



Te Kaunihera o
MANUKAU
City Council

Wattle Farm Reserve Management Plan

The reader should note that this plan is due for review and contains information that is out of date or superseded by other documents. Particular reference should be made to The Manukau Operative District Plan 2002 and Making Connections – A Strategy for Manukau's Parks into the Future 2002/10. In the future this reserves will be included in a larger Coastal & Riparian Reserves Management Plan that covers all coastal reserves in Manukau City. This new plan is currently being drafted.

1992

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1.0 Introduction

Wattle Farm Reserve is located 5 km south of Manukau City Centre on Wattle Farm Road. Approximately half of the reserve's 12.9 hectares consists of 2 ponds. These ponds are remnants of the former sewage disposal system for Manurewa. When the southern interceptor reached Manurewa and that area was connected to the City's major sewage system, the ponds were transformed into a recreation facility.

Manukau City Council took over the ownership of the ponds from the Auckland Regional Authority in 1972 and they now form part of a recreation reserve which also doubles as a wildlife habitat.

The reserve and particularly the ponds are used extensively for model boat sailing. The venue is considered one of the best of its type in the country for this purpose and the NZ National Championships are frequently held there.

The remainder of the reserve consists of grassed open space with stands of mature trees. The Auckland Regional Council operates a major pump station on the reserve as part of its city-wide sewerage collection system.

2.0 Legal Description, Zoning and Classification

Wattle Farm Reserve is held under a variety of titles and has a legal description as follows:

LOT	DP	AREA	CLASSIFICATION	GAZETTE
1	63760	6.2498 ha	Part bed Manukau Harbour	
1,2,3,4	46600	3.7252 ha	Drainage Purpose	1960 p. 1559
220	73243	.9810 m ²	Recreation Reserve	
220	73242	.3119 m ²	Recreation Reserve	
221	74563	1.7123 ha	Recreation Reserve	
(12.97393 ha)				

It would be appropriate for Council to reclassify all land as Recreation Reserve following adoption of the Management Plan.

The above lots are zoned as Reserve 1 under the Proposed Second Reviewed District Scheme. The major purpose of this zone is the provision and protection of areas of public open space.

These areas are predominantly free of buildings and provide for casual outdoor recreation use (refer to the Appendix for a full zone statement).

3.0 The Existing Site

The site can be define in terms of three distinct areas:

1. The ponds
2. Pond margins
3. Grassed open space and access

3.1 The Ponds

The two ponds are the dominant visual element in the reserve and provide the focus for most activity for the public and the birdlife.

The southern pool is oblong in shape and has the more formal edges of the two. The northern pond is informally shaped reflecting the estuary margins which used to occupy the site prior to their use as sewerage ponds. In the past a fibrolite wall was used to separate the river flow from the pond. This has since fallen into disrepair and is mainly used by birds as a roost.

The northern pond flows over a concrete weir which provides the outlet into the Waimahi Inlet. The main uses for the ponds are:

- (a) Wildlife habitat
- (b) Aquatic based recreation

3.1.1 *Wildlife Habitat*

Both ponds are used by a range of birdlife (refer page 4) as a permanent habitat and as a seasonal feeding ground. Most feeding areas are based in or around the northern pond and the weir area. The southern pond is less attractive in terms of food supply because of the active weed control programme and occasional de-watering undertaken by Council.

The weed growth in the northern pond is becoming so rampant (1991) that concern has been expressed about its negative impact on the birdlife habitat values.

In the 1970s rudd were illegally liberated in the ponds. In 1988 the Auckland Acclimatisation Society stocked the northern pond with rudd, perch and golden tench in response to requests from coarse angling groups. Of these species only the rudd appears to have survived because of the poor water quality and the large amount of weed. The Auckland Waikato Fish and Game Council (which has replaced the Acclimatisation Society) have recommended that no further stocking of the ponds takes place until the weed problem and water quality are improved.

3.1.2 *Aquatic Based Recreation*

Most aquatic based recreation takes place around the ponds although some visitors do swim in the southern pond. The ponds provide the focus for walking, picnicking and observing the birdlife.

The main structured use of the reserve is by the Northern Maritime Model Society who run several regattas each year on the southern pond.

3.2 Pond Margins

The edges of the ponds are critical for several reasons. They:

- Provide habitat for wildlife
- Determine the appearance (formal, natural etc)
- Determine the degree of accessibility
- Influence the types of activity which take place
- Provide shelter and shade

Much of the margin of the northern pond consists of bush remnant and/or raupo. These areas provide a valuable contrast to the open grassed parts of the reserve and the bush also provides a habitat for a wider range of birdlife than that associated with the ponds. These margins also provide nesting areas.

The central median between the ponds is a constructed element in the landscape and has the appearance as such. The eastern margins of both ponds adjoin the most heavily used part of the reserve adjacent to the access road and carparks. The edge of the southern pond has been formalised with a stone wall to cope with the heavy usage whilst the eastern edge of the northern pond has grassed margins with some planting. The geometric shape of the southern pond strongly reflects its origins as a sewerage pond and it still has the appearance as such. Changing the shape of this pond could have a significant impact on the appearance and atmosphere of the reserve and create more space for model boat racing.

The edge treatments are critical in future management of this reserve and require careful consideration as part of the long term management of people and habitat values.

3.3 Grassed Open Space and Access

The remainder of the reserve consists of access roads, carparks and grassed open space with stands of mature and semi mature trees.

The open space which borders Wattle Farm Road was formerly occupied by another pond in 1987. It was filled in when the adjoining pond was dredged. This area has only recently settled and stabilised. The grassed areas are mainly used for walking, ball games and general passive recreation. Because of its elevation, the eastern end of the reserve offers good views over the ponds and beyond, to the mangrove forest.

4.0 Vegetation

The mature trees on the site consist mainly of totara, pine, eucalyptus, willows and wattles. Of these the totara formed part of the original forest cover in the area. Council has planted a variety of shrub species in various locations within the reserve. These plantings consist mainly of, ngaio, flax and coprosma. The northern pond has extensive margins of raupo and is flanked on the western edge by a significant mangrove forest.

5.0 Birdlife

Birds sighted on the ponds and margins or within the bush areas fringing the reserve include the following:-

- Dabchich (*Podiceps rufopectus*)
- Black Shag (*Phalacrocorax carbo*)
- White-Faced Heron (*Ardea novaehollandiae*)
- White Heron (*Egretta alba*)
- Black Swan (*Cygnus atratus*)
- Mallard (*Anas platyrhynchos*)
- Grey Duck (*Anas superciliosa*)
- New Zealand Shoveler (*Anas rhynchotis*)
- Australasian Harrier (*Circus approximans*)
- Pukeko (*Porphyrio melanotus*)
- Pied Stilt (*Himantopus ho. Leucocephalus*)
- Black-Backed Gull (*Larus dominicanus*)
- New Zealand Kingfisher (*Halcyon sancta vagans*)
- Welcome Swallow (*Hirundo tahitica neoxena*)
- Hedge sparrow (*Prunella modularis*)
- Grey Warbler (*Gerygone igata*)
- Fantail (*Rhipidura fuliginosa*)
- Song Thrush (*Rudus philomelos*)
- Blackbird (*Turdus merula*)
- Silvereye (*Zosterops lateralis*)
- Chaffinch (*Fringilla coelebs*)
- Green Finch (*Carduelis carduelis*)
- House Sparrow (*Passer domesticus*)
- Starling (*Sturnus vulgaris*)
- Indian Myna (*Acridotheres tristis*)

6.0 Surrounding Land Use

With the exception of the Waimahia inlet, the reserve is bordered on all sides by Residential 1 and 2 land. The Residential 2 zone to the south of Wattle Farm Road is yet to be developed and contains a significant wetland area directly opposite Wattle Farm Reserve.

Other Reserves in the area include Mountfort Park which lies approximately 1 kilometre to the north. This is the primary active sports reserve for the Manurewa/Weymouth area and is yet to be fully developed. Other active sports reserves include Leabank and Gallagher Park.

Passive reserves in the surrounding area include Kauri Point Reserve in Wattle Farm, Beaumonts Park and several smaller neighbourhood and esplanade reserves within a 3 km radius.

7.0 Present Use

7.1 Casual Recreation

The reserve is predominantly used for a variety of casual, passive recreational activities including walking, children's playground, feeding ducks, observing birdlife, and casual stopovers by motorists in the area.

The children's playground is located in the north-eastern corner of the reserve and has suffered vandalism on several occasions in recent years.

7.2 Model Boating Club

The Northern Maritime Model Society Inc operates from facilities within the reserve. The Society holds several regattas throughout the year including NZ championship races. The venue is generally considered to be ideally suited for the use and frequently draws large crowds of spectators. In addition to formal regattas, model boat enthusiasts and club members use the ponds on a regular basis during the week.

The standard course is triangular in shape with the orientation changed to suit the wind conditions. The club members have indicated that additional width to the southern pond would be advantageous in that it would provide greater flexibility in setting courses. They have also indicated that a minimum edge depth of 400-500mm would also help prevent weed build-up on the margins of the southern pond.

8.0 ARC Pump Station

The sewerage pump station on the site contains three variable speed pumps with a maximum output of 240 kilowatts. These pumps provide lift for all material collected south to Papakura which is then gravity fed to Mangere. The pumps are designed to cope with the maximum sewer flow but they occasionally overflow into the ponds during periods of very heavy rain or power failures. (Approx. 2-3 times per year). Infiltration from the stormwater system into the sewer is the main cause of the overflows and the material entering the ponds is mainly stormwater. Access to the pump station is required at all times and is gained through the main carpark for the reserve.

9.0 Pedestrian Access

Wattle Farm Reserve is heavily used as a through route from Wattle downs to various points north. A footbridge was erected in 1989/90 to facilitate easier access for this purpose. Consideration needs to be given to the best alignment of the path due to its close proximity to nesting areas and the sensitivity of the habitat that the path passes through.

10.0 Current Management Problems

10.1 Pond Weed Control

It is necessary to keep the southern pond relatively free of weed to allow unimpeded passage by model boats. The weed growing in the ponds has been identified by officers from the Ministry of Agriculture and Fisheries as *Ruppia polycarpa* commonly known as horse's mane. This species is native to New Zealand and is also found in Australia.

Control has been carried out in the past by applying the herbicide diquat in the late summer. Dewatering has also been used. This method relies on desiccation of

plants after the water is emptied. However, many pools remain after emptying due to the uneven nature of the bottom and plants survive this process.

MAF officers recommended a combination of dewatering and diquat gel application in late summer and to continue using brackish water in this pond which tends to eliminate other submerged species.

The weed growth in the northern pond also includes additional species *Egeria densa*, *Lagarosiphon major*, and *Potamogeton crispus* which are all capable of forming dense surface growth. In this pond this growth is acceptable because of the birdlife that it attracts.

It is also important to prevent interflow between the two ponds to inhibit the spread of pond plants.

10.2 Litter Control

The northern pond requires regular monitoring and litter removal. This involves Council staff collecting litter from a boat. Most litter washes into the pond from the drainage channel which flows into the reserve from the Mahia Road area. Council is currently investigating ways to trap the litter prior to it entering the ponds.

10.3 Wildlife Habitat vs. Recreation Use

Wattle Farm offers a rare opportunity for observing at close range, a variety of birdlife in a natural setting within an urban environment. The close proximity of people and birdlife continues to frequent the area and that pressure from reserve users does not drive them away. To this end active management is required to maintain the habitat quality and to confine people to specific areas of the reserve.

The existing informal and positive methods of control as well as habitat management have proved successful to date. As sub-divisional development occurs in the surrounding area, pressure to adopt more formalised methods of control are likely to be required.

Structure such as boardwalks, observation platforms and clearly defined and fenced paths will assist in encouraging people to remain in designated areas.

Continued separation of ponds will ensure that water plants are able to remain in the northern pond in order to retain its habitat value. The landscape concept plan outlines in more detail how this will be achieved.

10.4 Vehicle Control

At present vehicles have access over most of the grassed areas of the reserve. This has resulted in unacceptable behaviour associated with cars such as people water skiing behind vehicles, excessive speeds, driving on soft grassed areas, and the jetty and the dumping of trashed cars on the reserve. Physical controls on vehicle movement are required in order to reduce the potential for such activities and to confine vehicle movement.

10.5 Vandalism (Wilful Damage)

Some of the vandalism on the reserve is associated with motor vehicle use as described above. The playground has also suffered damage on various occasions. Council will consider relocating the playground to a more prominent site between the pump station and the Boat Club as shown on the development concept plan. In this location it will be clearly visible from the carpark and the high use area of the reserve and should be subject to more informal policing from the public.

10.6 Stormwater Catchment Management

Council is currently preparing catchment management plans for the whole city. As part of this process, a plan has been prepared for the Mahia Catchment of which the Wattle Farm ponds form a part. The ideal size for the ponds to function as a wet pond system has been identified as approximately 5 hectares. The existing northern pond would function quite effectively in its present form as a wet pond system but its area is approximately 40% of that ideally required.

For a 20% AEP storm or greater, the pond level would raise above the embankment that separates the ponds from the tidal inlet. To prevent serious erosion or washout of the embankment it has been suggested that any new walkway along this area be edged with heavy timber and set at a constant level to act as a weir.

11.0 Objectives and Policies

11.1 Major Management Objective

To manage Wattle Farm Reserve for the physical, mental and spiritual enjoyment of the public by providing for passive outdoor recreation and wildlife habitat.

12.0 Landscape

12.1 Objective

1. To enhance the landscape character of the reserve by protecting and enhancing the "natural" environment and confining intensive development to specific areas.
2. To implement the proposals illustrated in the landscape development plan in stages, as finances permit, following adoption of this management plan. (Refer to suggested staging programme in Appendix "*").

12.2 Policies

1. Intensive development (carparking, access roads etc) will be confined to the existing location at the eastern end of the southern pond.
2. To protect habitat areas by encouraging the public to stay on the designated tracks boardwalks and observation platforms.
3. To investigate the feasibility of incorporating all or part of the wetland area on the southern side of Wattle Farm Road into the Wattle Farm Reserve.

4. To improve views into the reserve from Wattle Farm Road by reshaping the existing mounds.

13.0 Vegetation Management

13.1 Objective

To manage the existing vegetation in a sustainable way by inter-planting and to create new areas of planting appropriate to the reserve.

13.2 Policies

1. Any new planting shall comply with that specified in the landscape development plan.
2. In locating any new planting, account shall be taken of any views into the site.
3. Noxious plants shall be removed from the reserve.
4. Council may gradually phase out plantings which are not considered sympathetic to the character of the park and replace them with native vegetation (refer also to Habitat values p*).
5. Exotic species and flower beds shall not be planted in the reserve.
6. Care shall be taken to insure that any new planting adjacent to the southern pond does not shelter the pond to the extent that model boat racing cannot occur.
7. The Council may remove trees in the following situations. Subject to Manukau City Council's Tree Removal Policy:
 - The tree is dead, dying or diseased.
 - The tree has become a danger to public safety.
 - The tree interferes with essential public utilities or important public construction work.
 - The tree is obstructing the water flow in any drainage system, watercourse, stream or river.
 - The tree has outgrown its location or site, and is causing serious damage to buildings or property, public or privately owned.
 - The tree is suppressing or inhibiting growth of more desirable specimen trees or other vegetation of greater interest to the public.
 - The tree is a poor specimen or unsuited to the site and needs to be removed in order that the area be replanted with trees that will make better specimens.
8. The open space areas shall be maintained to the appropriate category based on Manukau City Council's maintenance specification.

14.0 Water Management

14.1 Objective

To manage the ponds as separate bodies of water in order to:

- a) limit the rate and amount of weed growth in the southern pond and
- b) allow the northern pond to be managed in a “natural” state.

14.2 Policies

1. Weed growth in pond 2 will be controlled by a combination of dewatering and diquat gel application as per MAF recommendations in Appendix “3”.
2. Both ponds shall be kept free of litter and other debris through programmes of regular monitoring and removal.
3. Council will investigate the potential for physical entrapment of litter emerging from the Mahia Road stream.
4. The southern pond should be kept in its brackish condition in order to inhibit the growth of most varieties of pond weed.

15.0 Habitat Values

15.1 Objective

1. To retain and where appropriate enhance the habitat value of the reserve.
2. To encourage further varieties of birdlife into the reserve through planting of trees which are attractive to birds.

15.2 Policies

1. The public will be encouraged to stay on the designed tracks in the sensitive habitat areas of the reserve by means of barriers and signage.
2. Observation points will be constructed in order to direct people to specific parts of reserve.
3. Shallow pond margins will be extended on the eastern end of pond 3 as illustrated on the landscape development plan in order to improve the habitat value of the pond.

16.0 Recreation Use

16.1 Objective

To encourage recreational use appropriate to the nature of the reserve whilst preserving its value as a wildlife habitat.

16.2 Policies

1. The right of the public to gain recreational use and enjoyment of Wattle Farm shall be maintained in accordance with the reserves dual role as a habitat/recreation area.
2. The use of the reserve shall be limited to passive activities including appropriate aquatic pastimes as Council sees fit.
3. The public shall have free access over the areas of grassed open space and hardsurfacing. In other areas including the forest margin and habitat zones the public will be encouraged to stay on designated tracks.

17.0 Interpretation

17.1 Objective

To provide interpretation for visitors to the reserve where it is considered appropriate.

17.2 Policies

1. To provide interpretive information 3 types:
 - a) A brochure which incorporates information on conservation values and the birdlife found in the reserve to be available at selected Council outlets such as Ward Offices, Libraries, and on site.
 - b) On site signage.
 - c) On site interpretive talks where practicable.
2. Sign shall be of a robust design which is sympathetic to the environment in which they will be placed.
3. Community involvement will be encouraged in the interpretation and preservation of the reserve.
4. Council will investigate the possibility of forming a "Friends of Wattle Farm Reserve" group with the aim of becoming actively and physically involved in the operation, development and interpretation of the reserve.

18.0 Vehicle Access and Parking

18.1 Objective

To limit general vehicle access to designated areas of the reserve.

18.2 Policies

1. Vehicle access shall be confined to the areas shown on the landscape development plan.

2. Physical controls on vehicle movements such as barriers, bollards and walls shall be constructed where appropriate.
3. Temporary parking on areas other than those normally used for parking may, with the approval of Council, be permitted for special events.
4. Council vehicles and other vehicles authorised by Council such as mowing contractors shall have access to all parts of Reserve where their use is necessary.
5. Access to the ARC pump station will be kept free at all times.
6. The above policies apply equally to Motor cycles.

19.0 Vehicle Access and Parking

19.1 Objective

To limit general vehicle access to designated areas of the reserve.

19.2 Policies

1. Vehicle access shall be confined to the areas shown on the landscape development plan.
2. Physical controls on vehicle movements such as barriers, bollards and walls shall be constructed where appropriate.
3. Temporary parking on areas other than those normally used for parking may, with the approval of Council, be permitted for special events.
4. Council vehicles and other vehicles authorised by Council such as mowing contractors shall have access to all parts of Reserve where their use is necessary.
5. Access to the ARC pump station will be kept free at all times.
6. The above policies apply equally to Motor cycles.

20.0 Vehicle Access and Parking

20.1 Objective

To allow the public free access to approved outdoor areas of the reserve during the hours of daylight.

20.2 Policies

1. The public will be encouraged by positive means to remain in appropriate areas of the reserve.

2. The public will be discouraged from entering sensitive habitat areas by way of positive signage and clearly defined tracks.
3. Generally paths shall have unobtrusive surfaces and rely on natural drainage rather than formal kerb and channelling.
4. The public may be excluded from specific outdoor areas of the reserve from time to time for the following reasons:
 - a) Areas set aside for temporary exclusive use.
 - b) Areas set aside for parks work including painting, construction and other special purposes.
 - c) Areas of regenerating bush or new planting.
 - d) Areas of particularly sensitive habitat such as nesting areas.
5. Council will investigate the feasibility of establishing a pathway to Mahia Road via the drainage reserve.

21.0 Children's Play

21.1 Objective

To provide a children's play structure as a complimentary activity in the reserve environment.

21.2 Policies

1. All play equipment shall comply with the N.Z. Standard 5828 for Playgrounds and Playground Equipment.
2. The existing play structure will be relocated to the site shown on the landscape development concept.

22.0 Buildings and Structures

22.1 Objective

To ensure the provision and maintenance of the existing building on the reserve.

22.2 Policies

1. Council shall continue to maintain the existing toilet and adjacent room to a standard appropriate for public use.
2. The existing toilet facilities shall be upgraded or replaced as required with attention given to design for good natural light, ventilation and ease of cleaning and minimising damage from vandalism.

3. The ARC Pump Station shall continue to be used as such. The ARC shall liaise with Council if it proposes to make any changes or additions to the structure.
4. Any new structures on the reserve shall be related to the wildlife/open space values. Other non related structures with the exception of the playground and extensions to existing buildings shall be prohibited except where a clear need can be demonstrated.

23.0 Park Furniture

23.1 Objective

To provide seats, litter bins, signs, and other park furniture of a design appropriate to the surroundings (refer also to interpretation).

23.2 Policies

1. The number of signs and their size shall be kept to a minimum to avoid visual distraction from the natural environment.
2. Additional seating will be provided along the paths and on the observation platform.
3. The existing sign system shall be revised and refined in accordance with Council's signage policy and designs that are appropriate to the reserve.

24.0 Vandalism

24.1 Objective

To minimise the opportunities for vandalism by positive control whenever possible.

24.2 Policies

1. The possibility of closing the reserve during hours of darkness, will be investigated.
2. Low impact controls such as vehicle barriers, low walls etc. will be used to control vehicle movements within the reserve.
3. Regulatory signage will be kept to a minimum.

25.0 Utility Services

25.1 Objective

To minimise the visual and environmental impact of utility services.

25.2 Policies

1. Where possible all utility services shall be placed underground. Where this is not practicable, they should be sited in an unobtrusive manner as possible.
2. The placement of such services underground should be carefully sited with regard to existing features such as trees and shrubs.
3. The ARC pump station shall be screened with additional planting.
4. The water quality in the ponds will be monitored with regard to the impact of overflows from the pump station on wildlife and recreation values.

26.0 Liaison

26.1 Objective

To liaise where appropriate with other relevant organisations over matters of mutual concern.

26.2 Discussion

Areas beyond the boundaries of the reserve have an impact on the reserve itself. Communication with other organisations involved will ensure that wider issues are addressed beyond the immediate reserve.

26.3 Policies

Council will undertake to liaise with the following as and when necessary.

- Auckland Regional Council including the Harbours section with respect to Waimahia inlet.
- Department of Conservation.
- Auckland Waikato Fish and Game Council.
- Others as necessary.

27.0 Expansion of Reserve

27.1 Objective

To investigate the feasibility of incorporating the wetland on the south side of Wattle Farm road into the Wattle Farm reserve.

27.2 Policies

Council officers in conjunction with the landowners shall investigate and report on:-

- The likelihood of incorporating the wetland on the south side of the Wattle Farm Road into Farm Reserve.

28.0 Dogs

28.1 Objective

To ensure that dogs remain under the control of their owners in accordance with Council's by-laws.

28.2 Policies

1. The impact of dog behaviour on birdlife will be monitored. Should it be deemed necessary, appropriate action will be taken in accordance with by-laws to control any potential threat to wildlife on the reserve.

Wattle Farm Reserve 2010

What will Wattle Farm Reserve look like and how will it be used in the year 2010?

With sensitive management and growing public awareness, the reserve will continue to provide for the dual role of public recreation and wildlife habitat.

Urban development will have completely surrounded the reserve and its value as open space will be fully realised.

The ponds will have been modified to an informal shape and they will have a more natural appearance than they do at present.

Birdlife using the site will have increased due to the diversity of plant life which will have been established on the reserve.

Public usage will have increased but will have had minimal impact because of the greater degree of positive control implemented. Board walks will allow the public to experience the wetland areas intimately and in relative comfort.

A Friends of Wattle Farm Reserve will have been formed and they will be actively and physically involved in the development, upgrading and operation of the reserve together with the manning of interpretive programmes directed at improving the community's appreciation of wildlife and wetlands.

Report on the Weed Problem at the Wattle Farm Ponds, Manukau City

Paul D Champion

July 1990

The Wattle Farm ponds were inspected on 26/7/90 with staff from Manukau City Council, Parks Division.

The pond with the weed problem is used by model boat enthusiasts and floating weed impedes these boats and tangles around propellers. This pond occupies an area of 1.7 has and is filled with brackish water to an average depth of 1 metre. The pond adjacent to this is designated as a wildlife haven and has a much lower level of salinity.

A sample of the weed was identified as *Ruppia polycapar* R. Mason, commonly called horse's mane. This species is native to New Zealand and is also found in Australia. Members of this group are found throughout the world and are commonly found in brackish water. *Ruppia polycapar* is unusual in that it is also found in fresh water.

Control at present is carried out by the herbicide diquat applied in the gel form (brand name TORPEDO, ICI Chemicals) with a late summer application. However re-growth still occurs and causes problems to pond users.

The following options can be considered for future control:

- 1) De-watering
- 2) Diquat herbicide
- 3) Copper based herbicide
- 4) Weed exclusion mat
- 5) Grass carp
- 6) Salt water

- 1) De-watering

This method has been used in the past with varying success, relying on desiccation of plants after water is emptied. However many pools remain after emptying due to the uneven nature of the bottom and plants will survive this process in these pools.

- 2) Diquat

This herbicide is proven in its control of *Ruppia* when applied in its gel formulation in late summer. This could be combined with dewatering allowing better placement of this herbicide, also potentially saving costs by reducing the amount of diquat used. A rate of 20 l/ha is recommended for dense weed beds, a much smaller amount would be required in this situation. Approximate costs are \$240 for 20 l. Diquat is rapidly deactivated by muddy water so the timing of applicant would be important.

- 3) Copper based herbicide

Matthews (1975) in his manual "Weeds Control by Chemical Methods" suggested the use of copper sulphate at a high rate of 1 ppm in brackish water. As copper

would accumulate in the sediments and as the area is also a wildlife refuge, the use of copper sulphate is not acceptable.

4) Weed exclusion mat

Good control of various submerged weeds has been obtained by covering these with a mat through which light is excluded. This option would not be practical in this case due to cost (approximately \$30,000 + cost of laying mat) and also this plant sets copious seed and is spread by wild fowl. Thus it is likely that plants could establish on top of the mat.

5) Grass carp

Grass carp have been successfully used to control submerged weed in New Zealand up to now mostly on the introduced oxygen weeds. The problem is seed production would require long term presence of fish. Use of grass carp are subject to the availability of sterile fish, the suitability of the site for fish and also the approval from the Department of Conservation the local Fish and Game Council. Fish are sold at \$15/fish. The stocking rate would need to be established. It appears unlikely that these fish could tolerate the salinity of the pond and also due to the easy access to the site and its use a recreational area it is unlikely that permission would be granted for their use.

6) Salt water

When the pond was first used for model boating the water was of a low enough salinity to allow various other water weeds to grow in that pond. Since sea water was allowed into the pond only *Ruppia* could survive. From an inspection of the adjacent pond three problem submerged weeds *Egeria densa*, *Lagarosiphon major* and *Potamogeton crispus* were seen. All these species are capable of forming dense surface reaching growths, obviously unsuitable for model boating. However in the other pond these plants attract and support a healthy wildflower population and are acceptable for that reason. Therefore a saline influence should be maintained.

To summarise recommendations for future management:

The pond used for model boat enthusiasts should remain in its brackish condition with an annual diquat gel application in late summer. Dewater should precede this, the pond being refilled with sea water one week later. Before any boating event fragments of *Ruppia* vegetation could be removed with a scoop net.

If you have any further queries regarding this situation or another water weed problem, do not hesitate to contact me.

Stormwater Comprehensive Flood Management Study

(EXTRACT FROM WATER QUALITY SECTION OF MAHIA STORMWATER COMPREHENSIVE FLOOD MANAGEMENT STUDY)

2.8.3 Implications for Mahia Catchment

A wet pond system for this catchment would need to have an area of approximately 5 hectares for a depth of 0.9 to 1.0m.

At present there are two ponds existing within the Wattle Farm Reserve at the bottom of this catchment. Approximately half of this reserve was originally a tidal inlet, and approximately half of this inlet itself was formerly converted for use as sewage treatment ponds. This use has now been abandoned but one of the ponds remains and is now used for model boating. The reserve is designated for recreational use and also as a wildlife refuge.

The flow from the catchment into the ponds is by way of an open channel along the northern side of the reserve which discharges into part of the original tidal inlet with the reserve. The water level in this area is maintained above sea level by a concrete weir at the south west corner of the reserve. This forms one of the two ponds (pond 1). The other pond which is separated by an earth embankment has its water level maintained also at the weir level by a group of interconnecting pipes. There is however no continuous flow through this second pond. The pond can be emptied by way of a draining control gate structure.

The existing pond 1 would function quite effectively in its present form as a wet pond system. Its area of approximately 22,000m² is approximately 40% of that ideally required.

One of the objectives of the reserve management plan is that the boating pond is maintained as brackish water. The pond is filled by allowing inflow of seawater at high tide. The brackish water discourages weed growth in this pond. This is a requirement for the major use of the pond as a local and national venue for model boating.

Flushing with stormwater would destroy this requirement, so that pond 1 only is assumed to be available for water quality control.

The ponds overflow predominantly over the concrete weir at the southwest corner of the reserve. For a 20% AEP storm the pond level will rise and overtop the embankment between the ponds and the tidal inlet. Any significant flows over the embankment could cause serious erosion or washout of the embankment, so that protection measures are proposed.

Recommendations

- That pond 1 is considered to function as a wet pond for stormwater quality control. This use should be incorporated into the management plan for the reserve.
- That a "gross pollutant" debris trap be constructed prior to discharge from the Mahia Creek open channel into the reserve pond.

The debris trap will require cleaning at monthly or more regular intervals and following storms.

- That the west embankment walkway be edged with heavy timber set to a constant level to improve the functioning of the supplementary overflows and to reduce the danger of washout of the embankment.

