

# Noosa Fish Health Investigation Taskforce

Interim Report #1  
June 2009

PR09

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 was established by the Minister for Primary Industries and Fisheries in January 2009. The role of the Taskforce was to further investigate fish health problems at the Sunland Fish Hatchery on the Sunshine Coast and broader fish health issues associated with the Noosa River catchment.

The work of the taskforce complements an on-going Queensland Primary Industries and Fisheries (QPIF) investigation into a series of adverse fish health events that were initially reported in 2006. There have been six different syndromes or events involving the illness, death or deformity of fish identified over the past three years.

The first investigation by QPIF (January 2006) focussed on concerns regarding allegations of spray drift from chemical spraying operations on the neighbouring macadamia farm. Investigations at the time were unable to identify the cause of the problem. Nonetheless, recommendations concerning chemical usage, spraying equipment and strategies to minimise off target spray drift were provided to the macadamia farm operator at that time. Management of the farm has since changed. With more recent events, due to difficulties in reporting the events immediately they occurred, the opportunity was not available to take comprehensive samples and conduct a full investigation. However all available evidence has been collated and analysed. The event in December 2008 was reported promptly and has been subject to a detailed investigation.

This Interim Report #1 provides a brief summary of the investigations conducted to-date, actions of the Taskforce over the previous four months and reports on the initial findings from the Scientific Sub-committee of the Taskforce.

The Taskforce will complete additional work including further analysis of results obtained; spray drift modelling, hazard/risk assessment and possible experimental work. However the investigation has progressed to a stage where effectively all available avenues for investigation related to past events have been completed. The Taskforce and QPIF will investigate any other events should they occur.

The Taskforce has identified a number of separate syndromes and grouped them into six categories. Some of the syndromes, particularly the widely reported 'two-headed fish larvae', have received considerable publicity. These syndromes are described in Table 1.

**Table 1: Syndromes identified at Sunland Fish Hatchery**

	<b>Syndrome</b>	<b>Temporal distribution</b>	<b>Spatial distribution</b>	<b>Species affected</b>
1	Sudden deaths	Nov 05 – Jan 06	On farm	Multiple
2	Sudden deaths	Oct 07	On farm	Silver Perch/Golden Perch
3	Spinning juveniles	Oct 07 & Oct 08	On farm	Silver Perch/Golden Perch
4	Deformities, ill thrift	Feb 08	On farm	Silver Perch/Golden Perch
5	Deformities - Including 2-headed fish larvae.	Jul 08	Sourced from Noosa River (Occurred on farm in isolated shed with introduced water)	Australian Bass
6	Sudden death	Dec 08	On farm but introduced stock	Silver Perch (1 Mullet)

Investigations to-date have involved a comprehensive veterinary investigation at the Sunland Fish Hatchery, analysis of spray records and chemicals used on both properties, analysis and testing of

a range of water samples and assessments of fish records from the Noosa River. The investigations have concluded that the hatchery was an effective producer of native fish species for Queensland over a 20 year period. Similarly the investigation has found that the macadamia farm is currently operating in accordance with best practice with respect to the use of chemicals. Both operators have worked constructively and cooperatively with the taskforce in trying to resolve this case.

There has been considerable speculation that the cause of the problems at the hatchery was related to chemical use on the neighbouring macadamia farm. Investigations to-date have attempted to address this issue as well as assess wider issues including hatchery infrastructure and water supplies, husbandry practices and procedures, feeding and biosecurity practices and fish disease management.

To-date no definitive diagnosis has been found for any of the six identified syndromes despite a comprehensive investigation. Only two of the samples taken have tested positive for any chemical contaminants (one fish feed sample from the Hatchery (tested in December 2008) and one environmental sample from Cooloothin Creek (tested in May 2009)). Neither of these can readily be linked as cause/effect to the syndromes listed at this stage.

The Taskforce acknowledges the problems with sampling for chemicals that may be present for only a brief period, or occur at extremely low concentrations that may be below our most sensitive tests. Not detecting a residue in samples does not necessarily rule out any possible impact from a chemical.

At least in respect to the latest syndrome investigated, it seems likely that two or more factors operating in conjunction may have caused the problem. This means that correction of one or more of these contributing factors may avoid recurrence as long as the contributing factor and its impact can be identified.

In the interests of an open and transparent investigation process this report contains some preliminary discussion on the potential causal factors of the six syndromes identified. These preliminary findings suggest the following.

**Syndrome 1: Sudden death of multiple species on farm**

In the absence of any samples to test or other material that can be investigated, the Taskforce is prepared to accept that contamination from a spray event was a possible explanation of the event, but there is no clear evidence to support this or identify the chemicals involved.

**Syndrome 2: Sudden death of Silver Perch/Golden Perch on farm**

At this point no explanation can be provided.

**Syndromes 3-4: Spinning juveniles, deformities, ill thrift on Silver Perch/Golden Perch**

A remedial effect on juvenile fish was observed following atropine treatment. Given the specific treatment effect of atropine on symptoms of poisoning by organo-phosphate and carbamate compounds, it is likely that these chemicals probably played a part in these events. The source and identity of any possible chemical is not determined.

**Syndrome 5: Deformities in Bass larvae (including two-headed larvae)**

The Australian Bass spawning event, involving the progeny of four females in a single episode, produced deformities in July 2008. These females were sourced from the Noosa River and spawned in a shed at the aquaculture facility that was protected from spray drift. There is no evidence that any pesticide or chemical contamination of the Noosa River or on-farm was involved in this event. At this point no explanation can be provided and further information is being explored.

### **Syndrome 6: Sudden Death of Silver Perch**

At this point no explanation can be provided. The veterinary investigation suggests that this syndrome was not one of simple cause and effect but suggests the possibility of a “causal web”. The sudden death of fish can result from two or more factors acting in concert. Possible factors include gill fluke infestation, chemical contamination, high water temperature, low water oxygenation levels or other stressors.

At this stage of the investigation all testing of samples (both fish and water) has been completed. Testing to-date has found no evidence of any pesticide or chemical in any samples with the exception of one fish feed sample and two passive water samplers placed downstream from the hatchery. This latter result was only reported recently and the implications/origin of these chemicals is currently the subject of more detailed analysis.

Elements of the future work program and the role of the Taskforce in terms of ongoing communication and stakeholder engagement are also discussed in this report. Interim Report #2 is due in September 2009 and the final report from the Taskforce is due in February 2010.

## Background

Reports of fish health problems at the Sunland Fish Hatchery on the Sunshine Coast have been received by Queensland Primary Industries and Fisheries (QPIF) since January 2006. Prior to this only sporadic problems had been observed at the hatchery. Over the past 3 years there have been six syndromes or incidents identified. Some of these, such as those widely reported under the 'two-headed fish larvae' headline, have received considerable publicity. Due to community concerns an expert panel was assembled to investigate the cause of the fish health problems at the Sunland Fish Hatchery and broader issues associated with fish in the Noosa River System.

The Noosa Fish Health Investigation Taskforce was established by the Minister for Primary Industries and Fisheries in January 2009 and is managed by Queensland Primary Industries and Fisheries (QPIF). QPIF is now a business unit of the Department of Employment, Economic Development and Innovation (DEEDI). The Taskforce includes scientists and officers from Queensland Primary Industries and Fisheries (QPIF), Department of Environment and Resource Management (DERM), Queensland Health, affected industry representatives, a private aquaculture veterinarian and an independent ecotoxicologist. To date, the Taskforce members have met on four occasions.

As an outcome of the first Taskforce meeting a Scientific Sub-committee was formed and has been tasked with drafting the full scope of the scientific investigations that will occur over the next twelve months. The Scientific Sub-committee has met on three occasions and has reported back to the Taskforce on their progress to date.

To assist in determining the scope of the investigations, a detailed time-line of past events is currently being constructed using information supplied from all parties involved. An abridged timeline is presented as Appendix 1.

The Taskforce agreed that the final report could take up to 12 months given the complexity of the task and to ensure that the main spawning season for the hatchery in spring was able to be monitored.

The focus of the first phase of the Taskforce has involved 'looking back' at past events. This has involved investigation of all issues over the past 3 years and the analysis and interpretation of sampling that has occurred in relation to more recent incidents. This **Interim Report #1** is focussed on the summary of results to-date and the work still required to finalise the first phase of investigations. Information is also provided on future activities and planning by the Taskforce.

## Terms of Reference and Taskforce Membership

Terms of Reference for the Taskforce were developed to ensure that there were clear boundaries around the investigation in relation to timeframes and roles. The Terms of Reference also addressed concerns that were raised about potential broader ecosystem issues regarding the Noosa River catchment.

### Terms of Reference

1. Investigate the potential causes of fish deaths and larval deformities at the Sunland Fish Hatchery **from January 2006** with particular reference to:
  - appropriate aquaculture husbandry practices at Sunland Fish Hatchery
  - potential chemical contamination of ponds from agricultural practices
  - other possible causes.
2. Investigate any links between fish health problems at the Hatchery with broader ecosystem and fish health concerns in the Noosa River catchment.
3. Make findings or recommendations in relation to scientific sampling, analysis or experimentation to assist investigations.
4. Engage with relevant stakeholders including the affected parties, industry and relevant local and state government agencies.
5. Present a final report to the Minister on the outcome of the investigations to minimise the risk of similar occurrences in any aquaculture facilities by February 2010 with Interim reports of progress in April and September 2009.

### Taskforce Membership

There are a number of local and state government departments, industries and individuals that have an interest in the outcome of these investigations. Given these interests, the need for expertise in a number of fields and the need for transparency in the investigation the Taskforce have been inclusive with its membership. A full list of all members of the Taskforce and the Scientific Sub-committee is attached in Appendices 2 and 3.

## Meetings of Taskforce

The Taskforce has held four meetings since its inception. These meetings have been held on:

Taskforce Meeting #1: Wednesday 28 January

Taskforce Meeting #2: Friday 13 February

Taskforce Meeting #3: Tuesday 24 March

Taskforce Meeting #4: Tuesday 28 April

In addition the Scientific Sub-committee of the Taskforce has held three meetings.

Scientific Sub-committee Meeting #1: Monday 9 March

Scientific Sub-committee Meeting #2: Tuesday 7 April

Scientific Sub-committee Meeting #3: Thursday 28 May

A brief summary of the Taskforce meetings can be found in Appendix 4.

## Investigations

Investigations at the Sunland Fish Hatchery and in the surrounding catchment have been focussed on four areas. These are:

1. Veterinary investigations at the hatchery
2. Analysis of spray records and chemicals used on the neighbouring macadamia farm and at the hatchery.
3. Analysis of water samples from the hatchery, neighbouring properties and Cooloothin Creek.
4. Passive sampling conducted in Cooloothin Creek
5. Assessment of fish records and capture data from the Noosa catchment

### Veterinary investigations

A comprehensive onsite veterinary investigation has been conducted by QPIF at the Sunland Fish Hatchery. This investigation which commenced in December 2008 involved site visits by a QPIF Principal Veterinary Officer (Fish Pathologist) and an extensive investigation of the hatchery infrastructure and water supplies, processes and procedures, husbandry, feeding and biosecurity practices and fish disease management. From this investigation a number of fish, water and feed samples were taken for further laboratory investigations. One sample of fish feed taken for testing was found to have a chemical contaminant (see Appendix 5). Fish samples were examined for presence of tissue damage that could be attributed to viral, bacterial, parasitic or fungal organisms. Pesticide screening was conducted on fish and water samples and tests conducted to assess exposure to chemicals.

As a result of this investigation, advice and recommendations were provided to the hatchery operators on a range of measures from record keeping to biosecurity arrangements to ensure that the hatchery was operating at best practice standards. The overall assessment of the hatchery was that it was an effective producer of native fish species for Queensland and at the time of the inspection no significant husbandry, feed, genetic, infrastructure or staffing issues could be implicated in the fish kills and abnormalities experienced. A comprehensive report on this investigation was prepared and presented to the Scientific Sub-committee for consideration and subsequent advice to the Taskforce.

### Analysis of spray records and chemicals used

In addition to an assessment of the chemicals used at the hatchery undertaken as part of the veterinary investigation a comprehensive record and analysis of chemicals used on the neighbouring macadamia farm has been undertaken. These investigations began following allegations of spray drift from chemical spraying operations back in January 2006. This work involved on-site investigations of spraying activities, analysis of spray logs and assessments of the potential impacts of the registered agricultural chemicals being used on the farm on fish at the neighbouring hatchery. Investigations at this time were unable to identify the cause of the problem.

As a result of these investigations advice was provided to the macadamia farmer at that time concerning chemical usage, spraying equipment and strategies to minimise off target spray drift. Since that time there has been a change in management at the farm. The overall assessment of these investigations is that chemicals have been used legally and in accordance with label instructions. Currently the farm is considered to be operating under industry best practice guidelines. A comprehensive report of all investigations conducted in relation to chemical use and spraying on the macadamia farm was prepared by the local Biosecurity Officer (QPIF) from the Plant Biosecurity and Product Integrity business group. This report has been presented to the Taskforce and will be referred to the Scientific Sub-committee for consideration..

### **Analysis and testing of water samples**

To address concerns regarding possible pesticide contamination of water, water samples have been taken from the Sunland Fish Hatchery (QPIF), from house rainwater tanks in the area (QHealth) and from Lake Cooroibah, downstream from the hatchery (QPIF).

Results from this testing has to-date not detected the presence of any pesticides or chemicals within any water samples (with the exception of one sample tested recently and reported below) at the level of detection of the scientific equipment. Queensland Health has confirmed that water from the rainwater tanks complies with Australian drinking water guidelines.

While these results fail to confirm that fish health issues can be attributed to the presence of pesticides in the water they do not exonerate pesticides as a possible cause of these impacts. It is possible that chemicals could be in the water at levels that cannot be detected or that the presence of the chemicals in the water is transient and the sampling procedures were not sufficiently robust to detect their presence. These issues are currently being addressed by the Scientific Sub-committee.

### **Passive Sampling conducted in Cooloothin Creek**

Testing of potential contamination in the local waterways has also been conducted by the Department of Environment and Resource Management (DERM) through the use of passive samplers situated in Cooloothin Creek adjacent to the macadamia farm and at two sites further downstream.

The last series of water tests from passive samples employed by the Department of Environment and Resource Management (DERM) over the February-March 2009 period indicated that very low levels of agricultural and other chemicals were found downstream of the Sunland Fish Hatchery.

The pesticide detections were returned from two passive samplers placed at the same location downstream of the hatchery close to where Cooloothin Creek enters Lake Catharaba (see Appendix 5). These samplers were in place over January-February 2009. Other passive samplers placed adjacent to the macadamia farm and downstream did not detect the presence of any agricultural chemicals. The concentration of chemicals detected in these samplers is very low and considered negligible by Queensland Health in relation to potential impacts on humans. The source of these chemicals has not been determined. These results have been referred to the Scientific Sub-committee for further analysis.

### **Assessment of fish records and capture data from the Noosa catchment**

To address concerns that some incidents at the Sunland Fish Hatchery were the result of problems with fish stock captured from the Noosa River system an analysis of fishing data and fish broodstock has been initiated. The aim of this analysis is twofold:

- to survey known fish hatcheries to determine if problems identified at the Sunland Fish Hatchery were recorded elsewhere when Noosa River broodstock were used;
- to identify if there are long term ecosystem health issues in the Noosa River that may be associated with a decline in fish stocks.

Fisheries officers from QPIF have begun these investigations and they are ongoing and will be partly based on tagging records of Australian Bass in the Noosa River from 1983-2009.

## Scientific Sub-committee

The Scientific Sub-committee was established by the Taskforce to consider all information relevant to the scientific investigation and provide an interpretation of the cause of the incidents at Sunland Fish Hatchery and within the Noosa River system. Membership of the Scientific Sub-committee is listed in Appendix 3.

The Scientific Sub-committee established the following **guiding principles** to direct its work program and deliberations.

- *Work through the risk assessment framework to clearly identify what events we are investigating through sampling/experimentation*
- *Identify possible causes of the problems and how they are to be investigated*
- *Identify which events will not be investigated due to lack of possible evidence*
- *Identify previous scientific work relevant to these investigations (literature review)*
- *Identify gaps in the literature particularly related to the potential impacts of chemicals on fish*
- *Assess sampling programs conducted to-date. What they mean and what they don't?*
- *Recommend other sampling programs and provide advice on design of these programs.*
- *Recommend possible experimental or research programs that may be required.*

The Scientific Sub-committee has held three meetings. In order to draw together the many disparate parts of the investigation the committee identified six syndromes that were the focus of the investigations into previous problems identified at the hatchery. These were identified based on reports collated in the timeline of events (Appendix 1 for abridged timeline). These are classified as Phase 1 investigations and are described in Table 1.

**Table 1: Syndromes identified at Sunland Fish Hatchery**

	<b>Syndrome</b>	<b>Temporal distribution</b>	<b>Spatial distribution</b>	<b>Species affected</b>
1	Sudden deaths	Nov 05 – Jan 06	On farm	Multiple
2	Sudden deaths	Oct 07	On farm	Silver Perch/Golden Perch
3	Spinning juveniles	Oct 07 & Oct 08	On farm	Silver Perch/Golden Perch
4	Deformities, ill thrift	Feb 08	On farm	Silver Perch/Golden Perch
5	Deformities (Inc. 2-headed fish larvae)	Jul 08	Sourced from Noosa River (Occurred on farm in isolated shed with introduced water)	Australian Bass
6	Sudden death	Dec 08	On farm but introduced stock	Silver Perch (1 mullet)

### **Scientific Sub-committee synopsis to-date**

A synopsis of investigations to date was prepared following the second meeting of the Noosa Fish Health Investigation Scientific Sub-committee. The Sub-committee has further work to complete before a comprehensive report or findings from Phase 1 Investigations can be presented. The first report from the Scientific Sub-committee to the Taskforce was a synthesis of the information collected to date and provides a brief comment on the nature of investigations undertaken. The report provides interim discussion of the potential causes of the six syndromes identified based on evidence available to-date.

The following is a summary of the key elements of Scientific Sub-committee report based on those prepared by the Chair, Ian Douglas.

#### **Synopsis to date:**

- The investigation is not complete, but it is expected that the Scientific Sub-committee will provide a report on Phase 1 of the investigation by August.
- No new adverse effects were reported.
- No samples remained to be tested.
- The group had previously identified six separate (although potentially related) syndromes (see Table 1).

The following summarises investigations to-date using information contained in the Scientific Sub-committee report.

#### **Syndrome 1:**

It seems that the hatchery owner and adjacent farmer at that time suspected that a spray event was involved. In the absence of any samples to test or other material that can be investigated, the Scientific Sub-committee is prepared to accept that a spray event was a plausible explanation of the event. It is noted that there is a lack of evidence to scientifically support this conclusion.

#### **Syndrome 2:**

At this point no explanation can be provided.

#### **Syndromes 3-4:**

These events demonstrated some remedial effect following atropine treatment. Given the specific treatment effect of atropine on organo-phosphate and carbamate compounds, the sub committee accepts that these chemicals may have played a part in these events. The source and identity of any possible chemical is not determined.

#### **Syndrome 5:**

The Australian Bass spawning event, involving the progeny of four females in a single episode, produced deformities in July 2008. The Scientific Sub-committee is advised that, while occurring on the hatchery, these fish were isolated from any spray drift contamination that might have occurred on-farm. For this reason, it has been suggested that these fish may be demonstrating exposure within the Noosa River where they were sourced, however there is no evidence to support this suggestion at this time. Therefore, it is important to assess when and where this damage may have been instigated. This includes consideration of the early development of fish and investigations will include assessments of a range of possible causes of larval deformities. At this point no explanation can be provided and this syndrome is subject to ongoing investigation

## Syndrome 6:

The histopathology reported indicates that this syndrome was not one of simple cause and effect but rather suggests the possibility of a “causal web”. That is two or more factors acting in concert could have caused the deaths. Possible factors include gill fluke infestation, chemical contamination, water temperature, water oxygenation levels or other stressors. Fish sampling occurred between the first and second waves of losses. It may be that a chemical(s) was/were involved in this causal web but on the basis of the testing performed, it is not possible to implicate any one chemical as the cause at this time.

In addition to the comments above on possible causes the following information was provided from the Scientific Sub-committee.

To-date, no detection of any pesticide or chemical involved in spraying has been found in any sample that has been tested. The only exception is a single positive sample taken from fish feed. **(Since this Scientific Sub-committee report was tabled chemicals were detected in the passive sampling in Cooloothin Creek and are described in the Investigations section of this report).** This feed is not exposed to environmental contamination on the hatchery. Only a small amount of fish feed was used and this is likely diluted when placed in the ponds. The potential for contamination of ponds or tanks from using this feed is still being investigated.

It is acknowledged that very low concentrations of some chemicals in water could potentially cause an adverse effect on fish. A number of variables are involved including the breed of fish, hydrophilic/hydrophobic nature of some chemicals and associated water quality parameters (e.g. temperature, dissolved oxygen). The short half lives of some chemicals means that they are not easy to detect in water. It should be noted that failure to detect any residue does not exonerate the chemical. However for each sample where chemicals were not detected it is important that one of the following conclusions is reached: 1) the Limit of Quantification (LOQ) was not low enough to assess the risk; 2) the sample chosen (time, matrix etc.) was not appropriate to assess the risk; 3) there is insufficient hazard data to draw conclusions; or 4) pesticides weren't involved in the fish health syndromes.

Balancing this is a number of factors:

- Testing methods were refined to produce a 10-fold increase in test sensitivity, providing a detection level of 1 µg/litre (1 part per billion) and no still residues were detected at that level.
- Susceptibility levels of various breeds vary considerably.

In order to produce the observed effect as a result of chemical impacts, the following would have to apply:

- The chemical must be capable of causing the observed effect;
- The chemical must be present in the environment where the fish eggs or larvae occur – that is it must be released into the general area;
- The chemical must be present in the environment, long enough to cause the effect;
- The chemical must transport to the ponds;
- The chemical must be present in places in the ponds where it becomes available to fish to achieve a detrimental level in the fish;
- If no chemical is detected then the chemical would need to have its effect at a level below the limit of reporting or be too transient to be sampled successfully;
- The chemical must be taken up (bioconcentrated) by the fish to a level that causes a response to occur.

It has been alleged that bass numbers in the Noosa River have declined in recent years on the basis of anecdotal advice from commercial fishermen who encounter bass as a by-catch in estuarine net fisheries. The Sub-committee has sought objective information on this. Long-term monitoring data from QPIF will be integrated with details of bass tagging programs in the Noosa River (1983-2009), data collected by the SEQ Healthy Waterways program, commercial fishing log books and stakeholder interviews to reach an informed conclusion on the validity of these allegations. None of these data sources alone are likely will provide definitive information as to the cause of any trends that emerge. Declines in fish numbers within coastal rivers almost invariably involve the effects of multiple stressors including habitat alteration, flow regulation and fishing pressure. Interviews with hatchery operators suggest that some reduction in numbers has occurred in recent years with a range of potential causes identified. No abnormal effects or a problem in spawning has been recorded outside of the Sunland Hatchery although sample sizes are low.

## Discussion

The Noosa Fish Health Investigation Taskforce was established with the expectation that a final report would be delivered in February 2010. This recognised the need to investigate a series of events or syndromes that occurred from late 2005 to late 2008. For a number of these syndromes no samples were available and the investigation relied on assessing all possible causes of an event and matching this to known or purported actions at the time. For events where samples were taken the aim was to determine through scientific testing the cause of these incidents. This work was considered to be Phase 1 of the investigation.

This phase of the work is substantially complete and to-date it has been difficult to arrive at any definitive diagnosis of the cause of the problems. There is circumstantial and scientific evidence that has been collected that will allow the Taskforce to identify possible causes of the problems and these will be addressed more completely in the final report.

There remain differences of opinion within the Taskforce concerning the evidence presented to date. Over the next few months it is hoped that further analysis and assessment of this information will provide greater clarification.

However equally critical is the need to move onto the second phase of these investigations which will involve finalising a desk top risk/hazard assessment. This work will determine if any experimentation or additional sampling or testing is possible or required to address past incidents.

An additional component of this work in Phase 2 is to recognise the need to establish clear procedures and protocols for dealing with any future events. One of the concerns repeatedly expressed about the earlier events was that inadequate sampling has made it very difficult to determine the cause of the past problems. Procedures need to be in place by July in preparation for breeding activities at the hatchery and spraying season on the adjacent macadamia farm. It is imperative that any future problems are able to be immediately investigated.

It has been important to recognise that two industries and a number of individuals have been significantly adversely impacted by the events. The role of the Taskforce is to ensure that as much as practical both industries have a clear way forward from these events. Work has also commenced to ensure that there are clear lines of communication between the two enterprises to ensure that both owners/operators of the production enterprises are aware of upcoming activities on both properties.

## Future Actions

The following actions are currently being addressed by the Taskforce and the Scientific Sub-committee.

### Taskforce Actions:

- Complete Phase 1 investigations and reporting
- Establish protocols for sampling for new incidents
- Establish communication channels between the affected property owners/operators prior to upcoming spraying and hatching seasons
- Finalise Taskforce Workplan for remainder of 2009
- Interim Report #2 due in September to provide final analyses of Phase 1 investigations

### Scientific Sub-committee Actions

- Following the next meeting the Chair to summarise the findings and conclusions as far as possible in relation to Phase 1 investigations and report to the Taskforce.
- QPIF Fisheries staff to collate and analyse available fishing data and records from the Noosa River.
- Provide recommendations to the Taskforce on any experimental work that may contribute to the investigations for inclusion in Taskforce Workplan
- Finalise risk/hazard assessment.
- Identify the agricultural enterprises that occur within the local area (encompassing both the Noosa River and Cooloothin Creek catchments) and provide details of the pesticides likely to have been used in those industries.
- Investigate with the Australian Pesticides and Veterinary Medicines Authority spray drift models to provide a more comprehensive knowledge on the potential impacts of spraying near the hatchery. This work to also involve a more detailed analysis of chemicals used at the aquaculture facility.

# Communication and Stakeholder Engagement

## Communication

The issues and incidents at Sunland Fish Hatchery have received widespread publicity and continue to generate interest. There has been considerable radio, newspaper and television coverage. Some of the reporting has been unbalanced and has not recognised the complexities associated with this case. There remains significant interest in the findings of the scientific work being coordinated through the Scientific Sub-committee.

The continued reporting of this issue has been of some concern to members of the Taskforce. This is related to the fact that the investigations are incomplete and no definitive statements can be made at this stage.

Following each Taskforce meeting a Communiqué has been developed to ensure that the major issues discussed by the Taskforce are communicated. To-date this information has not included details on the results of testing of samples (water or fish) or any diagnosis of the cause or causes of the events at the hatchery as the investigations were not complete.

In addition to the Communiqué there have been a number of media releases/statements made by the Minister for Primary Industries and Fisheries to ensure that this investigation is conducted in an open and transparent manner. The most recent of these provided details regarding the detection of chemicals in the passive samplers in Cooloothin Creek.

## Stakeholder Engagement

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. The Taskforce has taken the approach of being inclusive and consequently this has resulted in expansion of membership of the taskforce. The Taskforce also recognises that both property owners are integral to a resolution of both the investigation and the issue and has worked constructively with both parties to keep them informed.

This issue obviously has direct ramifications for two industries, aquaculture and macadamia farming but also has relevance in relation to a range of land use planning issues. In relation to these issues the Taskforce has actively engaged with national regulators such as the Australian Pesticides and Veterinary Medicines Authority and other industry representatives. This work will continue.

## Appendices

### Appendix 1: Abridged Timeline of Events for the Noosa Fish Health Investigation

1974	40 Gilson Road Boreen Point Qld 4565 (210 acres) purchased by current owner of Sunland Fish Hatchery
1979-80	Commenced fish farming based on ornamental fish
1985	190 acres sold off (used for organic macadamia plantation –owner #1) Retained 20 acres which is now the site of the Hatchery
1986	Sunland Fish Hatchery started to work with Australian Bass (AB)
Early 1990s	Macadamia plantation sold to new owner (owner #2)
24/01/06	Fish deaths at hatchery reported to Regional Inspector (RI) QPIF. Hatchery and macadamia visited by QPIF
23/10/07	Fish deaths at the hatchery reported to RI QPIF. Hatchery and macadamia farm visited by RI QPIF
30/10/07	Hatchery Owner reports fish deformities in fish fry, dead fish and brood stock all dead. RI QPIF referred owner to Principal Veterinary Officer, Biosecurity Sciences Laboratory (PVO BSL).
30/10/07	Hatchery Owner contacted PVO BSL
31/07/07	Hatchery visited by RI QPIF
November 2007	Samples were collected from convulsing larvae before and after treatment with atropine. Samples subsequently submitted to laboratory by Private Veterinarian in October 2008
9/11/07	RI QPIF visits hatchery and provides sampling bottles for water samples requested by PVO BSL.
16/7/08	Australian Bass caught at Lake Cooroibah for breeding purposes
24/7/2008	RI QPIF advised macadamia farm now leased
19/09/08	Hatchery reports to RI QPIF that AB in the hatchery were spawning deformed embryos.
23/09/08	RI QPIF obtains water sample from Lake Cooroibah.
2/10/08	Chemical Residue Laboratory (QPIF) reports pesticide residues not detected in Lake Cooroibah water sample.
15/10/08	Private veterinarian consultant engaged by hatchery visits hatchery and collects various samples and delivers to PVO BSL.
28/10/08	Hatchery advises RI QPIF five spawnings of yellow tail show symptoms of convulsions and deformities.
31/10/08	Private veterinarian consultant lodges complaint with QPIF, DERM and APVMA formally submitting a case report and image dossier.
4/11/08	Samples submitted by private veterinarian processed for pesticides and histo 08-180386 and 08-180371
3/12/2008	Hatchery operator reports to RI QPIF concerns on spraying. RI's QPIF visit macadamia farm and observed spraying. A smoke fire observed on the northern side of the dam. Observed spray operator taking and recording wind measurements.
7/12/08	Hatchery reports to RI QPIF the death of six silver perch in one pond and that several other fish were breaking surface of the water and swimming on their sides.
8/12/08	RI QPIF visited the hatchery. Water samples were obtained from two outside ponds and a spawning tank inside the hatchery.
9/12/08	BSL staff visit hatchery and commence conducting a veterinary fish health investigation.
15/12/08	Hatchery advised RI QPIF that fish have progressively died up until 14/12/08 with a total number of deaths at 45.
14/01/09	Chemical Residue Laboratory reports pesticide residues not detected in the three water samples taken from the hatchery by RI QPIF on 8/12/08
28/01/09	Noosa Fish Health Investigation Taskforce convened by the Minister for Primary Industries and Fisheries

## Appendix 2: Taskforce Membership

<b>Participants</b>	
Jim Thompson	Director, Biosecurity Science (QPIF) <b>(Taskforce Chair)</b>
Ron Glanville	Chief Biosecurity Officer & Chief Veterinary Officer - Qld (QPIF)
Roger Chong	Principal Veterinary Officer, Animal Biosecurity Laboratories (QPIF)
Kareena Arthy	Managing Director, Biosecurity Queensland (QPIF)
Kerrod Beattie	Manager, Aquaculture Policy & Management (QPIF)
Ian Douglas	Manager, Animal Biosecurity & Chemical Residue (QPIF)
Peter Kind	Principal Scientist, Freshwater Fisheries & Habitat (QPIF )
Russel Scholl	Principal Policy Officer, Plant Biosecurity and Product Integrity (QPIF)
Michael Burke	Principal Policy Officer, (Field Crops) QPIF
Tiina Hawkesford	Senior Policy Officer, Taskforce Co-ordinator (QPIF)
Andy Christie	Industry Communications Officer (Biosecurity) QPIF
Julia Playford	Director, Freshwater and Marine Sciences (DERM)
Ben Sale (T)	Manager, Sunshine Coast, Brisbane North Region, Environmental Services (EPA)
Munro Mortimer	Senior Principal Scientist, Freshwater and Marine Sciences, Environmental Protection Agency (DERM)
Andrew Langley (T)	Public Health Physician, Sunshine Coast Health Unit, Qld Health
Peter Dusha	Sunshine Coast Regional Council
Matt Landos	Principal of Future Fisheries Veterinary Service
Margie Milgate	Growcom
Bruce Samball (T)	President, Aquaculture Association of Queensland
Jolyon Burnett	Chief Executive Officer, Australian Macadamia Association
<i>Kim Jones</i>	<i>Industry Development Manager, Australian Macadamia Association (Alternative for Jolyon Burnett)</i>
Heather Chapman	Associate Professor and Ecotoxicologist, Griffith University
<i>Dr Frederic Leusch</i>	<i>(Alternative for Assoc. Prof Heather Chapman)</i>
<b>Secretariat</b>	
Andrea Bontje	Executive Assistant, Biosecurity Queensland (QPIF)

## Appendix 3: Scientific Sub-committee Membership

<b>Participants</b>	
Ian Douglas	Manager, Animal & Chemical Biosecurity Science (QPIF) (SSC Chair)
Roger Chong	Principal Veterinary Officer, Biosecurity Sciences Laboratory (QPIF)
Peter Kind	Principal Scientist, Freshwater Fisheries & Habitat (QPIF )
Richard Watts	Principal Scientific Advisor, Plant Biosecurity and Product Integrity
Julia Playford	Director, Freshwater and Marine Sciences (DERM)
Munro Mortimer	Senior Principal Scientist, Freshwater and Marine Sciences, Environmental Protection Agency (DERM)
Andrew Langley (T)	Public Health Physician, Sunshine Coast Health Unit, Qld Health
Matt Landos	Principal of Future Fisheries Veterinary Service
Associate Prof Heather Chapman	Associate Professor and Ecotoxicologist, Griffith University

## **Appendix 4: Brief Summary of Meetings of Taskforce**

### **Taskforce Meeting #1**

The Minister for Primary Industries and Fisheries, the Hon. Tim Mulherin, opened the first meeting and outlined that he was looking for an open and transparent investigation of the issues raised. At this first meeting the Taskforce was apprised of the current situation and the investigations to date. Overviews of what had happened were provided by QPIF and Dr Matt Landos, who was working as a private consultant employed by the fish hatchery. The involvement and interests of all groups represented on the Taskforce were outlined and decisions made regarding the development of Terms of Reference, composition of the taskforce and the next steps to be taken. This included the development of a timeline of the history of all relevant events at the hatchery. It was agreed that the Taskforce needed to engage the services of an independent ecotoxicologist.

### **Taskforce Meeting #2**

The second meeting of the Taskforce focussed on finalising Terms of Reference and developing a risk assessment framework for setting boundaries on the investigation and prioritising the work program. Updates were provided to the Taskforce on the outcomes of the investigations conducted to that point. Following the receipt of an offer to assist, the Taskforce agreed to invite the Australian Pesticides and Veterinary Medicines Authority (APVMA) and the commonwealth Department for Water, Heritage and the Arts (DEWHA) to address the Taskforce at the next meeting. A Scientific Sub-committee was established to provide specialist scientific advice to the committee. It was agreed that a communiqué would be released following each meeting of the Taskforce.

### **Taskforce Meeting #3**

The third meeting of the Taskforce incorporated a presentation from the APVMA and DEWHA on the role of the national regulator regarding the use and review of agricultural chemicals. The presentation was followed by discussion and questions on issues such as registration, adverse effect reporting and pesticide review processes should problems occur. APVMA and DEWHA offered to provide specialist assistance in modelling spray drift processes. A summary of the first meeting of the Scientific Sub-committee was presented and updates provided on the fish health investigation and chemical residue analyses that had been undertaken. A report was presented by Fisheries on bass population statistics and reports from the Noosa River as part of the broader investigation into ecosystem health. The meeting was advised that Jim Thompson and Ron Glanville from QPIF had visited the hatchery and the macadamia farm between meetings 2 and 3.

### **Taskforce Meeting #4**

The meeting focussed on the report from the second meeting of the Scientific Sub-committee and the implications of the results received to date. An updated draft timeline was presented and was to be checked against departmental records before the release of the finalised timeline. Apart from some outstanding testing of water samples from Cooloothin Creek, modelling work on spray drift and some further analysis of test results it was agreed that the Taskforce has nearly completed Phase 1 of the investigation which involved looking back at incidents from the past. There was discussion on the need to plan for any future events in the upcoming season.

## Appendix 5: Results of Testing where Chemicals were Detected

### Passive Sampler Results – Chemicals in Water

The following results were obtained from passive samplers placed in Cooloothin Creek.

<b>Chemicals in Water</b>		
(Nanograms per litre)	Sampler 1	Sampler 2
<b>Agricultural Chemicals</b>		
Carbendazim	0.4-1	0.4-1
Atrazine	8.2	9.65
Metolachlor	14.75	14.75
<b>Household Chemicals</b>		
Tris(chloropropyl)phosphate	15.55	30.6
Galaxolide	0.5	1
Tonalide	<2	0.3

### Fish Feed Sample

A sample of fish feed used at the hatchery was tested for chemicals and cypermethrin was detected at 0.001mg/kg in the feed.

### Interpretation of Results

These results have been referred to the Scientific Sub-committee for further interpretation and advice.