

# REGIONAL WEED MANAGEMENT PLAN

**1.1 PLAN TITLE: *Regional Weed Management Plan for Aquatic Noxious Weeds***

**1.2 PLAN PROPONENTS**

**Regional Weeds Advisory Committee:**

*Southern Tablelands and South Coast Noxious Plants Committee*

**Address:**

*Queanbeyan City Council*

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*QUEANBEYAN ACT 2620*

**Secretary/Contact Person:**

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**Signature:**

*Chairman .....*

*Date: .....*

**1.3 NAME OF PLANT(S)**

<b>Botanical Name</b>	<b>Common Name</b>	<b>WONS Y/N</b>
<i>Alternanthera philoxeroides</i>	<i>Alligator Weed</i>	<i>Y</i>
<i>Cabomba spp</i>	<i>Cabomba</i>	<i>Y</i>
<i>Eichhornia crassipes</i>	<i>Water Hyacinth</i>	<i>N</i>
<i>Equisetum spp</i>	<i>Horsetail</i>	<i>N</i>
<i>Gymocoronis spilanthisoides</i>	<i>Senegal Tea Plant</i>	<i>N</i>
<i>Lagarosiphon major</i>	<i>Lagarosiphon</i>	<i>N</i>
<i>Pistia stratiotes</i>	<i>Water Lettuce</i>	<i>N</i>
<i>Salvinia molesta</i>	<i>Salvinia</i>	<i>Y</i>

**1.4 PLAN PERIOD**

**Starting Date:**

*1 July 2001*

**Completion Date:**

*30 June 2006*

**1.5 AREA OF OPERATION**

*South Coast Region of NSW*

*Illawarra District Noxious Weeds Authority*

*Bega Valley Shire Council*

*Shoalhaven City Council*

*Eurobodalla Shire Council*

**1.6 AIM** - *To prevent the establishment and spread of aquatic noxious weeds within the local aquatic environments, whilst maintaining the biological diversity, water quality and functioning of these systems.*

**1.7 OBJECTIVES**

- 1. Ensure all land managers meet their obligations under the Noxious Weeds Act 1993, whilst maintaining the conservation value and ecological functioning of these aquatic ecosystems*
- 2. Raise the level of community awareness and understanding of aquatic noxious weeds*
- 3. Prevent spread by controlling all new and isolated infestations*
- 4. Map all known infestations*

## **2.0 Stakeholders**

### **2.1 Signatories**

**Local Control Authorities (LCAs):** *Illawarra District Noxious Weeds Authority (IDNWA); Shoalhaven City Council; Eurobodalla Shire Council; Bega Valley Shire Council*

**Other Stakeholders:** *NSW Agriculture; NSW EPA; NSW NP&WS; Department of Land and Water Conservation (DLWC); NSW Fisheries; NSW Dairy Farmers Association; Sydney Catchment Authority; Southern Catchment Management Board; Pacific Power; Nursery Industry Association of NSW; NSW Farmers Association;*

## **Background and General Facts**

### **3.1 Reason for the Plan**

*Aquatic noxious weeds detailed in this plan may not necessarily be known to occur within the region. The aim of this plan is to ensure this situation remains for those respective weeds whilst also preventing the continued spread and infestation of known populations.*

*This regional plan embodies the four (4) principles of the National Weeds Strategy –*

- 1. Weed management is an essential and integral part of the sustainable management of natural resources and the environment, and requires an integrated, multi-disciplinary approach.*
- 2. Prevention and early intervention are the most cost effective techniques that can be deployed against weeds.*
- 3. Successful weed management requires a co-ordinated approach which involves all levels of government in establishing appropriate legislative, educational and co-ordination frameworks in partnership with industry, landholders and the community.*
- 4. The primary responsibility for weed management rests with landholders/land managers but collective action is necessary where the problem transcends the capacity of the individual landholder/land manager to address it adequately.*

### **3.2 Description of the Problem**

*The aquatic noxious weeds detailed within this management plan are all introduced species, some of which are capable of growing in water and on land.*

*Within the South Coast Region only Salvinia and Water Hyacinth are found within each LCA. Alligator Weed is found within the constituent council areas of the IDNWA only.*

*Each aquatic plant is a serious weed in its own right. They overwhelm native aquatic ecosystems disturbing the ecological stability, limit the use of water and water bodies for recreation or commercial purposes, reduce water quality, increase health hazards, increase water loss through evapotranspiration, and increase silting and the severity of flooding. Aquatics capable of growing on land, such as Alligator Weed, also pose threats to pasture lands. Under suitable conditions, usually where nutrient levels are high, growth is rapid. Salvinia for example can double the area it covers in 5-10 days. Water Hyacinth can multiply through daughter plants in one season to cover a 30m wide dam. Seeds can remain viable in some aquatic species for up to 15 years.*

*Many aquatics are also widely used as aquarium plants, and are often distributed (un)intentionally by nurseries and individuals, thereby increasing the risk of spread and further infestation.*

*Control of aquatics can also be costly and time consuming and may need to be repeated several times during a single season.*

*An integrated approach involving herbicides, manual/mechanical removal and water manipulation are the only viable options to control most aquatics. Biocontrol is not a feasible option on the South Coast due to the limited growth period of the weeds and the inability of the insects to subsequently build up numbers and control the weed in question prior to the onset of cooler conditions.*

*Other problems arise from the regular use of chemical and mechanical means of control. Environment Protection Licences (EPL) under the Protection of the Environment Operations Act (POEO) 1997 will be considered by the Environment Protection Authority (EPA) for the use of herbicides in water to control aquatic plants.*

*Applications for EPLs to use herbicides near water is generally considered unnecessary provided best management practices as detailed in the EPA publication, "Draft: Guidance for the Use of Herbicides Near Water: is followed and water pollution does not occur.*

*Decomposition of dead plant material controlled by herbicide application can cause eutrophication and stagnation resulting in algal blooms and/or the invasion of other aquatic weed species. Deoxygenation of the water column when the dead plant material decomposes can also cause fish kills. NSW Fisheries and the EPA have a joint protocol for the reporting of fish kills (Appendix 2).*

*Control of aquatic plants can be highly problematic as they are difficult to control or eradicate without damaging non-target species.*

*Not only can herbicides directly harm other aquatic life, but mechanical control or changing the hydrology can also have adverse environmental impacts. The Environmental Planning and Assessment Act 1979 together with the Threatened Species Conservation Act 1995, requires that environmental impact both generally, and on threatened species, be considered prior to any control program. If impacts were potentially significant then an Environmental Impact Statement or a species Impact Statement would need to be produced.*

### **3.3 Distribution of Infestations**

*Both Salvinia and Water Hyacinth are found throughout each of the six local government areas covered by this plan. Although not extensive they are commonly found in farm dams, storage reservoirs, creeks and wetlands. Both plants are occasionally found as ornamentals in urban pond situations.*

*Within the IDNWA LCA a total of 21 properties has been identified with either Salvinia or Water Hyacinth. Most infestations occur on farm dams isolated from other watercourses, although three creek systems in southern Wollongong are infested. Five properties under council care and control harbour either Water Hyacinth or Salvinia.*

*Local infestations also occur within Shoalhaven City, Eurobodalla Shire and Bega Valley Shire Council areas, and as with the IDNWA, infest mainly rural land tenures. Significant infestations of Salvinia have been recorded at both Flat Rock Dam (Nowra water supply) and Y Swamp within the Shoalhaven and Eurobodalla Council areas respectively, both under council care and control.*

*Only one isolated farm dam with Salvinia is found within the Bega Valley Shire area.*

*Alligator Weed is found within the IDNWA LCA area only. A total of 16 properties has been identified with this weed of which 15 occur in garden situations within the urban area, the other infestation being found in the lower reaches of semi-dry creek at Yallah.*

No other aquatic noxious weeds have been recorded within the area covered by this management plan, although Senegal Tea Plant was recorded (1984) as naturalised in a farm dam at West Dapto. This infestation has now been eradicated.

### 3.4 Weed Biology/Ecology

**Alligator Weed** is an introduced stoloniferous perennial, forming dense floating or rooted mats up to 1m deep. It is an extremely serious weed of fresh and brackish waters and may be terrestrial or aquatic. Flowering and maximum growth occurs in mid-summer. Viable seed has not been recorded in Australia. It propagates vegetatively and each node can develop into a new plant.

Mistakenly grown by the Sri Lankan community for the vegetable Mukunawanna.

**Cabomba** is an exotic submerged perennial up to 2m long, usually rooted but can survive in free floating deep water. It is a summer growing and flowering plant not yet recorded in NSW. The genus is widely used as an aquarium plant.

**Water Hyacinth** is an introduced free-floating stoloniferous perennial up to 1m tall. It spreads vegetatively by stolons rooting at nodes to produce new plants and by seed production. Flowering and maximum growth occur in summer. Seeds can germinate in three (3) days or remain dormant for 15 years. A much prized plant for cultivation in garden ponds, it is often distributed (un)intentionally by nurseries and individuals. Biocontrol can limit growth under suitable conditions.

**Horsetail** is an erect, non-flowering perennial herb up to 60 cm in height reproducing by spores and tuber-bearing rhizomes. It is naturalised only near Sydney in NSW, although it has been reported as being imported and sold by nurseries.

**Senegal Tea Plant** is a freshwater or marsh growing emergent herb, that forms bushes or extends from the banks to form mats of tangled stems. It can spread vegetatively when stem fragments containing nodes are broken off as well as by seed.

Senegal Tea Plant is an extremely hardy plant with rapid growth rates (15 cm week). Seeds germinate in spring and grow rapidly. Flowering starts in late spring and continues until falling temperatures prevent further growth. Plants are dormant during winter, re-shooting from the crown the following spring.

**Lagarosiphon** is a submerged aquatic plant that forms large mats of stems below the water surface. Most plants are sterile as male plants (flowers) have not been recorded in Australia. Spread is by vegetative means. A popular aquarium plant it has been widely promoted by nurseries in the past.

**Water Lettuce** is an introduced, floating, tufted, stoloniferous perennial. As with most aquatics, when nutrient levels are adequate growth is rapid, and many daughter plants are produced on stolons from the parent plants. Seeds are not recorded in Australia. Water Lettuce is frost sensitive which may limit its ability to establish on the South Coast. It is widely used in aquaria.

**Salvinia** is an introduced free floating aquatic fern. It does not produce any viable spores in Australia with its main means of spread vegetatively by fragmentation and from single nodes. Thrives under warm temperatures and high nutrient levels. It can double its size every 5-10 days. Biocontrol is effective under such conditions. Maximum growth occurs in summer. Although frost sensitive, it can survive these conditions.

A popular aquarium plant, it is often sold by nurseries and aquaria and distributed by individuals.

### **Other Serious Aquatic Weeds**

*This Plan specifically addresses noxious weeds, however, other serious emerging aquatic plants can also be included. Enforcement actions for these weeds would not apply, although other actions could be applicable.*

*Other serious aquatic weeds include *Elodea canadensis* (Canadian Pondweed), *Egeria densa* (Dense Waterweed), *Ludwigia peruviana*, *Nymphaea capensis* (Cape Waterlily), *Myriophyllum spp* (Watermilfoils), *Hydrilla verticillata* (Water Thyme), and *Ceratophyllum demersum* (Hornwort).*

### **3.5 Method and Rate of Spread**

*As described in Section 3.4 all aquatics have rapid growth rates and are spread by either vegetative means and/or seed production, being dispersed throughout catchment systems by periodic floods. Growth rates are maximised under warm temperatures and high nutrient levels.*

*On the South Coast, maximum growth rates occur over the summer period, December to April when flowering, seed production and vegetative propagation occur.*

*Man is also a major source of spread of aquatic weeds. With most aquatics valued for their ornamental or horticultural qualities, they are commonly sold or otherwise distributed by nurseries, aquaria and private individuals.*

*Aquatics can also be spread through the movement of machinery working in infested waterways as well as naturally through bird life movement between freshwater systems.*

### **3.6 Roles and Responsibilities of Land Managers**

*The following land managers and support agencies/groups will have an important role in the implementation of this plan. This will include the six LCAs detailed in Section 1.5; NSW NP&WS, particularly in relation to threatened species; NSW EPA in relation to Environment Protection Licences under the POEO Act; NSW Agriculture, Department of Urban Affairs and Planning; Nursery Industry Association of NSW; NSW Dairy Farmers Association and other farmer/land owner groups identified in LCA areas.*

## **3.0 Legislative and Regulatory Situation**

### **4.1 Current Declaration**

*The following declarations apply to the aquatic weeds listed in the respective LCAs that support this plan –*

<b>W1</b>	<i>Alligator Weed</i>	-	<i>Illawarra District Noxious Weeds Authority (IDNWA); Shoalhaven City Council (SCC); Eurobodalla Shire Council (ESC); Bega Valley Shire Council (BVSC)</i>
	<i>Cabomba</i>		<i>IDNWA; SCC; ESC; BVSC</i>
	<i>Horsetail</i>		<i>IDNWA; SCC; ESC; BVSC</i>
	<i>Senegal Tea Plant</i>		<i>IDNWA; SCC; ESC; BVSC</i>
	<i>Lagarosrphon</i>		<i>IDNWA; SCC; ESC; BVSC</i>
	<i>Water Lettuce</i>		<i>IDNWA; SCC; ESC; BVSC</i>
	<i>Salvinia</i>		<i>IDNWA; SCC; ESC; BVSC</i>
	<i>Water Hyacinth</i>		<i>ESC; BVSC</i>
<b>W2</b>	<i>Water Hyacinth</i>		<i>IDNWA; SCC</i>

### **4.2 Declaration Changes**

*No Changes are sought to current declarations at this time. Water Hyacinth currently declared as a W2 Noxious Weed in the Illawarra Noxious Weed Authority and Shoalhaven City Council areas respectively, will be considered for review as a W1 Noxious Weed during the life of the Plan, to enhance consistency throughout the South Coast region.*

### **4.3 Enforcement Strategy**

*This plan will involve the annual inspection and appropriate control by integrated techniques of all known infestations of those aquatic weeds listed. An active control and inspection program will be undertaken annually. Control by manual/mechanical means will be pursued where appropriate to ensure the spread of the weed is minimised.*

*The aim of the enforcement strategy will be to fully and continuously suppress and destroy all known aquatic weed populations thereby limiting their potential spread, whilst simultaneously ensuring clean areas remain free of these weeds. This control activity will be subject to appropriate and required environmental impact assessment and will aim to protect native biodiversity and the functioning of natural ecosystems.*

*Where necessary notices under the Noxious Weeds Act 1993 will be served to ensure the aim of this Plan is being met.*

*Annual inspections of all nurseries and aquaria will complement activities to ensure such weeds are not being spread intentionally.*

*Control and enforcement will be undertaken on a catchment basis with all main waterways inspected at least once annually for aquatic noxious weeds. With LCAs frequently sharing catchments, co-operation amongst LCAs will be needed to implement consistent management strategies that will effectively limit the spread of aquatic weed populations within the region.*

## **4.0 Considerations and Opportunities**

### **5.1 Opportunities to be Exploited**

*Provide for the investigation of external funding sources to supplement the control budget, this will include sourcing funding from the following areas –*

- *Weeds of National Significance – National Weeds Strategy and Natural Heritage Trust*
- *Incentive funding for Native Vegetation Management/and Landcare works and combating land degradation*
- *Seek funding from commercial sources, such as Nursery Industry Association, nursery retailers, chemical companies and NSW Farmers Association for advertising to increase community awareness and understanding of aquatic noxious weeds.*
- *Seek formation of Rapid Response team from appropriate agencies to provide for site assessment and development of management plan where required. ( ie areas of high conservation significance).*

### **5.2 Industry Sectors**

*This will include industry sector initiatives as mentioned in 5.1.*

### **5.3 Ecological**

*As detailed in Appendix 1, the majority of aquatic noxious weeds forming this plan do not have an effective biological agent capable of controlling outbreaks. The exemption to this however does apply to the three aquatic weed species found within the region, namely Water Hyacinth, Salvinia and Alligator Weed.*

*Neochetina bruchi, a South American weevil, has been released on Water Hyacinth at Jerrara Dam Kiama, and although establishing it failed to control this infestation.*

*The flea-beetle, Agasicles hygrophila, has been found on Alligator Weed infesting a semi-dry creek bed at Yallah, south of Wollongong. A high proportion of the foliage and emergent stems were*

*damaged indicating the insect may be suitable as part of an integrated approach, particularly in heavy or otherwise inaccessible populations.*

*The weevil, *Cyrtobagous singularis*, has been released on *Salvinia* at Wollongong and further south (Nowra and Moruya), however, none of the populations established.*

*The potential for biological agents to be used as part of the management tools available to control aquatic weeds within the region is unfortunately negligible due to the short summer growth period experienced on the South Coast. With insect life cycles taking up to three (3) months, as in the case of *Neochetina* spp on *Water Hyacinth*, populations are insufficient to build up and cause damage to the target plant prior to the onset of the cooler winter months, at which time the insects become inactive.*

*This Plan should aim to lobby various agencies such as CSIRO and the CRC to encourage further research into insect types capable of remaining active over the cooler winter months, thereby ensuring population numbers have a base for increased growth when more conducive summer conditions return.*

*Aquatic weeds represent the symptom of a problem, rather than the cause. It is therefore necessary to attack aquatic weeds on a broad multi-pronged front. Unless this is done, control of one weed species may result in its replacement by another.*

*Catchment management can play an important role in limiting the extent of disturbed or degraded wetland systems, which are susceptible to weed invasion. An important component of aquatic weed management is to maintain the health of the wetland systems, by such actions as preventing the clearance of native vegetation and reducing nutrient enriched inflows and sewerage, effluent or organic waste discharge. In intensive agricultural areas such as that area covered by this Plan, the later may be difficult to implement, however, due to the many sources of nutrients.*

*Under the framework of the National Water Quality Management Strategy the NSW Government's Water Reform process identifies guidelines to achieving longterm river health, maintaining biodiversity and securing a sustainable quality water resource. The development of water quality plans as part of this process, offers one opportunity to ensure an integrated approach to weed control across catchments.*

*In controlling aquatic noxious weeds, direct contamination of water through the use of herbicides also poses another dilemma for LCAs, particularly in regard to community concerns and perceptions.*

*Regulations of Acts covering the use of herbicides have been formed to limit the harmful effects of herbicides on the environment. Regulations of the NSW Pesticides Act 1999 make it an offence to use a herbicide in a manner other than specified on the label. Further, under the Protection of the Environment Operations Act (POEO) 1997, it may be necessary to apply for an Environment Protection licence to regulate water pollution from the herbicide spraying activity.*

*If an application for an EPL is submitted to the EPA, a Weed Management Plan will need to be prepared. A general approach to the Draft Plan is detailed in Appendix 3.*

*The time taken to process such applications as an Off-Label permit or Environment Protection Licence, and the need to prepare Weed Management Plans, in the case of the later, often means the season may be at an end prior to approval being granted, with the weed having spread well beyond its initial source in the meantime.*

*It is envisaged as part of this Management Plan, Stage Agencies will be lobbied to streamline procedures in this regard to allow the target weed to be controlled within the shortest period of time whilst still meeting appropriate environmental criteria.*

*Community concern in regard to herbicide usage applies not only to the application of the herbicide to the water, but also to the surfactant used in any residual activity the herbicide may have and in their toxicity to domestic animals and (aquatic) wildlife. However, registered herbicides, used according to the manufacturer's recommendations pose little threat to domestic animals and wildlife. Most herbicides registered for aquatic use have a relatively short period of activity. Reglone® for example, has the longest withholding period of only ten (10) days. Water must not be used for consumption or irrigation within this period.*

*Herbicides are a valuable tool that often give the best and most cost effective means of control of aquatic weeds. Their use however should form only part of an integrated approach to control, with all due care and responsibility being taken with their intended application. As part of the implementation of the Management Plan control measures to be used will be determined for each weed in each situation with site assessments to ensure compliance with legislative requirements.*

#### **5.4 Species Management**

*The predominant growth of aquatic weeds is over the summer period December to April.*

*Most aquatics are effectively killed using registered herbicides over this time period. Appendix 1 details herbicides that may be used to effectively treat each aquatic weed.*

*Chemical spraying generally gives the best and most cost effective means of control for aquatic weeds. Due to the rapid growth rates of most aquatics over summer, several treatments may be required over any one season to ensure desirable control is achieved on the target weed.*

*Hand/manual removal of aquatics from small areas can be successful provided the rate of removal is faster than the growth rate of the plant. Physical removal should be adopted to remove remaining live plants from the waterbody following the initial knockdown by either herbicides or mechanical means.*

*Mechanical removal is also quite effective in controlling larger infestations, however, this method is expensive and should ideally be used as part of an integrated approach to control.*

*Water manipulation, or the periodic raising and lowering of water levels may also effectively reduce the growth of most undesirable aquatic weeds, particularly free floating species such as Water Hyacinth and Salvinia. This method has been demonstrated at Jerrara Dam, Kiama where Water Hyacinth has been effectively managed with regular changes in water levels and herbicide treatments.*

*Plant competition is another means by which long term and inexpensive weed control can be achieved. However, this may not be suitable in all situations, such as with rural dams. The aim is to produce a complete cover of low-growing plants which can maintain themselves and compete successfully with undesirable species. This method may be appropriate in natural wetland areas and/or areas previously controlled for the target weed, and not being used for domestic or commercial purposes.*

*Shading or reducing light penetration are control methods suitable for some species, although only in small areas.*

*Integrated control is a sensible strategy which includes a combination of each of the above described methods so that they complement each other without detriment to the environment. Floating booms or nets on infested waterways may also be used to contain the spread of some aquatics, such as Water Hyacinth and Salvinia, provided they are used in conjunction with mechanical or chemical means.*

## **5.5 Community**

*Many aquatics are highly prized aquarium plants and are often distributed (un)intentionally by nurseries and individuals. Whilst some are aware of the problems posed by aquatic noxious weeds, there is still a great deal of ignorance regarding aquatic weeds throughout the general community. Nurseries often distribute and sell many aquatic noxious weed species to the general public who are then led to believe that these plants are desirable.*

*Rural landholders are often the exception to this rule, however, as this sector of the community generally has a need to maintain farm dams and creeks clear of weed growth for domestic or commercial reasons. Rural residential land owners are often somewhat less informed in regard to this due to their differing requirements from the land.*

*In increasing community awareness and ownership of the problem with aquatic noxious weeds, the Nursery Industry Association and commercial retailers have an important role to play. Aquatic noxious weeds should be promoted through these organisations in co-operation with LCAs as well as through school projects, local shows, “care” groups, garden clubs and the local media. Weeds Awareness Week should also aim to highlight which weeds pose the greatest hazards to our waterways.*

*Previous strategies have not been fully successful due to a number of factors –*

- *Little or no co-operation or dialogue between nursery traders and LCAs*
- *Lack of effective education and extension programs*
- *Failure of the whole community to recognise and accept the need to control aquatic noxious weeds;*
- *Insufficient LCA staff to carry out inspections and extension work.*

*All of the above factors have some bearing on the success of aquatic noxious weed control strategies throughout the region and for these strategies to be successful each needs to be taken into account and provided for. This Plan aims to address these shortcomings.*

*A regional approach will provide for increased community ownership and awareness and hence commitment of the community to the control of aquatic weeds throughout the region as well as providing for increased co-operation between LCAs, private landholders, State Agencies and industry.*

*Co-ordination of activities such as the sharing of labour resources for planning, undertaking of inspections, control activities on LCA land, and a general sharing of community awareness resources such as pamphlets and brochures can all provide for both a cost advantage due to economies of scale, and increased control of aquatic weeds across the region. Something that cannot be achieved in isolation.*

## **5.6 Extension and Education**

*Extension and education programs will form a vital part of this plan and should be structured in a way that the resources of adjoining LCAs can be combined to firstly share the workload and secondly create an economy of scale in running these types of programs. There will also be a provision for the sharing of printed promotional material as well as sharing of media material, which includes newspapers, radio and TV.*

*Currently each LCA conducts its own extension and education programs, which is usually done in isolation from other LCAs and the frequency and quality of these programs can vary depending upon time and resources available.*

*Under a regional program the timing of extension activities would be scheduled across the region to achieve the optimum result. For example, awareness programs begin in October/November alerting people to the presence of aquatic noxious weeds. The emphasis should then shift to control options available including herbicide usage over the period December to April.*

*Overlaying these seasonal strategies should be an overall educational program highlighting the spread and dangers that aquatic noxious weeds can cause. This program should aim to utilise the resources and expertise of stakeholders such as the Southern Catchment Management Board Nursery Industry Association of NSW and Streamwatch (DLWC), and should outline aquatic (noxious) weed identification. Council and property owner responsibilities under the Noxious Weeds Act, Council's property inspection process and the assistance and advice that can be provided by LCAs to property owners to gain the control of aquatic noxious weeds.*

*The co-ordination of these types of strategies on a regional basis will produce uniform results which are delivered in a cost effective and timely manner.*

## **5.7 Links to Other Strategies**

*Aquatic weeds pose a major threat to the region's natural environment and man-made aquatic ecosystems. They block drainage channels and streams, hinder fishing and water activities, limit stock access and effect biodiversity and ecological stability.*

*Co-ordination of activities and implementation of programs that impact upon weed control are major issues raised in both the National and NSW Weed Strategies. This management plan aims to draw on the collective efforts of Local Government, private individuals, community groups, other government agencies and industry to develop and implement an efficient and cost-effective approach to managing aquatic noxious weeds on a regional basis. In undertaking the development of a strategic plan to manage aquatic weeds through an integrated and co-ordinated approach this plan addresses fundamental objectives raised under Goals 2 and 3 in the National Weeds Strategy. Indeed, three (3) of eight (8) aquatic weed species detailed in this management plan are listed as Weeds of National Significance (refer 1.3). An important objective of the NSW Weeds Strategy is the development and implementation of programs to reduce environmental degradation and the loss of biodiversity through weed invasion. The development of a South Coast Aquatic Weed Management Plan addresses this fundamental issue.*

*The NSW Government prioritises funding to weed control programs for which a state wide or regional plan has been prepared. This plan aims to assist contributing councils to access State Government funds toward the control of aquatic noxious weeds as well as providing local communities with the opportunity to secure other funding sources (refer 5.1).*

*This Plan further complements strategies (being) developed by neighboring regions such as the Hawkesbury-Nepean Aquatic Weeds Taskforce.*

*Although aquatics are predominantly summer growing plants, the inspection for these weeds fits quite successfully into most LCAs annual weed control program.*

*Property inspections undertaken outside the summer growing season for other noxious weeds can also note the occurrence of aquatic weeds, which depending on the situation, may be controlled by manual/mechanical means upon detection or else targeted for control over the upcoming summer period. This will streamline aquatic noxious weed property inspections required during the summer period.*

*General drainage and creek maintenance works undertaken by constituent councils could also easily be integrated into specific aquatic weed sites, alleviating the burden on the noxious weed budget and complementing the overall integrated control program.*

## **5.8 Contingencies**

*Several barriers and contingencies have been identified. These include –*

- Barrier 1 – Not all landholders recognise aquatic noxious weeds.*
- Barrier 2 - Failure of the south coast community to realise that aquatic noxious weeds belong to and affect everyone in the region.*
  
- Contingency - Increase the level of community awareness and understanding of the problems posed by aquatic noxious weeds.*
  
- Barrier 3 - The present extent and distribution of aquatic noxious weeds within the South Coast region is not precisely known.*
  
- Contingency - Increased emphasis afforded to inspections for aquatic noxious weeds*
  
- Barrier 4 - Rapid life cycle of most aquatics means seed set and/or vegetative spread occurs before control is possible.*
  
- Contingency - This plan recognises the need to initiate intervention at the earliest stage in the life cycle of the plant. Increased community awareness complemented by regular inspections and enforcement should alleviate any problems in this regard.*
  
- Barrier 5 - Programs lacking co-ordination between stakeholders.*
- Barrier 6 - Uncertainty as to occupier obligations to control noxious weeds on water courses.*
  
- Contingency - Co-ordinate group control activities and enforce control where required according to priorities.*
  
- Barrier 7 - Reluctance by land occupiers to implement recommendations of Noxious Weeds Officer*
- Barrier 8 - Increasing constraints placed on LCAs and land occupiers with regard to herbicide usage*
  
- Contingency - Promotion and adoption of integrated control techniques. Lobby relevant State Agencies to streamline guidelines that will prevent development of new weed problems by permitting early intervention.*

- *Barrier 9 - Aquatic Weeds are spread unintentionally on machinery and by the nursery trade.*
  
- Contingency - In partnership with other State Agencies and relevant industry bodies identify existing and potential avenues that facilitate new aquatic weed introductions, and develop preventative action plans to interrupt these pathways of introduction.*
  
- *Barrier 10 - Funding of Plan for Inspectorial and Operational activities may not be available.*
  
- Contingency - NSW Agriculture to provide matching funds for aquatic weed management, for operational and inspectorial programs*
  
- *NSW Agriculture to provide contingency funds to LCAs for outbreaks of WI noxious weeds where major infestations are found that are beyond the resources of the landholder (NWAC Policy Paper 3 Nov 1995).*

**6.0 Performance Indicators and Actions**

	<b>Action Plan for Control</b>	<b>Performance Indicator</b>	<b>Who</b>	<b>Address Which Objective</b>
<b>Current Activities</b>	<b>Education and Extension</b>			
	Promotion of aquatic noxious weeds within the region is variable in relation to identification problems, landholder responsibility and techniques	Some participation in shows, Weedbuster Week. Discussion with garden clubs/interest groups. Publication and distribution of brochures, media articles	LCAs	1
<b>Proposed Activities</b>	Engage all Councils in a consistent approach to the promotion of aquatic noxious weeds within the region in relation to identification problems, landholder responsibility and control techniques	All Councils to participate in shows, Weedbuster Week. Discussion with garden clubs/interest groups. Publication and distribution of brochures, media articles	LCAs	1
	Inform all nurseries on restrictions on sale of aquatic noxious weeds and reason for action	All nurseries notified	LCAs NSW Agriculture	1 and 3
	Liaise with Streamwatch re development of materials for schools and community groups	Production of Streamwatch aquatic weed educational material	LCAs NSW Agriculture Streamwatch	1
	Production of aquatic noxious weed brochure	Production and distribution of brochure	LCAs NSW Agric Nursery Ind Assoc	1
	Compilation of aquatic noxious weed register	Register established, promoted and receiving feedback	LCAs NSW Agriculture	1
	<b>Program Management</b>			
<b>Current Activities</b>	General Property Inspections	Properties inspected and control activities implemented	LCAs Landholders	2 and 3
	Spray units or contractors are available	Councils spray units are available as a priority	LCAs	2 and 3
<b>Proposed Activities</b>	Targeted inspection of all infested lands	Property inspections to be made on regular basis during growing period and serve notices where required	LCAs	2 and 3
	Inspect all main waterways at least once annually for aquatic weeds	All main waterways inspected	LCAs	2 and 3
	Inspection of all nurseries/aquaria	All nurseries/aquaria inspected annually	LCAs	1, 2 and 3
	Control all infestations	Required control measures implemented annually	LCAs Landholders	

	<b>Action Plan for Control</b>	<b>Performance Indicator</b>	<b>Who</b>	<b>Address Which Objective</b>
<b>Proposed Activities (Cont)</b>	Implement preventative measures to stop the movement and introduction of aquatic noxious weeds into and within the region	(Un)intentional aquatic weed movement and spread stopped. Effective enforcement and monitoring programs implemented	RWAC LCAs Nursery Industry Assoc NSW Agric	3
	Uniform mapping of infestations on shire by shire basis	Maps	LCAs	4
	Centralised Mapping Repository	Hardware Complementary Software	RWAC LCAs NSW Agriculture	4
	Control activities subject to appropriate impact assessment	Significant adverse impacts do not occur without thorough assessment	LCAs, NP&WS, NSW Agric, DLWC and others involved in weed control	1 and 2
	<b>General</b>			
<b>Current Activities</b>	Definitive approvals required for control along watercourses	Provision of Documentation	LCAs NSW EPA NSW Ag	2 and 3
	Extension of best practices	Landholders have been informed as to adoption of integrated control strategies that incorporate chemical, mechanical/ manual, water manipulation and biological control methods	LCAs	1, 2 and 3
	Report on progress and seek grant funds from NWAC for LCA control programs	Reports and submissions made	LCAs	1-4
<b>Proposed Activities</b>	Co-ordinate group control activities	Control activities co-ordinated annually	RWAC LCAs	2 and 3
	Assess the need and ensure compliance with legislative requirements at each site (TSC Act 1995, POEO Act 1997, NW Act 1993)	Evaluation and determination of need for relevant licences/enforcement action. Provision of documentation	LCAs NSW EPA NPWS NSW Ag	1, 2 and 3
	Increased co-operation and liaison with agencies to assist in introduction of alternate bio-agents suitable to cooler climates	Establishment of bio-agents in areas where their use is appropriate	LCAs NSW Ag CSIRO CRC Landholders	1, 2 and 3
	Review program annually	LCA, RWAC and NWAC adopt varied plan	LCA	1-4

## **7.0 Monitor and Review Process**

*This Management Plan is not an inflexible document, but an adaptive management program that draws on the collective action of all stakeholders to address the problem at hand.*

*LCAs will be responsible for the implementation of this plan within their local area and will be required where necessary to enforce the provisions of the Noxious Weeds Act 1993 on any landholder who fails to meet their responsibilities.*

*In ensuring the stated aim, objectives and performance indicators as detailed in this Management Plan are met, it is proposed to review the program annually. Written reports and comment from regional entities, LCAs, public and private organisations that have expertise in the control of aquatic noxious weeds will be considered at each review and revisions made to the plan, as appropriate. This evaluation process will enable the constituent councils to this Plan to monitor the Plan's progress toward the prevention, limitation and abatement of aquatic noxious weeds within the South Coast Region. Constituent councils will be able to ensure appropriate implementation of management actions at this time, as well as making the necessary adjustments where necessary.*

*A regional report will be prepared by the Chief Weeds Officer of the Illawarra District Noxious Weeds Authority to the Secretary of the Southern Tablelands and South Coast Noxious Plants Committee with information provided at each annual review. Information provided will need to be detailed in respect of the proposed action plan for control.*

*By incorporating appropriate regulation with constant dialogue and evaluation and setting in place an effective monitoring program, it is envisaged the major goals of prevention, control and abatement will be achieved.*

*Monitoring programs with respect to aquatic weeds are probably unfortunately under-utilised at the present time, however, under this Plan such programs will be encouraged as the responsibility of the local control authority, and will ultimately be essential to the success of the Plan. Regular property inspections as well as the establishment of advisory/contact networks will provide the basis for which effective monitoring can be achieved. Simple and inexpensive monitoring information such as that proposed with the aquatic weed register, will serve as a baseline to determine the (initial) extent of the problem over time. This information can then be referred to NSW Agriculture as part of their W1 Notifiable Weed database for more detailed technical assessment of the potential ecological and economic costs of each aquatic weed problem. Where necessary NSW Agriculture may be able to suggest the most appropriate control strategies for that area.*

*This document does not stand alone as an instrument to deal with the aquatic noxious weed problem on the South Coast. It merely provides guidance that draws on the collective efforts of many to achieve a more efficient approach to aquatic weed management within the region.*

## **8.0 Benefits**

*Infestations of aquatic weeds in the region cause, to varying degrees, ecological, economic, social and public health impacts. Strategies to control aquatic weeds in infested water bodies, in efforts to abate their negative impacts, must however, be designed so as not to cause problems greater than those related to the aquatic weeds themselves. This Plan aims to address this issue.*

*In preventing the introduction and effectively controlling existing aquatic noxious weeds within the region this Plan has the potential to benefit industry, the environment and the community as a whole. Indeed, three (3) of the eight (8) aquatic weed species detailed in this Plan are listed as Weeds of National Significance (refer 1.3). Two of these species are found within the area covered by this Plan. In controlling the spread of these species in particular, or otherwise preventing their introduction, significant benefits can be expected to flow not only within the South Coast Region, but to the national level also.*

*The turf industry valued at around \$50 million a year in NSW, with several operators in the Illawarra and Nowra, would all but be lost should weeds such as Alligator Weed not be prevented from spreading. Likewise, the extractive industries and operators of heavy machinery, of which several large operators exist within the region, would also need to be quarantined with no product or machinery allowed to be moved should they be found to be spreading such weeds. This would effectively cause the cessation of all operations resulting in unnecessary hardship to the region's community.*

*Agricultural land would all but be rendered useless should Alligator Weed and Horsetail be permitted to establish in suitable areas. The region's water supplies, which service not only the South Coast but much of the metropolitan area of Sydney, would also be in grave danger were aquatics given free rein to establish and spread.*

*Existing infestations of aquatic weeds within the region are mostly confined to rural lands. Effective control of these infestations will directly benefit this sector of industry by improving livestock accessibility to water supplies, reducing flood damage associated with aquatic weed debris and increasing water quality and availability for irrigation.*

*With several significant infestations of aquatic weeds recorded in natural wetlands and creek systems throughout the region, benefits to the environment, although difficult to measure, would also be expected to be immense, especially to native flora and fauna.*

*Most aquatic weeds compete for nutrients, light and space. Their control and prevention in spreading would enhance biodiversity, improve water quality and water availability (less evapotranspiration) through all affected, or otherwise susceptible, aquatic ecosystems in the region.*

*In this respect the community would benefit also. The aesthetic appearance of waterways would be improved, public health issues associated with waterborne disease vectors would diminish and restrictions on recreational and commercial activities would be alleviated, such as was experienced at Flat Rock Dam, Nowra.*

*To achieve the above noted benefits which would be expected to flow from the implementation of this Plan, each LCA will need to contribute on average at least the equivalent of 20 x man days, plus financial assistance toward the production of promotional material.*

**9.0 Resources**

*Please find attached copies of regionally produced pamphlets distributed to landholders within the South Coast area. Please note these resource materials are available from constituent councils to this Management Plan and are updated as necessary. Further reference material in relation to aquatic weeds can be obtained by contacting the relevant officer below –*

*Attention: David Pomery  
Chief Weeds Officer  
Illawarra District Noxious Weeds Authority  
PO Box 148  
KIAMA 2533  
Phone 02 4233 1129*

*Attention: Ian Borrowdale  
Chief Weeds Officer  
Shoalhaven City Council  
PO Box 42  
NOWRA 2541  
Phone 02 4429 3468*

*Attention: Graham Harding  
Chief Weeds Officer  
Eurobodalla Shire Council  
PO Box 99  
MORUYA 2537  
Phone 02 4474 1269*

*Attention: Allan Smith  
Chief Weeds Officer  
Bega Valley Shire Council  
PO Box 492  
BEGA 2550  
Phone 02 6499 2141*

*Attention: Michael Michelmore  
Regional Weed Control Co-ordinator  
NSW Agriculture  
PO Box 389  
GOULBURN 2580  
Phone 02 4823 0617*

*Attention: Peter Gorham  
Noxious Plants Advisory Officer  
NSW Agriculture  
Locked Bag 11  
WINDSOR 2756  
Phone 02 4577 0626*

*Information pertaining to herbicide usage may be referred to the –*

*Environment Protection Authority  
PO Box 513  
WOLLONGONG EAST 2520  
Phone 02 4226 8100*

***Threatened Species***

*Manager  
NSW NPWS  
Threatened Species Unit-Sydney Zone  
PO Box 1967  
HURSTVILLE 2220  
Phone 02 9585 6678*

*Manager  
NSW NPWS  
Threatened Species Unit  
PO Box 2115  
QUEANBEYAN 2620  
Phone 02 6299 2929*

***Nursery Contacts***

*Nursery Industry Association of NSW Ltd  
PO Box 13  
ROUSE HILL 2155  
Phone 02 9679 1472*

***Fisheries Management***

*NSW Fisheries  
PO Box 456  
NOWRA 2541  
Phone 02 4423 2200*

*Further contact details for any organisation or individual not listed above may be available by contacting Local Council Control Authority staff detailed above.*

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## Introduction

*Aquatic noxious weeds have been recognised as an ever increasing problem within the South Coast regional area for some time now. The recent detection of Salvinia at sites such as Flat Rock Dam, Nowra and at 'Y Swamp' and Newstead Pond within Eurobodalla and Alligator Weed and Senegal Tea plant within the Illawarra, indicate the real threat these weeds pose both to the community and to the environment of the region.*

*This Management Plan is an important step in the co-ordinated response to the problem and serves as an efficient means of communicating the scope of activities necessary to effectively deal with the problem.*

*The attached Appendix serves to provide background information as to the control strategies available to effectively manage the aquatic noxious weeds detailed within this Plan.*

## Proposed Control Strategies

*The control measures to be used will be determined for each weed in each particular location. The Management Plan will be based on a catchment approach, and will aim to minimise the risk of spread of the weed and harm to the environment. With all potential measures care will be taken to ensure that control of the noxious weed is not of greater environmental harm than the problems caused by the presence of the weed.*

## Physical Removal

*Physical removal shall be considered in each situation to determine the feasibility as an efficient and cost effective control strategy. In many cases the nature of the problem is such that physical and/or mechanical means are not efficient nor cost effective in reducing the incidence of aquatic weeds.*

## Biological Control

*Biological control will be considered. In general terms biological control is slow, and only effective on large/dense infestations, although insects ability to establish on the South Coast has yet to be determined. Most species do not have biological agents available.*

## Chemical Control

*Chemical control will only be considered when an assessment of the situation indicates to the Inspector responsible for control of the infestation that other means of control will not provide a satisfactory level of control or are cost effective.*

*When using herbicides as the control option, it will be essential that operators take all due care and responsibility and always read the label and follow instructions carefully.*

*In consultation with the landholder and relevant agencies the most appropriate herbicide to control the infestation in the situation will be used. At the time of publication the following chemicals are registered on the respective aquatic noxious weeds listed. Current herbicide information is available at the National Registration Authority (NRA) web site at [www.affa.gov.au/nra/pubcris.html](http://www.affa.gov.au/nra/pubcris.html).*

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## Noxious Aquatic Weed Spectrum

### **Botanical Name**

*Alternanthera philoxeroides*  
*Cabomba spp*  
*Eichhornia crassipes*  
*Equisetum spp*  
*Gymnocoronis spilanthoides*  
*Lagarosiphon major*  
*Pistia stratiotes*  
*Salvinia molesta*

### **Common Name**

Alligator Weed  
Cabomba  
Water Hyacinth  
Horsetail  
Senegal Tea Plant  
Lagarosiphon  
Water Lettuce  
Salvinia

*Aquatic weeds declared within the South Coast region may not necessarily be known to occur. In the event of discovery this Management Plan provides details of proposed control methods, so that prompt action may be undertaken. All of the following weeds are Declared in the Category of W1 (Notifiable) within each of the LCAs signatory to this Plan, except Water Hyacinth, which is declared in the Category of W2 within Shoalhaven City Council and the IDNWA areas respectively.*

### **Category Definition and Action Required**

#### **W1 - Notifiable Noxious Weed**

*A weed of limited distribution or not present in the State but which poses a threat to agriculture, the environment, or the community. Landholders must notify their Local Control Authority within three (3) days of detecting W1 weeds on their land and also must continuously suppress and destroy the infestation.*

#### **W2 - Noxious Weed**

*A weed which poses a threat to agriculture, the environment or the community and has the ability to spread to other areas. Landholders must continuously suppress and destroy the infestation.*

#### ***Alternanthera philoxeroides – Alligator Weed***

- 1. Physical removal – not a practical solution as plant has long deep rhizomes, small fragments will regrow. Free floating masses of material may be physically removed to reduce quantities of herbicides to be used. Extreme care must be taken to prevent reshooting from broken fragments.*
- 2. Biological control – the flea beetle (*Agasicles hygrophila*) has been found established in the area, however, the beetle only attacks aquatic forms of the plant and down to the water line. Terrestrial forms not harmed.*
- 3. Chemical control – this is the only option for terrestrial alligator weed. Treat as soon as possible after detection. Follow up treatment as required. Products containing Metsulfuron Methyl should only be used on terrestrial forms whilst Glyphosate based products are recommended for aquatic forms only.*

*Herbicide ® Product Name:*

*Davison Glyphosate 450 Herbicide*  
*Nufarm Brushkiller 600 Herbicide*  
*Dupont Brush-Off Brush Controller*  
*Mastra Glyphosate Herbicide*  
*Generex Metsulfuron*  
*Farmoz Lynx 600 Herbicide*  
*Parti-San 600 Herbicide by Sanonda*  
*Farmoz Bushwacker Brush Control Herbicide*  
*Davison Metsulfuron Methyl 600 Herbicide*  
*Roundup Biactive Herbicide by Monsanto*  
*United Farmers Metsulfuron Methyl Herbicide*  
*S U Metsulfuron 600 Herbicide*  
*Allout Glyphosate 360 Herbicide*  
*Agcare Biotech Glyphosate 360 Herbicide*  
*Sipcam Glyphosate 360 Herbicide*  
*Davison Glyphosate Gold 500 Herbicide*  
*United Farmers Metsulfuron Methyl 600 Herbicide*  
*Yates Zero 360 Weedkiller*  
*Summit Sum-Met DF Herbicide*  
*Chemica Pacific Glyphosate 360 Herbicide*  
*Farm Direct Metsulfuron Herbicide*  
*Topgly 500 Herbicide*  
*Pestmaster Aqua-Tech Glyphosate 360 Herbicide*

### ***Cabomba spp***

*Cabomba*, mostly submersed, usually rooted in bottom mud but can survive in free floating deep water. May occur in ponds, lakes and slow moving streams.

#### *Control Strategy*

1. *Physical removal - Physical removal is recommended.*
2. *Biological control - NOT an option. No biological control agents available.*
3. *Chemical control - No registered herbicides.*

### ***Eichhornis crassipes – Water Hyacinth***

*Water hyacinth* can destroy native wetlands, choke waterways, and dams, killing fish and native flora. The effects can be similar to those of *Water Lettuce* and *Salvinia*. Decomposition of dead *hyacinth* causes water pollution and stagnation, mats formed can restrict movement of water craft.

#### *Control Strategy*

1. *Physical removal – Physical removal of plant mass, if practical, is the preferred option. Dense grasses, shrubs and or woody vegetation on the bank edges may render this method unsatisfactory. Plants are large and easily identified.*
2. *Biological Control – not effective due to unsuitable climate. Releases have been carried out in selected areas with poor results. Ineffective in controlling small quantities of *hyacinth* that commonly occur throughout the region.*
3. *Chemical control – best applied to moderate or heavy infestations where appropriate and when plants are actively growing. Observe withholding periods.*

*Herbicide ® Product Name:*

*Nufarm Amitrole T Herbicide*

*Watrol Non-Residual Herbicide*

*Mantek Vegetroll Herbicide*

*Davison Glyphosate 450 Herbicide*

*Country Glyphosate 360 Herbicide*

*Nufarm AF-300 Herbicide*

*Davison 2, 4-D Ester 800 Selective Herbicide*

*Reglone Non-Residual herbicide*

*Mastra Glyphosate Herbicide*

*Amino 500 Selective Herbicide by Sanonda*

*Roundup Biactive Herbicide by Monsanto*

*Generex 2,40D Amine 500 L Herbicide*

*Generex 2, 4-D Ester 800 L Herbicide*

*Nufarm Weedmaster 360 herbicide*

*Allout Glyphosate 360 Herbicide*

*Farmers 2,4-D Amine 500 Herbicide*

*Agcare Biotech Glyphosate 360 Herbicide*

*Artfern Glyphosate 360 herbicide*

*Sipcam Glyphosate 360 Herbicide*

*Davison Glyphosate Gole 500 Herbicide*

*Yates Zero 360 Weedkiller*

*Summit Sum-Ester 800 L Herbicide*

*Cyndan Weedeath Herbicide*

*Chemica Pacific Glyphosate 360 Herbicide*

*Farm Direct 2, 4-D Amine 500 Herbicide*

*Farm Direct 2, 4-D Ester 800 Herbicide*

*Farm Direct Glyphosate 360 Herbicide*

*Topgly 500 Herbicide*

*Pestmaster Aqua-Tech Glyphosate 360 Herbicide*

### ***Equisetum spp – Horsetail***

*Potential risk to damp open woodlands, pastures, arable lands, roadsides, streambanks and embankments. Mainly spread by vegetative means, rhizomes and tubers, some spread may occur from spores.*

#### *Control Strategy*

- 1. Physical Removal - because of the extensive rhizome system and deeply buried tubers, physical removal is ineffective.*
- 2. Biological Control - NOT an option. No biological control agents.*
- 3. Chemical Control – only feasible option. Read label and follow instructions carefully.*

#### *Herbicide ® Product Name:*

*Dichlobenill*

*Casoron G*

*PERM 1499*

*Rate 18 g per square metre*

*Comment Spread granules evenly over soil. Granules must be watered immediately after application.*

### ***Gymnocoronis spilanthoides – Senegal Tea Plant***

*A freshwater or marsh growing emergent herb, forms bushes or extends from banks to form mats of tangled stems.*

*Control Strategy*

1. *Physical Removal - Only method to be used.*
2. *Biological Control - NOT an option. No biological control available.*
3. *Chemical Control - There are no registered herbicides to control this plant.*

***Lagarosiphon major – Lagarosiphon***

*A submerged aquatic plant of temperate regions occurring in freshwater ponds, lakes, dams and slow moving streams. Forms large mats of stems below the water surface. Has the ability to grow in deep cold water reservoirs, at depth up to 7 metres.*

*Control Strategy*

1. *Physical Removal - Mechanical control is recommended.*
2. *Biological Control - NOT an option. No biological controls available.*
3. *Chemical Control - There are no registered herbicides to control this plant.*

***Pistia stratiotes – Water Lettuce***

*Free floating plant of lakes streams reservoirs or slow moving streams. Mainly reproduces from daughter plants. Widely used as an aquarium plant. Forms a dense mat and spreads quickly over the entire water surface. Can shelter and be a breeding site of disease carrying mosquitoes, vectors of diseases such as Ross River Fever and Encephalitis.*

*Control Strategy*

1. *Physical Removal - Physical removal of plant mass, if practical, is the preferred option. Dense grasses, shrubs and or woody vegetation on the bank edges may render this method unsatisfactory. Plants are large and easily identified.*
2. *Biological Control - NOT an option. No biological controls available.*
3. *Chemical Control – treat small infestations to minimise herbicide quantity to be used. Apply to actively growing plants. Observe withholding periods.*

*Herbicide ® Product Name:*

*Watrol Non-Residual Herbicide  
Mantek Vegetrol Herbicide  
Davison Glyphosate 450 Herbicide  
Country Glyphosate 360 Herbicide  
Nufarm AF-300 Herbicide  
Reglone Non-Residual herbicide  
Mastra Glyphosate Herbicide  
Roundup Biactive Herbicide by Monsanto  
Nufarm AF-100 Floating Herbicide  
Nufarm Weedmaster 360 Herbicide  
Allout Glyphosate 360 Herbicide  
Agcare Biotech Glyphosate 360 Herbicide  
Artfern Glyphosate 360 Herbicide  
Sipcam Glyphosate 360 Herbicide  
Davison Glyphosate Gold 500 Herbicide  
Yates Zero 360 Weedkiller  
Chemturf AF-100 Floating Herbicide  
Chemica Pacific Glyphosate 360 Herbicide  
Farm Direct Glyphosate 360 Herbicide  
Topgly 500 Herbicide*

***Salvinia molesta – Salvinia***

*Free floating plant can double its growth in as little as four day, forms thick mats which can completely cover water storages. Children, livestock and native animals may be in danger of drowning if entangled in a mat of Salvinia. Can shelter and be a breeding site of disease carrying mosquitoes, vectors of diseases such as Ross River Fever and Encephalitis.*

*Control Strategy*

- 1. Physical removal – Physical removal of plant mass, if practical, is the preferred option. Dense grasses, shrubs and or woody vegetation on the bank edges may render this method unsatisfactory. Plants are large and easily identified.*
- 2. Biological Control – not effective due to unsuitable climate. Releases have been caarried out in selected areas with poor results..*
- 3. Chemical control – best applied to moderate or heavy infestations where appropriate and when plants are actively growing. Observe withholding periods.*

*Herbicide ® Product Name :*

*Watrol Non-Residual Herbicide*

*Mantek Vegetrol Herbicide*

*Reglone Non-Residual Herbicide*

*Water Clear Aquatic Weed Control*

*Nufarm AF-100 Floating Herbicide*

*Chemturf Af-100 Floating Herbicide*

*Off-label permits for the use of Round-Up Biactive® have been approved by the National Registration Authority for use on Salvinia in various aquatic situations for Eurobodalla Shire Council and Illawarra District Noxious Weeds Authority staff respectively.*

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## **Guidelines for the Development of Weed Management Plans**

Weed Management Plans submitted to the EPA in an application for an Environment Protection Licence will need to identify the aquatic weed infestation and include any areas likely to be infested. In addition, the Plan should include –

- Justification for the use of herbicide(s) including comparisons of environmental impacts and cost effectiveness of any alternative methods of weed control or herbicide application methods;
- Brief description of the extent of the weed infestation(s);
- Target weed species;
- The type(s) of herbicides to be used, estimated quantities to be used and the proposed method of application for each weed species;
- Description of the waters where weeds are to be controlled (water depth, flow velocity, proximity to sensitive water users or ecosystems);
- Proposed monitoring and reporting program; and
- Names of individuals who will carry out the weed control activities and their qualifications in relation to herbicide use (eg NSW Farmers – Farm Chemical user Training Program Certificate).

## Glossary

<b>IDNWA</b>	Illawarra District Noxious Weeds Authority
<b>SCC</b>	Shoalhaven City Council
<b>ESC</b>	Eurobodalla Shire Council
<b>BVSC</b>	Bega Valley Shire Council
<b>NSW Ag</b>	NSW Agriculture
<b>NSW EPA</b>	NSW Environment Protection Authority
<b>NSW NPWS</b>	NSW National Parks & Wildlife Service
<b>DLWC</b>	Department of Land & Water Conservation
<b>LCAs</b>	Local Control Authorities
<b>CSIRO</b>	Commonwealth Scientific & Industrial Research Organisation
<b>CRC</b>	Co-operative Research Centre for Weed Management Systems
<b>TSC Act</b>	Threatened Species Conservation Act 1995
<b>POEO Act</b>	Protection of the Environment Operations Act 1997
<b>NW Act</b>	Noxious Weeds Act 1993
<b>NWAC</b>	Noxious Weeds Advisory Committee
<b>RWAC</b>	Regional Weeds Advisory Committee

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