

## **ATTACHMENT 5: Recommendations from Workshop in Getting the Jump on Amphibian Disease**

This workshop brought together policy makers, laboratory and field scientists, veterinarians, microbiologists, members of frog interest groups, members of farming industries, the general public and commercial frog aquaculturists from Australia, USA, New Zealand, Spain, Germany and Uruguay. The aim was to produce a set of feasible recommendations to decrease risks of virulent diseases to wild amphibians in Australia and globally.

The workshop was held on 28-29 August 2000 immediately following the scientific conference of the same name. Participants were well-informed with the latest data from Australia and other countries. The workshop coordinators were Keith McDonald (Queensland Parks and Wildlife Service, Atherton) and Liz Dovey (Environment Australia). It was moderated by Liz Dovey, assisted by Harry Hines (Queensland Parks and Wildlife Service, Brisbane) and Megan Johnson (School of Public Health and Tropical Medicine, James Cook University, Townsville).

These recommendations were distilled from 8 sessions extending over 2 days. Each session addressed specific issues and in most cases was introduced by a speaker who highlighted the key points. The participants then formed into several groups to develop feasible recommendations, the groups reassembling as the final component of each session to discuss recommendations. An outline of the workshop is found at <http://www.jcu.edu.au/school/phtm/PHTM/frogs/gjwork.htm>. The recommendations were made available for comment on the WWW at <http://www.jcu.edu.au/school/phtm/PHTM/frogs/gjoad.htm> for 2 months. Modifications were made on the basis of suggestions received over this time if this preserved the original intent of the Workshop.

Speare R. (ed) Recommendations from Workshop in Getting the Jump on Amphibian Disease. Attachment 7. *In*: Speare R and Steering Committee of Getting the Jump on Amphibian Disease. Developing management strategies to control amphibian diseases: Decreasing the risks due to communicable diseases. School of Public Health and Tropical Medicine, James Cook University: Townsville. 2001:131-147.

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## 1. INTERNATIONAL ISSUES

### Policies/Legislation Controls

#### Recommendation 1.1

Diseases which may have serious implications for wild amphibians, with probable impacts on biodiversity, should be accepted as legitimate for restriction / control of movement of amphibians between nations.

#### Recommendation 1.2

Chytridiomycosis and ranaviral disease of amphibians should be placed on the Office International des Epizooties (OIE) List B with the consequent certification and testing requirements for export or import of amphibians.

#### Recommendation 1.3

Declining Amphibian Population Task Force (DAPTF) should develop an international framework to support amphibian disease research.

### Non-controlling Actions/Management

#### Recommendation 1.4

Risk assessment should be carried out in all countries for chytridiomycosis and ranaviral diseases including determination of strains of pathogens and zones within countries.

#### Recommendation 1.5

In particular risk assessment should be carried out for countries importing or exporting produce with a high risk of harbouring amphibians (e.g., bananas) or intending to import or export such produce.

#### Recommendation 1.6

Countries and zones within countries should be classified as free or infected with chytridiomycosis by use of sampling protocols that have sufficient statistical strength to give defensible results.

#### Recommendation 1.7

Protocols should be adopted to demonstrate that amphibians are free of chytridiomycosis and ranavirus before importation into or export from Australia.

#### Recommendation 1.8

A precautionary approach should be adopted in classification of countries and zones: lacking evidence of freedom from chytridiomycosis using the recommended survey strategy, a country should be regarded as infected with *B. dendrobatidis*.

**Recommendation 1.9**

All produce imported into Australia should be free of amphibians and importers must follow protocols at the point of packing of produce and during transit to achieve amphibian-free status.

**Research Priorities****Establishing standard testing protocols****Recommendation 1.10**

The sensitivity and specificity of testing protocols for chytridiomycosis and ranaviral disease in live amphibians should be determined.

**Recommendation 1.11**

Data on diagnostic tests and reagents for these should be freely shared between institutions within and between countries.

**Recommendation 1.12**

The global status of chytridiomycosis should be determined for all countries and zones within countries by conducting surveys using protocols that will give statistically defensible results.

**Recommendation 1.13**

A feasible sampling strategy at the country level should be designed to give a reliable indication of whether a country is free of *B. dendrobatidis*.

**Recommendation 1.14**

IUCN should be asked to request that each nation carry out such a survey.

**Recommendation 1.15**

DAPTF should be requested to assist developing countries in carrying out their surveys.

**Recommendation 1.16**

Countries with diagnostic expertise in amphibian disease should make this expertise available to others, and reasonable costs for this should be supported in part or whole by these countries or non-government organisations.

**Risk assessment of imported amphibians****Recommendation 1.17**

Risk assessment should be performed on the prevalence of *B. dendrobatidis* and ranaviruses in frogs imported deliberately or accidentally into countries.

**Recommendation 1.18**

For Australia a survey of the species, number, destination and route of arrival of exotic amphibians should be carried out.

**Recommendation 1.19**

Imported amphibians should be examined using sensitive and specific diagnostic tests to determine the prevalence of *B. dendrobatidis* and ranaviruses.

**Recommendation 1.20**

Any frog found dead or ill on arrival at the point of importation should be examined for disease in a laboratory with the appropriate level of expertise.

**Development of treatment / disinfection protocols****Recommendation 1.21**

A practical and effective treatment / disinfection protocol for administration to live amphibians should be developed to provide a chemical barrier at point of export and point of import.

**Recommendation 1.22**

A standard protocol should be developed for treating amphibians for chytridiomycosis upon arrival in Australia and at point of export from Australia as well as treating any amphibians prior to movement within countries.

**Communication****Recommendation 1.23**

Individuals and organisations concerned with deliberate or accidental movement of amphibians between countries must be made aware of the risks of transporting chytridiomycosis, ranaviruses, and other pathogens between countries and the need to decrease those risks.

**Recommendation 1.24**

These individuals and organisations must be informed of the testing and treatment protocols for amphibians needed to decrease risks of moving pathogens between countries and of any legislation, regulations or guidelines governing these.

**2. NATIONAL ISSUES****Legislation / policy****National level****Recommendation 2.1**

In Australia chytridiomycosis should be listed as a key threatening process.

**Recommendation 2.2**

A nomination should be prepared by the Core Working Group using this document and other data to list chytridiomycosis as a key threatening process in Australia.

**State level****Recommendation 2.3**

Movement of amphibians between states should be subject to control on the basis of chytridiomycosis and ranaviral disease.

**Recommendation 2.4**

Quarantine legislation should be established to limit the transmission of amphibian diseases.

**Recommendation 2.5**

Quarantine areas or zones for chytridiomycosis should be established on the basis of disease presence and absence.

**Recommendation 2.6**

Procedures to enable rapid response to disease outbreaks in amphibian populations should be established.

**Recommendation 2.7**

Guidelines to minimise disease should be included in state policies for taking, keeping, trading and relocating amphibians, and these guidelines should be enforced.

**Programs / management****Recommendation 2.8**

Strategies to minimise transmission of disease, particularly chytridiomycosis, should be implemented in all research programs on amphibians.

**Recommendation 2.9**

These strategies should include conditions on permits.

**Recommendation 2.10**

The public should be made aware of actions that may increase the risk of disease spread including actions that increase the number of infective stages in the environment and increase the geographic range of pathogens:

1. Artificial breeding of amphibians should be discouraged unless proscribed conditions are met.
2. Keeping of tadpoles in a location/region should be permitted only if tadpoles have been collected from that location/region.
3. Metamorphs resulting from tadpole raising should be returned to the wild at the same point of collection.
4. Adult amphibians should not be moved a distance greater than they would be expected to move unassisted.

5. If amphibians are to be moved in ways different from 2.10.2-2.10.4 above, they should be tested for chytridiomycosis and given complete treatment or disinfection protocols prior to release.

**Recommendation 2.11**

High risk populations of amphibians should be identified and more stringent quarantine conditions applied to these populations.

**Recommendation 2.12**

Representative members of all Australian species should be cryopreserved in such a manner as to allow cloning in the future or have gametes preserved to allow artificial breeding.

**Recommendation 2.13**

The knowledge and infrastructure on captive breeding of amphibians should be expanded, particularly with respect to species that are threatened or particularly vulnerable.

**Recommendation 2.14**

Commercial breeders of amphibians must meet a standard that minimises the impact of disease in their activities and prevents the dissemination of chytridiomycosis and ranaviral disease.

1. This should be based on industry best practice, established by consultation between industry, government parks and wildlife departments and primary industries departments, and amphibian disease experts.
2. The standards should be implemented and monitored through industry self regulation.
3. Ongoing monitoring for disease should be an essential component of this.
4. Dead and terminal amphibians should be routinely submitted for pathological examination.
5. Premises should be accredited if they meet the set of standards, and this accreditation could be used in advertising material.

**Recommendation 2.15**

A surveillance system for amphibian diseases should be maintained and adequately supported and should include:

1. Voluntary submissions of dead and live specimens by the public, wildlife managers and scientists
2. Compulsory submissions of dead specimens of threatened species, imported specimens, amphibians in industry, and specimens under permit.
3. Integration of the surveillance system with population monitoring projects.

**Recommendation 2.16**

A one-off national baseline survey for chytridiomycosis should be conducted as part of a national project designed to give a statistically meaningful baseline.

**Recommendation 2.17**

Data on surveillance should be collated, analysed, interpreted and disseminated to wildlife managers, researchers and public by an objective, authoritative, scientifically credible central group.

**Recommendation 2.18**

The level of expertise in amphibian disease diagnosis should be expanded by training of veterinarians and others.

**Recommendation 2.19**

The commercial amphibian industry should be encouraged to provide a source of specific pathogen free frogs for research, for routine toxicity testing and for pets in states where this is permitted.

**Recommendation 2.20**

Environmental guidelines should include recommendations to minimise the impact of disease on amphibian populations by maximising the suitability of the environment

1. General recommendations to give best habitat for amphibians
2. Specific habitat recommendations for amphibians appropriate to area
3. Included as part of land care packages
4. Local councils should be encouraged to reward landowners who comply by giving rate reductions.

**Recommendation 2.21**

Funding should be sought from:

- Recovery plans for endangered species
- Listing as a key threatening process
- Commercial sources

**Recommendation 2.22**

Infrastructure, protocols and funding mechanisms should be established to enable rapid response in the event of amphibian disease outbreaks

1. The feasibility of adopting or integrating response strategies with Aquaplan should be investigated.
2. The resources, people, responsibilities, funding obligations and lines of command should be identified prior to a disease outbreak and be preapproved for rapid response.

**Research****Recommendation 2.23**

Standards for diagnostic tests for chytridiomycosis and ranaviruses in live amphibians should be established and their sensitivity, specificity and predictive values determined.

**Recommendation 2.24**

Those laboratories and individuals with expertise to investigate and describe new diseases of amphibians including isolation and characterisation of novel pathogens should be identified:

- Australian Animal Health Laboratory, Australia
- National Wildlife Center, USA
- Reagent Park's Zoo, UK.

**Recommendation 2.25**

The potential non-amphibian reservoirs of chytridiomycosis should be investigated.

**Recommendation 2.26**

The epidemiology of chytridiomycosis and ranaviral disease including the hypothesis of a novel agent being imported into countries and regions should be investigated.

**Recommendation 2.27**

A standard experimental testing protocol should be defined to evaluate the susceptibility of species to chytridiomycosis:

1. Include laboratory-raised amphibian strain of known susceptibility as a standard
2. Standard infection protocols with defined strains of *B. dendrobatidis*
3. Under standard environmental conditions

**Recommendation 2.28**

The standard lab model should be used to evaluate the susceptibility of key amphibian species so that risk assessment for chytridiomycosis can be done for potentially threatened populations in countries and zones within countries.

**Recommendation 2.29**

Isolates of *B. dendrobatidis* and ranaviruses from around the globe should be collected into at least 2 secure centres.

- In Australia this centre should be the Australian Animal Health Laboratory, Geelong, Victoria.

**Recommendation 2.30**

Disease work should collect data to enable better modelling for ranaviruses and chytridiomycosis.

- Key factors include prevalence, incidence, pathogenicity, environmental influences, force of infection.

**Recommendation 2.31**

Any analysis of susceptibility and ecological factors should take into account the phylogenetics of native frogs.

**Recommendation 2.32**

Immune response to chytridiomycosis and ranaviruses should be investigated particularly the role of immunosuppression in increasing susceptibility.

**Recommendation 2.33**

The concept of strains (e.g., mutations, mutation rates and endemism) of *B. dendrobatidis* should be investigated and data disseminated to assist in a global mapping survey.

**Recommendation 2.34**

The effect of temperature on the physiology and immunology of amphibians should be assessed.

**3. REGIONAL ISSUES****Movement of amphibians in farm produce: reduction at source****Recommendation 3.1**

Work should be done in collaboration with industry (banana, other fruit, vegetable, nursery industry) at local, state and national level to determine the critical control points where frogs enter product and where they can be most effectively removed.

**Recommendation 3.2**

Educational campaigns for producers should be developed to:

1. highlight importance of worker training in frog spotting and removal before transport:
  - Poster for workers in packing sheds and other sites
  - Training videos for workers
2. communicate information on effective removal of frogs from produce to growers and packers:
  - Additions to Farmcare and Freshcare manuals should be written to provide this information.
  - Disseminate strategies using normal communication tools within industries including industry specific magazines and journals.

**Recommendation 3.3**

Each industry should be assisted to set a defined standard for each product to meet "ecofriendly" criteria that minimise the number of frogs moved with produce.

**Recommendation 3.4**

The involvement of each industry in accidental translocation of amphibians should be quantified.

**Recommendation 3.5**

For packing sheds a container should be designed and tested to facilitate the humane and effective removal of detected frogs from the shed environment.

## **Movement of amphibians in farm produce: management at receiving end**

### **Recommendation 3.6**

Exotic amphibians accidentally or illegally imported should be euthanased humanely and submitted to pathological examination in an institution with appropriate quarantine procedures.

### **Recommendation 3.7**

Native amphibians accidentally or illegally moved outside their native range should be placed in the pet trade in states where this is allowed after treatment / disinfection using a standard protocol.

### **Recommendation 3.8**

In states where placing translocated amphibians in the pet trade is an option, the infrastructure for collection, maintenance and allocation of these amphibians should to be supported and sustained.

### **Recommendation 3.9**

Each region should assess the risk to their local amphibians in terms of accidentally translocated frogs, including their disease status and the current status of chytridiomycosis and ranaviral disease in amphibians in that region.

### **Recommendation 3.10**

Community educational material should be developed to enable people to distinguish between local frogs and foreign frogs from overseas and from other areas in Australia.

## **Movement of amphibians in other materials**

### **Recommendation 3.11**

The involvement of industries other than farm or nursery industries in accidentally moving amphibians should be investigated.

### **Recommendation 3.12**

If some industries are found to pose a significant risk of accidentally moving amphibians, these industries should be encouraged to reduce or eliminate these risks.

## **Pathogens in the laboratory**

### **Recommendation 3.13**

Live amphibian pathogens, particularly the amphibian chytrid and ranaviruses, must be worked with only in a laboratory where facilities, protocols and training are of such a standard that pathogens can not escape into the wild.

**Recommendation 3.14**

A higher level of safety for work with ranaviruses should be set than for *B. dendrobatidis*.

**Recommendation 3.15**

For *B. dendrobatidis* and ranaviruses the safety level which laboratories have to meet to allow them to work with live agents is level 2 biosecurity.

**Recommendation 3.16**

This information should be disseminated through the laboratory monitoring and ethics systems within universities and other research institutions.

**Decreasing disease risks in amphibian husbandry****Recommendation 3.17**

Standards should be established for four different amphibian husbandry situations:

1. native amphibian species only exposed to native amphibians
2. exotic amphibians and native amphibian species potentially exposed to exotic amphibians
3. threatened native amphibian species
4. large scale commercial production of exotic or native species.

**Recommendation 3.18**

For each situation guidelines should be developed on quarantine protocols within facilities to minimise the risk of introduction and transmission of pathogens within facilities:

1. native amphibian species only exposed to native amphibians, threatened and otherwise
2. exotic amphibians and native amphibian species potentially exposed to exotic amphibians
3. large scale commercial production of exotic or native species.

**Recommendation 3.19**

For each situation guidelines and protocols should be developed to minimise pathogens being distributed within and outside the facility.

**Recommendation 3.20**

Industries should be primarily self-monitoring to ensure that their facilities and protocols confirm to appropriate standards.

**Recommendation 3.21**

Animals that die in husbandry facilities should be pathologically examined to determine cause of death particularly for facilities dealing with endangered and threatened Australian frogs and with imported frogs.

**Recommendation 3.22**

Protocols should be developed to lessen the risk of disease from native amphibians kept by members of the public as permitted under state regulations.

**Field Research**

Recommendations recognise that there is potential for research studies to increase the transmission of pathogens and that there are strategies that can be used to remove or decrease these risks.

The recommendations are grouped under 2 categories requiring different strategies:

1. Protocols to prevent movement of pathogens between sites
2. Protocols to prevent increase in the rate of transmission within a site.

**Philosophy of field research on amphibian populations****Recommendation 3.23**

Protocols should be developed to strike a balance between preventing disease transmission and allowing relevant research to be carried out.

**Recommendation 3.24**

A hierarchy of risk should be developed by researchers using the conservation status of species at sites and the status of chytridiomycosis and ranaviral disease at sites.

**Recommendation 3.25**

Work between sites should use this hierarchy of risk to 1) minimise the possibility of spread of pathogens and 2) minimise the potential severity of impact of a pathogen if it was introduced into a site.

**Recommendation 3.26**

The sequence of work between sites should if feasible proceed from 1) sites of low prevalence and density of pathogens to sites of higher prevalence and density of pathogens (minimisation of potential for spread) and 2) from sites of high conservation status to sites of less conservation status (minimisation of impact on amphibian population).

**What is a site?**

A site is defined as a location or place within which the proximity of individual amphibians is such that they are likely to transmit pathogens in nature with the site definition depending on the particular pathogen and physical characteristics of the location.

**Recommendation 3.27**

For amphibian researchers working within river systems, separate transects should be regarded as separate sites and for isolated water bodies such as lakes, ponds and dams, separate water bodies should be regarded as separate sites.

**Recommendation 3.28**

Working within sites the recommendations for within populations should apply; working between sites the recommendations for between populations should apply.

**Between populations****Recommendation 3.29**

The standard to achieve between sites should be that researchers do not introduce pathogens into any site.

**Recommendation 3.30**

This standard should be maintained even if pathogens are already present at the site.

**Recommendation 3.31**

Disinfection procedures between sites should be carried out to kill all pathogens on personnel and their equipment:

1. Wash equipment in water to remove any visible organic debris.
2. Apply disinfecting solution for 1 minute. Sodium hypochlorite at 0.4% and 70% ethanol are 100% effective at killing *B. dendrobatidis* zoosporangia and zoospores. 5% active chlorine for 1 min may be needed for ranaviruses. The disinfecting solution can be applied by spray, by immersion or by wiping the surface of the item with the disinfecting solution.
3. Dry equipment if possible between sites. Drying alone for 3 hours will kill *B. dendrobatidis*, but not ranaviruses.

**Recommendation 3.32**

If equipment cannot be disinfected between sites, it should be enclosed in watertight bags which should not be opened at other sites.

**Recommendation 3.33**

Items of clothing that cannot be easily disinfected between sites should be replaced at each new site.

**Recommendation 3.34**

Amphibians should not be moved between sites.

**Within populations****Recommendation 3.35**

The standard to aim for within an amphibian population should be the current risk that members of that population are exposed to naturally. Researchers do not have to adopt strategies that are designed to reduce risks below the natural baseline.

**Recommendation 3.36**

Handling techniques should be standardised so as not to increase the risk of transmission of pathogens between individual animals:

1. Gloves or plastic bags if used for handling should be used only on one amphibian unless sterilised adequately between uses or washed in the same water from which the amphibian population is collected.
2. Gloves and plastic bags can be sterilised in bleach (0.4%) and then washed in pathogen-free water or the same water occupied by the amphibian being collected.
3. Handling without protective covering is permitted if hands are washed thoroughly in the same water occupied by the next amphibian to be handled or by washing in pathogen-free water. If hand washing in suitable water is not possible between individuals, direct handling should not be done, and single use gloves or plastic bags should be used.
4. Water collected from natural water bodies should not be used for rehydrating or wetting amphibians not normally using that water.

**Recommendation 3.37**

Temporary housing or holding facilities for amphibians should not increase the risk of exposure above the natural baseline level for that population.

1. Each amphibian should be housed separately so that it does not have direct contact with others.
2. If containers that have been used to hold amphibians are to be reused, they should be sterilised by immersion in 5% bleach for at least 1 minute to kill ranaviruses and *B. dendrobatidis* before reuse.
3. To dispose of containers that have been used to hold amphibians, immerse containers in 5% bleach for at least 1 minute to kill ranaviruses and 0.4% bleach for 30 seconds to kill *B. dendrobatidis*. Containers are then sterile and can be disposed of by normal methods.

**Recommendation 3.38**

Protocols to prevent transmission of pathogens by non-invasive procedures such as weighing and measuring should be followed:

1. Implements should be physically cleaned of any secretions or body fomites between use
2. Implements should be sterilised by spraying or wiping with 70% alcohol or 0.4% bleach after cleaning and leaving the disinfectant on the surface for at least 30 seconds.
3. If possible, each specimen should be weighed in its own plastic bag without coming into contact with scales or measuring implements.

**Recommendation 3.39**

Standard protocols to prevent transmission of pathogens by surgical procedures such as toe clipping and implantation of devices should be followed:

1. instruments and other implements should be cleaned between individual amphibians
2. fluids and tissue physically removed from their surfaces
3. sterilised with 70% alcohol or 0.4% bleach for at least 30 seconds.

**Recommendation 3.40**

Researchers should incorporate measures to clean their hands and instruments into their procedures of surveying amphibians so that the protocols become routine and confusion about the state of sterilisation of instruments does not occur.

**Recommendation 3.41**

Amphibians with signs of illness are high risk in terms of pathogen transmission. Researchers should adopt protocols to minimise the risk of pathogens being subsequently transmitted to other frogs:

1. Ill amphibians should be captured using a glove or plastic bag, and placed in a temporary holding container, to be dealt with after all other amphibians have been examined
2. Any gloves or plastic bags used with ill amphibians should be disposed of and not sterilised and not reused.
3. Instruments used with ill amphibians should not be reused until adequately sterilised. This will include cleaning of secretions, blood and tissue, immersion in 70% ethanol or 0.4% bleach for 10 minutes, drying, coating with ethanol and immediate flaming or alternatively physical cleaning and subsequent autoclaving.
4. Ill amphibians should not be returned to the wild, but should be submitted for pathological examination.

**Recommendation 3.42**

Tadpoles cannot be treated as individuals in the survey situation, but each aggregate should be treated as a unit.

**Research on disinfection protocols****Recommendation 3.43**

The effectiveness of practical disinfection techniques and procedures able to be used in the field should be determined.

**4. ROLE OF COMMUNITY****Recommendation 4.1**

Wildlife managers, researchers and community members should form a partnership to decrease risks of disease to amphibians.

**Recommendation 4.2**

The community should be encouraged and assisted to be active in disease surveillance:

- monitoring deaths
- accurately recording clinical signs in ill amphibians
- collecting ill and dead amphibians for pathological examination
- assisting in surveys of road kill samples for chytridiomycosis.

**Recommendation 4.3**

Disease surveillance should be done under a structured and integrated system that includes the broad community (many eyes), voluntary frog groups (filtering information), amphibian pathologists (interpreting disease findings), information users (wildlife managers), with free-flow of information between all levels.

**Recommendation 4.4**

The community should be encouraged and assisted to be active in caring for and “nurturing” ill amphibians:

- retrieval of ill frogs from harm’s way and bring into the care of skilled people
- rehabilitation of frogs
- repatriation and release of cured amphibians
- developing good husbandry techniques
- dissemination of information about techniques and diseases to other care groups, government and the scientific community

**Recommendation 4.5**

The community should be encouraged and assisted to be active in monitoring of amphibian populations:

- densities, movements, reproductive activity and success
- surveillance for exotic amphibians.

**Recommendation 4.6**

The community should be encouraged and assisted to be active in protection, improvement and creation of habitats for amphibians.

**Recommendation 4.7**

Information on relevant diseases of amphibians should be disseminated to the community through a range of audiences (schools, general public, policy makers, herpetologists, disease specialists) with particular emphasis on the factors associated with amphibian population declines, the need to preserve Australian frog density and diversity, how to detect and control disease, and how to minimise risks associated with translocation of frogs.

**Recommendation 4.8**

A range of mechanisms should be used to disseminate information to the community on amphibian diseases and their role in amphibian population declines; these mechanisms could include TV, printed media, internet, events, inclusion in school and tertiary curricula, workshops for educators, displays in zoos, museums and nature houses, and by CD-ROM.

**Recommendation 4.9**

Funding to community organisations and others to support and assist the activities outlined in recommendations 4.1 to 4.8 should be provided by government, non-government organisations, commercial sources, and community donations.