Enhancement of the emergency disease management capability in Victoria: adapting Victoria's arrangements for the management of aquatic animal disease emergencies through Exercise Rainbow

Doroudi, East, Appleford, Walker and Button designed and conducted a workshop simulating a disease outbreak on a trout farm, with the aim of increasing Victorian government preparedness to respond to unpredictable aquatic disease emergencies

Abstract

Exercise Rainbow was designed to build capacity within the Victorian Department of Primary Industries (VDPI) to respond effectively and efficiently to an emergency disease incident in aquatic animals. Four preliminary one-day workshops were conducted with VDPI staff to provide training prior to the actual two-day exercise that simulated an outbreak of infectious disease on a fictional trout farm and in an adjacent natural waterway. Evaluation of the outcomes of the exercise and jurisdictional performance highlighted a good general awareness of emergency disease management procedures within VDPI, but a number of opportunities for further improvement and or development of the existing systems were also identified.

Introduction

Many fisheries and aquaculture industries around the world have suffered major production losses through the impact of disease epidemics (Agriculture Fisheries and Forestry – Australia, 2005). To date Australia has essentially avoided many of these documented disease epidemics. A major disease incident occurred in 1995 and 1998 which resulted in the death of a substantial proportion of the Australian wild pilchard population (Jones, Hyatt, Hine, Whittington, Griffin and Bax, 1997; Gaughan, Mitchell and Blight, 2000).

In 2002, a federal budget initiative entitled 'Building a National Approach to Animal and Plant Health', was announced which included a suite of projects to be funded over 4 years to the total of $3 million for aquatic animal health research into the following four program areas: 1) diagnostic capability; 2) emergency preparedness (AQUAVETPLAN manuals); 3) emergency preparedness (training, for example simulation exercises); and 4) establishment of a joint industry/government body for aquatic animal health management (Agriculture Fisheries and Forestry – Australia, 2005).

Whilst the Australian Federal government had already prepared a range of resources such as the AQUAVETPLAN Control Centres Management Manual (Agriculture Fisheries and Forestry – Australia, 2001), due to differences between States/Territories in their policies and operational procedures, there was a need to adapt this Commonwealth resource to the local legislative and administrative requirements in each State/Territory. Further, in the event of an emergency

The exercise simulated an outbreak of infectious disease on a fictional trout farm.

disease incident, the relevant jurisdiction must be capable of establishing a State/Territory Disease Control Headquarters (SDCHQ), with responsibility for strategic management of the disease outbreak, must be established, and it must ensure that appropriate interdepartmental and interstate relations and communications are in place."

In 2003, the VDPI developed the 'Victoria's Arrangements for the Management of Aquatic Animal Emergencies' (VAMAADE), an adaptation of the AQUAVETPLAN Control Centres Manual (Agriculture Fisheries and Forestry – Australia, 2001) to local legislative and administrative requirements (Department of Primary Industries, 2003). The availability of response plans is only the first step. Staff must be familiar with these plans and able to implement them. One form of training that can develop these staff skills is the simulation exercise. Because of the relative absence of emergency disease events in the Australian fishing and aquaculture, government staff have had relatively little exposure to emergency management policy and procedures and therefore, simulation exercises provided an appropriate tool to test the VAMAADE. Simulation exercises can also be used to ensure that the appropriate interdepartmental relations and communications are in place.

Over the past four years, the Office of the Chief Veterinary Officer (OCVO) within the Australian Government Department of Agriculture, Fisheries and Forestry (AG-DAFF) has conducted a program of simulation exercises designed to enhance the ability of all State/Territory jurisdictions to respond to an emergency disease event in the aquaculture industries. This program has now conducted seven exercises with individual States focussing on particular aquaculture industries within that State and three further exercises with participants from a range of jurisdictions focussing on aspects of management of disease emergencies at a national level (Scott and East, 2004).

The objectives of Exercise Rainbow, the subject of this paper, were to improve pre-existing frameworks and resources in order to build capacity within VDPI and to develop more robust procedures for management of the response to emergency disease incidents.

Background

Due to the relative lack of emergency disease incidents in Australian aquaculture and fisheries, response plans are usually adapted from management systems developed for other unpredictable emergencies, including outbreaks of infectious disease among terrestrial animals. In one such study, the Australian government conducted *Exercise Minotaur* as a direct response to the foot-and-mouth epidemic which struck the UK in 2001 (Koob, 2004). Although relatively little is known about the broader impacts of disease outbreaks among aquatic animals, such studies of other unpredictable emergency incidents provide a general idea of their likely impacts on affected communities, and confirm the importance of increasing preparedness to manage aquatic animal disease emergencies.
The 2001 epidemic of foot-and-mouth disease in the UK, for example, had a serious impact not only on the livestock industry itself, but also a measurable impact on the mental health of farming communities (Peck, Grant, McArthur and Godden, 2002), and wide-reaching impacts on rural economies (Donaldson, Lowe and Ward, 2002). Other studies indicate that psychiatric morbidity associated with such emergencies is also lasting (McFarlane, Clayer and Bookless, 1997 discuss the example of bushfire emergencies). The impacts of animal diseases on terrestrial farms in Australia are likely to be the greatest in regional economies with the

lowest diversification (Garner and Lack, 1995). Similarly we may also expect the social and economic impacts of aquatic animal disease emergencies to be greatest in regional areas where aquaculture or fisheries are a major component of the economy.

Method

A preliminary one-day training workshop was conducted to provide regional VDPI staff with training in emergency management of aquatic animal disease outbreaks as detailed in *'Victoria's Arrangements for the Management of Aquatic Animal Disease Emergencies'* (Department of Primary Industries, 2003). These preliminary workshops were conducted over a period of four days from 27th to 30th April 2004 with VDPI staff from the four regions of Victoria (Gippsland, North, Southwest and Port Philip Bay). The major subjects of the training workshop were:

- Fish disease – emergency response arrangements
- Fish-kill investigations
- Responses to emergency fish disease
- Fisheries Victoria's role in an emergency response.

The basic scenario for the subsequent two-day simulation exercise involved a disease event on a fictional trout farm in the Snobs Creek area (300 km north of Melbourne). The simulation also involved occurrence of the disease within the adjacent natural waterway, Snobs Creek. This geographic site was chosen because the farm was sited upstream of a significant proportion of the Victorian trout industry. The simulation was called *Exercise Rainbow* after the Rainbow Trout, the predominant species of trout grown in the area.

Seven days prior to the exercise, each participant received a preliminary briefing document, *Instructions for Participants* that included details of how the exercise would be conducted and explained the basic scenario and events that had occurred between the first observation of mortalities and the day of the exercise. Additional briefing notes were provided to the Local Disease Control Centre (LDCC) controller and the Planning Manager.

The first day of the exercise commenced with an initial meeting of the Incident Management Team at a time immediately after report of the fish mortality incident. Simultaneously, a diagnostic team was dispatched to the farm reporting the fish mortality with two additional teams sent to investigate dangerous contact premises. Each team was met by a role-playing actor who provided details of the farms and animals being inspected. The actor also provided photos of the farm's fish in lieu of the teams collecting samples of fish for laboratory submission.

Trout fry.

The second session on the first day represented a subsequent time period after laboratory confirmation of the disease had been received and the SDCHQ had decided to proceed with eradication of the disease by slaughtering out the three properties. This second session was extended into the second day to allow completion of each team's destruction and disposal plans. The final session of the exercise represented a time period 7 days later when the surveillance program had revealed that the disease had spread to wild fish in Snobs Creek.

Various inputs (documents, phone calls etc) designed to direct the exercise and introduce particular issues were introduced by the exercise controllers throughout the two days. For each session of the exercise, the exercise controllers had a checklist detailing a pre-determined list of communications and actions that the exercise directing team had identified as necessary components of the response. The checklists included space to record whether each item was completed, the time at which it was completed and whether the jurisdiction needed prompting to complete the item. The checklists were designed based on the response activities described within the VAMAADE and the AQUAVETPLAN Control Centres Management Manual.

The maximum value was extracted from the exercise by using formal debriefing and evaluation methods including both a 'hot' debrief at the close of the exercise, a questionnaire and subsequent opportunities for participants to provide considered feedback via Email to the exercise facilitators. This range of evaluation techniques were designed to determine whether the aim and objectives of the exercise had been successfully addressed and to highlight limitations in the current response arrangements. The debriefing process allowed personal experiences of the participants to be captured and assessed and also allowed an assessment of the qualitative performance of activities i.e. their efficacy and efficiency during the exercise.

Results and Discussion

Exercise Rainbow demonstrated that the VDPI has the staff and expertise to effectively deal with an emergency disease incident in the aquaculture industry. By the end of the exercise, all the necessary plans had been developed for the quarantine of infected properties, the prevention of movement of infected fish and the destruction and disposal of infected fish. Assessment of the exercise concluded that the response plans developed during the exercise would have dealt effectively with the disease outbreaks on-farm but that control of the disease once it had entered a population of wild fish was problematic.

The VDPI manual Victoria's Arrangements for the Management of Aquatic Animal Disease Emergencies proved to be an effective support tool for conducting the response to a disease outbreak. After receiving the pre-exercise briefing material, the LDCC director had prepared specific task lists for each team within the LDCC based on the job cards in the manual and specifically tailored to this exercise. This allowed the teams to rapidly move into their roles.

The relative inexperience of Fisheries Officers in the management of disease incidents was addressed by each LDCC position being held by an Animal Health staff member shadowed by a Fisheries Officer. This worked well with the combined expertise allowing each pairing to effectively and efficiently complete their roles in the exercise. One example of the availability of expert fisheries knowledge provided by local Fisheries Officers was the suggestion that once the disease had spread to the wild fish population, effective control of fish movement by the recreational fishing industry could be most effectively undertaken by the positioning of Fisheries Officers to police movement at local boat ramps.

Planning group working on the map to identify control zones.

One failure in this partnering system was where fisheries staff participating in the field teams were uncertain of their responsibilities and powers. For example, they did not impose quarantine on the infected premise or dangerous contact premises during their initial visit. This may be because they were not familiar with the Livestock Disease Control Act 1994. Each field team was lead by a gazetted, experienced Animal Health Officer (AHO) who had the powers to impose quarantine, however he did not. There was no explanation provided as to why these officers did not impose quarantine on the infected premise during the first visit but it may have been due to the fact that the disease diagnosis was not confirmed at that time.

The interaction of Fisheries and Animal Health staff was beneficial to both groups and also identified several areas where the standard procedures used in management of disease events in terrestrial animals are not directly applicable to aquaculture. These included:

- Diagnostic and surveillance teams used both the standard terrestrial 'Animal Emergency Information System' (ANEMIS) forms and the standard VDPI *Fish Kill* forms. Whilst useful, the ANEMIS forms need modification to be directly applicable to aquaculture. For instance, the form should require diagnostic teams to gather information on water source, flow and disposal and whether water discharge can be stopped without adverse impacts on the farm. The source and type of feed used on the farm should also be recorded. The use of one consolidated form rather than the current two would be preferable.
- Imposition of quarantine on properties with a design that includes a flow-through water system (water is taken from a natural waterway, pumped through the farm and discharged back into the natural waterway) is impractical without immediate impacts on the stock. Thought needs to be given to the nature of quarantine and whether it is appropriate to apply quarantine to such properties before diagnosis of an emergency disease is confirmed. If disease is present in a flow-through system, it is likely to have spread downstream before detection of the disease.
- Infection in a wild population of fish introduces problems in the issuing of notices and the control of disease. The owner of such stock is likely to be the Crown and there was uncertainty as to whom the notices should be issued. Some debate as to the roles of the Catchment Management Authority and the conservation management agencies were held without resolution of the issue. This is a larger issue that would also apply to native animals and wild birds with diseases such as avian influenza.

Conduct of Exercise Rainbow also highlighted several limitations in the current planning arrangements:

- On several occasions during the exercise, the staff needed to consult the Victorian Environmental Protection Authority (VEPA) and the Victorian Department of Sustainability and Environment (VDSE) to seek advice on issues such as the control of bird access to the infected premises and the use of chemicals for killing fish in open waterways. A VEPA officer on site would have made these consultations easier and quicker. In addition, involvement of the administrative unit responsible for the use of chemicals, the VDPI Chemical Standards Branch in emergency aquatic animal disease responses would also be useful. The LDCC also needed information about the local industry. Although an extension officer was placed in the LDCC to liaise with the affected industry, an industry member within the LDCC would have provided a ready source of such information.
- There was a concern that participants did not file all of the appropriate documents. Communication also raised some issues. For example, the media unit arranged a press briefing prior to the Industry Liaison Officer informing industry members of the disease outbreak. There was a need for greater communication between groups within the LDCC. While the details of some laboratory results were filed without a copy going to the surveillance and tracing teams.
- Thought should be given to include the representatives of affected industry, other government departments eg EPA in the LDCC to facilitate EPA clearance of chemical usage, disposal etc. Other representatives such as those representing local government may also be appropriate under certain conditions.

Recommendations

As a result of the conduct of Exercise Rainbow and the lessons learned, a series of recommendations were included in the final report. These included:

1. That the VDPI Veterinarians be encouraged to gain experience in the area of fish health to provide additional expertise in the event of a major disease emergency in fisheries and aquaculture.
2. That the VDPI standard operating procedures for emergency disease management of terrestrial animals be reviewed to ensure that these procedures are suitable for use in diseases of aquatic animals.
3. That a list of equipment necessary for the establishment of an LDCC be created and measures undertaken to ensure that this equipment is immediately available for use when a LDCC is established.
4. That the staffing of the LDCC be reviewed to consider inclusion representatives of:
    - A VEPA officer;
    - the appropriate Catchment Management Authority; and
    - a representative of the affected industry.
5. That the fish kill kits provided to Fisheries and Animal Health staff include appropriate laboratory sample packaging for submission of samples.

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A fisheries officer helps release 3,000 endangered trout cod into Ovens River, after a successful 12 year restocking program.

6. That LDCC staff consult other members and teams within the LDCC prior to completing proposed actions.
7. That training of Fisheries staff be reviewed to ensure that they are aware of their powers with respect to emergency animal disease incidents under the *Livestock Disease Control Act* 1994 and have greater understanding of chemicals and their uses in disease emergencies.
8. That LDCC staff ensure that, in an emergency, they record all appropriate information and file it as required.
9. That the VAMAADE be updated on a regular basis and that the discrepancies listed above and any others found be corrected.
10. That the VDPI continues the practice of conducting exercises involving both Animal Health and Fisheries staff to build participants skills in emergency aquatic animal disease management and continue to build relationships between the two groups.
11. That for the purpose of fish disease emergencies, the VDPI appoints specified trained Fisheries staff as Stock Inspectors to provide them with the powers necessary to conduct inspections on properties, impose quarantine of farms and other disease response actions when not accompanied with Animal Health staff.

Outcomes

The planned outcomes achieved from this project were:

1. Increased awareness and ownership of the VAMAADE within VDPI.
2. More effective emergency response procedures for the control and eradication of emergency diseases in Victorian waters.
3. The integration of various divisions of the VDPI (Fisheries Victoria, Animal Health Operations Branch, regional CAS staff, Chemical Standards Branch and the Office of the Chief Veterinary) in this project establish a working relationship towards dealing with aquatic animal disease emergency outbreaks.
4. Development of increased expertise within the VDPI to conduct and evaluate simulation exercises involving the response to a disease incident in the aquaculture and fisheries industries.

Conclusion

The exercise served to foster a working relationship between the divisions of VDPI that would be involved in the response to an emergency aquatic animal disease incident, and in doing so raised the awareness of government officers to the contribution that each group can make to a combined response team. A number of minor issues were identified during the exercise that, if addressed, would assist in the effective management of emergency disease incidents.

Fisheries Victoria staff received valuable training in emergency disease management principles and familiarity with the job descriptions within LDCC through the training workshops and simulation exercise. Animal Health staff received valuable training in aquatic animals and the aquatic environment. This will lead to improved management of emergency disease events involving aquatic animals in Victoria. This project is generally applicable across other aquaculture and fisheries industries in Victoria as the skills developed by VDPI, in large part, are generic.

The improved efficiency of VDPI ability to detect and manage disease outbreaks has a National benefit for maintenance of trading status through demonstrable animal health programs. Improved control of disease introduction and spread, reduce the risk of serious impacts on the aquaculture industry, seafood market, seafood consumers and conservation of diversity of wild stocks.

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