent seagrass marshes	15 547	0	–
Avoca	Pst3.2: Salt pans and salt flats	7 060	0	–
Avoca	Pt3.1.1: Floodplain clay pans	6 956	0	–
Avoca	Pst1.1: Temporary saline swamp	6 106	0	–
Avoca	Lst1.1: Temporary saline lakes	4 595	0	–
Avoca	Lt1.1: Temporary lakes	4 501	0	–
Avoca	Pp2.2.2: Permanent sedge/grass/forb marshes	1 704	0	–
Avoca	Lst1.2: Temporary saline lakes with aquatic beds	1 646	0	–
Avoca	Pt3.1.2: Clay pans	1 047	0	–
Avoca	Pt1.6.1: Temporary woodland floodplain swamp	793	0	–
Avoca	Lst2.1: Temporary saline floodplain lakes	568	0	–
Avoca	Lt2.1: Temporary floodplain lakes	341	0	–
Avoca	Pst2.2: Temporary salt marsh	330	0	–
Avoca	Pst4: Temporary saline wetland	245	0	–
Avoca	Psp4: Permanent saline wetland	225	0	–
Avoca	Pt4.2: Temporary wetland	223	0	–
Avoca	Pt1.6.2: Temporary woodland swamp	153	0	–
Avoca	Pt1.1.2: Intermittent River red gum swamps	93	0	–
Avoca	Lp1.1: Permanent lakes	82	0	–
Avoca	Pt2.3.1: Floodplain freshwater meadow	68	0	–
Avoca	Pt1.1.1: Intermittent River red gum floodplain swamp	52	0	–
Avoca	Pt4.1: Temporary floodplain wetland	50	0	–
Avoca	Lp2.1: Permanent floodplain lakes	11	0	–
Avoca	Pt2.3.2: Freshwater meadow	9	0	–
Avoca	Pp4.2: Permanent wetland	7	0	–
Barwon Darling	Lt1.1: Temporary lakes	31 568	0	–
Barwon Darling	Lt2.1: Temporary floodplain lakes	28 294	0	–
Barwon Darling	Lp2.1: Permanent floodplain lakes	26 734	0	–
Barwon Darling	Pt1.6.2: Temporary woodland swamp	12 894	0	–
Barwon Darling	Pt4.2: Temporary wetland	9 644	0	–
Barwon Darling	Rp1.4: Permanent lowland rivers and streams	6 554	0	–
Barwon Darling	Pt1.6.1: Temporary woodland floodplain swamp	3 383	0	–
Barwon Darling	Pt1.2.1: Intermittent Black box floodplain swamp	2 249	0	–
Barwon Darling	Pt4.1: Temporary floodplain wetland	1 973	0	–
Barwon Darling	Lp1.1: Permanent lakes	1 795	0	–
Barwon Darling	Rt1.4: Temporary lowland rivers and streams	1 607	0	–
Barwon Darling	Pp4.1: Permanent floodplain wetland	992	0	–
Barwon Darling	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	747	0	–
Barwon Darling	Pt1.2.2: Intermittent Black box swamp	714	0	–
Barwon Darling	Pp4.2: Permanent wetland	669	0	–
Barwon Darling	Pt2.2.2: Temporary sedge/grass/forb marsh	450	0	–
Barwon Darling	Pt1.1.1: Intermittent River red gum floodplain swamp	429	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Barwon Darling	Pt3.1.1: Floodplain clay pans	132	0	–
Barwon Darling	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	71	0	–
Barwon Darling	Pt1.3.1: Intermittent Coolibah floodplain swamp	60	0	–
Barwon Darling	Pt3.1.2: Clay pans	48	0	–
Barwon Darling	Pt1.1.2: Intermittent River red gum swamps	11	0	–
Barwon Darling	Rt1.1: Temporary high energy streams	7	0	–
Barwon Darling	Rp1.2: Permanent transitional zone streams	5	0	–
Barwon Darling	Pt1.3.2: Intermittent Coolibah swamp	3	0	–
Barwon Darling	Pps5: Permanent springs	<1	0	–
Barwon Darling	Ru1: Unspecified river (landform unknown)	<1	0	–
Border Rivers	Rt1.4: Temporary lowland rivers and streams	26 917	0	–
Border Rivers	Rt1.1: Temporary high energy streams	7 949	0	–
Border Rivers	Rp1.4: Permanent lowland rivers and streams	6 356	0	–
Border Rivers	Pt4.1: Temporary floodplain wetland	3 178	0	–
Border Rivers	Rt1.2: Temporary transitional zone streams	2 335	0	–
Border Rivers	Pt1.6.2: Temporary woodland swamp	1 072	0	–
Border Rivers	Pt1.6.1: Temporary woodland floodplain swamp	1 026	0	–
Border Rivers	Rp1.1: Permanent high energy streams	1 000	0	–
Border Rivers	Lp1.1: Permanent lakes	773	0	–
Border Rivers	Lp2.1: Permanent floodplain lakes	626	0	–
Border Rivers	Pt1.1.1: Intermittent River red gum floodplain swamp	607	0	–
Border Rivers	Rp1.2: Permanent transitional zone streams	575	0	–
Border Rivers	Pp4.1: Permanent floodplain wetland	551	0	–
Border Rivers	Lt2.1: Temporary floodplain lakes	518	0	–
Border Rivers	Pt2.3.1: Floodplain freshwater meadow	361	0	–
Border Rivers	Pt2.3.2: Freshwater meadow	326	0	–
Border Rivers	Pt1.3.1: Intermittent Coolibah floodplain swamp	323	0	–
Border Rivers	Pt4.2: Temporary wetland	317	0	–
Border Rivers	Lt1.1: Temporary lakes	303	0	–
Border Rivers	Lp2.2: Permanent floodplain lakes with aquatic beds	255	0	–
Border Rivers	Pp4.2: Permanent wetland	116	0	–
Border Rivers	Pt2.1.2: Temporary tall emergent marsh	96	0	–
Border Rivers	Pt3.1.1: Floodplain clay pans	93	0	–
Border Rivers	Rt1.3: Temporary low energy streams	78	0	–
Border Rivers	Pt3.1.2: Clay pans	76	0	–
Border Rivers	Lt2.2: Temporary floodplain lakes with aquatic beds	45	0	–
Border Rivers	Pp2.3.1: Permanent floodplain grass marshes	26	0	–
Border Rivers	Pt1.2.2: Intermittent Black box swamp	9	0	–
Border Rivers	Rp1.3: Permanent low energy streams	9	0	–
Border Rivers	Pt1.1.2: Intermittent River red gum swamps	9	0	–
Border Rivers	Pp2.2.2: Permanent sedge/grass/forb marshes	5	0	–
Border Rivers	Pt1.2.1: Intermittent Black box floodplain swamp	4	0	–
Border Rivers	Ru1: Unspecified river (landform unknown)	2	0	–
Border Rivers	Pt2.2.2: Temporary sedge/grass/forb marsh	1	0	–
Border Rivers	Pt1.3.2: Intermittent Coolibah swamp	1	0	–
Border Rivers	Pps5: Permanent springs	<1	0	–
Broken	Pt3.1.2: Clay pans	1 604	0	–
Broken	Pt1.1.1: Intermittent River red gum floodplain swamp	1 200	0	–
Broken	Pt3.1.1: Floodplain clay pans	832	0	–
Broken	Pt1.1.2: Intermittent River red gum swamps	579	0	–
Broken	Pt1.6.1: Temporary woodland floodplain swamp	294	0	–
Broken	Pt2.3.1: Floodplain freshwater meadow	203	0	–
Broken	Pst4: Temporary saline wetland	185	0	–
Broken	Lt1.1: Temporary lakes	171	0	–
Broken	Pt1.6.2: Temporary woodland swamp	160	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Broken	Pt1.2.2: Intermittent Black box swamp	104	0	–
Broken	Pt2.1.1: Temporary tall emergent floodplain marsh	79	0	–
Broken	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	77	0	–
Broken	Lt2.1: Temporary floodplain lakes	70	0	–
Broken	Pt2.3.2: Freshwater meadow	68	0	–
Broken	Pst3.2: Salt pans and salt flats	60	0	–
Broken	Pt2.1.2: Temporary tall emergent marsh	60	0	–
Broken	Lp1.1: Permanent lakes	46	0	–
Broken	Lp2.1: Permanent floodplain lakes	16	0	–
Broken	Pst1.1: Temporary saline swamp	16	0	–
Broken	Pp4.2: Permanent wetland	3	0	–
Broken	Pt1.2.1: Intermittent Black box floodplain swamp	2	0	–
Broken	Pp4.1: Permanent floodplain wetland	1	0	–
Broken	Pps5: Permanent springs	<1	0	–
Campaspe	Pt3.1.2: Clay pans	1 705	0	–
Campaspe	Pt1.1.2: Intermittent River red gum swamps	388	0	–
Campaspe	Pt1.6.2: Temporary woodland swamp	143	0	–
Campaspe	Lt1.1: Temporary lakes	85	0	–
Campaspe	Pt2.1.2: Temporary tall emergent marsh	38	0	–
Campaspe	Pt2.3.2: Freshwater meadow	33	0	–
Campaspe	Lp1.1: Permanent lakes	22	0	–
Campaspe	Pp2.4.2: Permanent forb marshes	3	0	–
Campaspe	Pps5: Permanent springs	1	0	–
Castlereagh	Rt1.4: Temporary lowland rivers and streams	557	0	–
Castlereagh	Rp1.4: Permanent lowland rivers and streams	488	0	–
Castlereagh	Lt1.1: Temporary lakes	279	0	–
Castlereagh	Lt2.1: Temporary floodplain lakes	177	0	–
Castlereagh	Pt4.2: Temporary wetland	51	0	–
Castlereagh	Pt1.6.2: Temporary woodland swamp	35	0	–
Castlereagh	Rp1.2: Permanent transitional zone streams	32	0	–
Castlereagh	Pt3.1.2: Clay pans	30	0	–
Castlereagh	Pt1.2.2: Intermittent Black box swamp	25	0	–
Castlereagh	Rp1.3: Permanent low energy streams	17	0	–
Castlereagh	Pp4.2: Permanent wetland	16	0	–
Castlereagh	Pt2.1.1: Temporary tall emergent floodplain marsh	13	0	–
Castlereagh	Rt1.2: Temporary transitional zone streams	12	0	–
Castlereagh	Rp1.1: Permanent high energy streams	11	0	–
Castlereagh	Lp1.1: Permanent lakes	5	0	–
Castlereagh	Pt1.1.2: Intermittent River red gum swamps	1	0	–
Castlereagh	Rt1.1: Temporary high energy streams	1	0	–
Castlereagh	Pt2.2.2: Temporary sedge/grass/forb marsh	1	0	–
Castlereagh	Pt1.2.1: Intermittent Black box floodplain swamp	1	0	–
Castlereagh	Pps5: Permanent springs	1	0	–
Central Murray	Pt1.1.1: Intermittent River red gum floodplain swamp	36 559	22 047	60.3
Central Murray	Pp4.1: Permanent floodplain wetland	7 331	2 401	32.8
Central Murray	Lt2.1: Temporary floodplain lakes	4 684	1 852	39.5
Central Murray	Lst2.1: Temporary saline floodplain lakes	1 630	1 513	92.8
Central Murray	Rp1.4: Permanent lowland rivers and streams	12 011	1 080	9.0
Central Murray	Lt1.1: Temporary lakes	13 767	1 053	7.6
Central Murray	Psp4: Permanent saline wetland	1 008	916	90.9
Central Murray	Rt1.4: Temporary lowland rivers and streams	10 267	716	7.0
Central Murray	Pp2.1.1: Permanent floodplain tall emergent marshes	969	710	73.3
Central Murray	Lp2.1: Permanent floodplain lakes	1 744	395	22.6
Central Murray	Pt1.6.1: Temporary woodland floodplain swamp	918	393	42.8
Central Murray	Pst1.1: Temporary saline swamp	1 102	267	24.2
Central Murray	Pst4: Temporary saline wetland	1 252	237	18.9

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Central Murray	Pt1.2.1: Intermittent Black box floodplain swamp	3 049	236	7.7
Central Murray	Rt1.3: Temporary low energy streams	249	163	65.5
Central Murray	Pt2.3.1: Floodplain freshwater meadow	526	84	16.0
Central Murray	Pt4.1: Temporary floodplain wetland	807	63	7.8
Central Murray	Pt3.1.2: Clay pans	3 641	35	1.0
Central Murray	Pt3.1.1: Floodplain clay pans	6 608	32	0.5
Central Murray	Rt1.2: Temporary transitional zone streams	60	27	45.0
Central Murray	Lp1.1: Permanent lakes	1 542	19	1.2
Central Murray	Pt1.1.2: Intermittent River red gum swamps	717	5	0.7
Central Murray	Lst1.1: Temporary saline lakes	1 797	4	0.2
Central Murray	Pp2.4.1: Permanent floodplain forb marshes	132	3	2.3
Central Murray	Pp2.3.1: Permanent floodplain grass marshes	41	2	4.9
Central Murray	Rp1.3: Permanent low energy streams	19	2	10.5
Central Murray	Pp4.2: Permanent wetland	3 199	0	–
Central Murray	Pt1.7.2: Intermittent Lignum swamps	1 373	0	–
Central Murray	Pt1.7.1: Intermittent Lignum floodplain swamp	1 018	0	–
Central Murray	Pt1.6.2: Temporary woodland swamp	561	0	–
Central Murray	Pt2.1.1: Temporary tall emergent floodplain marsh	436	0	–
Central Murray	Pt4.2: Temporary wetland	418	0	–
Central Murray	Pt2.3.2: Freshwater meadow	403	0	–
Central Murray	Pt1.2.2: Intermittent Black box swamp	401	0	–
Central Murray	Pst3.2: Salt pans and salt flats	361	0	–
Central Murray	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	247	0	–
Central Murray	Pt2.2.2: Temporary sedge/grass/forb marsh	232	0	–
Central Murray	Lsp2.1: Permanent saline floodplain lakes	188	0	–
Central Murray	Rp1.1: Permanent high energy streams	104	0	–
Central Murray	Pp2.2.2: Permanent sedge/grass/forb marshes	89	0	–
Central Murray	Rp1.2: Permanent transitional zone streams	75	0	–
Central Murray	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	68	0	–
Central Murray	Pt2.1.2: Temporary tall emergent marsh	52	0	–
Central Murray	Rt1.1: Temporary high energy streams	51	0	–
Central Murray	Lsp1.1: Permanent saline lakes	46	0	–
Central Murray	Pp2.1.2: Permanent tall emergent marshes	42	0	–
Central Murray	Lt2.2: Temporary floodplain lakes with aquatic beds	18	0	–
Central Murray	Pp2.3.2: Permanent grass marshes	1	0	–
Condamine Balonne	Rt1.4: Temporary lowland rivers and streams	83 638	0	–
Condamine Balonne	Pt2.1.1: Temporary tall emergent floodplain marsh	35 572	0	–
Condamine Balonne	Pt4.1: Temporary floodplain wetland	30 720	0	–
Condamine Balonne	Pt1.7.1: Intermittent Lignum floodplain swamp	11 797	0	–
Condamine Balonne	Lt1.1: Temporary lakes	10 712	0	–
Condamine Balonne	Lt2.1: Temporary floodplain lakes	8 606	0	–
Condamine Balonne	Pt1.6.1: Temporary woodland floodplain swamp	6 462	0	–
Condamine Balonne	Pt1.2.1: Intermittent Black box floodplain swamp	4 683	0	–
Condamine Balonne	Pt4.2: Temporary wetland	4 428	0	–
Condamine Balonne	Rt1.1: Temporary high energy streams	4 120	0	–
Condamine Balonne	Pt2.1.2: Temporary tall emergent marsh	4 108	0	–
Condamine Balonne	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	2 923	0	–
Condamine Balonne	Pt1.6.2: Temporary woodland swamp	2 550	0	–
Condamine Balonne	Pp2.1.1: Permanent floodplain tall emergent marshes	2 550	0	–
Condamine Balonne	Pp4.1: Permanent floodplain wetland	2 361	0	–
Condamine Balonne	Pt3.1.1: Floodplain clay pans	2 349	0	–
Condamine Balonne	Rt1.2: Temporary transitional zone streams	1 996	0	–
Condamine Balonne	Rp1.4: Permanent lowland rivers and streams	1 902	0	–
Condamine Balonne	Lt2.2: Temporary floodplain lakes with aquatic beds	1 726	0	–
Condamine Balonne	Lp2.2: Permanent floodplain lakes with aquatic beds	1 452	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
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Condamine Balonne	Lst2.1: Temporary saline floodplain lakes	1 322	0	–
Condamine Balonne	Pp4.2: Permanent wetland	1 285	0	–
Condamine Balonne	Lp1.1: Permanent lakes	1 234	0	–
Condamine Balonne	Lp2.1: Permanent floodplain lakes	876	0	–
Condamine Balonne	Pt1.1.2: Intermittent River red gum swamps	528	0	–
Condamine Balonne	Pt1.1.1: Intermittent River red gum floodplain swamp	503	0	–
Condamine Balonne	Pt1.3.1: Intermittent Coolibah floodplain swamp	363	0	–
Condamine Balonne	Lp1.2: Permanent lakes with aquatic beds	363	0	–
Condamine Balonne	Lst1.1: Temporary saline lakes	303	0	–
Condamine Balonne	Pt1.3.2: Intermittent Coolibah swamp	268	0	–
Condamine Balonne	Pt2.2.2: Temporary sedge/grass/forb marsh	242	0	–
Condamine Balonne	Pt2.3.1: Floodplain freshwater meadow	192	0	–
Condamine Balonne	Rt1.3: Temporary low energy streams	145	0	–
Condamine Balonne	Pt2.3.2: Freshwater meadow	100	0	–
Condamine Balonne	Rp1.2: Permanent transitional zone streams	65	0	–
Condamine Balonne	Rp1.1: Permanent high energy streams	54	0	–
Condamine Balonne	Pt3.1.2: Clay pans	45	0	–
Condamine Balonne	Pp2.1.2: Permanent tall emergent marshes	41	0	–
Condamine Balonne	Pp2.3.1: Permanent floodplain grass marshes	25	0	–
Condamine Balonne	Rp1.3: Permanent low energy streams	21	0	–
Condamine Balonne	Pt1.7.2: Intermittent Lignum swamps	7	0	–
Condamine Balonne	Pt1.5.2: Temporary paperbark swamp	6	0	–
Condamine Balonne	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	6	0	–
Condamine Balonne	Pps5: Permanent springs	6	0	–
Condamine Balonne	Lsp1.1: Permanent saline lakes	3	0	–
Condamine Balonne	Pp2.2.2: Permanent sedge/grass/forb marshes	1	0	–
Condamine Balonne	Pt1.2.2: Intermittent Black box swamp	1	0	–
Condamine Balonne	Ru1: Unspecified river (landform unknown)	<1	0	–
Edward Wakool	Rt1.4: Temporary lowland rivers and streams	6 878	0	–
Edward Wakool	Rp1.4: Permanent lowland rivers and streams	3 040	0	–
Edward Wakool	Pt3.1.1: Floodplain clay pans	2 399	0	–
Edward Wakool	Pt3.1.2: Clay pans	1 217	0	–
Edward Wakool	Pt1.1.1: Intermittent River red gum floodplain swamp	1 114	0	–
Edward Wakool	Pt1.2.1: Intermittent Black box floodplain swamp	1 101	0	–
Edward Wakool	Lt1.1: Temporary lakes	764	0	–
Edward Wakool	Pp4.1: Permanent floodplain wetland	678	0	–
Edward Wakool	Pt1.2.2: Intermittent Black box swamp	555	0	–
Edward Wakool	Pt2.2.2: Temporary sedge/grass/forb marsh	264	0	–
Edward Wakool	Pt1.6.1: Temporary woodland floodplain swamp	218	0	–
Edward Wakool	Pt1.6.2: Temporary woodland swamp	212	0	–
Edward Wakool	Lt2.1: Temporary floodplain lakes	208	0	–
Edward Wakool	Pt1.1.2: Intermittent River red gum swamps	194	0	–
Edward Wakool	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	193	0	–
Edward Wakool	Pt4.2: Temporary wetland	172	0	–
Edward Wakool	Pt4.1: Temporary floodplain wetland	114	0	–
Edward Wakool	Pp4.2: Permanent wetland	98	0	–
Edward Wakool	Pt1.7.1: Intermittent Lignum floodplain swamp	85	0	–
Edward Wakool	Pt1.7.2: Intermittent Lignum swamps	78	0	–
Edward Wakool	Pt2.3.2: Freshwater meadow	76	0	–
Edward Wakool	Pt2.3.1: Floodplain freshwater meadow	68	0	–
Edward Wakool	Pt2.1.1: Temporary tall emergent floodplain marsh	43	0	–
Edward Wakool	Lp1.1: Permanent lakes	37	0	–
Edward Wakool	Pp2.3.1: Permanent floodplain grass marshes	7	0	–
Edward Wakool	Pp2.3.2: Permanent grass marshes	6	0	–
Edward Wakool	Psp4: Permanent saline wetland	6	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Edward Wakool	Pst1.1: Temporary saline swamp	5	0	–
Edward Wakool	Lp2.1: Permanent floodplain lakes	4	0	–
Edward Wakool	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	4	0	–
Edward Wakool	Pp2.2.2: Permanent sedge/grass/forb marshes	3	0	–
Edward Wakool	Rt1.3: Temporary low energy streams	2	0	–
Goulburn	Pt3.1.2: Clay pans	4 179	0	–
Goulburn	Pt3.1.1: Floodplain clay pans	3 886	0	–
Goulburn	Pt1.1.1: Intermittent River red gum floodplain swamp	3 715	0	–
Goulburn	Pt1.1.2: Intermittent River red gum swamps	1 297	0	–
Goulburn	Lsp2.1: Permanent saline floodplain lakes	1 272	0	–
Goulburn	Lt1.1: Temporary lakes	1 042	0	–
Goulburn	Pst4: Temporary saline wetland	968	0	–
Goulburn	Lp1.1: Permanent lakes	945	0	–
Goulburn	Lt2.1: Temporary floodplain lakes	799	0	–
Goulburn	Pt1.6.2: Temporary woodland swamp	701	0	–
Goulburn	Lt1.2: Temporary lakes with aquatic beds	579	0	–
Goulburn	Pt2.1.1: Temporary tall emergent floodplain marsh	496	0	–
Goulburn	Pt2.3.1: Floodplain freshwater meadow	366	0	–
Goulburn	Pt2.1.2: Temporary tall emergent marsh	215	0	–
Goulburn	Lp2.1: Permanent floodplain lakes	184	0	–
Goulburn	Lt2.2: Temporary floodplain lakes with aquatic beds	165	0	–
Goulburn	Pt1.6.1: Temporary woodland floodplain swamp	155	0	–
Goulburn	Pt2.2.2: Temporary sedge/grass/forb marsh	153	0	–
Goulburn	Pt2.3.2: Freshwater meadow	117	0	–
Goulburn	Pt1.2.2: Intermittent Black box swamp	117	0	–
Goulburn	Pp4.2: Permanent wetland	91	0	–
Goulburn	Lst2.1: Temporary saline floodplain lakes	67	0	–
Goulburn	Pt4.2: Temporary wetland	50	0	–
Goulburn	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	31	0	–
Goulburn	Pp2.1.1: Permanent floodplain tall emergent marshes	29	0	–
Goulburn	Pst3.2: Salt pans and salt flats	16	0	–
Goulburn	Pp2.1.2: Permanent tall emergent marshes	8	0	–
Goulburn	Pt1.2.1: Intermittent Black box floodplain swamp	6	0	–
Goulburn	Rt1.2: Temporary transitional zone streams	6	0	–
Goulburn	Rt1.1: Temporary high energy streams	2	0	–
Goulburn	Pp4.1: Permanent floodplain wetland	1	0	–
Goulburn	Pps5: Permanent springs	<1	0	–
Gwydir	Rp1.4: Permanent lowland rivers and streams	1 434	577	40.2
Gwydir	Rt1.4: Temporary lowland rivers and streams	632	188	29.7
Gwydir	Pt2.1.1: Temporary tall emergent floodplain marsh	42	42	100.0
Gwydir	Rp1.3: Permanent low energy streams	19	19	100.0
Gwydir	Lt2.1: Temporary floodplain lakes	108	15	13.9
Gwydir	Pt1.3.1: Intermittent Coolibah floodplain swamp	12	3	25.0
Gwydir	Pt1.6.1: Temporary woodland floodplain swamp	10	2	20.0
Gwydir	Pt1.1.1: Intermittent River red gum floodplain swamp	3	1	33.3
Gwydir	Rp1.2: Permanent transitional zone streams	853	0	–
Gwydir	Rp1.1: Permanent high energy streams	636	0	–
Gwydir	Lt1.1: Temporary lakes	609	0	–
Gwydir	Pt4.2: Temporary wetland	445	0	–
Gwydir	Pp4.2: Permanent wetland	224	0	–
Gwydir	Pt3.1.2: Clay pans	180	0	–
Gwydir	Pt1.6.2: Temporary woodland swamp	157	0	–
Gwydir	Lp1.1: Permanent lakes	51	0	–
Gwydir	Pt1.3.2: Intermittent Coolibah swamp	28	0	–
Gwydir	Pt2.2.2: Temporary sedge/grass/forb marsh	13	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Gwydir	Pp4.1: Permanent floodplain wetland	10	0	–
Gwydir	Pt3.1.1: Floodplain clay pans	10	0	–
Gwydir	Pp2.2.2: Permanent sedge/grass/forb marshes	8	0	–
Gwydir	Pt1.4.2: Intermittent River Cooba swamp	4	0	–
Gwydir	Pt1.1.2: Intermittent River red gum swamps	3	0	–
Gwydir	Pp1.1.2: Permanent paperbark swamps	1	0	–
Gwydir	Rt1.3: Temporary low energy streams	1	0	–
Gwydir	Pt4.1: Temporary floodplain wetland	1	0	–
Gwydir	Rt1.2: Temporary transitional zone streams	1	0	–
Gwydir	Pps5: Permanent springs	<1	0	–
Kiewa	Pt4.2: Temporary wetland	553	0	–
Kiewa	Pt3.1.2: Clay pans	261	0	–
Kiewa	Pt2.2.2: Temporary sedge/grass/forb marsh	185	0	–
Kiewa	Lp1.1: Permanent lakes	44	0	–
Kiewa	Pt1.6.2: Temporary woodland swamp	42	0	–
Kiewa	Pt1.1.2: Intermittent River red gum swamps	14	0	–
Kiewa	Lt1.1: Temporary lakes	8	0	–
Kiewa	Rp1.1: Permanent high energy streams	2	0	–
Kiewa	Pp4.2: Permanent wetland	2	0	–
Kiewa	Pp2.1.2: Permanent tall emergent marshes	1	0	–
Kiewa	Pps5: Permanent springs	<1	0	–
Lachlan	Pp2.1.1: Permanent floodplain tall emergent marshes	3 440	3 440	100.0
Lachlan	Lt2.1: Temporary floodplain lakes	21 190	667	3.1
Lachlan	Pt1.1.1: Intermittent River red gum floodplain swamp	1 615	547	33.9
Lachlan	Lp2.1: Permanent floodplain lakes	702	534	76.1
Lachlan	Rp1.4: Permanent lowland rivers and streams	6 019	472	7.8
Lachlan	Pt1.2.1: Intermittent Black box floodplain swamp	7 299	279	3.8
Lachlan	Lp1.1: Permanent lakes	5 441	178	3.3
Lachlan	Pt4.1: Temporary floodplain wetland	8 716	121	1.4
Lachlan	Pt2.1.1: Temporary tall emergent floodplain marsh	115	100	87.0
Lachlan	Pt1.2.2: Intermittent Black box swamp	7 610	88	1.2
Lachlan	Pt4.2: Temporary wetland	13 276	48	0.4
Lachlan	Pp4.1: Permanent floodplain wetland	652	39	6.0
Lachlan	Pt2.1.2: Temporary tall emergent marsh	14	14	100.0
Lachlan	Pt3.1.2: Clay pans	2 106	13	0.6
Lachlan	Pp2.1.2: Permanent tall emergent marshes	9	9	100.0
Lachlan	Rt1.4: Temporary lowland rivers and streams	9 804	3	<0.1
Lachlan	Pt1.7.2: Intermittent Lignum swamps	15 791	0	–
Lachlan	Lt1.1: Temporary lakes	12 854	0	–
Lachlan	Pt3.1.1: Floodplain clay pans	12 818	0	–
Lachlan	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	7 093	0	–
Lachlan	Pt1.7.1: Intermittent Lignum floodplain swamp	6 428	0	–
Lachlan	Pt2.3.1: Floodplain freshwater meadow	2 959	0	–
Lachlan	Pt2.3.2: Freshwater meadow	2 259	0	–
Lachlan	Pt1.6.2: Temporary woodland swamp	2 219	0	–
Lachlan	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	1 719	0	–
Lachlan	Pt2.2.2: Temporary sedge/grass/forb marsh	1 097	0	–
Lachlan	Pt1.6.1: Temporary woodland floodplain swamp	1 089	0	–
Lachlan	Rp1.1: Permanent high energy streams	1 021	0	–
Lachlan	Pt1.1.2: Intermittent River red gum swamps	583	0	–
Lachlan	Pp4.2: Permanent wetland	338	0	–
Lachlan	Rt1.3: Temporary low energy streams	196	0	–
Lachlan	Rp1.2: Permanent transitional zone streams	191	0	–
Lachlan	Pp2.2.2: Permanent sedge/grass/forb marshes	100	0	–
Lachlan	Rt1.2: Temporary transitional zone streams	70	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Lachlan	Rp1.3: Permanent low energy streams	62	0	–
Lachlan	Pp2.3.2: Permanent grass marshes	21	0	–
Lachlan	Pps5: Permanent springs	7	0	–
Loddon	Pst1.1: Temporary saline swamp	5 949	0	–
Loddon	Pst3.2: Salt pans and salt flats	4 546	0	–
Loddon	Pt3.1.2: Clay pans	4 334	0	–
Loddon	Lp1.1: Permanent lakes	3 894	0	–
Loddon	Pst4: Temporary saline wetland	3 786	0	–
Loddon	Lsp1.1: Permanent saline lakes	3 206	0	–
Loddon	Lst1.1: Temporary saline lakes	2 044	0	–
Loddon	Lt1.1: Temporary lakes	1 887	0	–
Loddon	Pt2.3.1: Floodplain freshwater meadow	1 632	0	–
Loddon	Pt2.3.2: Freshwater meadow	1 162	0	–
Loddon	Pt1.6.2: Temporary woodland swamp	922	0	–
Loddon	Pt3.1.1: Floodplain clay pans	903	0	–
Loddon	Lt2.1: Temporary floodplain lakes	892	0	–
Loddon	Pt2.2.2: Temporary sedge/grass/forb marsh	728	0	–
Loddon	Lst2.1: Temporary saline floodplain lakes	329	0	–
Loddon	Pt1.1.2: Intermittent River red gum swamps	288	0	–
Loddon	Pt1.6.1: Temporary woodland floodplain swamp	275	0	–
Loddon	Pt1.1.1: Intermittent River red gum floodplain swamp	261	0	–
Loddon	Lst1.2: Temporary saline lakes with aquatic beds	181	0	–
Loddon	Rt1.4: Temporary lowland rivers and streams	131	0	–
Loddon	Pt4.2: Temporary wetland	112	0	–
Loddon	Pt1.7.2: Intermittent Lignum swamps	67	0	–
Loddon	Pt1.2.2: Intermittent Black box swamp	65	0	–
Loddon	Pt2.1.1: Temporary tall emergent floodplain marsh	54	0	–
Loddon	Lt2.2: Temporary floodplain lakes with aquatic beds	52	0	–
Loddon	Lp2.1: Permanent floodplain lakes	49	0	–
Loddon	Pt4.1: Temporary floodplain wetland	40	0	–
Loddon	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	35	0	–
Loddon	Rp1.4: Permanent lowland rivers and streams	18	0	–
Loddon	Lp1.2: Permanent lakes with aquatic beds	17	0	–
Loddon	Lt1.2: Temporary lakes with aquatic beds	9	0	–
Loddon	Pp2.4.2: Permanent forb marshes	9	0	–
Loddon	Pp4.2: Permanent wetland	8	0	–
Loddon	Pp2.2.2: Permanent sedge/grass/forb marshes	7	0	–
Loddon	Pps5: Permanent springs	4	0	–
Lower Darling	Lt1.1: Temporary lakes	122 402	0	–
Lower Darling	Pt4.2: Temporary wetland	69 056	0	–
Lower Darling	Lt2.1: Temporary floodplain lakes	64 936	0	–
Lower Darling	Pt4.1: Temporary floodplain wetland	34 578	0	–
Lower Darling	Lp2.1: Permanent floodplain lakes	9 389	0	–
Lower Darling	Pt2.3.2: Freshwater meadow	7 130	0	–
Lower Darling	Pt1.6.2: Temporary woodland swamp	4 311	0	–
Lower Darling	Rp1.4: Permanent lowland rivers and streams	2 841	0	–
Lower Darling	Pt3.1.2: Clay pans	1 380	0	–
Lower Darling	Rt1.4: Temporary lowland rivers and streams	1 180	0	–
Lower Darling	Pt1.2.2: Intermittent Black box swamp	1 145	0	–
Lower Darling	Pp4.2: Permanent wetland	1 099	0	–
Lower Darling	Pt1.2.1: Intermittent Black box floodplain swamp	809	0	–
Lower Darling	Pt1.1.1: Intermittent River red gum floodplain swamp	803	0	–
Lower Darling	Pt2.2.2: Temporary sedge/grass/forb marsh	598	0	–
Lower Darling	Lst1.1: Temporary saline lakes	509	0	–
Lower Darling	Pt2.3.1: Floodplain freshwater meadow	314	0	–
Lower Darling	Lp1.1: Permanent lakes	296	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Lower Darling	Pt1.6.1: Temporary woodland floodplain swamp	107	0	–
Lower Darling	Pp4.1: Permanent floodplain wetland	96	0	–
Lower Darling	Pt1.1.2: Intermittent River red gum swamps	76	0	–
Lower Darling	Pt3.1.1: Floodplain clay pans	75	0	–
Lower Darling	Pp2.3.2: Permanent grass marshes	26	0	–
Lower Darling	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	15	0	–
Lower Darling	Rp1.1: Permanent high energy streams	8	0	–
Lower Darling	Rp1.2: Permanent transitional zone streams	2	0	–
Lower Murray	Lp2.1: Permanent floodplain lakes	93 064	83 401	89.6
Lower Murray	Ewd1.3.2: Coastal lagoon	20 923	20 923	100.0
Lower Murray	Pt2.1.2: Temporary tall emergent marsh	7 463	7 456	99.9
Lower Murray	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	6 468	6 422	99.3
Lower Murray	Pt4.1: Temporary floodplain wetland	5 753	4 287	74.5
Lower Murray	Etd1.3.3: Tide dominated estuary	2 189	2 189	100.0
Lower Murray	Lsp1.1: Permanent saline lakes	2 674	2 079	77.7
Lower Murray	Pst1.1: Temporary saline swamp	2 276	1 851	81.3
Lower Murray	Rp1.4: Permanent lowland rivers and streams	13 297	1 621	12.2
Lower Murray	Psp4: Permanent saline wetland	1 995	1 305	65.4
Lower Murray	Pp4.1: Permanent floodplain wetland	4 085	910	22.3
Lower Murray	Pt3.1.1: Floodplain clay pans	2 080	879	42.3
Lower Murray	Lst2.1: Temporary saline floodplain lakes	825	825	100.0
Lower Murray	Pst4: Temporary saline wetland	1 285	736	57.3
Lower Murray	Pt1: Temporary swamps	3 766	706	18.7
Lower Murray	Pt2.2.2: Temporary sedge/grass/forb marsh	1 162	655	56.4
Lower Murray	Pst2.2: Temporary salt marsh	427	412	96.5
Lower Murray	Rp1: Permanent Streams	1 428	406	28.4
Lower Murray	Rt1.4: Temporary lowland rivers and streams	1 045	377	36.1
Lower Murray	Etd1.2.1: Tide dominated saltmarsh	350	350	100.0
Lower Murray	Ewd1.2.3: Intertidal saltmarsh	166	166	100.0
Lower Murray	Pst3.2: Salt pans and salt flats	719	163	22.7
Lower Murray	Ewd1.2.4: Intertidal mudflats and sand bars	131	131	100.0
Lower Murray	Rt1: Temporary Streams	294	99	33.7
Lower Murray	Etd1.2.2: Tide dominated mudflats and sandbars	64	64	100.0
Lower Murray	Pt2.3.1: Floodplain freshwater meadow	971	50	5.1
Lower Murray	Pt4.2: Temporary wetland	2 269	44	1.9
Lower Murray	Pt2.1.1: Temporary tall emergent floodplain marsh	49	38	77.6
Lower Murray	Pt1.2.1: Intermittent Black box floodplain swamp	363	34	9.4
Lower Murray	Lt1.1: Temporary lakes	21 091	25	0.1
Lower Murray	Pt1.1.1: Intermittent River red gum floodplain swamp	431	22	5.1
Lower Murray	Pp2.3.1: Permanent floodplain grass marshes	89	22	24.7
Lower Murray	Lp1.1: Permanent lakes	11 082	20	0.2
Lower Murray	Etd1.2.3: Tide dominated forests	19	19	100.0
Lower Murray	Pt3.1.2: Clay pans	4 940	16	0.3
Lower Murray	Pt1.7.1: Intermittent Lignum floodplain swamp	2 474	11	0.4
Lower Murray	Pp2.1.1: Permanent floodplain tall emergent marshes	9	9	100.0
Lower Murray	Rt1.2: Temporary transitional zone streams	14	7	50.0
Lower Murray	Etd1.1.1: Tide dominated rocky shoreline	7	7	100.0
Lower Murray	Lt2.1: Temporary floodplain lakes	9 111	5	0.1
Lower Murray	Pp4.2: Permanent wetland	104	3	2.9
Lower Murray	Pt1.7.2: Intermittent Lignum swamps	13	3	23.1
Lower Murray	Psp2.1: Permanent salt marsh	3	2	66.7
Lower Murray	Pu1: Unspecified wetland	1 768	0	–
Lower Murray	Lst1.1: Temporary saline lakes	1 526	0	–
Lower Murray	Pt1.6.2: Temporary woodland swamp	829	0	–
Lower Murray	Psp1.1: Saline paperbark swamp	132	0	–
Lower Murray	Rp1.2: Permanent transitional zone streams	99	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
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Lower Murray	Pt1.5.2: Temporary paperbark swamp	83	0	–
Lower Murray	Pt1.1.2: Intermittent River red gum swamps	77	0	–
Lower Murray	Pt1.6.1: Temporary woodland floodplain swamp	77	0	–
Lower Murray	Pp2.2.2: Permanent sedge/grass/forb marshes	45	0	–
Lower Murray	Rp1.1: Permanent high energy streams	40	0	–
Lower Murray	Pt1.5.1: Temporary paperbark floodplain swamp	32	0	–
Lower Murray	Pt1.2.2: Intermittent Black box swamp	27	0	–
Lower Murray	Pp2.4.1: Permanent floodplain forb marshes	23	0	–
Lower Murray	Rp1.3: Permanent low energy streams	15	0	–
Lower Murray	Rt1.1: Temporary high energy streams	10	0	–
Lower Murray	Pt2.3.2: Freshwater meadow	9	0	–
Lower Murray	Rt1.3: Temporary low energy streams	3	0	–
Lower Murray	Pps5: Permanent springs	2	0	–
Macquarie	Pp4.1: Permanent floodplain wetland	18 093	17 404	96.2
Macquarie	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	816	88	10.8
Macquarie	Pt3.1.2: Clay pans	1 528	45	2.9
Macquarie	Rp1.4: Permanent lowland rivers and streams	7 058	44	0.6
Macquarie	Pt2.3.1: Floodplain freshwater meadow	52	32	61.5
Macquarie	Pp2.1.2: Permanent tall emergent marshes	22	22	100.0
Macquarie	Pp4.2: Permanent wetland	595	16	2.7
Macquarie	Pt3.1.1: Floodplain clay pans	580	10	1.7
Macquarie	Pp2.3.2: Permanent grass marshes	7	7	100.0
Macquarie	Lt1.1: Temporary lakes	8 290	0	–
Macquarie	Pt1.1.1: Intermittent River red gum floodplain swamp	5 316	0	–
Macquarie	Rt1.4: Temporary lowland rivers and streams	2 935	0	–
Macquarie	Pt1.6.2: Temporary woodland swamp	2 031	0	–
Macquarie	Rp1.1: Permanent high energy streams	1 817	0	–
Macquarie	Pt2.2.2: Temporary sedge/grass/forb marsh	1 711	0	–
Macquarie	Pt1.2.1: Intermittent Black box floodplain swamp	1 635	0	–
Macquarie	Pt1.3.1: Intermittent Coolibah floodplain swamp	1 434	0	–
Macquarie	Pt4.1: Temporary floodplain wetland	1 114	0	–
Macquarie	Lt2.1: Temporary floodplain lakes	968	0	–
Macquarie	Lp1.1: Permanent lakes	720	0	–
Macquarie	Rp1.2: Permanent transitional zone streams	458	0	–
Macquarie	Pt1.6.1: Temporary woodland floodplain swamp	437	0	–
Macquarie	Pt4.2: Temporary wetland	378	0	–
Macquarie	Pt1.1.2: Intermittent River red gum swamps	349	0	–
Macquarie	Pt1.2.2: Intermittent Black box swamp	263	0	–
Macquarie	Pp2.3.1: Permanent floodplain grass marshes	208	0	–
Macquarie	Pt1.4.2: Intermittent River Cooba swamp	101	0	–
Macquarie	Lp2.1: Permanent floodplain lakes	49	0	–
Macquarie	Pp2.2.2: Permanent sedge/grass/forb marshes	18	0	–
Macquarie	Pps5: Permanent springs	15	0	–
Macquarie	Rp1.3: Permanent low energy streams	4	0	–
Macquarie	Pt1.4.1: Intermittent River Cooba floodplain swamp	3	0	–
Macquarie	Rt1.3: Temporary low energy streams	1	0	–
Macquarie	Rt1.1: Temporary high energy streams	<1	0	–
Macquarie	Ru1: Unspecified river (landform unknown)	<1	0	–
Mitta Mitta	Rp1.1: Permanent high energy streams	1 451	0	–
Mitta Mitta	Pt4.2: Temporary wetland	790	0	–
Mitta Mitta	Pt1.6.2: Temporary woodland swamp	635	0	–
Mitta Mitta	Pst4: Temporary saline wetland	622	0	–
Mitta Mitta	Pt2.2.2: Temporary sedge/grass/forb marsh	361	0	–
Mitta Mitta	Pp4.2: Permanent wetland	282	0	–
Mitta Mitta	Pt3.1.2: Clay pans	253	0	–
Mitta Mitta	Lt1.1: Temporary lakes	198	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
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Mitta Mitta	Lp1.1: Permanent lakes	33	0	–
Mitta Mitta	Rp1.4: Permanent lowland rivers and streams	10	0	–
Mitta Mitta	Pp2.2.2: Permanent sedge/grass/forb marshes	1	0	–
Murrumbidgee	Pt1.1.1: Intermittent River red gum floodplain swamp	7 518	4 740	63.0
Murrumbidgee	Pt3.1.2: Clay pans	10 579	3 155	29.8
Murrumbidgee	Pt4.1: Temporary floodplain wetland	8 269	2 595	31.4
Murrumbidgee	Pt3.1.1: Floodplain clay pans	7 319	1 346	18.4
Murrumbidgee	Lt1.1: Temporary lakes	28 901	1 004	3.5
Murrumbidgee	Rp1.4: Permanent lowland rivers and streams	10 569	793	7.5
Murrumbidgee	Pp4.1: Permanent floodplain wetland	2 747	770	28.0
Murrumbidgee	Pt1.2.1: Intermittent Black box floodplain swamp	3 841	750	19.5
Murrumbidgee	Rt1.4: Temporary lowland rivers and streams	13 576	641	4.7
Murrumbidgee	Lp2.1: Permanent floodplain lakes	787	634	80.6
Murrumbidgee	Lp1.1: Permanent lakes	493	117	23.7
Murrumbidgee	Pp2.1.1: Permanent floodplain tall emergent marshes	134	117	87.3
Murrumbidgee	Lt2.1: Temporary floodplain lakes	1 744	58	3.3
Murrumbidgee	Rp1.3: Permanent low energy streams	108	5	4.6
Murrumbidgee	Pt2.2.2: Temporary sedge/grass/forb marsh	20 786	0	–
Murrumbidgee	Pt4.2: Temporary wetland	14 859	0	–
Murrumbidgee	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	4 975	0	–
Murrumbidgee	Pp4.2: Permanent wetland	4 037	0	–
Murrumbidgee	Pt1.2.2: Intermittent Black box swamp	3 777	0	–
Murrumbidgee	Rp1.1: Permanent high energy streams	2 480	0	–
Murrumbidgee	Pt2.3.2: Freshwater meadow	2 012	0	–
Murrumbidgee	Pt2.3.1: Floodplain freshwater meadow	1 265	0	–
Murrumbidgee	Pt1.7.1: Intermittent Lignum floodplain swamp	1 244	0	–
Murrumbidgee	Pt1.6.2: Temporary woodland swamp	832	0	–
Murrumbidgee	Rp1.2: Permanent transitional zone streams	713	0	–
Murrumbidgee	Pt1.6.1: Temporary woodland floodplain swamp	408	0	–
Murrumbidgee	Pp2.2.2: Permanent sedge/grass/forb marshes	302	0	–
Murrumbidgee	Pt1.7.2: Intermittent Lignum swamps	220	0	–
Murrumbidgee	Pp3: Peat bogs and fen marshes	173	0	–
Murrumbidgee	Pt1.1.2: Intermittent River red gum swamps	167	0	–
Murrumbidgee	Pt2.1.1: Temporary tall emergent floodplain marsh	154	0	–
Murrumbidgee	Pp2.3.2: Permanent grass marshes	122	0	–
Murrumbidgee	Pp2.3.1: Permanent floodplain grass marshes	36	0	–
Murrumbidgee	Pps5: Permanent springs	19	0	–
Murrumbidgee	Pt2.1.2: Temporary tall emergent marsh	8	0	–
Murrumbidgee	Rt1.1: Temporary high energy streams	6	0	–
Murrumbidgee	Rt1.2: Temporary transitional zone streams	5	0	–
Murrumbidgee	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	1	0	–
Murrumbidgee	Ru1: Unspecified river (landform unknown)	<1	0	–
Namoi	Pp4.2: Permanent wetland	9 314	0	–
Namoi	Pt3.1.2: Clay pans	5 181	0	–
Namoi	Lp1.1: Permanent lakes	4 208	0	–
Namoi	Pt4.2: Temporary wetland	3 454	0	–
Namoi	Lt1.1: Temporary lakes	3 398	0	–
Namoi	Pt1.6.2: Temporary woodland swamp	3 202	0	–
Namoi	Rp1.4: Permanent lowland rivers and streams	2 121	0	–
Namoi	Pp4.1: Permanent floodplain wetland	1 648	0	–
Namoi	Pt1.2.2: Intermittent Black box swamp	1 161	0	–
Namoi	Rt1.4: Temporary lowland rivers and streams	889	0	–
Namoi	Pt1.1.1: Intermittent River red gum floodplain swamp	850	0	–
Namoi	Rp1.1: Permanent high energy streams	788	0	–
Namoi	Pt1.1.2: Intermittent River red gum swamps	773	0	–

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Namoi	Pt2.2.2: Temporary sedge/grass/forb marsh	610	0	–
Namoi	Pt1.3.2: Intermittent Coolibah swamp	602	0	–
Namoi	Pt1.2.1: Intermittent Black box floodplain swamp	541	0	–
Namoi	Rp1.2: Permanent transitional zone streams	478	0	–
Namoi	Pp2.2.2: Permanent sedge/grass/forb marshes	273	0	–
Namoi	Pt1.6.1: Temporary woodland floodplain swamp	239	0	–
Namoi	Pt3.1.1: Floodplain clay pans	234	0	–
Namoi	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	42	0	–
Namoi	Pt1.7.2: Intermittent Lignum swamps	16	0	–
Namoi	Pt4.1: Temporary floodplain wetland	14	0	–
Namoi	Rp1.3: Permanent low energy streams	11	0	–
Namoi	Rt1.2: Temporary transitional zone streams	7	0	–
Namoi	Rt1.3: Temporary low energy streams	3	0	–
Namoi	Rt1.1: Temporary high energy streams	2	0	–
Namoi	Pps5: Permanent springs	1	0	–
Namoi	Ru1: Unspecified river (landform unknown)	<1	0	–
Ovens	Pt3.1.2: Clay pans	1 026	0	–
Ovens	Pt3.1.1: Floodplain clay pans	594	0	–
Ovens	Pt2.3.1: Floodplain freshwater meadow	510	0	–
Ovens	Pt2.3.2: Freshwater meadow	422	0	–
Ovens	Pt1.1.1: Intermittent River red gum floodplain swamp	368	0	–
Ovens	Pt1.6.2: Temporary woodland swamp	365	0	–
Ovens	Pt1.6.1: Temporary woodland floodplain swamp	309	0	–
Ovens	Lt2.1: Temporary floodplain lakes	162	0	–
Ovens	Lp2.1: Permanent floodplain lakes	150	0	–
Ovens	Pt4.1: Temporary floodplain wetland	106	0	–
Ovens	Pt4.2: Temporary wetland	88	0	–
Ovens	Pt1.1.2: Intermittent River red gum swamps	83	0	–
Ovens	Pt2.2.2: Temporary sedge/grass/forb marsh	64	0	–
Ovens	Lt1.1: Temporary lakes	62	0	–
Ovens	Lp1.1: Permanent lakes	42	0	–
Ovens	Pp2.1.1: Permanent floodplain tall emergent marshes	23	0	–
Ovens	Pp4.1: Permanent floodplain wetland	22	0	–
Ovens	Lt2.2: Temporary floodplain lakes with aquatic beds	15	0	–
Ovens	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	6	0	–
Ovens	Pp4.2: Permanent wetland	4	0	–
Ovens	Pp2.2.2: Permanent sedge/grass/forb marshes	3	0	–
Ovens	Pt2.1.1: Temporary tall emergent floodplain marsh	3	0	–
Ovens	Pt2.1.2: Temporary tall emergent marsh	2	0	–
Ovens	Pps5: Permanent springs	<1	0	–
Paroo	Pt1.6.1: Temporary woodland floodplain swamp	159 323	0	–
Paroo	Lt2.1: Temporary floodplain lakes	49 587	0	–
Paroo	Pt4.1: Temporary floodplain wetland	25 305	0	–
Paroo	Lt1.1: Temporary lakes	11 877	0	–
Paroo	Lsp2.1: Permanent saline floodplain lakes	11 718	0	–
Paroo	Pt2.1.1: Temporary tall emergent floodplain marsh	10 433	0	–
Paroo	Rt1.4: Temporary lowland rivers and streams	9 883	0	–
Paroo	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	8 259	0	–
Paroo	Pt1.2.1: Intermittent Black box floodplain swamp	8 117	0	–
Paroo	Lp1.1: Permanent lakes	8 030	0	–
Paroo	Pt1.6.2: Temporary woodland swamp	6 977	0	–
Paroo	Pt4.2: Temporary wetland	6 518	0	–
Paroo	Pt1.7.1: Intermittent Lignum floodplain swamp	3 428	0	–
Paroo	Pt2.1.2: Temporary tall emergent marsh	2 608	0	–
Paroo	Pst2.2: Temporary salt marsh	2 511	0	–
Paroo	Lp2.1: Permanent floodplain lakes	2 439	0	–

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Paroo	Pt1.3.1: Intermittent Coolibah floodplain swamp	1 888	0	–
Paroo	Pt2.2.2: Temporary sedge/grass/forb marsh	1 661	0	–
Paroo	Pp2.1.1: Permanent floodplain tall emergent marshes	654	0	–
Paroo	Pt1.2.2: Intermittent Black box swamp	466	0	–
Paroo	Pp4.2: Permanent wetland	461	0	–
Paroo	Pp2.2.1: Permanent floodplain sedge/grass/forb marshes	407	0	–
Paroo	Lst1.1: Temporary saline lakes	357	0	–
Paroo	Rt1.1: Temporary high energy streams	311	0	–
Paroo	Rt1.2: Temporary transitional zone streams	257	0	–
Paroo	Pp4.1: Permanent floodplain wetland	194	0	–
Paroo	Rp1.4: Permanent lowland rivers and streams	174	0	–
Paroo	Pt2.3.1: Floodplain freshwater meadow	81	0	–
Paroo	Pt1.1.2: Intermittent River red gum swamps	68	0	–
Paroo	Pst4: Temporary saline wetland	62	0	–
Paroo	Pt1.3.2: Intermittent Coolibah swamp	44	0	–
Paroo	Pt1.1.1: Intermittent River red gum floodplain swamp	38	0	–
Paroo	Pt3.1.2: Clay pans	31	0	–
Paroo	Pt2.3.2: Freshwater meadow	25	0	–
Paroo	Lst2.1: Temporary saline floodplain lakes	18	0	–
Paroo	Lsp1.1: Permanent saline lakes	16	0	–
Paroo	Pp2.1.2: Permanent tall emergent marshes	11	0	–
Paroo	Pps5: Permanent springs	9	0	–
Upper Murray	Pt3.1.2: Clay pans	847	0	–
Upper Murray	Rt1.4: Temporary lowland rivers and streams	495	0	–
Upper Murray	Rt1.1: Temporary high energy streams	366	0	–
Upper Murray	Lt1.1: Temporary lakes	289	0	–
Upper Murray	Pp4.2: Permanent wetland	273	0	–
Upper Murray	Pt1.1.2: Intermittent River red gum swamps	253	0	–
Upper Murray	Pt1.6.2: Temporary woodland swamp	251	0	–
Upper Murray	Rp1.1: Permanent high energy streams	250	0	–
Upper Murray	Rt1.2: Temporary transitional zone streams	208	0	–
Upper Murray	Pt3.1.1: Floodplain clay pans	177	0	–
Upper Murray	Pt2.2.2: Temporary sedge/grass/forb marsh	129	0	–
Upper Murray	Lp1.1: Permanent lakes	101	0	–
Upper Murray	Rp1.2: Permanent transitional zone streams	83	0	–
Upper Murray	Pt4.2: Temporary wetland	67	0	–
Upper Murray	Pps5: Permanent springs	63	0	–
Upper Murray	Rp1.4: Permanent lowland rivers and streams	51	0	–
Upper Murray	Lp2.1: Permanent floodplain lakes	7	0	–
Upper Murray	Rp1.3: Permanent low energy streams	2	0	–
Upper Murray	Pp3: Peat bogs and fen marshes	<1	0	–
Upper Murray	Rt1.3: Temporary low energy streams	<1	0	–
Warrego	Rt1.4: Temporary lowland rivers and streams	52 538	0	–
Warrego	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	19 148	0	–
Warrego	Pt1.6.1: Temporary woodland floodplain swamp	3 575	0	–
Warrego	Pt2.1.1: Temporary tall emergent floodplain marsh	3 141	0	–
Warrego	Lp1.1: Permanent lakes	2 916	0	–
Warrego	Pp4.1: Permanent floodplain wetland	2 460	0	–
Warrego	Pt4.2: Temporary wetland	2 125	0	–
Warrego	Lt2.1: Temporary floodplain lakes	2 073	0	–
Warrego	Pt4.1: Temporary floodplain wetland	2 068	0	–
Warrego	Pt2.1.2: Temporary tall emergent marsh	1 567	0	–
Warrego	Pt1.3.1: Intermittent Coolibah floodplain swamp	1 092	0	–
Warrego	Rt1.1: Temporary high energy streams	1 017	0	–
Warrego	Rt1.2: Temporary transitional zone streams	984	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Warrego	Lt1.1: Temporary lakes	913	0	–
Warrego	Pt1.6.2: Temporary woodland swamp	820	0	–
Warrego	Pt3.1.1: Floodplain clay pans	708	0	–
Warrego	Rp1.4: Permanent lowland rivers and streams	586	0	–
Warrego	Lp2.1: Permanent floodplain lakes	416	0	–
Warrego	Pt1.3.2: Intermittent Coolibah swamp	73	0	–
Warrego	Rt1.3: Temporary low energy streams	34	0	–
Warrego	Rp1.2: Permanent transitional zone streams	23	0	–
Warrego	Pp4.2: Permanent wetland	18	0	–
Warrego	Pt1.1.1: Intermittent River red gum floodplain swamp	9	0	–
Warrego	Pt1.1.2: Intermittent River red gum swamps	2	0	–
Warrego	Pps5: Permanent springs	2	0	–
Warrego	Pst1.1: Temporary saline swamp	2	0	–
Warrego	Pt2.2.2: Temporary sedge/grass/forb marsh	1	0	–
Warrego	Ru1: Unspecified river (landform unknown)	1	0	–
Wimmera	Lt1.1: Temporary lakes	26 884	0	–
Wimmera	Lst2.1: Temporary saline floodplain lakes	5 877	0	–
Wimmera	Pt3.1.2: Clay pans	4 811	0	–
Wimmera	Lt2.1: Temporary floodplain lakes	3 951	0	–
Wimmera	Pst4: Temporary saline wetland	2 922	0	–
Wimmera	Pt1.6.2: Temporary woodland swamp	2 198	0	–
Wimmera	Pt1.1.1: Intermittent River red gum floodplain swamp	1 999	0	–
Wimmera	Pt1.1.2: Intermittent River red gum swamps	1 927	0	–
Wimmera	Pt2.3.1: Floodplain freshwater meadow	1 571	0	–
Wimmera	Pst1.1: Temporary saline swamp	1 563	0	–
Wimmera	Lst1.1: Temporary saline lakes	1 505	0	–
Wimmera	Lp1.2: Permanent lakes with aquatic beds	817	0	–
Wimmera	Psp3.1: Permanent seagrass marshes	780	0	–
Wimmera	Psp4: Permanent saline wetland	732	0	–
Wimmera	Pt1.6.1: Temporary woodland floodplain swamp	694	0	–
Wimmera	Pt2.3.2: Freshwater meadow	619	0	–
Wimmera	Pt3.1.1: Floodplain clay pans	577	0	–
Wimmera	Pt4.2: Temporary wetland	500	0	–
Wimmera	Lt2.2: Temporary floodplain lakes with aquatic beds	498	0	–
Wimmera	Pst2.2: Temporary salt marsh	435	0	–
Wimmera	Pst3.2: Salt pans and salt flats	423	0	–
Wimmera	Lst2.2: Temporary saline floodplain lakes with aquatic beds	391	0	–
Wimmera	Lp1.1: Permanent lakes	276	0	–
Wimmera	Pt1.2.1: Intermittent Black box floodplain swamp	218	0	–
Wimmera	Lt1.2: Temporary lakes with aquatic beds	216	0	–
Wimmera	Lp2.2: Permanent floodplain lakes with aquatic beds	161	0	–
Wimmera	Lp2.1: Permanent floodplain lakes	158	0	–
Wimmera	Pp4.2: Permanent wetland	97	0	–
Wimmera	Lst1.2: Temporary saline lakes with aquatic beds	77	0	–
Wimmera	Pt2.2.2: Temporary sedge/grass/forb marsh	70	0	–
Wimmera	Pp4.1: Permanent floodplain wetland	69	0	–
Wimmera	Pt2.1.2: Temporary tall emergent marsh	64	0	–
Wimmera	Pt2.1.1: Temporary tall emergent floodplain marsh	55	0	–
Wimmera	Pt1.7.1: Intermittent Lignum floodplain swamp	47	0	–
Wimmera	Pt1.2.2: Intermittent Black box swamp	31	0	–
Wimmera	Pp2.4.2: Permanent forb marshes	21	0	–
Wimmera	Lsp1.1: Permanent saline lakes	20	0	–
Wimmera	Lsp1.2: Permanent saline lakes with aquatic beds	18	0	–
Wimmera	Pt4.1: Temporary floodplain wetland	8	0	–
Wimmera	Pt2.2.1: Temporary sedge/grass/forb floodplain marsh	6	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) wetland type	Total area (ha)	Influenced by Commonwealth environmental water	
			Area (ha)	% of total
Wimmera	Psp1.1: Saline paperbark swamp	5	0	–
Wimmera	Pp2.4.1: Permanent floodplain forb marshes	3	0	–

Annex C. ANAE floodplain types inundated by Commonwealth environmental water by valley

For floodplains, the area inundated by out-of-channel delivery of Commonwealth environmental water is presented in Table C1.

Table C1. Area of each floodplain ecosystem type and the contribution of Commonwealth environmental water to supporting floodplain ecosystem diversity within each valley, sorted by the area inundated with inundation highlighted in blue.

Valley name	Australian National Aquatic Ecosystem (ANAE) floodplain type	Total area (ha)	Inundated by Commonwealth environmental water	
			Area (ha)	% of total
Avoca	F4: Floodplain with unspecified vegetation	6 896	0	–
Avoca	F1.8: Black box woodland floodplain	3 947	0	–
Avoca	F1.12: Woodland floodplain	2 571	0	–
Avoca	F1.6: Black box forest floodplain	1 625	0	–
Avoca	F2.4: Shrubland floodplain	130	0	–
Avoca	F3.1: Upland sedge/forb/grassland floodplain	38	0	–
Avoca	F2.2: Lignum shrubland floodplain	22	0	–
Avoca	F3.2: Sedge/forb/grassland floodplain	6	0	–
Avoca	F2.3: Upland shrubland floodplain	5	0	–
Barwon Darling	F3.2: Sedge/forb/grassland floodplain	240 395	0	–
Barwon Darling	F1.10: Coolibah woodland and forest floodplain	93 465	0	–
Barwon Darling	F1.6: Black box forest floodplain	54 878	0	–
Barwon Darling	F2.4: Shrubland floodplain	37 069	0	–
Barwon Darling	F4: Floodplain with unspecified vegetation	20 951	0	–
Barwon Darling	F1.8: Black box woodland floodplain	10 977	0	–
Barwon Darling	F1.12: Woodland floodplain	5 923	0	–
Barwon Darling	F1.2: River red gum forest floodplain	3 889	0	–
Barwon Darling	F1.4: River red gum woodland floodplain	48	0	–
Barwon Darling	F2.3: Upland shrubland floodplain	37	0	–
Barwon Darling	F1.5: Upland black box forest floodplain	12	0	–
Barwon Darling	F1.7: Upland black box woodland floodplain	11	0	–
Border Rivers	F1.12: Woodland floodplain	55 700	0	–
Border Rivers	F1.2: River red gum forest floodplain	21 268	0	–
Border Rivers	F4: Floodplain with unspecified vegetation	15 059	0	–
Border Rivers	F1.10: Coolibah woodland and forest floodplain	5 657	0	–
Border Rivers	F3.2: Sedge/forb/grassland floodplain	4 014	0	–
Border Rivers	F1.8: Black box woodland floodplain	3 307	0	–
Border Rivers	F2.4: Shrubland floodplain	250	0	–
Broken	F1.12: Woodland floodplain	3 792	0	–
Broken	F4: Floodplain with unspecified vegetation	2 122	0	–
Broken	F1.4: River red gum woodland floodplain	1 633	0	–
Broken	F1.8: Black box woodland floodplain	1 272	0	–
Broken	F3.2: Sedge/forb/grassland floodplain	144	0	–
Broken	F3.1: Upland sedge/forb/grassland floodplain	45	0	–
Broken	F1.2: River red gum forest floodplain	14	0	–
Broken	F2.2: Lignum shrubland floodplain	9	0	–
Broken	F1.3: Upland River red gum woodland floodplain	8	0	–
Campaspe	F4: Floodplain with unspecified vegetation	4	0	–
Campaspe	F1.12: Woodland floodplain	3	0	–
Castlereagh	F1.8: Black box woodland floodplain	15 331	0	–
Castlereagh	F1.12: Woodland floodplain	427	0	–
Castlereagh	F1.10: Coolibah woodland and forest floodplain	418	0	–
Castlereagh	F2.4: Shrubland floodplain	156	0	–
Castlereagh	F1.2: River red gum forest floodplain	66	0	–
Castlereagh	F4: Floodplain with unspecified vegetation	50	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) floodplain type	Total area (ha)	Inundated by Commonwealth environmental water	
			Area (ha)	% of total
Central Murray	F1.2: River red gum forest floodplain	93 402	5 432	5.8
Central Murray	F1.4: River red gum woodland floodplain	113 670	4 438	3.9
Central Murray	F1.8: Black box woodland floodplain	40 047	117	0.3
Central Murray	F3.2: Sedge/forb/grassland floodplain	2 006	5	0.2
Central Murray	F4: Floodplain with unspecified vegetation	34 112	4	<0.1
Central Murray	F1.3: Upland River red gum woodland floodplain	27	4	14.8
Central Murray	F1.6: Black box forest floodplain	3 885	3	0.1
Central Murray	F3.1: Upland sedge/forb/grassland floodplain	2	2	100.0
Central Murray	F2.2: Lignum shrubland floodplain	3 210	0	–
Central Murray	F1.12: Woodland floodplain	2 203	0	–
Central Murray	F2.4: Shrubland floodplain	1 105	0	–
Central Murray	F1.1: Upland river red gum forest floodplain	64	0	–
Central Murray	F2.3: Upland shrubland floodplain	47	0	–
Central Murray	F1.7: Upland black box woodland floodplain	16	0	–
Condamine Balonne	F1.10: Coolibah woodland and forest floodplain	709 056	0	–
Condamine Balonne	F3.2: Sedge/forb/grassland floodplain	291 601	0	–
Condamine Balonne	F4: Floodplain with unspecified vegetation	189 245	0	–
Condamine Balonne	F1.12: Woodland floodplain	80 812	0	–
Condamine Balonne	F2.4: Shrubland floodplain	23 608	0	–
Condamine Balonne	F1.8: Black box woodland floodplain	9 427	0	–
Condamine Balonne	F2.2: Lignum shrubland floodplain	2 087	0	–
Condamine Balonne	F1.2: River red gum forest floodplain	1 669	0	–
Condamine Balonne	F3.1: Upland sedge/forb/grassland floodplain	460	0	–
Condamine Balonne	F1.4: River red gum woodland floodplain	283	0	–
Condamine Balonne	F2.3: Upland shrubland floodplain	168	0	–
Condamine Balonne	F1.9: Upland coolibah woodland and forest floodplain	23	0	–
Condamine Balonne	F1.1: Upland river red gum forest floodplain	1	0	–
Edward Wakool	F1.8: Black box woodland floodplain	56 406	0	–
Edward Wakool	F1.4: River red gum woodland floodplain	37 923	0	–
Edward Wakool	F3.2: Sedge/forb/grassland floodplain	17 171	0	–
Edward Wakool	F1.2: River red gum forest floodplain	7 726	0	–
Edward Wakool	F4: Floodplain with unspecified vegetation	6 819	0	–
Edward Wakool	F1.12: Woodland floodplain	5 923	0	–
Edward Wakool	F1.6: Black box forest floodplain	328	0	–
Edward Wakool	F2.4: Shrubland floodplain	258	0	–
Edward Wakool	F2.2: Lignum shrubland floodplain	177	0	–
Edward Wakool	F1.1: Upland river red gum forest floodplain	9	0	–
Edward Wakool	F1.3: Upland River red gum woodland floodplain	1	0	–
Goulburn	F4: Floodplain with unspecified vegetation	11 834	0	–
Goulburn	F1.4: River red gum woodland floodplain	9 296	0	–
Goulburn	F1.2: River red gum forest floodplain	4 712	0	–
Goulburn	F1.12: Woodland floodplain	2 208	0	–
Goulburn	F1.3: Upland River red gum woodland floodplain	1 249	0	–
Goulburn	F3.2: Sedge/forb/grassland floodplain	671	0	–
Goulburn	F1.8: Black box woodland floodplain	178	0	–
Goulburn	F2.2: Lignum shrubland floodplain	63	0	–
Goulburn	F3.1: Upland sedge/forb/grassland floodplain	11	0	–
Gwydir	F4: Floodplain with unspecified vegetation	31 963	1 119	3.5
Gwydir	F1.10: Coolibah woodland and forest floodplain	9 337	559	6.0
Gwydir	F3.2: Sedge/forb/grassland floodplain	5 735	249	4.3
Gwydir	F1.9: Upland coolibah woodland and forest floodplain	2 690	110	4.1
Gwydir	F1.12: Woodland floodplain	5 072	33	0.7
Gwydir	F1.4: River red gum woodland floodplain	127	25	19.7
Gwydir	F1.2: River red gum forest floodplain	1 023	21	2.1
Gwydir	F1.1: Upland river red gum forest floodplain	28	5	17.9
Gwydir	F1.8: Black box woodland floodplain	38	1	2.6

Valley name	Australian National Aquatic Ecosystem (ANAE) floodplain type	Total area (ha)	Inundated by Commonwealth environmental water	
			Area (ha)	% of total
Gwydir	F2.4: Shrubland floodplain	221	0	–
Gwydir	F1.11: River cooba woodland floodplain	143	0	–
Gwydir	F3.1: Upland sedge/forb/grassland floodplain	36	0	–
Kiewa	F4: Floodplain with unspecified vegetation	13	0	–
Kiewa	F1.12: Woodland floodplain	2	0	–
Lachlan	F1.2: River red gum forest floodplain	26 769	6 596	24.6
Lachlan	F2.2: Lignum shrubland floodplain	156 027	6 155	3.9
Lachlan	F1.8: Black box woodland floodplain	50 431	2 227	4.4
Lachlan	F1.4: River red gum woodland floodplain	15 357	1 955	12.7
Lachlan	F2.4: Shrubland floodplain	19 626	327	1.7
Lachlan	F3.2: Sedge/forb/grassland floodplain	44 792	260	0.6
Lachlan	F4: Floodplain with unspecified vegetation	56 921	0	–
Lachlan	F1.6: Black box forest floodplain	22 022	0	–
Lachlan	F1.12: Woodland floodplain	2 398	0	–
Lachlan	F1.7: Upland black box woodland floodplain	797	0	–
Lachlan	F1.1: Upland river red gum forest floodplain	289	0	–
Lachlan	F3.1: Upland sedge/forb/grassland floodplain	141	0	–
Lachlan	F1.5: Upland black box forest floodplain	43	0	–
Lachlan	F1.3: Upland River red gum woodland floodplain	28	0	–
Lachlan	F2.1: Upland lignum shrubland floodplain	27	0	–
Lachlan	F2.3: Upland shrubland floodplain	18	0	–
Loddon	F4: Floodplain with unspecified vegetation	20 792	0	–
Loddon	F1.8: Black box woodland floodplain	6 267	0	–
Loddon	F3.2: Sedge/forb/grassland floodplain	3 149	0	–
Loddon	F1.12: Woodland floodplain	1 261	0	–
Loddon	F2.2: Lignum shrubland floodplain	850	0	–
Loddon	F1.4: River red gum woodland floodplain	347	0	–
Loddon	F1.2: River red gum forest floodplain	25	0	–
Loddon	F3.1: Upland sedge/forb/grassland floodplain	15	0	–
Loddon	F1.6: Black box forest floodplain	14	0	–
Loddon	F2.4: Shrubland floodplain	13	0	–
Lower Darling	F1.6: Black box forest floodplain	88 806	0	–
Lower Darling	F1.2: River red gum forest floodplain	13 902	0	–
Lower Darling	F2.4: Shrubland floodplain	10 585	0	–
Lower Darling	F1.8: Black box woodland floodplain	4 145	0	–
Lower Darling	F1.12: Woodland floodplain	1 318	0	–
Lower Darling	F2.2: Lignum shrubland floodplain	599	0	–
Lower Darling	F4: Floodplain with unspecified vegetation	306	0	–
Lower Darling	F2.3: Upland shrubland floodplain	139	0	–
Lower Darling	F3.2: Sedge/forb/grassland floodplain	114	0	–
Lower Darling	F1.5: Upland black box forest floodplain	39	0	–
Lower Darling	F1.1: Upland river red gum forest floodplain	32	0	–
Lower Darling	F3.1: Upland sedge/forb/grassland floodplain	5	0	–
Lower Murray	F2.4: Shrubland floodplain	83 534	1 450	1.7
Lower Murray	F1.8: Black box woodland floodplain	11 573	741	6.4
Lower Murray	F2.2: Lignum shrubland floodplain	37 217	733	2.0
Lower Murray	F4: Floodplain with unspecified vegetation	6 500	552	8.5
Lower Murray	F1.4: River red gum woodland floodplain	11 648	336	2.9
Lower Murray	F1.2: River red gum forest floodplain	8 767	241	2.7
Lower Murray	F3.2: Sedge/forb/grassland floodplain	2 814	86	3.1
Lower Murray	F1.3: Upland River red gum woodland floodplain	938	37	3.9
Lower Murray	F1.7: Upland black box woodland floodplain	495	33	6.7
Lower Murray	F1.1: Upland river red gum forest floodplain	65	11	16.9
Lower Murray	F3.1: Upland sedge/forb/grassland floodplain	1 205	9	0.7
Lower Murray	F2.3: Upland shrubland floodplain	798	9	1.1
Lower Murray	F2.1: Upland lignum shrubland floodplain	460	9	2.0

Valley name	Australian National Aquatic Ecosystem (ANAE) floodplain type	Total area (ha)	Inundated by Commonwealth environmental water	
			Area (ha)	% of total
Lower Murray	F1.12: Woodland floodplain	7 559	6	0.1
Lower Murray	F1.6: Black box forest floodplain	5 942	0	–
Macquarie	F3.2: Sedge/forb/grassland floodplain	169 235	4 536	2.7
Macquarie	F2.4: Shrubland floodplain	26 868	29	0.1
Macquarie	F1.10: Coolibah woodland and forest floodplain	125 341	0	–
Macquarie	F1.2: River red gum forest floodplain	24 051	0	–
Macquarie	F4: Floodplain with unspecified vegetation	6 027	0	–
Macquarie	F1.8: Black box woodland floodplain	5 414	0	–
Macquarie	F1.12: Woodland floodplain	4 913	0	–
Macquarie	F1.4: River red gum woodland floodplain	3 086	0	–
Macquarie	F1.6: Black box forest floodplain	635	0	–
Macquarie	F1.11: River cooba woodland floodplain	10	0	–
Macquarie	F1.1: Upland river red gum forest floodplain	4	0	–
Macquarie	F1.7: Upland black box woodland floodplain	<1	0	–
Mitta Mitta	F4: Floodplain with unspecified vegetation	67	0	–
Mitta Mitta	F3.1: Upland sedge/forb/grassland floodplain	19	0	–
Murrumbidgee	F2.4: Shrubland floodplain	84 100	8 154	9.7
Murrumbidgee	F1.2: River red gum forest floodplain	58 050	7 219	12.4
Murrumbidgee	F1.8: Black box woodland floodplain	15 677	1 474	9.4
Murrumbidgee	F1.4: River red gum woodland floodplain	15 480	883	5.7
Murrumbidgee	F3.2: Sedge/forb/grassland floodplain	13 644	88	0.6
Murrumbidgee	F4: Floodplain with unspecified vegetation	21 024	16	0.1
Murrumbidgee	F1.12: Woodland floodplain	8 025	15	0.2
Murrumbidgee	F1.1: Upland river red gum forest floodplain	277	2	0.7
Murrumbidgee	F2.2: Lignum shrubland floodplain	958	0	–
Murrumbidgee	F3.1: Upland sedge/forb/grassland floodplain	29	0	–
Murrumbidgee	F1.6: Black box forest floodplain	25	0	–
Murrumbidgee	F1.3: Upland River red gum woodland floodplain	5	0	–
Murrumbidgee	F2.3: Upland shrubland floodplain	3	0	–
Namoi	F1.12: Woodland floodplain	23 594	0	–
Namoi	F1.8: Black box woodland floodplain	6 943	0	–
Namoi	F4: Floodplain with unspecified vegetation	4 923	0	–
Namoi	F1.2: River red gum forest floodplain	3 911	0	–
Namoi	F2.4: Shrubland floodplain	159	0	–
Namoi	F1.10: Coolibah woodland and forest floodplain	3	0	–
Ovens	F1.4: River red gum woodland floodplain	8 540	0	–
Ovens	F1.2: River red gum forest floodplain	2 140	0	–
Ovens	F1.12: Woodland floodplain	565	0	–
Ovens	F4: Floodplain with unspecified vegetation	508	0	–
Ovens	F3.2: Sedge/forb/grassland floodplain	442	0	–
Ovens	F3.1: Upland sedge/forb/grassland floodplain	68	0	–
Ovens	F1.1: Upland river red gum forest floodplain	4	0	–
Paroo	F3.2: Sedge/forb/grassland floodplain	330 407	0	–
Paroo	F1.12: Woodland floodplain	290 746	0	–
Paroo	F1.10: Coolibah woodland and forest floodplain	80 456	0	–
Paroo	F2.4: Shrubland floodplain	55 870	0	–
Paroo	F1.6: Black box forest floodplain	16 974	0	–
Paroo	F1.8: Black box woodland floodplain	1 490	0	–
Paroo	F2.2: Lignum shrubland floodplain	435	0	–
Paroo	F1.4: River red gum woodland floodplain	201	0	–
Paroo	F4: Floodplain with unspecified vegetation	144	0	–
Paroo	F2.3: Upland shrubland floodplain	90	0	–
Paroo	F1.9: Upland coolibah woodland and forest floodplain	43	0	–
Paroo	F3.1: Upland sedge/forb/grassland floodplain	28	0	–
Paroo	F1.5: Upland black box forest floodplain	19	0	–
Paroo	F1.3: Upland River red gum woodland floodplain	<1	0	–

Valley name	Australian National Aquatic Ecosystem (ANAE) floodplain type	Total area (ha)	Inundated by Commonwealth environmental water	
			Area (ha)	% of total
Upper Murray	F4: Floodplain with unspecified vegetation	131	0	–
Warrego	F1.10: Coolibah woodland and forest floodplain	781 155	0	–
Warrego	F3.2: Sedge/forb/grassland floodplain	36 883	0	–
Warrego	F1.12: Woodland floodplain	25 313	0	–
Warrego	F1.4: River red gum woodland floodplain	5 175	0	–
Warrego	F2.4: Shrubland floodplain	3 394	0	–
Warrego	F2.2: Lignum shrubland floodplain	1 404	0	–
Warrego	F4: Floodplain with unspecified vegetation	522	0	–
Warrego	F1.8: Black box woodland floodplain	441	0	–
Warrego	F3.1: Upland sedge/forb/grassland floodplain	154	0	–
Warrego	F1.3: Upland River red gum woodland floodplain	93	0	–
Warrego	F1.9: Upland coolibah woodland and forest floodplain	75	0	–
Warrego	F2.3: Upland shrubland floodplain	49	0	–
Wimmera	F1.4: River red gum woodland floodplain	3 084	0	–
Wimmera	F4: Floodplain with unspecified vegetation	3 061	0	–
Wimmera	F1.12: Woodland floodplain	2 992	0	–
Wimmera	F1.8: Black box woodland floodplain	1 600	0	–
Wimmera	F3.2: Sedge/forb/grassland floodplain	802	0	–
Wimmera	F3.1: Upland sedge/forb/grassland floodplain	184	0	–
Wimmera	F2.3: Upland shrubland floodplain	165	0	–
Wimmera	F1.3: Upland River red gum woodland floodplain	164	0	–
Wimmera	F2.4: Shrubland floodplain	109	0	–
Wimmera	F1.7: Upland black box woodland floodplain	69	0	–
Wimmera	F2.2: Lignum shrubland floodplain	68	0	–
Wimmera	F1.6: Black box forest floodplain	58	0	–

Annex D. ANAE river channel types influenced by Commonwealth environmental water by valley

The length of river and stream channels of differing ANAE type influenced by the delivery of Commonwealth environmental water is presented in Table D1 as an in indicator of the contribution of Commonwealth environmental water towards ecosystem diversity within each valley. River length measurement is highly dependent on the resolution of the mapping with higher resolution mapping capturing more twists and turns in the river that increase the measured river length along the flow path between two points. The Basin ANAE waterway mapping compiles state data that varies in resolution from 1:70 000 to 1:100 000.

Commonwealth environmental water is typically delivered from storages into lowland rivers. In hilly landscapes and where rivers cut through gorges the ANAE classification often identifies individual river sections as high energy streams. These transition into low energy lowland rivers as the valleys widen and flatten further downstream. The different ANAE types recorded in Table D1 are mostly different ecosystem types identified on the same major river within each valley rather than separate watercourses.

Table D1. Length of river and stream ecosystem types influenced by the delivery of Commonwealth environmental water as represented by the Basin ANAE waterways data set in each valley

Valley name	Australian National Aquatic Ecosystem (ANAE) waterway type	Length (km)
Avoca	–	–
Barwon Darling	Rp1.4: Permanent lowland rivers and streams	2 950
Barwon Darling	Rt1.4: Temporary lowland rivers and streams	508
Border Rivers	Rp1.4: Permanent lowland rivers and streams	987
Border Rivers	Rt1.4: Temporary lowland rivers and streams	639
Border Rivers	Rt1.1: Temporary high energy streams	88
Border Rivers	Rp1.2: Permanent transitional zone streams	79
Border Rivers	Rp1.1: Permanent high energy streams	29
Border Rivers	Rt1.2: Temporary transitional zone streams	14
Broken	Rt1.4: Temporary lowland rivers and streams	276
Campaspe	Rp1.4: Permanent lowland rivers and streams	98
Campaspe	Rp1.2: Permanent transitional zone streams	28
Campaspe	Rp1.3: Permanent low energy streams	19
Campaspe	Rt1.4: Temporary lowland rivers and streams	17
Campaspe	Rp1.1: Permanent high energy streams	8
Campaspe	Rt1.2: Temporary transitional zone streams	3
Campaspe	Rt1.3: Temporary low energy streams	2
Castlereagh	–	–
Central Murray	Rp1.4: Permanent lowland rivers and streams	2 176
Central Murray	Rt1.4: Temporary lowland rivers and streams	223
Central Murray	Rp1.3: Permanent low energy streams	53
Central Murray	Rp1.2: Permanent transitional zone streams	41
Central Murray	Rp1.1: Permanent high energy streams	9
Central Murray	Rt1.1: Temporary high energy streams	5
Central Murray	Rt1.3: Temporary low energy streams	1
Condamine Balonne	Rt1.4: Temporary lowland rivers and streams	1 400
Condamine Balonne	Rp1.4: Permanent lowland rivers and streams	935
Edward Wakool	Rp1.4: Permanent lowland rivers and streams	969
Edward Wakool	Rt1.4: Temporary lowland rivers and streams	80
Goulburn	Rp1.4: Permanent lowland rivers and streams	343
Goulburn	Rp1.1: Permanent high energy streams	106
Goulburn	Rp1.2: Permanent transitional zone streams	47
Goulburn	Rt1.4: Temporary lowland rivers and streams	26
Goulburn	Rt1.1: Temporary high energy streams	6
Goulburn	Rt1.3: Temporary low energy streams	5
Goulburn	Rt1.2: Temporary transitional zone streams	4

Gwydir	Rp1.4: Permanent lowland rivers and streams	580
Gwydir	Rt1.4: Temporary lowland rivers and streams	190
Gwydir	Rp1.2: Permanent transitional zone streams	170
Gwydir	Rp1.1: Permanent high energy streams	116
Gwydir	Rp1.3: Permanent low energy streams	44
Gwydir	Rt1.3: Temporary low energy streams	27
Kiewa	–	–
Lachlan	Rp1.4: Permanent lowland rivers and streams	1 294
Lachlan	Rt1.4: Temporary lowland rivers and streams	184
Lachlan	Rp1.1: Permanent high energy streams	77
Lachlan	Rp1.2: Permanent transitional zone streams	38
Lachlan	Rp1.3: Permanent low energy streams	4
Loddon	Rp1.4: Permanent lowland rivers and streams	463
Loddon	Rp1.2: Permanent transitional zone streams	52
Loddon	Rt1.4: Temporary lowland rivers and streams	40
Loddon	Rt1.2: Temporary transitional zone streams	3
Loddon	Rp1.1: Permanent high energy streams	2
Lower Darling	–	–
Lower Murray	Rp1.4: Permanent lowland rivers and streams	991
Macquarie	Rp1.4: Permanent lowland rivers and streams	598
Macquarie	Rp1.2: Permanent transitional zone streams	145
Macquarie	Rp1.1: Permanent high energy streams	72
Macquarie	Rt1.4: Temporary lowland rivers and streams	14
Mitta Mitta	–	–
Murrumbidgee	Rp1.4: Permanent lowland rivers and streams	1 590
Murrumbidgee	Rt1.4: Temporary lowland rivers and streams	121
Murrumbidgee	Rp1.1: Permanent high energy streams	104
Murrumbidgee	Rp1.2: Permanent transitional zone streams	29
Murrumbidgee	Rp1.3: Permanent low energy streams	26
Murrumbidgee	Rt1.3: Temporary low energy streams	3
Murrumbidgee	Rt1.2: Temporary transitional zone streams	2
Namoi		–
Ovens	Rp1.4: Permanent lowland rivers and streams	295
Ovens	Rt1.4: Temporary lowland rivers and streams	140
Ovens	Rt1.1: Temporary high energy streams	55
Ovens	Rp1.1: Permanent high energy streams	4
Ovens	Rp1.2: Permanent transitional zone streams	8
Ovens	Rp1.3: Permanent low energy streams	2
Paroo	–	–
Upper Murray	–	–
Warrego	Rp1.4: Permanent lowland rivers and streams	302
Warrego	Rt1.4: Temporary lowland rivers and streams	181
Warrego	Rt1.2: Temporary transitional zone streams	6
Warrego	Rp1.3: Permanent low energy streams	4
Wimmera	–	–