

# Salvinia best practice management



# Why is it so difficult?

Salvinia achieves difficult-to-manage levels in Australia because:

- optimum conditions are prevalent (temperatures, nutrients, low flows)
- the plant has an extremely high growth rate in optimum conditions – dry mass can double in 2.5 days)
- plants can regrow from a fragment

# Can it be eradicated?

Very few infestations can be eradicated, but it is possible:

- every single plant must be treated or removed
- small infestations found early
- enclosed water bodies (1ha)
- may take years of follow up
- emergent veg less likely
- always threat of reinfestation

# Current best practice

- Each control method has a best practice role (biocontrol, physical removal, herbicides).
- Booms are an essential management tool.
- Need for ongoing management
  - follow up always required, eradication is rare, salvinia will always be present.

# Biocontrol (salvinia weevil)

- Very good management tool in subtropics
- Less consistent results associated with monsoonal flushing, temperate zone winters, over-storey vegetation
- Timeframes need to be accommodated (12 months to 4 years)
- Does not eradicate – brings salvinia to a very low level
- Needs to be managed – releases should be protected and monitored, presence each year should be monitored, salvinia should be maintained as a single layer (herbicide strip treatments)
- May not be an acceptable way to remove initial bulk, but should always be incorporated for ongoing management.





early in 14<sup>th</sup>  
month

Effective biocontrol over  
14 months in subtropics

middle of 14<sup>th</sup>  
month



# Releasing weevils



# strip treatments



# monitoring damaged buds



# weevil rearing facilities



# Herbicides

- broad scale use needs repeat application (up to 3) and follow up
- spot spraying good follow up method
- each herbicide has a different 'best use'

## **diquat**

- effective knockdown on thicker mats
- can be misleading as high kill can be achieved, but regrowth will occur
- high user risk (S6 chemical)

## **Immerse**

- effective on primary form and scattered plants
- very good as follow up
- approved for use in protected areas (kero component not tested and is cause for concern)

## **glyphosate**

- effective on single-layered infestations
- needs up to three applications
- has no label registration, can only be used under permit

## **orange oil**

- evidence it is effective on primary salvinia, restricted to ornamental ponds

# herbicide applications by boat



# regrowth after 1<sup>st</sup> glyphosate



# Regrowth after Immerse herbicide



# Immerse Myall Lakes NP



# Physical removal

- broad scale often cost prohibitive, certain situations call for it - Hawkesbury River is example of extreme costs and effort once an infestation has become so extensive
- ongoing small scale is BP - Ewen Maddock Dam is example of best practice salvinia management (in house mechanical scoop)
- manual removal very useful for follow up/eradication efforts - Myall Lakes National Park is example of eradication potential using extensive manual removal

# Hawkesbury River

## \$1.8 million collaborative effort



- 88 kms river and tribs. covered in tertiary salvinia
- team of harvesters worked non-stop for 8 months
- estimated 140 000 t salvinia removed over 14 months
- ongoing management occurring (biocontrol, spot spraying, booms).

# Commercial harvesters



Two 13-m<sup>3</sup> capacity harvesters (cost between \$1000 and \$1800 per day)

One 26-m<sup>3</sup> capacity harvester (worked at cost for three months, \$12 300 per 6 day week inc. deck hand)

# Ancillary plant and disposal



# Small scale mechanical removal

- used to keep salvinia at manageable levels in areas that need to be kept clear, or where herbicides or biocontrol are unacceptable
- more cost effective and better practice (part of ongoing management plan)

# Ewen Maddock Dam



- boat and scoop cost between \$5000 and \$7000, plus fuel (\$2080 in 2005) plus operator (\$2220 in 2005 – 74 hrs).
- herbicide sprayed on dumped and stranded salvinia
- booms and biocontrol also used

# Manual removal – Myall Lakes



- successful eradication, half tonne salvinia manually removed along 15km of shore line.

- initial bulk removed by 20 staff, 2 weeks, 2 km of creek line, using pool scoops and 20L garbage bins or bags
- 4 staff over 80 days in body of lake
- follow up was 4 people over 30 days across a 2 year period.

# Booms and containment



# ag-pipe booms



# booms for monitoring



# For the rest of the details.....

- see the **Salvinia Control Manual....**



(available early July if nothing else goes wrong)