

Site 22. Liverpool Road Retarding Basin, Boronia

A Melbourne Water retarding basin reserve on the Dandenong Creek floodplain, with artificial lakes, an open park area and sections of native vegetation. Melway ref. 65 G4.

Site Significance Level: *State*

- There are five regionally endangered Ecological Vegetation Classes and one that is regionally vulnerable;
- The site is known habitat for Swamp Skink and likely habitat for Powerful Owl, which are both vulnerable species listed under the *Flora and Fauna Guarantee Act*;
- Together with Sugarloaf Hill, the site is a major ecological 'stepping stone' on the Dandenong Creek habitat corridor for daily and seasonal movements of birds and insects;
- 113 indigenous plant species were found on the site in this study, or 170 if one takes this site and the adjoining Sugarloaf Hill together - large numbers by Knox standards;
- There are numerous plant species and several fauna species that are rare or threatened in the Melbourne area;
- The waters of Dandenong Creek and adjacent wetlands support aquatic life that deserves further investigation.

Aerial photograph and plan: See page 114, which covers this site, Sugarloaf Hill and Dobson's treed paddock.

Boundaries

This 22.45 ha site comprises the whole of the Melbourne Water property known as the Liverpool Road Retarding Basin. Not all of the vegetation is significant, but for the purposes of town planning and management, the property needs to be treated as a whole.

Land use & tenure: Melbourne Water reserve for drainage purposes, doubling as a public park.

Site description

Liverpool Road Retarding Basin has an important function in mitigating floods downstream and it is a popular public park, particularly for walking dogs. It also supports significant native flora and fauna. Its location abutting Sugarloaf Hill (Site 23) adds greatly to the conservation significance of both sites.

The retarding basin property is mostly on the floodplain of Dandenong Creek at elevations of 131-137 m, but the western fringe includes the foot of Sugarloaf Hill to an elevation of 144 m. The floodplain soil is alluvium washed down by Dandenong Ck and extensively excavated for drainage works. The soil in the areas marked 'Valley Heathy Forest' and 'Lowland Forest' on the aerial photograph of p. 114 comprises light grey loam over clay, derived from the Devonian volcanic flows of the Dandenong Ranges

The course of Dandenong Ck through the property is an excavated channel feeding a wetland and lake within the retarding basin. Water exits the lake through a pipe into another channel outside the property's northern boundary. There is a second artificial lake to the south of the channel within the property.

Both lakes have some fringing semi-aquatic vegetation and wetlands at their respective upstream ends. There are also wetlands in the site's southwest, surrounded by dense Swamp Scrub. The lakes and wetlands are used by waterbirds, frogs and probably reptiles.

The areas of Swamp Scrub are likely to be regrowth following clearing of Swampy Woodland. It is a common phenomenon that paperbarks regenerate far better than eucalypts following clearing of Swampy Woodland in seasonally inundated areas, leading to the formation of Swamp Scrub.

Similarly, clearing of Swampy Riparian Woodland and less flood-prone areas of Swampy Woodland can result in the formation of dense stands of wattles, such as the Blackwoods in the patches marked 'Wattle Scrub' on the aerial photograph of p. 114.

Despite the past clearing, the Swamp Scrub at Liverpool Road Retarding Basin supports a fairly rich range of understorey plant species. This richness appears to be slowly dwindling as the vegetation matures, and may need a fire to regenerate it. The Wattle Scrub has probably never supported many understorey species at all, except on the banks of the creek channel.

The site's western edge, and a narrow strip beside Liverpool Rd near the car park, have not been cleared and retain mature vegetation and some large, old trees. The lowest lying sections are Swampy Woodland, with Lowland Forest above it, and Valley Heathy Forest on the lower northeast slopes of Sugarloaf Hill.

The unlabelled dark green areas on the aerial photograph of p. 114 are generally planted trees of species or forms that do not occur naturally in the district. The main exception is the small patches within the area west of the car park marked

'Dumped soil', which contain eight indigenous species that have volunteered themselves, including the locally uncommon species *Calystegia marginata*, *Goodia lotifolia* and *Gynatrix pulchella*.

Although there is a disfigured sign at the car park which used to state that dogs must be kept on leads, a high percentage of all visitors to the park bring dogs and let them roam off their leads. This diminishes the enjoyment of the park for many other users due to safety concerns and the amount of excrement left behind. It also discourages waterbirds and other wildlife, particularly from breeding in what would otherwise be suitable habitat fringing the lakes. It is common to see people encouraging their dogs to chase waterbirds.

Forest birds and reptiles are rather abundant on the hill slopes in the site's west. The Swamp Skink (a vulnerable species listed under the *Flora & Fauna Guarantee Act*) has been found on the site in recent years.

Relationship to other land

The site is treated in this report as separate from Sugarloaf Hill (Site 23) only because of the difference between the two sites' land uses and ownership. Ecologically, the two sites function as one and the conservation values of one cannot be considered in isolation from the other.

There are few ecological barriers for birds, bats, insects and pollen to travel between these sites and the large area of contiguous native vegetation in the Dandenong Ranges. The trees along Dandenong Creek and Pavitt Lane provide an almost continuous corridor. Dobson's treed paddock (Site 21) is nearby on the other side of Liverpool Rd, and it is close to vegetated corridors along Dobson's Creek (Site 20) and Mountain Hwy (Site 92). There are also patches of remnant vegetation downstream along the Dandenong Creek drain and also every few hundred metres to the north of the site, in Maroondah municipality (see Lorimer *et al.* 1997).

Bioregion: Gippsland Plain.

Habitat types

Perennial Stream (No EVC number). Flora includes *Isolepis inundata*, *Juncus gregiflorus* and *Potamogeton crispus*.

Lakes (No EVC number). Fringing vegetation dominated by rushes (*Juncus* species). Aquatic species not determined.

Lowland Forest (EVC 16, **regionally Vulnerable**): 0.9 hectares in total, comprising approximately 0.4 ha in excellent ecological condition (rating A), 0.4 ha in good ecological condition (rating B), 0.1 ha in fair ecological condition (rating C) and a few scattered trees around the car park. 56 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus obliqua* typically 22-25 m tall, with far fewer *E. radiata* and *E. ovata*.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Moderately dense. Dominated by various combinations of *Cassinia aculeata*, *Bursaria spinosa* and *Leptospermum scoparium*, and with substantial numbers of *Acacia verticillata* and *Pultenaea gunnii*. *Melaleuca ericifolia* intrudes from adjoining Swampy Woodland. Members of the Proteaceae family are uncharacteristically absent, perhaps due to past clearing.

Ferns: Bracken is abundant almost throughout.

Ground flora: Rather dense, knee-deep and with an abundance of the wiry grass *Tetrarrhena juncea*, often sharing dominance with *Gahnia radula* or *Pteridium esculentum*. *Lomandra* species are abundant but not dominant. Tufted grasses, particularly *Austrostipa rudis* and *Themeda triandra*, are present in low density.

Swamp Scrub (EVC 53, **regionally Endangered**): Total area 1.8 ha, assessed in 1997 as being equally divided between ecological condition ratings A (excellent) and B (good). 42 indigenous plant species were found.

Dominant canopy trees: *Melaleuca ericifolia*. There are also emergent *Eucalyptus ovata* and *Acacia melanoxylon*.

Shrubs: Sparse, comprising *Acacia verticillata*, *Coprosma quadrifida*, *Goodenia ovata*, *Leptospermum scoparium* and *Senecio minimus*.

Vines: Indigenous vines absent, but the weed Japanese Honeysuckle is a serious problem.

Ferns: *Cyathea australis* and *Blechnum minus* are relatively sparse but are nevertheless still fairly prominent features of the ground flora.

Ground flora: Apart from the ferns, there are sparse patches of *Triglochin striatum*, *Juncus*, *Isolepis inundata*, grasses and *Lobelia anceps*.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**): Includes perennial and seasonal wetland. Total area 1.1 ha, assessed in 1997 as comprising approximately 0.1 ha in excellent ecological condition (rating A) and 1.0 ha in good ecological condition (rating B). 21 indigenous species were found. Dominant species are variously rushes, Common Reed, sedges or *Persicaria* species.

Valley Heathy Forest (EVC 127, **regionally Endangered**): 0.3 ha in total, comprising approximately 2,200 m² in good ecological condition (rating B) and 800 m² in fair ecological condition (rating C). 40 indigenous plant species found.

Dominant canopy trees: *Eucalyptus goniocalyx*, 10-15 m tall, 30-40% foliage cover. There are also smaller numbers of *E. radiata*, *E. obliqua* and *E. ovata* (all present in larger densities in the adjoining EVCs).

Dominant lower trees: Scattered *Exocarpos cupressiformis*, 12 m tall and fewer *Acacia melanoxylon*.

Shrubs: Mostly up to 2-3 m tall and dense with *Bursaria spinosa* (typically 60% foliage cover). *Acacia stricta* is fairly abundant.

Vines: *Pandorea pandorana* is quite common, as is the light twiner *Billardiera mutabilis*.

Ferns: *Adiantum aethiopicum* is abundant. *Pteridium esculentum* is also present close to the ecotone (boundary) with EVCs downhill, where it is more abundant.

Ground flora: A layer typically 20-30 cm deep with a foliage cover of approximately 80%. Dominated by *Themeda triandra*, *Austrostipa rudis* and other grasses. *Gahnia radula* is scarce.

Swampy Woodland (EVC 937, regionally Endangered): The area mapped on p. 114 as this EVC measures 6,200 m², of which approximately 4,400 m² is in good ecological condition (rating B) and 1,800 m² is in fair ecological condition (rating C). 41 indigenous plant species were found.

There is also 4,800 m² of Wattle Scrub shown on p. 114 (excluding the strip along Dandenong Ck) that represents regrowth of Swampy Woodland, in poor ecological condition (rating D) relative to pristine Swampy Woodland.

Dominant canopy trees: *Eucalyptus ovata*, fairly sparse.

Dominant lower trees: *Acacia melanoxylon* and fewer *Melaleuca ericifolia*.

Tall Shrubs: Dominated by *Acacia verticillata*, *Coprosma quadrifida*, *Leptospermum scoparium*, *Ozothamnus ferrugineus* and (in one patch) *Bursaria spinosa*.

Lower Shrubs: *Goodenia ovata*, *Pultenaea gunnii* and *Senecio minimus*.

Vines: Sparse *Pandorea pandorana*. The vine weeds *Rubus discolor* and *Lonicera japonica* are a significant threat.

Ferns: *Pteridium esculentum* is abundant. There are also moderate numbers of *Cyathea australis* and small numbers of *Histiopteris incisa* and *Polystichum proliferum*. *Hypolepis rugosula* was present until recently but could not be found in 2002 or 2003 during drought.

Ground flora: *Phragmites australis* and *Lepidosperma elatius* are each dominant in some areas. Elsewhere, the dominant ground flora species are *Lomandra longifolia* and various grasses, including *Microlaena stipoides*, *Austrostipa rudis*, several wallaby-grass species and the characteristic species *Austrofestuca hookeriana*, *Poa tenera* and *Poa ensiformis*. *Gonocarpus tetragynus* is abundant but not dominant.

Swampy Riparian Woodland (EVC 83, regionally Endangered): The area mapped on p. 114 as this EVC measures approximately 900 m² and is in fair ecological condition (rating C). 19 indigenous plant species found.

There is also 3,100 m² of Wattle Scrub along the Dandenong Ck channel that represents regrowth of Swampy Riparian Woodland, in fair ecological condition (rating C) relative to pristine Swampy Riparian Woodland.

Dominant canopy trees: *Eucalyptus ovata*, fairly sparse.

Dominant lower trees: *Acacia melanoxylon* (characteristically supporting the mistletoe, *Amyema quandang*), with fewer *Melaleuca ericifolia* and *Pomaderris aspera*.

Tall Shrubs: *Acacia verticillata*, *Leptospermum scoparium*, *Ozothamnus ferrugineus* and the characteristic species, *Prostanthera lasianthos*.

Lower Shrubs: *Goodenia ovata*.

Vines: The characteristic species *Calystegia marginata* is present in small numbers.

Ferns: *Pteridium esculentum* is the only fern recorded (although *Cyathea australis* and other species no doubt appear at times).

Ground flora: Greatly affected by weeds and herbicide use. Survivors are *Acaena novae-zelandiae*, *Carex appressa*, *Epilobium hirtigerum*, *Juncus* species, *Lomandra longifolia*, *Persicaria hydropiper* and *Poa ensiformis*.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Alisma plantago-aquatica</i>
E	<i>Acacia stricta</i>	V	<i>Alternanthera denticulata</i>
V	<i>Acacia verticillata</i>	C	<i>Amyema pendula</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Amyema quandang</i>
	<i>Acrotriche serrulata</i>		<i>Arthropodium strictum</i>
V	<i>Adiantum aethiopicum</i>	C	<i>Austrofestuca hookeriana</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Juncus pallidus</i>
C	Baumea acuta	E	<i>Juncus pauciflorus</i>
C	Baumea ?rubiginosa		<i>Juncus sarophorus</i>
C	Baumea tetragona		<i>Lachnagrostis filiformis</i>
	<i>Billardiera mutabilis</i>		<i>Lepidosperma elatius</i>
C	Blechnum minus		<i>Leptospermum continentale</i>
V	Bolboschoenus medianus (perhaps planted)	E	<i>Leptospermum scoparium</i>
	<i>Burchardia umbellata</i>	V	<i>Lindsaea linearis</i>
	<i>Bursaria spinosa</i>	E	<i>Linum marginale</i>
E	Calystegia marginata	E	<i>Lobelia anceps</i>
	<i>Carex appressa</i>		<i>Lomandra filiformis</i>
E	Carex gaudichaudiana		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Cassinia aculeata</i>		<i>Lomandra longifolia</i>
	<i>Cassinia arcuata</i>	V	<i>Lythrum hyssopifolia</i>
E	<i>Centella cordifolia</i>	E	<i>Melaleuca ericifolia</i>
V	<i>Coprosma quadrifida</i>		<i>Microlaena stipoides</i>
E	<i>Cyathea australis</i>		<i>Microtis parviflora</i>
	<i>Deyeuxia quadriseta</i>	V	<i>Opercularia ovata</i>
	<i>Dianella admixta</i>	V	<i>Opercularia varia</i>
	<i>Dichelachne rara</i>		<i>Oxalis exilis/perennans</i>
	<i>Dichondra repens</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	C	Ozothamnus rosmarinifolius
E	<i>Drosera peltata</i> subsp. <i>peltata</i>		<i>Pandorea pandorana</i>
V	<i>Eleocharis acuta</i>		<i>Persicaria decipiens</i>
V	<i>Epacris impressa</i>	E	<i>Persicaria hydropiper</i>
	<i>Epilobium hirtigerum</i>	E	<i>Persicaria lapathifolia</i>
	<i>Eragrostis brownii</i>	E	<i>Phragmites australis</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Pimelea humilis</i>
	<i>Eucalyptus goniocalyx</i>	V	<i>Platylobium formosum</i>
V	<i>Eucalyptus obliqua</i>		<i>Poa ensiformis</i>
V	<i>Eucalyptus ovata</i>		<i>Poa morrisii</i>
E	<i>Eucalyptus radiata</i>	E	<i>Poa tenera</i>
V	<i>Exocarpos cupressiformis</i>	E	Polystichum proliferum
	<i>Gahnia radula</i>	E	<i>Pomaderris aspera</i>
E	<i>Gahnia sieberiana</i>	V	Potamogeton crispus
V	<i>Glycine clandestina</i>	E	<i>Prostanthera lasianthos</i>
	<i>Gonocarpus tetragynus</i>		<i>Pteridium esculentum</i>
C	Goodenia elongata	V	<i>Pultenaea gunnii</i>
	<i>Goodenia lanata</i>		<i>Rytidosperma laeve</i>
	<i>Goodenia ovata</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
C	Goodia lotifolia		<i>Rytidosperma pallidum</i>
E	<i>Gynatrix pulchella</i>		<i>Rytidosperma penicillatum</i>
V	<i>Hemarthria uncinata</i>	E	<i>Rytidosperma semiannulare</i>
C	Histiopteris incisa		<i>Rytidosperma setaceum</i>
V	<i>Hydrocotyle hirta</i>		<i>Rytidosperma tenuius</i>
E	<i>Hypericum gramineum</i>		<i>Senecio glomeratus</i>
C	Hypolepis ?rugosula		<i>Senecio hispidulus</i>
E	<i>Isolepis cernua</i> var. <i>cernua</i>	E	<i>Senecio minimus</i>
E	<i>Isolepis cernua</i> var. <i>platycarpa</i>	C	Sigesbeckia orientalis
V	<i>Isolepis inundata</i>		<i>Tetrarrhena juncea</i>
E	<i>Isolepis marginata</i>	V	<i>Thelymitra peniculata</i>
	<i>Juncus amabilis</i>		<i>Themeda triandra</i>
C	Juncus australis	E	<i>Triglochin striata</i> (flat leaf variant)
	<i>Juncus bufonius</i>	E	<i>Typha orientalis</i>
	<i>Juncus gregiflorus</i>	E	<i>Viola hederacea</i>
C	<i>Juncus holoschoenus</i>		

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cyperus eragrostis</i>	<i>Paspalum distichum</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Phalaris aquatica</i>
<i>Aira elegantissima</i>	<i>Echinochloa crus-galli</i>	<i>Plantago coronopus</i>
<i>Aira caryophyllaea/elegantissima</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Erica lusitanica</i>	<i>Plantago major</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Prunus cerasifera</i>
<i>Asparagus scandens</i>	<i>Hedera helix</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Holcus lanatus</i>	<i>Rosa rubiginosa</i>
<i>Atriplex prostrata</i>	<i>Hypericum androsæmum</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Hypericum tetrapterum</i>	<i>Rumex crispus</i>
<i>Briza minor</i>	<i>Hypochoeris radicata</i>	<i>Salix fragilis</i>
<i>Callitriche stagnalis</i>	<i>Ilex aquifolium</i>	<i>Salix × reichardtii</i>
<i>Conyza sumatrensis</i>	<i>Isolepis levynsiana</i>	<i>Solanum nigrum</i>
<i>Coprosma repens</i>	<i>Juncus articulatus</i>	<i>Sonchus asper</i> s.l.
<i>Coprosma robusta</i>	<i>Leontodon taraxacoides</i>	<i>Sonchus oleraceus</i>
<i>Cortaderia selloana</i>	<i>Lonicera japonica</i>	<i>Stellaria media</i>
<i>Cotoneaster simonsii</i>	<i>Lotus subbiflorus</i>	<i>Torilis arvensis</i>
<i>Cotula coronopifolia</i>	<i>Lotus uliginosus</i>	<i>Tradescantia fluminensis</i>
<i>Crataegus monogyna</i>	<i>Myosotis arvensis</i>	<i>Viburnum tinus</i>
<i>Crocasmia × crocosmiiflora</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Cynodon dactylon</i>	<i>Pinus radiata</i>	
<i>Danthonia procumbens</i>	<i>Pittosporum undulatum</i>	

Notes concerning some of the locally threatened plant species

- Austrofestuca hookeriana* (Hooker Fescue). Dozens scattered around the site's southwestern corner.
- Baumea ?rubiginosa* (Soft Twig-rush). One patch in seasonal wetland.
- Baumea tetragona* (Square Twig-rush). Small amounts in Swamp Scrub.
- Blechnum minus* (Soft Water-fern). A viable population in Swamp Scrub.
- Bolboschoenus medianus* (Marsh Club-rush). Beside the southern lake, perhaps planted.
- Calystegia marginata* (Forest Bindweed). Small numbers beside Dandenong Ck.
- Carex ?gaudichaudiana* (Fen Sedge). In Swamp Scrub, 150 m south of the main lake.
- Gahnia sieberiana* (Red-fruit Saw-sedge). About ten scattered plants.
- Goodenia elongata* (Lanky Goodenia). Small amounts in Swamp Scrub.
- Goodia lotifolia* (Golden-tip). Several grow in the dumped soil marked on the aerial photograph on p. 114.
- Gynatrix pulchella* (Hemp Bush). Several on the large mound of clay fill.
- Histiopteris incisa* (Bat's Wing Fern). Very scarce, perhaps just a single individual.
- Hypolepis ?rugosula* (Ruddy Ground-fern). One patch present in the mid- to late 1990s, but not visible in 2002-3.
- Isolepis platycarpa* (a Club-rush). Abundant when conditions are suitable.
- Juncus australis* (Austral Rush). In wetland, numbers not recorded.
- Juncus holoschoenus* (Joint-leaf Rush). In wetland, numbers not recorded.
- Linum marginale* (Native Flax). Moderate numbers appear seasonally in a small area beside a path.
- Ozothamnus rosmarinifolius* (Rosemary Everlasting). One plant in Swampy Woodland in the SW of the site, in 2002.
- Persicaria lapathifolia* (Pale Knotweed). Moderate numbers where Dandenong Ck enters the lake, possibly not present locally prior to European settlement.
- Polystichum proliferum* (Mother Shield-fern). Small numbers scattered beneath Swamp Gums.
- Potamogeton crispus* (Curly Pondweed). Viable population in the Dandenong Ck channel. This species is not well recorded because of the small number of botanists who investigate flora in streams in the region.
- Solanum ?aviculare* (Kangaroo Apple). Recorded by the author in 1994 without any details.
- Triglochin striatum* (Streaked Arrow-grass). Substantial numbers.

Fauna of special significance**Vulnerable in Victoria**

- The three species below are listed under the *Flora and Fauna Guarantee Act 1988* as well as being listed as Vulnerable:
- Swamp Skink. A viable population was found c. 1999 (e.g. Clemman 2000); also another at nearby Bungalook Conservation Reserves.
- Great Egret. A 1999 record from the Atlas of Victorian Wildlife.
- Powerful Owl. Bound to visit occasionally (but not actually observed); known to roost in adjoining Site 20.
- Hardhead. Recorded by the U3A Knox Birdwatching Group on 20th October 2000 and 29th October 1999.

Rare or Threatened in suburban Melbourne

Platypus. Trapped in Dandenong Ck at Liverpool Rd in 2001, with indications of visitation to the retarding basin (Williams 2002).

Buff-banded Rail. Recorded by the U3A Knox Birdwatching Group on 2nd March 2001.

Black-fronted Dotterel

Dusky Woodswallow

Scarlet Robin

Fauna habitat features

- The site is part of a major stepping-stone on the Dandenong Creek habitat corridor;
- The site is well connected to the large area of contiguous native vegetation in the Dandenong Ranges;
- The creek channel and lakes are likely to support aquatic fauna from invertebrates and eels to Platypus;
- The wetlands are breeding grounds for frogs and they support reptiles and invertebrates;
- When considered in conjunction with the abutting Site 23, there is a substantial sized area of bushland with diverse composition, from aquatic habitat and open space to tall, moist forest and low, grassy woodland, and much of it in good condition;
- There is plenty of good cover for wrens and ground-dwelling fauna such as reptiles, including logs and dense undergrowth;
- There are substantial numbers of large, old trees with hollows;
- Fauna on the site always have access to water, even during drought.

Significance ratings

This site is registered as Site 4801 on the Department of Sustainability & Environment's 'BioSites' database, where it is rated as 'Regional' significance. However, the rating was not based on a thorough assessment of the site's attributes against current criteria.

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Together with Sugarloaf Hill, the site is a major 'stepping stone' on the Dandenong Creek habitat corridor. It follows from criterion 1.2.6 that this attribute of the site is of **Regional** significance.

Richness and Diversity

The presence of seven EVCs on the site and the abutting Sugarloaf Hill stands out in the region as a particularly diverse assemblage of EVCs in a relatively small area, corresponding to steep geomorphological gradients. The standard criteria take this to confer **Regional** significance on the site.

The totals of 113 indigenous plant species in the site and 170 including Sugarloaf Hill are high for Knox, but this type of attribute is not formally recognised in the standard criteria. Despite the absence of a fauna survey, the abundance of bird life also stands out in Knox.

Regionally Threatened Ecological Vegetation Class

As indicated above, the site's most intact vegetation has a conservation significance rating under 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a) which is at least High, and probably reaches Very High in some places due to the presence of regionally threatened EVCs in good condition. On this basis, criterion 3.2.3 confers **State** significance to the site.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The site is known habitat for Swamp Skink and Hardhead, which are both listed by the Department of Sustainability & Environment as vulnerable species. The skink is also listed under the *Flora and Fauna Guarantee Act 1988*. The known presence of such listed species is recognised as significant under criterion 3.1.2 of Amos (2004). The level of significance depends on where this site ranks among all other habitat sites for the species in Victoria or the Gippsland Plain Bioregion. The site provides a small but valuable area of habitat for Hardhead, which makes the site **Regionally** significant. The report by N. Clemman cited below indicates how hard it is to determine the presence and abundance of Swamp Skinks, but he concludes that the population at the retarding basin is small (but evidently viable) and that the habitat is limited. This gives the site as a whole **Regional** significance.

The Powerful Owl has the same conservation status in Victoria as the Swamp Skink, and it is known to roost in the adjoining Site 20. Criterion 3.1.3 confers **Regional** significance upon sites like Liverpool Road Retarding Basin that are likely to support a vulnerable species and are adjacent to known habitat for the species.

Threats

- Invasion by environmental weeds, the main threats being Square-stem St. John's Wort (or St. Peter's Wort) (*Hypericum tetrapterum*), Blackberry (*Rubus discolor*), willows (*Salix* species), Montpellier Broom (*Genista monspessulana*), Cleavers (*Galium aparine*) and exotic grasses;
- Damage such as trampling from recreational activities;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Continual harassment of fauna by dogs off leads (often unwittingly), particularly of waterbirds that would otherwise breed around the lakes;
- Predation of fauna (particularly birds) by foxes.

Management issues

- Heightened weed control is important to the retention of the site's high conservation significance;
- A bushland management plan would be desirable to guide better management of the site or better ranking of priorities;
- Dogs off leads are a substantial problem for wildlife and human visitors. A sign could provide an alert to the threat to waterbirds. An approved 'off lead' area may contain the practice to somewhere where the impact is acceptable. Improved signs and some policing will be necessary to ameliorate the problem.

Administration matters

- This site is very worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (including that of the lakes) and its importance to a waterway;
- It is partly covered at present by overlay VPO1 on the basis that Water Ecoscience (1998) included most of the native vegetation within their Site 7;
- Some liaison may be required between Council and Melbourne Water to deal with the problem of dogs off leads.

Information sources used in this assessment

- Vegetation field data and mapping by G.S. Lorimer in 1997, as reported by Reid J.C., Moss H. and Lorimer G.S. (1997), '*Vegetation Survey of Linear Reserves. A Management Strategy for Riparian and Flood Plain Vegetation*', for Knox City Council. This includes a list of indigenous and introduced plant species within each of nine separate areas of the site;
- Additional observations of plant species recorded by G.S. Lorimer in 1991, 1993, 1995, 2001 and 2002 during brief visits to the site;
- Incidental observations of birds, reptiles and frogs while the above data was being gathered;
- '*Distribution of Platypus along Upper Dandenong and Dobsons Creeks. Results of Live Trapping Surveys, October 2001 - February 2002*', a report by G.A. Williams of the Australian Platypus Conservancy to Knox City Council, April 2002;
- '*Distribution, Habitat Utilisation and Management of the Threatened Swamp Skink (Egernia coventryi) at Liverpool Road Retarding Basin, Boronia*', a report by N. Clemman of the Arthur Rylah Institute for Environmental Research for Melbourne Water, April 2000;
- Bird lists from U3A Knox Birdwatching Group, who visit the site from time to time;
- Records from the Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.