AQUATIC PLANT MANAGEMENT IN NEW SOUTH WALES
- AN OVERVIEW -

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Summary. Since settlement white man has changed existing waterways or created new ones for irrigation, and so has shifted the balance of aquatic plants. These disturbed or unstable systems proved to be ideal places for aquatic plants to colonise. To achieve his goal therefore - to supply water - he has had to manage the plants.

INTRODUCTION

The attitudes towards the management of aquatic plants has changed little since Europeans first colonised this country in the 1770's. Settlers attempted to apply knowledge of their experiences to a completely foreign environment. Instead of the relatively high and regular rainfall in Europe, they were faced with a primarily arid climate. Under these conditions growth of aquatic plants were finely tuned to the water availability. They would colonise new areas in time of above average rainfall and decrease as water areas contracted during dry periods.

Since settlement Australians have endeavoured to increase the productivity of the land by removing the rainfall variability factor with irrigation. These artificially created aquatic ecosystems are, in most cases, ideal for the proliferation of both native and exotic aquatic plants. As the demand for water increased so the need to maintain the efficiency of the system increased. This in turn led to an escalation in the management cost, because it was largely believed that the most efficient system was one totally devoid of vegetation. As stated earlier the attitude towards management has changed little and the people responsible for drawing up and overseeing control practices can give you numerous reasons as to why an irrigation or drainage system should be maintained totally free of all plant growth. One that is regularly stated is that the system looks unsightly. In most cases these arguments do not constitute a valid reason for expending increasing amounts of money on management. The word ERADICATION is still used extensively in weed control.

Not only is the word inappropriate in most cases, but in an effort to achieve this aim, money is expended unnecessarily and systems tend to become unstable which increases expenditure in the long term due to increased channel maintenance. For example, channel banks require rebuilding due to soil erosion, if vegetation is not present to bind the soil.

Until recent times man's ability to supply irrigation water and utilize this water resource has not been severely hampered by aquatic plant growth, as he has been able to effectively keep plant populations at a suitably low level. However as the range of uses and demand for water

increases it has become increasingly difficult to manage these aquatic systems to enable maximum utilization of this limited resource.

MANAGEMENT STRATEGIES

The management of aquatic plants relies on various control strategies. These can be subdivided into: No Action, Chemical, Mechanical, Biological, Preventative, or an Integration of any of the above.

No Action: It may be better to do nothing at all rather than upset the balance within the system. Unfortunately, because of demands placed on regulated irrigation supply and drainage channel systems, conditions conducive to weed growth are continually changing. These changes, by their nature tend to promote instability.

Chemical: This form of management has been and still is heavily relied upon to control aquatic plants. Increasingly the use of chemicals in aquatic systems is being questioned and it is realised that guidelines must be compiled to ensure correct use in or near these systems. A uniform approach must be adopted to ensure that existing chemicals used within aquatic systems are not removed from the market place because of misuse resulting in unwarranted contamination.

The supply systems that have been developed in Australia in most cases could not exist without the use of some chemicals, as chemical control has proven to be an effective and relatively cost efficient method of ensuring continuity of supply. It behoves us all to ensure that chemicals are not misused to safeguard our licence to apply them, within these systems.

Mechanical: Generally refers to the use of excavating machinery such as backhoes and draglines. There appears to be little interest in the use and development of new machines capable of doing a more efficient job. Mechanical control can be used effectively to reduce weed populations however there are some major disadvantages associated with the use of excavating machinery if it is not used judiciously. E.g.:

- Relatively High Cost
- Short Term Results
- Overexcavation of Channels
- Spread of Viable Plant Parts

Overexcavation is a major problem within our irrigation areas and districts. Where there has been a reliance on this form of control channel dimensions have been altered creating over capacity systems which have proved to be ideal places for aquatic plant growth. Overexcavation results in:

- Inability to dry out channels effectively during the non-irrigation season.
- Decreased water velocities.

The spread of viable plant parts is also a major factor influencing aquatic plant control. Examples where mechanical removal would not be recommended are: *Phragmites australis* (Common Reed) and *Alternanthera philoxeroides* (Alligator Weed). Both these plants can reproduce from

underground parts, and if they are mechanically removed, these vegetative reproductive parts will be spread throughout the system.

In some cases there may be no alternative to this form of control. If it has to be used, ensure that more problems are not being created than are being solved.

There is ample, but perhaps not documented, evidence in the irrigation areas to suggest that negative economies will result where caution is not exercised.

Biological: There has been notable successes in biological control with floating aquatic species in Australia, however the aquatic plants which can cause problems within our irrigation systems are submerged and emergent species. As yet no biological control agents have been investigated in New South Wales for use on these types of plants. E.g. *Elodea canadensis* and *Sagittaria montevidensis* .

Preventative: Crisis management is still used as a valid technique in the maintenance of irrigation systems. Work is only carried out when the system can no longer function effectively. We should be preventing the plants from reaching a population where they cause this degree of obstruction. Various methods can be employed to ensure that a problem does not occur:

- Control plants at low population densities
- Carry out regular surveys to determine undesirable species
- Regular drying of the system
- If the system is used for intermittent irrigation during the season, fill the channel for several weeks to remove bank species which interfere with flows - E.g. *Cyperus eragrostis*.

Integrated: Systems can be more effectively managed if the various control methods are integrated to form an overall management strategy.

DESIGN AS A COMPONENT OF MANAGEMENT

The design and construction of most irrigation systems in New South Wales appears to have proceeded with little thought for the parameters which influence aquatic plant growth or for maintenance facilities and operation procedures to simplify features which aid in their management.

- Construct channels to correct capacity. Over capacity results in slow flows.
- Provide uniform grade.
- Allow for access on at least one side of the channel. On large channels, access on either side would be required.
- Provide as steep a channel bank batter as the earth will allow to reduce bank species.
- Provision for planting of competitive species to stabilise the channel system.
- Ensure high standard of construction supervision and quality control.

The management of systems and their design are complementary and it is

important that they be treated as such. By integrating the two, the control of aquatic plants can be greatly simplified.

The Water Resources Commission (N.S.W.), Design Branch now requests advice from Operations branch with regard to design factors which effect long term management of the system.

HOW SHOULD WE BE PLANNING

Personnel responsible for system management should be assessing each problem. It is no longer appropriate to classify all systems as similar, requiring the same method or methods of control. Every situation is unique.

Whilst the operation and maintenance costs are escalating yearly, there is also an increasing call on management for accountability of monies expended on aquatic plant control. Most organisations do not find the task of preparing an accurate dissection of operational and maintenance costs, an easy one.

At present the Water Resources Commission is developing a computer programme that will enable an accurate picture of control types and costs to be quickly available. Past and present control strategies will have to be examined in detail, so that we will then be able to more effectively assess the type and cost of channel maintenance in the future.

We have a choice in vegetation management:

- Use the same techniques and methods for controlling plants as we have done in the past and expect to continue this process ad infinitum.

or

- Assess each problem and by using an integrated control approach, establish a system which requires minimal maintenance to ensure it functions effectively.