The need to preserve our cultural heritage and the needs for development are in perpetual conflict. In the ideal world, no cultural heritage sites would be destroyed or would decay. But this is impractical as the same physical locations are commonly in continuous demand for modern developments of various kind. Likewise the forces of nature, wind, water and fire exact a toll on the sites as a whole or their integrity. Combined with the detrimental actions of people, little in terms of resources would survive, would it not be for the conservation of cultural resources by management action or by physical intervention.

This background note will set out some of the processes necessary for the successful completion of conservation management plans. Moreover the conditions imposed by the physical environment of Micronesia, as well as the management restrictions imposed by limited resident technical expertise and restricted funding require that such processes be appropriate for the area. In this document we will first address some fundamentals of cultural resource management and will address the process of developing a cultural resource conservation management plan. In the final section we will address issues relating specifically to the management of historic resources of the late 19th and 20th century.

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### The four principles of CRM

<table>
<thead>
<tr>
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<th>Details</th>
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<td>1</td>
<td>Tangible cultural resources are finite</td>
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<td>Tangible cultural resources are scarce</td>
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<td>3</td>
<td>Tangible cultural resources are non-renewable</td>
</tr>
<tr>
<td>4</td>
<td>Tangible cultural resources are valuable</td>
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Before we embark on a discussion of the processes leading up to and contained in cultural resource conservation management plans, it is appropriate to reconsider some of the fundamental parameters of cultural resource management (CRM).

Cultural resource management is a process which involves three basic steps:

1. The location, identification and documentation of the resource.
2. Assessment of the value or significance of the resource to the community or sections of the community.
3. Management of the resource so as to retain its cultural significance—this involves a range of options or strategies from controlled destruction, passive management and active management to preventative intervention.

Cultural resources are the manifestation of people’s interaction with their environment. People’s needs, for shelter, provision of food and procurement of raw materials for tools, to name a few, modified the environment and have left a series of traces. Theoretically each Pacific Island as a whole can be considered as a single cultural site; one large culturally modified environment, both directly (due to the actions of people) and indirectly (due to the effects of introduced fauna and flora). However, common terminology and management only looks at specific localized manifestations: “sites” if the resources are immovable (and ‘artefacts’ if the resources are movable). This artificial separation of cultural landscapes into discrete and hence “manageable” entities (sites and places) has several implications on the practice of Cultural Resource Management (CRM). It needs to be understood that cultural sites can neither be seen isolated from other sites in their “vicinity” in time and space, nor can they be seen totally isolated from the cultural context within which and against which they were created.

“Traditional” Cultural Resource Management (CRM), as practiced in Australia, New Zealand and the USA, is considered as a process to safeguard the physical manifestations of cultural heritage, namely indigenous and historic places. The tangible manifestations of these cultural sites, however, are only one part of the heritage connected with these sites. While European cultural concepts are very much preoccupied with the tangible resources, i.e. artefacts, visible traces of prehistoric sites, buildings, engineering works, rock art and the like, other cultures value the spiritual connections with locations. These traditional or sacred sites may show tangible evidence of cultural modification, or they may not.

Further, for many of the world’s peoples, the Pacific Islanders among them, cultural heritage is largely oral, handed down by word of mouth from generation to generation, to selected members of a group. Gender differentiation (men’s sites, women’s sites) as well as age differentiation of “heritage”, i.e. traditional knowledge, is common. Thus, a holistic approach to CRM includes the management of intangible resources, that is language, oral history, traditional skills and technology; movable resources, such as artefacts, machinery plant, vehicles and the like, as well the physical sites and places.

Whilst conservation management plans are primarily concerned with the tangible aspects of the resources, it needs to be considered that the significance values attached to the resources are rooted in the intangible sphere.

THE FOUR PRINCIPLES OF CRM

There are four basic principles which underlie all cultural resource management actions: These are that the physical evidence of past cultural activities (remains, sites, and places) is finite, scarce, non-renewable and valuable. Let us look at these principles in turn.

**Principle 1: Tangible cultural resources are finite**

The first axiom that cultural resources are finite is obvious. Since the cultural resources are manifestations of past events only a set number of these were created within the respective time frame. Thus their number is finite.

**Principle 2: Tangible cultural resources are scarce**

The process of economic and cultural societal development is on one level one of replacement and renewal, so that the physical evidence of past activities is a diminishing resource. Further, natural environmental modifications (such as natural disasters) and natural decay of constituent materials further decrease the extent of the resource. There are only a certain number of traditional house sites, one Nan Madol, and only a few buildings of the Spanish or German Colonial period and traditional fishtraps. If these sites are destroyed they cannot
be re-created or re-generated in the social and historical context of their original construction. Copies can of course be made, but they do not have the same value or context in cultural terms.

**Principle 3: Tangible cultural resources are non-renewable**

This third axiom follows on from the second one above. Places may be copied, but we cannot renew the spiritual, social and historical moments in which these places were created. Thus every single site is a unique physical manifestation of activities, ideologies, technologies, social and societal practices, and so forth, particular to that place at that point in time. All those elements of a site in association with each other create a unique record of the past and once destroyed that particular past cannot be renewed.

It needs to be stressed that cultural resources form a social and chronological continuum and that a continual modification of culture took and still takes place. Sites and places can be seen as merely snapshots in time and space, one image of this continuum. To use an analogy borrowed from the video age, places and sites are “freeze frames” of a video (without end) called cultural development.

Therefore, while we have to appreciate that tangible cultural resources are non-renewable, we also have to understand that in principle cultural resources are replaceable with “new editions” of the same resource. For example, Chamorro culture did not “stop” after the European invasion of Guam, Hawaiian culture did not “die out” following Christianisation. While some physical expressions of this culture, such as some technologies, ceased and gave way to imported technologies, many if not all of the intangible components of the heritage continued in terms of spiritual beliefs, oral traditions and skills passed on from generation to generation. Because the European “idea” of heritage is very much preoccupied with the tangible evidence of such, the misconception was created that traditional culture stopped or “died out”.

**Principle 4: Tangible cultural resources are valuable**

The final principle is that cultural sites are valuable. What does valuable mean? In some cases it is possible to define value in monetary terms. The environmental conservation movement is under ongoing pressure to justify land conservation in terms of cost-benefit analyses. In many ways there have always been these sorts of pressures in cases of urban conservation where land values in central business districts and potential for income from high rise hotel developments are seen to outweigh the cultural costs of retaining historic structures.

So value here, means more than dollars and cents and carries with it some other implications. When we talk about cultural value we are implying some perceived importance to an island nation’s society - that a particular place has some meaning to one or more sections of our community.

That cultural places are valued is obvious all around us. There is Federal and State legislation to protect our cultural heritage. Places relating to our past are reserved for public use and education.

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**The Three Main Elements of the Planning Process**

The process of developing a conservation management plan rests on three main pillars, which for the ease of memorizing have been labelled societal, contextual and physical components. Whilst conservation management plans are preoccupied with the intervention in the physical decay processes of cultural resources, it would be a mistake to assume that all that a conservation management plan has to address are the mechanics of physical conservation needs and prescribe treatments to mitigate decay.

All three components need to be taken into account and, what is more, need to be given equal weight in order to arrive at a successful plan which stands a good chance of success of achieving its goals.

The physical component refers to the assessment of the nature and extent of the resource or resources to be considered, their documentation, assessment of their state of preservation and the identification of the causes for the decay which takes place. The contextual component assesses the history of the specific resource, its background, the wider view of things locally and regionally, and its cultural context. The societal component addresses the role of the resource as well as its historical context in the contemporary society where the resource is placed in. It addresses the opinions, expectations and constraints of the community to which the resource belongs.

In the following we will address all three streams and their interaction. Referring to figure 1 it becomes obvious that both the physical and the con-
textual stream merge in the statement of significance which underpins the conservation policy and following that all future actions. The societal component feeds in data through the process, which culminates in the completion of the conservation management plan. From this node point, then, will flow a number of actions which will intervene with the ongoing decay of the resource and will through means of physical conservation, rehabilitation or stabilization ensure the future survival of the resource for the benefit of all stakeholders involved.

In the following we will first look at these three components individually and then at their interaction.

**PHYSICAL COMPONENT**

**Identification and documentation**

The first step in a conservation management plan is the identification and documentation of the resource or resources.

The sites need to be identified, i.e. located and identified as sites.

*Documentation* is the principle of recording a resource for future generations. It is highly unlikely that you will be the first or the last person to work on a resource. When you work on a resource, it is very important that you know the complete history of the resource including all changes to its fabric and its setting, etc. It will be equally important that all future generations know what you have done. The documentation of a resource, following its identification is the primary source of data collection on the resource. All attributes of a resource are noted, such as dimensions, locality, composition, appearance and so on.

The process of investigation and documentation comprises of the following steps.

- Analysis of extant data
- Physical Survey
- Analysis of materials observed
- Comparison with other sites
- Production of report
- Proposed action(s)

**Survey**

Let us now look at some these in greater detail.

**Analysis of extant data**

This is the least intrusive of all actions. A *desktop survey* or *desktop study* is conducted by accessing, compiling and evaluating the available information of cultural resources of a given area. The collection of historical data is necessary to provide you with the knowledge of what you can expect. It is performed by extracting relevant information from a variety of sources: previous site surveys, regional or thematic studies, excavation reports, anecdotal information and oral history data as well as predictive models for site presence.

The examination of the property register and other archival documents, as well as contemporary ac-
counts (newspapers etc.) will provide you with an overview of the changes the resource may have experienced. The examination of secondary works on the period, the architect or the type of resource is also necessary.

Physical Survey

A survey occurs with increasing levels of intensity, depending on the time, funds and staff available to execute the survey. It needs to be understood that all States require that people conducting surveys have relevant permits and comply with a host of regulations. Further, it is appropriate to conduct surveys for historic sites in collaboration with members of the Local Councils or similar representational organizations. Archaeological or historical surveys should not be conducted without such permits.

Windscreen Survey. A survey which initially involved the assessment of the nature and frequency of resources present in an area. The survey is conducted by vehicle, driving along predefined transects and routes. This kind of survey is more suited for the historical, built environment where it would note the general distribution of buildings, structures and neighborhoods, representing different architectural styles, periods, and types of construction.

Reconnaissance Survey. A reconnaissance survey entails a pedestrian walk-over of the area affected by development. Surface sites, such as structures and artefact/midden scatters, are mapped and described. In some instances, this cannot be done given dense vegetation or other obstructions. As far as submerged ('underwater') sites are concerned, a reconnaissance survey entails a handful of exploratory dives in an area.

Representative survey. A representative or sample survey, of part of the area under assessment. This survey consists of intensively surveyed transects, representative samples of physiogeographical units or artefical, randomly selected survey areas.

Intensive Survey. An intensive or ground-cover survey is a careful and close look at the area being surveyed. It is designed to identify precisely and completely all cultural and historical properties in the survey area. It generally involved detailed background research, and a thorough inspection and documentation of all cultural and historical properties in the area. It usually requires a pedestrian walk-over of the area in a regular fashion, walking survey lines which have been set apart at very narrow, regular distances, thus covering the entire area affected. This will be upheld even in case of dense vegetation or other obstructions. As far as submerged sites are concerned, an intensive survey entails a comprehensive coverage of the bottom, regardless of the number of dives it takes to accomplish the task.

Any survey should document the kinds of cultural and historical properties expected; the boundaries of the area surveyed; the method of survey, including an estimate of the extent of survey coverage; the kinds of cultural and historical properties present in the survey area; a record of the precise location of all cultural and historical properties identified; information on the appearance, significance, integrity, and boundaries of each property sufficient to permit an evaluation of its significance; specific properties that were identified, and the category of information collected; and description of the areas examined that did not contain cultural or historical properties.

Identification

Historic resources can be grouped into three large classes:

- the built environment
- landscapes; and
- underwater sites.

The built environment comprises of a variety of resources, such as

- Residential Sites (Houses and associated outbuildings)
- Commercial Sites (Stores, Hotels, Shops, Office Buildings, etc.)
- Industrial Sites (Factories, Mining Sites, Shipyards, Flour Mills, Fuel Storage sites, etc.)
- Public Sites (Government Buildings, Schools, sports grounds, race courses, Grand Stands, Public Town Clocks, etc.)
- Infrastructure Sites (Public utilities, Canals, Gasworks, Power Stations, Water Supply, etc.)
- Sacred Sites (Churches, Mosques, Synagogues, Temples, Cemeteries, Memorials, etc.)
- Transportation Infrastructure Sites (Bridges, Railway lines, cuttings, embankments and stations; Roads, Road Reserves (Tree rows), Subway Stations, Airports, Seaplane facilities, harbors, Wharves, Lighthouses, etc.)
• Military Sites (Barracks Buildings, Coastal Defense Gun installations, airfields, Temporary and Permanent Fortifications).

Landscapes comprise designed, natural, rural and industrial landscapes. Residential landscapes comprise private gardens; public gardens (botanical gardens, parks, zoos, etc.); streetscapes (trees, houses, ensembles of set architectural styles) and townscape (spatial lay-outs, silhouettes, precincts, etc.). Cultural landscapes comprise of agricultural landscapes (field and pasture systems); industrial landscapes (quarries, open cut mines, mine dumps, etc.); road and rail systems (road and railway cuts and dams, road reserves [tree rows]) and regulated river systems.

Underwater sites consist of sites in the waters of the oceans, and where present, rivers and lakes and encompass harbour structures, ship and aeroplane wrecks as well as material dumps.

Documentation

In this section we will look at the principles underlying the survey of historical resources and will address the types of surveys which can be conducted. We will also look at the types and levels of documentation required to successfully collate the data relevant to the conservation of an islands heritage.

Data to be collected

A description of the extant resource should take into account:

• The components of the resource, such as the location of the resource, any contributing structures (out buildings etc.), and the surrounds of the resource (site, garden etc.)

• Architectural Plan of the Resource(s), such as the floor plan and shape of the building, sections through the building (cutaway views), number and type of storeys, the interior lay-out of rooms and details of the building.

• The architectural elements of the resource(s), foundations, cellar(s), walls (external and internal), roofing, heating system (fireplaces & chimneys), doors and windows.

• The fabric (materials) of the resource(s), such as wood, masonry, brickwork, plaster/stucco (detailing, wall finish), terracotta (shingles etc.), metal (roofing, columns, balustrade), glass (windows), paint systems

The data to be collected during a documentation comprise qualitative and quantitative data, descriptive data and information on the site’s or object’s location. Further pictorial evidence in form of photographs and drawings is to be added.

Quantitative Data

These comprise that kind of information that can be measured in one way of the other and which can be replicated at the site or object. This entails measurements of length, width and height of the site or object as a whole as well as parts thereof, weight (where applicable), orientation (relative to north), and so forth.

Qualitative Data

Qualitative data comprise that kind of information which addresses the completeness of artifacts or sites, their state of preservation, colour, and the like. Qualitative data are not replicatable without taking into account the bias introduced by the observer.

Descriptive Data

This type of data consists of a narrative describing the site or objects and its constituent parts and includes information on setting, spatial relationship of site components and so forth.

Locational Data

The location of the site or object, as well as its ownership and other information are summarized under this heading.

Pictorial Evidence

The photographic and pictorial documentation should ideally comprise the following:

• Measured plan drawings (site plan, floor plan, elevations, sections, detailed construction techniques, framing, windows, door, roof and ornaments.

• Colour slide photography (structure, interior, surrounds, details)

• Large-format black & white photography (elevations, details, interiors [key areas])

• Photogrammetry (stereo-photography of elevations)
Analysis of materials recovered or observed during survey

Any cultural material encountered during a survey is normally left on site. It is recorded as to class (artefact, faunal remains, residential property, etc.), type (tool type, buildings style, etc.) and other attributes in the field and photographed where necessary or desirable. The description and analysis of the material assemblage allows us to understand the type of site encountered (habitation site, quarry site etc.) as well as to reconstruct some of the activities which may have occurred within the site.

Comparison with other sites

The site needs to be compared with other sites of the same kind or other kind in the immediate or wider geographical area. The comparison should take into account site type, site location (in relation to physio-geographical features, such as confluence of creeks), the artefactual material excavated or recorded on the surface, the species composition of the faunal assemblage and the like.

Documentation of single sites/buildings

The process of documentation comprises a series of steps:

- Identification of purpose and extent of documentation
- Collection of historical information
- Conduct of (re-)survey
- Description of physical evidence of extant resource
- Photographic and pictorial documentation
- Production of report

Before embarking on a documentation exercise, it is wise to identify the purpose and extent of documentation. An answer to the following questions helps you to determine the level of documentation possible and/or appropriate:

1. Why is this particular resource to be documented and what shall the documentation achieve? Is it
   - purely for the Archival Record?
   - Historical Overview of a Precinct?
   - Condition Report/ Conservation Needs Assessment?
   - Documentation prior to Alterations?
   - Documentation prior to Destruction?
   - Comparative Study of Architecture?
   - Other Research?

2. What amount of funds in terms of staff time, travel, supplies (film etc.) and equipment can be expended?

3. Who is available to do the documentation?

4. Is (are) the person(s) qualified (necessary background, training and skills)?

Assessment of the State of Decay

However well managed cultural resources may be, they will always be subject to decay due to environmental conditions, direct or indirect actions by people, or inherent failures of the material(s). Thus, if we value the physical evidence of Micronesia’s past then steps need to be undertaken to avert or at least mitigate this decay.

The subject area of physical conservation is extremely specialized, and with increasing technology and methodology will continue to become even more so in the future. This is normally the domain of conservation architects, material scientists, engineers, conservators and the like. However, in order to be in a position to responsibly manage the resources, you will need to have a good grasp on the principles and general methods so that you can employ and deploy these specialists with maximum impact.

The conservation of the physical evidence of cultural and historical resources is needed to avert their gradual or sudden decay. However, since cultural and historical resources are scarce, finite and un renewable the very act of conservation may in fact be detrimental to their well-being and imperil the chances of their survival. History is full of examples where well intentioned acts of preservation and conservation, at the time executed with the best technology available, have gone awry and in fact increased decay or introduced new dangers to the physical fabric of the resource. Treatments should be reversible. Treatments that are not reversible should not be used except as a last resort to replacement.

Thus very careful planning and execution of conservation measures is of utmost importance. The process of conservation planning is a central strategy in the conservation of cultural resources. Central to a conservation policy is the assessment of the
resource and its fabric(s) and the statement of signifi-
cance.

What is decay?

Environmental decay is the process of transforming
materials from a complex state into one or more
components of a simpler state. In the United States
we distinguish between the deterioration of inor-
ganic materials, and the decay or decomposition of
organic materials. Even though in common usage
these terms are used interchangeably, we need to
separate them in their usage for this subject.

All materials can be divided into two groups, or-

ganic, i.e. made from living organisms, and inor-
ganic, i.e. made from non-living materials, and
within each group into natural and processed. The
following table provides some overview.

| Material making up cultural resources (constituent mate-
rials) | Natural | Processed |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Inorganic</td>
<td>stone, sand, clay, soil, metal ore</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ceramics, bricks, terracotta, glass, metals, paint, stucco, concrete, mortar</td>
<td></td>
</tr>
<tr>
<td>Organic</td>
<td>wood, bone, ivory, shell, skin, fur, bark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>timber, furniture, paper, textiles, lime</td>
<td></td>
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</tbody>
</table>

The decay of materials is caused by natural agents, i.e. physical, chemical or biological processes, or by
direct or indirect actions of people. These agents act on the structural weaknesses of materials,
some of which are natural and other of which are
the result of the manufacturing processes involved
in the creation of the material.

Decay Processes

There are three main processes responsible for the
natural breakdown and deterioration of materials.
Usually these act together, and not isolated from
each other:

- Physical processes — mechanical stresses are set up in
the fabric of the material, causing structural
weaknesses such as cracking, warping, fracturing,
abrating, splitting. Water, heat and wind are na-


- Natural agents

Natural agents which contribute to the physical
deterioration of materials can include natural dis-
\textit{ners} such as hurricane and typhoons, floods,
fires, earthquakes and volcanic eruptions. These
processes tend to be spectacularly and immedi-
ately destructive of cultural resources. The major
natural agent responsible for the deterioration of
cultural property is climate. Climate includes such
factors as moisture, temperature, wind and sun-
light.

- Moisture is the most damaging element of the cli-
\textit{mate. Feilden (1979:11) states that it is damaging
for two reasons:}}
The major processes of deterioration and decay.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Physical</th>
<th>Biological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gases</td>
<td>Radiant energy</td>
<td>Vegetation</td>
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<tr>
<td>Oxygen</td>
<td>Sunlight</td>
<td>Algae</td>
</tr>
<tr>
<td>Ozone</td>
<td>Ultraviolet</td>
<td>Bacteria</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>Infrared</td>
<td>Fungi</td>
</tr>
<tr>
<td>Sulfur dioxide</td>
<td>Temperatures</td>
<td>Lichens</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>Heat (high)</td>
<td>Plant roots</td>
</tr>
<tr>
<td>Salts (airborne or in solution)</td>
<td>Fire</td>
<td>Invertebrates</td>
</tr>
<tr>
<td>crystallisation</td>
<td>Cold (frost)</td>
<td>Earthworms</td>
</tr>
<tr>
<td>electrolysis</td>
<td>Cycles of heat and cold</td>
<td></td>
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<tr>
<td>Water</td>
<td>Thermal expansion</td>
<td>Insects</td>
</tr>
<tr>
<td>Ground water</td>
<td>Impact</td>
<td>Ants</td>
</tr>
<tr>
<td>Rain</td>
<td>Falling branches etc.</td>
<td>Moths</td>
</tr>
<tr>
<td>Humidity</td>
<td>Collapsing components</td>
<td>Silverfish</td>
</tr>
<tr>
<td>Solvents</td>
<td>Abrasives</td>
<td>Termites</td>
</tr>
<tr>
<td>Acids, alkalis</td>
<td>Dirt, soil particles</td>
<td>Wood beetles</td>
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<tr>
<td>Cleaning solutions</td>
<td>Airborne dust and smoke</td>
<td>Mud wasps</td>
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<td>Organic solvents</td>
<td>Water</td>
<td>Mammals</td>
</tr>
<tr>
<td>Liquid Vapor</td>
<td>Wind-moved vegetation</td>
<td>Rodents</td>
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<tr>
<td>Solvents (natural)</td>
<td>Animals (rubbing )</td>
<td>Rabbits</td>
</tr>
<tr>
<td>Acids</td>
<td>Moisture absorption</td>
<td>Wombats</td>
</tr>
<tr>
<td>Alkalis</td>
<td>Shrinking/swelling</td>
<td>Birds</td>
</tr>
<tr>
<td>Decomposing leaf matter</td>
<td>Matter in motion</td>
<td>Hard-hoofed animals</td>
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<tr>
<td></td>
<td>Mechanical stress</td>
<td>People</td>
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<td></td>
<td>Wave action</td>
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<td></td>
<td>Mechanical vibrations</td>
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<td></td>
<td>Inherent stresses</td>
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</table>


1. Each component material is best suited to a specific and often limited range of relative humidity and temperature. This is especially, and critically, true of materials which are hygroscopic, that is, which absorb and lose moisture relative to immediate environmental conditions. Such materials can be imagined as functioning somewhat like a sponge, contracting and expanding in response to their water content. This process provokes mechanical stresses manifested as warping, cracking, splitting and fracturing, and which would result in the detachment or powdering of a painted surface.

2. In most cases, chemical reactions which damage cultural property depend upon the presence of water.”

In addition, it needs to be appreciated that many cultural resources are comprised of various materials which may have different hygroscopic indices. For example, hygroscopic swelling and shrinking is a common phenomenon of all clay-derived products, such as pottery and bricks. Their hygroscopic
indices, depending on the temperature at which the bricks were fired, differ from that of the mortar and any wooden components, such as window frames, beams etc. used in a building. Thus the materials swell or shrink at different rates, leading to increased decay of the structure.

Rain will erode and weather cultural materials both physically and chemically. Frost, which enters porous materials as rain, upon freezing expands and can set up a freeze-thaw cycle of mechanical stresses. Likewise, moisture in wood can expand in the sun and cause paint to blister.

Condensation can provoke chemical reactions and provide suitable micro-environments for the growth of micro-organisms. Capillary action is a process where water rises through porous materials. Soluble salts from the ground water and soluble compounds from the material are carried with the rising water to the surface, adjacent to the external atmosphere. At the surface the water evaporates and the salts re-crystallize in the pore spaces. Crystallized salts occupy a greater space than water and can set up great mechanical stress including internal rupturing or spalling of the surface.

Chloridation is a process which occurs near the sea or ocean. Sodium chloride, suspended in the air by wave action (esp. breakers), is deposited on the surface of materials by moist winds. The hygroscopic qualities of many component materials allow the airborne salts to become embedded in the matrix of the material, which, when they re-crystallize have a destructive effect similar to that described for capillary action.

Relative humidity and temperature are important factors in the growth of microorganisms, such as bacteria, mould and fungi, all of which attack organic cultural materials. Very high temperatures combined with a large diurnal range can cause thermal stress in building materials, based on the grade of expansion and contraction. As many cultural resources are made of different component materials, differential contraction or expansion leads to increased mechanical stresses, which may lead to material failure. Mortar joints separating between the mortar and the brick or masonry surface are a common example, which then allows further entry of moisture by capillary action.

Light can activate deterioration causing fading and aging in a variety of materials, breaking down compounds into base materials. Ultraviolet light, for example, is particularly destructive on bone when combined with the actions of moisture (shrinking-swelling) and temperature variations (expansion-contraction). Accidentally exposed parts of burial will disintegrate in a few weeks time.

Wind erosion is a form of physical weathering where wind-blown particles of grit, soil or sand abrade the surfaces of buildings and sites. In desert environments, where sand and soil particle movements are common, many prehistoric artefacts have been thus “sand blasted” resulting in a polish-like sheen (desert polish) on their surface.

Biological agents

These range from animals ingesting and digesting matter to animals and people destroying matter by impact, undermining or destruction. The majority of the biological agents attack organic matter by ingesting and digesting it: ants, moths, silverfish, termites and wood beetles destroy wood and wood products, such as paper, as well as textiles made from animal skin/hair or plant fibres. Algae, bacteria, fungi, and lichens do the same.

Other insects, such as mud wasps aid the deterioration of sites, especially rock art, by depositing on silt thus staining the rock surface and—potentially—the rock art. Rabbits and other ground dwelling animals, including land crabs digging burrows may destroy archaeological subsurface sites.

Hard-hoofed introduced animals, such as sheep and cattle, can destroy the plant cover of an area, making it prone to various types of soil erosion. Further, cattle use rock shelters for shade and shelter, rubbing the rock art in the process.

The effects of plants on cultural resources is varied, depending on the vegetation zone and type of cultural resources present. Table 5.3. summarizes some impact in a tropical environment exemplifying the varied nature of potential problems.

Human agents

The destruction induced by humans can be both intentional and unintentional. Feilden (1979:15-16) suggests that there are four main causes of intentional destruction: economic gain, ideology, changes in taste, and vandalism. Unintentional actions include wars, neglect, poor quality of work and manufacturing techniques, faulty conservation treatments, incompetence, tourism and modern industrial processes. In this last category we can all see the effect of pollution on cultural materials in
our own environments. Fossil fuels cover places with a black, sooty grime and, when they are burned, emit sulphur dioxide, which turns into acid rain.

**Weaknesses inherent in the materials**

All processed materials potentially have inherent weaknesses. For example the tensile strength of a wooden beam cut against the grain is less than that cut parallel to it, and both are less than the strength inherent in an unmodified tree trunk.

A good example for the inherent weaknesses in materials are metals. With the exception of gold, metals do not occur in their pure form in nature. They may occur as compounds, but more commonly in the form of oxides, called ore. The smelting and production process creates pure metals or metal alloys, which are chemically unstable. Over time, and provided they are exposed to oxygen and an electrolyte (such as humidity and watersoluble salts), they oxidize again (*corrode*) and return once more to a stable state. This corrosion, however, is a process of deterioration, which we try to halt or retard by applying conservation measures. The more processed the metals are, the more prone they are to corrosion, especially so, if the manufacturing process adds further inherent stresses. Compare for example the occurrence and degree of corrosion on cast iron (low) with that on steel (high) and on welding joints (very high).

Feilden (1987:33) in his book *Between two earthquakes* argues that conservation or repair needs assessments for structures should be standardized in their reporting:

"From the administrative point of view, it is important that the work needed should be classified under standardized headings as follows: immediate—to prevent danger to persons; urgent—to avoid rapid decay necessary—to preserve the building fabric in at least a wind- and water-tight condition; desirable—to rehabilitate or improve including anti-seismic diagnosis; under observation—to gain more information to make correct diagnosis."

This reporting structure has general applicability.

**Condition Report**

A condition report describes the present condition of a site or object and its constituent materials. The report addresses the overall condition of a site or object in terms of presentation. Each of the components of the site or object is addressed separately and in turn, summarizing the constituent materials of the fabric, the appearance of the component and state and magnitude of deterioration (if any) of the individual constituent materials. Where feasible, the causes for the decay of the fabric are identified.

**Conservation Needs Assessment**

Based on the condition report an assessment of the conservation needs can be established. This assessment should address all of the deterioration processes identified above and determine whether corrective and interventional action is required.

**Threat Assessment**

Based on the condition report an assessment an assessment of the threats to the resource is prepared. This assessment takes into account threats deriving from environmental decay and deterioration, natural disasters, and interference by people (visitors, developmental pressures).

**Contextual Component**

The contextual component covers the background of the cultural resource(s) under consideration. A systematic research into the history of the resource from its inception or manufacture to the present day is required to provide an assessment of the site’s or object’s use over time. In addition, the research should include the gathering of information on the social, economical, and political or, where relevant, the technological situation which led to the creation of the site or object. Finally, the research needs to cover comparable sites or objects in order to assess the relative standing of the resource under discussion. This research should entail the consultation of published as well as archival records, and the conduct of oral history research.

**Historic Context**

Based on the above mentioned background research it is possible to draw up a concise statement which summarizes the background, or context, of the resource under discussion. It outlines the conditions which led to its creation, refers to the resource relative standing compared to other resources of the same kind, and to other resources in the same locality. The history of the resource is narrated comparing it to the historical background during its period of use.
On one end decisions have to be made determining which sites and places should be protected, and which should be allowed to be destroyed, if such destruction is inevitable. On the other end mechanisms need to be developed and implemented, which protect that part of the heritage selected for extended conservation.

**Values and Value Judgments**

Evaluation is the process of determining whether identified properties meet defined criteria of historical, architectural, archaeological, or cultural significance. The evaluation of the cultural significance of a cultural resource is the pivotal action which determines the future management of the resource. Therefore, it is very important to understand the various concepts of values attached to resources and the means of determining cultural significance. When a resource looses its integrity, its looses its ability to convey those characteristics from which it is significant.

**Places of value, values for places**

Above we have seen that cultural resources are valuable. Various nations, states within such nations and historic preservation organizations, use a multitude of value judgments to evaluate the significance of a cultural resource. Let us look at these significance values and compare them in their meanings. The list of examples given below shows significance values are frequently mentioned:

- Heritage Value
- Historic Value
- Cultural Value
- Public Value
- Social Value
- Scientific Value
- Archaeological Value
- Research Value

It is obvious that many of the terms overlap in their meaning. Thus these values can be grouped into five major categories:

- Scientific Value
- Historic Value
- Aesthetic Value
- Social Value
- Economic Value

**The Statement of Significance**

While it would be ideal to preserve vestiges of the past in place and unchanged, we obviously cannot hope to conserve all evidence of past life in the Pacific Islands. Effective cultural resource management is about making informed decisions which fulfill the overall aims and philosophy of conservation. Cultural resource management has two major aims:

1. Long term preservation of a balanced sample of historic places, through legal protection and physical conservation.
2. Short term management practices which minimize the necessity for destruction of such sites, and the opportunities of mitigating the effects of destruction of sites or their components, where this occurs.
**Scientific Value**

Scientific value is a common concept of cultural and natural heritage preservation agencies throughout the world. It is argued that because archaeological and historical sites have the potential to answer scientific questions of the present or the future, these sites need to be protected, often from the actions of those people whose ancestors created the sites in the first place. Other terms used to express the same or a similar concept are research value, archaeological value and archival value.

**Historic Value**

Historic value is commonly used when a place has connections to an historic event, a historic person or a group of people, and if that place can be used to illustrate, document or interpret that event or that person or group of people.

**Aesthetic Value**

Aesthetic value is mainly used in the protection of the natural heritage, but sometimes can be used to ascribe a value to a particular building, rock art or cultural landscape. Since beauty and aesthetics are solely in the eye of the beholder, aesthetic value is very much determined by the cultural background of the person conducting the evaluation.

**Social Value**

Social value encompasses the collective attachment to places which embody meanings important to the community as a whole, or to substantial parts of that community. Such places are commonly community owned or publicly accessible, or in some other way included in people’s daily lives. Social value may not be obvious in the fabric of a place, and may not be apparent to the disinterested, or non-initiated observer.

**Economic Value**

Economic value is nowhere considered to be an official criterion for any of the decisions on the preservation of heritage. However, commonly this criterion has been used by the general public to assess the significance of a site in a direct or an indirect manner.

**Establishing Context**

Even though we ascribe values to the resources, it should be clear that almost all of these values derive from parameters which are not inherent in the physical structure of the resource. Thus the fabric of a site does not ascribe any social value to it. This is done by people interacting with the resource. Likewise, the fabric of a resource does not inherently make it valuable for scientific enquiry. This value is ascribed to the resource by the research questions asked by the academic community. Thus, the value of a resource is derived from its context.

Establishing context is a major phase in the management of cultural or historical resources. Often this phase is dealt with hastily or inattentively, ultimately to the detriment of the resulting management action.

Because cultural and historic resources cannot be seen as entities divorced from the historical or social environment they come from, we need to ascertain the context of a cultural or historical resource to assess their significance.

Commonly, the following three types of context for sites are identified

- Historical context
- Social context; and
- Environmental context

In addition, many resources need to be seen in their

- Typological Context; and
- Topological Context.

Let us look at an example. Imagine you are handed a metal ring. Unless specified by context or analogy, that ring will remain meaningless to you beyond the descriptive parameters of raw material, size, weight and manufacturing technique. The context for the ring solely provides for its cultural significance. The context can be chronological/historical (the ring stems from a Bronze Age site), topological (it was found in a grave), typological (it formed part of the bridle for a horse), social (the other grave goods suggest that the buried person was a high ranking person, probably a chieftain), or environmental (the burial was found on what had once been an island in a lake). Without access to the entirety of the context the ring remains meaningless or at best skewed in its interpretation.
Figure 3. The focal role of the cultural significance assessment in the cultural resource management process (after Spennemann 1993)
**Determination of Significance**

The determination of significance relies on a set of stated criteria. Various state and national agencies have developed a set of criteria for the evaluation of sites for the inclusion in the various National Registers of sites. In total eight criteria have been developed.

Integrity is the principle of wholeness or completeness of material or fabric and historic character. Each time there is a loss of material or fabric for whatever reason (natural or human) or a loss of historic character, the resource is said to have lost part of its integrity.

The significance of a structure, site, or object must be evaluated within its context. This is extremely useful when there are many identical or very similar resources that meet the criteria for significance. For example, there are thousands of temporary barrack buildings that were built during World War II and are still extant in good condition. Are all of them significant? The context for this type of structure will help determine which ones are more significant than others.

**Significant at which level?**

Further, there is the question of significance at various levels. While some sites may be considered to be of world heritage significance, other sites may be of local significance only. It is imperative that there are significance assessment mechanisms which allow a graded set of site evaluations. The following significance levels can easily be derived and understood:

- Significance at the International Level
- Significance at the Federal Level
- Significance at the State Level
- Significance at the Regional Level
- Significance at the Local Level

**Historical sites—unbiased sets of data?**

We need to pose the question on whether historic sites are unbiased sets of data.

Natural decay differentiates groups of sites into those sites and structures made from perishable materials (such as wooden buildings and those sites made from non-perishable materials (such as concrete). Among the sites made up of perishable materials, some traces remain, such as artefacts and bones/shells from food refuse. If the sites are located in areas which proved to be of prime settlement land in the time since European invasion, these sites may well have been destroyed. Therefore the currently surviving archaeological sites are not an unbiased set of data.

For the historical resources we have to ask the same question. In many of the world’s cultures, wealthy and/or powerful people were able to erect structures or more durable materials, such as stones, if stones were available. These structures survive. For European contexts the same holds true.

There is a natural decay-driven survival bias whereby well-built structures survive, which are usually those of the economically powerful who could afford them in the first place. Conversely, the less well built structures, those of the common people, do not survive that well and disappear. Thus the heritage of the less well endowed becomes less visible over time.

Any assessment of the significance of a site for registration must take into account this bias. There is a subconscious tendency among the historical architecture viewpoint and (as opposed to the archaeology viewpoint) of CRM to protect grand sites, which tend to be more three-dimensional than the “common” sites, which are, not surprisingly the sites of the common people,

The practitioners of CRM simply enhance the natural selection process further. While CRM needs to counterbalance this trend, and needs to consider less prestigious sources as well, another bias is introduced by doing so.

It needs to be realized that any such decision, any such bias is driven by the political, ideological, economic and social context of the person or persons writing the policy.

**The Concept of Representativeness**

Sullivan & Pearson (1989:59) argue:

“Positive management of sites must be selective. All sites cannot be physically conserved, researched, or interpreted. Even if it were sane or practical to conserve all cultural resources, the actual investment of time, intelligence, and funding required is simply not available. It is therefore necessary to select sites for active conservation...ideally, sites selected for active conservation measures will ... be significant as
outstanding examples, or a representative sample, of the particular cultural resource.”

Who determines whether the sites are outstanding and representative? The answer to this question reaches back to the issue of the ownership of the past touched upon earlier. But we will also have to look at the issue of outstanding sites and that of representativeness. Can cultural resources be representative?

The concept is clearly one taken from the architectural historical world, where architectural styles can be defined in retrospect, and where buildings can be seen as representative of that style, i.e. comprising of the main style-defining elements. Likewise, of the collective work of an architect, a number of buildings can be defined as representative of that person’s work.

However, the moment we leave the architectural area and move into the historical area, the definition of representativeness becomes more problematic. A number of buildings can be seen as representative of the boom period of Melbourne or San Francisco, can characterize the increase in wealth. But while these buildings can be outstanding examples of the lavishness of architectural ornamentation of the period, one has to ask, whether they are representative of the period as a whole, or only of a small part of that period, of a social class to be specific. To what extent would working class, inferior quality housing be just as representative of the period, documenting the living conditions of those people on whose labor the wealth was made possible. Representativeness, therefore, is a quality which very much depends on the ideological and conceptual framework of the assessor of the cultural resource.

As before when assessing aesthetic values, beauty (or representativeness) is in the eye of the beholder. While the development of significance thresholds and type profiles, as espoused by the Australian Heritage Commission (1990b), is one approach to generalize and de-individualize the process, the development of the threshold limits still reflects personal predilections.

The issue of representativeness is even more complex where the cultural background of the cultural resource is radically different from that of the assessor, or where we are dealing with prehistoric sites, where cultural change has taken place.

Sites versus ensembles

An issue worth noting is that in many cases the total may be greater than the sum of its parts. A set of places of lesser significance may become a very significant entity merely because of the uniqueness of the setting, or because the site complex is uniquely suitable to interpret a particular component of an island’s heritage.

Site ensembles, i.e. sites with contributing structures, as well as historic districts are important concepts to be considered when determining the significance of sites. In registers, as well as inventory systems, these sites need to be linked to afford them the level of protection they deserve.

SOCIETAL COMPONENT

Research of Community Opinion and Government Policy

Identification of stakeholders

The parties or segments of society who are interested in a particular cultural resource or class of resources are the stakeholders.

Consultation of all stakeholders and solicitation of stakeholders’ opinions

Public participation is extremely important. People are almost always against any proposal if they feel they have not been consulted. When asked, most people will not comment, but there must be an opportunity to comment or participate in the process. The stakeholders are those people or parties who are the most likely to comment and give relevant input or feedback. In addition to the stakeholders, the general public must also be given the opportunity to comment.

Formulation of a strategic issues document

A strategic issues document summarizes the issues of various stakeholder groups. For example, the resident of an historic area may be concerned that parking in the neighborhood may become more of a problem if the area is designated as an historic district because of the influx of tourist.
Stakeholder review of the strategic issues document
Once the stakeholders concerns are identified, the stakeholders should be given a chance to verify that their concerns are fairly and adequately stated.

Management document

Development of a management framework based on revised strategic issues document
The management framework addresses the stakeholders concerns. The stakeholders are then informed as to how their concerns will be accommodated. Responding to the parking concern mentioned above, the planner may respond with statistics that most tourist will visit the district by public transportation and/or that additional parking spaces will be constructed on the edge of the historic. The stakeholders would then be allowed to respond as to whether they believe that the response is adequate. If the stakeholders felt that this approach was not adequate, they could comment further.

Review Processes prior to final document
It is important to include a possibility for the stakeholders to review the proposed actions.

Public Consultation on Significance Statement
Given the pivotal role of the statement of significance it is crucial that statement be both concisely written and all inclusive of the values held by the stakeholders. Due to the individual background and interests of the author of such a statement, the statement may emphasize some values over others. Therefore it is important that the stakeholders have an opportunity to comment on the statement of significance.

Public Review of Conservation Policy
Like the statement of significance, the conservation policy drawn up needs to be commented upon by the stakeholders, as this policy will provide the conceptual framework from which all future management options, interventive and preventive, will flow.

Consultation after implementation
Ongoing regular consultation with stakeholders during implementation of conservation management plan

![Figure 4. Flowchart of process leading from a statement of significance to the formulation of a conservation management plan](image)

Making site-specific policy
Conservation treatments are steps undertaken by the managers of the cultural or historic resource to mitigate the effects of environmental decay. It is important to understand that almost all conservation treatments espoused can only delay the process of decay. Most materials will, eventually, break down, no matter what conservation is espoused.
This is even more true in such cases, where the cultural significance of the resource is vested in its location, and where all conservation measures need to be undertaken at the location.

Likewise all actions detrimental to the integrity and significance of the cultural resource need to be spelled out. The actions recommended or espoused should follow the Secretary of Interior Standards for the Treatment of Historic Properties (1992).

**Conservation Ethics**

Secretary of Interior Standards for the Treatment of Historic Properties (1992) recommends repairing and replacing historic materials only when necessary. This is in response to the principles of minimal intervention and compatibility. Any repairs or replacements must be visually and physically compatible with the resource. Only the deteriorated or damaged materials are replaced. New materials should match the old materials in composition, design, color, texture, and craftsmanship. In other words, the Standards recommend that replacement materials be “in kind.” Compatible substitute materials are only allowed when the original materials, such as certain sandstones which are no longer quarried, are not available. Whether the new material is “in kind” or a substitute material, the new materials should be marked and dated on the back to document that they are replacement pieces. The locations of replacement pieces should be documented also on drawings. Any treatment of historic materials must be reversible. The only exception to this policy is when the original material must be replaced, such as deteriorated stone. In that case, the stone could be consolidated with an
irreversible treatment to extend the useful life of the deteriorated historic material.

The Australia ICOMOS Burra Charter on the conservation of historic resources stipulates that “techniques employed should be traditional, but in some circumstances may be modern ones for which a firm scientific basis exists and which have been supported by a body of evidence” (emphasis ours). This is in response to the disastrous effects several early conservation actions had on some resources of World Heritage status, such as the introduction of iron clamps into the Acropolis in Athens, Greece, or the Borobudur on Java, Indonesia. The utilization of materials must be compatible with the fabric of the place or resource they are repairing.

The key points of the ethics of conservation are

- minimum intervention (or alteration)
- reversibility of treatment
- respect for the historic fabric
- documentation of actions taken

Minimum intervention, i.e. to do as little as possible, but as much as unavoidably necessary. Minimal intervention is the principle that the less change to a building, structure, object, or site, the better. Each time there is a change to a resource there is usually a decrease in the integrity of the resource.

Reversibility of treatment implies that whatever is done to a resource can be undone with little or no damage to the resource, thereby returning the resource or object to that state of preservation, that existed before the treatment(s) began. Non-reversible treatments should only be undertaken as a last resort. In the future, there may be available materials or preservation techniques which are not available today. If a non-reversible treatment is used today, it may preclude using a more compatible treatment in the future.

Respect for the historic fabric, i.e. not to replace an original fabric unless no other alternative exists to conserve the place of which the fabric forms part. Unfortunately, it is not uncommon that during a conservation process parts or components are replaced that need not be replaced. When restoring stained glass windows it often occurs that cracked panels are replaced and newly painted artwork is inserted. Likewise, when mitigating the decay of building timbers, often only part such as the column base) of a timber column needs to be stabilized and replaced with modern timber, but in the process of the work the entire column is removed and replaced. The Secretary’s Standards clearly stipulate that the removal of parts of the resource, which contribute to the significance of the resource is unacceptable.

Documentation of actions taken. Documentation is the principle of recording a resource, a treatment, or a material for future generations. Whilst it is possible that you will be the first person to work on a resource, it is highly unlikely that you ever will be the last. When you work on a resource, it is very important that you know the complete history of the resource including all changes, repairs, replacements, alterations, etc. In view of the potential detrimental effect conservation measures may have on the resource, it is imperative that all future generations know exactly what you have done. Thus all conservation measures be documented carefully and in full, and that copies of this documentation be kept off-site at various locations (archives, relevant municipal libraries etc.) in case of a disaster affecting the site. Ideally, the moment conservation measures are contemplated for a resource, or part thereof, a conservation file is established, which includes all discussions, planning and documentation of measures undertaken or contemplated. This file forms the primary data resource if conservation problems reoccur, or if new problems develop. If the resource is ever destroyed, there will be a record not only that it existed but also of its appearance, size, and composition. From this information, a replica or reconstruction can be made in the future if future generations decide that this is desirable or necessary

Following from these ethical principles are the levels of increasing intervention, ranging from preservation to restoration and reconstruction. The preferable action is that of maintenance and preservation, usually stabilization.

Always remember that maintenance is generally better than restoration, and restoration is preferable to reconstruction. Likewise, reversible treatments are preferable to non-reversible ones, and non-reversible treatments are preferable to replacement of the affected part. Further, the replacement of the affected part of a column or the like, is preferable to the replacement of the entire column.

It needs to be remembered that none of the stabilization and conservation measures undertaken mitigating the effects of decay can be successful, if the work only addresses the symptoms and does not eradicate or at the very least substantially mitigates the underlying cause of the decay. Thus,
repainting a brick wall affected by rising damp without eradicating the cause of the moisture intrusion into the masonry would be pointless. Unfortunately treatment of the symptoms rather than the causes is only too often the case if no detailed conservation analysis has been carried out and a comprehensive management plan is lacking.

In addition, the conservation programme undertaken will remain a complete waste of money and time if the successful conservation effort is not followed up by a schedule of monitoring and ongoing mitigating maintenance. This schedule, which needs to be rigorously adhered to, is the only safeguard to prevent that, or another, conservation problem from (once more) becoming a serious issue.

**MANAGEMENT ACTIONS**

**Active versus passive management strategies**

Management can be defined as that set of processes developed to look after cultural places or sites so as to retain their cultural significance. This concept of retaining and maintaining cultural significance is central to the whole process of cultural resource management. Management practices should be dependent upon the assessment of the cultural value or significance of a place and should be developed with the aim of retaining cultural significance. In order to manage cultural resources, a variety of strategies can be espoused ranging from passive to active, with various shades of combinations. In the broadest terms there are three basic management options or strategies available to the manager: Passive management, active management and controlled destruction of a resource.

**Passive Management**

Passive Management involves no interference in the physical fabric of a place - this strategy should include regular monitoring to determine whether a more active strategy is required.

**Active Management**

Active Management may involve a low-level of interference with the physical fabric of a place, such as routine maintenance, or it may involve a range of conservation strategies, including preservation, restoration, and reconstruction.

**Destruction**

Whilst controlled destruction is the most drastic and final option available to the manager, and one that is often difficult to reconcile within a conservation ethic, it is nevertheless, an all too familiar element of management decisions and problems.

There are various degrees of destruction. The rehabilitation or adaptive reuse of a structure allows some change to the material to accommodate the continued use or new use while reserving the most significant spaces and features.

Active management also implies the ability to foresee future developments and to predict a variety of threats to the cultural resources, in order to be able to divert or at least mitigate these threats when they occur.

**Conservation Management Plan**

There are various degrees of destruction. The rehabilitation or adaptive reuse of a structure allows some change to the materials to accommodate the continued use or a contemporary new use while preserving those materials and significant features, such as significant spaces.

**Execution of actions to remove or mitigate the underlying causes for the decay**

In a masonry wall with rising damp, the problem must be addressed before the building is preserved. If moisture is allowed to wick up into the building, deterioration of many materials will occur. The sources of all unwanted moisture into the building must be eliminated. This may include repairing or replacing the gutter and regrading the site so that rain water drains away from the building. A word of caution, regrading the site may disturb archeological remains. It may also include installing foundation drains or adding a vapor barrier to the foundation wall to prevent moisture from rising above a certain level.

If the roof is leaking, it makes no sense to repair the ceiling until after the roof has been repaired or replaced. The greatest degree of replacement is usually allowed for roofs because they protect the remainder of the resource. If the ceiling is repaired first, the new work plus more of the existing ceiling will be damaged the next time the roof leaks. If a very conservative approach is taken to repairing the roof, the useful life of the roofing materials
may be extended for a short period; but when they failure, other materials may be damaged.

**Execution of recommended physical intervention options**

Once all problems have been solved and the building has been allowed to dry out gradually, then other work can commence. The wooden doors and windows may swell because of excess moisture in the building and stick. Once the building has allowed to dry out, the sticking problem may solve itself. Instead, if the doors and windows are planed, they may be too loose once they dry out and shrink.

Destructive work, such as rewiring and installation of new plumbing, should be done before other repairs and restorations. It may make no sense to repair or restore decorative finishes, such as stencilling and wallpaper, before rewiring.

**Documentation of physical intervention carried out**

As mentioned before, all intervention should be documented. For new buildings, as-built drawings are done because new buildings are not always built exactly as designed. Likewise, there are usually more change orders on an existing building than a new building because once the work commences, more deterioration may be found. The documentation should record not only what was done, but also where, how, how much, with what, and why.

**Implementation of Maintenance Plan**

Once an investment has been made to preserve a structure, site, or object, it only make good sense to protect the investment. If buildings are well maintained, they seldom need to be repaired or restored. Deferred maintenance usually cost three times as much because of the additional damaged caused by the lack of good and timely maintenance. Good maintenance is like preventative medicine. It solves problems before they become serious problems.

Monitoring is an integral part of any good maintenance program. Monitoring will detect problems early on in the deterioration process and allow actions to be taken to reduce or eliminate future deterioration.

Should the monitoring show that elements of the building or site have deteriorated and need to be fully or partially replaced to ensure the survival of the building, this constitutes another conservation action under the Burra Charter and should only be undertaken after consultation with an architect and in accordance with a conservation plan. One consequence of undertaking repair without such guidance is that elements of the place which contribute to its overall significance may be removed or damaged.

Probably the best way to approach a maintenance and monitoring routine is to consult with a conservation architect who could draw up a programme of daily, weekly, monthly, etc. tasks. It is obvious too, that different sorts of places will require different routines. Historic houses, open on a regular basis to visitors, will require a more intensive and constant routine than sites isolated within national parks or other protected areas.

Stabilization of buildings is another step of interventive maintenance, depending on the environment your resource is located in. Many historical buildings in California, for example, are not likely to withstand a moderate earthquake, as the effects of the Loma Prieta Quake in 1989 has shown. A number of structures have since been modified by introducing strengthening measures (seismic retrofit). Even though these measures may impair part of the historic integrity of the resource they ultimately contribute to the survival of the resource in case of a natural disaster. Thus these stabilization measures are interventive maintenance.

Preventative maintenance can also reduce or remove potential sources of deterioration, such as trying to reduce traffic vibrations and air pollution through planning controls by re-routing heavy vehicular traffic along different roads, or the planting of trees as windbreaks to reduce the content of soluble salts in the air, thus reducing the impact of chloridation.

**Implementation of Site Monitoring Plan**

Basic monitoring of the state of preservation of a resource and subsequent interventive maintenance is an activity which must be carried out on a regular basis by site managers and their staff, because “…a policy of preventative maintenance and preservation work is less expensive in every way than hopeful neglect followed by extreme measures” (Felden 1982:217).

Monitoring is the most important component of effective site management and preventative maintenance of the cultural resources. The aim is to detect a potential problem before it becomes serious, and to take corrective action. Monitoring can entail
to regularly check a site after each torrential rain for the presence of leaks, after each storm event for the presence of dislodged roof elements, broken windows and the like. Further a systematic audit of the state of preservation of the resource should be conducted at regular annual or semi-annual intervals. Often, however, the decay is gradual and cannot be easily noted.

the effectiveness of different methods can be built up over time.

Site Management Plan
A site management plan sets out all those management strategies and actions required for the daily administration of a cultural resource. These strategies and actions do not represent any intervention in the physical fabric of the resource, but affect its utilization, and setting. It is important to note, that a site management plan is based on the statement of significance of a cultural resource, and that all actions proposed by the plan are derived from that statement.

Formulation of Site Management Policy
The site management policy sets out the policy framework which ensures that the various layers of significance preset in a site are safe guarded in the management process, and that no management actions are taken, which would detrimentally affect the significance.

A series of management actions are prescribed for execution, such as visitor control, land use modification and site use modification.

Visitor Control
Often visitors intentionally and unintentionally damage cultural resources. This may be vandalism, such as graffiti, or the mere number of visitors leading to increased erosion and the like. Visitor control entails the modification of visitor behavior by education, guidance and legal enforcement, re-routing of visitor routes, preventing visitors to touch or climb upon sites, limiting the number of visitors to access sites and so forth. Such management actions are likely to prolong the life of a cultural resource without interfering with its structural and physical integrity.

Land use modification
A number of land use practices are detrimental to cultural resources. This may range from the excessive use of sprinkler systems and overwatered lawns (leading to ring damp or sinking foundations) to inappropriate land clearing techniques (burning) and clearing of vegetation in general. The management options available are the prescription of specific techniques for vegetation clearing, the prohibition of the destruction of some vegetation and the active replanting of other plants.
The heavy traffic on a nearby road or parking lot may create many vibrations as well as an excessive amount of carbon dioxide emissions which may damage a resource. Altering the traffic flow would reduce or eliminate such factors.

Site use modification
Finally, the use of the site may be modified in order to safeguard its cultural significance.

PLAN REVIEW
Both conservation management plans and site management plans must not be seen as static documents, because the conditions under which these documents were conceptualized are not static either. Parameters defining the suitability and applicability of a plan will change. This may range from variations in funding to changes in the availability of skilled personnel and updated environmental compliance laws, which suddenly may prohibit or limit the use of a treatment system. Environmental conditions and visitor patterns may change, increasing or decreasing pressure on the resource. Some of the proposed management options may have appeared suitable at the time of plan development, but proved to be unworkable. A systematic plan review process allows for the modification of such aspects and the

WRITING CONSERVATION MANAGEMENT PLANS
If all the above mentioned steps and issues are taken into account, all that needs to be considered when writing a conservation management plan is a suitable structure.

A Suggested Structure for CMP’s
A conservation management plan should possess a clear structure which allows the reader to understand how the plan was arrived at, what the plan intends to do, what the goals are and which strategies are espoused to achieve these goals.

A structure should contain the following key components, roughly in the same order:
1. Introduction

2. Background
3. Existing conditions and trends
4. Issues, needs and opportunities
5. Goals and objectives
6. Implementation

Introduction
The introduction should set out the purpose of the plan, the target groups identified, the legal authority, its history and a schedule for plan modifications.

Background
The background section should set out the historical and geographical/environmental context in which the resources need to be seen, and against which they need to be assessed.

Existing Conditions and Trends
This third section is a “condition report” of both the resources and the historic preservation mechanisms in place to safeguard these resources from future deterioration.

Issues, needs and opportunities
This section sets out the issues deriving from the assessment of the existing conditions and trends, identifies which management and interventive needs there are, and what opportunities exist for further improvement of a resource or a group of resources in its context, as established in section 2.

Goals and objectives
This is a very brief sections which sets out the goals the actions proposed in the plan shall achieve. It addresses the needs and issues outlined earlier and selects those issue to be resolved as broad goals. A set of strategies is devised to meet these goals. For the ease of execution of actions and for financial planning it is advisable that a set of priorities be developed.

Implementation
The implementation sets out the individual actions required to carry out the goals set out before. This section should also contain information on how the success or failure of the implementation can be measured, and what actions shall be taken to mitigate any failure.
SOME FINAL THOUGHTS

In this background document we have stressed the importance of the three components of a conservation management plan, the physical, the conceptual and the societal. Since conservation management plans deal with physical intervention in the deterioration of the physical fabric of a site or object, it is easy to become carried away an only consider the physical components of the issue. The key to success is the support of the project/plan by all stakeholders. The second best option is that those stakeholders that do not agree with the project/plan at least accept its execution. This can only be achieved if not only adequate, but thorough consultation between the parties has occurred.

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REFERENCES


