

CHAPTER 3

Basin Plan Fish Monitoring Summary (2015/16 – 2024/25): Intersecting Streams Water Resource Planning Area

Hayden Schilling & David Crook

October 2025

Contents

3.1	Citation Details	139
3.2	Acknowledgements	139
3.3	Introduction	140
3.3.1	What This Report Includes	141
3.3.2	Sampling Methods	142
3.4	Climate Overview	145
3.5	Flow Data	147
3.6	Species Diversity	149
3.7	Murray cod	152
3.8	Golden perch	153
3.8.1	Population Structure	154
3.8.2	Temporal Trends in Abundance	155
3.8.3	Health	156
3.8.4	Distribution	157
3.9	Freshwater catfish	159
3.10	Bony herring	160
3.10.1	Population Structure	161
3.10.2	Temporal Trends in Abundance	162
3.10.3	Health	163
3.10.4	Distribution	164
3.11	Australian smelt	166
3.12	Common carp	167
3.12.1	Population Structure	168
3.12.2	Temporal Trends in Abundance	169
3.12.3	Health	170
3.12.4	Distribution	171
3.13	Threatened Species	173
3.14	Appendix	175
3.14.1	References	181

3.1 Citation Details

Please cite the overall report when referring to this chapter:

Schilling, H., Crook, D. 2025. Basin Plan Fish Monitoring Summary (2015/16 – 2024/25): Water Resource Planning Area Reports. NSW Department of Primary Industries and Regional Development. Port Stephens Fisheries Institute. 649pp. (PUB25/840)

Report cover image credit: Jason Thiem, NSW DPIRD; Fish images credit: Gunther Schmida

3.2 Acknowledgements

This work is funded by the NSW Department of Primary Industries and Regional Development and the Commonwealth Government under the *Federation Funding Agreement – Environment on Implementing Water Reform in the Murray-Darling Basin*. The dataset used in the temporal analysis was generated by NSW DPIRD Fisheries from 1994 – 2025 and sourced from multiple internally and externally funded projects. The authors acknowledge past and present DPIRD Fisheries scientists, technicians and managers that contributed to its collection, as well as the ongoing support of external collaborators and funding agencies (in particular, the Murray–Darling Basin Authority, the Commonwealth Environmental Water Office, and the NSW Freshwater Recreational Fishing Trust). We continue to be thankful for the ongoing site access granted by private landholders across NSW and acknowledge that we work on Country which always was and always will be Aboriginal land. The fish surveys that generated the data used in our analyses were conducted under permits approved by the NSW Fisheries Animal Care and Ethics Committee.

3.3 Introduction

This report spans 2015/16 to 2024/25 and uses all suitable fish assemblage data collected by NSW DPIRD Fisheries using standardized electrofishing monitoring techniques. The format of the report follows and expands upon the previous reports (Schilling & Crook 2023, 2024, 2025b). This report focusses on the Intersecting Streams Water Resource Planning Area (WRPA) shown in Figure 3.1.

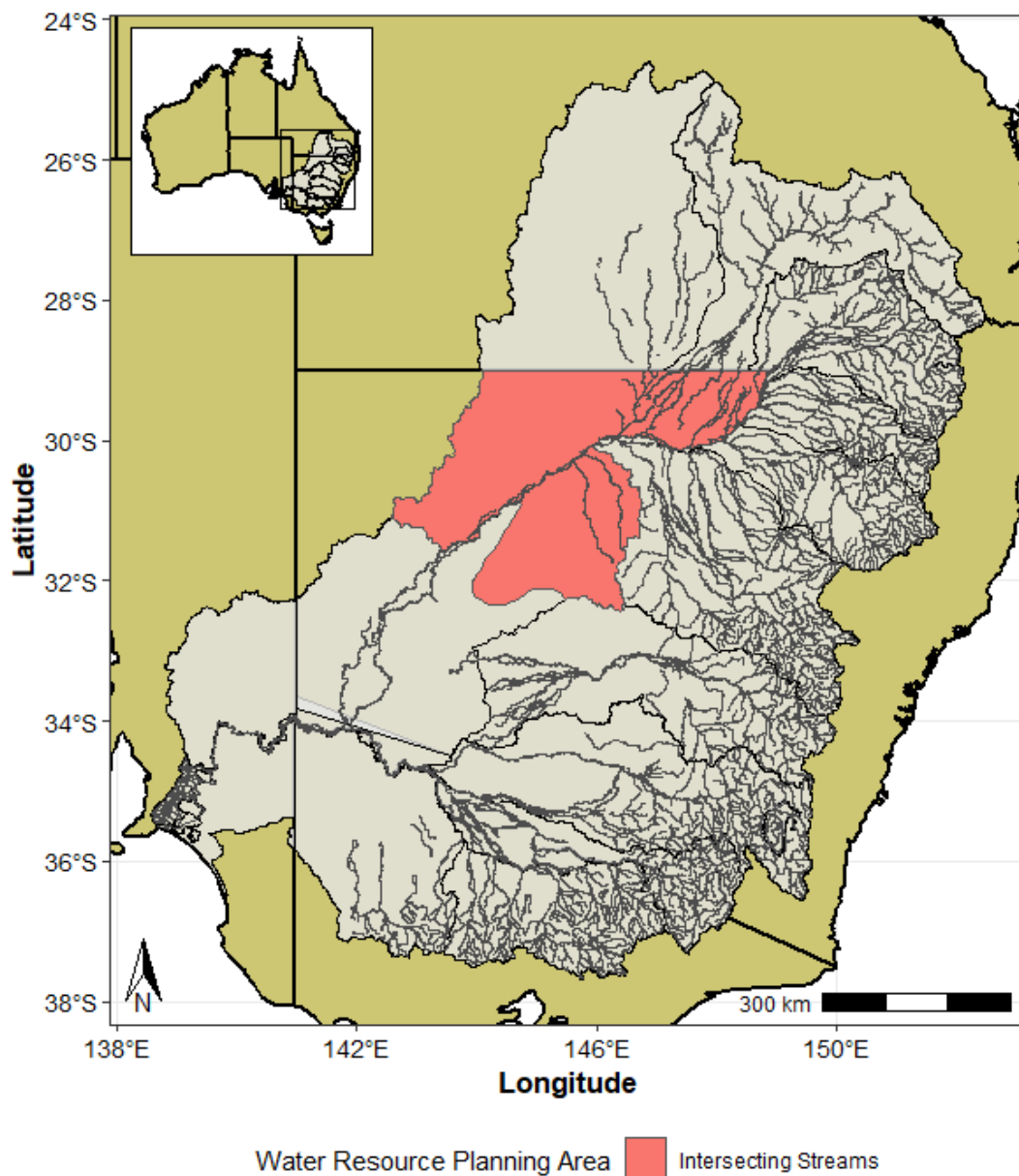


Figure 3.1: Murray-Darling Basin with the key region of this report highlighted. Inset map shows the whole of Australia with a box around the MDB.

3.3.1 What This Report Includes

This report starts with an overview of the standardised monitoring programs including sampling details and statistics. An overview of the hydrological and climatic conditions during the reporting period is also provided as context for interpreting the fish population status data.

Following the introductory sections, we present a summary of *fish diversity* across the Intersecting Streams WRPAs. Separate plots for native and alien species show the total number of unique species observed at each site.

The main body of the report provides detailed information on the *population structure, relative abundance, health, and distribution* of six key fish species:

- Murray cod
- Golden perch
- Freshwater catfish
- Bony herring
- Australian smelt
- Common carp

Population structure information includes length frequency plots of observed fish and the proportion of fish classified as Young of the Year (YOY). This information can be used to infer the size structure of populations and the level of recruitment each year. For additional context, we provide a summary table showing any stocking which occurred for the species in each year (if relevant).

Relative abundance and *relative biomass* (a unit-less measure representing the number (or biomass) of fish in an area) information is adapted from the modelled outputs from a more in-depth publication (Crook et al. 2023) which considers all available electrofishing data within the NSW Murray-Darling Basin (MDB). The updated analysis uses generalised linear mixed models to generate annual indices of relative abundance and biomass for each WRPAs. In this report we present the modelled time series of relative abundance showing the predicted number (or biomass) of fish observed per 90 second shot of electrofishing. The abundance and biomass trends for the Intersecting Streams WRPAs are contrasted with the overall NSW MDB dataset. It should be noted that these are modelled estimates of relative abundance/biomass, not absolute abundance/biomass as absolute estimates would require extensive calibration surveys that are not included in the monitoring program.

Health information is provided as a summary of any visible health conditions recorded for the key species. The number of health conditions observed in a fish population is generally reflective of water quality, competition, and many other factors. Fewer observations of health conditions indicate healthier populations. The health conditions detailed are any that were observed as part of the biological measurements taken. We provide a comparison of the prevalence of health conditions in the Intersecting Streams WRPAs and greater MDB (excluding the Intersecting Streams WRPAs).

Distribution maps are provided for each species to show the observed distribution of each species from electrofishing samples. The distribution maps also show the relative abundance (number of fish observed per 90 seconds of electrofishing) at each site to give an indication of how the population is spread over the landscape.

Finally, the distributions and numbers of *Threatened species* are reported. The report includes threatened species that were recorded by standardised monitoring programs in the Intersecting Streams WRPAs during the reporting period.

For each section of the report, we provide a *Summary Statement*. This statement provides a very brief overview of the key messages for each section.

3.3.2 Sampling Methods

Three main methods are used during routine fish monitoring surveys: boat electrofishing, backpack electrofishing and bait traps. This report mainly includes the electrofishing data with the bait traps informing the distribution of small bodied threatened species. The electrofishing was conducted using the standard methodology implemented in the Sustainable Rivers Audit (SRA; Davies et al. 2010). This usually includes 12 shots of 90 seconds “power on” during each sampling event.

As each chapter of this report compiles data from multiple projects, there is some variation in how sites were chosen and the effort of sampling conducted each year (Table 3.1). Details of which projects contributed data to this report can be seen in Table 3.5. At each site, sampling gear was applied as suited to the local conditions with either boat, backpack, or a hybrid of the two, in addition to 10 unbaited bait traps that are set in areas of the sampling reach that are not electrofished. Most sampling occurred between the months of September and May.

Table 3.1: Sampling effort (Number of sites sampled) each sampling season in the Intersecting Streams WRPA. Variation in sampling effort is due to different numbers of projects and interruptions to planned sampling such as flooding, site desiccation, and extreme weather.

Sampling Season	Number of Boat Electrofishing Sites	Number of Backpack Electrofishing Sites	Number of Hybrid Sites	Total
2015/2016	6	3	0	9
2016/2017	10	3	0	13
2017/2018	5	5	1	11
2018/2019	2	1	0	3
2019/2020	7	1	0	8
2020/2021	4	0	2	6
2021/2022	6	0	0	6
2022/2023	7	0	0	7
2023/2024	7	3	0	10
2024/2025	13	3	1	17

The sites sampled during the reporting period are shown in Figure 3.2. A breakdown of sites sampled each sampling season is shown in the Appendix (Figure 3.20).

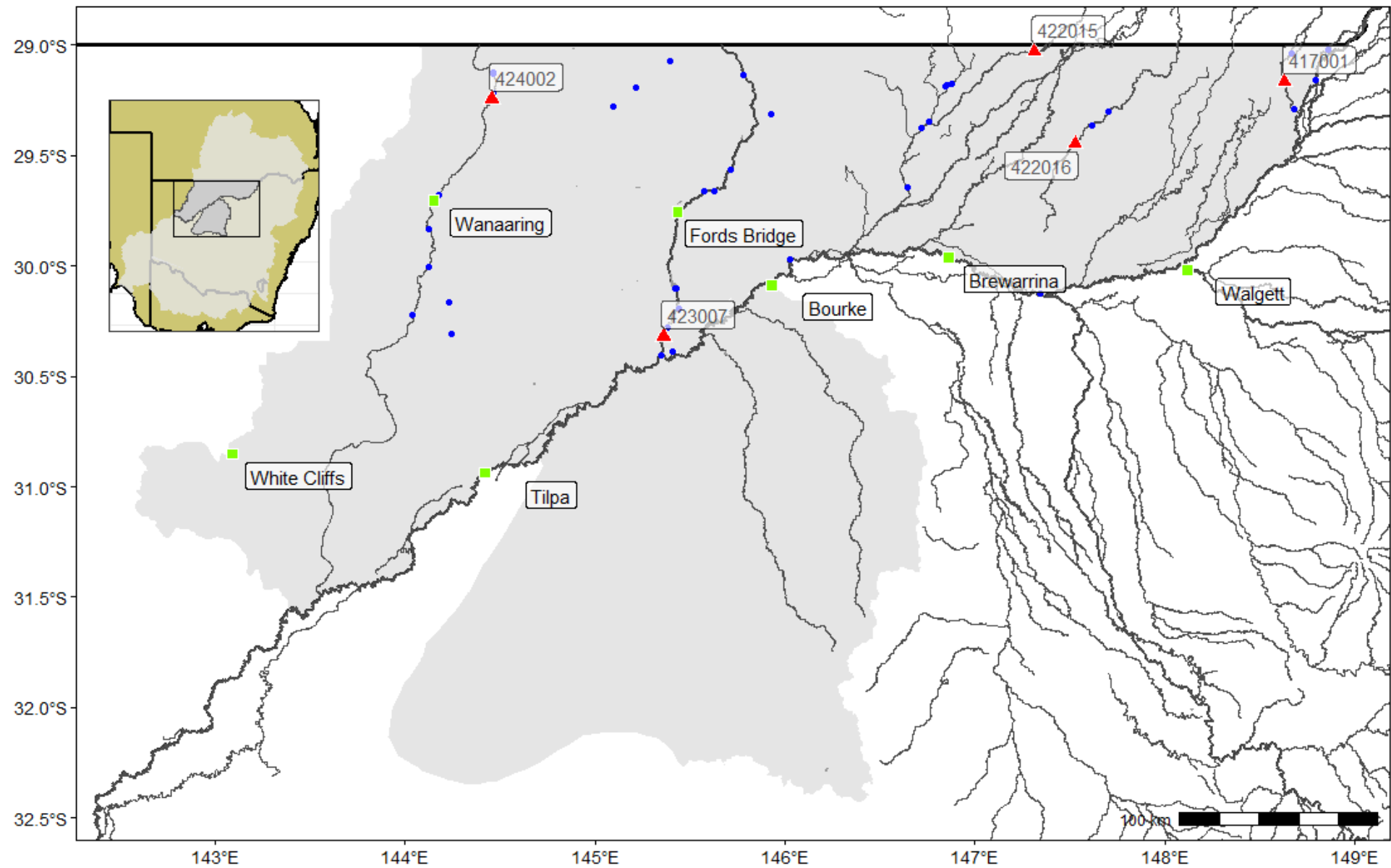


Figure 3.2: Sites (dots) sampled during the reporting period. Red triangles show key flow gauges along with their gauge ID number. Green squares show key towns

Each sampling method has a different effectiveness at sampling each species. Table 3.2 shows the total numbers of each key species caught by each method.

Table 3.2: Number of each key species caught by sample method over the 10 year period. Further data on total catch is provided in the Appendix.

Common name	Boat Electrofishing	Backpack Electrofishing	Bait Trap
Australian smelt	3	0	0
Bony herring	4,797	73	8
Common carp	2,508	192	99
Golden perch	285	39	24

A subset of sampled fish had biological measurements taken during the surveys, including but not limited to length and weight measurements and visual health assessments. Table 3.3 shows the number of biological measurements taken each year for the key species.

Table 3.3: Number of biological measurements taken for the key species each sampling season.

Sampling Season	Australian smelt	Bony herring	Common carp	Golden perch
2015/2016	0	136	35	24
2016/2017	2	640	358	69
2017/2018	0	103	74	67
2018/2019	0	1	0	0
2019/2020	0	78	38	35
2020/2021	0	229	288	25
2021/2022	0	413	186	3
2022/2023	1	326	353	42
2023/2024	0	202	325	27
2024/2025	0	289	324	64

3.4 Climate Overview

The following is a summary of the climatic conditions during the reporting period in terms of how the observed conditions compare to long term records. These are direct extracts from the [Australian Bureau of Meteorology climate summaries archive](#) and are written in the given year. To interpret, 2019 states it was the warmest year on record, meaning 2019 was the warmest year on record up to and including 2019 but not including more recent years.

3.4.0.1 2015

New South Wales recorded well above average temperatures in 2015. Nights were particularly warm, the sixth-warmest on record for the State. Rainfall was close to average for the state as a whole.

3.4.0.2 2016

2016 was a generally wet, warm year for NSW as a whole, with substantial variability throughout the year and across the state. Following a record-warm start to the year, May to September was the wettest such period on record for NSW, with cooler weather in much of the west of the state. Minimum temperatures were the warmest on record for the State as a whole, with record-warm daytime temperatures on parts of the east coast.

3.4.0.3 2017

The year 2017 was the warmest on record for New South Wales for both mean and daytime temperatures. It was also the State's driest year since 2006. Following the warmest summer on record for the State, heavy rain in March across the east then made way for a very dry winter and start to spring. Winter overnight temperatures were the lowest since 1997, but daytime temperatures remained above average for most of the year, and were the warmest on record overall.

3.4.0.4 2018

2018 was the warmest on record for New South Wales for both mean temperature and mean maximum temperature, whilst the mean minimum temperature was fourth-warmest on record. The year was dominated by very dry conditions, with the third-driest January to September on record. October to December saw some relief from the dry, with above average rainfall across parts of the State. Despite this, New South Wales experienced its sixth-lowest annual rainfall on record; its driest year since 2002.

3.4.0.5 2019

2019 was the driest and warmest year on record for New South Wales. Despite some rain in some months, most of the State received much less rainfall than usual, with the northeast and far west particularly dry. Heatwaves in January brought very high temperatures, and large fires from September onward caused extensive damage and persistent smoke.

3.4.0.6 2020

2020 saw above average temperature and rainfall in New South Wales. Temperatures were above average across the state in most months except during autumn. There was widespread rain during autumn and spring and in December, but early winter and November rain was below average.

3.4.0.7 2021

New South Wales had its 6th wettest year on record, with 2021 rainfall 30% above average. This included significant floods along the east coast in March, and the state's wettest November on record. It was the state's coolest year since 1996, at 0.15 °C above the 1961–1990 average.

3.4.0.8 2022

2022 was exceptionally wet with the state-averaged annual total being the second-highest on record (since 1900) and many sites recording their highest annual totals on record. Maximum temperatures were lower than average with the state-averaged annual maximum temperature being the coolest since 1992. Minimum temperatures were generally warmer than average with the state-averaged annual minimum temperature being 0.73 °C above the 1961–1990 average.

3.4.0.9 2023

The state-averaged rainfall was 22.9% below the 1961-1990 average. Rainfall was above average over small parts of the state's south, west of the Great Dividing Range, while being below average over most of the northern half of the state, especially over parts of the Northern Tablelands, Northern Rivers, Mid-North Coast, and Upper Hunter, where annual rainfall was in the lowest 10% of historical records (since records began in 1900). State-averaged annual maximum temperature was 1.96 °C above the 1961-1990 average, which is the third highest on record.

3.4.0.10 2024

Rainfall totals in 2024 were above average to very much above average for the northern and western areas of the state, as well as central parts of the coast. Totals were below average for large parts of the south-east, as well as small parts of the state's north-east and south-west. Mean maximum temperatures in 2024 were above average to very much above across the state, and highest on record around southern parts of the South West Slopes and Snowy Mountains districts.

3.4.0.11 2025

The 2025 NSW climate summary is not yet available but in early 2026 it will be available [here](#).

3.5 Flow Data

Below shows a summary of flow data from a variety of flow gauges in the Intersecting Streams WRP (Figure 3.3).

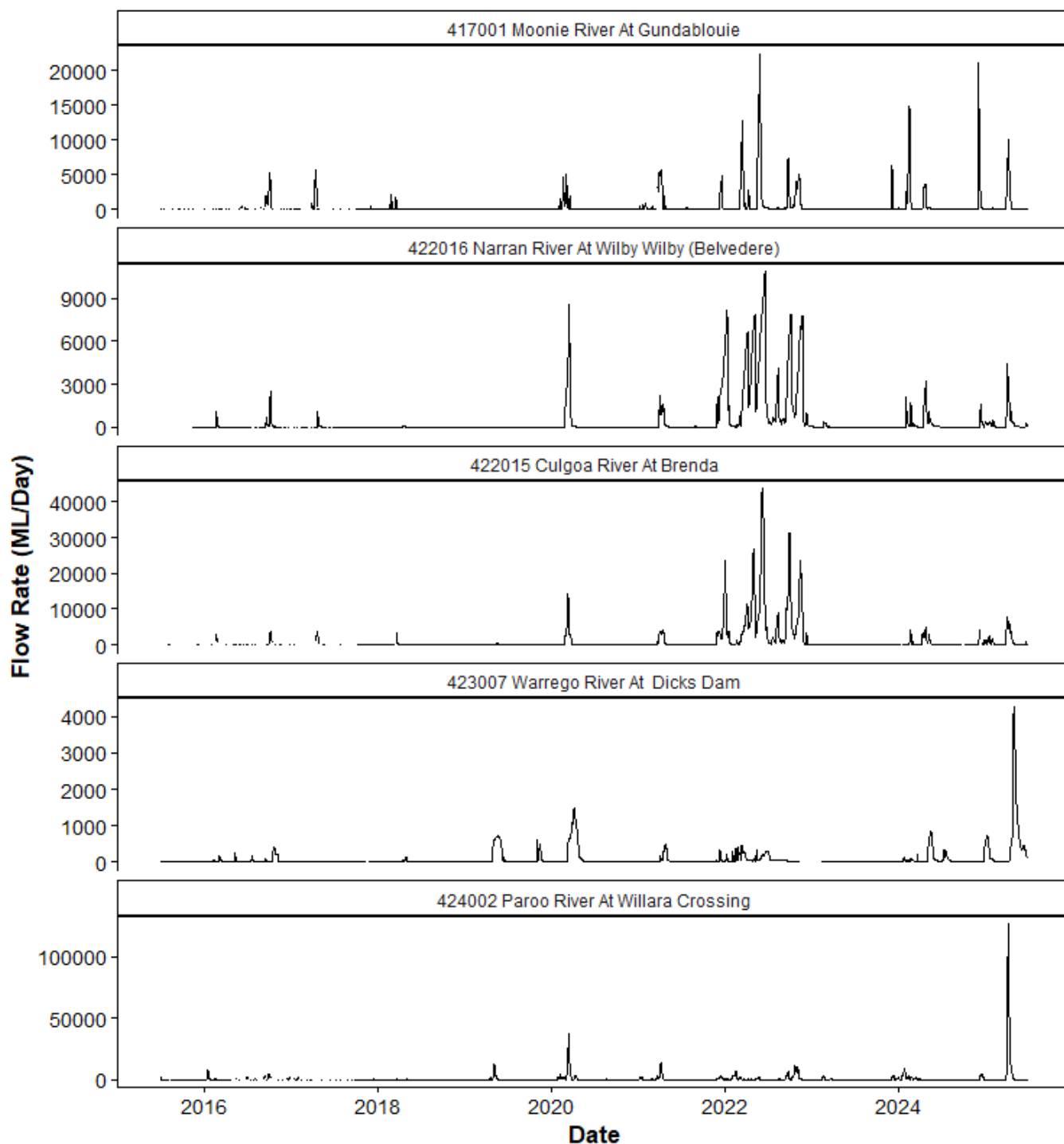


Figure 3.3: Flow data from various gauges in the Intersecting Streams WRP over the reporting period. Gauge locations can be seen on Figure 3.2. Note the differing scales on the y-axis.

Water temperature data, where available, are also shown in Figure 3.4.

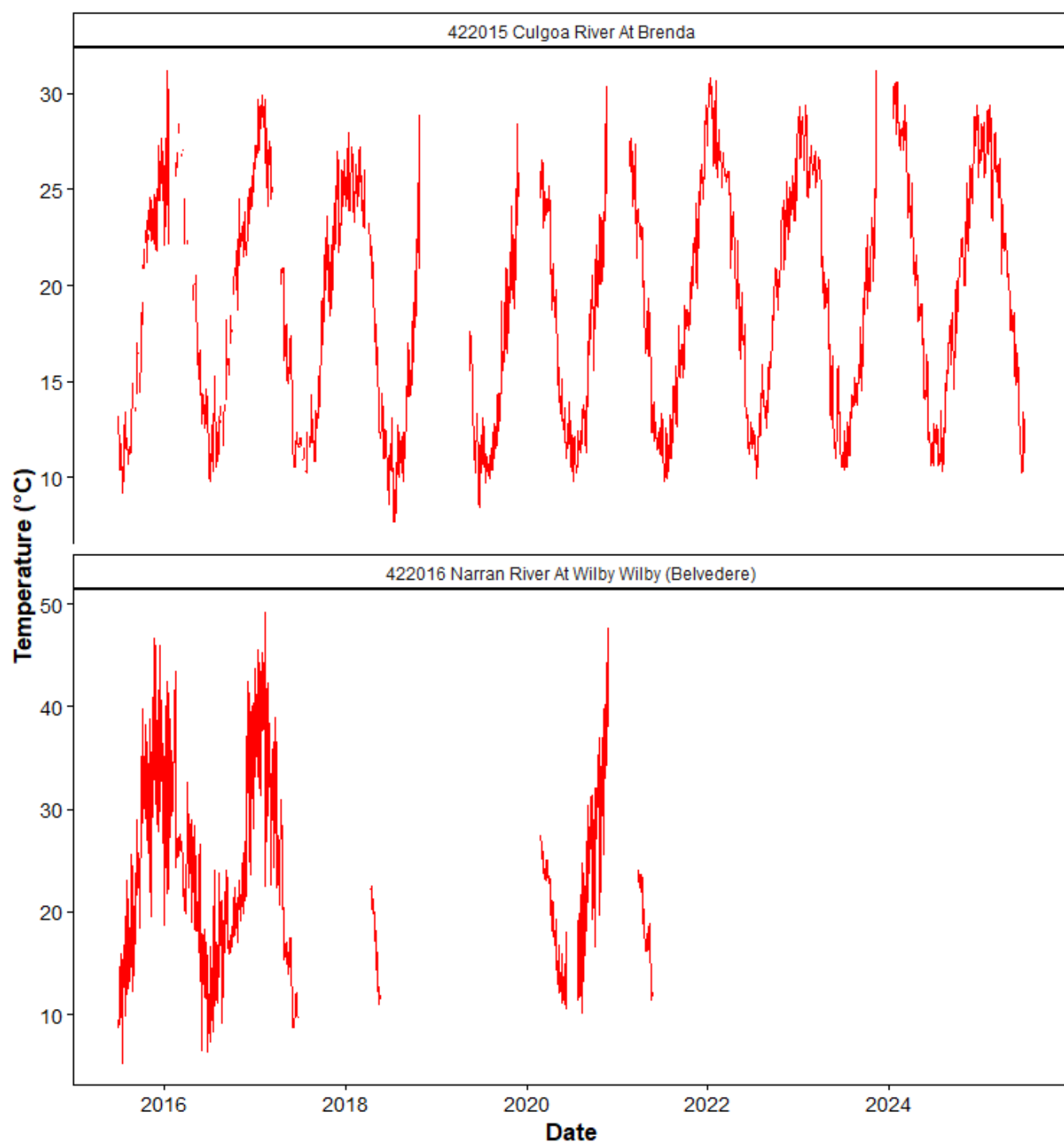


Figure 3.4: Water temperature data from various gauges in the Intersecting Streams WRPA over the reporting period. Gauge locations can be seen on Figure 3.2. Note the differing scales on the y-axis.

3.6 Species Diversity

A total of 12 fish species were observed across the Intersecting Streams WRPA including three alien species. Figure 3.5 shows the number of native and alien species found at each site. The full list of species caught and observed is presented in Table 3.6.

3.6.0.1 Summary Statement:

Native and alien diversity was generally consistent across the region with slight increases in the central area near the lower Warrego River.

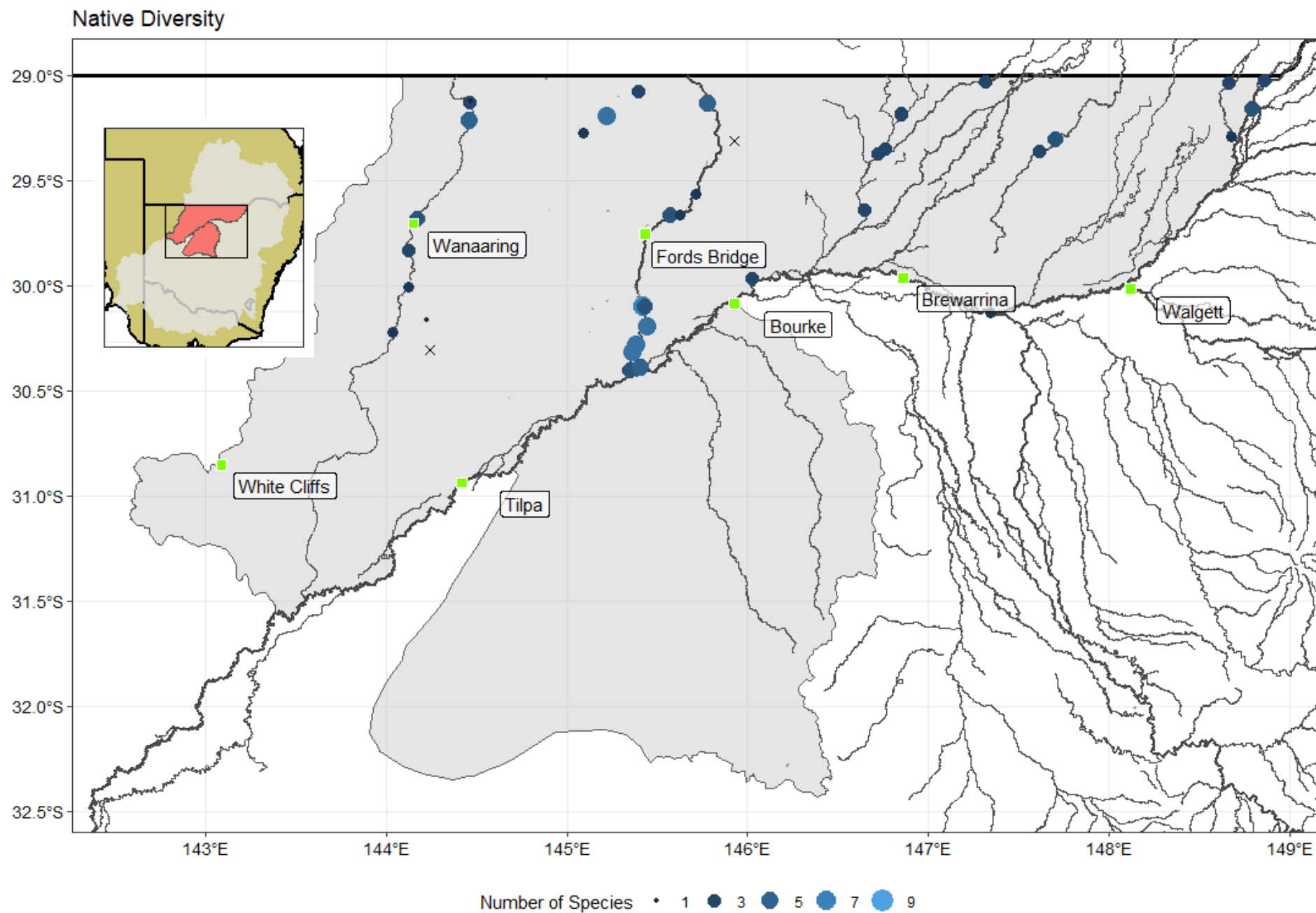


Figure 3.5: Native diversity across all sampling sites. Bubble size represents the number of unique species observed at each site across all sampling methods and events. X represents a site that had water and was sampled, but no fish species were caught at all. Green squares show key towns. Dry sites are excluded.

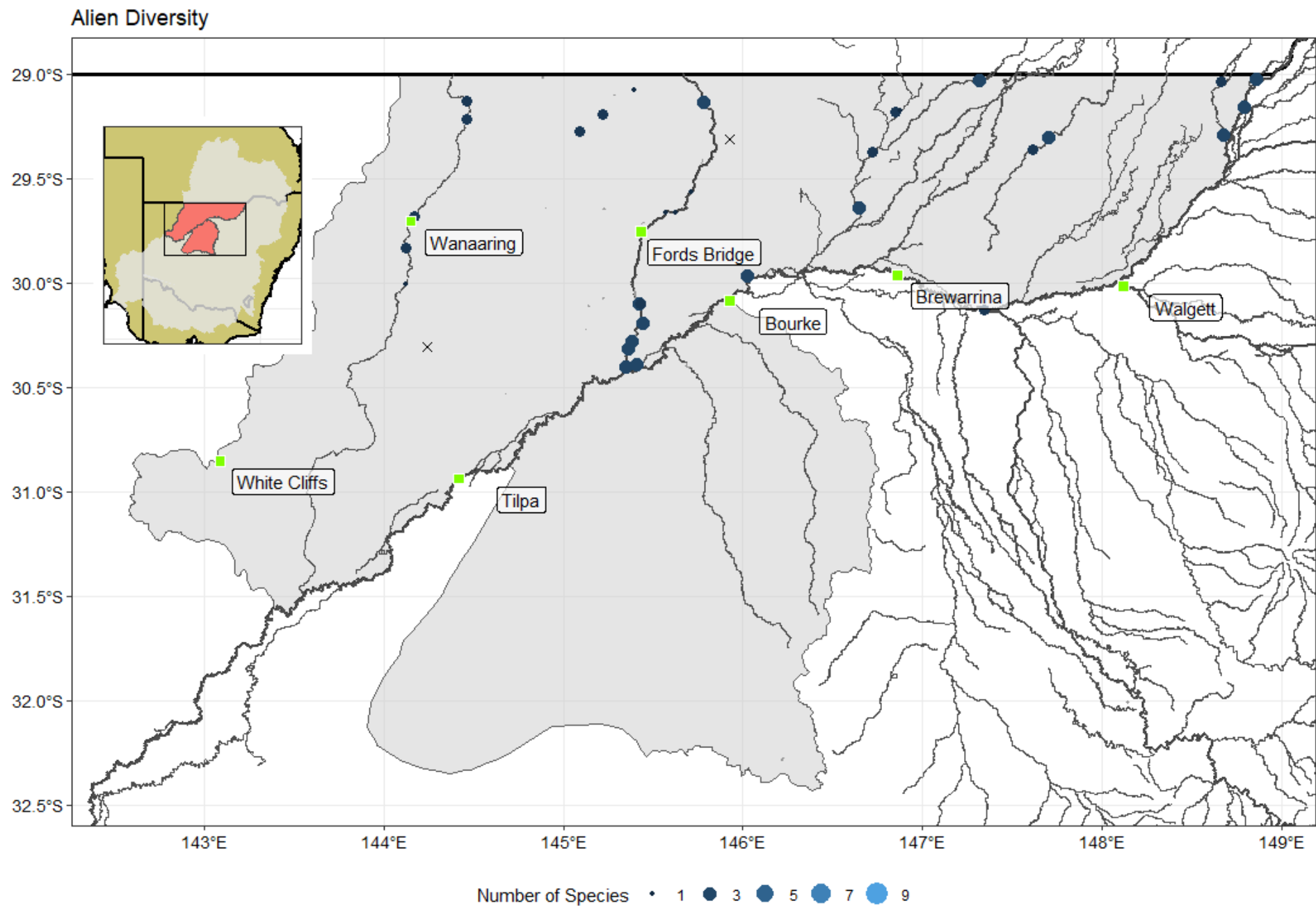


Figure 3.6: Alien diversity across all sampling sites. Bubble size represents the number of unique species observed at each site across all sampling methods and events. X represents a site that had water and was sampled, but no fish species were caught at all. Green squares show key towns. Dry sites are excluded.

3.7 Murray cod



3.7.0.1 Summary Statement:

Over the reporting period no Murray cod were caught in the Intersecting Streams WRPA during standardised sampling. Overall, this suggests that Murray cod only occur in very low abundances in the Intersecting Streams WRPA.

3.8 Golden perch



3.8.1 Population Structure

Figure 3.7 shows the observed length frequency plot for Golden perch for each of the sampling seasons. The observed numbers of Young of the Year (YOY) ranged from 1 to 57, and 7% to 88% of measured fish within a season, with a mean percentage YOY of 42%.

Overall, during the reporting period, across all the MDB water resource planning areas, the percentage YOY for Golden perch was 7% (577 out of 8,543).

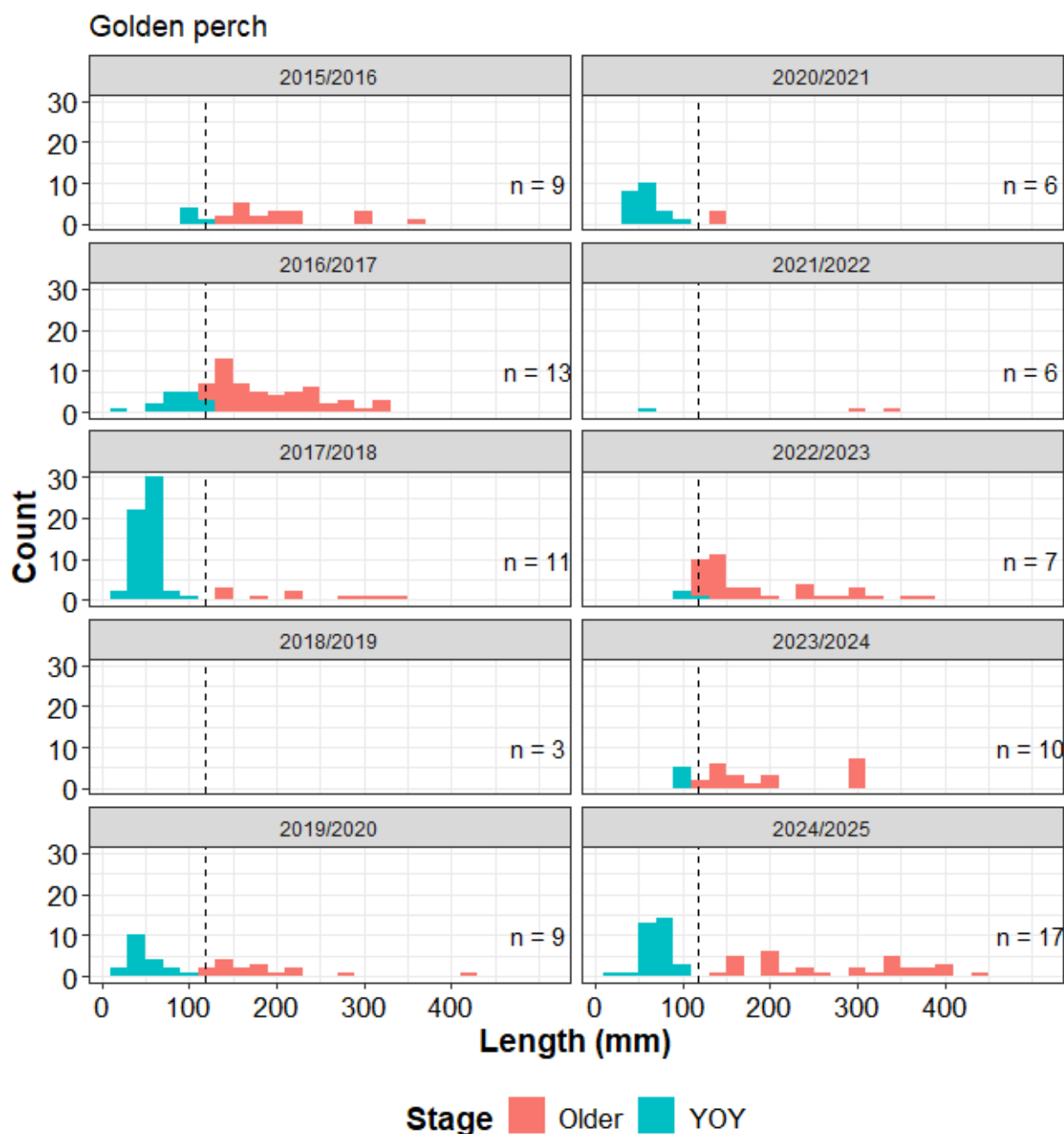


Figure 3.7: Length frequency plots for Golden perch by sampling season. YOY represents Young of the Year fish. n shows the number of sampling events in each season. Note some stages may appear either side of the cut-off line due to binning of data in the histogram.

3.8.1.1 Summary Statement:

Sporadic recruitment with possible recruitment failures in 2018/19, 2021/22 and 2022/23. There is evidence of strong recruitment in 2024/25.

3.8.1.2 Stocking

A total of 0 Golden perch were stocked into the waterways of the Intersecting Streams WRPA during the reporting period.

3.8.2 Temporal Trends in Abundance

The relative abundance and biomass of Golden perch since 1994 was modelled based on all suitable boat electrofishing data. The left-hand panels of Figure 3.8 show the abundance and biomass trends for the Intersecting Streams WRPA and the right-hand panels show the overall trends across the NSW MDB.

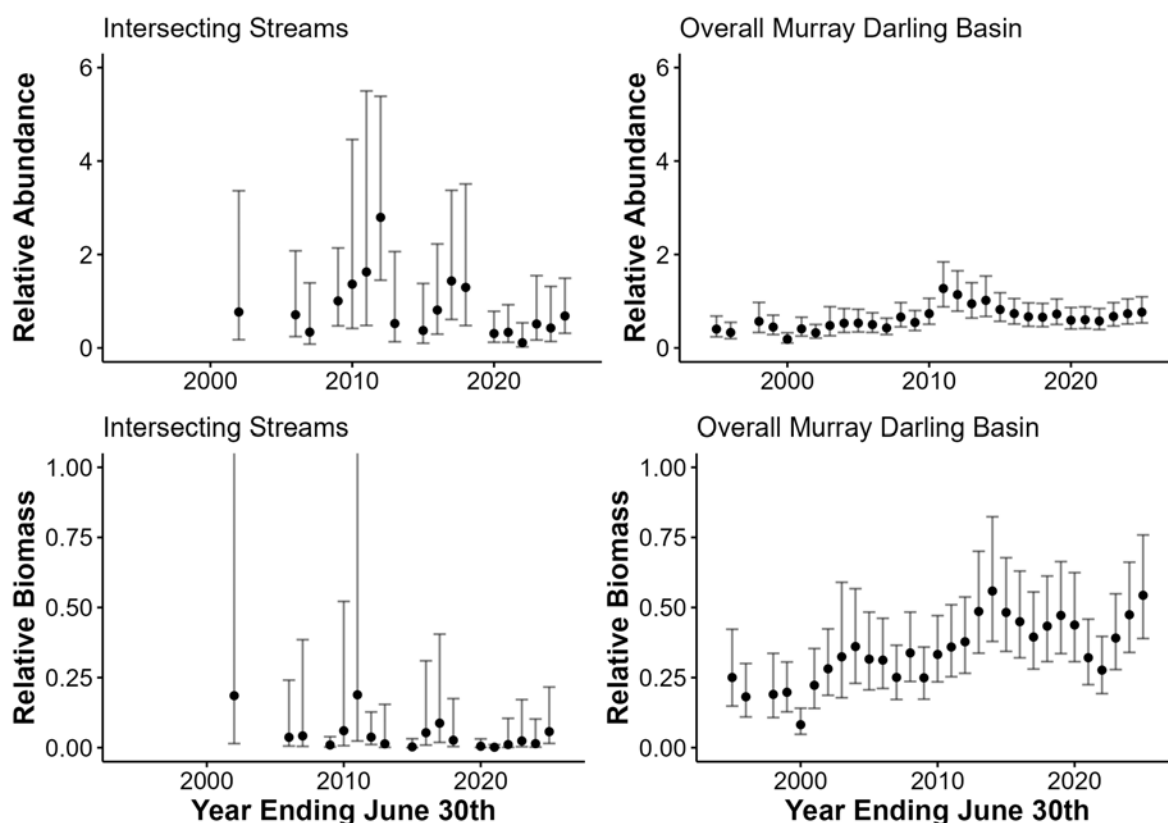


Figure 3.8: Relative abundance and biomass of Golden perch in both this WRPA and the overall Murray-Darling Basin. These are model estimates based upon all boat electrofishing data within the NSW DPIRD Freshwater ecosystem database and the output of generalised linear mixed models. Error bars show the 95% confidence intervals around the estimates. Some error bars may be truncated for clarity.

3.8.2.1 Summary Statement:

Relative abundance has fluctuated since the 2000s but has been trending slightly upwards since 2021 and is approximately equal to the overall NSW MDB. Biomass has remained relatively stable since 2020 and is considerably lower than the overall NSW MDB.

3.8.3 Health

The prevalence of any health issues ranged from 0% of sampled fish in 2020/2021 to 44% of sampled fish in 2023/2024 (Figure 3.9). The most common health issue for Golden perch in the Intersecting Streams water resource planning area was the presence of the parasite *Lernaea*, which was observed in a total of 27 fish, corresponding to 8% of all Golden perch measured.

Across the other WRPA's, 24% of Golden perch (2,010 out of 8,543 Golden perch) showed a health condition (excludes Intersecting Streams).

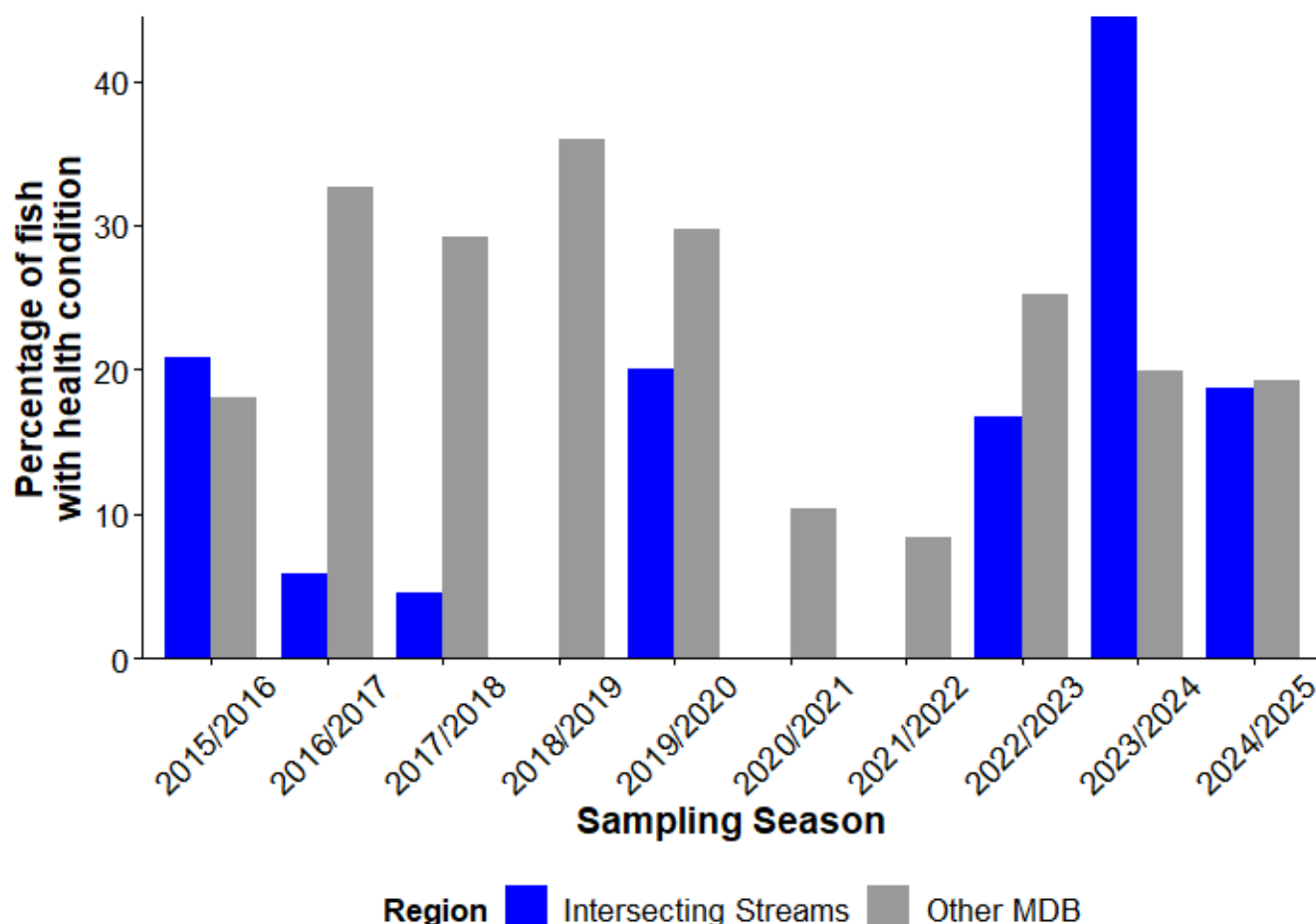


Figure 3.9: Timeseries showing the prevalence of health conditions in Golden perch. Blue shows the region-specific data while the grey shows the average across the other NSW MDB WRPA's.

3.8.3.1 Summary Statement:

The presence of observable health conditions for Golden perch in the Intersecting Streams was variable and ranged from low to high. While most years showed similar occurrence to the rest of the NSW MDB, no health issues were recorded in 2020/21 and 2021/22. 2024/25 showed a moderate proportion of recorded health conditions similar to the wider NSW MDB.

3.8.4 Distribution

Golden perch were recorded at 33 out of 39 sites in the Intersecting Streams WRP. The maximum observed relative abundance at a site was 1.2 fish caught per 90 seconds of electrofishing. Figure 3.10 shows the distribution and relative abundance of Golden perch across the Intersecting Streams WRP.

3.8.4.1 Summary Statement:

Golden perch were generally found in the north and western regions of the Intersecting Streams WRP.

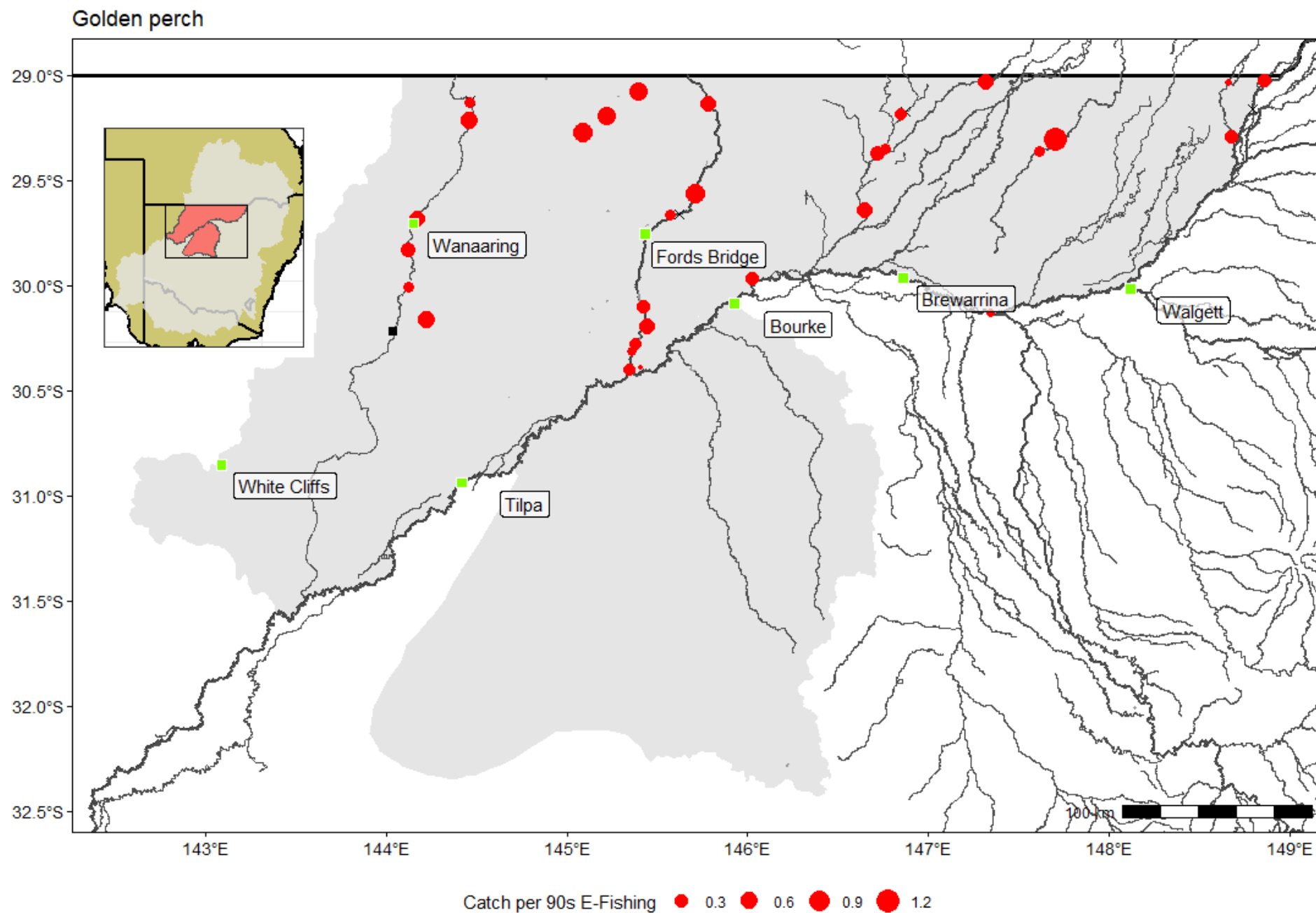


Figure 3.10: Distribution of Golden perch. Filled circles show sites where the species was present, and the size of the circle represents relative abundance. Sites that were sampled with electrofishing but did not contain the species are shown with an X. Green squares show key towns.

3.9 Freshwater catfish



3.9.0.1 Summary Statement:

Over the reporting period no Freshwater catfish were caught in the Intersecting Streams WRPA during standardised sampling. Overall, this suggests that Freshwater catfish only occur in very low abundances in the Intersecting Streams WRPA.

3.10 Bony herring



3.10.1 Population Structure

Figure 3.11 shows the observed length frequency plot for Bony herring for each of the sampling seasons. The observed numbers of Young of the Year (YOY) ranged from 1 to 235, and 3% to 100% of measured fish within a season, with a mean percentage YOY of 41%.

Overall, during the reporting period, across all the MDB water resource planning areas, the percentage YOY for Bony herring was 24% (12,657 out of 53,166). Bony herring are not a stocked species.

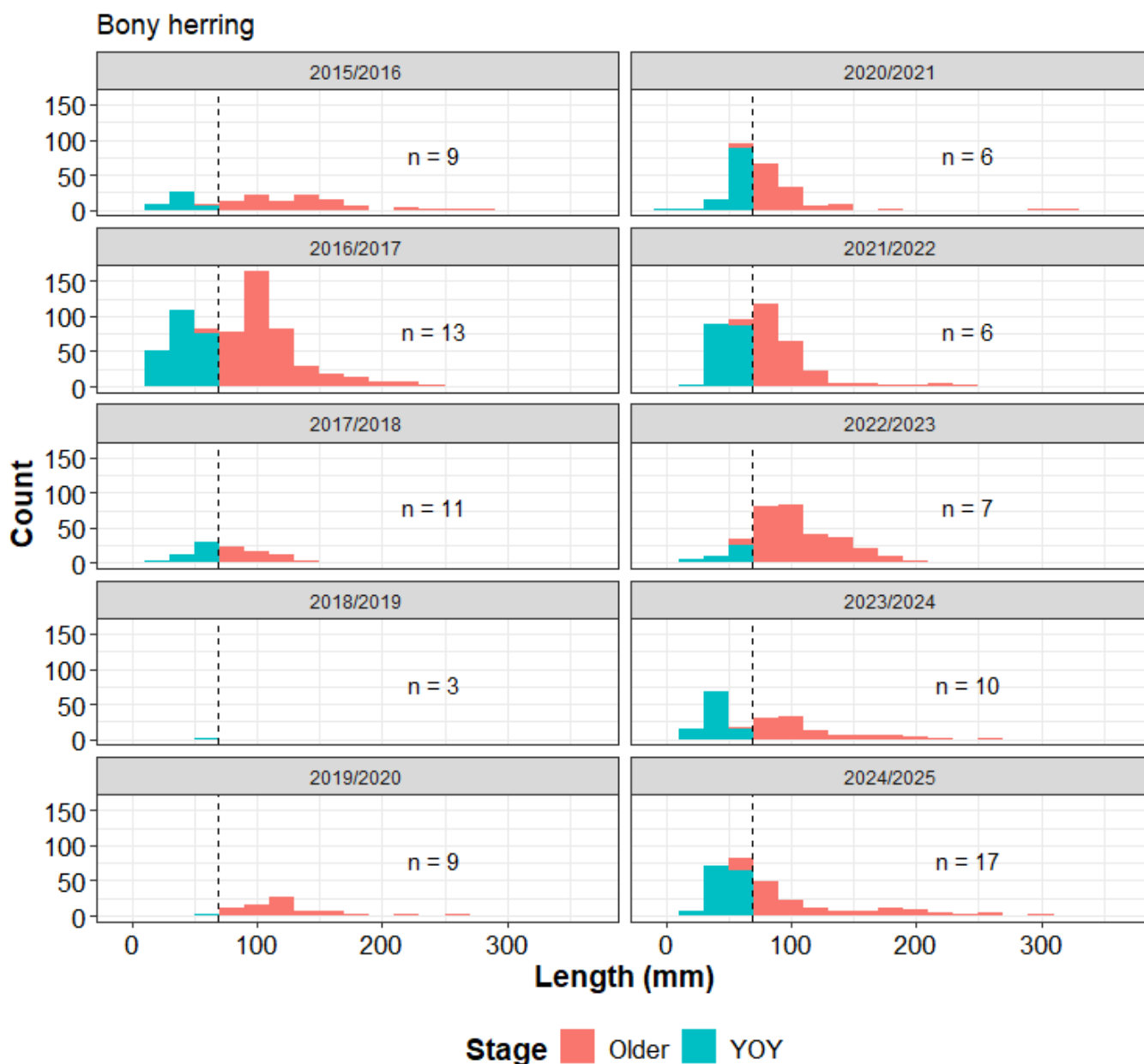


Figure 3.11: Length frequency plots for Bony herring by sampling season. YOY represents Young of the Year fish. n shows the number of sampling events in each season. Note some stages may appear either side of the cut-off line due to binning of data in the histogram.

3.10.1.1 Summary Statement:

Regular recruitment in most years except 2018/19 and 2019/20. Note that low sampling effort in some years may limit the ability to detect recruitment in this WRPA.

3.10.2 Temporal Trends in Abundance

The relative abundance and biomass of Bony herring since 1994 was modelled based on all suitable boat electrofishing data. The left-hand panels of Figure 3.12 show the abundance and biomass trends for the Intersecting Streams WRPA and the right-hand panels show the overall trends across the NSW MDB.

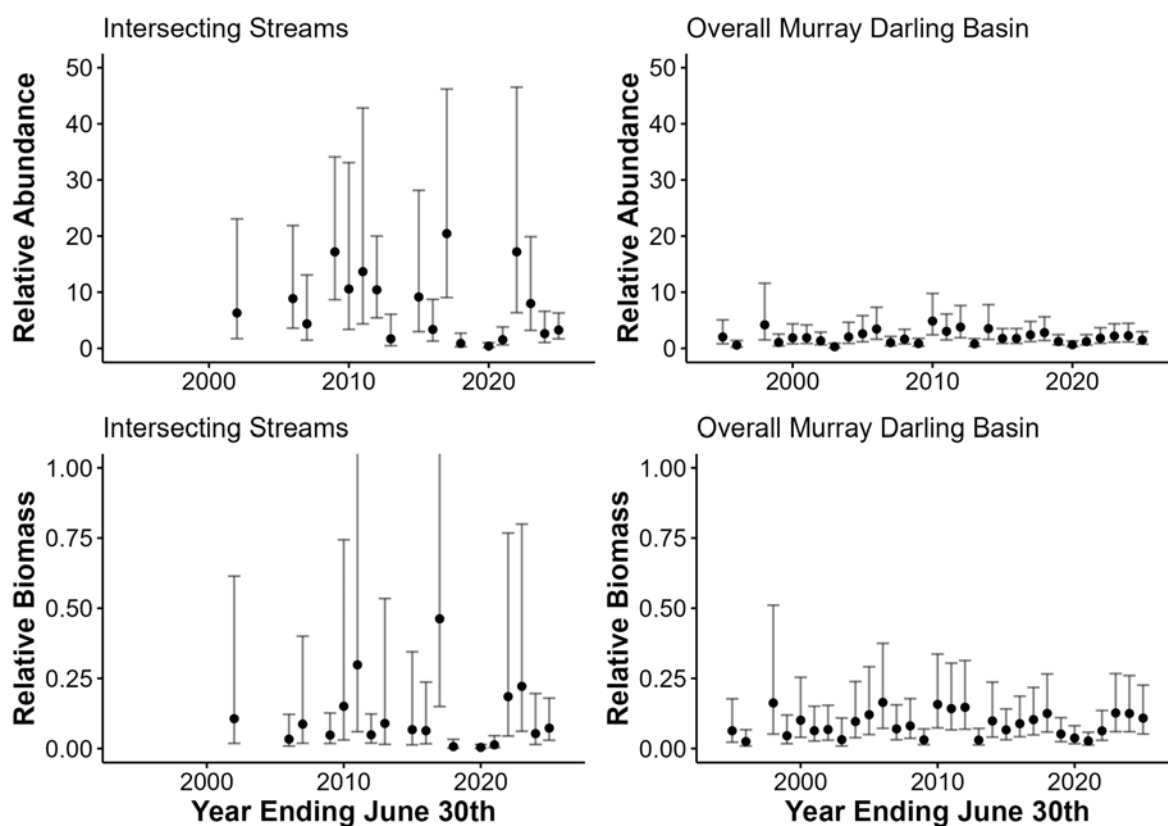


Figure 3.12: Relative abundance and biomass of Bony herring in both this WRPA and the overall NSW MDB. These are model estimates based upon all boat electrofishing data within the NSW DPIRD Freshwater ecosystem database and the output of generalised linear mixed models. Error bars show the 95% confidence intervals around the estimates. Some error bars may be truncated for clarity.

3.10.2.1 Summary Statement:

Abundance and biomass both highly variable since the 2000s but both show evidence of a decline over the last 4 years. Abundance and biomass in 2024/25 comparable to the overall NSW MDB.

3.10.3 Health

The prevalence of any health issues ranged from 0% of sampled fish in 2015/2016 to 8% of sampled fish in 2023/2024 (Figure 3.13). The most common health issue for Bony herring in the Intersecting Streams WRPAs was Fungus, which was observed in a total of 51 fish, corresponding to 2% of all Bony herring measured.

Across the other NSW MDB WRPA, 1% of Bony herring (599 out of 53,168 Bony herring) showed a health condition (excludes the Intersecting Streams WRPAs).

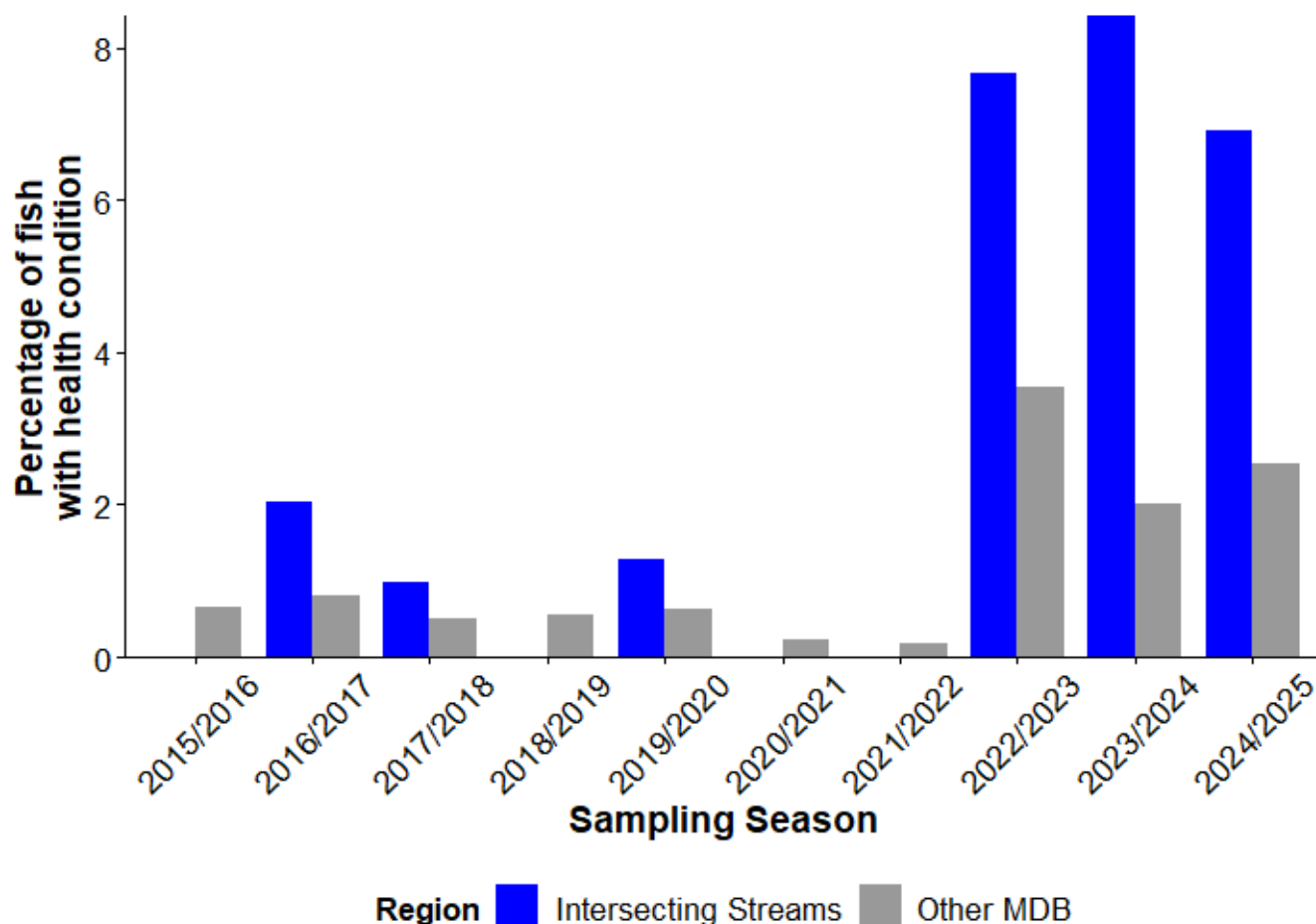


Figure 3.13: Timeseries showing the prevalence of health conditions in Bony herring. Blue shows the region-specific data while the grey shows the average across the other NSW MDB WRPA.

3.10.3.1 Summary Statement:

Presence of observable health conditions was low in all years but from 2022/23 to 2024/25 there was a higher level of observed health conditions.

3.10.4 Distribution

Bony herring were recorded at 32 out of 39 sites in the Intersecting Streams WRPA. The maximum observed relative abundance at a site was 46.4 fish caught per 90 seconds of electrofishing. Figure 3.14 shows the distribution and relative abundance of Bony herring across the Intersecting Streams WRPA.

3.10.4.1 Summary Statement:

Bony herring were recorded across the Intersecting Streams WRPA.

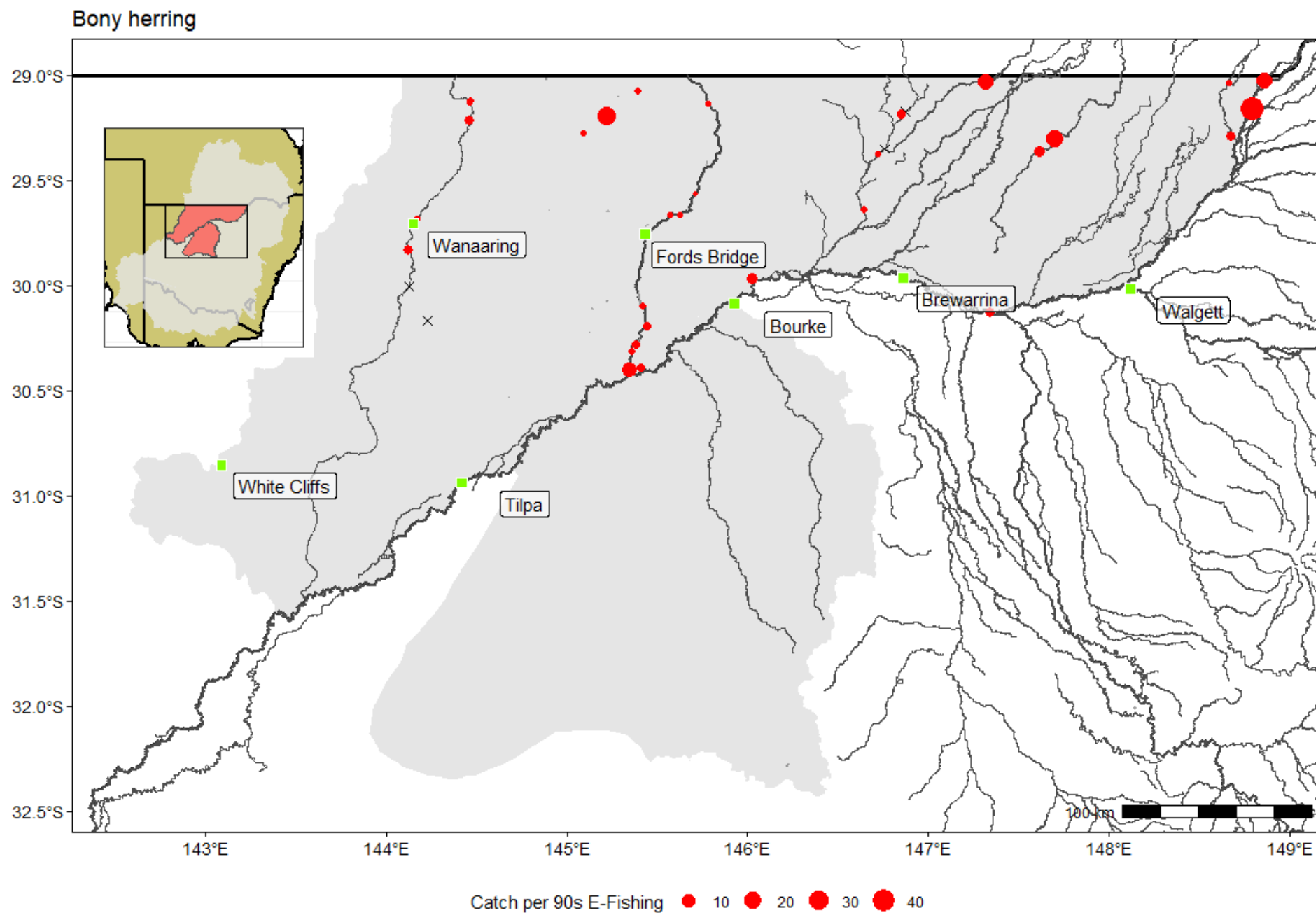


Figure 3.14: Distribution of Bony herring. Filled circles show sites where the species was present, and the size of the circle represents relative abundance. Sites that were sampled with electrofishing but did not contain the species are shown with an X. Green squares show key towns.

3.11 Australian smelt



3.11.0.1 Summary Statement:

Over the reporting period only 3 Australian smelt were caught in the Intersecting Streams WRPAs during standardised sampling. Zero of these occurred in 2024/25. Overall, this suggests that Australian smelt only occur in very low abundances in the Intersecting Streams WRPAs.

3.12 Common carp



3.12.1 Population Structure

Figure 3.15 shows the observed length frequency plot for Common carp for each of the sampling seasons. The observed numbers of Young of the Year (YOY) ranged from 17 to 310, and 49% to 97% of measured fish within a season, with a mean percentage YOY of 81%.

Overall, during the reporting period, across all the MDB water resource planning areas, the percentage YOY for Common carp was 53% (34,492 out of 64,987). Common carp are not a stocked species.

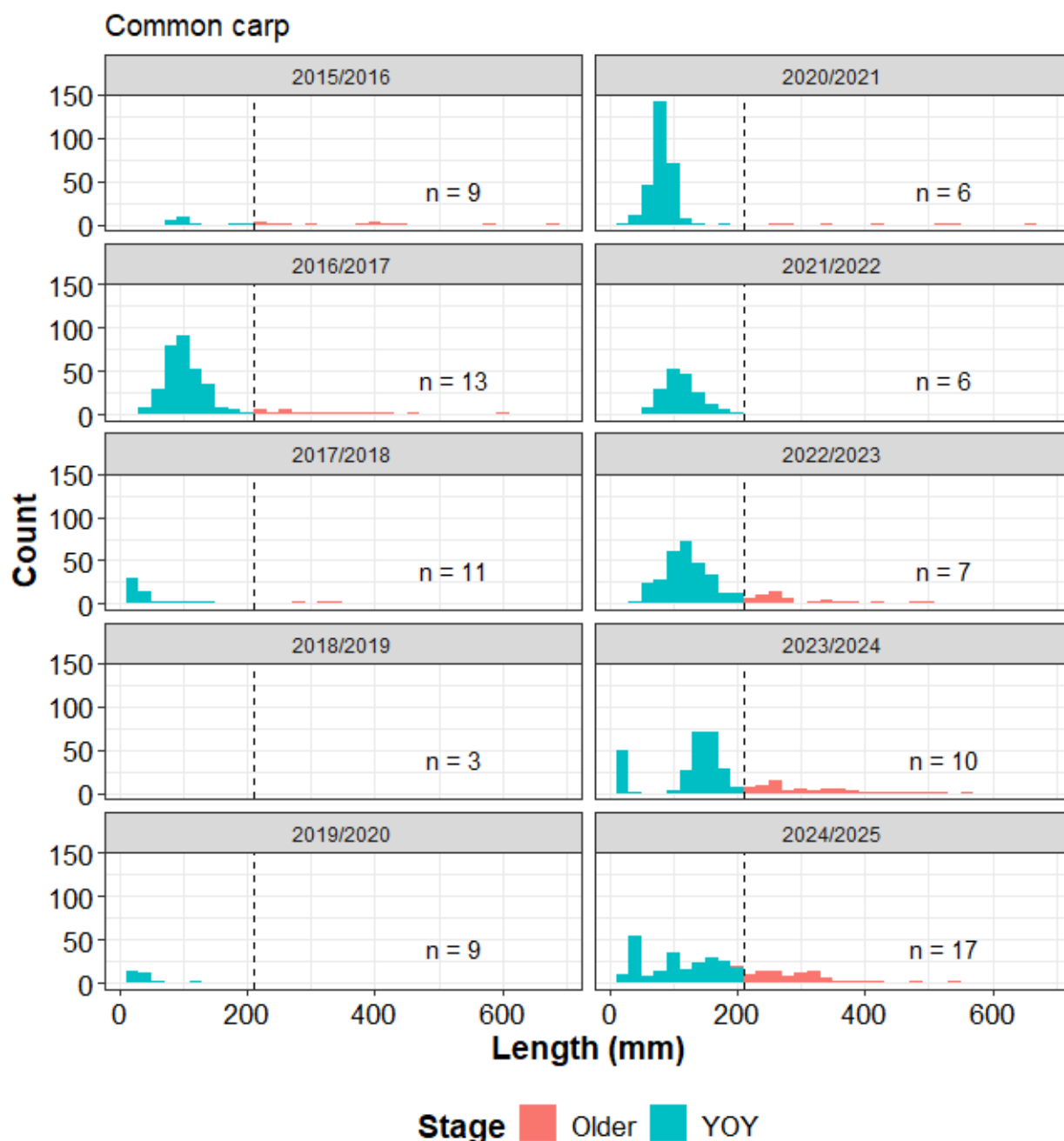


Figure 3.15: Length frequency plots for common carp by sampling season. YOY represents Young of the Year fish. n shows the number of sampling events in each season. Note some stages may appear either side of the cut-off line due to binning of data in the histogram.

3.12.1.1 Summary Statement:

Variable recruitment with very strong peaks in 2016/17, 2021/22, 2022/23 and 2023/24. Moderate recruitment in 2024/25. Large fish (>500 mm) present in low abundance in most years compared to other WRPA's. Note low sampling effort in some years.

3.12.2 Temporal Trends in Abundance

The relative abundance and biomass of Common carp since 1994 was modelled based on all suitable boat electrofishing data. The left-hand panels of Figure 3.16 show the abundance and biomass trends for the Intersecting Streams WRPAs and the right-hand panels show the overall trends across the NSW MDB.

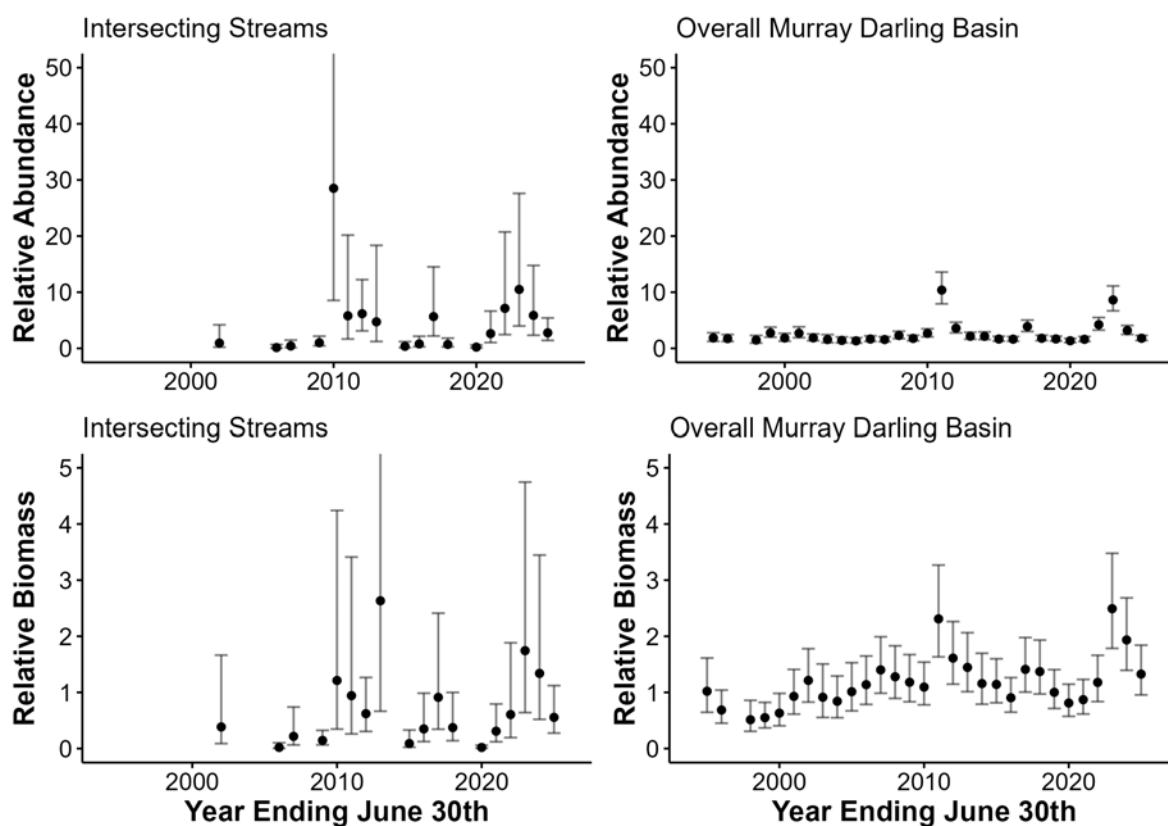


Figure 3.16: Relative abundance and biomass of Common carp in both this valley and the overall Murray-Darling Basin. These are model estimates based upon all electrofishing data within the NSW DPIRD Freshwater ecosystem database and the output of generalised linear mixed models. Error bars show the 95% confidence intervals around the estimates. Some error bars may be truncated for clarity.

3.12.2.1 Summary Statement:

Abundance and biomass show evidence of a likely small increase from the early 2000s and are comparable to the wider NSW MDB. Both abundance and biomass appear to have decreased since 2022/23 when both were at high levels.

3.12.3 Health

The prevalence of any health issues ranged from 0% of sampled fish in 2015/2016 to 14% of sampled fish in 2023/2024 (Figure 3.17). The most common health issue for Common carp in the Intersecting Streams water resource planning area was Lesions, which was observed in a total of 49 fish, corresponding to 2% of all Common carp measured.

Across the other WRPAs, 4% of Common carp (2,334 out of 64,989 Common carp) showed a health condition (excludes Intersecting Streams).

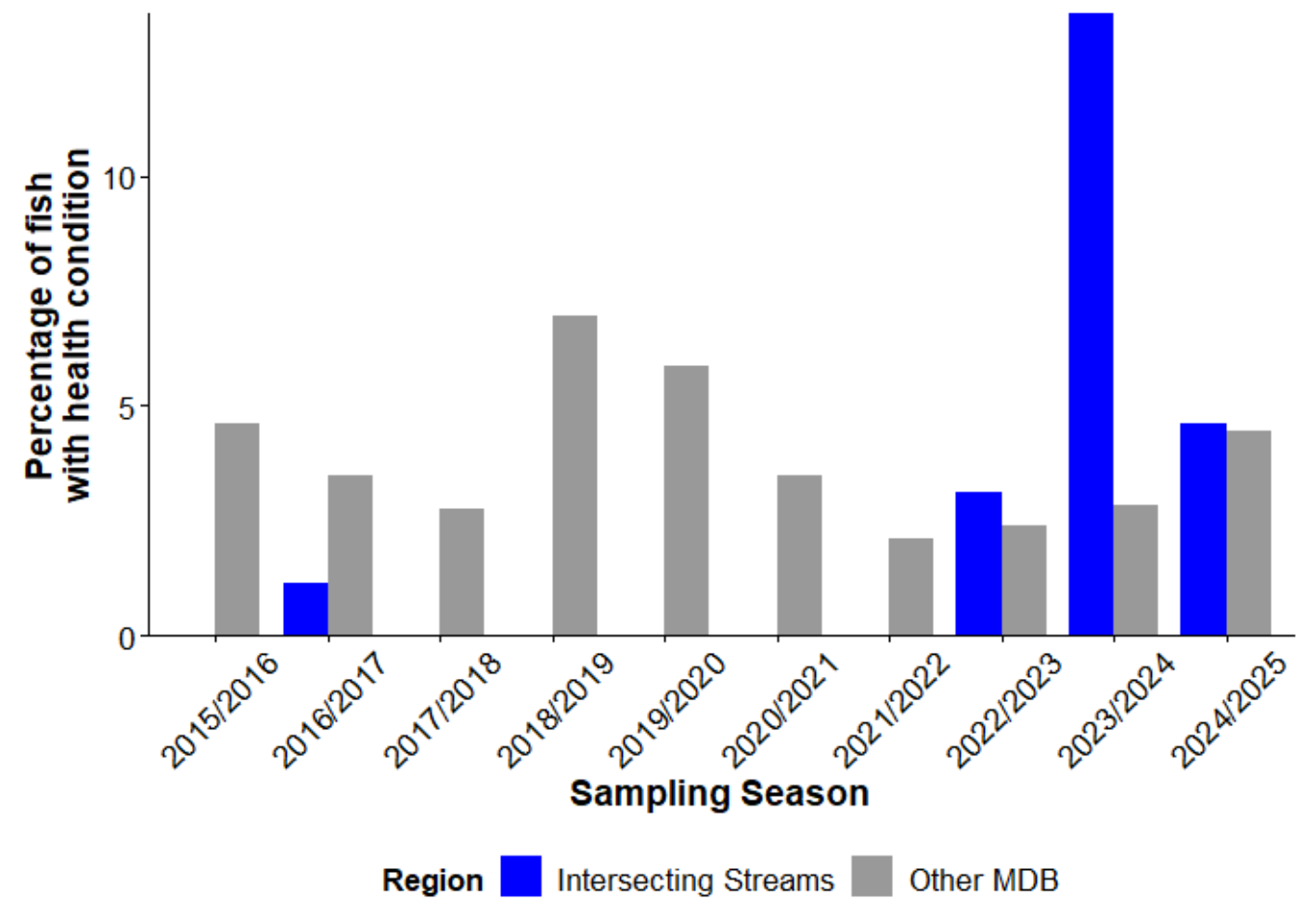


Figure 3.17: Timeseries showing the prevalence of health conditions in Common carp. Blue shows the region-specific data while the grey shows the average across the other NSW MDB WRPAs.

3.12.3.1 Summary Statement:

The presence of observable health conditions for Common carp in the Intersecting Streams was low with small increases after 2022/23. Presence of health conditions was similar to the overall Murray-Darling Basin in 2024/25.

3.12.4 Distribution

Common carp were recorded at 30 out of 39 sites in the Intersecting Streams WRP. The maximum observed relative abundance at a site was 17.1 fish caught per 90 seconds of electrofishing. Figure 3.18 shows the distribution and relative abundance of Common carp across the Intersecting Streams WRP.

3.12.4.1 Summary Statement:

Common carp were found across the Intersecting Streams region.

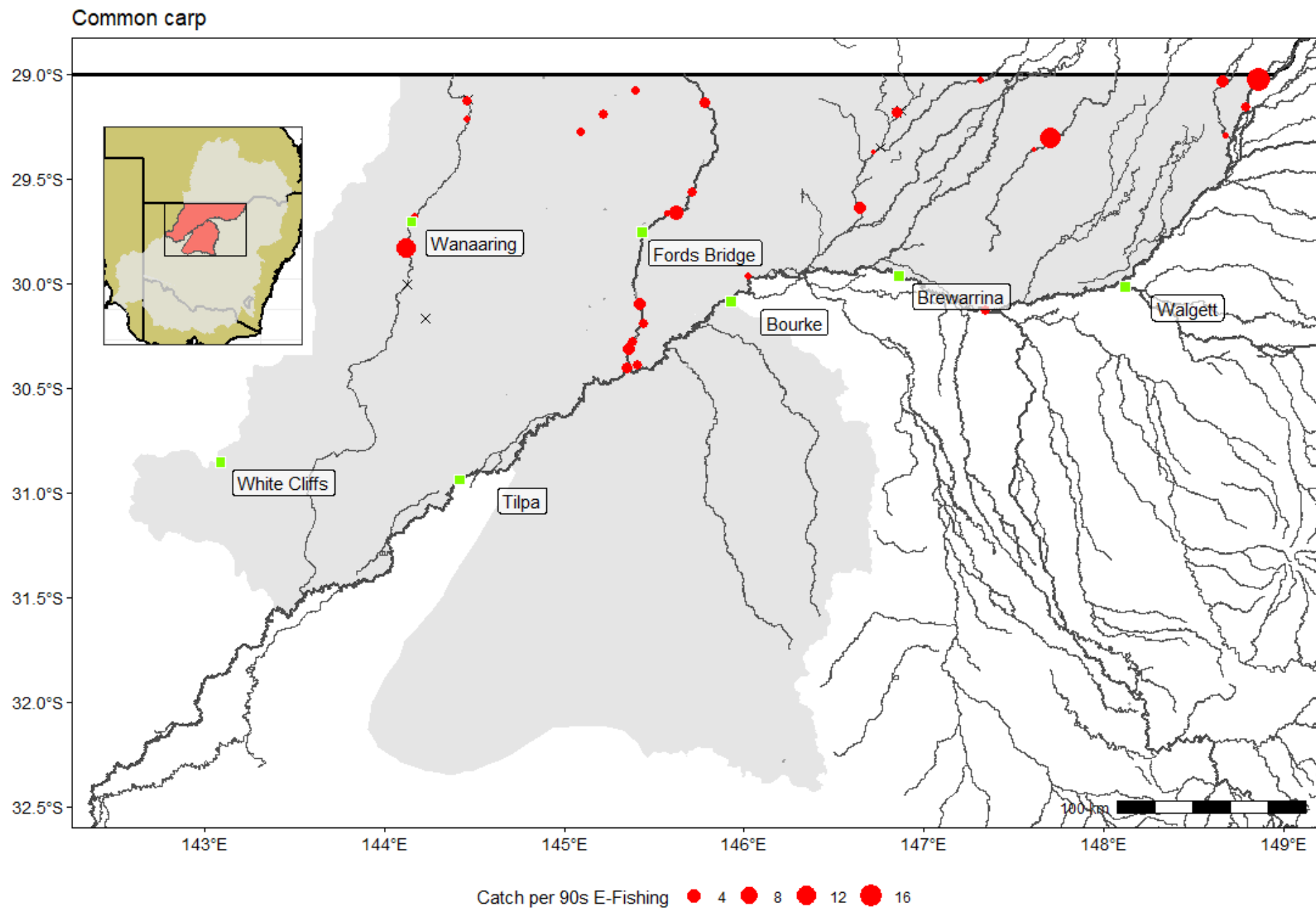


Figure 3.18: Distribution of Common carp. Filled circles show sites where the species was present, and the size of the circle represents relative abundance. Sites that were sampled with electrofishing but did not contain the species are shown with an X. Green squares show key towns.

3.13 Threatened Species

The following table (Table 3.4) shows the fish species listed under either the *NSW Fisheries Management Act 1994* (FMA) or the *Commonwealth Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) which were observed in the Intersecting Streams Water Resource Planning Area during the reporting period. A list of all threatened fish species observed by NSW DPIRD Fisheries (as part of any sampling program in any area) is provided in Table 3.8.

Table 3.4: Listed species which were observed in this region during the sampling period.

Species	Common name	Total caught	Total observed (not caught)
<i>Ambassis agassizii</i>	Olive perchlet	25	1

The following pages provide more information on where each species was caught.

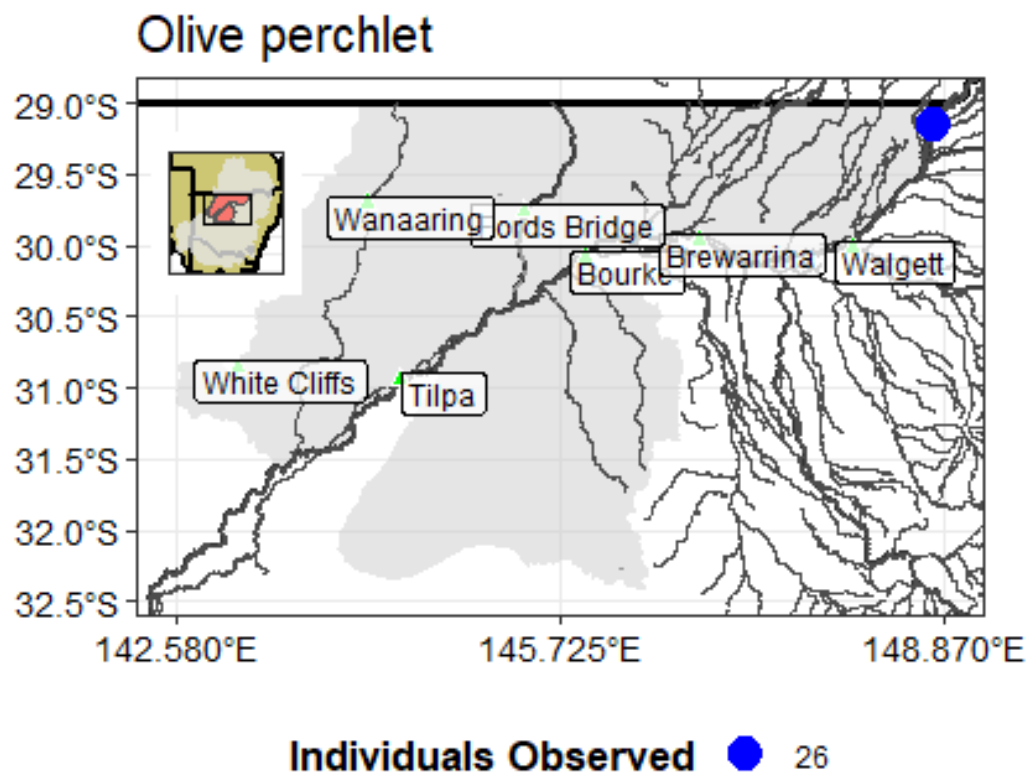


Figure 3.19: Distribution of the observed threatened species. Filled circles show sites where the species was present, and the size of the circle represents number of observed individuals abundance. Green triangles show key towns.

3.13.0.1 Summary Statement:

25 Olive perchlet were caught and one was observed at Cubberoo Lagoon in 2016/17. This site has not been sampled since.

3.14 Appendix

This report contains data from the projects listed in Table 3.5.

Table 3.5: Projects included in this report. Sampling Events show the total number of sampling events included from each project. Sampling Seasons shows which sampling seasons each project contributed data to.

Project Name	Sampling Seasons	Sampling Events
Basin Plan Environmental Outcomes Monitoring	2015/2016, 2016/2017, 2017/2018, 2018/2019, 2019/2020	28
Basin Plan Environmental Outcomes Monitoring 2	2022/2023, 2023/2024, 2024/2025	19
FlowMER2.0 - Northern Basin	2024/2025	8
Toorale Long Term Intervention Monitoring	2015/2016, 2016/2017, 2017/2018, 2019/2020, 2020/2021, 2021/2022, 2022/2023, 2023/2024	61

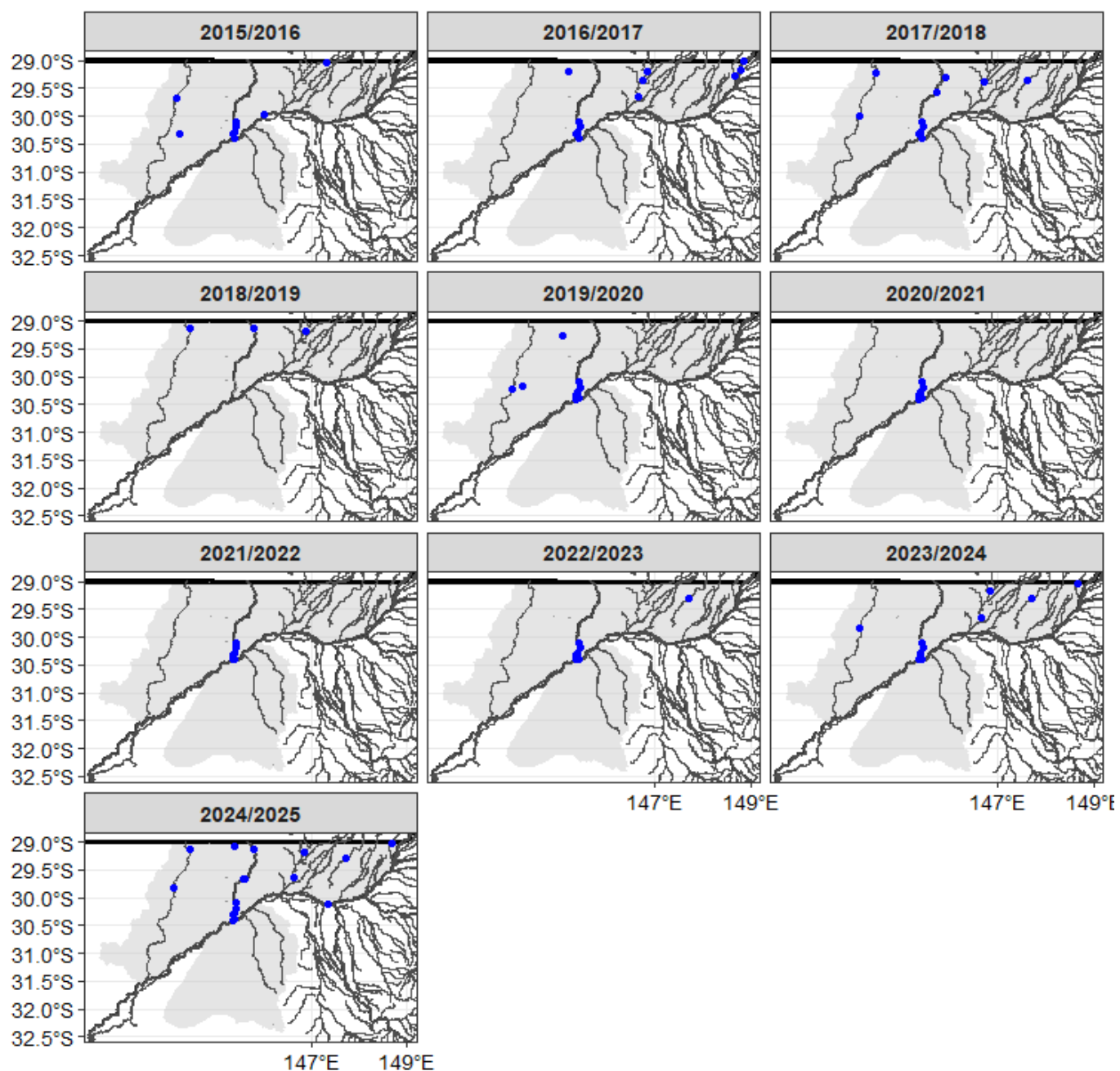


Figure 3.20: Sites sampled and included in this report by sampling season. Dry sites are not shown.

Table 3.6 shows all species detected during this survey period as part of standardised monitoring projects (see Table 3.5). Note there are variations in effort between sampling seasons so this information should be considered in conjunction with Table 3.1. The Expected from Modelling column identifies species which are possible to occur based upon MaxENT habitat modelling (likelihood threshold > 0.33; NA represents no modelling was undertaken). Species that were possible from the modelling but not observed during standardised sampling in the Intersecting Streams WSPA were: Silver perch, Murray hardyhead, Unspecked hardyhead, Murray cod, Southern purple-spotted gudgeon, Freshwater catfish, Redfin. It should be noted that the MaxENT modelling models habitat availability and is not always a reliable index of abundance, it merely indicates possible distribution based upon habitat. A full list of species observed during this period across the standardised monitoring protocols and sampling methods is presented in Table 3.9.

Table 3.6: Total number caught of each species by sampling season. Sampling season refers to the July-June ending June 30th of the specified year.

Common name	Expected from modelling	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Australian smelt	YES	0	2	0	0	0	0	0	1	0	0
Bony herring	YES	275	1,827	103	1	78	392	648	467	442	645
Carp gudgeon species complex	YES	6	2	0	0	37	5	1	0	0	0
Common carp	NA	35	465	74	0	38	383	186	725	515	378
Desert rainbowfish	NA	0	0	0	0	0	0	0	5	0	13
Eastern gambusia	NA	11	120	10	1	1	24	14	7	2	60
Golden perch	YES	23	69	67	0	35	25	3	41	23	62
Goldfish	NA	2	199	7	1	3	3	3	29	20	21
Hyrtl's catfish	YES	6	24	2	0	0	0	0	1	4	2
Murray-Darling rainbowfish	YES	5	24	3	0	0	2	2	0	1	0
Olive perchlet	YES	0	25	0	0	0	0	0	0	0	0
Spangled perch	YES	15	183	23	0	3	18	84	60	30	62

The following table summaries the sampling methods for each species caught (Table 3.7).

Table 3.7: Total catch of each species by sampling method.

Common name	Backpack Electrofishing	Bait Trap	Boat Electrofishing
Australian smelt	0	0	3
Bony herring	73	8	4,797
Carp gudgeon species complex	0	47	4
Common carp	192	99	2,508
Desert rainbowfish	4	0	14
Eastern gambusia	70	1	179
Golden perch	39	24	285
Goldfish	3	3	282
Hyrtl's catfish	8	14	17
Murray-Darling rainbowfish	5	0	32
Olive perchlet	0	2	23
Spangled perch	60	121	297

Table 3.8: Listed threatened species recorded in the Murray-Darling Basin (from the NSW DPIRD Fisheries Freshwater Ecosystem research database). Species are listed under either the NSW Fisheries Management Act 1994 (FMA) or the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC)

Genus, species	Common Name	EPBC Status	FMA Status
<i>Ambassis agassizii</i>	Agassiz's glassfish, olive perchlet, western New South Wales population	NA	Endangered Population
<i>Bidyanus bidyanus</i>	Silver Perch, Bidyan	Endangered	Vulnerable
<i>Craterocephalus fluviatilis</i>	Murray Hardyhead	Endangered	Critically Endangered
<i>Galaxias rostratus</i>	Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow	Critically Endangered	Critically Endangered
<i>Galaxias tantangara</i>	Stocky Galaxias	NA	Critically Endangered
<i>Maccullochella macquariensis</i>	Trout Cod	Endangered	Endangered
<i>Maccullochella peelii</i>	Murray Cod	Vulnerable	NA
<i>Macquaria australasica</i>	Macquarie Perch	Endangered	Endangered
<i>Mogurnda adspersa</i>	Southern Purple Spotted Gudgeon	NA	Endangered
<i>Nannoperca australis</i>	Southern Pygmy Perch	Vulnerable	Endangered
<i>Tandanus tandanus</i>	Freshwater catfish, eel tailed catfish, Murray-Darling Basin population	NA	Endangered Population

Table 3.9 shows all species detected during this survey period across all programs and methods. Due to variations in project methods protocols, this data is presented only to give a complete list of species observed in the region. The Expected from Modelling column identifies species which are possible to occur based upon MaxENT habitat modelling (likelihood threshold > 0.33; NA represents no modelling was undertaken). Species that were possible from the modelling but not observed during standardised sampling in the Intersecting Streams WRPA were: Silver perch, Murray hardyhead, Unspecked hardyhead, Southern purple-spotted gudgeon, Freshwater catfish, Redfin. It should be noted that the MaxENT modelling actually models habitat availability and is not always a reliable index of abundance, it merely indicates possible distribution based upon habitat. A list of species caught as part of standardised monitoring during this period is in Table 3.6.

Table 3.9: Total catch of each species by all sampling programs and all methods in the region. Sampling season refers to the July-June ending June 30th of the specified year. Note these include projects with sampling not representative of the community and the data should be interpreted with appropriate caution.

Common name	Expected from modelling	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Australian smelt	YES	0	16	0	0	29	0	0	1	0	3,941
Bony herring	YES	292	2,726	122	1	130	532	830	539	455	7,214
Carp gudgeon species complex	YES	59	12	0	0	1,518	22	1	0	3	23
Common carp	NA	50	803	503	0	660	1,039	2,814	5,960	809	10,569
Desert rainbowfish	NA	0	0	0	0	0	0	0	5	1	236
Eastern gambusia	NA	12	447	29	1	13	42	17	9	3	1,027
Golden perch	YES	54	131	359	0	1,067	95	81	75	44	12,609
Goldfish	NA	4	402	7	1	13	133	18	147	58	58
Hyrtl's catfish	YES	171	892	5	0	4	3	370	991	583	8,353
Murray cod	YES	0	0	0	0	0	0	0	0	0	1
Murray-Darling rainbowfish	YES	5	86	4	0	0	3	3	1	1	0
Olive perchlet	YES	0	25	0	0	0	0	0	0	0	0
Spangled perch	YES	262	857	40	0	22	574	3,392	2,931	176	22,116
Unidentified fish	NA	0	0	0	0	0	0	0	0	0	8

3.14.1 References

- Crook D. A., Schilling H. T., Gilligan D. M., Asmus M., Boys C. A., Butler G. L., Cameron L. M., Hohnberg D., Michie L. E., Miles N. G., Rayner T. S., Robinson W. A., Rourke M. L., Stocks J. R., Thiem J. D., Townsend A., van der Meulen D. E., Wooden I., Cheshire K. J. M. (2023) Multi-decadal trends in large-bodied fish populations in the New South Wales Murray–Darling Basin, Australia. *Marine and Freshwater Research* **74**, 899-916. <https://doi.org/10.1071/MF23046>
- Davies, P.E., Harris, J.H., Hillman, T.J. and Walker, K.F., 2010. The sustainable rivers audit: assessing river ecosystem health in the Murray–Darling Basin, Australia. *Marine and Freshwater Research*, **61**(7), 764-777. <https://doi.org/10.1071/MF09043>
- Schilling, H., Crook, D. 2023. Basin Plan Environmental Outcomes Monitoring for Fish (2014/15 – 2019/20): Water Resource Planning Area Reports. NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 517pp. (PUB23/369)
- Schilling, H., Crook, D. 2024. Basin Plan Fish Monitoring Summary (2014/15 – 2022/23): Water Resource Planning Area Reports. NSW Department of Primary Industries Fisheries, Port Stephens Fisheries Institute. 572pp. (PUB24/461)
- Schilling, H., Crook, D. 2025b. Basin Plan Fish Monitoring Summary (2014/15 – 2023/24): Water Resource Planning Area Reports. NSW Department of Primary Industries and Regional Development, Port Stephens Fisheries Institute. 625pp. (PUB25/277)