[redacted]

From: DEW:Correspondence OCE
Sent: Friday, 31 December 2021 1:45 PM
To: DEW:Minister Speirs Correspondence
Cc: DEW:Correspondence NP&WS
Subject: DEW-D0015892_CE Approved [SEC=OFFICIAL]
Attachments: DEW-D0015892_ATT6_2022_Duck_and_Quail_Newspaper_Advert.docx; DEW-D0015892_ATT5_2022_Quail_Gazette.docx; DEW-D0015892_ATT4_2022_Duck_Gazette.docx; DEW-D0015892_ATT3_2021_Preliminary_CHASA_stubble_quail_report.pdf; DEW-D0015892_ATT2_2021_for_2022_Statement_of_Outcomes_Reference_Panel_final.pdf; DEW-D0015892_ATT1_2022_Condition_Forecast_Report.pdf; CE approved - DEW-D0015892_MEW_Briefing_2022_Open_Season.pdf

Importance: High

OFFICIAL

Hi

Please find attached a brief approved by the CE, for the Minister's consideration.

Yours sincerely,

[redacted]
Office of the Chief Executive
Department for Environment and Water
81-95 Waymouth Street, Adelaide
Postal: GPO Box 1047, Adelaide 5001
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SOUTH AUSTRALIA
Government of South Australia
Department for Environment and Water
Helping South Australians conserve, sustain and prosper

1

Government of South Australia
Department for Environment and Water

DEW-D0015892

Briefing Type: Project or program advice

TO: MINISTER FOR ENVIRONMENT AND WATER

RE: 2022 DUCK AND QUAIL OPEN SEASONS

THROUGH: CHIEF EXECUTIVE [redacted] 31/12/2021
A/EXECUTIVE DIRECTOR, NATIONAL PARKS AND WILDLIFE SERVICE [redacted], 30/12/2021

Critical Date for Minister to Action: 6 January 2022, to allow for a notice in The Advertiser and the SA Government Gazette to be published in mid-January 2022

RECOMMENDATIONS

That you:

1. Note the 2021 Waterfowl, Environment and Climate Conditions and Forecasts Report (Attachment 1)

NOTED

2. Note the Statement of Outcomes from the meeting of the Duck and Quail Hunting Open Season Stakeholder Reference Panel (Attachment 2)

NOTED

3. Note the preliminary Stubble Quail abundance and distribution report prepared by CHASA (Attachment 3)

NOTED

4. Approve a restricted 2022 duck open season with an 8 bird bag (recommended) and sign the 2022 duck open season Gazette notice (Attachment 4)

APPROVED / NOT APPROVED

5. Approve a restricted 2022 quail open season with an 20 bird bag (recommended) and sign the quail open season Gazette notice (Attachment 5)

APPROVED / NOT APPROVED

6. Approve, subject to your decisions above, the 2022 open season newspaper notice (Attachment 6)

APPROVED / NOT APPROVED

7. Note that, subject to declaration of a duck hunting open season, a gazette notice relating to duck hunting on unalienated Crown lands will be signed by the Executive Director, National Parks and Wildlife Service.

NOTED

8. Note that a draft media release, draft speaking notes, draft response to correspondence and draft website information regarding any 2022 duck and quail open seasons will be prepared in January 2022.

NOTED

9. Note the Department for Environment and Water intends to proactively disclose this briefing, as endorsed by the Chief Executive, given the public interest in duck and quail hunting.

NOTED

Comments	---------- **DAVID SPEIRS MP** **Minister for Environment and Water** / / 2022

BACKGROUND

Pursuant to section 52 of the *National Parks and Wildlife Act 1972* (the Act), you may declare an open season for protected species, traditionally up to 8 duck species and stubble quail (*Coturnix pectoralis*), and make conditions applicable to the season. Conditions include species that can be hunted, numbers to be hunted (bag limit), where hunting can take place (including on public lands), timing and length of season. Traditionally, a 'full' South Australian open season:

- has bag limits of up to 12 duck and 25 stubble quail per hunter per day (noting separate permits are required for duck and quail open seasons);
- commences as early as mid-February and finishes as late as June (duck) or late August (quail); and
- includes or excludes game reserves, and unalienated Crown lands open or closed depending on operational needs, risks and local conditions.

Declaration of open season conditions are varied from year-to-year depending on seasonal data (e.g. wetland and habitat conditions, climatic forecasts, bird data, etc.) to ensure that declared species are hunted sustainably.

In January 2021, you approved a duck open season from 20 March 2021 to 27 June 2021 with a bag limit of 4 ducks and various other restrictions; you did not declare a quail open season for 2021 (refer DEW-D0011264/21EW0011877).

In 2021, 1210 duck hunters held permits in South Australia. Typically, around one third of South Australian duck permits are held by interstate hunters. COVID-19 related border restrictions impacted on interstate permit holders hunting in South Australia in 2021. For context, Victoria have around 25,000 duck hunters (and 28,000 quail hunters) holding permits.

Annual estimates of hunter activity and take prepared by the Conservation and Hunting Alliance of South Australia (CHASA) in collaboration with the Department for Environment and Water (DEW) indicate that around 12,500 duck were taken during the 2021 open season, over around 5300 hunter days. Hunters took 2.63 duck per hunting day on average, with a averaged seasonal harvest of 11.6 ducks per hunter. Black duck (51%), grey teal (29%) and maned (wood) duck (10%) were the species predominantly taken. As would normally occur, opening weekend saw the most intense hunter effort, representing 27% of all effort in 2021. Hunting effort in 2021 was focused in the Lower Lakes and Riverland regions, with less effort than usual in the South East region. Hunters who responded to the survey reported achieving a full 4-bird bag on 47% of hunting days; conversely hunters took zero duck on 17% of hunting days. Nine percent of duck open season permit holders responded to the hunter survey in 2021.

For context, based upon extrapolated hunter survey data, between 2015 and 2019, the approximately 1600-1900 duck hunters in South Australia took between c. 27,000 and c. 80,000 duck each year, while between 2017 and 2019 the 150-200 quail hunters took an estimated 4000-6000 stubble quail annually. This compares to the estimated typical Victorian

harvest of around 350,000 ducks and 170,000 stubble quail by c. 25,000-30,000 duck and/or quail hunters respectively.

DISCUSSION

DEW provides you with recommendations in relation to open season duck and quail setting, based on analysis of data that are collated or collected annually in October/November. A report has been attached summarising the 2021 data (Attachment 1) collected and collated from:

- volunteer and DEW on-ground wetland and waterfowl surveys in the Fleurieu, Murraylands (including Riverland), Coorong and South East regions;
- DEW aerial surveys in the Riverland, Coorong and South East regions;
- the University of New South Wales Eastern Australian Waterbird Survey; and
- BOM data and other remotely sensed climate and habitat condition data.

In addition, representatives from hunting and non-hunting groups with an interest in the duck and quail open seasons who participate on the Duck and Quail Open Season Stakeholder Reference Panel (the Panel) have provided an agreed 'Statement of Outcomes' (Attachment 2) for your consideration. Beyond all groups agreeing that both duck and quail open seasons should/could occur in 2022, only limited consensus was reached by the Panel on the details of the potential seasons at the 2021 Panel meeting. The written advice in the Statement of Outcomes, discussions which occurred at the Panel meeting, and other material provided by Panel member groups has been considered by the department, along with other departmentally collected material, in drafting this briefing.

Antecedent conditions and forecast summary

Ninety-five wetlands were surveyed for the annual SA Wetland and Waterfowl Surveys in 2021, the equal highest number and most area surveyed since surveys began in 2003. These surveys covered more than 45,000 hectares of wetland, and were based on over 140 survey visits and nearly 300 hours of survey effort by volunteers and DEW staff. Of the 95 wetlands surveyed, around 80% of wetlands were partially-full to full.

The surveys found game duck numbers were the fourth lowest since 2003, around 35% of the dataset average. Game duck abundances in the Coorong and SE regions were less than 20% of the long-term average, while the Fleurieu was around 50%. Positively, the abundance in the Murraylands was around 125% of the dataset average.

DEW aerial surveys of the Riverland, Coorong and South East regions found that duck abundance increased by around 50% since 2020.

Results from the 39th annual Eastern Australia Waterbird Survey (EAWS), undertaken by the University of New South Wales, show that game duck abundance decreased marginally from 2020, and continued to reflect the trend of long-term decline. More positively, the wetland area index increased from 2020, although this index remains around half of the long-term average. It should be noted that this increase in wetland extent likely negatively influenced the abundance recorded due to ducks dispersing to newly inundated wetlands outside the

survey areas, and reduced detectability of duck on newly inundated wetlands within the survey area (and this issue of duck dispersion/detectability may similarly have affected the South Australian ground and aerial surveys). Abundances of all game duck species were below the long-term average, with 4-5 of 8 species showing continued long-term decline (depending on analytical date range).

Climatic conditions relevant to duck and quail opens seasons, particularly rainfall, improved markedly in 2021 relative to the past few years. At the 12 month scale, most of Australia experienced at least average rainfall, with significant areas above average and very much above average, including areas of the Murray-Darling Basin (MDB) which received the highest on record. Parts of SE of SA and Riverland, and western Victoria were below average however. No parts of Australia remain subject to drought at the 12 month scale, however 4-year cumulative rainfall is well below average across SE South Australia and SE Queensland. Inflow to storages in the MDB is around the long-term average, but much better than both 2020 and the 10-year average. Storages in the MDB are around 94%, well above 2020. River Murray flow to South Australia is well above entitlement.

The current BOM climate forecast for summer is positive from an open season perspective. Current La Niña conditions, coupled with a positive Southern Annular Mode, are likely to result in a wet summer (noting that the La Niña will likely decay in January though). As a result, there is a high likelihood of exceeding average rainfall over Qld, NSW and Victoria across summer, while the likelihood is trending mostly average over SA and NT, with average to below average rainfall forecast for WA. There is a high likelihood of exceeding median maximum temperatures for most of SA, WA, NT, Qld, Tas. & western Vic. Average or cooler conditions are expected for NSW and eastern Vic. For minimum temperatures, there is a high likelihood of exceeding medians over most of Australia, aside from SE WA, western SA and some of NE NSW.

Land condition, as described by remotely sensed normalized difference vegetation index, soil moisture availability and pasture biomass, shows general improvement relative to 2020, reflecting the better climatic conditions in 2021.

DEW Recommendation

Based on the analysis of climate, wetland, landscape and waterfowl data, and consultation with and information from the Panel, a restricted duck open season and a restricted stubble quail open season are recommended for 2022.

Duck

Waterfowl, environmental and climate data and forecasts indicate a moderately restricted duck open season can be declared in 2022. The department notes that all groups on the Panel were supportive of a duck open season in 2022. Hunting groups on the Panel advised for an open season with only minor restrictions from a 'traditional full' season (e.g. exclusion of one 'game' duck species), while non-hunting groups on the panel advocated for a more restricted open season (e.g. a 4 bird bag). Only one game duck species is proposed for exclusion by the department in 2022: Australasian (blue-winged) shoveler, which continues to show consistent declines in abundance over the past 10 years (broadly, 1-2 generation lengths) in the DEW

ground surveys and consistent long-term decline in the EAWS. Panel member groups found consensus in recommending the species be excluded from a 2022 open season. CHASA have requested that the species remains recognised as a 'game species' in South Australia, while Birds SA have requested it is no longer recognised as such. Non-hunting panel member groups recommend pink-eared duck, hardhead and chestnut teal also be excluded or at least their bag limited in 2022. The recommended bag limit and mid-March opening date reflect current game duck abundances and ongoing trends, improved rainfall and habitat availability at the eastern continental scale which will hopefully prolong duck breeding, and continued rainfall trends and concomitant habitat availability in the SE of SA.

It is recommended that a restricted open season for the taking of protected duck is declared for 2022. The following conditions are recommended (see Attachment 4 for specific detail):

a. Specific species permitted: grey teal (*Anas gracilis*), chestnut teal (*Anas castanea*), Pacific black duck (*Anas superciliosa*), Australian shelduck (mountain duck) (*Tadorna tadornoides*), maned (wood) duck (*Chenonetta jubata*), pink-eared duck (*Malacorhynchus membranaceus*) and hardhead (*Aythya australis*).
b. Closed season for: Australasian (blue-winged) shoveler (*Anas rhynchotis*).
c. Open season date and times: 30 minutes prior to sunrise on Saturday 19 March 2022 to 30 minutes after sunset on Sunday 26 June 2022, and duck are only to be taken in the period between 30 minutes prior to sunrise and 30 minutes after sunset on any given day of the open season.
d. Taking eggs prohibited.
e. Bag limit: 8 ducks of the permitted species per hunter per day, and on any day of the open season.
f. Area of the state open season applies: all of the state.
g. Open season in game reserves: Bool Lagoon Game Reserve closed. All other nine game reserves open partially or fully throughout the open season.

Quail

CHASA have undertaken stubble quail surveys in 2021 (Attachment 3). These surveys recorded over 16,000 stubble quail during 'drive' counts and counts from harvesters during crop harvesting over an area of over 8000 ha. Based on the surveys, the extrapolated estimated abundance in the agricultural regions of South Australia is around 12 million stubble quail. Based on typical hunter effort when stubble quail open seasons have been declared in South Australia, hunter take would represent <1% of the estimated 2021 population.

The CHASA quail survey data are a welcome addition to the landscape condition data and climate records and forecasts which have been used to inform quail open season setting decision making in recent years (noting that hunter survey data has been available as an index of quail abundance and distribution in years when quail open seasons have been declared). Non-hunting Panel groups, while appreciative of the CHASA survey, call for future quail surveys to be independently run. The declaration of a quail open season is supported by all groups on the Panel, with non-hunting groups recommending a range of restrictions (e.g. a less than full traditional bag), while hunting groups are advising for a near 'full traditional' season (e.g. delayed opening dates). The recommended bag limit, season opening date and

season duration reflect the findings of the CHASA survey, recent positive rainfall and pasture/crop availability trends improving for stubble quail habitat condition, and published peer-reviewed recommendations[1] for quail season commencement and duration.

It is recommended that a restricted open season for the taking of stubble quail (*Coturnix pectoralis*) is declared for 2022. The following conditions are recommended (see Attachment 5 for specific detail):

a. Open season date and times: 30 minutes prior to sunrise on Saturday 30 April 2022 to 30 minutes after sunset on Sunday 31 July 2022, and stubble quail are only to be taken in the period between 30 minutes prior to sunrise and 30 minutes after sunset on any given day of the open season.
b. Taking eggs prohibited.
c. Bag limit: 20 Stubble Quail per hunter per day.
d. Area of the state open season applies: all of the state.

These recommendations for the 2022 duck and quail open seasons are based on 2021 data and forecasts for early 2022. Should conditions deteriorate or circumstances change, you may revoke or revise any open season declarations.

Game Reserves

It is proposed that nine of the 10 game reserves in South Australia be open at specified times during the 2022 duck open season, should it be declared. It is recommended that Bool Lagoon Game Reserve be closed for hunting in 2022 because of environmental conditions and management considerations specific to this reserve. Both the hunting and non-hunting stakeholders on the Panel agreed to close the Bool Lagoon Game Reserve for hunting in 2022. A number of other routine restrictions to game reserve access will also apply should the duck open season for 2022 be declared. Two game reserves in the Riverland - Moorook and Loch Luna - will open for 10 weekends in 2022 to spread-out hunting effort and prevent shooting on South Australian long weekends and during Victorian and South Australian school holidays when these game reserves are popular with non-hunter visitors. Chowilla Game Reserve will open for 8 weekends, for the aforementioned reasons and with the two fewer weekends due to planned park management activity.

Open Season Hunting On Unalienated Crown Land

Open season hunting is generally permitted on unalienated Crown land across the state if an open season is declared. For management reasons DEW updates and publishes a list of unalienated Crown land parcels on which hunting is prohibited. Subject to an open season declaration, DEW will prepare a gazettal notice, pursuant to section 56A of the *Crown Land Management Act 2009*, to be signed by the Executive Director, National Parks and Wildlife Service in early 2022.

[1] Frith, H.J. and Carpenter, S.M., 1980. Breeding of the Stubble Quail, *Coturnix pectoralis*, in south-eastern Australia. *Wildlife Research*, *7*(1), pp.117-137.

Hunter surveys

Data gathered through hunter surveys can contribute to improved wildlife management decisions, especially in regard to setting any open season restrictions. The data typically illustrate the role that restricted bag limits and season duration can have on managing hunting impacts on duck and quail populations. The voluntary system of collecting hunter returns, based on the 'citizen science' model and coordinated by CHASA with support from DEW officers has had a varied return rate from 5-20 per cent since 2015 (9% in 2021). DEW are considering methods to increase hunter participation in the survey, with phone surveys (akin the Victorian hunter survey model), or a dedicated app for reporting are the currently favoured options. Implementation of any improved model in 2022 will be subject to departmental resource availability.

Next steps

Pending your decision on the declaration of duck and quail seasons, the following would be undertaken:

- two Gazettal notices (one for duck open season, one for quail open season) to be sent to the Government Gazette by the department on Friday 7 January 2022 for publication on Thursday 13 January 2022 (Attachments 4 and 5). Only the appropriate notice(s), reflecting your decision will be submitted for publication.
- a notice (the statutory instrument of open season declaration) published in The Advertiser (Attachment 6). Attachment 6 includes four notices reflecting the possible combinations (both open, both closed, duck only, quail only) of your declaration decisions. The department will submit only the appropriate notice, reflecting your declaration, to The Advertiser for publication on Saturday 15 January 2022.

Further, subject to your decisions, a Ministerial media release, DEW website content and media speaking notes will be prepared for your noting regarding the season. A draft response to any correspondence received regarding the season(s) will also prepared for your consideration. The gazette granting consent to hunt on unalienated Crown land will be prepared for the approval of the Executive Director of National Parks and Wildlife.

DEW's briefing to you providing advice on the 2020 duck and quail open season, was subject to a Freedom of Information request in February 2020 (F0002984104). Given the anticipated interest in this advice again in 2022, and as occurred in 2021, the department intends to proactively disclose the briefing, and associated attachments, on the DEW Proactive Disclosure website (https://www.environment.sa.gov.au/about-us/freedom-of-information/proactive-disclosure/department-proactive-disclosure).

CONSULTATION

In late 2021, DEW District Rangers were consulted regarding their local knowledge of their districts and recommendations in relation to duck and quail open season setting.

The Panel, facilitated by DEW staff, convened on 21 December 2021 to review the hunter, waterfowl, quail, environmental and climate data and develop an agreed 'Statement of Outcomes' (Attachment 2). Beyond agreement that both duck and quail open season could

occur in 2022, only limited consensus for open season recommendations was reached within the Panel. The Panel comprises the following stakeholders:

- Conservation Council of SA (CCSA), up to six representatives invited, with five representatives attending in 2021.
- Conservation and Hunting Alliance of South Australia (CHASA), up to six representatives invited, with six representatives attending in 2021.
- Wetlands and Wildlife (W&W), one representative invited and one attending in 2021.
- BirdsSA, one representative invited and one attending in 2021.
- DEW staff who generally facilitate, observe or advise.

FINANCIAL/HR IMPLICATIONS

Are there financial or HR implications? No

ATTACHMENTS

Attachment 1 – 2021 Waterfowl, Environment and Climate Conditions and Forecasts Report

Attachment 2 – Statement of Outcomes from the 2021 meeting of the Duck and Quail Open Season Stakeholder Reference Panel

Attachment 3 – Preliminary CHASA stubble quail abundance and distribution report

Attachment 4 – 2022 duck open season Gazette notice

Attachment 5 – 2022 quail open season Gazette notice

Attachment 6 – 2022 duck and quail open season Advertiser notices

[redacted]

Director Conservation and Wildlife
Department for Environment and Water

29/12/2021

Waterfowl, Environment and Climate conditions and forecast considerations to inform 2022 Duck and Quail Seasons setting

December 2021

SOUTH AUSTRALIA

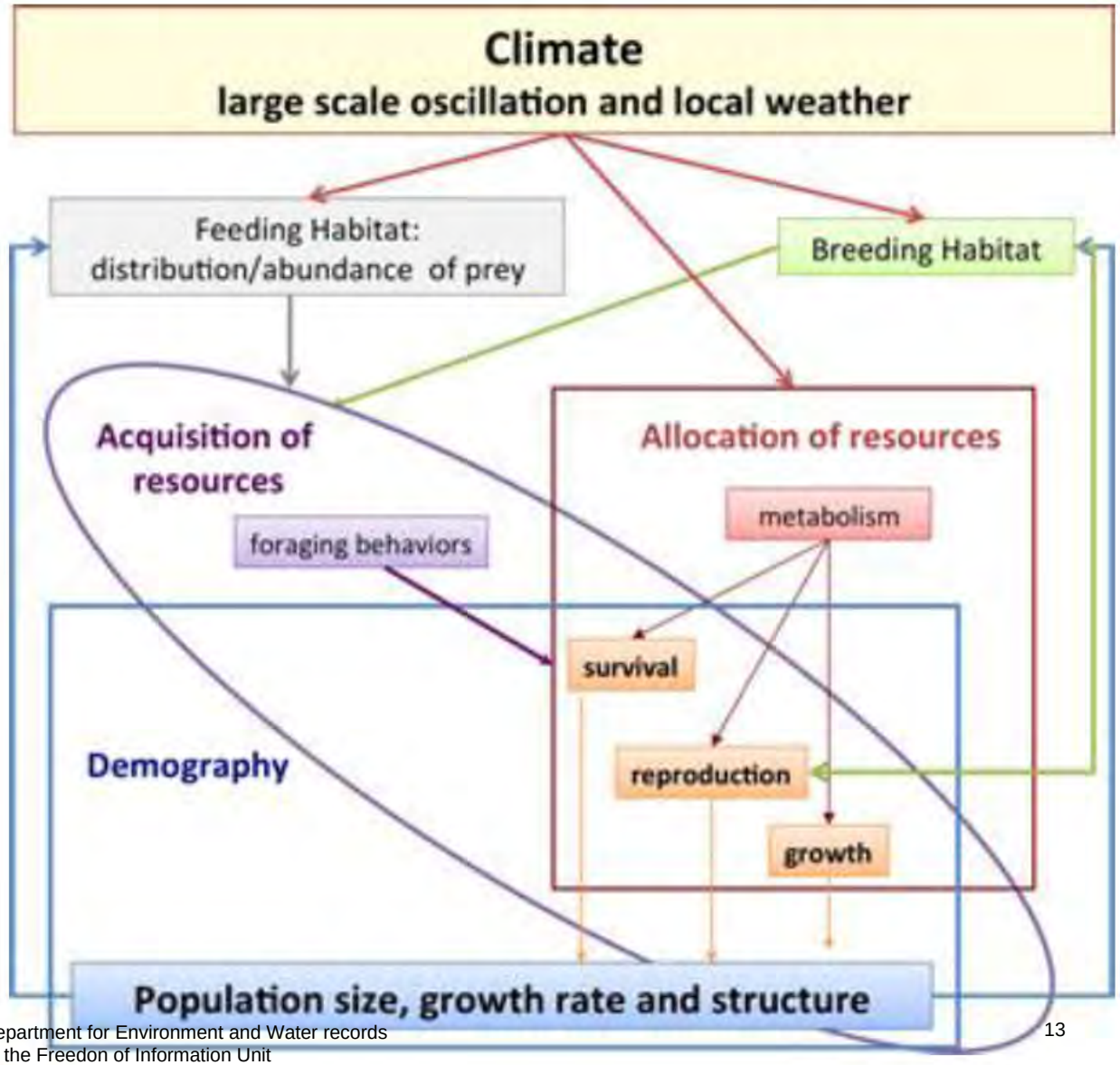
Government of South Australia
Department for Environment and Water

Conditions – review and outlook

- Climate influence on bird abundance & distribution
- Rainfall summary
- Climate drivers
  - El Niño Southern Oscillation - La Niña
  - Indian Ocean Dipole
  - Southern Annular Mode
- Summer rainfall & temperature forecasts
- River Murray inflows, storages and flow to SA
- Lake Eyre Basin

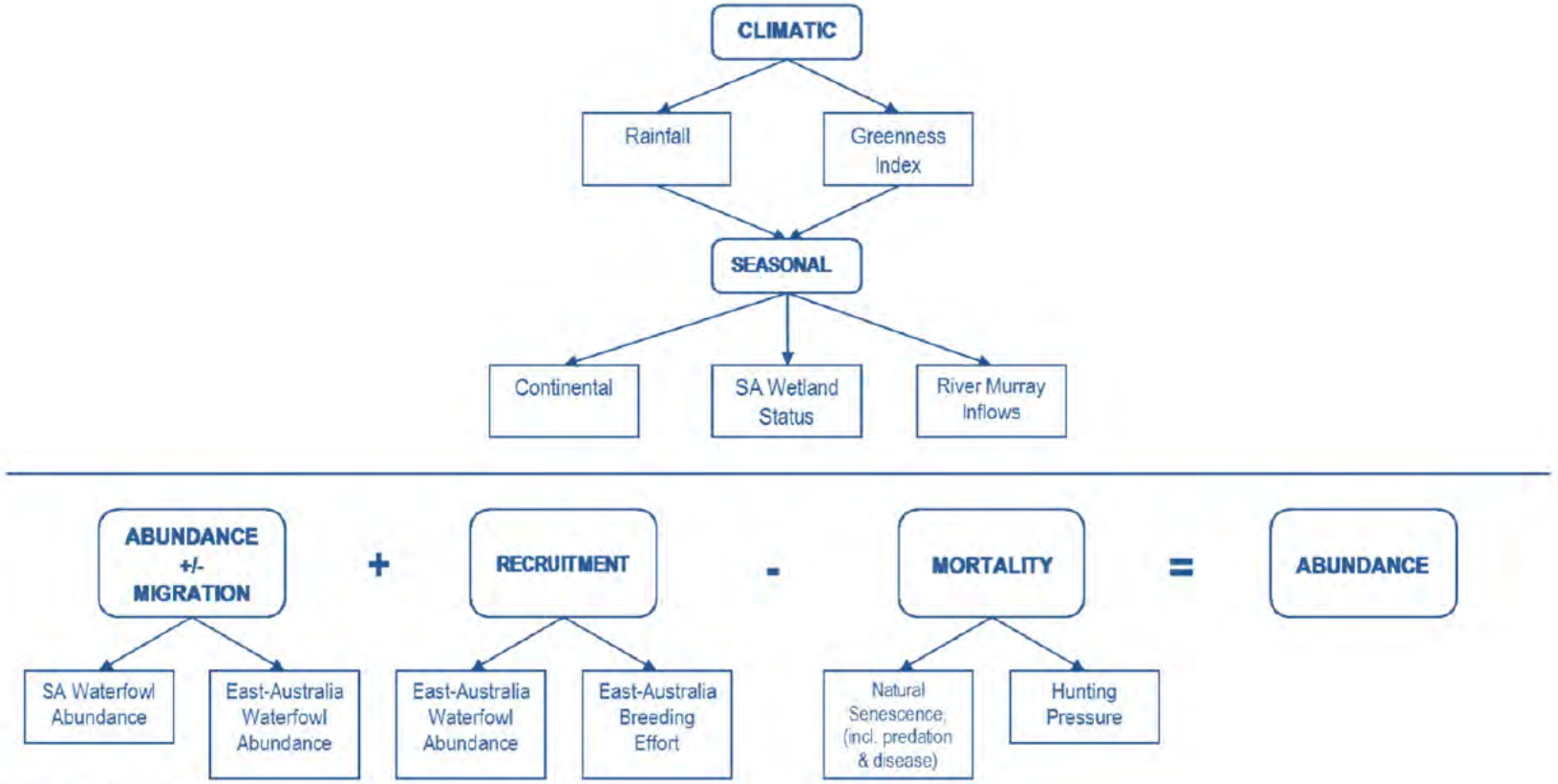
Climatic conditions affecting bird abundance & demographics

Source: Jenouvrier, S., 2013. Impacts of climate change on avian populations. *Global Change Biology*, *19*(7), pp.2036-2057.

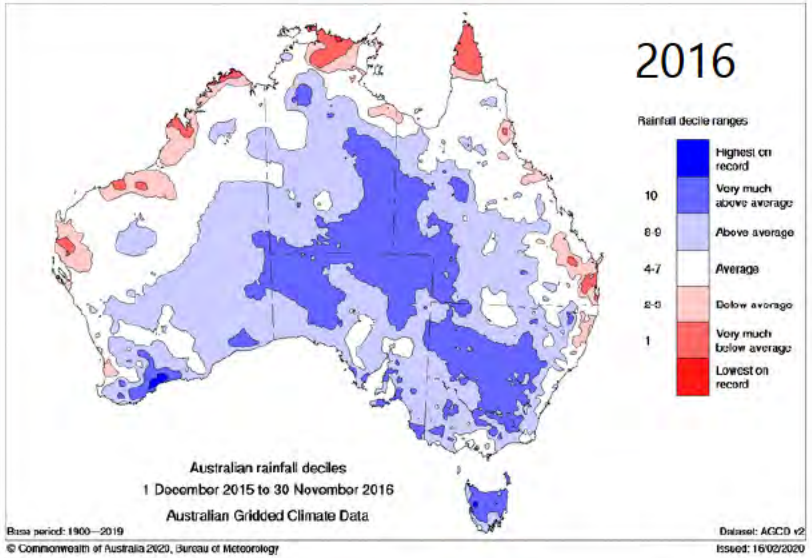


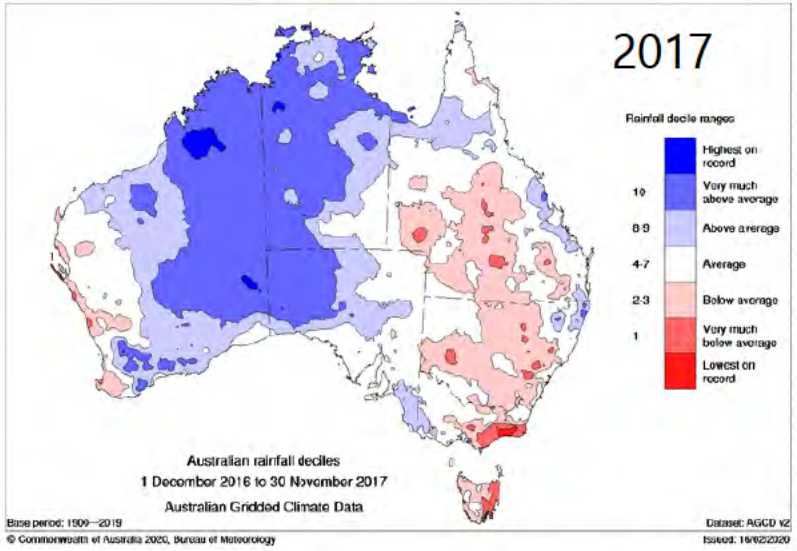
Duck and quail hunting in South Australia

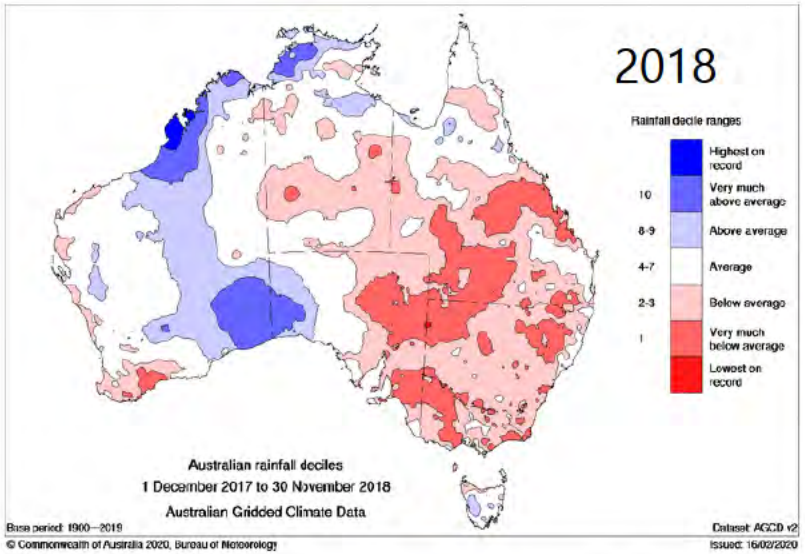
Factors influencing waterfowl species and populations

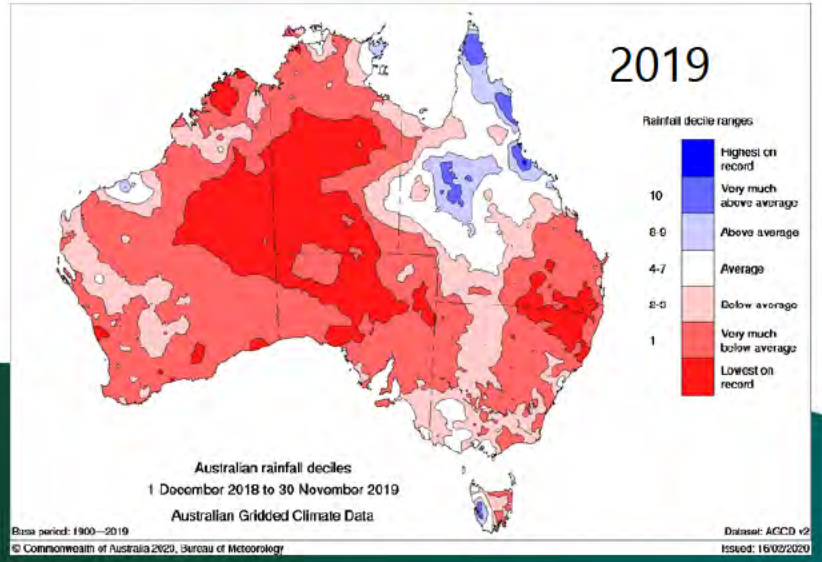


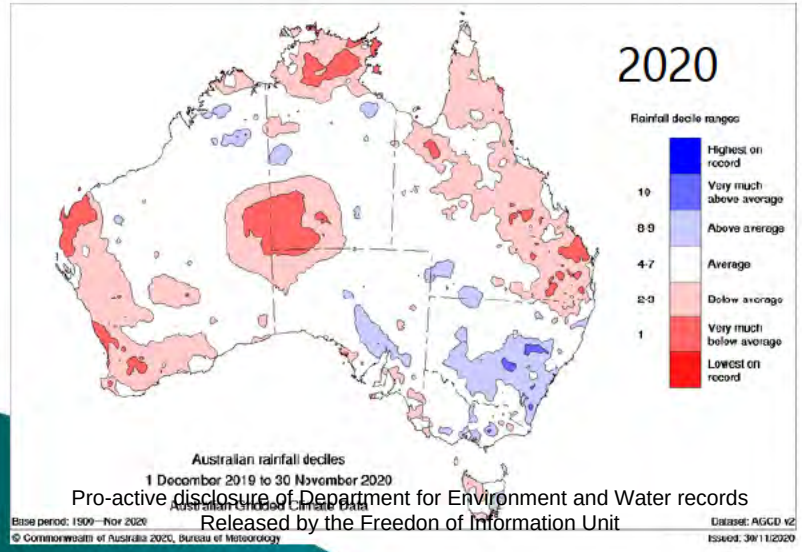
Rainfall 2016 to 2021 (1 Dec - 30 Nov)

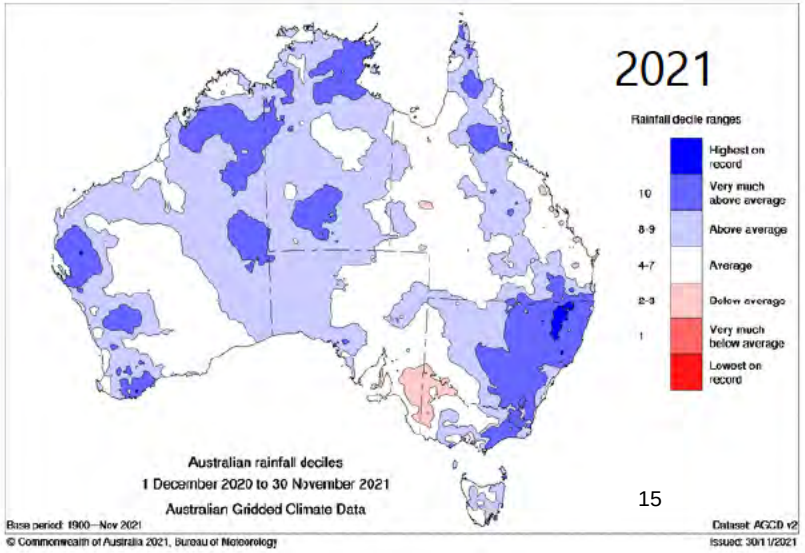






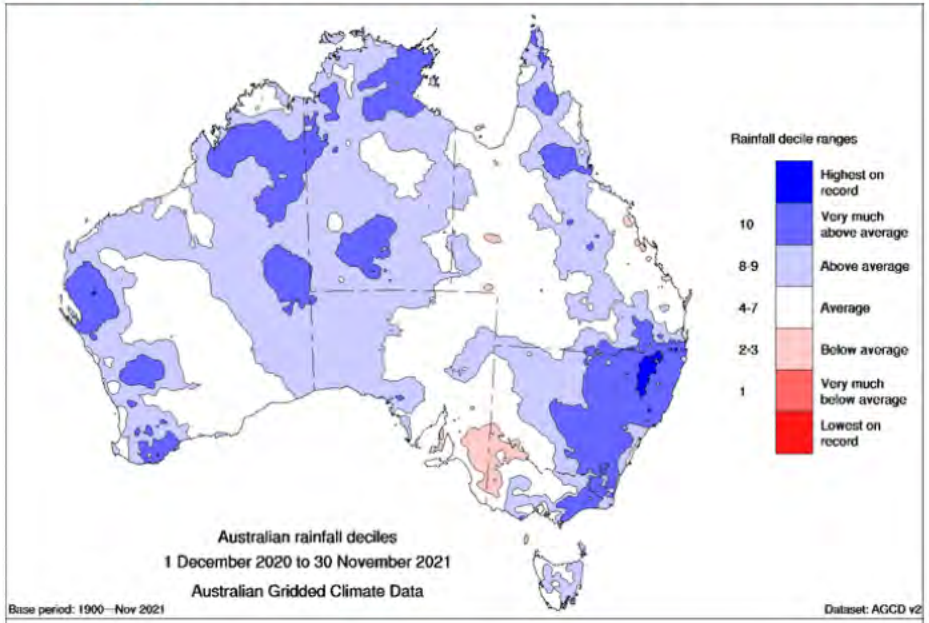




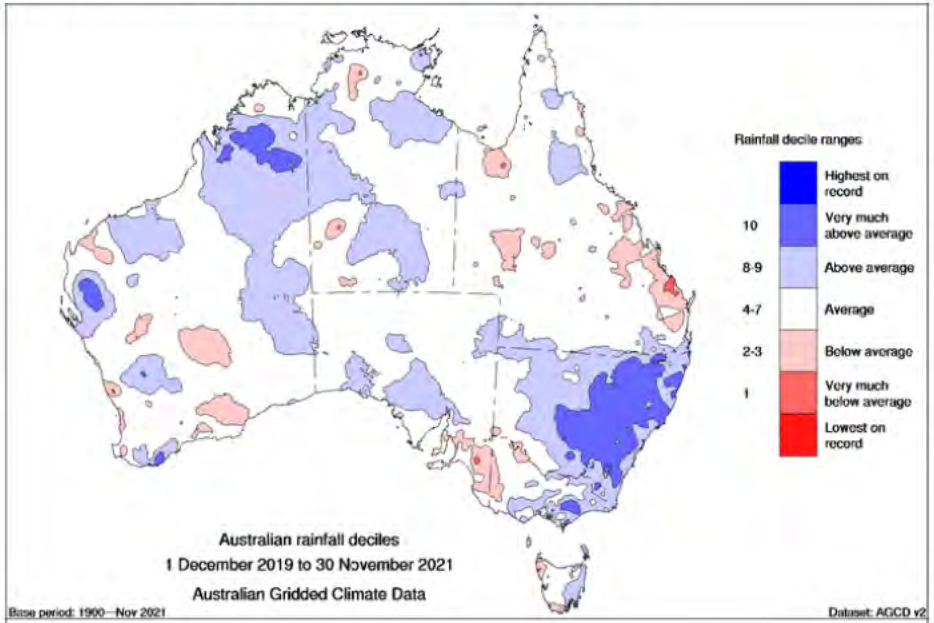


12, 24, 36 and 48 month rainfall deciles

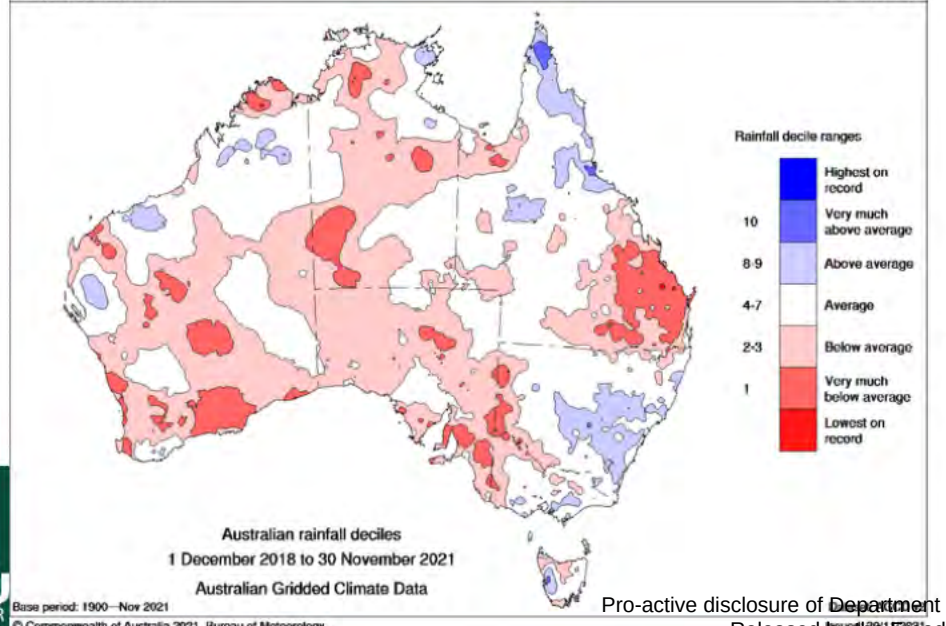
12 month



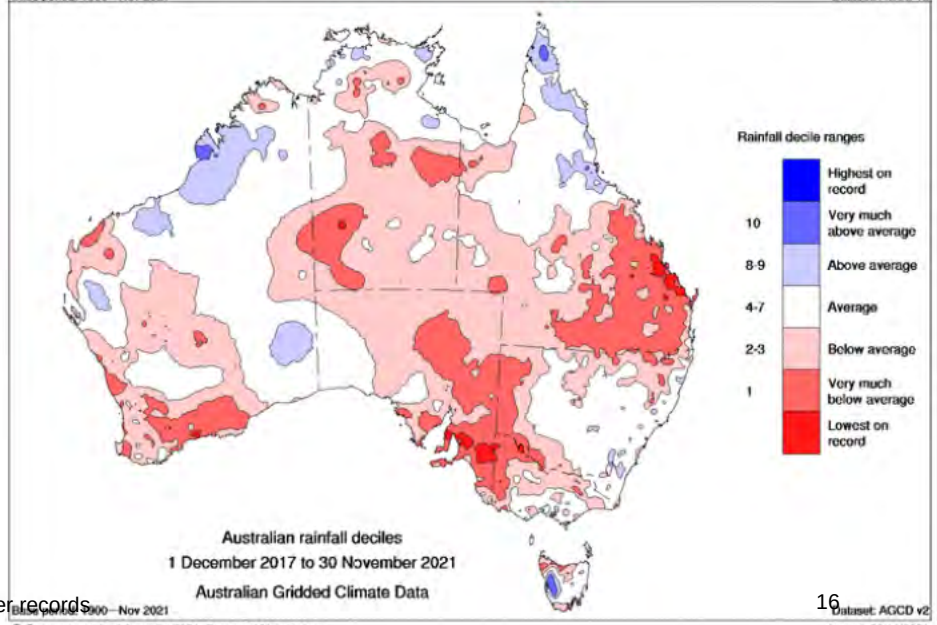
24 month



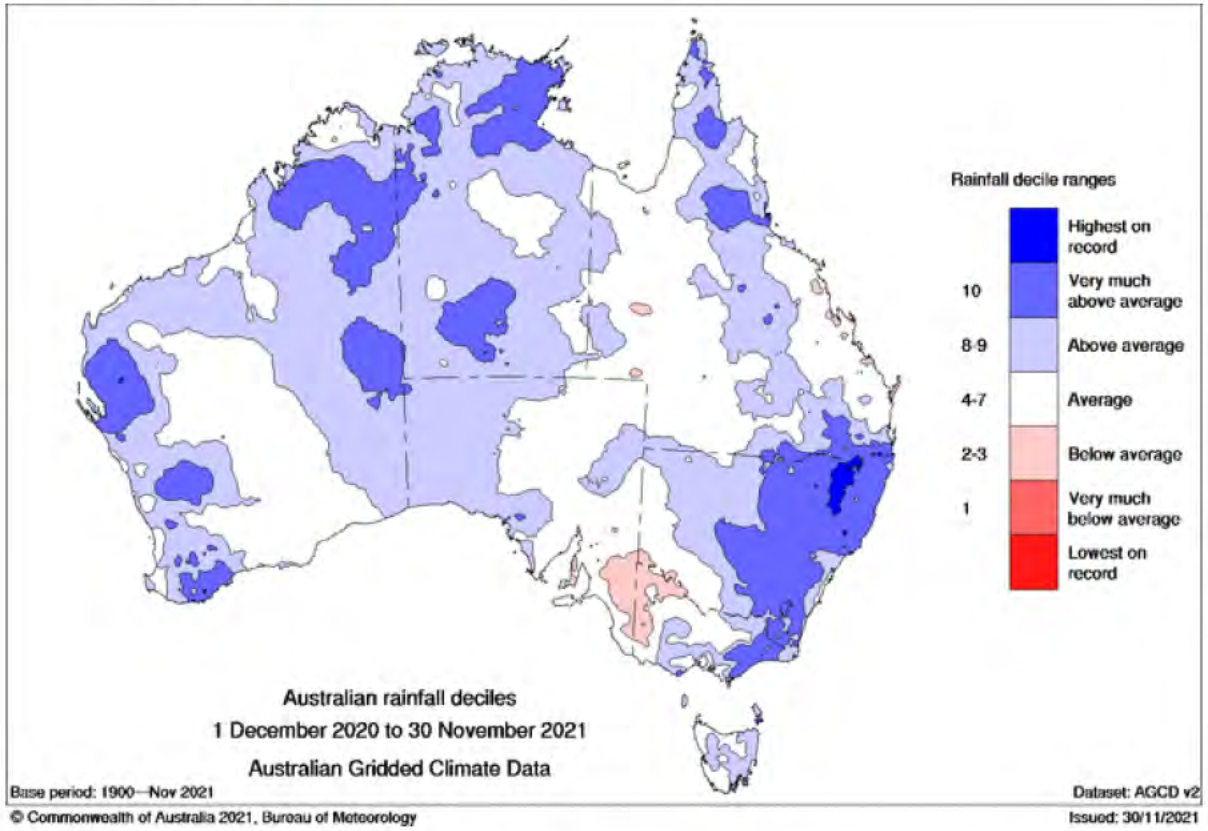
36 month

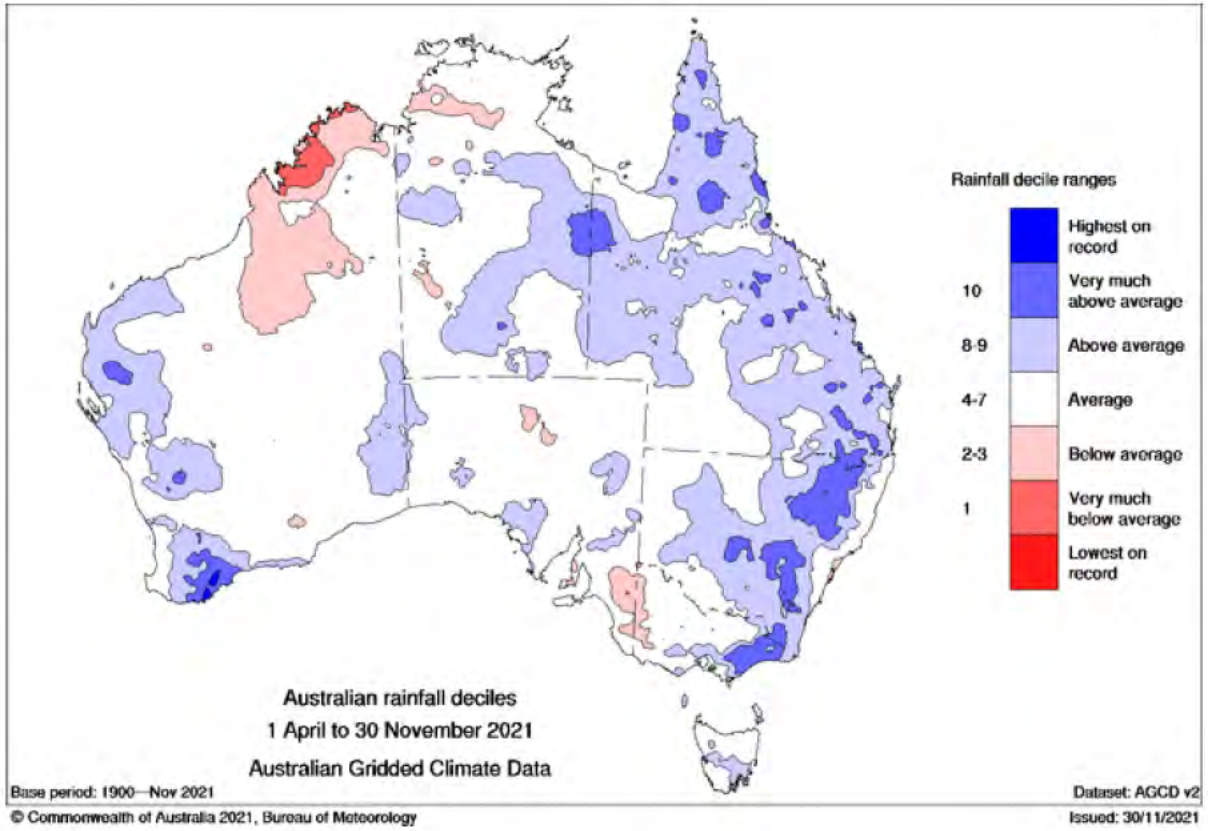


48 month

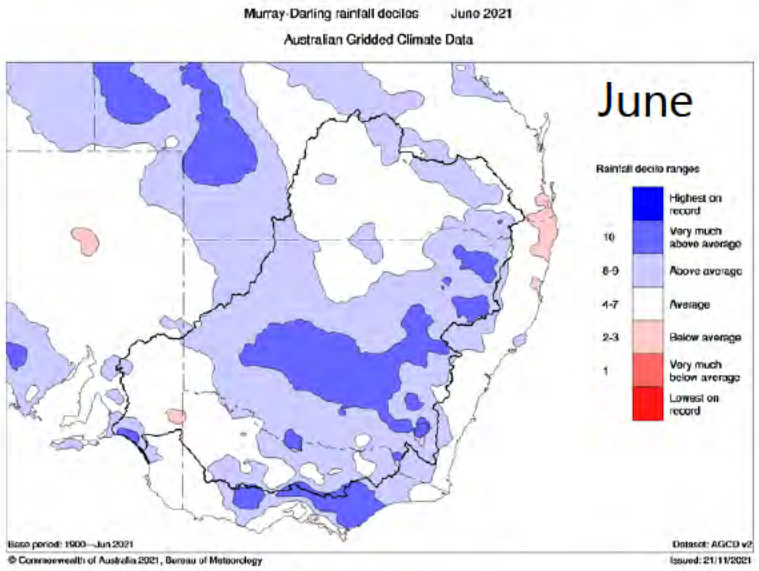


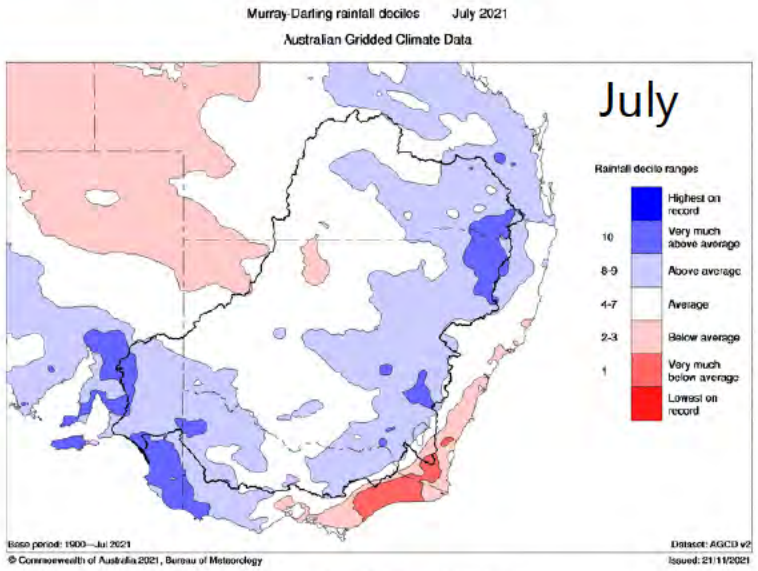
Rainfall deciles: 12 month & southern wet season

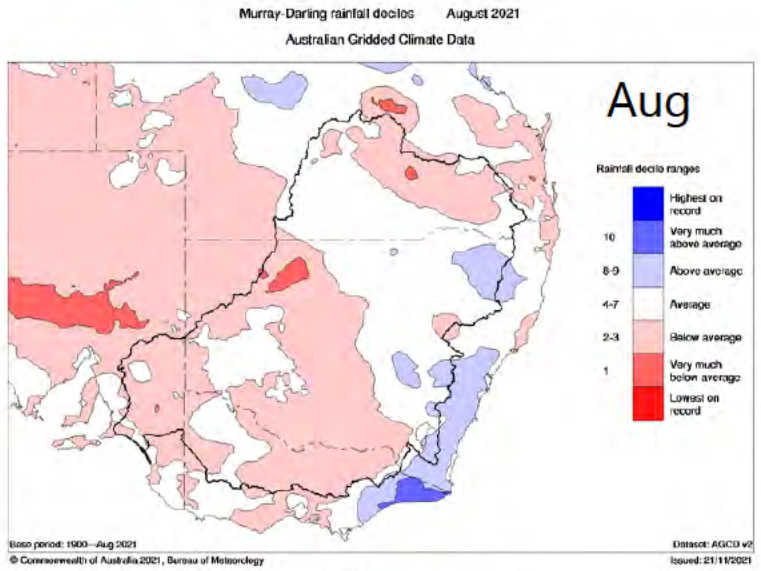


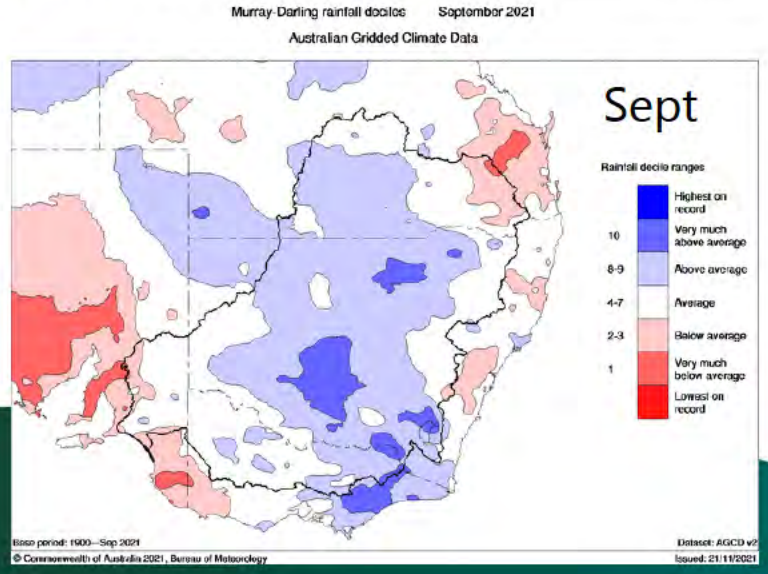


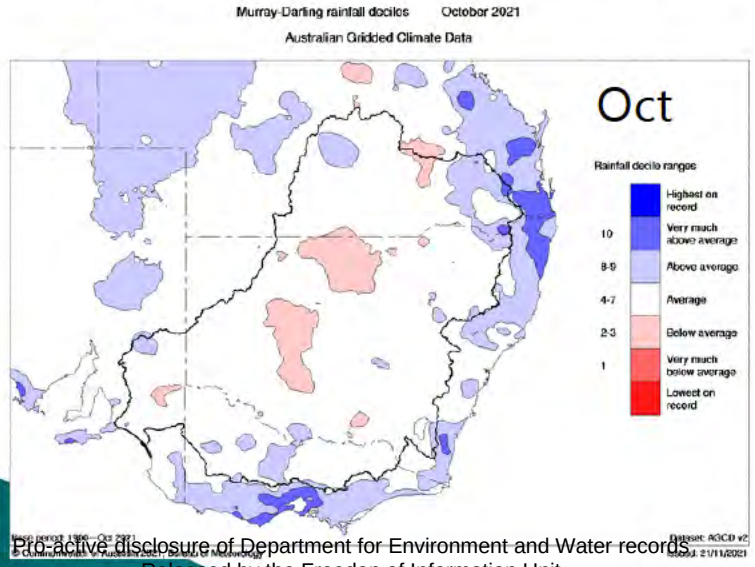
2021 Rainfall in the Murray Darling Basin

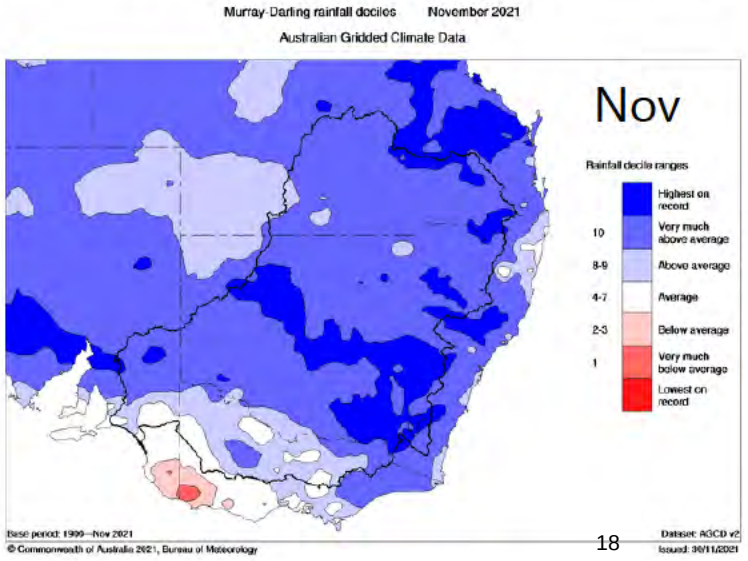


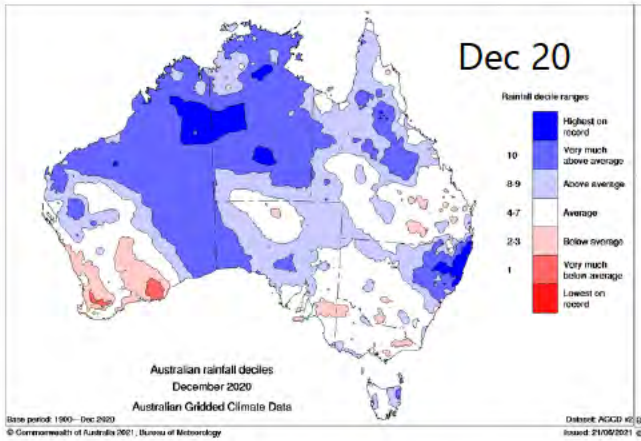


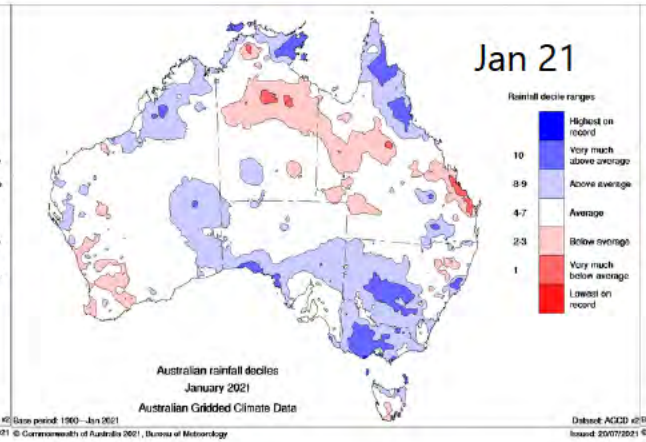


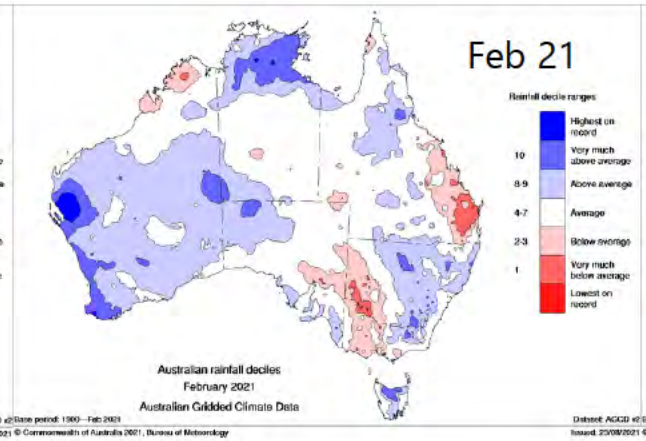


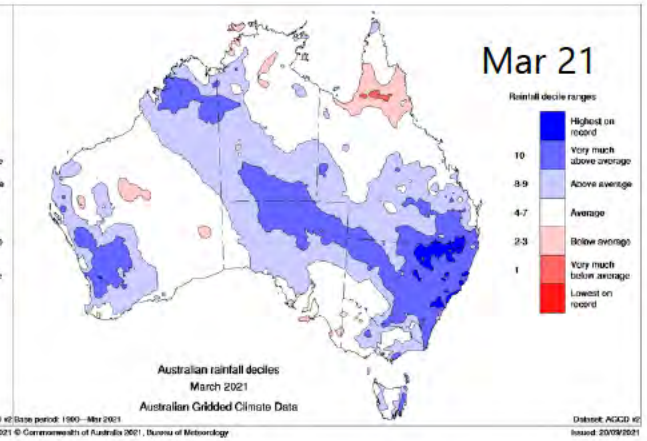


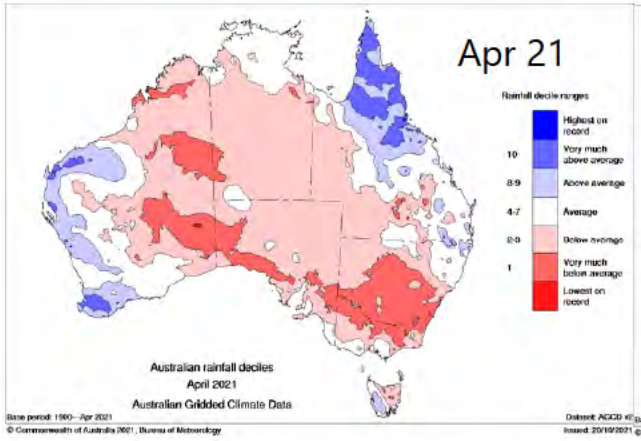


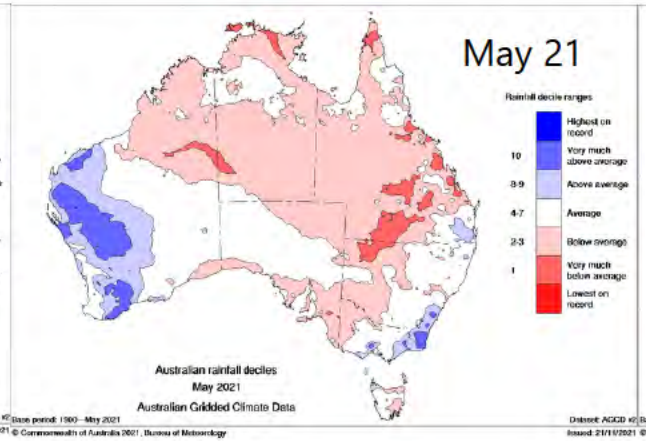


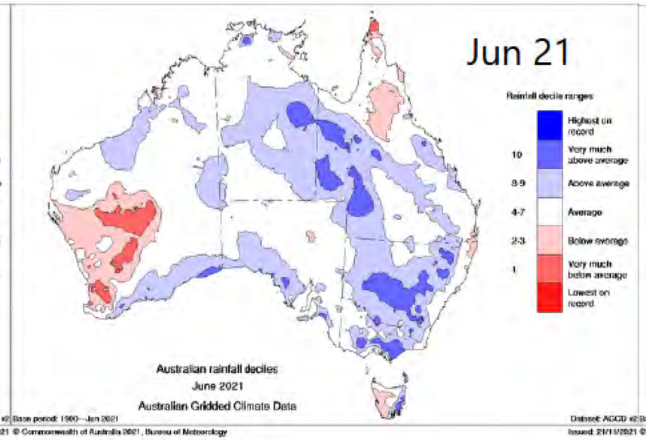


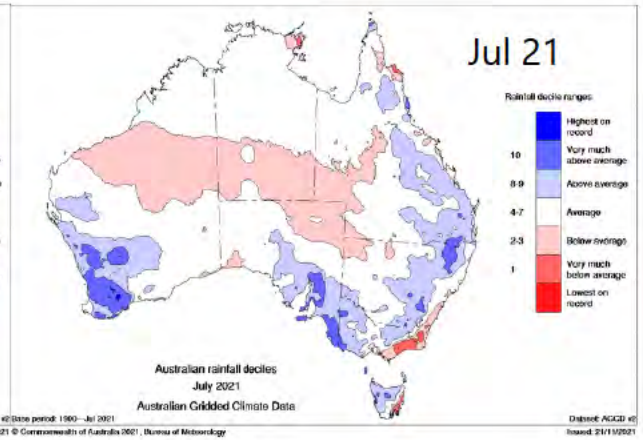


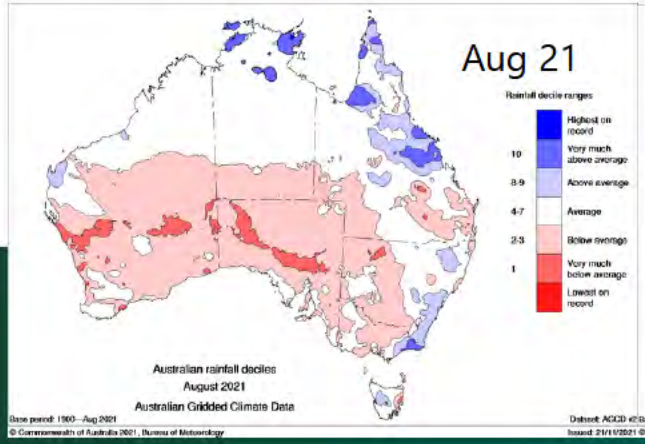


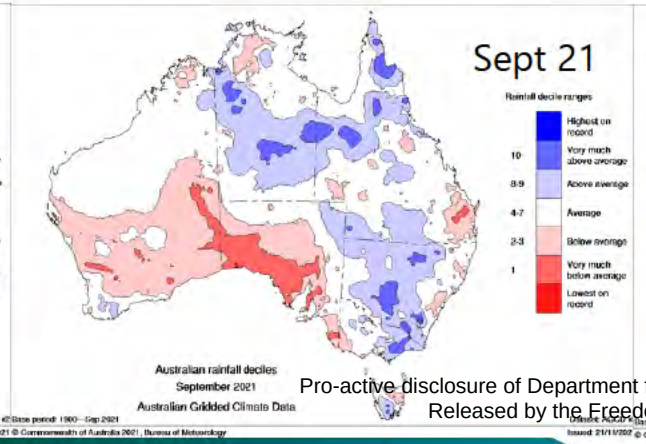


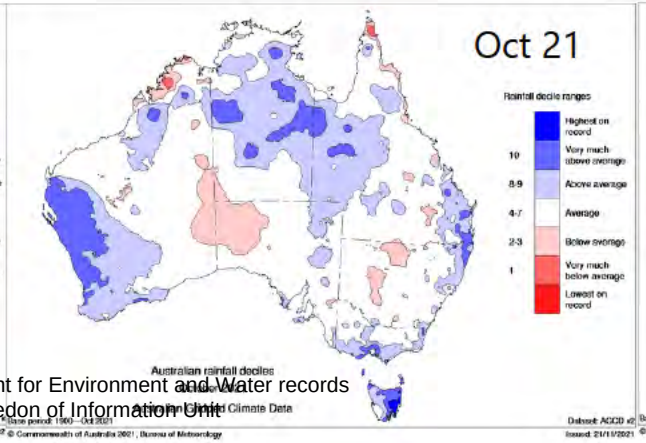


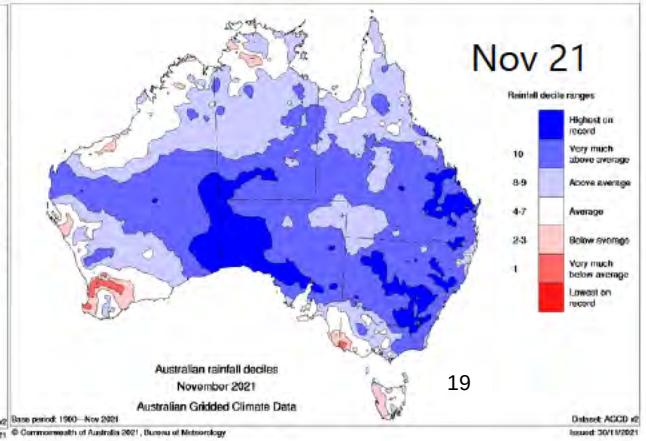




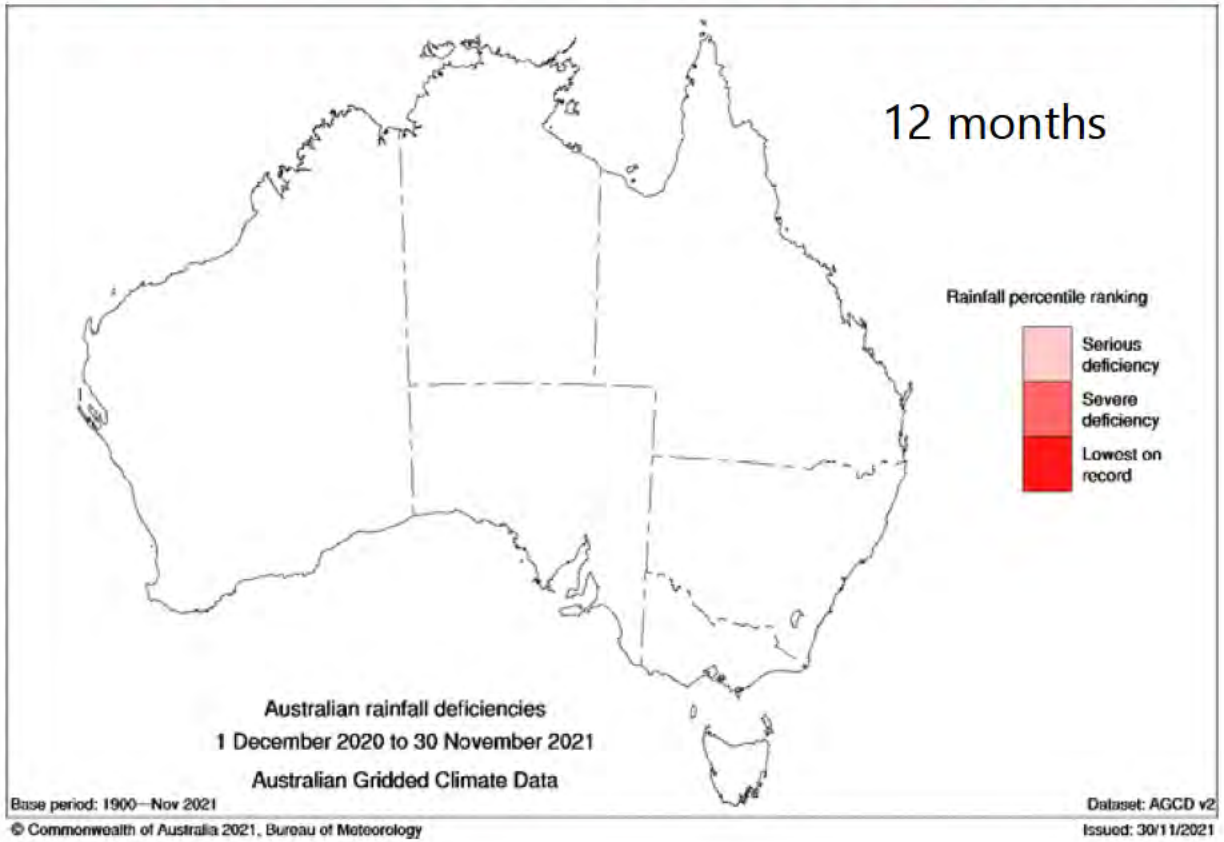


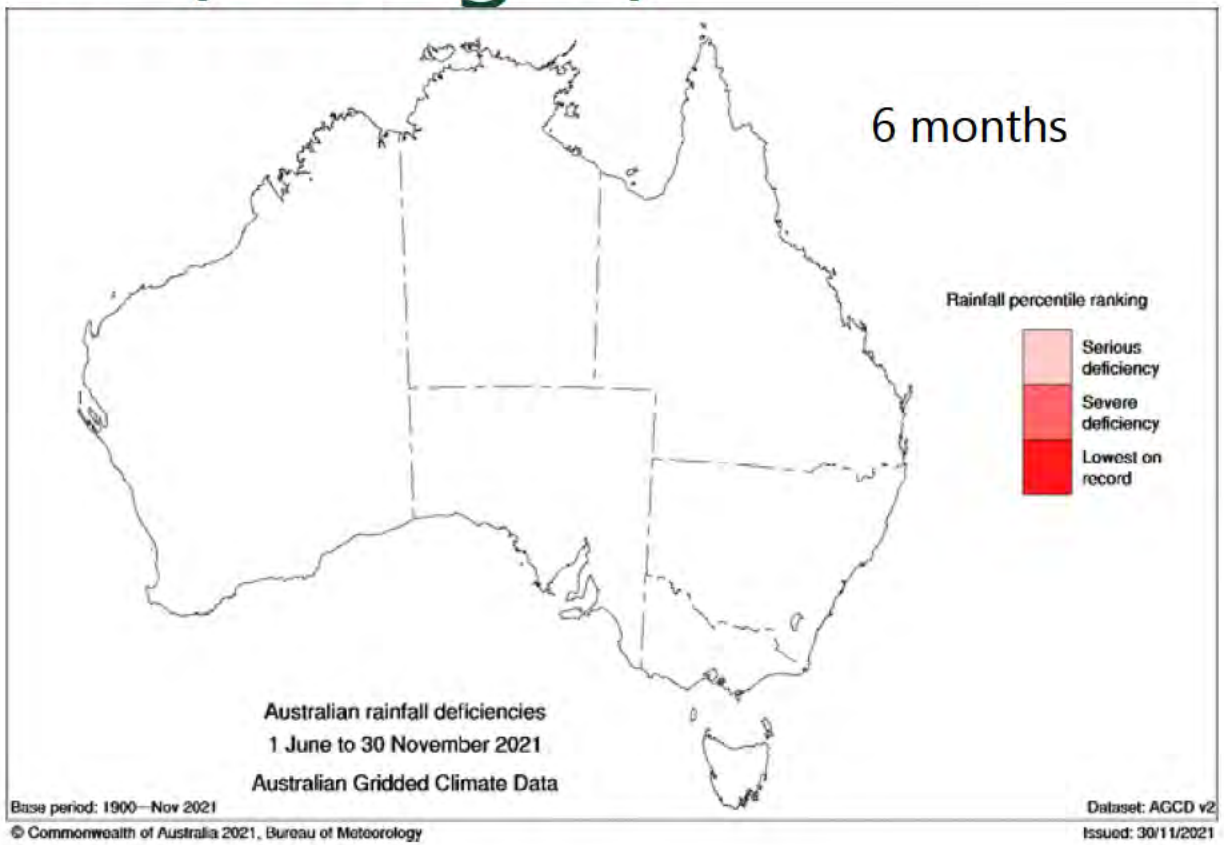




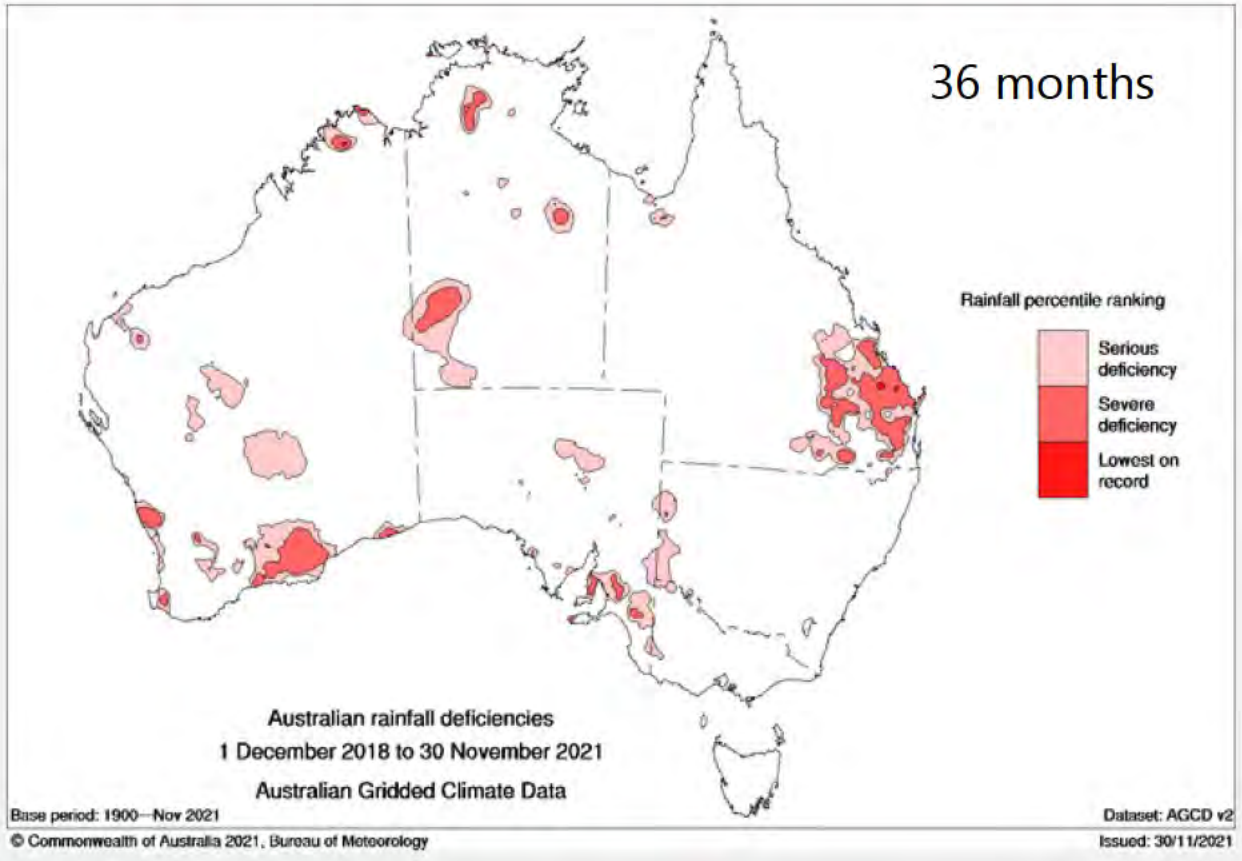


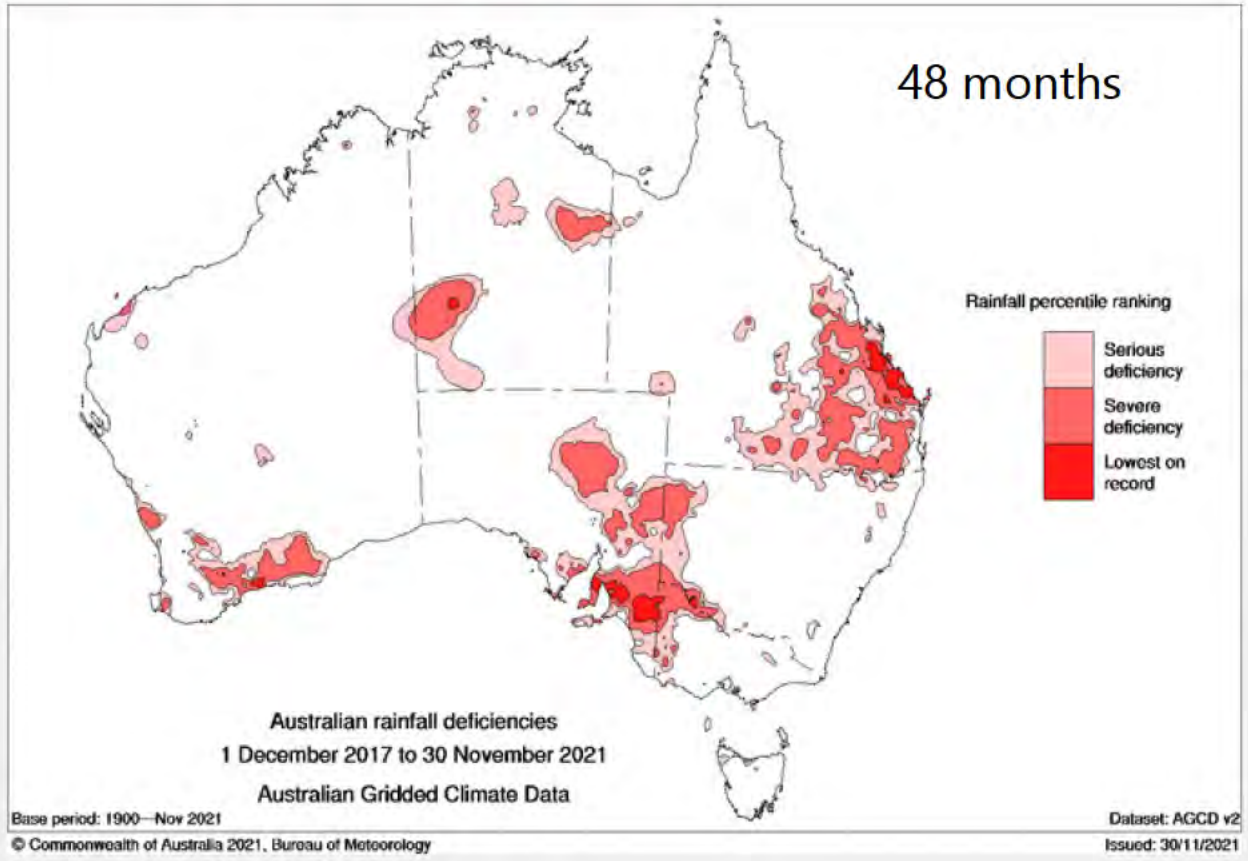
2021 Rainfall deficiencies (drought)



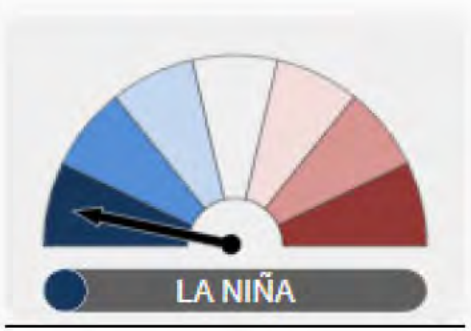


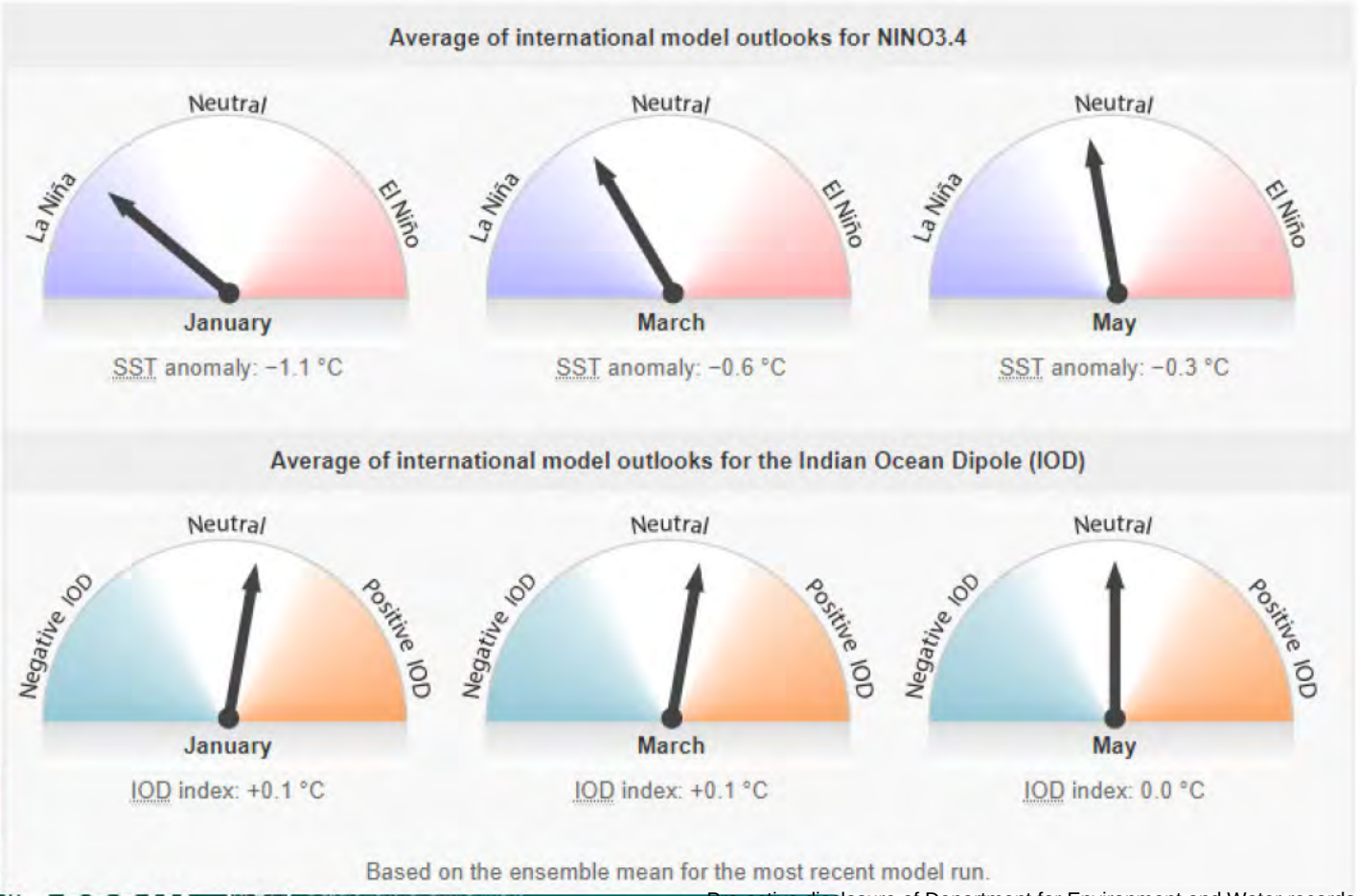
2021 Rainfall deficiencies (drought)

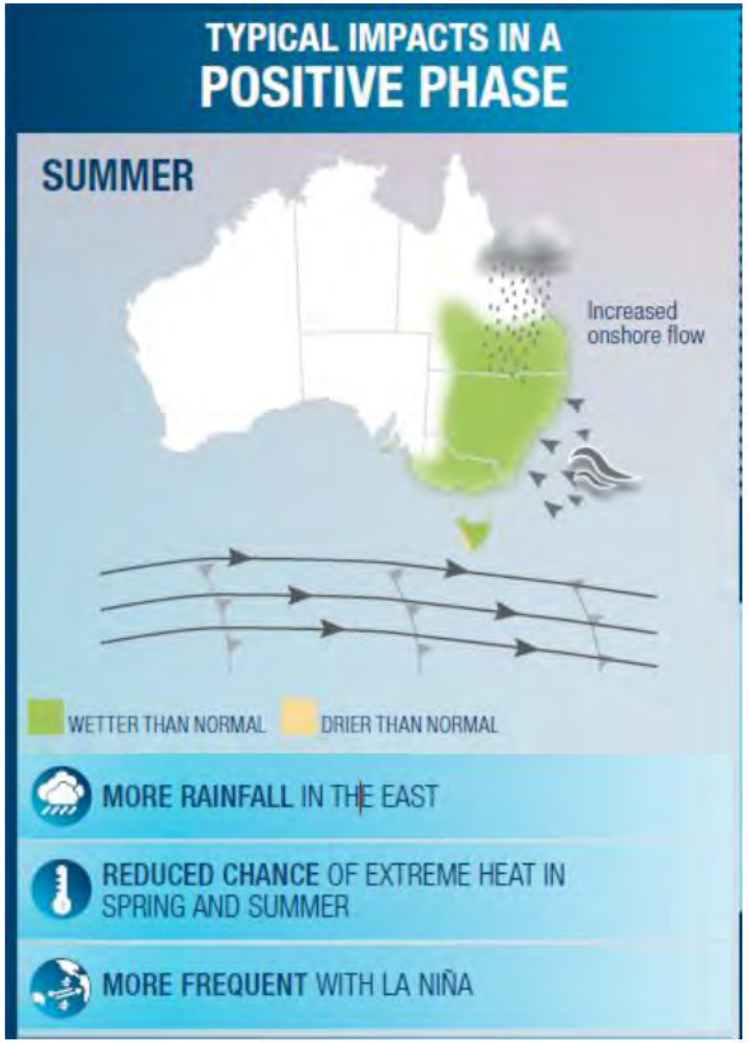




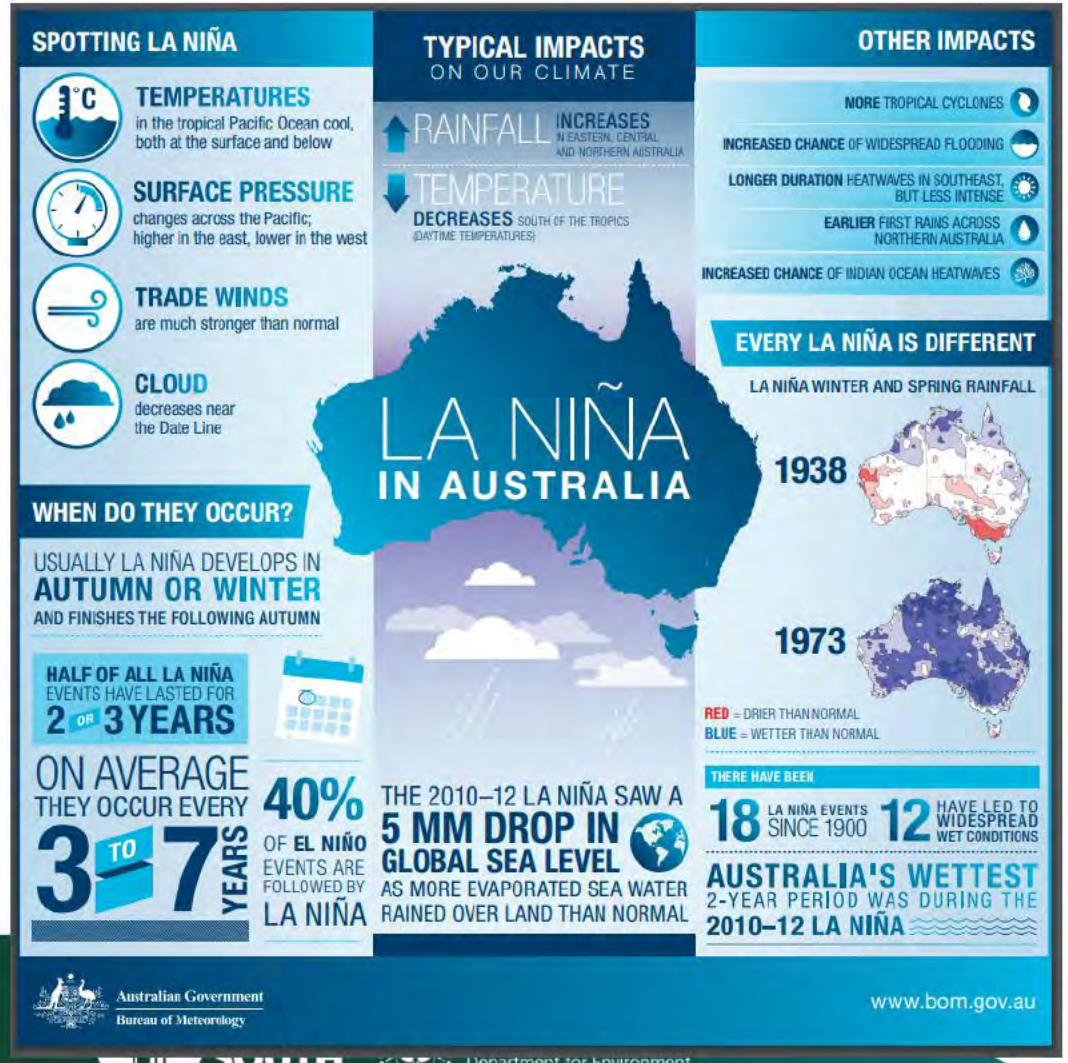
Climate Drivers

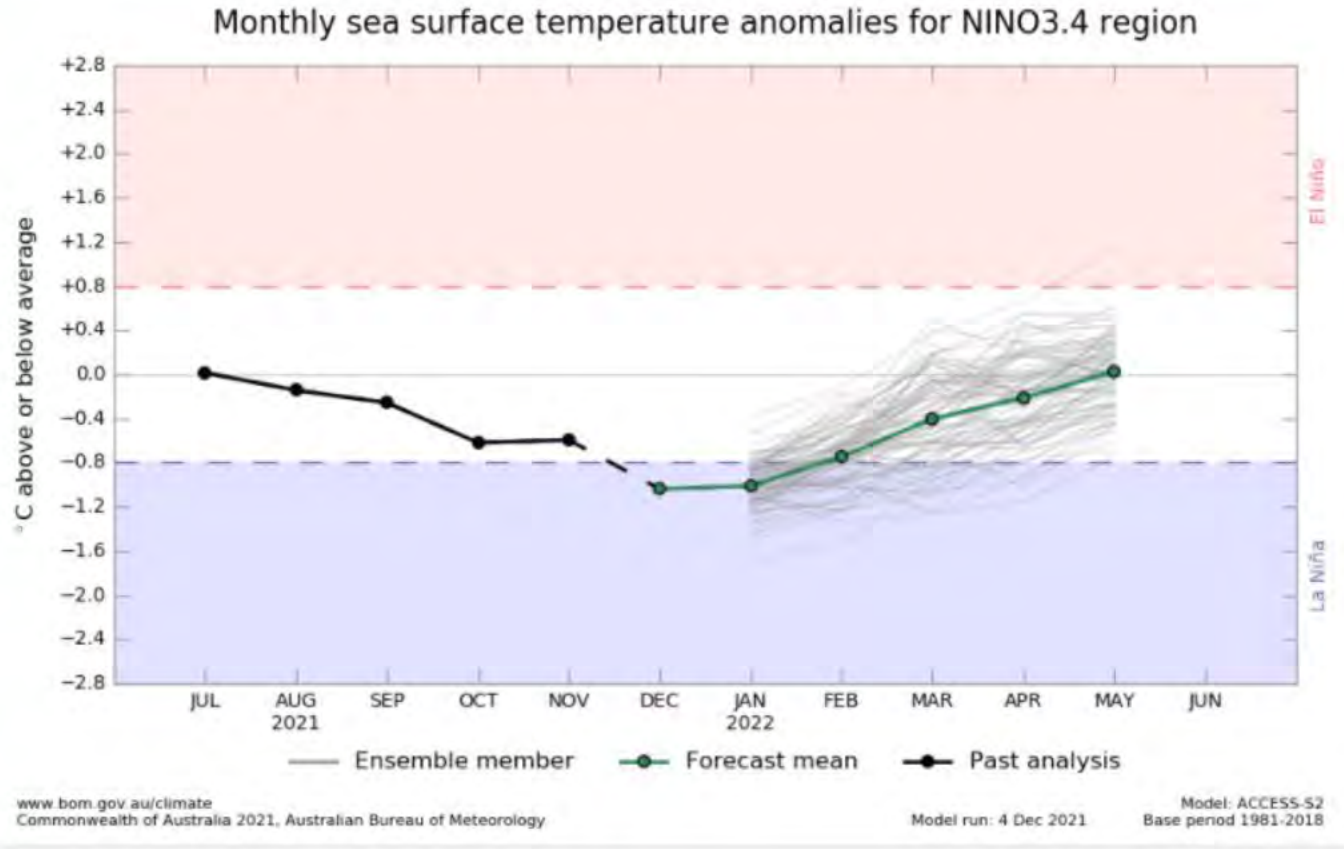




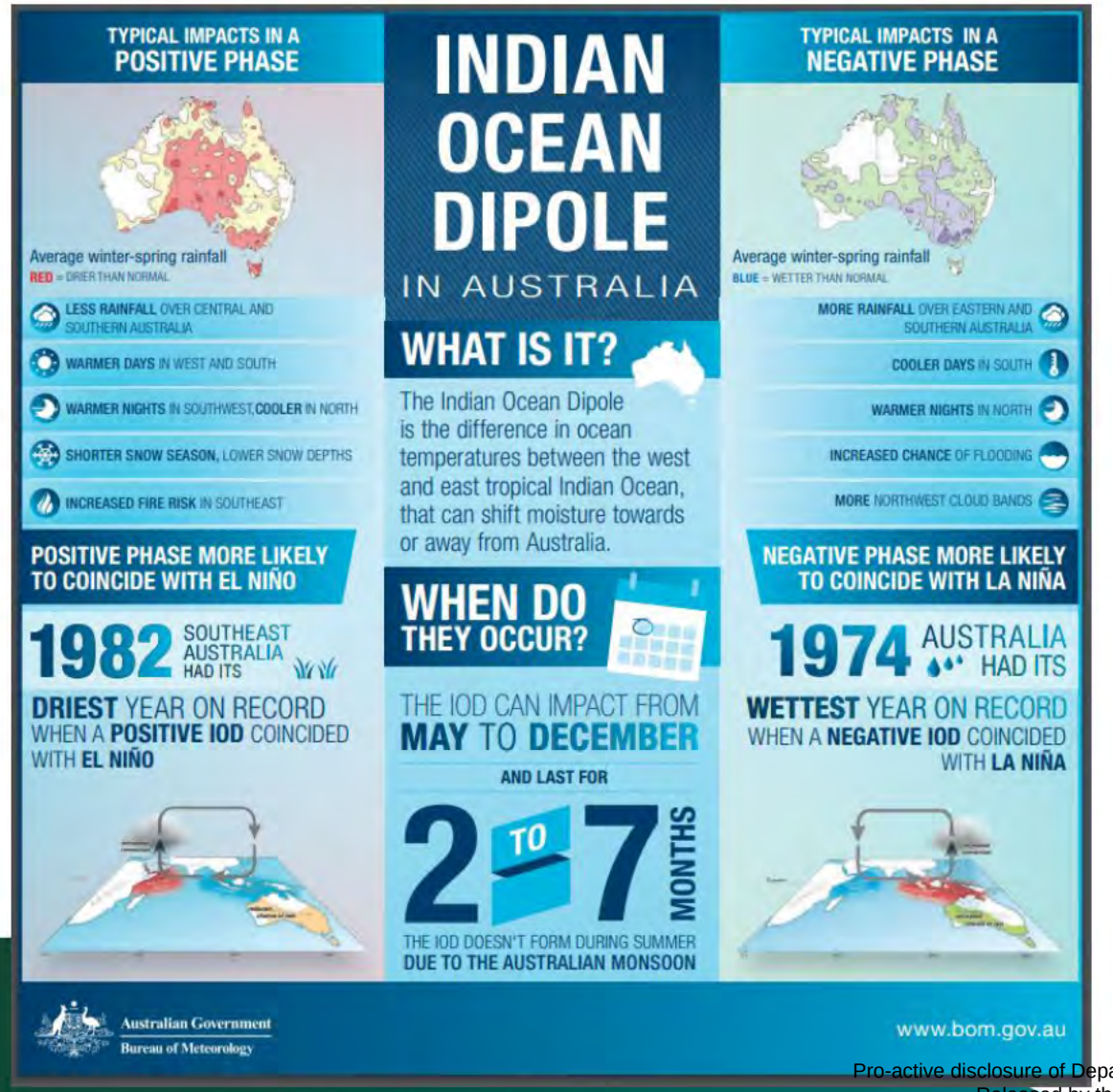


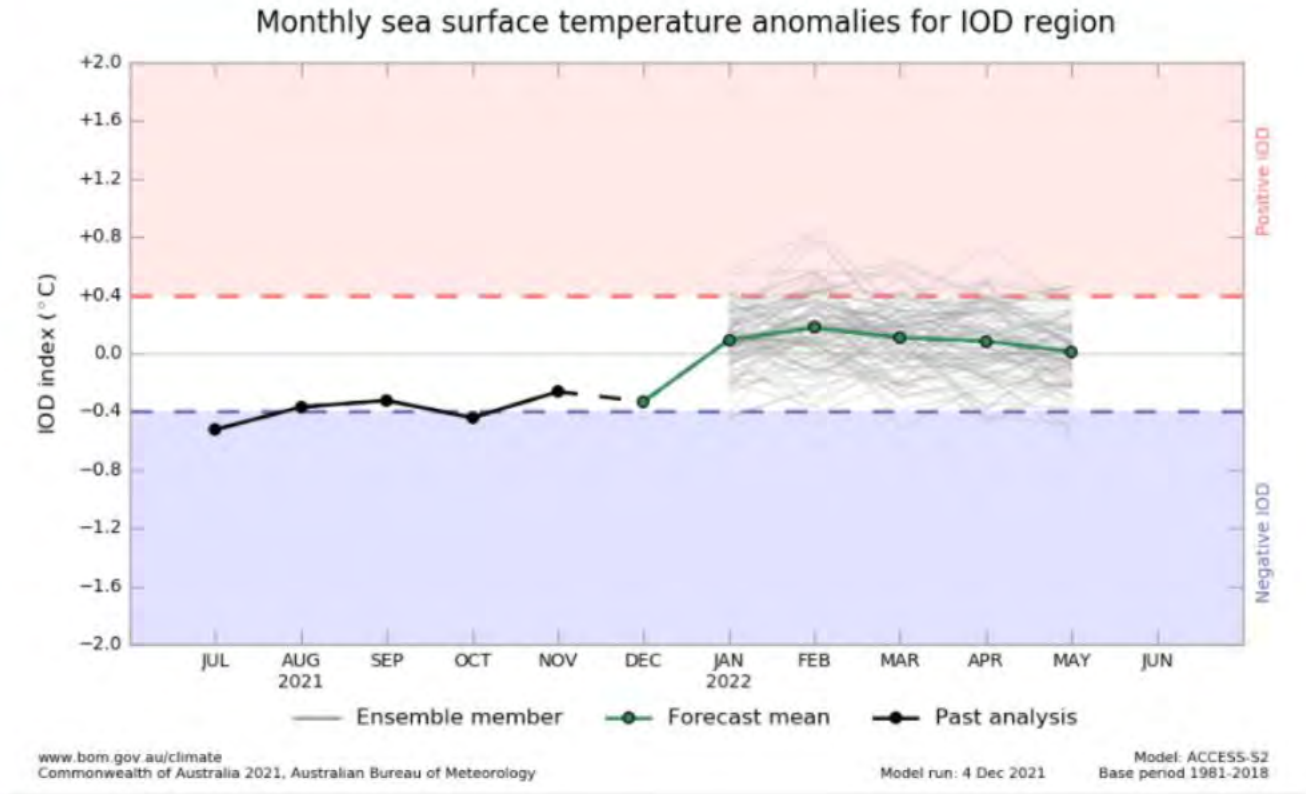
El Niño Southern Oscillation - La Niña



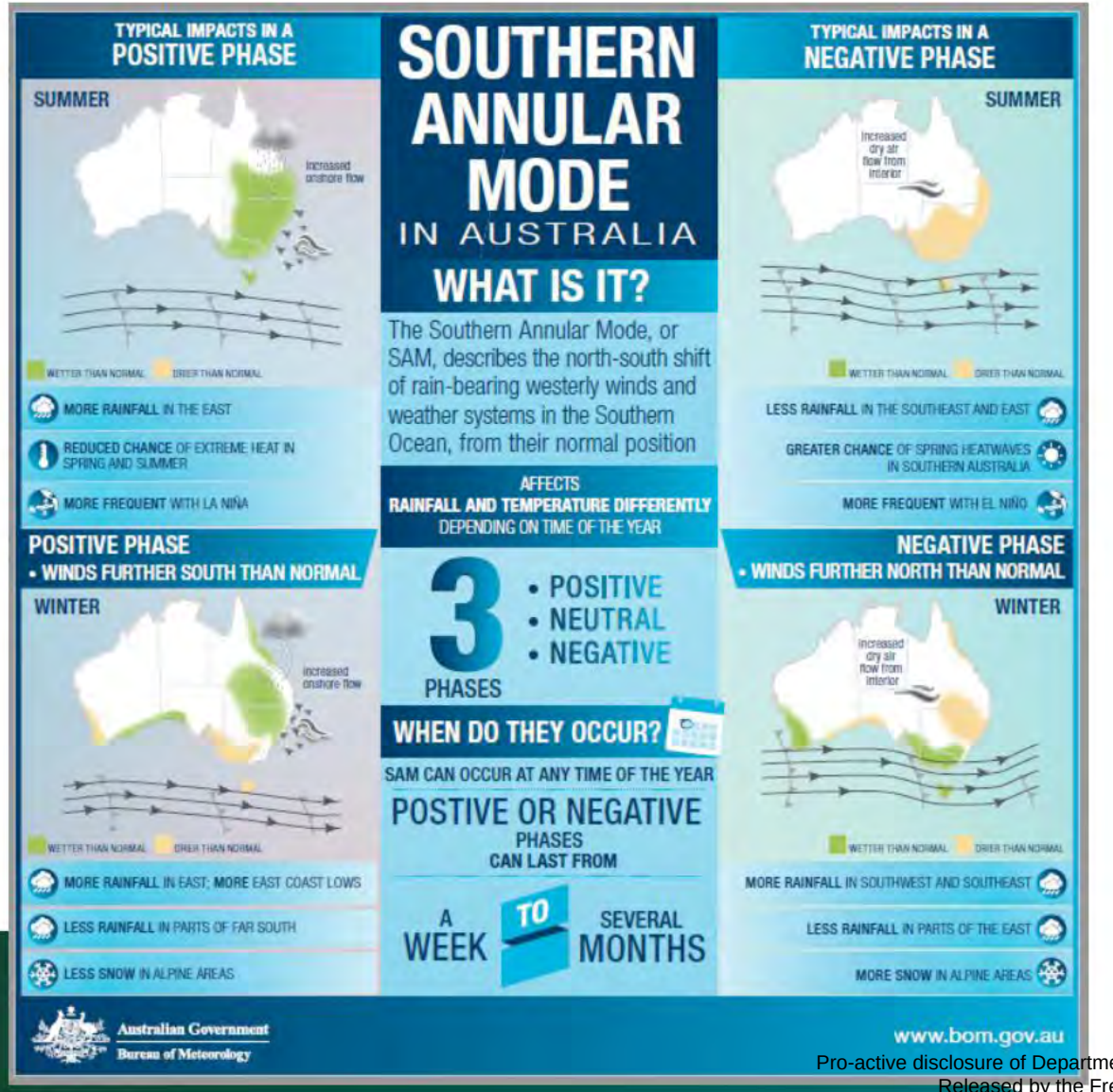


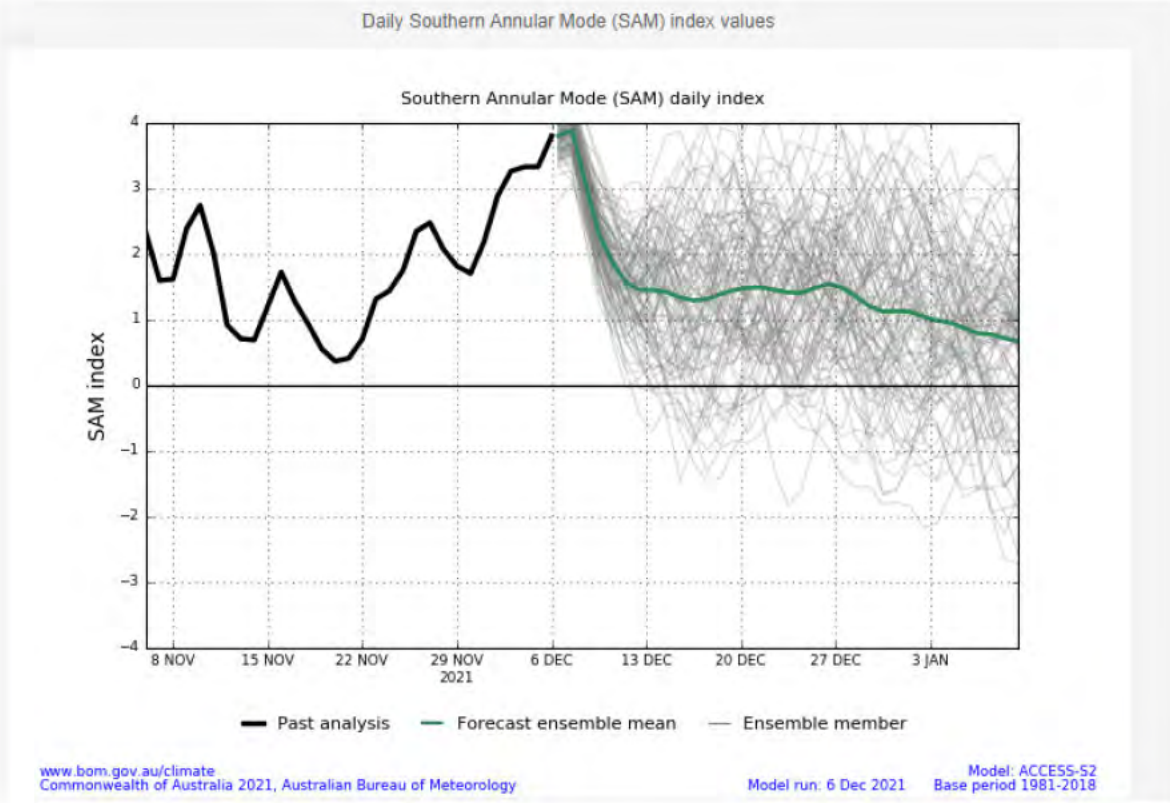
Indian Ocean Dipole





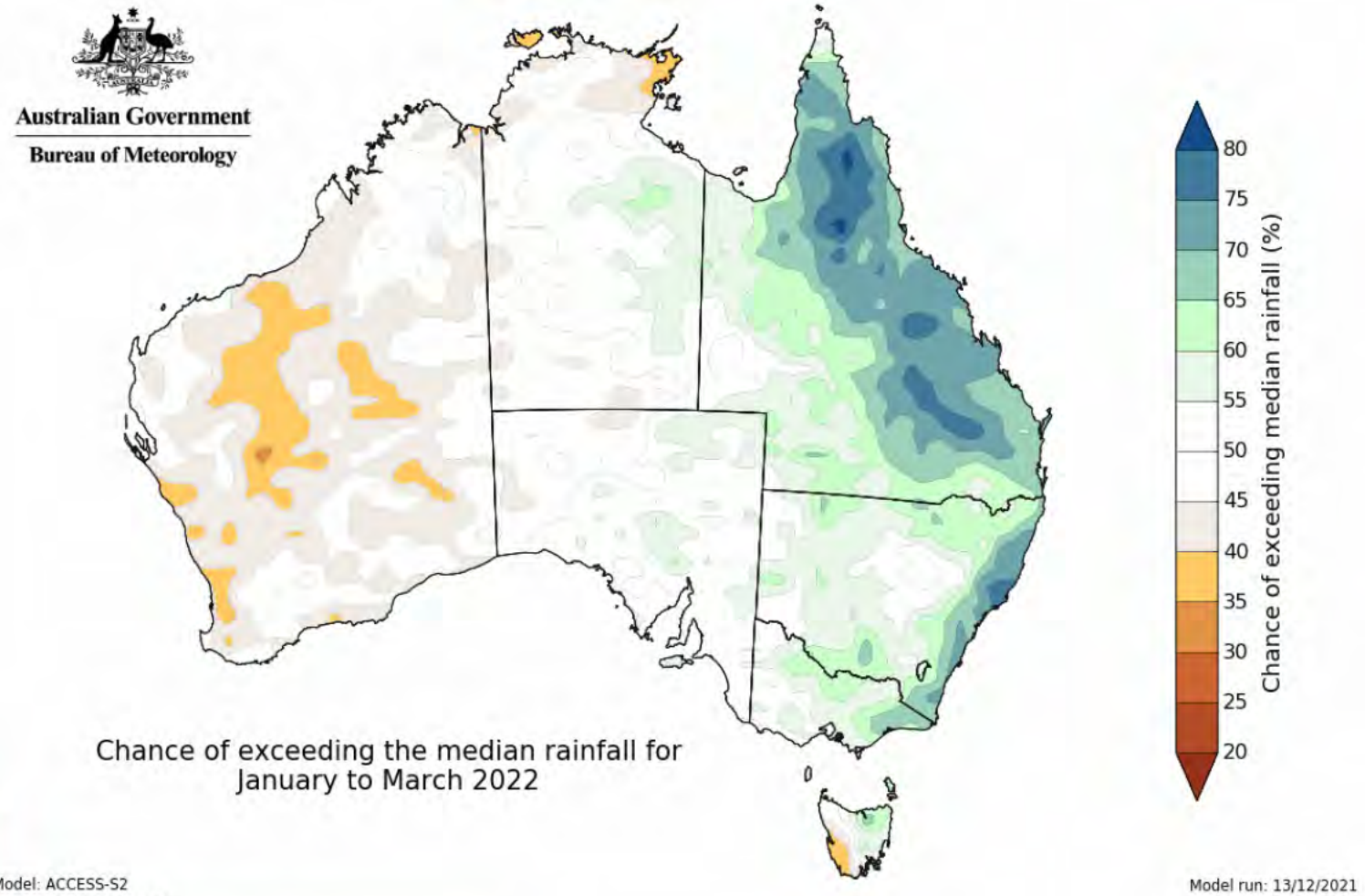
Southern Annular Mode





Forecast rainfall

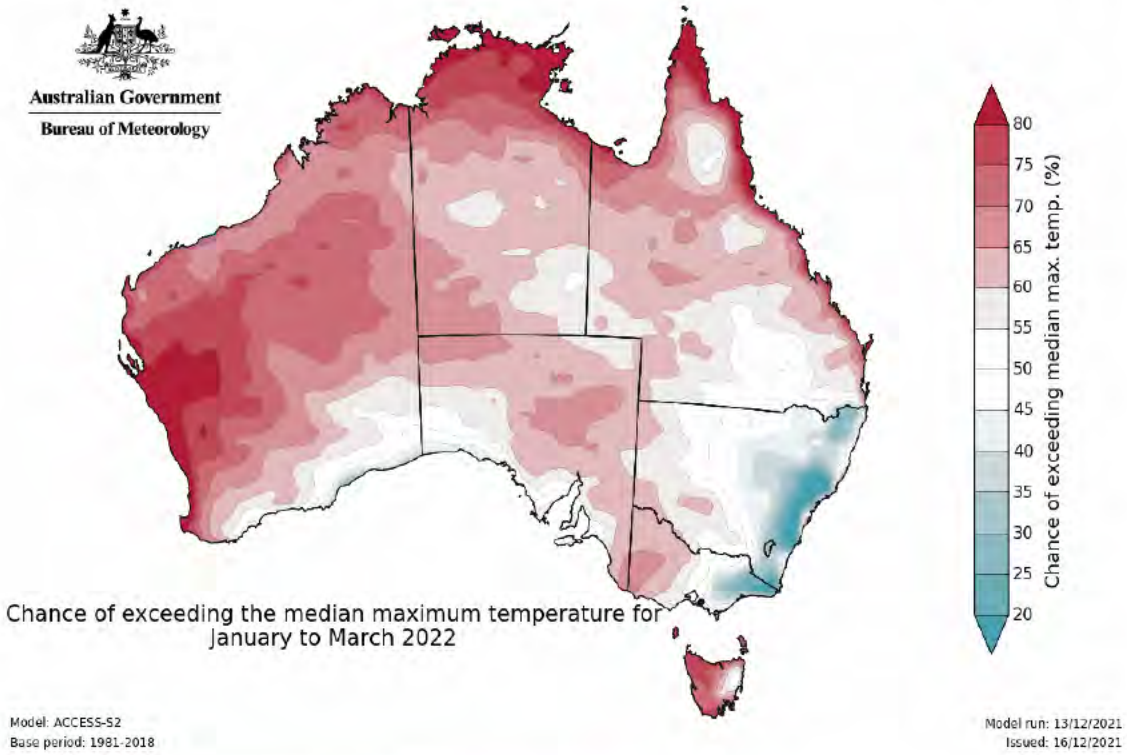
Chance of exceeding median rainfall January to March 2022

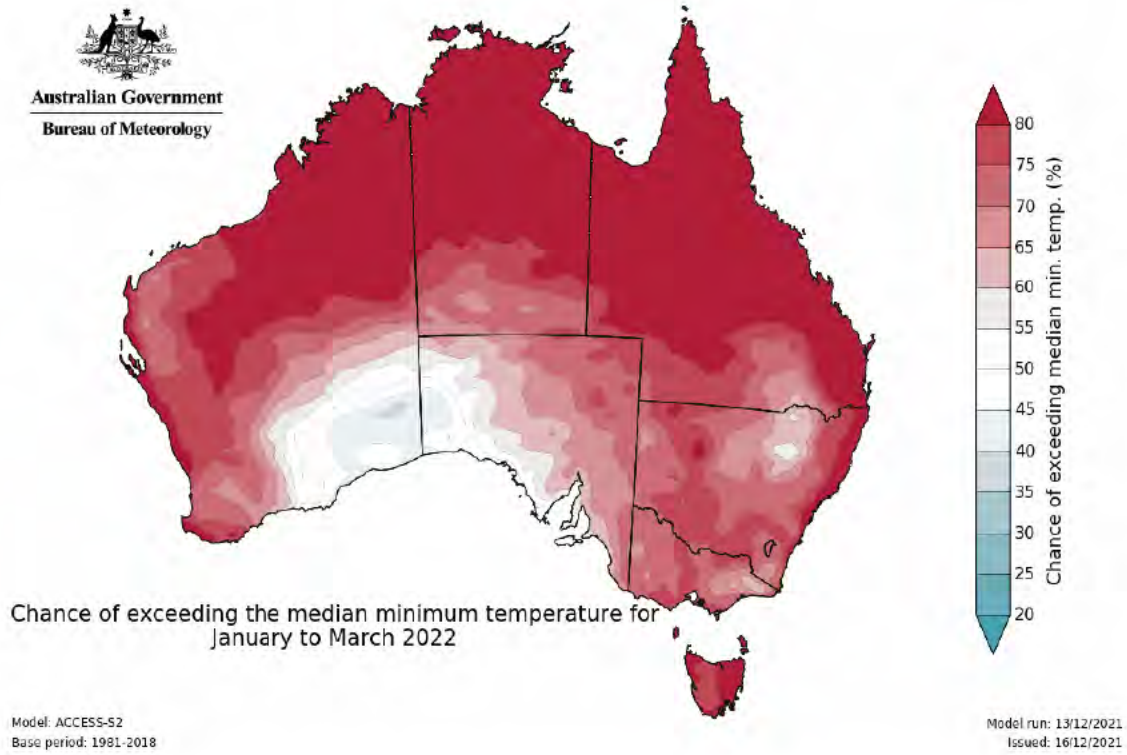


and Water

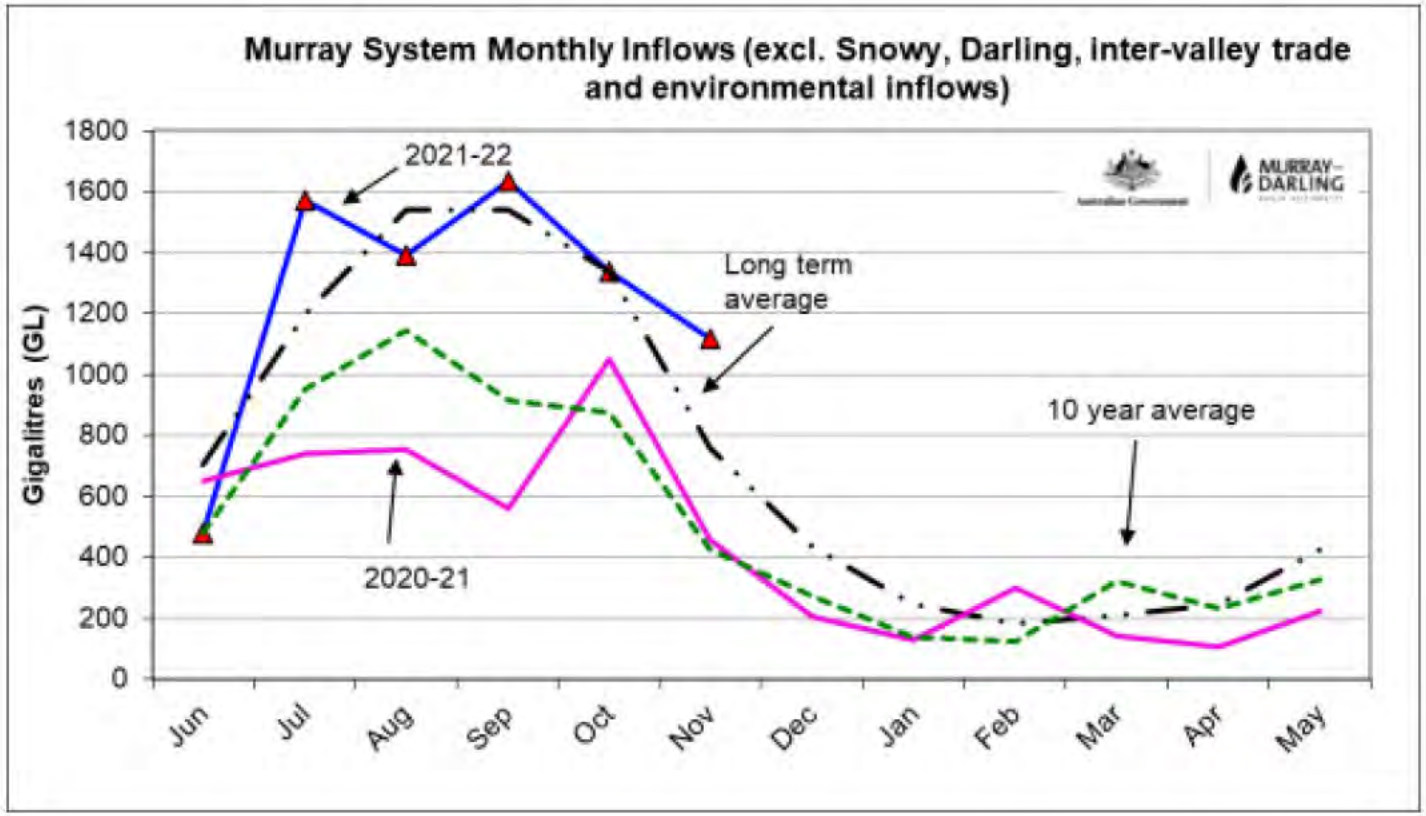
Forecast temperature

Chance of exceeding median maximum and minimum temperatures - January to March 2022

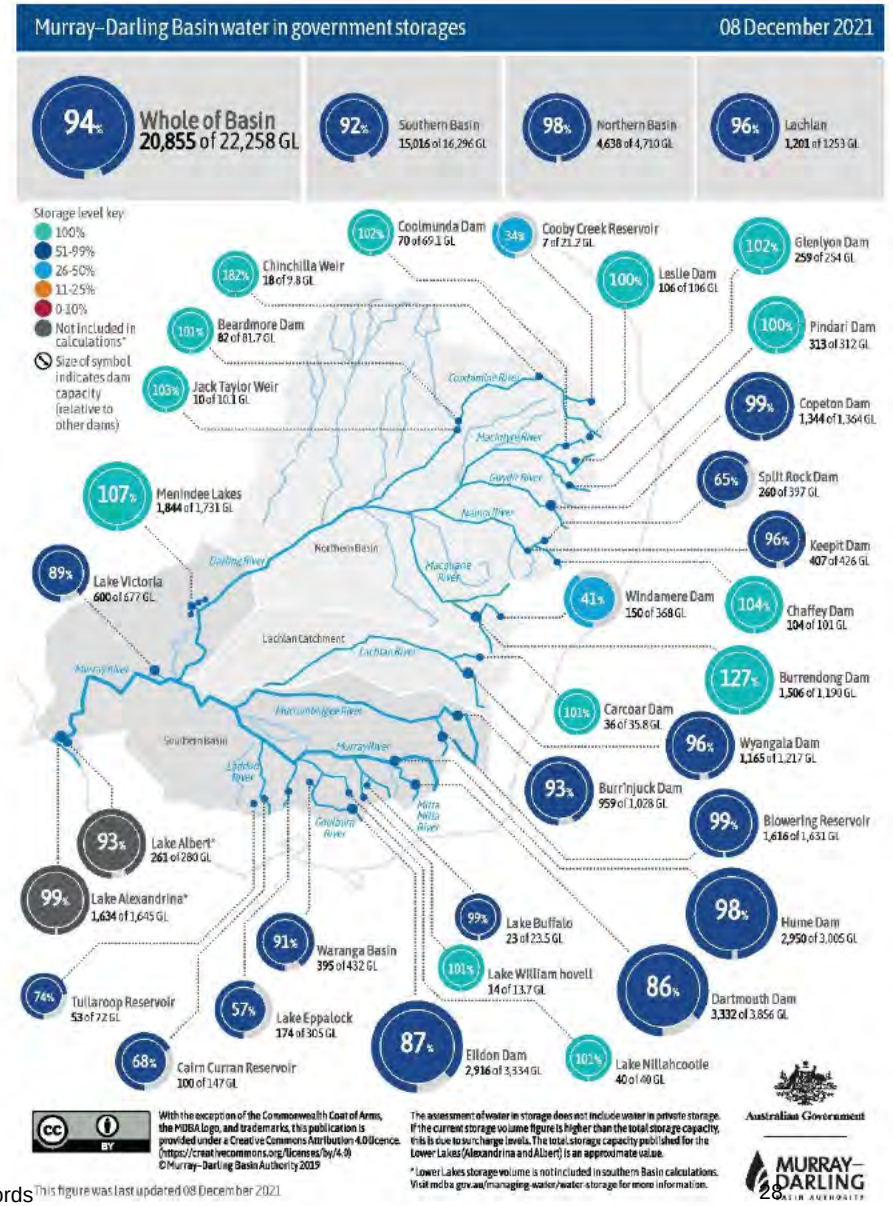




River Murray inflows and storages



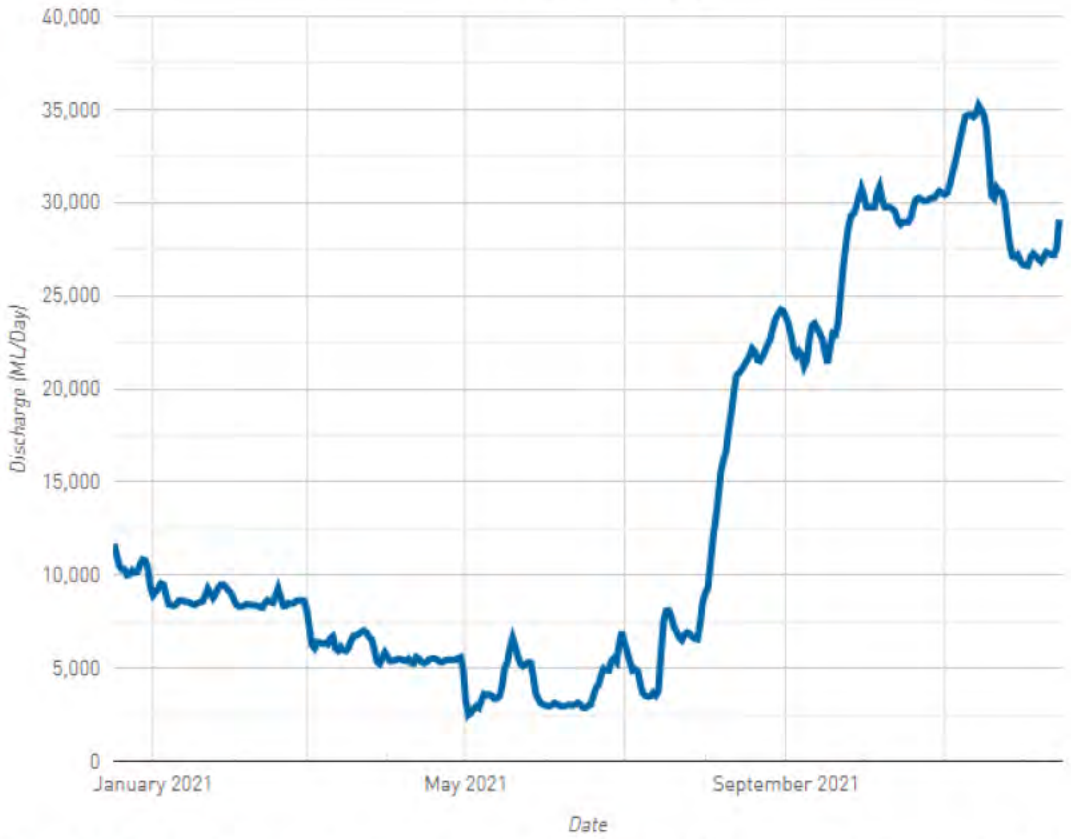
https://www.mdba.gov.au/sites/default/files/weeklyreports/River-Murray-Operations-Weekly-Report-15-December-2021.pdf



https://www.mdba.gov.au/sites/default/files/water-in-storages/weeklybasinreports/Basin-Storage-20211208.pdf

River Murray flow to SA

Flow to SA



2021-22 flow to SA outlook

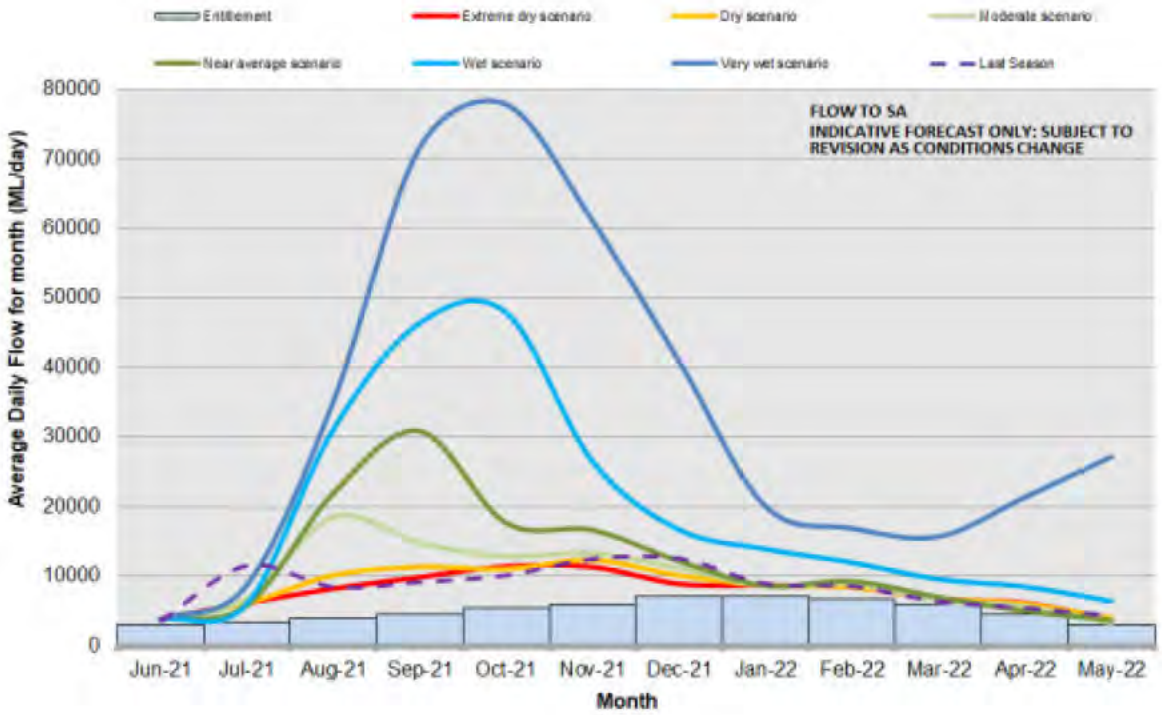


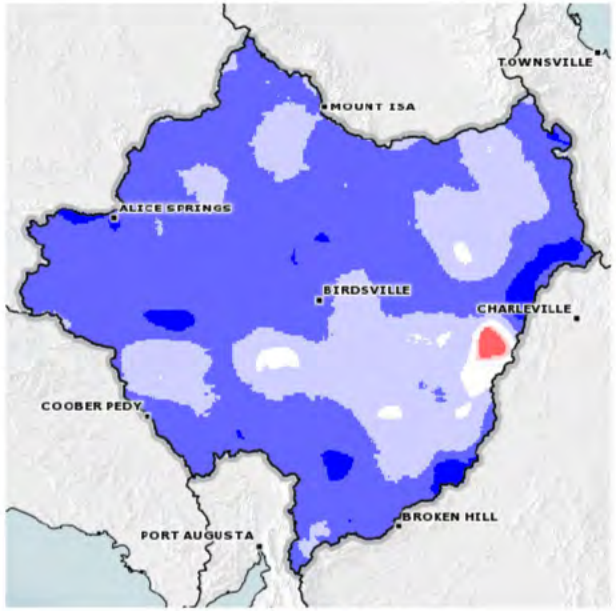
Figure 19: Flow to South Australia outlook

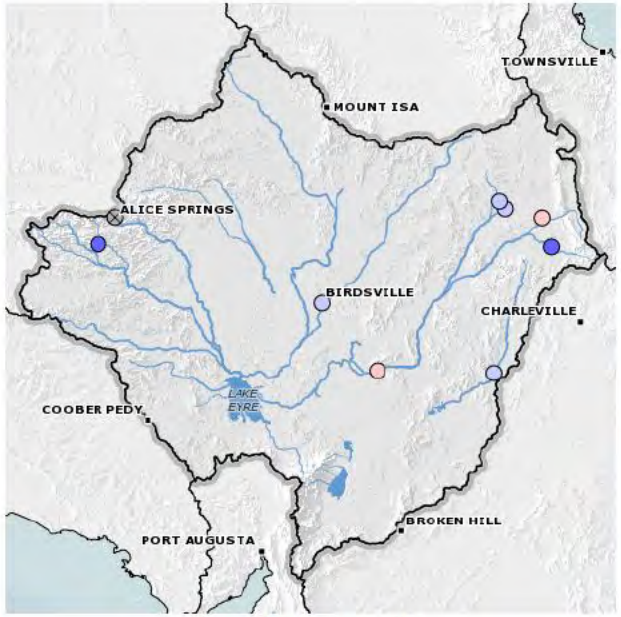
https://riverdata.mdba.gov.au/flow-south-australia-calculated

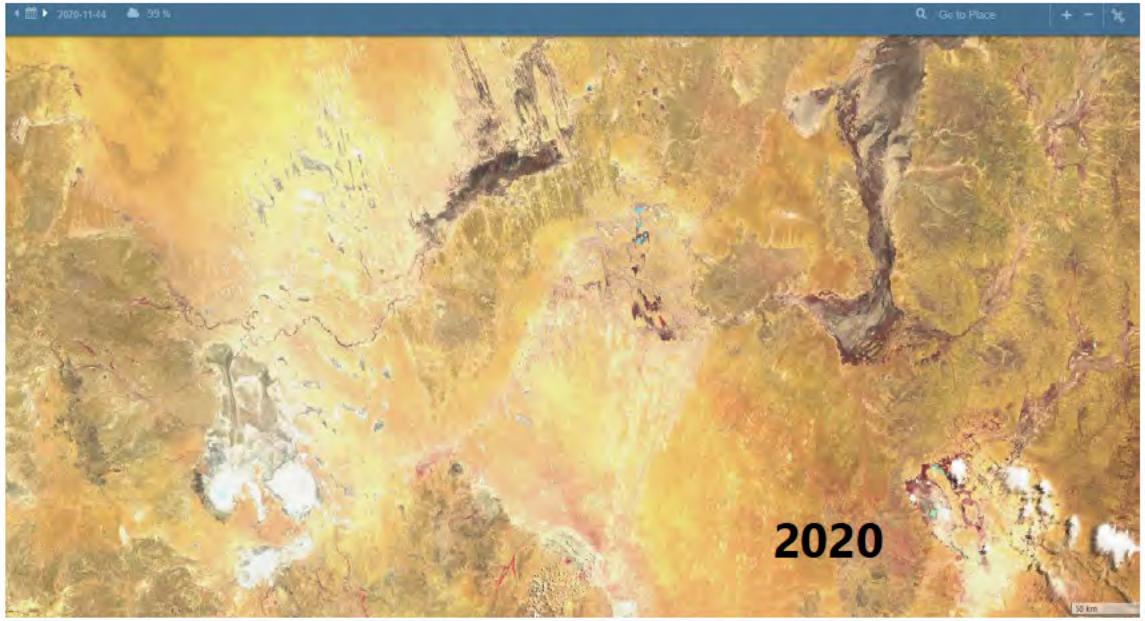
Murray-Darling Basin Authority (2021) River Murray System Annual Operating Outlook 2021-22 water year 1 June 2021 – 31 May 2022, MDBA, Canberra

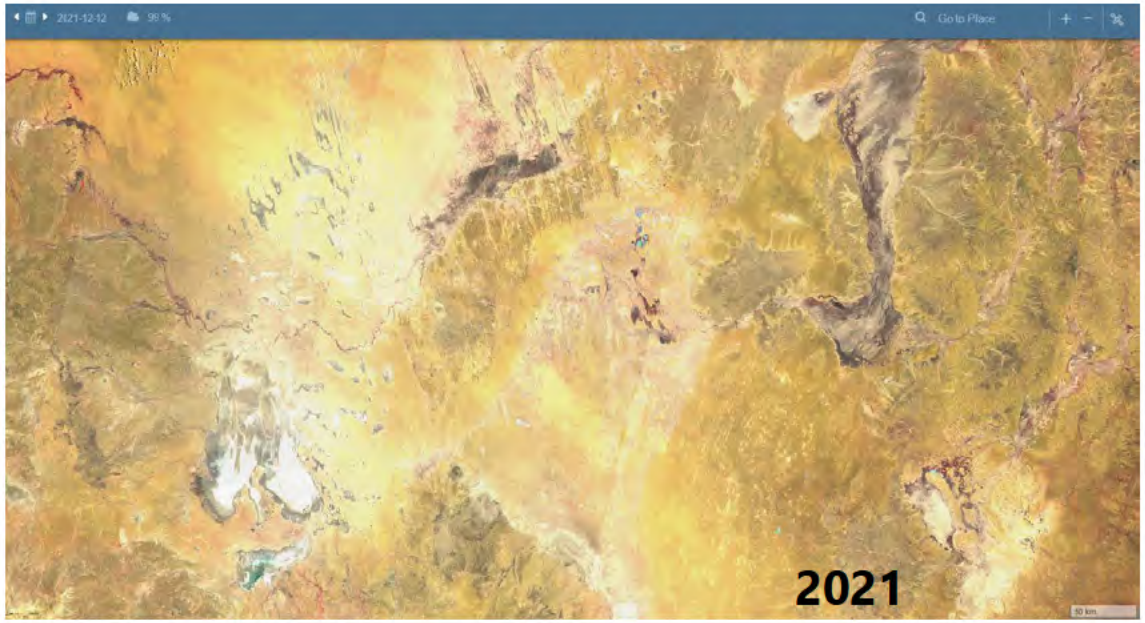
Lake Eyre Basin

November 2021









Climate – review and outlook summary

Rainfall summary

At the 12 month scale, most of Australia experienced at least average rainfall, with significant areas above average and very much above average, including areas of the MDB which received the highest on record. Parts of SE and Riverland, and western Victoria were below average.

Through southern winter, rainfall was average, above average or very much above average across much of the MDB. SE and Riverland, and western Victoria were below average.

June, July, September and November rainfall was mostly average or better than average across MDB. August and October were average or below average across most of the MDB.

No parts of Australia are subject to drought at the12 month scale. 4-year cumulative rainfall is well below average across SE South Australia and SE Queensland.

Climate drivers

La Niña	Likely wet summer, forecast to decay from January.
IOD	Neutral, forecast to be trending positive in 2022.
Southern Annular Mode	Positive, wetter than normal in SE Australia, linked with La Niña.

Climate – review and outlook summary cont.

Summer rainfall forecast

High likelihood of exceeding average rainfall over Qld, NSW and Victoria. Trending mostly average over SA and NT. Average to below average for WA.

Summer temperature forecast

High likelihood of exceeding median max. temperature over most of SA, WA, NT, Qld, Tas & western Vic. Average or cooler for NSW and eastern Vic.

High likelihood of exceeding median min. temperature over most of Australia, aside from SE WA, western SA and some of NE NSW.

MDB inflow and storage

Inflow around long-term average. Better than 10 year average and above 2020.

Whole of basin storage at 94%, southern basin at 92%, northern basin at 98% & Lachlan 96%.

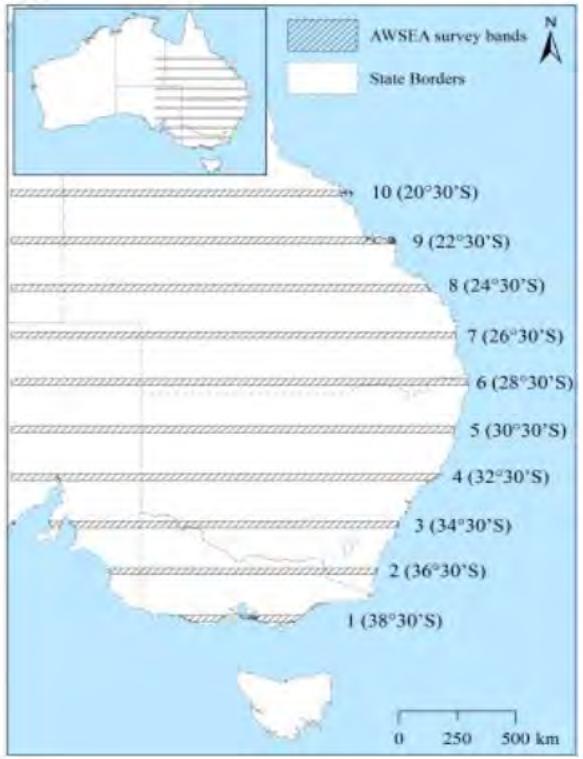
Flow to SA

Well above entitlement flow (c. 30 GL/day at mid-December).

Waterfowl Abundance and Distribution, and Habitat Availability

- Eastern Australian Waterbird Survey
- Wetlands and Waterfowl Surveys
- SA Aerial Surveys

Eastern Australian Waterbird Survey (EAWS)



Key to wetlands from W-E, by band

10 Lake Moondarra, Cloncurry River, Flinders River, Campaspe R, Burdekin R

9 Georgina R, Eyre Ck, Hamilton R, Diamantina R, Lake Galilee, Styx R

8 Mumbleberry-Torquinnie Lakes, Eyre Ck, Diamantina R, Thomson R, Barcoo R, various small coastal wetlands

7 Goyder Lagoon, Lake Yamma Yamma, Cooper Ck, Bulloo R, Paroo R, Warrego R

6 Lake Eyre, Lake Hope, Bulloo R, Paroo R, Warrego R, Balonne R,

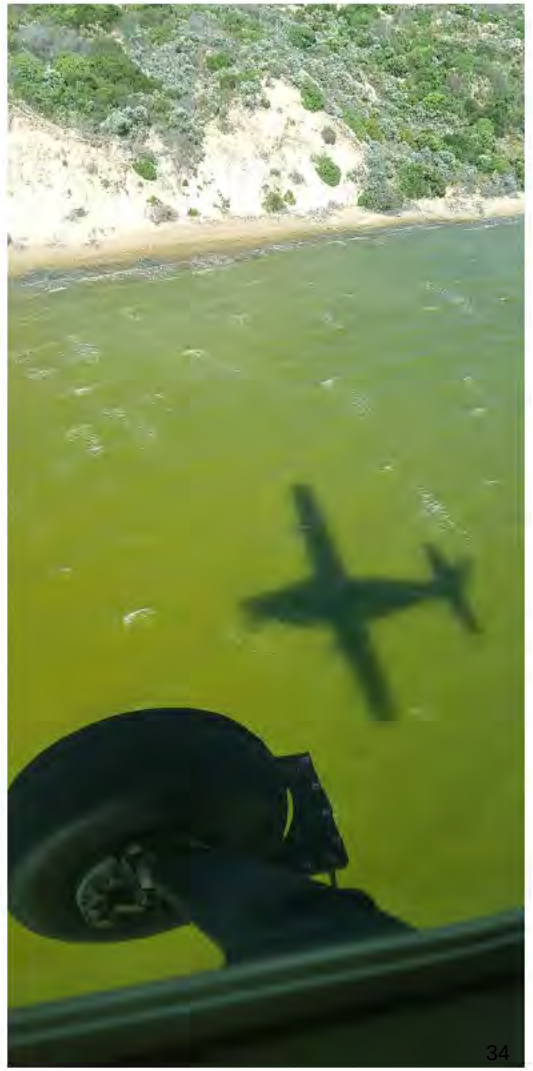
5 Lake Frome, Paroo O'flow, Darling R, Macquarie Marshes

4 Menindee Lakes, Talywalka Lakes, Myall Lakes

3 Murray River Lakes, Lowbidgee wetlands

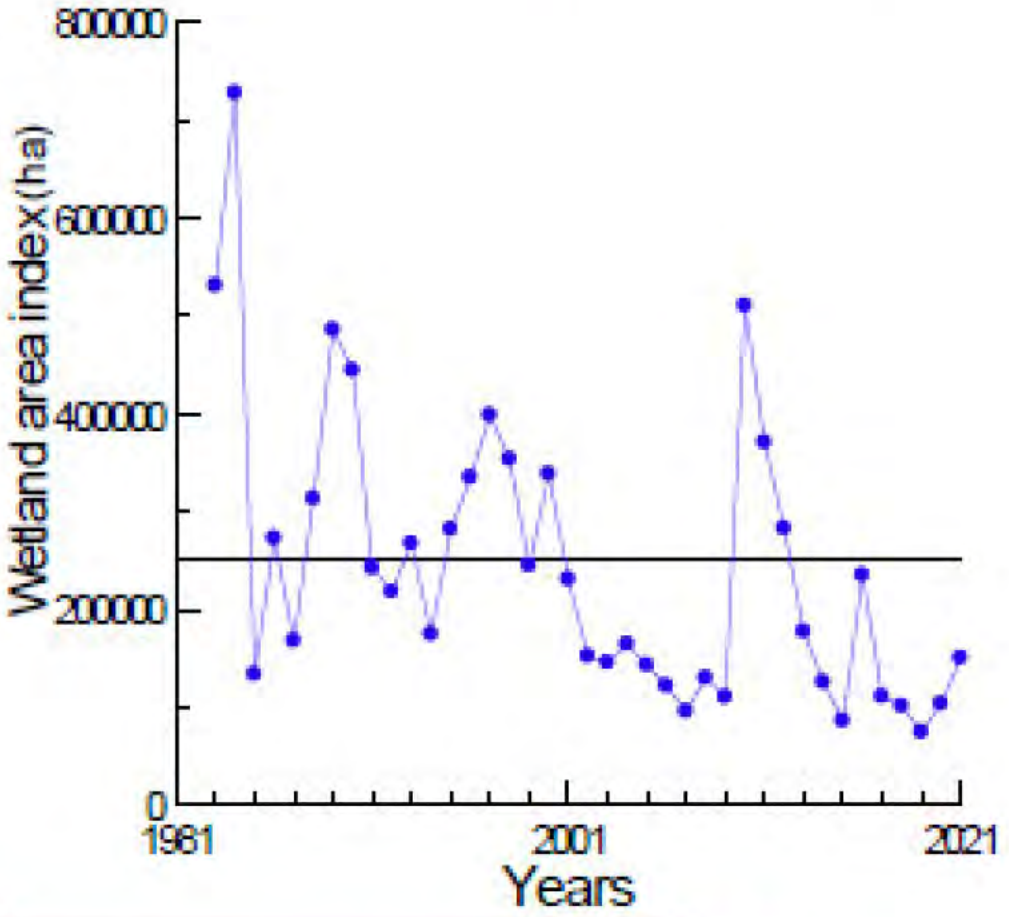
2 Coorong, Cooper + Mokoan Lakes, Cooma-Monaro

1 Curdies Inlet, Jack Smith Lake



- Porter J.L., Kingsford R.T., Francis R., and Brandis K. (2021) *Aerial Survey of Wetland Birds in Eastern Australia- October 2021 Annual Summary Report,* University of New South Wales

EAWS - Wetland Index & Distribution



2021 Wetland area index – 150,803 ha

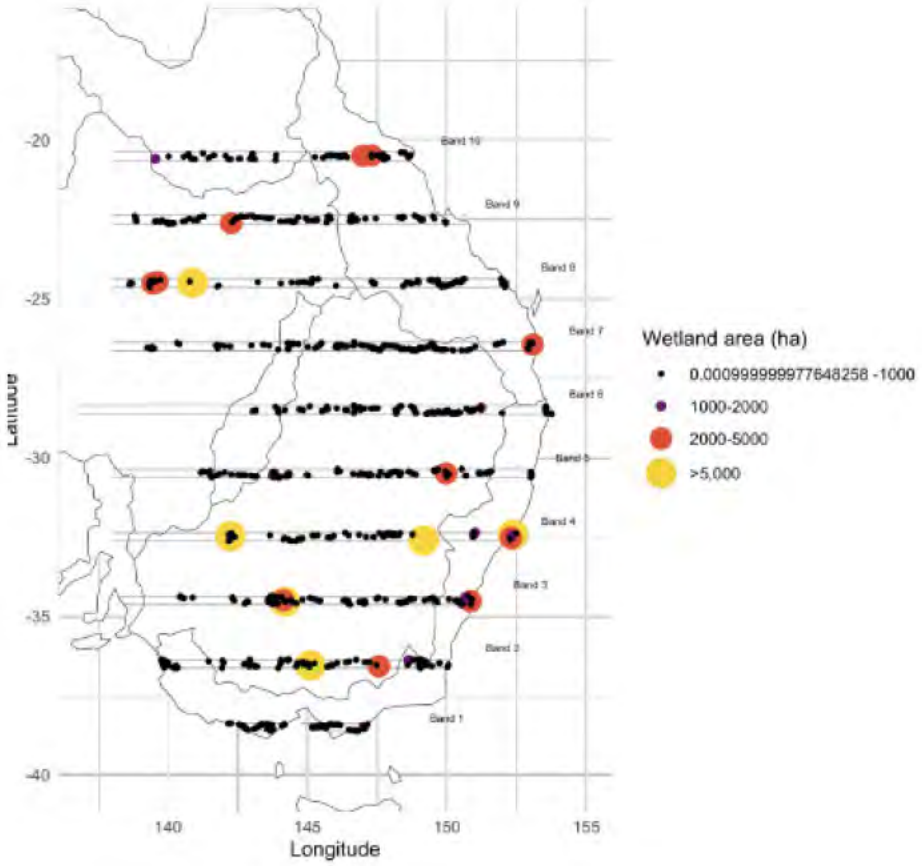
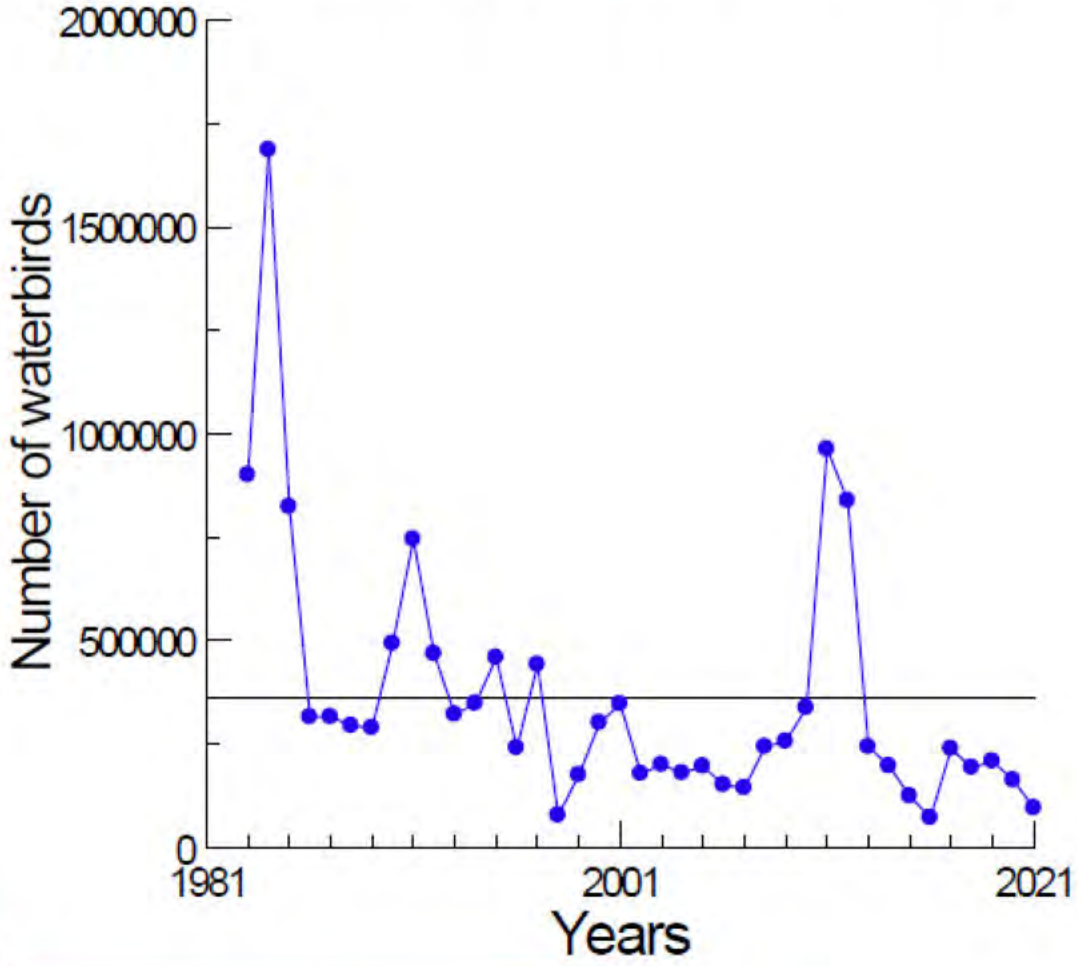


Figure 7. Distribution of wetland area in the 2021 Eastern Australian Waterbird Survey. All surveyed wetlands with surface water present are plotted; dry wetlands not plotted.

EAWS - Waterbird abundance & distribution



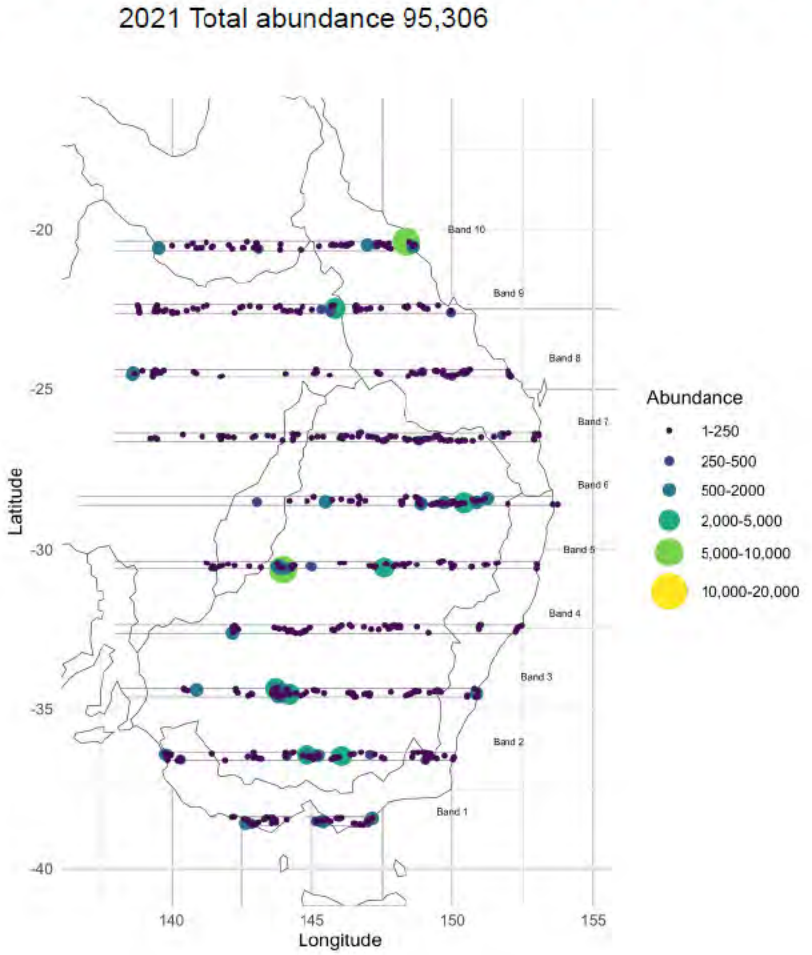
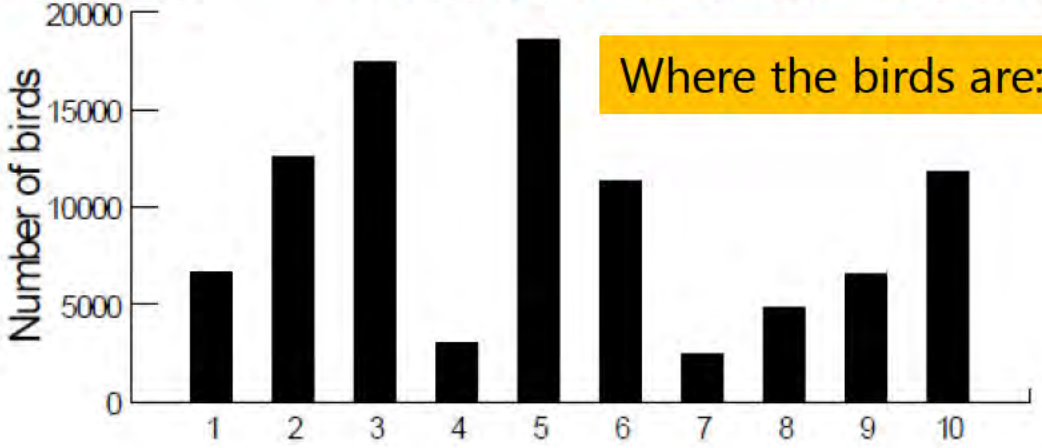
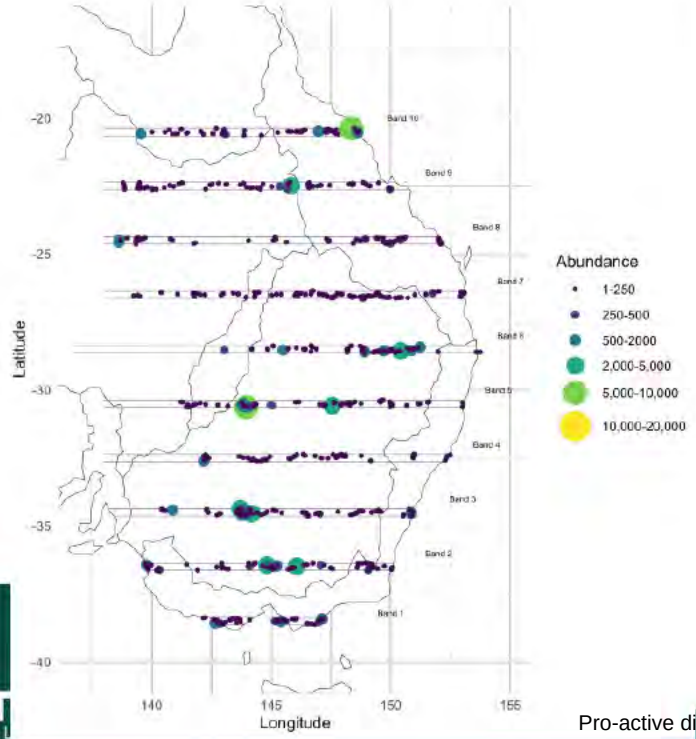


Figure 5. Distribution and abundance of waterbirds in the 2021 Eastern Australian Waterbird Survey. Dry wetlands and those with zero waterbirds not plotted.

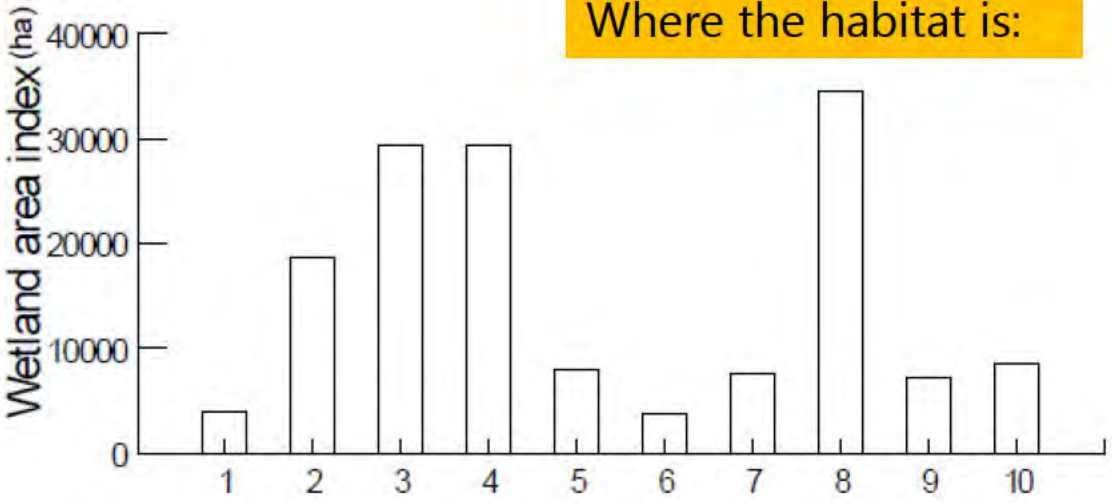
EAWS - Waterbird locations

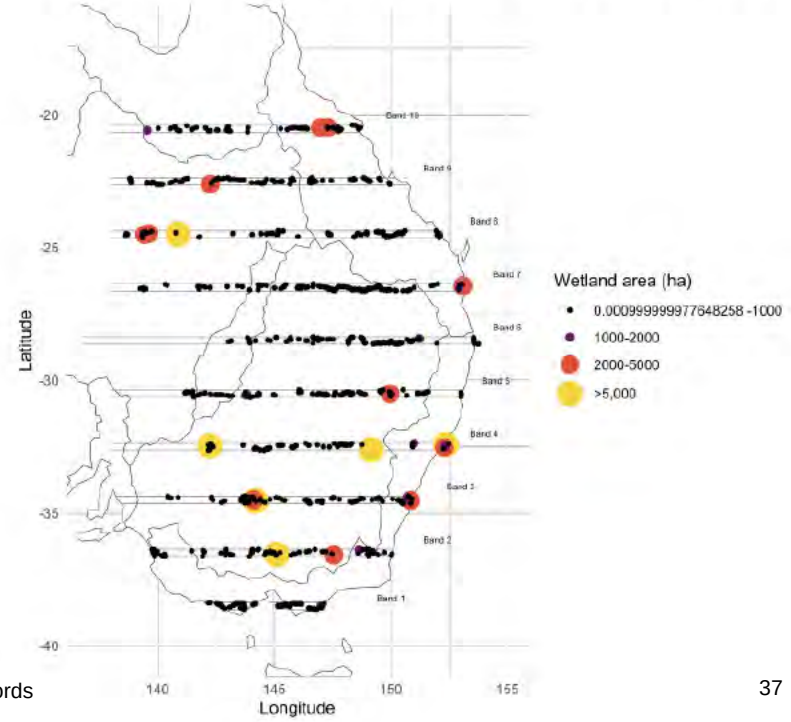
Where the birds are:





Where the habitat is:





EAWS – Waterbird Breeding

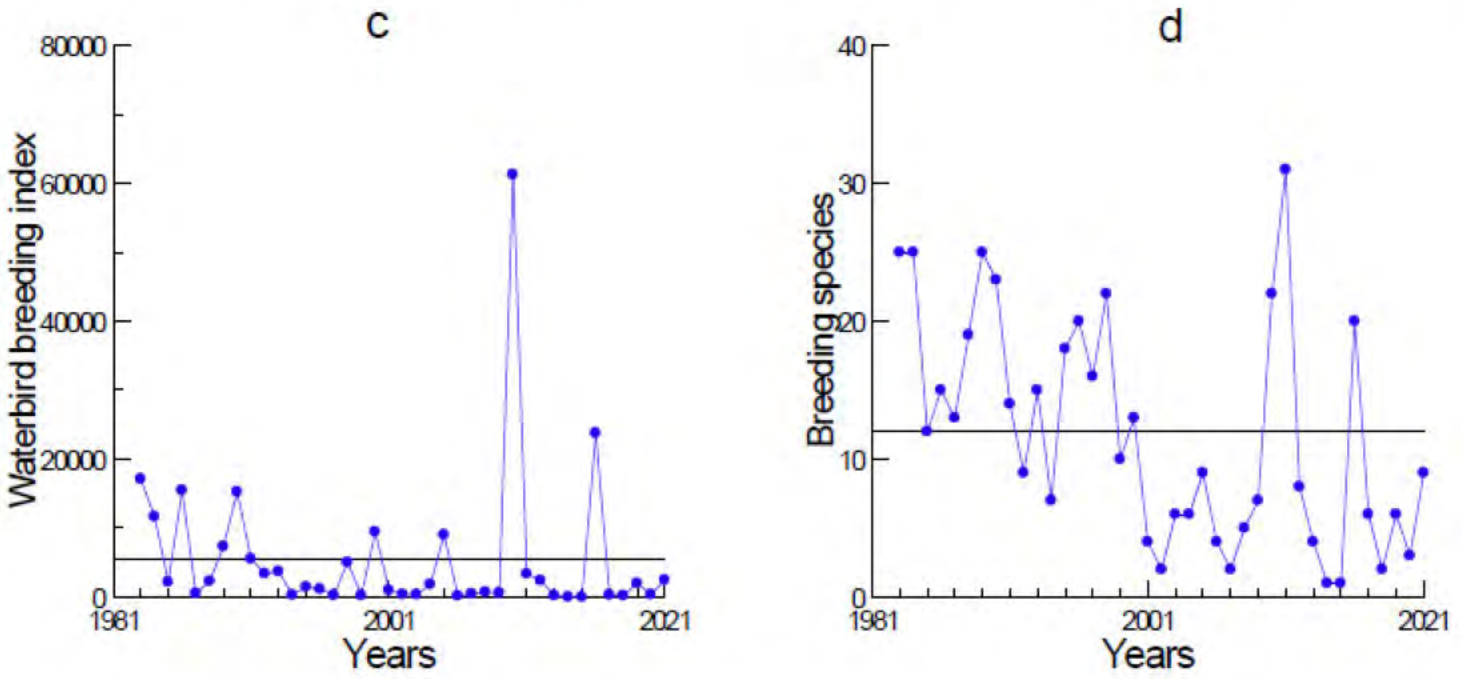


Figure 1. Changes over time in a) total abundance, b) wetland area index, c) waterbird breeding index and d) number of breeding species in the Eastern Australian Waterbird Aerial Survey (1983-2021); horizontal lines show long term averages.

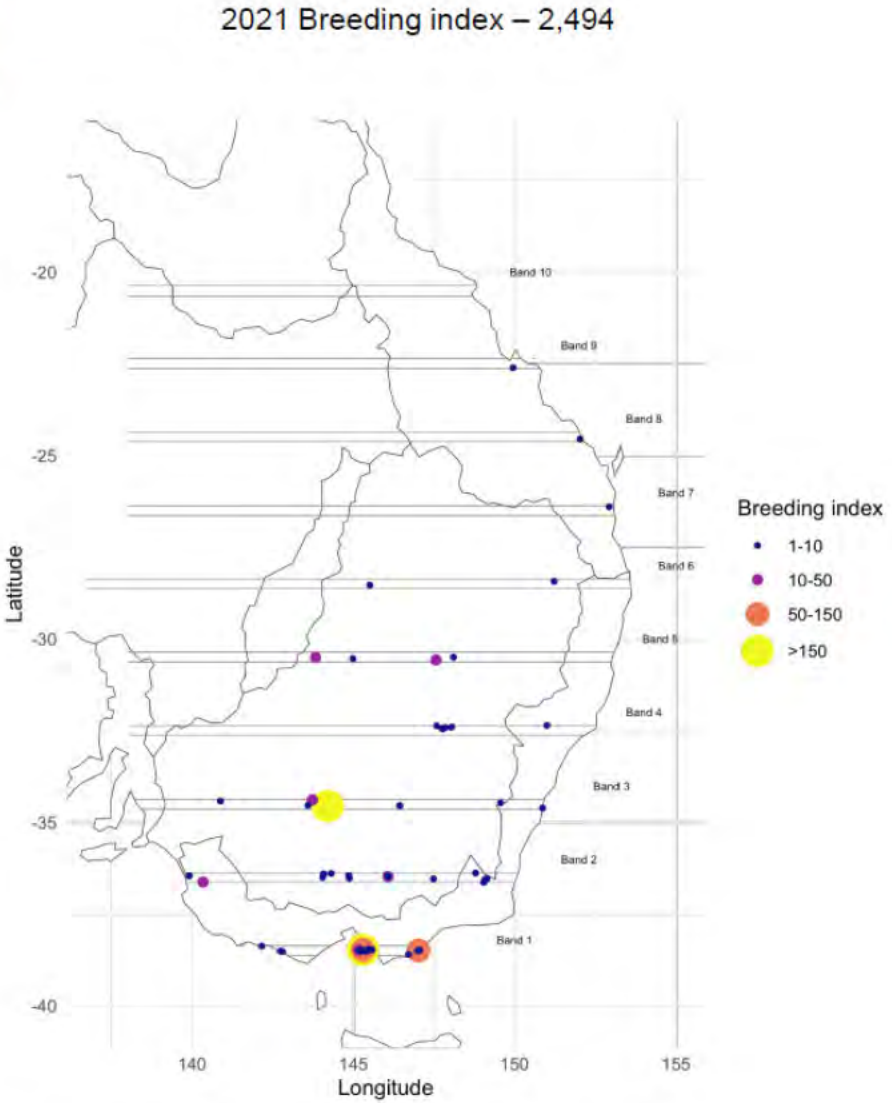


Figure 6. Distribution of waterbird breeding in the 2021 Eastern Australian Waterbird Survey. Only wetlands with breeding recorded are plotted.

EAWS – Game Duck

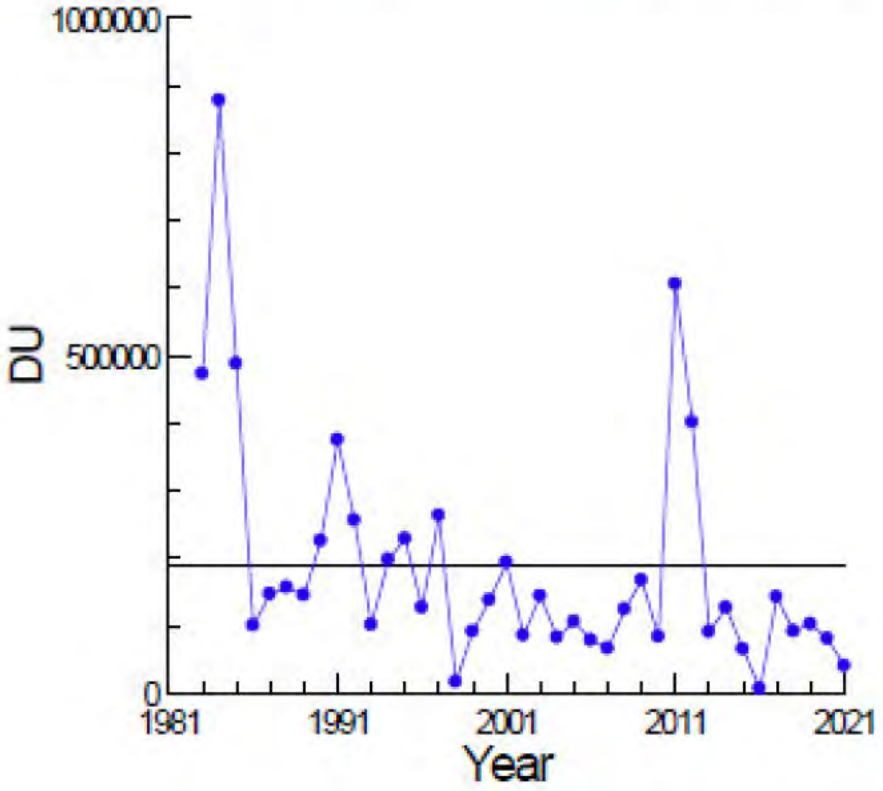
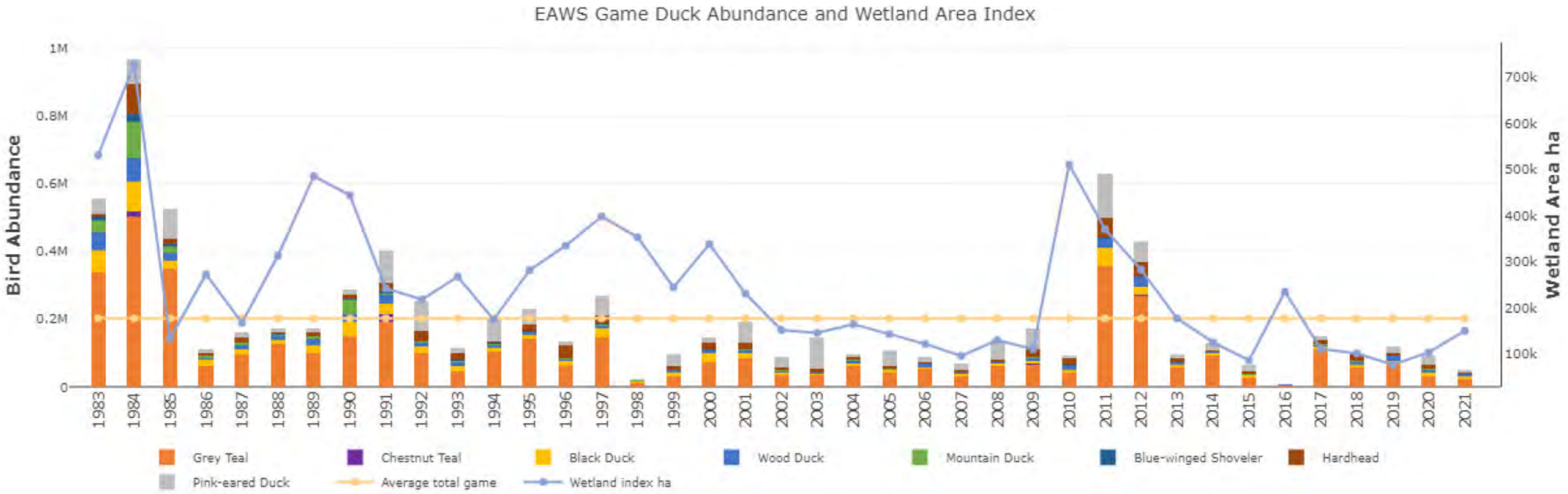


Table 3. Trends in abundances of game species from the Eastern Australian Waterbird Survey (1983-2021).

Species	Trend	Regression all years	Trend	Regression 1983-84 omitted
Pacific black duck	decline	r^2=0.33, p<0.001	decline	r^2=0.21, p<0.002
Australasian shoveler	decline	r^2=0.56, p<0.001	decline	r^2=0.51, p<0.001
Chestnut teal	no trend	r^2=0.10, p=0.042	no trend	r^2=0.07, p=0.114
Grey teal	decline	r^2=0.24, p=0.002	decline	r^2=0.14, p=0.025
Hardhead	no trend	r^2=0.04, p=0.220	no trend	r^2=0.02, p=0.473
Mountain duck	decline	r^2=0.39, p<0.001	decline	r^2=0.33, p<0.001
Pink-eared duck	no trend	r^2=0.07, p=0.093	no trend	r^2=0.05, p=0.192
Australian Wood duck	decline	r^2=0.22, p=0.003	no trend	r^2=0.10, p=0.055

EAWS game duck species composition



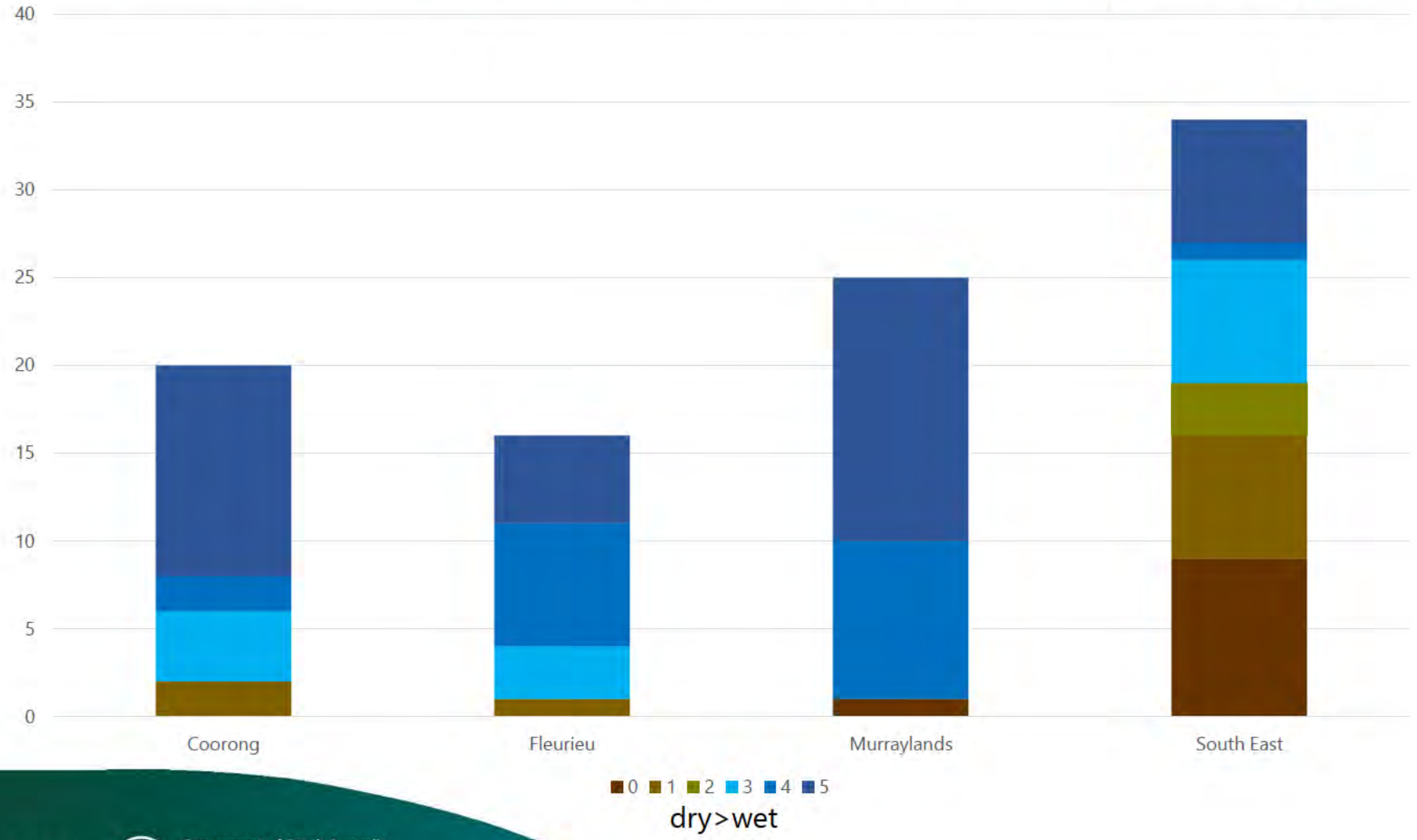
SA Wetland and Waterfowl Surveys

- Annual DEW volunteer-based survey (since 2003)
  - Thanks to all volunteers and DEW who assisted with the 2021 surveys
- Provides snapshot of suite of wetlands
- Indication of trends - not intended as absolute measure
- 95 wetlands surveyed in 2021 (total wetlands 100+ in register)
  - The most sites ever surveyed (tied equally with 1 other year)
  - 142 surveys conducted
  - 288 hours of survey effort by 64 individuals
  - Largest area covered - 45,664 ha (possibly reflection of new collection method)

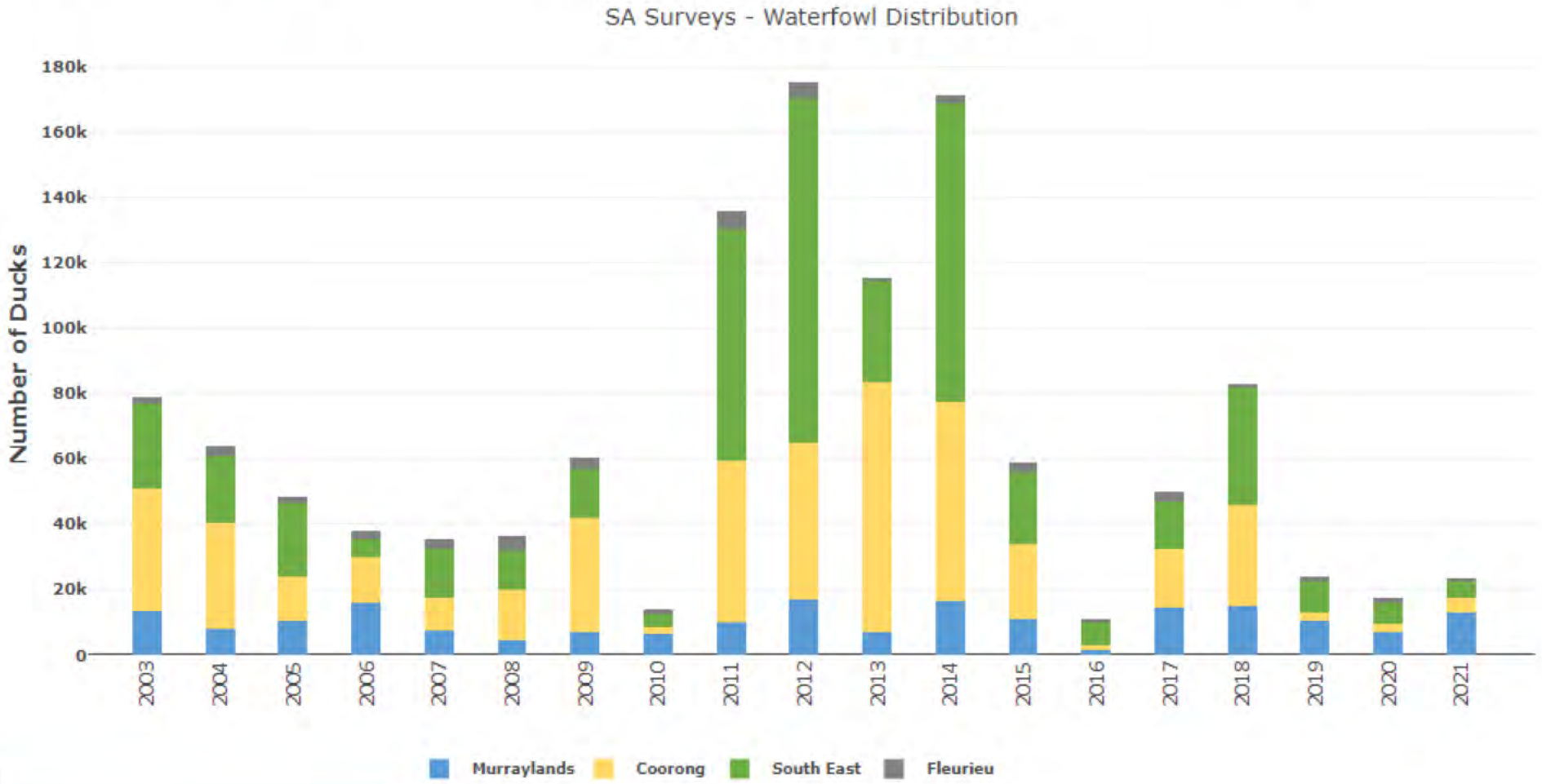
SA Wetland and Waterfowl Surveys – effort summary

	Murraylands		Fleurieu		Coorong		South East		Total	
Year	No. of Wetlands Surveyed	Wetland Area Surveyed (ha)	No. of Wetlands Surveyed	Wetland Area Surveyed (ha)	No. of Wetlands Surveyed	Wetland Area Surveyed (ha)	No. of Wetlands Surveyed	Wetland Area Surveyed (ha)	No. of Wetlands Surveyed	Wetland Area Surveyed (ha)
2003	23	1450	15	518	22	3392	28	7175	88	12535
2004	21	1594	15	488	25	3020	25	4251	86	9353
2005	22	1639	15	507	25	2205	24	3783	86	8134
2006	24	1650	15	512	28	3560	24	3283	91	9005
2007	25	2890	12	502	28	3365	26	3105	91	9862
2008	26	2790	14	562	27	3100	28	2618	95	9070
2009	24	2750	12	564	27	3210	28	2710	91	9234
2010	25	3570	14	466	22	3405	26	2196	87	9637
2011	19	2970	16	1695	17	4147	25	3128	77	11940
2012	20	3070	16	1695	18	4247	25	3128	79	12140
2013	13	2670	5	16	12	2725	19	6406	49	11817
2014	24	4785	12	307	19	5680	22	7223	77	17995
2015	23	3744	13	3990	20	3009	23	2298	79	13040
2016	22	6701	16	1798	17	3883	30	5492	85	17874
2017	17	3504	14	1102	13	2438	17	3852	61	10896
2018	21	2406	15	316	20	2902	25	8812	81	14436
2019	16	2247	14	232	10	307	22	1886	62	4672
2020	24	3329	16	277	21	4235	29	15714	90	23555
2021	25	17517	16	1212	20	6496	34	9347	95	34573
Average	22	3751	14	882	21	3438	25	5074	82	13146

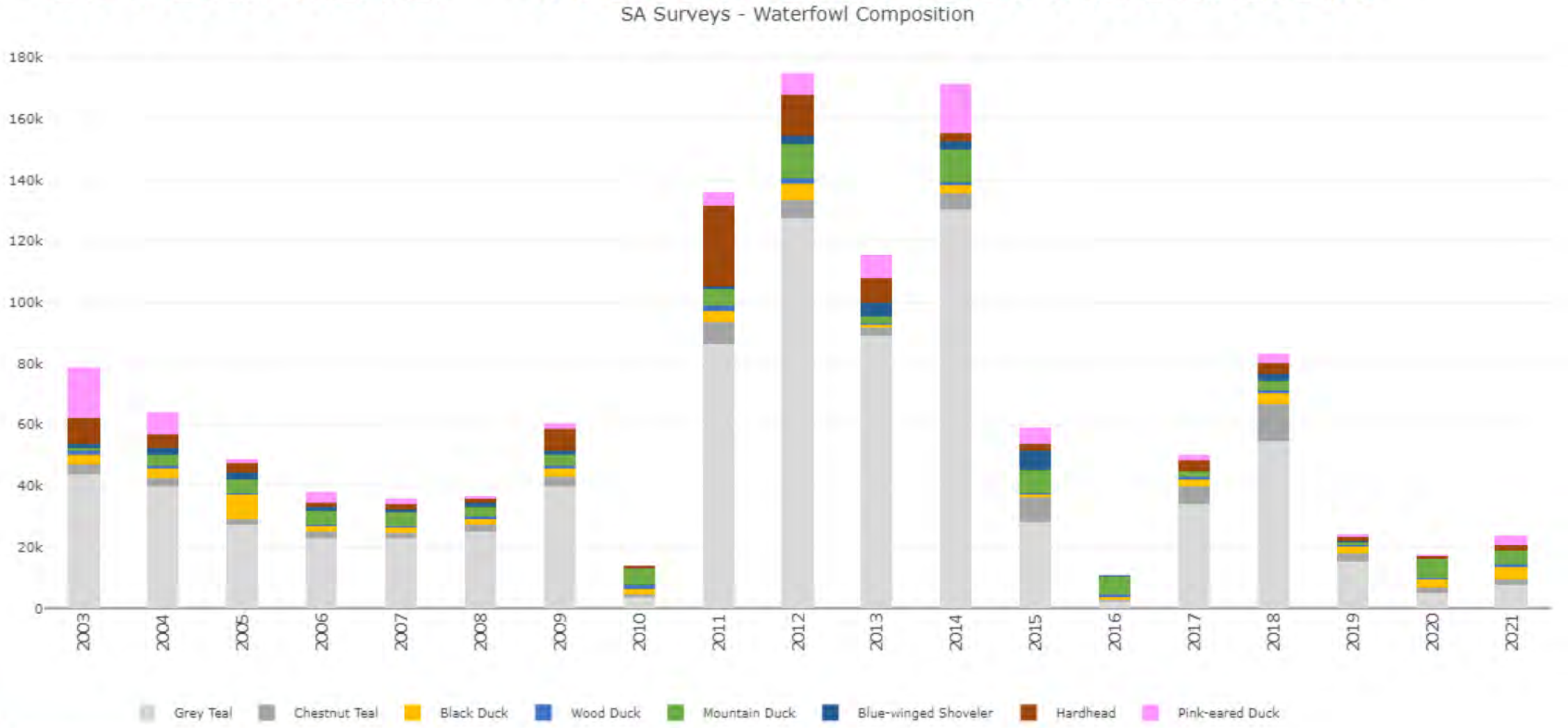
2021 SA Surveys – Wetland Capacity



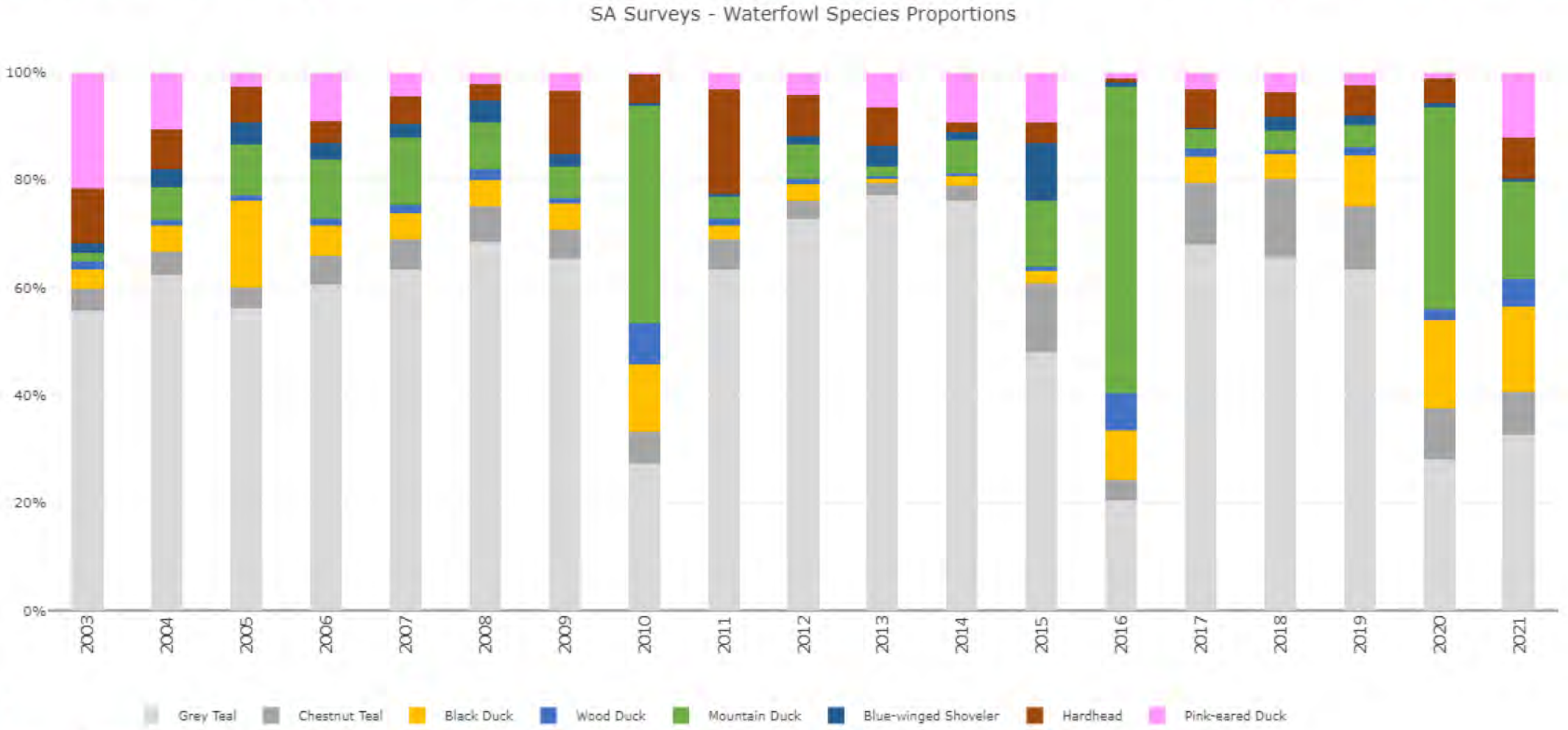
SA Surveys – Waterfowl Distribution



SA Surveys – Waterfowl Composition



SA Surveys – Waterfowl Species Proportions



Game duck abundance

Year	Grey Teal	Chestnut Teal	Black Duck	Wood Duck	Mountain Duck	Blue-winged Shoveller	Hard Head	Pink-eared Duck	Totals
2003	43,948	3,177	2,801	1,389	1,102	1,428	8,126	16,946	78,917
2004	39,789	2,746	3,038	801	3,869	2,118	4,673	6,762	63,796
2005	27,339	1,848	7,824	522	4,583	1,956	3,190	1,292	48,554
2006	22,881	2,078	2,096	441	4,216	1,178	1,520	3,396	37,806
2007	22,594	2,055	1,709	501	4,537	908	1,792	1,589	35,685
2008	25,031	2,398	1,724	819	3,129	1,518	1,093	794	36,506
2009	39,626	3,232	2,955	724	3,539	1,364	7,084	2,088	60,612
2010	3,801	826	1,733	1,051	5,609	86	760	33	13,899
2011	86,256	7,341	3,689	1,661	5,482	715	26,342	4,358	135,844
2012	127,695	5,734	5,311	1,686	11,422	2,331	13,434	7,472	175,085
2013	89,105	2,658	689	627	2,052	4,419	8,435	7,353	115,337
2014	130,353	5,084	2,982	613	10,730	2,634	2,967	15,915	171,277
2015	28,392	7,630	1,243	464	7,251	6,374	2,277	5,487	59,117
2016	2,200	401	997	724	6,112	87	83	107	10,709
2017	34,009	5,776	2,324	841	1,692	171	3,636	1,535	49,983
2018	54,665	11,946	3,839	672	3,082	2,076	3,809	3,028	83,114
2019	15,151	2,818	2,283	395	955	438	1,341	572	23,954
2020	4,845	1,656	2,797	375	6,478	134	809	178	17,272
2021	**7,715**	**1,900**	**3,748**	**1,172**	**4,331**	**73**	**1,815**	**2,873**	**23,627**
Average	42,389	3,753	2,831	815	4,746	1,579	4,905	4,304	65,321

Species proportions

Year	Grey Teal	Chestnut Teal	Black Duck	Wood Duck	Mountain Duck	Blue-winged Shoveller	Hard Head	Pink-eared Duck
2003	55.7	4	3.5	1.8	1.4	1.8	10.3	21.5
2004	62.4	4.3	4.8	1.3	6.1	3.3	7.3	10.6
2005	56.3	3.8	16.1	1.1	9.4	4	6.6	2.7
2006	60.5	5.5	5.5	1.2	11.2	3.1	4	9
2007	63.3	5.8	4.8	1.4	12.7	2.5	5	4.5
2008	68.6	6.6	4.7	2.2	8.6	4.2	3	2.2
2009	65.4	5.3	4.9	1.2	5.8	2.3	11.7	3.4
2010	27.3	5.9	12.5	7.6	40.4	0.6	5.5	0.2
2011	63.5	5.4	2.7	1.2	4	0.5	19.4	3.2
2012	72.9	3.3	3	1	6.5	1.3	7.7	4.3
2013	77.3	2.3	0.6	0.5	1.8	3.8	7.3	6.4
2014	76.1	3	1.7	0.4	6.3	1.5	1.7	9.3
2015	48	12.9	2.1	0.8	12.3	10.8	3.9	9.3
2016	20.5	3.7	9.3	6.8	57.1	0.8	0.8	1
2017	68	11.6	4.6	1.7	3.4	0.3	7.3	3.1
2018	65.8	14.4	4.6	0.8	3.7	2.5	4.6	3.6
2019	63.3	11.8	9.5	1.6	4	1.8	5.6	2.4
2020	28.1	9.6	16.2	2.2	37.5	0.8	4.7	1
2021	**32.7**	**8**	**15.9**	**5**	**18.3**	**0.3**	**7.7**	**12.2**
Average	56.6	6.7	6.7	2.1	13.2	2.4	6.5	5.8

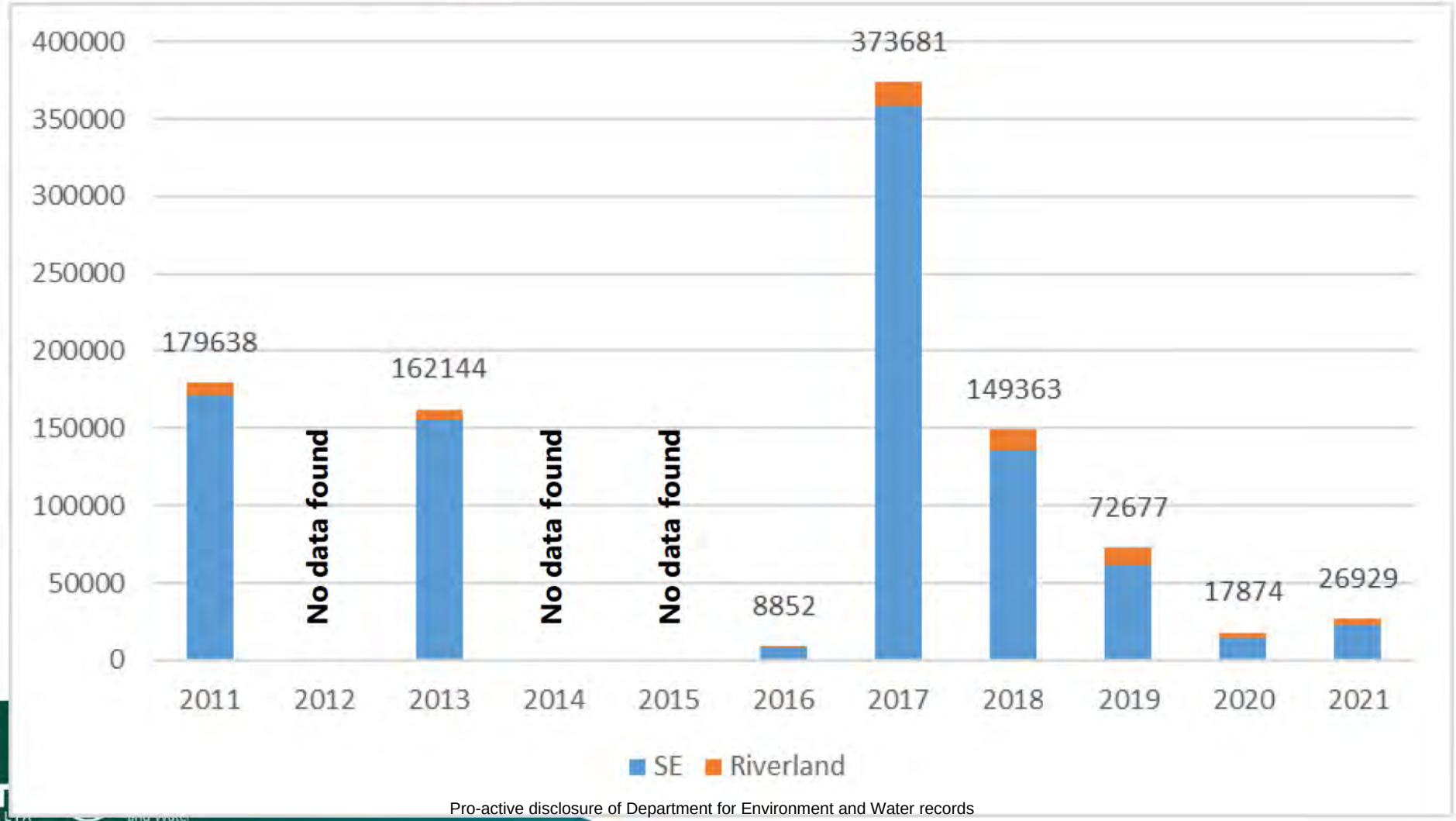
2021 abundances relative to long-term averages

		Grey Teal	Chestnut Teal	Black Duck	Wood Duck	Mountain Duck	Blue-winged Shoveller	Hard Head	Pink-eared Duck	Totals
SA W&W Surveys	2021	7,715	1,900	3,748	1,172	4,331	73	1,815	2,873	23,627
	dataset average (2003-2021)	42,389	3,753	2,831	815	4,746	1,579	4,905	4,304	65,321
	2021 as % of dataset average	18	51	132	144	91	5	37	67	36
EAWS	2021	24,744	54	5,658	7,008	2,479	57	3,176	6,528	49,704
	dataset average (1983-2021)	108,521	1,295	17,272	12,681	7,594	2,119	16,363	36,482	202,330
	2021 as % of dataset average	23	4	33	55	33	3	19	18	25

2020 abundances relative to long-term (1983/2003-2020) averages

		Grey Teal	Chestnut Teal	Black Duck	Wood Duck	Mountain Duck	Blue-winged Shoveler	Hard Head	Pink-eared Duck	Totals
SA W&W surveys	2020	4,845	1,656	2,797	375	6,478	134	809	178	17,272
	2003-2020 average	44,316	3,856	2,780	795	4,769	1,663	5,076	4,384	67,637
	2020 as % of 2003-2020 average	11	43	101	47	136	8	16	4	26
EAWS	2020	30,208	909	10,688	9,035	2,429	267	12,844	24,850	91,230
	1983-2020 average	110,727	1,328	17,578	12,831	7,729	2,174	16,711	37,271	206,347
	2020 as % of 1983-2020 average	27	68	61	70	31	12	77	67	44

SA Aerial Surveys



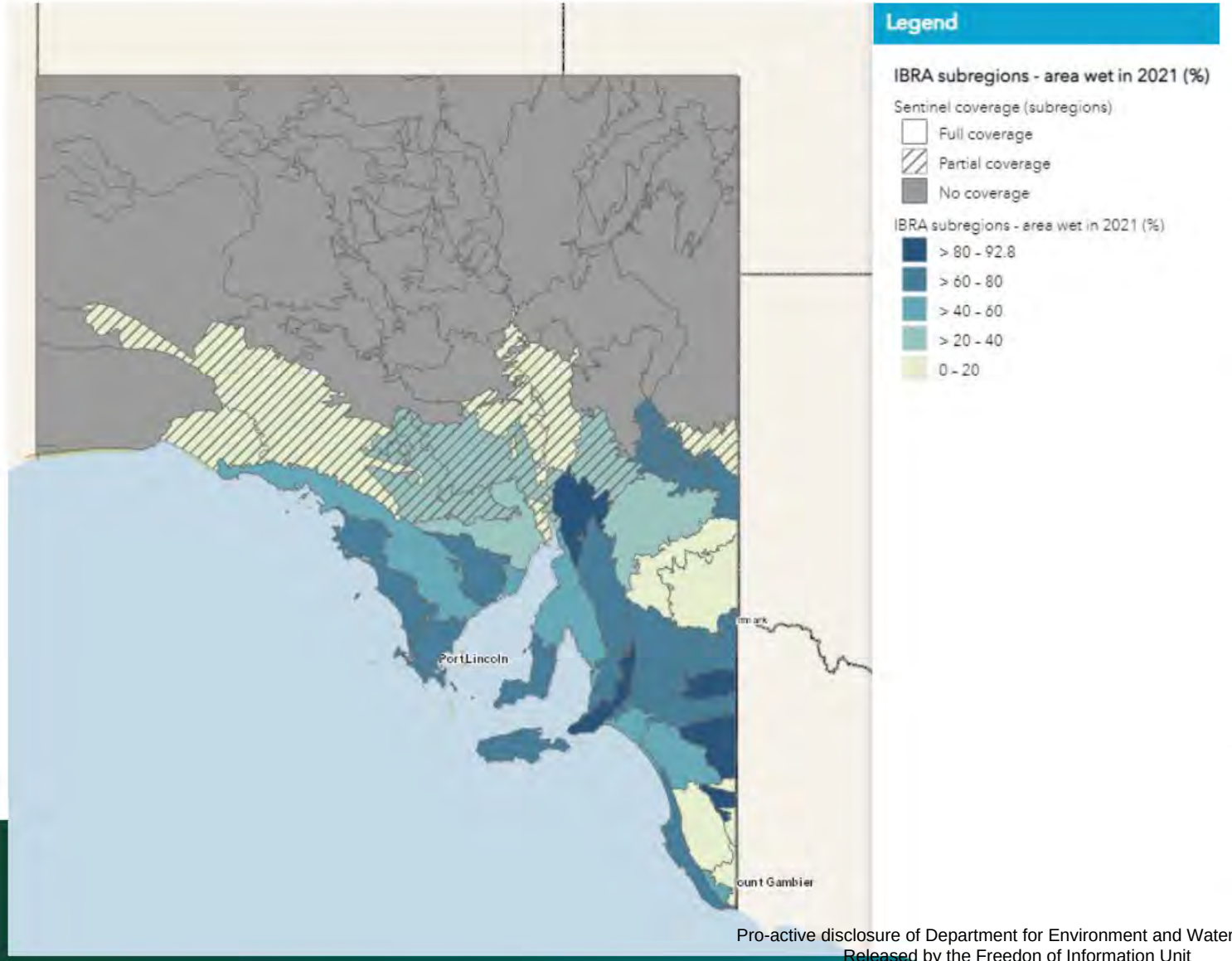
Waterfowl and habitat summary

South Australia	
Wetland habitat in 95 SA wetlands	Around 80% of wetlands surveyed were partially-full to full.
Abundance of ducks	Fourth lowest since 2003, c. 35% long-term average.
	Abundance in the Coorong and SE <20% of the long-term average, Fleurieu c. 50%, Murrayland/Riverland c. 125%.
Species dominance	Nearly 1:1 resident:nomadic species, on average around 1:4.
Eastern Continental Scale	
Wetland area index	Improved from 2020, around half of long-term average.
Total waterfowl abundance	Decreased marginally from 2020, continued long-term decline.
Breeding index & # species breeding	Breeding index improved considerably from 2020, 9 species breeding.
Game duck species	All abundances below long-term average, 4-5 of 8 species show continued long-term decline (depending on survey range).

Landscape Condition

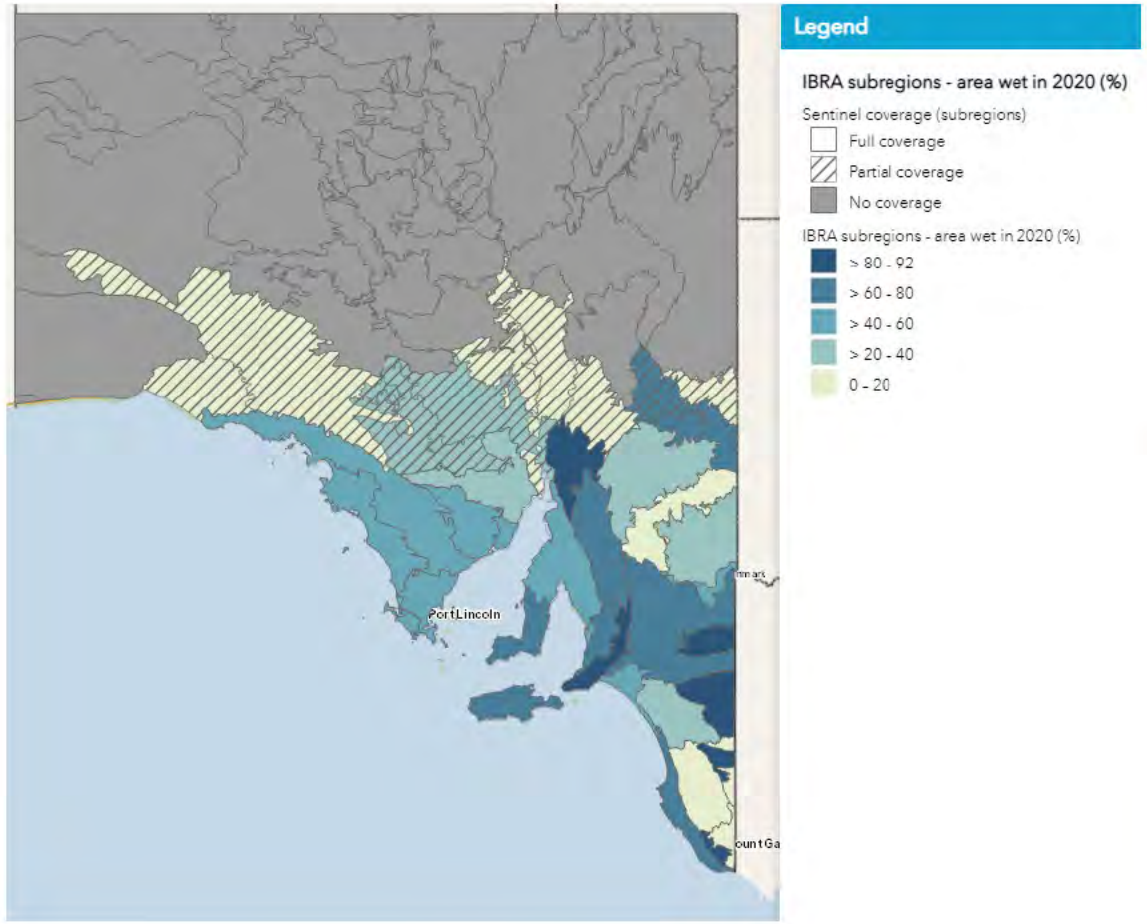
- Remotely sensed wetland extent
- Normalised Difference Vegetation Index
- Soil Moisture
- Pasture Biomass

Remotely sensed wetland extent

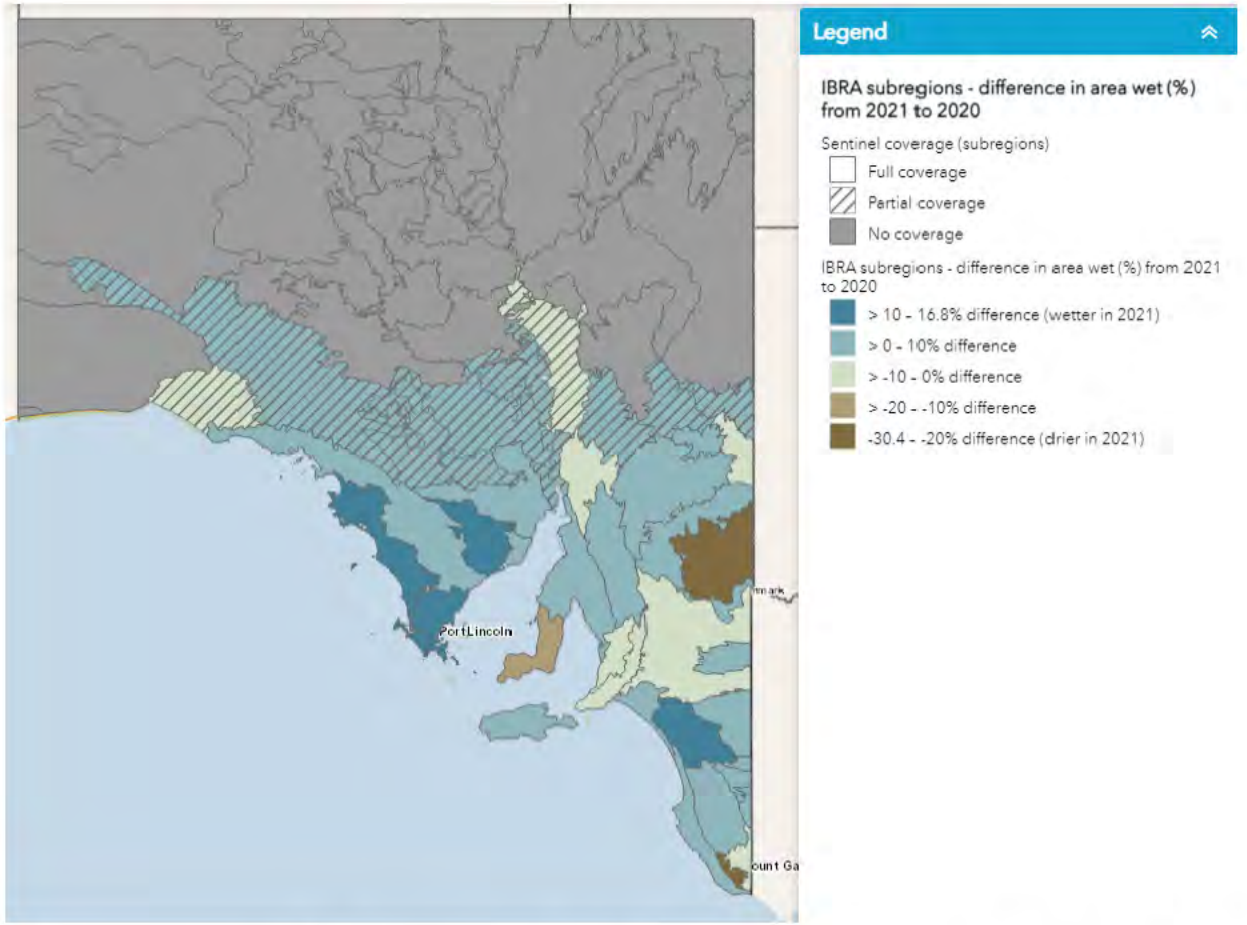


IBRA subregion	Total area of wetlands (ha)	2021 Area wet (%)	2020 Area wet (%)
Barrier Range	55.77	69.94	73.54
Bimbowrie	10.66	68.88	65.39
Braemer	1,629.36	16.52	15.87
Bridgewater	29,582.46	70.60	67.27
Broughton	1,808.58	74.26	71.59
Eyre Hills	13,281.32	75.28	58.47
Eyre Mallee	6,253.38	55.37	50.34
Fleurieu	2,078.33	82.07	84.36
Glenelg Plain	517.49	12.21	16.45
Kangaroo Island	6,999.33	68.88	62.35
Lowan Mallee	720.92	92.89	92.20
Lucindale	10,358.39	10.93	7.15
Mount Gambier	165.06	51.58	81.92
Mount Lofty Ranges	3,520.70	79.10	79.86
Murray Lakes and Coorong	5,744.49	54.19	47.81
Murray Mallee	7,087.51	64.43	66.79
Murray Scroll Belt	18,898.36	64.08	56.26
Myall Plains	18,621.46	33.67	32.49
Olary Spur	1,115.29	37.56	36.39
South Olary Plain	993.04	14.89	38.11
Southern Flinders	425.64	91.77	92.28
Southern Yorke	7,235.07	60.94	78.80
St Vincent	13,362.71	47.04	46.60
Talia	12,421.71	69.41	53.65
Tintinara	8,508.82	51.03	39.66
Wimmera	1,109.96	12.19	11.93

Remotely sensed wetland extent

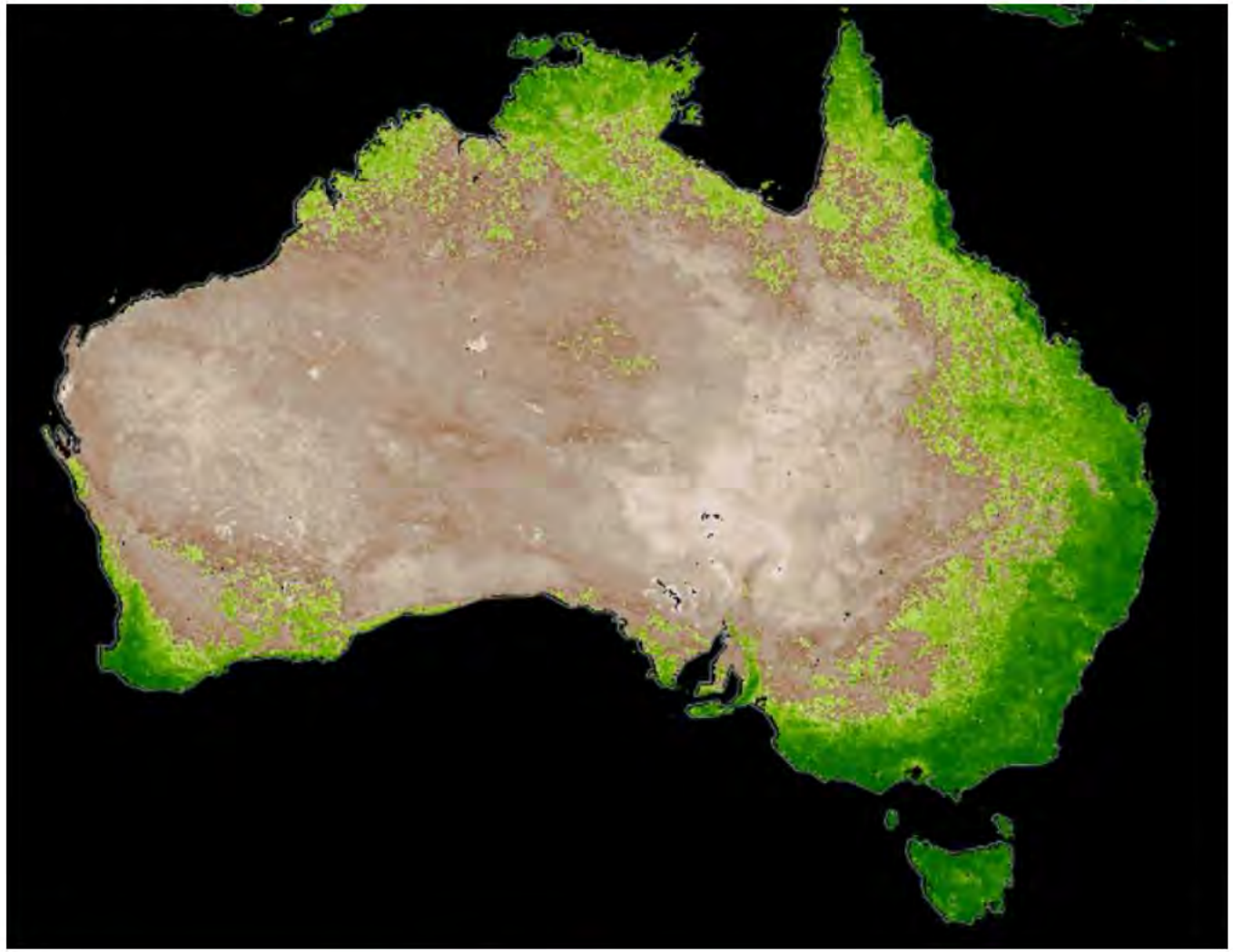


2020



Difference in extent between 2021 and 2020

Normalised Difference Vegetation Index (NDVI)

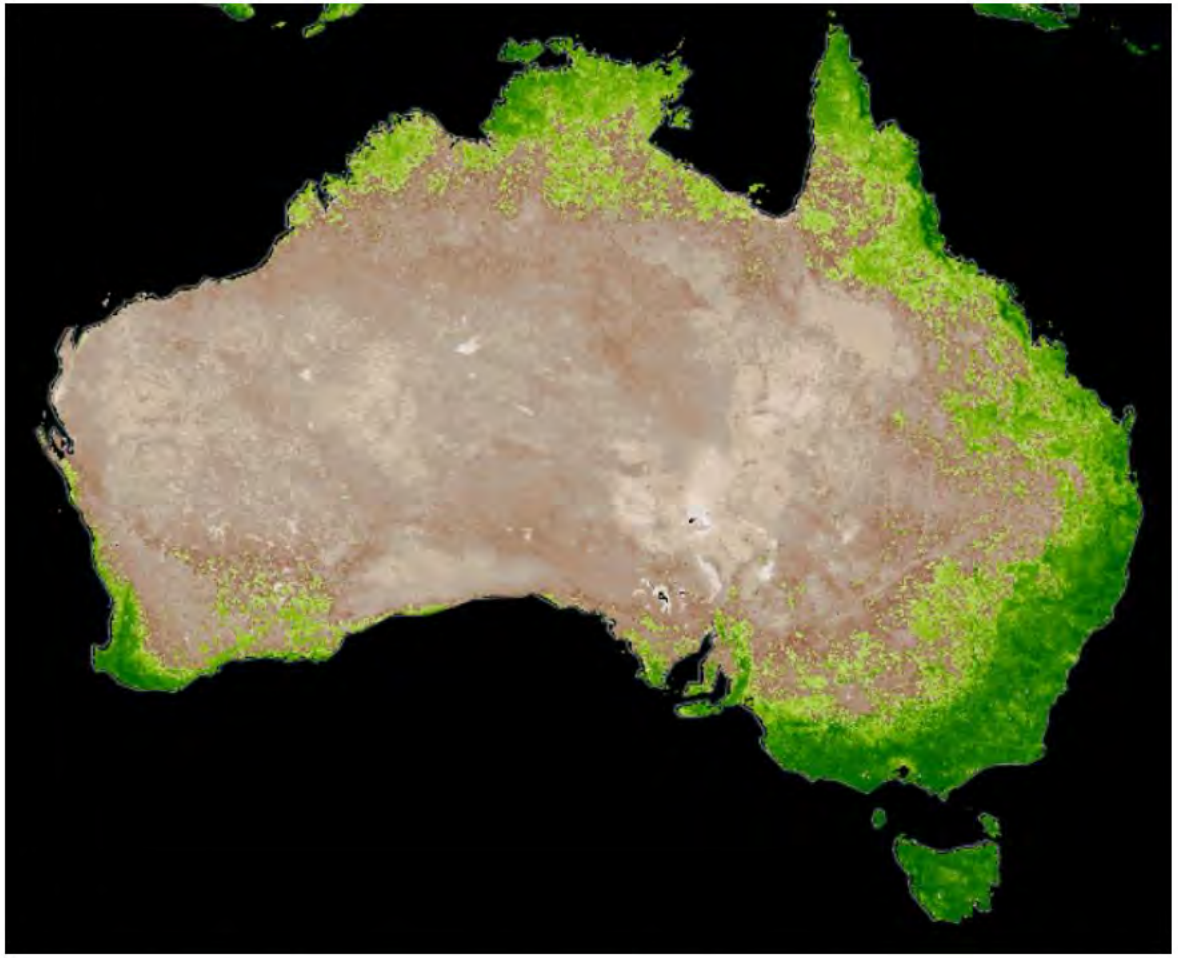


MODIS NDVI Vegetation Indices
16-day – 30 November 2021

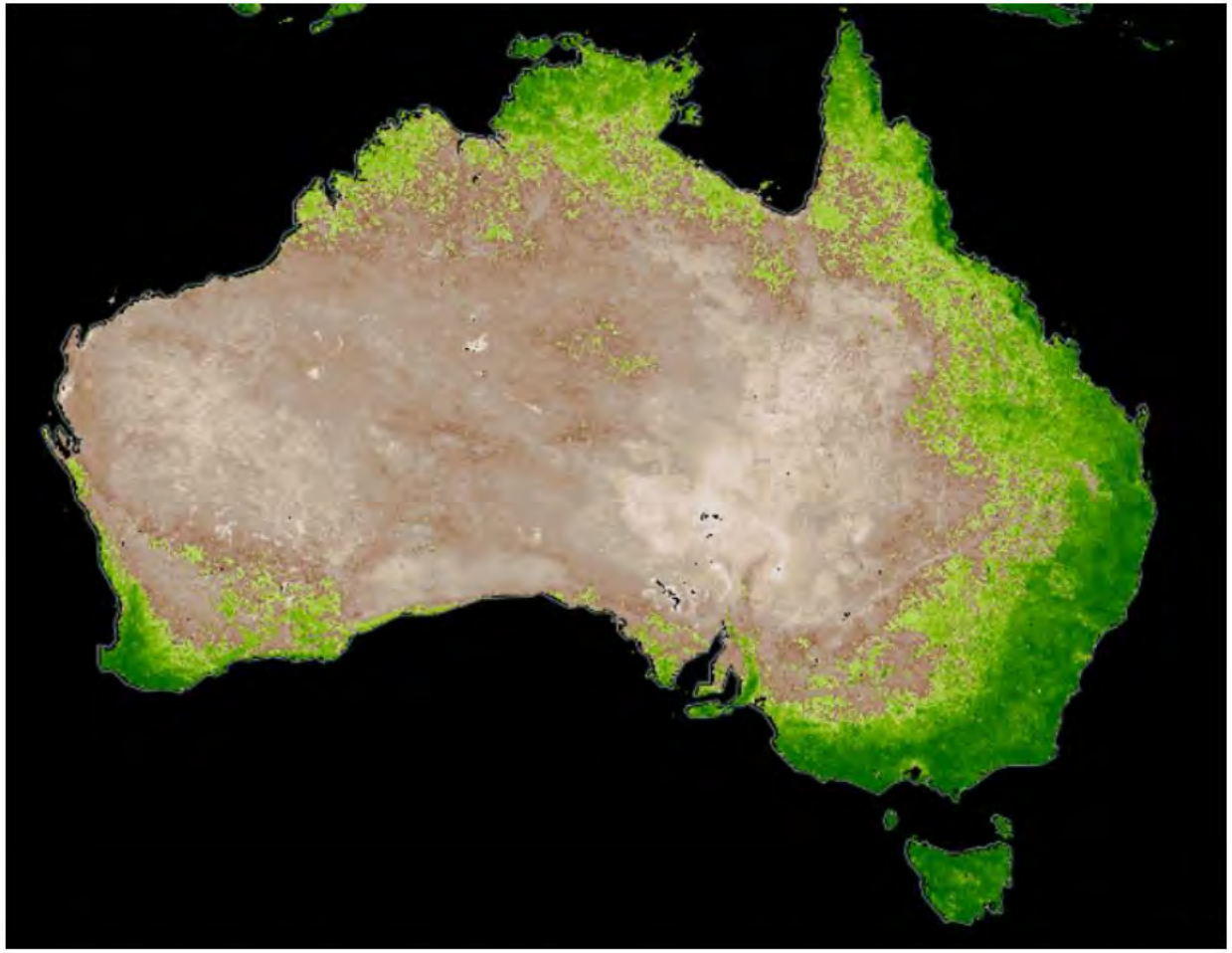
Source: NASA Worldview

https://worldview.earthdata.nasa.gov/?v=80.43946905844555,-56.2612488029705,182.4458724736002,-6.479998802970556&l=MODIS_Aqua_L3_NDVI_Monthly,MODIS_Terra_L3_NDVI_Monthly,Reference_Labels_15m(hidden),Reference_Features_15m(hidden),Coastlines_15m,VIIRS_NOAA20_CorrectedReflectance_TrueColor(hidden),VIIRS_SNPP_CorrectedReflectance_TrueColor(hidden),MODIS_Aqua_CorrectedReflectance_TrueColor(hidden),MODIS_Terra_CorrectedReflectance_TrueColor(hidden)&lg=true&t=2021-11-30-T15%3A05%3A40Z

Normalised Difference Vegetation Index



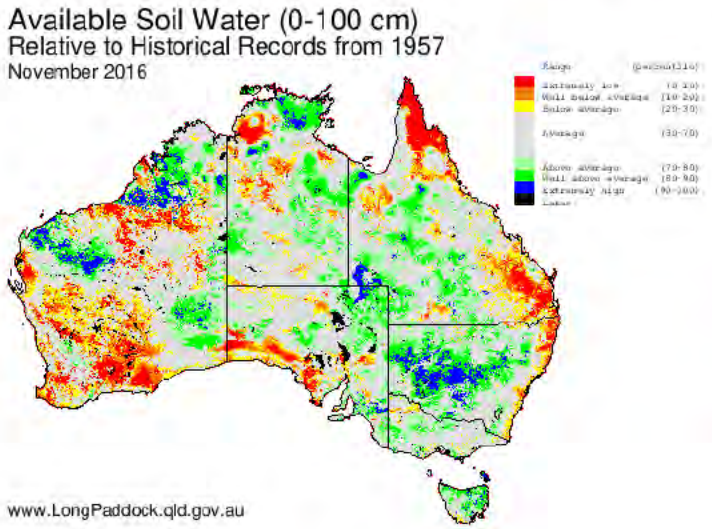
MODIS NDVI Vegetation Index 16-day – 30 November **2020**

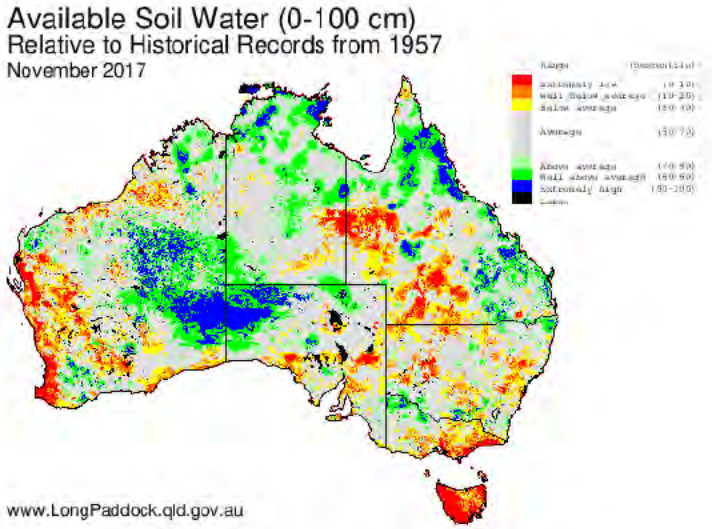


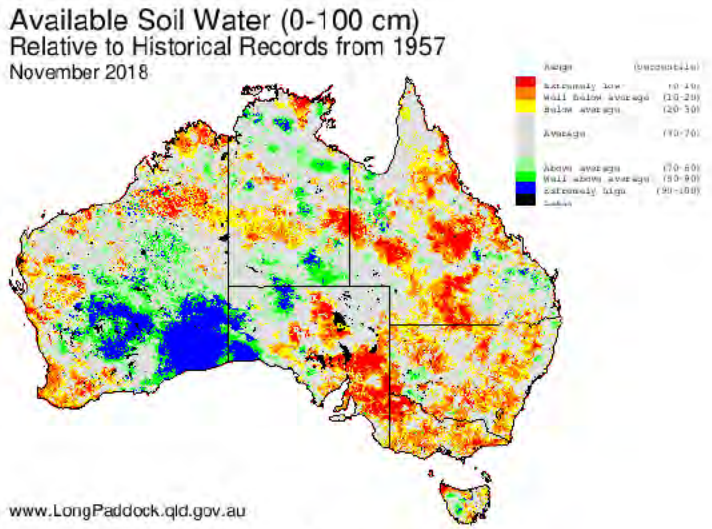
MODIS NDVI Vegetation Index 16-day – 30 November **2021**

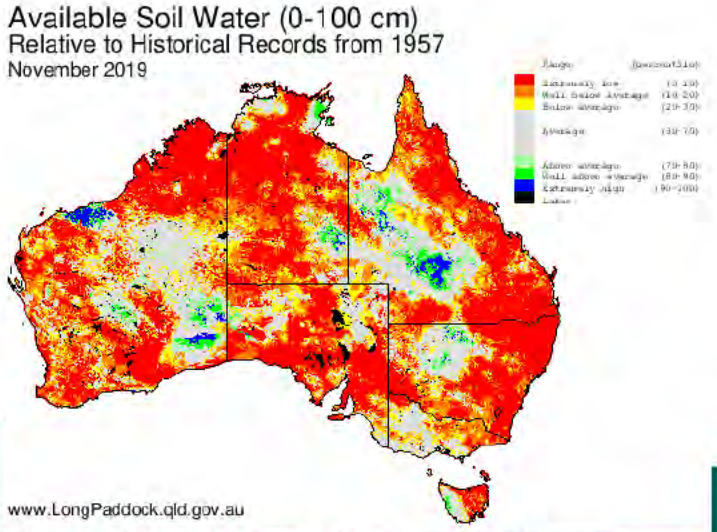
Available Soil Water (0-100cm)

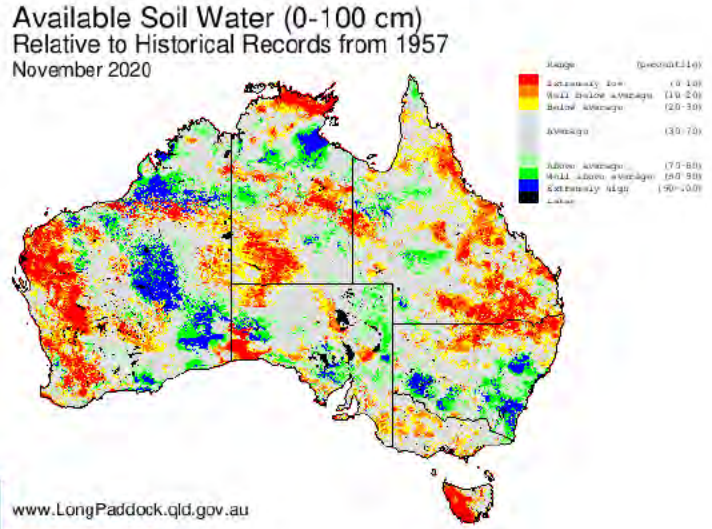
(Relative to historical records from 1957)

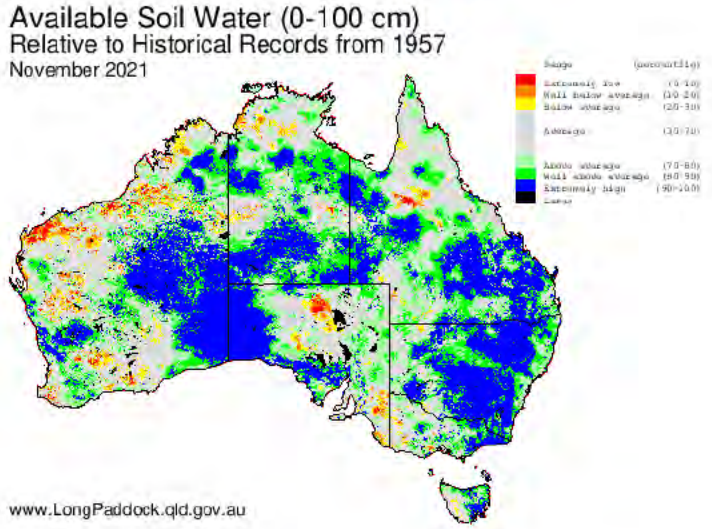






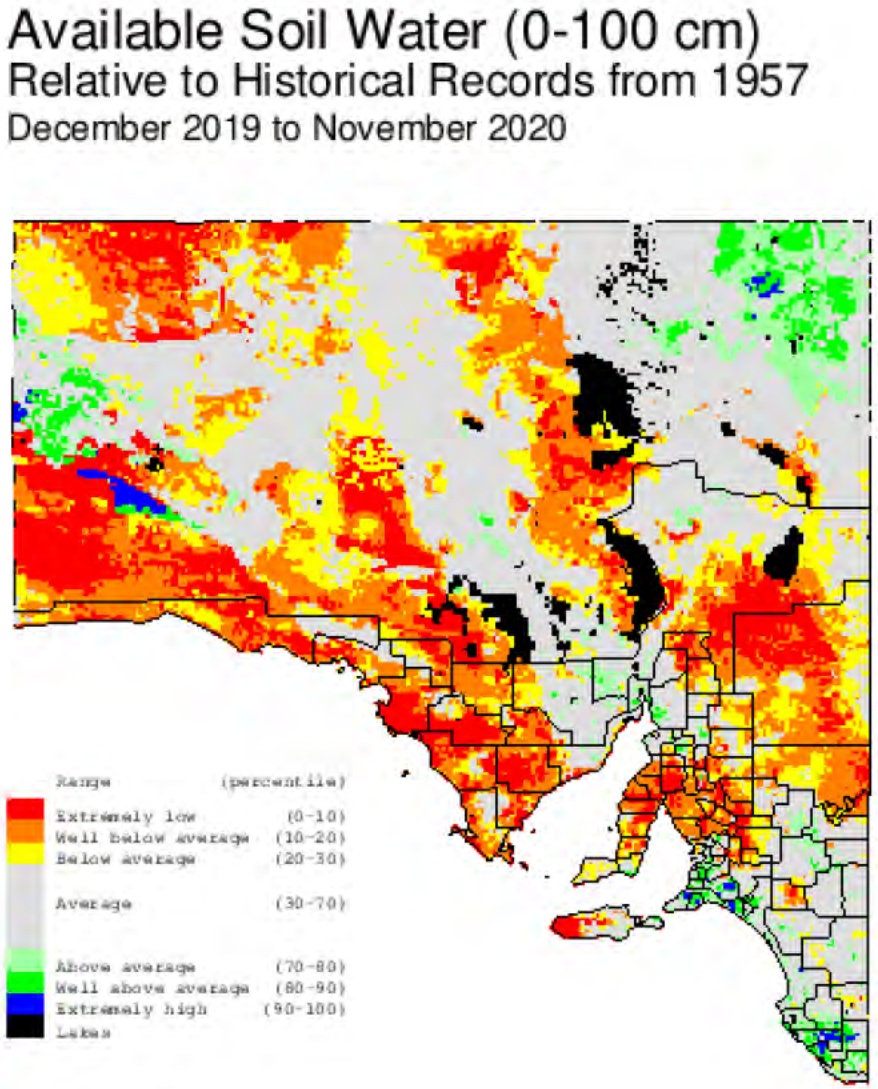


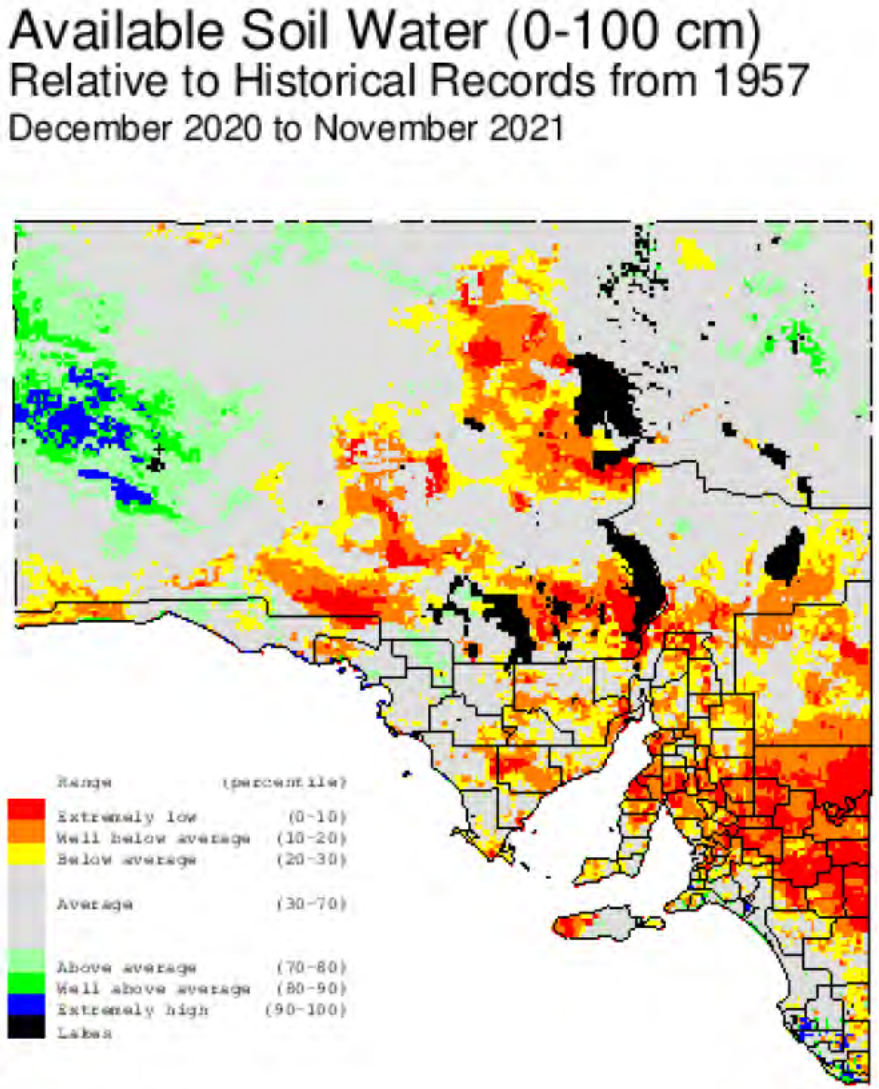




Available Soil Water (0-100cm)

(Relative to historical records from 1957)

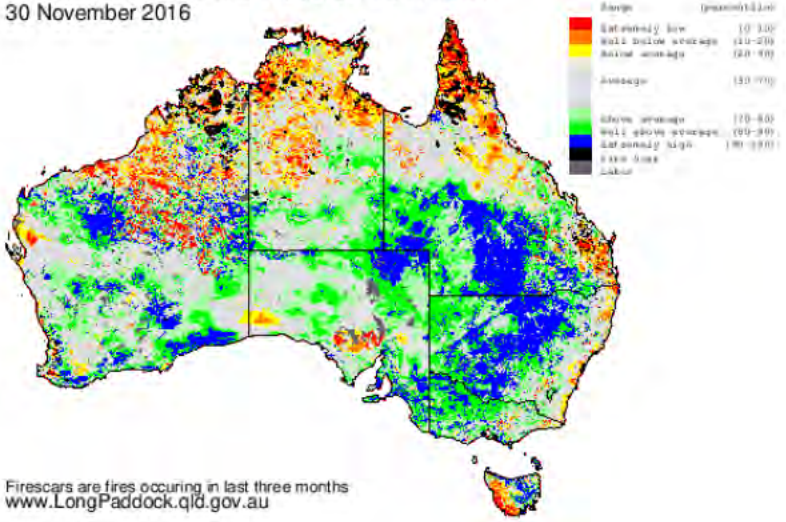




www.LongPaddock.qld.gov.au

Pasture Biomass

TSDM Percentile
Relative to Historical Records from 1957
30 November 2016



Firescars are fires occuring in last three months
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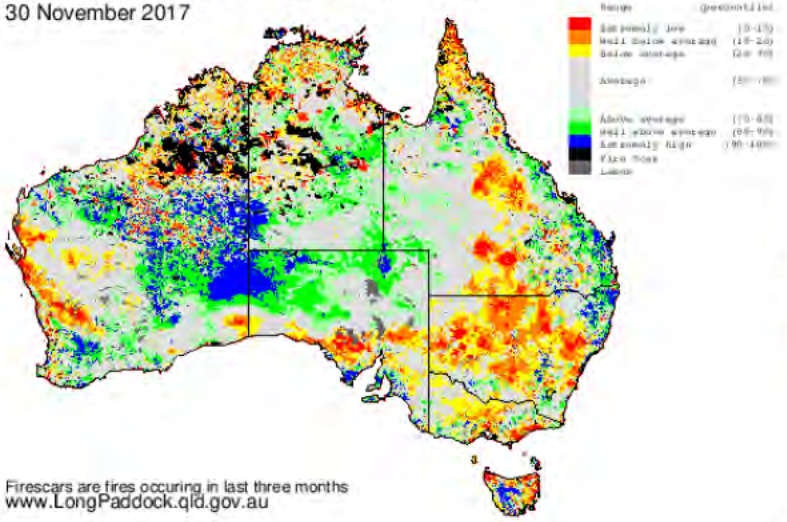
TSDM Percentile
Relative to Historical Records from 1957
30 November 2017



Firescars are fires occuring in last three months
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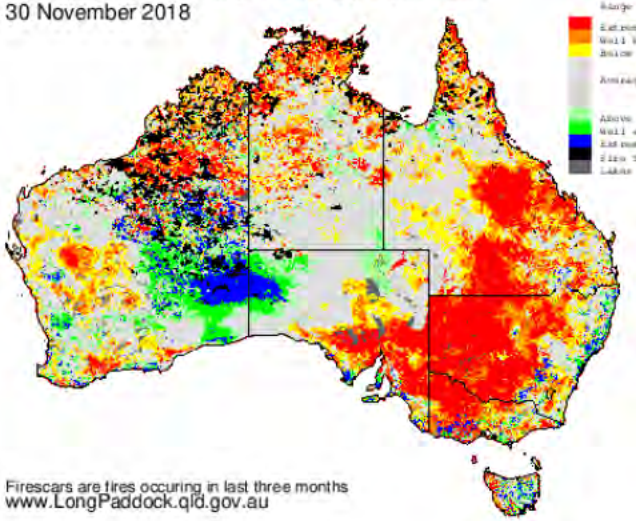
TSDM Percentile
Relative to Historical Records from 1957
30 November 2018



Firescars are fires occuring in last three months
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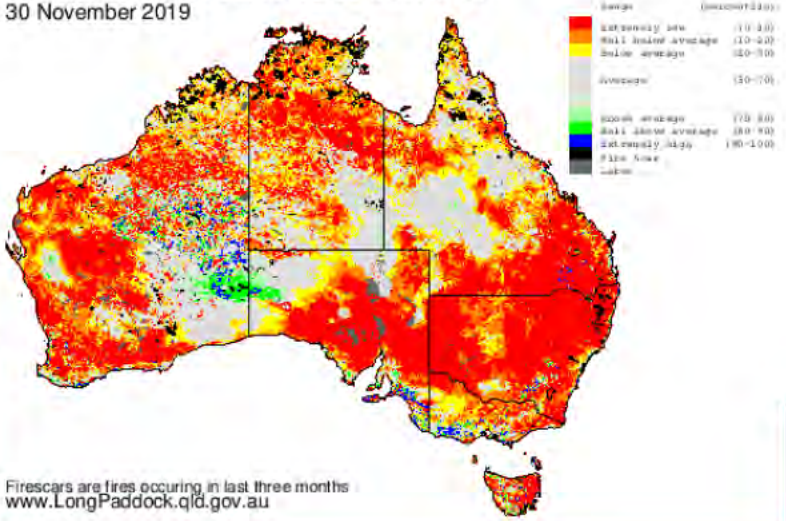
TSDM Percentile
Relative to Historical Records from 1957
30 November 2019



Firescars are fires occuring in last three months
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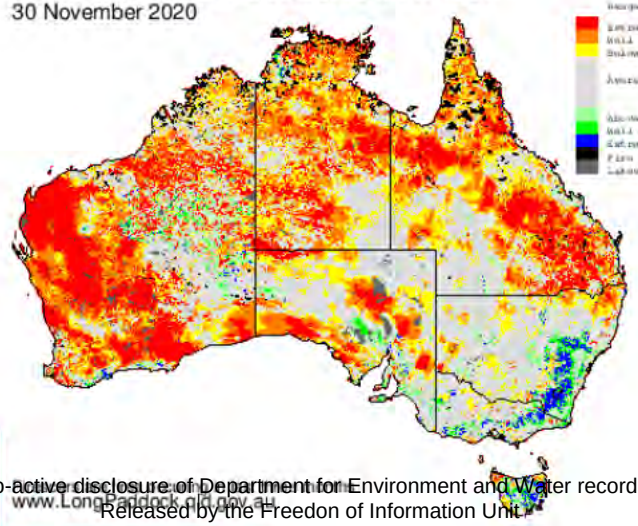
TSDM Percentile
Relative to Historical Records from 1957
30 November 2020



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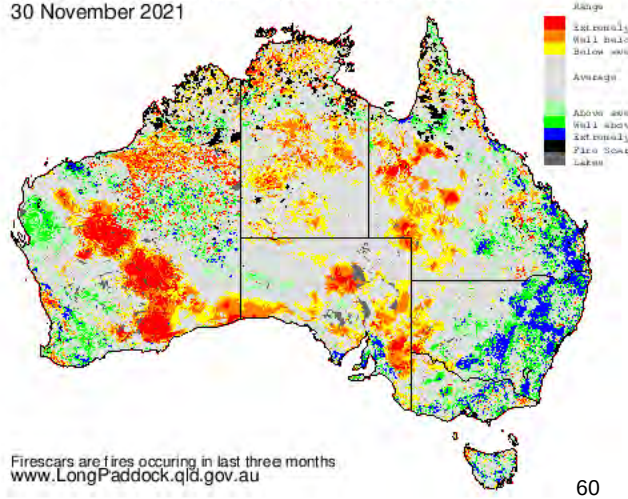
TSDM Percentile
Relative to Historical Records from 1957
30 November 2021



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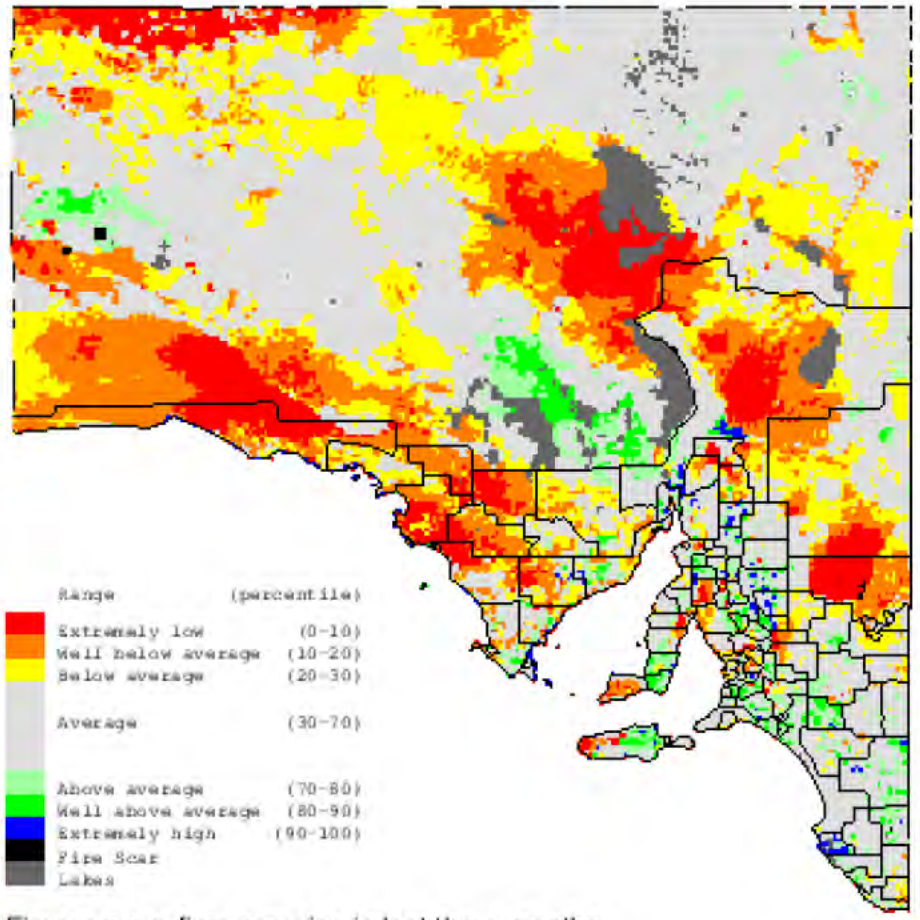
Pasture Biomass

TSDM Percentile
Relative to Historical Records from 1957
30 November 2020



Firescars are fires occuring in last three months
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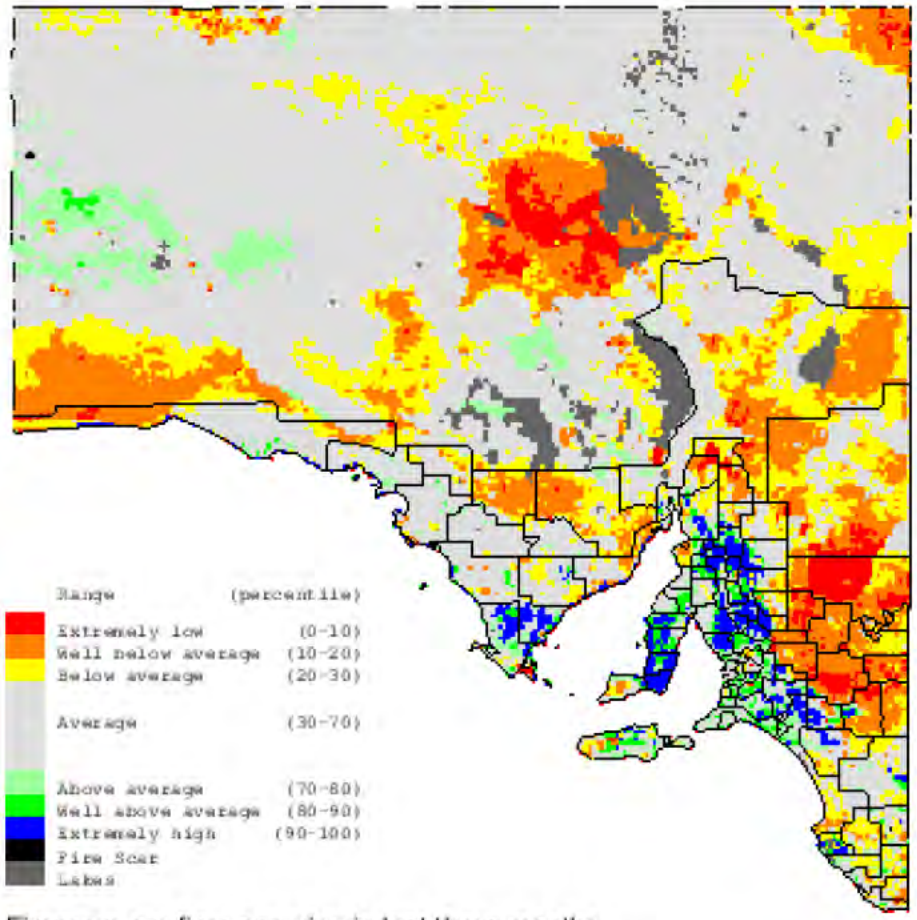
TSDM Percentile
Relative to Historical Records from 1957
30 November 2021



Firescars are fires occuring in last three months
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Landscape Condition summary

Wetland Extent

New parameter being implemented. Around 20% of available wetland habitat 'wet' in 2021, comparable with 2020.

Continental NDVI

New data source since for 2021. BoM have stopped providing historical source due to sensor issue.

2021 November NDVI coarsely comparable to 2020.

Available Soil Water

Continued improvement in continental-scale soil moisture.

Soil moisture across SE, Riverland, Murraylands average or below average. Improved from 2020 across much of the rest of SA.

Pasture Biomass

Pasture biomass (as TDSM) improving (average or better) across much of Australia relative to 2018-20.

Pasture biomass (as TDSM) now average or better across most of South Australia, deficiencies across parts of LEB, Eastern Pastoral/Riverland, nth EP/far west coast and SE. improved on EP, AMLR, N&Y and parts of Murraylands.

References

- Bureau of Meteorology - www.bom.gov.au
- Jenouvrier S. (2013) Impacts of climate change on avian populations. *Glob Change Biol*, 19: 2036-2057. doi:10.1111/gcb.12195
- Department for Environment and Water – www.environment.sa.gov.au
- Murray Darling Basin Authority – www.mdba.gov.au
- Murray-Darling Basin Authority (2021) River Murray System Annual Operating Outlook 2021-22 water year 1 June 2021 – 31 May 2022, MDBA, Canberra
- Porter J.L., Kingsford R.T., Francis R., and Brandis K. (2021) Aerial Survey of Wetland Birds in Eastern Australia- October 2021 Annual Summary Report, University of New South Wales
- The Long Paddock- www.longpaddock.qld.gov.au

2021 for 2022 Duck and Quail Hunting Open Season Stakeholder Reference Panel Statement of Outcomes

'Statement of Agreed Outcomes' on the 2022 Duck and Quail Hunting Season from the meeting of the Duck and Quail Hunting Open Season Stakeholder Reference Panel, held on Tuesday, 21 December 2021.

DUCK

- Declare an Open Season or not?
  - Birds SA and Conservation Council of South Australia (CCSA) – Restricted 3 open season.
  - Wetlands and Wildlife (W&W), and Conservation and Hunting Alliance of South Australia (CHASA) – Restricted 1 open season.
- Which species should be hunted?
  - Consensus - Australasian (Blue-winged) Shoveler excluded.
  - Birds SA and W&W – no other exclusions.
  - CCSA – split within
    - Also exclude pink-eared duck and hardhead.
    - Also exclude chestnut teal.
  - CHASA – no other exclusions, and note that Australasian (Blue-winged) Shoveler should remain as a 'game species' in South Australia.
- Parts of the state to which the open season applies.
  - Consensus position – open throughout the state.
- Season opening.
  - Birds SA and CCSA – coincide with Victorian opening[1].
  - W&W and CHASA – mid-February opening.
- Season closing.
  - Birds SA and CCSA – a season not exceeding 3 months.
  - W&W and CHASA – last Sunday of June[2].
- Open and close times.
  - Birds SA – sunrise to sunset.
  - W&W and CHASA – civil twilight[3].
  - CCSA – split within
    - no opinion.
    - sunset to sunrise.
    - civil twilight.
- Game Reserves.
  - Consensus position – Bool Lagoon Game Reserve closed, all others as per 2021[4].
- Bag limit.
  - Birds SA and CCSA – 4 bird bag.
  - W&W – 10 bird bag.
  - CHASA – 12 bird bag.

[1] The Victorian Wildlife (Game) Regulations 2012 regulate opening as the third Saturday in March of each year (noting this may be varied). For 2022, the regulated Victorian opening date will be Saturday 19 March 2022.
[2] Sunday 26 June 2022.
[3] Civil twilight defined as 30 minutes prior to sunrise to 30 minutes after sunset.
[4] As per 2021 Duck Open Season. Bool Lagoon Game Reserve closed, all others open, noting Chowilla, Moorook and Loch Luna Game Reserves to not open on Easter, long-weekends and school holidays; and restriction exist within Chowilla, Moorook, Loch Luna, and Tolderol Game Reserves.

- Species specific bag limits.
  - Birds SA - 1 chestnut teal, pink-eared duck and hardhead per day.
  - W&W and CHASA – no species specific limits.
  - CCSA - split within
    - 1-2 hardhead per day.
    - 1-2 chestnut teal per day.
    - 1-2 pink-eared duck per day.
- Additional duck open season comments.
  - W&W – haven't shot on their property for two years, wetlands looking ok, particularly Cortina Lakes.
  - CHASA – Civil twilight exists as conservation measure to ensure hunted birds fall close to the hunter and are recovered quickly and not lost in cover, thereby entering the bag. It is a long standing centuries old cultural practice of hunters generally that dictates that they use the resource efficiently. Regardless of the abundance of the game it is not to be wasted. CHASA are opposed to alignment of opening weekend with Victoria. Numerous bird and climate reports through 2021 support a full open season. Pike – CHASA register concerns about restricted access to Tanyaca Horseshoe.
  - CHASA estimates from published game duck surveys (National Waterbird Survey 2008[5], EAWS 2021[6] and other large area game duck surveys that overlap the EAWS area including Victorian game bird survey 2021[7] and Riverina NSW survey 2021[8]), that the population of game ducks in Australia is between 6 and 14 million ducks, and therefore a 12 bird bag that produced a harvest of 80,000 game ducks in South Australia in 2018 results in total hunter offtake far less than the sustainable offtake threshold of up to 20% of the population. Hence, there is no risk of an R1 12 bird bag.
  - Birds SA – A Restricted 3 open season is recommended on the basis of the SA waterfowl abundance ground count of 23,627 which is at the bottom end of the 20-40,000 range for Restricted Level 3 and on the basis of the total waterfowl abundance count from the EAWS survey of 49,704 which is well below the threshold of 150,000 at which No Season can be declared (Decision Matrix – Season Setting).
  - Birds SA – Request that DEW commence the process to delete Australasian Shoveler from the list of South Australian game ducks, based upon the extremely low abundances for this species consistently recorded over the last six years in the SA ground surveys and in the EAWS surveys. Birds SA quoted examples of two species where it claimed imposition of hunting restrictions occurred too late to prevent extinction occurring.

[5] Kingsford, R.T., Porter, J.L., and Halse, S.A. (2012) National waterbird assessment. Waterlines Report Series, (4)
[6] Porter J.L., Kingsford R.T., Francis R., and Brandis K. (2021) Aerial Survey of Wetland Birds in Eastern Australia- October 2021 Annual Summary Report, University of New South Wales
[7] Ramsey, D., and Fanson, B. (2021) Preliminary results from the 2021 survey of game ducks in Victoria. Arthur Rylah Institute, DELWP, Victoria
[8] Vardanega, M.C., Dundas, S.J., and McLeod, S.R. (2021) 2021-2022 Annual Waterfowl Quota Report to DPI Hunting, NSW Department Primary Industries

QUAIL

- Declare an Open Season or not?
  - Consensus position – open season.
- Parts of the state to which the open season applies.
  - CHASA, W&W and Birds SA – open throughout the state.
  - CCSA – split within
    - open throughout the state.
    - closed on Kangaroo Island and the Murray Mallee region.
- Season opening.
  - CHASA – split opening: South East region open mid-march, rest of state open early April.
  - CCSA – split within
    - open late April/beginning of May.
    - open April.
  - W&W – open early April.
  - Birds SA – open beginning of May.
- Season closing.
  - CHASA and W&W– close Sunday 28 August 2022.
  - CCSA and Birds SA– close end of July.
- Open and close times.
  - CHASA and W&W - civil twilight.
  - CCSA – split within
    - civil twilight.
    - sunrise to sunset.
  - Birds SA - sunrise to sunset.
- Bag limit.
  - CHASA and W&W – 25 bird bag.
  - CCSA – split within
    - 10 bird bag.
    - 15 bird bag.
  - Birds SA – 15 bird bag.
- Additional quail open season comments.
  - CHASA - would prefer one licence including both duck and quail open seasons in future. CHASA recognise that quail hunting is a sustainable activity. CHASA season opening and closing dates reflect their experience with quail population dynamics in SA.
  - CCSA – appreciative of CHASA quail survey, and support the call for an independent study of quail numbers prior to decision making in December 2022.
  - W&W – recognises efforts of [redacted] to organise the CHASA quail survey, and notes hunting encourages hunters to engage in game management.
  - Birds SA – sustainable management requires ongoing monitoring. Birds SA's position on an open season in 2022 is contingent upon a commitment to an independent study before December 2022.
  - Birds SA – the season opening and closing of beginning of May to end of July is based upon the recommendations of Frith and Carpenter (1980)[9]. Birds SA has not seen any independent research to justify moving away from that timing.

[9] Frith, H.J. and Carpenter, S.M., (1980). Breeding of the Stubble Quail, *Coturnix pectoralis*, in south-eastern Australia. *Wildlife Research*, *7*(1), pp.117-137.

The Presence and Abundance of Stubble Quail (*Coturnix pectoralis*) across South Australia

Preliminary Report December 2021

By [redacted], Wildlife Biologist, SSAA National

Abstract

Stubble quail were found and counted across several regions in South Australia. A total of 108 private properties were surveyed during harvest and by volunteers conducting drive counts. A total of 16,024 individual birds were counted over a sample area covering 8,333 hectares. An average state-wide density of 1.35 quail per hectare was found. Comparing this estimated density to the area size of habitat used by the species across the state's agricultural regions, projections suggest that the stubble quail population is large and ranges between 6,201,992– 17,803,220 individuals ($\bar{x}$=12,002,606; 95%CI). With hunter bag surveys indicating a recreational quail hunting state-wide harvest of approximately 5,091 individuals per year, it is clear that quail hunting has an insignificant impact on state-wide quail populations and poses no risk to their existence. The state-wide harvest represented 0.04% of the estimated population, which is vanishingly small compared with internationally accepted harvest rates of 10-20% of the population.

Introduction:

The presence and abundance of stubble quail (*Coturnix pectoralis*) has been subject to much debate in the absence of data. The absence of data is not a recent issue. Frith and Waterman (1977) were the first researchers to publish the movements of stubble quail, and their study helped fill a knowledge gap. Through their work we now know that stubble quail are highly nomadic and are capable of travelling vast distances across the landscape. Studies in North America have shown that high quality data can be gathered from harvested bobwhite quail where sex and age ratio analysis can inform managers of breeding season productivity (Rollins et al, 2005) which can be used as an indicator of healthy populations. In South Australia, there has been some preliminary work conducted in this space with stubble quail samples being collected by hunters because of their interest in the species and ensuring the sustainability of hunting (Godson & Hall, 2013).

In contrast, the South Australian Government has shown little interest in gathering biological data on the species in the past and has persisted with an arrangement of surrogate data that has not been tested to inform hunting season settings (DEW, 2020). The lack of recent data has led the South Australian Environment Minister David Speirs questioning the sustainability of quail hunting (BirdsSA, 2019).

Within the hunting community there is an appetite to collect data to show hunting is no risk to state-wide stubble quail populations and that hunters can continue to sustainability harvest quail within a regulated environment. Any ban or closure of the regulated season has the potential to drive the activity underground where there would be no conservation benefits. Currently hunting provides an opportunity to collect biological data on stubble quail, and without regulated hunting seasons this opportunity would be lost.

There are a number of options available to collect data that can be used to assist in decision making. New technology such as bioacoustics surveys of quail populations show promise

(McDonald and Hall, 2017) but are likely to require a significant initial investment to roll out at large scale. As technology improves, bioacoustics surveys will continue to become a more attractive option than much more labour-intensive traditional abundance sampling methods. The use of both bioacoustics and occupancy modelling can already provide a monitoring approach that identifies population trends and effects of environmental changes (Abrahams and Geary, 2020).

Line transect distance sampling has been a widely used and accepted method to collect data for estimating the abundance of a variety of species in a range of environments. For those people that have regular experience in flushing stubble quail (e.g., hunters), there are significant concerns regarding the detectability of the species. Being a small, cryptic and evasive ground bird, stubble quail may indeed be very problematic when it comes to meeting the required assumptions of line transect distance sampling design. These key assumptions are 1). that objects are detected at their initial locations and 2). that those on the transect line are detected with certainty (Owusu, 2019).

The Victorian Government's Game Management Authority is funding a monitoring project that will attempt to use this technique for stubble quail in 2022. Due to the same concerns above, they will involve biometricians to assist with the calculation of detection probabilities that will hopefully overcome detection issues (S. Toop, 2021, personal communication, 5 October 2021). It won't be until after initial surveys have been conducted and sufficient observations recorded, to determine if this method will be appropriate to use for stubble quail.

With the lack interest from the South Australia government to be involved is such work, hunting organisations in South Australia have initiated a citizens science project to identify the presence of stubble quail across the state and calculate density estimates of populations. Using data from past hunting returns, this report will make a reasonable assessment to determine whether the historical harvest of stubble quail has been insignificant compared to the potential population of stubble quail in South Australia. Further to this, that quail hunting can be considered a sustainable activity and doesn't pose an extinction risk to the species.

Method:

Drive counts were conducted across private properties during November and December 2021 using several observers walking abreast and/or with the assistance of trained dogs. All quail flushed during each activity were counted. Observers were instructed to be careful not to count the same bird twice. Observers also took note of habitat types that were surveyed as well as mapping the area covered during the drive count to assist in determining quail density.

Quail counts were also conducted across private properties in November and December 2021 while landowners and/or employees were in the process of harvesting crops. Machine operators were instructed to only count birds that flushed and flew away from unharvested crop. The number of quail counted during these operations are deemed an exhaustive census

of stubble quail found in habitat of a known size. This approach to monitoring stubble quail was successfully applied in New South Wales (McDonald & Hall, 2017).

Additional observations and/or counts were made and recorded by farmers while vehicles (utilities and farm bikes) were driven through paddocks during normal farm activities.

Results:

During the period November and December 2021, survey returns covering 108 different sites were received. Only 6 sites recorded no sightings.

Stubble quail counted:

The total number of stubble quail counted during combined harvest surveys and drive counts was 16,024. The total area covered by combined harvest surveys and drive counts was 8,333 hectares.

Stubble quail densities:

Density of stubble quail found ranged from 0.75 ± 0.2 (SE) birds per hectare in the Murray Lands to 6.68 ± 0.7 (SE) per hectare on the Eyre Peninsula with a state-wide average of 1.35 ± 0.2 (SE) per hectare (See Figure 1, Table 1).

Different crop types yielded different means of flushed individuals per hectares. The main crop types included barley (ρ=1.39 ± 0.2 (SE)), canola (ρ=1.70 ± 0.2 (SE)), hay (ρ=1.35 ± 0.2 (SE)), wheat (ρ=1.34 ± 0.2 (SE)), mixed grasses (ρ=1.51 ± 0.2 (SE)) and legumes (ρ=1.38 ± 0.2 (SE)) (See Figure 2). Stubble quail were found to be present in all crop and habitat types surveyed.

Table 1: The regional, habitat type breakdown of stubble quail counted with their estimated densities. *Properties with just sightings excluded.

Region	Habitat Present [c] Cereal, [p] Pulse, [o] Oilseed, [f] Forage Crop	Properties Surveys*	Area Covered (ha)	Quail Counted	Estimated Density per hectare (Mean and 95%CI)
Murray Lands	C, F, P	38	4,003	732	0.75 (0.33 – 1.17)
Yorke Peninsula	C, P	30	2,444	12,352	1.67 (0.64 – 2.40)
South East	C, F	21	1172	1301	1.14 (0.66 – 1.63)
Eyre Peninsula	O	4	200	1300	6.68 (4.30 – 9.05)
Northern	C	4	283	179	1.20 (-0.38 – 2.77)
Kangaroo Island	C	7	184	89	0.52 (0.18 – 0.85)

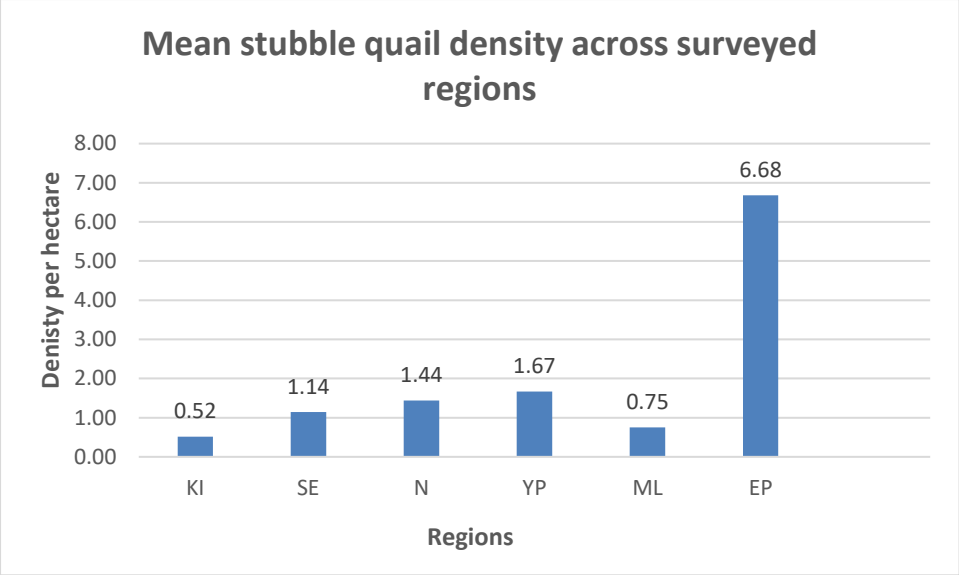

Figure 1: Density of stubble quail (per hectare) observed during surveys conducted in various regions of South Australia, 2021.

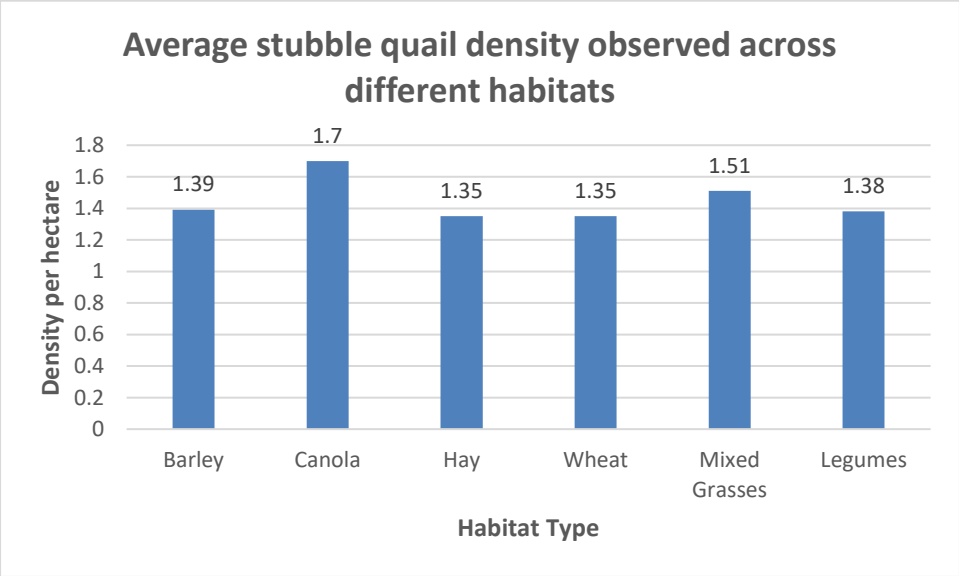

Figure 2: Density of stubble quail (per hectare) observed during surveys conducted in various habitat types during harvest operations and drive counts in South Australia, 2021.

Discussion:

Stubble quail status:

Stubble quail have an IUCN Red List Category of Least Concern. Justification given for this category is that the species has an extremely large range and simply does not approach the thresholds for Vulnerable under the range size criterion. The population trend is said to be increasing and therefore does not approach the thresholds of Vulnerable under population trend criterion. Although population size has not yet been quantified, it is not believed to

approach the thresholds for Vulnerable under the population size criterion (Birdlife International, 2021). There is evidence provided in the result of surveys in South Australia in 2021 to reveal that stubble quail occupy a large range, when considering that they were present in 102 of the 108 (94.44%) surveyed areas across six regions of the state. By the IUCN criteria stubble quail are a species of Least Concern.

Stubble quail diet and habitat use:

The diet of stubble quail has been well researched. For example, a study of quail in 1924 that examined stomach contents of 30 birds collected in the New South Wales regions of Bega, Cooma, Goulburn, Bathurst and Corowa found a variety of food items (Kinghorn, 1926). As ground feeding birds, stubble quail mainly eat seeds and green leaf material including pasture plants and weeds. Animal material in the form of insects and their larvae is of secondary importance to adult birds, but are an important food source for hatchlings (McNally, 1956). All of these food items are found in a variety of habitats in South Australia.

However, the types of habitats where stubble quail can be found vary across the landscape. Populations can be found in contrasting environments throughout zones identified as arid, winter rainfall, summer rainfall and elevated tablelands (Frith & Carpenter, 1980). Wheat, oats and barley crops across all stages of cultivation (i.e. ploughing to crop harvesting) provides habitat. Unsown land, mixed pastures (containing volunteer grasses) and weedy uncultivated land can also provide habitat for stubble quail (Frith & Waterman, 1977). The habitats covered during the 2021 surveys suggest that these habitat preferences are still valid.

The reduction of forest country after the European settlement in locations in Victoria has been said to have extended the stubble quail's range beyond the natural grass-covered plains found in areas such as the Western-districts and Wimmera, the Spinifex country of the Mallee, the Sword-grass areas of the Gippsland coast and the grassy flats of numerous river valleys. Stripped wheat stubble is considered, to some observers, to be the most-favourite habitat of this species (Miller 1938, Hall 2013).

This situation is similar in South Australia where stubble quail are common throughout the year in crops, stubbles and pastures. In dryer seasons, quail tend to congregate in the remaining areas of good cover within the local area (Pedler, 1975) and then move once food becomes exhausted, to areas such as grassy pasture lands that hold better resources (Cruise, 1966). This opportunistic movement has been suggested to have occurred recently in conversations with farmers and stakeholders involved in this project.

A bird study across three broad districts 100km east of the Perth in Western Australia also indicated the presence of stubble quail in areas of forest, cleared grasslands and cropland. Stubble quail appeared in varying numbers in different locations throughout the year (Masters & Milhinch, 1973). The variation in presence of stubble quail in different habitats is evident from our surveys (See Figure 2).

Stubble quail occasionally occur in the alpine and subalpine zones (such as the Snowy Mountains) but this is quite uncommon and only during periods such as snow-free months. In these zones, the late summer period can provide a suitable grasslands habitat and have the required conditions to hold quail (Osbornel & Green, 1992).

Literature supports the common view that stubble quail can make use of a wide variety of habitat when resources are available. Knowing this, suggestions of the total size of available habitat that can be utilised by stubble quail can be made. Data held by the Department of Agriculture, Water and the Environment (AWE, 2021) can be used to break down Natural Resource Management (NRM) regions into habitat types. Habitat types classified as 'Nature Conservation', Grazing Native Vegetation', Grazing Modified Pastures', Dryland Cropping' and 'Irrigated Pastures', provide habitat types consistent with areas that stubble quail are likely to inhabit from time to time.

The Department of Agriculture, Water and the Environment (AWE, 2021) indicates eight NRM regions across South Australia cover 70,858,000 hectares. These NRM regions include Northern and Yorke Peninsula (3,289,872 ha) Adelaide and Mount Lofty Ranges (307,609 ha), Eyre Peninsula (3,887,208 ha), Kangaroo Island (324,506 ha), Alinytjara Wilurara (9,089,209 ha), SA Murray Darling Basin (4,246,959 ha), South East (2,085,831 ha) and the Arid Lands (47,626,806 ha) (See Table 2). It is acceptable to say that stubble quail have extensive habitat in both variety and size in South Australia to maintain a substantial population.

Rainfall is a key component that can affect at least two elements of the stubble quail's needs which will determine whether they remain in an area. Those elements are the density and height of the top cover and the low growing grasses and herbs (Frith & Carpenter, 1980). In years of high rainfall in spring the breeding season is extended and extensive and availability of food is high (Frith & Waterman, 1977). Multiple observations of young birds during the harvest surveys suggest that breeding may have been extended and extensive this year.

South Australian habitat and climatic conditions:

Spring rainfall in South Australia during the 2-month period leading up to the 2021 survey period was very much above average as seen in Figure 3 (Bureau of Meteorology, 2021a). This is on the back of a 12-month period in which most of the state had average to above average rainfall (Figure 4) and a 24-month period in which the majority of the state had average rainfall (Figure 5). Periods of concurrent negative rainfall deciles are behind us for now as Australia enters a wet period under La Nina conditions. These conditions, similar to the what was experienced above by Frith & Waterman (1977), explains the widespread presence of stubble quail across the regions that were surveyed.

The Bureau of Meteorology Climate outlook (Bureau of Meteorology, 2021b) has suggested the La Ninna and the positive Southern Annular Mode (SAM) state are likely to influence above median rainfall outlooks for the coming months. The increased chance of unusually high rainfall (in the top 20% of historical records) over most of the eastern states as well as patches of South Australia during December 2021 to February 2022 will confidentially maintain resources for stubble quail across the summer months to remain in areas throughout South Australia.

The latest report by the Department of Primary Industries and Regions (DPIR, 2021) regarding the condition of crops and pastures in South Australia indicated crops had established well with follow up rains that were above average in July 2021. This resulted in a wet period that provided deeper soil moisture to support crops with some waterlogging in some districts. Although August rains were below average, the soil moisture reserves have

maintained crop potential with an estimated harvest of 7.98 million tonnes of grain from 3.9 million hectares sown. This adds further evidence that food availability for stubble quail is high and so is the potential to hold significant stubble quail populations.

Table 3 displays the projected tonnage and hectares sown for all crops throughout the York Peninsula, Lower, Mid and Upper North. These regions are favoured hunting locations for many quail hunters. DPIR (2021) has projected a mixed crop harvest estimate of 4.4 million tonnes from 1.6 million hectares sown.

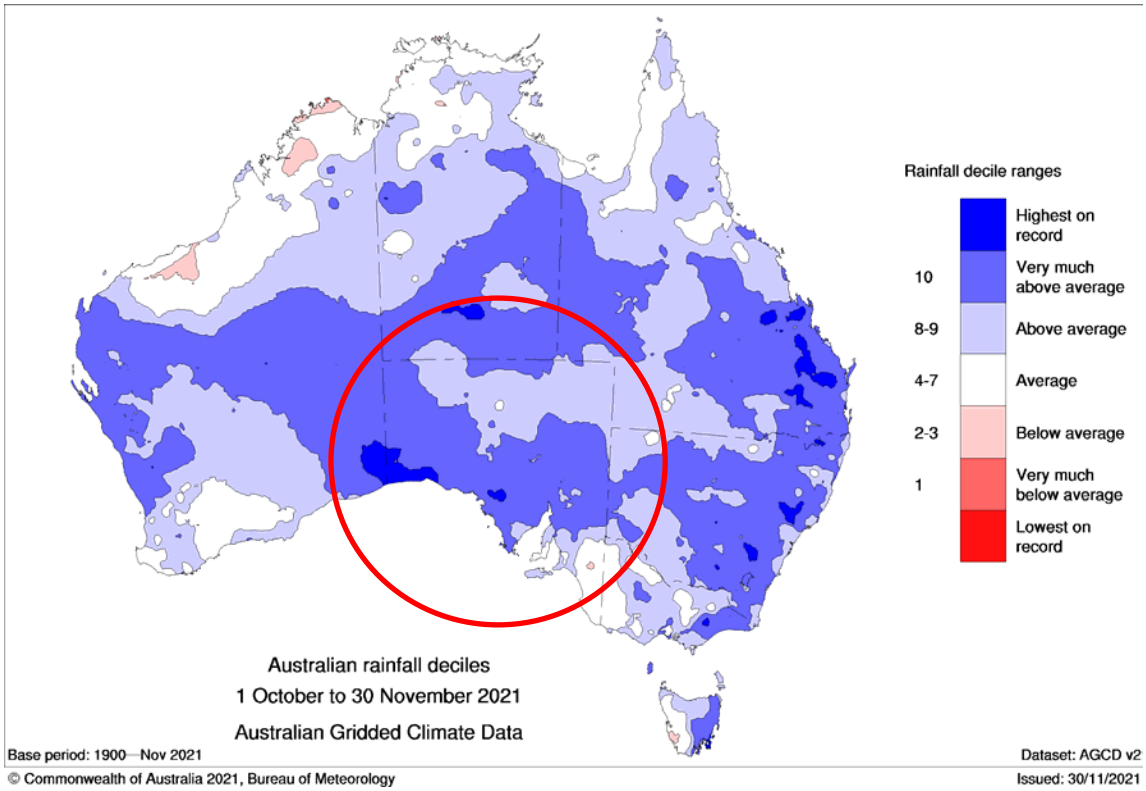

Figure 3: For the period 1 October to 30 November 2021, the majority of South Australia was very much above average in terms of rainfall deciles (Bureau of Meteorology, 2021a).

Table 2: NRM regions within South Australia that contain areas (hectares) of suitable habitat for stubble quail (AWE, 2021)

Habitat Type	Northern & Yorke	Adelaide & Mount Lofty Ranges	Eyre Peninsula	Kangaroo Island	Alinytjara Wilurara	SA Murray Darling Basin	South East	Arid Lands
Nature Conservation	60,129	21,323	883,263	142,700	9,080,971	1,143,348	243,592	7,418,902
Grazing Native Vegetation	267,493	695	84,439	-	8,236	1,164,033	2,896	39,935,239
Grazing Modified Pastures	1,259 364	228,589	626,531	153,212	2	881,409	1,538,857	254,255
Dryland Cropping	1,700,449	51,573	2,292,966	28,581	-	1,047,263	256,148	18,410
Irrigated Pastures	2,437	5,429	9	13	-	10,906	44,338	-
Total Area (ha)	**3,289,872**	**307,609**	**3,887,208**	**324,506**	**9,089,209**	**4,246,959**	**2,085,831**	**47,626,806**

Table 3: Crop estimates (2021-22) for the Yorke Peninsula and North districts (DPIR, 2021) ([c] Cereal, [p] Pulse, [o] Oilseed, [f] Forage Crop)

Crop Type	Hectares					Tonne				
	Yorke Peninsula	Lower North	Mid North	Upper North	Crop Total	Yorke Peninsula	Lower North	Mid North	Upper North	Tonne Total
Wheat [c]	163,000	70,000	248,000	240,000	721,000	569,000	254,000	682,000	638,000	2,143,000
Durum [c]	13,500	4,200	5,000	6,000	28,700	43,500	15,000	14,000	20,500	93,000
Barley [c]	167,000	24,000	99,000	91,500	381,500	585,000	97,000	286,000	238,000	1,206,000
Oats [c]	4,200	3,100	5,000	5,500	17,800	11,300	10,200	12,800	10,500	44,800
Triticale [c]	1,000	400	1,700	1,200	4,300	3,000	1,400	4,800	3,200	12,400
Peas [p]	11,000	6,100	15,000	14,000	46,100	20,000	15,200	24,000	23,500	82,700
Lupins [p]	1,000	500	1,800	3,000	6,300	1,400	1,000	2,700	4,600	9,700
Beans [p]	12,000	3,100	13,000	12,200	40,300	24,000	11,500	26,000	22,000	83,500
Chickpeas [p]	6,600	400	2,500	4,600	14,100	8,300	800	4,500	8,300	21,900
Lentils [p]	129,000	6,200	14,500	10,000	159,700	260,000	12,500	17,500	15,800	305,800
Vetch [p]	2,600	300	4,000	5,600	12,500	1,500	450	3,100	2,200	7,250
Canola [o]	12,000	5,500	23,000	24,500	65,000	21,200	12,000	46,000	51,500	130,700
Hay [f]	23,000	10,000	35,000	17,000	85,000	105,000	53,000	15,000	52,000	225,000
Totals	**545,900**	**133,800**	**467,500**	**435,100**	**1,582,300**	**1,653,200**	**484,050**	**1,138,400**	**1,090,100**	**4,365,750**

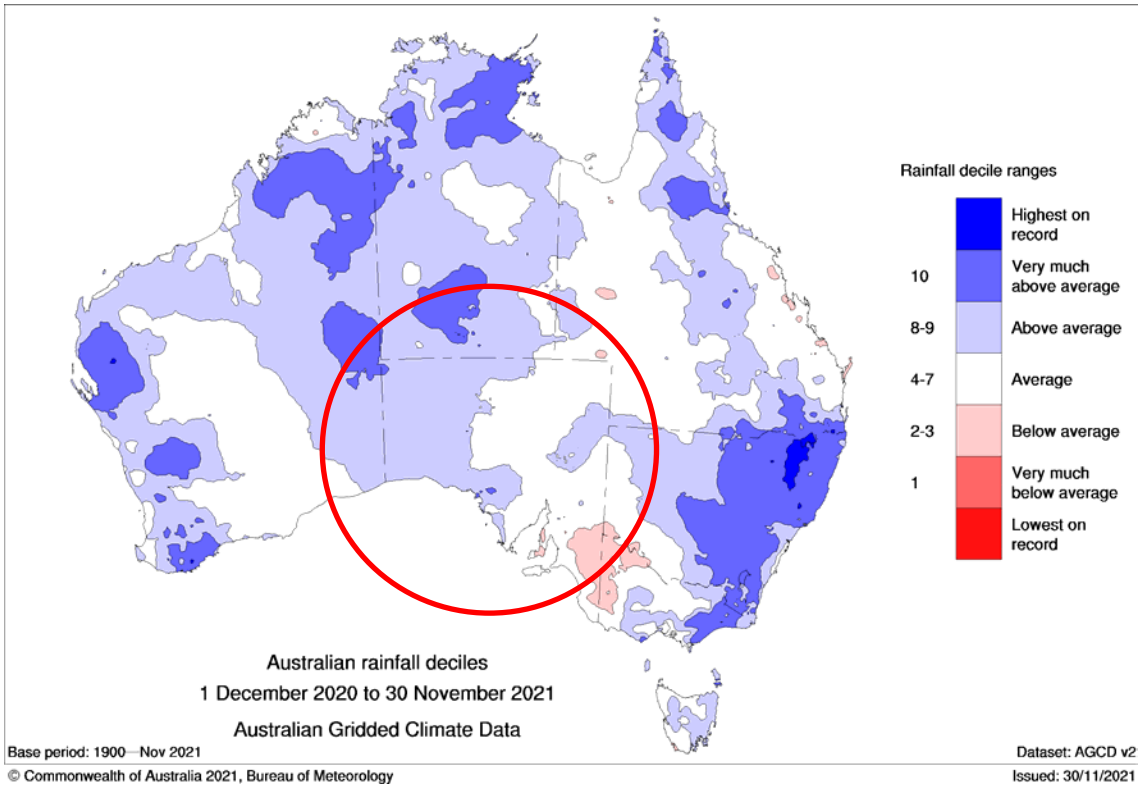

Figure 4: For the period 1 December 2020 to 30 November 2021, the majority of South Australia was average to above average in terms of rainfall deciles (Bureau of Meteorology, 2021a).

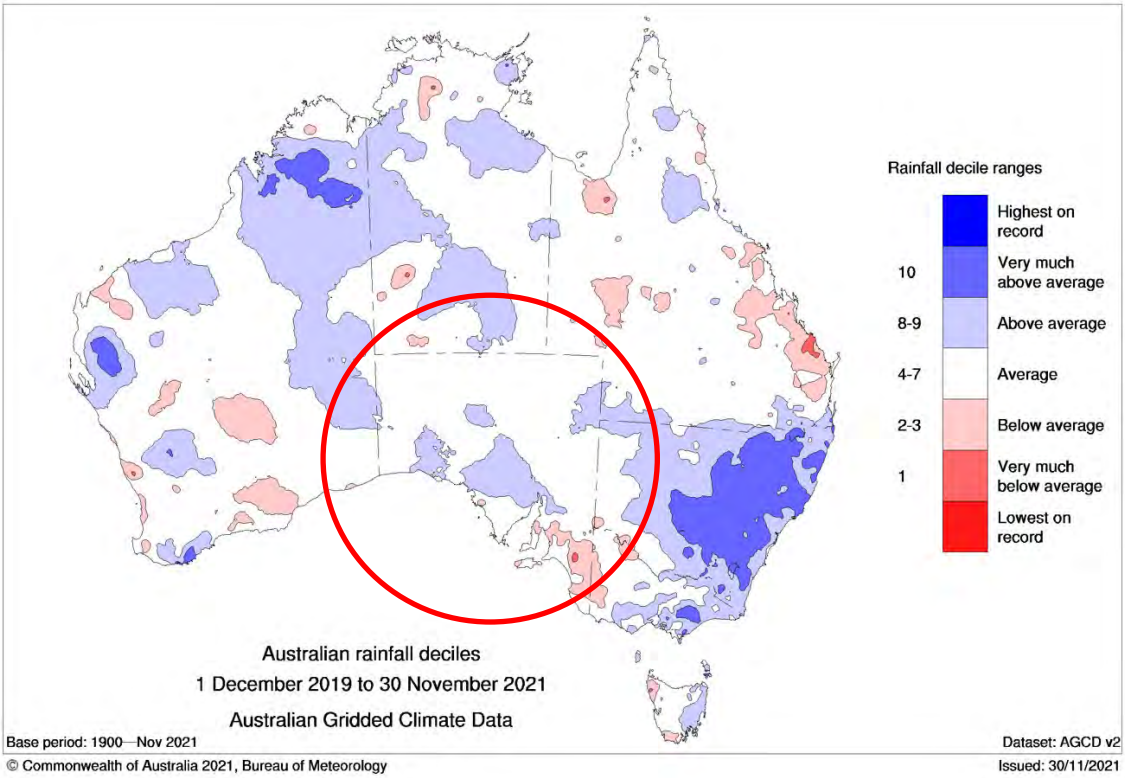

Figure 5: For the period 1 December 2019 to 30 November 2021, the majority of South Australia was average with areas of above average in terms of rainfall deciles (Bureau of Meteorology, 2021a).

Quail presence and abundance in South Australia:

The regions covered during the presence and abundance survey (See Figure 6) included the Yorke Peninsula, North districts, Eyre Peninsula, Murray lands, the South East and outer Adelaide. Crop types surveyed include wheat, hay, field pea, barley, lentils, mixed grass, lupins and canola.

Harvest operations across the state showed that stubble quail were widespread and were found in different densities across the landscape. Densities can be different even in adjoining paddocks and these densities can change quickly due to changing crop conditions.

Prior to harvest, a local Nalyappa farmer told the author that his field pea paddock had "lots of flushing quail" when conducting his final spray weeks before harvest (T. Andrews, personal communication, 19 October 2021). This was a field pea paddock and the spray used in the desiccation process likely contained chemicals such as glyphosate that dried off more than just the intended crop.

Subsequently, at harvest time his count of that particular paddock was lower than he expected (0.03 birds per ha). It wasn't until he harvested barley in the neighbouring paddocks that he realised that the quail may have moved in response to his spraying operations that potentially diminished the stubble quail's food resources. The average density for this cluster of properties was 1.48 birds per hectare, ranging between 0.03 to 3.33 per hectare (See Figure 7). Hunters with many years of experience know that spraying activities cause stubble quail to move on from once productive areas because green pick and/or insect resources are diminished by chemicals.

Based on the density estimates found during surveys, the York Peninsula as a whole provides a substantial habitat area to hold significant stubble quail populations. Table 4 provides a population estimate across three common habitat types that stubble quail were found to be present within the Yorke Peninsula region. The estimated population of the species just in this region alone is 600,244. This estimate excludes many other habitat types that are suitable for stubble quail found throughout the Yorke Peninsula.

A cluster of harvest operations in the Upper Murray Lands near the South Australia, Victorian and New South Wales border showed lower densities (0.02) of stubble quail than found in the Nalyappa cluster above (See Figure 7). The mean annual rainfall for the borders area is 251.7mm (Renmark Station #024003) compared to 370.2mm (Moonta Station #022011) near the Nalyappa cluster (BOM, 2021). The borders area has a drier climate and stubble quail would generally be found in higher numbers in pockets of good resources. Crop estimates for this area (North Murray Mallee) suggest crop yield of only 0.8 tonne per hectare compared to 3.3 tonne per hectare on the Yorke Peninsula (DPIR, 2021).

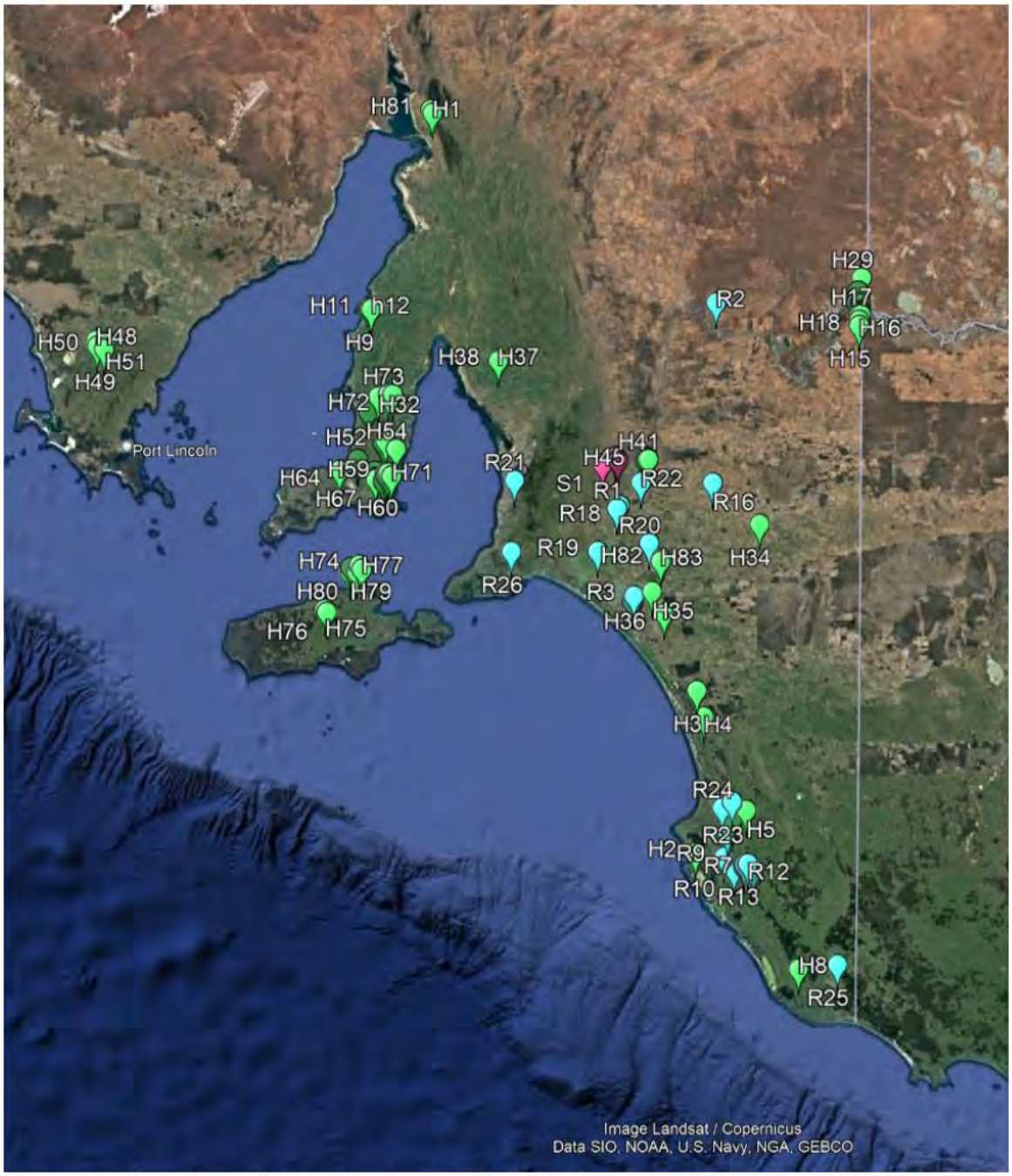

Figure 6: Locations of presence (blue markers) and harvest (green markers) surveys and landholder sightings of stubble quail (pink markers).

Table 4: Estimated stubble quail population present in three common crops in the Yorke Peninsula region of South Australia

Crop Type	Crop Estimate (ha)	Estimated Density per hectare	Stubble Quail Estimate
Barley	167,000	1.65	274,964
Lentils	129,000	1.20	154,875
Wheat	163,000	1.05	170,404
Total			**600,244**

Figure 7: During harvest of the Nalyappa Cluster on Yorke Peninsula, 146 quail were counted at an average density of 1.48 birds per hectare across four paddocks totalling 161 hectares. The paddocks mainly consisted of barley and field pea crops.

Being sparse, dry and low-growth monocultures, these areas allow stubble quail to see and react to harvest equipment allowing them to discreetly move off the path of approaching equipment without flushing. The border areas are rarely visited by hunters and stubble quail populations within these types of environments would not experience hunting pressure at a level near that of other preferred hunting areas within the state.

Figure 8: During harvest operations in the Murtho-Wonuarra Cluster (north Murray Mallee), 51 quail were counted at an average density of 0.02 birds per hectare across 17 wheat paddocks totalling 3,055 hectares.

The harvest and presence surveys provided an indication of the minimum population of stubble quail that could be found in a particular area. Harvest counts provided an exhaustive census of a known sized area (they covered a whole paddock) but they will not pick up every individual in the paddock. Stubble quail have the chance to avoid detection by running away from approaching headers unseen by the operators that were watching out for flushing (flying) birds and therefore would be missed and not counted.

Estimating the stubble quail population and hunting risk:

Data collected from hunters is important in help determine how many stubble quail are harvested across the state and at regional level. Due to seasons not being declared in 2020 and 2021, there has been a wasted opportunity to accumulate a larger data set. The state-wide

average harvest of stubble quail is approximately 5,091 birds based on hunters returns with an estimated 2,087 bagged from the Yorke Peninsula region (See Table 5).

Table 5: Estimating the total quail harvest on the Yorke Peninsula using data from hunters returns 2017-2019 (CHASA, 2020).

Year	Mean daily Bag	Permit Numbers	State-wide Hunter Days	Total Statewide Harvest	Proportion of YP only hunter days	Estimated total YP Harvest
2017	13.27	209	447	5,932	0.349	2,070
2018	9.52	190	528	5,064	0.40	2,025
2019	9.88	150	433	4,278	0.50	2,167
3-year Average	**10.89**	**183**	**469.33**	**5,091.33**	**0.42**	**2,087.33**

To get a clear picture and understand the actual risk posed by hunting to quail populations we can make projections of the estimated population of stubble quail at the agricultural district level. By using density estimates established by surveys, there is an estimated population between 6,201,992– 17,803,220 individuals ($\bar{x}$=12,0002,606; 95%CI)(See Table 6).

To achieve a sustainable harvest, the aim is to be under the maximum sustainable yield of the species. Brennan *et al* (2014) in their work with bobwhite quail suggests that harvest levels on quail should not be more than 20% of the total population. Presently, based on bag survey data and the mean regional densities below, the state-wide harvest of stubble quail in all identified agricultural areas indicates a harvest rate of approximately 0.04%. On the Yorke Peninsula alone, the region most visited by hunters, data indicates a harvest rate of approximately 0.23% (See Table 5&6).

Table 6: Estimate of stubble quail populations in 'Crops by District' using regional density estimates. Regions not surveyed have been excluded. Sub regions are calculated using total regions estimates (DPIR, 2021).

District	ha	@ Min Density	@ Max Density	@ Average Density
Western Eyre Peninsula	562,300	2,418,504	5,090,543	3,754,523
Lower Eyre Peninsula	325,400	1,399,575	2,945,870	2,172,722
Eastern Eyre Peninsula	472,400	2,031,836	4,276,671	3,154,254
Yorke Peninsula	529,800	300,046	1,464,470	882,258
Upper North	423,100	26,899	1,188,539	607,719
Mid North	436,200	27,732	1,225,338	626,535

Lower North	126,100	8,017	354,230	181,123
Lower Murray	139,300	45,516	163,056	104,286
Northern Murray Mallee	300,900	98,318	352,216	225,267
Southern Murray Mallee	255,800	83,582	299,424	191,503
Upper South East	219,800	145,375	357,150	251,263
Lower South East	68,000	44,975	110,492	77,733
Kangaroo Island	19,300	3,489	16,408	9,949
State Total	**3,878,400**	**6,201,992**	**17,803,220**	**12,002,606**

Conclusions:

Hunters are conservationists and they care for the quarry they seek. They want gamebirds to be around for them and future generations to come. It is not only important for wildlife managers to consider the sustainability of populations of the hunted species, but the social benefits for hunters themselves. This project is a culmination of many people wanting to tell the story that there are people out there that care enough about stubble quail to get the data required by the Minister to show that hunting does not risk stubble quail populations. This report provides evidence that stubble quail are widespread across many regions of South Australia and that their densities vary across the landscape but are still very significant in number.

For those that doubt the sustainability of hunting, this is another example that Australia's oldest land use is sustainable and through regulation and seasons there are opportunities to learn more about this species. The numbers speak for themselves, there are literally millions of stubble quail in farmers paddocks. Those wanting to enjoy the hunt with family and friends can bring home a prized game meat for a unique meal that will never have an impact on the species population.

This is a preliminary report for the purposes of providing data for the South Australian Duck and Quail Stakeholder meeting. Harvests across the state are ongoing and more survey data will be received in the coming weeks that will form the basis of more investigation and analysis. A final report will be prepared early next year to add to the information and assessment provided in this report.

Acknowledgements:

I acknowledge the assistance provided by various volunteers that include members of the Conservation and Hunting Alliance of South Australia (CHASA) and the many landholders that took the time to observe and count stubble quail during their harvest operations.

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ATTACHMENT 4

National Parks and Wildlife Act 1972

Open Season for the Taking of Specified Species of Protected Animals – Ducks

PURSUANT to Section 52 of the *National Parks and Wildlife Act 1972*, I, David Speirs, Minister for Environment and Water, being the Minister for the Crown to whom the administration of the *National Parks and Wildlife Act 1972* is for the time being committed, declare an Open Season for the taking of specified species of protected animals as set out in this notice.

1 Specified Species

The species to which the open season applies is limited to the following:

- grey teal (*Anas gracilis*)
- chestnut teal (*Anas castanea*)
- Pacific black duck (*Anas superciliosa*)
- Australian shelduck (mountain duck) (*Tadorna tadornoides*)
- maned (wood) duck (*Chenonetta jubata*)
- pink-eared duck (*Malacorhynchus membranaceus*)
- hardhead (*Aythya australis*).

2 Open Season Dates and Times

Subject to other provisions of this notice, the open season for the species identified in *Clause 1* is Saturday 19 March 2022 until Sunday 26 June 2022 inclusive, and the specified species of protected animal listed in *Clause 1* may only be taken in the period between 30 minutes prior to sunrise and 30 minutes after sunset on any given day of the open season.

Refer to *Clause* 6 for further restrictions to open season dates in Game Reserves.

3 Prohibition Against Taking Eggs

A person shall not take eggs of any species during the open season.

4 Bag Limit

On any day of the open season, a person shall not take more than 8 ducks made up of any combination of the following species:

- grey teal (*Anas gracilis*)
- chestnut teal (*Anas castanea*)
- Pacific black duck (*Anas superciliosa*)
- Australian shelduck (mountain duck) (*Tadorna tadornoides*)
- maned (wood) duck (*Chenonetta jubata*)
- pink-eared duck (*Malacorhynchus membranaceus*)
- hardhead (*Aythya australis*).

5 Area of the State

The open season in relation to the species of protected animal listed in *Clause 1* applies to the whole of South Australia, excluding:

- All reserves constituted under the *National Parks and Wildlife Act 1972*, other than those game reserves specified in *Clause 6* below; and
- All wilderness protection areas and all wilderness protection zones constituted under the *Wilderness Protection Act 1992*; and
- All sanctuary zones within any marine park established under the *Marine Parks Act 2007*.

ATTACHMENT 4

6 Open Season in Game Reserves

6.1 Subject to the further restrictions contained in this clause, open season (including *Clause 2, Clause 3 and Clause 4* restrictions) applies in relation to Chowilla Game Reserve, Moorook Game Reserve, Loch Luna Game Reserve, Currency Creek Game Reserve, Lake Robe Game Reserve, Mud Islands Game Reserve, Poocher Swamp Game Reserve, Bucks Lake Game Reserve and Tolderol Game Reserve.

6.2 Restrictions apply to the dates of the open season for Chowilla Game Reserve, Moorook Game Reserve and Loch Luna Game Reserve from those specified in *Clause 2*.

6.2.1 *Chowilla Game Reserve*

The specified species in *Clause 1* may only be taken in Chowilla Game Reserve between 30 minutes prior to sunrise and 30 minutes after sunset on the following specified open season dates:

- Saturday 19 March 2022
- Sunday 20 March 2022
- Saturday 26 March 2022
- Sunday 27 March 2022
- Saturday 2 April 2022
- Sunday 3 April 2022
- Saturday 7 May 2022
- Sunday 8 May 2022
- Saturday 14 May 2022
- Sunday 15 May 2022
- Saturday 4 June 2022
- Sunday 5 June 2022
- Saturday 18 June 2022
- Sunday 19 June 2022
- Saturday 25 June 2022
- Sunday 26 June 2022

6.2.2 *Moorook Game Reserve and Loch Luna Game Reserve*

The specified species in *Clause 1* may only be taken in Moorook Game Reserve and Loch Luna Game Reserve between 30 minutes prior to sunrise and 30 minutes after sunset on the following specified open season dates:

- Saturday 19 March 2022
- Sunday 20 March 2022
- Saturday 26 March 2022
- Sunday 27 March 2022
- Saturday 2 April 2022
- Sunday 3 April 2022
- Saturday 7 May 2022
- Sunday 8 May 2022
- Saturday 14 May 2022
- Sunday 15 May 2022
- Saturday 21 May 2022
- Sunday 22 May 2022
- Saturday 28 May 2022
- Sunday 29 May 2022

- Saturday 4 June 2022
- Sunday 5 June 2022
- Saturday 18 June 2022
- Sunday 19 June 2022
- Saturday 25 June 2022
- Sunday 26 June 2022

6.3 Area restrictions are imposed for the open season in relation to the specified species of protected animal listed in *Clause 1* in game reserves as follows:

6.3.1 *Chowilla Game Reserve*

The open season applies to the whole reserve, subject to the following exclusions:

a) For safety reasons, all of the area within a 500 metre radius centred upon the Chowilla Homestead, shearing shed, Lock 6 on the River Murray, the Chowilla Creek Regulator, Pipeclay Weir, Slaney Weir and Coombool Outstation (homestead) including any portion of creeks or waterbodies within 500 metres of these sites.

6.3.2 *Moorook Game Reserve*

The open season applies to the whole reserve, subject to the following exclusions:

a) The western boundary of Sections 474, 475 and 476, Hundred of Moorook, County of Albert, adjacent to the Kingston-Loxton Highway; and
b) An area of Wachtels Lagoon being the land and water contained within and bounded by a line commencing at E 442748, N 6210926, then south-easterly to E 443079, N 6210458, then south-easterly to E 443268, N 6209307, then westerly to E 442454, N 6209208, then north-easterly to E 441377, N 6209958, then north-easterly to the point of commencement.

All lines are geodesics based on the Geocentric Datum of Australia 1994 (GDA94).

6.3.3 *Loch Luna Game Reserve*

The open season applies to all creeks and associated backwaters of the reserve, subject to the following exclusions:

a) A 500 metre radius of any house or outbuilding, and within 300 metres of any road or bridge; and
b) For safety reasons, the open season does not apply to all of the area within 500 metres radius of the homestead of Section 706 McIntosh Division Hundred of Cobdogla Irrigation Area.

6.3.4 *Tolderol Game Reserve*

The open season applies to the whole reserve, subject to the following exclusions:

a) The area of Tolderol Game Reserve being the land and water west of a line commencing at E 332052, N 6084977, south to E 332014, N 6083738.

All lines are geodesics based on the Geocentric Datum of Australia 1994 (GDA94).

6.3.5 *Bucks Lake Game Reserve, Currency Creek Game Reserve, Lake Robe Game Reserve, Mud Islands Game Reserve and Poocher Swamp Game Reserve*

ATTACHMENT 4

The open season applies to the whole of each reserve.

Dated: January 2022

David Speirs, Minister for Environment and Water

ATTACHMENT 5

National Parks and Wildlife Act 1972

Open Season for the Taking of Specified Species of Protected Animals – Stubble Quail

PURSUANT to Section 52 of the *National Parks and Wildlife Act 1972*, I, David Speirs, Minister for Environment and Water, being the Minister for the Crown to whom the administration of the *National Parks and Wildlife Act 1972* is for the time being committed, declare an open season for the taking of stubble quail (*Coturnix pectoralis*) as set out in this notice.

1 Open Season Dates and Times

Subject to other provisions of this notice, the open season for the taking of stubble quail (*Coturnix pectoralis*) will start on Saturday 30 April 2022 and end on Sunday 31 July 2022 inclusive. Stubble quail may only be taken in the period between thirty (30) minutes prior to sunrise and thirty (30) minutes after sunset on any given day of the open season.

2 Prohibition Against Taking Eggs

A person shall not take eggs of any species during the open season.

3 Bag Limit

On any day of the open season, a person shall not take more than twenty (20) stubble quail (*Coturnix pectoralis*).

4 Area of the State

The open season in relation to stubble quail (*Coturnix pectoralis*) applies to the whole of South Australia excluding:

4.1. All reserves constituted under the *National Parks and Wildlife Act 1972*; and

4.2. All wilderness protection areas and all wilderness protection zones constituted under the *Wilderness Protection Act 1992*; and

4.3. All sanctuary zones within any marine park established under the *Marine Parks Act 2007*.

Dated: January 2022

David Speirs, Minister for Environment and Water

ATTACHMENT 6

NEWSPAPER ADVERTS

NB: There are 4 newspaper advert versions for each combination of declaration options

Option 1 – Open season declared for duck (8 bird bag) and quail (20 bird bag) – DEW Recommended

Option 3 – Open season for duck (8 bird bag) and closed for quail

Option 4 – Open season for quail (20 bird bag) and closed for duck

Option 4 – Closed season for duck and quail

ATTACHMENT 6

OPTION 1 – Open season declared for duck (8 bird bag) and quail (20 bird bag) – Recommended

2022 Duck and Quail Hunting Open Seasons

Pursuant to section 52 of the *National Parks and Wildlife Act 1972*, Hon David Speirs MP, Minister for Environment and Water, has declared open seasons for specified species of protected duck and quail.

Only the following protected duck species can be taken, subject to seasonal restrictions outlined below:

- grey teal (*Anas gracilis*)
- chestnut teal (*Anas castanea*)
- Pacific black duck (*Anas superciliosa*)
- Australian shelduck (mountain duck) (*Tadorna tadornoides*)
- maned (wood) duck (*Chenonetta jubata*)
- pink-eared duck (*Malacorhynchus membranaceus*)
- hardhead (*Aythya australis*)

Only the following protected quail species can be taken, subject to seasonal restrictions outlined below:

- stubble quail (*Coturnix pectoralis*)

No other species of protected duck or protected quail may be taken other than those specified above.

DUCK HUNTING OPEN SEASON DETAILS

Period – from thirty (30) minutes prior to sunrise on **Saturday 19 March 2022** to thirty (30) minutes after sunset on **Sunday 26 June 2022**.

Bag Limit – On any day of the open season, a person shall not take, have possession or control of more than eight (8) duck of the species listed above.

Area – the whole of the State, excluding all national parks, conservation parks, recreation parks and regional reserves constituted under the *National Parks and Wildlife Act 1972;* and all marine park sanctuary zones constituted under the *Marine Parks Act 2007*; and all wilderness protection areas and all wilderness protection zones constituted under the *Wilderness Protection Act 1992*.

Game Reserves that the open season applies to are Mud Islands Game Reserve, Currency Creek Game Reserve, Poocher Swamp Game Reserve, Lake Robe Game Reserve, Bucks Lake Game Reserve and parts of Tolderol Game Reserve, Chowilla Game Reserve, Moorook Game Reserve and Loch Luna Game Reserve.

Bool Lagoon Game Reserve is **closed** to hunters during the 2022 open season.

Tolderol, Moorook, Loch Luna and **Chowilla Game Reserves** are subject to further restrictions, as set out on the Department for Environment and Water website.

QUAIL HUNTING SEASON DETAILS

Period – from thirty (30) minutes prior to sunrise **Saturday 30 April 2022** to thirty (30) minutes after sunset on **Sunday 31 July 2022**.

Bag Limit – On any day of the open season, a person shall not take, have possession or control of more than twenty (20) stubble quail (*Coturnix pectoralis*).

ATTACHMENT 6

Area – the whole of the State, excluding all reserves constituted under the *National Parks and Wildlife Act 1972;* and all marine park sanctuary zones constituted under the *Marine Parks Act 2007*; and all wilderness protection areas and all wilderness protection zones constituted under the *Wilderness Protection Act 1992*.

GENERAL RESTRICTIONS

All hunters must comply with the requirements of the *Code of Practice for the Humane Destruction of Birds by Shooting in South Australia*.

A person must not take:

- protected duck between thirty (30) minutes after sunset on any one day of the open season and thirty (30) minutes prior to sunrise on the next day.
- protected quail between thirty (30) minutes after sunset on any one day of the open season and thirty (30) minutes prior to sunrise on the next day.
- protected duck or quail eggs.

PERMITS

A specified 'duck' or 'quail' open season permit is required to hunt duck or quail in South Australia. Duck hunters are required to pass the Waterfowl Identification Test to obtain a permit. For information on the test and permits please telephone the DEW Fauna Permits Unit (08) 8124 4972.

MORE INFORMATION

Further restrictions apply. Visit environment.sa.gov.au and search for 2022 duck and quail hunting season or contact your local National Parks and Wildlife Service Office.

(BANNER) www.environment.sa.gov.au

ATTACHMENT 6

OPTION 2 - Open season declared for duck (8 bird bag), closed season for quail

2022 Duck Hunting Open Season

Pursuant to section 52 of the *National Parks and Wildlife Act 1972*, Hon David Speirs MP, Minister for Environment and Water, has declared an open season for specified species of protected duck only.

Only the following protected duck species can be taken, subject to seasonal restrictions outlined below:

- grey teal (*Anas gracilis*)
- chestnut teal (*Anas castanea*)
- Pacific black duck (*Anas superciliosa*)
- Australian shelduck (mountain duck) (*Tadorna tadornoides*)
- maned (wood) duck (*Chenonetta jubata*)
- pink-eared duck (*Malacorhynchus membranaceus*)
- hardhead (*Aythya australis*)

No other species of protected duck may be taken other than those specified above.

DUCK HUNTING OPEN SEASON DETAILS

Period – from thirty (30) minutes prior to sunrise on **Saturday 19 March 2022** to thirty (30) minutes after sunset on **Sunday 26 June 2022**.

Bag Limit – On any day of the open season, a person shall not take, have possession or control of more than eight (8) duck of the species listed above.

Area – the whole of the State, excluding all national parks, conservation parks, recreation parks and regional reserves constituted under the *National Parks and Wildlife Act 1972;* and all marine park sanctuary zones constituted under the *Marine Parks Act 2007*; and all wilderness protection areas and all wilderness protection zones constituted under the *Wilderness Protection Act 1992*.

Game Reserves that the open season applies to are Mud Islands Game Reserve, Currency Creek Game Reserve, Poocher Swamp Game Reserve, Lake Robe Game Reserve, Bucks Lake Game Reserve and parts of Tolderol Game Reserve, Chowilla Game Reserve, Moorook Game Reserve and Loch Luna Game Reserve.

Bool Lagoon Game Reserve is **closed** to hunters during the 2022 open season.

Tolderol, Moorook, Loch Luna and **Chowilla Game Reserves** are subject to further restrictions, as set out on the Department for Environment and Water website.

GENERAL RESTRICTIONS

All hunters must comply with the requirements of the *Code of Practice for the Humane Destruction of Birds by Shooting in South Australia*.

A person must not take:

- protected duck between thirty (30) minutes after sunset on any one day of the open season and thirty (30) minutes prior to sunrise on the next day.
- protected duck eggs.

NO 2022 QUAIL HUNTING OPEN SEASON

No open season for protected quail has been declared for 2022.

PERMITS

ATTACHMENT 6

A specified ‘duck’ hunting open season permit is required to hunt duck in South Australia. Quail hunting permits will not be available in 2022 due to the closed hunting season. Duck hunters are required to pass the Waterfowl Identification Test to obtain a permit. For information on the test and permit please telephone the DEW Fauna Permits Unit (08) 8124 4972.

MORE INFORMATION

Further restrictions apply. Visit environment.sa.gov.au and search for 2022 duck and quail hunting season or contact your local National Parks and Wildlife Service Office.

(BANNER) www.environment.sa.gov.au

ATTACHMENT 6

OPTION 3 - Closed season for duck, open season declared for quail

2022 Quail Hunting Seasons

Pursuant to section 52 of the *National Parks and Wildlife Act 1972*, Hon David Speirs MP, Minister for Environment and Water, has declared an open season for specified species of protected quail only.

Only stubble quail (*Coturnix pectoralis*) can be taken, subject to seasonal restrictions outlined below.

QUAIL HUNTING SEASON DETAILS

Period – from thirty (30) minutes prior to sunrise **Saturday 30 April 2022** to thirty (30) minutes after sunset on **Sunday 31 July 2022**.

Bag Limit – On any day of the open season, a person shall not take, have possession or control of more than twenty (20) stubble quail (*Coturnix pectoralis*).

Area – the whole of the State, excluding all reserves constituted under the *National Parks and Wildlife Act 1972;* and all marine park sanctuary zones constituted under the *Marine Parks Act 2007*; and all wilderness protection areas and all wilderness protection zones constituted under the *Wilderness Protection Act 1992*.

GENERAL RESTRICTIONS

All hunters must comply with the requirements of the *Code of Practice for the Humane Destruction of Birds by Shooting in South Australia*.

A person must not take:

- protected quail between thirty (30) minutes after sunset on any one day of the open season and thirty (30) minutes prior to sunrise on the next day.
- protected quail eggs.

NO 2022 DUCK HUNTING OPEN SEASON

No open season for protected duck has been declared for 2022.

PERMITS

A specified ‘quail’ hunting open season permit is required to hunt quail in South Australia. Duck hunting permits will not be available in 2022 due to the closed hunting season. For information on quail hunting permits please telephone the DEW Fauna Permits Unit (08) 8124 4972.

MORE INFORMATION

Further restrictions apply. Visit environment.sa.gov.au and search for 2022 duck and quail hunting season or contact your local National Parks and Wildlife Service Office.

(BANNER) www.environment.sa.gov.au

ATTACHMENT 6

OPTION 4 - Closed season for duck and quail

No Duck and Quail Hunting Open Seasons in 2022

The Hon David Speirs MP, Minister for Environment and Water, has not declared open seasons for protected duck or protected quail in 2022 because of the current and forecast climate, and landscape conditions; and available biological data.

No species of protected duck or protected quail, or their eggs, may be taken pursuant to section 52 of the *National Parks and Wildlife Act 1972* in 2022.

MORE INFORMATION

Visit environment.sa.gov.au and search for 2022 duck and quail hunting season or contact your local National Parks and Wildlife Service Office.

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