



Environmental Protection Authority

Guidance for the Assessment of Environmental Factors

(in accordance with the
Environmental Protection
Act 1986)

**Protection of the Western
Swamp Tortoise Habitat,
Upper Swan/Bullsbrook**

No. 7

June 2006

Western Australia

FOREWORD

The Environmental Protection Authority (EPA) is an independent statutory authority and is the key provider of independent environmental advice to Government.

The EPA's objectives are to protect the environment and to prevent, control and abate pollution. The EPA aims to achieve some of this through the development of environmental protection Guidance Statements for the environmental impact assessment (EIA) of proposals.

This document is one in a series being issued by the EPA to assist proponents, consultants and the public generally to gain additional information about the EPA's thinking in relation to aspects of the EIA process. The series provides the basis for EPA's evaluation of, and advice on, development proposals subject to EIA. The Guidance Statements are one part of assisting proponents in achieving an environmentally acceptable proposal. Consistent with the notion of continuous environmental improvement and adaptive environmental management, the EPA expects proponents to take all reasonable and practicable measures to protect the environment and to view the requirements of this Guidance as representing the **minimum** necessary process required to achieve an appropriate level of environmental protection.

The Western Swamp Tortoise is the one of the most endangered tortoises on earth and one of Australia's most endangered species. The EPA therefore emphasises through this guidance statement and the existing *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002* that protection of the Western Swamp Tortoise and its habitat are critical. The existence of the small remnant population of Western Swamp Tortoise (110 individuals in 2001) in this policy area is precarious.

While guidance is provided specifically in relation to the Western Australian *Environmental Protection Act, 1986*, proponents are reminded to ascertain any responsibilities they may have in regard to this issue under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

This Guidance Statement has the status of "Final" which means it has been reviewed by stakeholders and the public. The EPA has signed off the Guidance Statement and published it although it will be updated regularly.



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26 June 2006

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Guidance Statement No. 7

Guidance Statement for the Protection of the Western Swamp Tortoise Habitat, Upper Swan/Bullsbrook

Key Words: Western Swamp Tortoise Habitat, environmental impact assessment

1 PURPOSE

Guidance Statements generally are developed by the Environmental Protection Authority (EPA) to provide advice to proponents, and the public, about the minimum requirements for environmental management that the EPA would expect to be met when a proposal is considered during the assessment process. The generic process is set out in Appendix 1.

This Guidance Statement should be used when preparing documentation for referral of proposals, planning schemes and amendments to the EPA, as well as for formal assessment and audit.

The purpose of this Guidance Statement is to protect the habitat of the critically endangered Western Swamp Tortoise, *Pseudemydura umbrina*, through careful management of activities and development surrounding the habitat.

This Guidance Statement relates to the habitat of the Western Swamp Tortoise occurring in the Ellen Brook Nature Reserve (No. A27620 and A42126) and the Twin Swamps Nature Reserve (No. A27621), which are managed by the Department of Conservation and Land Management (CALM) (see Appendix 2). These are the only two areas where populations of the Western Swamp Tortoise have been continuously recorded since the 1960's. Potential habitat of the Western Swamp Tortoise occurs in a number of other places, which are not the focus of this Guidance Statement.

This Guidance Statement applies to all proposals subject to environmental impact assessment (EIA) by the EPA in the policy area, as defined in the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002* ("the EPP") (Government of Western Australia, 2003a) (see Appendix 2), that may impact on the habitat areas of the Western Swamp Tortoise. The policy was gazetted on the 18 February 2003.

The policy area identified for the protection of the habitat of the Western Swamp Tortoise contains the surface and groundwater catchment around the Twin Swamps Nature Reserve and Ellen Brook Nature Reserve to the best knowledge available.

The relationship between groundwater and surface water in the area surrounding the habitat swamps within the Nature Reserves is poorly understood (Townley *et al.*, 1997).

Therefore, the application of the precautionary principle prevails in defining the

boundary of the policy area and in managing the habitat for the tortoise.

2 THE ISSUE

2.1 Context

The Western Swamp Tortoise is one of the most endangered tortoise or turtle species on earth. It is listed as “threatened” under the Western Australian *Wildlife Conservation Act 1950*, “endangered” under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and as a critically endangered species in the IUCN 2000 Red List of threatened animals (Burbidge and Kuchling, 2004).

Western Swamp Tortoises have been recorded only from scattered localities in a narrow (3 to 5 km wide) strip of the Swan Coastal Plain with largely alluvial soils, roughly parallel with the Darling Scarp, running from Perth Airport at Guildford to near Pearce Royal Australian Air Force Base at Bullsbrook. Anecdotal information (Burbidge, 1967, 1981) suggests that their stronghold was the clay soils of the Swan Valley, the first part of Western Australia developed for agriculture. Almost all this land is now cleared and either urbanised or used for intensive agriculture or the extraction of clay for brick and tile manufacture.

Several factors are believed to have contributed to the threatened status of the Western Swamp Tortoise:

- a very small natural geographic range, most of which has been developed for agriculture, housing or industry, or mined for clay;
- protection of only a very small area of marginal habitat in reserves;
- a very specialised biology, that is the tortoise depends on a rare habitat type, eats only live prey, and has low reproduction and growth rates;
- an increasingly dry climate, which is compounded by the marginal habitat; and
- the presence of exotic predators, particularly the European Red Fox. Both reserves were fenced to control predation, Ellen Brook in 1990 and Twin Swamps in 1993/4 (Burbidge and Kuchling, 2004).

The wild population in 2001 was about 110 individuals within the Ellen Brook and Twin Swamps Nature Reserves north east of Perth, however, only about 25 of these were adults. About another 165 individuals were located at Perth Zoo in 2001 as part of a captive breeding program. Most of those in the Twin Swamps Nature Reserve have been reintroduced from the captive breeding program since 1994.

Breeding is made difficult for a number of reasons - the low numbers of adult females available, young hatchlings taking 10 to 15 years to reach sexual maturity and the females only producing up to five eggs per year (Government of Western Australia, 2000b).

The conservation significance of the Western Swamp Tortoise habitat is based on a number of international, national and regional criteria. Accordingly the significance of this habitat is due to the:

- rarity of the habitat;
- biodiversity of the habitat;
- ecological significance of the habitat's catchments; and
- regional, national and international significance of the Western Swamp Tortoise and its habitat.

The Western Swamp Tortoise inhabits shallow, ephemeral winter-wet swamps on clay or sand over clay soils and requires suitable aestivation refuges nearby. Threats to the survival of the Western Swamp Tortoise in the wild include:

- fire and fire fighting operations;
- predation;
- changes in water quality and quantity;
- seasonal changes in water tables;
- fragmentation of habitat;
- human population pressures; and
- the small amount of habitat available.

The risk of these threats can be increased through:

- impacts on the habitat from intensification of development in the area;
- impacts on the habitat from detrimental land use change in the area;
- increased human population pressures; and
- climate change resulting in reduced rainfall.

CALM manages the Ellen Brook and Twin Swamps Nature Reserves under draft Interim Management Guidelines which are currently being updated, as well as through the Recovery Plan for the Western Swamp Tortoise (Burbidge and Kuchling, 2004). The Plans address matters such as fire management, predator control, water supplementation of swamps (at Twin Swamps), weed control, tortoise population monitoring, habitat restoration and water quality monitoring.

However, the successful protection of the habitat within the reserves also depends crucially on activities outside the reserves, in the policy area. This Guidance Statement is focused on development proposals within the policy area, but outside the reserves.

2.1.1 Fire

The Western Swamp Tortoise is vulnerable to fire. The populations within the Twin Swamps Nature Reserve are vulnerable particularly throughout summer when some aestivate below leaf litter and logs. In the Ellen Brook Nature Reserve they are less vulnerable in summer as they aestivate in below ground clay tunnels. An increase in the

risk of fire within the Nature Reserves by accidental ignition and spread of fires may occur as a result of development, from machinery, vehicles and from arson (CALM, 2001).

CALM and the City of Swan have an agreed Fire Response Plan to immediately send fire fighting equipment to a reported wildfire on or adjoining both Nature Reserves. CALM's fire management plan for the Nature Reserves details how fire suppression methods should be managed to protect the tortoise habitat.

Because of the different aestivation habitats and tortoise behaviour in the two reserves, a different approach to fire management has been adopted. At Twin Swamps parts of the reserve are subject to prescribed burning to enable these areas to act as a low-fuel sanctuary, in the event of a wild fire. In addition, artificial aestivation tunnels, which provide some level of protection from fire, have been trialled with some success.

In contrast, fire management at Ellen Brook Nature Reserve focuses on maintenance of strategic firebreaks, as well as weed control. Due to the predominant aestivation of Western Swamp Tortoises at Ellen Brook Nature Reserve in tunnels well under the ground, there is less risk to the tortoises, than at the Twin Swamps Nature Reserve in the event of a fire. There are therefore fewer requirements for prescribed burning in the reserve. Fire operations at Ellen Brook Nature Reserve are carefully managed to ensure machinery damage to aestivating habitats does not occur.

This Guidance Statement addresses fire management issues to be considered by development proposals in the policy area.

2.1.2 Predation

Predators, particularly foxes, kill Western Swamp Tortoises and may also destroy their eggs. Before fencing, foxes were abundant in both nature reserves. Tortoises are thought to be more prone to predation at Twin Swamps Nature Reserve, where aestivation refuges are mostly on the surface. At Ellen Brook Nature Reserve, where aestivation occurs underground, the species is better protected against predation, but the very small population size means that even occasional predation can have a significant effect (Burbidge and Kuchling, 2004).

The habitat areas of the Nature Reserves are currently fenced to prevent access of unwanted predators, with predators that enter the reserves controlled by 1080 baiting. The increased density of residences surrounding the Reserves may increase incidences of damage to the fence, providing access for predators, such as foxes, dogs and cats, to the reserves.

2.1.3 Changes in water quality and quantity

Although the relationship between groundwater, surface water flows and the swamp systems within the Ellen Brook and Twin Swamps Nature Reserves is not well understood, an examination of available information has determined approximate surface water catchments for the habitat swamp areas in each of the Nature Reserves. Research undertaken by the CSIRO for the Department of Environment (DoE) (Townley *et al.*, 1997) concluded that the hydrology of the habitat swamps in both Nature Reserves appear to be dominated by a balance between rainfall, surface inflows and outflows, and evaporation.

It is understood that the swamps at Twin Swamps Nature Reserve probably fill in response to the first winter rains from direct rainfall and surface water runoff. Late in the winter, the regional water table will rise until the swamps are fed by groundwater. It is suggested that the rise in the water table near Twin Swamps Nature Reserve may be at least partly due to flow from the east, from the Darling Scarp (Townley *et al.*, 1997). The swamps within the Ellen Brook Nature Reserve are fed by rainfall and surface inflow from properties immediately adjoining and not by groundwater as they are perched on a less permeable (more clayey) base. Although the Ellen Brook passes through the Ellen Brook Nature Reserve it is not thought to interact with the habitat swamps within the reserve.

At Ellen Brook Nature Reserve water levels are not greatly affected by drought and the swamps contain water from June to November during most years. Water quality at Ellen Brook Nature Reserve is high and there is little evidence of pollution entering the swamps on the reserve (Burbidge and Kuchling, 2004, p18).

On the other hand, swamps within the Twin Swamps Nature Reserve are greatly affected by drought. It is only in average to high rainfall years that the swamps contain water for long enough to enable Western Swamp Tortoises to breed successfully (Burbidge and Kuchling, 2004).

Development or land use changes that may reduce the quantity of water reaching the swamps will be detrimental to the survival of young tortoises and breeding adults. To provide additional water, bores have been installed at Twin Swamps Nature Reserve supplementing water in some ponds in the drier years.

The quality of surface and groundwater from surrounding development sites may be adversely impacted by activities such as domestic animals, fertiliser and pesticide application and effluent disposal systems. If the intensity of development around the reserves increases, this could lead to reductions in water quality within the seasonal wetlands of the habitat area, potentially threatening the viability of the wild population of the Western Swamp Tortoise.

Residents in proximity to wetland environments are often exposed to nuisance midge and mosquito swarms. While the area does not have a current midge problem, midge numbers would likely increase if the wetlands became nutrient enriched. Control of midge and mosquitos is generally by chemical spray.

Chemicals may also be used to treat pests on grown produce such as an orchard or vegetable crops which may be associated with development. Application of chemicals could drift as spray into the Nature Reserve or affect water quality and adversely impact on the Western Swamp Tortoise population.

However, such chemicals would adversely impact the wetland invertebrates that the Tortoises feed upon and therefore degrading the tortoise habitat.

2.1.4 Human population pressures

As a number of the threats to the remaining populations of the Western Swamp Tortoise are related to human population pressures, such as fire, weeds and domestic animals, there is a need for low density development with land use controls immediately adjacent to the Ellen Brook and Twin Swamps Nature Reserves where these human population pressures will be most threatening. Away from the area immediately surrounding the Nature Reserves where impacts are largely related to the surface water catchment, controlled development may be more viable as human population impacts are more able to be managed.

The supporting infrastructure of development may increase the risk of pollutant spills and contamination from construction, maintenance, additional road usage, sewage systems, power and water supply as well as houses and gardens.

There is no public access permissible inside the barrier fence and onto habitat areas within the Nature Reserves. Recreational demands to use the areas outside of the Reserves for horse riding, vehicle access and pedestrian/ pet access may add nutrient loads directly into the swamps, soil erosion and fence maintenance issues.

2.1.5 Habitat

Ellen Brook Nature Reserve (73 hectares) and Twin Swamps Nature Reserve (155 hectares) provide habitat that is crucial to the ongoing protection of the Western Swamp Tortoise.

Due to the small amount of habitat available to the Western Swamp Tortoise any development or change in land use that will reduce or degrade the habitat area would be detrimental to the long term survival of the tortoise.

2.2 Current protection mechanisms

Recovery Plans are prepared by CALM to delineate, justify and schedule management actions necessary to support the recovery of an endangered or vulnerable species or ecological community. In 1992 CALM developed a Western Swamp Tortoise Recovery Plan. The Western Swamp Tortoise Recovery Plan has been progressively updated, with the most recent plan published in 2004 (Burbidge and Kuchling, 2004). A specialist recovery team implements this plan.

The objective of the 2004 Western Swamp Tortoise Recovery Plan is to “decrease the chance of extinction of the Western Swamp Tortoise by creating at least three wild populations and increasing the total number of mature individuals to >50”.

The state *Wildlife Conservation Act 1950* does not explicitly protect the habitat of a particular species, only the animals themselves.

This Act provides for taxa of plants and animals to be listed as ‘threatened’. The Western Swamp Tortoise is declared Specially Protected and listed under Schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2005*, with other fauna that is rare or likely to become extinct and is ranked as ‘Critically Endangered’ by CALM’s Threatened Species Scientific Committee.

The Western Swamp Tortoise habitat is also protected through the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. This Act protects threatened species and their habitat against an “action” (on-the-ground disturbance). If there is potential for adverse impacts on the Western Swamp Tortoise or its habitat, an approval is required from the Commonwealth Minister for the Environment prior to the commencement of on site works. Declared Rare Flora and a number of threatened ecological communities are also protected under this legislation.

Amendments to the *Environmental Protection Act 1986* made in 2003 introduced the concept of “environmental harm”, and made causing or contributing to environmental harm an offence (unless the harm was trivial or negligible). Under Section 3A(2)(a), “environmental harm” includes “direct or indirect harm to the environment involving removal or destruction of, or damage to ... the habitat of ... indigenous aquatic or terrestrial animals”. This would include the habitat of the Western Swamp Tortoise.

In 2002 the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002* (EPP) was approved, for the purpose of protecting “habitat suitable for the long-term survival of wild populations of the western swamp tortoise” within the defined policy area. The EPP identifies beneficial uses relating to the maintenance of ecological processes, integrity and functions upon which the tortoise depends, and associated research and biological diversity conservation uses. Within the policy area these are declared as beneficial uses to be protected by the EPP. This is achieved by a programme, including, among other things:

- the Recovery Plan administered by CALM;
- landowners and public authorities managing land in the policy area to minimise habitat degradation;
- government promoting awareness of the policy; and
- public authorities ensuring that their decisions or actions in the policy area minimise habitat degradation (the EPP provides a list of Acts to which this provision might apply).

The EPP provides a non-exhaustive list of activities that might degrade habitat, including the use of fertilisers and pesticides, waste disposal, mining, groundwater abstraction, clearing and lighting unauthorised fires.

This Guidance Statement is supplementary to that Policy.

2.3 Other significant conservation values and issues

The Twin Swamps and Ellen Brook Nature Reserves, are located on the eastern side of the Swan Coastal Plain, an area of high floristic biodiversity where most (>97%) of the native vegetation has been cleared. The values of both reserves have been recognised for many years as System Six area M17 (Department of Conservation and Environment, 1983).

The Government's *Bush Forever* policy (Government of Western Australia, 2000a) recognises the reserves as containing regionally significant remnant vegetation and identifies the Reserves as Bush Forever Sites 400 Twin Swamps Nature Reserve and 301 Ellen Brook Nature Reserve (Government of Western Australia, 2000b).

The Ellen Brook Nature Reserve contains two threatened ecological communities. The Marri woodland in the northern half is listed as critically endangered (floristic community type 3c) and the shallow, ephemeral winter-wet swamps in the southern half is listed as vulnerable (floristic community type 8) (English and Blyth, 1997). Floristic surveys of the Nature Reserve have recorded 236 species of native plants, including two species of Declared Rare Flora and eight priority flora.

The Twin Swamps Nature Reserve supports *Melaleuca raphiophylla* forest which is listed as a vulnerable threatened ecological community (floristic community type 15). Surveys of the reserve have recorded 201 species of native plants, including one species of priority flora.

The high conservation values of both reserves are also recognised by their inclusion in the Register of the National Estate (Australian Heritage Commission, 2000) and the Directory of Important Wetlands (Environment Australia, 2001).

In addition to the impacts of water quality on the Western Swamp Tortoise, the area is within the catchment of the Swan and Canning Rivers, the subject of the *Environmental*

Protection (Swan and Canning Rivers) Policy 1998. The Ellen Brook catchment is currently the highest contributing catchment of nutrients to the Swan and Canning Rivers.

Appendix 2 shows the areas identified in Bush Forever and the Conservation category wetlands.

2.4 Planning framework

Most of the land within the policy area is zoned 'Rural' under the Metropolitan Region Scheme (MRS) with the Nature Reserves reserved for 'Parks and Recreation' and a 'Railways' reserve running through the area from south-east to north-west, adjoining the western boundary of the Twin Swamps Nature Reserve.

The policy area is entirely within the City of Swan. The City of Swan's Town Planning Scheme is required to be consistent with the MRS broad zonings. It provides a greater level of planning detail (for example, the "Special Purpose" areas referred to below).

Under the City of Swan Town Planning Scheme (TPS) No. 9 the zoning of the Nature Reserves is Parks and Recreation, consistent with the MRS reservation.

On 9 August 2002 an amendment to the TPS No 9, Amendment No. 356, rezoned an area of land east and south of the Twin Swamps Nature Reserve from 'General Rural' to 'Special Purpose (Ellenbrook Road)'. Amendment No. 356 sets out the requirement for the preparation of an approved Outline Development Plan (ODP) for the entire Amendment Area prior to any subdivision, strata subdivision and/or development to ensure coordinated subdivision and development of the land.

The ODP must address a range of environmental issues particularly aimed at protecting the habitat of the Western Swamp Tortoise, as well as other planning and environmental issues. The ODP must specify improvements in surface and ground water quality, reductions in nutrient loadings and demonstration of a reduced risk to the Western Swamp Tortoise habitats. The ODP must also include a subdivision guide plan with lot sizes, which shall be a minimum of 8 hectares in area.

To the east of the policy area, and adjoining the eastern boundary of the Ellenbrook Nature Reserve the land is zoned 'Landscape', which is intended "to ensure that development is compatible with and will enhance the landscape and environmental qualities of the locality. The TPS No. 9 specifies criteria including retention of remnant vegetation, water quality protection, strategic revegetation and fire management provision. An ODP is required and it must address, among other things, environmental impact assessments and proposed conservation measures".

Otherwise, the land surrounding the Nature Reserves is zoned 'General Rural', where the purpose is to retain the rural character and amenity and environmental issues are not a primary focus.

The North East Corridor Extension Strategy (Western Australian Planning Commission, 2003), which seeks to identify potential areas for future urban development in this general area acknowledges the significance of the protection of the habitat of the Western Swamp Tortoise. The two Nature Reserves are identified as absolutely constrained from future urban development and much of the surrounding land in the policy area as having ‘hard constraints’ for such development. However, a strip of land between the two reserves (within the City of Swan’s ‘Special Purpose’ area) and an area of land in the north west corner of the policy area are identified as having ‘soft constraints’ for future urban development. The Strategy defines an area of ‘soft constraint’ as one “within which development is possible within the constraint, but environmental, cost, design, management, technical and/or political constraints are likely to be less severe” than for an area of hard or absolute constraint. As noted below, the EPA does not consider any of the land within the policy area suitable for urban development.

3 THE GUIDANCE

3.1 Application of the Guidance to Assessment

All proposals that are likely, if implemented, to have a significant effect on the environment are required to be referred to the EPA under section 38 of the *Environmental Protection Act 1986*. All schemes and scheme amendments are required to be referred to the EPA for evaluation under section 48A of the Act. When considering proposals with the potential to impact upon the habitat of the Western Swamp Tortoise in and around the policy area, the EPA will examine the proposal against the EPA’s objective to protect the remaining populations of the critically endangered Western Swamp Tortoise and their habitats, consistent with the objectives of the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002* and the provisions of the *Wildlife Conservation Act 1950*.

In doing so, the EPA is guided by the Principles of Environmental Protection listed in Position Statement No 7 (EPA, 2004a).

3.1.1 Principles of Environmental Protection

The EPA’s consideration of proposals in and around the policy area with the potential to impact on the Western Swamp Tortoise habitat will be guided by the Principles of Environmental Protection listed in the EPA’s Position Statement No. 7. Those of particular relevance to these considerations are:

- precautionary principle;
- intergenerational equity;

- conservation of biological diversity and ecological integrity;
- shared responsibility;
- integrated environmental management;
- accountability and transparency; and
- enforcement.

3.1.2 *Interdependence*

In addition the EPA notes the particular significance of interdependence in environmental matters. Ecological processes are interconnected with physical and biological systems, food webs and natural cycles. Being interconnected and interrelated requires an understanding and appreciation that affecting or managing one part of the environment may affect one or a number of other parts. These interrelated and interdependent systems can be finely balanced.

3.2 **Guidance for Achieving Desired Outcomes**

Further to the above, the following section 3.2.1 outlines the EPA's requirements and expectations for all developments.

Based on the types of proposals previously referred to the EPA and current land uses in and around the policy area, it is considered that the land uses likely to require specific guidance fall into the following categories:

- rural residential development (section 3.2.2);
- agricultural development, such as aquaculture, turf farms and horticulture (section 3.2.3); and
- clay excavation (section 3.2.4).

3.2.1 *All developments/ proposals*

All types of development, including those described above will be expected to meet the following criteria. These expectations are additional to the requirements of the City of Swan, listed in TPS No. 9 and its Appendices.

Urban residential subdivision or intensive animal industries

No urban residential subdivision or intensive animal industries (eg. pig, poultry or beef industries) should be permitted within the policy area.

Remnant native vegetation

Under Part V of the EP Act the clearing of native vegetation requires a permit (with some limited exceptions). The policy area of the EPP was declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* (Government of Western Australia, 2005) as an environmentally sensitive area (ESA). Under the *Environmental*

Protection (Clearing of Native Vegetation) Regulations 2004 (Government of Western Australia, 2004a), some minor clearing activities (e.g. firebreaks) can be undertaken without a clearing permit. In ESAs these exemptions do not apply and all clearing requires a permit.

In considering a permit application the Chief Executive Officer is required to ensure that it is consistent with any approved EPPs. In this instance, the Western Swamp Tortoise Habitat EPP has the purpose of protecting Western Swamp Tortoise habitat, and lists 'the clearing of vegetation' as an activity 'which might degrade the western swamp tortoise habitat'. Opportunities for clearing native vegetation within the policy area are likely to be severely limited.

In addition to a developer holding, and conforming to, the requirements of a clearing permit for clearing within the policy area, the EPA considers that there should be no net loss of remnant native vegetation. The EPA's *Position Statement No.9 Environmental Offsets* establishes the purpose, scope and principles for environmental offsets that the EPA will consider in future advice and recommendations. The Position Statement provides the EPA's view that environmental offsets should be used to counterbalance significant and unavoidable adverse environmental impacts, with an aspirational goal of achieving a 'net environmental benefit' (EPA, 2006).

Buffers to wetlands and watercourses

Minimum buffers to Conservation, Resource Enhancement and EPP wetlands:

The buffer adjoining a wetland helps to maintain the ecological processes and functions associated with the wetland, and protects the wetland from potential adverse impacts. A buffer can also help to protect the community from potential nuisance insects, for example, midges. To maintain wetland values, it is important to determine, protect and manage an adequate buffer. The EPA's expectations for the identification and protection of wetland buffers are outlined in chapter B4 of its *Environmental Guidance for Planning and Development* (Draft Guidance Statement No 33, EPA, 2005).

The EPA recommends a minimum dryland vegetated buffer of 50 metres or 1 m Australian Height Datum (AHD) higher than the farthest extent of the wetland dependant vegetation, whichever is the larger. The entire buffer should be protected with the wetland proper. The paper "Guidelines for design of effective buffers for wetlands on the Swan Coastal Plain" Davies PM and Lane JAK (1995) should also be used to assist in establishing appropriate wetland buffers.

It is also important to provide buffers that recognise the potential health and amenity impacts of nuisance insects such as midge and mosquitoes, which may be associated with some wetlands. The EPA has produced *Guidance for the Assessment of Environmental Factors on Management of Mosquitoes by Land Developers* (EPA, 2000), which may assist in addressing this issue. The determination of appropriate wetland buffers should occur as part of detailed planning. The Western Australian Planning Commission is preparing a "*Guideline for the Determination of Wetland Buffer Requirements*" which will assist. At time of writing it is in draft form.

Minimum buffers to watercourses

The EPA's expectations for the identification and protection of watercourse buffers are outlined in chapter B5 of its *Environmental Guidance for Planning and Development* and attachment B5-1 provides a methodology for determining buffer width (EPA, 2005).

The following *minimum* dryland vegetated buffer width guidelines are recommended for watercourses on private land where the end use is not for public water supply:

- permanent water 50 metres;
- seasonally flowing 30 metres; and
- flow in response to specific rain events 10 metres.

Measurements should be made from the edge of riparian vegetation (or wetland dependant vegetation) or the edge of the 1 in 100 year floodway where the flood plain is wide (EPA 2005).

The above buffers are the recommended minimum, and an analysis of slope, soil drainage and fringing vegetation may require greater and variable buffer widths. (see B5-1 of draft Guidance No 33).

Fire Management Plan

A fire management plan will be required for all developments within the policy area. A fire management plan should be developed in consultation with the Fire and Emergency Services Authority (FESA) and the City of Swan.

Groundwater protection

The surface and ground water quality and quantity is to be protected.

Grazing of animals

No grazing in Conservation, Resource Enhancement and EPP wetlands, river beds, nature reserves or Bush Forever sites. Stocking rates should be consistent with the Department of Agriculture and Food guideline *Stocking rate guidelines for rural small holdings: Swan Coastal Plain and Darling Scarp* (Van Gool, Angell and Stephens, 2000).

Development setback

No development within 100 metres from the boundary of the Ellen Brook and Twin Swamps Nature Reserves.

3.2.2 *Rural residential development*

In addition to the requirements outlined in section 3.2.1, the following guidelines are considered to be more specific to rural residential type developments or subdivisions:

- for any subdivision within the policy area no lot should be of a size less than eight hectares;

- effluent disposal systems should be installed in accordance with current environmental guidelines; and
- management plan/s should be developed to address the following issues:
 - φ nutrient and drainage management;
 - φ fire management;
 - φ stocking rates; and
 - φ native vegetation protection and revegetation.

3.2.3 *Agricultural developments*

In addition to the requirements outlined in section 3.2.1, the following guidelines are considered to be more specific to agricultural development.

Horticulture and viticulture

Management plan/s should be developed to address the following issues:

- wind drift of chemical spray residues across the property boundaries and entering watercourses or wetlands;
- changes to drainage, (may require the approval of the Commissioner of Soil Conservation under regulation 5 of the *Soil and Land Conservation Regulations 1991*);
- leaching of applied chemicals such as fertilisers and pesticides into water resources (groundwater or surface waters);
- the availability of an adequate water supply; and
- erosion from excessive runoff. For steep sloping land, expert advice should be obtained to develop a conservation plan.

With regard to viticulture, in July 2002 the (then) Department of Environmental Protection (DEP) and the Water and Rivers Commission (WRC), in conjunction with the Wine Industry Association of WA, the Grape Growers Association of WA and the (then) Department of Agriculture Western Australia published Environmental Management Guidelines for Vineyards (WRC *et. al.*, 2002) to outline best management practices for viticulture. Viticulture proposals within the policy area should be implemented in accordance with these guidelines to help ensure their compatibility with protection of the Western Swamp Tortoise habitat.

Aquaculture

The WRC produced a Water Quality Protection Note specifically on the requirements for aquaculture proposals (WRC, 2003). Proposals for aquaculture within the policy area of the Western Swamp Tortoise will need to comply with all relevant requirements contained in this Note.

A proposed aquaculture development should as a minimum:

- minimise the impacts of the construction and operation of the aquaculture development on the waterways or wetlands of the policy area; and
- prevent discharge of pollutants in excess of the WRC guidelines for aquaculture.

The proposal should address the following areas, as outlined in the WRC aquaculture note:

- site selection;
- waste management;
- construction of land based ponds;
- water supplies;
- waste discharge;
- solid waste management; and
- monitoring and reporting.

3.2.4 Clay extraction developments

The EPA notes that the Swan Valley contains deposits of high quality plastic clays which are essential to local manufacturers of clay based products such as bricks and roof tiles. The northern-most extent of this deposit is in the vicinity of the Ellen Brook Nature Reserve.

As part of any proposal for clay extraction in this area, the following management criteria have been adopted by the EPA:

- extraction shall be staged so as to minimise the area to be disturbed at any one time with progressive rehabilitation;
- investigations shall be undertaken to determine the ground levels, surface water flow directions and water qualities (chemical and suspended solid content);
- drainage shall be managed so as to:
 - ⊕ detain all drainage waters on site for the duration of the clay extraction operation, so that they do not enter the Western Swamp Tortoise habitat areas (nor create unacceptable impact elsewhere);
 - ⊕ determine the need for, and manage the impacts of dewatering;

- ⊕ appropriately modify drainage systems with which the proposal interacts if necessary to isolate the Nature Reserves from the effects of poor water quality in the local drainage system; and
- ⊕ monitor drainage to detect, report on, and manage any drainage impacts on the Western Swamp Tortoise habitat, caused by the clay extraction activities.;
- groundwater shall be protected and its use managed, so that there is no:
 - ⊕ excavation below the permanent water table; and
 - ⊕ groundwater interaction between the proposal and the Western Swamp Tortoise habitat area.;
- storage of topsoil and overburden stockpiles shall be planned to avoid erosion;
- the impacts of the transport of clay shall be minimised;
- there shall be periodic reporting of monitoring results;
- where monitoring reveals any unacceptable environmental impacts, there shall be consequential changes to project management to remedy those impacts; and
- rehabilitation – the resultant end land use shall not affect the habitat of the Western Swamp Tortoise and shall be consistent with the regional development, rehabilitation and drainage strategy.

As a result of the EPA's formal assessment of a number of clay extraction proposals in the vicinity of the Ellen Brook Nature Reserve, the Minister for the Environment has issued statements binding the proponents to conditions. A Regional Development, Drainage & Rehabilitation Strategy (Bowman Bishaw Gorham, 2001) has been produced to meet one of these conditions. All proposals should be consistent with this strategy.

The EPA's assessment of a recent change of conditions for a proposal for clay extraction in the general area of the Ellen Brook Nature Reserve (EPA, 2004c) endorsed an environmental offset commitment by the proponent to transfer to the State at no cost Bush Forever Site 301B (the eastern half of Lot 12 Lexia Avenue), which would form a valuable addition to the Reserve. The EPA's Position Statement on environmental offsets outlines the circumstances in which such offsets might be appropriate (EPA, 2006).

3.3 Incentives for landowners

A range of incentive programs that are currently operating in WA and are accessible by private landowners wishing to conserve biodiversity on their property is available in *Biodiversity Incentive Programs in Western Australia* (Government of Western Australia 2004b). Copies are available for viewing from the DoE library (Head office) and CALM information centres or website, www.calm.wa.gov.au.

4 APPLICATION

4.1 Area

This Guidance Statement applies to all applications for all developments with the potential to impact upon Western Swamp Tortoise habitats within the policy area for the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002*.

4.2 Duration and Review

The duration of this Guidance Statement is for five years, unless circumstances require it to be reviewed earlier.

5 RESPONSIBILITIES

5.1 Environmental Protection Authority Responsibilities

The EPA will apply this Guidance Statement during the assessment of proposals under Part IV of the *Environmental Protection Act 1986* where Western Swamp Tortoise habitat is an environmental factor.

5.2 Department of Environment (DoE) Responsibilities

The DoE will assist the EPA in applying this Guidance Statement in environmental impact assessment and in conducting departmental functions under Part V of the *Environmental Protection Act 1986*.

5.3 Proponent Responsibilities

Where proponents demonstrate to the EPA that the requirements of this Guidance Statement are incorporated into proposals, in a manner which ensures that they are enforced and audited, the assessment of such proposals is likely to be assisted.

6 DEFINITIONS AND ABBREVIATIONS

Definitions

biological diversity / biodiversity: the variety of life forms, the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form (Commonwealth of Australia, 1996).

development: the erection, construction, demolition, alteration or carrying out of any building, excavation, clearing or other works in, on, over, or under land or waters, or a material change in the use of land or waters or any other act or activity in relation to land or water declared by regulation to constitute development, but not including any work, act, or activity declared by regulation not to constitute development.

ecological community: an assemblage of organisms characterised by a distinctive combination of two or more ecologically interacting species.

EPP wetland: Any wetland protected under the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* or subsequent revised policy.

environmental impact assessment: process and procedures associated with Part IV of the *Environmental Protection Act 1986*.

landowner: the legal owner of the land.

policy area: the area identified in Schedule 1 of the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002*.

proponent: the person or company which is nominated under section 38 of the *Environmental Protection Act 1986* as being responsible for the proposal.

regionally significant natural area: a component of remnant native vegetation, rock outcrop or water body that collectively aims to form a comprehensive, adequate and representative system of conservation areas. In order to establish whether an area falls into this category it needs to be part of the existing or proposed conservation system or to meet (in part or whole) a range of agreed criteria (EPA, 2005).

stakeholder: a person, agency or interested group which is directly affected by procedures to implement the *Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002* in and/or adjacent to the policy area.

Abbreviations

CALM	Department of Conservation and Land Management
DEP	Department of Environmental Protection

DoE	Department of Environment
EIA	environmental impact assessment
EPA	Environmental Protection Authority
EPP	Environmental Protection Policy
WRC	Water and Rivers Commission

7 LIMITATIONS

This Guidance Statement has been prepared by the Environmental Protection Authority to assist proponents and the public. While it represents the contemporary views of the Environmental Protection Authority, each proposal that comes before the Environmental Protection Authority for environmental impact assessment will be judged on its merits. Proponents who wish to deviate from the Guidance provided in this document should provide robust justification for the proposed departure.

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9 ACKNOWLEDGMENTS

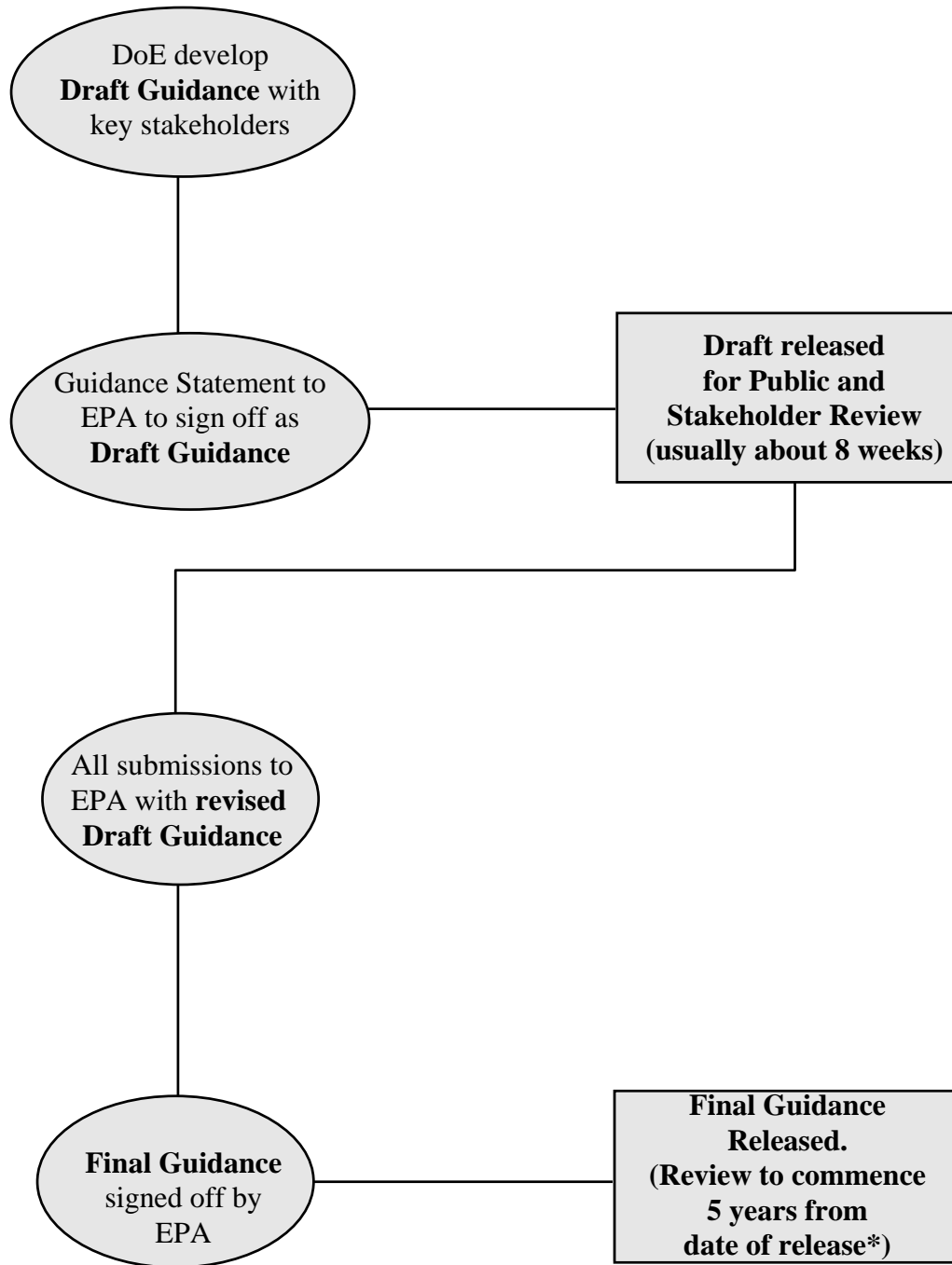
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Appendix

Generic Flow Diagram for the Guidance Statement Process



*Guidance may be reviewed earlier if circumstances require it.

Appendix 2 Western Swamp Tortoise Habitat policy area

