

## 10.1 Exhibition of Draft Warringah Biodiversity Conservation Study

---

### EXECUTIVE SUMMARY

---

#### Purpose

To seek Council's approval to publicly exhibit the draft *Warringah Biodiversity Conservation Study*.

#### Summary

The draft *Warringah Biodiversity Conservation Study* (WBCS) enables Council to rationalise the management of remnant vegetation within Warringah through the use of a priority matrix to assess conservation significance and provide a thorough and replicable assessment of the known and potential distribution of a range of key threats to biodiversity within the LGA.

The WBCS project pulled together extensive data and best practice policy, to prioritise the conservation and management of biodiversity. The WBCS divided Warringah's 3227 ha of remnant vegetation into 790 discrete patches (called assessment units), and describes the conservation significance and relevant operational threats for each.

Prioritisation of vegetation utilises a decision making matrix whereby each patch of vegetation/bushland reserve is attributed a score for a range of different criteria; and then a total score for all criteria enables "ranking" based on conservation significance. The Warringah matrix in the WBCS follows a model developed by CSIRO (known as an Analytical Hierarchy Process) for conservation planning.

Moving forward, the WBCS will facilitate and assist in directing resources and expenditure toward areas of significant habitat and developing management programs that target those threats most relevant to biodiversity conservation in Warringah. The WBCS was presented to the Environment Sustainability Strategic Reference Group (ES-SRG) at the 7 November 2011 meeting, and one supportive response was received on 20 December 2011.

It is proposed to publicly exhibit the draft WBCS for a period of 4 weeks and garner feedback from the community prior to returning to Council for consideration. Consultation will be undertaken in accordance with Councils' Community Engagement Framework.

#### Financial Impact

The WBCS will provide an improved system for allocating funding and resources to priority bushland areas.

#### Policy Impact

The WBCS is consistent with policies including the Warringah Local Habitat Strategy 2007, ENV-PL 005 Bushland Policy 2008; and draft Environmental Sustainability Strategy 2011.

---

### RECOMMENDATION OF DEPUTY GENERAL MANAGER COMMUNITY AND ENVIRONMENTAL SERVICES

That Council exhibit the draft Warringah Biodiversity Conservation Study for a period of 4 weeks, and note that a further report will be brought to Council following the exhibition period.

---

---

## REPORT

---

### Background

The Warringah LGA contains 3227 ha of mapped native vegetation (outside of National Parks), made up of 37 vegetation communities (Smith and Smith 2005 and ELA 2010). Of this, approximately 1100 ha comes under the care, control and management of Council, either by direct ownership or divested management responsibility. The remainder of remnant vegetation totalling 2127 ha is privately owned, or managed and owned by the Crown and other government agencies (excluding DECCW).

Council undertakes a range of strategic and operational bushland management activities including: strategic land-use planning, the development of strategies and Plans of Management, environmental education activities, bush regeneration and noxious weed control, the provision of recreational infrastructure, threatened species management, strategic fire management and bush fire hazard management.

The WBCS seeks to rationalise and prioritise expenditure on biodiversity in Warringah in two ways; by prioritising extant vegetation based on the conservation significance of each area and by reviewing the severity of ecological threats and their relevance to biodiversity within the Warringah context.

The prioritisation and targeted management of on - and off-reserve biodiversity has been identified as a key action in Australia's Biodiversity Conservation Strategy (Consultation Draft) 2010, and in the Discussion Paper prepared for the Review of the Biodiversity Strategy for NSW 2010 (prepared by Commonwealth and State Governments respectively).

Council has undertaken many Warringah-wide biodiversity studies and has identified and mapped key areas of biodiversity habitat including (but not limited to), threatened species habitat, vegetation communities and core bushland and wildlife corridors. These documents were used in the development of the draft WBCS.

The prioritisation of Warringah's vegetation and identification of the distribution of key threats will provide a context for Council's strategic inventories and operational plans, and will assist in prioritising management of native vegetation on private and public land into Warringah's future.

### Aims and objectives

The primary aim of the WBCS is to prioritise restoration and conservation of Warringah's biodiversity.

The objectives of the project were to:

- facilitate strategic biodiversity management based on informed judgement
- identify "priority" sites for management and restoration
- provide a guide for the allocation of capital – financial and staff resources
- provide a consistent method to compare the conservation value of remnant vegetation throughout the Warringah LGA.

The WBCS will inform strategic and operational management activities, including the preparation of policy documents and planning instruments, restoration activities, pest species management and strategic fire management.



## Development of the WBCS

The criteria used to rank vegetation and map key threats to biodiversity were developed by internal workshops with key biodiversity staff and a thorough review of current literature. The rationale for the criterion used in the assessment is presented in a discussion paper which was sent to leading environmental managers for peer review, including CSIRO and Eco Logical Australia Pty Ltd. Positive preliminary advice was received from CSIRO, and included reference to the quality of the metrics chosen and commendation on using such a prioritisation system to manage investment in biodiversity. Unfortunately, the review was not able to be formalised due to CSIRO resource constraints. A full review, including suggested amendments was provided by Eco Logical Australia Pty Ltd.

At the 7 November 2011 meeting of the Environmental Sustainability Strategic Reference Group (ES-SRG), Council Officers presented the draft WBCS to the Group, and requested comments on the draft by 5 December 2011; however this period was extended until 20 December 2011. One comment was received on 20 December 2011.

The submission received was generally positive and reinforced and addressed opportunities for future application of the WBCS, including the development of online databases and tools, and provided positive feedback on readability of the report. The chief concern raised in the submission related to the ease of access, and interpretation of the information provided in the tables and maps. Based on this feedback, a number of amendments have been made to the layout and format of the reports; including the provision of tabular data as excel files with a “filter” function and amendments to the orientation of the report pages.

## Content of the WBCS

The WBCS is made of 6 sections, including the introduction, methods, the conservation significance assessment and the threat significance assessment.

The WBCS is set out as follows:

- **Section 1** contains an introduction discussing the relevance and context of the Study;
- **Sections 2 and 3** describe the methods used to develop the Study, including the types of fieldwork undertaken, and the results of the fieldwork undertaken, including the vegetation validation and the remote camera survey;
- **Sections 4 and 5** contain detailed discussion of the conservation significance assessment, including references in the mapping to the overall conservation significance of remnant vegetation, and review of the distribution of each individual criterion. Reference is made in these sections to the map booklets and tables which accompany the report;
- **Section 6** contains the threat significance assessment, including an outline of the known and potential distribution of key threats to biodiversity in the LGA.

## Criteria used for the Conservation Significance Assessment

The method used to prioritise vegetation takes the form of a decision making matrix whereby a patch of vegetation/bushland reserve is attributed a score for a range of different criteria; and then a total score for all criteria is calculated. In this way, reserves can be “ranked” based on conservation significance. The matrix follows a model developed by CSIRO (known as an Analytical Hierarchy Process) for conservation planning. The Warringah matrix in the WBCS uses a total of 8 criteria, including resilience, connectivity, threatened biota, creeklines, perimeter to area ratio, size, vegetation rarity, and distribution of exotics. A summary of each of these is detailed below:

### *Resilience*

Resilience is a measure of the ability for an ecosystem to recover after disturbance, and is a good indicator of overall ecosystem health. In the matrix, a given patch of vegetation is attributed one of 5 scores, representing a ranking of very high, high, medium, low or very low. Vegetation ranked as very high receives a higher score than vegetation ranked as very low.

### *Connectivity*

This is a measure of the relationship between one patch of vegetation and another at a landscape scale. Connectivity is important to allow the movement of animals, plant propagules, and helps ensure the genetic integrity of the biodiversity of a patch of vegetation. In the matrix, a given patch of vegetation is given 1 of 5 scores for connectivity – the values assigned are based on a draft update of the 2005 Natural Area Survey – Vegetation History and Wildlife Corridors report by Smith and Smith. The categories used are Regional Core Habitat, Local Core Habitat, Regional Wildlife Corridor, Local Wildlife Corridor and no connectivity.

### *Threatened Biota*

Some plants, animals, populations of plants and animals and ecosystems have been identified by the State and Federal Governments as being threatened with extinction. This criterion recognises the importance of patches of vegetation as refuges and habitat for these species, populations and ecological communities. Within the matrix, a given patch of vegetation can receive one of 4 scores, based on one of the following 4 categories - Known Core Habitat, Known Marginal Habitat, Potential habitat – Native Vegetation or Potential Habitat – Weeds.

### *Creeklines*

The presence of watercourses within a patch of vegetation increases the diversity of habitat types within that patch. Further, the highly urbanised nature of Warringah means that the majority of creeklines are generally in poor condition. Patches of vegetation containing creeklines in a more “natural” condition should receive higher values than patches of vegetation containing creeklines in poor condition. In the matrix, a given patch of vegetation is attributed 1 of 4 scores for creeklines, based on the catchment groupings defined in the Warringah Creek Management Study 2004 – Category A, B and C or no creek.

### *Perimeter to Area Ratio*

The shape of a patch of vegetation has implications for the health and integrity of that patch of vegetation. Generally, long skinny reserves are more prone to degradation than reserves that are circular or square. This criterion is calculated by comparing the total length of the edge of the reserve with the total area of the reserve. Reserves with a low edge to area ratio are attributed a higher score than reserves with a high edge to area ratio. The matrix uses a total of 4 categories to rank this criterion.

### *Size*

Many studies have shown that with an increase in the size of a reserve comes a corresponding increase in species abundance and diversity, resilience and overall health. Generally, the size of a reserve dictates its long term viability. The matrix uses a total of 7 size categories – 0-2ha, 2-4ha, 4-10ha, 10-30ha, 30-60ha, 60-170ha, and >170ha. Larger reserves are attributed higher scores for this criterion than smaller reserves.

### *Vegetation Rarity*

Vegetation rarity is a measure of the distribution of vegetation types in Warringah. The matrix uses the criteria from the Warringah Natural Area Survey – Vegetation Communities and Plant Species Report – areas of vegetation are attributed to one the following categories - >90% cleared within Warringah or threatened in Australia, Threatened in NSW, Rare in Australia, Threatened in Warringah, or moderately common. Rarer vegetation communities are given higher scores.

### *Distribution of Exotics*

This criterion is a measure of degradation, based on the proportion of the patch of vegetation containing weeds and other exotic plants. This criterion detracts from the site score because the presence of exotic vegetation impacts negatively on conservation significance. Any given patch of vegetation is attributed one of 5 scores.

## Criteria and definitions used for the Threat Significance Assessment

The threat significance assessment involved mapping the known and potential distribution of 9 key threats within the LGA, including land clearing, weed invasion – altered hydrological regimes and nutrient enrichment, weed invasion – edge effects, carnivorous feral predators (foxes), carnivorous domestic predators (cats and dogs), feral rabbits, uncontrolled recreational access, altered fire regimes and encroachments. The assessments for these were primarily desktop assessments based on existing data. A summary of the threats addressed in the report, and the relevant method of assessment is detailed below. A summary of the definitions and criteria used to map the distribution of the key threats is provided in Table 1 (below). Additional details of the methods used in the development of the study can be found in the Warringah Biodiversity Conservation Study Discussion Paper.

**Table 1 - Criteria and definition for the threat assessment**

	Threat Likelihood	Definition	Datasets
Land Clearing	Known	Approved/unapproved clearing based on aerial photograph interpretation and review of vegetation polygon boundaries.	<ul style="list-style-type: none"> <li>- Most recent aerial photo (2009)</li> <li>- Updated Native Vegetation 2011</li> </ul>
	Potential	Unreserved Public/private land -Land classified as operational land under the <i>Local Government Act 1993</i>	<ul style="list-style-type: none"> <li>- Warringah property layer</li> <li>- Land register layers</li> <li>- Crown land layers</li> <li>- LEP 2011 zones.</li> </ul>
Encroachment	Known	Known encroachment along residential/bushland interface (habitat destruction/degradation) based on aerial photo interpretation and analysis using the Warringah Plan of Management layer.	<ul style="list-style-type: none"> <li>- Most recent aerial photo (2009)</li> <li>- Updated Native Vegetation 2011</li> <li>- Warringah Plan of Management layer</li> </ul>
	Potential	Public reserves containing native vegetation adjacent to land zoned as rural, residential, business or industrial under the LEP 2011	<ul style="list-style-type: none"> <li>- LEP Land Use Zones</li> </ul>
Weed Invasion – altered hydrological regimes and nutrient enrichment	Known	Areas of degraded vegetation intersecting with a stormwater pit, pipe or GPT	<ul style="list-style-type: none"> <li>- Updated Native Vegetation 2011</li> <li>- Pits</li> <li>- Pipes</li> <li>- GPTs</li> </ul>
	Potential	Areas of intact mapped vegetation containing a stormwater pit, pipe or GPT	<ul style="list-style-type: none"> <li>- Pits</li> <li>- Pipes</li> <li>- GPTs</li> </ul>
Weed Invasion – edge effects	Known	Areas where mapped degraded vegetation was adjacent to a land use considered to be consistent with particular land uses – these were roads and land	<ul style="list-style-type: none"> <li>- Updated Native Vegetation 2011</li> <li>- Roads</li> <li>- LEP Land Use Zones</li> </ul>

	<b>Threat Likelihood</b>	<b>Definition</b>	<b>Datasets</b>
		zoned for rural, residential, business or industrial purposes.	
	Potential	Areas where mapped vegetation is adjacent to land uses considered consistent with edge effects, including roads and land zoned for rural, residential, business or industrial purposes.	<ul style="list-style-type: none"> <li>- Updated Native Vegetation 2011</li> <li>- Roads</li> <li>- LEP Land Use Zones</li> </ul>
Fauna Predation - Foxes	Known	Based on known occurrences of foxes within vegetated areas	<ul style="list-style-type: none"> <li>- Data layer based on information collected via infra-red camera surveys, ecological assessments and via fox management programs.</li> </ul>
	Potential	All vegetated areas in the study	
Fauna predation – cats and dogs	Known	Based on the distribution of known occurrences of uncontrolled cats and dogs within vegetated areas	<ul style="list-style-type: none"> <li>- Established datasets from assessments and infra-red Camera survey.</li> </ul>
	Potential	Areas of vegetation located within 500m of a residential boundary or those containing fire trails or other formal or informal trails.	<ul style="list-style-type: none"> <li>- Local Environment Plan Zones 2011</li> <li>- Warringah Draft Mountain Bike Trails</li> <li>- Combined Fire Trails</li> </ul>
Feral rabbits	Known	Based on the distribution of known occurrences of rabbits when they are in or adjacent to vegetated areas.	<ul style="list-style-type: none"> <li>- Pest Species Data – 2008-2011</li> <li>- Warringah Feral Animal and results from infra-red camera surveys</li> </ul>
	Potential	Based on the distribution of vegetated areas adjacent to land use types that present habitat for rabbits including open grassed areas.	<ul style="list-style-type: none"> <li>- Warringah Council Land Register</li> <li>- Warringah -Plans of Management</li> </ul>
Uncontrolled Recreational Access	Known	Areas where known tracks and fire trails intersect with native vegetation	<ul style="list-style-type: none"> <li>- Draft Mountain Bike Trails</li> <li>- Combined Fire Trails</li> <li>- Road Centre lines</li> </ul>
	Potential	Vegetated areas located within 100m of a known recreational access threat. i.e. 100m from a track or trail	<ul style="list-style-type: none"> <li>- Draft Mountain Bike Trails</li> <li>- Combined Fire Trails</li> <li>- Road Centre lines</li> </ul>

	<b>Threat Likelihood</b>	<b>Definition</b>	<b>Datasets</b>
Altered Fire Regimes – too frequent	Potential	Based on categories in the Warringah-Pittwater Bushfire Risk Management Plan – areas adjacent to assets ranked with an extreme or very high risk rating.	- Bushfire Management Zone - Bushfire Management Asset
Altered Fire Regimes -too infrequent	Potential	Based on categories in the Warringah-Pittwater Bushfire Risk Management Plan – areas adjacent to assets ranked with high, medium or low risk rating.	- Bushfire Management Zone - Bushfire Management Asset

### Findings of the WBCS

The results of the study are presented in the report via tables and map booklets providing the statistical data on the spatial extent of conservation significance and the operation of key threats. Some of the key findings of the report include;

- land clearance is considered the greatest threat to Warringah’s biodiversity due to the extensive area potentially impacted and the irreversibility of its direct and indirect impacts;
- uncontrolled recreational access is widespread in Warringah and primarily impacts areas with very high to high conservation significance because they are large and offer attractive recreational experiences to users;
- both land clearance and uncontrolled recreational access promote the distribution of other threats to biodiversity such as weed invasion, fauna predation and habitat fragmentation into the core of significant bushland areas;
- The known threat of predation by the European Red Fox is greatest in the areas of highest conservation significance;
- A larger proportion of Warringah’s vegetation is known to be impacted by weed invasion caused by altered hydrological regimes and nutrient enrichment than the area potentially impacted;
- Since 2005 Warringah has lost a total of 58.7ha of vegetation, but gained via revegetation and regrowth a total of 9.85ha. This represents a total net loss of 48.85ha.
- 59.2% of Warringah’s total vegetation fits into the highest category for conservation significance.

Through the prioritisation of biodiversity and key threats, the study enables Council to allocate resources and expenditure based on thorough data - ensuring the efficiency and effectiveness of strategic and operational management works.

### Exhibition and Community Consultation

It is recommended that Council publicly exhibit the draft WBCS for a period of 4 weeks. Consultation will be undertaken in accordance with Council’s Community Engagement Framework. Two key types of consultation are intended; exhibition of the draft WBCS at Council libraries, Civic Centre and at Council’s website, and community briefing sessions held at Council.

### *Exhibition of Documentation*

The draft WBCS will be made available at Council's website, in Council's libraries and at the Civic Centre. Submissions will be invited in writing for the duration of the exhibition period.

### *Community Briefing Sessions and advertisements*

A total of 2 community briefing sessions are planned during the exhibition period. Advertisements for the consultation will be placed in the Manly Daily, on Council's website, and an article placed in the autumn edition of Eco News.

### *Submissions and comments*

All submissions and comments received during the public exhibition period will be considered by Council staff and the WBCS amended as appropriate. A report including a summary of all submissions and comments received during the public exhibition period, and any amendments made to the WBCS, will be presented to Council. It is likely the Council report will include a recommendation that the WBCS be used as a principal guiding document for strategic and operational bushland management in Warringah.

### **Timing**

The exhibition period (including the community briefing sessions) is proposed to be held from February to March 2012.

### **Financial Impact**

The WBCS will provide an improved system for allocating funding and resources to priority bushland areas.

### **Policy Impact**

The WBCS is consistent with policies including the Warringah Local Habitat Strategy 2007, ENV-PL 005 Bushland Policy 2008; and draft Environment Sustainability Strategy 2011.

**Group Manager Natural Environment**

***Attachment CD***– Draft Warringah Biodiversity Conservation Study

