Application for a

Department of
Environment and Conservation (NSW)

Section 91 Licence

to harm or pick a threatened species, population or ecological community*, or damage habitat under the *Threatened Species Conservation Act 1995.*

1. Applicant's Name: *(if additional persons require authorisation by this licence, please attach details of names and addresses)*	[redacted]	
2. Organisation name and position of Applicant: *(if applicable)*	New South Wales Golf Club Co. Ltd Course Superintendent	
3. Postal address:	PO Box 28 Matraville 2036 NSW	4. Telephone: B.H. [redacted] A.H. [redacted]
5. Location of the action *(including grid reference and local government area and delineated on a map).*	NSW Golf Club La Perouse See locality and site maps (Attachment 1a and b and attached Environment Plan)	
6. Full description of the action and its purpose *(eg. scientific research, environmental assessment, regeneration activities, development etc.).*	1. Ecological restoration activities including bush regeneration and ecological burns to improve the health of the Eastern Suburbs Banksia Scrub (ESBS) remnants which include: • ongoing bush regeneration work in remnants 11, 12, 13a, 13b, 14 and 15 • new bush regeneration work in remnants 3, 6, 7 • ongoing maintenance works at 2 previous burn sites in remnant 15 (ecological burns carried out in 2006 and 2007)	

* A threatened species, population or ecological community means a species, population or ecological community identified in Schedule 1, 1A or Schedule 2 of the *Threatened Species Conservation Act 1995.*

11. Species impact: *(please tick appropriate box)*	
a) For action proposed on land declared as critical habtat; or	☐ An SIS is attached
b) For action proposed on land not declared as critical habitat.	☑ Items 12 to 25 have been addressed

N.B: Provision of a species impact statement is a statutory requirement of a licence application, if the action is proposed on critical habitat.
The provision of information addressing items 12 to 17 is a statutory requirement of a licence application if the action proposed is not on land that is critical habitat. Information addressing any of the questions below must be attached to the application.

12. Describe the type and condition of habitats in and adjacent to the land to be affected by the action.	The site is a golf course. The bushland on the golf course is confined to a number of remnants of variable size and condition The type and condition of the bushland on the golf course is covered in more detail in sections 2.5 and 3.2 of the attached Environment Plan. Section 5.2 of the Environment Plan describes the condition of each vegetation remnant and provides recommendations for management actions.
13. Provide details of any known records of a threatened species in the same or similar known habitats in the locality *(include reference sources).*	Both ESBS and SFW are present in the locality. There are 6 patches of ESBS in Botany Bay NP, La Perouse and Little Bay as well as other patches at Jennifer St, Prince Henry Hospital and St Michael's Golf Course. For more detail see Table 1 in the ESBS Recovery Plan. SFW is present to the north of Lake Perrie. There are records for other threatened species in the locality including the Green and Golden Bell Frog, Eastern Bent-wing Bat,

	Acacia terminalis subsp terminalis, Wallum Froglet and Powerful Owl. However it is unlikely that ESBS provides habitat for these threatened species.
14. Provide details of any known or potential habitat for a threatened species on the land to be affected by the action *(include reference sources).*	The vegetation remnants at NSW Golf Course represent habitat for ESBS as shown on the map in Attachment 1a and b.
15. Provide details of the amount of such habitat to be affected by the action proposed in relation to the known distribution of the species and its habitat in the locality .	2.663 Ha of ESBS will be affected out of a total distribution of 149 Ha and 36.48 Ha in the locality.
16. Provide an assessment of the likely nature and intensity of the effect of the action on the lifecycle and habitat of the species.	1. Bush regeneration work will have a beneficial effect on the ESBS endangered ecological community. Invasion by *Chrysanthemoides monilifera*, Bitou Bush is one of the key threatening processes on this EEC and this is being removed together with many other weeds. Conducting ecological burns should also have a beneficial effect by stimulating germination of seed in the soil seed bank as has occurred as result of other recent burns at the NSW Golf Course. 2. Line of sight trimming will not reduce the extent of ESBS at NSW Golf Course but it will change the structure of the ESBS vegetation that is to be trimmed.
17. Provide details of possible measures to avoid or ameliorate the effect of the action.	Bush regeneration has been consistently carried out over the last 5 years by the National Trust and will continue to be carried out over the next 5 years using standard bush regeneration methods. These works are undertaken using fully qualified and experienced bush regenerators overseen by a bush regeneration supervisor who has successfully completed a TAFE certificate in Bush Regeneration and has at least two years experience working in this field and will be carried out in line with Appendix 6 and Sections 4 and 5.2 of the attached Environment Plan. The ecological burns will be undertaken as per sections 4.2.5 and 5.2 (particularly 5.2.5) of the attached Environment Plan. Weeds will be removed from all areas to be burnt prior to any ecological burn. Extensive bush regeneration following the burns will ensure

	that weeds are effectively controlled and the results of the burns appropriately monitored as per section 4.11 of the attached Environment Plan. All burnt areas will be roped off for protection. Line-of-sight trimming will be managed to minimise impacts on ESBS by undertaking it in a sensitive manner and avoiding any impacts on smaller native shrubs and groundcovers.

N.B: The Director-General must determine whether the action proposed is likely to significantly affect threatened species, populations or ecological communities, or their habitats. To enable this assessment the Applicant is required to address items 18 to 25. Information addressing any of the questions below must be attached to the application.

18. In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	Not applicable because no threatened species will be impacted.
19. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	Not applicable because no endangered populations will be impacted.
20. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: (i) is likely to have an adverse effect on the extent of the ecological	(i) Bush regeneration and ecological burns will have a positive effect by increasing the extent and quality of the ESBS within the remnants over the longer term. For more detail see sections 3.3,

community such that its local occurrence is likely to be placed at risk of extinction, or	4.2.5 and 5 as well as Appendix 6 of the Environmental Plan. Line of sight trimming will not affect the extent of ESBS in the remnants on the golf course
(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	(ii) Bush regeneration and ecological burns will increase the species diversity within the ESBS remnants and as a result will have a beneficial effect on the composition of these remnants. Line of sight trimming will change the structure of the vegetation and over time this may result a reduction in the number of species present.
21. In relation to the habitat of a threatened species, population or ecological community:	
(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and	(i) Bush regeneration activities and ecological burns may modify ESBS habitat in the short term due to reduction in above ground vegetation but will improve the habitat for ESBS in the longer term by removing weeds and increasing species diversity within the remnants on the golf course. Line of sight trimming will not remove vegetation but it will modify the structure of the ESBS and potentially change the species composition over time in those areas that are trimmed (see questions 16 and 20 above).
(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and	(ii) None of the proposed activities will alter the extent of ESBS habitat that currently exists at the golf course which is already fragmented (refer to Attachment 1a and b).
(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	(iii) All ESBS habitat is important given the restricted nature of this endangered ecological community and the degree of clearing that it has undergone. Bush regeneration and ecological burns may modify ESBS habitat in the short term as discussed above but in the longer term, once the vegetation has recovered from fire and disturbance associated with weed removal, the habitat for this endangered community should improve. Line of sight trimming is likely to modify the structure and in the longer possibly the composition of the habitat but this will be restricted to a small area (see question 7).
22. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).	A draft report recommending the identification of Critical Habitat for ESBS has been prepared and will be exhibited in the second half of 2008. Bush regeneration and ecological burns are unlikely to have an adverse effect on Critical Habitat once it has been declared for the reasons discussed below (question 24). Line of sight trimming will not reduce the extent of Critical Habitat once it has been

	declared but it will modify the structure of the ESBS which is trimmed and potentially the species composition of those areas.
23. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.	The bush regeneration and ecological burns actions are consistent with the following objectives and actions in the Recovery Plan for the ESBS EEC: • 9.3 Threat management and ecological restoration To restore and where practical connect and enlarge remnants of ESBS through appropriate management. Line of sight trimming is not consistent with any objectives and actions in the Recovery Plan for the ESBS EEC.
24. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	Bush regeneration and ecological burns address 3 of the Key Threatening Processes for ESBS. These are: invasion of native plant community by *Chrysanthemoides monilifera,* high frequency fire, invasion of the native plant community by exotic perennial grass eg. *Eragrostis curvula.* Bush regeneration will remove Bitou Bush and African Lovegrass together with many other exotic species. Both high fire frequency and fire exclusion reduce species diversity therefore reinstatement of an appropriate fire regime is recommended in the Environment Plan. Line of sight trimming could be considered part of the Key Threatening Process clearing of native vegetation. While no vegetation is proposed to be cleared, trimming will result in modification to the structure of the vegetation.

Important information for the Applicant

Processing times and fees

The *Threatened Species Conservation Act 1995* provides that the Director-General must make a decision on the licence application within 120 days where a species impact statement (SIS) has been received. No timeframes have been set for those applications which do not require a SIS. The Director-General will assess your application as soon as possible. You can assist this process by providing clear and concise information in your application.

Applicants may be charged a processing fee. The Director-General is required to advise prospective applicants of the maximum fee payable before the licence application is lodged. Therefore, prospective applicants should contact the DEC prior to submitting a licence application .

A $30 licence application fee must accompany a licence application.

Protected fauna and protected native plants*

* Protected fauna means fauna of a species not named in Schedule 11 of the *National Parks and Wildlife Act 1974.*
Protected native plant means a native plant of a species named in Schedule 13 of the *National Parks and Wildlife Service 1974.*

Licensing provisions for protected fauna and protected native plants are contained within the *National Parks and Wildlife Act 1974.* However, a Section 91 Licence may be extended to include protected fauna and protected native plants when these will be affected by the action.

If you are applying for a licence to cover both threatened and protected species please provide the information requested in Item 10 and a list of protected species and details of the number of individuals animals or proportion and type of plant material which are likely to be harmed or picked.

Request for additional information

The Director-General may, after receiving the application, request additional information necessary for the determination of the licence application.

Species impact statement

Where the application is not accompanied by a SIS, the Director-General may decide, following an initial assessment of your application, that the action proposed is likely to have a significant effect on threatened species, populations or ecological communities, or their habitats. In such cases, the *Threatened Species Conservation Act 1995* requires that the applicant submit a SIS. Following initial review of the application, the Director-General will advise the applicant of the need to prepare a SIS.

Director-General's requirements for a SIS

Prior to the preparation of a SIS, a request for Director-General's requirements must be forwarded to the relevant DEC Office. The SIS must be prepared in accordance with section 109 and 110 of the TSC Act and must comply with any requirements notified by the Director-General of the Department of Environment and Conservation (NSW).

Certificates

If the Director-General decides, following an assessment of your application, that the proposed action is not likely to significantly affect threatened species, populations or ecological communities, or their habitats, a Section 91 Licence is not required and the Director-General must, as soon as practicable after making the determination, issue the applicant with a certificate to that effect.

N.B: An action that is not required to be licensed under the Threatened Species Conservation Act 1995, may require licensing under the National Parks and Wildlife Act 1974, if it is likely to affect protected fauna or protected native plants.

I confirm that the information contained in this application is correct. I hereby apply for a licence under the provisions of Section 91 of the *Threatened Species Conservation Act 1995.*

Applicant's name, organisation and position	Applicant's signature	Date
[redacted] Golf Course Superintendent		20th June 2008

For more information or to lodge this form, contact the Environment Protection and Regulation Division in your nearest office:

Sydney Metro Branch	Southern Branch	Northern Branch	Western Branch
P: 02 9995 5000	P: 02 6122 3100	P: 02 6640 2500	P: 02 6841 9800
F: 02 9995 6900	F: 02 6299 3525	F: 02 6642 7743	F: 02 6882 9217
PO Box 668	PO Box 622	PO Box 498	PO Box 1020
Parramatta	Queanbeyan	Grafton	Dubbo
NSW 2124	NSW 2620	NSW 2460	NSW 2830

Department of Environment and Conservation
Head Office, PO Box A290, Sydney South NSW 1232
Phone: 2 9995 5000 (switch) Fax: 9995 5999 Email: info@environment.nsw.gov.au

Attachment 2: Schedule of works at NSW Golf Course

Remnant no.	Bush regeneration works	Ecological burn	Line of sight trimming
1 Northern section	Ongoing • Bitou Bush removal • Grass edge treatments	Nil	Trim vegetation to height of 1-2 m
3 Southern Section	Commence 2008 • Prepare for burn as per s.5.2 of the Environment Plan	August/ September 2009	Trim vegetation to height of 0.5-2 m
Northern Section	Commence 2011 • Prepare for burn as per s.5.2 of the Environment Plan	August/September 2012	Nil
6 Old Tip	Nil	July 2008	Nil
7 Southern section	Commence 2008 • prepare areas for burn as per s. 5.2 of the Environment Plan	August/September 2009	Trim regrowth following fire to a height of 1-2 m
11	Ongoing • walk through removal of Bitou Bush • control annual weeds • remove invading grasses Commence 2009 • prepare areas for burn as per s. 5.2 of the Environment Plan	August 2010	Trim vegetation to height of 0.5-2 m
12 Northern section	Commence 2008 • prepare areas for burn as per s. 5.2 of the Environment Plan	August/September 2008	Trim regrowth following fire to a height of 1-2 m
Southern section	Ongoing • Bitou Bush removal • Grass edge treatment	Nil	Trim vegetation to height of 1-2 m
13a	Ongoing	Nil	Nil
13 b Northern section	Commence 2008 - 2010 • prepare areas for burn as per s. 5.2 of the Environment Plan	August/September 2011	Nil
Middle section		August/September 2010	Nil
Southern section		August/September 2009	Nil

14	Commence 2008 • hand pull Bitou Bush prior to burn • prepare areas for burn as per s. 5.2 of the Environment Plan	August/September 2009	Nil
15	Ongoing • follow up weeding in burnt areas • monitoring of regrowth and selective removal of Acacias as required	June 2007	Nil

Environment Plan

for

THE NSW GOLF CLUB

June 2008 Revision

Prepared for the NSW Golf Club by
Total Earth Care Pty Ltd
37 Irrawong Road, North Narrabeen NSW 2101.
Tel 9913 1432 Fax 9913 1434 email consulting@totalearthcare.com.au

List of figures

List of photographs

1.0 BACKGROUND

1.1 Introduction

The NSW Golf Club (the NSWGC; the Club) has a special golf course, a course that provides a terrific playing experience in a stunning natural setting. Currently ranked in the top 50 golf courses in the world, the Club aims, at all times, to achieve the highest possible quality in their management practices. The Club has a high level of expertise within its staff, consultants and golf course architects. In 1999 the Club identified a gap in their management team, and approached Kate Low and Associates to work on an Environment Plan for the golf course.

The 2001 Environment Plan included a recommendation for the ongoing review and update of the Plan. As part of this process, the Club has engaged Total Earth Care Pty Ltd (TEC) to assist them in preparing this 2008 revision of the Environment Plan.

The plan consists of:

- Site description
- Identification of management issues
- Recommendations
- Actions/ implementation plan.

This Plan is intended to be a working document.

The NSWGC has extensive areas of an Endangered Ecological Community (EEC), known as the Eastern Suburbs Banksia Scrub of the Sydney Basin Bioregion (ESBS), throughout the bushland areas of the course. This has implications for the management of the course. This plan focuses particularly on vegetation management, and is intended to assist the Club in fulfilling its legal obligations regarding the protection of threatened Eastern Suburbs Banksia Scrub.

1.2 Purpose of this Plan

This plan is a strategic document that will assist in management decisions. In line with other management documents prepared for the NSWGC, it is a 5 year plan.

The specific recommendations regarding fire and vegetation management, that may potentially have an impact on the ESBS vegetation community, provide supporting information that can be submitted to the NSW Department of Environment and Climate Change (DECC) as part of an application under section 91 of the *Threatened Species Conservation Act* (1995).

1.3 Method

The 2001 report was based on extensive site survey, consultation and research. The site was surveyed repeatedly over an 18 month period, in all seasons and climatic conditions. A number of environmental considerations were mapped including:

- Native vegetation communities

- Fire history
- Planting
- Major management issues
- Catchments and drainage.

The 2001 Plan was developed in close consultation with the Course Superintendent, Gary Dempsey, and with ongoing contact with the Greens Committee and the General Manager of the Club, David Burton. Consultation with the NPWS, Department of Land and Water Conservation (DLaWC) and The Environment Protection Authority (EPA), as well as a literature of current golf course practices assisted in developing the best practices for the course.

This current review has been conducted again in consultation with the course superintendent, and with reference to changes in legislation, government policies and improved knowledge regarding the management of the course, the natural environment and the remnant ESBS vegetation community. The Plan also records the environmental management recommendations implemented by the Club since the completion of the original Plan. The current review did not include any detailed vegetation survey effort, but did include a brief inspection of the bushland remnants along with a review of the bushland regeneration contractor's annual reports in order to update management recommendations contained within the Plan. The vegetation mapping and vegetation descriptions remain the same as per the 2001 Environment Plan (Low 2001).

1.4 Aims and Objectives

The Strategic Directions for the Golf Course 2006 - 2011 states the overall Vision for the course. This Plan aims to fit within that vision, in particular respecting the following points:

- Do not change the basic ethos of NSWGC;
- Maintain a natural golf course through a sympathetic course management approach (i.e. work with natural grasses and flora and not create an artificial environment);
- Protect the natural setting and environment;
- Use environmentally sound course management techniques; and
- Enhance the NSWGC's world status.

In summary, the aim of the Environment Plan for the NSWGC is to **protect one of its greatest assets, the natural environment.** The environmental management of the course and surrounding bushland is part of the Club's Mission statement.

Photo 1: Flannel Flowers between the 15th and 16th in Spring 2000 following the fires of 1998.

2.0 SITE DESCRIPTION

2.1 Location

The NSWGC is at La Perouse, on the southern tip of the eastern suburbs of Sydney. It is bordered by Botany Bay National Park to the east, south and west, and by St Michaels Golf Club to the north. The NSWGC lies within the municipality of Randwick City Council.

2.2 Climate

The NSWGC occupies a highly exposed site. The course is subject to almost constant salt laden winds, most rain falling in storms, and lightening strikes. These exposed conditions define the vegetation and management of the course.

Average annual rainfall at La Perouse is around 1150mm, falling on 105 days per year. Most rain (approximately 70%) falls in major storms, which come from the SE_SW in January-July (Leeson, 1987, p26). Average summer maximum temperatures are 26° Celsius, with the maximum temperature recorded being 45°C. Average winter minimum temperatures are 8°C, with the lowest temperature recorded being 0°C (Benson and Howell, 1990; Bureau of Meteorology, 2000).

2.3 Geology, soils and topography

The NSWGC lies on sandy soils. The underlying geology is Hawkesbury sandstone, though unconsolidated Aeolian dunes sands overly most of the course. Outcrops of sandstone are evident adjacent to the 13th fairway and along the coast. The topography is striking for its steep undulations, varying from 53 metres above sea level at the clubhouse to sea level. The natural topography has not been substantially altered by the construction of the golf course.

The soils are deep, almost pure sand, have very low waterholding capacity, and tend to be water repellent (hydrophobic). Generally the sand grains are fine to medium, and very infertile. These soils are subject to extreme wind erosion hazard and high water erosion hazard.

The distinctive north-south alignment of the dunes indicates that soils form part of the Tuggerah series. These are wind blown sands from the Quaternary period. (Chapman and Murphy, 1989).

2.4 Catchments and Drainage

The distinctive north-south sand dunes of the NSWGC create a landscape that is highly dissected. There are nine separate catchments over the course, making management of water runoff difficult.

The soils of the course are highly free draining, and most runoff tends to be sub surface (Chapman and Murphy, 1989). Fig 2, Catchments and Drainage shows the catchments of the course.

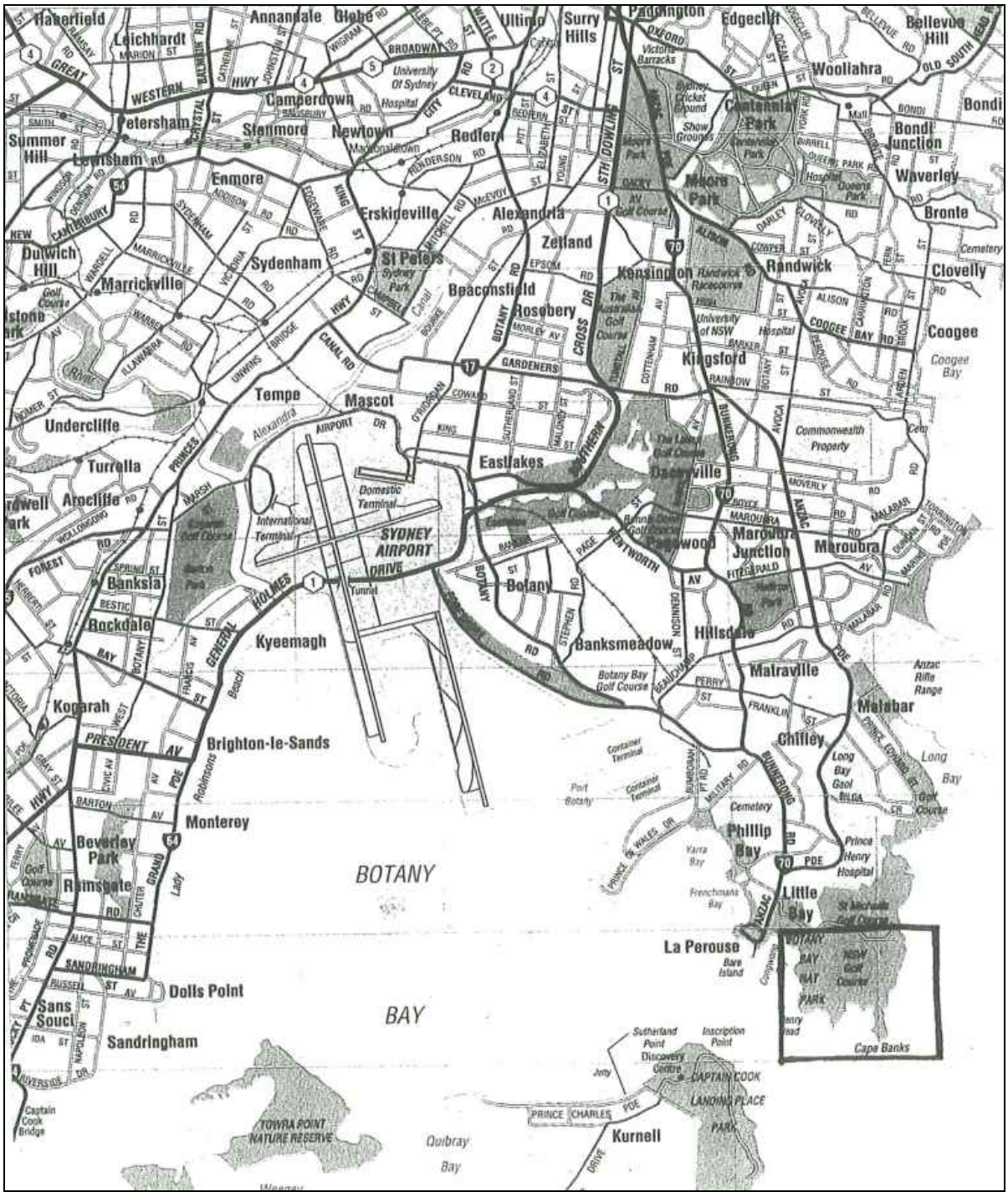

Figure 1: Location Plan

2.5 Vegetation Communities

The NSWGC has approximately 25 hectares (ha) of bushland throughout the course. The vegetation has been classifies into seven groups, as shown in Fig 3, Vegetation communities. The major vegetation communities found on the NSWGC are described in more detail below.

The native vegetation on the NSWGC forms important links with vegetation on the La Perouse peninsula. As figure 3, Native Vegetation of the La Perouse peninsula indicates, the vegetation along the coast and the vegetation on the northern boundary of the course provide vital corridors between the eastern and western sides of the peninsula.

The health of the native vegetation at the NSWGC is variable.

Eastern Suburbs Banksia Scrub (ESBS)

Covering over half the course, this is the most extensive community at the NSWGC. ESBS is an ecological community only found on nutrient poor sand deposits in the eastern suburbs of Sydney. It includes an assemblage of over 100 species, and is generally heath or scrub, with occasional areas of woodland or low forest and limited wetter areas. (NSW Scientific Committee, 1997)

This vegetation type once covered approximately 5,300 hectares (NPWS 2004), but the extensive development of Sydney's Eastern Suburbs has meant that less than 3% of the original vegetation remains in isolated remnants totalling 146 hectares. Figure 4 shows the original distribution of Eastern Suburbs Banksia Scrub.

Reflecting its conservation status, in 1997 Eastern Suburbs Banksia Scrub was listed as an endangered ecological community under Part 3 Schedule 1 of the *NSW Threatened Species Conservation Act* (1995). In 2002, the Scientific Committee established under the TSC Act, considered that an amendment should be made to the listing following the receipt of additional information about the ecological community, and the community was re-listed as Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion. Eastern Suburbs Banksia Scrub of the Sydney Region is also listed as a threatened ecological community under the *Environment Protection and Biodiversity Conservation Act* 1999 (Commonwealth).

In 2004, a Recovery Plan for the Eastern Suburbs Banksia Scrub Endangered Ecological Community was approved by the NSW Environment Minister (DEC 2004). One of the actions in the Recovery Plan included the preparation of a recommendation for the identification of critical habitat, and in 2006 a draft recommendation was released for public comment (DEC 2006).

Swamp / wet heath

An area of swamp/ wet heath is confined to one section of the course, immediately north of Lake Perrie. Whilst it was probably always a moist area, this area has been altered by the construction of Lake Perrie, and is now more regularly inundated by overflow water from the lake. Despite these changes, this area supports robust vegetation community with a high level of species diversity. In a single 'walk through' survey of this area prior to the 2001 Plan, 33 native species were recorded. At the time there was a low level of weed infestation, predominantly of Whiskey Grass (*Andropogon virginicus*). This vegetation community is probably wet Eastern Suburbs Banksia Scrub, though may be another endangered community, called Sydney Freshwater Wetlands.

It is an important habitat for frogs (3 species heard calling).

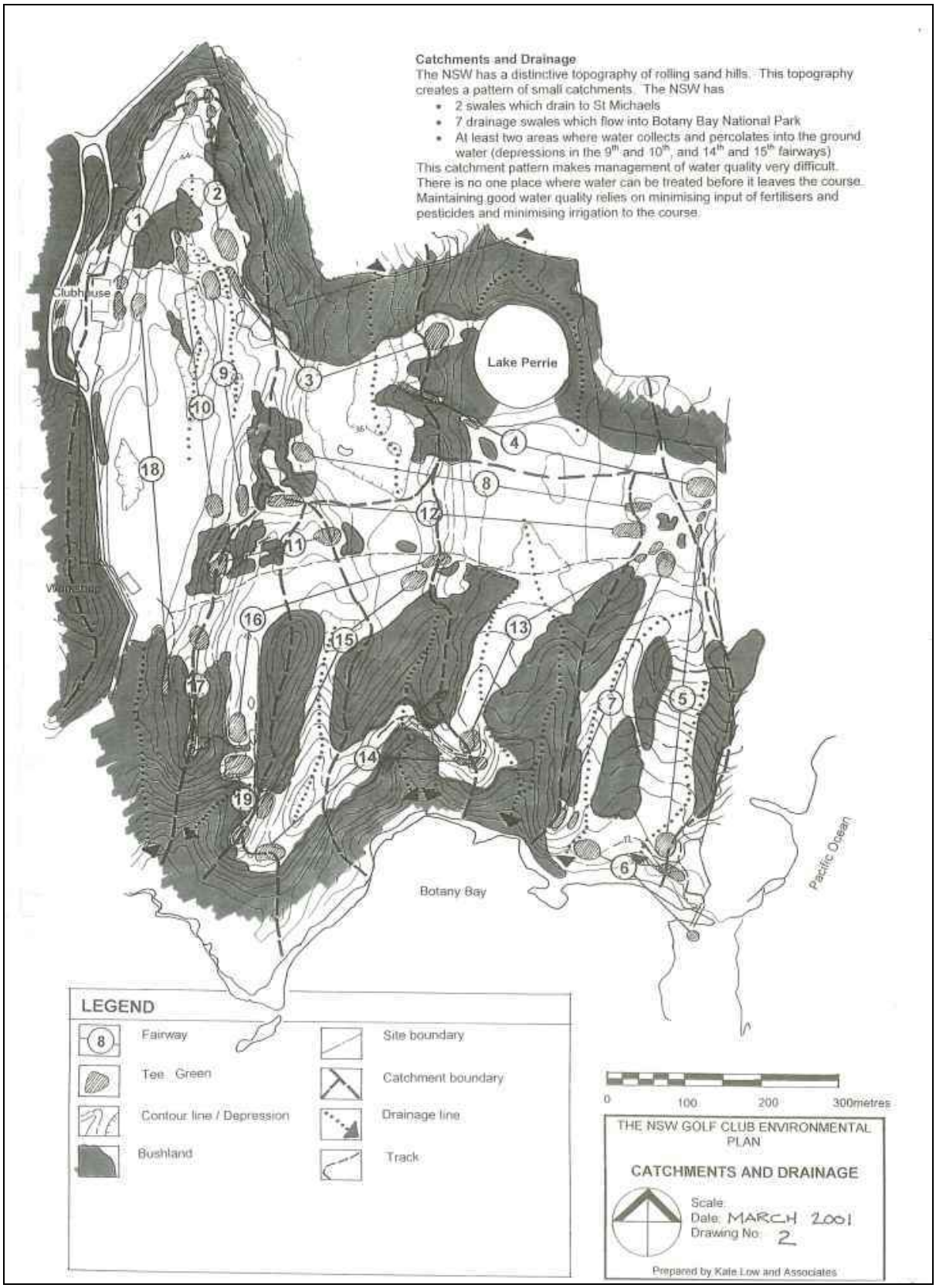

Figure 2: Catchments and drainage

Coastal Sandstone Heath

Coastal sandstone heath is found along the coast, from La Perouse to Long Reef, on shallow sandstone derived soils usually with sandstone outcrops evident. The vegetation structure is highly variable, with the major influences at the NSWGC being soil moisture, proximity to salt laden coastal winds, and time since last fire. Currently at the NSWGC the vegetation structure includes low open heath, wet heath and sedgeland. The most prominent patch of wet heath is near the 6th (Benson and Howell, 1994).

Coastal Dune Forest

Coastal Dune forest is limited to the sheltered slopes of several dunes near the clubhouse at the NSWGC. Here it is a low open forest community. The striking trunks of *Angophora costata* are visible to the left as one drives into the NSWGC.

Regenerating Heath

Following the fires of 1998, extensive areas of the course are regenerating. In some areas, particularly where the vegetation was previously fairly degraded, it is not yet possible to classify the regenerating vegetation community. These areas are likely to be either Eastern Suburbs Banksia Scrub or Coastal Sandstone heath. Additional mapping of the vegetation communities within the course is planned, and this will establish the extent of ESBS on the course.

Very degraded areas

Several areas on the course are highly degraded as a result of past management practices. These areas no longer retain viable native vegetation, and have special management requirements.

2.6 Fauna

No site specific fauna surveys have been carried out at the NSWGC as part of the development of the original Plan or this review. The course has a substantial boundary with Botany Bay (North) National Park, where surveys have been carried out. Fauna identified within the National Park includes:

- Five frog species,
- 11 lizard species,
- Four snake species,
- 84 bird species (76 native, eight introduced),
- 10 mammals (four native, six introduced),

(NPWS, undated, NPWS, 2000).

All these species are likely to be present at the NSWGC. The list of fauna found within Botany Bay National Park (North) is included in Appendix 5.

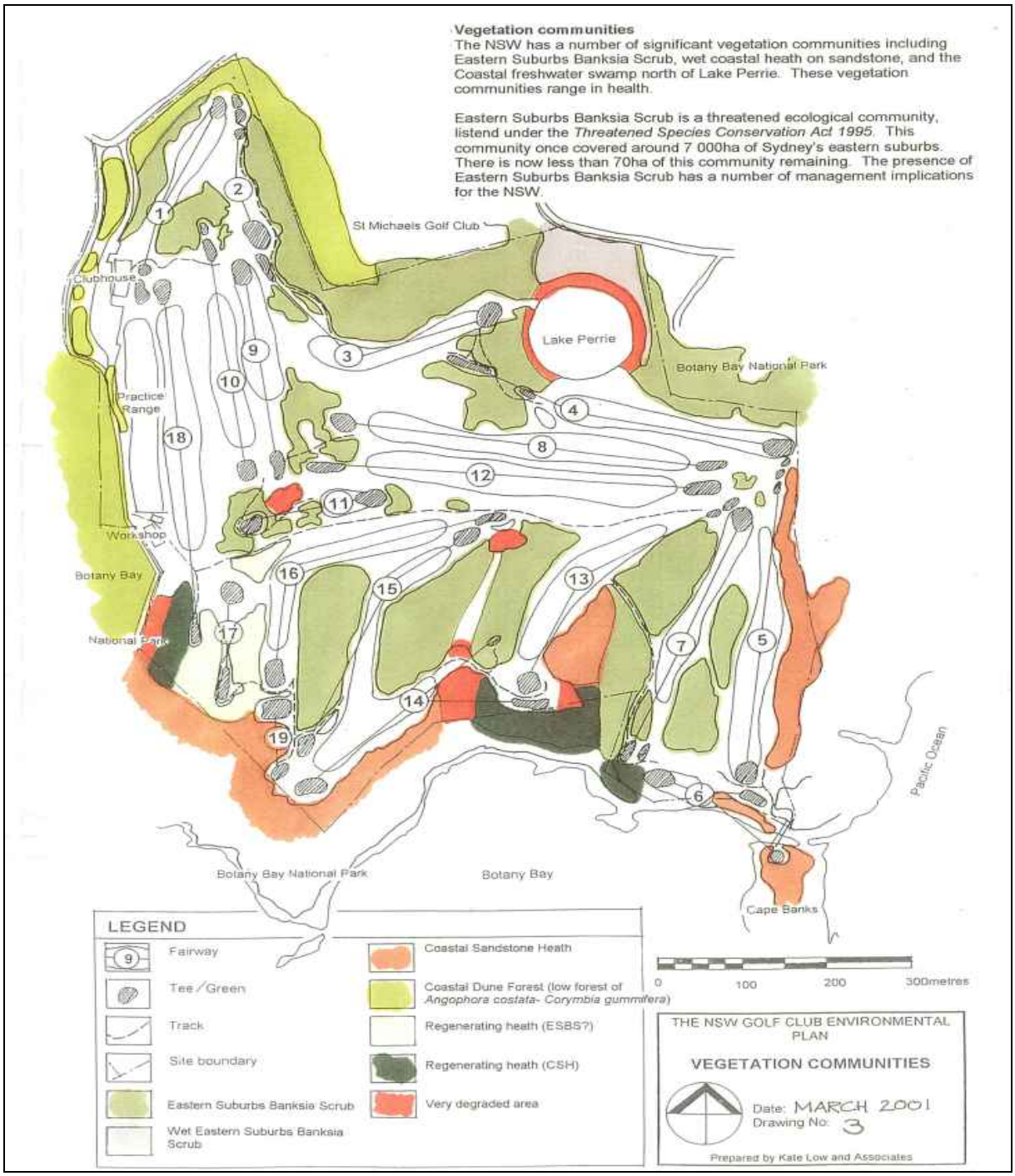

Figure 3: Vegetation communities of the NSW Golf Course.

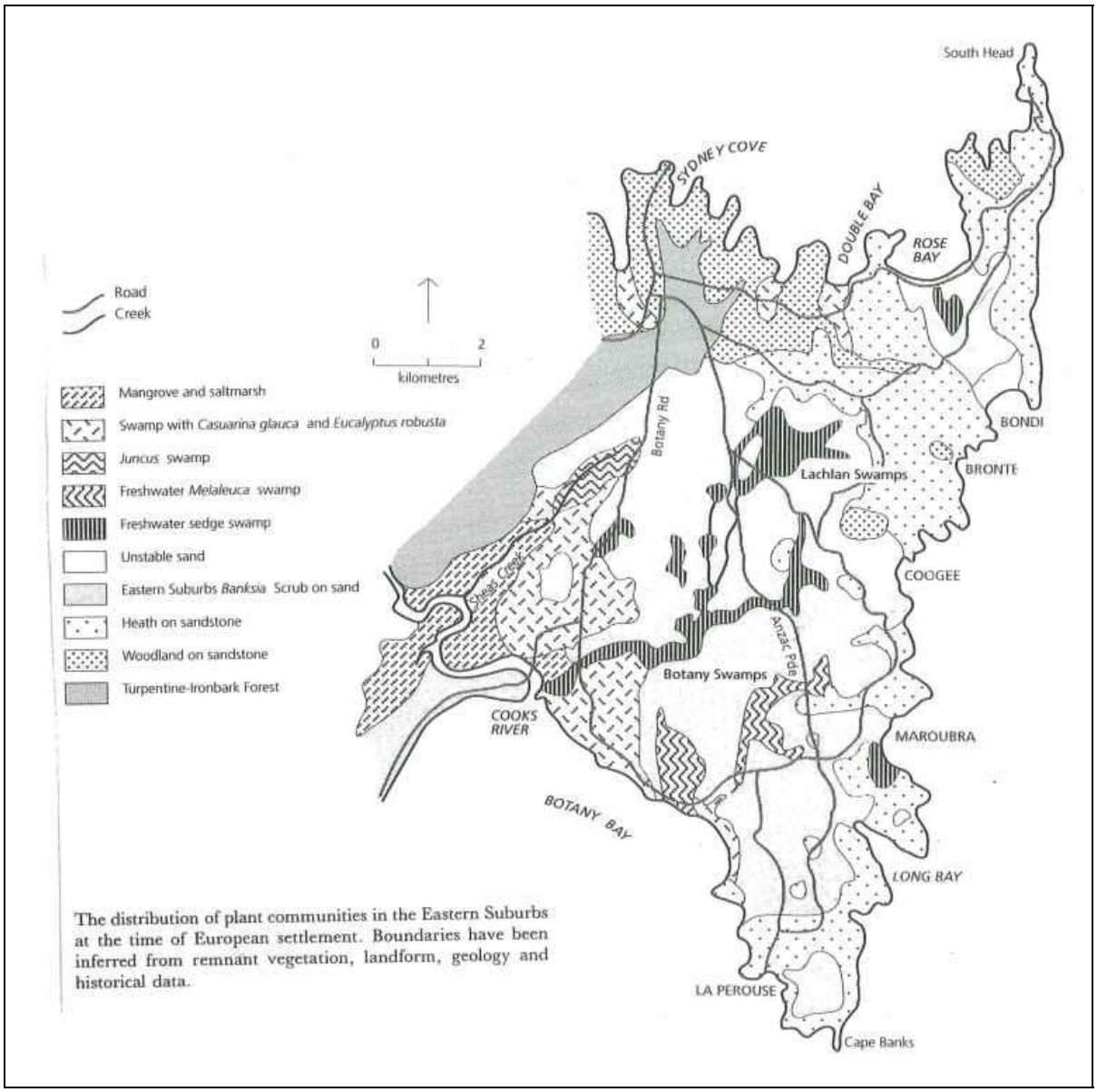

Figure 4: Distribution of plant communities Sydney's Eastern Suburbs at the time of European settlement.

(Benson and Howell, 1990)

3.0 MANAGEMENT ISSUES

3.1 Legislative framework

Environmental management is controlled by many pieces of legislation. The following table lists some of the main Acts affecting the management of the NSWGC. Please note that legislation changes all the time, and it is the responsibility of land managers to keep up to date on changes. Since the original 2001 Environment Plan was prepared the main changes potentially affecting course management are the approval of the Recovery Plan for ESBS, and associated environmental impact assessment guidelines (NPWS 2003) prepared under the *NSW Threatened Species Conservation Act* 1995. In addition, the DECC has submitted a recommendation to identify critical habitat for the ESBS EEC, and this issue is being carefully monitored by the Club.

More detail on the TSC Act is included in Appendix 1.

The NSWGC lease their land from the NSW Department of Lands. One of the special conditions of the lease is that ALL native vegetation on the course must be protected. The 2004 ESBS Recovery Plan states that consent and determining authorities will ensure that management plans are reviewed with reference to the Recovery Plan, and that public authorities that manage land containing ESBS manage the site in accordance with the Recovery Plan (see 3.2.2 below).

Legislation	Implications
NSW Threatened Species Conservation Act 1995 The TSC Act (1995) aims to prevent the extinction of and promote the recovery of threatened species, populations and ecological communities. Threatened species, populations and ecological communities are listed in schedules under this Act.	▪ Eastern Suburbs Banksia Scrub (ESBS) is listed as an endangered ecological community under Schedule 1 Part 3 of the TSC Act. ▪ The Club, as lessee of Crown land, are required to protect ESBS, and manage the site in accordance with Recovery Plan. ▪ To carry out <u>any</u> work within ESBS, including weeding, bush regeneration and ecological burns, the Club <u>must</u> submit a section 91 licence application to the Department of Environment and Climate Change. (Details in Appendix 1) ▪ Schedule 3 of the Act lists key threatening processes, seven of which are potentially relevant to ESBS at the course. ▪ The TSC Act makes provision for the identification and declaration of critical habitat for endangered ecological communities.

Environment Protection and Biodiversity Conservation Act 1999 Cwlth	Eastern Suburbs Banksia Scrub is also listed as an endangered ecological community under the EPBC Act (1999). If the Club propose any development that may have a significant impact on ESBS (matter of National Environmental Significance), they will need to comply with this Act.
Environmental Planning and Assessment Act 1979	This is the principal Act controlling development in NSW. Any proposed development needs to be approved under this Act. The consent authority for development undertaken by the Club is Randwick City Council.
Protection of the Environment Operations Act, 1997	The Protection of the Environment Operations Act (1997) (POEO) is the principal legislation governing water, air and noise pollution in NSW. It is administered by DECC under the powers of the statutory Environment Protection Authority (EPA) and local government. Section 120 of the Act states that a person must not pollute any waters, cause any waters to be polluted, or permit any waters to be polluted. Severe penalties exist under the POEO Act and the legislation places liability on anyone who participated or contributed to the pollution of waters. The NSWGC and its employees could be liable depending on the circumstances of the case. Penalties range from on the spot fines of $750 ($1500 for corporations) to $250 000. Under the POEO Act *Protection of the Environment Operations (Clean Air) Regulation 2002 reg*ulates pollution from fires. The Club must get approval from the DECC to carry out any ecological burns.
The Pesticides Act 1999	The Pesticides Act 1999 regards the most serious offences are those relating to the deliberate or negligent use of pesticides. It is an offence to use a pesticide in a way wilfully or negligently that causes: • injury or likely injury to another person or property; • material harm to a threatened fauna species; or • harm to a non-target plant or animal. Pesticide users must follow the label (or permit) and storage requirements. Reasonable actions must be taken to ensure that non-target impacts are avoided. The NSW DECC is the government agency that enforces safe use of pesticides in NSW.

Crown Lands Act 1989	The NSW is on Crown Land, and the Club is a holder of a lease issued to the Club by the Minister according to section 34 of the Act.
Noxious Weeds Act 1993	The Noxious Weeds Act applies weed control classes for various weed plant species that are identified in a weed control order. The lease applying to the Club requires that noxious plants are eradicated or controlled according to legislative requirements. The local control authority under the Act is Randwick City Council.
Water Management Act 2000	The Water Management Act 2000 controls the carrying out of activities in or near water sources in New South Wales. Works within 40 metres of a river, lake or estuary require a controlled activity approval under this Act.

3.1.1 Recovery Plan

The Commonwealth and New South Wales Recovery Plan for the Eastern Suburbs Banksia Scrub endangered ecological community was approved in 2004. It was prepared to satisfy both the Federal and State legislative requirements under the EPBC Act and TSC Act. The Recovery Plan identifies the current and future actions to be taken to ensure the long-term survival of ESBS. Actions have been developed under five broad categories including:

- Survey and assessment;
- Reservation/protection of the community
- Threatmanagement and ecological restoration;
- Community awareness, education and involvement; and
- Research.

The Recovery Plan identifies the public authorities, including the Department of Lands, who will manage their land in accordance with the approved Recovery Plan, and carry the relevant actions for the areas for which they have responsibility (DECC 2004).

3.1.2 Key Threatening Processes

The following key threatening processes are potentially relevant to ESBS (DEC 2004):

- Clearing of native vegetation;
- Invasion of native plant communities by *Chrysanthemoides monilifera*;
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition;
- Infection of native plants by *Phytophthora cinnamomi*;
- Competition and grazing by the feral European Rabbit *Oryctolagus cuniculus*(L.);
- Invasion of native plant communities by exotic perennial grasses; and
- Anthropogenic climate change.

Table 1 of the Recovery Plan sets out management issues recorded for each ESBS site. The specific management issues listed for the NSWGC are fire and weed management, fox and rabbit control, access, erosion control, drainage and run off issues, inappropriate plantings, mowing/slashing/removal of overstorey, and dumping of green waste. The Recovery Plan acknowledges the existence of the NSWGC Environment Plan, which addresses the management of the course with respect to the relevant key threatening processes and the identified management issues.

3.1.3 Site Management Plan

The ESBS Recovery Plan includes as one of its actions (9.3.3) the development and implementation of site specific management plans for each ESBS site under management of a public authority, including the licensee of Crown land such as the NSWGC. Site management plans are to address threatening processes and identified management issues (see 3.1.1 above), as well as the management issues below (DECC 2004):

- fire management;
- weed management;
- site hydrology (increased nutrient status, runoff, stormwater discharge);
- pest management (rabbits);
- site visitation (access and usage);
- decontamination of the site (where relevant);
- protective fencing; and
- use of educational and interpretive signs.

The Environment Plan, while not specific to the ESBS vegetation community, addresses the management of the course with respect to the relevant key threatening processes and the identified management issues within the ESBS Recovery Plan.

3.1.4 Critical Habitat Recommendation

The TSC Act makes provision of the identification and declaration of critical habitat for an endangered ecological community such as ESBS. A draft recommendation for the declaration of critical habitat for ESBS was released in 2006. The recommendation includes the identification of areas of ESBS within the course, and associated buffer areas, that together form the proposed critical habitat. If approved, any developments and activities proposed by the Club within the critical habitat area will require a Species Impact Statement to be completed. DECC, however, has indicated that it may use discretionary power when considering harm to critical habitat from playing the game of golf, and also permit (s95 TSC Act) activities that are of a trivial nature or have negligible impact on ESBS.

3.2 Vegetation

Vegetation management is probably the single most important environmental management issue for the NSWGC. The NSW Golf Club began in 1928, developing playing areas, and leaving inter-fairway areas to regenerate. Today that leaves a pattern of highly fragmented islands of bushland, surrounded by the course. Many of these bushland fragments are large and relatively healthy, while others have been extensively altered, and are much less healthy. In all there is approximately 25 hectares of bushland on the NSW.

It is the bushland of the NSWGC that is one of the key elements that makes the course so special. Golfers have the opportunity to enjoy the flora and fauna located within the course while playing. Protecting the bushland of the course is fundamental to maintaining the character of the NSWGC, and this is in line with the objectives of the ESBS Recovery Plan.

Specific management issues affecting vegetation at the NSWGC are:

- Eastern Suburbs Banksia Scrub
- Inappropriate planting
- Clearing
- Edge treatments
- Fire Regime
- Weed and feral animal Control
- Vegetation corridors.

3.2.1 Eastern Suburbs Banksia Scrub (ESBS)

Approximately 16 hectares of Eastern Suburbs Banksia Scrub have been identified on the NSWGC, spread throughout the course in around 21 fragments. As described in Appendix 1, this vegetation community is an endangered ecological community, and is protected under the *NSW Threatened Species Conservation Act* (1995). It has also listed as a nationally threatened ecological community under the *Commonwealth Environment Protection and Biodiversity Conservation Act* (1999). The further loss and fragmentation of habitat as a consequence of clearing and development is identified as the major threat to the ESBS community (DEC 2004).

A number of current management practices could potentially threaten this vegetation community and some of these practices are illegal under the Act. For this reason the Club has submitted an s91 Application (TSC Act) to DEC, and has received an s95 permit to under take certain management actions that will not cause a significant impact on the ESBS EEC. There are a number of current practices which may potentially damage vegetation, and these are described in more detail below.

3.2.2 Planting

Planting is a well established and respected horticultural and rehabilitation practice. If in area of low resilience is cleared or weeded, it is traditional to plant it. In areas where there is a threatened ecological community such as ESBS, or where there is potential for natural regeneration, planting is considered inappropriate. Inappropriate plantings in and around remnants has been identified as a threat to the ESBS community at the course (DEC2004), and is therefore not an acceptable practice in some circumstances. The reasons for not planting into ESBS are:

- Planting into a remnant of ESBS constitutes “picking” under the TSC Act, and is illegal.
- It is important to maintain the genetic integrity of the endangered ecological community. Introducing plants from nurseries may alter the genetic makeup of the community and lead to habitat degradation.

- There is often seed stored in the soil which, given the right conditions will germinate. Planting affects the potential for the soil seed bank to germinate.
- Planting into a remnant will alter the floristic composition of the vegetation community. Even if only species from the threatened community are planted, it is impossible to recreate the complexity of the community. For instance, some species may be difficult to propagate. Planting tends to over-represent some species and ignore others. Over time this alters the floristic composition of the vegetation community.
- Long term more cost effective.

If planting is needed in an area adjacent to ESBS due to poor natural regeneration, plants need to be carefully chosen, and good records kept of all plantings. Plantings used on the course are propagated from native seed collected on site under license.

Photo 2: Planting adjacent to the new path system. While the construction of the new path system left areas of bare soil, it is preferable to let bushland grow back to the path rather than to plant into these areas.

Photo 3: The slope behind the 10th Tee, shown in 2001, is a typical example of several areas on the course that have been planted. Where these areas are adjacent to bushland, particularly Eastern Suburbs Banksia Scrub, plantings need to be carefully recorded and documented.

3.2.3 Clearing

Periodically the Club are pressured by members to clear some vegetation to improve playing conditions and sight lines. Any clearing contravenes the special conditions of the Club's lease with the Department of Land and Water Conservation regarding protection of vegetation. It is also regarded as the major threat to the ESBS community, and removal of overstorey is identified as a management issue specific to the Club (DEC 2004).

Any areas of Eastern Suburbs Banksia Scrub that the Club want to clear need to be approved by the DECC prior to carrying out these works. The potential of a significant impact of the actions or works will be assessed either as part of a development application to Council or as part of a s91 Application. The Club currently has a s95 permit and an open burn approval from DECC that allows line of sight trimming, ecological burns and bush regeneration activities within areas of ESBS in line with this Plan.

3.2.4 Edge treatment

The junction of bushland and the golf course (fairways, rough, tees and greens,) is a difficult place to manage. Several key threatening processes, including *Clearing of native vegetation* and *Invasion of native plant communities by exotic perennial grasses* are directly relevant to

the management of these edges. Mowing and slashing are also identified as management issues specific to the Club (DEC 2004).

Edges have high levels of light, are often affected by irrigation water, and have exotic grasses competing with native species. The exotic grasses (Couch, Buffalo) make a dense mat that prevents germination of natives and alters the composition of the understorey. Before the fire in 1998, the low levels of light found under the dense tea tree monocultures effectively controlled most grassy edges. Without this shrub canopy, exotic grasses are favoured by the high light conditions, and began invading bushland remnants. Since 2003, the Club has employed bush regeneration contractors who conduct hand weeding and spot spraying of exotic grass species that may infiltrate bushland from these edge zones.

Photo 4: Bushland edge on the 16th in 2001. Couch is growing into the bush, and there are many annual weeds taking advantage of the high light conditions.

3.2.5 Fire and vegetation

Throughout south-eastern Australia, most vegetation types require periodic fires to stimulate the continuation of various ecological processes. The relationship between fire and healthy bushland is complex and not fully understood, but it is recognised that the season in which fires occur, the intensity of the fires and their frequency are all relevant to maintenance of vegetation communities. These three elements are generally referred to as the 'fire regime'. Different vegetation communities have different ideal fire regimes.

High frequency fire is identified as a key threatening process, and can result in the disruption of life cycle processes and loss of vegetation structure and composition. Fire has recently played a significant role at the NSWGC. In 1998 fire burnt almost 12 hectares of bushland at the NSWGC. Most of these areas had previously been dense monocultures of Tea-tree (*Leptospermum laevigatum*). The fire stimulated massive germination and there is a great diversity of species now growing.

The Club has also conducted some prescribed burning within several bushland remnants on the course. In 2002, areas in remnants 11, 12 and 13 were burnt, however little regeneration of native plant species occurred. Due to the poor results achieved from these burns, a new system was trialled whereby standing mature vegetation is felled, left to dry and then burnt. Two areas in remnant 15 were burnt in this way in 2006 and 2007 respectively and very good regeneration results were achieved. The Club erects protective exclusion fencing and erects information signage for a period of approximately six months following any controlled burns conducted as part of the management of the native bushland on the site, including ESBS.

Because extensive areas of the NSWGC are ESBS, an appropriate fire regime will need to be implemented which complies with the Recovery Plan. The Recovery Plan identifies that the understanding of the fire ecology of the ESBS community is not well understood, and research into what is an appropriate fire regime is a priority action. In the interim the Recovery Plan proposes the following fire parameters for ESBS:

- successive fires at intervals of less than 8 years should be avoided;
- successive fires at intervals of more than 15 years should be avoided; and
- fire exclusion for a period of more than 30 years should be avoided.

Where there are areas of overgrown vegetation, there has usually been a long time interval since a fire. A decline in biodiversity is predicted if fire regimes are outside of the preceding parameters. The fire history across the course should be documented and mapped in order that any future prescribed burns occur within the parameters above.

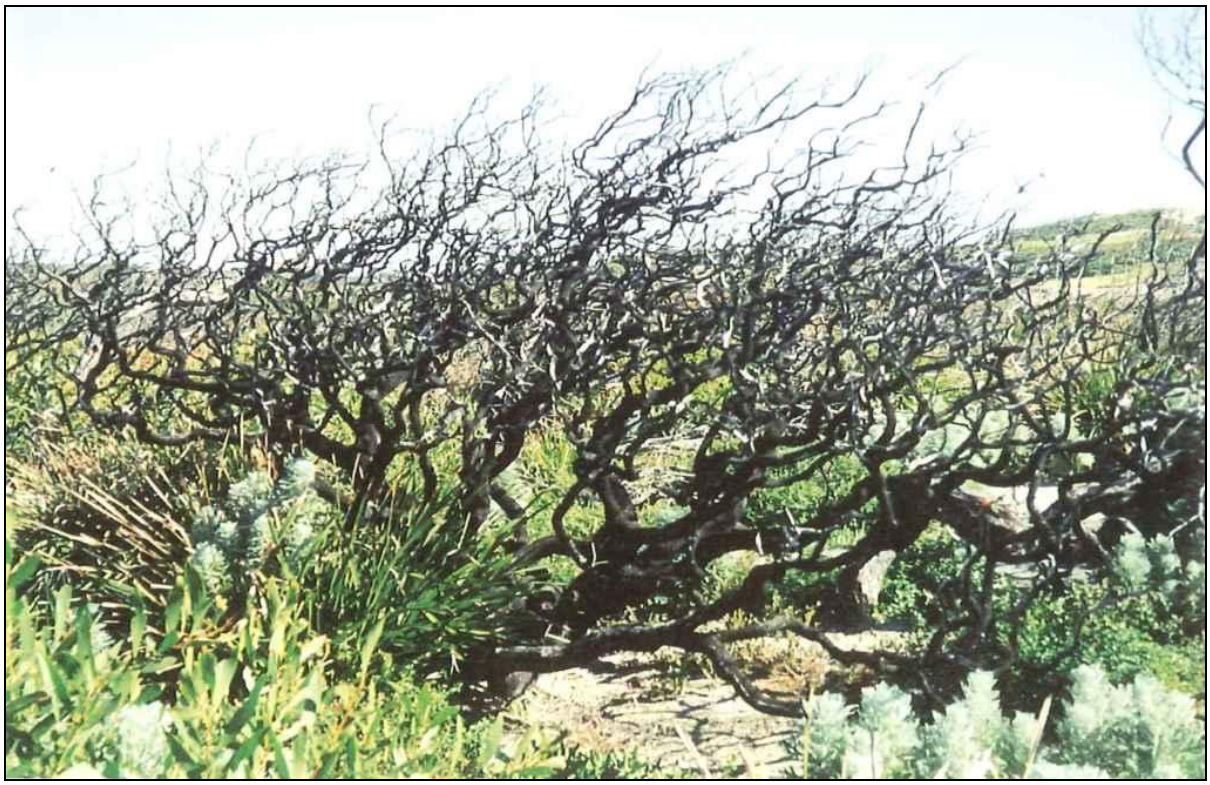

Photo 5: Regenerating bushland 20 months after the 1998 fire. Dead shrubs were left standing where possible to assist natural regeneration

3.2.6 Vegetation corridors

The vegetation on the NSWGC provides important links between the eastern and western sides of Botany Bay National Park. As Figure 7, Vegetation of the La Perouse peninsula, shows, these links are particularly important along the coast, and on the northern boundary of the course.

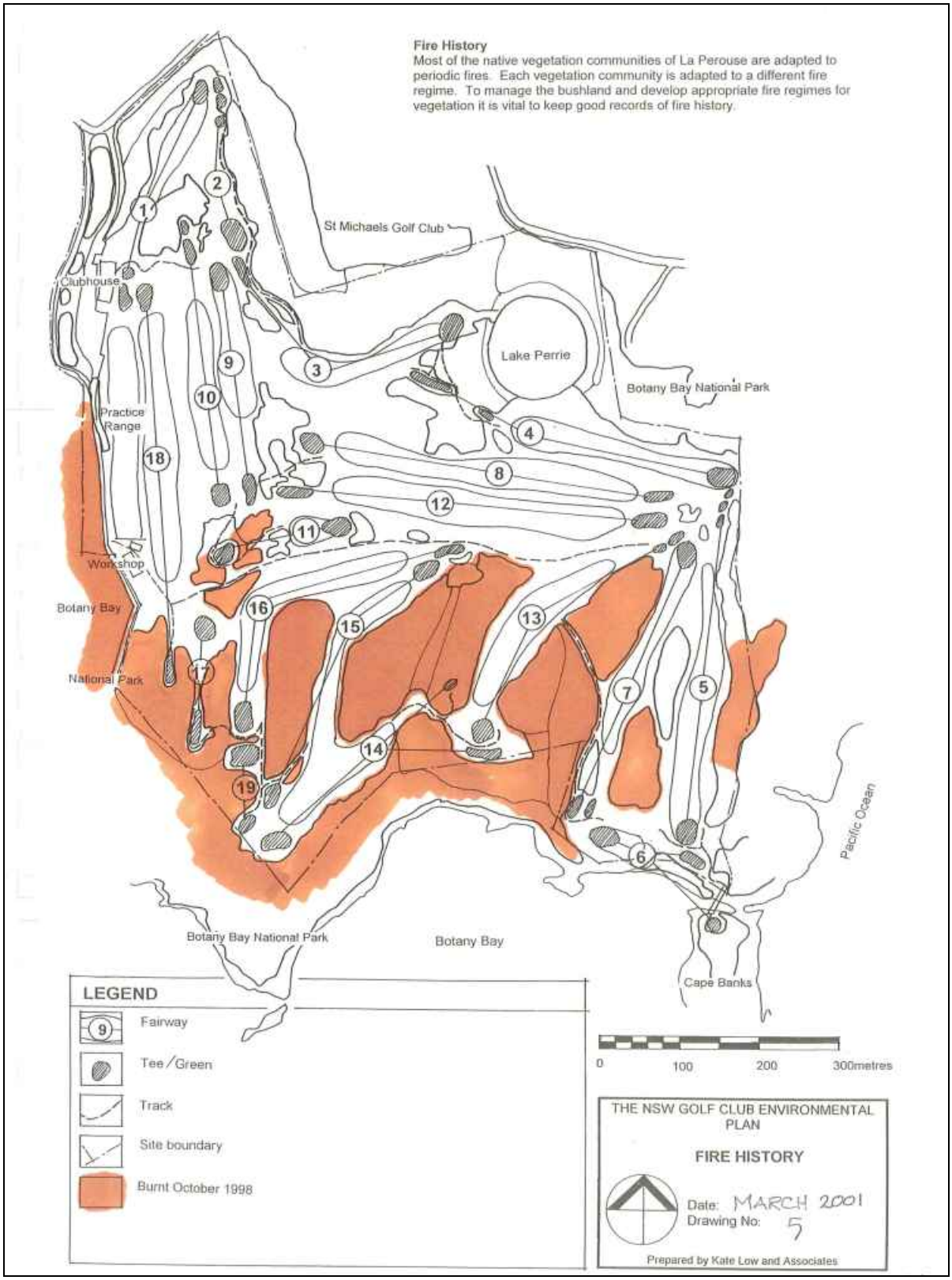

Figure 5: Fire History of the NSW

3.3 Weed control

3.3.1 Bitou Bush

The major environmental weed on the NSWGC is Bitou Bush (*Chrysanthemoides monilifera subsp rotundata*). Bitou bush was first introduced to the La Perouse area around 1968 by the army on the recommendation of the NSW Soil Conservation Service. The area that was planted is immediately to the east of the NSWGC. The Bitou Bush spread gradually, with severe infestations not occurring until the late 1970's and 1980's. Many infestations are more recent, such as the area between the coast and the 15th tee, where Bitou Bush took hold after a fire in January 1990 (NPWS Ranger, Tony Prior, pers.comm., 12 January, 1999).

The NSWGC have been involved in a number of strategies to control this weed over many years, including, aerial spraying of Roundup® in winter, biological controls, and physical removal (both by bush regenerators and by machinery). Overall, The NSWGC has been highly successful in this work, and there are currently no substantial infestations of Bitou Bush at the NSWGC. Ideally, aerial spraying occurs one per year in conjunction with the DECC, and on-going hand removal of seedlings by bush regeneration contractors throughout all remnants across the course.

In March 1999, Bitou Bush was listed as a threatening process under the TSC Act. In 2006 the Department of Environment and Conservation released the NSW Threat Abatement Plan (TAP) – Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed). The TAP lists Eastern Suburbs Banksia Scrub as the vegetation community most at risk from invasion of Bitou Bush (DEC 2006), and the NSWGC is identified as a high priority area for bitou bush control.

There are still substantial infestations of Bitou immediately around the NSWGC, in Botany Bay National Park, at St Michaels, and at the Pistol Club. Because birds and foxes spread Bitou Bush, while there are infestations nearby, Bitou will always be an issue at The NSWGC. Several of these areas around the course are listed in the TAP as high priority control areas, and on-going control will hopefully reduce the re-introduction of bitou to the course.

3.3.2 Other weeds

As Bitou bush is controlled around the course, there is the potential for other weeds to become more of a problem in bushland. Weeds that could potentially be a problem in bushland at the NSW include:

- **Turkey Rhubarb (*Acetosa sagittata*).** This is a highly invasive vine, with a large underground structure and profuse wind borne seeds. It is establishing in a number of areas around the course. It is also present in other areas on neighbouring properties, so is likely to remain an issue.
- **Annual weeds.** Weeds such as Fleabane, Catsear and Dandelion are likely to thrive in the bare sand and high light conditions that predominate at The NSWGC. They are unsightly, but do not tend to cause major ecological problems.

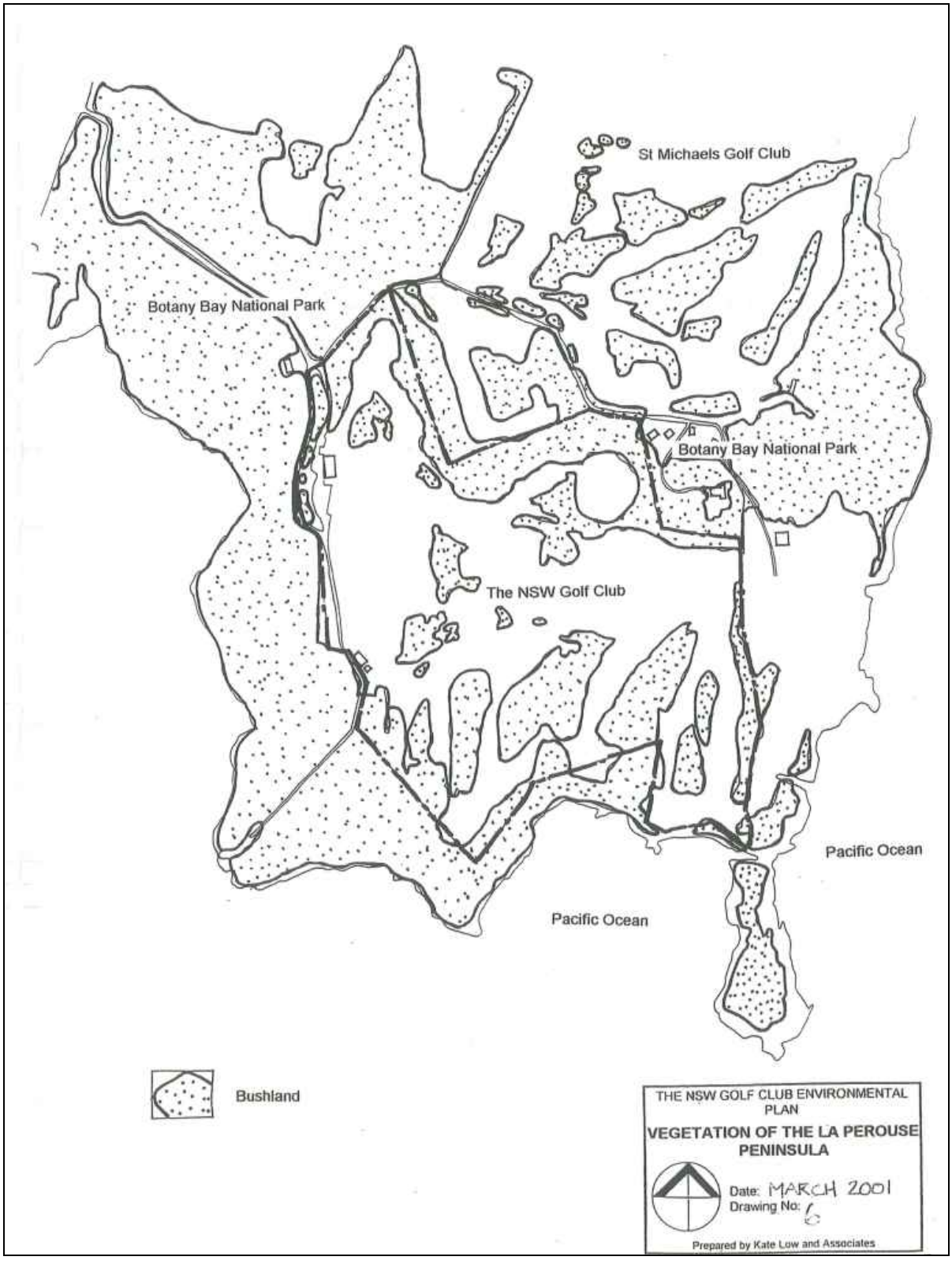

Figure 6: Vegetation of the La Perouse peninsula

Grasses. As discussed in section 3.7.4 Edge treatment, the turf grasses of the course become weeds when they grow into bushland. They have the potential to be a substantial problem. Other perennial exotic grasses should also be actively managed as invasion of ESBS by them is listed as a key threatening process under the TSC Act.

3.4 Water usage and water quality

Golf courses tend to have high water usage requirements. This has two main environmental implications; the use of a scarce resource, and the potential impact that higher levels of runoff can have on bushland areas downslope from irrigated areas.

The NSWGC has increased the storage of Lake Perrie, the dam on the NSWGC, by 20 megalitres to a total capacity of 55 megalitres. This strategy now means that the course for the majority is independent of the reticulated water supply and only requires town water in cases of emergency.

The NSWGC has excellent water minimisation strategies in place. In summary, these are:

- During the summer months (Oct-November to March-April) only greens and tees are watered.
- Fairway grasses have been gradually replaced with drought tolerant species, which can survive with minimal water.
- A finely tuned and highly efficient irrigation system installed on the course in 1998 continues to provide excellent water.
- Installation of a bio-cycle wastewater treatment system, with re-use of effluent for course irrigation.
- Use of rainwater for toilet flushing and washdown of equipment at the new workshop area.

These strategies make the NSWGC a leader in low water usage for golf courses.

However, water security is an ongoing issue for NSWGC, and the Club is investigating the possibility of bore water, access to recycled water from the Malabar Sewage Treatment plant and improved harvesting of rain water. While availability of more water is desirable for the golf course it has environmental implications for surrounding bushland, and will need to be managed carefully.

Activities on golf courses, such as fertilising, pesticide application and mowing, have the potential to pollute runoff leaving the course. Pollution of runoff can substantially lower water quality in watercourses down stream of the course.

The highly dissected nature of the catchments of the NSWGC and the tendency for sub surface drainage makes it difficult to manage the quality of runoff. There is no one place where a settling pond can be built to protect water and bushland downstream. Instead the NSWGC must rely on good practices by staff to minimise the potential for water pollution.

Effective practices currently in place include:

- Minimal fertiliser application (Fairways are only fertilised once a year, or twice if there is a major tournament)
- Minimal use of pesticides

There is the potential for higher levels of water pollution around the maintenance sheds, where machinery is washed down and tanks are rinsed out. The most effective way of minimising this pollution is with a closed loop wash down bay, where water is recycled, and oils, organic matter and pollutants can be trapped and removed from the system. The NSWGC installed a wash down bay as part of the new workshop constructed recently.

3.5 Soil conservation

On an established course like the NSWGC the main potential for soil erosion occurs when construction takes place, such as a new path system, or renovating tees and greens. Short-term erosion control measures are necessary until vegetation re-establishes to prevent sedimentation impacting upon waterways and bushland remnants including ESBS.

3.6 Pesticide and fertiliser use

Use of pesticides is a major environmental issue for golf courses. Golf courses have extensive areas of monocultures in the fairways. The turfgrasses used on greens are cool season grasses, which while providing a perfect playing surface, are difficult to grow and require high levels of maintenance and pesticide use.

A well respected management approach to minimise pesticide use is known as Integrated Pest Management (IPM). IPM includes the following:

- Tolerate a certain level of damage i.e. aim to control pests, not eradicate them.
- Use a range of control techniques, including chemical, physical, biological and cultural practices.
- Practice pesticide rotation

The NSWGC practices IPM, using a range of methods to control pests and weeds.

Fairways at the NSWGC are only fertilised once a year, or more frequently if there is a tournament or abundant water. This low level of fertiliser application means that there is minimal impact on surrounding bushland areas.

Greens and tees are fertilised regularly. While this involves higher levels of fertiliser, it is to small and localised areas of the course and does not present a major environmental issue.

3.7 Native fauna

Generally most native fauna are predominantly within the bushland areas of the course. Protecting the bushland, maintaining links with surrounding fauna habitat areas, and keeping bushland as healthy as possible also protects habitat for fauna species.

Raising the awareness of members of the natural heritage of the golf course will help to protect native fauna.

3.8 Feral animals

The main problem feral animals at the NSWGC are rabbits, foxes and starlings. Competition and grazing by the rabbit is listed as a key threatening process under the TSC Act, and fox and rabbit control are listed as site specific management issues. Starlings pose a particular problem as they spread the seed of Bitou Bush. Currently there are no control programs for starlings, while other feral animal control occurs at least twice per year via engagement of a licensed controller. The Club periodically controls rabbits using Pindone®, approximately every two years.

Any control program for these species needs to be carried out in conjunction with neighbouring land managers.

3.9 Site Visitation (Access and Usage)

The main access and usage to the site is by Club members and staff, then visitors to the Club, and non-golfers who have pedestrian access to the surrounds of the course. The Club has a responsibility to ensure that members and their guests understand the unique nature of the course environment, and are aware of the presence of ESBS and the sensitivity of the bushland remnants on site. Management of the playing surfaces of the course and the sensitive bushland areas are managed by the course greens staff in combination with experienced bushland regeneration contractors.

The NSW works with DECC in the ongoing management of ESBS within the course, and this includes limiting access to the bushland areas of the course. Vehicle movements are excluded from the bushland areas of the site, and access is limited to pedestrian traffic and staff experienced in the preservation of the native plant species.

3.10 Site specific management issues

3.10.1 The dump site.

Adjacent to the maintenance road between the 12th, 13th and 15th holes is an area that has been used as a dump for over 50 years. Following the fire of 1998, this area became highly visible, as surrounding vegetation was burnt out. A report into the fire damage identified the dump site as a management issue, as it has caused higher levels of weed infestation in the bushland surrounding it (Low 1998). The dump site covers approximately 1500m^2.

The Club has been awarded the right to hold the 2009 Men's Australian Open Golf tournament and this area will be used as part of the area required for the staging of the event. As the surrounding bushland is Eastern Suburbs Banksia Scrub, this work will need to be carefully carried out to ensure the integrity of the ESBS is not threatened.

3.10.2 Vegetation management zones

For ease of description, vegetation on the course has been divided up into discrete management zones. There are a number of places on the course where there are localised management issues. The zones and issues are indicated on Figure 7.

3.10.3 Degraded areas

Some areas (indicated on map 7) were identified in the 2001 Plan where the vegetation did not regenerate well after the 1998 fire. These areas contained dense infestations of Bitou Bush or a long history of site disturbance. In these areas the soil seed bank has been exhausted. Since 2001 restoration works has occurred within these areas apart from the dump site is indicated above. The new works depot is complete and restoration of the old site is on-going.

3.10.4 Entrance and Car Park

The entrance to the NSWGC was identified in the previous Plan as an area requiring a specific management solution, due to the mish-mash of grassy areas, weeds, and native trees and understorey. The presence of several Swamp Mahogany (*Eucalyptus robusta*) trees in the area, a regionally significant species in the eastern suburbs of Sydney, warranted preservation as well. The site contained large areas of Kikuyu and other annual weeds that were potentially impacting upon the National Park. Remnant bushland also needed to be protected from further weed invasion, and gradually regenerated.

Works completed in this area since 2001 include weed removal, landscaping and planting, a new entrance way and preservation of native bushland areas. The car park area was also re-modelled, including improvements to the stormwater management in this area so that water does not enter the adjoining Botany Bay National Park from the car park area. As these works are complete reference to this management issue of the course has been removed from the Recommendations and Implementation Table sections of the Plan.

3.10.5 Works depot

The construction of a new maintenance shed south of the existing depot was completed in 2005. The shed is located adjacent to a large earth mound, which forms the 18th tee, and is constructed from a steel frame with 'Colourbond' walls and roofing. Stormwater runoff from the building is collected and pumped to an existing reservoir within the Golf Course.

The existing depot buildings have been demolished, and the ground at the site was decontaminated by private contractors and certified by a private certifier. The area has been rehabilitated and landscaped using native plant species of local provenance, and additional planting works are proposed. Reference to this management issue of the course has been removed from the Recommendations and Implementation Table sections of the Plan.

4.0 RECOMMENDATIONS

The recommendations for the NSWGC are described here in two complementary forms, a summary description, and an implementation table including recommendations completed since the previous Plan. The summary description briefly outlines recommendations. The implementation table gives detailed recommendations. Where any additional background information is required, it is included in the summary description.

4.1 Legislative framework

Environmental legislation is constantly changing. It is a challenge for land managers to keep up. The Course Superintendent and General Manager need to keep up to date with changes in legislation. A list of web sites that provide updates on changes to legislation is included in the Implementation Plan.

4.2 Vegetation

Because the vegetation of The NSWGC is native bushland that contains an endangered ecological community, it has special requirements and needs to be looked after by appropriately trained staff. Greenkeeping and horticulture qualifications do not provide all of the necessary skills to work in bushland remnants. From 2003, the Club has employed professional bush regeneration contractors to work in the bushland remnants at The NSWGC. These contractors do all vegetation management and regeneration work within bushland remnants.

Specific recommendations have been made for each vegetation remnant in the implementation table.

4.2.1 Eastern Suburbs Banksia Scrub (ESBS)

The principal environmental aim at the NSWGC is to protect all bushland remnants, especially Eastern Suburbs Banksia Scrub.

The 2001 plan was submitted as supporting information supplied to the DECC for a Section 91 Application to carry out any activity (such as weeding and carrying out burns) in areas of ESBS. The DECC assessed the proposed activity, and decided to grant a Section 95 permit. The Club has recently received a new s95 permit for works that could potentially impact the ESBS community, and this revised Plan will be submitted to DECC as supporting information for the works.

The Club continues to educate members, visitors and staff about the value of Eastern Suburbs Banksia Scrub, and their obligations under the *NSW Threatened Species Conservation Act* (1995).

4.2.2 Planting

No planting is to occur into any ESBS remnant, or within 5 metres of any ESBS remnant.

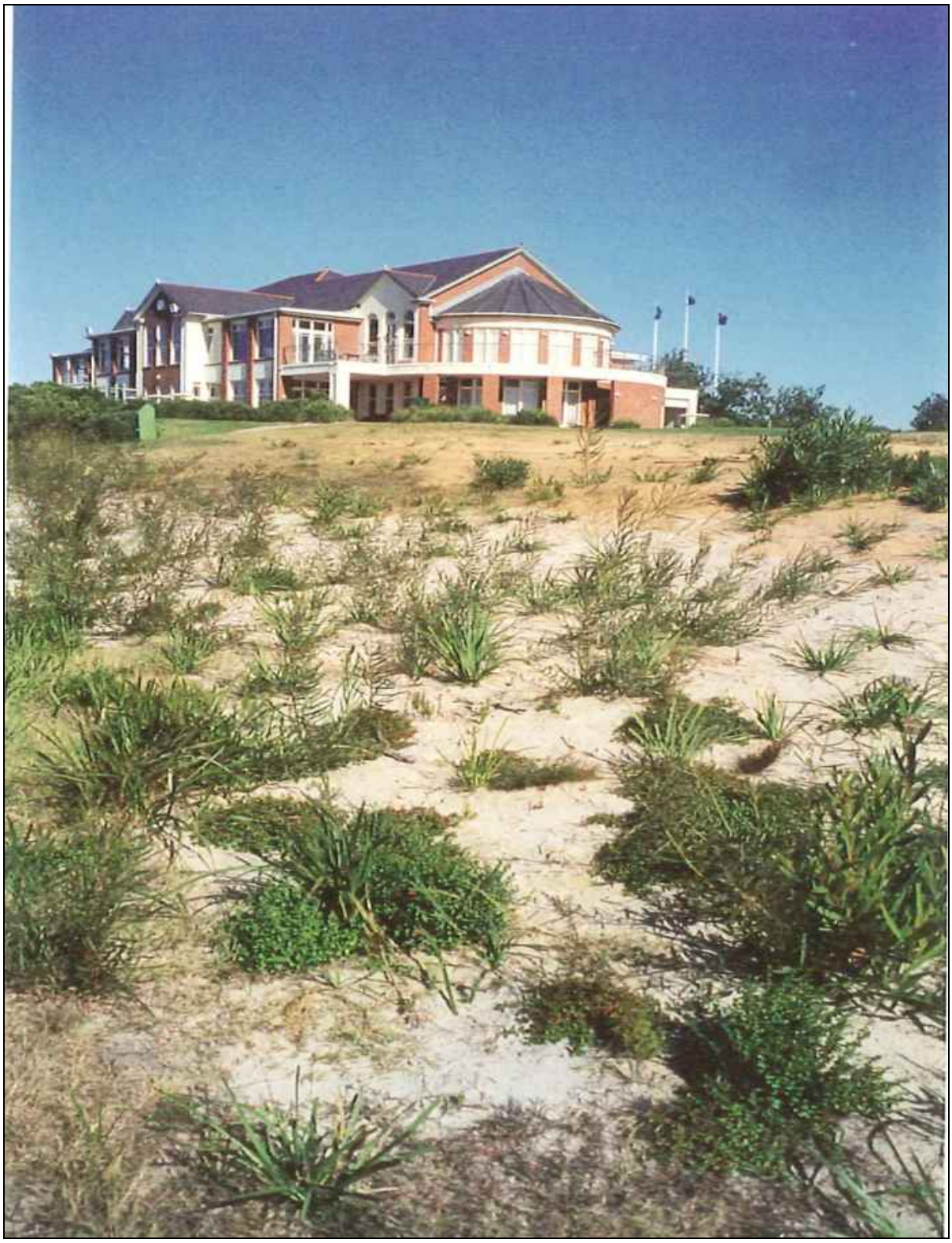

Photo 6 Noel's Knoll, on the 1st. After soil on this hole was moved to improve the playability of the hole, large numbers of native plants germinated. This is a good example of the presence of a native seed bank.

Planting should be limited to the list of species described in Appendix 3. Seed collection has occurred on the site under Licence, and provenance specific plants have been used on the course where planting has been required.

Records of areas planted, the species used, when plantings take place and the success rate of planting is recorded. The locations of plantings are plotted onto a site map.

4.2.3 Clearing

Do not clear any further areas of bushland on the course. Some line of sight clearing is approved under the s95 permit issued to the Club under the TSC Act. All green waste generated form line of sight clearing and bushland regeneration works removed from site.

4.2.4 Edge treatment

Spray outside of all bushland remnants with a monocot specific herbicide such as Fusilade®. The width of the area to be sprayed will vary between ½ -2 metres, depending on the remnant. The course superintendent will determine this width. Bush regenerators will remove by hand the grasses that have spread into remnants, and will also control annual weeds in the sprayed zone.

Mowers will be excluded from bushland areas, and buffers zone will be established around the ESBS remnants to act as a barrier to inappropriate management techniques, and provide delineation of the ESBS areas. Develop a work specification for edge treatment that will ensure the protection of the ESBS community, satisfy the requirements of the Club and be applicable if the recommendation for Critical habitat is approved, and critical habitat buffer areas are located in areas currently subject to edge treatments.

4.2.5 Fire and vegetation

Fire will need to be actively managed at the NSWGC. The following guidelines are recommended:

- Follow the guide for fire intervals in Table 1.
- Keep clear records of all fires at the NSWGC. This is vital if appropriate fire intervals are to be maintained. Map the extent of all fires.
- Vary the season of fire as much as possible within the acceptable “safe” period for fires.
- Only burn one or two pockets each year, as remnants may require high levels of maintenance to control weeds after the fire.
- Establish protective exclusion fencing and temporary signage for at least a six month period providing information about the prescribed burns and the reason for exclusion from the area during initial post-fire regeneration period.
- Establish permanent monitoring quadrats or transects in areas scheduled for ecological burns. Carry out follow up surveys at regular intervals following burns.

Fire ecologists in NSW have developed Table 1. Reflecting the complexity of vegetation management and fire regimes, this table shows that a wide variety of fire regimes are acceptable. It is important that fire intervals are varied.

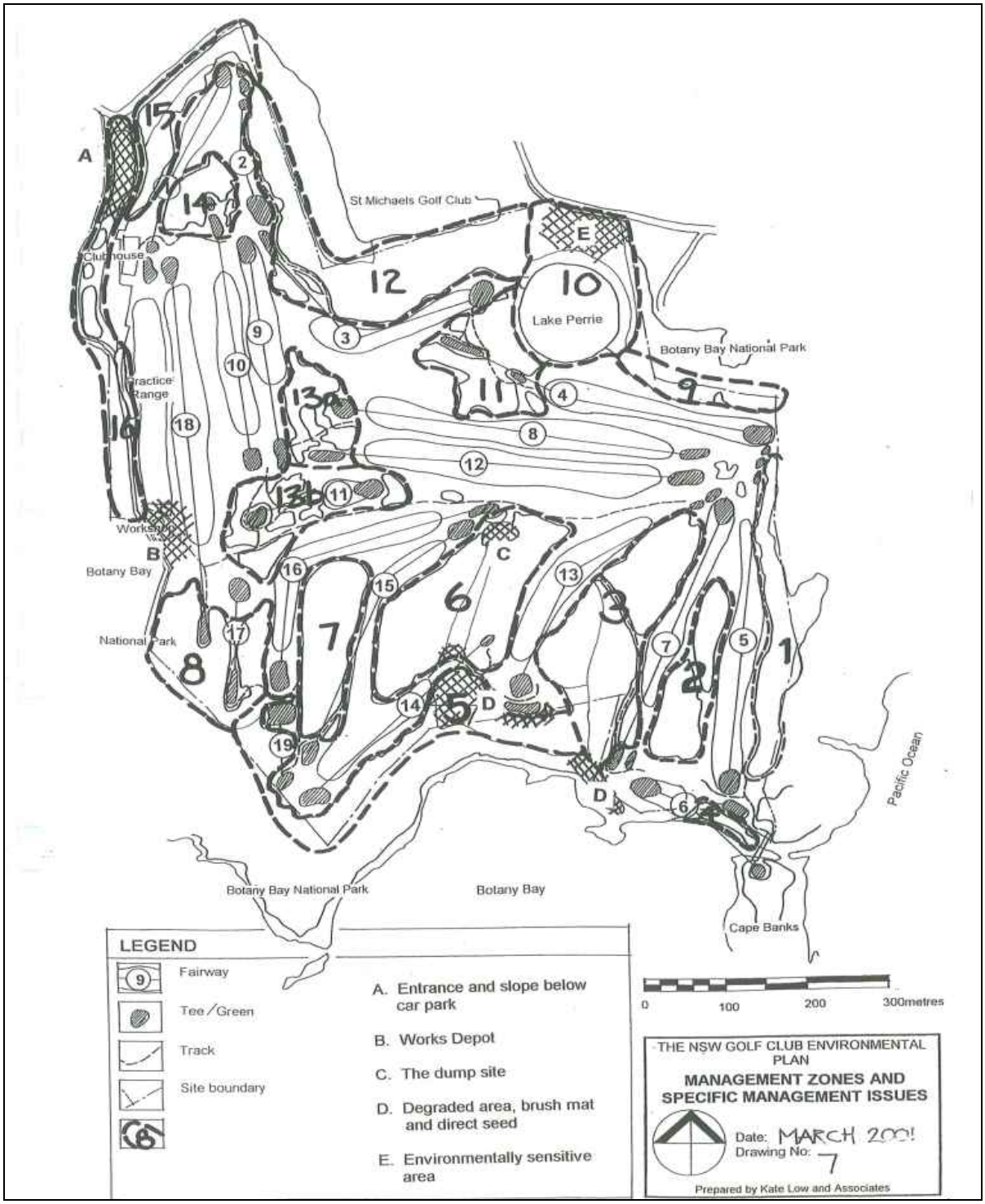

Figure 7: Vegetation management zones and site specific management issues

Photo 7: Areas like this will benefit from an ecological burn.

Vegetation Community	Broad Vegetation Grouping	Decline in biodiversity predicted if:
Coastal Sandstone Heath & Coastal Dune Heath (Easter Suburbs Banksia Scrub)	**Shrubland -Heath Complex** Fire regime A	• more than two successive fires occur at less than 8 years apart. • more than two successive fires occur at intervals of more than 15 years apart. • there are no fires for more than 30 years.
Coastal Dune Forest	**Dry Forest Complex** Fire regime B	• more than two successive fires occur at less than 5 years apart. • there are no fires for more than 30 years.
Coastal Freshwater Swamp	**Wetlands**	• any fire event occurs.
A variable fire regime within the above thresholds is required to avoid species decline, and this requires varying fire frequency, intensity, season and pattern of burn.		

(Adapted from National Parks and Wildlife Service 1999)

Table 1: appropriate fire frequencies for vegetation at the NSW Golf Club.

Figure 9 shows proposed fire regimes for each vegetation community

The process for obtaining permission to carry out an ecological burn is:

- Fires can only be carried out between 1st April and 30th September.
- The Club will need to get an approval for open burning from the DECC and notify the the NSW Fire Brigade.
- Inform neighbours (the NPWS Botany Bay National Park, St Michaels, The NSW Pistol Club)

4.3 Weed control

4.3.1 Bitou Bush Control

Continue the existing program of annual aerial spraying in winter of areas where there are substantial infestations. The annual bush regeneration contract will allow for all remnants to be hand picked throughout the year to weed out Bitou seedlings.

4.3.2 Other Weeds

The bush regeneration contractors will focus on Turkey Rhubarb, scattered occurrences of Lantana, and the exotic perennial grasses African Love-grass, Kikuyu and Buffalo Grass. Other noxious, annual, perennial and grass weeds, are to be treated within bushland remnants.

4.4 Water usage and water quality

Maintain as low a level of watering as is practically possible. Ensure that sprinkler overspray into bushland areas is minimised. The drainage line though bushland beside the 13th will require regular monitoring to see if changes to irrigation are causing degradation in this remnant.

4.5 Soil conservation

Soil conservation is primarily an issue when carrying out construction at the NSWGC. Plan all construction so that soil is uncovered for the minimum practical time. If soil is excavated, exposed or left uncovered overnight, install temporary silt fences around construction zones and cover all spoil mounds.

4.6 Pesticide and fertiliser use

Existing practices are effective.

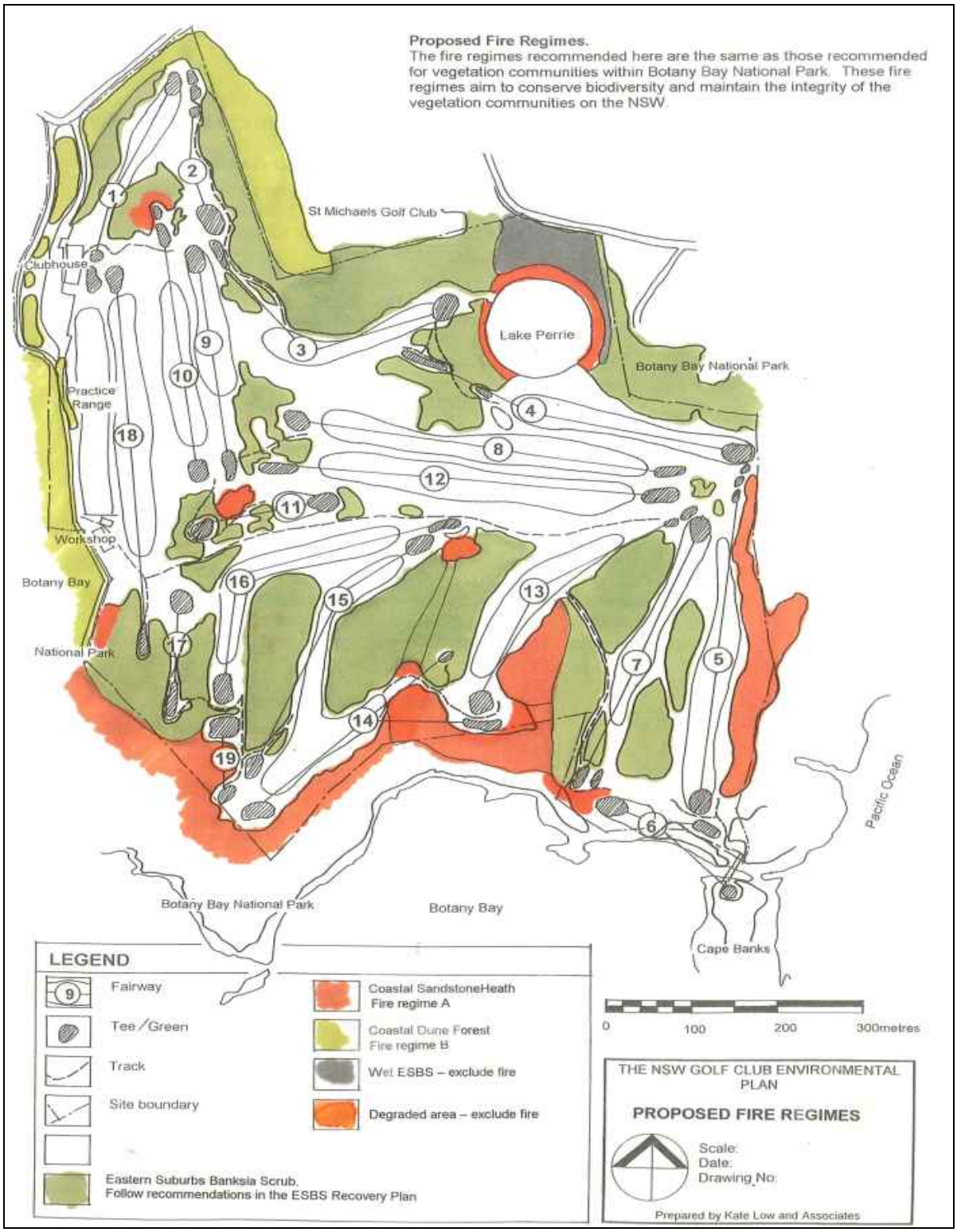

Figure 8: Proposed fire regime

4.7 Native fauna

Raising the awareness of members and their guests is a positive way of protecting fauna at the NSWGC, and adding another dimension to the golfing experience. Suggested ways of doing this are:

- Buy copies of Bird identification books to put in the Clubhouse library. Print out fauna lists to make available to golfers.
- Birds Australia, one of the major ornithological groups, runs a program called Birds on Golf Courses. If there is sufficient member interest, become involved in this program.
- Continue to use the Windy Wales as an avenue to educate members about fauna on the course.

4.8 Feral animals

Maintain current rabbit baiting program and use of licensed controller to target feral animals, predominately rabbit and foxes. Liaise with the DECC regarding fox baiting on the NSWGC and adjoining areas.

4.9 Site Visitation (Access and Usage)

Continue to provide members and their guests information regarding the unique course setting and the presence of the endangered ecological community ESBS within the bushland remnants within the course. Continue to monitor access to the course from adjoining areas to assess the potential impacts to ESBS areas, and exclude all vehicle access to the course unless under strict supervision of the course superintendent.

4.10 Staff training

All greenkeepers have, or are in the process of gaining, greenkeeping and/ or horticultural qualifications. As a long term goal, ideally one or more of the Greenkeeping staff should gain Bush Regeneration Certificate 4 qualifications through NSW TAFE.

The Club has implemented the e-par® Environmental Management System as an integral part of golf club operations to help reduce water, waste and energy and minimise liability. Environmental management with e-par has many benefits including raising the awareness of staff and giving them information regarding their own environmental responsibilities.

4.11 Monitoring

Monitoring is vital to any environmental management. Without checking the effects of management practices, it is difficult to tell whether these practices are effective.

As part of the bush regeneration program, the following should be recorded:

- Bi-annual mapping of condition of bushland of the course. Major weeds in each remnant/ management zone need to be identified, to record changes in weed species.

- Photographs taken of every bushland remnant, from an identified photo spot, so that visual changes can be tracked. It is important that the same spot is used every time so that comparisons can be made.
- Annual report by bush regenerators of areas worked, and landmarks achieved.

In addition to the general monitoring carried out as part of the bush regeneration program, specific monitoring in areas of major management actions such as ecological burn areas should be carried out. This will involve establishing permanent monitoring quadrats or transects that are sampled prior to burns with regular follow up surveys. The data collected will contribute to the implementation of the ESBS Recovery Plan objectives 9.1 Survey and assessment, 9.3 Threat management and ecological restoration and 9.5 Research. Data should be forwarded to the DECC for the development of strategic management measures such as the preparation of Best Practice Guidelines for ESBS and refinement of mapping.

4.12 Communications

The main lines of communications are between:

- The Board, committees (management) and members
- Management and staff
- The Club and neighbours.

Generally there are good levels of communication, but a few areas need to be addressed.

Initiating management practices such as the use of fire can greatly upset some members, leading to misunderstanding and confusion. The 'Windy Wales' is the main vehicle for communicating with members. Use it more to inform members of proposed actions so that there are no surprises.

The NSWGC has carefully cultivated a good relationship with the DECC with regard to the protection and management of the ESBS community within an operational golf course. A high turnover of NPWS staff has led to a deterioration of this relationship, and Club management are understandably frustrated with this situation. This is a difficult situation, as it is a systemic problem within the NPWS, and largely out of the control of the Club.

5.0 IMPLEMENTATION PLAN

5.1 LEGISLATIVE FRAMEWORK

Desired Outcomes:
For the NSWGC to comply with all legislative requirements.

Issue	Recommended action	Priority
Keeping up to date	The course Superintendent and General Manager need to keep abreast of all changes in legislation, recovery plans and critical habitat recommendations. Some useful web sites are listed below. Department of Environment and Climate Change NSW This page provides information regarding threatened species, key threatening processes, recovery planning and critical habitat, s91 licensing, environment protection and regulation and Parks and Wildlife. Department of Environment, Water, Heritage and the Arts http://www.environment.gov.au/ The Environment Defenders Office www.edo.org.au/ The NSW Department of Planning NSW Department of Planning	On-going

5.2 NATIVE VEGETATION (General)

Desired Outcomes:

- **Protect and conserve the native vegetation communities of the NSWGC**
- **Protect Eastern Suburbs Banksia Scrub, and fulfil all legislative requirements of the *Threatened Species Conservation Act 1995*, and the *Environment Protection and Biodiversity Conservation Act 1999* [Cwealth]**
- **Improve the health of vegetation communities**
- **Fulfil lease obligations with relation to vegetation management**

Issue	Recommended action	Priority
Protection vegetation communities	Do not clear or alter any further patches of bushland on the course. Any future redesign of tees, holes, greens or paths need to be confined to existing cleared areas. This will also fulfil lease obligations.	High
	Do not plant into remnant vegetation, or into area where there is still a viable seed bank, and natural regeneration is likely.	High
Protect ESBS	Develop this Environment Plan to include site specific recommendations for each patch of Eastern Suburbs Banksia Scrub, and submit to DECC for approval. (See native vegetation – specific management zones)	High
	Incorporate the recommendations of the ESBS Recovery Plan into the Environment and Strategic Plans for the course.	High
Health of vegetation communities	Bushland management requires specialist skills, skills that are very different to greenkeeping and horticultural skills. Continue to employ bush regenerators on an ongoing basis to work in all bushland remnants of the NSWGC. Include this as part of the recurring maintenance costs for the Club. Contract works are included in Appendix 6, which should include vegetation monitoring program.	On going
	Manage bushland edges using a monocot specific herbicide, such as Fusilade® to prevent exotic grasses growing into bushland remnants	On going

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 1. Coastal Sandstone Heath – East of the 5th Fairway			
Health	Fairly healthy.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Hand remove and spot spray annual, perennial and grass weeds.	
Weeds	No major weeds		
Edge	Minor issue		
Fire	Not burnt.	Burn next 5 -15 years	
Other	Several informal tracks dissect this area. Line of sight trimming	Close off and brush mat these Trim vegetation to height of 1-2 metres as per s95 permit	
Remnant No. 2. Eastern Suburbs Banksia Scrub – 2 patches between the 5th, 6th and 7th.			
Health	Mixed. Healthy, good diversity, few weeds in the centre of each remnant. Highly degraded pocket at the southern limit, adjacent to the 6th.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Spray grass edges with Fusilade, outside of remnant. ▪ Hand remove and spot spray annual, perennial and grass weeds.	
Weeds	Few.		
Edge	Moderate infestations around edges. Invasive grasses an issue on all edges.		
Fire	Partly burnt 1998.	Burn next 8-15 years.	
Other			

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 3. Eastern Suburbs Banksia Scrub and Coastal Sandstone Heath – Large patch between the 7th and 13th, dissected by access path, 1 patch adjacent to 7th Tee.			
Health	Overall healthy.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Hand remove and spot spray annual, perennial and grass weeds. ▪ Spray grass edges with Fusilade®, outside of remnant. ▪ Weed drainage line	
Weeds	Some annuals, grass weeds around edges. Weeds along drainage line, particularly on upper slope.		
Edge	Substantial problems around all edges.		
Fire	Burnt 1998.	Burn other sections next 2 -10 years	
Other	Drainage Line Line of sight trimming	This drainage line will need to be monitored, and may require intense bush regeneration with the new water regime Trim vegetation to height of 0.5-2 metres as per s95 permit	
Remnant No. 4. Wet heath adjacent to the 6th.			
Health	Highly degraded, substantial plantings where this wet area extends through the golf course.	Highly degraded remnant. Low priority for regeneration. Monitor twice a year to ensure that it is stable, and not getting worse.	
Weeds	Extensive infestations of Pennywort (*Hydrocotyle bonariensis*).		
Edge	Grasses invading on edges		
Fire	Not burnt 1998	Do not burn	
Other			

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 5. Coastal Sandstone Heath and regenerating heath along the coast adjacent to the 13th and 14th.			
Health	Moderately to highly degraded.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Hand remove and spot spray annual, perennial and grass weeds.	
Weeds	Bitou, Lantana, annual weeds, grass weeds		
Edge	Couch invading along edges		
Fire	Burnt 1998	Do not burn degraded areas	
Other	Includes highly degraded areas in the valley past the 14th Tee and below the new 14th Tee. Also highly degraded area immediately below the 7th Tee	▪ Brush mat and direct seed bare areas with *Acacia sophorae, Leptospermum laevigatum, Lomandra longifolia,* and *Isolepis nodosa.*	
Remnant No. 6. Eastern Suburbs Banksia Scrub between the 12th, 13th 14th and 15th.			
Health	Variable. Very healthy on both hills, degraded in and around dump site. Degraded along drainage line, particularly close to the dump.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Handweeding of minor and scattered patches of Lantana ▪ Hand remove and spot spray annual, perennial and grass weeds. ▪ Spray grass edges with Fusilade®, outside of remnant.	
Weeds	Mainly annuals. Grasses around edges.		
Edge	Edges affected by turf grasses, particularly adjacent to 15th green.		
Fire	Burnt 1998.	Burn in the next 8-20 years	

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 7. Eastern Suburbs Banksia Scrub between the 15th and 16th.			
Health	Very healthy remnant.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Spray edges, outside of the remnant with Fusilade®. ▪ Hand remove couch grass which has invaded edges ▪ Twice yearly control of annual weeds (early and late summer)	
Weeds	Few		
Edge	Edges affected by turf grasses.		
Fire	Burnt 1998	Burn southern section 2009, rest in next 5-15 years	
Other	Line of sight trimming	Trim vegetation to height of 1-2 metres as per s95 permit	
Remnant No. 8. Eastern Suburbs Banksia Scrub and regenerating heath between 16th, 17th and 18th.			
Health	Generally healthy, but substantially fragmented, with long edges, and many plantings adjacent to paths.	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Spray edges, outside of the remnant with Fusilade®. ▪ Hand remove couch grass which has invaded edges ▪ Twice yearly control of annual weeds (early and late summer)	
Weeds	Few, mainly on edges. Some *Acetosa saggitata*.		
Edge	Edges affected by turf grasses		
Fire	Burnt 1998	Burn next 8-20 years	
Other			

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 9. Eastern Suburbs Banksia Scrub – Adjacent to the 4th.			
Health	Mature Banksia scrub, with simplified understorey	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Spray edges, outside of the remnant with Fusilade®. ▪ Hand remove couch grass which has invaded edges	
Weeds	Extensive couch grass infestation in understorey, some Lantana		
Edge	Edges affected by turf grasses		
Fire	No record or physical evidence of burning in last 25 years	Burn in the next 5 years, in conjunction with NPWS	
Other	Land shares boundary with Botany Bay National Park.		
Remnant No. 10. Wet heath (wet Eastern Suburbs Banksia Scrub) north of Lake Perrie			
Health	Healthy, diverse community with predominantly wet ESBS species	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Target Whisky Grass (*Andropogon virginicus*)	
Weeds	Some Lantana, Bitou Bush, Whisky Grass		
Edge			
Fire	Has been burnt frequently in the past (dumped cars). No burn in the last 6-8 years	Do not burn this area.	
Other			

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 11. Eastern Suburbs Banksia Scrub – highly fragmented area between the 3rd and 4th.			
Health	Highly fragmented and degraded remnant. Substantial plantings adjacent to 4th Tee	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Handweeding of minor and scattered patches of Lantana ▪ Hand remove and spot spray annual, perennial and grass weeds. ▪ Spray edges, outside of the remnant with Fusilade®	
Weeds	Grass understorey weeds, Lantana		
Edge	All edges infested with turf grasses		
Fire	Ecological burn in part of area in 2002	Ecological burn proposed for 2010 in line with temporal and spatial mosaics and according to Section 4 Recommendations	
Other	Wet ESBS at the bottom of the hill, next to the 4th fairway. Line of sight trimming	Protect and try to extend this remnant. Do not burn the wet area of this remnant. Trim vegetation to height of 0.5-2 metres as per s95 permit	

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 12. Eastern Suburbs Banksia Scrub – adjacent to the 2nd and 3rd.			
Health	Degraded, senescent remnant, infested with Bitou Bush.	▪ Extensive bush regeneration needed. Weed remnant before burning, and intensive follow up will be required after the burn ▪ On-going hand weeding to remove Bitou bush seedlings ▪ Handweeding of minor and scattered patches of Lantana ▪ Spray edges, outside of the remnant with Fusilade®. ▪ Hand remove couch grass which has invaded edges	
Weeds	Bitou Bush, Lantana, grass weeds in understorey		
Edge	Edges infested with turf grasses.		
Fire	Prescribed burn in section of remnant in 2002	Prescribed burn in section of remnant proposed in 2008	
Other	This remnant is also on the grounds of St Michaels golf course Line of sight trimming	Undertake burn in conjunction with St Michaels Golf Course. Trim vegetation to height of 1-2 metres as per s95 permit Trim regrowth following fire to height of 1-2 metres as per s95 permit	

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 13(a). Eastern Suburbs Banksia Scrub – highly fragmented area between the 8th, 9th and 12th.			
Health	Very degraded, but with a diverse range of species	▪ Continuing bush regeneration required. Weed remnant before burning, and intensive follow up will be required after the burn ▪ On-going hand weeding to remove Bitou bush seedlings ▪ Hand remove and spot spray annual, perennial and grass weeds. ▪ Spray edges, outside of the remnant with Fusilade®.	
Weeds	Extensive grass infestation in understorey, Lantana and Bitou Bush		
Edge	Edges extensively infested with turf grasses		
Fire	Prescribed burn in section of remnant in 2002		
Other	Pine trees (*Pinus radiata*) planted through this remnant. Water storage in the middle of this remnant.	Remove Pine trees with minimum disturbance prior to burning this remnant	

NATIVE VEGETATION – Individual management zones

Issue	Description	Recommended action	Priority
Remnant No. 13(b). Eastern Suburbs Banksia Scrub – highly fragmented area around the 11th.			
Health	Highly fragmented and degraded remnant, but with a diverse range of species.	▪ Continued bush regeneration is required through the area. ▪ On-going hand weeding to remove Bitou bush seedlings ▪ Hand remove and spot spray annual, perennial and grass weeds. ▪ Spray edges, outside of the remnant with Fusilade®. ▪ Handweeding to follow planned ecological burns	
Weeds	Extensive grass infestations in understorey, some lantana.		
Edge	Edges infested with turf grasses		
Fire	Southern section of this remnant was burnt in 1998	Carry out ecological burns in southern, middle and northern sections in 2009, 2010 and 2011 respectively following finalised preparation works.	
Other	Monitoring	Post ecological burn monitoring in established quadrats or transects	
Remnant No. 14. Eastern Suburbs Banksia Scrub and planted area between the 1st and 10th.			
Health	Following primary, secondary and maintenance weeding the area has been prepared for ecological burns. Significant regeneration is expected following ecological burns..	▪ Handweeding to follow planned ecological burns ▪ Spray edges, outside of the remnant with Fusilade®.	
Weeds	Grass understorey.		
Edge	Edges infested with turf grasses		
Fire	No record or physical evidence of burning in the last 25 years.	Carry out ecological burns in 2008 following finalised preparation works.	
Other	Monitoring Sewerage system within this remnant	Post ecological burn monitoring in established quadrats or transects	

NATIVE VEGETATION – Individual management zones			
Remnant No. 15. Eastern Suburbs Banksia Scrub and Coastal Dune Forest, between the 1st and the entrance.			
Health	Healthy remnant with significant regeneration following ecological burns	▪ On-going hand weeding to remove Bitou bush seedlings ▪ Continued handweeding throughout ecological burn areas. ▪ Continued thinning of *Acacia longifolia* subsp. *sophorae* foliage or stems in burn areas to prevent the species from dominating and smothering other regenerating species ▪ Spray edges, outside of the remnant with Fusilade®. ▪ Hand remove and spot spray annual, perennial and grass weeds.	
Weeds	Few weeds		
Edge	Some edges infested with turf grasses .		
Fire	Ecological burns carried out in 2006 and 2007 in two patches	Continue to plan for additional ecological burns based on temporal and spatial mosaics and according to Section 4 Recommendations	
Other	Monitoring	Post ecological burn monitoring in established quadrats or transects	
Remnant No. 16. Eastern Suburbs Banksia Scrub and assorted fragments in and around the Entrance and car park			
Health	Small degraded fragments	▪ Regenerate remnants at the Entrance and along the steep slope. ▪ Control annual weeds at base of slope	
Weeds	Annual weeds, African Love Grass (*Eragrostis curvula*) Lantana, Bitou Bush		
Edge			
Fire	No record or physical evidence of burning in the last 25 years.	Use pile burns as a regeneration tool if appropriate	
Other	Front entrance to be redesigned		

5.3. FIRE

Desired Outcomes:

- **To develop appropriate fire regimes for vegetation communities at the NSWGC**
- **To protect the buildings and associated infrastructure of the course**

Issue	Recommended action	Priority
Process for approval for ecological burns	The process for obtaining permission to carry out an ecological burn is: ▪ Fires can only be carried out between 1st April and 30th September. ▪ The Club will need to get permission to burn from the Department of Environment and Climate Change (DECC) and the NSW Fire Brigade. ▪ Inform neighbours (the NPWS, St Michaels, The NSW Pistol Club) **Getting Approval to burn from the DECC or Council** ▪ Under the *Protection of the Environment Operations Act* (1997) Clean Air Regulation (2002), open fires are prohibited within the metropolitan area. Approvals are issued in line with Part 2A of the regulation, including for ecological burns. ▪ The approval is generally valid for 12 month ▪ Determine if approval or assessment required under TSC Act or EP&A Act. **Getting permission to burn from the NSW Fire Brigade** ▪ Apply to NSW Fire Brigade (Matraville) for a permit (Telephone no. 9694-1146). Fire Brigade staff are available to make a site inspection to advise the Club on safety issues and help with filling out the permit. ▪ Fires can only be lit on appropriate weather days (the NSW Fire Brigade will advise on this), and on low pollution days (the DECC will advise on this). The permit is valid for 21 days.	As required

5.3. FIRE

<table>
<tr><th>Issue</th><th>Recommended action</th><th>Priority</th></tr>
<tr><td>Fire Regimes ESBS</td><td>Follow recommendations on fire made in the ESBS Recovery Plan. Install temporary protect fences and educational signs at all areas burnt for at least six months post-fire.</td><td>High</td></tr>
<tr><td>Keeping records</td><td>Map all fires at the NSWGC and record date, intensity of burn, cause (if known)</td><td>High</td></tr>
<tr><td>Keep members informed</td><td>Fire is essential to maintaining the health and biodiversity of the vegetation communities. Members need to understand fire management strategy.</td><td>Medium</td></tr>
<tr><td>Fire regimes</td><td>Follow the fire recommendations made the Draft Fire Management Plan – Sydney Harbour and Botany Bay National Parks.
Burn as indicated for individual management zones.
<table>
<tr><th>Vegetation Community</th><th>Broad Vegetation Grouping</th><th>Decline in biodiversity predicted if:</th></tr>
<tr><td>Coastal Sandstone Heath
&
Coastal Dune Heath (includes ESBS)</td><td>Shrubland –Heath Complex</td><td>• more than two successive fires occur at less than 8 years apart.
• more than two successive fires occur at intervals of more than 15 years apart.
• there are no fires for more than 30 years.</td></tr>
<tr><td>Coastal Dune Forest</td><td>Dry Forest Complex</td><td>• more than two successive fires occur at less than 5 years apart.
• there are no fires for more than 30 years.</td></tr>
<tr><td>Wet ESBS,
Wet heath</td><td>Wetlands</td><td>• any fire event occurs.</td></tr>
<tr><td colspan="3">A variable fire regime within the above thresholds is required to avoid species decline, and this requires varying fire frequency, intensity, season and pattern of burn.</td></tr>
</table></td><td>On-going</td></tr>
</table>

5.4 WEED MANAGEMENT

Desired Outcomes:
Maintain noxious weed control, including Bitou Bush
Control plants which are invading bushland remnants

Issue	Recommended action	Priority
Bitou Bush control	Current practices which are effective: ▪ Aerial spraying of Bitou Bush ▪ Involvement in trials for biological controls ▪ Disposal of green waste	On-going
	Employ bush regenerators to carry out hand weeding and spot spraying of Bitou seedlings from all bushland remnants. Follow recommendations in vegetation management zones.	On-going
Couch grass control	Use a monocot specific herbicide to make a spray edge around all bushland remnants	On-going
Annuals and other noxious weeds	Follow recommendations in vegetation management zones.	On-going

5.5 WATER USAGE AND WATER QUALITY

Desired Outcomes:

- **To minimise water use on the course.**
- **To maintain and improve the water quality at all exit points from the course.**

Issue	Recommended actions	Priority
Water minimisation	Current practices which are effective: ▪ Fairways are not watered during summer (Oct/ Nov – April) ▪ Use of drought tolerant grasses on fairways ▪ Well designed irrigation system	On-going
	Continue to educate members about the look of the course and the importance of water minimisation. Continue investigations into bore water and recycled water.	On-going
	Record water usage averages, so that they can be used as a benchmark. Continue to monitor health of bushland around the course to ensure that over watering is not impacting on bushland areas	On-going
Water quality	Current practices which are effective: ▪ Minimal use of fertilisers on fairways (once a year, or twice when there is a major tournament) ▪ Integrated pest management	On-going
	Install and maintain silt fences below and surrounding disturbed areas until stabilised to catch sediments and water borne seed.	

5.6 FERAL ANIMALS

Desired Outcomes:
To control feral animal species, including rabbits, foxes, dogs and starlings.

Issue	Recommended action	Priority
Rabbits	Current practiced which are effective ▪ Control of rabbits with Pindone® every two years ▪ Engage licensed controller to control rabbits twice per year	On-going
Foxes	Engage licensed controller to control foxes twice per year Investigate the possibility of baiting foxes with 1080® Carry out fox control in conjunction with NPWS and St Michaels Golf Course	On-going
Dogs	Cooperate with NPWS in any dog control program	Medium
Starlings	Cooperate with NPWS in any starling control program	medium

6.0 REFERENCES

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NSW Threatened Species Conservation Act (1995)

APPENDIX 1 - The Threatened Species Conservation Act (1995)

The objects of the TSC Act include:

- to prevent extinction and promote the recovery of threatened species, populations, and ecological communities;
- to ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed; and
- to encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving cooperative management.

Threatened species, populations and ecological communities are listed in 'schedules' under the Act. The NSW Scientific Committee makes a final determination regarding threatened ecological communities, and the community is then gazetted. The Final Determination is understood to be the legal definition of the ecological community.

A list of characteristic species is included in the Final Determination. The species present in ESBS are not limited to this list, not do all species need to be present for the community to be described as ESBS.

Under the TSC Act it is an offence to harm or pick threatened species, populations and ecological communities (plants), or to damage their habitat. Picking includes "to gather, pluck, cut, pull up, destroy, poison, take, dig up, remove or injure the plant or any part of the plant" [s5 NPW Act 1974]. A licence is generally required, under section 91 of the TSC Act, to harm or pick ESBS, or to damage its habitat.

Some of the activities currently undertaken at the NSWGC including clearing for paths, lopping to improve sight lines, planting, fertilising, watering, and even weeding, constitute 'picking' under the Act.

National Parks has prepared a Recovery Plan for ESBS. The implications for the NSWGC have been addressed in the revised Environment Plan.

Summary

- Eastern Suburbs Banksia Scrub is an ecological community that has only been identified in Sydney's Eastern Suburbs. It now occupies less than 3% of its pre-1788 distribution.

- There are extensive areas of Eastern Suburbs Banksia Scrub on The NSW Golf Course.

- On 13 June 1997, Eastern Suburbs Banksia Scrub was listed as an endangered ecological community on Part 3 of Schedule 1 of the Threatened Species Conservation Act 1995.

- In general, a Section 91 Licence is required to harm or pick Eastern Suburbs Banksia Scrub or damage its habitat. In certain circumstances a licence may not be required, eg. acts essential for carrying out development in accordance with a development consent within the meaning of the Environmental Planning and Assessment Act 1979 OR when an activity is identified in, and carried out in accordance with, a property management plan approved by the Director General of National Parks and Wildlife.

- Penalties for harming or picking Eastern Suburbs Banksia Scrub without a Section 91 Licence, when one is required, include: fines up to $220,000, imprisonment for up to two years and the costs of damage mitigation and habitat restoration.

- The National Parks and Wildlife Service has prepared a recovery plan for Eastern Suburbs Banksia Scrub. This has implications for the management of the ESBS by the NSWGC.

- The Threatened Species Conservation Act 1995 also has other provisions, including: declaration of critical habitat, threat abatement plans, stop work orders and joint management agreements. These may also apply to The NSW Golf Course at some point in the future. A draft recommendation for the Identification of Critical Habitat for the Eastern Suburbs Banksia Scrub Endangered Ecological Community has been released for public comment. The map of the proposed area of critical habitat within the NSWGC forms part of the draft report. The NSWGC made a submission in May 2006to the DECC in response to the draft recommendation.

Appendix 2 – Useful Contacts

Getting permission for ecological burns:
NSW Fire Brigade, Matraville
Bunnerong Road, Matraville
Tel:9694 1146

EPA (for permission to pollute)
Mr Mick O'Flynn,
Manager: Sydney Local Government
Environment Protection Authority
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Department of Land and Water Conservation
Julie Hickman
Reserve Management
Sydney Metropolitan Office
P.O. Box 3935
Parramatta 2124
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(any queries about burning)

Land and Water Conservation
Land Assessment and Management Co-ordinator
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Wollongong East 2520
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Deborah Stevenson
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APPENDIX 3

Table 2: Species suitable for planting at the NSWGC	
Botanic Name	**Common Name**
Acmena smithii	Lilly Pilly
Allocasuarina littoralis	Black She-Oak
Casuarina glauca	Swamp Oak
Eucalyptus piperita	Sydney Peppermint
Eucalyptus robusta	Swamp Mahogany
Melaleuca linariifolia	Snow in summer
Angophora hispida	Dwarf Apple
Baeckea imbricata	
Callistemon citrinus	Crimson Bottlebrush (Wet)
Correa alba	White Correa
Hakea gibbosa	Dagger Bush
Leptospermum polygalifolium	Lemon scented tea tree
Melaleuca erubescens	Pink Honeymyrtle
Micromyrtus ciliata	
Oxylobium cordifolium	Heart leafed Shaggy Pea
Pultenaea daphnoides	Pultenaea
Rulingia hermanniifolia	Wrinkled Kerrawang
Westringia fruticosa	Coast Rosemary
Carpobrotus glaucescens	Pigface
Dianella congesta	Flax Lily
Isolepis nodosa	Knobby Club Rush
Mirbelia rubiifolia	Mirbelia
Viola hederacea	Native Violet
Hibbertia scandens	Guinea Flower
Pandorea pandorana	Wonga Wonga Vine

Appendix 4 – Flora list

A comprehensive flora survey did not form part of the 2001 Environment Plan or this 2008 revision. The following list is a list of native flora found in Botany Bay National Park, adjacent to the NSWGC. Where the plant has positively been identified within the grounds of the NSWGC, this is indicated.

This is not a definitive list.

Definitely found at the NSW	*Botanic Name*	Common name
FERNS		
*	*Adiantum aethiopicum*	Maidenhair Fern
	Asplenium difforme	
*	*Blechnum cartilagineum*	
?	*Blechnum indicum*	
*	*Calochlaena dubia*	Soft Bracken
	Cyathea australis	Tree Fern
*	*Gleichenia dicarpa*	
	Gleichenia microphylla	
	Gleichenia rupestris	
	Histiopteris incisa	Batswing Fern
*	*Hypolepis muelleri*	Harsh ground Fern
*	*Lindsaea linearis*	
*	*Pteridium esculentum*	Bracken
FAMILY Centrolepidaceae		
*	*Centrolepis fascicularis*	
	Centrolepis strigose	Hairy Centrolepis
FAMILY Commelinaceae		
*	*Commelina cyanea*	Commelina
FAMILY Cyperaceae The SEDGES		
	Baumea acuta	
	Baumea gunnii	
*	*Baumea juncea*	
	Baumea nuda	
	Baumea rubiginosa	
*	*Baumea teretifolia*	
	Carex pumila	
	Caustis pentandra	
	Chorizandra cymbaria	
	Chorizandra sphaerocephala	
	Cyathochaeta diandra	
*	*Cyperus polystachos*	
	Eleocharis spacelata	Tall Spike Rush
*	*Gahnia clarkei*	

*	*Gahnia sieberiana*	
	Isolepis cernua	
*	*Isolepis nodosa*	
	Lepidosperma concavum	
	Lepidosperma filiforme	
*	*Lepidosperma laterale*	
	Lepidosperma neesii	
	Lepidosperma viscidum	
	Gymnoschoenus sphaerocephalus	
	Ptilothrix deusta	
	Schoenus apogon	
	Schoenus brevifolius	
*	*Schoenus ericetorum*	
	Schoenus nitens	
	Schoenus paludosus	
	Tricostularia pauciflora	
FAMILY Eriocaulaceae		
	Eriocaulon scariosum	
FAMILY Haemodoraceae		
	Haemodorum corymbosum *Haemodorum planifolium*	
FAMILY Iridaceae		
	Patersonia fragilis	
	Patersonia glabrata	
FAMILY Juncaceae		
?	*Juncus alexandria/ firmis*	
?	*Juncus continuus*	
*	*Juncus krausii*	
*	*Juncus palludus*	
*	*Juncus planifolius*	
	Juncus usitatus	
FAMILY Liliaceae		
*	*Blandfordia nobilis*	Christmas Bells
	Burchardia umbellata	
	Crinum pendunculatum	Crinum Lily
*	*Dianella caerulea*	Blue Flax Lily
*	*Dianella congesta*	
*	*Dianella revoluta*	Mauve Flax Lily
	Sowerbaea juncea	Vanilla Lily
	Thelionema umbellata	
	Thysanotus tuberosus	Fringe Lily
FAMILY Orchidaceae ORCHIDS		
	Acianthus fornicatus	Pixie Orchid

	Caleana major	
	Calochilus paludosus	
	Calochilus robertsonii	
	Cryptostylis erecta	Hooded Orchid
	Lyperanthus suaveolens	
	Microtis unifolia	
	Prasophyllum sp.	Leek Orchid
	Pterostylis acuminata	
	Thelymitra pauciflora	
FAMILY Philesiaceae		
*	*Eustrephus latifolius*	Wombat Berry
*	*Geitnoplesium cymosum*	Scrambling lily
FAMILY Poaceae THE GRASSES		
*	*Agrostis avenacea var avenacea*	
*	*Agrostis billardieri*	
	Aristida ramosa	
	Aristida warmburgii	
	Astrafestuca littoralis	
	Cymbopogon refractus	
*	*Danthonia tenuior*	
*	*Deyeuxia quadriseta*	Red Bent Grass
*	*Dichelachne crinita*	Plume Grass
	Dichelachne micrantha	
	Digitaria parviflora	
*	*Entolasia stricta*	
*	*Eragrostis brownii*	
	Eragrostis parviflora	
	Hemarthria uncinata	Mat Grass
*	*Imperata cylindrica*	Blady Grass
*	*Microlaena stipoides*	Weeping grass
	Panicum simile	Two colour panic
	Paspalum distans	
*	*Phragmites australis*	Native Reed
	Plinthanthesis paradoxa	
	Poa poiformis	
	Spinifex sericeus	Spinifex
	Sporobolus virginicus	
	Stipa mollis	
*	*Themeda australis*	Kangaroo Grass
*	*Zoysia macrantha*	
FAMILY Restoniaceae		
	Empodisma minus	
*	*Hypolaena fastigata*	
*	*Leptocarpus tenax*	
?	*Lepyrodia gracilis*	

	Lepyrodia scariosa	
?	*Restio complanatus*	
?	*Restio tetraphyllus ssp. meiostachyus*	
FAMILY Selaginaceae		
*	*Selaginella uliginosa*	Selaginella
FAMILY Smilacaceae		
*	*Smilax glyciphylla*	Native Sarsparilla
FAMILY Xanthorrhoeaceae		
*	*Lomandra filiformis*	
	Lomandra glauca	
*	*Lomandra longifolia*	
	Lomandra multiflora	
*	*Lomandra obliqua*	
*	*Xanthorrhoea resinifera*	
FAMILY Xyridaceae		
	Xyris gracilis	
	Xyris operculata	
FAMILY Zamiaceae		
	Macrozamia communis	
Dicotyledons		
FAMILY Aizoaceae		
*	*Carpobrotus glaucescens*	Pigface
*	*Tetragonia tetragonioides*	Warrigal greens
Family Apiaceae		
*	*Actinotus helianthi*	Flannel Flower
	Actinotus minor	
	Apium prostratum	
*	*Centella asiatica*	Centella
*	*Hydrocotyle sp*	Pennywort
	Platysace ericoides	
	Platysace lanceolata	
	Platysace stephensonii	
*	*Xanthosia pilosa*	Woolly Xanthosia
	Xanthosia tridentata	Rocky Xanthosia
FAMILY Araliaceae		
*	*Polyscias sambucifolia*	Elderberry Panax
FAMILY Asclepediaceae		

	Marsdenia suaveolens	
FAMILY Asteraceae		
*	*Cotula australis*	
	Cotula coronopifolia	
*	*Epaltes australis*	
*	*Pseudognaphalium luteo-album*	Cudweed
	Senecia glomeratus	
	Senecia hispidulus	
	Senecia lautus	
FAMILY Baueraceae		
*	*Bauera rubiodies*	Native dog rose
FAMILY Campanulaceae		
*	*Wahlenbergia gracilis*	
FAMILY Caryophyllaceae		
*	*Spergularia rubra*	Sperry
FAMILY Cassythaceae		
	Cassytha glabella	Devils twine
*	*Cassytha pubescens*	Common Devils Twine
FAMILY Casuarinaceae		
*	*Allocasuarina distyla*	
	Allocasuarina littoralis	
	Allocasuarina torulosa	
FAMILY Convolvulaceae		
*	*Calystegia soldenella*	
*	*Dichondra repens*	Kidney Weed
FAMILY Crassulaceae		
	Crassula sieberana	
FAMILY Cunoniaceae		
*	*Ceratopetalum gummiferum*	NSW Christmas Bush
FAMILY Dillenaceae		
*	*Hibbertia acicularis*	
	Hibbertia empetrifolia	
*	*Hibbertia fasciculata*	
	Hibbertia linearis	
	Hibbertia obtusifolia	
*	*Hibbertia scandens*	
FAMILY Droseraceae THE SUNDEWS		

	Drosera binata	
	Drosera peltate	
?	*Drosera pygmaea*	
*	*Drosera spatulata*	
FAMILY Elaeocarpaceae		
*	*Elaeocarpus reticulatus*	Blueberry Ash
FAMILY Elatinaceae		
	Elatine gratioloides	
FAMILY Epacridaceae		
*	*Astroloma pinifolium*	
*	*Brachyloma daphnoides*	
*	*Epacris longiflora*	
*	*Epacris microphylla*	
	Epacris obtusifolia	
	Leucopogon ericoides	
	Leucopogon esquamatus	
	Leucopogon parviflorus	
	Leucopogon virgatus	
*	*Monotoca elliptica*	
	Monotoca scoparia	
*	*Sprengelia incarnata*	
	Styphelia laeta	
	Styphelia triflora	
	Styphelia viridis	
*	*Woollsia pungens*	
FAMILY Euphorbiaceae		
*	*Amperea xiphoclada*	Broom Spurge
*	*Breynia oblongifolia*	Coffee Bush
*	*Glochidion ferdinandi*	
	Micrantheum ericoides	
	Monotaxis linifolia	
*	*Omalanthus populifolius*	Bleeding heart
	Poranthera ericifolia	
	Poranthera microphylla	
	Pseudanthus orientalis	
*	*Ricinocarpus pinifolius*	
FAMILY Fabaceae subfamily faboidae		
	Almaleea paludosa	
*	*Aotus ericoides*	
*	*Bossiaea ensata*	
*	*Bossiaea heterophylla*	
*	*Bossiaea scalopendra*	
	Desmodium phytidophyllum	

*	*Dillwynia floribunda*	
*	*Dillwynia glaberrima*	
*	*Dillwynia retorta*	
	Glycine clandestina	
*	*Glycine microphylla*	
*	*Gompholobium glabratum*	
*	*Hardenbergia violacea*	Happy Wanderer
*	*Kennedia rubicunda*	
	Mirbelia rubiifolia	
	Oxylobium cordifolium	
*	*Phyllota philicoides*	
?	*Pultenaea daphnoides*	
?	*Pultenaea dentata*	
	Pultenaea linophylla	
	Pultenaea retusa	
	Sphaerolobium vimineum	
*	*Viminaria juncea*	
FAMILY Fabaceae subfamily Mimosoidae		
	Acacia implexa	
*	*Acacia myrtifolia*	
*	*Acacia sophorae*	
*	*Acacia sophorae (*Prostrate)	
*	*Acacia suaveolens*	
*	*Acacia terminalis*	
	Acacia ulicifolia	
FAMILY Geraniaceae		
	Erodium crinitum	Blue Heronsbill
*	*Pelargonium australe*	
FAMILY Goodeniaceae		
*	*Dampiera stricta*	
	Goodenia bellidifolia	
*	*Goodenia ovata*	
*	*Goodenia paniculata*	
?	*Goodenia stelligera*	
*	*Scaevola ramosissima*	Snake flower
	Selliera radicans	Cavanilles
FAMILY Haloragaceae		
*	*Gonocarpus micranthus*	
	Gonocarpus salsoloides	
	Gonocarpus tetragynus	
*	*Gonocarpus teucrioides*	
FAMILY Juncaginaceae		

	Triglochin striata	Streaked Arrow grass
FAMILY Lamiaceae		
*	*Westringia fruticosa*	Coast Rosemary
FAMILY Lauraceae		
*	*Endiandra sieberi*	Corkwood
	Utricularia biloba	Moth Bladderwort
	Utricularia dichotoma	Fairies Aprons
	Utricularia uliginosa	Asian Bladderwort
FAMILY Lobeliaceae		
*	*Lobelia alata*	
FAMILY Loganiaceae		
	Mitrasacme polymorpha	
FAMILY Meliaceae		
	Synoum glandulosum	Bastard Rosewood
FAMILY Menispermaceae		
*	*Sarcopetalum harveyanum*	Pearl Vine
*	*Stephania japonica*	Snake Vine
FAMILY Moraceae		
*	*Ficus rubiginosa*	Port Jackson Fig
FAMILY Myrsinaceae		
	Rapanea howittiana	Muttonwood
	Rapanea variabilis	Muttonwood
FAMILY Myrtaceae		
*	*Acmena smithii*	Lilly Pilly
*	*Angophora costata*	Angophora
	Baeckea brevifolia	
*	*Baeckea imbricata*	
*	*Callistemon citrinus*	
*	*Callistemon linearis*	
	Callistemon pinifolius	
*	*Calytrix tetragona*	
*	*Corymbia gummifera*	
	Darwinia fascicularis	
	Darwinia leptantha	
	Eucalyptus botryoides	
*	*Eucalyptus globoidea*	
*	*Eucalyptus robusta*	
*	*Kunzea ambigua*	
*	*Leptospermum arachnoides*	
	Leptospermum continentale	

*	*Leptospermum juniperinum*	
*	*Leptospermum laevigatum*	
	Leptospermum polygalifolium	
	Leptospermum squarrosum	
	Leptospermum trinervium	
*	*Melaleuca armillaris*	
	Melaleuca ericifolia	
*	*Melaleuca linarifolia*	
*	*Melaleuca nodosa*	
*	*Melaleuca thymifolia*	
	Micromyrtus ciliatus	
FAMILT Oleaceae		
*	*Notelaea longifolia*	
FAMILY Pittosporaceae		
	Billardiera scandens	
*	*Pittosporum revolutum*	
*	*Pittosporum undulatum*	
FAMILY Polygalaceae		
	Comesperma ericinum	
FAMILY Polygonaceae		
*	*Persicaria decipiens*	
FAMILY Primulaceae		
	Samolus repens	Creeping brookweed
FAMILY Proteaceae		
*	*Banksia aemula*	Wallum Banksia
*	*Banksia ericifolia*	Heath Banksia
*	*Banksia integrifolia*	Coast Banksia
*	*Banksia oblongifolia*	
*	*Banksia robur*	Swamp Banksia
*	*Banksia serrata*	Old Man Banksia
	Conospermum ellipticum	
*	*Conospermum taxifolium*	
*	*Hakea dactylioides*	
	Hakea gibbosa	
	Hakea sericea	
*	*Hakea teretifolia*	
*	*Isopogon anemonifolius*	Drumsticks
*	*Lambertia formosa*	Mountain Devil
	Lomatia silaifolia	
*	*Persoonia lanceolata*	
	Persoonia levis	
	Petrophile pulchella	

*	*Xylomelum pyriforme*	Woody Pear
FAMILY Rhamnaceae		
	Cryptandra amara	
FAMILY Rubiaceae		
?	*Opercularia aspera*	
?	*Opercularia varia*	
*	*Pomax umbellata*	Pomax
FAMILY Rutaceae		
	Boronia parviflora	
	Boronia rigens	
*	*Correa alba*	White Correa
*	*Correa reflexa*	
	Eriostemon australasius	
	Eriostemon buxifolius	
	Eriostemon myoporoides	
*	*Philotheca salsolifolia*	
	Zieria laevigata	
	Zieria pilosa	
FAMILY Santalaceae		
*	*Exocarpus cupressiformis*	Cherry Ballart
FAMILY Sapindaceae		
*	*Dodonea triquetra*	Hop Bush
FAMILY Solanaceae		
	Solanum americanum	
FAMILY Stackhousiaceae		
	Stackhousia nuda	
	Stackhousia viminea	
FAMILY Sterculiaceae		
*	*Lasiopetalum ferrugineum*	
*	*Rulingia hermannifolia*	Wrinkled Kerrawang
FAMILY Stylidaceae		
	Stylidium graminifolium	Trigger Plant
FAMILY Thymelaeaceae		
*	*Pimelia linifolia*	Rice Flower
FAMILY Typhaceae		
*	*Typha orientalis*	Cumbungi
FAMILY Verbenaceae		

*	*Chloanthes stoechadis*	Chloanthes
FAMILY Violaceae		
*	*Hybanthus monopetalus*	
*	*Viola hederacea*	
FAMILY Vitaceae		
*	*Cissus antarctica*	
	Cissus hypoglauca	

SPECIES FOUND BELOW THE DAM IN THE SWAMP AREA			
Family	Botanic Name	Found at Jennifer St, East	West
Apiaceae	*Centella asiatica*		
Asteraceae	*Epaltes australis*		
Cassythaceae	*Cassythia sp.*		*
Centrolepidaceae	*Centrolepis fascicularis*		
Droseraceae	*Drosera sp (spatulata?, pygmaea?)*		*
Epacridaceae	***Epacris microphylla***		*
Fabaceae	***Acacia sophorae***	*	
	Dillwynia floribunda	*	*
Goodeniaceae	*Goodenia paniculata*[2]		
Haloragaceae	*Gonocarpus micranthus*	*	*
Hypericaceae	*Hypericum gramineum*		
Myrtaceae	***Baeckea imbricata***		*
	Callistemon citrinus[2]	*	
	Callistemon linearis		
	Kunzea ambigua		*
	Leptospermum arachnoides		*
	Leptospermum juniperinum[2]	*	
	Melaleuca linariifolia		
	Melaleuca nodosa[2]		*
	Melaleuca thymifolia		
Proteaceae	***Banksia ericifolia***	*	*
	Hakea teretifolia[2]	*	*
Adiantaceae	*Adiantum aethiopicum*		
Cyperaceae	*Baumea juncua*		
	Baumea teretifolia ?		
	Cyperus polystachus		
	Leptocarpus tenax[2]		
Gleicheniaceae	*Gleichenia dicarpa*[2]		
Juncaceae	*Juncus krausii*		
	Juncus paludis		
	Juncus planifolius ?	*	*
	Juncus sp.		
Selaginellaceae	*Selaginella uliginosa*		

Bold type indicates plants that are listed in the Scientific Committee's final determination on Eastern Suburbs Banksia Scrub.

[2] Indicates plants that are listed in the Scientific Committee's final determination for Sydney Freshwater Wetland

Appendix 5 - Fauna List

Fauna of Botany Bay National Park	
Frogs	
Common Eastern Froglet	*Crinia signifera*
Wallum Froglet	*Crinia tinnula*
Brown Toadlet	*Pseudophryne bibronii*
Green and Golden Bell Frog	*Littoria aurea*
Brown striped frog	*Limnodynastes peronii*
Lizards	
Common Scalyfoot	*Pygopus lepidopus*
Jacky lizard	*Amphibolurus nobbi*
Eastern Blue Tongue Lizard	*Tiliqua scincoids*
Eastern Water Dragon	*Physignathus leseurii*
Mountain Dragon	*Tympanocryptis dimensis*
Red Throated Skink	*Pseudemoia platynotum*
Copper-tailed Skink	*Ctenotus taeniolatus*
Eastern Water Skink	*Eulamprus murrayi*
Grass Skink	*Lampropholis delicata*
Garden Skink	*Lampropholis guichenoti*
Striped Skink	*Ctenotus robustus*
Snakes	
Red-bellied black snake	*Pseudechis porphyriacus*
Eastern Brown Snake	*Pseudonaja textiles*
Black bellied Swamp snake	*Hemiaspis signata*
Tiger Snake	*Notechis scutatus*
Mammals	
Common Brushtail Possum	
Common Bentwing bat	
House Mouse	
Black Rat	
Fox	
Cat	
Rabbit	
Dog	

Birds	
Waterbirds, birds of the coastline	
Little Penguin	
Wandering Albatross	
Brown Quail	
Common Pheasant	
Australian Gannet	
Little Black Cormorant	
Great Cormorant	
Red necked Stint	
Sooty Oystercatcher	
Pied Cormorant	
White Faced heron	
Eastern Reef Heron	
Kelp Gull	
Silver Gull	
Southern Giant Petrel	
Wedge Tailed Shearwater	
Japanese Snipe	
Eastern Curlew	
Whibrel	
Crested Tern	
Eastern Common Tern	
Australian Gannet	
Lesser Golden Plover	
Masked Lapwing	
Ruddy Turnstone	
Raptors, Birds of prey	
Black shouldered Kite	
White Bellied Sea Eagle	
Nankeen Kestrel	
Australian Goshawk	
Little Falcon	
Pigeons, Doves	
Bar shouldered Dove	
Spotted Dove	
Feral Pigeon	
Parrots and cockatoos	
Galah	
Yellow tailed Black Cockatoo	
Sulphur-crested Cockatoo	
Crimson Rosella	
Cuckoos	
Fantail Cuckoo	
Shining Bronze-Cuckoo	
Fantail Cuckoo	
Kingfishers, Rollers	

Laughing Kookaburra	
Sacred Kingfisher	
Dollar Bird	
Swallows, Martins, Pipits, Wagtails, Cuckoo Shrikes and Bulbuls	
Welcome Swallow	
Tree Martin	
Australian Pipit	
Black faced Cuckoo shrike	
Red-whiskered Bulbul	
Old world thrushes, Flycatchers and allies	
Blackbird	
Eastern Yellow Robin	
Southern Yellow Robin	
Leaden Flycatcher	
Golden Whistler	
Rufus Whistler	
Grey Fantail	
Willy Wagtail	
Warblers, Wrens, Thornbills	
Golden-headed Cisticola	
Superb Fairy Wren	
Variegated Fairy-Wren	
White –browed Scrub Wren	
Yellow Thornbill	
Honeyeaters	
Eastern Spinebill	
Little Wattlebird	
Yellow faced Honeyeater	
White-plumed Honeyeater.	
White napes Honey eater	
Tawny crowned Honey eater	
New Holland Honey eater	
Pardelotes, White-eyes, Finches	
Spotted Pardelote	
Silvereye	
House Sparrow	
Star Finch	
Red browed Firetail	
Drongos	
Spangled Drongo	
Butcherbirds, Magpies	
Grey Butcherbird	
Australian Magpie	
Introduced birds (may also be listed under individual bird groups)	
Ringnecked Pheasant	
European Starling	
Common Mynah	
House Sparrow	

Blackbird	
Red-whiskered Bulbul	
Spotted Dove	
Feral Pigeon	

Appendix 6 - The bush regeneration contract

The following summarises the complete works specification for the current and ongoing bush regeneration contractors.

Hand weed all remnants to remove Bitou Bush seedlings

After course staff have sprayed edges of remnants, gradually remove invading grasses from all remnants by hand.

Control annual weeds in bare areas around the edges of remnants

Target *Acetosa sagittata, Lantana camara.*

Prepare areas for ecological burns as directed by Course Superintendent. Maintain areas after ecological burns.

Brush mat and direct seed degraded areas along the coast (as indicated on plan). Collect seed and brush matting from bushland on the course. **Do not collect from areas of Eastern Suburbs Banksia Scrub.** Use *Acacia sophorae, Isolepis nodosa, Lomandra longifolia, Leptospermum laevigatum.*

Weed and regenerate remnants in and around the entrance, and on the steep slope between the entrance and exit.