University of Pretoria etd – Breedlove, G (2002)

CHAPTER FIVE: A METHOD TOWARDS THE SYSTEMATICS FOR CULTURAL LANDSCAPES.

5.1 Sub-problem Four - Can suitable methods be found or developed to display the characteristics of the cultural landscape?

The literature search addresses the various methods in which parameters are used to display spatial data with an aim to convenient access, maintenance, expansion and retrieval. In addition, methods of data capturing, evaluating, classification and storing are investigated to identify the most suitable options for cultural landscapes.

A parameter is defined in Webster[314] as 'a variable, a limit, a boundary, or a guideline.' It indicates a defined quality or quantity that changes within limits. In order to set a parameter for the cultural landscape, the qualities and quantities of the cultural landscape have to be defined. These must be identifiable or measurable but could encompass various types and amounts of information. Different terms[315] that have been used to describe this activity are:

a. Cultural mapping,
b. Indigenous knowledge mapping,
c. Indigenous cultural landscape mapping,
d. Knowledge mapping.

Hart[316] criticises the existing methods of knowledge mapping and proposes a model that does not set out to capture- from the outset- indigenous landscape knowledge of the country. He says that to follow this "old" system will merely reinvent the same "relic" approach consistent with archaeological and anthropological [analogue] studies of the past; that confined indigenous cultures to indigenous landscape knowledge as it is being applied to land. In contrast, he proposes a model that attempts to reconcile aspects of indigenous landscape knowledge mapping, which presently exist, with those that need to be developed.

Hart[317] suggests that any landscape knowledge map (database) should be an interactive, open system for dialogue that defines, organises and builds on the intuitive, structured and procedural landscape knowledge used to explore and solve problems. It should expose the

---

[314] Webster 1996
[315] Hart. 2001 p. 6.
[316] Hart. 2001
[317] Hart. 2000 p. 15

University of Pretoria etd – Breedlove, G (2002)

processes [not necessarily the sources] of landscape knowledge formulation that leads to proposed solutions. Landscape knowledge map should try to capture and make accessible to others the experience, methods, processes and judgements used by persons or groups about a given intent. It should be an active technique for making contextual landscape knowledge re-presentable, explicit and transferable to others. Of intrinsic importance, it should provide an opportunity to re-negotiate the past, and present the future through a process that is based on mutual understandings of landscape being born out of creative interaction.

Hart[318] theorises that indigenous land can be spoken "for", as opposed to land that is spoken "about". This theory may present an opportunity to activate and apply this system of knowledge in new and dynamic ways. However, the system requires participation on the part of individuals or communities to share their knowledge.

5.1.1 User Requirements to adequately describe and display data.

To develop an interactive spatial and non-spatial database and to adequately design the functions of it, it is necessary to understand the requirements of the systems and those of the users. A series of question regarding the database provides guidelines for commencing with the design of the system: [319]

a. Can it access and make new information available to novices and other non-computer trained people?
b. Can it access and make new information available over time?
c. Can it support interpretative methods needed to assist others in navigating the approach and process?
d. Can the interpretative methods be accessed when needed?
e. Is the system compatible with the level of landscape knowledge and context available?
f. Is the system organised, simple and easy to use?
g. Does the system fit well with landscape knowledge structures, methods procedures and representations needed?
h. Does the system document the approaches and explain the processes being used?
i. Does the system point to other sources of information?
j. Is the information easy to exchange and share with other users?
k. How does the system manage and cope with the growth and diversity of knowledge in ways that are complementary to how landscape knowledge plays an active role in the day to day lives of peoples?

---

[318] Hart. 2000 p. 15
[319] Questions are from several sources and rearranged into topics. Hart 2000 p. 14,

University of Pretoria etd – Breedlove, G (2002)

5.1.2 Database structure options

A variety of database structures have developed oven the past fifty years. Originally database structures were geared towards specific application driven procedures. The output and functions of the application would determine the database structure. More recently, the move is towards a unified database with an adaptable Database Management System (DBMS) that manipulates data into the required format. Further developments of databases include the move from a relational to an object-oriented approach, which creates data units that simulate the real world characteristics of an object rather than attempting to mould the object into a set of linked tables. Several database options are currently available.

a. The first option is a hierarchical data model, which, in essence, is a tree structure based on the parent and children approach. The weak point of this model is that redundant data occurs, and the efficiency of the system drops.

b. The second option is a network data model. This model is similar to the hierarchical model. The key difference is that child objects can link to more than one parent object. Network database flow diagrams look somewhat like a spider web, composed of nodes and links. The fact that the model is complex is its biggest limitation. In order to retrieve information from the data, the user/programmer has to know exactly the data structure of a database. This model is approaching true data independence, and has been widely and very successfully used.

c. The third option is the relational database model, which, unlike the previous two models, did not develop in an ad hoc organic fashion. The relational model is based on a set of two-dimensional (row and field) tables. Links between the tables is established by means of common columns (fields). As an example, a well-established software package, Microsoft Access 2000 complies with the rules of Codd[320] as listed below. Access 2000 is one of the most widely used Rational Database Management Systems (RDBMS) at present.

   Due to the simplistic yet versatile nature of the relational model, it is currently the dominant database structure used in industry. Most GIS software packages make explicit use of the relational model. Both spatial to temporal and temporal to temporal data connections are handled using the relational model. Limitations of the relational model are its lack of flexibility when simulating real world situations.

d. The fourth model, the object-oriented approach to database model design is currently under development. Database theorists are attempting to use a combination of the relational model and neural networks to create a database

[320] Date. 2000.

University of Pretoria etd – Breedlove, G (2002)

structure that has the ability to simulate real world situations, including those based on chance and other non-binary situations.

Industry standards presently favour relational databases and most future developments in databases appear to be related to the relational model in some way. In a discussion on the relational model, Date states[321] that Dr. Edgar Codd set about defining a set of rules in 1972 in order to provide a level of compliance as to what is and what is not a relational database. He says that a database management system is fully relational if a set of twelve rules were observed. The twelve rules stem from a single foundation rule, "Rule Zero", which can be stated as:[322]

For a system to qualify as a relational database management system, that system must use its relational facilities to manage the database.

Following is an explanation of Codd's twelve subsidiary rules.

a. The information rule.

The information rule simply requires all information in the database to be represented in one and only one way, namely by values in column positions within rows of tables. This requirement is referred to as 'the basic principle of the relational model.'

b. The guaranteed access rule.

This rule is a restatement of the fundamental requirement for primary keys. It says that every individual value in the database must be logically addressable by specifying the name of the containing table, the name of the containing column, and the primary key value of the containing row.

c. Systematic treatment of null values.

The DBMS is required to support a pre-presentation of 'missing information and inapplicable information' that is systematic, distinct from all regular values (distinct from zero or another number).

d. Active online catalogue based on the relational model.

The system is required to support an online, relational catalogue that is accessible to authorised users by means of their regular query language.

e. The comprehensive data sub-language rule.

The system must support at least one relational language that (a) has linear syntax, (b) can be used both interactively and within application programs, and (c) supports data definition operations, data manipulation operations, security integrity constraints, and transaction management operations (begin, commit, etc).

---

[321] Date. 2000

[322] Date. 2000

University of Pretoria etd – Breedlove, G (2002)

f. The view-updating rule.

All views that are theoretically updateable must be updateable by the system.

g. High-level insert, update, and delete.

The system must support set-at-a-time INSERT, UPDATE, and DELETE operators.

h. Physical data independence.

i. Logical data independence.

j. Integrity independence.

Integrity constraints must be specified separately from application programs and stored in the catalogue. It must be possible to change such constraints without unnecessarily affecting existing applications.

k. Distribution independence.

Existing applications should continue to operate successfully (a) when a distributed version of the DBMS is first introduced; (b) when existing distributed data is redistributed around the system.

l. The non-subversion rule.

If the system provides a low-level (record-at-a-time or 'by the back door') interface, then that interface cannot be used to subvert the system by (e.g.) bypassing a relational security or integrity constraint.

5.1.3 Mapping tools and methods

Before the options for mapping tools are explored it is appropriate to investigate a counter argument. Victor Hart from QUT suggests that heritage should not be documented, but should be recorded in an autochthonous manner. He argues conventional western ways of mapping is uncharacteristic of the indigenous ways. Hart says[323]:

> *In therefore attempting to truly* examine *Indigenous relations to* and *in between landscape, culture* and *power in* a *variety* of *historical* and *geographical settings, landscape architects and other professions must be aware that those who have* gone *before them have left indelible patterns and processes by which these can be recognised.*

Hart further recommends that[324]:

> *Indigenous landscape knowledge* map *should be an interactive, open system for dialogue that defines, organises and builds on the, intuitive, structured and procedural Indigenous landscape-knowledge used to explore and solve problems. It exposes the processes [not necessarily the sources)* of *indigenous landscape knowledge formulation that leads to proposed solutions. Indigenous landscape*

[323] Hart. 2001.
[324] Hart. 2001.

University of Pretoria etd – Breedlove, G (2002)

> *knowledge* map *is trying to capture and* makes *accessible to others the experience, methods, processes* and *judgements* used *by Indigenous* persons or *groups about* a given *intent. It is an active technique for making contextual Indigenous landscape knowledge representable, explicit and transferable to others.* Of *intrinsic importance, it provides an opportunity to re-negotiate the past, present and the future through* a *process that is based on mutual understandings on landscape-rights being* born out of *creative interaction. Not all interactions will be comfortable; not all interactions will be uncomfortable. Contestation is, after all, an ongoing creative process, not* a *fixed aesthetic outcome.*

This is a noteworthy argument since it places the onus on the people that map culture to move away from the traditional way of capturing data in space and time and towards a method that allows the continuous update and change of the data by the concerned individuals of groups. From this the question arises whether the intangibility of cultural resources can be spatially represented or whether the only way to carry forth the knowledge is orally and in pictures. Three options are currently available for mapping of displayable data. Three options are available for mapping of displayable data.

5.1.3.1 Hand Draughting

Hand-draughted maps on paper, or a transparent medium have been the traditional way of displaying information. Points, polygons, or lines representing a specific set of data can be coded which is linked to a map key indicating value, classification or another required characteristic.

5.1.3.2 Computer Aided Draughting (CAD)

CAD is an advanced way of displaying information or data. The points, polygons and lines are drawn with a computer program designed to display the data on the computer monitor, or a print file could be sent to a printer where the image is printed on paper or a medium of choice. Several programs exist that could accomplish similar tasks. Some programs such as AutoCad[325] have an option to assign an attribute to an object that is then displayed or could be listed in a table for printing. These functions are successful where standard building plans, landscape design plans, or other visual representations are being produced, but can not be used or manipulated for large data base management, or queries.

5.1.3.3 Geographic Information Systems.

Computerised information systems have the capability to store, analyse and manipulate

---

[325] Raker & Rice. 1985. p.231

University of Pretoria etd – Breedlove, G (2002)

large volumes of information, which in turn enable the users of the system to utilise such information in a cost effective manner for the purposes of planning and management, for own or shared benefit. The latest addition to information systems technology was the development of geographic information systems (GIS) which gained momentum during the late 1980s and which have today become a buzzword in the field of information processing.[326]

A computerised geographic information system, in layman's terms, is a management information system (MIS) similar to systems found and operated in a variety of institutions and organisations such as government departments, municipalities, banks and chain stores. However, there is one important difference: the added capability to store, analyse and manipulate information with geographic or spatial components in the same manner as the other descriptive information. GIS could therefore be described as a management information system with (geo) graphical or spatial capability.

The potential application field of geographic information systems is wide ranging and is not formally categorised, but application tendencies point towards three important application classes:

a. Cadastral and facilities management.

b. Natural resources management.

c. Socio-economic and demographic monitoring.

Geographic information systems[327] allows users to link non-spatial data (database tables and queries) to spatial entities such as computer aided drafted (CAD) entities. The power of geographic information systems lies in its ability to manipulate both spatial and non-spatial data. However, it means that most data represented on the system has a set of spatial attributes. Unlike statistics in tabular format, geographic information systems data usually have links to geographic space.

The components of geographic information systems vary depending on whether the computer aided drafting, database or integrated approach is taken. The background data storage of both spatial and non-spatial information varies form package to package. The front end toolbox comprises a set of commands that allow the user to input, label, edit and manipulate the four main components of a spatial data set, namely; points, lines, polygons and meshes.

[326] DEAT 2001

[327] Marble. 1990. p.7-8

University of Pretoria etd – Breedlove, G (2002)

The manuals for ArcView developed by Environmental Systems Research Institute, Inc. (ESRI)[328] document many of the different map projections that can be used to accurately represent real world features on a Cartesian plane. Spatial data can be stored in decimal degrees which means that it is not projected and users can choose a projection if so desired. Until recently, the curvature of the earth was modelled according to the Clark 1880 Datum; however, the South African Surveyor General has adopted the more accurate WGS84 Datum in January 2000. The central meridian (line of highest accuracy) is taken as the Greenwich (or zero) Meridian.

Spatial data modelling refers to the various ways that a geographic information system can capture and store information. In essence, the two major categories of spatial data are raster and vector based data models. ArcView[329] is primarily vector-based, with points, lines and polygons being used to make up all the feature entities in the geographic database. Raster based systems allow for a far higher level of spatial analysis, with each grid cell being able to respond to the values of its neighbours. Vector based systems are a lot more compact, and allow for a far higher level of spatial boundary definition. Vector based systems however do not handle detailed map areas with constant, often gradual, changes in value effectively. Temporal data modelling refers to methods that are employed to simulate the passage of time in a GIS. This model is used where the function of tracking change over time is required. Without this requirement, a backup procedure will allow the temporal progression of the system to be accurately documented.

As in the case of non-geographic management information systems, a geographic information system is an operating tool for providing information to decision-makers in an enhanced, effective manner for the purpose of planning, operation and management.

a. Using geographic information systems.

The display method must utilise the appropriate system to display the documentation methods, the evaluation methods and criteria, the classification criteria and the cultural character as spatial data with an aim to convenient access, maintenance, expansion and retrieval. In addition, appropriate methods, as identified in the literature search, to capture data, evaluate data, classify the data and to store the data must be implemented.

i. Hardware

Hardware includes the computers and network systems on which the geographic information system software is operated such as mainframe

[328] ESRI 1996. p.149-159

[329] ESRI 1996. p.149-159.

University of Pretoria etd – Breedlove, G (2002)

computers, mini- and micro computer workstations as well as peripheral equipment such as digitising tables, scanning equipment, plotters, printers and video equipment. The decreasing cost and increasing power of mini- and microcomputer platforms render them extremely useful for high-intensity processing of large volumes of information.

ii. Software

Software includes geographic information system core software which includes the graphical (point, polygon or line) and alphanumerical databases, as well as a host of supplementary software such as image processors, statistical analysis software, spreadsheets, data conversion programs, text editors, computer aided draughting (CAD) software word processing and customised application software. Market development has also seen a substantial decrease in cost of geographic information system application software, and more importantly, the development of low-cost user-friendly geographic information system viewing software which can be used by decision makers, negating the requirement for high levels of computer literacy.

The required hardware, software, expertise and management depend on the goals and objectives set by users, the intensity of use and the internal or external implementation of geographic information system. It may vary in organisations from the very basic to the most comprehensive combination thereof.

b. An example of using a Geographic Information System to map cultural heritage.

Faced with a charge to create a heritage database, the National Historic Preservation Act (NHPA)[330] of the United States of America laid the foundations of historic preservation by creating a national repository of historic sites and buildings: the National Register of Historic Places [NHPA Title 1(Sec. 101)(a)(1)(A)]. In addition, the NHPA established a network of State Historic Preservation Offices to locate, catalogue, monitor, and maintain historic places [NHPA Title 1(Sec. 101)(b)]; and instituted a nation wide inventory of historic sites and buildings [NHPA Title 1 (Sec.101)(b) (3)], among other mandated functions. The Historic Preservation Fund, a program of matching grants administered by the Secretary of the Interior, supports the State Historic Preservation Office (SHPO) activities, specifically the survey and inventory of historic places.

[330] USA National Park Service. 2001

University of Pretoria etd – Breedlove, G (2002)

The Cultural Resource Mapping division of the National Parks Service proposed to record the five (5) million historic properties and all five hundred thousand (500,000) survey data points into a computer database and in a Geographic Information System.

The beneficiaries of this automation would include

i. State Historic Preservation Offices (SHPO),
ii. Federal land managing agencies, including the National Park Service (NPS), Bureau of Land Management (BLM), and the Forest Service (USFS),
iii. Permitting and project sponsored agencies such as the Natural Resources Conservation Service (NRCS) and
iv. Department of Transportation.

The motivation address for the system states that these agencies rely daily on State Historic Preservation Office[331] inventories. With an automated inventory the amount of time and money needed to conduct searches will be cut dramatically. The promise of standardised data exchanges offers many Federal agencies the opportunity to develop co-ordinated and consistent approaches in their cultural resource management program. The public will gain quicker and greater access to the data on the inventory. Researchers will be able to take advantage of the information on the inventory to enhance their research projects. The cumulative result will be a growing constituency and appreciation for historic preservation, and better preservation of the USA national heritage.

5.1.3.4 Existing South African databases

Several databases exist in South Africa that are used to record data of cultural, archaeological or historical nature.

a. South African Heritage Resources Agency

The National Monuments Council (NMC), predecessor to the South African Heritage Resources Agency (SAHRA) was a statutory organisation established under the National Monuments Act, responsible for the protection of the cultural heritage of South Africa until April 2000 when the SAHRA replaced the National Monuments Council. The register was a national list of sites considered conservation-worthy in terms of the criteria set out in the National Monuments Act

[331] Lynch & Gimblett. 1992. pp.453-471

University of Pretoria etd – Breedlove, G (2002)

The National Monuments Act (Act 28 of 1969)[332.] empowered the National Monuments Council to:

> *compile and maintain a register of immovable property which it regards as worthy of conservation on the ground of its historical, cultural or aesthetic interest and to supplement, amend or delete any entry in the register from time to time by notice in the (Government) Gazette.*

Entry of a site in the register is, therefore, a statement about the importance of the site; it has been recognised as part of South Africa's biophysical or cultural heritage. The register was kept by the National Monuments Council and could be consulted by members of the public and authorities at any of the National Monuments Council regional offices. These functions were transferred to the South African Resources Agency. In terms of section 3(1) of the Act, the national estate is comprised of heritage resources that are culturally significant or of other special value. The South African Heritage Resources Agency is in the process of developing the criteria for the purpose of the assessment of the significance/value of heritage resources and with a view to their grading, as contemplated in section 7 of the Act.

Survey forms such as the Archaeological Data Resource Centre standard site documentation form or the site survey form of SAHRA were used to record information of a site, but are no longer in use. (Appendix Four)

b. The Department of Public Works

The Department of Public Works use their own system to record data related to their buildings and property. The Cultural History Museum - Open Window in Pretoria use their own database system referred to as the Archaeological Data Resource Centre (ADRC) to record their data. The Transvaal Museum, the National Museum in Cape Town and most other smaller museums use the Dewey Decimal library classification system to record and keep their data. So it is that each metro council, museum, or provincial department keeps their records and use their tested methods to keep their data bases and records.

c. South African National Parks

The South African National Parks have developed a form to grade the significance of the artefacts and sites during the preparation for the Augrabies Falls National Park cultural resources inventory.[333] (Appendix Three)

---

[332] http://www.nationalmonuments.co.za/f2.htm 6/24/01 9:32 PM
[333] South African National Parks. 2001.

University of Pretoria etd – Breedlove, G (2002)

d. **Department of Environmental Affairs and Tourism**

The Department of Environmental Affairs and Tourism has developed a database that has captured on national, provincial and local scale some aspects of the history and culture of South Africa. The product is called Environmental Potential Atlas (ENPAT)[334] and it is updated yearly with new information that becomes available. This platform is based on the relational model of database management and thus suitable for cultural heritage data capturing and display.

5.1.3.5 Conclusion to Sub-problem Four literature search

The literature firstly demonstrates that there are methods to determine whether an information management system is designed to suit the requirements of the users for which it is intended. Secondly, it is clear that database structures can be defined and databases can be designed to meet the requirements of the data manipulation. These in short can be presented as:

a. Method of identification
b. Method of the documentation
c. Method of evaluation or assessment
d. Method of classification
e. Method of archiving
f. Method of publishing
g. Method of management to include monitoring and maintenance.

Thirdly the literature shows that international success has clearly illustrated the power and usefulness of geographic information system and spatial modelling techniques, in conjunction with public input, to model and, to capture public perceptions. To understand the relevance of the geographic information system to the systematics of cultural landscape the qualities of geographic information system is investigated.

a. Which different types of database structures are available?
b. Which database structures compatible with the GIS and Database Management System (DBMS) software are in use at present and in the near future?
c. Can the system support interaction and shared dialogue?
d. Can user interactivity vary the assumptions of approaches and test for implications?
e. Do they allow for multiple levels of complexity to be described?
f. What are the requirements of the database in order to implement the desired

[334] DEAT/ENPAT 2001

University of Pretoria etd – Breedlove, G (2002)

system?

It is recommended that a vector based data model without a temporal feature seems to be best suited for the display the cadastral nature of the heritage-related information and cultural landscapes.

5.2 Addressing Hypothesis Four - Suitable discrete methods can be found to systematise cultural landscape characteristics.

In addressing the hypothesis four, a systematics that could be recommended and tested in South Africa under the National Heritage Resources Act as well as against the systematics as identified in the literature is derived from a comparison and a compilation of the specific processes that are required under the South African system as well as those required in the international institutes. Processes from two international countries, the United States of America and Australia, are extracted and recompiled because these have been found to be the most comprehensive in addressing the systematics for cultural heritage or cultural landscapes. The result is a distinctive systematics that complies with the South African statutory requirements, and that meets the requirements of an effective systematics.

5.2.1 National Heritage Resources Act. - System Requirements.

In Chapter 1 Part 1 Section 5(7) of the National Heritage Resources Act (NHRA)[335] the requirements for cultural heritage assessment are clearly identified. These are:

(7) 'The identification, assessment and management of the heritage resources of South Africa must-

(a) take account of all relevant cultural values and indigenous knowledge systems;

(b) take account of material or cultural heritage value and involve the least possible alteration or loss of it;

(c) promote the use and enjoyment of and access to heritage resources, in a way consistent with their cultural significance and conservation needs;

(d) contribute to social and economic development;

(e) safeguard the options of present and future generations; and

(f) be fully researched, documented and recorded.'

Six components of a possible systematics are identified in this section, namely:

a. Identification

b. Assessment

[335] National Heritage Resources Act. No 25 of 1999.

University of Pretoria etd – Breedlove, G (2002)

c. Management
d. Research
e. Document
f. Record.

The ultimate intention with such as system would be the safeguarding of the National Estate according to the Preamble of the National Heritage Resources Act[336], which reads:

> *…promote good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed to future generations.*

It is granted that this list represents a western interpretation of requirements, yet until an African or an autochthonous systematics, or an indigenous systematics comes into being, safeguarding the National Estate will be according to these western methods. If we listen to Hart[337], it is possible though to guide the systematics to include African and Southern African concepts, and to ensure the adaptability of the systematics for implementation by various levels of management, agencies and practitioners.

5.2.2. Review of Australian requirements.

5.2.2.1 ICOMOS Australia

A comprehensive procedure is proposed by the Australian ICOMOS[338] (appendix Eleven) and adopted by the Australian Heritage Commission (AHC) It recommends the following process:

a. Identify place and association
b. Gather and record information about the place sufficient to understand significance (documentary, oral, physical)
c. Assess significance
d. Prepare statement of significance
e. Identify obligations arising from significance
f. Gather information about other factors affecting the future of the place (owner/manager's needs and resources, external factors, physical condition)
g. Develop policy (identify options, consider and test their impact on significance) h. Prepare a statement of policy
i. Manage place in accordance with policy (develop strategies, implement strategies through a management plan, record place prior to any change)

---

[336] National Heritage Resources Act. No. 25 of 1999
[337] Hart. 2001
[338] Australian ICOMOS. 1999. p.10

University of Pretoria etd – Breedlove, G (2002)

j. Monitor and review.

Numerous organisations in Australia have adopted the ICOMOS Burra Charter as a guideline for their cultural landscape systematics. In a document focussed on the protection of cultural heritage in Micronesia, involving steel, Spennemann and Look[339] identifies cultural resource management as a process that involves three basic steps:

a. The location, identification and documentation of the resource.
b. Assessment of the value or significance of the resource to the community or sections of the community.
c. 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.

5.2.2.2 Australian Committee for IUCN

under the Australian Committee for IUCN[340], the Australian Natural Heritage Charter suggests a ten step process for natural heritage conservation:

a. Obtain the study evidence
b. Identify people with an interest
c. Determine the significance
d. Assess the physical condition and management realities.
e. Develop a conservation policy
f. Determine the conservation processes
g. Decide who has responsibility for decisions, approvals, and actions.
h. Prepare the conservation plan
i. Implement the conservation plan
j. Monitor the results and review the plan.

5.2.3 Review of USA National Park Service requirements

As indicated in Chapter Three, the USA National Park Service under the United States of America Secretary of the Interior Standards in a publication entitled Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes requires the following procedure;

a. historical research;
b. inventory and documentation of existing conditions;
c. site analysis and evaluation of integrity and significance;
d. development of a cultural landscape preservation approach and treatment plan;

---

[339] Spenneman & Look. 1994

University of Pretoria etd – Breedlove, G (2002)

e. development of a cultural landscape management plan and management philosophy;

f. development of a strategy for ongoing maintenance; and, preparation of a record of treatment and

g. future research recommendations.

5.2.4 A comparison between the National Heritage Resources Act, the Australian Heritage Commission, and the USA National Park Service and generic requirements for a systematics.

The requirements under the National Heritage Resources Act and that as required under by the USA National Park Service and the various Australian institutions can be combined into a workable systematics that builds on the strengths of these systems and that incorporated the applicable systems from other nations and organisations.

Table Eleven: Comparison between recommended processes from NHRA, AHC and USA NPS

NHRA	Australian Heritage Commission	USA NPS	Generic Database[341]	Recommended process
Identification	Location and Identification	Historic research, inventory	Method of identification	Locate and identify
Recording	Gathering, Documentation, archiving, and publishing	Documentation	Method of documentation. Method of archiving Method of publishing	Recording, archiving, Publishing
Assessment	Evaluation and assessment	Analysis and evaluation	Method of evaluation and assessment	Assessment
Grading	Statement of significance Classification	None	Method of classification	Grading
Management	Management to include monitoring and maintenance to include develop conservation policy. Determine conservation process, prepare conservation plan Implement conservation plan.	Preservation approach and treatment plan. Management plan and management philosophy. Ongoing maintenance; and, preparation of a record of treatment	Method of management	Management to include monitoring, conservation policy. Determine conservation process, prepare conservation plan. Implement conservation plan.
None	None	Research recommendations		Research recommendations

The geographic information system will implement the recommended processes in an effective and efficient manner. The geographic information system will use geo-referenced data and provide the answers to questions[342] involving:

a. the particulars of a given location,

b. The existing condition,

c. The changes that have occurred since the previous query

[340] Australian Committee for IUCN. 1999
[341] As determined from the literature search of this Chapter.
[342] Bernhardsen. 1992. p3

University of Pretoria etd – Breedlove, G (2002)

d. The assessed value of a place,

e. The assigned grading, or

f. The relationship and systematic patterns of the region.

The individual steps in the recommended process (Table Eleven) each could be presented with spatial and a non-spatial characteristic. As with all geographic information systems, the spatial data is presented in point, lines or polygons, and the non-spatial data as numeric, alpha or raster or photographic representation.

Table Twelve. Potential spatial and non-spatial characteristics of documentation.

Method	Spatial data	Non-spatial data
Identification	Point, polygon or line	Alpha description
Documentation	Point, polygon or line	Alpha description with photographic representation
Evaluation	Point, polygon or line	Alpha or numeric listing
Classification	Point, polygon or line	Alpha or numeric listing
Archiving	Point, polygon or line	Numeric
Publishing	Point, polygon or line	Alpha description, photographic representation and numeric listing
Maintenance	Point, polygon or line	Alpha and numeric listing.
Monitoring	Point, polygon or line	Alpha and numeric listing.

5.3 Resolution to Hypothesis Four.

The literature and the research has demonstrated that suitable discrete methods can be found to systematise cultural landscape characteristics, and that the database requirements can be met with a geographic information system. The literature and the research thus support the hypothesis that suitable discrete methods can be found to systematise cultural landscape characteristics.

The following chapter will attempt to compile a systematics for cultural landscapes by combining the knowledge gained from the literature search, with the research that has been completed in the previous four chapters into a suitable systematics for South African significant cultural landscapes.