This Sub-regional Species Strategy (Strategy) for the Growling Grass Frog has been prepared in response to obligations arising from the Melbourne Strategic Assessment conducted under Part 10 of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).1

The Strategic Assessment evaluated the impacts of the Victorian Government’s Program ‘Delivering Melbourne’s newest sustainable communities’ on matters of national environmental significance listed under the EPBC Act. The Program provides for urban development in four growth areas within Melbourne’s expanded 2010 Urban Growth Boundary and in 28 existing precincts within the 2005 Urban Growth Boundary. It also provides for the development of the Regional Rail Link (west of Werribee to Deer Park) and the Outer Metropolitan Ring Transport Corridor/E6 Road Reservation.

The Strategic Assessment led the Victorian Government to make commitments to the Commonwealth Government in relation to conservation outcomes and measures to protect matters of national environmental significance. These commitments are outlined in ‘Delivering Melbourne’s newest sustainable communities: Program Report’ (Program Report) (Victorian Government, 2009), and include the preparation of this Strategy.

The Strategy has been informed by a detailed technical report and associated recommendations for Growling Grass Frog conservation (Ecology and Heritage Partners 2011a). The implementation of this Strategy will be drawn from this report.

The Strategy requires approval from the Commonwealth Government.

1.1 Purpose of the Strategy

The requirement to prepare this Strategy arises from the Program Report. A commitment was made in the report that:

Sub-Regional Species Strategies will be prepared for some specific matters of national environmental significance such as the Growling Grass Frog, Southern Brown Bandicoot, and Golden Sun Moth. These strategies will inform the preparation of the Biodiversity Conservation Strategies by identifying important populations, areas to be retained (where known) as required by prescriptions and habitat links. They will influence negotiations and the design of precincts that will occur during the preparation of precinct structure plans, as required by the relevant prescriptions. Each Sub-Regional Strategy must be approved by the Commonwealth Government prior to the finalisation of the Biodiversity Conservation Strategy.2

In accordance with this commitment, the purposes of this Strategy are to:

• Inform the draft Biodiversity Conservation Strategy and draft Growth Corridor Plans for the growth areas, which will inform the design of precincts during the precinct structure planning stage and the preparation and implementation of Conservation Management Plans.
• Identify important populations of Growling Grass Frog, areas of habitat to be protected as required by the prescription, and habitat corridors to provide connectivity between populations.

1.2 Scope of the Strategy

The Strategy sets out all the requirements for the Growling Grass Frog in the growth areas to satisfy the commitments in the Program Report. The Strategy is a key mechanism to deliver the conservation outcomes for Growling Grass Frog in the Program Report, namely:

• functioning sustainable populations of Growling Grass Frog with connectivity between populations
• protection and enhancement of important populations.

The Strategy identifies land in the growth areas that is suitable habitat for the Growling Grass Frog, and places this land into two categories:

• habitat that will be protected and managed for the conservation of the Growling Grass Frog (Category 1 habitat)
• habitat that can be cleared for urban development, but for which compensatory habitat is required (Category 2 habitat).

The protection and management of Category 1 habitat will achieve the conservation outcomes for the Growling Grass Frog, and will satisfy the protection requirements of the prescription (see Appendix 1). No additional land in the area covered by this Strategy will therefore be required to be protected for the Growling Grass Frog at the precinct structure planning stage.
The Strategy provides direction about the design and management of Category 1 areas for Growling Grass Frog, including guidance on the preparation of Conservation Management Plans.

The Strategy also sets out the survey, compensatory habitat provisions, and/or salvage and translocation requirements that apply to Category 2 habitat, which must be implemented at the precinct structure planning stage. Surveys will only be required to determine salvage or translocation requirements for Growling Grass Frog from within development areas. The Strategy sets out a mechanism for providing compensatory habitat for the removal of Category 2 habitat.

1.3 Area covered by the Strategy

The Program, as defined in the Program Report, means the Urban Growth Boundary Review for Melbourne for the development of land, including associated transport infrastructure, within the following areas:

- investigation areas for the expansion of the 2005 Urban Growth Boundary
- areas inside the 2005 Urban Growth Boundary for which a planning scheme amendment to introduce a Precinct Structure Plan had not commenced as at 26 May 2009 (the existing 28 precincts)
- areas in the Outer Metropolitan Ring Transport Corridor/E6 Road Reservation and the Regional Rail Link corridor between west of Werribee and Deer Park (section 2).

In accordance with the definition of the Program, this Strategy applies to Melbourne’s four growth areas within the expanded 2010 Urban Growth Boundary given effect by Planning Scheme Amendment VC68, the existing 28 precincts within the 2005 Urban Growth Boundary and the Outer Metropolitan Ring Transport Corridor/E6 Road Reservation. The four growth areas are:

- Melbourne’s western growth area – Melton and Wyndham
- Melbourne’s north-western growth area – Sunbury
- Melbourne’s northern growth area – Hume, Whittlesea and Mitchell
- Melbourne’s south-eastern growth area – Casey and Cardinia

This Strategy does not apply to the Regional Rail Link corridor between west of Werribee and Deer Park (section 2), nor does it apply to any of the 28 precincts for which a planning scheme amendment to introduce a Precinct Structure Plan has been approved prior to 1 March 2012.

1.4 Development and consultation

Under the Program Report, the Department of Sustainability and Environment (DSE) is the lead agency for the preparation of this Strategy. The Department engaged Ecology and Heritage Partners to prepare a technical report that informed the preparation of this Strategy (Ecology and Heritage Partners 2011a).

Technical workshops were held during February and March 2010 to assist and guide the work of Ecology and Heritage Partners. The workshops involved a range of frog experts and conservation planners, DSE staff, other consultants and academics.

An agency working group has also been actively involved in the implementation planning for this Strategy, and its connection to the growth corridor planning process. This group includes the Growth Areas Authority, Department of Planning and Community Development, Department of Transport, and Department of Treasury and Finance.
Growing Grass Frog is listed as “Endangered” in Victoria (DSE 2007) and “Vulnerable” nationally under the EPBC Act (DEWhA 2009). Growing Grass Frog is also listed as a threatened taxon under the Victorian Flora and Fauna Guarantee Act 1988. A draft Flora and Fauna Guarantee Action Statement (Robertson 2003) and a draft National Recovery Plan (Clemann and Gillespie 2010) have been developed for the Growing Grass Frog.

2.1 Commonwealth legislation

The EPBC Act is the Commonwealth Government’s principal piece of environmental legislation and provides for the protection of matters of national environmental significance. The Act requires any proposals likely to have a significant impact on matters of national environmental significance (e.g. listed threatened species) to be approved by the Commonwealth Minister.

Under section 146 of the EPBC Act, the Commonwealth Minister may agree to undertake a strategic assessment of the impacts of actions delivered under a policy, plan or program on these matters.

The ‘Delivering Melbourne’s Newest Sustainable Communities Strategic Impact Assessment Report’ (DSE 2009) evaluated the impacts of the Victorian Government’s Urban Growth Boundary Review for Melbourne Program on species and ecological communities listed under the EPBC Act, as well as on Ramsar-listed wetlands, which could be affected by urban runoff.

The Commonwealth Minister for the Environment, Heritage and the Arts endorsed the Program, as set out in the Program Report, in February 2010.

The endorsement of the Program was a necessary step prior to any approval by the Commonwealth Minister of classes of actions forming part of the Program in accordance with section 146B of the EPBC Act. No actions affecting matters of national environmental significance (e.g. removal of listed grassland vegetation) can be undertaken until an approval is granted by the Commonwealth Government. Any approved action must occur in accordance with the endorsed Program and conditions set by the Commonwealth Minister.

To date, the Commonwealth Minister has approved two classes of actions under the endorsed Program: Regional Rail Link corridor between west of Werribee and Deer Park (section 2) and development within the existing 28 precincts within the 2005 Urban Growth Boundary.

Currently, there is no approval for development in the growth areas beyond the 2005 Urban Growth Boundary (i.e. within the expanded 2010 Urban Growth Boundary given effect by Planning Scheme Amendment VC68) or for the Outer Metropolitan Ring Transport Corridor/E6 Road Reservation. Normal referral and approval processes under Part 9 of the EPBC Act apply to proposals within these areas where approval is yet to be granted under the Part 10 process.

Under the normal Part 9 approval process, the Commonwealth Government would typically expect known breeding habitat for the Growing Grass Frog and dispersal corridors between breeding habitat to be avoided and protected from development, and may also seek to protect dispersal corridors that connect potential habitat if this forms part of a link to breeding habitat. Developments with unacceptable impacts would not be approved. No compensation is payable for loss of development potential in such cases.

Removal of such habitat, which is consistent with the definition of an important population (see section 3.2) in most cases would be considered a significant impact under the EPBC Act and would likely have some type of restriction placed on the amount that could be cleared. Compensatory habitat would be required for any such areas permitted to be cleared. Compensatory habitat would also be required for removal of other suitable habitat as defined in this document.

2.2 State legislation

The Planning and Environment Act 1987 (P&E Act) is the primary legislation for regulating the Program in Victoria. The P&E Act provides for the preparation of a comprehensive set of provisions and policies for planning schemes, which regulate the use, development and conservation of land in Victoria.

The key legislation that will apply at each stage of implementing the Program is identified in section 4 of the Program Report. Other legislation may be triggered, depending on the nature of land use activity occurring (e.g. extractive industry and utilities). The Program Report also details the relevant planning policy mechanisms triggered by the legislation.

2.3 Program Report

The Program Report is the primary statutory document associated with the Melbourne Strategic Assessment. It contains binding commitments on the part of the Victorian Government to the Commonwealth Government.
The commitments in the Program Report include a requirement to establish planning mechanisms for implementing the various aspects of the Program. This includes preparing a Biodiversity Conservation Strategy for the growth areas and Sub-regional Species Strategies to inform the preparation of Growth Corridor Plans and Precinct Structure Plans.

The Program Report also identifies the conservation outcomes to be achieved for each matter of national environmental significance and the mechanisms for how these outcomes will be delivered. This Strategy plays a key role in delivering the outcomes for the Growling Grass Frog.

The Program Report outlines the steps for implementing the Program, including the logic and relationship between the key statutory documents. This Strategy is a requirement of ‘Stage 2: Process Implementation’ (see diagram below).

The Victorian Government’s progression in establishing the planning mechanisms for implementing the Program is described below.

2.4 Planning policy framework

2.4.1 Growth Corridor Plans

Draft Growth Corridor Plans (GAA 2011) have been prepared to guide the creation of new communities within the growth areas in accordance with the State Planning Policy Framework. These plans set out the regional framework for the preparation of Precinct Structure Plans within the growth areas and show broad land use patterns, proposed transport networks, regional open space, important waterways and areas of environmental sensitivity.

The draft Growth Corridor Plans have been informed by this Strategy and the Biodiversity Conservation Strategy (DSE 2011a). The draft plans require approval from the Minister for Planning.
2.4.2 Biodiversity Conservation Strategy

The Biodiversity Conservation Strategy (DSE 2011a) sets out all the requirements for matters of national environmental significance and State significance in the growth areas to satisfy the commitments made to the Commonwealth Government in the Program Report.

The purposes of the Biodiversity Conservation Strategy are:

- To outline how the conservation outcomes for matters of national environmental significance identified in the Program Report will be achieved spatially within the growth areas.
- To identify the land within the growth areas that is required to be protected due to the Sub-regional Species Strategies and prescriptions prepared for matters of national environmental significance.
- To identify how areas set aside for conservation will be managed.

The Biodiversity Conservation Strategy identifies land within the growth areas that cannot be cleared for urban development and will be protected and managed for conservation, and land that can be cleared. No additional land will be required to be protected during the precinct structure planning stage in the area covered by the Strategy.

It has applied the protection requirements of the Sub-regional Species Strategies to identify the land that is required to be protected for conservation. The implementation of the Biodiversity Conservation Strategy will therefore satisfy the protection requirements of this Strategy.

2.4.3 Precinct Structure Plans

The precinct structure planning process applies to all land in the growth areas. A Precinct Structure Plan sets out the future structure of the suburb, detailing the location of housing, activity centres, community facilities, local transport networks, open space and areas of biodiversity value.

Precinct Structure Plans must be prepared in accordance with the Growth Corridor Plans, as well as the Precinct Structure Planning Guidelines (GAA 2009). These guidelines provide guidance on the assessment, protection and management of biodiversity values within the precinct and identify outputs that must be produced, including a Conservation Management Plan and/or Native Vegetation Precinct Plan.

Precinct Structure Plans must be prepared and approved by the Minister for Planning and incorporated into the relevant planning scheme before urban development can proceed (some exceptions apply). Once a plan has been incorporated into the relevant planning scheme, planning permits can be granted by the relevant authority (usually council) for urban development.

2.4.4 Planning permits

A planning permit is a legal document that gives permission for a use or development on a particular piece of land under a planning scheme. The permit includes written conditions that must be satisfied in carrying out an approved use or development. The conservation outcomes in the Program Report may be given effect by the precinct structure plan informing the conditions of development and subdivision permits.

A planning permit is required for the removal of native vegetation unless an exemption applies. The Victorian Native Vegetation Management Framework (DNRE, 2002) is a relevant decision guideline when assessing any proposal to remove native vegetation.

2.4.5 Native Vegetation Precinct Plans

Native Vegetation Precinct Plans must be prepared for each precinct within the growth areas in accordance with Clause 52.16 of local planning schemes. A Native Vegetation Precinct Plan sets out the requirements for the protection and removal of native vegetation within a precinct.

Native Vegetation Precinct Plans are incorporated into the relevant local planning scheme and must be consistent with the prescriptions and the requirements of the Biodiversity Precinct Structure Planning Kit (DSE, 2010a).

2.4.6 Conservation Management Plans

Conservation Management Plans outline how matters of national environmental significance will be protected and managed within a precinct and must be prepared where there are important populations or habitats of threatened species that require particular management.

Conservation Management Plans are prepared alongside, or as part of, the precinct structure planning process and form part of the planning scheme amendment that incorporates the Precinct Structure Plan.
2.4.7 Prescriptions

The Program Report committed to preparing prescriptions for matters of national environmental significance. Impacts on matters of national environmental significance are not permitted until prescriptions for those matters have been approved by the Commonwealth Government.

The prescriptions establish requirements for the identification and protection of habitat for matters of national environmental significance, which influences the design of precincts during the preparation of Precinct Structure Plans. The prescriptions also identify how impacts on these matters are to be mitigated, including through the provision of offsets (or compensatory habitat), translocation, and the implementation of a Conservation Management Plan.

Prescriptions are required to be approved by the Commonwealth Environment Minister. The Minister has approved prescriptions for most relevant matters of national environmental significance, which were approved in 2010. These are:

- Natural Temperate Grassland
- Grassy Eucalypt Woodland
- Golden Sun Moth
- Striped Legless Lizard
- Growling Grass Frog
- Southern Brown Bandicoot
- Matted Flax-lily
- Spiny Rice-flower
- Migratory species

The Program Report allows the existing prescriptions to be revised in certain circumstances.

This Strategy is consistent with and incorporates the requirements of the prescription for Growling Grass Frog. The implementation of this Strategy will satisfy the requirements of the prescription and is designed to deliver the conservation outcomes for the species identified in the Program Report.

It is therefore proposed that approval of this Strategy could replace the approved prescription for Growling Grass Frog within the growth areas including the existing 28 precincts for which a planning scheme amendment to introduce a Precinct Structure Plan has not been approved prior to 1 March 2012.
3. Areas required for conservation

3.1 Ecology of Growling Grass Frog

Growling Grass Frog is known to occur in each of the four growth areas, primarily along the major waterways together with several off-stream waterbodies located within the vicinity of these waterways and some more remote wetlands and farm dams. The technical report (Ecology and Heritage Partners 2011a) summarises the current state of knowledge in relation to the ecology and distribution of the Growling Grass Frog. The key points are listed below.

- Although formerly widely distributed across south eastern Australia, including Tasmania the species has declined markedly across much of its former range particularly over the past two decades.
- This species is largely associated with permanent or semi-permanent still or slow flowing waterbodies. There is a strong correlation between the presence of the species and key vegetation attributes, particularly a diversity of emergent, submerged and floating vegetation. An important habitat requirement for Growling Grass Frog is an ‘open’ terrestrial habitat immediately adjacent to waterbodies.
- Populations are structured as metapopulations, demonstrating spatially clustered patterns of wetland occupancy, where movement between waterbodies occurs as habitat conditions change over time, that is, when waterbodies dry out or flood.
- Waterbodies that are located within close proximity to each other are more likely to support a population of Growling Grass Frog compared with isolated sites. Frogs have been recorded moving up to one kilometre in one night.
- Dispersal is thought to occur primarily along drainage lines or other low-lying areas between waterbodies, and unhindered movement between and within waterbodies is considered important for population viability.
- Water quality is important for successful breeding and larval development. It is likely that Growling Grass Frog tadpoles are sensitive to some horticultural chemicals, such as fertilizers and pesticides.
- Habitat fragmentation and the loss of dispersal corridors are increasingly important causes of declines in amphibian populations that have been extensively studied.
- Plague Minnow Gambusia holbrooki is known to eat the eggs and tadpoles of Growling Grass Frog and has been implicated in the decline of other members of the Bell Frog complex. Hence many waterways which contain this fish, such as those within Melbourne, are not conducive to breeding, with the species relying on off-line waterbodies, particularly those within 300m of larger waterways.

Areas occupied by the Growling Grass Frog within the growth areas support several permanent waterbodies with suitable microhabitat features such as aquatic vegetation that is, emergent, submergent and floating vegetation, which are important for ongoing dispersal, breeding and recruitment. Adjoining terrestrial environments also support essential habitat for non breeding activity such as movement, foraging, over-wintering and shelter. Many of the permanent and ephemeral waterways also provide linkages to other suitable sites across the landscape.

3.2 Important populations within the growth areas

Consistent with the prescription, this Strategy is focussed on the long-term protection of important populations and associated habitats. ‘Important Population’ is defined below (DEWHA 2009):

‘Much of the habitat for Growling Grass Frog has been isolated or fragmented, restricting the opportunity for important population processes such as dispersal and colonisation. As such, any viable population is considered to be an important population for the persistence and recovery of the species.

For this species, a viable population is one which is not isolated from other populations or waterbodies, such that it has the opportunity to interact with other nearby populations or has the ability to establish new populations when waterbodies fill and become available. Interaction with nearby populations and colonisation of newly available waterbodies occurs via the dispersal of individual frogs across suitable movement habitat.'
In addition, a population of Growling Grass Frog could be considered an important population if it is near the limit of the species range for example, small isolated populations in South Australia, is well-studied or has a history of monitoring, and hence provides opportunity for greater understanding of the species through the collection of long-term data.

In the context of this Strategy, and based on the definition in the EPBC Act Policy Statement (DEWHA 2009), important populations are currently known to occur in the following areas:

- Merri, Darebin, Edgars and Kalkallo Creeks, and their tributaries
- Kororoit Creek, lower Skeleton Creek, sections of Werribee River, and their tributaries
- Jackson and Emu Creeks, and their tributaries
- Within the Casey-Cardinia growth area principally along the southern parts of Cardinia Creek and Clyde Creek.

3.3 Suitable habitat within the growth areas

Habitat was assessed throughout the growth areas as described in Ecology and Heritage Partners (2011 a, 2011 b). This included assessment of more than 200 waterbodies to complement the extensive Growling Grass Frog surveys undertaken as part of this and other projects (Ecology and Heritage Partners 2011a and b).

Each waterbody was assigned to one of three habitat classes (i.e. low, moderate, high) based on the habitat preferences of the frog (Hamer and Organ 2008; Heard and Scroggie, 2010), as follows:

- High quality habitat: Areas that currently contain, or have a high likelihood to contain important habitat attributes required by the species for breeding as well as foraging and dispersal (e.g. permanent or semi-permanent, extensive aquatic vegetation, high water quality, connected to other occupied sites, absence or low densities of predatory fish, high cover of terrestrial refuge sites).
- Moderate quality habitat: Habitat that supports one or more key habitat characteristics outlined above, but not all (for example site may be important for dispersal or foraging but not breeding).
- Low quality habitat: Sites that are unlikely to be used by Growling Grass Frog for breeding and of low importance for dispersal due to one or more of the following: absence or lack of aquatic vegetation, low water quality, presence of predatory fish, lack or low cover of terrestrial refuge sites.

To supplement this habitat assessment a wetness habitat connectivity model was developed by DSE for use on the project. The model provides a representation of landscape permeability and predicts landscape occupancy by Growling Grass Frog, or where the species has the highest potential to occur. This is particularly useful in areas where there are few or no documented records of Growling Grass Frog (Ecology and Heritage Partners 2011a).

This enabled the overall extent of suitable habitat to be mapped across the growth areas. The definition of suitable habitat is based on the following criteria:

- the site is known to, or is likely to support key habitat characteristics for Growling Grass Frog, and/or
- the area has a moderate to high wetness habitat connectivity modelled.

“Suitable habitat” generally includes High and Medium quality habitat described above, and in some cases Low quality habitat where this is part of functional connectivity, particularly between known and likely breeding locations. Suitable habitat is represented by Category 1 and Category 2 habitat in Ecology and Heritage Partners (2011a).

This Strategy and the supporting technical document (Ecology and Heritage Partners 2011a) has documented approximately 18,060 hectare of suitable Growling Grass Frog habitat in the growth areas within the expanded 2010 Urban Growth Boundary and the 28 precincts. Much of this habitat, approximately 7,650 hectare, occurs within non-urban areas, including approximately 2,800 hectare protected as a result of Rural Conservation Zoning through Planning Scheme Amendment VC68. Approximately 10,400 hectare of this habitat occurs within the Urban Growth Zone (including approximately 1600 hectare within the 28 precincts).

The general distribution of suitable habitat is also shown in Figures 1a to 1d. However the Category 2 area shown in this strategy has been slightly reduced from that of Ecology and Heritage Partners (2011a) to indicate precisely which areas will trigger a compensatory habitat requirement, as described in section 3.4.2. These Category 2 areas avoid any overlap with mapped terrestrial native vegetation.

3 Precincts that are effectively complete were not included in these figures.
Figure 1a: West Growth Area – Growling Grass Frog

Important habitat areas, linkages and suitable habitat for Growling Grass Frog

Legend

- Incomplete
- Completed
- Transport Infrastructure
- Western Grassland Reserve
- Current Urban Growth Boundary
- Initial Urban Growth Boundary 2030
- Category 1 - Strategically Important Habitat Areas (for protection)
- Category 2 - Other Suitable Habitat requiring offset if cleared
- Category 3 - Linkages to be created
- Category 1 areas affecting the UGB

Survey Records (Year of Survey)

- pre 2000
- post 2000

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Figure 1b: North West Growth Area – Growling Grass Frog
Important habitat areas, linkages and suitable habitat for Growling Grass Frog

Legend
Precinct Structure Planning
- Incomplete
- Completed
- Transport Infrastructure
- Current Urban Growth Boundary
- Initial Urban Growth Boundary 2030

Survey Records (Year of Survey)
- pre 2000
- post 2000

Disclaimer: This map is a snapshot generated from Victorian Government data. This material may be of assistance to you but the State of Victoria does not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any loss or damage which may arise from reliance upon it. All persons accessing this information should make appropriate enquiries to assess the currency of the data. © The State of Victoria, Department of Sustainability & Environment (DSE), 2011. http://www.biodata.vic.gov.au | Map produced by Esri Australia, DSE and MRC 2011.
Figure 1d: South Growth Area – Growling Grass Frog

Important habitat areas, linkages and suitable habitat for Growling Grass Frog

Legend

- Category 1 - Strategically Important Habitat Areas (for protection)
- Category 2 - Other Suitable Habitat requiring offset if cleared
- Category 3 - Linkages to be created

Survey Records (Year of Survey)

- pre 2000
- post 2000

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3.4 Areas required for conservation

In order to achieve the objectives of this Strategy and the conservation outcomes of the Program Report, it is important that sites currently supporting or that have the potential to support viable populations of Growling Grass Frog in the future are protected and secure.

Growling Grass Frog populations and habitats within and outside the growth areas need to be protected and managed on a landscape level, and also on a patch or population level, where frogs have the capacity to move within and between sites, that is, no barriers to dispersal. The greatest opportunity to achieve this outcome is by protecting key waterways with large buffers that allow for protection and creation of additional breeding habitat with sufficient area for foraging and dispersal between sites.

Although the larger waterways themselves are important, it is also vital to protect free standing waterbodies in the vicinity (i.e. within 300m) of these waterways wherever practicable as it is typically these waterbodies, and not the creeks themselves, within which Growling Grass Frog breed.

This Strategy has identified and mapped habitat to be protected for conservation purposes within the growth areas. This is referred to as Category 1 protection areas and represents the areas of habitat of the highest strategic conservation significance. These areas are all based on important populations as defined under the EPBC Act.

Category 2 habitat areas are also of high conservation significance but will be able to be cleared as long as compensatory habitat is provided elsewhere.

Category 1 and 2 areas are shown in Figures 1a to 1d.

3.4.1 Category 1 protection areas

Indicative Category 1 protection areas are shown in Figures 1a to 1d. These are areas of suitable/potential habitat that must be protected and enhanced to ensure the long-term viability of important populations of Growling Grass Frog within the growth areas. Depending on the size and importance of the waterway, these generally include a buffer of 50m to 200m, on each side of the waterway (i.e. a habitat corridor of up to 400m wide along the waterway).

The indicative Category 1 protection areas currently shown on Figures 1a to 1d are ‘interest’ areas within which further refinements will be made during the public consultation process. This is discussed further below.

The indicative Category 1 protection areas as currently indicated are considered sufficient to:

- protect much of the existing core habitat areas of the important populations and enhance it through improved management
- create extensive new areas of habitat consisting of a network of constructed wetlands (frog ponds) planted with indigenous vegetation and interspersed with grassed or treed areas
- include sufficient areas above the Urban Floodway Zone where large off-stream waterbodies can be created to provide for breeding
- enable other uses such as stormwater treatment and passive recreation to occur without undermining the conservation objectives.

The vast majority of areas to be protected (Figures 1a to 1d) are located within existing areas of Rural Conservation Zone and Urban Floodway Zone designated through Planning Scheme Amendment VC68. However 650 hectare of Urban Growth Zone are also proposed to be protected within the expanded 2010 Urban Growth Boundary where this occurs on the key waterways. A further 503 hectare is identified for protection within the 28 precincts. The area of land to be protected in indicative Category 1 areas, and the habitat that will be removed that requires a compensatory habitat requirement are provided in Table 1 and shown in Figures 1a-d.

Note that in Table 1, the Total area of suitable habitat (mapped in Ecology and Heritage Partners 2011a) is slightly larger than the combined total of Category 1 (protection) and Category 2 (habitat requiring compensatory habitat) shown in this strategy. Note also that these figures will change once the investigation and refinements to Category 1 boundaries is undertaken prior to finalisation of this strategy (and the draft Biodiversity Conservation Strategy).
Table 1. Area (ha) of land recommended for protection for Growling Grass Frog (indicative Category 1 areas) in the growth areas

<table>
<thead>
<tr>
<th>Zone</th>
<th>Total area of suitable habitat in growth areas (incl. 28 precincts) (ha)</th>
<th>Area of habitat to be protected (Category 1 areas) (hectare)</th>
<th>Area of habitat that could be removed (and requires compensatory habitat) (hectare)</th>
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<tr>
<td></td>
<td>Expanded growth areas 28 precincts</td>
<td>Expanded growth areas 28 precincts</td>
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<td>Urban Growth Zone</td>
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<td>503</td>
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<td></td>
<td></td>
<td>6862</td>
<td>1048</td>
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<tr>
<td>Urban Floodway Zone</td>
<td>1158</td>
<td>552</td>
<td>3</td>
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<td></td>
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</table>

There are two key effects of designating Category 1 areas.
Firstly, Category 1 areas will be excluded from urban development and will be protected and managed for Growling Grass Frog conservation.
In exceptional circumstances, that is, where necessary for the provision of infrastructure of state significance or to balance biodiversity outcomes with state significant planning objectives (e.g. planning of town centres within the growth areas), there is potential to reduce the width of the corridor where this does not undermine the ability of the corridor overall to achieve its purpose. In such situations this may mean buffers may be significantly reduced on one or both sides of the waterway to create pinches where frontage to waterways and/or closer physical connection between users of commercial and community facilities on either side of a waterway may be possible. A hypothetical example of how this may work is shown in Figure 2.
The Biodiversity Conservation Strategy, which was informed by this Strategy, has identified the land within the growth areas where such reductions in corridor widths may apply and sets out the further actions and decision-criteria that will apply to these areas. The Biodiversity Conservation Strategy has identified approximately 54 hectares of land removed from Growling Grass Frog corridors on the Merri Creek and Werribee River to provide room for proposed town centres at Donnybrook and Tarneit West (see draft Growth Corridor Plans). This has been reflected in the figures in Table 1. In addition, further refinements will be made to the indicative Category 1 protection areas during the public consultation process, in order to meet the state significant planning objectives of the Growth Corridor Plans. Further work will be undertaken during 2011 to define the final configuration of the Category 1 protection areas for Growling Grass Frog, based on analysis of likely metapopulation usage and landform, (for example identification of areas where land is too steep to practically deliver frog ponds). Additional land may become available for urban development as a result of this investigation. The final corridor boundary will be shown on the finalised Biodiversity Conservation Strategy and Growth Corridor Plan.
Secondly, the hydrology within Category 1 areas, and potentially upstream, will need to be maintained or improved to provide for the long-term use of these areas by Growling Grass Frog. This may affect the type of stormwater and other hydrological management proposed for the precinct. This issue will be considered by Melbourne Water in consultation with DSE, and reflected as appropriate in the local drainage schemes. It will also be included at the precinct structure planning stage through the integrated water management plan component. Further guidance to inform integrated water management plans that deliver beneficial outcomes for Growling Grass Frog and riparian areas will be developed by DSE in conjunction with Melbourne Water and the Growth Areas Authority.

The detailed design of Category 1 areas will be provided in the Conservation Management Plans for each precinct, which must be to the satisfaction of DSE. The Growling Grass Frog buffer areas need to include a dedicated habitat and corridor function. However, there is ample scope to also include passive and some active open space uses within the wider buffer areas (i.e. within the 100m and 200m buffers on either side of the waterway). Parts of these Category 1 areas will therefore be incorporated into the Integrated Open Space Networks for the growth areas.

The Category 1 areas will include extensive areas of habitat including a network of constructed wetlands (frog ponds). These will be planted with indigenous aquatic and amphibious vegetation and will be interspersed with grassed and treed areas. Whilst some wetlands will be “off-limits” to the public, in most situations there will be opportunity to include visitation and viewing areas, with sensitively designed boardwalks etc. Dispersal of frogs between wetlands will be achieved by including generally grassed (mown and some unmown) areas. Mown areas and intervening stands of trees and other indigenous revegetation will be appropriate for passive recreation. Bicycle and walking trails throughout the network of wetlands and terrestrial areas will be compatible with the overall objectives but need to be sensitively designed and located.

A conceptual design of how a Category 1 area may look in terms of wetland spacing, stormwater treatment and open space uses is shown in Figure 3.
As a general principle Category 1 areas must be established and permanently protected prior to destruction of Category 2 areas within the same precinct. It should be noted that the maps in Figures 1a to 1d and in the accompanying technical report (Ecology and Heritage Partners 2011a) identify Category 1 areas extending beyond the growth areas into areas of urban Melbourne and also beyond Melbourne into rural areas (including into the Western Grassland Reserves). These are indicative, as in many cases areas outside the growth areas have not been surveyed for Growling Grass Frog. However they do provide additional context for the protection works in the growth areas.

Such areas outside the growth areas do not convey any particular management obligation on the landowner. Nonetheless these areas should be used to guide the conservation of Growling Grass Frog through the protection and enhancement of habitat where relevant (e.g. to inform the design of voluntary incentive schemes for biodiversity conservation).

3.4.2 Category 2: other suitable habitat

Category 2 areas are shown in Figures 1a to 1d. These are areas of other suitable habitat that will be allowed to be cleared for urban development, but for which compensatory habitat must be provided elsewhere. All such compensatory habitat should be located within Category 1 areas.
Category 2 areas have been mapped based on a combination of:
- other known breeding sites
- other waterways and wetlands providing suitable habitat
- terrestrial habitat providing connectivity between wetlands and ultimately to likely breeding habitat
but have excluded areas mapped as native vegetation, as these areas incur a different set of offset and compensatory habitat obligations, as described in the draft Biodiversity Conservation Strategy.

Category 2 habitat has therefore been defined based on the areas that the Commonwealth Government would typically require to be protected or for which offsets (or compensatory habitat) would be required (DEWHA 2009), but excluding native vegetation.

Recent research has shown that the chance of vacant or new wetlands being colonised by Growling Grass Frog is determined overwhelmingly by the presence and proximity of other occupied wetlands within a one kilometre radius (Heard and Scroggie 2010). This rule has not been applied to the definition of suitable habitat that requires offsets given the narrower interpretation in DEWHA (2009). However this emphasises the fact that urbanisation of the growth areas will remove large areas of land that would have represented potential opportunities for dispersal and colonisation, particularly during favourable conditions.

As a general principle, Category 2 areas should not be removed within a precinct until the Category 1 areas have been secured and new or enhanced habitat sufficiently established to be available for the species, including use by translocated frogs (where relevant). Where practicable, development should be staged to allow for creation and establishment of habitat for at least two to three years prior to removal of habitat, and to the satisfaction of DSE. There may be cases where insufficient area of Category 1 habitat exists within a precinct and additional areas of compensatory habitat are required outside the precinct. The Conservation Management Plan will document these arrangements and ensure removal of Category 2 habitat is accounted for and appropriate development sequencing, salvage/translocation and habitat provision/creation in Category 1 areas is specified.

3.4.3 Category 3: Habitat linkages to be created

Habitat linkages are depicted as arrows that identify where habitat connectivity should be provided. The purpose of these areas is to ensure connectivity of Growling Grass Frog habitat across the landscape, where this cannot be fully achieved through waterway corridors.

Three potential linkages have been identified in this Strategy in the growth areas, marked with red arrows in Figures 1c and 1d. The details of these linkages will be refined and identified following public consultation.

3.5 Management of retained (Category 1) areas

The Category 1 areas will include extensive areas of managed habitat including a large network of constructed wetlands (frog ponds). These will be planted with indigenous aquatic and amphibious vegetation and will be interspersed with grassed and treed areas, following standards defined below. While some wetlands will be “off-limits” to the public, in most situations there will be ample opportunity to have some visitation and viewing areas, with sensitively designed boardwalks etc. Dispersal of frogs between wetlands will be achieved by including grassed (mown and some unmown) areas. Mown areas and intervening stands of trees and other indigenous revegetation will be appropriate for passive recreation. Bicycle and walking trails throughout the network of wetlands and terrestrial areas will be compatible with the overall objectives but need to be sensitively designed and located.

A three-stage approach of 1) protection 2) enhancement and 3) creation of habitats will be used as part of the prioritisation of conservation actions for Growling Grass Frog in the Category 1 areas. Habitat enhancement will be undertaken where Growling Grass Frog is known to occur, or at sites within the vicinity of occupied sites that have the greatest potential to contribute to the long-term viability of populations.
Information pertaining to site-specific habitat improvement requirements will be provided in the Conservation Management Plans prepared as part of the precinct structure planning process. However, the following approach must be followed:

- There will be up to 400 dedicated Growling Grass Frog wetlands created or enhanced within the urban growth areas in Category 1 areas, including approximately 200 constructed frog ponds. This is based on wetlands being placed approximately every 300m along the protection corridors where necessary (and where opportunities exist), taking into account the location of existing wetlands and other opportunities such as suitable habitat within the waterway.
- The size, spatial configuration and hydrology of dedicated Growling Grass Frog wetlands and associated riparian/waterway areas should generally be based on Guidelines for Management of Endangered Growling Grass Frog in Urbanised Landscapes (Heard and Scroggie 2010) and any additional guidance provided in this Strategy. Most wetlands will be at least 1000m² in area and some will be larger where opportunities exist.
- Some minor waterways, particularly those with buffers less than 100m wide may have few dedicated frog ponds, and these may be much smaller, relying instead on the waterway itself and works associated with the local drainage scheme to achieve conservation outcomes for Growling Grass Frog. This recognises that broader waterway corridors provide greater opportunities to create larger wetlands and breeding habitat, where landform permits. Narrower waterways are of lower priority but should still provide opportunities for dispersal. Steeply incised waterways, such as Jacksons Creek, similarly provide fewer opportunities to create new frog ponds, but are nonetheless important for the species given the existing habitat.
- Wetlands must be designed and planted to ecological best practice standards, and to maximise habitat suitability for Growling Grass Frog. This will include appropriate zones of indigenous wetland vegetation and areas of open water. Standards for this are provided in of the supporting technical report to this Strategy (Ecology and Heritage Partners 2011a).
- Stormwater wetlands that will be created for drainage purposes are likely to be required in these areas in addition to dedicated Growling Grass Frog ponds. These stormwater wetlands will be identified in the Precinct Structure Plan. Stormwater wetlands are able to provide habitat for Growling Grass Frog, but as predators (in particular Plague Minnow) are unable to be effectively managed, dedicated Growling Grass Frog wetlands are the primary mechanism for creating habitat. However stormwater wetlands should be designed wherever possible to provide habitat for the Growling Grass Frog and will be included in the overall management planning (and Conservation Management Plan) for Category 1 areas. In smaller waterways, well designed stormwater wetlands may be the main type of constructed wetlands used.
- Terrestrial habitat for the species must be provided around each dedicated Growling Grass Frog wetland, as described in (DEWHA, 2009). Dedicated Growling Grass Frog wetlands must have a high quality, densely planted indigenous revegetation area of at least 10m (no trees). An additional 90m of managed terrestrial buffer is required around each Growling Grass Frog wetland (subject to landform constraints). This can be less intensively revegetated and in some cases will take the form of open grassland/pasture with sparse plantings.
- The actual waterways will also be enhanced and replanted or regenerated to provide high quality indigenous revegetation in general to 30m from the water’s edge.
- The combination of dedicated Growling Grass Frog wetlands and managed buffers (100m) will generally occupy at least 50 percent of the Category 1 areas, although this may be less in steeply incised areas such as sections of Jackson Creek. The addition of revegetated riparian areas and associated terrestrial buffers will occupy the majority of the remaining land within the Category 1 areas.
• Monitoring including presence/absence surveys (two night survey per year of each wetland) must be undertaken. Monitoring will be for a ten year intensive survey period post construction. Ongoing monitoring will be undertaken by DSE. Stormwater wetlands must also be monitored where they provide potential habitat for Growling Grass Frog, for example in smaller waterway corridors.

3.6 Future survey requirements

Surveys will be required to determine presence of Growling Grass Frog at every wetland/dam determined to be suitable habitat (i.e. located within Category 2 areas on Figures 1a to 1d). These surveys will be the responsibility of landowners. The surveys must be undertaken prior to wetland destruction/drainage to establish whether salvage or translocation of animals is required.

Although these surveys need not necessarily be undertaken prior to the Precinct Structure Plan approval stage, ideally such surveys would be undertaken with sufficient lead time to inform the appropriate sequence and timing of wetland removal in relation to nearby compensatory habitat creation/protection. Consideration will need to be given to this in the preparation of the Conservation Management Plan and may have a bearing on development sequencing within the Precinct Structure Plan.

To guide this process a translocation strategy and operational plan will be developed by DSE. Costs for survey, and for salvage, translocation and monitoring (where required) will be borne by landowners. Translocation and salvage principles are discussed in section 7.2 of Ecology and heritage partners 2011a.

In the future, DSE will also undertake surveys within protected habitat corridors to inform implementation and monitoring for this Strategy.
4. Implementation and review

Several Government agencies will be involved in the implementation of this Strategy, including DSE, Growth Areas Authority, Melbourne Water, Commonwealth Department of the Sustainability, Environment, Water, Population and Communities, local councils, and private organisations such as land developers, consultancies and land management bodies and contractors.

The strategies and management requirements provided in this Strategy may need to alter if new information becomes available or if management actions are considered inappropriate or inadequate for the long-term persistence of Growing Grass Frog. This will be included within the Monitoring and Reporting Framework to be developed as required by the Program Report.

Land within the Urban Growth Zone that is encumbered as a result of the Growing Grass Frog Category 1 protection areas should be vested in the crown and be managed by a public authority. Given the strong focus on waterways as the core of the protection corridors, the public land manager will generally be Melbourne Water. However the land will not be required to be transferred to the Crown for Growing Grass Frog protection, and in some cases private landholders may prefer to keep the land and to enter into a management agreement with DSE (under section 69 of the Conservation Forests and Lands Act 1987). The management agreement would be to manage the land for Growing Grass Frog, including creation of new habitat where relevant.

An appropriate planning mechanism for documenting the management arrangements for the Category 1 protection areas associated with the precinct (or other development proposal) will be applied. This mechanism must detail the timing, liability and funding of compensatory habitat required from a precinct or other development proposal, and the detailed management arrangements for the Category 1 area. It must be consistent with and implement the requirements of this Sub-regional Species Strategy.

The mechanism should specify the amounts of money per hectare for each affected property that will be required to provide compensatory habitat, based on the approach set out in this Strategy, including the maps showing the location of habitat requiring such compensation. These areas are shown in Figures 1a to 1d. The funds will be paid to DSE (through the BushBroker program).

This is similar to the “offset” arrangements for Golden Sun Moth (DSE 2011b) and is a highly efficient way of fulfilling the obligations placed on a landowner with respect to provision of compensatory habitat. DSE will then provide the funds to the land manager (Melbourne Water or private landholder) on a fee for service basis. The indicative costs of fees for compensatory habitat will be in the range of $6,000 to $8,000 per developable hectare. The offset costs that are included in this document are based on the proposed conservation measures and preliminary cost estimates. They should be treated as indicative only. They are not final and may change following public consultation and the Commonwealth Government’s approval process.

The arrangements to secure compensatory habitat in the designated Category 1 areas with Melbourne Water, and the payment of the fee will be facilitated by DSE. As the compensatory habitat fee will be determined on a cost-recovery basis, based on Melbourne Water construction and management costs for 10 years, prices are subject to change. If the fee amount changes, this will be published on the DSE website for the next 12 month period.

All such compensatory habitat “offset” requirements will be accounted for by DSE and reports made publicly available in conjunction with reporting of other offset requirements for the Program.

Outside the Urban Growth Zone (i.e. within Rural Conservation Zone and other zones), the ultimate land management arrangements may vary and in many cases land may remain in private hands. Revenue collected for compensatory habitat from the relevant Urban Growth Zone land will be used to fund contracts with landowners to provide Growing Grass Frog habitat management (potentially in partnership with Melbourne Water), or similar arrangements depending on particular landowner circumstances. Transfer of land to the Crown will be encouraged where this suits landowner requirements.

The performance of this Strategy in terms of achieving the intended outcomes and the approaches described in section 3 will be reviewed after five years of its adoption and then every 10 years after that, the reviews informed by the results of monitoring. If considered necessary, adjustments to the strategy will be identified during these reviews. Any such adjustments would need to be to the satisfaction of the Commonwealth Government.
5. References


Appendix 1: Prescription for Growling Grass Frog

Preamble
The following objectives should apply to management of Growling Grass Frog in relation to urban development planning:

- Protect important Merri Creek population;
- Identify and protect other important populations including in the Pakenham area and south east growth area, and along Kororoit Creek;
- Retain, upgrade and connect or buffer some existing habitats within proposed precincts;
- Create new habitat within precincts;
- Manage hydrology and aquatic vegetation carefully to avoid the introduction of predatory fish; and
- Monitor retained and new habitat, and adjust management accordingly.

Detail
Precinct planning design should not commence until surveys to confirm the presence of suitable habitat and likely occurrence of Growling Grass Frog in an area are complete (irrespective of whether the species is actually detected). Surveys to be consistent with Biodiversity Precinct Planning Kit methodology.

A Growling Grass Frog Conservation Management Plan (CMP) must be prepared for precincts (or other development areas included within the Program) containing suitable habitat for Growling Grass Frog. The CMP must be prepared prior to exhibition of the Precinct Structure Plan (PSP), or for developments not covered by a PSP, prior to approval of that development. The CMP must be to the satisfaction of the Department of Sustainability and Environment (DSE).

The CMP must demonstrate how, for an important population (or potentially important population) of Growling Grass Frog:
- Habitat will be retained and/or created and managed with sufficient connectivity so the population can function over the long term. This may consider and include habitat both on and off-site but must not rely on translocation;
- Monitoring will be employed to determine effectiveness;
- Habitat and threatening processes will be appropriately managed in a way that is responsive to the results of monitoring; and
- Actions relating to proposed development will be sequenced to ensure there is no net loss of habitat and local population.

The conservation management plan must be consistent with, and respond to, any relevant Sub-regional Strategy for the Growling Grass Frog approved by DSE.

The determination of a practical management area and shape for areas retained for Growling Grass Frog habitat must be to DSE satisfaction.
The indicative cost of establishing and managing the Growling Grass Frog protection areas across the growth areas is $55 million (Table 2). The indicative costs of fees for compensatory habitat will be in the range of $6,000 to $8,000 per developable hectare. The offset costs that are included in this document are based on the proposed conservation measures and preliminary cost estimates. They should be treated as indicative only. They are not final and may change following public consultation and the Commonwealth Government’s approval process.

As the EPBC Act does not invoke compensation for land that is encumbered (for example due to the presence of Growling Grass Frog habitat) the cost of acquiring Urban Growth Zone land is excluded from these cost estimates and it is assumed that such land will eventually be surrendered to the Crown.

Assumptions:
- Costs are for total of Category 1 areas irrespective of current zoning.
- 200 dedicated frog ponds to be created.
- Intensive terrestrial revegetation area is 10m around each pond, plus a less intensive 90m foraging area beyond.
- Does not include any public open space infrastructure e.g. paths, boardwalks, visitor facilities.

Table 2. Indicative cost of establishing and managing Category 1 protection areas over ten years. Costs will be finalised when Commonwealth approval has been provided.

<table>
<thead>
<tr>
<th>Component</th>
<th>Annual rate ($)</th>
<th>One off cost ($)</th>
<th>Total cost over ten years ($mil)</th>
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<tr>
<td>Wetland design, investigation, construction, planting, signage</td>
<td>NA</td>
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<tr>
<td>Terrestrial revegetation</td>
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<tr>
<td>Weed control, plant replacement, mowing etc (terrestrial and wetland)</td>
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<tr>
<td>Monitoring</td>
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<tr>
<td>TOTAL</td>
<td></td>
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