

Draft Environmental Protection Policy for the Western Swamp Tortoise Habitat

Environmental Protection Authority
Perth, Western Australia
July 1994

A Draft Environmental Protection Policy for the Western Swamp Tortoise Habitat

The critically endangered western swamp tortoise occurs only in the south-west of Western Australia and is thought to be Australia's rarest vertebrate and the world's rarest tortoise or turtle. In recent decades there has been a large decline in numbers of the tortoise and at present there are believed to be less than 40 individuals in the wild. There is wide concern that the population may be approaching extinction. The extinction of the tortoise would appear as a severe failing in our community's management of endangered species and would be viewed as a major loss locally, nationally and internationally.

A Species Recovery Plan¹ has been prepared by the Department of Conservation and Land Management and is being implemented. The objective of the Recovery Plan is to "decrease the chance of extinction of the western swamp tortoise by creating at least two wild populations and doubling the total number of individuals by the year 2002". Issues addressed in the Recovery Plan include captive breeding at Perth Zoo, protection of the only known wild population and habitat, the enhancement and expansion of the available habitat and the release of captive bred animals into the wild.

Two small Nature Reserves 30km from the centre of Perth, which contain marginal remnant habitat, will be the focus for increasing western swamp tortoise numbers in the wild. As Perth grows so do the pressures caused by human activity in and around the two reserves. This draft Environmental Protection Policy seeks to ensure that the only remaining habitat is protected and the western swamp tortoise is given the best chance to survive in the wild.

The role of an Environmental Protection Policy

Environmental Protection Policies are prepared under Part III of the *Environmental Protection Act* 1986. Policies can be established to protect any portion of the environment or more generally to provide a framework for better environmental management.

Unique to Policies is the capacity to establish environmental objectives and measures to guide the protection and better management of any portion of the environment. Environmental measures for achieving specified objectives usually include voluntary community activities, government support and extension, through to appropriate decision-making by responsible authorities.

Using a 'precautionary' approach to protect the western swamp tortoise habitat.

Ecological systems such as the tortoise habitat are very complex and many characteristics of the systems are either not known or are extremely difficult to establish in exact terms. The 'precautionary principle', which asserts that it is important to use a cautious and conservative approach to interventions in important ecological systems², is one way of dealing with this absence of exact information. Put simply, activities that have the potential to impact on the habitat should be postponed until more is known about the system and activities can be managed to minimise potential impacts.

¹ Western Swamp Tortoise Recovery Plan (in print), Wildlife Management Plan No 11 - Department of Conservation and Land Management.

² Myers, Norman (1993), Biodiversity and the Precautionary Principle. *Ambio* Vol. 22 No 2-3.

A 'precautionary' approach in limiting impacts on the western swamp tortoise habitat is fundamental to the Policy content and success in achieving its purpose. As more becomes known about the western swamp tortoise and its habitat the 'precautionary' approach may be relaxed during regular reviews of the Policy.

For example, the characteristics of groundwater surrounding Twin Swamps Nature Reserve are extremely complex³. If large amounts of groundwater were extracted near the habitat it would be very difficult to ensure that this did not cause wetlands in the habitat to dry out earlier each year affecting the tortoises' ability to breed. Therefore, it is necessary to apply a 'precautionary' approach and minimise the need to extract large amounts of groundwater and ensure future increases in extraction of the ground water are carefully assessed for possible impacts.

Developing the draft Environmental Protection Policy with the community

The protection of the western swamp tortoise habitat requires a community effort and therefore the draft Policy has been developed in close consultation with members of the community. A Committee comprising representatives from local landowners, conservation groups and local and state government was established in January 1994 to advise the Environmental Protection Authority on development of the draft Policy. The Committee has met four times and will continue to provide advice during the future steps in the Policy development.

The Environmental Protection Authority would like to formally thank the members of the Committee who provided advice during the preparation of the draft Policy.

Draft Environmental Protection Policy text

In broad terms, the objective of the proposed Policy is to establish environmental objectives for the management of land use in areas near and in the habitat of the western swamp tortoise. It is intended that the Policy will establish -

- two zones of land surrounding the habitat; one incorporating the surface water catchment of the habitat and the other including land approximately one kilometre or less from the habitat;
- environmental quality objectives for the habitat and a means of ensuring that at least these objectives are monitored regularly;
- a programme for achieving the environmental objectives using a cautious approach to minimise risk; and
- a series of environmental protection measures to safeguard against damage or destruction of the habitat.

In summary, environmental objectives for the habitat are to be achieved by limiting future activities which may interfere with and degrade the habitat.

The draft Policy consists of four elements -

Part 1 - Preliminary. This part establishes the purpose of the Policy, the portion of the environment to which the Policy applies and defines terms used in the Policy.

³ V and C Semeniuk Research Group (1993), Investigations of stratification and groundwater in four selected areas of the northeast corridor, Perth metropolitan area - implications for urbanization and water management. Prepared for the Water Authority of Western Australia.

Part 2 - Basis and programme for habitat protection. This part establishes the beneficial uses of the tortoise's habitat, the basis for protection and activities that may degrade the habitat, environmental quality objectives and establishes a programme for the protection of the habitat. An important feature of this Part is the establishment of regular monitoring of environmental quality objectives.

Part 3 - Control of Certain Activities. This part establishes a mechanism for protecting the habitat from unauthorised tampering with vermin proof fence, drainage, taking of ground water, discharge of contaminants, heavy fertiliser use, intense animal farming and uses of nearby premises that may destroy or degrade the habitat. At least initially the EPA will have "Policy" responsibility for the Policy area (except for the Nature Reserves), but some aspects of this may in time be delegated to other agencies.

Schedules - The Schedules define the Policy area and environmental quality objectives.

The Environmental Protection Policy process

The *Environmental Protection Act* 1986 requires that a draft Policy be widely advertised and submissions invited from individuals and agencies likely to be affected.

Submissions received during this public review and comment period are considered by the Authority during further development of the Policy.

After considering public submissions the Authority prepares a "revised draft" Policy which is made available for public inspection and referred to the Minister for the Environment. The Minister for the Environment is then required to make additional reasonable endeavour to consult with individuals and agencies likely to be affected by the Policy. The Minister may then amend the revised draft Policy, approve that Policy by order and publish the "Approved Policy" in the *Government Gazette*. Approved Policies are subject to disallowance in either House of Parliament, and are required to be reviewed within seven years of approval.

Interested persons and organisations are invited to submit written comments on the draft Policy by 14 October 1994 to:

The Chairman
Environmental Protection Authority
Westralia Square
141 St George's Terrace
PERTH WA 6001

Attention: Mr Ed Russell or Mr Charlie Nicholson

Inquiries: call (09) 222 7000
fax (09) 322 1598

*drafted - Kevin McAlpine
Tim Dambrosca
(ex caron)*

*JA.
Jude
can you handle
please?*

*A Bourbridge has assisted
DEP & has prepared
comment. Currently with
L Mutter (Metro). Will be
sent to Env Protection
once comment received.
Thanks to Kevin,
JA*

*W, fyi re Wikboard.
pls return JA.*

ENVIRONMENTAL PROTECTION ACT 1986

DRAFT ENVIRONMENTAL PROTECTION (WESTERN SWAMP TORTOISE HABITAT) POLICY 1994

PART 1 - PRELIMINARY

Citation

1. The policy may be cited as the *Environmental Protection (Western Swamp Tortoise) Policy 1994*.

Purpose of the Policy

2. The purpose of this policy is to enable the western swamp tortoise to survive by protecting the tortoise's remnant habitat.

Interpretation

3. (1) In this policy -

"**contaminant**" means any matter or thing that is likely to alter, directly or indirectly, the environment to the detriment of the habitat's capacity to support the tortoise;

"**Ellen Brook reserve**" means Reserve no. 27620 classified as a class "A" reserve vested in the National Parks and Nature Conservation Authority for the purpose of preservation of fauna, namely the short-necked tortoise and includes Reserve no. 42126 classified as a class "A" reserve vested in the National Parks and Nature Conservation Authority for the purpose of conservation of flora and fauna;

"**habitat**" means the habitat of the tortoise which occurs:

(a) in the Ellen Brook reserve in the area delineated in the Plan as "habitat";
and

(b) in the Twin Swamps reserve in the area delineated in the Plan as "habitat";

"**high protection area**" means, in relation to each of the policy areas, the portion of the policy area delineated in the Plan as "high protection area";

"**Plan**" means Department of Land Administration Miscellaneous Plan no. 1851;

"**policy area**" means one of the 2 areas of land delineated in the Plan as "policy area";

"**this policy**" means this environmental protection policy;

"**tortoise**" means the animal species *Pseudemadura umbrina* commonly known as "western swamp tortoise" or "short-necked tortoise";

"**Twin Swamps reserve**" means Reserve no. 27621 classified as a class "A" reserve vested in the National Parks and Nature Conservation Authority for the purpose of preservation of fauna, namely the short-necked tortoise; and

"**wastewater**" means liquid waste and includes faecal matter and urine.

(2) In this policy, expressions used have the meanings they have in the Act.

Application

4. (1) The policy applies to the policy areas.
- (2) For information purposes, a copy of the Plan is set out in Schedule 1.

PART 2 - BASIS FOR PROTECTION OF HABITAT, ENVIRONMENTAL QUALITY OBJECTIVES AND PROGRAMME FOR PROTECTION OF HABITAT

Beneficial uses

5. The following uses of the habitat are declared to be beneficial uses to be protected under this policy:
 - (a) use of the habitat to support and increase the wild population of the tortoise for an indefinite period;
 - (b) use of the habitat for the introduction of tortoises bred in captivity;
 - (c) use of the habitat as a resource for studying the natural environment and its relationship to the tortoise as a critically endangered species; and
 - (d) use of the habitat to support and study native flora and fauna in the habitat, including rare and threatened ecological communities, to ascertain the relationship of the flora and fauna to the tortoise.

Basis for protection

6. (1) The tortoise is critically endangered and at severe risk of extinction, its only remaining habitat being confined to Twin Swamps reserve and part of Ellen Brook reserve.
one found by wildlife officer?
- (2) The tortoise is no longer present in Twin Swamps reserve and is only in Ellen Brook reserve. The re-introduction of the tortoises into Twin Swamps reserve will commence in July 1994 with the release of tortoises bred in captivity.
- (3) The habitat is marginal, especially in dry years, and has already been subject to degradation.
- (4) Predation by introduced animals such as the European red fox has been a significant cause of decline in the tortoise population.
- (5) The habitat is subject to increasing pressure brought about by the expansion of the Perth metropolitan area and the intensification of existing land uses of land in the area around the habitat. Further domestic, industrial and agricultural uses of the land in the area around the habitat may cause further degradation or the destruction of the habitat.

Significant causes of degradation or destruction

7. The habitat may be degraded or destroyed by:
 - (a) the drainage of water into and out of the habitat;
 - (b) variations in the habitat's water table level;

- (c) the presence and increase of wastewater, nutrients, sediments and chemicals and other contaminants in and around the habitat, particularly in the surface and ground water catchments of the habitat;
- (d) the carrying out of excavation or mining operations in or around the habitat;
- (e) the clearing of native vegetation in the habitat;
- (f) uncontrolled burning of portions of the habitat, particularly when the swamp is dry in Twin Swamps reserve, where shelter in clay fissures is not available for the tortoise to escape from fire;
- (g) the spread of disease within the habitat that infects the tortoise or alters the habitat in a manner that affects the tortoise;
- (h) opportunities for predation of the tortoise;
- (i) alteration to the habitat caused by other animals; and
- (j) the presence and spread of weeds in the habitat.

Environmental objectives for western swamp tortoise habitat

8. For purposes of the Policy, the environmental quality objectives to be achieved and maintained under this policy in respect of the quality of surface water in and entering the habitat are set out in Schedule 2.

Achievement of beneficial uses and achievement and maintenance of environmental quality objectives

9. The measures designed to achieve the beneficial uses to be protected under this policy and the programme by which the environmental quality objectives are to be achieved and maintained are as follows:

- (a) the conservation and proper management of the habitat;
- (b) the control or prevention of causes of degradation or destruction of the habitat particularly in relation to the use of land in the policy areas which may affect the amount or quality of water in the habitat;
- (c) the identification of the source of contaminants and the taking of remedial action in relation to contaminants;
- (d) the implementation of management practices in relation to land and water in the policy areas that assist in the protection of the habitat;
- (e) the planning and management by individuals, community groups and public authorities of the use of land within the policy areas in a manner that:
 - (i) minimizes the risk of degradation or destruction of the habitat; and
 - (ii) is compatible with the achievement of the beneficial uses and the achievement and maintenance of the environmental quality objectives;
- (f) the public authorities with the responsibility for planning in the policy areas to allow the presence:
 - (i) in the policy area applying to Ellen Brook reserve, of no more than 60 dwellings; and

- (ii) in the policy area applying to Twin Swamps reserve, of no more than 100 dwellings;
- (g) in relation to domestic wastewater disposal systems installed in the high protection area after the commencement of this policy, the use of a sewerage system or system that incorporates a nutrient attenuation process; and
- (h) the co-ordination by the Environmental Protection Authority of:
 - (i) regular monitoring and annual reporting of alterations to the habitat including, but not limited to, the quality of surface water in and entering the habitat; and
 - (ii) action recommended in the reporting process.

PART 3 - OFFENCES IN RELATION TO THE POLICY AREA

Interpretation

10. In this Part -

"authority" includes an approval, a licence, consent or permission required under any written law;

"authorized under the Act" means in accordance with works approval, a licence, a requirement contained in a pollution abatement notice, a condition under section 45 of the Act, a direction under section 73 of the Act, an exemption under section 75 of the Act or the exercise of any power conferred by the Act; and

"commencement" means the day on which this policy comes into operation.

Interfering with vermin proof fence

11. (1) A person must not damage, open or remove any part of the vermin proof fence within Ellen Brook reserve or Twin Swamps reserve or do any act that affects the supply of electricity to the fence.
- (2) Subclause (1) does not apply to a person:
- (a) who is authorized under the *Conservation and Land Management Act 1984* and is acting in accordance with the authority; or
 - (b) who is requested by a person referred to in paragraph (a) to effect repairs or maintenance in relation to the fence or supply of electricity to the fence.

Construction or alteration of dams or drainage system

12. (1) A person must not construct or alter, and an occupier of premises within a high protection area must not cause or permit the construction or alteration of:
- (a) a dam in; or
 - (b) any system for, or affecting, the drainage of water into or out of, the high protection area.

- (2) Subclause (1) does not apply:
- (a) to the completion, after commencement, of the construction or alteration of a dam or system referred to in subclause (1) where:
- (i) the construction or alteration had lawfully begun; or
- (ii) an authority to begin the construction or alteration had been obtained,
- before commencement, and the construction or alteration is in accordance with any relevant authority;
- or
- (b) to a person who is authorized under the Act or the *Conservation and Land Management Act 1984* to do an act which would otherwise be prohibited under subclause (1) and is acting in accordance with the authority.

Taking of ground water

13. (1) A person must not pump, draw or otherwise take, and an occupier of premises within a policy area must not cause or permit the pumping, drawing or taking of, any ground water from beneath the surface of a policy area.
- (2) Subclause (1) does not apply:
- (a) to an occupier of premises within a policy area:
- (i) who, in the 5 year period before commencement, had lawfully pumped, drawn or otherwise taken, or had lawfully caused or permitted the pumping, drawing or taking of, ground water from beneath the surface of the policy area; and
- (ii) who, after commencement and in accordance with any relevant authority, pumps, draws or otherwise takes, or causes or permits to the pumping, drawing or taking of, ground water from beneath the surface of the policy area;
- (b) to a person who pumps, draws or otherwise takes ground water to the extent that the pumping, drawing or taking is caused or permitted by a person referred to in paragraph (a);
- or
- (c) to a person who is authorised under the Act or the *Conservation and Land Management Act 1984* to do an act which would otherwise be prohibited under subclause (1) and is acting in accordance with the authority.

Contamination

14. (1) A person must not discharge, and an occupier of premises within a policy area must not cause or permit the discharge of, any waste or contaminant into the soil or waters of any portion of the policy area.

- (2) Subclause (1) does not apply:
- (a) to the discharge of wastewater from a domestic wastewater disposal system into soil or waters outside the high protection areas;
 - (b) to the discharge of wastewater from a domestic wastewater disposal system into soil or waters outside the high protection area if the system:
 - (i) was installed before commencement; or
 - (ii) is installed after commencement and incorporates a nutrient attenuation process;
 - (c) to the application of phosphorus in fertilizer where the application is in accordance with clause 15;
 - (d) to an occupier of premises within a policy area:
 - (i) who, in the 5 year period before commencement, had lawfully discharged, or caused or permitted the discharge of, a particular type of waste or contaminant into the soil or waters of a portion of the policy area; and
 - (ii) who, after the commencement and in accordance with any relevant authority, discharges or causes or permits the discharge of that type of waste or contaminant into the soil or waters of that portion of the policy area as long as the waste or contaminant is discharged at a rate no greater than the rate at which it was discharged in the 5 year period before commencement;
 - (e) to a person who discharges waste or other contaminant into the soil or waters of a portion of a policy area to the extent that the discharge is caused or permitted by a person referred to in paragraph (d);
 - (f) to a person who is authorized under the Act to do an act in a place outside a high protection area which would otherwise be prohibited under subclause (1) and is acting in accordance with the authority;
- or
- (g) to a person who is authorized under the *Conservation and Land Management Act 1984* to do an act which would otherwise be prohibited under subclause (1) and is acting in accordance with the authority.
- (3) The defences provided for in section 74 (1) of the Act, as offences by section 74 (2) of the Act, apply to the proceedings for an offence under subclause (1) and for that purpose the reference in section 74 (1) in relation to emissions are to be read as references to a "contaminant".

Limit on amount of fertilizer to be used

15. A person must not apply, and an occupier of premises within a high protection area must not cause or permit the application of, more than 9kg of phosphorus in fertilizer to any hectare of land in a high protection area within a 12 month period.

How well this be measured?

Restriction on numbers of animals

16. (1) In this clause, a reference to an **"animal population unit"** is a reference to 100 kg of live animal weight.
- (2) A person must not keep, and an occupier of premises within a high protection area must not cause or permit to be kept, on premises within a high protection area at any one time more animals than such number that is in proportion to 7 animal population units for each hectare of land comprising the premises.
- (3) Subclause (2) does not apply:
- (a) to an occupier of premises:
- (i) who, in the 5 year period before commencement, had lawfully kept, or had lawfully caused or permitted to be kept, on the premises at any one time a greater number of animals than the number referred to in the subclause; and
- (ii) who, after commencement and in accordance with any relevant authority, keeps or causes or permits to be kept, on the premises at any one time no more than the number of animals which had been lawfully kept under paragraph (a);
- or
- (b) to a person who keeps animals within a high protection area to the extent that the keeping is caused or permitted by a person referred to in paragraph (a).

Some land uses not allowed

17. (1) A person must not use, and an occupier of premises within a policy area must not cause or permit to be used, premises within a policy area for any purpose or in any manner that is likely to adversely affect the habitat's capacity to support the tortoise.
- (2) Subclause (1) does not apply:
- (a) to an occupier of premises within a policy area:
- (i) who, in the five year period before commencement, had lawfully used, or had lawfully caused or permitted the use of, the premises for a purpose or in a manner which was likely to adversely affect the habitat's capacity to support the tortoise; and
- (ii) who, after commencement and in accordance with any relevant authority, but subject to subclause (3), uses, or causes or permits to be used, the premises for that purpose or in that manner;
- (b) to a person who uses premises within a policy area for any purpose or in any manner that is likely to adversely affect the habitat's capacity to support the tortoise to the extent that the use is caused or permitted by a person referred to in paragraph (a);

(c) to a person who is authorized under the Act or the *Conservation and Land Management Act 1984* and is acting in accordance with the authority;

or

(d) where clause 12 (2), 13 (2), 14 (2) or (3) or 16 (3) applies.

(3) Subclause (2) (a) does not apply:

(a) to any portion of the premises used, or caused or permitted to be used, after commencement for the purpose or in the manner referred to in subclause (1) which before commencement had not so used or caused or permitted to be used; or

(b) to the extent to which the use of the premises, after commencement for the purpose or in the manner referred to in subclause (1) intensifies or increases or is caused or permitted to be intensified or increased.

Penalties

18. A person who contravenes clause 11 (1), 12 (1), 13 (1), 14 (1), 15, 16 (2) or 17 (1) commits an offence and is liable:

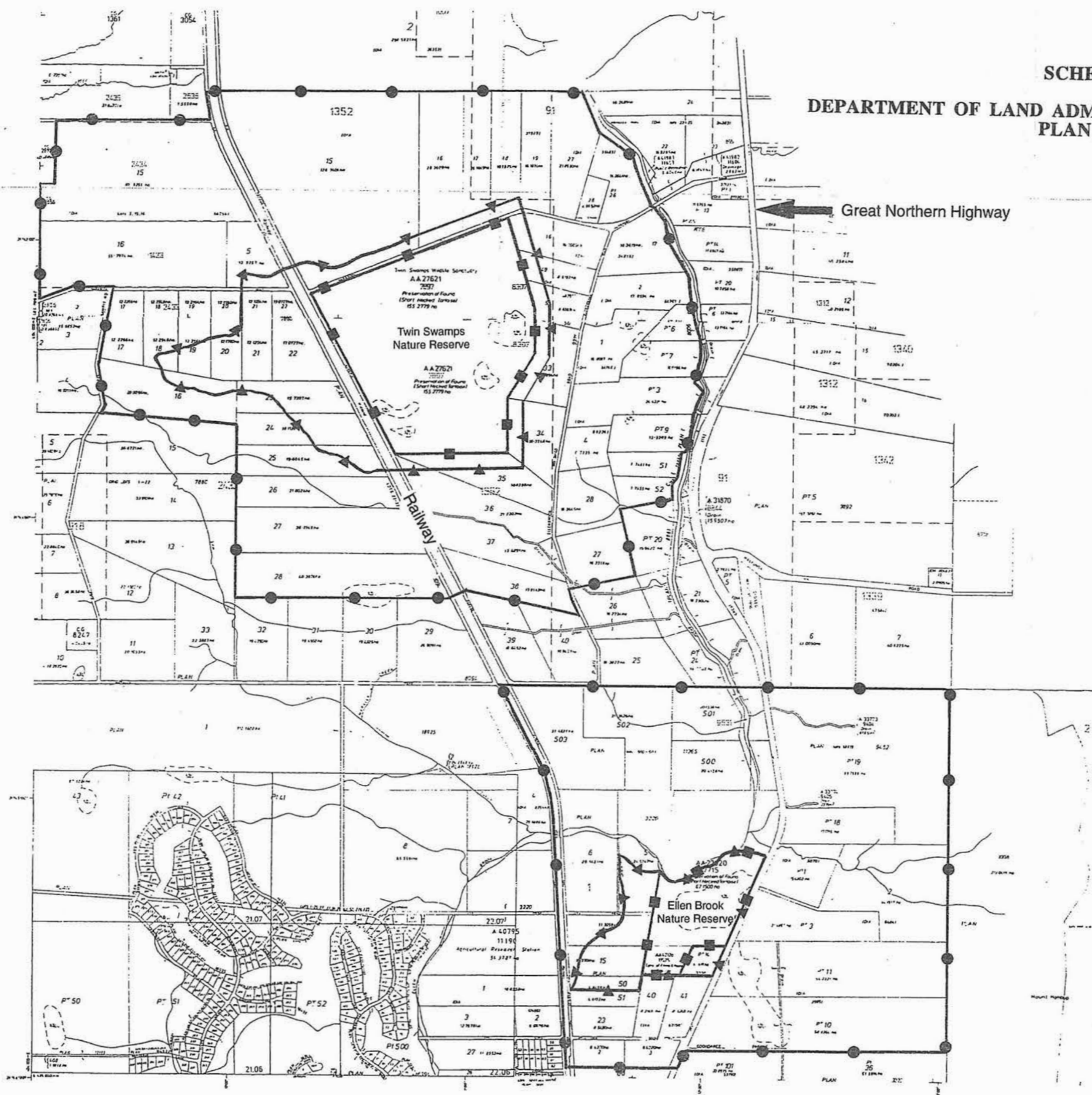
(a) in the case of an individual, to a penalty not exceeding \$5 000 and if the offence is a continuing offence, to a daily penalty not exceeding \$1 000; or

(b) in the case of a body corporate, to a penalty not exceeding \$10 000 and, if the offence is a continuing offence, to a daily penalty not exceeding \$2 000.

SCHEDULE 1

DEPARTMENT OF LAND ADMINISTRATION MISCELLANEOUS PLAN NO. 1851

[Clause 4(2)]



- "Policy Area" boundary
- ▲— "High Protection Area" boundary
- "Habitat" boundary



Proposed Environmental Protection Policy Area WESTERN SWAMP TORTOISE HABITAT		FILE No. 813/994	DEPT. OF LAND ADMINISTRATION MISCELLANEOUS PLAN NO. 1851
DISTRICT SWAN		SCALE 1:15000 ALL MEASUREMENTS IN METRES	
SUBJECT TO SURVEY AMENDMENTS		Gazetted _____ Recorded on Public Plan _____	Registered for Survey No. 813/994 On S.I. No. BG35 (10) 5 2 & 3 DEPT. OF LAND ADMINISTRATION MISCELLANEOUS PLAN No. 1851
Public Plans BG35 (10) 5.2			
A. BG35 (10) 5.3			
Reference CORR. 813/994 Page 9			
Prepared by B. A. MCKAY Date 21.04.1994			
Checked [Signature] Date 22.4.94			
Approved [Signature] Date 22.4.94			

SCHEDULE 2
ENVIRONMENTAL QUALITY OBJECTIVES

[Clause 8]

PART 1 - QUALITY OF SURFACE WATER IN THE HABITAT

Division 1 - Interpretation

Depth at which, and number of samples to be taken

1. A reference in Division 2 to an amount of a substance, whether as a single amount or as a range, is a reference to the amount of the substance in 2 consecutive samples taken at a depth which is at least the depth set out in the Table to this clause opposite the location -

Table

Ellen Brook reserve at depth gauge no. 1	0.35m
Twin Swamps reserve at the east wetland	0.15m
Twin Swamps reserve at the north-west wetland	0.20m
Twin Swamps reserve at the south-west wetland	0.35m

Division 2 - Limits of amounts of substances

Cadmium

2. The limit for the amount of cadmium in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 0.002 mg/L.

Chlorophyll

3. The limit for the amount of chlorophyll a in surface water is set at:

- (a) for Ellen Brook reserve, at depth gauge no. 1 - no more than 0.005 mg/L;
- (b) for Twin Swamps reserve:
 - (i) at the east wetland - no more than 0.010 mg/L;
 - (ii) at the north-west wetland - no more than 0.005 mg/L;
 - (iii) at the south-west wetland - no more than 0.005 mg/L.

Chromium

4. The limit for the amount of chromium in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 10 µg/L.

Copper

5. The limit for the amount of copper in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 1.0 µg/L.

Fluoride

6. The limit for the amount of fluoride in surface water in Ellen Brook reserve and Twin Swamps reserve is set at no more than 0.1 mg/L.

Iron

7. The limit for the amount of iron in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 1000 µg/L.

Lead

8. The limit for the amount of lead in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 1.0 µg/L.

Mercury

9. The limit for the amount of mercury in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 0.1 µg/L.

Nickel

10. The limit for the amount of nickel in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 15 µg/L.

Nitrogen (ammonia)

11. The limit for the amount of ammonia nitrogen in surface water is set at:

- (a) for Ellen Brook reserve, at depth gauge no. 1 - no more than 0.1 mg/L;
- (b) for Twin Swamps reserve:
 - (i) at the east wetland - no more than 0.1 mg/L;
 - (ii) at the north-west wetland - no more than 0.2 mg/L;
 - (iii) at the south-west wetland - no more than 0.3 mg/L.

Nitrogen (nitrate)

12. The limit for the amount of nitrate nitrogen in surface water is set at:

- (a) for Ellen Brook reserve, at depth gauge no. 1 - no more than 0.1 mg/L;
- (b) for Twin Swamps reserve:
 - (i) at the east wetland - no more than 0.1 mg/L;
 - (ii) at the north-west wetland - no more than 0.1 mg/L;
 - (iii) at the south-west wetland - no more than 0.2 mg/L.

Nitrogen (total)

13. The limit for the amount of total nitrogen in surface water is set at:

- (a) for Ellen Brook reserve, at depth gauge no. 1 - no more than 1.0 mg/L;
- (b) for Twin Swamps reserve:
 - (i) at the east wetland - no more than 5.0 mg/L;
 - (ii) at the north-west wetland - no more than 5.0 mg/L;
 - (iii) at the south-west wetland - no more than 10 mg/L.

pH

14. The limit for the pH in surface water is set at:
- (a) for Ellen Brook reserve, at depth gauge no. 1 - between 6.5 and 7.5;
 - (b) for Twin Swamps reserve:
 - (i) at the east wetland - between 6.0 and 7.5;
 - (ii) at the north-west wetland - between 6.5 and 7.0;
 - (iii) at the south-west wetland - between 5.0 and 6.0.

Oxygen

15. The limit for the amount of dissolved oxygen in surface water is set at:
- (a) for Ellen Brook reserve, at depth gauge no. 1 - at least 90%;
 - (b) for Twin Swamps reserve:
 - (i) at the east wetland - at least 80%;
 - (ii) at the north-west wetland - at least 80%;
 - (iii) at the south-west wetland - between 50% and 80%.

Phosphorus

16. The limit for the amount of total phosphorus in surface water is set at:
- (a) for Ellen Brook reserve, at depth gauge no. 1 - no more than 0.05 mg/L;
 - (b) for Twin Swamps reserve:
 - (i) at the east wetland - no more than 0.2 mg/L;
 - (ii) at the north-west wetland - no more than 5.0 mg/L;
 - (iii) at the south-west wetland - no more than 0.2 mg/L.

Selenium

17. The limit for the amount of selenium in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 5.0 µg/L.

Salinity

18. The limit for the amount of total dissolved solids in surface water is set at:
- (a) for Ellen Brook reserve, at depth gauge no. 1 - no more than 100 mg/L;
 - (b) for Twin Swamps reserve:
 - (i) at the east wetland - no more than 100 mg/L;
 - (ii) at the north-west wetland - no more than 500 mg/L;
 - (iii) at the south-west wetland - no more than 1000 mg/L.

Tin

19. The limit for the amount of tin in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 0.008 µg/L.

Zinc

20. The limit for the amount of zinc in surface water in Ellen Brook reserve or Twin Swamps reserve is set at no more than 5 µg/L.

PART 2 - QUALITY OF SURFACE WATER ENTERING THE HABITAT

Quality of substances in surface water entering the reserves

21. (1) Subject to subclause (2), the limit for the amount of a substance mentioned in column 1 of the Table to this clause that is present in surface water entering Ellen Brook reserve or Twin Swamps reserve is set at not more than the amount set out opposite that substance in column 2 of the Table.

*Who sample
where?*

(2) A reference in the Table to an amount of a substance, whether as a single amount or as a range, is a reference to the amount of the substance in 2 consecutive samples.

Table

Arsenic	50 µg/L
Cadmium	0.002 mg/L
Chromium	10 µg/L
Copper	1 µg/L
Fluazifop	10 µg/L
Fluoride	0.1 mg/L
Glyphosate	1 µg/L
Iron	1 000 µg/L
Lead	1.0 µg/L
Mercury	0.1 µg/L
Nickel	15 µg/L
Nitrogen (ammonia)	0.15 mg/L
Nitrogen (nitrate)	0.1 mg/L
Nitrogen (total)	3 mg/L
Phosphorus	Ellen Brook reserve: 0.05 mg/L Twin Swamps reserve: 0.1 mg/L
pH	6.0-7.0
Salinity (total dissolved solids)	100 mg/L
Selenium	5 µg/L
Tin	0.008 µg/L
Suspended solids	80 mg/L
Zinc	5 µg/L