



## AQUATIC WEED MANAGEMENT PRACTICES IN SOME PONDS AND LAKES OF BRAMHAPURI TOWN, DISTRICT CHANDRAPUR (MS)

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**Abstract:** Ponds and lakes provide hospitality to large variety of plants. Some plants are essential for growth and development of other organisms living in the habitat. Due to improper management of waste and immense dumping of fertilizers in ponds and lakes, some plants grows and complete their life cycle in water and cause a damage to aquatic environment directly. These unabated plants are known as aquatic weeds. Dense growth of aquatic weeds may provide ideal habitat for the development of mosquitoes causing malaria, encephalomyelitis, filariasis. Over growth of aquatic plants forms a dense covering over the water causing threat to aquatic life. Regular decomposing of plants decreases oxygen level and increases carbon-dioxide level in the pond, which results in unpleasant taste and offensive odour. So, management of these weeds is necessary to maintain the diversity and livelihood of people living nearby the ponds. The present report reveals that, different practices were applied in different ponds and lakes of Bramhapuri city to manage and control the over growth of aquatic weeds.

**Keywords:** Aquatic weeds, Management practices, Biological control

### Introduction:

Aquatic plants are essential components of any pond or lake. They perform many physiological activities which create an environment suitable for other organisms. One of such physiological activity is photosynthesis which provides food for insects, fishes, waterfowls, and microscopic organisms. Plants maintain the balance in ponds by taking up Carbon dioxide and releasing Oxygen in water, which is vital for survival of aquatic animals. This process also maintains the pH of pond water. The aquatic plants provide habitat and protection to many birds, insects, fishes, reptiles, amphibians and microscopic organisms. The floating plants on the surface of water, or emerged from water near shore, act to buffer destructive wave action that could lead to erosion. Aquatic plants may also acts as filters to trap particles and absorb the organic particles in turbid water (DEM Office of Water Resources 2014).

The pond is said to be ideal if it possesses native plants with mixed species diversity. And different species occupies different zone in depth of water. Some plants found submerged at the depth of 30 feet. While some are rooted emergent and some floating plants form a canopy on the surface of water.

But as invasive plants expand in a new area, they suppress the growth of native

plants and cause localized extinction of native species. These invasive plant species can invade a particular zone of the depth profile and suppress the native plant species that normally inhabit the area. Invasive plants dominate to the borders of lakes and ponds, with native plants often confined to a shallow fringe around the lakes and ponds. Invasive plants reduce native plant growth and decelerate human uses of waters by forming dense surface canopies that shade out lower-growing native plants and interfere with water flow and fishing. Dense surface canopies also radically change the habitat quality for fish. Dense plant beds provide a place for small forage fish to hide and reduce the ability of predatory fish such as bass and northern pike to see their prey. Many animal species are linked to specific native plant communities and the diversity of native communities provides a variety of habitats for aquatic insects and other fauna. Invasive plants reduce the diversity of native plant communities, which leads to a reduction in the diversity of both fish and aquatic insects. Therefore, invasive plants are harmful to the diversity and function of aquatic ecosystems and can have significant adverse impacts on water resources. When these invasive plant species exhibit rapid growth and produce dense monocultures they are known as aquatic weed, that displace more desirable native plants,

reduce biodiversity, interfere with flood control and create breeding sites for disease-vectoring mosquitoes. Poor planning and poor management results in aquatic weed problems.

Aquatic weeds often reduce the effectiveness of water bodies for fish production. Aquatic weeds can assimilate large quantities of nutrients from the water reducing their availability for planktonic algae. They may also cause reduction in oxygen levels and present gaseous exchange with water resulting in adverse fish production (Lancar et.al. 2002). The uncontrolled growth of invasive plants often provides an undisturbed habitat that mosquitoes prefer and where they can proliferate. Mosquitoes can colonize virtually any type of water body and aquatic vegetation provides a perfect environment for mosquitoes to thrive (Gettys et.al. 2014). Dense growth of aquatic weeds may provide ideal habitat for the development of mosquitoes causing malaria, encephalitis filarisis. These weeds may also serve as vectors for disease causing organisms and can greatly reduce the aesthetic value of water bodies from a recreational point of view.

Aquatic weeds have been found to severely reduce the flow capacity of irrigation canals thereby reducing the availability of water to the farmer's field. Aquatic weeds (emergent, floating and submerged) interfere with the static and flow water system. They perform the process of evapo-transpiration which results in tremendous loss of water from water bodies like lakes, ponds and dams. Inflowing water system, aquatic weeds impede the flow of water in irrigation canals and drainage channels thereby increasing evaporation damage structures in canals and dams, clog gates, siphons, valves, bridge piers, pump etc. Hurdle in flow of water may result in localised floods in neighbouring areas. India has the largest canal network in the world where the velocity of flowing water is reduced by about 30- 40 % due to the presence of aquatic weeds (Lancar et.al. 2002). Over growth of aquatic plants forms a dense covering over the water causing threat to aquatic life.

Aquatic weed is a great problem of entire world. Most severely affected countries by aquatic weeds in North and South America are Mexico, Atlanta, California and Argentina etc. European countries are Spain, Norway, France and Netherlands, and in Africa are Egypt, Zimbabwe, Kenya and South Africa etc. while in case of South and South East Asia the affected countries by aquatic weeds are Malaysia, Japan, Philippines, Indonesia, SriLanka, Thailand, Bangladesh and India.

Aquatic weeds cause several problems in India. The canal of Chambal commanded area in Rajasthan and Madhya Pradesh and Bhakra-Nangal in Himachal Pradesh and Punjab have been greatly slowed by aquatic weed. Several irrigation and hydroelectric projects in country like Tungabhadra project in Karnataka, Nagarjun Sagar in Andhra Pradesh and Kakki and Idikki reservoir in Kerala are suffering with massive growth of aquatic weeds. Vast majority of lowland paddy fields in Kerala, Goa and North-East region of India are badly infested with aquatic weed like *Eichhornia crasipes*, *Salvinia molesta*, *Chara* sp., *Nitella* sp. and algal scum. Out of about 140 aquatic weeds, *Eichhornia crasipes*, *Ipomoea aquatic*, *Trapa augustata*, *Ceratophyllum demersum*, *Salvinia molesta*, *Nelumbo nucifera*, *Alternanthera philoxeroides*, *Hydrila verticillata*, *Vallisneria spiralis*, *Chara* sp., *Nitella* sp., *Potamogeton* sp. are of primary concern in India (Varshney et.al 2008).

Considering the above problems it is necessary to implement suitable method to control the immense growth of aquatic weeds. Basic methods used to control weeds include preventive, mechanical, biological and chemical techniques. Of these, some techniques have been used to control aquatic weeds in some ponds of Bramhapuri city.

Present study has been done three ponds and lakes of Bramhapuri city. These are Barai Lake, Kot Lake and Peth Ward Lake. The investigation was undertaken with following aims and objectives.

**Aims & Objectives:**

- Listing of aquatic weeds
- Applying the control measures.

**Material and Methods:**

List of aquatic weeds were prepared by intense field visit and identified by standard floras. The digital documentation of listed plants was prepared. Control and management of listed aquatic weeds was done by following methods using manual (Durborow et.al. 2007).

**Manual Harvesting**

Removal of immensely grown aquatic weeds by hands is one of the best management practices instead of using chemicals. This manual method of harvesting was applied only for submerged and emergent weeds in shallow ponds. While removing the weeds a care has been taken to remove as much of rhizomes or rootstocks as possible to avoid re-growth.

**Biological Control**

Some fishes were used to control unwanted aquatic plants. These fishes are used as they consume submerged plants and filamentous algae. The care was taken that the fishes should not escape out of ponds.

**Chemical Control**

Use of chemicals (herbicides) to control weeds plants is most common control measure to manage over growth of weeds. For potential impact and management of weeds it is necessary to identify the species correctly.

**Glyphosate** (Pondmaster) is one of the most common herbicide sold as a liquid. It is broad spectrum herbicide, mixed with surfactant and sprayed on higher aquatic weeds.

**Imazapyr** (Habitat) is a liquid herbicide that is mixed with water and a surfactant or vegetable oil and sprayed on emergent or floating aquatic weeds.

**2,4-D** (Aquacide) is effective for controlling submerged aquatic plants. These compounds rapidly and completely decompose in about 3 weeks.

**Observation and Discussion:**

In the present investigation, it has been observed that, improper management of waste and dumping of sewage in local ponds and lakes of Bramhapuri harbours the growth of unwanted aquatic plants. During the study three Lakes- Kot Lake, Barai Lake and Peth ward Lake, it has been found that, Kot Lake was most severely affected pond in

Bramhapuri. It was followed by Perh Ward Lake and Barai Lake was found to be less affected. (Table-1)

Table-1: Lake wise listed plants and Control Measures

Sr. No.	Name of Pond/Lake	Reported Weeds	Control Measure
1.	Kot Lake	<i>Eichhornia crassipes</i> , <i>Pistia stratiotes</i> , <i>Typha angustata</i> , <i>Ipomea aquatica</i> , <i>Ipomea carnea</i>	Manual Harvesting, Chemical Control
2.	Peth Ward Lake	<i>Hydrilla verticillata</i> , <i>Vallisneri spirallis</i> , <i>Eichhornia crassipes</i> , <i>Typha angustata</i> , <i>Ipomea aquatica</i> , <i>Ipomea carnea</i> , <i>Polygonum glabrum</i> ,	Manual Harvesting, Biological Control, Chemical Control
3.	Barai Lake	<i>Typha angustata</i> , <i>Ipomea aquatica</i> , <i>Ipomea carnea</i>	Manual Harvesting, Chemical Control

**PHOTO PLATE**

A. *Eichhornia crassipes* from

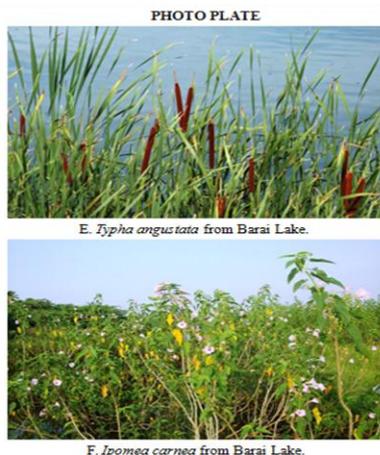


B. *Pistia stratiotes* from Kot

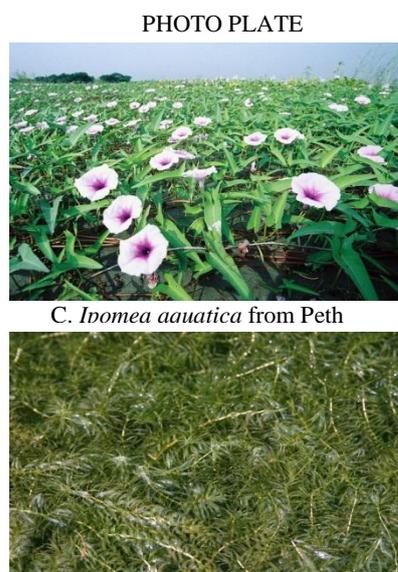
The entire water body of **Kot Lake** is occupied by monoculture of *Eichhornia crassipes*, *Pistia stratiotes* and *Typha angustata*, *Ipomea aquatica*, *Ipomea carnea* found surrounding the water bodies. To control these weeds, manual harvesting method was applied at large scale and Glyphosate (Pondmaster) and 2,4-D (Aquacide) were applied to remove remnants.

The great diversity in aquatic weeds was found in **Peth Ward Lake**. The dominant species found are *Hydrilla verticillata*, *Typha*

*angustata*, *Ipomea aquatic*, *Eichhornia crassipes*. First, manual method was used to remove all weeds and Chemical herbicides were applied followed by manual methods. Then, biological methods (fishes) were applied to remove submerged weeds.



**Barai Lake** is found be less affected by aquatic weeds. The plants like *Typha angustata*, *Ipomea aquatic*, *Ipomea carnea* are found in shallow water and surrounding the water body. As all are emergent plants, only manual harvesting method was used. And to remove remnants, Herbicides were used at small scale.



While using herbicides care has been taken that, used according to the manufacturer’s specifications, herbicides are seldom directly

toxic to fish. However, the addition of any herbicide to a plant-infested body of water will alter water quality. Oxygen production by photosynthesis will be decreased and decomposition of the dead plant material will increase oxygen consumption. The result will be a noticeable decrease in dissolved oxygen concentrations compared to pre-treatment levels.

**Summary and Conclusion**

The entire water body of **Kot Lake** is under the process of beautification of the lake by corporation and presently the work is not in progress. At present the lake is occupied by monoculture of *Eichhornia crassipes*, *Pistia stratiotes* and *Typha angustata*, *Ipomea aquatic*, *Ipomea carnea*.

The dominant species found in the **Peth Ward Lake** are *Hydrilla verticillata*, *Typha angustata*, *Ipomea aquatic*, *Eichhornia crassipes*.

**Barai Lake** is found be less affected by aquatic weeds. The plants like *Typha angustata*, *Ipomea aquatic*, *Ipomea carnea* are found in shallow water and surrounding the water body.

Selection of the best treatment or combination of treatments depends on the species of water plant, the extent of the problem, economic considerations, local environmental conditions, and pond uses. First, be sure that you have an aquatic plant problem. Some aquatic plant growths are minor and temporary, and do not require costly weed control actions, thereby saving you worry, time and money. If aquatic plants cover more than 25% of the pond surface area, you should consider implementing weed control. Second, different types of weeds (algae, floating-leaf weeds, emergent weeds, and submersed weeds) require different treatments (Shelton and Murphy 1989). Depending on the type of weed and the severity of the problem, one or a combination of the control methods can be very effective.

Physical removal of waterweeds from ponds is a good control technique. Harvesting of aquatic plants consists of three essential steps. These are

- (1) Cutting or uprooting the weeds
- (2) Collecting the cut weeds
- (3) Removing the weeds from the pond

Harvesting can be accomplished with simple hand tools and physical labor or with the help of cutting machines. Whole plant removal generally is better than cutting because some plants can reproduce from cuttings.

The success of any harvesting operation depends on the prompt and complete removal of all cut weeds. Haphazard or partial removal of the cut weeds can increase the problem, since each unremoved plant fragment has the potential to form a new weed. Also, cut plants left in the water will decay and release nutrients that stimulate future weed growths. Decomposing plants left in the pond use oxygen and can cause fish kills. Harvesting provides immediate relief from nuisance plant growths and does not endanger fish life.

After harvesting the same can be used for manure preparation. The organic value of the different weeds are under the process of study.

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