Considerations for the 2023 duck season

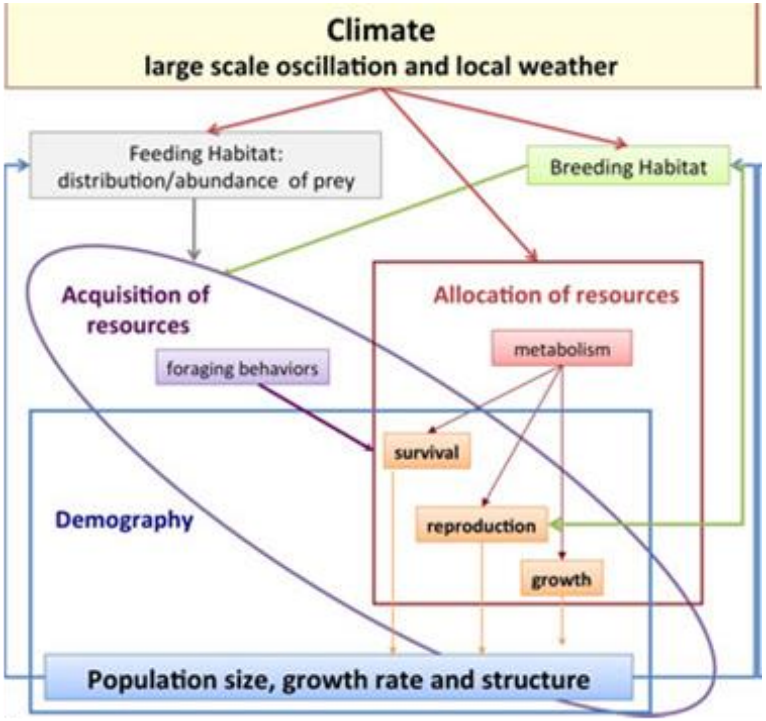
Current as at 20 December 2022

Game Management Authority


Past and present climatic conditions dictate environmental conditions
Climatic predictions can be used to consider whether environmental conditions will change into the future

Climatic conditions and waterfowl

- Climatic conditions, such as large scale oscillations (e.g. Southern Oscillation Index) and local weather (e.g. rainfall and temperature) can effect the distribution, productivity and size of waterfowl populations.
- In Australia, waterbird abundance is strongly related to river flows and rainfall (Kingsford *et al.* 2017).
- Large and extensive rainfall events can contribute to population increase as conditions are enhanced to support breeding and recruitment. Conversely, during dry periods, breeding may be modified or greatly reduced (see Kingsford and Norman 2002).
- Hunting during periods when there is little recruitment (e.g. dry periods) removes breeding adults which can negatively affect subsequent recruitment and further drive declines in hunted species (Kingsford *et al.* 2017).



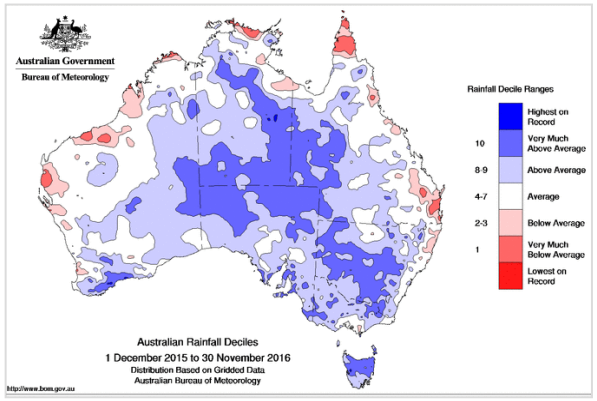
Climate effect on waterbird populations. Source: Jenouvrier 2013

Game Management Authority

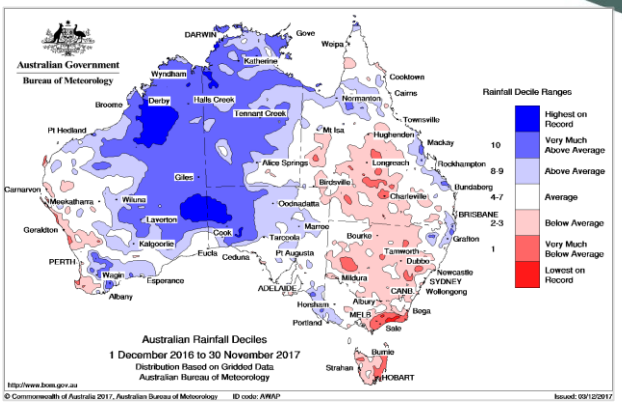
Annual rainfall deciles 2016 to 2022

(Deciles = rainfall received compared to historical averages)

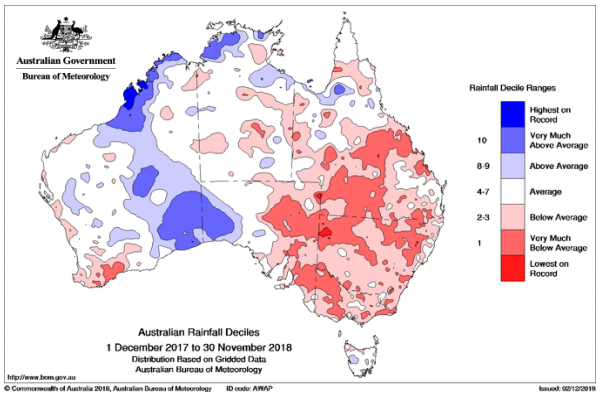
2016



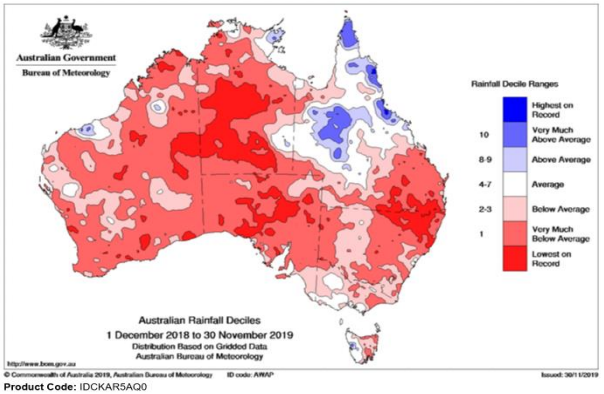
2017



2018



2019



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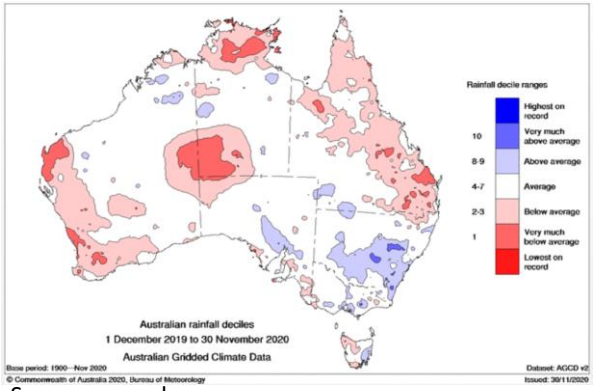
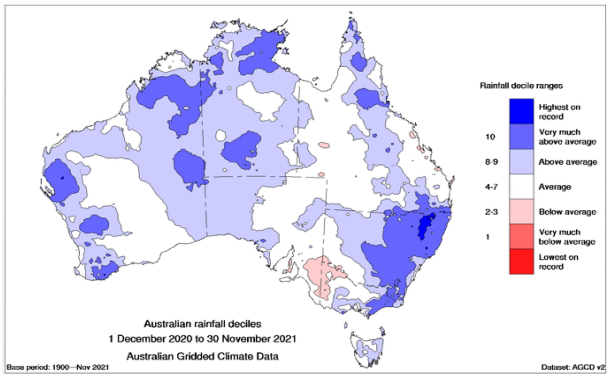
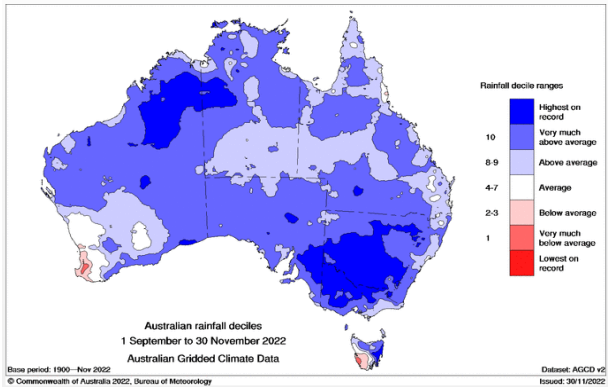
2020



2021



2022

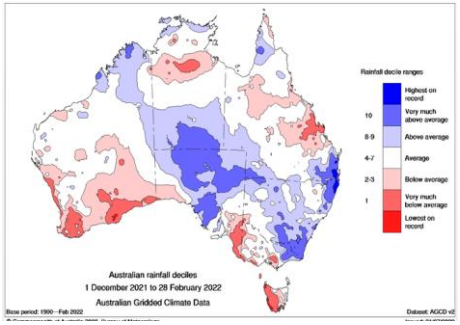


Source: www.bom.gov.au

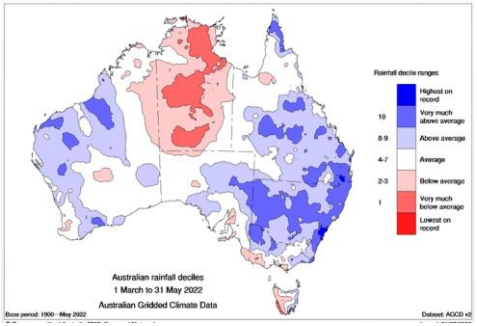
Game Management Authority

Rainfall through the seasons 2022

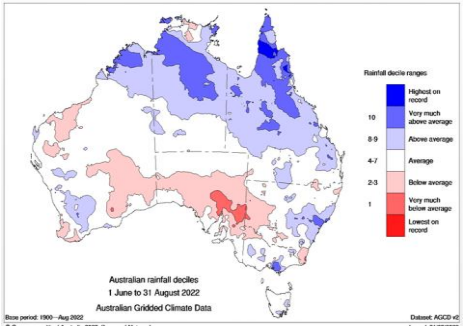
Summer



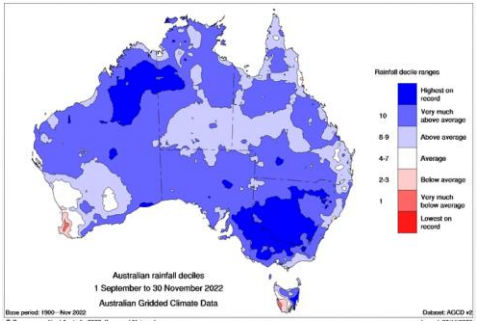
Autumn



Winter



Spring

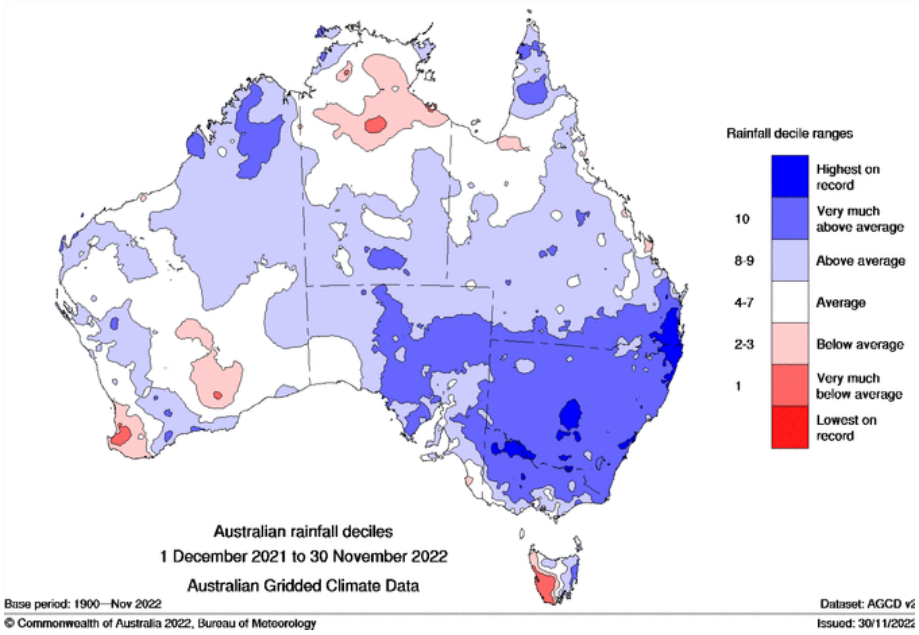


- **Summer:** In eastern Australia, much of NSW, parts of southern Queensland and eastern Victoria received above average rainfall over the summer period. Most of Queensland and Victoria received average to below average falls. South-eastern South Australia received below average rainfall.
- **Autumn:** NSW, the southern half of Queensland, northern Victoria and Gippsland received above average rainfall in autumn.
- **Winter:** Average rainfall was received across most of Victoria, half of NSW and parts of southern Queensland in winter. Below average rainfall was received in parts of western NSW and parts of south-east South Australia. All of northern Queensland experienced above average rainfall.
- **Spring:** All of eastern Australia received above average rainfall with most of Victoria and NSW receiving highest rainfall on record leading to extensive flooding.

Source: www.bom.gov.au

Year-to-date rainfall 2022

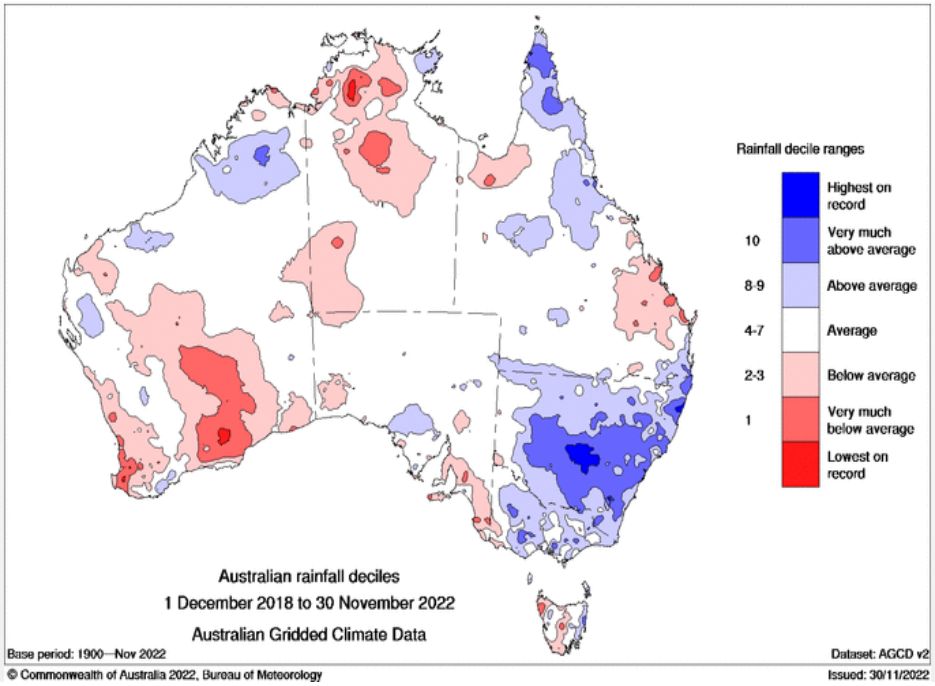
- Spring rainfall was the highest on record for NSW, Victoria and the Murray Darling Basin (MDB) as a whole, with very much above average rainfall received for most of Australia, fuelled by a weakening negative Indian Ocean Dipole and La Niña event.
- It was Australia's second wettest spring since the La Niña of 2010, and the tenth wettest since records began in 1900.
- Serious rainfall deficiencies have been cleared in most of Australia following very much above average spring rainfall.
- Record spring rainfall has resulted in many water storages in the northern MDB either at or above full capacity.



Source: www.bom.vic.gov.au

Four-year rainfall

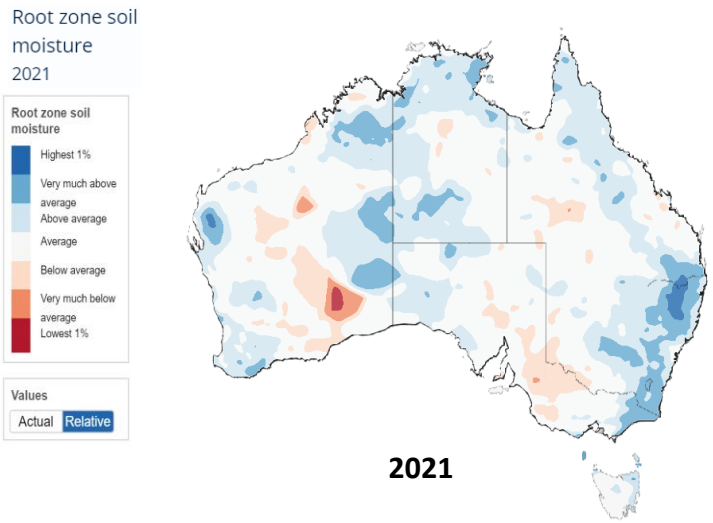
- Multi-year rainfall deficiencies which originated during the 2017-2019 drought have been almost entirely removed from the eastern states, with the largest area of remaining multi-year rainfall deficiencies in parts of Western Australia and northern NT.
- Seasonal conditions have improved over large areas in the last two years, with water storage levels significantly increasing across much of Australia, especially in the Murray-Darling Basin
- Many areas experiencing rainfall deficiencies for periods longer than 24 months have typically experienced above average rainfall.

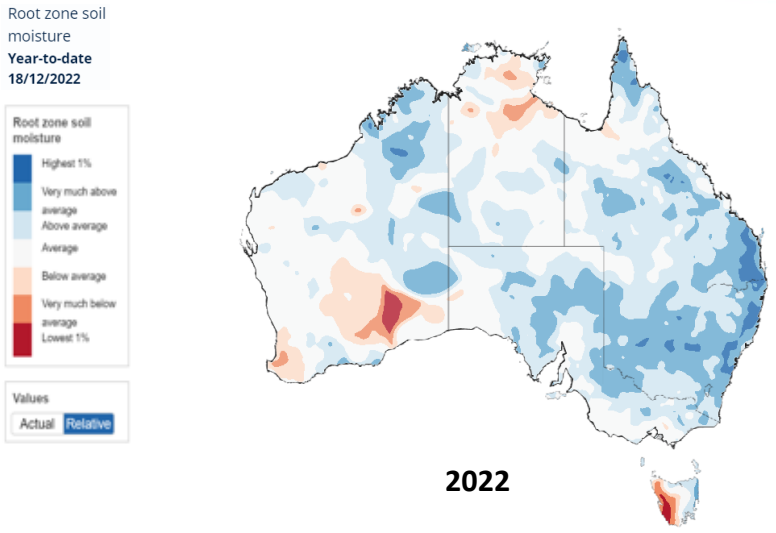


- Further periods of above average rainfall are needed to progress drought recovery, especially in parts of Queensland and South Australia.
- Low storage conditions continued in parts of central Queensland and 41% of the state was in drought or drought affected (as of November 2022).

Source: www.bom.vic.gov.au

Soil moisture – December 2022





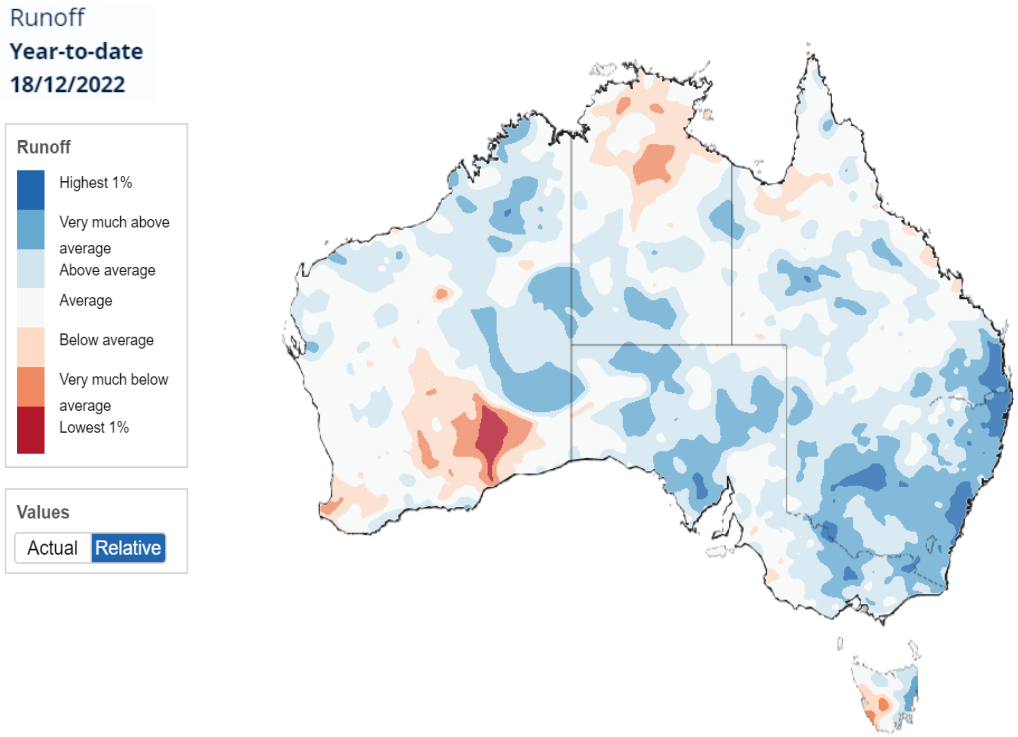
- Root zone (0-100cm) soil moisture as at December showed an improvement over much of eastern Australia from 2021 to 2022.
- At 10 December 2022, root zone soil moisture was above average for most of Australia, except for parts of Western Australia, reflecting very much above average spring rainfall.
- Parts of coastal NSW and Queensland and central NSW recorded in the highest 1% runoff.

Source: www.bom.gov.au

Runoff

Runoff impacts the availability of water in the wetlands and the health of riverine systems. It has a direct influence in the creation and maintenance of waterbird habitat.

- Year-to-date runoff for much of eastern Australia and parts of South Australia has ranged from above average to very much above average.



Source: www.bom.gov.au

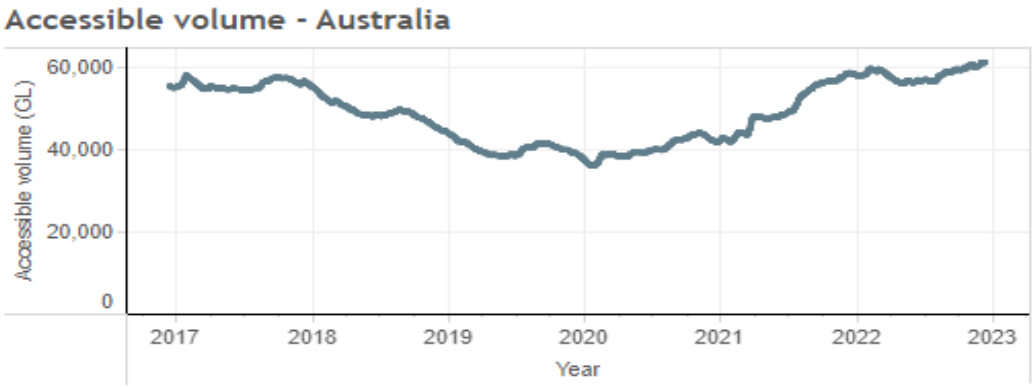
Australian water storage levels

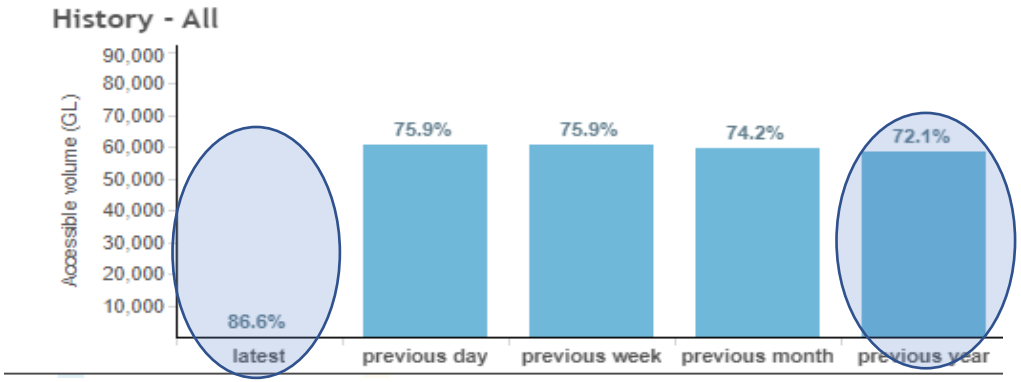
Water storage levels provide an indicator of the availability of waterbird habitat and waterflows through feeder systems.

However, often impoundments and storages can trap water and prevent it from entering creeks, streams and wetlands, thereby reducing available habitat. Therefore, this information must be considered in context, particularly during dry periods.

Deep storages generally provide poor habitat for game ducks.

- In 2022, Australia's water storages increased by 14.5% from the same time last year, from 72.1% to 86.6%.

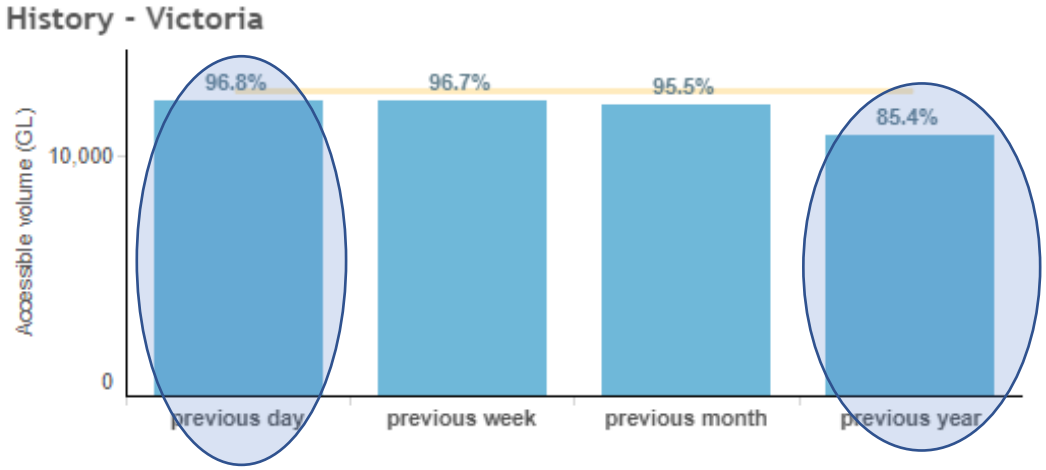




Game Management Authority

Source: www.bom.gov.au

Victorian water storage levels



- The total (Melbourne and Regional) Victorian water storage levels are currently at 96.8% compared to 85.4% last year.
- Storage levels have increased by 11.4% from this time last year.

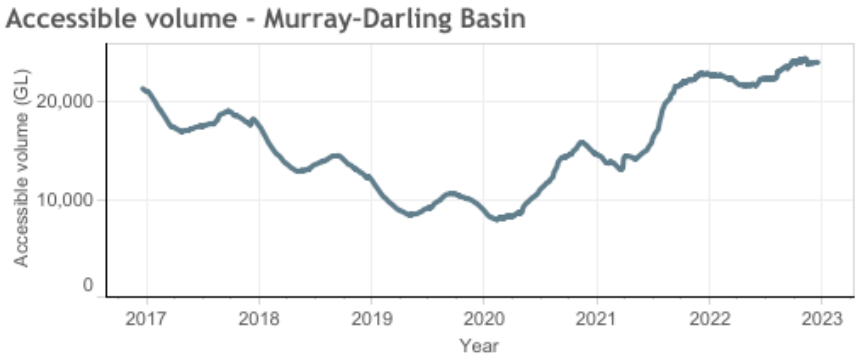
Game Management Authority

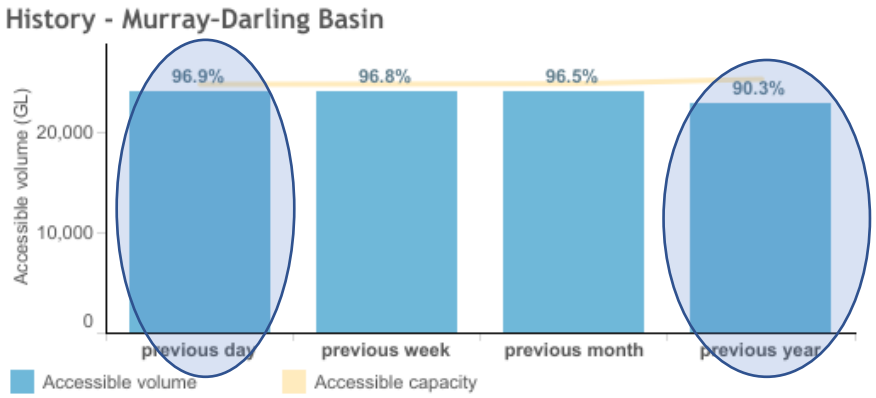
Source: www.bom.gov.au

Murray-Darling Basin water storage levels

The Murray–Darling Basin is a critical area for waterfowl production and Australia's most developed river basin (240 dams storing 29,893 GL).

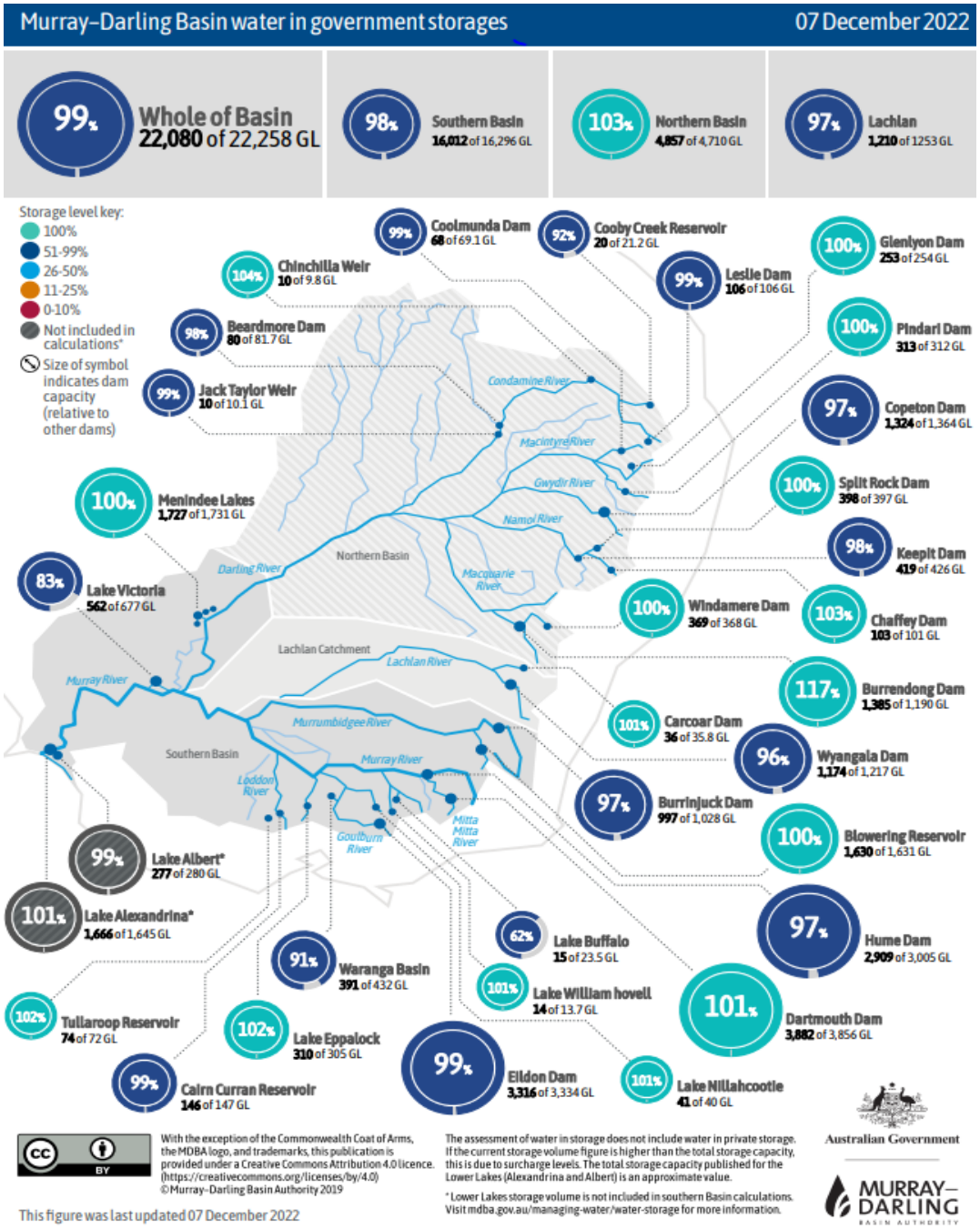
- Storage systems in the MDB are at 96.9% of capacity, which is 6.6% higher than at the same time last year (90.3%).
- Storage volumes in the northern MDB are at 103%, up from 90.9% in November 2021.
- Storage volumes in the southern MDB are at 98%, up from 90.4% in November 2021.





Source: www.bom.gov.au

Game Management Authority



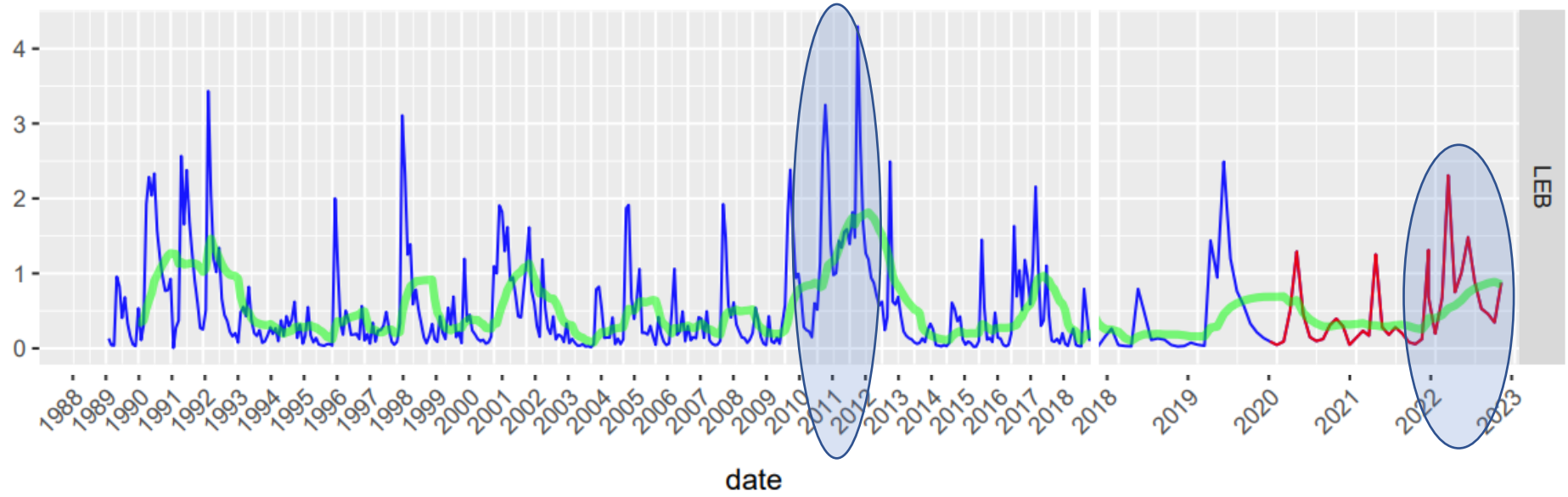
- This figure shows a detailed breakdown of storages in the Murray-Darling Basin.
- It shows that the majority of storages are nearing or exceeding capacity.

Game Management Authority

Source: www.bom.gov.au

Lake Eyre Basin

- Central Australia did not receive heavy rainfalls seen in the south east and coastal areas of eastern Australia.
- Some rivers and wetlands in the northern Lake Eyre Basin experienced small to moderate floods which have since subsided. Lake Eyre had minor flooding but is expected to dry.
- There are indications that monsoonal conditions, widespread rainfall and cooler weather may develop near northern Australia over the coming period which could affect the northern Basin.
- Water surface area in the Lake Eyre basin are not as favourable as the last major wet period experienced during 2010-2012 and are at average levels in 2022.



Source: Klaassen 2023

Habitat availability

Eastern Australian Waterbird Survey (EAWS)

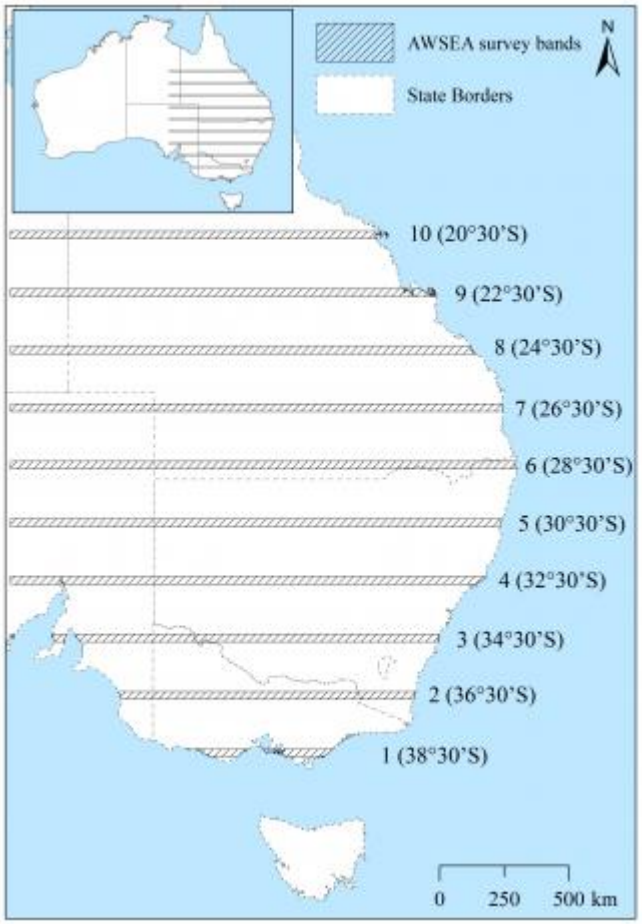
The EAWS monitors changes in the abundance and distribution indices of 50 waterbird species in eastern Australia. It also tracks changes in waterbird habitat over time.

The EAWS was designed by CSIRO's Dr Graeme Caughley and has been conducted annually in October since 1983. Waterbirds are counted from the air across ten aerial survey bands (each 30 km in width), every two degrees of latitude, crossing eastern Australia to monitor all wetlands over 1ha in size.

The EAWS provides:

- an index (not total count) of abundance of waterbirds, including game ducks
- information on the distribution of waterbird and game duck populations along survey bands
- the extent and distribution of habitat along survey bands, and
- information on waterbird breeding.

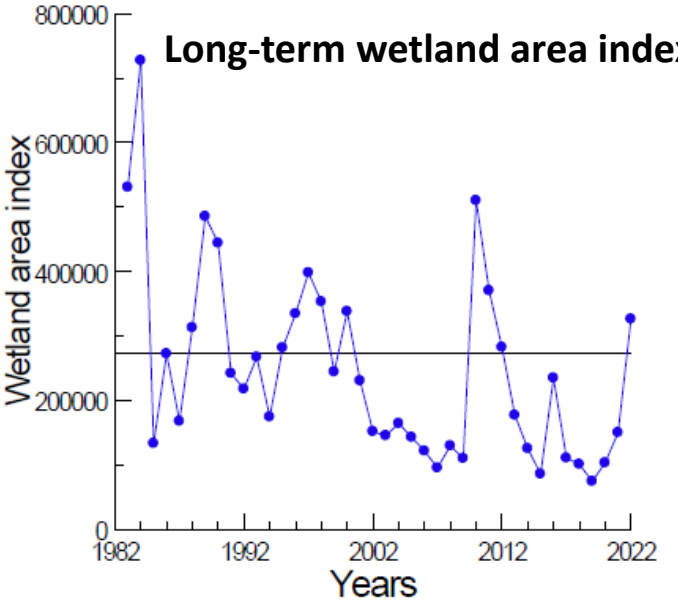
The information is valuable for examining waterbird trends on over one-third of continental Australia and over a long period.



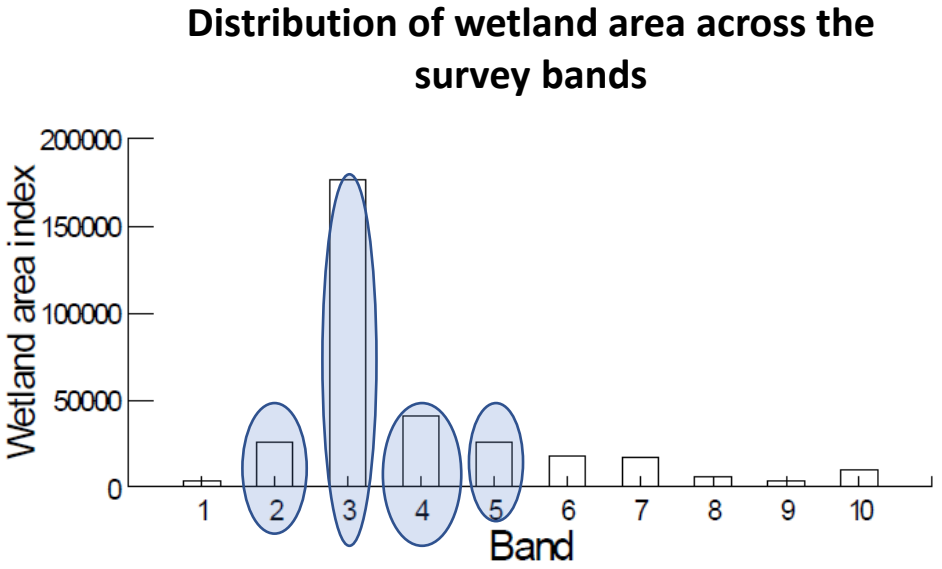
EAWS wetland area index

The wetland area index is a measure of wetland availability across all 10 EAWS transects (bands). This gives an indication of the extent and distribution of habitat available for waterbirds.

- The 2022 wetland area index ranked 13th of the 40 surveys.
- The wetland area index is above the long-term average.
- The majority of the available habitat occurs from northern Victoria to northern NSW (bands 2-5).



Changes over time in wetland area in the Eastern Australian Waterbird Survey (1983 - 2022); horizontal line shows long-term average.

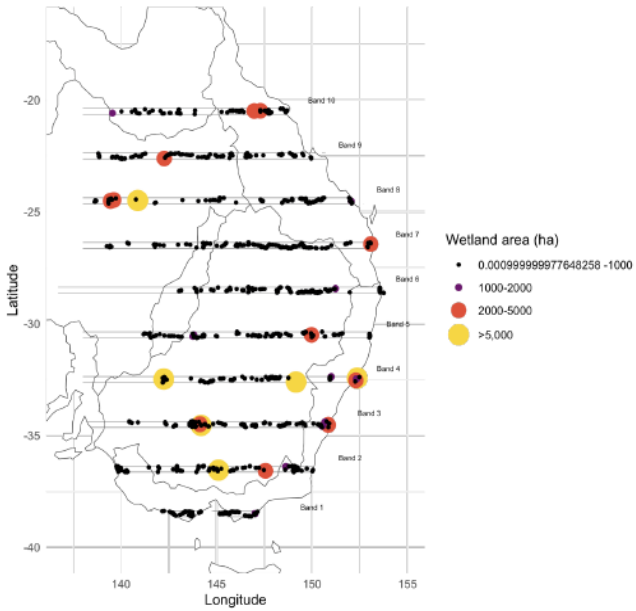


Distribution of wetland area index in 10 survey bands of the Eastern Australian Waterbird Survey in 2022.

Wetland distribution – 2021 & 2022

2021

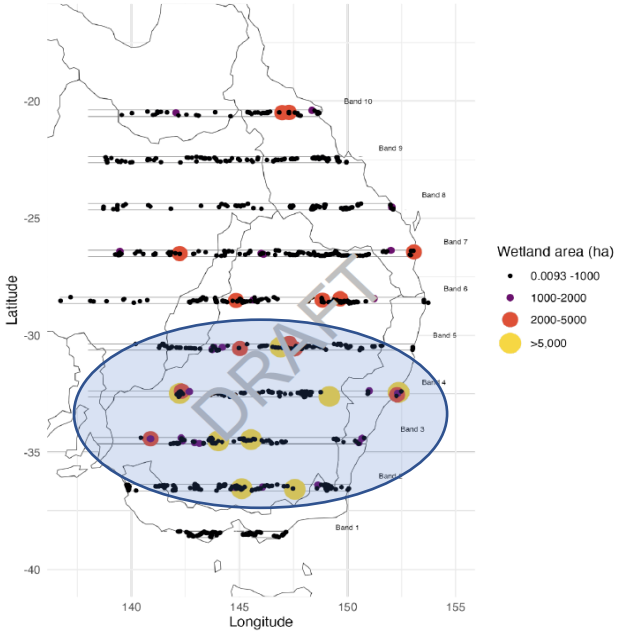
2021 Wetland area index – 150,803 ha



All surveyed wetlands with surface water present are plotted; dry wetlands not plotted

2022

2022 Wetland area index – 326,769 ha

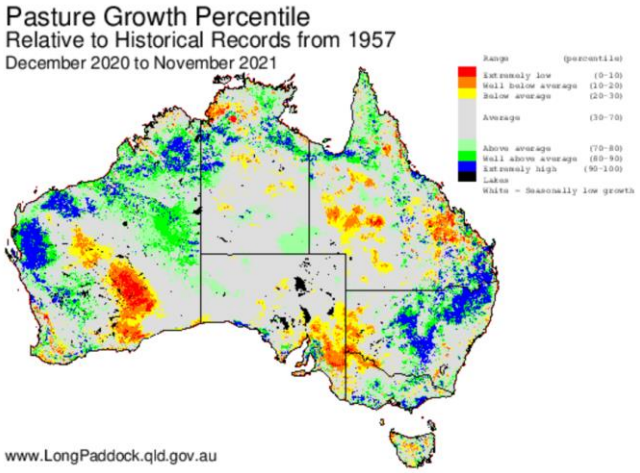


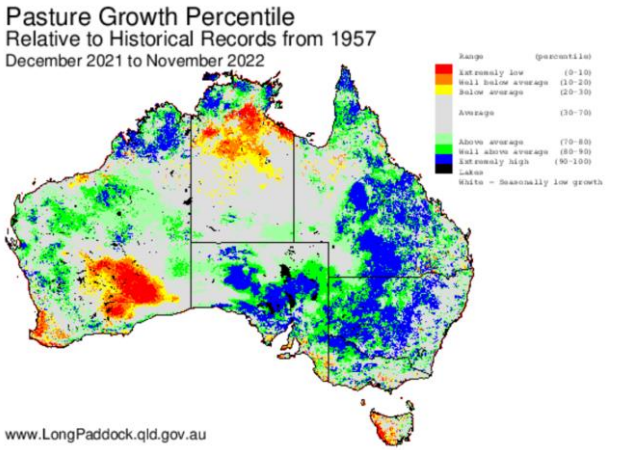
- The majority of the habitat surveyed occurred in bands 2 to 5. This is reflected in the increased wetland area in the northern Murray-Darling Basin, in particular the Macquarie Marshes, Lowbidgee wetlands, Talyawalka Creek and Menindee Lakes.

Pasture conditions

Pasture condition is a coarse indicator of potential feeding habitat for grazing species, such as Wood Duck and Mountain Duck, and nesting habitat for ground-nesting game ducks.

- Over the last 12 months, pasture growth throughout much of eastern Australia has increased substantially from 2021.
- Pasture growth in almost all of eastern Australia was average to extremely high, with most 2021 deficiencies removed.





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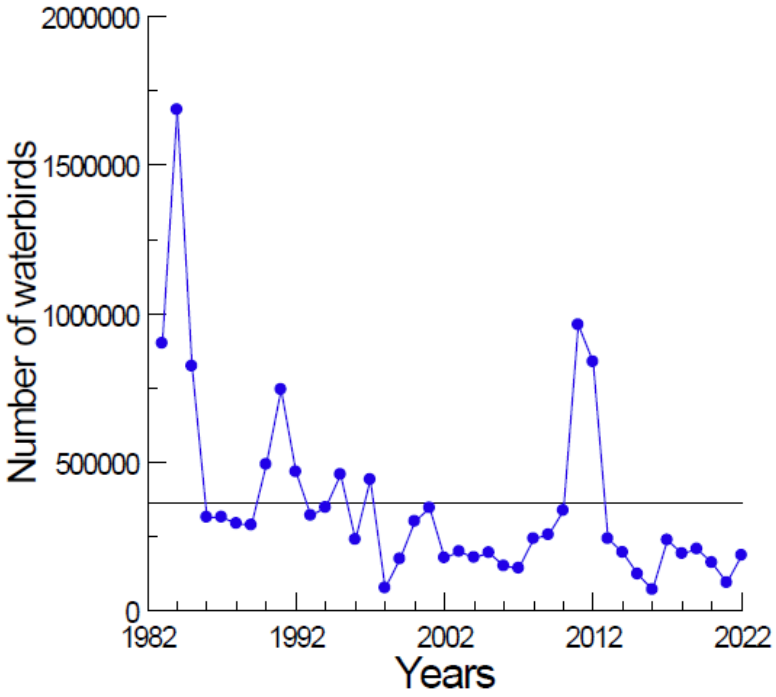
Population indices of abundance, distribution and breeding

Index of waterbird abundance (all waterbirds)

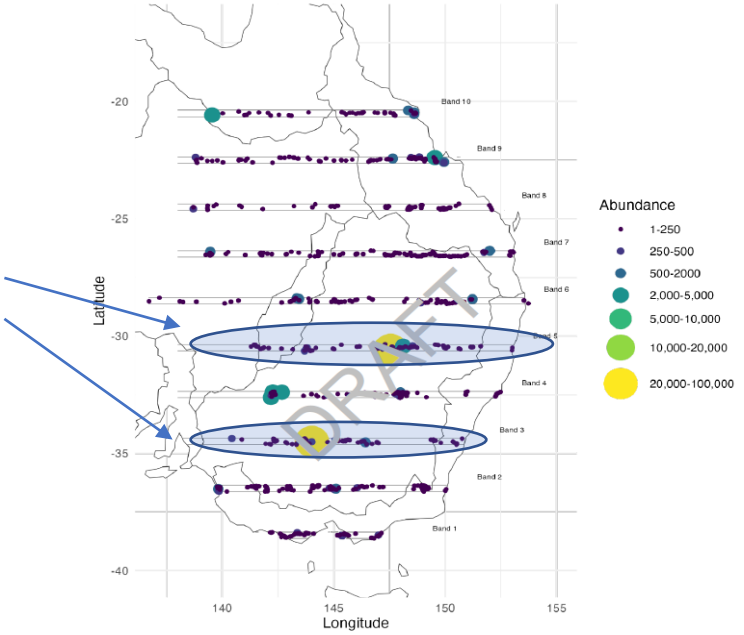
Up to 50 waterbirds species are surveyed in October each year and includes all Victorian game duck species and non-game species such as swans, Freckled Duck, ibis, coots etc.

- The index of waterbird abundance (187,175) increased by 96% from 2021 (95,318) but was still below the long-term average. The waterbird abundance index was the 11th lowest in 40 years.
- Two wetland complexes (Macquarie Marshes, Lowbidgee Wetlands) supported 65% of the total abundance.



Waterbirds were most abundant in bands 3 and 5.

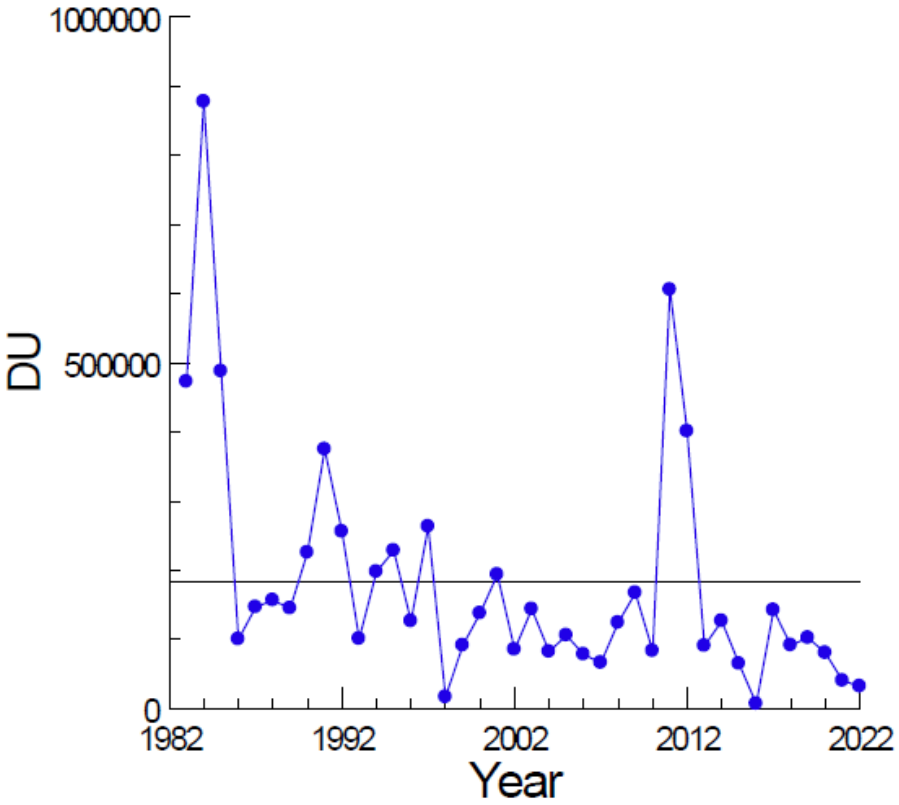
2022 Total abundance 187,175



Dry wetlands and wetlands with zero waterbirds not plotted

The abundance index is not a total count. It provides information on the trends in waterbird abundance along the survey bands.

EAWS game duck abundance index



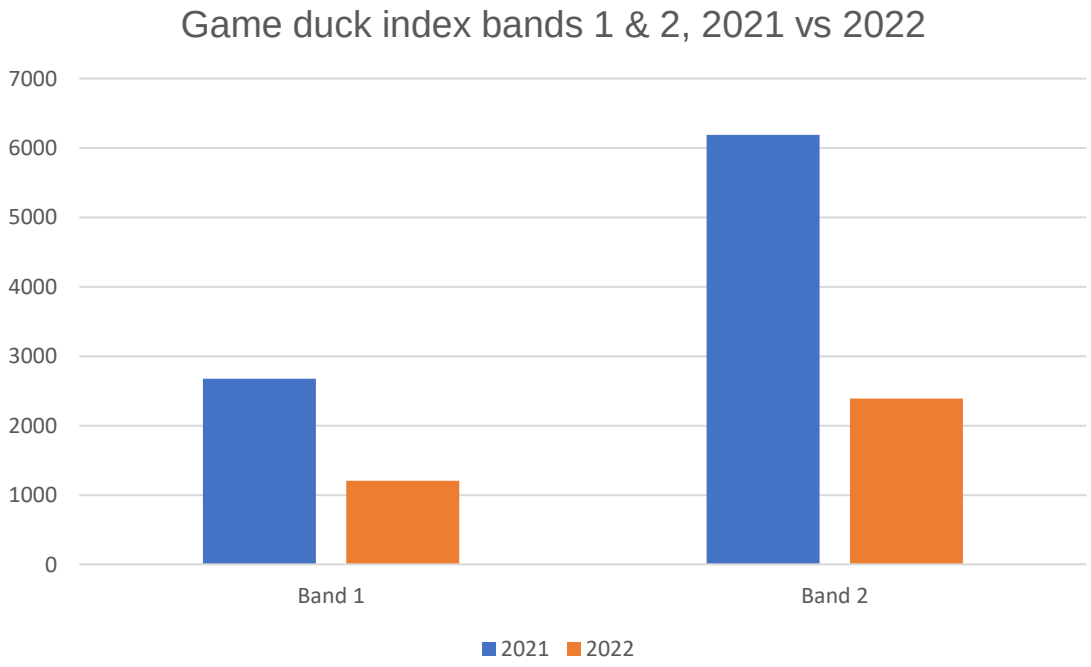
This index provides information on game ducks only.

- The game duck abundance index decreased by 2% from last year.
- The 2022 game duck abundance index was the 3rd lowest recorded in 40 years and is at 25% of the long-term average.
- The decrease in the index was despite an increase in available habitat. Game duck abundance and habitat availability have a positive relationship, so when habitat increases, so does duck abundance but with a lag as it takes time for the habitat and birds to respond.
- Six out of the eight game duck species show long-term declines in abundance.

Game Management Authority

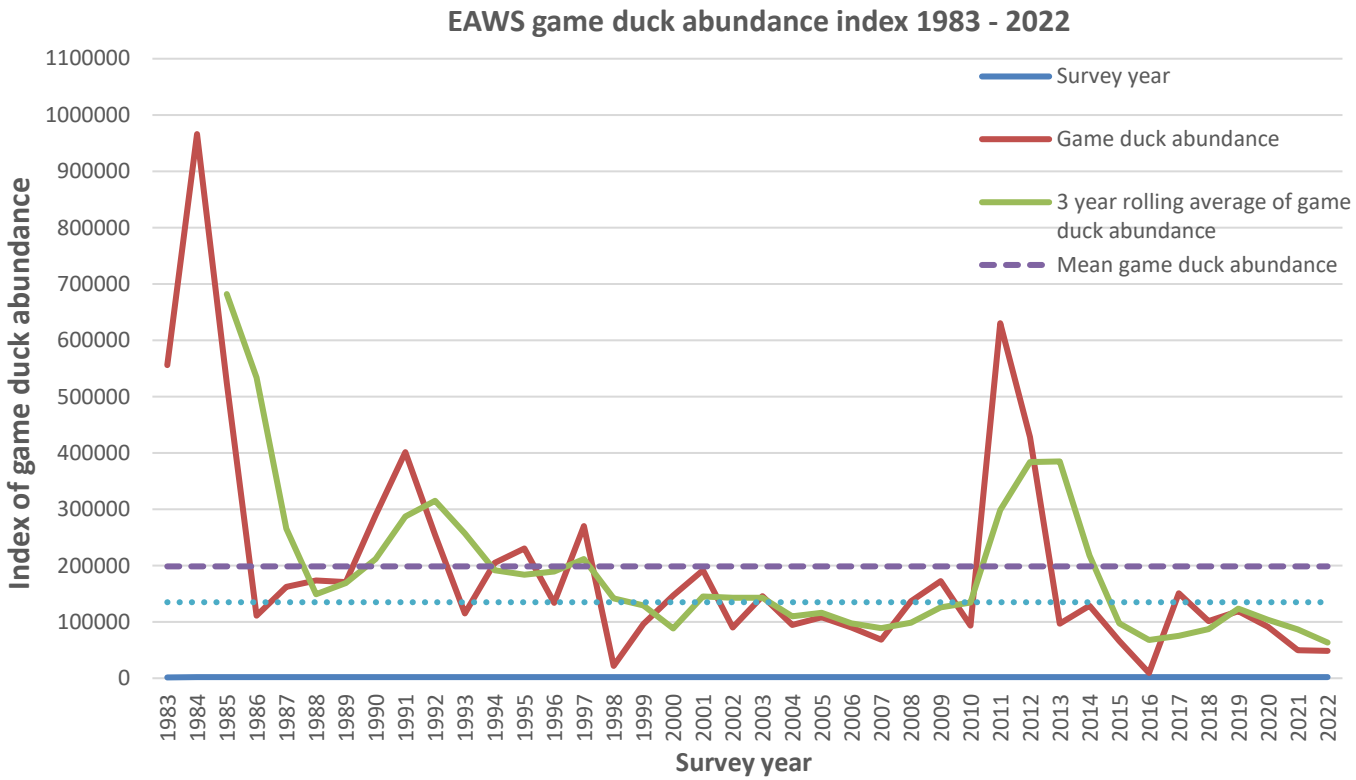
EAWS game duck abundance index bands 1 & 2 (Victoria)

- Bands 1 and 2 cover parts of Victoria. Band 1 covers parts of southern coastal Victoria and band 2 covers parts of northern Victoria.
- Game duck abundance in bands 1 and 2 declined in 2022 compared to 2021, despite similar habitat conditions in the previous year (although there was an increase in habitat in band 2).



Game Management Authority

EAWS game duck abundance index over time

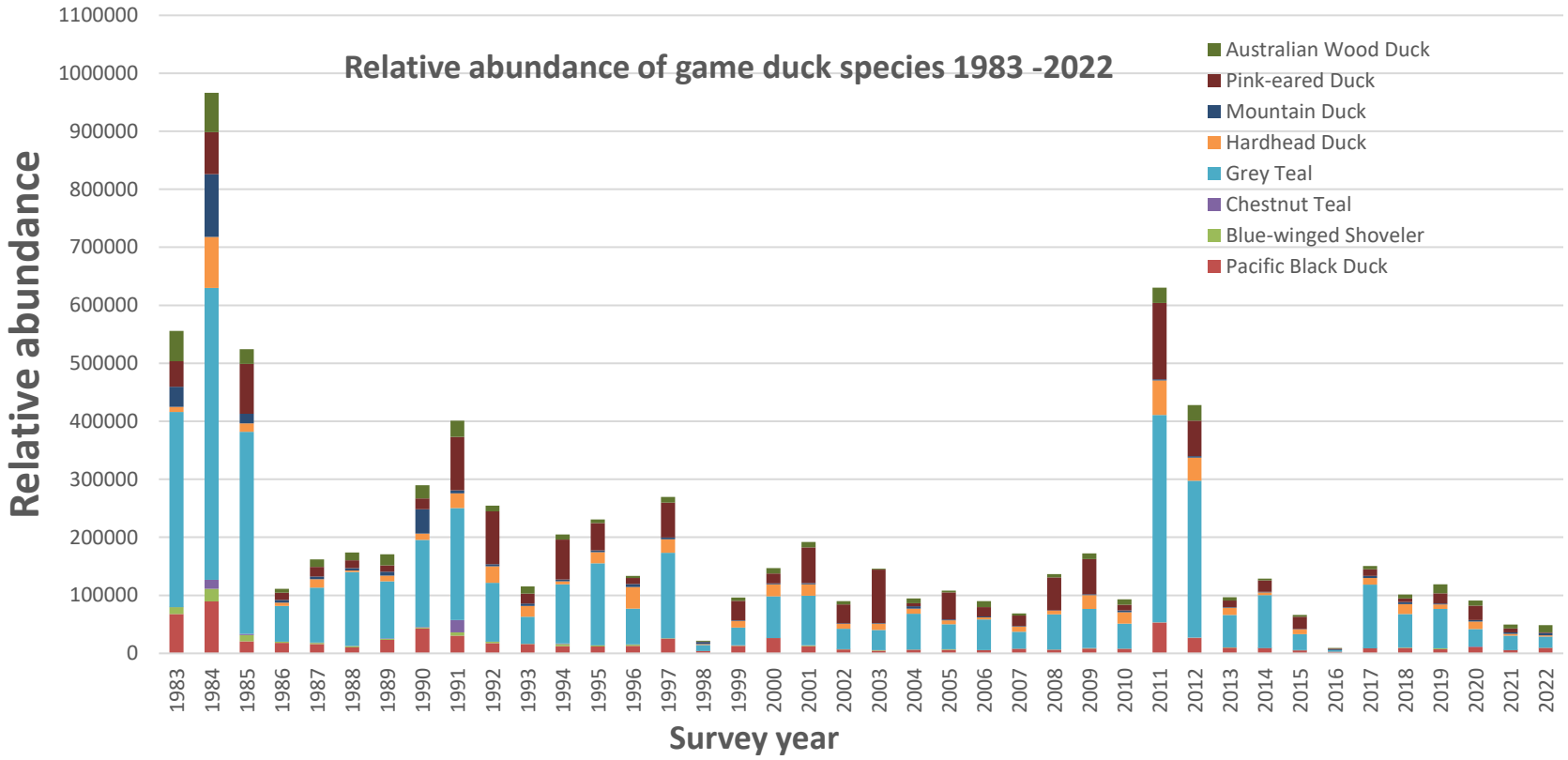


When considering management implications, the abundance index must be considered in context with:

- distribution of birds
- habitat availability and distribution
- climatic forecasts
- concentrations of birds

- This graph includes abundance index data (red line) and the 3-year rolling (or moving) average (green line). A rolling average is used to get an overall trend in a data set.
- The long-term average (mean) and median abundance levels are also included. The median is the mid-value and can be more suitable than the average when outliers are present.
- Eastern Australian game duck abundance was below both the mean and median for 2022.

EAWS relative abundance of game duck species 1983-2022



The percentage of game ducks detected in 2022 EAWS were:

- Black Duck 18% (11%), Grey Teal 40% (50%), Wood Duck 26% (14%), Pink-eared Duck 2% (13%), Hardhead 4% (6%), Mountain Duck 9% (5%), Chestnut Teal <1% (<1%) and Blue-winged Shoveler 1% (<1%). Figures in parentheses are from 2021.

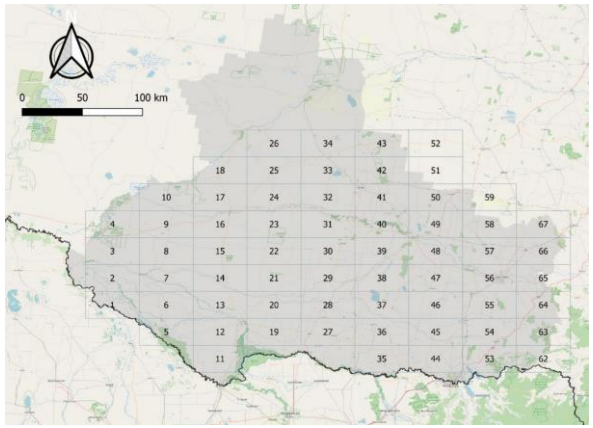
Victorian game duck abundance estimates

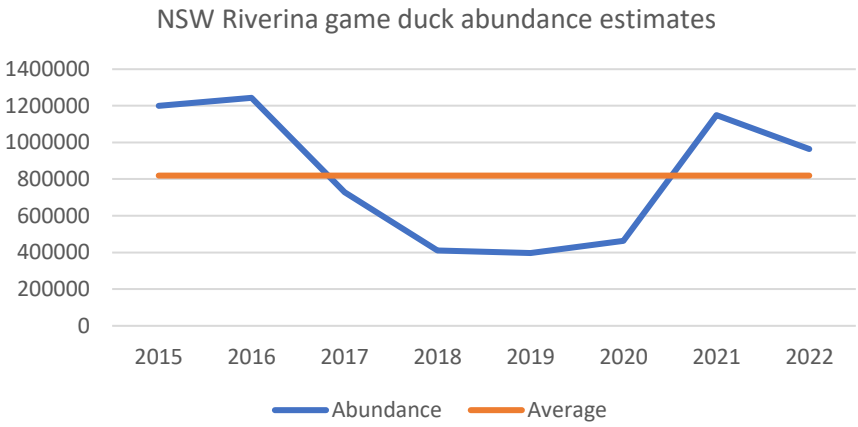
- The annual aerial survey of Victoria's game duck population commenced on 14 October 2022 and was postponed on 16 October due to weather conditions and flooding across the state.
- The survey re-commenced on 25 November 2022 and concluded on 12 December 2022. Results from the survey will not be available until late-February or early-March in 2023.

NSW Riverina waterfowl abundance surveys

- Helicopter counts of randomly selected farm dams were conducted throughout the NSW Riverina in June 2022 to determine waterfowl abundance in order to set annual crop damage mitigation destruction quotas.
- Unlike other years, large dams, wastewater ponds, wetlands and channels were not surveyed in 2022, which may have affected results.
- Game duck* numbers decreased from the previous year by 16% from 1,149,395 to 963,902.

*Includes Plumed Whistling Duck, which is not a Victorian game duck species





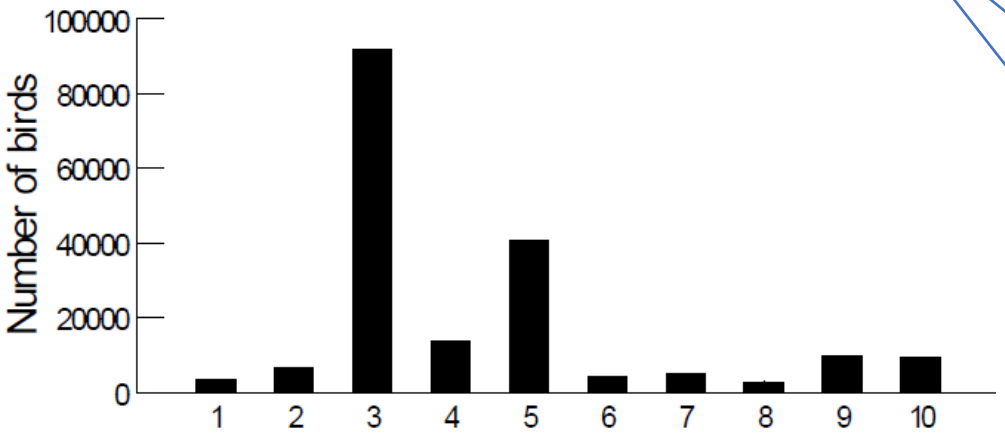
Game Management Authority

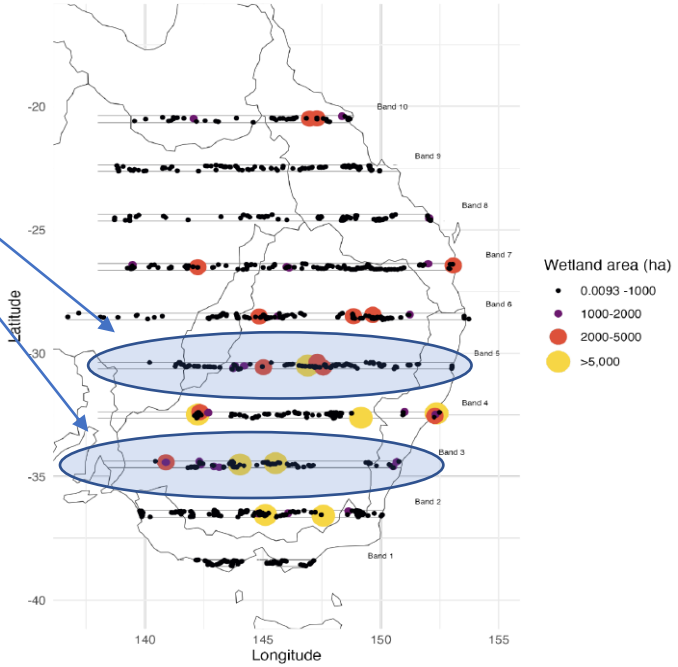
Source: NSW Department of Primary Industries (2022) *2022-2023 Annual Waterfowl Quota Report to DPI Hunting.*

EAWS waterbird distribution

2022 Wetland area index – 326,769 ha

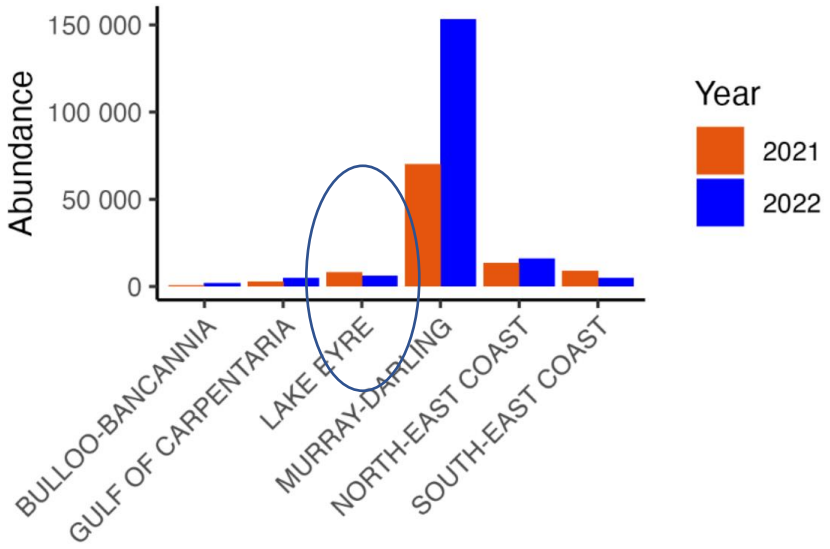
Waterbirds were most abundant in bands 3 and 5.





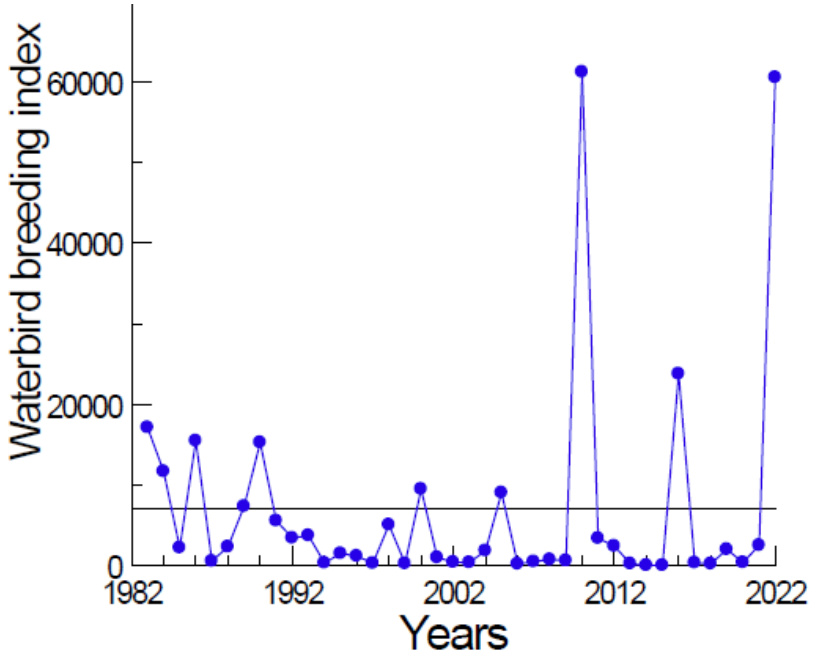
- Waterbirds were widely dispersed in low densities. However, a large proportion of waterbirds (65% of those detected) were concentrated in survey bands 3 and 5, in the Lowbidgee Wetlands and Macquarie Marshes, respectively.
- 75% of the total waterbird abundance was concentrated in eight wetlands.
- Around 41% of surveyed wetlands supported no waterbirds (which includes wetlands that were dry).

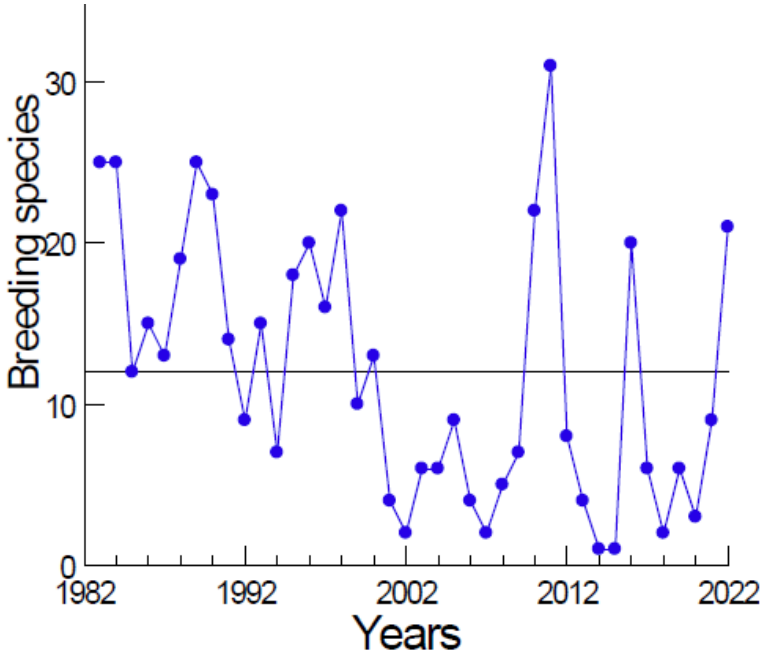
EAWS waterbird distribution cont..



- Unlike the major eastern Australian floods of 2010 and 2011, Lake Eyre Basin wetlands failed to benefit from the rainfall in 2022.
- Central Australia did not receive the heavy rains seen in the south east and coastal areas and Lake Eyre only had minor flooding. Lake Eyre contains very little water and may dry.
- Some rivers and wetlands in the northern Lake Eyre Basin, including the Diamantina and Georgina Rivers, experienced a small to moderate flood and only supported low numbers of waterbirds. Waterbird abundance in the Lake Eyre Basin declined in 2022 from 2021 in contrast with the Murray-Darling Basin which increased significantly.

Waterbird breeding (all species combined)





- The EAWS breeding index (all species combined) increased an order of magnitude from the previous year and was well above the long-term average and the second highest recorded.
- Five species of non-game waterbirds (i.e. ibis, pelican, spoonbill, tern and egret) comprised 96% of the total breeding recorded.
- EAWS breeding species richness increased considerably from 2021 and was well above the long-term average and was the fifth highest on record.

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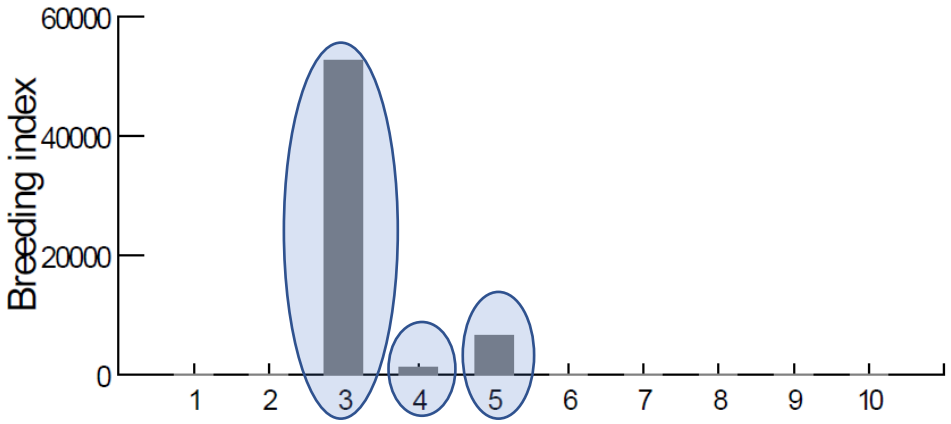
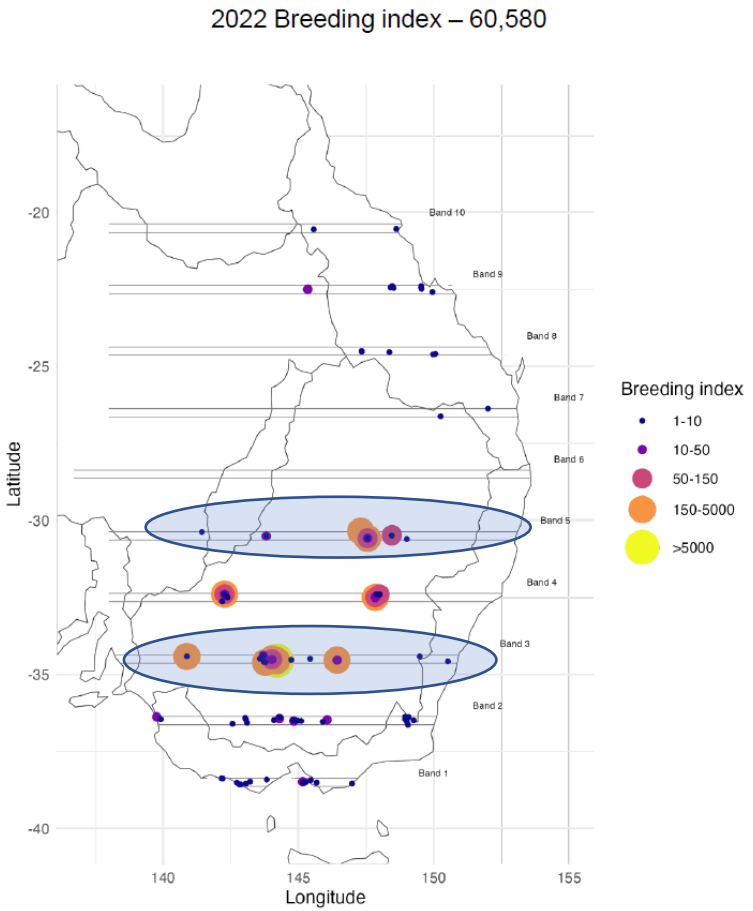
Waterbird breeding (all species combined)



- Most breeding occurred in bands 3, 4 and 5 (New South Wales, Murray-Darling Basin).
- Ibis comprised most of the breeding recorded (80% of the total).



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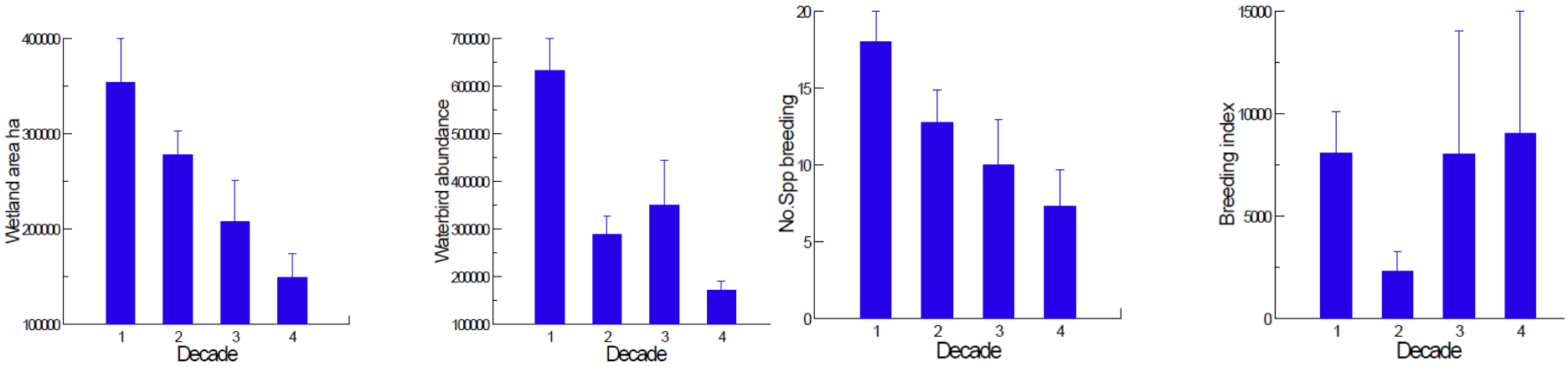
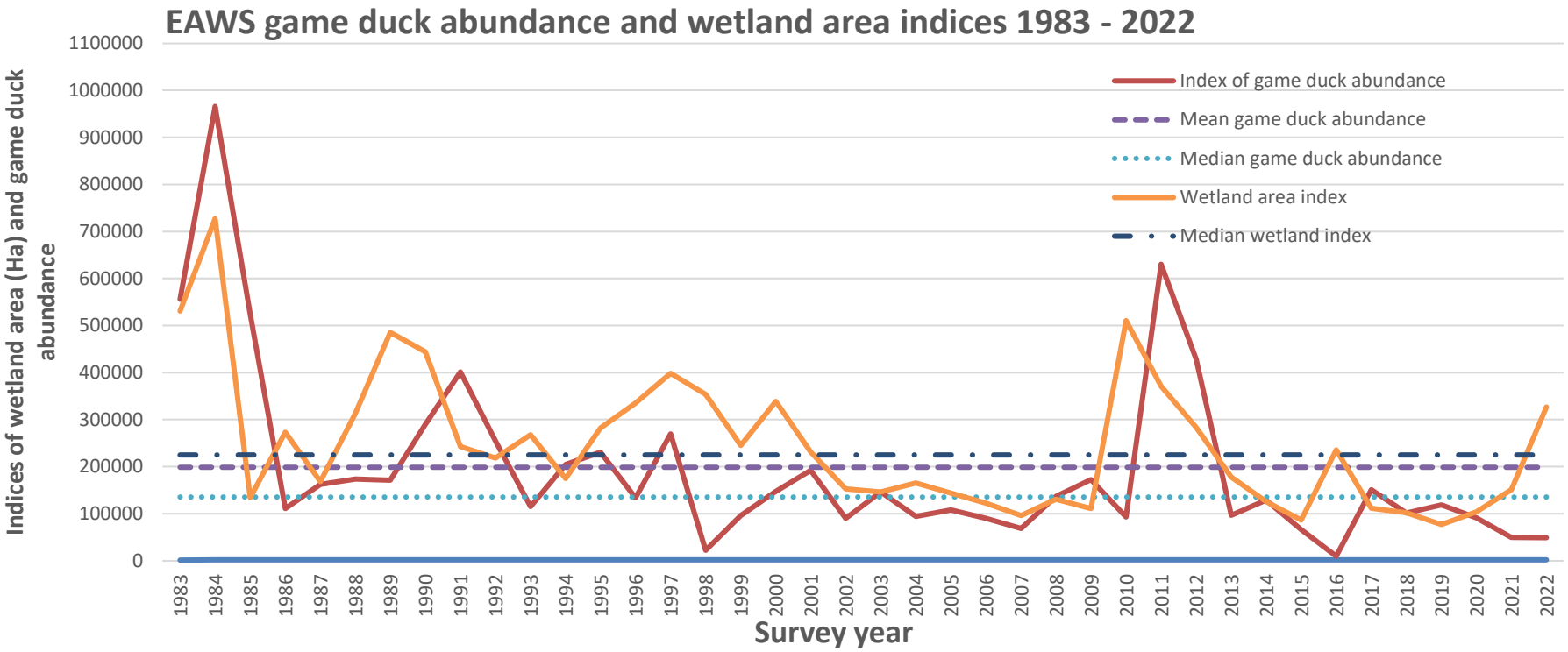
EAWS indices over time

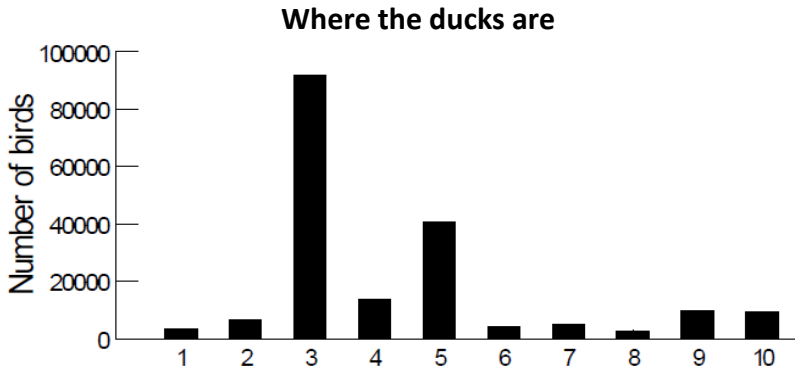


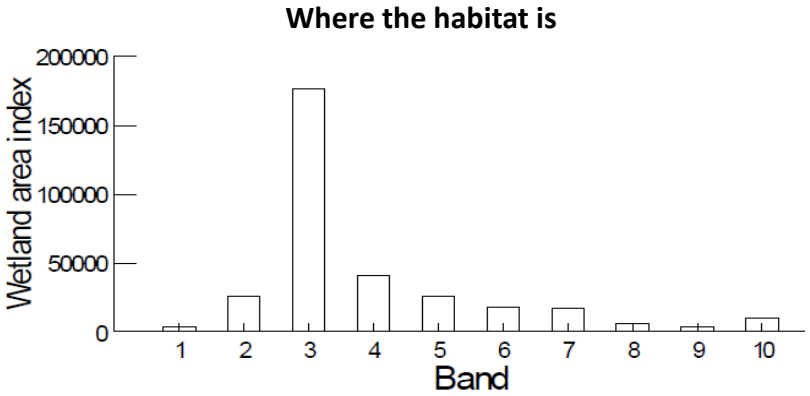
Decadal changes in indices for total abundance, wetland area, number of breeding species and breeding in the EAWS 1983 - 2022

- For eastern Australia, overall waterbird abundance, breeding index and breeding species richness are positively related to habitat availability (wetland area index).
- Major EAWS indices for waterbirds (wetland area index, total abundance index, number of species breeding) continue to show significant declines over time.

EAWS game duck abundance, distribution and habitat - summary







Climate predictions – future conditions

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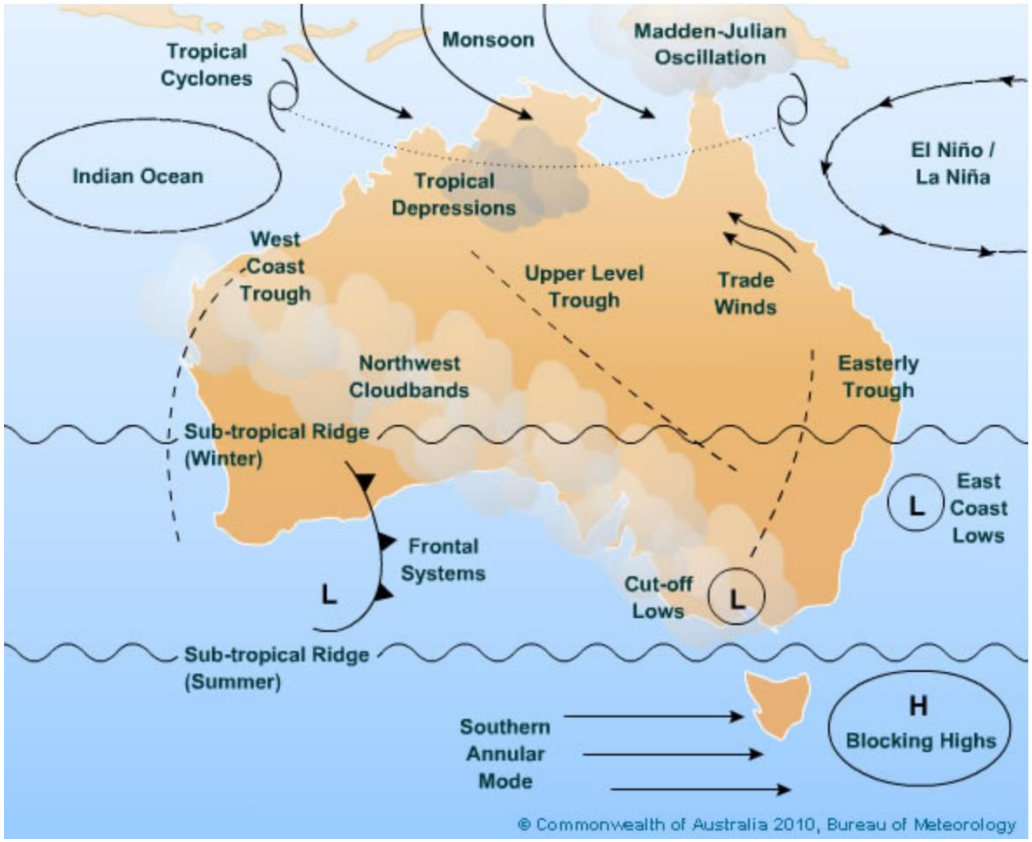
Current climate drivers

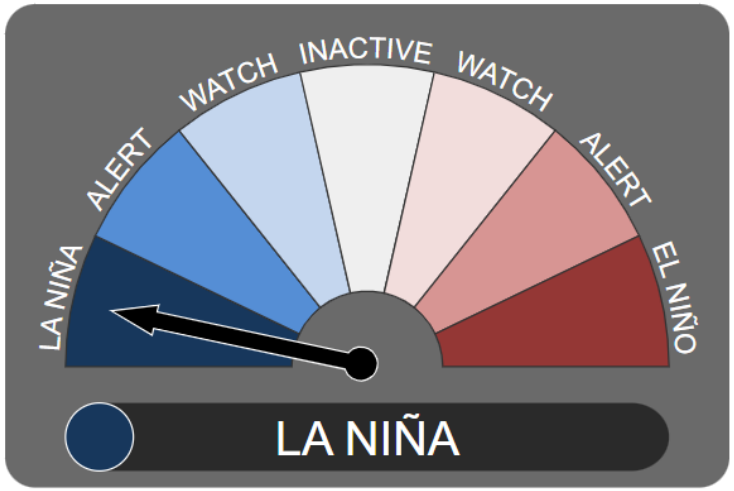
- Australia's climate can vary greatly from one year to the next.
- A number of drivers can influence the Australian climate. Influences will have varying levels of impact in different regions at different times of year.
- Current influences on Australia's climate include:
  - La Niña
  - The Southern Annular Mode (SAM)
- These influences typically result in above average rainfall for northern, eastern or central parts of the country.

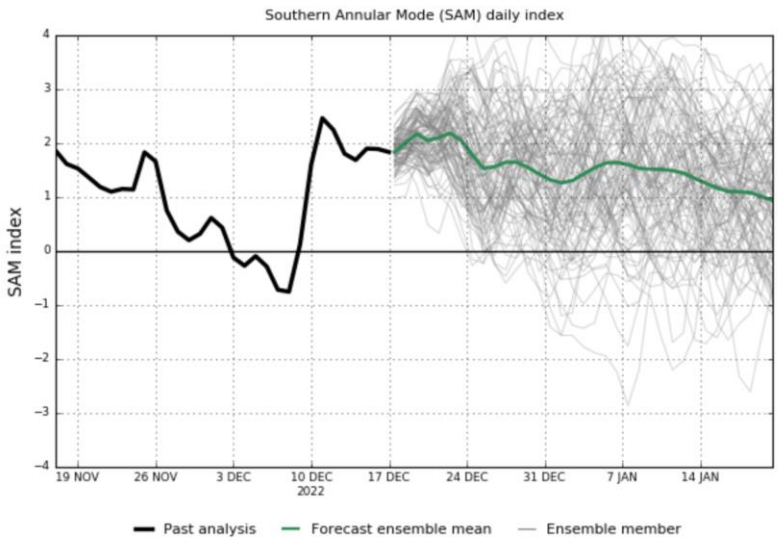


Source: www.bom.gov.au

La Nina and Southern Annual Mode

- La Niña continues in the tropical Pacific. Atmospheric and oceanic indicators of the El Niño–Southern Oscillation (ENSO) reflect a mature La Niña. Models suggest a return to ENSO-neutral in January or February 2023.
- The Southern Annular Mode is in a weakly positive phase and is likely to be neutral to positive through December. During summer, a positive SAM increases the chance of above average rainfall for parts of eastern Australia and below average rainfall for western Tasmania.
- The Indian Ocean Dipole (IOD) has returned to neutral. Weekly values of the IOD index have been in the neutral range (between −0.4 °C and +0.4 °C) for five consecutive weeks with the most recent value being −0.16 °C.

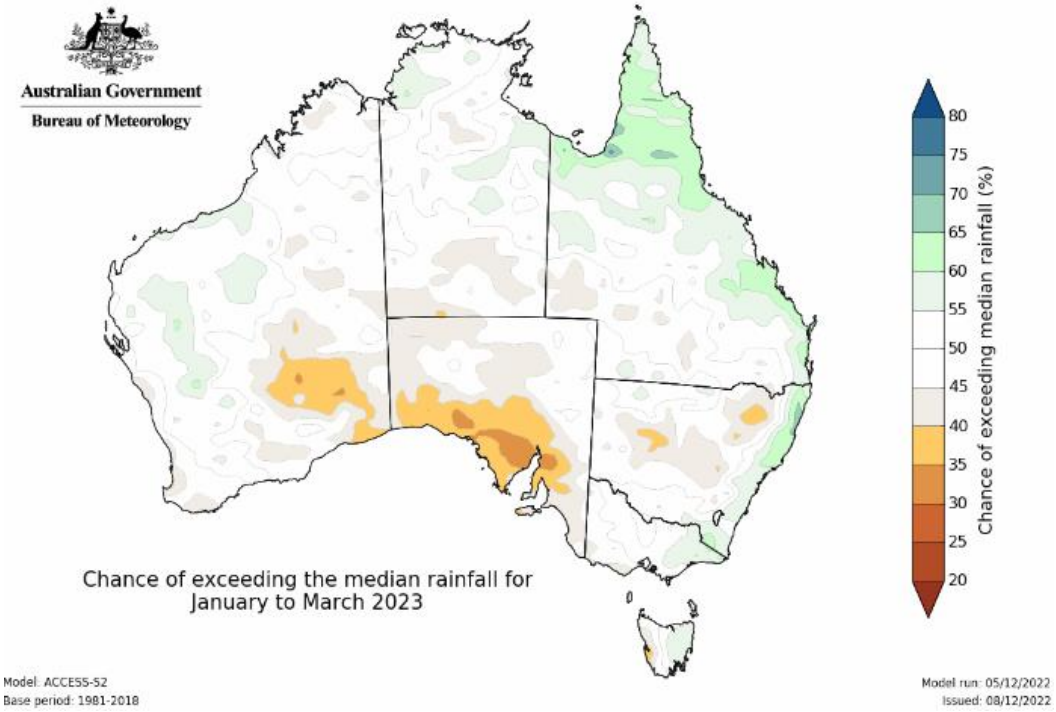




Source: www.bom.gov.au

January – March 2023 predicted rainfall

January – March rainfall prediction can be used to indicate the potential impact on habitat for the forthcoming season.



- For January to March as a whole, most of Australia has close to equal chances of above to median rainfall. Above median rainfall is likely (>60% chance) for the Cape York Peninsula and east of the Great Dividing Range for south-east parts of Queensland and north-east parts of New South Wales. Below median is likely (>60% chance) for parts of the southern interior of Western Australia and southern parts of South Australia.

Source: www.bom.gov.au

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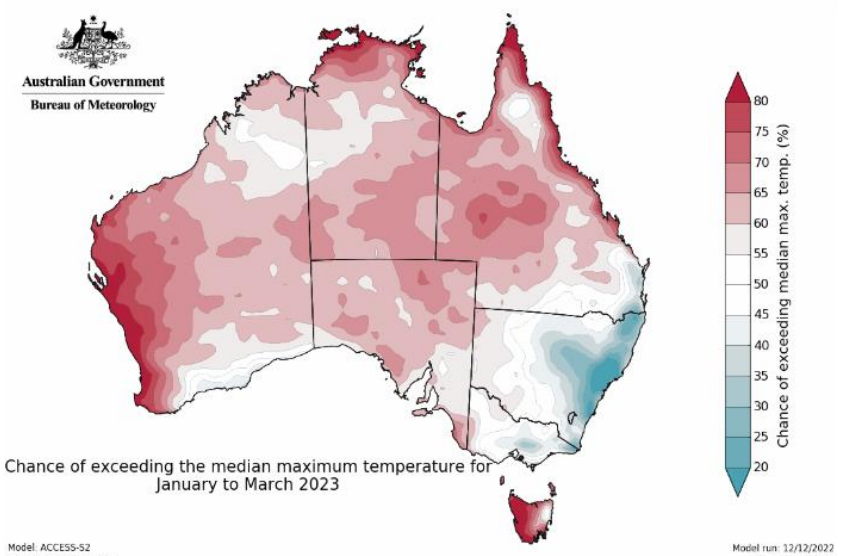
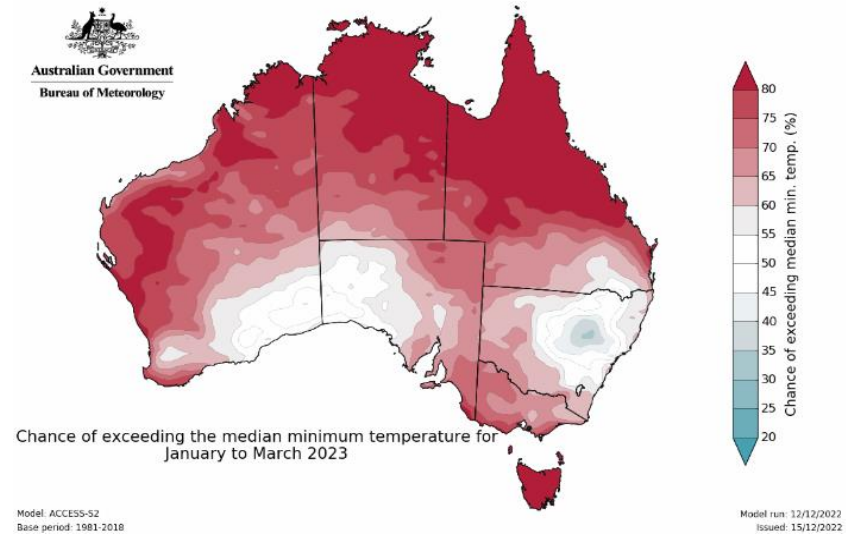
January – March 2023 temperature prediction





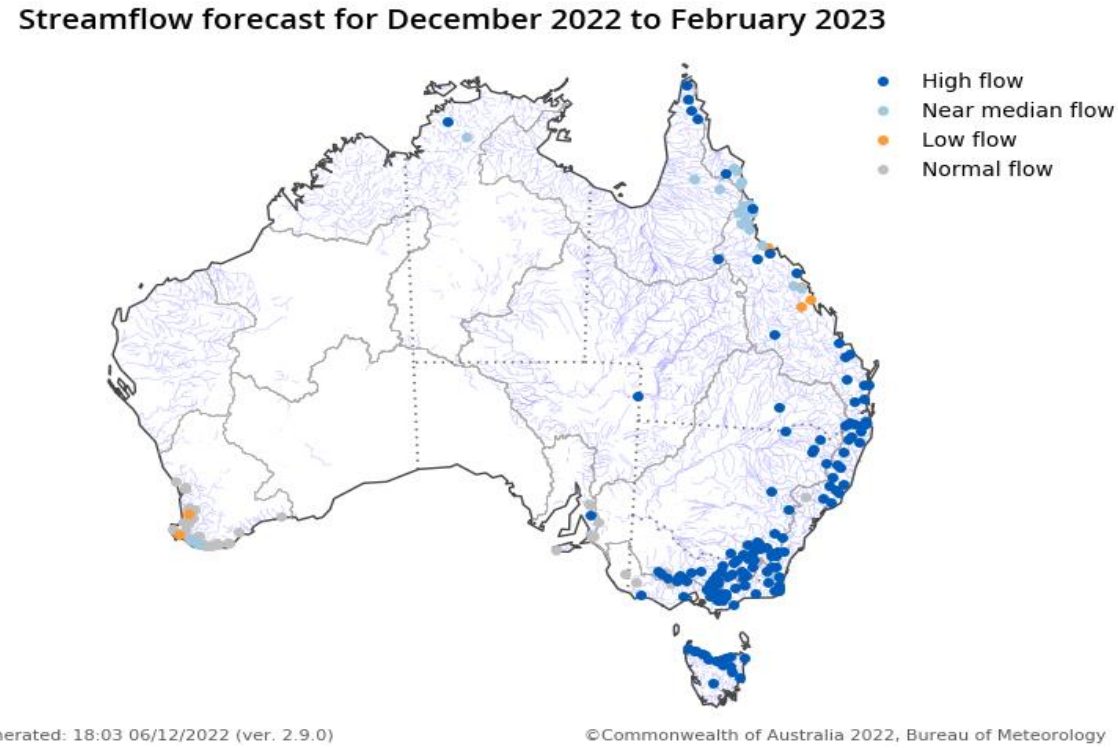
- For January, above median maximum temperatures are likely (>60% chance) for most of Australia except for most of southern Queensland, New South Wales and Victoria where below median temperatures are likely.
- January to March median minimum temperatures are likely to very likely (>60% to >80% chance) be warmer than median for most of Australia except over north-eastern NSW, south east Western Australia and western South Australia.

Source: www.bom.gov.au

Streamflow predictions

Streamflow has a direct influence on waterbird habitat extent and population abundance. Rivers and creeks provide feeding, resting and breeding habitat and provide inputs into wetlands where they have not been diverted.

- High streamflows are forecast for December to February for most sites in eastern Australia.



Source: www.bom.gov.au

2022 harvest estimates

Harvest statistics can provide information on the health and dynamics of game duck populations, including distribution, abundance and productivity.

- The 2022 duck season ran a full 12 weeks. The season length was 90 days, commencing on 16 March and concluding on 13 June, and the daily bag limit was four birds. Blue-winged Shoveler and Hardhead could not be hunted.
- There was a maximum of 23,098 Game Licence holders endorsed to hunt duck in 2022. It was estimated that 50%, or 11,549, actually hunted, each taking an average seasonal harvest of 23.3 ducks.
- The average number of duck hunting days per active duck hunter was estimated to be 8.5 days, twice the long-term average.

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Source: Moloney, P.D. and Flesch, J.S. (2022) *Estimate of duck and Stubble Quail harvest in Victoria for 2022 (in draft).*

2022 harvest estimates cont…

- The estimated seasonal harvest in 2022 was 262,567, 82% of the long-term average (320,000).
- The total estimated number of duck hunting days was 96,100, 14% above the long-term average (85,140).
- The two most commonly harvested species were Pacific Black Duck (37%) and Australian Wood Duck (26%). The remaining ducks harvested were Grey Teal (18%), Chestnut Teal (10%), Mountain Duck (8%) and Pink-eared Duck (1%).
- Pacific Black Duck, Grey Teal and Wood Duck usually make up approximately 90% of the total harvest, each with approximately 30%. Pacific Black Duck harvest was slightly up on the average and Grey Teal were significantly reduced.
- The total harvest was estimated to be greatest in the West Gippsland CMA, followed by the North Central CMA and the Goulburn Broken CMA.
- The top five towns for the total reported number of ducks harvested were (in descending order) Sale, Bairnsdale, Shepparton, Kerang and Geelong.

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Long-term harvest estimates

Estimates	2009[1]	2010[2]	2011	2012	2013	2014	2015[3]	2016[4]	2017[5]	2018[6]	2019[7]	2020[8]	2021[9]	2022[10]	Avg 2009 - 2022
Licensed hunters	18,348	21,861	23,716	24,533	24,036	26,261	25,837	25,681	26,324	25,799	24,925	23,378	24,330	23,098	24,153
Total # hunter days	76,659	85,801	103,450	109,718	91,748	118,800	91,264	100,749	96,508	91,570	81,023	29,501	19,720	96,102	85,186
Total harvest	222,302	270,574	600,739	508,256	422,294	449,032	286,729	271,576	438,353	396,965	238,666	60,403	52,456	262,567	320,065
Avg # days hunted in the season	4.0	4.0	4.5	4.6	3.7	4.6	3.6	3.9	3.8	3.6	3.3	1.26	2.57	8.5	4
Seasonal harvest per licence holder	11.1	12.5	26.0	21.2	17.2	17.3	11.4	10.5	17.4	15.7	9.62	2.58	2.16	11.57	13.3
Opening w/end bag per hunter	4.5	4.2	9.2	5.3	9.5	5.7	5.8	5.1	7.1	6.3	4.4	N/A	N/A	N/A	5.6*
Avg # ducks per day hunted	2.7	3.1	5.7	4.6	4.6	3.7	3.1	2.6	4.5	6.4	2.9	2.05	2.33	2.73	3.6

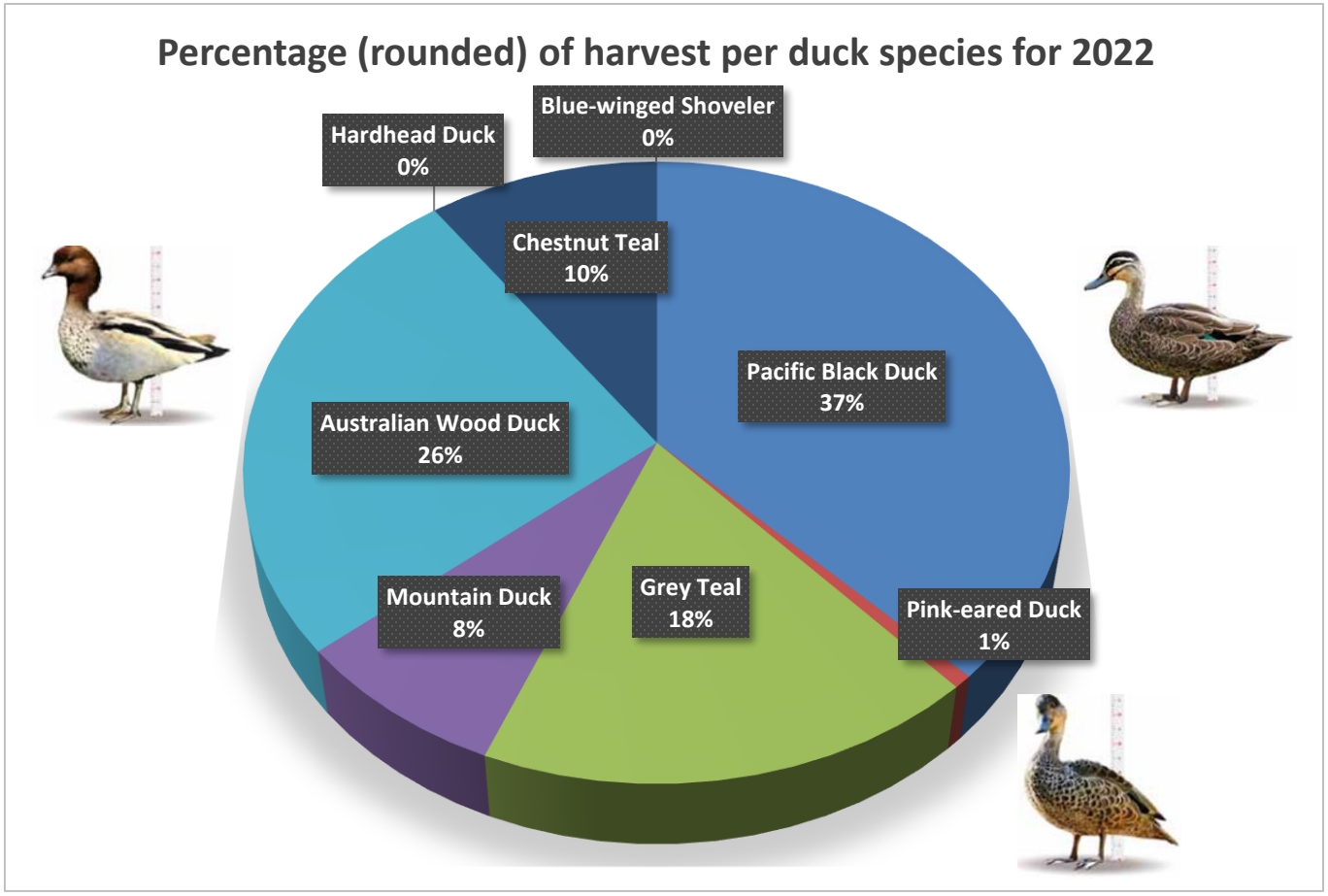
**Does not include 2020, 2021 and 2022 following a mid-week opening*

Harvest estimates are at 95% confidence intervals

Modified season arrangements

1. Two (2) birds a day with an additional three (3) Wood Duck. No Blue-winged Shoveler (BWS), Pink-eared Duck or Hardhead duck (49 day season)
2. Five (5) birds a day with an additional three (3) Wood Duck. No more than one (1) Blue-winged Shoveler (72 day season)
3. Ten (10) birds a day which included a maximum of two (2) BWS on opening day. Five (5) birds per day which includes a maximum of 1 BWS for season remainder (80 day season)
4. Eight (8) birds on opening day. Four (4) birds a day for season remainder. No BWS hunted in 2016 (87 day season)
5. Ten (10) birds a day. No BWS hunted in 2017 (87 day season)
6. Ten (10) birds a day. No BWS hunted in 2018 (87 day season)
7. Four (4) birds per day on opening weekend. Five (5) birds per day for the remainder of the season. No BWS hunted in 2019 (65 day season)
8. 3 birds per day. No BWS hunted in 2020 (38 day season). COVID-19 restrictions applied to travel, gathering size, no overnight camping
9. 5 birds per day. No BWS hunted in 2021 (20 day season). COVID-19 restrictions applied to travel and the size of social gatherings
10. 4 birds per day. No BWS and Hardhead hunted in 2022 (90 day season)

Harvest per game species



Source: Moloney, P.D. and Flesch, J.S. (2022) *Estimate of duck and Stubble Quail harvest in Victoria for 2022 (in draft).*

Interim Harvest Model output

- An expert panel recommended to develop a harvest management framework to translate waterfowl monitoring and wetland availability data into harvest recommendations while adaptive harvest management is developed simultaneously.
- An interim harvest model was developed by two members of the expert panel who are experts in waterfowl ecology.
- The model uses information from long-running duck population data sets to explore the relationship between game duck abundance and habitat availability.
- The relationship between the total point score and historic seasonal arrangements produces a recommended daily bag limit for the forthcoming season.
- Based on 2022 data, the recommendation for 2023 is four birds per day.
- The experts recommended to regulate the bag limit rather than season length if there was a need to restrict seasonal harvest.

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Summary

Summary

- This report should be read in conjunction with source material and references cited below.
- La Niña and other drivers have influenced Australia's climate for the last three years, resulting in significant rainfall throughout parts of eastern Australia. Water storages, wetlands and waterways have benefitted from record spring rainfall, including wildlife that inhabit these environments. The EAWS wetland area index is above the long-term average. Multi-year rainfall deficiencies experienced during the 2017 – 2019 drought have been almost entirely removed from the eastern states.
- Storages, wetlands and waterways in the Murray-Darling Basin are near or at capacity and major rivers in the central and southern Basin experienced some of the highest flood levels recorded. However, central Australia did not receive the heavy rainfall that was seen in the south east and coastal areas and Lake Eyre and some of its tributaries experienced small to moderate flooding and supported low numbers of waterbirds. A large part of Queensland is in drought or drought affected.
- As a result of the improved conditions in the Murray-Darling Basin, waterbird breeding and breeding species richness indices have increased significantly and are above the long-term averages.
- Although having increased from the previous year, the waterbird abundance index was below the long-term average. Waterbirds were most abundant in New South Wales (in bands 3 to 5), as was waterbird breeding. The highest abundances were recorded in southern (band 3) and northern (band 5) New South Wales, with major concentrations in the Lowbidgee Wetlands and Macquarie Marshes.
- The EAWS index of game duck abundance for eastern Australia has declined from 2021 and is the third lowest recorded in 40 years, or 25% of the long-term average. The game duck abundance index for Victoria decreased from the previous year. Six of the eight game species show continued long-term declines.
- Climatic influences causing above average rainfall in eastern Australia are predicted to decline in the coming months and neutral conditions are expected to return. Cooler conditions over most of New South Wales and Victoria are expected to persist for the outlook period. High streamflows are forecast for December to February at most locations in eastern Australia.
- The interim harvest model which considers the relationship between game duck abundance and the extent of habitat throughout eastern Australia recommends a daily bag limit of four ducks. This is influenced by low-moderate duck abundance, recent drought conditions from 2017-19, benign conditions in the Lake Eyre Basin and the time it takes populations to recover and grow.

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