REVIEW OF PROGRESS TOWARDS THE SALVINIA STRATEGIC PLAN 2006-2007

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Executive Summary

The National Aquatic Weeds Management Group, Australian Government and States continued to minimise the impacts of salvinia in Australia. The activities supported by the management group helped prevent the spread of salvinia and other aquatic weeds and minimised impacts on our waterways. Key achievements are summarised below.

Prevent the Spread of Salvinia
The Aquatic Weeds Early Detection project commenced with three aquatic weed identification workshops and follow up training sessions held in Northern NSW and North Central Victoria. These actions aimed to increase capacity of stakeholders to monitor waterways for salvinia (and other high priority aquatic weeds) and report outbreaks.

Other achievements include:
- Aquatic weed identification workshops in Queensland and South Australia
- The launch and distribution of the Pet Industry Association of Australia's (PIAA) 'Responsible Handling of Aquatic Plants' DVD, which provides a tool for industry prevent aquatic weed introductions
- Written paper on aquatic weeds for the Nursery and Garden Industry Australia
- Aquatic weed spread advert published in NSW Freshwater Anglers club annual report, which was distributed to 24,000 members

Upgrade efforts to prevent the trade of salvinia
A weed risk assessment of aquatic plants in the ornamental plant trade identifies 45 aquatic plants within the trade with significant weed risk. After weed risk assessment 20 have been recommended for national ban whilst further information is needed for the remaining 25 species along with other aquatic species used as food plants.

Minimise the impacts of salvinia
Stakeholders constructed a further four salvinia biological control facilities. There are now seven facilities operational meaning weeds officers and landholders have access to biological control agents in all regions except Far North Queensland. These facilities provide a reliable supply of weevils, sometimes on a user pays basis. As a result of these facilities the utilisation of salvinia biological control has increased. In NSW the number of releases made has increased from 12 in 2002/2003 to approximately 60 during 2006/2007.

The appointment of a fulltime aquatic weeds project officer and implementation of control in the Burnett region resulted in a significant reduction (approx 90%) in the amount of salvinia in the region.

Coordinate management
The National Aquatic Weeds Management Group continues to provide a platform for a coordinated approach to management of salvinia in Australia. The group identifies required tasks to address strategy priorities and reviews progress of strategies.

SALVINIA STRATEGIC PLAN 2006 – 2007

Introduction

Salvinia – Its history and impacts in Australia

Salvinia *(Salvinia molesta)* is a Weed of National Significance (WoNS) because of its severe impacts in freshwater ecosystems. It adversely affects the biodiversity and functioning of wetland and riparian ecosystems, water quality, water storage and distribution infrastructure, recreation and amenity values. It has often been described as one of the world's worst weeds.

Salvinia was introduced into Australia as an aquarium and fish pond plant in the 1950's and is now considered naturalised along most of the east coast of Australia from Cairns to Jervis Bay. Despite being banned throughout Australia salvinia remains a popular pond plant. Its popularity poses an ongoing threat of re-infestation into local waterways.

A National Solution

The national Salvinia strategic plan identifies a range of required tasks to reduce the impact of existing infestations, stop the illegal trade, prevent spread and increase coordinated management. Implementing the plan is the responsibility of a range of stakeholders from a landholder level to Australian Government.

Progress to Date

Key progress to date on the national Salvinia strategic plan includes:

- Establishment of biological control facility in NSW (2004/20005), which has made salvinia weevils available to all NSW Stakeholders
- Establishment of funding arrangements (user pays) for existing biological control facilities (Brisbane and NSW) and future facilities (2004/2005) helps ensure such facilities will operate beyond initial funding periods.
- Research has proved that the salvinia weevil (*Cyrtobagous salviniae*) provides effective control in cooler climates of Australia, including Sydney and Hunter regions. As a result, greater control of infestations in cool temperate climates is likely.
- Education and awareness activities including brochures, media articles, and displays by key stakeholders have increased awareness of key stakeholders, including the aquarium and nursery industry
- Best management practice for salvinia agreed on and documented in best practice manual. All salvinia managers have access to best practice information (2006/2007)
- Establishment of biological control facilities in South East Queensland Central Queensland, North Queensland and Darwin ensures availability of weevil in these regions (2006/2007).
- Regional bodies in key regional areas (Hawkesbury Nepean, Hunter and Mary Burnett) have incorporated salvinia management into their plans. This will help ensure ongoing management efforts are adequately supported.

Goals and Achievements in 2006/2007

2.1 Prevent and/or reduce the introduction and spread of salvinia

Goal 2.1.2 – Conduct regular monitoring of waterways for salvinia

Aquatic Weeds Early Detection

The Aquatic Weeds Early Detection (AWED) project started with identification workshops for weeds officers in Northern NSW and Waterwatch in North Central Victoria. Project aims to train weed control authorities, resource management staff and Waterwatch to implement protocols (originally developed by NAWMG) for detecting salvinia and other aquatic weeds. This includes conducting prioritised surveys and monitoring waterways. Efforts in 2007/2008 will focus on these two regions and South East Queensland.

Noosa District Landcare conducted 9 aquatic weed identification workshops in south East Queensland and 1 in South Australia. As a result more than 165 community people in both states who utilise waterways are familiar enough with salvinia and high priority aquatic weeds to identify and report them.

Stakeholders include NSW Department of Primary Industries (AWED proponent), Noosa District Landcare Waterwatch Victoria, Department of Primary Industries Victoria, Local governments in NSW and NAWMG.

Funding: Defeating the Weeds Menace, Burnett Mary Regional Management Group, South East Queensland Catchments, and Department of Water, Land and Biodiversity Conservation SA.

Research proposal

A project submitted for funding by Sydney University aims to develop sensors attachable to Autonomous Aerial Vehicles (UAV's) that are capable of detecting salvinia. If successful this could provide a low cost tool to survey waterways for aquatic weeds in remote and inaccessible areas.

Stakeholders include Sydney University (proponent), NSW Department of Primary Industries, NAWMG Maitland City Council, Farm Dam Control and Sunwater Qld.

Discussion

To date two listed actions are achieved (potential sources & protocols) and the other two are being implemented. The early detection and UAV pilot projects are long term and their effectiveness for detecting infestations early will not be known for some years. At the national level the completion of two initiatives and the future implementation of the other two represent a significant contribution (higher than 65%) towards this goal.

Future initiatives in this field will mostly relate to education and awareness campaigns (as per 2.1.3) to continue early detection efforts and scoping of how the early detection project can be implemented on a broader scale.

Goal 2.1.5 Improve industry cooperation

Pet Industry DVD

The Pet Industry Association of Australia launched and distributed to its members the 'Responsible Handling of Aquatic Plants' DVD, It provides aquarium and pet shop owners with a tool to learn more about the impact of aquatic weeds and how their industry can prevent their introduction and spread. The outcome will be a more informed and responsible industry. This project was a cooperative effort as members of the NAWMG provided assistance.

Funding: Defeating the Weeds Menace

Illegal Aquatic Plants poster

NSW Department of Primary Industries national poster on illegal aquatic plants provides the aquarium and nursery industry with a state by state guide to illegal aquatic plants. Posters have been distributed to the industry, weed control authorities and the general public. PIAA, Nursery and Garden Industry and all States/Territories had input into this project.

Funding: Natural Heritage Trust

Nursery and Garden Industry Australia – paper on aquatic weeds

An aquatic weeds paper for the July 2007 edition of the NGIA clippings series was prepared. The paper covers topics such as the impacts of aquatic weeds, actions the trade can take to reduce risk of future introductions and the aquatic plants weed risk assessment project.

Discussion

These initiatives improve the industry's recognition of declared plants and to some extent improve self regulation. The PIAA and the Nursery and Garden Industry of Australia's (NGIA) involvement in the NAWMG and the aquatic plants weed risk assessment project demonstrates strong linkages and cooperation between weed managers and the industry, which is likely to continue.

Self regulation is a difficult concept and is unlikely to be further pursued. Future efforts for cooperation should include greater efforts by states to communicate impending aquatic plant declarations to the industry and reporting by the industry of plant sales and new species.

The outcomes of these products and the resulting cooperation between industry and government means this goal is mostly (80%) complete.

2.1.6 Improve cooperation from non-industry groups

NSW Fishing clubs advertisement

A half page preventing aquatic weeds spread advertisement developed by NSW DPI for the NSW fishing clubs yearbook. 24,000 copies of the yearbook distributed to members. Advertisement aims to make the audience aware of how boats and fishing equipment can spread aquatic weeds and what actions they can take to prevent spread.

Discussion
This represents a first step since National Coordination commenced to target non industry groups who may be spreading salvinia. Future extension and education efforts (2.1.3) will target fishing, water garden and frog clubs in each state.

Other goals

2.1.1 Maintain natural characteristics of waterways - Discussion
This strategy goal is being addressed by the regional catchment bodies nationwide. Efforts by NAWMG will be to ensure that such bodies recognise the importance of this work for aquatic weed management

2.1.3 Change community attitudes and actions on salvinia - Discussion
This item is mostly complete although it will be ongoing. A range of extension materials are available and considerable efforts have been invested in extension. Future extension efforts are required with water gardeners, whom a minority continue to use salvinia.

2.1.4 Prevent importation of all salvinia spp. - Discussion
Complete but ongoing. No imports of salvinia recorded since commencement of national coordination.

2.1.7 – Minimise potential for further spread – Discussion
No progress on developing quarantine protocols. NAWMG need to discuss this item to determine just how realistic it is and where protocols would be of use.

2.2 Upgrade efforts to prevent the trading of salvinia

2.2.4 Provision of alternative pond and aquarium plants

Weed risk assessment
In 2005/2006 NAWMG recommended a strategy variation due to difficulties and risks associated with provision of safe alternative pond and aquarium plants. Instead NAWMG recommend that weed risk of pond and aquarium species in the trade be assessed.

A weed risk assessment of aquatic plants in the trade project commenced in August 2006. A project working group consisting of industry and government was formed and the National Institute of Water and Atmospheric Research (NIWA) from New Zealand were contracted to undertake the work.

Stakeholders include NSW Department of Primary Industries, NAWMG, Biosecurity Queensland, Department of Primary Industries Victoria, NIWA, PIAA, Austral Watergardens, and PISCES plants.

Funding: Defeating the Weeds Menace and NSW Department of Primary Industries

Discussion
The intent of the initial strategy was to ensure that when plants are removed from the ornamental trade they're not replaced by other species. Of the 401 species in the trade in Australia 45 were identified as having significant weed potential. Twenty of these were recommended for national ban after a weed risk assessment. However, further evaluation is required on the remaining 25 before recommendations can be made. In addition, 25 aquatic plant species not yet naturalized in Australia pose a weed risk. On completion of this project the results will be submitted to the Australian Weeds Committee for review and action.

This strategy item cannot be finalised until the 25 species that require further evaluation are risk assessed. Future efforts will be directed here. The project also highlighted the threat food plants may pose to aquatic environments. Use of such plants by both ethnic communities and permaculture pose an ongoing threat and investigation of this potential risk (including risk assessments) are required.

Other goals

2.2.1 Provide uniform regulations on trade of salvinia across Australia - Discussion
Complete – salvinia banned in all states and territories. The implementation of the Weed Risk Assessment Project has established a consultation process with the aquatic plant trade.

2.2.2 Enforce trade regulations - Discussion
Trade regulations are enforced in each state and territory. However, in May 2006 NAWMG identified the need for all state and territories to have nursery and aquarium shop inspection programs in place. Such inspection programs are in place in NSW and WA. An ongoing issue is the trade in aquatic weeds through the internet.

2.2.3 Develop accreditation of exotic aquatic plant growers - Discussion
No progress on accreditation although this item has been discussed. This project may not be necessary as the aquatic plants weed risk assessment aims to address the issues of aquatic plant propagation.

2.3 Strategies to minimise the impact of salvinia

2.3.1 Strategic control of all infestations

Salvinia Best Practice Manual
NSW DPI finalised, launched and distributed the Salvinia best practice manual, which provides weed control authorities with a reference tool to develop appropriate management and action plans for infestations. An aquatic weeds management forum was held in Grafton NSW. The workshop also included field trips and training to disseminate salvinia best practice information to weeds control officers in Northern NSW and Hunter Central coast.

Funding: Natural Heritage Trust, Defeating the Weeds Menace

Strategic Sites
Strategic control of infestations continues in key areas including Kakadu NP, Wollombi Brook, NSW, Hawkesbury River NSW, and Central Queensland. Infestations at key sites are mapped, strategic plans developed and required works implemented. In the Hawkesbury river catchment, off river sources have been targeted by the Hawkesbury River County Council. Such efforts have considerably reduced impact and potential to spread.

A project officer was employed to oversee management of the Wollombi Brook salvinia infestation. To date achievements include mapping, community meetings, boom management, on ground works, biocontrol and landholder meetings.

Funding: Department of Environment and Heritage, NSW DPI, Hawkesbury Nepean Catchment Management Authority, Queensland Parks and Wildlife Service, Burnett Mary Regional Management Group, Cape York Regional Management Group, Hunter CMA and various local governments

Discussion
Of particular concern is the infestation at Honey dam near Cooktown due to the potential for it to spread to the downstream Lakefield National Park (an iconic park). For this reason management efforts should aim for eradication.

The availability of the best practice manual means weed control authorities have an appropriate tool to develop strategic control programs for infestations. Positive developments include further involvement of Catchment Management Authorities at the key sites listed above.

This item is mostly complete but requires ongoing efforts by NAWMG to review regional plans. Developing and implementing a salvinia and aquatic weed control training for weed control agencies is a potential future option to complete this strategy item from a national perspective.

2.3.2 Improve community's understanding of the ecology, biology and impacts of salvinia

Salvinia training, field days and/or media releases
Burnett Catchment Care Association appointed a fulltime project officer to improve community understanding of salvinia and other aquatic weeds management. Three field days, press releases, ten newspaper articles, four radio interviews and five news pieces were held to disseminate information to community members in Central Queensland.

Media articles were also on infestations in key areas such as the Hawkesbury river, Wollombi brook and Kakadu. Weed warriors programs are under development in South East Queensland and Cape York

Discussion
Efforts to date have made significant contributions to the communities understanding of salvinia issues at the key sites of Kakadu, central Queensland, Hawkesbury Nepean

and Wollombi Brook. With a range of extension items available on going efforts will focus on key target audiences (such as water gardeners) and regionally significant areas.

2.3.3 Implement biological control

Salvinia biological control facilities

Four regional biological control facilities were constructed during 2006/2007, which when fully operational will provide weed control authorities with reliable access to salvinia weevils. These facilities are located in Mirriamvale, Yeppoon, Townsville (QLD) and Darwin. See Appendix 1 for a map showing facility locations in Australia.

Stakeholders include Livingstone Shire Council, Conservation Volunteers Australia, Department of Environment and the Arts NT, Brisbane City Council and NSW DPI.

Funding: Defeating the Weeds Menace, Mary Burnett regional group, Capricorn mob, Defeating the Weeds Menace, NT government, local governments in NSW and QLD.

Discussion

The completion of these four facilities means stakeholders in all but one region of Australia now have access to salvinia biological control agents, some on a user pays basis. The establishment of the user pays basis ensures continual operation of the facility. As a result of these facilities the utilisation of salvinia biological control has been increased and will continue to increase when facilities come on line. In NSW the number of releases made has increased from 12 in 2002/2003 to 70 during 2006/2007.

Future efforts in this field will include the establishment of a new facility for Far North Queensland and evaluating the effectiveness of these facilities across Australia. As a result of the above developments this goal is mostly (>80%) complete.

2.3.4 Investigate new potential control options

Research progress

Research into the salvinia weevil has identified that it can lay eggs at temperatures as low as 13^{o}C, which is 8^{o}C lower than what has been published in previous literature.

A new research project by University of Wollongong aims to determine augmentation strategies for future releases to improve performance in cool climates.

A project proposal submitted to trial new herbicides and integrate herbicides with biological control was submitted but unsuccessful.

Discussion

Current research, along with recent field findings, prove that the salvinia weevil performs satisfactorily in cooler temperate climates than previously thought. This has allowed weed managers to identify suitable biocontrol sites and as a result there has been more effective control of salvinia in temperate Australia.

The above findings and the identification of physical options from the Best Practice manual demonstrate this action is mostly complete. However, future efforts are

required to assess new herbicides (and integrate them with biological control) as there are a range of environments (ie small creeks and dams) where biological control is less effective.

2.3.5 Change community attitudes and actions on control.

Extension and field day efforts in the Burnett and Wollombi brook regions provided key information to the community on the control of salvinia.

Discussion

The availability of robust extension materials along with successful past efforts at key sties to change attitudes has contributed to implementation but measuring change in community attitudes is difficult. This action will remain an ongoing task where important control works are carried out.

2.4 Coordinate Management

2.4.1 National Assessment on the Distribution and Impacts of Salvinia

Discussion

Assessments on distribution were made in 2005/2006. National salvinia maps will be updated during 2007/2008 to provide more information on impact of salvinia, location of biological control facilities and release sites, strategic infestations and management efforts.

2.4.2 Provide cooperative management frameworks.

Management plans and best management practice

Management plans are in place for infestations in NSW and new plans were prepared for strategic infestations at Honey Dam Qld, Central Queensland and Kakadu National Park NT. All plans contain appropriate linkages to regional, state, and/or federal bodies and incorporate components of the salvinia best practice manual.

Discussion

Providing cooperative management frameworks for managing all salvinia infestations poses challenges due to the number of infestations present. However all high priority infestations have management plans.

2.4.3 Manage the implementation of the plan

Discussion

The establishment of the NAWMG means the plan is being implemented and reviewed on a regular basis, and the national management of salvinia coordinated. The NAWMG meets twice per year and holds at least two teleconferences per year. This goal has been achieved but requires ongoing efforts from NAWMG and stakeholders to ensure outputs continue to be delivered and outcomes achieved.

The stability, commitment, and regular attendance of members of National Aquatic Weeds Management Group have contributed to its effectiveness. Over 90% attendance at meetings are always achieved and six of the original ten inaugural members remain on the group since its inception in 2003.

Stakeholders during 2006/2007 include: NSW DPI, Biosecurity Qld, PIAA, DPI VIC, Lake McDonald Catchment Care, Local Government, CSIRO, community members and Department of Primary Industries and Arts NT.

Attachment A – National Aquatic Weeds Management Group (as of 30 June 2007)

Membership group

Organisation	Name
Community (Hunter)	Margaret McMahon
CSIRO Entomology	Shon Schooler
Pet Industry Association of Australia	Anthony Ramsey
Community (Noosa & District Landcare Group)	Phil Moran
NSW Department of Primary Industries	Syd Lisle
Biosecurity Qld (Department of Primary Industries)	Phil Maher
Department of Primary Industries (Victoria)	Lalith Gunasekera
Community (Hawkesbury/Nepean)	Neale Tweedie (Chair)
Local Government	Paul Rasmussen

Technical advisors

NSW Department of Primary Industries	Rod Ensbey
Maitland City Council	Brian Worboys

Coordinator

NSW Department of Primary Industries	Andrew Petroeschevsky

Corresponding members

Department of Water, Land and Biodiversity Conservation (SA)	Dennis Gannaway
Nursery and Garden Industry Australia	Robert Chin
Environment ACT	Kerrin Styles
Department of Agriculture and Food (WA)	Simon Merewether
Department of Primary Industries, Water and Environment (Tas)	Andrew Crane
Department of Environment and Arts (NT)	Steve Wingrave

Attachment B – Financial Reporting Table for Aquatic WoNS management (Alligator Weed, Cabomba and Salvinia)

	2006-07	Planned budget		Actual Expenditure	
	Employees & Positions Held	**Recipient's Contributions** (without GST)	**Funds paid by the Commonwealth** (without GST)	**Recipient's Contributions Expended** (without GST)	**Commonwealth Funds Expended** (without GST)
	Co-ordinator salary and on-costs		85,200		85,500
	Management, admin support, research officers	86,000		86,000	
	NRM groups, state /territory community support inputs	31,300		31,300	
A	**Total Employment Costs**	**$117,300**	**$85,200**	**$117,300**	**$85,500**
	Operating Cost Items	**Recipient's Contributions** (without GST)	**Funds be paid by the Commonwealth** (without GST)	**Recipient's Contributions Expended** (without GST)	**Commonwealth Funds Expended** (without GST)
	Management Group travel & meeting expenses	23,000	41,600	23,000	27,000
	General operating costs and extension	5,100	12,500	5,100	12,800
B	**Total Operating costs**	**$28,100**	**$54,100**	**$28,100**	**$39,800**
C	**Total Cost (without GST) (A+B)**	**145,400**	**$139,300**	**145,400**	**$125,300**
D	**GST (10%)**	**$14,540**	**$13,930**	**$14,540**	**$12,530**
E	**Total Cost (including GST)**	**$159,940**	**$153,230**	**$159,940**	**$137,830**

Attachment C National Salvinia Distribution Map with Salvinia Operating Facilities