1.0 Cover Page

NSW DEPARTMENT OF PRIMARY INDUSTRIES

REGIONAL WEED MANAGEMENT PLAN

1.1 PLAN TITLE: African Olive Management Plan for the Sydney Region.

1.2 PLAN PROPONENTS

Regional Weeds Advisory Committee: Sydney West Blue Mountains, South West Sydney, Sydney North and Sydney Central Weeds Committees.

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Signature: Chairman:..... Date: .....

1.3 NAME OF PLANT(S) **WONS** NO

Botanical name(s):	**Common name(s):**
Olea europaea subspecies *cuspidata*	African Olive

1.4 PLAN PERIOD

Starting date: 1/7/2008 Completion date: 30/6/2013

1.5 AREA OF OPERATION:
This plan extends over the geographical area represented by the Sydney Central, South West Sydney, Sydney North and Sydney West ~ Blue Mountains regional weeds committees.

1.6 AIM: To reduce the environmental impact of African Olive within the Sydney region.

1.7 OBJECTIVES:
1. To identify high, medium and low priority areas of works, based on characteristics such as level of biodiversity, threatened species, new incursions etc by 2009.
2. To reduce infestations of African Olive in high priority areas by 2013.
3. To contain infestations of African Olive in medium and low priority areas by 2013.
4. To seek the declaration of African Olive as a Class 4 noxious weed in relevant remaining LGAs in the Sydney region.
5. To target enforcement activities in high priority areas, and areas adjacent to where works on African Olive will be carried out.
6. To increase awareness of the impacts, identification and control methods of African Olive.
7. To ensure a continued strategic focus to control African Olive through ongoing; surveys, monitoring, research and evaluation.

2.0 STAKEHOLDERS

*LCAs of the four Sydney Weeds Committees, *Department of Environment and Climate Change (DECC), Hawkesbury Nepean Catchment Management Authority (HNCMA), Sydney Metropolitan Catchment Management Authority (SMCMA), *Department of Lands (DOL), *Department of Housing (DOH), *Botanic Gardens Trust (Mount Annan Botanic Garden), *Sydney Water Corporation (SWC), *RailCorp, Dept of Primary Industry (DPI), *Roads and Traffic Authority (RTA), *Department of Defence (DOD),

* Key land managers who are critical to the success of this Plan

3.0 BACKGROUND and JUSTIFICATION

Introduced to Australia in the mid 19th century for horticultural purposes, African Olive is proving to have serious impacts on the natural environments in the Sydney Region. This plan has been developed to coordinate a regional, strategic approach to managing African Olive in the Sydney region.

African Olive is an aggressive woody weed, capable of forming a dense and permanent canopy in a wide range of vegetation types [(1)]. With over 17 species of birds reported to spread African Olive [(3)], it has been recorded in every local government area in the Sydney region. It is well established on the clay soils in Western Sydney with the worst infestations in the LGAs of Camden, Campbelltown and Wollondilly.

Whilst African Olive appears to prefer the clay soils of the Cumberland Plain, it also has the ability to establish on dry exposed ridgelines, and grow on high soil moisture and fertility sites [(1)]. In the past decades African Olive has been noticed to be **spreading rapidly across the Sydney landscape** and if nothing is done to control this weed, its impact is likely to increase dramatically.

***Left**: The beginning of an African Olive infestation at Mt Annan, 1984 and*

***Below:** African Olive marching down the same hill in 2004.*

*Photos: Peter Cuneo**

** Peter Cuneo is the Manager - Natural Heritage, at Mount Annan Botanic Garden. Through his experience in treating the African Olive, and his research, he is currently the leading expert on African Olive in the Sydney Region.*

Of particular concern is the serious impact of African Olive on the Cumberland Plain bushland of Western Sydney. The Cumberland Plain is among the most threatened bushland in New South Wales and has been identified as a priority for conservation.[(5)] The native vegetation of this region has been extensively cleared since European settlement with **only 12 per cent** remaining as intact bushland. [(5)]

African Olive has been reported to pose a significant threat to the **endangered**

ecological communities on the Cumberland Plain, including: Cumberland Plain Woodland; Western Sydney Dry Rainforest and River Flat Eucalypt Forest on Coastal Floodplains [(2)].

With 76% of all Cumberland Plain bushland occurring on privately owned land, **the declaration of African Olive in the Sydney region is of urgent priority.**

The activities of the Sydney Weeds Committees are guided by two Regional Weeds Strategies;
The Sydney Metropolitan and the *Draft* Hawkesbury Nepean Weeds Strategy. A key action in these strategies was the prioritisation of weeds. African Olive ranked the following way for each committee;

- 2 for South West Sydney
- 9 for Sydney West Blue Mountains
- 19 for Sydney North
- 20 for Sydney Central

The South West Sydney Weeds Committee in particular have recognised African Olive **as one of the worst** environmental weeds in their region.

The following recommendations were made in Peter Cuneo's most recent paper on African Olive [(1)];

- African Olive can no longer be considered a sleeper weed,
- There is a **strong case to declare African Olive as a Class 4 weed**,
- A coordinated strategy for African Olive is required to prevent future permanent loss of native plant diversity.

If no action is taken to control African Olive there will be:

- Continued loss of biodiversity
- Continued impact on endangered ecological communities
- Further spread and establishment across Sydney
- Continual reinfestation of controlled areas
- Increased cost of control in the future
- Where it is not declared, councils will continue to be powerless to act regarding private property infestations.

3.1 Distribution of Infestations

African Olive has been recorded in every LGA in the Sydney region. It is considered a widespread weed in the South West Sydney and Sydney West Blue Mountains regions and a common weed in the Sydney North and Sydney Central region.

The following excerpt has been taken from Peter Cuneo's African Olive paper [1]. Also see attached map, on the following page, which used satellite imagery to map African Olive.

African Olive distribution in Western Sydney - NSW

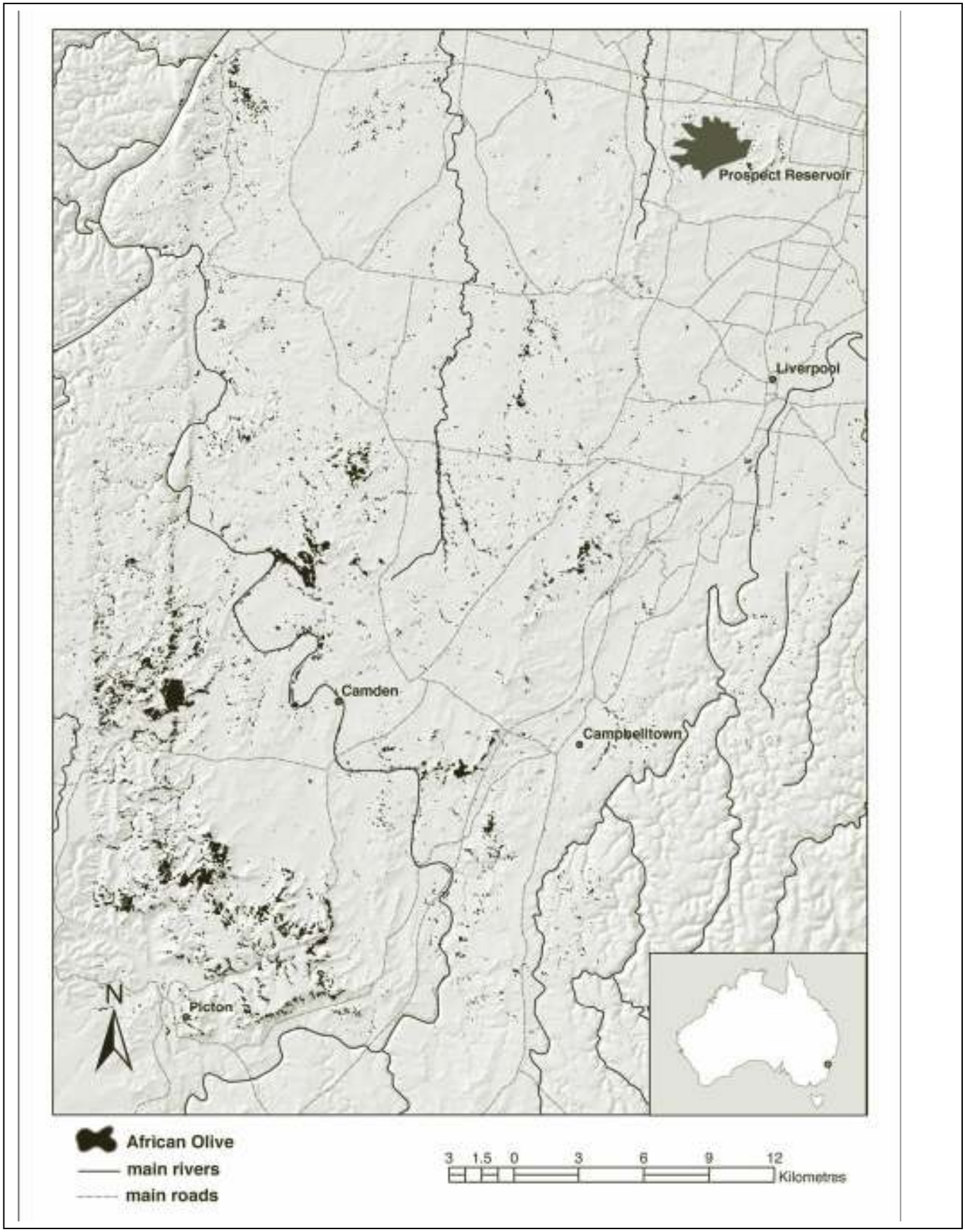
The Camden – Campbelltown area on the southern edge of the Cumberland Plain in western Sydney is the most established centre of African Olive occurrence in Australia. Here historic properties have provided multiple source locations for the spread of African Olive, facilitated by frugivorous birds. It was first noted as a potential problem weed in the area around the mid -1970s, by which time it had formed shrubby thickets on the steeper

slopes and hills in the Camden – Cobbitty area, particularly on the Razorback Range (Forestry Commission NSW 1976, D. Benson, pers. comm). By the 1980s it was described as a major invading weed of grazing parkland in the Camden/Campbelltown area (Dellow 1987). The rapid expansion of African Olive in the Camden – Campbelltown area from the 1980s has been documented at Mount Annan Botanic Garden. With the cessation of grazing, African Olive has spread throughout Mount Annan Botanic Garden beginning with scattered occurrences over 20 hectares in 1985 to a present coverage of 80 hectares, with some sections now developed into mature (>15 years age) pure stands on steeper sites.

From established populations in south-west Sydney, African Olive is now spreading northwards to other areas of the Cumberland Plain, primarily along roadsides and beneath powerlines into the Penrith and Windsor areas.

African Olive occurs as scattered occurrences in the Kurrajong – Grose Vale area and Scheyville National Park. In the Ryde LGA, where African Olive is a declared noxious weed, infestations appear to have originated from historic plantings at Brush Farm, with current spread now limited to several small bushland parks.

Please refer to the following map showing locations for South Western Sydney.



African Olive is well-established on the clay soils and hilly terrain of south-western Sydney. It is widely established in the Camden region, and has spread rapidly since the 1980s. Dense infestations now threaten fragmented native vegetation. Source: Landsat 2000 imagery.

3.2 Weed Biology

Characteristics of African Olive:

- Native to South Africa
- Shrub or branched tree to about 12 m high. Leaves oblong to elliptic; upper surface glossy grey-green with a recurved (hooked) tip
- White to cream tubular flowers, flowering in spring at the junction of the leaves and the stem.
- Fruit is (7-10mm) smaller than European Olive
- Trees at the early mature stage are capable of producing thousands of fruits.
- Spread by bird-dispersed seed.
- Has ability to form dense seedling carpets which provide successive generations of plants.
- Outcompetes established native vegetation, casting dense shade which prevents the regeneration of native plants.

The following links have the most up to date data on weed biology;

Link: http://www.weeds.org.au

4.0 LEGISLATIVE and REGULATORY SITUATION

4.1 Current Declaration

In the Sydney region, African Olive is currently a declared Class 4 noxious weed under the Noxious Weeds Act 1993 in the City of Ryde only.

4.2 Declaration Changes

It is proposed that African Olive be declared as a Class 4 noxious weed under the Noxious Weeds Act 1993 in the remaining LCAs in the Sydney region. This would result in African Olive being declared noxious and strategically managed across the entire Sydney region.

Whilst some Councils may choose not to declare African Olive for various reasons, it is anticipated that they will still be involved in implementing many of the actions in the regional plan.

Some stands of African Olive will have heritage values for some Councils; exemptions for these will be written into Class 4 plans.

5.0 CONSIDERATIONS and OPPORTUNITIES

5.1 Financial support to carry out the plan

To assist in the implementation of this plan, funding will be sought from various state and federal government agencies for on-ground works and developing education and awareness raising programs.

A great deal of work is already being undertaken by councils and other agencies in the Sydney region to control African Olive and effective control techniques are available. This huge contribution could be used to seek further funding, improve strategic coordination of projects and provide models for further work in other areas.

5.2 Species Management

The following information has bee taken from Peter Cuneo's African Olive paper [1]

Technique	Application method	Comments
Cut stump	Plants are sawn off close to ground level and undiluted Glyphosate360 g/l (eg,Roundup®) is applied (Ensbey 2004) by brush or applicator bottle (within 30 seconds) to the entire stump APVMA permit 9158). Triclopyr (Garlon 600® - reg label 31898) and diesel mixture (1:14) (Ensbey 2004) is also highly effective as a "cut and paint" application(Dellow 1987),	Plants growing in damp areas or treated during dry conditions may require special attention as they may re-shoot (National Trust 1999).
Foliar Spray	Spray control of seedlings and coppice shoots using Glyphosate 360g/ldiluted at 1:75 or 1:100 rate (Ensbey 2004) (APVMA permit 9158).	Effectiveness is highly variable. Ziesing (1997) reports increased effectiveness in seedling control with the addition of Urea in spray tank.
Tree injection	Portable drills are used to drill 3 cm deep holes into the trunk at a 45degree angle, spaced 4 cm apart. Undiluted Glyphosate 360 g/l at a rate of 2.5 ml per hole is injected into each hole using an applicator bottle or backpack injection unit (APVMA permit 9158). Frilling technique is similar, with chisels used instead of portable drills to create an opening at regular intervals in the trunk for the injection of glyphosate.	This is commonly used to control African Olive in inaccessible areas, such as olive "halos" around large Eucalypt perch trees, where cutting and removal of material is not practical. African Olives are left in situ and can be useful in maintaining temporary habitat for small native birds.
Basal bark spray	Garlon® (Triclopyr) diluted in diesel oil applied to the first 30 cm of trunk, wetting the bark to runoff point. In NSW & SA, Garlon® is registered for use on Olive as both a cut stump and basal bark application at a rate of 1:14 with diesel oil (Reg label 31898).	Simple-to-apply technique, outstanding in controlling olive regardless of size (Dellow 1987). Cost effective, but best done by experienced personnel with spray equipment fitted with Viton® seals (resistant to mineral oils). Care is required to prevent soil contamination in bushland areas.
Fire	Young olive plants <1 metre are killed by low intensity fire(von Richter et al 2005)	Mature African Olive trees can be controlled by fire when individual cut stumps are exposed to intense heat produced by large pile burns placed on top. (P. Dixon, pers.comm).
Physical removal/cultural	Seedlings can be hand pulled at the <10 cm stage, which is best done during moist soil conditions. African Olive is palatable to stock, who effectively control the development of young seedlings. In agricultural situations, African Olive is readily controlled by increasing grazing pressure (Parsons & Cuthbertson 1992).	
Mechanical removal	Mechanical control of mature plants with drum mulcher (attached to excavator) has been used where access is available and erosion hazard is low.	Highly effective for large scale infestations, provided African Olive trees and seedlings are treated with herbicide prior to mechanical mulching. Mulched material maintains soil cover.

5.3 Extension and Education

The main focus for education and extension activities will be to increase skills in the identification and control of African Olive by both residents and local and state agency staff. This will be achieved through numerous means such as:

- High profile media campaign when African Olive is declared in local newspapers.
- Articles in Mayoral columns.
- Distribute information to agency staff on African Olive identification and management, especially regulatory officers, health and building / development control officers and parks staff.
- Including African Olive in weed displays.
- Including African Olive in regional weed brochures, WEEDeck and the committees' website.

5.4 Links to other Strategies

The plan is a direct outcome of both the ***Draft*** **Hawkesbury Nepean and Sydney Metropolitan Weeds Strategies**, the strategies which guide the actions of the Sydney Weeds Committees.

The plan meets several 'Desired Outcomes' of the **NSW Weeds Strategy**:

- The development and implementation of programs to reduce environmental degradation and the loss of biodiversity through weed invasions;
- The implementation and monitoring of weed control programs on public and State-owned and Crown Land to ensure that objectives are achieved in an efficient and cost effective manner;
- An effective and efficient system for delivery of noxious weeds control and the enforcement of weeds legislation.

It also conforms to the Mission Statement for the **National Weeds Strategy;** "to reduce the detrimental impact of weeds on the sustainability of Australia's productive capacity and natural ecosystems", and to Objective 3.2; 'encourage the development of strategic plans for weed management at all levels'.

The plan also contributes to the Natural Resource Commissions (NRC) Statewide target; 'By 2015 there is a reduction in the impact of invasive species'.

5.5 Barriers and Contingencies

The following barriers were identified in meeting the objectives of this plan, these have been considered and contingencies have been incorporated into the action plan.

1. Reluctance of landholders to control African Olive (Action 6.10, 6.11 & 6.12)
2. Control is often not coordinated with neighbouring landowners, which reduces effectiveness (Actions 6.10 6.12)
3. Cost of control can be significant for residents (Action 6.12)
4. Cost of control on public land is significant due to large extent of infestations (Actions 6.2, 6.3, 6.6 & 6.7)
5. Lack of awareness and skills in African Olive identification and control, and its impacts to the environment (Action 6.11).

6.0 ACTION PLAN

ACTION PLAN FOR CONTROL	PERFORMANCE INDICATOR	WHO	ADDRESSES WHICH OBJECTIVES (Number)
Surveying, Monitoring and evaluation			
6.1 Carry out broad scale mapping of African Olive using satellite imagery or aerial photo interpretation, for the Sydney region.	Broad scale mapping carried out by 2009	Sydney Weeds Committees	1
6.2 Determine high, medium and low priority areas of works., based on characteristics such as level of biodiversity, threatened species, new incursions etc	Priority areas of works determined by 2010	Sydney Weeds Committees	1
6.3 Determine adequate containment lines.	Containment lines identified by 2010	Sydney Weeds Committees	1
6.4 Record areas of works at a regional level using GIS.	GIS is used to collect information on locations of works being carried out by 2010 Area of works updated by 2013	Sydney Weeds Committees	7
6.5 Review African olive plan to incorporate new information and data.	African olive plan reviewed and any new information incorporated by 2012.	Sydney Weeds Committees	7
On-ground works			
6.6 Carry out control works to reduce African Olive in high priority areas on public land (eg. High biodiversity sites, bush regen sites, new incursions.	Works in high priority areas on public land begin by 2009	Sydney –wide LCAs, state agencies Sydney Weeds Committees, bushcare.	2
6.7 Carry out works to contain African olive in medium and low priority areas on public land.	Containment works in med and low priority areas on public land begin by 2010	Sydney – wide LCAs, state agencies Sydney Weeds Committees, bushcare	3
6.8 Carry out works to contain African Olive to broadscale containment lines.	Works to contain African Olive within containment lines begin by 2010	Sydney – wide LCAs, state agencies	3

Enforcement			
6.9 Send submissions to NWAC for African Olive Class 4 declaration in all relevant LCAs across the region.	African Olive declared in 70% of the LCAs in the Sydney region by June 2013.	Sydney – wide LCAs	4
6.10 Target enforcement activities on private land within high priority areas or areas where works are being carried out on land adjacent.	Proactive inspection programs implemented in high priority areas and around areas where works are being carried out on land adjacent.	Sydney – wide LCAs, private landholders	5
Education			
6.11 Provide information and increase technical skills for the community and LCA staff, in African Olive identification and appropriate control.	Media blitz when African Olive is declared in local newspapers. Articles in Mayoral columns. Distribute information to agency staff on African Olive identification and management, especially regulatory officers, health and building / development control officers and parks staff. Include African Olive in weed displays and at other times in conjunction with local festivals, tree giveaways, etc. Include African Olive in regional weed brochures, WEEDeck and the committees' website.	Sydney wide LCAs, DECC, DPI, Sydney Weeds Committees	6
6.12 Implement incentives programs to encourage proactive private property control of African Olive	LCAs, DECC and CMAs are encouraged to implement incentives programs. Incentives programs implemented to control African Olive on private land.	Sydney – wide LCAs, CMAs, DECC, Sydney Weeds Committees, private landholders.	6

7.0 MONITOR and REVIEW PROCESS

This plan is designed to be monitored and reviewed on an ongoing basis. Mapping has been incorporated into the plan to both determine the extent of African Olive infestations and to record areas of works by members of the Sydney Weeds Committees, this will initially be completer by 2010 and then updated again in 2013.

Council and agency staff will also carry out monitoring on the ground via there regular field inspections and progress meetings with contractors.

Please refer to surveying, monitoring and evaluation section in action plan.

8.0 BENEFITS

Controlling African Olive will have a positive effect on biodiversity conservation in the region, by protecting the species integrity of remnant bushland areas and revegetated habitat corridors. Of particular benefit will be the reduction in the impact of African Olive on the endangered ecological communities of the Cumberland Plain.

9.0 RESOURCES

1. Cuneo, P. & Leishman, M.R. (2006): African Olive (*Olea europaea* subsp. *cuspidata*) as an environmental weed in eastern Australia: a review. Cunninghamia 9(4): 545-577.
   URL : http://www.rbgsyd.nsw.gov.au/__data/assets/pdf_file/81638/Cun94Cun545sm.pdf
2. Tozer, M (2003): The native vegetation of the Cumberland Plain, western Sydney: Systemic classification and field identification of communities. Cunninghamia 8(1): 1 – 75.
2. Johnson, S. & Lisle, S (2007): Issues posed by Feral Olives in New South Wales. NSW DPI
3. NSW Scientific Committee (2000) Western Sydney dry rainforest in the Sydney Basin Bioregion - Endangered ecological community determination - final. DEC (NSW), Sydney.
4. Department of Environment and Conservation (NSW). (2005): Recovering Bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland. Department of Environment and Conservation (NSW), Sydney.