

# Noosa Fish Health Investigation Taskforce

Interim Report #2  
March 2010

On 26 March 2009, the Department of Primary Industries and Fisheries was amalgamated with other government departments to form the Department of Employment, Economic Development and Innovation.

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## Executive Summary

The Noosa Fish Health Investigation Taskforce (the Taskforce) was established by the **Minister for Primary Industries and Fisheries** in January 2009. Since then the **Department of Primary Industries and Fisheries** has been incorporated into the Department of Employment, Economic Development and Innovation (DEEDI). This change has not impacted, or altered, the work of the Taskforce, nor the responsibilities of the Minister in relation to this investigation. The role of the Taskforce is to investigate fish health issues involving the Sunland Fish Hatchery and the surrounding Noosa catchment.

Interim Report #1, released in June 2009, contained Terms of Reference for the investigation, a summary of issues and a summary of investigations conducted prior to May 2009 (Phase 1). The report focused on the preliminary analysis of six syndromes or incidents. No definitive conclusions on the cause of the problems being experienced at the hatchery could be made based on the evidence collected to May 2009.

Since Interim Report #1 was released, a number of additional issues have emerged. This report outlines the issues being addressed in Phase 2 of the investigation (June 2009 – February 2010). The report also indicates the type of outcomes that will likely be included in the final report. No specific results are presented in this report because analysis is continuing.

Significant information has been collected and analysed since May 2009 and the final report from the Taskforce is due in April 2010. There have been three additional incidents reported at the hatchery involving further deformities and mortalities of fish, adding to the six events or syndromes listed in Interim Report #1.

There have also been reports of a number of sick animals (including horses and ducks) and people near the fish hatchery that are claimed to be the result of chemical contamination. The reports and investigations are mostly outside the terms of reference of the Taskforce, but results of relevant investigations into these claims will be considered in the final report.

Despite these additional incidents the two major issues being addressed continue to be:

- Deaths or deformities in fish at the Sunland Fish Hatchery independent of the Noosa River system and allegedly linked to spray activities of the adjacent macadamia farm.
- Deaths or deformities in fish at the Sunland Fish Hatchery, allegedly due to some aspect of the Noosa River system unrelated to the adjacent macadamia farm.

Phase 2 of this investigation has included continued analysis of the original six syndromes, extensive literature reviews and investigations into the incidents reported over the last six months. The Australian Pesticides and Veterinary Medicines Authority (APVMA) have prepared a spray drift modelling report which investigates potential fish exposure concentrations resulting from spray drift under local conditions. This work coupled with a literature review of toxic endpoints for fish has contributed to identifying the potential risks from both acute and chronic exposure to chemicals.

The investigation has been complex and difficult due partly to the inability to obtain definitive test results, the lack of definitive scientific evidence regarding cause-effect relationships, the continued emergence of new issues and the differing opinions of members of the Taskforce and Scientific sub-Committee.

The final report will contain a comprehensive summary of all results relevant to the deaths and deformities in fish as contained in the Terms of Reference for this investigation. The context and

discussion of results will also be provided. It will also contain a series of recommendations on the prevention of future adverse incidents.

## Update of Activities

This section is an update of activities since Interim Report #1 was circulated in June 2009.

### Meetings of Taskforce

Taskforce (membership in Appendix 1) meetings held since Interim Report #1 was completed are listed below.

- Taskforce Meeting #5: 3 July 2009
- Taskforce Meeting #6: 14 August 2009
- Taskforce Meeting #7: 8 October 2009
- Taskforce Meeting #8: 4 December 2009
- Taskforce Meeting #9: 2 February 2010
- Taskforce Meeting #10: 26 February 2010

A brief summary of the Taskforce meetings 5, 6, 7, 8, 9 and 10 can be found in Appendix 3.

### Meetings of Scientific Sub-committee

Scientific Sub-committee (membership in Appendix 2) meetings held since Interim Report #1 was completed are listed below.

- Scientific Sub-committee Meeting #3: 28 May 2009
- Scientific Sub-committee Meeting #4: 6 August 2009
- Scientific Sub-committee Meeting #5: 22 September 2009
- Scientific Sub-committee Meeting #6: 16 February 2010

There has been considerable additional work conducted by the Scientific Sub-committee out of session. This has included overseeing sampling programs, analysis of results, preparation of reviews of relevant literature and discussions with other scientists.

### Activity since June 2009

The major events and tasks that have occurred since the Interim Report #1 was released in June 2009 are listed below:

- Three fish health incidents were reported at the Sunland Fish Hatchery leading to additional investigations – mullet deformities (July 2009), Australian bass mortality (September 2009) and golden perch mortality (November 2009).
- Two draft veterinary reports were produced regarding the mullet deformities and the Australian bass mortality. These reports were provided to the SSC for consideration.
- Installation of the weather station at Sunland Fish Hatchery in October 2009 to record detailed weather conditions on the fish hatchery.
- Establishment by the Department of Environment and Resource Management (DERM) of a catchment wide water monitoring program using passive samplers.

- Presentation to the SSC of the APVMA spray drift modelling report. This report models the likelihood of spray drift from the neighbouring macadamia farm depositing chemicals on the Sunland Fish Hatchery and addresses likelihood of spray drift under different scenarios. Estimates are made of potential chemical deposition rates under each scenario.
- Rainwater tank sampling was undertaken by Queensland Health on a number of properties in the immediate vicinity of the investigation site to investigate concerns raised about possible human health impacts from spray drift.
- Establishment of communication channels between the affected property owners/operators to ensure that farm and hatchery management information was able to be shared during the spraying and spawning seasons that have recently been completed.

## Investigations

Interim Report #1 focused on the six identified syndromes. Data from these investigations has been collected and results of testing are now being collated and analysed (Phase 1 of the investigation). However, the extent of the investigations has been expanded by the events recorded since July 2009.

The intention of the Taskforce process was to monitor a full spawning and breeding season at the hatchery to determine if events were ongoing or restricted to past incidents. Over the past six months a number of additional events have been reported and investigated.

### Fish Investigations at Sunland Fish Hatchery since May 2009

- Mullet spawning in July 2009 – following production of deformed embryos from mullet broodstock collected from the Noosa River. This resulted in a trial being established by Fisheries Queensland at the Bribie Island Research Centre (BIRC) (see below).
- Australian bass fry mortalities in September 2009 – with bass broodstock that were sourced from outside the Noosa catchment.
- Golden perch in November 2009 – fingerlings placed in an outside pond were presumed to have died when they were unable to be located.

### Mullet Breeding Project

A mullet breeding project was undertaken by Fisheries Queensland staff at the BIRC using mullet sourced from the Noosa River. The project was undertaken as a result of the mullet spawning incident at Sunland Fish Hatchery in July 2009. The report of the project states that embryonic development was slower than expected, but did not show unusual deformities. Reasonable numbers of normal larvae hatched, and samples of embryos, larvae and broodstock have been submitted for more detailed analyses.

### Fish Investigations in Noosa River Catchment

A report has been completed of available data describing fish stocks in the Noosa River catchment which includes:

- Long-term monitoring data collected by Fisheries Queensland
- Tag/recapture data from recreational anglers
- Data collected by the Environmental Health Monitoring Program (Healthy Waterways Partnership)
- Reports of bass by-catch by the Noosa Estuary commercial net fishery.

The report was peer reviewed by relevant experts before submission to the SSC.

## Monitoring

In addition to actively responding to reported incidents at Sunland Fish Hatchery, a major focus for the Taskforce and its member agencies has been to establish monitoring programs and systems to address concerns regarding potential chemical contamination. Consequently, over the last seven months a series of monitoring programs have been implemented. These are summarised as:

- *Hatchery site sampling* also involving the monitoring of agricultural and other chemicals used nearby (overseen by Taskforce members but coordinated by Biosecurity Queensland).
- *Environmental sampling* involving passive water samplers placed within the Noosa River Catchment (overseen by Taskforce members but coordinated and managed by DERM).
- *Rainwater tank* monitoring involving the testing of household rainwater tanks (coordinated and managed by Queensland Health).

### Hatchery site sampling

Filter paper samplers have been deployed at the hatchery to test for the presence of spray drift from neighbouring areas. In addition there have been a large number of water and fish samples collected and analysed for the presence of a range of chemicals.

This includes the completion of Phase 1 investigations and a significant number of analyses related to the incidents and activities over the past six months. Investigations into the sickness of other domestic animals at the hatchery site have also resulted in further samples being submitted for chemical and toxin analyses. These results will be included in the final report.

### Environmental sampling

In August 2009, environmental water samplers were deployed at nine locations throughout the Noosa River System to monitor chemical contaminants in the water. Replicate samplers were placed at two locations. The first of these samples was collected from 27 July 2009 to 26 August 2009, with the second sampling collected from 11 December 2009 to 11 January 2010.

This sampling is to address concerns that the Noosa River catchment is being polluted by agricultural chemicals. A major role for the Taskforce is to assess the potential impacts of very low levels of chemicals that have been found in the river system. This analysis has considered issues such as the potential impacts of long term exposure to low levels of chemicals in the aquatic environment, and the potential for additive (or combined) effects of different chemicals.

Previous experience has shown that very low levels of chemicals (well below the recommended safe levels for drinking or exposure) are likely to be detected using this process. The implications of these low levels on animals such as fish is complex and for most species unknown. Data from studies overseas has been useful as a guide. However, given the current state of scientific knowledge in this area, firm conclusions may be unable to be made. The results will be included in the final report.

### Human health Concerns

Concerns have been raised regarding human health issues during this investigation but are being considered by Workplace Health and Safety, Local Government, Australian Pesticides and Veterinary Medicines Authority, Queensland Health and residents' General Practitioners. Queensland Health has repeatedly monitored rainwater tanks and is assessing a report of a cancer cluster.

## Scientific Sub-committee work and report

The Scientific Sub-committee (SSC) was established by the Taskforce to consider all information relevant to the scientific investigation and provide an interpretation to the Taskforce of the possible cause or causes of the incidents at Sunland Fish hatchery and within the Noosa River system. Membership of the SSC is listed in Appendix 2.

A report from the Chair of the SSC to the Taskforce Chair in October 2009 identified that the focus of the investigations centred on the two main “events” or syndromes:

- |            |   |
|------------|---|
| Syndrome A | Deaths or deformities in fish at the Sunland Fish Hatchery independent of the Noosa River system and linked allegedly to spray activities of the adjacent macadamia farm. |
| Syndrome B | Deaths or deformities in fish at Sunland Fish Hatchery due allegedly to some aspect of the Noosa River system unrelated to the macadamia farm.                            |

The report of Chair of the SSC is a personal summary of activities to-date and does not present a consensus view of the SSC. There are differing views within the SSC about the results presented to date, which may impact on the ability of the Taskforce to present an agreed set of findings in the final report.

### Extract of report prepared by the Chair of the Scientific Sub-committee

The Chair of the SSC said that “It is highly unlikely that there is a single cause of the observed syndromes but a combination of factors is likely to be operating.”

This was based on:

#### For syndrome A

- the first spray risk assessment by the APVMA suggests that the chances of spray drift occurring are low but does not rule it out; a second assessment with different parameters (for example, pond water depth, spray calibrations) will be important in concluding the risk of spray drift contributing to the syndrome
- the apparent dearth of eco-toxicological data for these native species means that any conclusion or conclusions cannot be certain – it is likely that the SSC will recommend to the Taskforce that data of this type should be collected in the future (beyond the life of the current Taskforce)
- the recent installation of weather monitoring and spray drift monitoring equipment will contribute to a better understanding of the local issues and assist in determining the likely impact of spray drift
- the recent commencement of fish monitoring provides an additional method for monitoring impacts
- the chances of a fault with the hormone (quality or application) contributing to the syndrome are very remote
- no firm conclusions can be reached at present and ultimately the activities now in place (risk assessment; weather monitoring; spray collection; fish sampling) should clarify or limit the likely causes or combination of causes
- it’s likely to be a combination of the effects of chemicals from whatever source (hatchery, spray drift, other), predisposition of the fish to exposure due to environmental conditions at the hatchery and specific aspects of the enterprise itself (such as depth of water and/or cleanliness of the ponds) – the “causal web” theory
- the SSC is likely to recommend to the Taskforce that various monitoring activities continue past the life of the Taskforce.

### **For syndrome B**

- There is a claim that resident fish in the Noosa River have somehow been affected by conditions in the river itself and that this has affected their ability to produce many or any viable offspring
- this can only be conjecture given the very small sample size of fish allegedly affected
- the fact that something is occurring within the hatchery itself cannot be excluded
- for example if the BIRC spawning of resident river fish had also produced deformed embryos then the case for the hypothesis would have been strengthened; the fact that it did not does not rule out the hypothesis (given the limitations to how these results may be interpreted) but it certainly doesn't support the claim
- the SSC will recommend to the Taskforce a repeat of the spawning at Bribie with greater fish numbers and at a more appropriate time in the breeding season (an activity after the life of the Taskforce)
- interpretation of the catch and release data for bass in the Noosa River is that the data are not sufficiently robust to show a reduction in bass recruitment; an additional report on this has been prepared for peer review and subsequent presentation to the SSC for their information
- The passive sampling in the Noosa river system should clarify allegations of environmental contamination.

## **Communication and Stakeholder Engagement**

### **Communication**

The issues and incidents at Sunland Fish Hatchery continue to receive widespread publicity and interest. Apart from the release of some results of chemical testing, the release of information has been limited due to the need to ensure that all information can be placed in the context of the investigation.

### **Stakeholder Engagement**

As stated in Interim Report #1 one of the main tasks for the Taskforce was to provide a forum where all groups affected by this issue were able to openly discuss and share perspectives and information.

Difference of opinion within the Taskforce remains and continues to be addressed. The Taskforce also recognises that both property owners remain integral to a resolution of the investigation and the associated issues, and hence has worked constructively with both parties to keep them informed.

The Taskforce recognises that as well as the direct implications of any findings on the two property owners and the aquaculture and macadamia industries, there are a range of issues that may emerge from this investigation. These go beyond the scope of the terms of reference for the Taskforce. As such there will be a significant effort to work with all stakeholders who may be affected by the findings and recommendations of the final report and processes established to ensure issues not directly relevant to this Taskforce are raised with appropriate stakeholders.

## **Discussion**

This investigation has been complex and difficult partly due to the inability to obtain definitive test results, the lack of definitive scientific evidence regarding cause-effect relationships, the continued emergence of new issues and the differing opinions of members of the Taskforce and the SSC.

The main focus for the final report will be to place on record the results obtained and provide a comprehensive analysis of what these results mean. Where possible, causes for the events recorded will be documented. Where evidence is equivocal the range of potential causes will be listed and discussed.

The work associated with this investigation has been comprehensive (see list of relevant documents in Appendix 4). The final report will contain a series of recommendations covering issues relevant to the prevention of future adverse incidents at the Sunland Fish Hatchery and future activities at both the hatchery and the neighbouring macadamia farm. The report will clearly identify who or which agency or organisation is responsible for taking these issues forward.

In addition the final report will highlight and provide specific advice and recommendations regarding:

- gaps in the scientific knowledge identified by this investigation
- future research work to be conducted as a follow on from this investigation
- conditions under which agricultural spraying should be conducted including spray drift considerations such as;
  - buffers
  - timing
  - wind directions
- activities at Sunland Fish Hatchery and how biosecurity measures are undertaken
- the outcome of the scientific investigations by the APVMA on the use of a range of chemicals and recommendations regarding future use of chemicals
- lessons for the conduct of investigations of future incidents
- similar situations where fish farms and orchards are in close proximity and
- chemical use in the Noosa River catchment.

It is anticipated that the work of the Taskforce will cease following the presentation of the final report. However, it is likely that work will continue on a number of fronts to address issues raised and to follow up on any future incidents or issues that require ongoing investigation past April 2010. It is expected that where government involvement is required this will be through the relevant government departments.

## Appendices

### Appendix 1: Taskforce Membership

Participants	
Jim Thompson	Director, Biosecurity Sciences (DEEDI) (Chairperson)
Ron Glanville	Chief Biosecurity Officer & Chief Veterinary Officer - Qld (DEEDI)
Matt Landos	Private Veterinary Officer, Future Fisheries Veterinary Services
Paul Murray	Queensland Health
Margie Milgate	Growcom
Bruce Sambell	President, Aquaculture Association of Queensland
Ben Sale	Manager, Sunshine Coast, Brisbane North Region, Environmental Services (DERM)
Kerrod Beattie	Manager, Aquaculture Policy & Management (DEEDI)
Peter Kind	Principal Scientist, Freshwater Fisheries & Habitat (DEEDI)
Jolyon Burnett	Chief Executive Officer, Australian Macadamia Association
Caroline Dalton	Industry Communications Officer, Biosecurity (DEEDI)
Assoc Prof Heather Chapman	Ecotoxicologist, Griffith University
Munro Mortimer	Senior Principal Scientist, Investigations Water Quality and Aquatic Ecosystem Health, Division of Environment and Resources Sciences (DERM)
Daran Marteene	Sunshine Coast Regional Council
Michael Burke	Principal Policy Officer, Field Crops (DEEDI)
Andrew Langley	Public Health Physician, Sunshine Coast Health Unit, Queensland Health
Julia Playford	Director, Water Quality and Aquatic Ecosystem Health, Division of Environment and Resource Sciences (DERM)
Greg Robbins	General Manager, Animal Science (DEEDI)
Tiina Hawkesford	Senior Policy Officer, Taskforce Co-ordinator (DEEDI)
Russel Scholl	Principal Policy Officer, Plant Biosecurity and Product Integrity (DEEDI)
Roger Chong	Principal Veterinary Officer, BSL (DEEDI)
Secretariat	
Andrea Bontje	Executive Assistant, Biosecurity Queensland (QPIF)

## Appendix 2: Scientific Sub-committee Membership

Participants	
Greg Robbins (replaced Ian Douglas)	General Manager, Animal Science (DEEDI) (SSC Chair)
Roger Chong	Principal Veterinary Officer, Biosecurity Sciences Laboratory (DEEDI)
Peter Kind	Principal Scientist, Freshwater Fisheries & Habitat (DEEDI)
Richard Watts	Principal Scientific Advisor, Product Integrity (DEEDI)
Julia Playford	Director, Water Quality and Aquatic Ecosystem Health, Division of Environment and Resource Sciences (DERM)
Munro Mortimer	Senior Principal Scientist, Investigations, Water Quality and Aquatic Ecosystem Health, Division of Environment and Resources Sciences (DERM)
Andrew Langley	Public Health Physician, Sunshine Coast Health Unit, Qld Health
Matt Landos	Private Veterinarian, Future Fisheries Veterinary Services
Associate Prof Heather Chapman	Ecotoxicologist, Griffith University

## **Appendix 3: Summary of Meetings of Taskforce since Interim Report #1**

### ***Taskforce Meeting #5***

The meeting focussed on establishing a protocol for any future response to incidents, including sampling process, training for sampling and “hotline” facility. Agreed to develop a contingency plan and the SSC was asked to provide advice on surface traps for sampling. The meeting also acknowledged the differing views and interests of members on some issues. The SSC meeting report #3 was tabled which included strong differing views on the hormone issue. The APVMA had advised of a change to the labelling for Carbendazim.

### ***Taskforce Meeting #6***

The sampling protocol and contingency plan were examined and it was agreed to include a decision tree in the plan. The mullet spawning events and the subsequent work undertaken at BIRC were discussed. A process was established to implement communication channels between the owner of Sunland Fish Hatchery and the macadamia farmer regarding the upcoming spraying and breeding seasons. DERM has deployed passive samplers in the Noosa catchment.

### ***Taskforce Meeting #7***

The meeting looked the SSC meeting report #5 and the implications of the results received to date. The APVMA Modelling and Risk Assessment Report and the literature review “Incidence of malformations in fish embryos/larvae (Review)” prepared by Erick Prochazka were tabled. Prioritisation of Taskforce work due to be completed before final report in February 2010 was discussed. It was suggested that the Sunland Fish Hatchery/Macadamia Farm issues could be used as a case study for local governments.

### ***Taskforce Meeting #8***

Taskforce Meeting #8 focussed on activities that had been occurring during the corresponding macadamia and hatching seasons at the two properties. Updates were provided on events being investigated and actions being undertaken by members of the Taskforce and the Scientific Subcommittee. The need to conduct and complete sampling and finalise reports related to spray drift modelling was discussed. The content of Interim Report #2 was discussed.

### ***Taskforce Meetings #9 and #10***

Two short meetings were held by teleconference in February and centred on an update of what had been occurring over the Christmas period and what actions were required to complete the investigation. Discussions were held on the content and process for delivering a final report, particularly how the recommendations were to be framed.

## Appendix 4: Summary of documentation prepared as part of the investigation or contributing to investigations

1	A Protocol for Responding to Adverse Fish Health Events and Chemical Overspray/Drift Incidents at Sunland Fish Hatchery (draft) by Munro Mortimer
2	A summary of the Airblast Application Studies (1997) by the Spray Drift Task Force
3	Larval mortality investigation by Matt Landos Future Fisheries Veterinary Services, 30 October 2008
4	Incidence of malformations in fish embryos/larvae (review) 28 September 2009 Prepared by Erik Prochazka Smart Water Research Facility, Griffith University – Nathan/Gold Coast Campus
5	Noosa Fish Health Incident: Ecotoxicological Endpoints for Fish and Other Aquatic Organisms (27 May 2009) by Chris Lee-Steere - Report submitted to the APVMA
6	Noosa Fish Health Incident: Spray Drift Risk Assessment Relevant to Suspected Adverse Events in a Fish Hatchery Adjacent to a Macadamia Farm Chemical Review Work Order CR299-1 (17 September 2009) by Chris Lee-Steere – Draft Report submitted by the APVMA
7	1 <sup>st</sup> Veterinary Report on Sunland Fish Hatchery 3 <sup>rd</sup> Edition (16 October 2009) Silver Perch Kill, Bass Deformity and Neurologic Syndromes by Roger Chong. Report to Noosa Fish Health Investigation Task Force
8	Noosa Fish Health Investigation Task Force – Interim Report #1 May 2009 by Jim Thompson
9	2 <sup>nd</sup> Veterinary Report – Mullet Deformities Syndrome 2 <sup>nd</sup> Edition (29 September 2009) by Roger Chong. Report to Noosa Fish Health Investigation Task Force
10	3 <sup>rd</sup> Veterinary Report - Bass Fry Kill Syndrome 1 <sup>st</sup> Edition (23 October 2009) by Roger Chong. Report to Noosa Fish Health Investigation Task Force
11	Noosa River Bass Suntag Tagging and Recaptures 1983-2009 (2009) by Bill Sawynok
12	Sampling Plan for the Noosa Fish Health Investigation Taskforce by Munro Mortimer
13	Survey of Abnormalities in Hatchery Raised Fish (Noosa Region) (2009) by Kerrod Beattie
14	Survey of Abnormalities in Hatchery Raised Fish (SE Region) (September 2009) by Kerrod Beattie
15	Technical Report Spawning of mullet from the Noosa River at BIRC - July 2009 Prepared by Dr Paul J Palmer, Senior Biologist, BIRC, DEEDI