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**Animals Australia's submission regarding  
Environmental and Population Conditions Relevant to Duck Shooting in Victoria 2022**

Dear Graeme,

Animals Australia appreciates the opportunity to comment on data and information available to stakeholders with respect to deliberations pertaining to a potential 2022 Victorian duck hunting season – including the Game Management Authority (GMA) document 'Considerations for the 2022 duck season' (hereafter, "**Considerations 2022**") and the recently developed Kingsford-Klaassen model<sup>1</sup> ("the KK model") that attempts to model past decision-making and continue that approach into the future.

As you are already aware, Animals Australia totally opposes recreational duck shooting and continues to urge the Victorian Government and relevant ministers to ban this inherently cruel and unnecessary practice on animal welfare and ethical grounds. Regardless of this enduring and well-based stance, we are participating in this consultation to ensure a detailed and fair analysis is provided of the **environmental** 'considerations' that the GMA and Ministers must base a judgment on prior to any duck shooting in 2022.

It is our strong view after assessing the documents provided to us in December 2021 that there should be **no duck shooting season permitted in 2022** based on the current environmental situation and waterbird population estimates. This submission outlines the dire situation facing our native waterbirds and we urge Ministers to ensure the unnecessary recreational shooting of these birds does not provide further risk to their long-term survival (in addition to the cruel impact on targeted birds).

As a preliminary and relevant matter, we have a number of serious concerns regarding the GMA's process for making recommendations to Ministers about the (previous) 2021 season. So far the timeline for consultation and submissions regarding the 2022 season seems very similar, so our criticisms of the previous process are pertinent to the current decision-making process.

### EXECUTIVE SUMMARY

- i. Documents released by the parliament in September 2021<sup>2</sup> provide insight into the decision process for the 2021 season. Key concerns are further detailed at Attachment A and include:
- The imposed timeline did not allow for effective consultation with stakeholders or DELWP, yet the proposed season was more than three months away.
  - A highly subjective "risk analysis" was prepared by GMA staff to influence the Board decision.

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<sup>1</sup> Professors Kingsford and Klaassen (29 November 2021) *Relationships among duck population indices and abiotic drivers to guide annual harvest management – Version 2, and subsequently* (23 December 2021) 'Using duck proxies and surface water to inform hunting arrangements' (published on the GMA website).

<sup>2</sup> Refer <https://www.parliament.vic.gov.au/assembly/tabled-documents/search-tabled-documents-database/details/3/10630>

These papers comprise Volume A and Volume B. Our references such as A32 indicate Volume A, page 32.

- The South Australian position (3 game species protected in 2021) was excluded from consideration.
  - Well-founded concerns for the sustainability of Hardhead Duck and Pink-eared Duck were ignored.
  - The bag limit was more than doubled on the basis of a trial helicopter survey that (according to candid comments from its architect) should not have been used for season bag limit settings.
  - The Ministerial briefing by GMA included the dubious claim that duck shooting brings huge economic benefits.
  - The Ministerial briefing mentioned social and health benefits for duck shooters but omitted the negative economic, social and health impacts for the vast majority of regional residents who do not participate in duck shooting but are forced to endure it for up to three months each year.
- ii. The Eastern Australia Waterbird Survey for 2021 conducted in October 2021 (hereafter “EAWS 2021”) has delivered stark and shocking waterbird population data for GMA, an agency tasked with promoting sustainability in game hunting. Despite extended La Nina conditions and record rains in some areas, game duck abundance estimates have plunged to the 3<sup>rd</sup> lowest on record (in four decades of surveys) and again breeding has been negligible. GMA continues to ignore Birdlife Australia’s request to set a baseline abundance for each species (that is, a target to be reached and maintained as a minimum for conservation). By every measure, the management of game ducks has failed to arrest their long-term decline.
- iii. The KK model has potential value as a broad “traffic light” system to guide season decision-making, as envisaged by the 2019 report<sup>3</sup> which suggested the model. For example, its 2022 prediction (a 4-bird bag) is useful for dampening shooter hopes that La Nina has guaranteed a full shooting season. But Kingsford and Klaassen acknowledge that the model is not prescriptive, has an (unspecified) margin of error, and should only be used as a guideline along with “due diligence”. **As game ducks have failed to recover despite La Nina rains, due diligence demands a season cancellation.** The KK model emulates old decision-making patterns rather than trying to reverse the serious long-term decline of duck species.
- iv. The Victorian helicopter survey, still in its trial phase and with its serious inadequacies recently exposed by the Kingsford-Prowse peer review<sup>4</sup>, has (similarly) released preliminary results that suggest **duck populations have not bounced back despite recent rains.** The preliminary report states that the increased population estimate (still subject to future revision) is “*mainly due to the inclusion of estimates for rivers/streams and sewage treatment ponds, which were not included in the pilot survey in 2020*”.<sup>5</sup> For the 2021 season, GMA relied on this trial helicopter survey to sanction the recreational killing of a quarter of a million ducks – the breeding stock so crucial for any chance of recovery. If COVID had not intervened, duck populations would be in an even more dire situation due to a longer and unwarranted killing season. In light of the critical issues raised by Kingsford-Prowse which point to multiple sources of error and likely over-estimation of population, **this experimental survey must not be used to sanction the killing of declining native duck species, further depleting limited breeding stock.** Further details are at Attachment B.
- v. The NSW Riverina helicopter survey report<sup>6</sup> (hereafter “the Riverina report”) has been selectively quoted to give an optimistic picture in *Considerations 2022*. The apparent “rebound” in 2021 has restored duck numbers to slightly below the 2016 level, but this should be seen in context. The 39-year results of the EAWS (p23 of *Considerations 2022*) show that game duck abundance across the eastern states reached its lowest level on record in 2016. In fact around half of the Riverina dams surveyed in 2021 were dry. While a killing target of 10% was set for three species (to mitigate alleged damage to

<sup>3</sup> Prowse, T., S. Briggs, R. Cooney, R. Kingsford, M. Klaassen, G. Webb, and P. Whitehead. 2019. *Waterfowl Adaptive Harvest Model: Expert Panel Review*. Report to the Department of Jobs, Precincts and Regions.

[https://djpr.vic.gov.au/\\_data/assets/pdf\\_file/0011/1992674/Waterfowl-AHM-Panel-Report-Final.pdf](https://djpr.vic.gov.au/_data/assets/pdf_file/0011/1992674/Waterfowl-AHM-Panel-Report-Final.pdf)

<sup>4</sup> Prof Richard Kingsford and Dr Thomas Prowse, Untitled review of the ARI helicopter survey of Victorian game birds, Sept 2021: [https://www.gma.vic.gov.au/\\_data/assets/pdf\\_file/0003/819282/Game-duck-review-Kingsford-Prowse.pdf](https://www.gma.vic.gov.au/_data/assets/pdf_file/0003/819282/Game-duck-review-Kingsford-Prowse.pdf)

<sup>5</sup> *Preliminary results from the 2021 survey of game ducks in Victoria*, Ramsey and Fanson, ARI, section 1.4 (the report has no page numbers): [https://www.gma.vic.gov.au/\\_data/assets/pdf\\_file/0004/821587/Preliminary-results-from-the-2021-survey-of-game-ducks-in-Victoria-FINAL.pdf](https://www.gma.vic.gov.au/_data/assets/pdf_file/0004/821587/Preliminary-results-from-the-2021-survey-of-game-ducks-in-Victoria-FINAL.pdf) Hereafter this will be referred to as “the preliminary report”.

<sup>6</sup> NSW Department of Primary Industries, *2020-2021 Annual Waterfowl Quota Report*

[https://www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0004/1288903/annual-waterfowl-quota-report-2020-21.pdf](https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/1288903/annual-waterfowl-quota-report-2020-21.pdf)

rice crops), the report found that the other five more vulnerable game species - Pink-eared Duck, Hardhead, Chestnut Teal, Blue-winged Shoveler, Mountain Duck – should only be targeted in extenuating circumstances<sup>7</sup>.

- vi. GMA continues to avoid consideration – or even a mention – of the clear reality of global warming which affects rainfall, temperature, evaporation and waterbird habitat. Without acknowledgement of climate science, GMA cannot plan for sustainability of waterbird species. Claims that game ducks are ‘resilient to harvesting’ are based on last-century studies using decades-old data, before climate change made its presence strongly felt in Australia. The Andrews government has committed to strong action on climate change, so this apparent “climate-denial” stance by GMA runs contrary to government policy.
- vii. GMA in its past considerations and recommendations continues to avoid the reality of changes in land use – the other key factor driving long-term decline in duck species. Human land utilisation and related intervention to increasingly divert floodwaters to irrigation has depleted the habitat needed for waterbird breeding. The traditional link between rainfall/runoff and breeding has been disrupted.
- viii. GMA in its ‘Considerations’ document makes much of possible wetter conditions in the next few months. However, even if flooding were to eventuate, and even if late breeding were to occur, a shooting season is contrary to the claims of the Regulatory Impact Statement (RIS) 2012 that underpins the current hunting regime. The RIS states that duck shooting is “humane” because shooting seasons are timed to avoid breeding and moulting periods when ducks are highly vulnerable (p29). It would also be contrary to s6(e)(ii) of the GMA Act 2014 (hereafter “the Act”).
- ix. Legal issues: We continue to hold grave concerns regarding GMA’s compliance with its “responsibility and sustainability” mandate (s5 of the Act) and sections 6 and 8A of the Act. **We also question the legal basis on which duck shooting is permitted on areas other than the 200 State Game Reserves and the additional 41 wetlands listed in the Wildlife (Game) Regulations 2012 (hereafter “the Regulations”).**
- x. **We recommend a complete cancellation of the 2022 season on environmental grounds.** The sustained long-term decline of our game duck species – despite a La Nina cycle - will only be exacerbated by the shooting of breeding stock and the demise of late-bred ducklings. Given the impact of climate change on our natural environment (including wildlife species), it is of concern that GMA has not included any environmental groups in its stakeholder consultation. Last season, the advice from Birdlife Australia and the state’s Environment Department (DELWP) was ignored.

## 1 SUSTAINABILITY

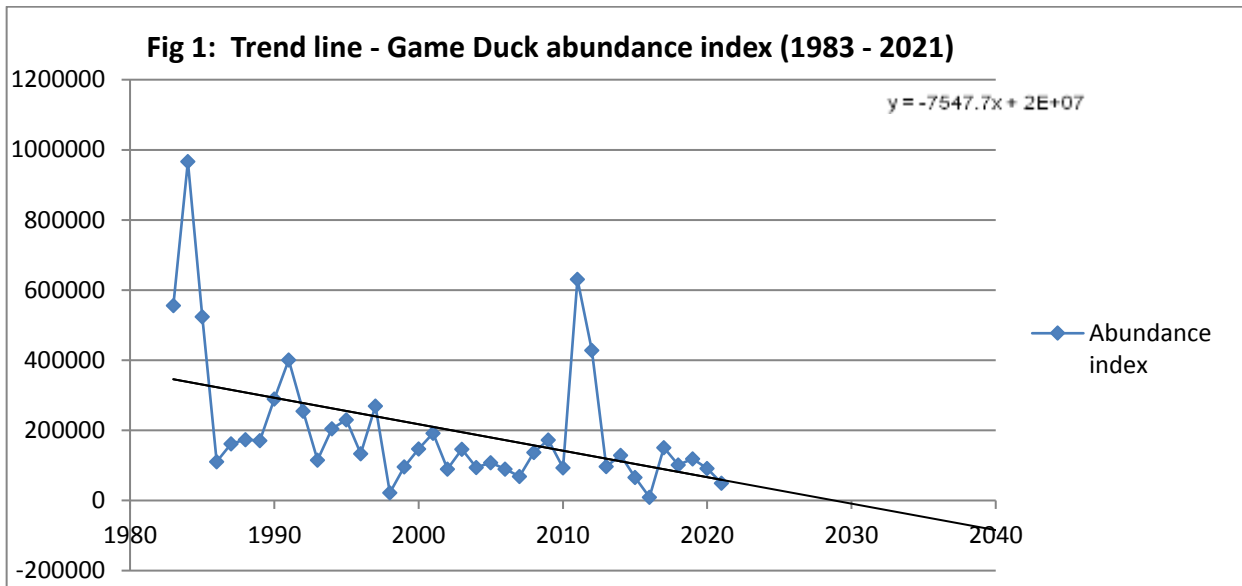
### 1.1 2021 AERIAL SURVEY of WETLAND BIRDS in EASTERN AUSTRALIA: DATA

The results of EAWS 2021 show that game duck abundance in 2021 is less than half (only 42%) that of 2020, which in turn was almost a quarter (23%) down on 2019, a year of record drought. **These shocking, successive, drops in abundance - despite welcome rain - should be sufficient to cancel any 2022 shooting season.** Breeding has failed to produce the bounce-back experienced when the Millennium Drought broke. *Considerations 2022* found most of the breeding was for non-game species; only 4 broods of game ducks were observed<sup>8</sup> in a survey covering one-third of the continent.

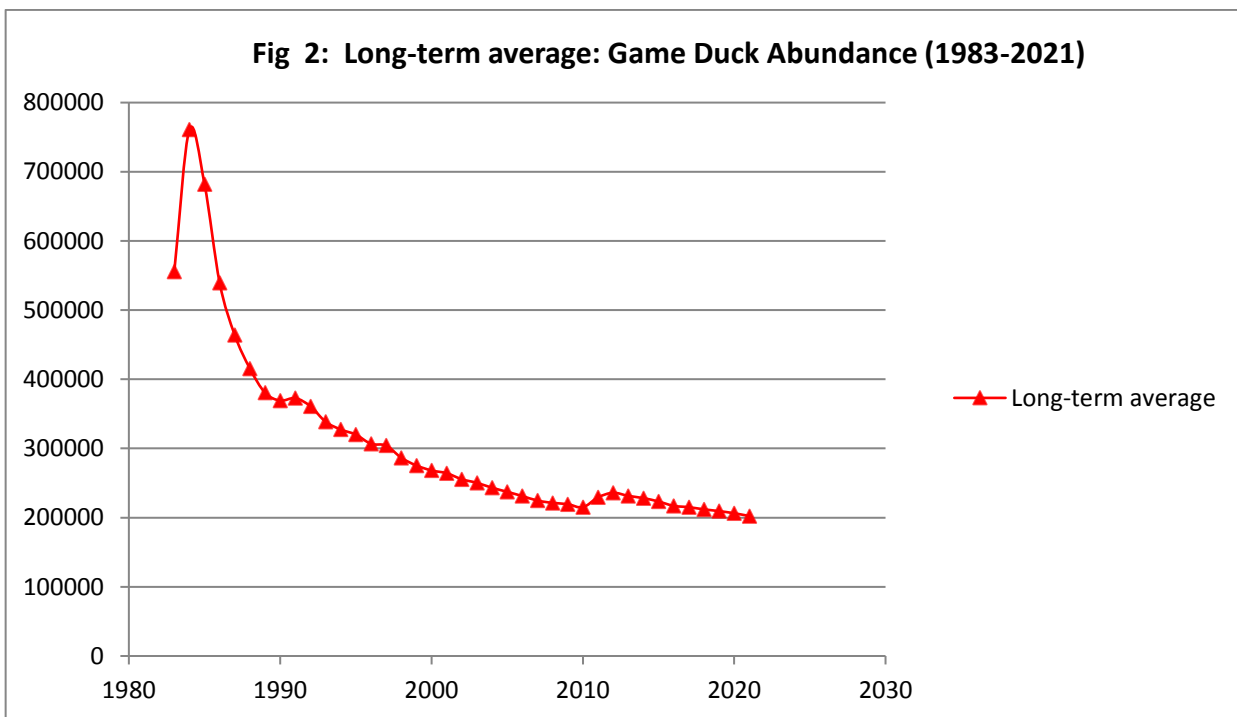
The EAWS 2021 confirmed that the four major indices for waterbirds (total abundance, breeding index, number of species breeding and wetland area index) continue to show significant declines over time. The EAWS summary report states that long term trends are more important for predicting population status than year to year fluctuations. Hence the graph below should ring alarm bells, with **the trend line showing likely extinction before 2030**, and possibly sooner as small populations are highly vulnerable to “shock” events such as disease and extreme weather (drought, heatwaves and violent storms).

<sup>7</sup> As the diet of some game duck species does not include rice crops, it is unclear why they would ever be targeted.

<sup>8</sup> Private communication, Daniel Taneski, GMA, 23 Dec 2021.



The game duck abundance index (49,704) is only a quarter of the long-term average – see the graph below. The long-term average itself is a misleading benchmark for sustainability in that it continues to decline over the 39 years of EAWS data because abundance is declining. The graph shows that the 2013 temporary blip from the end of the millennium drought has now dissipated.



EAWS 2021 reported that all game species abundances “were well below long term averages, in some cases by an order of magnitude”. The critical significance of this statement may be lost on those unfamiliar with scientific language and we note that GMA omitted it from the *Considerations* document. However, a drop by an order of magnitude indicates a 90% decrease. A change “by an order of magnitude” is scientific terminology to describe a change by a factor of ten (such as from 1000 to 100).

Six out of eight species continue to show significant long-term declines<sup>9</sup>. **Half (48%) of the wetlands surveyed had no waterbirds.**

Wetland area index was still well below the long-term average – less than two-thirds (61%) of that misleading benchmark. Like the long-term average for game duck abundance, the long-term average for the wetland area index has declined over time as shrinking values exert downward pressure on the average. Refer EAWS 2021, Fig 4 below:

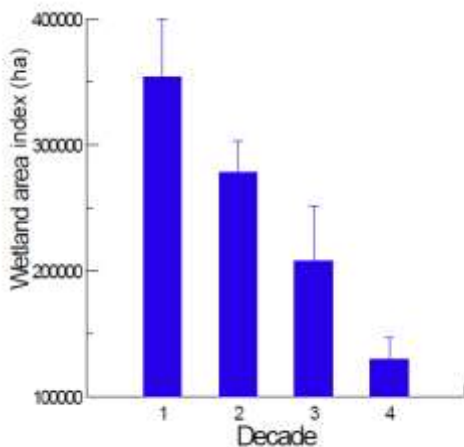


Fig 3: Reproduced from EAWS 2021

With such a dramatic and progressive shrinkage in wetland habitat, it is remarkable that GMA continues to ignore the key factors driving this decline, and the associated long-term decline in game duck abundance.

**On p33 of *Considerations 2022* GMA discusses “current climate drivers”. The inexplicable omission of global warming points to an unacceptable ‘climate-denialist mindset’.** This is contrary to the Andrews government’s acceptance of the reality of climate change and commitment to strong action to respond to it. GMA’s consistent failure to acknowledge mainstream climate science and its application to waterbird management is contrary to GMA’s obligations in s8A(d) to have regard to “*the principle of an evidence-based approach, which means considering the best available information when making decisions*”. This obligation is escalated now that available evidence strongly indicates population decline.

Despite repeated requests from Birdlife Australia and animal welfare groups, GMA has never adopted a precautionary approach to ensure continuing abundance of duck populations; its focus is instead on continuing shooting seasons – a very different aim. Its current policy of allowing the killing of 10% of an estimate of all game ducks in Victoria ensures that no season will ever be cancelled, until there are virtually no ducks left. But the following trend map shows why an acknowledgement of human-induced climate change would necessarily lead to a precautionary approach, given that rainfall trends are reducing waterbird habitat over the long-term:

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<sup>9</sup> There is an apparent typographical error in the EAWS 2021 report, p8, Table 3: with a p-value of 0.042, the Trend for Chestnut Teal should show as “decline”. This is in accord with the text (p3) which states six of the eight game species continue to show long-term decline.

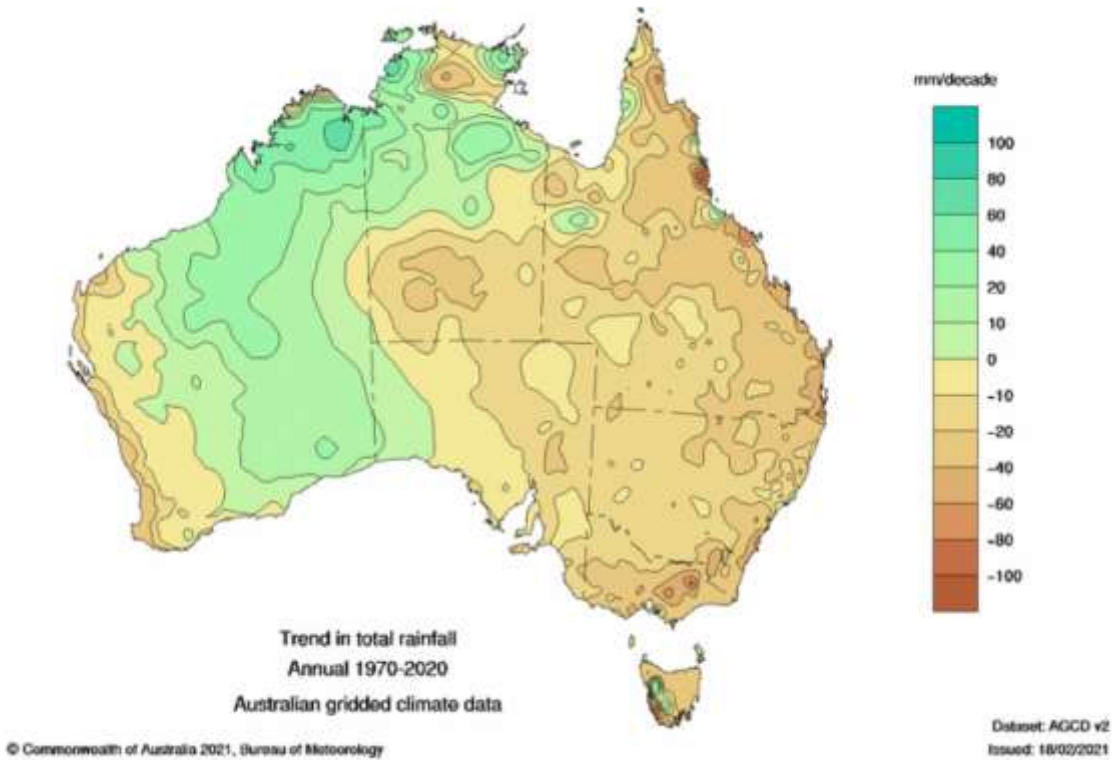


Fig 4

In the various regions of Victoria, this government data shows the decrease over the past 50 years in annual rainfall has been from 1 to 8 cm per decade – an astonishing loss of at least 4cm and at worst 32cm since Kingsford’s aerial surveys began. It is little wonder the game duck populations are struggling. Rather than face this serious decline in conditions for waterbirds, *Considerations 2022* focuses on the recent La Nina cycle which has brought wetter conditions in the relative short-term.

However multi-year rainfall deficiencies from the 2017-2019 drought still remain over significant parts of the surveyed area as shown by this map (*Considerations 2022*, p7):

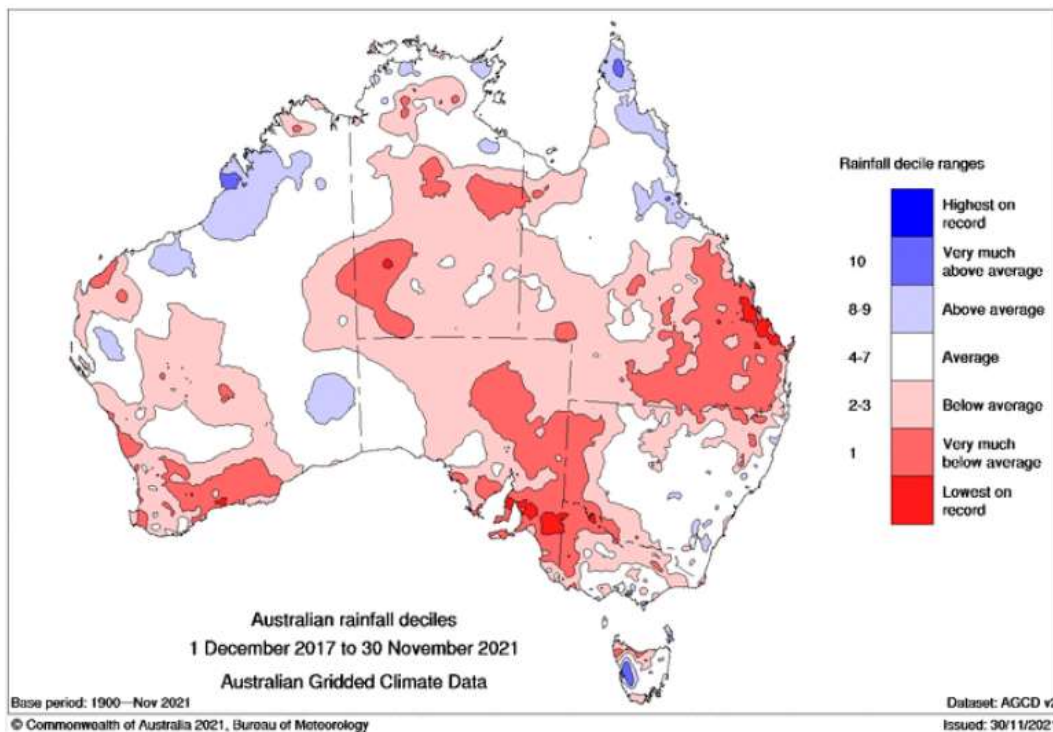


Fig 5

## 1.2 FURTHER COMMENTS ON THE *CONSIDERATIONS 2022* DOCUMENT

### 1.2.1 Victoria – vulnerable species

On p22 of *Considerations 2022* there is a graph showing that game duck abundance has plummeted in Band 2 (northern Victoria) compared with the previous (very poor) year. GMA failed to note the damning evidence that the 2020 game duck index for Band 2 was in turn less than half that of the previous year<sup>10</sup>.

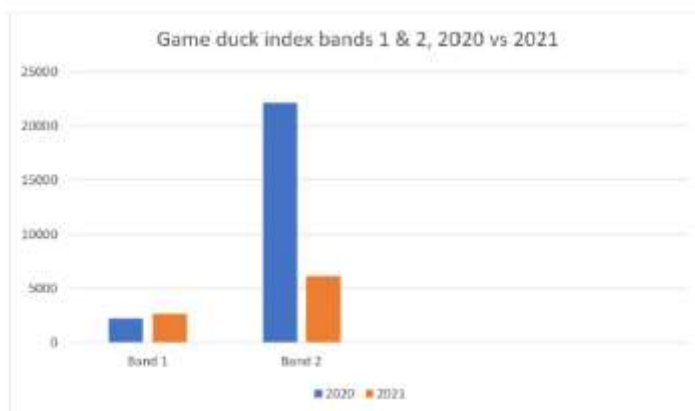


Fig 6

But the raw data (not published) is even more dire<sup>11</sup>: For EAWS 2021, Bands 1 and 2 combined reported seeing only 4 Blue-winged Shovelers, 54 Chestnut Teal and 14 Hardhead.

It is pertinent to quote from *Considerations 2022* (p3):

*Hunting during periods when there is little recruitment (e.g. dry periods) removes breeding adults which can negatively affect subsequent recruitment and further drive declines in hunted species (Kingsford et al.2017).*

and from p5:

*... northern and western Victoria and south-eastern SA ... received below to very much below average rainfall [in 2021].*

and from p7:

*Further periods of above average rainfall are needed to continue drought recovery, especially in parts of QLD, South Australia, far west NSW and large parts of Victoria, particularly in the north west. [emphasis added]*

### 1.2.2 – The Victorian helicopter survey

In *Considerations 2022* (p25), the second Victorian helicopter survey (Oct - Nov 2021) is quoted as finding a 20% increase in duck population to 2.94m. However the preliminary report by ARI's Ramsey and Fanson<sup>12</sup> states clearly that the increased estimate is "*mainly due to the inclusion of estimates for rivers/streams and sewage treatment ponds, which were not included in the pilot survey in 2020*" and these estimates are "*of a preliminary nature only and may be subject to revision in the final report*".

In documents released by the parliament this year<sup>13</sup> it is clear that the GMA Chairman encouraged Dr Ramsey to produce preliminary results (for use in 2021 season settings) from the original helicopter

<sup>10</sup> Source: comparison of relevant years of GMA's "*Considerations*" documents.

<sup>11</sup> Taneski, GMA, op. cit.

<sup>12</sup> Op.cit.

<sup>13</sup> Op. cit.

survey before ARI had confidence in its findings.<sup>14</sup> That first (Nov 2020) helicopter survey suffered from a number of serious data problems, including critical problems with calibration of satellite imagery that underpinned the entire survey. The methodology was based on duck counts from a stratified sample of waterbodies, then extrapolation to the total number of waterbodies (of each size category) across the state. Errors in estimating the number and current levels of waterbodies of each size category would seriously impact the results of the survey.

In 1.3.1 of the preliminary report for the second helicopter survey, the authors note the “classification accuracy” for satellite is 79% for dams, 92% for wetlands and 77% for streams. In other words, there is still considerable uncertainty about the number of wetlands of each size and type, and thus considerable uncertainty in the results.

But even accepting the results at face value, the 95% confidence intervals show that the “increase” could be spurious because these intervals are broad and overlap:

- In Nov 2020 the 95% confidence estimate for total game ducks was 1.84m – 3.27m.
- In Oct/Nov 2021 the 95% confidence estimate for total game ducks was 2.41m – 3.58m.

The preliminary report acknowledges (Table 3) that it is unable to reliably estimate numbers of five game species - Mountain Duck, Chestnut Teal, Hardhead, Pink-eared Duck and Blue-winged Shoveler. For the 2021 season, GMA seized upon the experimental estimate for total game duck population (2.45m) and increased the bag from 2 to 5 birds, ignoring protection for these vulnerable species (other than Blue-winged Shoveler). Note that the NSW helicopter survey report this year also identified the same five species as being vulnerable.

It is dangerous for non-statisticians to apply statistical results without an appropriate understanding of their limitations. The information in *Considerations 2022* (p25) will likely be seized upon once again by pro-shooting staff and stakeholders as evidence for a shooting season that will further reduce the prospects of species recovery from long-term decline.

The second Victorian helicopter survey remains a “snapshot” rather than a reliable benchmark. In no way is it a substitute for the long-running EAWS, which is a reliable indicator of trends rather than a population count. The ARI scientists have not yet revealed the actual number of each species that were physically counted in this latest helicopter survey, and their report will not be ready for some months to come. Hence there is little transparency in this trial process.

**Importantly, the Kingsford-Prowse peer review<sup>15</sup> of this ARI helicopter survey raises serious concerns about the accuracy of its results and identifies factors likely leading to inflated estimates (refer our Attachment B).**

### 1.2.3 The NSW helicopter survey over the Riverina

In *Considerations 2022* (p26), the Riverina report<sup>16</sup> is presented as evidence of a strong bounce-back for game ducks. The apparent “rebound” in 2021 has restored duck numbers to slightly below the 2016 level, but this should be seen in context. The 39-year results of the EAWS (p23 of *Considerations 2022*) show that game duck abundance across the eastern states reached its lowest level on record in 2016. In fact around half of the Riverina dams and channels surveyed in 2021 were dry (Riverina report, p19) and “many of the large waterbodies in the Riverina were dry or had very little water” (p18). Pink-eared Ducks “were only seen in low numbers” (p19). While a killing quota of 10% was set for the three more dominant species (to mitigate alleged damage to rice crops), the report recommended that the other five more vulnerable species - Pink-eared Duck, Hardhead, Chestnut Teal, Blue-winged Shoveler, Mountain Duck - only be targeted in extenuating circumstances (pp22-24)<sup>17</sup>.

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<sup>14</sup> See for example A1255 in these documents.

<sup>15</sup> Op. cit.

<sup>16</sup> Op cit.

<sup>17</sup> As the diet of some game duck species does not include rice crops, it is unclear why they would ever be targeted.



#### 1.2.4. Other concerns

Every year in its *Considerations* document, GMA omits the highly relevant data for game duck species breeding. Instead, GMA includes the breeding data for “all waterbirds” – which masks the desperate state of game duck breeding. In 2021 EAWS found only four broods of game ducks. Most (83%) of the observed breeding comprised ibis.

Every year, GMA confuses the picture for game ducks (the only relevant issue) by including statistics and graphs for “all waterbirds” – refer *Considerations 2022*, pages 20, 27, 28 and 29.

As in the past, *Considerations 2022* included distractions from the key issues. Three pages devoted to Australian water storage levels have little relevance to most game ducks. Shooters will no doubt exaggerate the significance of recent flooding events, but floodwater does not equate to ducks.

In its January 2021 submission to the GMA<sup>18</sup>, Birdlife Australia drew attention to recent research about flooding and duck breeding:

*Consistently low wetland ... index results suggest that water which would have historically flowed over floodplains, providing critical episodic breeding opportunities for waterbirds, is now being increasingly diverted into dams and irrigation or lost from the system via other mechanisms (Wentworth Group 2020<sup>19</sup>). Where flooding did occur in the Murray Darling Basin and waterbirds congregated ... flood events were smaller and shorter. This reduced hydroperiod<sup>20</sup> and lower water quality from reduction in water level and flow, limits sites used by waterbirds. In dryland wetlands these factors may reduce chick survivorship as they cannot metabolize saline water, which makes suitable freshwater conditions a limiting resource (Haig et al 2019<sup>21</sup>).*

A number of pages in *Considerations 2022* (and the final point at the end)<sup>22</sup> are devoted to optimism regarding further rainfall and risk of flooding in the first quarter of 2022.

**If floods do result in some late breeding, then it would be inhumane to shoot during the breeding season while offspring are immature. The 2012 Regulatory Impact Statement (RIS) for the Regulations (p29) claimed that duck shooting is humane because it is timed to avoid the vulnerable times of breeding and subsequent moult.**

Here is one Victorian farmer’s eye-witness account of the cruelty and destruction inflicted on duck broods during the shooting season:

*As I write there are many baby ducklings without mothers that now have to fend for themselves. The poor things are only golf ball size. Their mother’s shot dead while some are still injured and will die over the next few days.*

We intend to highlight the contradiction between the RIS – on which the current hunting regime is based – and GMA’s apparent support for a shooting season while late breeding is in progress. Currently wetlands can be closed when threatened species are present. **We are firmly of the view that the 2022 shooting season should be cancelled due to the continuing decline in waterbird abundance. However if a shooting season goes ahead, we will request that wetlands be closed to shooting if game ducks are observed breeding there.**

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<sup>18</sup> Available from GMA website: [https://www.gma.vic.gov.au/\\_data/assets/pdf\\_file/0003/621435/BirdLife-Australia-2021-Duck-season-considerations-submission.pdf](https://www.gma.vic.gov.au/_data/assets/pdf_file/0003/621435/BirdLife-Australia-2021-Duck-season-considerations-submission.pdf)

<sup>19</sup> Wentworth Group of Concerned Scientists (2020) *Assessment of river flows in the Murray-Darling Basin: Observed versus expected flows under the Basin Plan 2012- 2019*, Sydney.

<sup>20</sup> The length of time and portion of the year the wetland holds water.

<sup>21</sup> Haig, S.M., Murphy, S.P., Matthews, J.H. et al. (2019). *Climate-Altered Wetlands*

<sup>22</sup> See pages 33, 34, 36 and 43.

<b>1.3</b>	<b>The KK model [the Kingsford-Klaassen Model]</b>
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### 1.3.1 Technical concerns with the KK model

The KK model has been developed as an “interim” measure pending further development of Adaptive Harvest Modelling/Management (AHM). It was proposed by an expert panel in 2019 paper as a potential “traffic light” system.

Here we refer to two very recent papers by Professors Kingsford and Klaassen (“the authors”). On 29 November 2021 they published *Relationships among duck population indices and abiotic drivers to guide annual harvest management – Version 2* (hereafter “the Guide”) and on 23 December 2021 the GMA website posted a link to the authors’ *Using duck proxies and surface water to inform hunting arrangements* (hereafter “the Final”).

Comparison of these two papers produced less than a month apart shows that the model has been adjusted so that the suggested daily bag changed up or down by one bird, for three of the seven seasons which GMA has led (2015-2021 inclusive). These adjustments have enabled the model to replicate the actual GMA decisions for the controversial seasons of 2020 and 2021 (and as such introduces a question of credibility or influence). While a change of one bird (per shooter per day) may seem modest, it potentially results in a 50% increase in the number of game ducks destroyed (e.g. for the 2020 season the model’s prediction changed from a 2-bird bag to a 3-bird bag). The implications for sustainability are serious. This warns against relying on the model as anything more than a guide.

At the end of the Guide (pp20-32) there is a useful tabulation of issues raised by stakeholder consultation, and the authors’ responses. The authors “*stress this [the KK model] is a tool to inform decision making. It should not be used to set hunting arrangements without due diligence.*”

We agree that the KK model can provide general guidance, potentially as a “traffic light” system. For example, across the period of GMA season management 2015-2021, the model consistently suggests that GMA has been too generous to shooters and at the ‘expense’ of the waterbirds/populations in deciding the daily bag size. For the five years 2015-2019 inclusive, the GMA bag limit is at least DOUBLE that predicted by the KK model. (e.g. in 2017 and 2018 the GMA allowed a full 10-bird bag whereas the model suggested bags of 4 and 5 respectively.)

For the 2022 season, the KK model suggests a 4-bird bag (compared with the standard 10), which should inject a note of realism for the shooters expecting a full season due to La Nina conditions. However we believe that 4-bag limit is too high and should not be implemented for the following reasons:

- The KK model aims to continue the decision-making patterns of the past which have contributed to the serious ongoing decline in game duck abundance. The authors explain (Guide, p24) that the critical elements of the model (e.g. the brackets or cut-off points for indices, and the aggregated points score system or aPS) are “somewhat arbitrary” but have been set to produce “outcomes that are by and large comparable with decisions for hunting arrangements **made in previous years.**” That is a damning admission. The KK model is thereby committed to continuing the environmentally destructive game management policies of the past that contributed to the long-term decline of game duck species. ‘Sustainability’ in the current circumstances demands a precautionary approach.
- As discussed already in this submission, environmental conditions for game ducks have been adversely driven in recent decades by climate change/global warming and water diversion schemes for irrigation. The KK model attempts to mimic the policies from a thirty-year period (1991-2021) when environmental resilience was generally very different from today’s situation.

In 2017 Ramsey et al reported on AHM practices around the world and found that such modelling fails to cater for long-term structural changes such as climate change and changes in land use.<sup>23</sup>

- The KK model does not perform well in dry conditions: it has never predicted a season cancellation - not even in the depths of the Millennium Drought (2007).
- The graph comparing actual bag limits and predicted bag limits (Fig 5, p15 of the Guide) shows that the KK model predicts bags that are too generous in poor years and too low in “good” years, when compared with past practice.<sup>24</sup> Reliance on this model is thus environmentally irresponsible, putting species at risk when they are under most duress in adverse conditions. The authors have countered this criticism (Guide, pp28-29) by shifting an axis line on the graph (Fig 5). However it is clear that for poor seasons (e.g. actual season bag of 3 or less), the points are mostly above the red line, showing the KK model tends to predict a more generous bag in dry periods.
- Comparison of the box-plots in the Guide (p13) and the Final (no page numbers included) shows that the KK model in the Final form is even less reliable than in the Guide. The box plot in the Final shows that two of the indices (iPGame and iNSWC) produce REVERSE outcomes for “cancelled” (0-bag, shown in red) and “restricted” seasons (2-7 bag, shown in green). These are two of the five indices that each deliver aPS scores to suggest 0,1 or 2 birds in the daily bag; the final total delivered by the five indices is thus a bag between 0 and 10 birds a day. **It is concerning that two of the four birds proposed for the 2022 daily bag are derived from these two deeply flawed indices.** iPGame delivered a score of 0.66 (worth one aPS point) and iNSWC delivered a score of 0.62 (worth one aPS point). Ignoring those two spurious results, leaves a predicted bag of 2. Given that the KK model over-predicts for dry conditions (see previous point) a 2022 season cancellation is entirely consistent with the limitations of this model. Note that the Final boxplot shows even the iMedian (presumably taking all five indices into account) cannot reliably distinguish between a season cancellation (red box) and a season restriction (green box). We indicate our concern that the authors may have produced a hurried result before they checked its reliability. We suggest this as there is clear evidence (see our Attachment A) that ARI scientists were pressured by GMA to produce results prematurely for the 2021 season.
- In the Guide, p28, the authors respond to a stakeholder concern that the KK model is not a good fit for the data, given that the scatterplots suggest very weak positive relationships, with many points outside the confidence intervals. They say: “These are in fact very strong relationships for ecological studies”. The fact that other ecological studies also have poor fits for their models, is probably a reflection of the fact that the natural environment is complex and not easily modelled or predicted. Clearly the GMA must not simply rely on the KK model (in its recommendations) to absolve itself from its mandate of sustainability and responsibility.
- The KK model does not address the important issue we raised in consultation, namely that in dry periods, a much-reduced bag has sometimes been combined with a drastically shortened season (e.g. 2021) when GMA or government opts for a minimal season rather than cancellation.
- We are very concerned that there seems to be a tacit acceptance that season length should never be reduced because small changes in season length apparently have little impact on overall cull or hunter participation. However the authors acknowledge (Guide, pp26-27) that shortening the season length remains a valid management option: “To be effective, season length will have to be drastically modulated.” They agree with our stakeholder feedback that enforcement is easier in a shorter season (shooting is clearly audible outside the season), as opposed to trying to monitor bags at so many disparate locations around the state over an extended period.

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<sup>23</sup> *Towards the implementation of adaptive harvest management of waterfowl in south-eastern Australia*, Ramsey et al, ARI, December 2017, pp 5-6. [https://www.gma.vic.gov.au/\\_data/assets/pdf\\_file/0020/504434/Adaptive-Harvest-Review\\_2017.pdf](https://www.gma.vic.gov.au/_data/assets/pdf_file/0020/504434/Adaptive-Harvest-Review_2017.pdf)

<sup>24</sup> *The Final seems to have been prepared in such a rush that there are no page numbers and no identifying numbers on the various tables and graphs. However there is a graph plotting “predicted” against “observed” and this shows a similar pattern.*

- There is a corollary to the argument that modest changes to season length have little impact on hunters or total kill numbers. Given so many non-shooters live in regional Victoria, a shorter season would be less disruptive to their lives and livelihoods, and to the tourism industry, yet shooters would not experience any negative impacts. Historical data from 1952 onwards (source: GMA website) shows that duck shooting seasons used to be much shorter at 8 or 9 weeks, compared with the current default length of 12.5 weeks. There is ample scope to reduce the season length out of consideration for non-shooters in the regions (refer s8A (c) of the Act re the principle of equity). Under dire environmental conditions, seasons **should be cancelled** - but if the GMA and government lack the political courage to fully protect waterbirds from further decimation, then both bag size and season length should be severely restricted, regardless of inevitable protests from the hunting fraternity.

### 1.3.2 Fundamental concern with the rationale of the KK model

#### **There is a fundamental question: Does hunting contribute to long-term decline of duck populations?**

On 11 January 2021, the GMA Board met to determine recommendations for the 2021 season settings. The GMA briefing to the Board (see B20) claimed: “While there is no evidence that duck hunting has caused the long-term decline of game duck species in Australia, harvesting during protracted periods of vulnerability, such as low population abundance, concentration onto limited habitat and reduced breeding, can have short to medium-term impacts.” **This statement is grossly misleading. There are long-term impacts of shooting the ducks when they are declining.** Long-term decline is clearly shown by the four decades of EAWS surveys. This decline is driven by climate change and irrigation competition for environmental water, and exacerbated by the annual killing of breeding stock and their offspring. The “bounce-back” in good years has become more muted or (as now) non-existent<sup>25</sup>.

Contrary to the claim put to the GMA Board, **there is no evidence that duck hunting has NOT contributed to the long-term decline of game duck species in Australia.**

**But this misleading claim put to the Board is central to the GMA decision to commission the KK model which clearly aims to replicate past patterns of decision-making for duck season settings**<sup>26</sup>.

GMA’s annual *Considerations* documents previously referred to a Year 2000 report<sup>27</sup> from Kingsford et al, as evidence that duck shooting had no impact on duck populations. That report was based on studies from decades-old data, some from the mid-20<sup>th</sup> century, before the major threats to waterbirds – climate change and changes to land use (drainage of swamps and extension of irrigation schemes) – had a major impact.

But it is helpful to refer to another document from last century to gain some perspective on this claim. The Australian Museum drew on information and expertise from around the nation to compile *The Waterbirds of Australia* in 1985 (hereafter “*Waterbirds*”). Even without awareness of incipient global warming (which pushes ducks even closer to the brink), *Waterbirds* foreshadowed the changes that now threaten the sustainability of duck species and the future of duck shooting:

- (p172): Although the Pacific Black Duck was very heavily shot, there was no evidence that total numbers were affected by shooting... “*But the Black Duck, like all Australian ducks, is also threatened by the continuing drainage of swamps and wetlands which it needs to breed and by the control of rivers to prevent floods... these factors could quite easily reduce the numbers to a point where the species could no longer stand the toll taken by shooting.*”

<sup>25</sup> <https://www.smh.com.au/environment/tennis-ball-bounce-record-low-bird-numbers-highlight-water-system-woes-20161216-gtcgyn.html>

<sup>26</sup> See the Guide, p30: “The model indeed extrapolates past decisions into the future, assuming that past decision on hunting arrangements were (at least on average) correct.” Also the “somewhat arbitrary” cut-off points for the indices were set to achieve this (p24).

<sup>27</sup> Kingsford, Webb and Fullagar, *Scientific panel review of open season for waterfowl in New South Wales*, NSW National Parks and Wildlife Service, 2000.

- Chestnut Teal (p185): *“As the total number of wild ducks in Australia decreases with the continuing drainage of swamps, increasing pressure will be put on this species. There are grave doubts whether it is sufficiently numerous or resilient to stand such pressure and it may have to be protected in future.”*
- Pink-eared Duck (p196): *“At times it is one of the rarer species in Australia and there seems little justification for keeping it on the list of legal gamebirds.”*
- Hardhead Duck (p200): *“A survey of the species in Victoria, where they do not breed, showed that the mortality rate ... is slightly higher and the life expectancy slightly lower than for Grey Teal and Black Duck [the two most commonly shot birds]. Most of the birds recovered had been shot. In his own classic study of Australian waterfowl H.J. Frith<sup>28</sup> concluded that there must be ‘serious doubts for its survival as a common species.’”*

#### 1.4 Legal issues for GMA

While earlier governments and regulators did cancel duck shooting at times of severe drought, the GMA and the current Andrews government have never supported the cancellation of a season. Given the constant and severe decline in game duck abundance, this approach is at odds with the GMA’s mandate (s5(a) of the Act).

Despite falling duck abundance, GMA set a 2021 “harvest” goal of 245,000 ducks in a short season with a 5-bird bag (having earlier announced a 2-birds/day bag<sup>29</sup>). Due to the pandemic, the season was further truncated and shooters were not keen to participate. The killing of ducks was reduced to a (self-reported) estimate of 52,456. The impact on the desperately low numbers of ducks in Victoria was estimated to be only one-sixth of the previous annual average death count. Yet despite that partial reprieve, and La Nina conditions, game duck numbers in EAWS 2021 were 58% down on EAWS 2020, which in turn had been down almost a quarter (23%) compared with EAWS in 2019 (a year of record drought). **If GMA’s advice had been fully implemented for the 2021 season, the outcome for game ducks would have been even worse.**

GMA’s advice to Minister Thomas for the 2021 season<sup>30</sup> backed its recommendation by saying that the modified season *“allows duck populations to recover when environmental conditions improve.”* Clearly that advice was both misleading and ultimately incorrect.

It is important to note also that s5(a) of the GMA Act does not refer to “sustainability of game species” but rather, sustainability generally. Thus, the impact of duck shooting on protected and threatened species is also directly relevant.

Last year an ARI report about a proposed helicopter survey in Victoria included a recommendation for an annual 10% cull, as suggested by GMA<sup>31</sup>. **An annual 10% cull in Victoria would guarantee that no season is ever cancelled. The long-term decline in species would continue until there are no ducks left. This is in apparent breach of the sustainability mandate in s5(a) of the Act.**

It appears in our view that GMA is now searching for “science” to justify its actions. A highly mathematical, experimental helicopter survey and also the experimental KK model have been developed at considerable (but undisclosed) taxpayer expense. Such initiatives were promoted as “taking the politics out of duck shooting” but that will not happen, given the uncertainty and opacity of the methods used.

Neither of those two “scientific” approaches has the accuracy to deal with the five game duck species most at risk. An examination of GMA’s “harvest” reports for the last few years shows that the Pink-eared Duck

<sup>28</sup> H.J. Frith, *Waterfowl in Australia*, 1967.

<sup>29</sup> GMA Media release 6/2/2021 ‘2021 Duck Hunting Season Arrangements’

<sup>30</sup> Refer A1 in the documents released by the parliament in Sept 2021 – op. cit.

<sup>31</sup> NSW uses a 10% cull in quite a different context – no recreational duck shooting, much smaller numbers culled and only at the request of rice farmers.

and the Hardhead Duck numbers have collapsed, but no effort was made to protect these species in the 2021 season; this is unacceptable.

We note that AHM overseas has failed to gain community support, becoming instead the preserve of a rarified group of highly specialised scientists:<sup>32</sup>

*Due to the increased complexity of the technical aspects of AHM, involvement in and ownership of the process is now dominated by those biologists with a more numerical background. This has led to stakeholders concerned more about the social aspects of AHM being marginalised. This has led to some partners calling for harvest regulations to be set based on 'rules of thumb'.*

**In our view, given the dire situation of long-term species decline and failure to recover under La Nina conditions, together with the tiny and diminishing percentage of Victorians who actively shoot ducks (0.1 per cent in 2021, down from 0.2 per cent in 2019), it is time to end duck shooting.**

However GMA is conflicted: not only are some of its senior staff active duck shooters themselves, but growing amounts of taxpayer money are adding to the bureaucracy that supports this unpopular and unsustainable activity.

Currently the Regulations allows for duck shooting at 200 State Game Reserves and 41 other specified wetlands. However the legal basis for shooting ducks in other parts of the state remains unclear. GMA refers queries to DELWP and DELWP refers questions back to GMA. Unless the legal basis can be clearly listed on the GMA website (s8A (f) – the principle of transparency) then duck shooting should cease on all but the 241 wetlands clearly specified in Regulation 69.

It is unclear how GMA complied with the principles of s8A(b) of the Act in recommending the 2021 duck shooting season. GMA seem to have taken the view that it only has to consider the economic, social and environmental impacts of changes to the default season setting, claiming the default setting is “government policy”. That is a surprising view, given that the Regulations were made by the previous government and have since been modified in the wake of the 2017 season which, according to the GMA, opened with “illegal, unethical and irresponsible behaviour”.<sup>33</sup> In any case, the GMA has made no attempt to monitor or research the costs and benefits for non-shooters affected by duck shooting, as required by s6(h) of the Act. Many regional residents are supporters of Animals Australia, and they suffer disruption to their work, their health and their family life as a result of the constant shotgun noise and the anxiety it creates in humans (especially children) and animals.

It is unclear how the GMA complies with s6(i) of the Act, which require it to make recommendations to relevant Ministers. We are aware of requests to close certain wetlands to duck shooting either for public safety reasons or to provide a much-needed sanctuary for birdlife, but GMA claims to have no role in such matters and the requests are passed between GMA and DELWP and back again. Regional residents complain of getting nowhere with both GMA and DELWP. This was clear from a 2016 submission to the state’s consultation on *Protecting Victoria’s Environment – Biodiversity 2036*<sup>34</sup>:

*Restoration of sanctuary status to wetlands – the revision of the Wildlife Act in 1975 resulted in the inadvertent loss of long-held sanctuary status for Lakes Linlithgow and Bullrush. DELWP has steadfastly refused to restore that status, which would give protection to waterbirds, including reducing disturbance to large flocks of Red-necked Stint and Sharp-tailed Sandpipers [preparing for their long flight to Siberia].*

This concern was raised by an eminent local ornithologist on behalf of a community group. Apart from GMA’s recommendation on the 2022 season, we submit this case to you in light of GMA’s obligations to the welfare of non-hunted species (s6(e)(iii) of the Act), its mandate to promote sustainability (s5(a) of the Act is not restricted to game species) and its obligation to make recommendations to relevant Ministers (s6(i) of the Act). Those two wetlands could simply be closed to hunting until their classification is reviewed.

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<sup>32</sup> Ramsey et al, ARI, op. cit., p7

<sup>33</sup> Pegasus Economics, *Assessment of the GMA’s compliance and enforcement function*, 2017, page 19

<sup>34</sup> Submission from Hamilton Field Naturalists Club, p2: <https://www.hamilton-field-naturalists-club-victoria.org.au/images/pdf/Submissions/FireEcology/subm-vic-environment-biodiversity-2036.pdf>

## 2 RESPONSIBILITY

GMA's mandate (s5(a) and s6 of the Act) also requires that it promote responsibility in game hunting, address the humane treatment of animals that are hunted, and minimise negative impact on non-game wildlife, including protected and threatened wildlife.

### 2.1 WOUNDING

Wounding rates are still around 30 per cent of targeted birds because less than one per cent of the state's 25,000 duck shooters have undertaken field-based training to improve accuracy<sup>35</sup>. Each year the GMA annual report comments on its shooter education program, originally tagged the Shotgunning Education Program and later rebadged as a "Masterclass". However, despite these efforts and the considerable expense involved, fewer than 200 duck shooters have participated in the practical accuracy training in-field<sup>36</sup>.

In March 2020 as COVID-19 ravaged the world, two GMA representatives travelled to Denmark to study a program for encouraging shooters to reduce their wounding rate<sup>37</sup>. GMA has confirmed it has no specific target for decreasing the wounding rate<sup>38</sup>.

GMA's 2020-21 Annual Report announced the establishment of a Wounding Reduction Working Group which in time will develop a Wounding Reduction Action Plan. Relevantly, it is understood (indirectly)<sup>39</sup> that the Wildlife (Game) Regulations to be remade in 2022 may require proficiency testing of some type for hunters. Whilst welcome, skills and shotgun proficiency is only one element of the equation – the inherent action of the spray pattern of shotgun pellets will continue to wound a portion of all birds targeted.

**Meanwhile the 2022 season must be cancelled, to avoid the prospect of a hundred thousand game ducks suffering appalling injuries and lingering deaths (average season with 30% wounding).** Note that nothing has yet changed in terms of the shooters and their accuracy or their actions.

### 2.2 KNOWLEDGE AND SKILLS

The 2020 release of GMA's survey of shooter skills and knowledge<sup>40</sup> showed duck shooters generally scored worst among all game shooters. Duck shooters failed in particular on hunting laws, species recognition, best practice to minimise wounding, and humane treatment of waterbirds. That result simply confirms what duck rescuers and regional residents have been observing and reporting for several decades; birds continue to be wounded, waterbirds and all other wetland inhabitants distressed and disturbed.

While the knowledge survey report attempted to dismiss the results as simply a benchmark to highlight areas for improvement in the future, the reality is that the GMA has failed to effectively promote responsibility in duck shooting. The GMA has spent years and many thousands of dollars in the preparation and dissemination of educational material (e.g. Hunting Manual; social media applications; participation in hunting shows and other events with shooter groups), but these results indicate the material has been ineffectual.

Following the illegal and irresponsible behaviour of shooters at the 2017 duck opening, GMA was required to commission a review of its competence. The report by Pegasus Economics was severely critical. It found GMA was "too comfortable" with shooters and issued hunting licences without any checks on hunters' knowledge of the law or good practice<sup>41</sup>:

<sup>35</sup> Private communication from Simon Toop, GMA, 29.12.20

<sup>36</sup> Ibid.

<sup>37</sup> Source: GMA Annual report 2019-20

<sup>38</sup> Private communication from S Toop, op. cit.

<sup>39</sup> Weekly Times 7 December 2021 'Game Management Authority: Victorian hunters face mandatory shooting tests'

<sup>40</sup> Summary report of hunters' knowledge survey findings, GMA, August 2020

<sup>41</sup> [https://www.gma.vic.gov.au/data/assets/pdf\\_file/0011/481682/Assessment-of-the-GMAs-compliance-and.pdf](https://www.gma.vic.gov.au/data/assets/pdf_file/0011/481682/Assessment-of-the-GMAs-compliance-and.pdf) p25, accessed 31.12.21

*“... with the exception of duck hunter identification skills and hound hunter knowledge skills, applicants currently seeking a licence to hunt game are not required to prove any knowledge of the law, demonstrate even a basic understanding of safe and responsible hunting practices or possess any hunting competence... The current arrangements are analogous to VicRoads providing driver education only after a licence has been allocated to drive on a public highway.”*

Animals Australia’s Legal Counsel wrote to Minister Thomas on 4 February 2021 expressing the urgent view that:

*“... the only option that would promote the objects of the Wildlife Act, specifically, the protection and conservation of wildlife (s1A) would be an absolute prohibition on duck shooting for the 2021 season, and until effective regulatory reforms [recommended by Pegasus] are made.”*

It is disappointing to read (B62 in the papers disclosed by parliament, Sept 2021) that a senior executive at DJPR dismissed our letter as containing *“nothing new by way of claims that have been made by Animals Australia and others in the past.”*

## CONCLUSION

We refer you to the Executive Summary on pages 1 – 3 for an overview of this submission, and commend the detail and analysis to you at this crucial decision making point for the survival of our native waterbirds.

Whilst our animal protection charity, and the vast majority of Victorians, oppose recreational shooting of ducks on ethical grounds, we are aware this consideration is regrettably not within ‘scope’ of the request for submissions. We recognise that all animals are currently not treated and protected equally in this State, leaving many vulnerable to human-centred and (often) destructive interests. The Victorian government has committed to a modernised animal protection Act (to replace the dated *Prevention of Cruelty to Animals Act 1986*) which will explicitly (and soon) recognise the ‘sentience’ of animals (their ability to suffer, experience pain and pleasure). The killing and/or inherent wounding and maiming of native waterbirds through recreational shooting will then be an even more stark contravention of any claim that Victoria is a humane society.

**We recommend and urge a complete cancellation of the 2022 season on environmental and waterbird sustainability grounds** (as detailed in this submission). The serious and sustained long-term decline of our game duck species – despite a La Nina cycle - will only be exacerbated by the shooting of remnant breeding stock and the killing of late-bred ducklings.

Please contact me if further clarification of the points made in this submission are required.

Yours sincerely,



**Glenys Oogjes**  
Chief Executive Officer

Note: Attachments A and B follow and provide important further information to the points made in the body of this submission.



## ATTACHMENT A – concerns from the 2021 season decision process

(This information was revealed in documents disclosed to the Victorian Parliament in Sept 2021<sup>42</sup>)

- The timeline for submissions closing (Wed 6 Jan) and Board meeting (Monday 11 Jan), suggests recommendations were pre-prepared by GMA staff, and Board members had inadequate time to consider the 99 pages of stakeholder submissions (condensed to 2 paragraphs each).
- The “risk analysis” provided to the Board placed subjective weights on selective factors; this technique is easily manipulated to support a pre-determined recommendation. For example, it combined game bird abundance and wetland area into one factor, claiming they moved together (not true). If they were treated as two distinct factors the result would be more heavily weighted against a shooting season. Remarkably, it seems that climate change was not factored in as part of this risk assessment.
- As well as “sustainability” risk the Board was asked to consider “reputational risk” and “compliance risk”. It seems these may have been given equal weight with the sustainability risk.
- The SA position (3 game species protected) was excluded from Board consideration.
  - GMA staff claimed that SA had not made its decision by the time of the Board meeting. However that was incorrect: the decision was gazetted on Thurs 14 Jan 2021, which meant it had been lodged with the gazette by Friday 8 Jan 2021. It is highly unlikely that GMA staff would not have been abreast of the SA position.
- The threat to Hardhead Duck - raised by both Birdlife Australia and DELWP - was dismissed. But as this bird had satisfied all criteria for listing as a threatened species, sustainability should have demanded it be protected – even if the season started before the formal listing.
- The recent extended decline for Pink-eared Duck - raised by Birdlife Australia and Animals Australia – was also ignored.
- GMA staff informed the Board that: “Very little new information was provided through these submissions” – the 99 pages of carefully compiled arguments and data provided by stakeholders. (See B115).
- It is unclear whether DELWP was given adequate time and information to assess these important environmental issues. In early February DELWP’s Head of Biodiversity recommended further restriction/cancellation of the season but Ministers accepted the GMA recommendation that same day – for a season three months away.
- The original decision (2-bird bag) was later changed to a 5-bird bag on the basis of a trial helicopter survey which suffered serious data problems, and (according to its architect) should never have been used to determine season settings. See A1255 where Dr Ramsey (ARI) tells GMA that:

*“working with these data has been a bit of a nightmare. ... I am so glad we are not using these data to inform this year’s duck season. I wouldn’t of [sic] had any confidence in the estimates based on the current issues with the data.”*
- There is clear evidence of GMA pressuring the ARI scientists to deliver favourable results for the 2021 season settings, before the ARI had addressed the serious data problems of the 2020 helicopter survey. See B 624-627.

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<sup>42</sup> Op. Cit. A reference such as B115 refers to Volume B, page 115 in these documents.

- The Minister was erroneously advised that duck shooting brings huge economic benefits. A gross estimate of \$65m was quoted from a 2019 survey<sup>43</sup> and even indexed upwards by 2% annually since then. Clearly that was inappropriate, given the growing pandemic. But even between the 2013 economic survey and the 2019 survey (conducted by the same consultants RMCG), duck shooting decreased in economic impact. Importantly, the 2019 survey acknowledged that the NET economic benefit of duck shooting was minimal because expenditure would be diverted to other areas of the economy if duck shooting was unavailable.
  - In July 2020 Tourism Victoria included bird watching as part of its published National Visitor Survey. The report showed that **886,000 domestic tourists went bird watching in 2019 – a number which dwarfs the comparatively tiny number of hunters who participate in each duck shooting season.** Given the COVID risks and restrictions on interstate and international travel, it can be expected that the number of tourists interesting in birdwatching in Victoria will only increase from the 2019 figure. **If duck shooting is permitted during autumn, the presence of hunters will clash directly with tourists visiting regional Victoria specifically to observe birds in their natural habitat – not being shot out of the sky.**
- The Minister was advised of the social and health benefits that duck shooting brings to participants but there was no mention of the negative economic, social and health impacts for the majority of regional residents who do not participate in duck shooting but are forced to endure it for up to three months each year.

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<sup>43</sup> *Economic and social impacts of recreational hunting and shooting*, RMCG, Sept 2019:  
[https://www.gma.vic.gov.au/data/assets/pdf\\_file/0006/503196/Report-Economic-and-social-impacts-of-recreational-hunting-and-shooting.pdf](https://www.gma.vic.gov.au/data/assets/pdf_file/0006/503196/Report-Economic-and-social-impacts-of-recreational-hunting-and-shooting.pdf)

In April 2021, GMA received the results of a trial helicopter survey and rapidly moved to more than double the daily 'bag' (ducks per shooter per day) from 2 to 5 birds for the imminent shooting season. The highly technical project – designed, led and self-assessed by mathematicians at ARI - had suffered from serious data problems and delays<sup>44</sup>. However GMA relied on a superficial but enthusiastic review from a non-mathematician (Dr Steve McLeod, March 2021) to back the resulting estimate of 2.45m game ducks in Victoria (as at Nov 2020). McLeod's review made no attempt to address the obvious question: what were the potential areas of uncertainty in these new results?

Since that time GMA has obtained a review of the ARI survey by two academics with more directly relevant expertise, both in terms of mathematical theory (Dr Prowse) and waterbird ecology and the practical problems of aerial surveys (Prof Kingsford). However this review<sup>45</sup> - unlike the McLeod review – has not been provided to stakeholders.

Kingsford and Prowse provided an in-depth report pointing to a number of issues that cast serious doubt on the validity of the ARI population estimate. However GMA has seemingly selectively quoted from the report, posting the following on its website:

*An [evaluation of the monitoring program](#) was conducted by the Arthur Rylah Institute for Environmental Research. In addition, [Dr Steve McLeod](#), an expert who works in this field, and [Dr Thomas Prowse \(mathematical ecologist and Research Associate, University of South Australia\)](#) and [Professor Richard Kingsford \(Director of the Centre for Ecosystem Science, University of New South Wales\)](#) have separately reviewed the survey design and approach to data analysis. Both found that the program is robust and rigorous and is an effective way of counting ducks and provides critical data to ensure that duck season arrangements remain sustainable. Recommendations for refinements to the monitoring program contained in the reviews have been incorporated into the monitoring program.*

**In our view, this comment is a misrepresentation of what Prof Kingsford and Dr Prowse actually found. These reviewers praised the effort put into design and planning but were clearly concerned by the inaccuracies involved in the practical implementation of the survey and (crucially) its population estimate.**

Key concerns identified by Kingsford/Prowse include:

- The need to recognise the “***sometimes-competing dual objectives around sustainable hunting and conservation of species***”.
- ***“It is important to clearly identify the uncertainties in the model-based estimates so that their use within subsequent decision-making processes does not lead to unintended population consequences for these species (i.e. determining quotas). Further, Victoria’s game species do not only belong to or solely inhabit Victoria, and the current management system does not consider population drivers or data from outside Victoria.”***
- The survey focused heavily on two species which have reliably high counts – Wood Duck and Grey Teal<sup>46</sup> – and total abundance estimates for these species are more precise than for the remaining three species considered (Mountain Duck, Pacific Black Duck, Hardhead).<sup>47</sup> However the rather uncertain abundance estimates for these species are used to determine the total population estimate and hence the harvest quotas.

<sup>44</sup> This is evident from the documents disclosed by the Victorian Parliament, op. cit. Further discussed in Attachment A.

<sup>45</sup> Prowse and Kingsford, dated 28/9/2021 accessed at the GMA website:

[https://www.gma.vic.gov.au/\\_\\_data/assets/pdf\\_file/0003/819282/Game-duck-review-Kingsford-Prowse.pdf](https://www.gma.vic.gov.au/__data/assets/pdf_file/0003/819282/Game-duck-review-Kingsford-Prowse.pdf)

<sup>46</sup> Grey Teal and Chestnut Teal were combined in the ARI survey results.

<sup>47</sup> Note that Pink-eared Duck and Blue-winged Shoveler were not considered by the survey at all, as the counts of these species were far too low for analysis. Nevertheless the GMA offered them no protection when announcing the increased bag size of 5 birds daily.

- A critical component of the survey was the “probability of detection” – a recognition that observers will miss counting some birds. A correction factor is then applied to account for those missed. But in this survey the correction factors appear to be too high, resulting in over-estimates. For example, “...*detection probabilities for [small] dams are likely to be greater than 60% as estimated*”.
- Relatively large proportions of game species are usually found on large wetlands, but it seems the survey used a pro-rata method of counting on such wetlands – counting over a portion of the area and then scaling up to a total estimate. The survey helicopter travelled around the outside perimeter. But if only a portion of the edge is counted, then “extrapolation to the entire area will inflate counts” because most birds are found around the boundary.<sup>48</sup>
- The (Binomial) mathematical approach used for the estimation of counts assumes that the probability of detection is constant, but that assumption was not valid in the field. The consequence is “*under-estimation of probabilities of detection and over-estimation of population sizes.*”
- “... *there were some clear gaps in wetland coverage... It was not clear why no wetlands in western Victoria were surveyed. There are a range of ephemeral wetlands in this region which could have held water.*” [Satellite images would show wetlands in the western region, but in fact they support very few birds due to salinity. Hence the survey would over-estimate birds numbers in western Victoria by assuming its watery areas were similar to those in other regions.]
- “*The classification between natural wetlands, dams and sewage ponds, with category sizes is simplistic... there are large farm dams... which are significantly different to large storages (e.g. Dartmouth Dam)... Dartmouth Dam does not support any game species, despite its considerable size.*” Yet because the survey is based on average number of ducks per unit of water surface area, Dartmouth Dam would be given a considerable duck allocation.
- There are no replicate counts done (on different days) as a check to see if birds have moved over short-term time scales. [EAWS does replicate counts to estimate error.]

Not surprisingly, Kingsford and Prowse did not answer the critical question put by GMA: “**Are the estimates of waterfowl abundance and survey accuracy sound and reasonable?**” Instead, these reviewers (tactfully) referred to the list of concerns raised, and added:

**“... uncertainties remain in terms of estimating total abundances of the eight game species.”**

Kingsford also takes the opportunity in this document to refute the common criticism raised by shooters and GMA personnel, namely that the EAWS allegedly misses the ducks on farm dams. This appears to have been one of the driving factors behind commissioning a Victorian duck counting survey – at considerable taxpayer expense. Kingsford states clearly that the EAWS “*surveys small dams and treats data as an index [not a total count]*”.

**We take issue with the GMA’s misleading claim (see website text copied above) that “Recommendations for refinements to the monitoring program contained in the reviews have been incorporated into the monitoring program.”** The Kingsford-Prowse review was dated 28 September 2021 and the second helicopter survey of game ducks in Victoria took place from 19 October to 7 November 2021. It is unlikely that the timing would have allowed for these recommendations to be considered, discussed and implemented. We have received confirmation<sup>49</sup> that one of Kingsford-Prowse’s important recommendations had not been implemented, namely the replacement of proportional counts (and extrapolations) on large wetlands with comprehensive counts. The proportional count method leads to an inflated estimate of bird populations.

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<sup>48</sup> The EAWS survey always covers the entire area of a large wetland.

<sup>49</sup> Private communication from D Taneski, GMA, 5 January 2021

Finally, another anomaly to cast further doubt on the ARI survey; neither ARI, GMA or Kingsford/Prowse have commented on the extraordinarily high number of Mountain Duck (Australian Shelduck) reported in these helicopter surveys (Nov 2020 and Oct-Nov 2021). In both surveys this species was estimated at 17 per cent of the total population, yet in GMA's "harvest" reports they average at 2 per cent of hunter bags over the period 2009-2020.<sup>50</sup> A possible reason for this discrepancy is provided in *Waterbirds* (p160):

*"It has only recently been confirmed that during the second moult [towards the end of the spring breeding season] Mountain Ducks like to concentrate in large numbers on a few suitable stretches of water – preferably large salt lakes near the sea or in sheltered estuaries."*

During the moult, they are vulnerable and flightless for 26 days. After moulting, they "*disperse widely to breed in any suitable lakes, rivers and marshes.*" It's likely that the ARI helicopter is counting the Mountain Ducks as they gather together during their second moult. However by the time the shooting starts in autumn they will have scattered widely – possibly out of Victoria.

**Comments from Kingsford and Klaassen regarding the Victorian helicopter count (refer the *Guide*):**

- *"The number of ducks in Victoria and SE Australia is unknown and, despite the best of efforts and the use of advanced technology, likely also impossible to know with great accuracy."* (p7)
- A robust total population estimate is "*as yet problematic*". (p20)

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<sup>50</sup> GMA's 2021 "harvest" report is still not available, more than six months after that very short season ended.