WALLUM FROGLET

CONSERVATION ACTION STATEMENT

September 2010

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Photography acknowledgement

Wallum froglet, *Crinia tinnula*, ©Queensland Museum.

1 Introduction[1]

This Conservation Action Statement addresses the wallum froglet (*Crinia tinnula*)[2], which is identified as a significant species within Brisbane as per Council's Natural Assets Planning Scheme Policy (Brisbane City Council 2000).

Wallum froglet, *Crinia tinnula*

The wallum froglet is one of a small group of species referred to as 'acid' or 'wallum' frogs that inhabit low nutrient soils (mostly deep sand) of the near coastal lowlands and sand islands (Ingram and Corben 1975). They are so named for their ability to breed in waters of low pH (high acidity), which are characteristic of coastal wetlands. It is a small (20mm) terrestrial frog that seeks refuge in the base of reeds/sedges and under leaf litter.

This Conservation Action Statement will be updated as new information becomes available and to report progress on conservation actions. For more information about this or any other Conservation Action Statement, visit Council's website at **www.brisbane.qld.gov.au** or phone Council on **(07) 3403 8888.**

Aims

This Conservation Action Statement details Council's management intent for the long-term protection and conservation of wallum froglets within Brisbane through the following actions.

- Collating **existing information** on the distribution, ecology and management requirements of this species within Brisbane and surrounds.
- Identifying **key threatening processes** that significantly impact upon this species within Brisbane.
- Identifying **gaps in existing knowledge** of the habitat and management requirements of this species and allowing research priorities to be defined.
- Detailing **practical and affordable strategies and actions** that support the long-term protection and conservation of this species within Brisbane.

There are many other biodiversity benefits associated with the conservation of the wallum froglet including:

- The protection and management of habitat that will also help conserve other threatened flora and fauna;
- Increased information on the ecology, habitat requirements, diseases and other threatening processes that have influenced the distribution and abundance of the wallum froglet and that will assist in understanding the declines of other amphibian species; and
- The importance of amphibians as indicators of environmental health due to their dependence on both terrestrial and aquatic environments throughout their lifecycle.

In addition to having highly permeable skins, amphibians are extremely susceptible to environmental changes (Hines 2002). The conservation of the highly susceptible wallum froglet can ultimately result in the conservation of other less and/or equally vulnerable species.

[1] Unless otherwise stated, the information in this section is compiled from BAAM (2005). [2] This document follows the nomenclature provided by the Commonwealth Department of Water, Heritage and the Arts online 'Australian Faunal Directory' (DEWHA 2010), which is kept up to date with taxanomic revisions and provides a single, categorical point of reference for both common names and scientific names for all Australian taxa.

2 Conservation status

The conservation status of a species will influence how it is managed. 'Threatened' species are typically accorded a more stringent management regime than 'common' species. Various conservation registers identify the status of fauna species at local, state and national levels. The current conservation status of the wallum froglet is provided in Table 1.

Table 1: Official conservation status of Brisbane's wallum froglet

Species	Brisbane City[1]	South East Queensland[2]	Queensland	National[5]
Wallum froglet	Significant: species is uncommon, small population in low density across its range in Brisbane, species is a habitat indicator and in decline	Not listed	Vulnerable[3] High Priority[4]	Not listed

[1] Brisbane City Council 2000, *Brisbane City Plan 2000,* Natural Assets Planning Scheme Policy, vol. 2 [2] Significant for South East Queensland Bioregion under the Biodiversity Assessment and Mapping Methodology (Environmental Protection Agency 2002). [3] Queensland *Nature Conservation (Wildlife) Regulation 2006* under the *Nature Conservation Act 1992* [4] Queensland Department of Environment and Resource Management 'Back on Track' species prioritisation framework. [5] Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

3 Distribution[3]

National/state

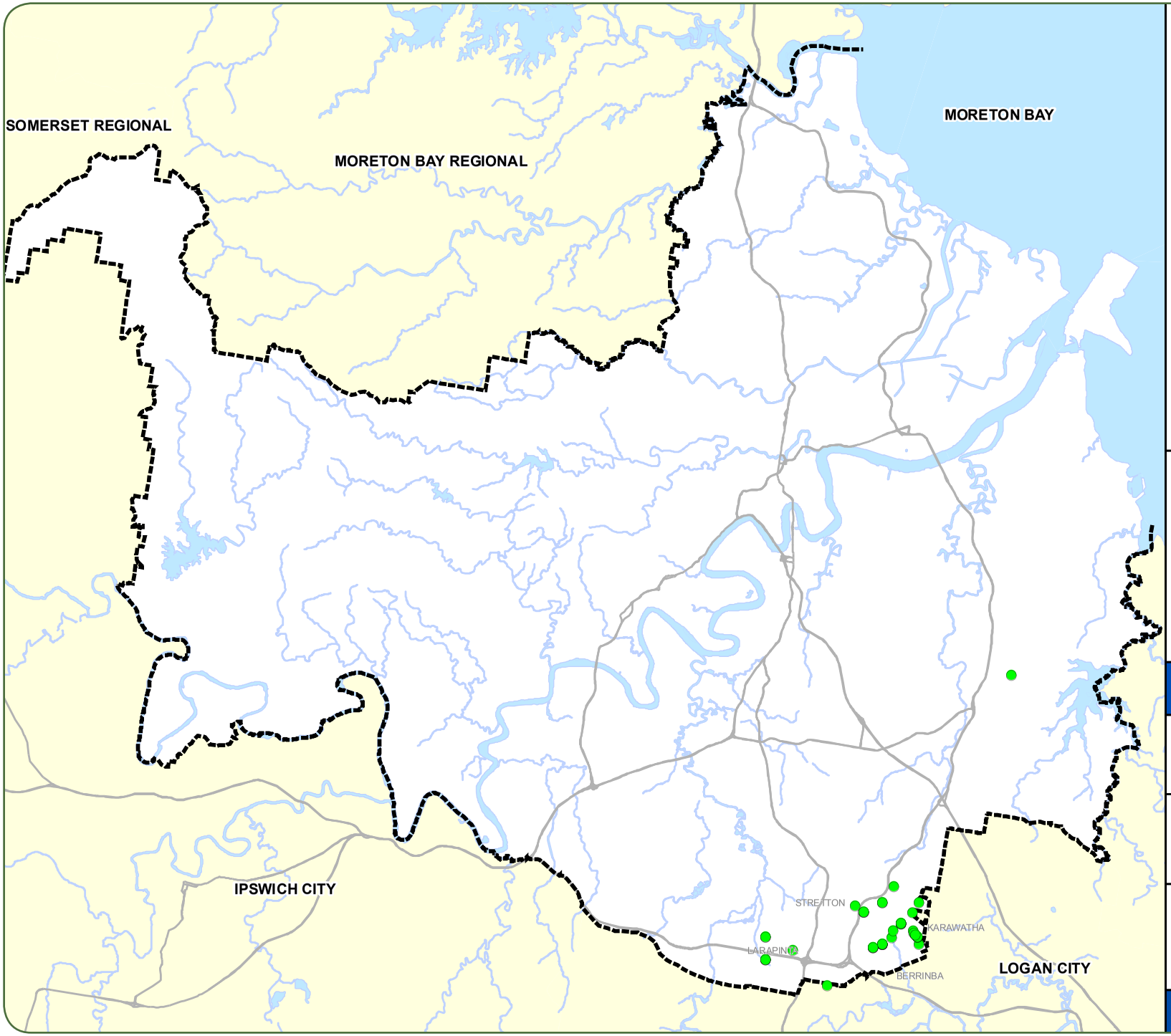
- Restricted to the lowlands, but found in a range of habitats, mostly wallum, usually in association with coastal sand plains and dunes.
- Occurs as far north as Litabella National Park on the southeast coast of Queensland, south to Kurnell in mid-eastern New South Wales (Hines *et al.* 2004).
- Also occurs on a number of other offshore islands including Fraser Island, Bribie Island, Moreton Island and North Stradbroke Island.
- Extent of occurrence is approximately 30,300km².
- Range is not continuous, being restricted by suitable habitat and encroached by coastal development (Hines *et al.* 2004).

Local

- Found in a range of habitats, but mostly wallum, usually in association with coastal sand plains and dunes.
- Have been recorded at Deagon Wetlands, Karawatha, Parkinson, Calamvale, Belmont, Chambers Flat and Logan in the Brisbane area (Council 2005; Meyer *et al.* 2006), as well as Moreton Island.

Verified wallum froglet records for Brisbane are shown on Map 1.

[3] Unless otherwise stated, the information in this section is compiled from BAAM (2005).



Wallum froglet

Wallum froglet

DATA INFORMATION

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Projection : Map Grid of Australia, Zone 56
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Conservation Action Statement

Records of wallum froglets in Brisbane

4 Ecology

Habitat

- Inhabit areas of wet heath, sedgeland, melaleuca woodland, eucalypt woodland and forest, and rainforest near swamps, lakes, creeks and soaks.
- Distribution is commonly associated with ephemeral swamps, but may breed in drainage ditches as well as shallow ephemeral waters in marsh/swamp areas.
- Limited research conducted into the non-breeding habitat usage of this species. However, it is more likely that the physical/chemical attributes of the breeding pond have the greatest influence on this species distribution, rather than broad forest type.
- They breed in oligotrophic (nutrient poor) acidic water with a pH less than 5.5, swamps and/or lakes in undisturbed wallum (Meyer *et al*. 2006).

Diet

To date there has been no research into the dietary requirements of the wallum froglet however they are most likely to feed on insects. All Australian endemic frogs will only recognise a food item if it is moving (i.e. they will not eat dead organisms). The type of prey consumed ranges from ants, termites, spiders, beetles and bugs to grasshoppers, cockroaches and even other frogs (Tyler 1994). The habitat and season play a significant role in determining the availability and type of food items that can be eaten.

Reproduction

- Breeds throughout the year, peaking in colder months.
- Males call from secluded positions either beside water or while afloat among emergent vegetation.
- Eggs are attached singly to fine stems of grass or reeds.
- The pH requirements of breeding ponds is between 4.3 to 5.2 (N.B. this is why this species belongs to the group of frogs sometimes referred to as the 'acid frogs').
- Larval period may extend up to six months if over-wintering occurs (Anstis 2002).

Table 2: Breeding seasons (green shading indicates breeding months)

Species	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Wallum froglet												

Movement patterns

- No detailed information available about dispersal and movement of individuals, although individuals have been trapped a considerable distance from breeding sites.
- Need to seek protection from desiccation during prolonged dry spells or when shallow water bodies dry up. Therefore, movement into the terrestrial environment could be extensive depending on the availability of suitable refuge sites.

5 Threats[4]

As with most amphibian species, there is no clearly identifiable cause of decline of populations of wallum froglets, although several factors are implicated. It is well known, however, that amphibians are extremely susceptible to environmental changes due to their dependence on both terrestrial and aquatic environments throughout their lifecycle, in addition to having highly permeable skins. As such, amphibians are important indicators of environmental health.

Habitat loss, fragmentation and simplification

- Since European settlement, an estimated 67,000 hectares, or two-thirds of the original woody vegetation in Brisbane City, has been cleared. This includes approximately 90% of lowland forests and more than 80% of all lowland vegetation (below 100 metres elevation). Habitat fragmentation is extensive, around 80% of the bushland remnants in the city are less than 20 hectares (Council 2001).
- Habitat loss reduces amphibian abundance and diversity. Draining wetlands directly affects frog populations by removing breeding sites and by fragmenting populations (Semlitsch 1998).
- Fragmentation affects frog populations by preventing migration or dispersal between catchments or between subpopulations within catchments, thus causing population isolation (Meyer *et al*. 2006). This isolation could then lead to genetic problems such as inbreeding. Small populations are also at a greater risk of extinction from events such as drought, fire or disease outbreak.
- Habitat fragmentation has been identified as an important factor in frog declines. Fragmentation of habitat by roadways can have deleterious affects on frog populations either directly (i.e. frogs being run over by vehicles while trying to cross the road), or indirectly through pollution by run-off from roads spoiling waterways, or populations becoming genetically isolated.
- Urban expansion is a major threat to the persistence of wallum froglet populations in Brisbane. The preferred habitat for this species (i.e. wallum, melaleuca swamp, sedgeland and banksia woodland) occurs on coastal lowlands that are in heavy demand for canal developments, drainage projects and transport corridors (Hines *et al*. 1999).

Habitat degradation and modification

- The wallum froglet is sensitive to changes in water chemistry and quality, and loss and modification of habitat (Hines *et al*. 1999).
- Disturbances of wallum soils, caused by human activities or trampling by animals (e.g. cattle and pigs), and changes in nutrient status can impact directly on native vegetation and biodiversity as well as indirectly on the water quality of breeding ponds. Changes in water quality can encourage other frog species to colonise sites used by wallum froglets, eventually displacing them.
- Habitat can also be degraded by changes in the water table (e.g. lowering caused by the digging of drainage channels to protect nearby developments from flooding).
- The practice of liming disturbed earth on acid sulphate soils to counteract the production of sulphuric acid increases the pH of surrounding lands and waters. The wallum froglet is restricted to acid environments and pH changes caused by liming can have detrimental effects on habitat suitability for the species.
- The plants in wallum habitats are extremely sensitive to small changes in the environment, such as variations in hydrology (water tables and drainage) or the addition of soil nutrients (via storm water and general runoff). Any changes to the plant community could have flow-on affects to wallum froglets (Meyer et al. 2006).
- Pollution of aquatic habitats by excessive usage of fertilisers, mainly from agricultural practices, is a threat to this species. Increased nitrate levels in breeding ponds can inhibit larval growth and development as well as reducing larval survivorship in frogs (Mann and Bidwell 1999). As well, such nutrient pollution can cause changes in the vegetation. Use of herbicides and insecticides for weed and mosquito control respectively can cause deformities or death in wallum froglets (Mann and Bidwell 1999).

[4] Unless otherwise stated, the information in this section is compiled from BAAM (2005).

5 Threats continued...

Inappropriate fire regimes

- To maintain diversity within wallum habitats essential to these frogs, it is necessary to employ appropriate fire strategies (Watson 2001) (i.e. regular, but patchy firing (mosaic burns) with a minimum fire-free interval of between 8 to 10 years) (McFarland 1988). It is important to protect swamps from fire during burning-off activities.

Hydrological changes

- Changes to hydrology caused by development within the catchment can impact negatively on wallum froglets by changing the length of time water is available for breeding.
- If water does not remain in the breeding area for sufficient time to allow recruitment, reproductive success may be impacted.
- If water remains permanently in the breeding area, predatory fish populations can establish, also impacting reproductive success.

Predation, competition and invasive species

- Feral pigs (*Sus scrofa*) can adversely affect this ground dwelling species either directly, through predation, or indirectly by destroying breeding habitat when foraging or wallowing.
- The mosquitofish (*Gambusia holbrooki*) preys on wallum froglet eggs and larvae, and competes for food. Any introduction of the fish to frog breeding ponds could impact wallum froglet populations.
- The cane toad (*Rhinella marinus*) can lay up to 35,000 eggs at a time. Direct impacts include predation of native eggs, tadpoles and frogs, or poisoning of native frogs that ingest cane toad eggs or larvae (Crossland and Alford 1998). Indirectly, effects include outcompeting native tadpoles for food resources or depleting oxygen levels in breeding pools. However, the effects of cane toads on wallum froglet populations is not fully known.

Disease

- Globally diseases are now recognised as causing the decline and disappearance of many frog species (Skerratt *et al.* 2007).
- *Batrachochytrium dendrobatidis*, the cause of amphibian *Chytridiomycosis* (*Chytrid* fungus), is a potentially fatal skin disease of amphibians and is thought to be responsible for the decline and disappearance of several frog species in South East Queensland (Department of Environment and Heritage 2006). There are records of deaths for all of the target frog species from this disease in Queensland (Berger *et al.* 2004). Adult frogs die within weeks of being experimentally infected. Tadpoles often carry the infection in their mouthparts, but otherwise appear and behave normally (Symonds *et al.* 2007). Because of this, licensed collectors or members of the public may unknowingly spread the disease to other environments (Anstis 2002). Temperature is known to have large effects on occurrence of disease, with outbreaks of *Chytrid* fungus in South East Queensland mostly occurring in the winter months (Berger *et al.* 2004).

Climate change

- Climate change is very likely to exacerbate the other threats previously listed here, particularly frog susceptibility to disease.
- Moisture is a crucial resource for amphibian reproduction regardless of reproductive mode. Changes in rainfall patterns as a result of a changing climate could reduce amphibian reproduction or recruitment (ability of tadpoles to become mature adults) (Lips 1999).
- Findings from recent research focusing on upland frogs in Eastern Australia have concluded that frog declines significantly coincided with rising minimum temperatures (Laurence 2008).

6 Conservation

Several Council biodiversity initiatives are contributing to the protection and management of the wallum froglet and its habitat across the city. The following are key initiatives.

- Bushland Acquisition program. Through this program more than 2700 hectares of the city's most significant lowland habitats have been purchased and protected to date.
- Wildlife Conservation Partnerships program. More than 600 private properties have established conservation partnerships with Council, covering some 2000 hectares of principally lowland habitats, some of which are significant wallum froglet habitat areas.
- Conservation Reserve Estate. More than 13,700 hectares of parkland including 7755 hectares of bushland and wetland reserves are managed and protected. This reserve network provides habitat for Brisbane's significant species.
- *Natural Assets Local Law (2003).* Over 61,000 hectares of significant native vegetation is covered by the Natural Assets Local Law.
- *City Plan (2000).* The City Plan designates a green space system throughout the city to recognise and protect the contribution of open space areas to ecological functions. The plan's Biodiversity Code and supporting Ecological Assessment Guidelines provide performance criteria and acceptable solutions to protect significant biodiversity values on, or adjacent to, proposed development. *City Plan* also includes statutory schedules of flora and fauna species considered significant in Brisbane. These schedules recognise the conservation significance of species at a citywide and/or regional level.

7 Research

The majority of recent amphibian research has focused on identifying threats that are causing frog population declines. There is very limited research addressing specific species, such as the wallum froglet. There is no current research being undertaken regarding the distribution and abundance of this species in Brisbane and a search of the literature failed to find any specific studies, past or present, of the effect of habitat modification or exotic species on wallum froglet populations.

8 Management intent

Strategies

Council intends to contribute to the long-term conservation of the city's significant wallum froglet through the following.

- Adopting and encouraging innovative voluntary and statutory mechanisms that protect important habitats and movement corridors.
- Securing and protection of important habitat for the wallum froglet.
- Ensuring appropriate ecological assessment, reporting and survey procedures are adopted in development, planning and management activities.
- Encouraging land management practices that avoid or minimise direct and indirect impacts on frogs and their habitats on both public and private lands.
- Ensuring the timely availability of accurate, adequate and contemporary information for policy, planning and management decisions and actions.
- Facilitating research that targets priority information gaps and contributes positively to the conservation of Brisbane's frogs and their habitats.
- Providing the Brisbane community with appropriate information and opportunities to contribute in a practical way to better understand and protect Brisbane's frogs.

8 Management intent continued...

Actions

Table 3 describes priority conservation actions that Council will pursue with its partners to address the stated strategies. These priority actions have been drawn from studies undertaken for Council by recognised frog experts and from consultation with a range of stakeholders. Actions will be undertaken as funds become available through Council's budgetary process. It should be recognised that Council must consider the timing of these actions against other priorities across the whole of the city.

Table 3: Management actions

Management aspect	Action	Timing	Lead agent & key stakeholders *
Habitat protection	Conserve and protect important frog habitat on privately owned land within Brisbane, through Council acquisition of significant habitat (Bushland Acquisition program) and through conservation partnerships with private landholders (Wildlife Conservation Partnerships program).	Ongoing	Council, private landowners
Habitat management	Develop specific assessment criteria and habitat management guidelines for developments and other potentially harmful activities occurring within or adjacent to known frog habitat.	2011	Council, universities
	Maintain habitat connectivity by ensuring linear infrastructure does not detrimentally impact on habitat connectivity in areas of frog habitat through Council's Wildlife Movement Solutions program.	Ongoing	Council, DTMR
	Develop and implement appropriate habitat rehabilitation protocols that will not negatively impact on local frog populations.	2011	Council, universities, community groups
	Undertake control or eradication of identified harmful or potentially harmful invasive species from known frog habitat.	Ongoing	Council
Research	Undertake habitat mapping across the city for the wallum froglet in the Brisbane area and develop associated baseline 'aquatic and terrestrial habitat requirement criteria' to ensure management strategies are directed to the most appropriate sites.	Commence 2010	Council, universities, QM
	Seek collaborative partnerships to undertake research on the potential threats to wallum froglet populations, particularly the effects of invasive species, the role of disease in frog decline, degradation of breeding and refuge habitats and the effects of climate change on local frog populations.	Commence 2010	Council, universities, QM
	Undertake research on the effectiveness of wildlife movement solutions (i.e. road culverts).	Ongoing	Council, universities
	Undertake research into the impacts from disturbance to and treatment of acid sulfate soils in wallum froglet habitat (i.e. the impacts from liming).	Commence 2010	Council, universities

8 Management intent continued...

Actions continued...

Table 3: Management actions continued

Management aspect	Action	Timing	Lead agent & key stakeholders *
Mosquito control	Continue the current use of specific and ecologically sound products for the control of mosquito larvae in aquatic habitats.	Ongoing	Council
Information Management	Develop a central database for the collation of monitoring data.	Underway	Council
	Relevant Council field staff to be trained in appropriate aquatic habitat management practices including the protocols for the control of disease (*Chytrid* fungus).	Commence 2011	Council
	Incorporate information relating to the impacts of invasive species on local frog species into Council's invasive species management community awareness programs.	2010	Council, community, community groups
Community involvement	Support one frog identification workshop each year.	Commence 2010	Council, QM, community
	Incorporate frog habitat management information for landholders into community programs, including Wildlife Conservation Partnership program, Creek Catchment Ranger and Habitat Brisbane programs and environment centre curricula.	Ongoing	Council
	Support one workshop each year to inform community rehabilitation groups of frog-friendly techniques for rehabilitating waterways.	Commence 2010	Council, catchment and Habitat Brisbane groups
	Support community based monitoring.	Commence 2010	Council, community groups

* Council: Brisbane City Council, DTMR: Queensland Department of Transport and Main Roads, QM: Queensland Museum.

8 Management intent continued...

Guidelines

The habitat protection and management guidelines detailed in Table 4 are provided to better assist environmental planners, land owners, land managers, private industry and the broader community to maintain and enhance existing wallum froglet habitat in Brisbane. These guidelines are preliminary and will be refined as more information about this species and its habitat requirements becomes available.

Table 4: Habitat protection and management guidelines

Issue	Guideline	Explanatory notes
Destruction, clearing or alteration of aquatic habitats due to local catchment development and localised invasions of invasive plant species.	Apply the Biodiversity, Waterway, Wetland and Stormwater Management Codes, Ecological Assessment Guidelines, other relevant state legislation and any species-specific assessment criteria.	The guidelines provided within the existing codes are generally acceptable for most species but may require the refinement to maintain viable populations of wallum froglets. The largest identified threat to the persistence of the wallum froglet is habitat loss due to urbanisation. Species specific guidelines will be developed to help Council and stakeholders protect populations when planning future development or changes in land use. The guidelines will suggest possible protective measures for frog populations under different situations. Existing habitat should be protected from future development wherever possible.
Habitat restoration or rehabilitation within the aquatic habitats or in vegetated areas surrounding breeding areas.	A minimum of 50 metres of intact terrestrial habitat and/ or buffer should be retained and maintained around aquatic habitats. Further research is however required to inform the specific management requirements for wallum froglets.	Wallum froglets may require additional terrestrial habitat as refuge sites to ensure persistence during dry spells. Information about species' micro-habitat requirements is essential for habitat protection. Habitat restoration management plans must incorporate invasive weed removal and alternative techniques for the use of herbicides and pesticides.
Human activities.	Limit public access to known breeding areas and avoid, where possible, undertaking works in these areas during the breeding season.	Ensure that recreational access and use of water bodies and Council activities do not inappropriately disturb wildlife utilising aquatic habitats.
	Educate landowners about the habitat requirements of the wallum froglet and support landowners in conserving such habitat, particularly breeding habitats within farmlands or areas close to agricultural practices.	Land use practices in areas near breeding sites should be monitored to ensure frog habitats are not contaminated by run-off of sediments or fertilisers and pesticides, which could cause eutrophication of the aquatic habitat. Trampling of terrestrial habitat surrounding breeding areas by domestic stock and wild pigs should also be monitored.
Mosquito control.	Employ 'best practice' principles, and use methods that are deemed 'safe' for frogs. Mosquito control should not be carried out during known frog breeding seasons (March through September are the main breeding months to be avoided).	Council will continue to use mosquito control products that are not harmful to frogs. It will maintain its membership of the Mosquito and Arbovirus Research Committee to support research that ensures the use of world best practice in mosquito management.

8 Management intent continued...

Guideines continued...

Table 4: Habitat protection and management guidelines continued

Issue	Guideline	Explanatory notes
Displacement of frog populations due to localised invasions of invasive plant and animal species.	Invasive species management activities in important wallum froglet habitat areas should incorporate mosquitofish and cane toad control.	Certain invasive species may need to be locally eradicated to maintain frog population viability at a given location. This may be particularly important in areas infested with mosquitofish and cane toads.
Lack of knowledge.	Landowners, community conservation groups and the broader community to be made aware, through existing Council programs, of habitat requirements, threats and management recommendations in areas known to support wallum froglet populations.	Information on habitat requirements, threats and management recommendations should be made readily available to the community, particularly Habitat Brisbane and catchment groups, Wildlife Conservation Partnership program landowners and landowners in areas known to support wallum froglet populations or where frog habitat is under threat.
Community involvement.	Community groups involved in restoration and rehabilitation works should, where relevant, be encouraged to consider the habitat requirements of local frog species. Any activities undertaken must not negatively impact on the local frog population.	By fostering community involvement, suitable frog habitat on privately owned and public land can be restored, as can linkages that form dispersal corridors between breeding areas. If an area already supports a diversity of frog species, expert advice should be sought before commencing further restoration work to enhance the frog habitat as restoration may not be necessary or may be detrimental to the existing balance.

9 Further information

Agencies

- Brisbane City Council (www.brisbane.qld.gov.au)
- Department of Environment, Water, Heritage and the Arts (www.environment.gov.au)
- Frogs Australia Network (www.frogsaustralia.net.au)
- Queensland Department of Environment and Resource Management (www.derm.qld.gov.au)
- Queensland Museum (www.qm.qld.gov.au)
- Queensland Frog Society (www.qldfrogs.asn.au)
- RANA Frog Group (www.ranafrog.org.au)
- Threatened Species Network (www.wwf.org.au)

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