



EPA FISH DEATH RESPONSE PROCEDURE

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1. INTRODUCTION

This procedure is aimed at providing guidance to EPA officers in responding to fish deaths. The procedure provides additional guidance for EPA to undertake responsibilities as described in the *Waterway Incident (Fish Death) Response Guideline* endorsed by the Minister for Environment in October 2006.

This procedure describes what EPA will do in response to a fish death and how we liaise with other agencies that have a stake in waterway management; in particular DSE, DPI, DHS, urban and rural water authorities, CMAs, Parks Victoria and regional local government.

This procedure replaces EPA's Interim Fish Death Protocol.

2. BACKGROUND TO FISH DEATHS

Fish deaths can be caused by a range of factors including low levels or flow of water in waterways and the consequent poor quality water, such as low oxygen, high temperatures or high nutrients. Fish deaths may also occur with the first rains after bushfires, a blue-green algal bloom, or as a result of pollution.

Further information on the causes of fish deaths can be found in the Fish Death Investigation Guidelines in Part J of the Operations manual.

For the purposes of this document a fish death event includes the deaths of fin fish, eels, molluscs (such as mussels) and crustaceans (for example, yabbies and crayfish). A 'fish death event' may involve the deaths of multiple fish.

3. EPA ROLE IN FISH DEATHS

EPA has the responsibility under the *Environment Protection Act 1970* to investigate any events that pollute or result from pollution of Victorian waterways and may direct any necessary clean-up action.

Under the *Emergency Management Manual Victoria*, EPA is listed as the 'control agency for pollution of inland waters'. EPA has agreed to take the role of Control Agency for fish deaths although this can be delegated to another agency by agreement.

4. AGENCY ROLES AND RESPONSIBILITIES

In October 2006, the Minister for Environment endorsed *Waterway Incident (Fish Death) Response Guideline* (the Statewide Guideline) that describes roles and responsibilities for all agencies in regard to fish deaths. A summary of the expected roles and the responsibilities of other agencies in response to a fish death are presented in Attachment 1.

The Statewide Guideline calls for the response to fish deaths to be managed at the local level in accord with the roles and responsibilities defined. In order to facilitate the regional response, Regional Response Plans need to be agreed with partner agencies. EPA has a responsibility to lead the development of the Regional response Plans.

The Statewide Guidelines allocate the following roles and responsibilities to EPA:

- lead development and renewal of Regional Response Plans
- carry out incident management (may be delegated by agreement)
- notify other relevant agencies and stakeholders so that they may respond
- attend at incident as required
- liaise with media (may be delegated by agreement)
- coordinate of clean-up activities where required in order to protect the environment
- manage a database for fish deaths
- investigate fish death events and determine, where possible, the cause. Report findings to relevant agencies and the community
- as appropriate, undertake enforcement action consistent with EPA's Enforcement Policy, and recovery of costs
- specify actions to be taken to manage any condition of pollution as a result of a waterway incident
- coordinate media releases.
- brief Minister for Environment
- as necessary, run a debrief session.

5. NOTIFICATION OF A FISH DEATH

Incident notification

It is most likely that other agencies or the public will be the first to notice or receive information in relation to a fish death in their catchment areas.

These agencies have been requested to notify EPA of the basic details of the fish death.

The information that should be reported

When an agency or member of the public reports a fish death to EPA, the EPA officer taking the call should ask for:

- personal identification and return phone number of notifier
- location and extent of incident
- time the incident occurred (recently or some time ago)
- whether fish are dead or merely affected

- approximate number of fish dead and whether they are fresh or decomposing
- whether other fauna are affected or do they appear to be healthy
- flow conditions of the waterway
- any probable cause such as an algal bloom, low DO or low water levels
- what action, if any, is currently being undertaken.

How to contact EPA:

Fish deaths are usually reported in daylight hours and are to be managed by the EPA regions.

Agencies reporting fish deaths are requested to telephone:

1. the relevant regional EPA office - during business hours (see Attachment 2 for telephone numbers)
2. EPA Polwatch on 1800 444 004 - on weekends and evenings up to 10 pm
3. the Emergency Response Officer - only if it is an emergency and needs to be dealt with after 10 pm. Contact is made via the 000 emergency number. Note: On calling 000 tell the operator that you need the Police to contact EPA via the EPA emergency response pager.

Polwatch (front desk, Second Shift, AHRO and ERO) have been instructed to refer all fish death notifications to the appropriate Regional Manager who will activate EPA's response.

If the Region cannot be contacted then the Emergency Response Officer (ERO) will manage the incident until the regional response is activated.

When notified of an incident, EPA will advise all relevant EPA units and relevant regional agencies in accordance with the Regional Response Plan. Contact numbers for agencies will be contained in the Regional Response Plan.

When notifying other agencies, the EPA Fish Death Response Manager should indicate the likely need for support from that agency.

A number of listed threatened species are listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Where native fish are involved, DSE should be contacted to enable an assessment of whether the fish death event involves nationally listed threatened species, such as the listed endangered Trout Cod (*Maccullochella macquariensis*) and the listed vulnerable Murray Cod (*Maccullochella peelii peelii*).

Flowchart 1 describes the EPA/external parties communication flow for a fish death.

6. REGIONAL RESPONSE STRUCTURE

The role of the EPA Fish Death Response Manager and Fish Death Response Officer

Upon notification of a fish death, the Regional Manager will develop a fish death response plan. The plan will include the nomination of a Fish Death Response Manager and Fish Death Response Officer as required. Where a multi-agency response is required, the Fish Death Response Manager will instigate the Regional Response Plan. The response plan will therefore accord with the requirements of the Regional Response Plan.

The EPA Fish Death Response Manager will need to determine the magnitude of the incident. If information was not forthcoming from the person who provided the initial notification, then EPA may conduct or request an agency to conduct a site inspection.

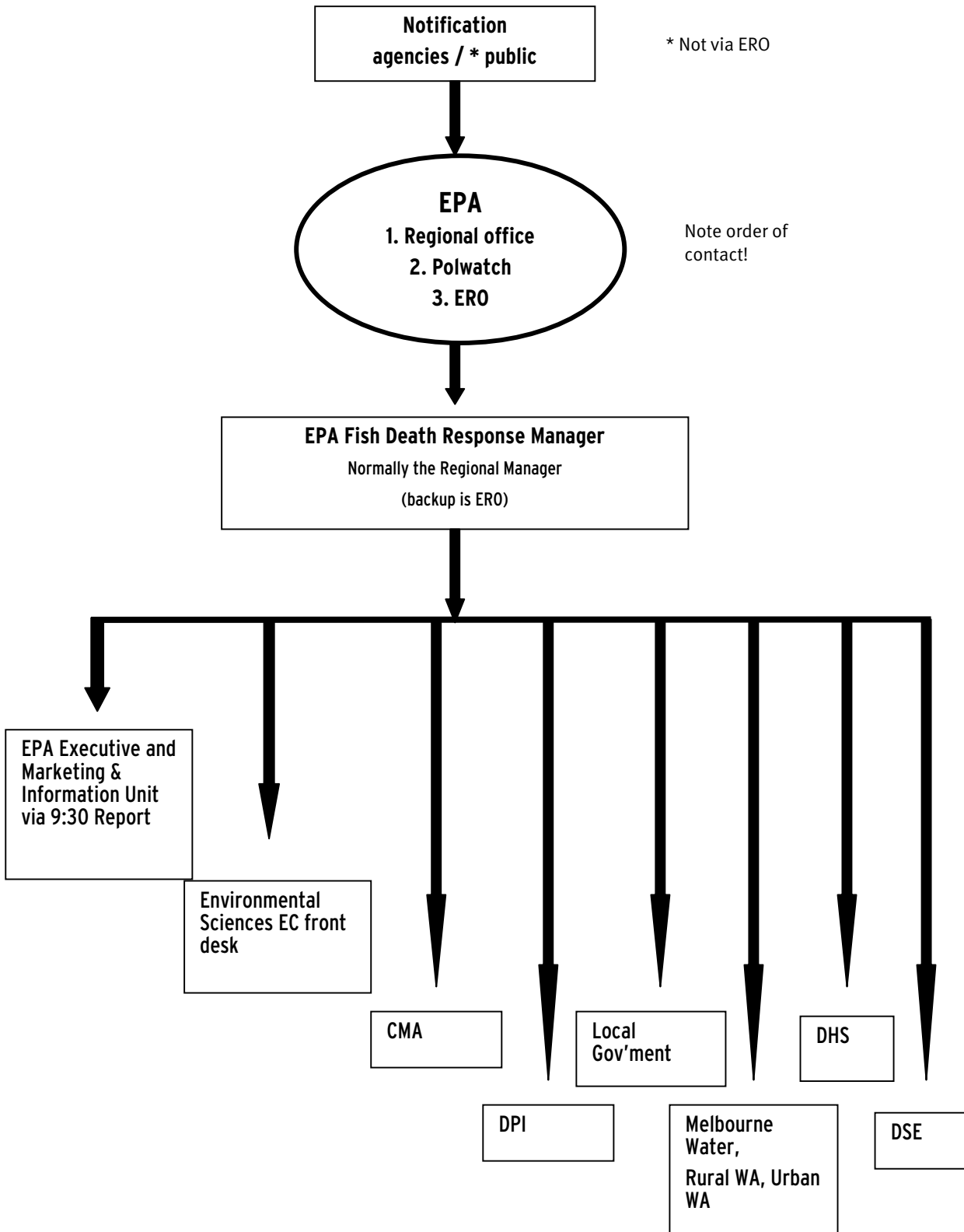
The Fish Death Response Manager will then:

- take on a communication and fish death response coordination role
- call in relevant and adequate EPA resources to effect the response. This will include the nomination of a Fish Death Response Officer/s.
- hold discussions with the officers from the relevant agencies in order to agree on and coordinate the immediate response to the incident
- ensure that the immediate response planning involves all relevant agencies and communicate the agreed immediate fish death response plan to all relevant agencies
- ensure that all information in relation to the fish death event is recorded on EPA's Fish Death database on Lotus Notes.

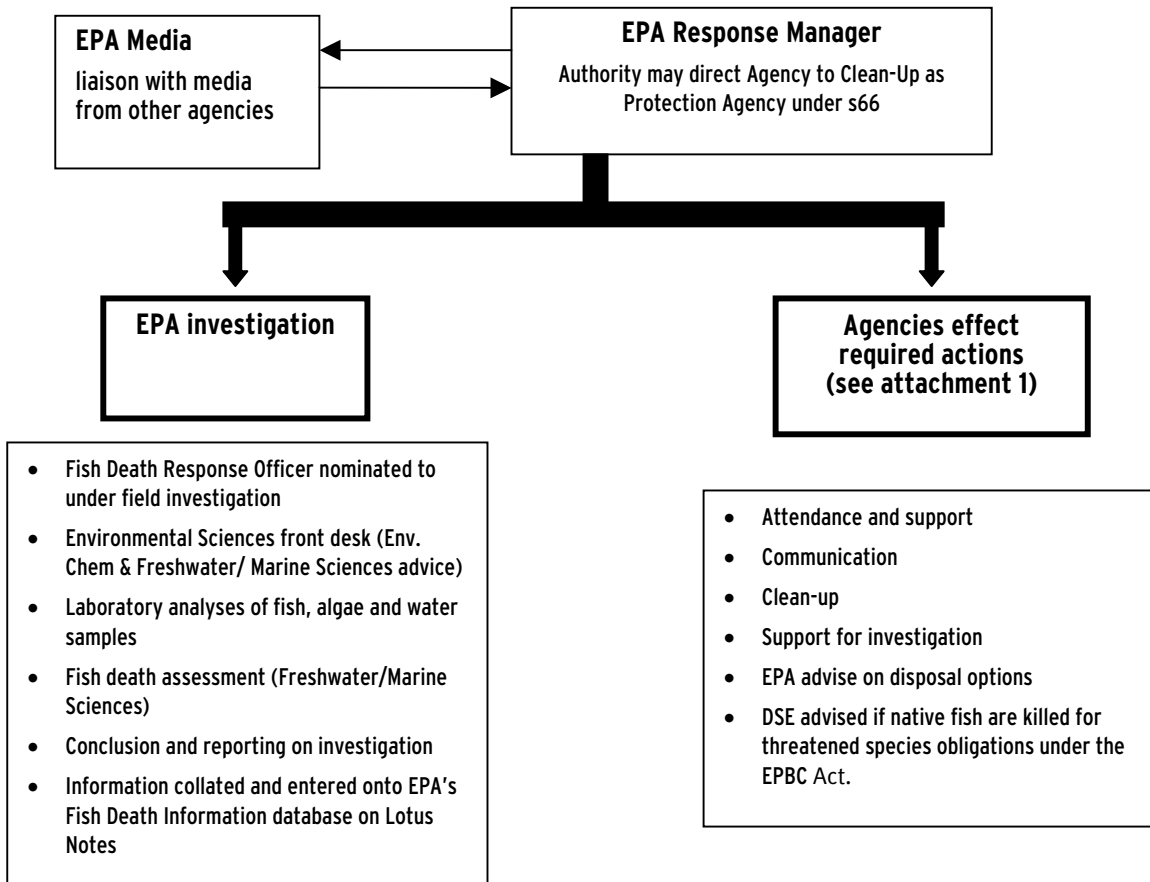
An EPA Response Officer will, if required:

- attend the scene,
- undertake assessments,
- commence the investigation,
- provide feedback to the Fish Death Response Manager on requirements, and
- manage site coordination with other agencies.

Flowchart 2 shows the response arrangements.



Flowchart 1: Fish death incident notification communication



Flowchart 2: Fish death incident response plan

Agency roles

Where the EPA Fish Death Response Manager requires support from other agencies to manage the event, the roles and responsibilities of the requested agency should accord with those described in the Statewide Guideline. Attachment 1 describes the expected roles and responsibilities of other agencies in the management of a fish death as described in the Statewide Guideline.

Given EPA officers are located only in major regional cities, it may be necessary to request local available field staff from other agencies to conduct the first inspection. In such cases, EPA staff will make contact and provide direction to local agency staff to organise field inspections.

Safety

Early responses to fish deaths significantly improve investigation effectiveness. The response must always be undertaken in a safe and controlled manner. As in normal operations all EPA staff are instructed to:

- drive carefully (SWP 5)
- ensure job safety analysis is preformed at appropriate stages
- take appropriate precautions when working near waterways (SWP 4)
- ensure appropriate communication (SWP 1)
- if required to use formalin, take care when handling formalin preservative and ensure that the guidance on use of formalin is followed, and that formalin is only transported in a vehicle on the way to and from a fish death event.

Agencies assisting or involved in a fish death response are expected to ensure their officers are trained and instructed in safe work procedures.

7. INVESTIGATION OF FISH DEATH INCIDENT

The EPA Response Officer will, when logistically possible, conduct a site investigation to determine the cause of the fish death.

As the location of fish deaths may be considerable distance from major regional cities, it is acceptable to request another agency involved in initial reconnaissance to commence the investigation. Fish Death Response Manager approval is required for this action. In such cases, Fish Death Response Officers should ensure that sampling is conducted in accordance with the EPA Fish Death Sampling Procedure and Report Form (Attachment 3) by the attending agency.

Fish Death Response Officers must:

- conduct site observations and in-situ measurements

- contact the Environmental Chemistry front desk or LERO (after hours) to discuss the significance of the environmental impact and sampling needs (EC and Freshwater/Marine Sciences)
- in accordance with the EPA Fish Death Sampling Procedure and Report Form (Attachment 3), complete field investigations, including water sampling and collection of fish and algal samples
- notify the Environmental Chemistry front desk (when samples have been taken) to receive advice on sample delivery. Fish samples will always be delivered to: Primary Industries Research Victoria (PIRVic) at 475-485 Mickleham Road, Attwood 3049, telephone: 9217 4300 [BH]
- enable the delivery of water and algal samples to EPA's Environmental Chemistry unit at the Centre for Environmental Science, Ernest Jones Drive, Macleod or route to an external laboratory, as advised, for analysis
- create an entry in EPA's Lotus Notes Fish Death Information Database for every fish death event. The database **must** be updated with information such as in-situ measurements of water quality and site observations as the investigation progresses. At the end of the investigation a summary of the findings should be included and the event marked as 'finalised'.

Environmental Science will:

- assign an Environmental Chemist to the incident. This person will be the Front Desk person unless advised otherwise
- in conjunction with Freshwater Sciences/Marine Science, assist Regional Services staff to develop a sampling and analysis plan for the event
- provide an officer/s to support the field investigation if requested by the Fish Death Response Manager
- provide a timeframe for the reporting of analytical results to the Fish Death Response Manager
- report on the results of the investigation to the Fish Death Response Manager and support the reporting of the results of the investigation to relevant agencies and the community.

Where the cost of analytical work is likely to be greater than \$2,000 but less than \$10,000, the analysis proposal needs to be approved by the Fish Death Response Manager,

Where the cost of analytical work is likely to be greater than \$10,000, the analysis proposal needs to be approved by the Senior Manager Science or Manager Freshwater Sciences or, when unavailable, Senior Manager Rural Services.

8. LEGAL ACTION AND COST OF CLEAN-UP

It is expected that agencies with waterway or water management responsibilities shall be responsible for their own costs incurred in responding to a fish death incident within their geographic jurisdiction. Attachment 1 describes the activities for which agencies would be expected to cover costs.

Where an agency does not undertake the roles and responsibilities as defined in the Statewide Guideline, and it is the opinion of the Fish Death Response Manager that part or all of the roles and responsibilities are required to effectively manage the fish death event, the Authority may declare that agency a Protection Agency under section 66 of the Environment Protection Act 1970. For that Protection Agency, the Authority may specify the actions or measures required to be taken for the management and control of an area or for abating or reducing any condition of pollution as a result of a waterway incident. The management and control actions specified should accord with the roles and responsibilities described in the Statewide Guideline.

Costs incurred for any activity undertaken as a Protection Agency will be covered by the delegated Protection Agency.

In respect to organisations without Protection Agency status, EPA may issue a Section 62B Direction under the EP Act, instructing the relevant organisation to conduct/facilitate a clean-up. Such organisations may then recoup the cost of complying with a Section 62B Direction from EPA.

Advice of an incident given by EPA to another agency does not constitute a direction to undertake clean-up for which clean-up costs will be incurred.

If the fish death is caused by a polluter, EPA will assist the clean-up agency in the recovery of costs associated with clean-up of pollutants in line with the 'polluter pays' principle. Costs incurred by other agencies in responding to a waterways pollution incident may be submitted to the courts in conjunction with the EPA cost recovery submission, and recovery of the costs would be at the discretion of the courts.

9. MEDIA RELEASES

Unless otherwise agreed EPA, as Response Manager, will issue all media releases. The EPA media unit will coordinate media releases and liaise with the other agencies, or issue joint statements, as required.

EPA Fish Death Response Managers or Fish Death Response Officers will have already contacted the media unit immediately following the receipt of notification of an incident, and should continue to refer all media enquiries to the EPA media unit.

10. DEBRIEF SESSION

Following a fish death response involving a number of agencies, a debrief session should be called and chaired by EPA to discuss the following issues:

- adequacy of the response and areas to improve
- results of the investigation
- ways to prevent a fish death of a similar nature occurring in the future.

The debrief should occur as soon as practicable following the fish death, and generally within one month. Recommendations from the debrief should be recorded and taken back to relevant agencies for action.



ATTACHMENT 1: Expected agency roles and responsibilities for fish death management

Defined roles and responsibilities for other agencies have been allocated by the Minister for Environment and documented in Waterway Incident (Fish Death) Response Guideline, October 2006. Table 1 describes the roles and responsibilities, and Table 2 provides a description of the activities and actions required for the roles and responsibilities. The information in Table 1 and Table 2 is extracted from the Statewide Guideline.

Table 1: Roles and responsibilities for fish death response management

RURAL/URBAN WATER AUTHORITIES
<ul style="list-style-type: none"> • Notification. • Attendance and support at a fish death. • Clean-up, where required and where polluter cannot be identified. • Support for investigation (where needed). • Implementation of Risk Management Plans under Safe Drinking Water Act. • Communication with water users.
PARKS VICTORIA
<ul style="list-style-type: none"> • Notification. • Attendance and support at a fish death. • Clean up where required and where polluter cannot be identified. • Support for investigation (where needed). • Implementation of Risk Management Plans under Safe Drinking Water Act. • Communication with water users.
CMA
<ul style="list-style-type: none"> • Notification • Attendance and support at a fish death. • Clean up where required and where polluter cannot be identified. • Support for investigation (where needed). • Communication with water users.

Table 2: Key response activities required for each of the roles and responsibilities presented in Table 1.

DPI
<ul style="list-style-type: none"> • Notification. • Attendance and support at a fish death. • Communication with water users (impacted recreational and commercial fishers). • Provision of laboratory services for fish disease. • Investigation where fish disease has been shown by the Chief Veterinary Officer as the cause. • Reporting on investigations where fish disease is has been shown as the cause. • Reporting of notifiable exotic diseases. • Briefing Minister for Agriculture.
DSE
<ul style="list-style-type: none"> • Notification. • Attendance and support at a fish death. • Clean up where required and where polluter cannot be identified. • Support for investigation (where needed). • Communication with water users. • Communication with federal stakeholders under Environment Protection and Biodiversity Conservation Act. • Brief Minister for Water.
MELBOURNE WATER
<ul style="list-style-type: none"> • Notification. • Attendance and support at a fish death (as per Regional Response Plan). • Clean up where required and where polluter cannot be identified. • Support for investigation (where needed). • Communication with water users.
DHS
<ul style="list-style-type: none"> • Notification. • Assessment of public health risk. • Advocacy and advice to other agencies to reduce risk to Human Health from consumption of fish or exposure to hazards in waterway that may be related to the fish kill.
REGIONAL LOCAL GOVERNMENT
<ul style="list-style-type: none"> • Notification. • Attendance and support at a fish death. • Clean up where required and where polluter cannot be identified. • Support for investigation (where needed). • Communication with water users.

A1.1 RESPONSE

Notification

- Where an incident is reported to an agency, notify EPA of incident.

Attendance and support at a fish death

- Where required by the Regional Response Plan, agency staff to attend fish event to provide assessment and reconnaissance.
- In the exception, where requested by the Control Agency, agency staff to undertake other activities as considered reasonable and practicable to manage incident.

Clean-up

- Where a clean-up of fish is required, agency to undertake or manage clean up and disposal. Disposal of fish to be at a location approved by EPA.

Support for investigation

- If requested and equipment and expertise is available, undertake the direct sampling of fish, waters, sediment etc for analysis by the investigation agency.
- Provide documented and anecdotal information to assist with the investigation of the reasons for the incident.

Implementation of Risk Management Plans

- Implement Risk Management Plans as required under the *Safe Drinking Water Act 2003*.

Communication with water users

- Communicate in a timely manner relevant stakeholders, information to warn waterway users about risks to health, environment or production.

Incident coordinator (may be delegated by agreement)

- Provide high level coordination of a waterway incident through the development of a response plan (in conjunction with waterway managers and key stakeholders), and to ensure that required actions by waterway managers and investigators are being undertaken in a timely manner.

Media liaison

- The agency responsible for incident control will act as the preferred contact for media. Media statements will, where practicable be vetted by agencies responding to the incident.

Investigation of cause (may be in partnership with other agencies)

- Undertake required investigation to determine the likely cause of the incident.

- Recommend further monitoring for a pre-emptive warning or recovery program.
- Where exotic fish disease is the known cause, DPI will undertake the investigation.

Allocating clean up responsibility where required,

- Where agreement cannot be reached with a support agency to undertake clean up activities, EPA will direct the appropriate waterway manager as a protection agency under s66 of the *Environment Protection Act 1970* to undertake clean-up. Direction to clean up will be undertaken based on the principles and hierarchy described in 4.2.2.1.

Enforcement against polluter where polluter can be identified,

- Where sufficient evidence is available to identify a legal entity as the polluter that has resulted in a waterway incident, EPA to consider prosecution under the *Environment Protection Act 1970*, or *Pollution of Waters by Oil and Noxious Substances Act 1986*.
- Where agencies have incurred costs from actions required to manage a waterway incident as a result of an identified polluter, to submit a summary of the costs to the court for consideration.

Running debrief

- At the completion of a waterway incident, run a debrief with the agencies that participated to review and improve the management of response and review outcomes of investigation to date.

Reporting on investigations

- At the completion of an investigation, report back to agencies and public on the finding and recommendations of the investigation.

Management of a database for fish deaths

- Develop and manage a database that provides information on events and findings of investigations.

Briefing Minister

- Where required, brief relevant minister on the progress of a waterway incident, and findings and recommendations of the investigation.

Reporting of notifiable exotic diseases

- Undertake required reporting of notifiable exotic diseases.



ATTACHMENT 2: EPA regional offices and contact details

Office hours (Monday – Friday):

North East Office (Wangaratta)

General office	(03) 5720 1111	Address:
Fax	(03) 5721 2121	27-29 FAITHFUL STREET Wangaratta, Victoria 3677

North West Office (Bendigo)

General office	(03) 5438 1000	Address:
Fax	(03) 5443 6555	43 WILLIAMSON STREET BENDIGO, VICTORIA 3550

South West Office (Geelong)

General office	(03) 5226 4825	Address:
Fax	(03) 5226 4632	4th Floor, Corner Little Malop & Fenwick Streets Geelong, Victoria 3030

Gippsland Office (Traralgon)

General office	(03) 5173 9800	Address:
Fax:	(03) 5174 7851	7 Church Street Traralgon, Victoria 3844

South Metropolitan (Dandenong)

General office	(03) 8710 5555	Address:
Fax	(03) 9794 5188	35 Langhorne Street Dandenong, Victoria 3175

After hours:

- Pollution Watch Line 9695 2777 or 1800 444 004 (Up to 10 pm).
- Emergency Response Officer (After Polwatch closes - but only for emergency incidents): Call 000 and advise operator that you need the Police to contact the EPA via the EPA emergency response pager.

NB: Do not rely on email as the prime means of reporting an incident or communicating advice.

ATTACHMENT 3. EPA fish death sampling procedure and report form

Response and notification

Conditions which result in the death of aquatic biota may be transient. Therefore a swift response is required to detect these conditions before they disappear. In addition, an early response to an incident will allow a timely warning to be issued (if required) or a statement made to allay public concern.

Once EPA has been notified that a fish death has occurred, the Fish Death Response Manager (normally the Regional Manager, with ERO as backup) should contact the Environmental Chemistry front desk or LERO (after hours) immediately to register the incident. EC front desk will notify Freshwater Sciences or Marine Science of the incident.

The EPA Response Officer at the site of the incident should, following recording of site observations and in-situ water quality measurements, contact EC front desk to discuss with EC and Freshwater/Marine Sciences further sampling needs (which will be dependent on the nature of the event).

Field investigation

Observation and collection of affected organisms

Every practicable effort should be made to obtain dying or freshly dead specimens to be forwarded for pathological examination. Take photographs and record all relevant observations and details on the Fish Death Report Form.

In the event of a fish death, observations should include:

- unusual swimming habit
- mouthing at the surface
- presence of parasites on the body, fins, in the mouth or gills
- colour of gills
- ulcers, fin rot, spotting, damage to scales, gill rakers
- bleeding from the anus
- species identification (if known)
- status of other biota at the same site (i.e., are there any other fish types or animals - birds, frogs, macroinvertebrates etc. - present and do they appear to be affected or healthy).

Information on the interpretation of observations associated with fish death events can be found in the Fish Death Investigation Guidelines in Part J of the Operations Manual.

Collection of fish

Fish need to be collected for both pathology and toxicant analysis, requiring the collection of both fresh chilled specimens and fixed specimens, wherever possible. Freshly dead or moribund fish (not yet dead, but dying) are best. Fish pathologists recommend that, where possible, fish be examined within three to six hours of death. Fish that are stiff but intact (such as with eyes clear or clouded) are still worth sampling for laboratory analysis. In cases of severe decomposition, only photographic records of the fish will be taken.

Fresh chilled specimens

Fresh fish specimens should be placed in plastic bags on ice, but not allowing direct contact with the ice. Chilled fish are preferred to frozen fish, as freezing destroys some internal structures.

Fresh chilled specimens are required for both pathology and toxicant analysis. For small and medium fish (<20 cm), include 10 or more. For large-sized fish include at least three. If the fish are too large for an esky, depending on their size, they can either be dissected (see below) and the organs chilled or the tail cut off and both parts chilled.

Fixed specimens

Small fish (less than 10 cm) are best fixed whole in a sealed plastic container. For larger specimens (10-20 cm) make sure to carefully slit open the abdominal cavity and trim off the gill covers to allow penetration of the fixative.

Large fish (>20 cm) require dissection (see below) and fixation of tissue/organ samples.

The field fixative is 10% neutral buffered formalin. The ratio of preservative to specimen mass is 10:1.

Ensure that you wear gloves and safety glasses, and work in a well ventilated area when using the field fixative, as it may cause skin, eye or respiratory irritation upon contact. In order to prevent evaporation of spilt formalin within your vehicle:

- do not conduct formalin work on the rear tailgate of the vehicle
- rinse the outside of both the formalin storage container and fixed samples containers, and seal with tape
- double bag any contaminated clothing (gloves) after use, for appropriate later disposal.

Do not store the field fixative in the vehicle for extended periods, as exposure to heat may generate formalin fumes.

Dissecting fish

If fish are to be dissected then photographs of the fish intact, showing any evidence of external abnormalities or physical damage, should be taken.

When dissecting fish, dissect out the gills, the heart, the viscera, and then also remove the head. The viscera (including intestines, liver, kidneys and spleen) should be removable as a 'bundle of guts', although the kidneys may need to be dissected out separately. Also take a slice through the fish that includes muscle tissue and skin (including the fat below the skin). Any external abnormalities detected should be included in the fixed and fresh samples collected. Multiple tissues and organs from one fish can be stored in one container or bag, but use a separate container for each fish sampled.

Further information on the collection and preservation of fish samples can be found in the Fish Death Investigation Guidelines in Part J of the Operations Manual. The Guidelines also include diagrams of external and internal fish anatomy.

Collection of algae

If an algal bloom is suspected take photographs showing the extent of coverage.

Phytoplankton blooms may look like a scum or film on the water surface. Blooms may not always be visible, so algal samples are to be routinely collected when fish death sampling occurs. Collect the phytoplankton in a clean plastic or glass wide-mouthed container by skimming the opened container across the surface scum on the water. Also take a sample of subsurface water away from any scum.

Excessive growths of *filamentous* algae, if present, should be sampled by collecting a mat of the plant material and placing it in a jar or plastic bag.

Samples can be chilled on a small amount of ice, without allowing direct contact with the ice, and submitted to the laboratory within 24 hours of sampling.

In-situ measurements

Measure dissolved oxygen (DO), temperature, pH and electrical conductivity (EC) at the surface and, where practicable, bottom and mid-water depths. If response officers have access to equipment to measure turbidity, then this should also be recorded. As DO, in particular, can vary from low to extremely high in the course of a day, a number of measurements should be taken throughout the investigation, and their times recorded. Slugs of contaminated water may also be detected by in-situ measurements at different time intervals. The sample locations and the times in-situ measurements were taken should be recorded on the Fish Death Report Form.

Water sampling

Water samples should be taken from drains or streams if they are suspected of contributing to the incident, to confirm or eliminate them as potential causes. Appropriate (unpolluted) control sites should also be sampled. EC front desk (EC and Freshwater/Marine

Sciences) will provide advice on what water sampling is needed, once the initial site inspection is completed.

Ensure appropriate numbers of suitable containers, and preservatives where applicable, are available for collection and storage of samples. For water quality (and sediments, if necessary), refer to EPA Publication 441, *A guide to the sampling and analysis of waters, wastewaters, soils and wastes*, as amended from time to time. For fish and algal samples refer to this Attachment.

For details of how, when and where to take samples in different aquatic environments, refer to the Fish Death Investigation Guidelines in Part J of the Operations Manual.

The number of samples that need to be collected will depend on the size and importance of the event. The Fish Death Response Manager, in consultation with Environmental Sciences, will assess some events as high-priority events. These events will require more detailed and comprehensive sampling.

Factors that may lead to an event being assessed as high priority include:

- whether threatened native species are affected (contact DSE for information on these species)
- how many fish are affected
- whether more than one fish species is affected
- whether a definite cause has been established
- whether the event occurred recently or some time ago (fish are obviously decomposed)
- whether the fish death event is likely to lead to a prosecution or other enforcement action.

Detailed written advice on water quality testing and sampling cannot be given as this will depend on the nature and severity of the individual fish death event.

Sampling should aim to cover all potential causes of death, especially for high priority events. Some samples may not be submitted if a probable cause of death is identified during the investigation. In addition, some types of samples can be held and submitted at a later date if necessary.

Environmental Chemistry will advise the Fish Death Response Officer on which samples can be held and which need to be submitted immediately.

Document and report

The Fish Death Report Form should be completed at the site. This documented information is critical, both to enable assessment of potential causes of the fish death and in the event of a prosecution, and therefore should be as extensive as possible. It is important that the presence of other biota, both affected and unaffected or apparently in a healthy state, also be recorded.



Photographs should be taken where possible, not only of the incident, but also the surrounding area to provide further information on the sampling site.

Completed Fish Death Report Forms and photographs should be forwarded to the Freshwater Sciences unit (inland waters) or Marine Science unit (marine) as soon as possible after the incident. All information (reports and photos) must be put onto EPA's Fish Death database on Lotus Notes.

Submission of samples

Environmental Chemistry front desk or LERO (after hours) must be notified when samples have been collected.

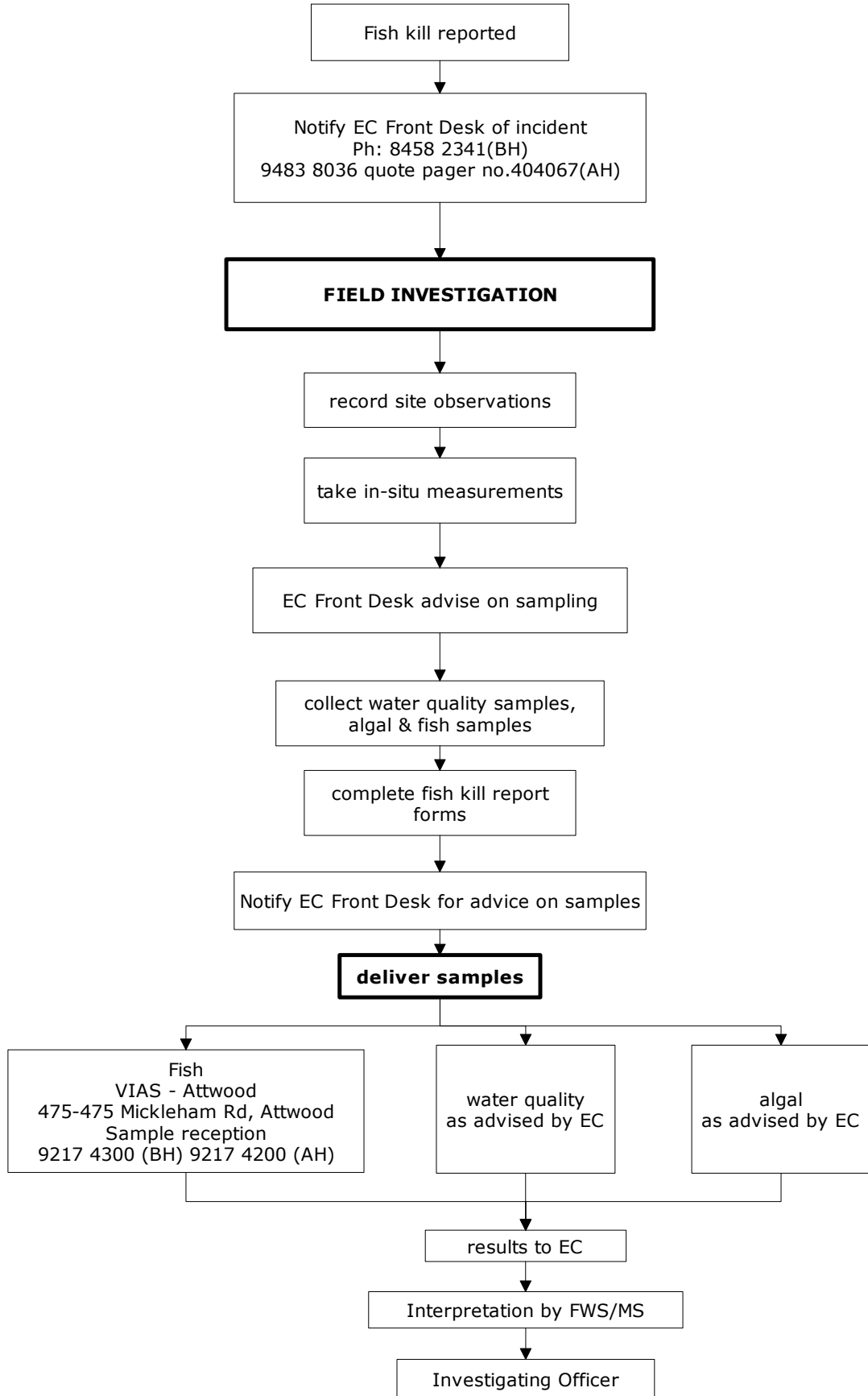
Environmental Chemistry will:

- advise the investigating officer where to deliver the samples
- notify the receiving laboratories of incoming samples in accordance with current standard practices.

Make sure to label all samples, and leave your name and contact number upon submission of any samples at the receiving laboratory.

Fish samples should be delivered to Sample Reception at Primary Industries Research Victoria (PIRVic) Attwood, (9217 4300 BH). Samples can be delivered out of hours to the caretaker at the PIRVic Attwood laboratories, 475-485 Mickleham Road, Attwood 3049, but notify them in advance.

When delivering samples for pathological assessment, ask to speak to the duty pathologist to discuss the incident and outline your requirements. It will assist the pathologist if you can leave a copy of the Fish Death Report Form. If the samples are delivered out of hours or by a courier, contact the duty pathologist at the first opportunity.



Fish death investigation flowchart



FISH DEATH REPORT FORM

Site information

1. Date and time

 / / . Arrive : . Depart : .

Officer/s:

Region:

2. SITE DESCRIPTION

Lake River Stream Dam Sea Embayment Estuary

Location.....

Description (*area, depth, width, substrate etc*)

.....

3. Tributaries, inflows and drains (*Include proximity, size and flow etc*)

.....

.....

4. Presence of algal blooms/aquatic vegetation

At site

.....

Above site.....

.....

Below site.....

.....

5. Presence of visible contaminants (*e.g., oil*) **or garbage and litter**

At site

.....

Above site

.....

Below site.....

.....



6. Weather conditions (*Wind strength and direction, rainfall, temperature etc*)

At time of investigation

.....

At time of death (*if known*)

.....

.....

Prior to death (*rain in last 24 hours ?*)

.....

.....

7. Colour or appearance of water and odour (*In particular, any anoxic or rotten egg gas smell*)

At site

.....

Above site

.....

Below site

.....

8. Tidal conditions/river height & flow etc

.....

.....

9. Use of biocide in the catchment

Yes No Unknown

Comments

.....

10. Activities in the area (*Dredging, shipping, industrial, agricultural, irrigation, residential, licensed discharges?*)

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11. Potential problems or ramifications of the incident (E.g., public water supply, irrigation diverters downstream, domestic off-take, known area for native fish species etc)

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.....
.....

12. At-site water quality measurements (Include readings from possible source on another sheet, if applicable)

Sample ID/location	/			/			/		
Date/time	/ / :			/ / :			/ / :		
Depth	Surface	Middle	Bottom	Surface	Middle	Bottom	Surface	Middle	Bottom
	o m	m	m	o m	m	m	o m	m	m
Temperature (°C)									
Dissolved oxygen (mg/L)									
(%sat)									
PH									
Salinity/conductivity at 25°C (units)									
Other									



13. Upstream water quality measurements (or up-current)									
Sample ID/location	/			/			/		
Date/time	/ / :			/ / :			/ / :		
Depth	Surface	Middle	Bottom	Surface	Middle	Bottom	Surface	Middle	Bottom
	o m	m	m	o m	m	m	o m	m	m
Temperature (°C)									
Dissolved oxygen (mg/L) (%sat)									
pH									
Salinity/conductivity at 25°C (Un									
Other									

14. Downstream water quality measurements (or down current)									
Sample ID/location	/			/			/		
Date/time	/ / :			/ / :			/ / :		
Depth	Surface	Middle	Bottom	Surface	Middle	Bottom	Surface	Middle	Bottom
	o m	m	m	o m	m	m	o m	m	m
Temperature (°C)									
Dissolved oxygen (mg/L) (%sat)									
pH									
Salinity/conductivity at 25°C (units)									
Other									



15. Location (*map or sketch*) indicating sampling points and aspect

Blank area for map or sketch.



Appearance of fish

16. Approximate number of fish and distribution along the shore or bank *(For a large death pace out the extent and count a representative section of the shore. A net is useful in fast-flowing streams. Have a sound basis for the estimate in case of a possible prosecution.)*

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17. Note presence of other affected animals *(This may indicate broadscale impact across animal groups)*

.....

.....

18. Are other animals present that appear to be healthy e.g., other fish, birds, frogs, macroinvertebrates? *(This may indicate an incident specific to certain types of animals)*

.....

.....

19. Predominant species *(Samples will confirm ID if unsure)*

.....

Others *(Indicate proportion)*

.....

.....

Length range *(By predominant species)*

.....

Weight range *(By predominant species)*

.....

20. Length of time since death. *Did deaths occur at the same time? (E.g., all in a state of advanced decay, stiff or freshly deathed.)*

.....

.....

21. Physical damage *(Evidence of attack by birds or other predators, presence of parasites, dumping etc.)*

.....

.....



22. Unusual actions or appearance in fish

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23. Take photographs (Note date/time, location and details of what is shown. Include name of photographer.)

1.....
2.....
3.....
4.....
5.....
6.....
7.....
8.....
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24. Witnesses (Interview people in the area)

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25. Cause (Identify the potential cause of the death if possible. If due to a discharge, identify the alleged source.)

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.....
.....



26. Details of samples for analysis [Note that this is not intended to replace EPA sample submission forms]						
Sample ID no.	Sample location	Date/time taken	Type. (fish, water, algal, sediment)	Delivered to:	Date/time delivered	Analyses requested

