

QUEENSLAND FLOODS
COMMISSION OF INQUIRY

STATEMENT OF DR JULIA PLAYFORD

I, **DR JULIA PLAYFORD** of c/o 400 George Street, Brisbane, Queensland, Director, Water Quality and Aquatic Ecosystem Health, Department of Environment and Resource Management (DERM), solemnly and sincerely affirm and declare:-

Requirement from Queensland Floods Commission of Inquiry

1. I have seen a copy of a letter dated 18 November 2011, which is attachment **JP-01**, from the Commissioner, Queensland Floods Commission of Inquiry (the Commission) to me requiring a written statement under oath or affirmation, and which details the topics my statement should cover.
2. I have further seen a copy of a letter a letter dated 18 November 2011, which is attachment **JP-02**, from the Commissioner, Queensland Floods Commission of Inquiry (the Commission) to [REDACTED] advising that if I cannot answer any part of the requirement because it does not refer to work done by my department or is outside my area of expertise that should be made clear in the statement provided.

Role

3. I am currently Director, Water Quality and Aquatic Ecosystem Health within the Environment and Resource Sciences Division of DERM.
4. I hold a Bachelor of Science with Honours majoring in botany from the University of Western Australian and a PhD from the Australian National University in the field of evolutionary biology. I have worked as a biologist since 1992, including as a Lecturer at the University of Queensland and in various managerial positions of biology work units at DERM and its predecessor departments.

Item 1: A brief overview of the ecological situation related to the reported deaths of large numbers of dugongs, turtles and dolphins in Queensland waters, and the diseases affecting fish in the Gladstone harbour since the 2010/2011 floods.

5. I cannot answer that part of Item 1 which refers to “and the diseases affecting fish in the Gladstone harbour” because it does not refer to work done by DERM. DERM has collected water quality samples in Gladstone Harbour. The Department of Employment, Economic Development and Innovation (DEEDI) is responsible for fish in Gladstone Harbour, so DERM has passed any sampling results which might pertain to the impacts on fish in Gladstone Harbour to DEEDI.

6. DERM is responsible for research and monitoring of specific species listed in the *Nature Conservation Act 1992*, which includes dugongs, some turtles and some dolphins.
7. The 2010-2011 floods affected a wide range of ecological values across Queensland's marine environments. Water quality has been affected due to nutrients, sediments and toxicants impacting coral reefs, seagrass beds and key species including dugongs and turtles.
8. A brief overview of the ecological situation related to the reported deaths of large numbers of dugongs and turtles is contained in:
 - a. Attachment **JP-03** Extracts from DERM Website.
 - b. Attachment **JP-04** Brief to Department of Premier and Cabinet (DPC) titled "Flood and cyclone impacts on dugong and turtles".
 - c. Attachment **JP-05** Marine Stranding Summary figures for marine turtles, dugongs, dolphins and whales.
 - d. Attachment **JP-06** Marine Stranding Summary graphs.
 - e. Attachment **JP-07** Dugong and Turtle Health Assessment Summary.
 - f. Attachment **JP-08** Briefing Note regarding annual reports on dugong and turtle strandings and mortality.
 - g. Attachment **JP-09** Marine wildlife stranding and mortality database annual report 2009-2010 – Dugong
 - h. Attachment **JP-10** Marine wildlife stranding and mortality database annual reports 2005-2010 – Marine Turtles
 - i. Attachment **JP-11** Seagrass and Turtle Deaths Gladstone Brief.
9. Parliamentary Briefs regarding Cyclone Yasi stranding numbers (which are not strictly relating to the floods but have some content regarding floods) are available upon request.
10. Parliamentary Briefs regarding dugong and turtle mortalities are available upon request.
11. An average of 2.36 turtles per year (range 1-5 turtles per year) have been recorded killed by vessel interaction within Port Curtis (Port of Gladstone) during the 11 years from 2000 to 2010. During 2011, however, there have been 25 turtles killed by vessel interaction within the Port of Gladstone up to 8 November 2011 comprising 23 green turtles, one loggerhead turtle and one flatback turtle. See Attachment **JP-12**. The majority (60%) of these turtles were adult sized. There has been one dugong confirmed to be killed by vessel impact and a second

dugong probably impacted by a vessel during the same period. No dugong had been recorded killed by boating in the previous 11 years within the port. Boating traffic within the Port of Gladstone has increased by 700% over the past year in response to the increased industrial development associated with the port. Further increases are expected as the port expands. The injuries to the turtles have ranged from cuts from propellers associated with large outboard motors to propellers greater than 1 m in diameter such as are on large commercial vessels and from impact of vessel keels on the turtles. There is some evidence that marine turtles use dredged areas as refugia, placing turtles at increased risk of interaction with vessels in these channels and turning basins.

12. In summary, there is a large increase in reported deaths of dugongs and turtles in Queensland waters since the 2010/2011 floods and, while the increase in deaths cannot be attributed to a single cause, preliminary indications are that the effect of the floods on food sources has contributed significantly to the increased deaths.
13. Dugong (listed as a vulnerable species under Queensland's *Nature Conservation Act 1992* and a listed migratory and marine species under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*) are primarily dependent on seagrass as a food source and tend to be very selective in the species grazed. The flood events potentially impacted on many of the seagrass meadows between Shoalwater Bay and Moreton Bay (and into northern New South Wales). Such a long stretch of the coastline affected by flood plumes at the same time means that the option of dugong moving to alternate coastal locations for grazing is diminished. Dugong can, however, move to alternate non-coastal locations for grazing. The number of dugong deaths and strandings recorded so far for 2011 has greatly exceeded the numbers recorded for 2010 and previous years. DERM scientists have reported that while a small number of the dugong deaths were related to human causes such as boat strikes, most died from unidentified causes. The lack of identification of cause of death is largely due to the decomposed nature of the animal prior to collection. The majority of deaths were reported in the Townsville and Moreton Bay areas.
14. The major food sources for turtles are seagrass, algae, corals (especially hard corals and their associated ecosystems), mangrove fruit and jellyfish. It is expected that malnutrition will potentially be a major contributor of death for turtles in the coming few years. Testing on turtles in Moreton Bay close to the river mouth where there is no seagrass has found that turtles are not in good health however further out on the eastern banks of Moreton Bay where the seagrass is in good condition the turtles are in better health. Testing on turtles in Gladstone Harbour has found that the turtle are not in good health. There has also been an increase in turtle mortality from vessel strike in Port of Gladstone.
15. DERM is also investigating increased number of dolphin deaths since the 2010/2011 floods, particularly dolphins in the *sousa* genus. It is more difficult to determine the cause of the increased deaths as dolphins do not eat seagrass, algae or corals.

Item 2: A brief overview of any other major ecological damage observed in Queensland waters (fresh and salt) which is temporally connected with the 2010/2011 floods (confined to those parts of Queensland where non-cyclonic flooding occurred).

16. A brief report compiled in February 2011 regarding the Monitoring of Aquatic Ecosystem Health Impacts of January 2011 Floods on South East Queensland (Moreton and Hervey Bays) is attachment **JP-13**.
17. The 2010-2011 floods affected a wide range of ecological values across Queensland's marine environments. Flood events in the Fitzroy, Burnett, Mary and Brisbane Rivers have delivered huge volumes of highly turbid fresh water into coastal marine environments, including the Great Barrier Reef. Water quality has been affected due to nutrients, sediments and toxicants impacting coral reefs, seagrass beds and key species. However native plants and animals evolved with Queensland's extremes of floods and droughts and generally wild populations are resilient, experiencing both growth and decline in numbers over time.
18. The "2011 Report Card" for the waterways and catchments of South-East Queensland is attachment **JP-14**. In the 2011 Report Card freshwater systems have generally improved their ecosystem health rating relative to the 2010 Report Card. The marine systems have generally worse ecosystem health ratings relative to the 2010 Report Card. However, despite the intense lengthy flooding, the marine systems ecosystem health ratings did not drop to the very low ratings received in the 2009 Report Card.

Item 3: An account of actions taken by the Department of Environment and Resource Management (DERM) to determine the cause of the ecological damage described in 1 and 2 (the ecological damage).

19. DERM continued its regular (ambient monitoring) water quality testing program as part of the Ecosystem Health Monitoring Program. In South East Queensland 389 sites are monitored. These sites comprise 254 estuarine and marine sites monitored monthly and 135 freshwater sites monitored twice a year.
20. DERM also continued its Event Monitoring water quality testing program (collection of water samples during storm events), but took more samples because of the nature of the particular event of the 2010/2011 floods. In SEQ this meant we collected 1960 samples nutrients and sediments in 2010-11 wet season compared to 995 in the previous year. In GBR we collected 3550 samples nutrients, sediments and pesticides in 2010-11 wet season compared to 1620 in the previous year.
21. After the 2011 floods DERM continued monthly water quality monitoring in Moreton Bay. DERM also met with researchers and representatives from relevant organisations including Healthy Waterways Ltd, CSIRO and the Universities and compiled a monitoring plan for Moreton Bay (**JP-13**).

22. DERM performed additional water and sediment quality testing. sites in South East Queensland for 216 organic chemicals and 28 metals. Water samples were collected from 43 sites for organic contaminants (including 18 seagrass and five coral sites), from 20 sites for metals and from 10 sites for sediment samples. A PowerPoint presentation I gave at the River Symposium in September 2011 showing preliminary results is attachment **JP-15**.
23. The Minister for the Environment has established a scientific advisory committee for marine strandings (Marine Animal Strandings Committee) comprising marine scientists, including myself and other DERM scientists. Information about the committee including minutes and recommendations is contained in attachment **JP-03**.
24. An oversight committee for Gladstone Harbour including a Scientific Advisory Panel has been established which includes representatives from:
 - a. DERM, including myself
 - b. DEEDI
 - c. DPC
 - d. Gladstone Regional Council
 - e. Local State and Federal Members of Parliament
 - f. Fishing industry
 - g. Fitzroy Basin Authority
25. DERM has continued monthly monitoring of water entering Gladstone Harbour from the Boyne and Calliope Rivers and started monitoring water in Gladstone Harbour. Two reports have been produced (an initial report and a supplementary report) which are attachment **JP-16**. DERM has placed information about Gladstone Harbour water quality on its website, which is attachment **JP-17**.
26. DERM in collaboration with the Great Barrier Reef Marine Park Authority (GBRMPA) initiated a number of actions in response to the impacts on coastal marine habitats and associated wildlife:
 - a. Commencing in April 2011, DERM turtle biologists deployed satellite telemetry tags on adult female green turtles to determine habitat usage in response to reduced availability of seagrass in inshore areas (six in Sandy Strait, three in northern Deception Bay, three in eastern Moreton Bay). GBRMPA in collaboration with James Cook University staff deployed additional satellite tags on turtles and dugong further north.
 - b. In June, GBRMPA and DERM collaborated in conducting four necropsy training workshops at Cairns, Townsville, Airlie Beach and Rockhampton to improve the skills of local veterinarians and Marine Parks staff in collecting

quality tissue samples for expert assessment of cause of death by university pathologists. PowerPoints from the training workshops are attachment **JP-18**.

- c. Following the June 2011 meeting of the Marine Animal Strandings Committee that considered the Gladstone strandings, an additional meeting of DERM and GBRMPA staff, DEEDI seagrass biologists and James Cook University marine biologists and veterinarians, was held in Townsville to review turtle and dugong issues in that area.
 - d. During June-July 2011, DERM staff in collaboration with university veterinarians, parasitologists, toxicologists and pathologists assessed the health of wild turtle populations in the Boyne River and Townsville areas. In addition to standard body condition measures, blood samples were collected for haematology and blood chemistry. At the Boyne River estuary, 55 per cent of the green turtles displayed poor body condition.
 - e. Flood plume mapping for marine environments is being developed by DERM in conjunction with GBRMPA. Water quality monitoring within the flood plume areas has commenced and will continue until December 2011 in order to assess the long term impacts of the floods. Reef Plan monitoring activities are being extended to include flood assessment and the monitoring of more inshore sites.
27. An Interim Conservation Order (ICO), which is attachment **JP-19**, was declared under the *Nature Conservation Act 1992*, to close net fishing in the Boyne River estuary for 60 days in response to excessive mortality of green turtles. This turtle mortality resulted from commercial net fishers targeting a post flooding aggregation of fish in the Boyne River estuary. DERM staff (QPWS Marine Parks) and Queensland Seafood Industry personnel negotiated a code of practice for reducing the impact of net fishing which is attachment **JP-20**. Stranding data indicates that these measures are working. This is consistent with the expected benefits of resuscitating comatose turtles on the deck of fishing vessels to recover before release and other actions introduced under the code of practice. Attachment **JP-21** is a preliminary report – Health Assessment of Turtle Population within Port Curtis in the vicinity of the Boyne River Estuary.
28. DERM staff (QPWS Marine Parks) continue to monitor strandings of sick, injured and dead marine wildlife in Queensland. Regional QPWS staff collect the bodies, perform necropsies (animal autopsies) where possible and appropriate, and enter data into a database, which is run by the Environment and Resource Sciences Division of DERM, called StrandNet. StrandNet is DERM's whole-of-Queensland marine wildlife stranding database. Local veterinarians and university pathologists collaborate with DERM for assessing cause of death based on examination of tissue samples necropsied from suitable carcasses. QPWS staff also work with the boating industry and ferries etc to reduce boat strike. Relevant documents are attached:
- a. **JP-22** DERM Website material including poster
 - b. **JP-23** DERM Operational Policy Marine Wildlife Strandings

- c. **JP-24** DERM Marine Wildlife Strandings Technical Manual
 - d. **JP-25** DERM Operational Policy – Administering scheduled drugs to animals
 - e. **JP-26** DERM Procedural Guide – Transportation of animal carcasses, parts and specimens by DERM staff
 - f. **JP-27** DERM Draft Procedural Guide – Assistance in whale disentanglements
29. In October 2011 DERM (QPWS) entered into a Memorandum of Understanding (MoU) with the Sea Turtle Foundation (a non-government agency based in Townsville) to facilitate collaboration in response to reports of stranded marine wildlife, to assist in carcass recovery and assist in the rescue of live stranded turtles to rehabilitation facilities. A copy of the MoU is attachment **JP-28**.
30. DERM organised a Dugong and Turtle Forum to “identify innovative ways to address diminished food supply, other impacts and better ways to share knowledge and understanding for the common purpose of building species resilience”. The forum was hosted by Sea World on 1 November 2011, and was attended by 32 participants (including the Minister for the Environment). Seven presentations showcased the most current information across the full sweep of relevant fields. These were followed by two concurrent roundtable discussions focussed on Animal rehabilitation / partnerships and Gladstone dugong and turtle.
31. DERM has placed a large amount of information on its internet site to keep the public informed which is contained in attachments **JP-03** and **JP-22**.

Item 4: in particular, whether the actions identified in 3 were intended to determine the causal contribution of:

- a. **displacement of sediment by the 2010/2011 floods**
 - b. **agricultural runoff, including the impact of chemicals and fertilisers, which occurred during the 2010/2011 floods**
 - c. **discharge of water from mines, power stations and/or coal seam gas projects due to an excess of water caused by the 2010/2011 floods to the ecological damage.**
32. The event monitoring water quality testing program and regular (ambient) monitoring water quality testing program were used to determine the causal contribution of displacement of sediment by the 2010/2011 floods.

The event monitoring water quality testing program include testing for pesticides in the Great Barrier Reef area and were used to determine the causal contribution of

agricultural runoff, including the impact of chemicals and fertilisers, which occurred during the 2010/2011 floods.

33. The specific water quality testing at a series of sites in South East Queensland for 216 organic chemicals and 28 metals was used to determine the causal contribution of the impacts of industrial activities runoff which occurred during the 2010/2011 floods. In addition, the sampling for organic contaminants in south-east Queensland gave an indication of the pesticide and herbicide impacts.
34. Discharge of water from mines, power stations and/or coal seam gas projects is managed under Transitional Environmental Programs (TEPs) which generally aim to allow releases that will not cause ecological damage. Monitoring is carried out by DERM regional staff and is outside my area of expertise.

Item 5: An account as to whether the actions taken by DERM have allowed a definitive conclusion as to the causes of the ecological damage or relative contributions of different causes, and

a. if so, what conclusion has been reached and the basis for that conclusion

b. if not:

i. what does DERM consider to be the likely causes of the ecological damage or relative contributions of different causes, and the basis for that opinion

ii. what further work would be required to come to a definitive conclusion, the timeframes over which that work could be completed and any barriers to its completion

35. The actions taken by DERM have not allowed a definitive conclusion as to the causes of the ecological damage or relative contributions of different causes.
36. What DERM considers to be the likely causes of the ecological damage or relative contributions of different causes, and the basis for those opinions are set out below.
37. This is not the first year in which there have been severe environmental impacts on seagrass pastures and associated increased deaths of dugong and turtles. Reports have been published on the impacts of the Bathurst Bay cyclone of 1899, Cyclone Althea and extended wide-spread flooding in the early 1970s, Cyclone Kathy in 1984, and two large floods a month apart in the Mary River in 1992. These reports led DERM staff in February this year to predict that there would be substantial increases in dugong and turtle strandings five to eight months after the extreme weather events. Strandings have already shown an increase over the past two years. The expert opinion is that while the flow-on impact of the recent extreme weather will cause some localised reductions in dugong and green turtle populations, the species are not at risk of shifting to a higher threatened species risk category. Given

the already strong habitat protection that is in place through national parks and marine protected areas, DERM is confident that the populations will recover, assuming that the recent extreme weather conditions do not continue over the next few years. DERM has been working with DEEDI on evaluating seagrass beds.

38. There is a large increase in reported deaths of dugongs and turtles in Queensland waters since the 2010/2011 floods and, while the increase in deaths cannot be attributed to a single cause, preliminary indications are that the effect of the floods on food sources has contributed significantly to the increased deaths.
39. The Scientific Advisory Panel assessed the issues associated with the increased turtle and dugong deaths in the Gladstone area earlier this year (the Scientific Advisory Panel also assessed fish deaths however DEEDI is responsible for this area) and determined that the poor health and increased deaths of marine wildlife in eastern Queensland have resulted from the negative impact of extreme protracted flooding over the last two years and the occurrence of three major cyclones impacting the north Queensland coast in recent years. The indications are that there has been extensive loss of seagrass along many parts of the coast south of Cairns. These damaged seagrass areas are expected to take more than a year to recover. This reduction in marine pasture is having the most noticeable impact on dugong and green turtles. There is an increased proportion of dugongs and turtles in poorer body condition, with an increased number of deaths. These marine animals are expected to move more widely than normal in search of suitable food resources with resulting changes in distribution patterns. Animals in poor condition are also less likely to survive encounters with humans.
40. In relation to ecological damage in South East Queensland the likely cause of ecological damage is sediment run off and freshwater flows. Testing shows that approximately one million tonnes of topsoil was deposited within 10 days. This is three times the average yearly load. However this is a known underestimate because it does not take into account urban impacts. Attachment **JP-29** details this further.
41. The likely cause of ecological damage in the Great Barrier Reef (GBR) is not certain as the data has not been fully analysed. It is likely to be a decline in seagrass over a number of years caused by sediment runoff and freshwater flows. While DERM monitors water quality in the catchments flowing to the GBR, GBRMPA monitors water quality within the GBR.
42. To come to a definitive conclusion of the causes of ecological damage or relative contributions of different causes in areas for which DERM is responsible would require the preparation of a final report, including compilation and analysis of all test data collected. The timeframe for completing such a report would be two to five years. Firstly, it would be necessary to wait until the spike of marine deaths has finished, with further test data being collected in that time, which could be some years. Secondly there are possibly only two staff within DERM with the required expertise to complete such a report and both staff have a competing workload.

Item 6: An account of what actions can be taken, if any, to minimise the impact of displacement of sediment by flooding on marine and freshwater ecosystems and for each action that can be taken:

- a. **whether that action has been taken by DERM, and if so when,**
 - b. **whether or not DERM intend to take that action and in either case, the reason for that intention**
 - c. **the timeframe over which that action could be completed for areas significantly affected by sediment displacement**
 - d. **any barriers to the completion of that work**
43. There are three main actions which can be taken to minimise the impact of displacement of sediment by flooding on marine and freshwater ecosystems:
- a. Managing rural runoff.
 - b. Managing urban runoff.
 - c. Managing point sources of sediment.
44. For “Managing rural runoff”:
- a. DERM and its predecessor departments have had some involvement in catchment management programs assisting to control diffuse sources of sediment including Healthy Country Program, Natural Heritage Trust Programs, Great Barrier Reef - Reef Plan, Best Management Practice, Q2 Coast to Country and programs run by Natural Resource Management (NRM) Groups. This involvement has spanned the last twenty years. DERM does not generally directly perform the actions under the programs. DERM’s involvement is mostly only either in providing funding to NRM Groups or providing scientific data or advice. I understand that [REDACTED] will be providing a statement to the Commission regarding DERM’s regulation of runoff in the Great Barrier Reef.
 - b. DERM intends to perform any actions for which it is responsible in any catchment management program.
 - c. This is ongoing work which could be reasonably expected to take decades.
 - d. I cannot specifically comment on barriers to completion of the work as it is outside my area of expertise apart from generally commenting that possible barriers would be funding and skills availability.
45. For “Managing urban runoff”, including managing erosion during civil construction and implementing water sensitive urban design:

- a. This action is done through the State Planning Policy for Healthy Waterways (SPP 4/10). SPP 4/10 is attachment **JP-30**, the Guidelines are attachment **JP-31** and a fact sheet is attachment **JP-32**. SPP 4/10 seeks to improve water quality in waterways by ensuring planning and development assessment under the *Sustainable Planning Act 2009* incorporates the environmental values of the Environmental Protection (Water) Policy 2009. DERM is working with Local Government Associations and industry to implement SPP 4/10.
- b. DERM has no increased approvals role under SPP 4/10. DERM will, when requested, provide advice to planners and assessment managers about urban stormwater quality, waste water management and environmental values.
- c. This is ongoing work which will last for the lifetime of SPP 4/10, and the implementation of SPP 4/10 within Local Government Associations might take some years.
- d. I cannot specifically comment on barriers to completion of the work as it is outside my area of expertise apart from generally commenting that possible barriers would be resourcing and skills availability within Local Government Associations.

46. For “Managing point sources of sediment”:

- a. There are very few specific industrial point sources of sediment. Where necessary, DERM uses a licensing approach to regulate release.
- b. DERM intends to perform any actions for which it is responsible in any licensing regime.
- c. I cannot specifically comment on timeframes for licensing approvals as it is outside my area of expertise.
- d. I cannot specifically comment on barriers to completion of the work as it is outside my area of expertise.

47. It is not actually possible to control displacement of sediment by flooding in all cases, particularly for extremely large floods. It is also normal ecology that a large flood will spread over a floodplain, initially killing animals and plants, but depositing soil and organic matter leading to a possible increase in animal and plant numbers in the future.

Item 7: A brief overview of the regulation by DERM of the toxicity of agricultural runoff, including chemicals and fertilisers.

48. I cannot answer Item 7 because, except as relating to the Great Barrier Reef, it does not refer to work done by DERM.

49. I understand that [REDACTED] will be providing a statement to the Commission regarding DERM's regulation of agricultural runoff in the Great Barrier Reef.

Item 8: An account of how DERM determines the allowed levels of certain chemicals and fertilisers; in particular, how flood is taken into account in that determination.

50. I cannot answer Item 8 because except as relating to the Great Barrier Reef, it does not refer to work done by DERM. The Australian pesticides and veterinary medicines authority (APVMA) regulates the use and labelling of pesticides in Australia. In Queensland, DEEDI is responsible for enforcing the use of chemicals according to their labelling.

51. I understand that [REDACTED] will be providing a statement to the Commission regarding DERM's regulation of chemicals and fertilisers in the Great Barrier Reef.

I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the *Oaths Act 1867*.

Signed [REDACTED]
Julia Playford

Taken and declared before me, at Brisbane this 24th day of November 2011

[REDACTED]
.....
Solicitor/Barrister/Justice of the
Peace/Commissioner for Declarations