

Management of wetland archaeological sites in New Zealand

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Warren Gumbley, Dilys Johns, and Garry Law

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Cover: A view of the MA2 excavation on the shore of Lake Mangakaware in 1970.
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ABSTRACT

Wetland archaeological sites are excellent archives. The anaerobic environment preserves organic matter to a much greater extent than drier environments, yielding historical, cultural, and climatological data unavailable elsewhere. This paper identifies 177 sites from the New Zealand Archaeological Association site recording scheme, and discusses the state of these sites and wet archaeological sites in New Zealand in general, including protection mechanisms available to preserve sites from ongoing degradation. Sites are best preserved by retaining high levels of ground water, minimising fertiliser-derived pollutants, and controlling stock numbers. High water levels can be maintained by relatively simple methods which require resource management advocacy for the protection of the whole wetland. Two case studies (Kauri Point and Lake Mangakaware) are presented, offering descriptions of significant wet sites, and discussing issues facing their preservation.

Keywords: Anaerobic, archaeology, artefacts, conservation, lake, management, peat, preservation, swamp anoxic, waterlogged, wet sites, Kauri Point, Owarau Pa, Lake Mangakaware, New Zealand

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1. Introduction

As Coles (2001) suggests, wetland archaeological sites are archives par excellence. They form a unique category of archaeological sites, which preserve a wide range of organic materials due to the largely anaerobic nature of their environment. An equally important aspect of wetlands is the 'living model' of environmental change, which, through the analysis of pollen, macro flora, fossils and invertebrates allows detailed reconstructions of past habitats. Sites preserved in this way contain a broader archaeological database, which allows a fuller understanding of the history of a site, the culture of its inhabitants, and its physical environment.

A **wet archaeological site** is a site where material evidence has been preserved as a direct consequence of waterlogging and lack of oxygen. We must make it clear that although wet archaeological sites occur in **wetlands**, this is not in itself a definition, simply a description of the type of environment where they are found. In this report we use the terms 'wetland site' and 'wet site' interchangeably.

Over the last forty years wet archaeological sites have become internationally recognised as particularly important for the study of prehistoric humans and their environments. Indeed, recognition of the unusual nature of such places extends well into the nineteenth century. Moreover, we know Maori understood the preservative qualities of swamps, and artefacts were buried in them for either preservation, or concealment, when a village was being left for long or short periods. The Kaitaia carving and Te Atiawa paepae are perfect illustrations of this (Fig. 1).

There is now a substantial and growing international body of literature on the management of wetland archaeological sites. It is universally recognised that the identification of archaeological sites in wetlands continues to be a problem. Currently it is generally agreed that the key to wet site conservation lies with wider hydrological and pollution control. This requires detailed assessment of the site, monitoring of key variables to detect any site changes, and the implementation of a management programme based on the results of the assessment and monitoring operations. Ongoing and regular monitoring of water level and quality, oxidation-reduction potential, pH, and temperature, is considered essential to effective conservation. It is also clear that the preservation of waterlogged archaeological remains requires the management programme to consider the condition of areas surrounding the immediate area of a wet site.

Archaeological deposits in wetlands (swamps, bogs, lakes, and river margins) are a particularly rich repository of scientific data about human settlement, cultural development, and the interaction of people with the environment. The wet environment assists the preservation of remains not found in 'dry' archaeological sites. These remains are organic materials, often thought of as wooden (e.g. the Kaitaia lintel), but including a much wider range such as animal and plant fibres, the remains of plant foods (e.g. seeds), leather, and also corpses. Because these represent a range of everyday domestic, industrial, and

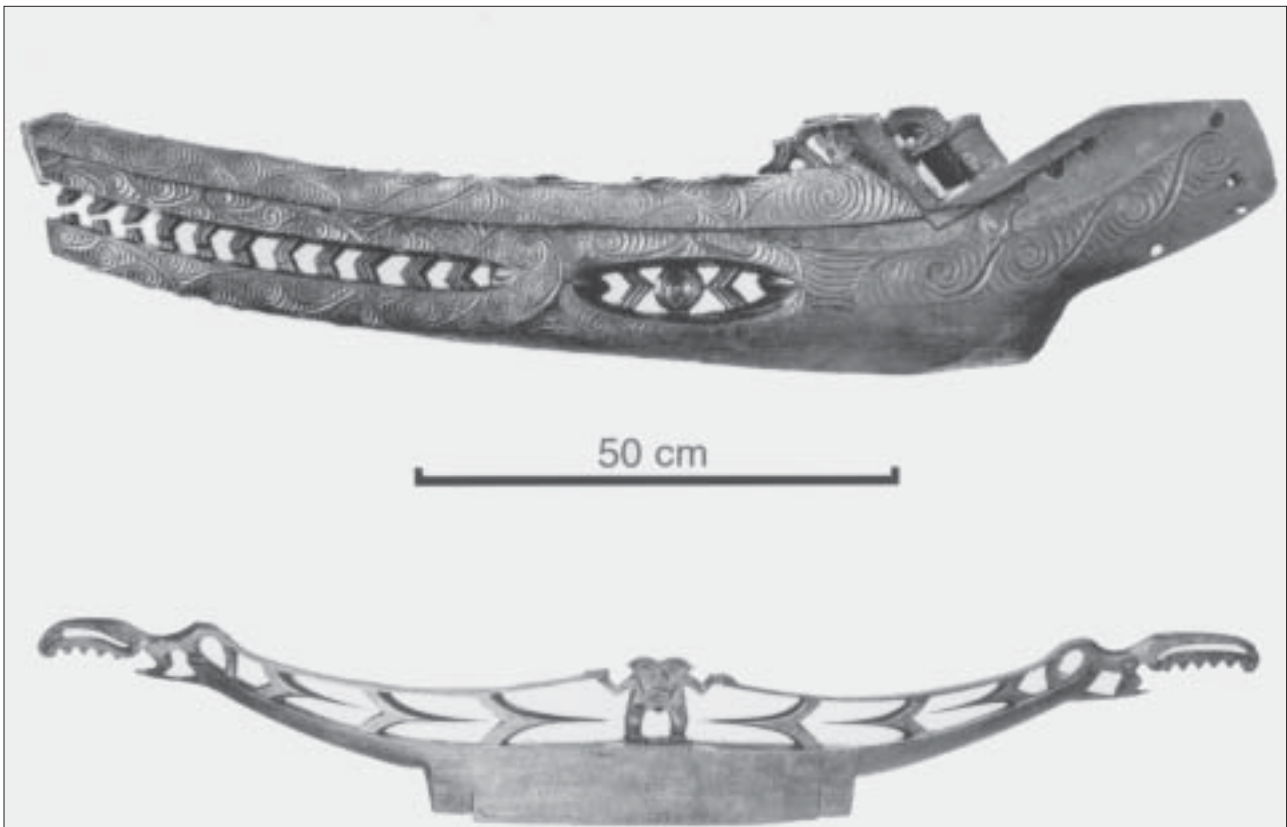


Figure 1. Two nationally significant ornately carved works which have been recovered from wet sites in New Zealand. *Upper*: the canoe prow from Mason Bay, Stewart Island. (Reproduced with the permission of *Niho o Te Taniwha Iwi Liaison Komiti and the Southland Museum and Art Gallery*.) *Lower*: The Kaitaia carving from Northland, Te Rarawa. (Reproduced with permission of *Auckland War Memorial Museum*.)

agricultural products not available in ‘dry’ sites, such wet sites comprise an aggregation of data which present significantly more complete representations of prehistoric settlement in New Zealand than would be available otherwise. These environments also preserve other remains, such as pollen, which allow the reconstruction of the wider environment—an aspect essential to accurate interpretation of the cultural remains. However, archaeological sites in wet environments are comparatively rare and particularly vulnerable to damage.

The preservation of organic material in waterlogged sites is a product of the anaerobic environment, which inhibits bacterial and fungal attack. Therefore changes in the physical environment of these sites will directly affect the preservation of the fragile organic materials contained in them. In England they recognise ‘seven key-causes of monument destruction in England’s wetlands: drainage, water abstraction, conversion of pasture into arable land, peat wastage, peat erosion, peat extraction, and urban and industrial development’ (Van de Noort et al. 2001: 16). Many of the same processes can be assumed to be active in New Zealand, although the conversion of pasture to arable land is less relevant here since conversion to pasture post-dates the creation of most of the sites in wet areas. However, we may add to this list the construction of water-control and flood-protection works, which have had a demonstrated effect in the Hauraki Plains (Allen et al. 1994).

It may be argued that the damage or destruction of a wetland archaeological site represents a proportionately greater loss of data than from a non-waterlogged

site. The extensive destruction of wetlands throughout New Zealand is bound to have had a substantial deleterious effect on the body of archaeological sites in these environments. Anecdotal evidence strongly supports this, although there has never been any formal study on the problem. Those sites remaining in such wet environments comprise a 'rump' of the sites that existed before wetland destruction began.

Although wet archaeological sites, in their broadest context, included sites in salt water, this report refers only to fresh-water sites. This is both to keep the report to a manageable size, and to avoid the differing technical considerations imposed by the marine environment.

This report has three broad aims:

- To make a general assessment of the circumstances and condition of New Zealand's wet archaeological sites, determine the natures of those sites, where they are found, and record the state of the nation's resource.
- To canvass the statutory mechanisms which can be employed to protect and manage these sites.
- To explore practical physical management issues relating to wet archaeological sites.

Case studies of two well-known New Zealand wet archaeological sites will be used to illustrate some of the practical management issues.

An inventory drawing on data from the New Zealand Archaeological Association site recording scheme is included as Appendix 1. This is complemented with a small comparative inventory drawn from the records of the Te Awamutu Museum (Appendix 2). In addition, Appendix 3 provides a review of international and New Zealand literature to assist further reading.

2. New Zealand's wetland archaeological sites

To effectively manage any resource there must be some notion of its nature, location, and condition—some form of inventory. New Zealand has no specific inventory of wet archaeological sites, but the New Zealand Archaeological Association Site Recording Scheme (SRS) is the national inventory of archaeological sites of all types. It is a large database which contained records of 54 000 sites in 2001. From this inventory we have been able to identify 178 recorded wet archaeological sites (listed in Appendix 1).

Although the SRS identifies a large number of sites, the record is not comprehensive. Many of the sites have been recorded on an ad hoc basis rather than as the result of systematic survey.¹ The 41 artefacts recovered from wet environments in Waipa district and housed in the Te Awamutu Museum were cross-referenced with the SRS. Aside from the 20 from Lake Mangakaware and Lake Ngāroto where there are recorded as 'lake pa' with known associated wet deposits,² none of the remaining 21 come from recorded archaeological sites (Appendix 2). This discrepancy is informative, when it is realised that the Waikato region is one of the few areas of New Zealand where there has been recognition of wet archaeological sites as a specific class of sites, and a New Zealand Archaeological Association filing region of modest size (3264 recorded sites in 2001). Additionally, we have to acknowledge the feedback from the file-keepers that those records for wet sites we do have mostly result from accidental, or incidental, identification rather than from specific programmes to identify them.

Table 1, and Figs 2 and 3, summarise the distribution of types of wet archaeological sites by region. It is apparent that there is some variation from region to region—it seems some regions are under-represented. To some extent this is an assumption, but Taranaki, Western Bay of Plenty, and the West Coast of South Island are regions where more wet sites could be expected. Taranaki and the West Coast are situated on the western coast and so have wet climates and a relative abundance of wetlands, now or in the past. The Bay of Plenty is known to have a high density of archaeological sites as well as large harbours and waterways draining the Kaimai-Mamaku Ranges and the Central Plateau. On

¹ Because the database is set up to be paper-based, the computer-accessible data is limited to site number, a simple site type (e.g. midden) and a grid reference. Therefore, a computer-based search would not provide the level of data needed to distinguish wet archaeological sites. Instead we had to rely on the authors' own knowledge, the published record, but most heavily on the knowledge of NZ Archaeological Association regional file-keepers. The value of the information from the latter depends on the familiarity of the file-keepers with their region's site record file. This reflects their experience and the size of the file. In some regions, such as the Bay of Plenty or Northland where in 2001 there were 7932 and 10 099 sites in the respective regional files, their very size means that gaps are inevitable. The only way to minimise this would be to examine the file for each site, a time consuming process beyond the scope of this report.

² A number of the items from the two lakes were unprovenanced finds that may or may not have come from any of the 'lake pa'.

TABLE 1. REGIONAL DISTRIBUTION OF WET ARCHAEOLOGICAL SITE TYPES.

	SWAMP/ RIVER/ LAKE PA	FISH- ING CAMP	KAINGA (POSS. SWAMP PA)	ARCH- AIC VILL- AGE	ARTEFACT CACHES/ FIND- SPOTS	EEL WEIRS/ CHANNEL	DRAINS	TRACK- WAYS/ CORDU- ROY RDS	REGI- ONAL TOTAL
Northland	6				7		56		69
Auckland	2				6		2		10
Waikato/Hauraki/ King Country	19	1			10	9		1	40
Bay of Plenty	10		8		1			1	20
East Coast	1							1	2
Hawke's Bay	1								1
Taranaki/ Whanganui	4				2				6
Rangitikei/ Manawatu	1		1			2			4
Horowhenua/ Kapiti	11								11
Canterbury	1								1
Otago/Southland/ Stewart Island				1	12				13
Total site types	56	1	9	1	38	11	58	3	177

this basis the Western Bay of Plenty could reasonably be expected to have a comparatively high density of wet archaeological deposits—something which does not appear to be reflected in the SRS. A recently found carving near Athenree at the northern end of Tauranga Harbour reinforces this supposition.

Since Pick raised awareness of the presence and importance of wet sites in the Waikato (Pick 1968) we expect that the standard of records for such sites in that region would be higher than elsewhere in New Zealand. To check this, the regional file for the Waikato was searched on a site by site basis. The lakes and swamps in the middle Waikato Basin, especially in the Waipa District (where Pick lived) appear to have been given coverage. However, there is a remarkable poverty of data relating to the extensive lakes and swamps of the lower Waikato Basin. Here recording has been very intermittent and ad hoc rather than a systematic exploration of these areas. Only three wet sites can be recognised in the NZAA database for this area³. Two sites (S13/46 and 47) are on the shore of Lake Waahi near Huntly with the third (S13/51) on the edge of a drained lake. This is a small total when the area has another three large lakes (Whangape, Waikare, and Rotongaro/Rotongaroiti) and five smaller lakes, along with the large Whangamarino Swamp.

The Hauraki Plains was an area of extensive wetlands until the end of the nineteenth century, but wet sites are similarly under-represented. There are three sites where the SRS notes the presence of waterlogged deposits. All are swamp pa, and include the well-known sites Paterangi and Oruarangi. However,

³ All three are find-spots for wood and fibre objects.

Figure 2. Distribution of recorded wet archaeological sites in the North Island, New Zealand.

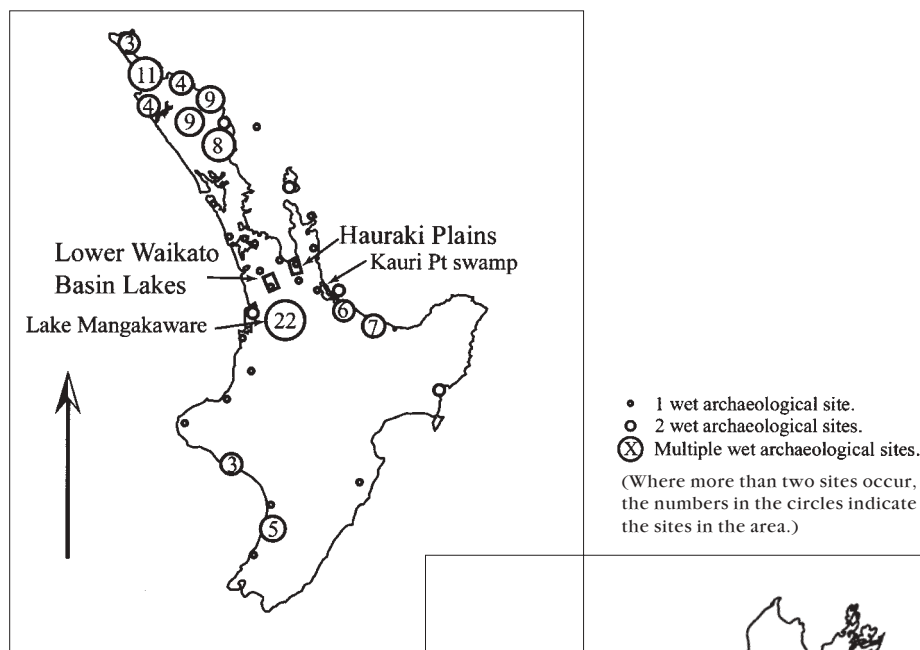
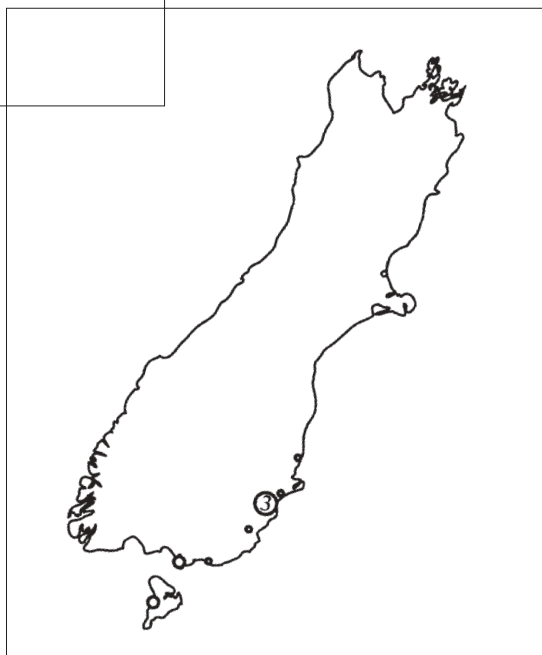


Figure 3. Distribution of recorded wet archaeological sites in the South Island, New Zealand. (Legend the same as for Fig. 2.)



archaeological excavations carried out on the plains during the 1990s show that the number of wet sites was substantially under-reported. The lower levels of most of the riverside pa have proved to be waterlogged when investigated. Similarly, the 'shell mound' sites found on the plains also include wet strata.

Another complicating factor in successful identification of wet sites is the drainage of wetlands around recorded sites. For example a pa near Huntly (S13/51) on the shores of a now drained lake (referred to above) is and was dry, but during excavation of drains an eel trap (hinaki) was found below the pa in the swamp. The lake/swamp, with its useful resources, was exploited as a functional extension of the pa.

The shortcomings of the inventory notwithstanding, some generalisations can be made. There are two common types of wet sites found in most regions: either habitation sites, or artefact finds. The former includes what are known as 'swamp pa' or 'lake pa', and other types of site, such as riverside pa and

undefended sites (e.g. the raised shell mound sites found in the Hauraki Plain). Some of these sites are not entirely wet, but include strata or areas that are water-logged. The second group are sites where only artefacts have been found and where no habitation is indicated. Wet find-sites are less widely recorded in the SRS and the examples from the Te Awamutu Museum collection indicate there is a bias in the SRS.

Other site types seem to be more common in some specific regions such as swamp drains in Northland (Barber 1989) or eel weirs (pa tuna) in the Waikato/Hauraki and Rangitikei/Horowhenua regions. To some extent the former probably reflects a regionally specific activity, while we suspect the latter reflects specific interests of several recorders rather than any particular regional bias. The absence of eel weirs recorded in Otago/Southland, for instance, can only reflect the lack of interest in recording them rather than a real absence. The same can be said for the Whanganui River and the Waikato River where large pa tuna were recorded historically.

Many, possibly most, of the recorded sites are only partially wet. They may be (or were) periodically water-logged, or only the lower strata of a site remain wet. For example, habitation sites are commonly dry in their uppermost strata, or in some areas around the edge of the site where it was artificially extended into a swamp or lake.

2.1 EVALUATION OF THE SITUATION IN NEW ZEALAND

For the reasons expressed above, the list in Appendix 1 under-represents the actual numbers and distribution of wet archaeological sites in New Zealand. This shortcoming reflects the:

- Lack of awareness of wet archaeological sites by site recorders over most of the country
- Regional biases in recognising some site types over others
- Inability to detect wet archaeological sites because of swamp drainage, earthworks and the generally 'hidden' nature of such sites, especially artefact caches

Guidelines to assist in recognising potential wet archaeological sites are needed. Regional predictive models may be useful, however, some generalisations may be attempted based on some broad patterns recognised while compiling the list.

The best-known class of wet archaeological sites—the so-called 'swamp pa' and 'lake pa'—are occupation sites usually entirely or partly formed from artificial mounds. These sites are normally as evident as typical 'dry' sites; the riverside pa and shell mounds of the Hauraki Plains are the same. These habitation sites commonly have associated waterlogged items in surrounding wetlands as well as those within the site itself. These associated items may be other structures (e.g. pa tuna) or portable artefacts.

The two case studies will make clear that wetlands adjacent, or close to substantial occupation sites (particularly pa) are likely candidates for the

presence of waterlogged artefact deposits, especially where these sites are in an area where archaeological sites are locally dense. There are other examples: the Shag River Mouth archaic site; the pataka door found during drain digging among what Day (1982: 84-85) called the Pukehoe complex; a large number and wide range of wooden artefacts, pieces of fibre, and pieces of gourd (hue) found in the Kiakia swamp adjacent to Tapuinikau Pa on the western side of Taranaki (Day 1996); 30 wooden tools were found in a dammed swamp near three pa close to Kaikohe (Slocombe 1996). Similar associations existed at Waitore (Cassels 1979), and at The Gutter on the west coast of Stewart Island (Gillies 1996).

Identifying potential sites of waterlogged material not associated with pa is a more intractable problem. This is especially so because these sites are often small deposits. Without exception these types of site have been found by accident. The circumstances of the Pukete and Chartwell Crescent carvings found in Hamilton are typical; they were found by accident as a result of earthworks (Edson 1983).

An example of a situation where there is high likelihood of such an association occurs at Papamoa in the Western Bay of Plenty, where there is an extensive complex of archaeological deposits arranged on either side of an ancient palaeo-channel that is now a swamp. Archaeological deposits are virtually continuous along both sides of this swamp for approximately 5 km, and include evidence of habitation and gardening (often superimposed). The area includes three recognisable swamp pa sited on islands within the swamp. At the very least the waterlogged deposits in this swamp will contain palaeo-environmental information essential to understanding the course and nature of Polynesian settlement at Papamoa. Considering the density and continuity of the prehistoric occupation it is hard to believe that organic artefacts do not exist there as individual items, or in caches, structures (such as walkways or tracks), or even raised stores. The Papamoa area is a part of Tauranga City where there has been a great deal of residential development since the mid-1990s. Although this residential development has not directly affected the old palaeo-channel (now called the Wairakei Reserve), it is used for utilities and drainage, and is being landscaped as a passive recreation area. The landscaping work is modifying the wetland, which is being 'tidied' to comply with the passive recreation role, albeit without any consideration of effects to the potential archaeological values there.

There is potential for the identification of some sites in written records, particularly Land Court records. An example of a class of site which may be identified in this manner is pa tuna (eel weirs). These were important places in economic cycles and so were mentioned in the court by groups establishing rights over areas.

3. Protection mechanisms

This section reviews how historic heritage wetland sites or the information and objects in them can be protected under the provisions of legislation and through other instruments. Consideration will be given to both:

- Recognised occupation sites which are in wetland locations
- Non-occupation sites where organic remains have, or are likely to be found

The emphasis here will be on practical interventions in processes, and potential means of achieving conservation outcomes. Vossler (2000) gives a more general overview of New Zealand legislation.

This section is not written from the perspective of an agency with regulatory powers in respect of heritage (that is a territorial local authority, or the Historic Places Trust (HPT)) rather it is written for a party which seeks to advocate conservation of wetland historic heritage site and needs to know the tools available. It avoids the complications in the Resource Management Act relating to the coastal marine area provisions, as the intent of this research project was to deal with inland sites. Table 2 presents a summary of possible threats to wet archaeological sites.

3.1 RESOURCE MANAGEMENT ACT 1991

While the Resource Management Act (RMA) is not primarily about historic heritage, it has provisions which mean it has some considerable value in helping to preserve heritage. It has material weight in dealing with matters of land use and protection of natural character, so—to the extent that protection of wetlands protects heritage values in those wetlands—it can be very useful.

The Resource Management Act is about ‘the sustainable management of natural and physical resources’ (section 5). Archaeological sites are considered to be a physical resource.

Within the Act there are lists of matters of national importance which have to be recognised and provided for by persons exercising functions and powers under the act, including:

‘The preservation of the natural character of ... wetlands, lakes and rivers and their margins and the protection of them from inappropriate subdivision, use and development. ...

The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.’

The protection of historic heritage from inappropriate subdivision, use, and development.’ (Section 6)

⁴ There is a current proposal before Parliament to promote heritage to being a matter of National Importance rather than one given ‘particular regard to’.

TABLE 2. SUMMARY OF POSSIBLE THREATS TO WET ARCHAEOLOGICAL SITES.

LOCATION / SCENARIO	POSSIBLE THREATS	CONSEQUENCE
Artificial island within a lake or a built-up site on a lake or river margin	Drainage channels either through the site or nearby Stopbanking through the site. Wave action from power boating Amenity planting, riparian vegetation restoration Use for cropping, pastoral farming Occupational use	Site damage/destruction, water table lowering and change from anoxic environment Site damage/destruction Lateral erosion Site damage in planting and from roots Site damage from cultivation/excavation for fence posts Site damage
A built-up site within a wetland away from an open water margin	Drainage channels either through the site or nearby Watertable lowering through drainage Amenity planting, riparian vegetation restoration Use for cropping, pastoral farming Occupational use	Site damage/destruction, water table lowering and change from anoxic environment Loss of anoxic conditions damaging cultural materials, risk of fire, large wooden object emerging from shrinking surface as soil oxidises Site damage in planting and from roots Site damage from cultivation/excavation for fence posts Site damage
Wet material depository in a lake or river bed adjacent to an occupation site	Reclamation. Navigational clearance, waterway clearance for flow capacity reasons, channel straightening Fossicking, e.g. by divers	Some soft soils will squeeze out ahead of an advancing fill. Damage is likely, or at least reduction of research potential. Material destruction Material removal from context, damage or loss through lack of conservation.
Likely wet material find location in a wetland	Drainage channels excavated through the site Watertable lowering through drainage Use for cropping, pastoral farming Mining of peat for use as a soil conditioner or potting-mix constituent Occupational use	Site damage / destruction, water-table lowering, and change from anoxic environment Loss of anoxic conditions damaging cultural materials, risk of fire, large wooden object emerging from shrinking surface as soil oxidises Site damage from cultivation/excavation for fence posts Destruction of the site Site damage

Other matters which need to be given ‘particular regard to’⁴ are:

‘Kaitiakitanga,

Recognition and protection of the heritage values of sites, buildings, places or areas.’ (section 7)

Because Maori cultural values get a particular emphasis in the Act it might be expected that Maori heritage sites might get greater attention than non-Maori ones. Practitioners in the RMA field dealing with Maori values would not all agree that this is always the outcome. The inclusion of historic heritage as a matter of national importance is a recent development. Historic heritage has a definition in the act that includes archaeological sites. It can be anticipated this will have an effect on the attention given to archaeological sites in RMA plans and consent proceedings.

Because a lot of the business that gets carried out under the RMA is concerned with consents for development or renewing existing consents to discharge, it sometimes seems the Act is about sustainable development. In fact it calls for sustainable management. The definition of sustainable management in the Act provides for use and development but

‘... while safeguarding the life supporting capacity of air, soil and ecosystems and avoiding, remedying, or mitigating any adverse effects of activities on the environment.’ (section 5)

3.1.1 Natural changes

All of the locations under consideration may potentially have threats from natural changes to the wetland regime. New Zealand has many coastal lakes and wetlands where the water-table is mediated by conditions at the coast—such as gravel bars which close naturally at times and lakes trapped behind moving coastal sand dunes. Some river-edge wetlands exist behind natural levee borders to the rivers. Rivers that meander in their river valleys can naturally breach their levee banks and cause water-table lowering where the breaches occur, or indeed directly damage or destroy river edge sites. Earthquakes can result in vertical land movements that affect the drainage regime. The Edgecombe earthquake, for instance, had a fault trace that crossed a low lying and wetland area. It had vertical subsidence of up to 2 m in places, but at others differential movement effectively raised some land with respect to adjacent areas and exposed non-cultural wood material formerly submerged in a river-bed.

Landslides—some earthquake triggered—can also form new lakes, some of which are transient, while others, such as Lake Waikaremoana, are much more stable. In coastal locations where there are mobile sand dunes, burial of wetland sites is a risk, but this may not affect their anoxic state. While burial and submergence do not directly damage or destroy a site they remove the symbolic, interpretive, and research value of a site.

It is important to note that the RMA does not contemplate that there is any obligation on management or regulatory agencies to sustain an existing condition against a natural change. Through its policies or plans under the RMA, a local government body may have set in place a policy to sustain a particular condition against natural changes, but these would be exceptions. Indeed anyone wanting to intervene to sustain an existing condition against a natural change would very likely need resource consent under the Act to undertake it.

3.1.2 Human-made changes

New Zealanders are relatively intense users of their rural landscape. Many parts of the country come under pressure for use for productive purposes. Wetlands, rivers, and lakes are no exception. The organic soils in wetland locations have long been attractive for development for pasture and other uses. It is in respect of man-made changes that the RMA has effect.

3.1.3 Policies, plans and rules setting

Regional councils must have Regional Plans with rules as well as policies and objectives under the RMA as to how they will manage the matters that the RMA puts within their responsibility.⁵ Territorial local authorities must have a District Plan under the RMA dealing with matters within its purview under the Act. Such a plan must have policies and may have rules.

The setting of regional and district plans is a complex procedure of issuing draft plans, objections, hearings by councillors, and very often Environment Court hearings on appeals over plans. Plan making is not a quick process and involvement in it requires persistence and advice from RMA professionals. However it is an important process and some historic heritage outcomes can only be achieved if appropriate policies, plans, and rules are in place.

Confusingly, in some areas there are unitary authorities which carry out both regional and local functions. In other areas some regional powers are delegated to local authorities.

In general it is essential that there are policies which express the value to be placed on historic heritage in the territory covered by the plan. Because different aspects of the RMA fall to regional or local councils it is important to get these considerations into the planning documents of both bodies. For instance, provisions relating to wetland sites may involve the policies and rules relating to water and soil which have to be dealt with at regional level. Recreational use of waterways in contrast falls to local councils to regulate. The Commissioner for the Environment has a paper on best practice for local authorities when operating in the heritage area gives some good high level guidance, including some for plan making.⁶

Some councils believe that all archaeological site protection is the role entirely of the Historic Places Trust and decline to include any more than the minimum in plans. This needs to be contested at the plan preparation stage. It is vital that regional and local council policies under the RMA have policies for the protection of historic heritage.

3.1.4 Listing of sites in plans

To be effective, a plan under the RMA must have some way of getting information about the presence of sites to those that use the plan. Marking of sites on plan maps and schedules of sites are ways of achieving this. The

⁵ They are also required to have a Regional Coastal Plan, but this is not likely to affect wetland sites within the scope of this paper.

⁶ It is available through the NZAA website www.nzarchaeology.org/ —on the professional resources page.

relatively low accuracy of site locations and their uncertain boundaries have worked against getting many sites onto planning maps. If a point location of a site is wrong or if it extends beyond the boundary of the land parcel it is indicated as being on, then any protection given by the plan may be lost where it is not marked. What some councils have done is use the location information as a warning layer map. This is a plan which alerts to the likely presence of a site in an area but does not carry the risk of wrong information being used in a legalistic way to avoid the plan site protection provisions.

When councils are looking at their RMA plans, it is a good opportunity to advocate for the establishment or upgrading of heritage registers operated or used by the council. When data on sites in a heritage register reaches a sufficient degree of precision, then the resistance on accuracy grounds to listing sites in the plan is overcome. Of course the 'stumbling block' is that this form of protection can only be given to known archaeological sites. Many waterlogged archaeological sites are unknown, largely as a function of their physical environment. In this regard predictive measures are important.

The New Zealand Archaeological Association is carrying out an upgrade programme to its national site recording scheme on a rolling basis with support from many local authorities. This is worthy of support.⁷

3.1.5 Classification of activities

As will be seen in a following section, the classification of activities as being 'permitted, controlled, restricted discretionary, discretionary, or non-complying', and the rules made in the plan about the notification of these, are key to getting advised about potential threats to sites. It is important that the plan rules do not call activities which may damage wetland archaeological sites 'permitted activities', and where activities which might affect wetland sites are classified as 'discretionary or controlled', that council's discretion not to notify applications is restrained.

3.1.6 Rules

Rules in plans are one way to achieve heritage protection outcomes for wetland sites, particularly where maintenance of the environment of the site is vital to its survival. With wetland sites there are a number of protective actions which may be able to be written into rules in plans. These need not be region- or district-wide rules but can be promulgated for local areas. Examples of what might be able to be achieved by rules are:

- Level limits for particular water bodies
- Clearance fire bans in wetlands to reduce peat fire ignition sources
- Requiring consents for new land drains in proximity to historic heritage wetlands
- Requiring water-table maintenance at wetland sites even when the surrounding area is being drained
- Requiring consents for amenity planting on particular wetland sites
- Requiring consents for tree removal clearance on particular wetland sites

⁷ See www.nzarchaeology.org/SRS_upgrade_project.htm

- Requiring consents for first time cultivation on particular wetland sites
- Boating limitations to control wake damage to sites adjacent to waterways

Rules in plans being promoted by council may best be drafted by officers who understand the need, rather than obtained from detailed proposals. Therefore the need for consultation in plan preparation is as important as proposing detail in submissions.

3.1.7 Plan changes

Plan Changes and New Regional Plans can be proposed to a council by anyone. Plans that require the management of water levels and water-tables in wetland heritage sites could be of particular value.

Regional Policy Statements and Regional and District Plans under the RMA have to be reviewed every ten years. However this does not limit the opportunity for changes before such a review becomes due. While new plans can only be prepared by a council it is possible for anyone to request a council to make a change to a plan. Anyone can also request a regional council to make a new Regional Plan on some aspect if there is not an existing one. The cost of preparing a plan may fall on those proposing it.

Ministers of the Crown or territorial local authorities can request changes to Regional Policy Statements. When a council accedes to such a request it then becomes the duty of the council to carry the change proposal forward. As with making plans, changes can be a lengthy process.

In a region with many wetland heritage sites it is conceivable that a Regional Plan dealing with water and soil aspects of their management could be promoted to the Regional Council as a new plan request or a modification to an existing plan. If such a request was well prepared so as to readily fit with the council's existing policy and plan framework it could find ready acceptance. It would need to be localised to identifiable areas, to be credible.

3.1.8 Consents

Consent-seeking is a central part of the RMA. Many opportunities exist in the consent process to oppose developments or seek to modify them so historic heritage in wetlands is preserved. Not all land modifications require consents, and not all consent applications come to public notice by being notified. These notification matters need to be addressed in the consent authority plan-making stage under the RMA.

Consultation gives opportunities for negotiation. This is a field for pragmatists with negotiating skills, but may involve some compromises to heritage value.

An activity within the scope of the RMA will either require a consent issued under the Act, or otherwise be allowed by it. Broadly speaking, matters relating to soil and water are the prerogative of regional councils⁸, while matters relating to land use are the prerogative of territorial local councils.

⁸ Adding to the confusion, many of these regional councils are now naming themselves Environment 'X', e.g. *Environment Waikato*.

A water-related activity would need a consent from a regional council unless there is a Regional Plan which permits them, while land uses are generally allowed unless there is a rule in a District Plan controlling them. The Minister of Conservation and the Department of Conservation are involved in consents to do with the Coastal Marine Area. These bodies are termed consent authorities.

The roles relevant to this document are set out below:

- Department of Conservation—Coastal permits within the coastal maritime area (jointly with regional councils)
- Regional Councils—Water consents, consents for contaminant discharge to land air or water, soil conservation
- Territorial Local Councils—Land use, subdivision, effects of activities on the surface of water

Complying activities

If an activity has been set down in a Regional or District Plan as a complying one, then no consent is needed. The activity requires no further approval from the consent authority. So for instance, if a Regional Plan said in respect of a lake held behind a gravel bar that the bar could be opened to release excess water then that could happen at any time without a consent. If a plan said that new land drains could be installed without a consent then that could be undertaken by any party at any time. No further conditions can be put on such an activity than exist in the plan rules. Hence while a consent authority might think it a good idea that an archaeologist is present while a drain is dug in an area where wooden artefacts have been found previously, the consent authority has no power to require this to happen for a complying activity if the requirement is not written into the rules.

Prohibited activities

A plan may classify some activities as prohibited. Consent procedures do not apply to these. They remain proscribed without possibility of being permitted

Existing rights

When the RMA was passed, many people held rights to undertake activities which they may or may not have exercised. These came from earlier legislation, some of it local Acts of Parliament. These were extinguished by the RMA, but rolled over within the RMA for varying periods into the future. Most of these are now expiring and have to be replaced by new consents. Some of the consent activity in a council is made up of these. Unless there is public interest in issues connected with them, quite loose existing conditions may be perpetuated in new consents.

3.1.9 Matters requiring consents

A key issue in the processing of consents is the question of notification. Plans under the RMA can set down activities requiring consents as ‘controlled, discretionary, restricted discretionary, or non-complying’. It is up to local authorities in setting-up their plan to decide what activities fall into which categories. The situation is complicated if there is a proposed plan as well as an existing one, and expert advice would need to be taken in that circumstance.

Notification need not be undertaken in the case of a discretionary activity or a non-complying activity, if the adverse effect on the environment is minor in the view of the consent authority, and if written approval has been obtained by the applicant from every person the consent authority considers may be adversely affected.

A controlled activity application need not be notified if the plan allows consideration of such applications without notification, or otherwise if written approval is obtained by the applicant from every person the consent authority considers may be adversely affected.

A restricted discretionary activity application need not be notified if the plan allows consideration without the need to obtain the written approval of affected persons.

Limited notification, of the parties the council considers affected, may apply in some circumstances. Registering an interest, by letter to the council, will usually get you included.

3.1.10 Process

Applications for resource consents are required to include an assessment of any actual or potential effects that the activity may have on the environment, commonly called an Assessment of Environmental Effects (AEE). Applications made to a consent authority are vetted by that authority. It is a common event for them to be sent back for more information.

Because notified applications take longer and are more problematic for both the applicant and the consent authority, there is often discussion at this time between the applicant and the consent authority to get the application in a form where it does not have to be notified. This may be by getting the proposed activity in a form where it has a minor effect and in getting written approval from potentially affected persons, or getting it within the definition of a discretionary activity, where the plan allows non-notification.

Parties seen as affected can have a considerable influence at this time. Their choice is not just to approve or not, but to seek to change the scale and location of the proposed activity and the conditions that might be imposed on the consent. Conditions need not be those contemplated by the Regional or District Plan, but might include ones settled by private agreement between the parties. Being recognised as a party in the first place is the difficulty with this area of negotiation.

Getting to hear of a proposal is the key to getting involved in consent negotiations. If you do hear of a proposal informally, write to the consent authority asserting your interest and need to be consulted. A standing request may be remembered, but you cannot rely on it. Inevitably some consents that you are interested in will not be notified and will be processed without your involvement. There is recourse to courts available at this time, if there is reason to contest the non-notification. This course of action is expensive.

Even with consents that are to be notified there will be negotiation between the consent authority and the applicant at this time over scale and conditions to get the proposal in a form that the officers consider can be supported. Third parties do not usually get involved in these discussions.

Notification is a procedure set down in the Act. The Historic Places Trust is a party to be notified if the application affects land subject to a heritage order, or affects any historic place, historic area, or wahi tapu which is registered under the Historic Places Act. Notification documents ask for submissions and set a closing date.

For major applications the AEE may append a series of environmental management plans. These are non-statutory devices which propose a method of operation, should the consent be granted. In effect they are a compendium of proposed conditions and procedures. They are given force if the consent is granted by being called up in the conditions so the undertakings become binding. Ensuring these documents give adequate warning of the potential of wetland finds and what is to happen if finds are made is important. Proposers may be quite open to suggestions as to the improvement of management plans at this stage.

Environmental management plans may call up iwi management plans in respect of any historic heritage such as koiwi finds, archaeological sites and artefact finds.

Conditions

Consent conditions for wetland archaeological sites need to go beyond conventional heritage conditions and look to protect the environment of the site, in order to protect the items within it. Conditions to consider might include:

- Level management limits for lakes and rivers
- Water-table controls to prevent over-drainage of wetlands used for agriculture
- A ban on fires as a part of land clearance in wetlands

3.1.11 Historic Places Act cross-linkage on consents

When HPA authorities (issued by the HPT) are granted for development, it is common to make the operation of the authority conditional on the applicants also obtaining a resource consent for the proposed development. Should the development not proceed, this assures the prevention of site destruction or damage preceeding the consent approval.

The reverse linkage of a consent condition requiring that an HPA authority be obtained, or alternatively an Historic Places Trust clearance that an authority is not required, is sometimes included by local authorities. However this is not universal. In some HPT offices at least, it is a standard submission on consents, when the HPT is consulted. Reinforcement from other quarters would be helpful.

3.1.12 Submissions on notified consents

Anyone may make a submission. Councils may provide forms for the purpose to ensure the necessary information is covered, but these do not need to be used. It may be worth discussing a proposal with an applicant at this time. Applicants obviously like submissions in support of the application and if you have potential influence with a consent authority they may be prepared to bargain on conditions to get that support. If parties achieve this there are options of

making a private agreement with the applicant, or putting your agreed conditions in your submission, with the proviso that you are supporting the application on an agreed basis.

Submissions need to be made by the deadline. Without that, you may lose standing as a party and have no further rights in the matter.

Submissions need not be in any legal form, but it will help if you can cite the RMA in support of the points you are making. Those considering the submissions will have expert advice on matters of law that is independent of the applicant, so any mistakes you make here need not be of great consequence. Submitters should obtain, or read at the council offices, a copy of the application and AEE so they are well informed on the application detail.

There are two basic rules:

- Don't attack the credibility or independence of the consent authority or those who will hear the submissions. If there are concerns here they are better argued elsewhere. You will need legal advice to do that.
- Don't challenge the financial viability of the proposal. The RMA has no mandate to consider that matter. Those hearing submissions are very familiar with this restriction and you risk devaluing the credibility of your submission by wasting time on that argument.

The arguments on consents often revolve around:

- The policies in the relevant RMA plan
- If there is an adverse effect or the likelihood of one
- If there has been adequate consideration of alternatives (not applicable unless it is likely there will be a significant adverse effect on the environment, see Fourth Schedule)
- The existence or adequacy of actions proposed to avoid, remedy, or mitigate the effects
- The conditions of consent proposed by the applicant or the consent authority

Submissions need to say if they are for or against the proposal, and if they are not against it in its entirety, what conditions applied to the activity might make it acceptable.

They need to say if the submitter wants to be heard in any hearing. If you are to be heard, then the substance of your submission can be put at the hearing. The written objection need not in that case cover much detail, but remember if it is material not adequately covered by the applicant, the consent authority officers may find it valuable in drawing up their recommendations.

3.1.13 Hearings and decisions

A consent authority has an obligation to give a decision on an application. It may delegate the decision making to the officers in minor cases—not often those that have been notified—or to a council committee or community board, or to a commissioner or commissioners. These commissioners may be elected representatives or they may be independent people engaged for the purpose or they may be a mixture. Independent commissioners may be used alone if the applicant is the council itself or the matter has some particular political connotation.

If both regional and local authorities are involved in consents for a particular project they can hold a joint hearing on the matter.

A consent authority is not obliged to hold a hearing if it considers it unnecessary. In any case where there are opposing submissions from people who want to be heard it is obliged to hold a hearing. Before anything further happens, a consent authority may seek to hold pre-hearing meetings with the applicant and any objectors to see if there is a basis for compromise on any points at issue. There is no risk in going to such meetings. They are an opportunity to state your views again, clarify them if necessary and may result in them being accepted in whole or part. If you choose not to go, you lose no later rights.

Before a hearing is held, council officers prepare a report on the proposal. This is given first to the consent seeker and after that it is generally available. Where it recommends granting the consent it will always have proposed conditions for the consent. It is always worth reading this prior to a hearing.

Hearings are not a full court procedure. The applicant makes submissions, which will usually follow the AEE and application document quite closely, but may go beyond it or modify it. There is no cross-examination of your submission by the applicant and you likewise have no cross-examination rights on the applicant's submissions.

Submitters can comment on the consent application and AEE, the officers' report, and on any of the applicant's earlier submissions in the hearing. You are not constrained to the submission you made at the notification stage in the points you cover.

It helps to have the submission available in written form, in multiple copies.

With elected members hearing most matters, as your elected representatives they are usually patient and polite, almost to a fault. They may ask questions on your evidence. Council officers present may do likewise after the members, but this is usually only on points of clarification. While you can have advocates or lawyers involved it is not necessary. Many submitters represent themselves.

You do not need to sit through the whole hearing. The council staff should be able to advise a time to appear.

After the hearing, consent authority members give a written decision. This may grant or refuse the consent, and if granting it do it under different conditions from those proposed by the applicant or by the officer's report. There may at times be negotiations by the council with the applicant at this time. More rarely third parties opposing the consent, but indicating a willingness to accept it with conditions, may become involved.

3.1.14 Appeals and standing

After a decision is made on a consent, parties to the hearing have the ability to appeal the decision to the Environment Court. Appeals can come from either the applicant, or any submitter. Sometimes both applicant and submitters appeal. At this point matters become much more legal and potentially expensive.

If an applicant appeals a decision because a consent was declined or because of the consent conditions, you will be notified and you need to respond that you wish to continue to be a party. You are not exposed to court costs in this circumstance.

It is vital, if you are to have influence in an appeal stage, to retain your standing as a party. You will lose standing if you do not respond within the timeframe set down. Don't rely on an appeal or a response by a party who seems to have the same interest as you. They may initially be keen for your support as a witness but they may later balk at the costs involved in proceeding to court or settle on some point important to them, but not to you. You will then be left without standing.

Appeals take a lot of time. For this reason consent applicants will want to settle them before the matter comes to an Environment Court hearing. A party has a considerable ability to influence an outcome where the applicant is pressed for time. An appeal settled at this stage is recorded by way of a consent order which modifies the original consent.

This paper does not cover Environment Court hearings for cases which get that far. Legal advice should be sought for matters proceeding there. Employment of legal advocates is desirable.

3.1.15 Private agreements

Disputes over consents need not be settled by conditions attached to consents. It is perfectly possible for an opponent to a consent to settle the matter by making a private agreement with the applicant and withdrawing the opposition as a result. These have an advantage in that matters the parties wish to keep private may be kept so, and conditions not within the scope of the RMA may be able to be included, or conditions that the consent authority may otherwise be unwilling to entertain. One disadvantage is the reputation one gains of being seen to be bought off by a secret side deal. This may damage the reputation of a body representing itself as acting in the public interest.

A disadvantage of private agreements is that enforcement for any ongoing obligations falls on the parties. The consent authority will not monitor and enforce private agreements.

3.1.16 Reserves resulting from subdivision consents

Where land abutting rivers or lakes is subdivided, an esplanade strip may be created, to be vested as a reserve in the council. The creation (or not) of such strips depends on such rules as the council has put in its District Plan, but even where the plan requires one, they do have the power to waive or reduce esplanade strips. While the purposes for which these strips are created do not include historic heritage they may well encompass wetland sites of historic heritage value. Councils have some further discretion in the matter of esplanade strips. They can become subject to the Reserves Act and thereby take in historic values to their management objectives. For sites next to waterways affected by a subdivision it is well worth submitting on matters to do with esplanade strip creation.

Councils often require reserve contributions as a condition of subdivision consents. These are often monetary rather than land, but in some circumstances sites of heritage value not readily able to be built over without a Trust authority may be accepted by councils as a reserve. Usually councils look to broad community value in reserves they acquire. A wetland with more than historic heritage value may be able to be protected in this way.

Either of these routes requires advocacy with the local council and using negotiation opportunities with subdivision developers.

3.1.17 Heritage orders

A seldom-used procedure in the RMA allows bodies, not restricted to government bodies, to become heritage protection authorities and apply for heritage orders over pieces of land (sections 187-198). The procedure is relatively tortuous, so is not suitable for any rapid response to a threat a proposed development may pose to a site. The heritage protection authority is potentially liable for purchasing the affected property if it renders it incapable of reasonable use, or otherwise withdrawing the order if the heritage authority does not accept the purchase obligation.

3.1.18 Enforcement orders and abatement notices

The RMA contains some provisions allowing activities causing unconsented effects to be halted. Enforcement orders are open to anyone, but involve the courts and are slow. Abatement notices can only be issued by an enforcement officer appointed either by a local authority or by the Minister of Conservation in respect of the coastal marine area.

Abatement notices are a potential method of approaching the problem of fires in peat. They will often be causing nuisance from the smoke apart from the potential to destroy heritage value. Notices may also be a possibility for halting damage, such as from boat wakes, where there is a particular activity such as powerboat club events that are responsible for the effect.

3.2 ANTIQUITIES ACT

Artefacts found in wetlands will commonly be covered by the Antiquities Act.⁹ The Act does not protect the sites or the artefacts in situ, but may be used to help deter anyone seeking to remove artefacts to become personal possessions.

The Antiquities Act controls the disposal of artefacts that may be found in New Zealand.

These come within the scope of antiquities under the act when they are:

‘Any chattel of any kind whatsoever which—

Is of national, historical, scientific, or artistic importance; and

Relates to the European discovery, settlement or development of New Zealand; and

Is, or appears to be more than 60 years old.’

⁹ www.cultureandheritage.govt.nz/antiquities

Apart from this general category of antiquity, the definition also lists specific types of antiquities:

‘artefacts—any chattel, carving, object, or thing which relates to the history, art, culture, traditions, or economy of the Maori, or other pre-European inhabitants of New Zealand which was, or appears to have been manufactured, used, or modified by any such inhabitant prior to 1902 ... parts of any ship, or aircraft wreck, older than 60 years.’

Most artefacts in wetlands will qualify under this legislation. The Act requires such finds to be declared, puts them in Crown ownership unless any other prior ownership can be established, and places barriers on their export. This Act does not, of itself, protect sites other than it removes the incentive of ownership of objects found from those who may consider removing them for personal gain.

Recreational divers in search of new experiences have been known to damage underwater sites with little realisation of the damage they were causing by removing material from context and by placing artefacts in an environment where they could not survive without conservation. This problem has no single answer. In general, education and sanctions for persistent offenders are responses. In particular sites there may be other mechanisms which can be employed, such as erecting signage, or burying the artefacts.

3.3 HISTORIC PLACES ACT

3.3.1 Nature of the Act

The Historic Places Act 1993 (HPA) promotes the identification, protection, preservation, and conservation of the historical and cultural heritage of New Zealand. It operates by recognising and registering historic places and wahi tapu. Registration of itself provides no particular protection other than some assurance that resource consent applications affecting the site will be notified to the HPT. However the procedure for interim registration under the HP Act does provide interim protection which is of value as a holding operation in the face of a threat. Interim registration can only be performed by the HPT.

Wetland archaeological sites meeting the Act criteria are protected under the Historic Places Act. Making the existence of sites known is a key to activating the HP Act protection. Protection is more effective if sites are registered because this invokes RMA procedures for notification when developments threaten.

Getting local authorities to list sites in their District Plans is a way of drawing sites to the attention of potential developers, so the HP Act procedures become engaged. The archaeological provisions of the Act do not protect any spiritual values of wetland sites.

3.3.2 Protection of archaeological sites

Archaeological sites are a special category of historic place. They are sites associated with human activity before 1900, or the wreck of a vessel that occurred before 1900, and in both cases must be a place that is capable of investigation by archaeological methods to provide evidence on the history of

New Zealand. There is blanket protection for such places. An authority must be obtained from the HPT to modify or destroy such a site. Note this definition is not constrained to Maori or prehistoric sites, though they are the ones most frequently considered under the Act.

The blanket protection is not highly effective for a number of reasons. The first is the lack of knowledge of many sites either to anyone, or to people who may unwittingly damage them. Secondly where sites are known, the rate of prosecution of people for destroying them knowingly without a consent has not been high. Hence a few are prepared to risk operating illegally. Lastly the HPT has often taken the view that recovery of information can substitute for protection of a site in some circumstances, so sites are destroyed after investigation, or with monitoring during the course of the development to record information exposed.

The archaeological provisions of the HP Act do not protect heritage values that are not reflected in archaeological information. Thus these provisions do not protect spiritual values of tangata whenua which might be associated with a site.

The linkage between the Historic Places Act provisions and the RMA are not that strong. Some councils choose to use them constructively. Other councils consider all matters within the scope of the HP Act to be outside their concern. When a council takes this latter view, the potential for unauthorised damage or destruction of known sites is substantially increased.

Nevertheless the HP Act provisions are one of the strongest means of protecting wetland archaeological sites. The protection can start to be effective only when sites are known to potential developers. This puts a responsibility onto heritage agencies to publicise sites they want protected to those who may damage them.

Authorities under the HP Act are not considered through such a public process as are RMA consents. In respect of registration of sites, the HPT is cognisant of the principles of natural justice and usually seeks input from those potentially affected by a proposed registration. Opportunities for advocacy by third parties do not usually arise on particular cases of an authority application or on the registration of a site.

The HPT has a network of regional officers who can be contacted over issues where the HP Act may be invoked.

3.3.3 Heritage covenants

The Historic Places Act has provision for Heritage Covenants to be agreed between site owners and the HPT. They are entered on land title documents, ensuring the presence of a site is signalled when people have reason to look at titles, such as when a change of ownership is considered, or undertaken. This is a valuable means of signalling the presence of important sites, but needs a co-operative landowner. Other covenant mechanisms are dealt with in Sections 3.5-3.7 of this report (below).

3.4 RESERVES MANAGEMENT PLANS

Reserves under the Reserves Act 1977 are required to have management plans. These are often subject to submission processes while they are in draft form. There is the opportunity to identify historic heritage wetland sites within reserves in this process and give them policies and mechanisms appropriate to their protection.

3.5 CONSERVATION COVENANTS UNDER THE RESERVES ACT

Two sorts of covenants are allowed under this Act:

- Section 77 Covenants—which may be between a private land owner and either the Crown or a local body. The purposes of these may include protecting land of historic value.
- Section 77A Nga Whenua A Rahui Kawaenata—where Maori land or Crown land held under a Crown lease by Maori may be protected for its historic value.

The advantage of these arrangements is that the management of the covenanted land becomes more formally established, and the covenant must achieve the purpose of the protection.

3.6 MAORI RESERVATION UNDER TE TURE WHENUA MAORI ACT 1993

Land may be set aside under this Act as a reservation for communal purposes including a place of historical or heritage interest. Management is vested in a body corporate. This mechanism will allow greater attention to be given to historic heritage values within Maori land.

3.7 THE QUEEN ELIZABETH II NATIONAL TRUST COVENANTS

The National Trust was established by the Queen Elizabeth the Second National Trust Act 1977,

‘to encourage and promote the provision, protection and enhancement of open space for the benefit and enjoyment of the people of New Zealand’

The broad definition of open space in the Act is:

‘Any area of land or body of water that serves to preserve or to facilitate the preservation of any landscape of aesthetic, cultural, recreational, scenic, scientific, or social interest or value’

The Trust operates primarily through covenants in respect of private land. It has some funds to help establish reserves. Its general operation has not been to preserve land solely with cultural value, but to seek to operate in areas with a broad range of values. Wetlands having more than historic heritage value could

come within the scope of its operations. The Trust is good at ensuring that the generosity of private landowners who agree to restrictions on their rights is recognised.

3.8 RAMSAR CONVENTION

New Zealand is a signatory to this UNESCO convention concerned with the protection of wetlands. The convention is primarily about protecting natural values, but in the case of wetlands these are often quite compatible with historic heritage values, so one is a useful support to the other. The New Zealand Government has listed several sites as being of international significance in respect to the Convention, they are:

- Farewell Spit
- Firth Of Thames
- Kopuatai Peat Dome
- Waituna Lagoon
- Whangamarino Swamp

When wetland historic heritage sites fall within these, the coincidence of Ramsar registration should be emphasised.

3.9 IWI MANAGEMENT PLANS

Under the RMA, Regional and District plans in their preparation have to have ‘regard to any relevant planning document recognised by an iwi authority affected by a [regional/district] plan’. (sections 66 and 74)

Such documents are termed Iwi Management Plans and are becoming more common. Ministry for the Environment funding is available to assist in their preparation. They are not restricted to land, but can cover water areas as well. Note that they are influential in the plan-setting stage, not in the consideration of resource consent applications, although they may be used as a resource concerning the presence of historic heritage, and hence as a guide to consultation needed in considering consent applications.

Iwi management plans are increasingly including historic heritage within their scope. They are a potentially valuable way of achieving increased recognition for Maori heritage values, particularly among Maori. It is for this reason they are listed here outside the context of the RMA, despite their principal statutory force being within that act.

Such plans can only be promulgated by iwi, but iwi—in preparing them—are calling on the knowledge of archaeologists. This means the opportunity for introducing archaeological values relating to known, or potential, wet archaeological sites is often there.

3.10 TREATY SETTLEMENTS

Existing and proposed settlements of Treaty Claims are increasingly looking to recognise kaitiakitanga in respect of waterways. Return of ownership in some form of the beds of lakes and rivers is becoming a feature. Where this is occurring it appears that the existing RMA powers of regional councils will remain, but extra procedures will be invoked in respect of planning consent applications affecting the lake or river beds. This, then, is an opportunity to ensure the archaeological sites in these areas are more fully considered, in as much as they affect Maori historic heritage. A risk is that it might degrade consideration of any non-Maori archaeological sites because they may be overlooked.

Where Crown land is returned to Maori ownership under a treaty settlement, but has a conservation value, there is often some ongoing involvement of the Crown in management. Crown heritage agencies need to be alert to the fact that these transactions identify and consider the ongoing management of heritage values on land or waterways so transferred.

3.11 HAURAKI GULF MARITIME PARK ACT 2000

Catchments draining to the Hauraki Gulf and to the eastern side of the Coromandel Ranges are subject to this Act. The catchments are the land which drains overland to the marine area covered by the Park. The extent of the catchment lands can be seen on the website referenced below.¹⁰ In section 8 of the Act it sets up the following as objectives for the management of the Park:

‘(b) the protection and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments:

(c) the protection and, where appropriate, the enhancement of those natural, historic, and physical resources (including kaimoana) of the Hauraki Gulf, its islands, and catchments with which tangata whenua have an historic, traditional, cultural, and spiritual relationship:

(d) the protection of the cultural and historic associations of people and communities of the Hauraki Gulf with its natural, historic, and physical resources:

(e) the maintenance and, where appropriate, the enhancement of the contribution of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments to the social and economic well-being of the people and communities of the Hauraki Gulf and New Zealand:

(f) the maintenance and, where appropriate, the enhancement of the natural, historic, and physical resources of the Hauraki Gulf, its islands, and catchments, which contribute to the recreation and enjoyment of the Hauraki Gulf for the people and communities of the Hauraki Gulf and New Zealand.’

¹⁰ www.doc.govt.nz/local/auckland/hauraki.htm

The Act then says:

(2) A regional council must ensure that any part of a regional policy statement or a regional plan that applies to the Hauraki Gulf, its islands, and catchments, does not conflict with sections 7 and 8 of this Act.

(3) A territorial authority must ensure that any part of a district plan that applies to the Hauraki Gulf, its islands, and catchments, does not conflict with sections 7 and 8 of this Act.

(4) A consent authority must, when considering an application for a resource consent for the Hauraki Gulf, its islands, and catchments, have regard to sections 7 and 8 of this Act in addition to the matters contained in the Resource Management Act 1991.

(5) The provisions of section 55 of the Resource Management Act 1991 apply as though sections 7 and 8 of this Act were a national policy statement and a regional council or a territorial authority must take action in accordance with that section and notify a change to a regional policy statement, plan, or proposed plan within 5 years of the date of commencement of this Act.'

This appears to considerably raise the status of historic heritage in the park catchment (including historic heritage wetland sites), over what is normally the case under the RMA. This arises through the Act objectives to protect historic resources being of 'national policy statement' status and having to be taken into account when considering consent applications. There are other provisions in the act regarding Ramsar sites being within the scope of the Park which may be significant, if there are historic heritage sites within them.

3.12 PURCHASE OPTIONS

Purchase of sites for their protection is an option worthy of consideration. It may not be sufficient in itself, if there is no protection against water-table lowering, and this may be beyond the control of a local landowner. Purchase is not an option for sites under lakes or rivers because private title does not exist for these areas.

Any land requires management to preserve the values it contains. This may require considerable ongoing funding and this financial commitment should not be overlooked if purchase is considered. Agencies which acquire land for historic heritage purposes include:

- Department of Conservation
- Auckland and Wellington Regional Councils
- Territorial local authorities
- Historic Places Trust

All of these organisations have many demands upon their funding and opportunities for purchase of wetland archaeological sites will not be an everyday occurrence. The chances would be increased, in some cases, if the conservation value included natural as well as historic values. Advocacy with these agencies is needed if an opportunity is seen.

Outside these, a special-purpose private trust could also seek to acquire a site and raise funds for preservation. Many charitable trusts may be able to be

tapped for finance to help such a project. The Heritage Order route under the RMA is one way to work for this outcome, but may be more fractious than trying to achieve a willing-seller / willing-buyer transaction.

Purchase negotiations are often best undertaken by an agent, without revealing the potential purchaser. When vendors believe public funds lie behind an intention to purchase, their price expectations can start to rise.

3.13 CONSERVATION ASSISTANCE

Even when land is in private ownership, with a sympathetic landowner there are ways of enhancing heritage protection. Funds are available from several sources for conservation land enhancement and protection. In the Auckland Region, for instance, there is the ARC Environmental Initiatives Fund. The fund has made grants for wetland conservation and—while it is not historic-heritage focused—a project including historic heritage would qualify for consideration. The New Zealand Landcare Trust,¹¹ is another potential source of funds.

3.14 CONCLUSIONS ON PROTECTION MECHANISMS

From the table of possible threats (see Table 2, above) we can see a match of some of instruments for protection to particular sites or locations. These are shown in Table 3 on the next page.

¹¹ <http://www.landcare.org.nz/>

TABLE 3. POSSIBLE THREATS MATCHED TO POTENTIAL INSTRUMENTS FOR PROTECTION.

LOCATION/ SCENARIO	POSSIBLE THREATS	TOOLS, GENERAL	TOOLS, SPECIFIC
Artificial island within a lake or a built-up site on a lake or river margin	<p>Drainage channels through the site</p> <p>Stopbanking through the site</p> <p>Wave action through site</p> <p>Amenity planting, riparian vegetation restoration</p> <p>Use for cropping, pastoral farming</p> <p>Occupational use</p>	<p>Site listing in plans under the RMA, rules for esplanade strips in district plans, site registration under the HPA, covenants, purchase, management as reserves within riparian strips</p>	<p>Regional plan provisions under the RMA requiring consents for specific localities. HPA procedures</p> <p>Regional plan provisions under the RMA so consents get notified, HPA procedures</p> <p>District plans under the RMA to control/limit boating, abatement notices</p> <p>Plan provisions under the RMA requiring consents for specific localities, HPA procedures</p> <p>District plans under the RMA requiring consents for cultivation in specific locales</p> <p>HPA procedures, district plan provisions under the RMA preventing construction</p>
A built-up site within a wetland away from an open water margin	<p>Drainage channels excavated through the site</p> <p>Water-table lowering through drainage</p> <p>Amenity planting, riparian vegetation restoration</p> <p>Use for cropping, pastoral farming</p> <p>Occupational use</p>	<p>Site listing in district plans under the RMA, site registration under the HPA, covenants, purchase</p>	<p>Regional plan provisions under the RMA requiring consents for specific localities, HPA procedures</p> <p>Regional plan provisions for controlling water tables to prevent over-drainage, consent conditions requiring watertable preservation at sites, District and Regional plan clearance fire controls to prevent peat fires</p> <p>Plan provisions under the RMA requiring consents for specific localities, HPA procedures</p> <p>District plans under the RMA requiring consents for cultivation in specific locales</p> <p>HPA procedures, district plan provisions under the RMA preventing construction</p>
Wet material depository in a lake or river bed adjacent to an occupation site	<p>Reclamation</p> <p>Navigational clearance, waterway clearance for flow capacity reasons, channel straightening</p> <p>Fossicking (e.g. by divers)</p>	<p>Site listing in district and regional plans under the RMA, site registration under the HPA, covenants</p>	<p>Regional plan provisions under the RMA to control reclamations and have applications notified</p> <p>Regional plan provisions under the RMA to control waterway excavations and have applications notified</p> <p>HPA procedures, Antiquities Act</p>
Likely wet material find location in a wetland	<p>Drainage channels excavated through the site</p> <p>Watertable lowering through drainage</p> <p>Use for cropping, pastoral farming</p> <p>Mining of peat for use as a soil conditioner or potting mix constituent</p> <p>Occupational use</p>	<p>Site listing in plans under the RMA, at warning level, site registration under the HPA</p>	<p>Regional plan provisions under the RMA requiring consents for specific localities, HPA procedures.</p> <p>Regional plan provisions for controlling water tables to prevent over-drainage, consent conditions requiring watertable preservation at sites, clearance fire controls to prevent peat fires</p> <p>District plans under the RMA requiring consents for cultivation in specific locales</p> <p>Regional plan provisions under the RMA to have applications notified</p> <p>HPA procedures, district plan provisions under the RAM preventing construction</p>

4. Principles of conservation

Once wet archaeological deposits have been identified, the conservation of these important archaeological sites becomes an issue. A thorough understanding of the chemical and physical processes occurring within and around the sites is involved. This may be thought of as a three-stage process requiring: an assessment of the nature and condition of preservation of organic remains in wet site deposits; the monitoring of physical and chemical variables within the wet deposits; and the development and implementation of a management programme.

4.1 ASSESSMENT OF ORGANIC REMAINS

The data collected at this stage will determine whether conservation measures can or should be undertaken. Therefore, before a conservation schedule can be implemented, assessment of the wet organic materials in situ is required, against which future deterioration can be measured. Caple noted no baseline knowledge exists of which archaeological deposits lack oxygen, and 'no proven methods for analysing and characterising such deposits is available at present' (Caple 1996: 114). He also noted that 'since there is a wide range of soil and hydrological conditions that can lead to anoxic or waterlogged conditions, a wide range of chemical, physical and biological variation can be expected'.

As well as abandoning preconceptions, this also means that the monitoring and management strategies developed from data recovered at this stage must vary from site to site. This will involve taking wood samples for examination and analysis. Small exploratory test pits need to be opened in order to assess the extent of deterioration of waterlogged artefacts and site strata. The test pits need to be both small and opened for a short time to reduce oxygen exposure—the principal factor in deterioration of organic materials. Remaining wood should be left in situ for future assessment of the same pieces. Monitoring equipment can then be placed in the site prior to reburial so that an ongoing seasonal picture of the burial environment can be recorded. This data is needed to create future conservation strategies of the site and its artefacts.

The bacterial species of interest in a waterlogged environment are those concerned with the metabolism of sulphur, iron, and nitrogen. Monitoring for elements such as sulphur, and the way it reacts with organic materials, would also be of value when assessing the sites in question, and in determining the role of different elements and organisms in organic material degradation.

Analyses of the organic samples should include: visible-light and scanning electron microscopy to examine cellular degradation, moisture content, and specific gravity for different wood species; past and present microbiological activity; and wood chemistry. Actual present and potential future sources of chemical pollution should be identified and characterised. For example, nitrates and phosphates used in fertiliser are oxidants (Van de Noort et al. 2001:

12). These can be expected to be common and probably persistent pollutants in New Zealand.

Finally, but most importantly, before consideration can be given to the conservation of a waterlogged site, its hydrological status must be assessed.

4.2 MONITORING OF DEPOSITS

As Coles (2001) suggests, the key to success in the protection of wetland sites lies in accurate monitoring. Monitoring programmes must be regular, ongoing, and frequently evaluated. However, each wetland archaeological site has different features and site-specific problems, therefore, monitoring parameters have to be tailored to suit.

The use of other specialists (such as environmental agencies with specialised knowledge, drainage engineers, local historians, and farmers) can provide useful background information when designing a monitoring schedule.

To date only three wetland sites have been monitored on a regular basis for a period of over a year. This work has been carried out by D.A. Johns at three different wetland locations in north Taranaki.

Before a management programme can be implemented, a minimum of one year of monitoring is required to take into account the seasonal pattern of wetting and drying which affect the stability of the site. At the end of that year an interim management plan may be developed and implemented. The plan will need periodic review and, if needed, alteration based on the results of the monitoring programme. An accurate plan of the site, including elevations, is essential at this stage.

Five main parameters need to be considered when designing a monitoring programme, these are:

- Water level
- Water quality
- Redox potential
- pH
- Temperature

4.2.1 Water level

It is crucial that these sites remain waterlogged throughout each year if they are to be protected. Heathwaite (1993) has described water balance as:

$$P + I = D + E + (R - C) \text{ mm (of rainfall)}$$

(P = precipitation, I = inflow of intrusive water, D = discharge, E = evaporation, R = reserve, and C = consumption; R - C represents storage)

If precipitation and inflow are less than discharge, evaporation, and consumption, there will be a net water deficit. To ensure water levels are sufficient, a study of the local hydrology over a year has to take place, and the following factors need to be evaluated:

- Level and fluctuation of the water-table

- Source of the water supply
- Threats to water retention
- Nature of the soil

The establishment of a database which can be used to define a site's hydrological balance, and actively manage it, is necessary. Water levels should not fall below the level of the archaeological remains at a site. Therefore, the level at which these deposits begin needs to be established. This should be determined during the assessment stage.

A common method of measuring water-table levels on sites employs piezometers (essentially wide plastic tubes with numerous perforations) inserted into the soil in and around the site. Each tube needs to be levelled to a datum once its location has been decided. Spacing of the tubes will differ from site to site and is dictated by the type of soil in which it is being inserted. Those soils with low hydraulic conductivity—for example, peat and clay soils—will require the tubes to be closer together. Monitoring must be regular and—at least for the first year—relatively frequent. With regard to the Sweet Track in the Somerset levels, Cox et al. (1995: 82) have suggested weekly monitoring.

A common hazard for piezometers is the presence of livestock. Areas which contain these measuring devices need to be fenced-off or protected in some way.

4.2.2 Water quality

Pollution has been found to be one of the most destructive influences of fragile wetland archaeological sites (Coles & Coles 1995). This can lead to several adverse affects, either directly or through the stimulation of other changes. Pollutants are typically chemical residues of fertilisers, pesticides, industrial chemicals, and faecal matter from humans and animals. In New Zealand it can be expected that most pollutants will result from agricultural and/or horticultural activities.

As well as the oxidisation-promoting qualities of nitrogen and phosphorous fertilisers they also promote eutrophication. This is an over-enrichment with nutrients and can encourage growth of vegetation, which on the one hand can take up water, and on the other can cause physical damage through the roots of plants penetrating the archaeological deposits and damaging artefacts in them.

A database establishing water quality at the site is required prior to a management plan being implemented. Samples taken from piezometers should be collected at regular intervals throughout each year and analysed. Monitoring over an extended period of time will provide valuable information showing change and the rate of change of water quality at a site. Monitoring personnel visiting a site will be required to be on the lookout for changes in water quality due to contamination, particularly during very dry or very wet weather, or when a polluting event is known to have recently taken place.

4.2.3 Oxidation-reduction potential

The oxidation-reduction potential (often referred to as redox or Eh), is a measure of the potential for electrochemical activity. Redox can be used to

characterise soils and groundwater environments as oxidising or reducing. Redox is often used as an indicator for the dominant chemical reactions taking place on a site because it is quick and easy to use.

Probes set below the water-table display negative values often associated with reducing conditions and waterlogging. Caple stated that waterlogged deposits preserving organic archaeological material are normally reducing at < -100 mV. This is based on data recovered from 12 sites in different situations in Britain. Sites with good preservation had redox values of approximately -200 mV or lower.

‘The survival and recovery of ancient organic materials from these sites indicate that low redox values are associated with those burial environments that produce conditions for the preservation of organic materials.’ (Caple 1996: 119-121)

Sites with intermediate levels of organic preservation had redox values in the range of -60 mV and -125 mV. ‘Thus slightly negative redox values are correlated with sites with variable levels of organic preservation’ (Caple 1996: 119-121).

In fact redox potential could probably produce the most important and useful information about anaerobic environments if the data could be trusted. Currently the problems associated with redox measurements are sufficient to make the measurements non-repeatable in some cases (Corfield et al. 1996), and unquantifiable interference of the electrodes during readings is not uncommon. Furthermore, D.A. Johns has recently spoken to a number of scientists working on wet sites in Europe who are now considering not using redox potential, because they do not consider the data provides a sufficiently accurate characterisation of the buried deposits. This is largely due to the introduction of small quantities of oxygen with the probes into the soil. However, at the Sweet Track in Somerset Levels, UK, a programme for redox measurement using permanently-buried redox cells has been implemented. This method effectively removes some of the sampling errors associated with hand-held readings. Results so far indicate that the re-flooded site is staying anaerobic (Brunning 2000).

We consider that redox measurements—used in conjunction with other tests to gain an overall picture of electrochemical data—are valuable for waterlogged sites. This is particularly true if potential problems, such as the use of the correct type of electrodes for different deposits, and an experienced operator to undertake the tests, are carefully considered.

4.2.4 pH

The pH of a solution describes the concentration of hydrogen ions, and is a measure of acidity or alkalinity. It is an important parameter for conservation of wetland sites because its measurement relies on water. A variety of electrodes can be used to measure the pH, but glass electrodes are the most common. It is a measurement that can be carried out with ease on both groundwater and flooded soils in situ, which avoids post-sampling changes which may occur in transit.

As part of the same study referred to with regard to redox potential Caple (1996: 121) found that 'the pH levels of the majority of the archaeological sites, were in the near neutral region of 6.0–7.2.' Combined, the redox potential and pH of the water are probably the two most useful parameters in characterising an anaerobic environment, providing that the sampling method does not introduce error.

4.2.5 Temperature

Temperature is frequently monitored to calibrate other phenomena measured and this should be measured in conjunction with the tests outlined above.

4.2.6 Ongoing evaluation of sites

For each type of monitoring mentioned above to be effective, an agency needs to be appointed to frequently visit the sites and ensure that the equipment is in place and functioning. Ongoing evaluation of each site's stability is required.

4.3 Management of deposits

Management strategies must vary from site to site. Caple concluded that

'... if we are to preserve these deposits it is essential to maintain all elements of this environment at the appropriate levels. The presence of water in such deposits is not sufficient to preserve the anoxic conditions and thus their archaeological contents.' (Caple 1996: 122)

Where the site lies within an isolated remnant of a wetland, achieving preservation will be significantly more difficult than when it lies within a large expanse of wetland. The smaller the area, the greater the problems associated with water levels and water quality are going to be. This has led Kendall et al. (2001: 171) to suggest 'that we can only preserve archaeological wetland sites if we can more or less control the hydrology.' Therefore, we should be looking particularly at preserving whole wetlands, rather than protecting 'monument islands'.

For those sites where this optimal situation is not present, some technical responses are possible and some have been attempted with various successes. The possibility of providing physical protection to a site in the form of a buffer zone, has been a successful option for several overseas wet site projects (Fischer 2001; Coles & Coles 1995). A buffer zone between the wetland archaeological features and the surrounding environs can reduce the effects of desiccation, and biological and chemical pollutants. One way to ensure that a buffer zone surrounds the wetland cultural features of the site would be land acquisition, but this is often too expensive. The following two examples from Britain are instructive of the problems that arise.

Cox et al. (1995) give the example of works designed to aid preservation at Shapwick Heath, an isolated remnant of a wetland where the catchment is large:

'Shapwick Heath is no exception to this rule and it is unfortunate that the only water supply that can be used for the present irrigation system is derived from the South Drain, an arterial water course fed by calcareous and agricultural run-off and water pumped from peat workings. This water of very high pH which is high in nutrients and dissolved oxygen, is very different in chemistry

from that characteristic of a semi-natural fen and is likely to adversely impact the functioning of the ecosystem.’ (p. 80)

‘This problem was appreciated by English Nature who in 1985 took steps to attempt to ameliorate the problem by first pumping the water into a lagoon in an effort to neutralise some of its anticipated adverse properties. However, there is no doubt that the holding capacity of this lagoon is too small to allow it to be effective. The lagoon is now colonised by reed beds of *Phragmites australis*, and these have become an attractive overnight roost for a flock of in excess of 250 000 starlings. Needless to say, their effect upon the nutrient level of the water in the lagoon is disastrous.’

‘It is unfortunate that the original siting of the ditch irrigation system within the woodland failed to utilise the fact that peat has an inherent buffering capacity in respect of water chemistry, particularly dissolved oxygen and pH. Had the ditches been sited at some distance from the trackway, the adverse chemistry of water fed into them could have been neutralised to a degree dependent upon such variables as distance and depth of peat.’

Another example of physical intervention is given by Caple (1996). This relates to Flag Fen, a large Bronze Age platform and post alignment (approximately 1 km long) used for ritual interment. The site was discovered during drainage works which lowered the water-table and threatened the site which now lies above the new water-table. To remedy this, lakes have been constructed nearby to allow water to slowly filter through the site back to the drains. Water is pumped into the lakes, which allows the pumped water to stagnate and lose oxygen that would otherwise cause the decay of the organic remains (Caple 1996: 120).

The first example serves to emphasise that careful planning, particularly with attention to the full range of variables, is essential if the works are to be effective. The second is a heartening example of a successful response to a very large and complex situation where the water-table can be reinstated within a defined area inside a de-watered wetland.

If a particular part of either site is under threat of desiccation, that area could be isolated using one or a combination of methods to achieve the desired water levels. It is clearly important that the exclusion of oxygen is successful and that buffer-zones are large enough to enable the buffering of pollutants. In smaller-scale situations answers may be as simple as blocking existing drains, or the use of small dams or bunds.

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