

# Department of Environment and Science's Response to the Independent Evaluation of the Queensland Estuarine Crocodile Management Program



# Minister's Foreword

The estuarine crocodile is an iconic Queensland species which was near extinction in the 1970s. The species has since recovered through the concerted efforts of governments and conservation groups over a period of nearly fifty years.

In 2021, the Department of Environment and Science committed \$12 million over four years as part of its ongoing funding to provide dedicated frontline officers to implement the Queensland Crocodile Management Program. The program is based on targeted removals, community education and ongoing research and monitoring.

I would like to thank the Independent Expert Committee, chaired by Queensland Chief Scientist Professor Hugh Possingham, for their thorough evaluation of the Queensland Crocodile Management Program. The Committee has recognised the rigorous science that underpins the program and found the Department's crocodile management approach to be pragmatic, robust and fit for purpose.

I thank the Committee for their considered findings and recommendations and support their adoption by the Department, while recognising some recommendations will require further consultation and research as part of implementation.

The Committee's report provides a strong roadmap for the continuous improvement of the management of estuarine crocodiles in Queensland and through the Department's response we can continue to get the balance right between conservation and management.



*Meaghan*

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# Introduction

In May 2021, Queensland Chief Scientist, Professor Hugh Possingham, was appointed Chair of an independent expert committee charged with reviewing and evaluating the effectiveness of the Department of Environment and Science's (DES) estuarine crocodile management program. The voluntary Crocodile Management Independent Expert Evaluation Committee (the Committee) included members with expertise in human and wildlife behaviour, crocodile ecology, social science and Traditional knowledge.

The Committee was formed following the completion of DES's three-year Estuarine Crocodile Monitoring Program that provided scientific research on crocodile populations over the last 30 years.

The Committee conducted a thorough evaluation focusing on the effectiveness of three core elements of the Queensland Crocodile Management Plan (QCMP):

1. Responding to crocodile sighting reports and removing problem animals
2. Enhancing the *Be Crocwise* community safety education and engagement program
3. Undertaking research and monitoring to ensure DES's crocodile management program is informed by the most up-to-date scientific data and findings.

Along with the core elements of the QCMP, the Committee investigated several key questions regarding DES's approach to crocodile management, including:

- Is the current management approach effective and adequate for ensuring public safety?
- How effective are the current management zone arrangements within the QCMP, and is there scope for improvements to be made to these arrangements, particularly considering the results from the Estuarine Crocodile Monitoring Program?
- Does the current *Be Crocwise* community education program require enhancement?
- Overall, what is working well and what is not?

# The Committee's Final Report and Recommendations

DES continues to pursue the dual goals of supporting the long-term conservation of wild crocodile populations within their normal range and reducing risks from crocodiles to the public.

The Committee has noted these two core objectives and recognised the successful conservation efforts in stabilising the estuarine crocodile population in Queensland, whilst also ensuring that attacks on people remain a rare occurrence.

The Committee's final report, titled: '*Findings from an Independent Evaluation of the Queensland Estuarine Crocodile Management Program*' noted the complex nature of managing estuarine crocodiles in Queensland. The Committee found DES's approach to be pragmatic, robust and fit for purpose. Overall, the Committee's final report was very complementary of the QCMP, noting the rigorous science that underpins the program and the professionalism and dedication of the officers involved in its implementation.

The Committee stated that the Government should be proud of the way the 2016–19 crocodile monitoring program was conducted and the subsequent preparation of the Technical Report and the analytical work that has followed. These achievements, along with DES's scientific research program were labelled as 'world-class' by the Committee.

The Committee's final report includes 22 recommendations designed to further strengthen and improve DES's crocodile management program. The final report separated the recommendations into three broad themes:

1. Recommendations regarding the Management Plan.
2. Recommendations regarding the *Be Crocwise Program*.
3. Recommendations regarding research and monitoring.

Six recommendations recognised by the Committee as the most important have been highlighted as priority recommendations within the final report.

# Response to the Committee's findings

DES welcomes the Committee's final report and its recommendations. DES thanks the Committee Chair, Queensland Chief Scientist Professor Hugh Possingham, and all members of the Committee for their efforts in undertaking this important review and developing the final report.

DES appreciates the Committee's positive feedback on the existing program and values the recommendations as an opportunity to further improve what is already a sound approach to managing estuarine crocodiles. DES supports all the Committee's recommendations, acknowledging that some actions will require detailed consultation, planning and evaluation if they are to be implemented effectively.

The QCMP remains the overarching framework for the state-wide management of estuarine crocodiles in Queensland and the associated public safety risks. Changes made to Queensland's crocodile management practices in support of the Committee's recommendations will be reflected in an updated version of the QCMP.

The following sections detail DES's response to the Committee's key findings. Details of the response to each individual recommendation is provided in Appendix 1.

# Queensland Crocodile Management Plan (QCMP)

In partnership with relevant stakeholders, DES will deliver actions to strengthen the public's understanding of the QCMP, increase DES's access to expert guidance and Traditional Owner collaboration, and explore adaptive approaches to manage the Queensland estuarine crocodile population.

In order to enhance the QCMP, DES proposes to undertake the following:

- Establish and publicise clear, structured processes regarding the public requesting amendments to the management zones within the QCMP.
- Consult with key stakeholders and explore additional scientific information to consider adopting a more quantitative approach to the risk assessment process.
- Restructure the QCMP into a more communicative document, clearly presenting information to the general public on the following:
  - » the objectives of the plan
  - » risk profiles for each of the Crocodile Management Zones
  - » why egg harvesting, wild crocodile harvesting for skins, and widespread culling are not practical approaches to reducing the risk of crocodile attack
  - » how crocodiles removed from the wild will be managed
  - » the role of Land and Sea Rangers in Crocodile management.

To ensure that the crocodile management program and other programs focused on human-wildlife interaction remain best practice and can respond to emerging issues, DES will establish an expert wildlife management group. This group will provide DES with a standing group of experts that can provide advice across a range of topics including crocodile management, flying-foxes, cassowaries, swooping birds and other suburban wildlife. The group will have a clear governance structure and terms of reference to ensure the group's role remains focused and effective.

DES remains committed to the policy that crocodiles removed from the wild for public safety reasons should (wherever possible) be humanely rehomed in crocodile farms and zoos. To ensure that there are suitable

options for rehoming of crocodiles into the future, DES will continue to consult with crocodile farms and zoos regarding their capacity to take crocodiles and work closely with these stakeholders to ensure that crocodiles will continue to be rehomed.

The Committee has recommended that in consultation with stakeholders, DES considers the annual removal of a modest number of crocodiles 2.4 metres or more in length on the populated east coast of Queensland crocodile country. It is important to note that this recommended approach would be designed to reduce the average size of crocodiles on the populated east coast (approximately Port Douglas to Ayr), rather than reduce the overall size of the population, or eliminate large crocodiles entirely. This approach would involve removal of crocodiles in addition to the typical rate of removal under the existing QCMP removal zone arrangements.

DES will proceed with a careful scientific approach to considering this proposal, to ensure that any additional removal of crocodiles is responsible, safeguards long-term crocodile populations and considers the important cultural significance of crocodiles for First Nations peoples. To fully address this recommendation, analysis and consideration of different removal scenarios and crocodile population dynamics is required.

DES has already commenced a study of the DNA of crocodile populations from across Queensland to better understand movement and interbreeding patterns. The results of this study will be combined with the results of the 2016–19 population monitoring program to develop a long-term population model. This model will allow DES to determine how crocodile populations are likely to respond to various levels of additional removal of crocodiles above 2.4 metres. This will help DES understand if there is potential to remove additional larger crocodiles in a way that is ecologically sustainable and would provide a meaningful contribution to public safety.

This increased scientific understanding will allow DES to consult with key stakeholders, including First Nations peoples to collectively consider the potential approaches to implement this recommendation and the potential benefits and risks of specific removal strategies.

# Be Crocwise Program

The Committee's recommendations in relation to DES's *Be Crocwise Program* relate to increasing engagement with the public and key stakeholders on crocodile management, while also developing a better understanding of community attitudes that drive people's behaviour in crocodile country. To address these recommendations DES will commit to the following actions:

- Undertake independent attitude and behaviour research including at targeted locations such as boat ramps in crocodile country to inform future messaging on crocodile management.
- Develop and implement a *Crocwise* strategy. This strategy will:
  - » identify collaborative opportunities with research institutions
  - » work with the tourism industry to capture their needs
  - » partner with wildlife parks and zoos on crocodile messaging
  - » include a scheduled evaluation of the program that builds on the relevant theories of attitude and behaviour change.
- Make amendments to the membership and utilisation of the Crocodile Roundtable Stakeholder Committee
- Trial and expand the formal recognition and incorporation of Traditional Owner knowledge and attitudes into the crocodile management program.

DES has committed additional resources to increase the capacity of the *Be Crocwise Program*. These resources will support the program's outreach in crocodile country in line with the Committee's recommendations, by:

- supporting the creation of new dedicated departmental positions to implement the *Be Crocwise Program*
- undertaking social attitude and behaviour research
- expert advice to aid the development of an enhanced *Crocwise* Strategy.



# Research and Monitoring

The Committee emphasised the value of continued crocodile research and monitoring activities and the importance of information being made available to the public to instil confidence in DES's crocodile management program. DES is committed to the following actions to address the Committee's findings:

- publicly releasing the *Estuarine Crocodile Population Monitoring in Queensland (1979–2019) Technical Report*
- an ongoing estuarine crocodile monitoring program that routinely visits relevant sites
- clearly articulating to the public how crocodile data is used
- aligning estuarine crocodile research with the objectives of the QCMP
- undertaking predictive modelling of crocodile and human populations to predict human—crocodile interactions in the future.

# Appendix 1— Committee Recommendations

RECOMMENDATION	THE COMMITTEE RECOMMENDS THE DEPARTMENT	DES RESPONSE	ACTIONS	STATUS
<b>Management Plan Recommendations</b>				
1. Management Plan amendment process	<p><b>(Priority A) Establishes and publicises clear, structured processes regarding Management Plan amendments, including:</b></p> <ul style="list-style-type: none"> <li>a regular evaluation process, which could include a major review of the Management Plan every five years, commencing from 2022, for example</li> <li>an inclusive and documented system allowing any community group or individual to request modifications to/minor reviews of the Management Plan, including modification and refinement of Crocodile Management Zones.</li> </ul>	Support	<p>The Department of Environment and Science (DES) will review and update the Queensland Crocodile Management Plan (QCMP). This will include:</p> <ul style="list-style-type: none"> <li>a requirement for a scheduled 5-year review of QCMP content to incorporate key learnings and policy developments over the intervening period</li> <li>incorporating a clear process for how members of the public can provide feedback on the QCMP including management zones</li> <li>establishing a transparent online system to receive requests for modifications which records actions undertaken.</li> </ul>	Commenced in 2022 via a review of the QCMP
2. Management Plan communications document	<p>Considers (during the next major review of the Management Plan) turning it into a communications document, and considers taking a more quantitative approach to the included risk assessment process. For example:</p> <ul style="list-style-type: none"> <li>Zones could be re-named to increase public understanding of the intent of each zone. For example, 'Active/Total Removal Zone' may have more meaning to the public than 'Zone A.'</li> <li>More information should be included regarding what happens to crocodiles that are removed (from the wild).</li> <li>The objectives of the Management Plan could be explained clearly within the document.</li> </ul>	Support	<p>DES will rename the management zones in the QCMP in line with the management intent and include details in the crocodile removal section on what happens to crocodiles that are removed from the wild. DES will include clearly articulated objectives of the plan upfront.</p>	Commenced in 2022 via a review of the QCMP

RECOMMENDATION	THE COMMITTEE RECOMMENDS THE DEPARTMENT	DES RESPONSE	ACTIONS	STATUS
3. Management zone risk information	Considers providing clear information on risk profiles for each Crocodile Management Zone and provides more information on how each of the zones was determined. Information on the key factors used to determine the level of risk to public safety should be estimated quantitatively (e.g., not just as 'higher' or 'lower'), and the way in which these factors are integrated to determine a zone should be explicitly stated.	Support	DES will include additional wording in the QCMP on the Crocodile Management Zones, outlining the factors that are used to determine each zone and the level of quantified risk to the public associated with each zone.	Commenced in 2022 via a review of the QCMP
4. Communication regarding ineffective strategies	Clearly communicates that egg harvesting, wild crocodile harvesting for their skins, and widespread culling are not practical approaches to reducing the risk of crocodile attack.	Support	DES will include a section in the QCMP outlining why egg harvesting, harvesting wild crocodiles for their skins, and widespread culling are not practical solutions to reducing the risk of crocodile attacks. Include updated content on website as well.	Commenced in 2022 via a review of the QCMP
5. Rehoming crocodiles	Proactively considers future options for rehoming problem crocodiles before zoos and farms across Queensland reach capacity.	Support	DES remains committed to rehoming problem crocodiles wherever possible and will continue to consult with relevant representatives of the crocodile farming and zoological industries regarding their capacity (and willingness) to accept crocodiles removed from the wild. DES will consult on available options and consider any required changes to current rehoming arrangements.	Commencing in 2022
6. Proactive removal on populated east coast	<p><b>(Priority B) In consultation with stakeholders, considers annual removal of a modest number of crocodiles 2.4 metres or more in length on the populated east coast for several years, in addition to the average number of problem crocodiles removed under current Management Plan arrangements, with appropriate frequency of monitoring.</b></p> <p>The number taken each year should be based on population modelling. This trial, to constrain population growth and reduce overall numbers locally, is a form of adaptive management that could deliver improved crocodile management outcomes and new knowledge.</p>	Support (through an adaptive management approach)	DES will continue genomic (DNA) work and population modelling to better understand how the population may respond to removing additional large crocodiles from the wild before proposing any changes to current practices. DES will also consult with key stakeholders including First Nation peoples on a balanced approach for removing additional crocodiles >2.4m from the wild populations. Any changes that are made to the policy for removing crocodiles from the wild will be included in the QCMP.	Underway, with outcomes of research and consultation in late 2022 to inform changes in management practices if required

RECOMMENDATION	THE COMMITTEE RECOMMENDS THE DEPARTMENT	DES RESPONSE	ACTIONS	STATUS
7. Role of Land and Sea rangers	Considers ways to increase the role of Land and Sea Rangers in on-ground crocodile management.	Support	DES will continue the strong engagement of Land and Sea Rangers and other Traditional Owners in crocodile country. DES is undertaking a trial in the Torres Strait to formally recognise and incorporate Traditional knowledge and attitudes into the crocodile management program, with the potential for further roll out.	Underway and ongoing
8. Wildlife Management Stakeholder Committee	<b>(Priority C) Establishes a Wildlife Management Stakeholder and Expert Committee for ongoing deliberation regarding the management of wildlife.</b>	Support (establish a standing expert committee)	DES will establish a standing expert committee on wildlife management and human-wildlife interaction, with a clear terms of reference and governance structure.	Commencing in 2022
<b>Be Crocwise Program Recommendations</b>				
9. Attitude and behaviour research	Pending funding availability, conduct research into the opinions and attitudes, as well as behaviours, of people that live in and visit croc country (including First Nations communities), and conduct research on people who live well outside croc country (e.g., Brisbane residents). This research could be similar to research conducted by Ipsos in relation to attitudes and behaviours towards Dingos on K'gari in 2021-22; to enhance the Department's ability to target messaging towards key audiences pending resource allocation.	Support	DES has committed funding for this program and will undertake preliminary work through simple mechanisms such as online surveys as well as engaging a suitable qualified organisation to undertake research on people's attitudes and behaviours toward crocodiles, with the findings to help inform educational programs.	Commenced in 2022
10. Human behaviour at boat ramps	Gathers further evidence regarding human behaviour at popular boat ramps in croc country and what behaviour change approaches could be enhanced accordingly.	Support	DES has commenced preliminary work on understanding behaviours at boat ramps and has increased the capacity of the Crocwise program to include officers travelling to and providing information at boat ramps. DES will also undertake research into motivations and behaviours at boat ramps as per Recommendation 9.	Underway with a view to expand in 2022
11. Collaboration with First Nations people	Explores additional opportunities to work with First Nations people to access their cultural knowledge about living with crocodiles, and to include culturally relevant interesting facts on interpretive signs to make them more engaging.	Support	As per recommendation 7, DES will continue the strong engagement of Land and Sea Rangers and other Traditional Owners in crocodile country and undertake a pilot in the Torres Strait to formally recognise and incorporate Traditional knowledge and attitudes into the crocodile management program. This pilot will inform possible future delivery across the broader crocodile country.	Underway and ongoing

RECOMMENDATION	THE COMMITTEE RECOMMENDS THE DEPARTMENT	DES RESPONSE	ACTIONS	STATUS
12. Crocodile Roundtable membership	Broadens Crocodile Roundtable membership to include relevant local and state government representatives from central Queensland areas.	Support	DES will invite relevant local and state government representatives from central Queensland to join the Crocodile Roundtable stakeholder committee.	Commencing in 2022
13. Crocodile management actions annual fact sheet	Provides an annual fact sheet to all Crocodile Roundtable members, local libraries, local councillors and members of parliament to educate them about latest crocodile management actions	Support	DES will develop, distribute and promote an annual fact sheet on crocodile management to key stakeholders including Roundtable members.	Commencing in 2022
14. Partnerships with wildlife parks and zoos	Continues to work in partnership with key stakeholders who publicly display crocodiles at wildlife parks and zoos to design and deliver consistent Be Crocwise program messaging.	Support	DES will continue to build strong connections with wildlife parks and zoos on the messaging of crocodiles and incorporate this work in the Be Crocwise program and proposed new Crocwise Strategy.	Underway and ongoing, with a view to strengthening in 2022
15. Information needed by tourism sector	Consults with tourism sector stakeholders (e.g., accommodation providers and tourism operators) to find out educational tools and resources they need to support the Be Crocwise program.	Support	DES will continue to work closely with tourism sector and include targeted communication and education initiatives via the proposed new Crocwise Strategy.	Underway and ongoing with a view to strengthening in 2022
16. Collaboration with research institutions	Collaborates with Australian research institutions, especially those with strong behaviour change management expertise, to evaluate existing programs and devise new messaging.	Support	DES will continue to work closely with research institutions and include future collaboration under the Crocwise Strategy.	Underway and ongoing with a view to strengthening in 2022
17. Funding allocation for evaluation of Crocwise, development of Crocwise strategy and new positions	<p><b>(Priority D) Allocates:</b></p> <ul style="list-style-type: none"> <li>ongoing and increased funding to implement and evaluate the effectiveness of the Crocwise program;</li> <li>one-off funding to design a comprehensive Crocwise strategy that incorporates learnings by work undertaken with Wongari (dingoes), First Nations people, and the theory of behaviour change; and</li> <li>new, fully-funded, dedicated positions to manage and coordinate the Be Crocwise program and to undertake analysis of effectiveness of Be Crocwise.</li> </ul>	Support	DES has allocated new funding to increase the resources and capacity of the Crocwise program, via new dedicated Crocwise positions; evaluation of the Crocwise program; research into behaviours and attitudes; and development of a new Crocwise Strategy.	Underway with additional resourcing to commence in 2022

RECOMMENDATION	THE COMMITTEE RECOMMENDS THE DEPARTMENT	DES RESPONSE	ACTIONS	STATUS
<b>Research and Monitoring Recommendations</b>				
18. Public confidence in the crocodile monitoring program science	<p><b>(Priority E) Increases the public's confidence in the science behind the crocodile monitoring program by:</b></p> <ul style="list-style-type: none"> <li>immediately releasing the Estuarine Crocodile Population Monitoring in Queensland (1979–2019) Technical Report to the public;</li> <li>providing a short, plain English document to the public explaining the methodology used throughout the Department's crocodile monitoring program and the validity of the results;</li> <li>considering producing a short video (with explanatory commentary) for the public featuring Wildlife and Threatened Species Operations staff conducting monitoring surveys; and</li> <li>considering inviting selected influential sceptics (e.g., media and social media commentators) to observe the process, and the professionalism, of Wildlife and Threatened Species Operations staff undertaking field operations.</li> </ul>	Support	DES will publish the Estuarine Crocodile Population in Queensland (1979–2019) Technical Report on the DES website accompanied by other resources to increase the understanding of how the monitoring program is conducted. DES will also work closely with key community leaders to further their understanding of the monitoring program and the science that underpins the management program.	Commencing in 2022
19. Cycling crocodile monitoring program	<p><b>(Priority F) Develops and initiates a funded 'cycling' crocodile monitoring program comprising surveys in a subset of chosen areas within croc country every year so that, collectively, every area is counted with a frequency of no less than once every five years (or as determined).</b></p>	Support	DES has commenced development of an updated monitoring program which 'cycles' between different monitoring locations over time, in line with the recommendation. This new program will be implemented across future monitoring seasons.	Development has commenced, and new 'cycled' monitoring will commence during 2022
20. Prediction of human-crocodile interactions	Uses projections of crocodile and human populations and behaviour to predict and anticipate future changes in patterns of human-crocodile interactions and crocodile attacks.	Support (undertaking the modelling)	DES will undertake modelling to predict how human and crocodile populations in key locations in future years may influence changes to human-crocodile interactions.	Commencing in 2022

Recommendation	The Committee recommends the Department	DES Response	Actions	Status
21. Articulate how data is used	<p>Develops a more transparent process to document the way in which data collection and research are driving continuous improvement relating to crocodile management priorities. For example:</p> <ul style="list-style-type: none"> <li>• The Department could document the relative benefits of Close-Kin Mark Recapture projects vs monitoring and evaluating the effectiveness of the Crocwise program.</li> <li>• The Department could explain why investigating and trialling crocodile detection and alert technology is its highest priority regarding crocodile management applied research.</li> </ul>	Support	DES will develop and release on the DES website an estuarine crocodile research and monitoring program plan.	Commencing in 2022
22. Research alignment with Management Plan	<p>Ensures research projects align with the objectives of the Management Plan by:</p> <ul style="list-style-type: none"> <li>• clearly justifying the need for research and monitoring projects;</li> <li>• prioritising research and monitoring projects; and</li> <li>• seeking the opinion of a wildlife management stakeholder and expert committee (refer to recommendation eight) regarding the research and monitoring program. This committee would investigate, for example, how the research findings would be used to improve current management practices.</li> </ul>	Support	DES will work with research organisations and develop and release on its website a research and monitoring program plan	Underway and ongoing with a view to consolidating in 2022

