AQUATIC WEED CONTROL OF CABOMBA AT GLENBROOK LAGOON QUESTIONS AND ANSWERS

Glenbrook Lagoon has been infested with aquatic weeds for a number of years. Blue Mountains City Council (BMCC) has successfully removed over 98% of Salvinia since 2005. Supported by funding from BMCC's local Environmental Levy and the Australian Government's Caring for our Country initiative, we are now going to be using a similar approach to treat the aquatic weed Cabomba. Further information is available online at www.bmcc.nsw.gov.au/sustainableliving/environmentalinformation/glenbrooklagoon.

Q. What is *Cabomba caroliniana* and why is it a problem?

A. A Weed of National Significance, *Cabomba caroliniana* is an escaped aquarium plant. A submerged aquatic weed, it takes root in the bottom of the Lagoon, grows in dense thickets and chokes the water environment.

- Cabomba is a highly invasive species that occupies nearly 100% of Glenbrook Lagoon. Whilst currently contained, if the weed escaped into the Hawkesbury Nepean and World Heritage National Park rivers, it could seriously damage the natural environment, Sydney's water supply, fisheries, tourism and water-based recreation.

Cabomba weed occupies nearly 100% of the Lagoon

The submerged mat of Cabomba chokes the Lagoon

- If left untreated, Cabomba impacts in a number of ways, for example:
- ***Environmental Impacts:*** Cabomba's dense underwater thickets prevent light from entering the water. This lowers oxygen levels in the water and impacts the survival of diverse aquatic plants and animals. Seasonal variations in the weed structure are also a concern; when the weed dies back in winter, it decomposes enmasse to create foul-smelling, oxygen-deficient and nutrient rich water—an ideal environment for algae growth.
- ***Social Impacts:*** With its dense undergrowth, Cabomba poses a hazard for recreational water use. Fishing lines can become entangled in the weed and water sports such as boating and canoeing are affected. In some water bodies, Cabomba has caused water to darken and grow stagnant, reducing the area's scenic value.
- ***Economic Impacts:*** Cabomba infestation is costly to control. If it escapes into the Hawkesbury Nepean catchment and Sydney's water supply, the economic impacts from increased maintenance and running costs are significant. Cabomba may also impact commercial fisheries and navigation of river systems.

- Cabomba weed can spread from one water body to another. A plant fragment (e.g. stem) is all that is needed to reproduce the weed elsewhere if it travels through creek systems or relocates through flooding. The weed can readily spread through fishing equipment, watercraft and trailers, water birds and animals.

Q. What are the treatment options?

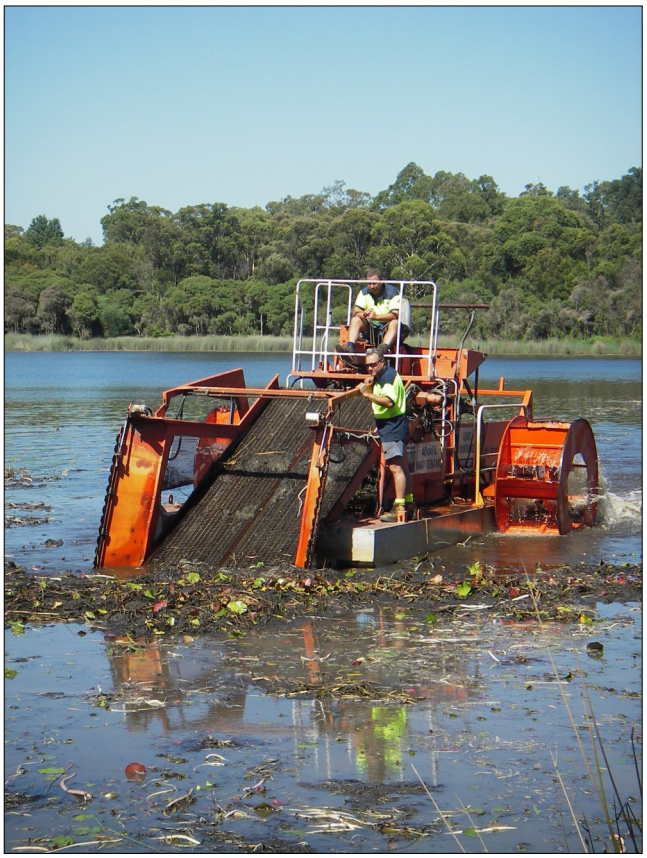
A. Council has investigated a variety of options for treating Cabomba. Approved by the Federal Government, "Shark" is the only herbicide that contains the active ingredient (carfentrazone-ethyl) to effectively target the weed Cabomba. Department of Primary Industries (DPI) research and Australian field trials have also identified the herbicide "Shark" as the most effective means to treat Cabomba. It is considered safe and harmless to humans, domestic pets, most plant species and other animals.

Council will be using an integrated process of the herbicide treatment and mechanical harvesting. Below are other methods that were considered:

- Draining: (otherwise known as 'drawdown'). This technique aims to dry out and kill Cabomba. It is a sound option for lower rainfall areas and small water bodies. It is not suitable for Glenbrook Lagoon. The sediment would not fully dry out and the Cabomba would survive. Besides being unsightly, a strong odour of rotting vegetation would occur. Additionally, draining the Lagoon would kill other aquatic life.

- Shading: Two shading methods exist to control Cabomba. This first floats black plastic blankets on the Lagoon surface for 3 or 4 months. This technique kills Cabomba, but it also kills other aquatic life. The second shading method lays plastic blankets on the bottom of the Lagoon to smother Cabomba. This method impacts other life and is impractical given the Lagoon's size.

- Mechanical harvesters: Harvesting aquatic weeds is expensive and in isolation does not offer long-term treatment—the weed almost certainly grows back. In combination with herbicide, however, harvesting can improve the results of weed control and help limit the amount of herbicide required.



An aquatic weed harvester in Glenbrook Lagoon

Q. How safe is the herbicide to humans?

A. The herbicide treatment is considered safe to humans, including infants and young children.

- The herbicide is active for up to 14 days but the active agent disappears from treated water within 21 days of application. This means that the herbicide breaks down quickly (and completely) and is therefore harmless to humans, other animals and most plants.

- In its diluted form, the herbicide has low toxicity if accidentally swallowed, absorbed through the skin, or inhaled. It poses no threat to pregnancy, does not cause nausea or vomiting, and whilst contact with the eyes is not recommended, it is minimally irritating.

- Whilst the diluted herbicide is harmless to humans, Council asks the public to refrain from contacting the water at Glenbrook Lagoon which may contain high levels of bacteria (see existing on-site signage).

Q. How safe is the herbicide to pets and other animals?

A. The herbicide is harmless to animals. Extensive research shows that the diluted herbicide is safe to mammals, birds, reptiles and insects. If consumed by an animal it breaks down quickly.

Q. How safe is the herbicide to trees and other plants?

A. Trees and other plants around the Lagoon should not be affected. The herbicide does not harm trees nor enter the root systems of other land-based plants. The herbicide may, however, impact other aquatic weeds and some broad leaf plants (namely algae, salvinia, and possibly floating bladder worts). Lily leaves will die back, but will quickly reshoot. Reeds and rushes will be mildly affected by limited browning of the stems.

Q. Will the herbicide impact my property?

A. No. Glenbrook Lagoon is a closed system with one small outflow which will be sealed during Cabomba treatment to prevent herbicide movement downstream. Weed treatment will occur during dry periods (not during heavy rain events) to ensure the herbicide does not exit the Lagoon.

Q. What are the likely long-term effects of the herbicide treatment in Glenbrook Lagoon?

A. None. The herbicide degrades rapidly in soil and water, and the active agent is undetectable 21 days after application.

Q. What are the benefits of removing Cabomba from Glenbrook Lagoon?

A. Preventing the spread of Cabomba into other water catchments is a key benefit as it avoids the environmental, economic and social impacts previously outlined. Locally, the long-term benefits include improved water quality through increased light and oxygen levels. This will encourage the recovery of the natural environment and improve the health and diversity of native species of plants, birds, frogs, turtles, fish and invertebrates.

Cabomba grows en-masse with fine delicate feathery leaves

Q. Will residents and local animals be disturbed by weed control activities?

A. Nearby residents may hear and see machinery and personnel moving about the Lagoon during weed control activities. Nesting birds and other animals may be mildly disturbed by activity and noise. Council will, however, schedule works to minimise disturbance. Each treatment period will last up to one week.

Q. What are the potential side-effects and how will Council manage them?

A. Cabomba control may result in temporary but visible side-effects. These may include:

- Floating vegetation mixed with sediment (sludge), dead vegetation, and possible unpleasant odours. Whilst noticeable, these side effects are temporary (in most cases, they last up to a few weeks).

- As a result of decomposing Cabomba, decreased oxygen levels may occur and result in some fish species "gasping" for air. However, the at-risk fish species are not known to occur in Glenbrook Lagoon. Council will also monitor oxygen levels and ensure aeration equipment is on hand in the unlikely event that oxygen levels need to be moderated.

If floating plant matter emerges on the Lagoon's surface, Council will attempt to remove these safely and dispose of them through aquatic harvesting and removal for composting offsite. However, most dead vegetation should decompose and the majority of this will occur on the bottom of the Lagoon.

Q. How soon will people see the effects of Cabomba treatment in Glenbrook Lagoon?

A. Cabomba starts to brown and die-off within 24 to 48 hours of the herbicide treatment. Plant death follows 7 to 10 days later. Surrounding reed beds may also turn brown, but these will recover.

Q. How long will the treatment take to be successful?

A. The herbicide is applied in two stages, 3 months apart. Each application requires approximately one week. The program will continue one to two times per year over a three year to four year period to ensure effective long-term weed control. In the first year, the program aims to achieve 80% control of Cabomba. Over the three to four year period, the program aims to achieve 99% control.

Q. How is Council paying for the Cabomba Weed Control Program?

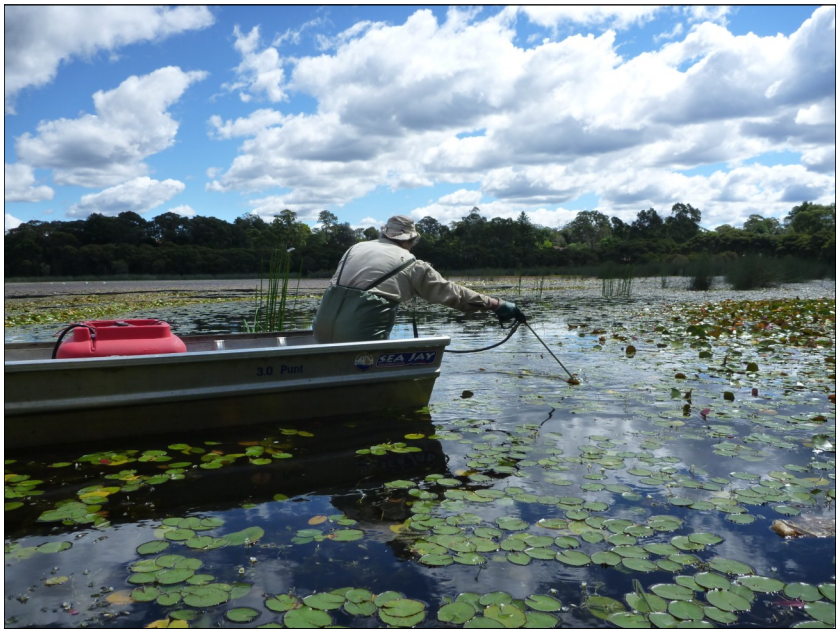
A. This project is partially funded from BMCC's local Environment Levy and the Australian Government's Caring for our Country funding package.

Q. What is the Environment Levy Program?

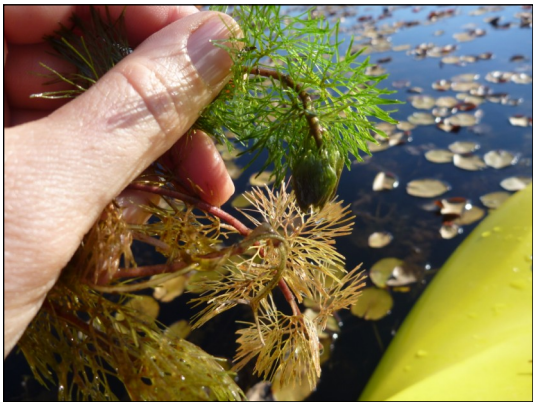
A. Council voted on 12 July 2005, to introduce the Environment Levy. The Levy gives Council funds each year to spend specifically on environmental protection and natural resource management projects within the Blue Mountains local government area. The Blue Mountains is currently experiencing serious environmental problems, these included weed invasion; poor water quality, localised flooding, stormwater runoff into bushland, degraded and unsafe walking tracks, worsening degraded lands (including significant erosion), failing on-site sewerage systems and an increasing number of threatened species. The Environment Levy provides critical funding to address these issues and deliver sustainability outcomes in the Local Government Area.

Q. What is Council's experience in aquatic weed control?

A. In 2006 Council successfully implemented a similar program to treat Salvinia using similar techniques of harvesting and herbicide.



Council conducting a trial of treating Cabomba in Glenbrook Lagoon



The browned off plant is Cabomba treated with the herbicide

Cabomba's dense underwater mats presents a safety hazard for recreation due to entanglement

Q. Why is swimming, boating and fishing prohibited in Glenbrook Lagoon?

A. Recreational activities are not recommended in Glenbrook Lagoon as there can be high bacterial levels caused by stormwater run-off from the surrounding urban area. Bacterial levels in the Lagoon are regularly recorded as exceeding water quality guidelines for recreational use. Additionally, the presence of Cabomba presents a safety hazard for recreation due to the potential for entanglement.

blue mountains City Council Environment Levy Your local levy at work

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