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Summary and Analysis of the Inventory of the National Estate: 2018



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1. Introduction

SAHRA is mandated with the compilation and maintenance of an inventory of the national estate as per section 39 of the NHRA. Part of this mandate includes the annual publication of a summary and analysis of the national estate inventory. This report provides the summarised view of the current content of heritage resources within the inventory. It is the third publication of the national estate reports since 2017.

2. Reporting Period

This report makes use of cumulative data recorded on the South African Heritage Resources Information System (SAHRIS) as at the end of the 2018 calendar year. As such, this report is representative of all data on SAHRIS up to and including 31 December 2018.

3. Data Sources and Limitations

The database used to populate this summary can be accessed directly via: <https://sahris.sahra.org.za>.

The heritage resources recorded in the inventory of the national estate is made up of a variety of sources, such as surveys, historical sources, heritage impact assessments, permit applications, and other relevant databases within the custodianship of SAHRA.

Annually, in preparation for this report, each Provincial Heritage Resources Authority (PHRA) is requested to verify the datasets of formally protected resources recorded within each province, and specifically the database of Provincial Heritage Sites. The purpose of this verification is to ensure the accuracy of data, and to ensure that any additional declarations and other changes that may have occurred during the reporting period are accordingly reported to SAHRA.

At the time of finalisation of this report, through the cooperation of the PHRAs, verification was received from the following authorities:

- Heritage Western Cape (HWC)
- KwaZulu-Natal Amafa and Research Institute (AMAFA)
- North West Provincial Heritage Resources Authority (NWPHRA)



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4. Recorded Resources

4.1 Immovable resources

Whilst the phrase “immovable heritage resource” is not defined within the National Heritage Resources Act, act 25 of 1999 (NHRA), we are utilising this term as a method to subsume the definitions of “Place”, “Site”, “Structure”, and “Heritage Site”, inclusive of any place, site, structure, or heritage site covered by water, as defined in section 2 of the NHRA.

Each immovable heritage resource, or site, recorded on SAHRIS, and therefore the inventory of the national estate, is designated by a specific site type, however for the purposes of summarisation and analysis the expanded site type taxonomy has been compressed to their principal term, for example, all rock art sites have been given the designation “Archaeological”, similarly all transport infrastructure has been designated “Structures”. The below shows the expanded taxonomy with the principal terms;

- **Archaeological**
 - Artefacts
 - Rock Art
 - Deposit
 - Shell Midden
 - Ruin > 100 years
 - Stone walling
 - Settlement
- **Living Heritage/Sacred sites**
- **Battlefield**
- **Burial Grounds & Graves**
- **Conservation Area**
- **Cultural Landscape**
- **Geological**
- **Meteorites**
- **Monuments & Memorials**
- **Natural**
- **Palaeontological**
- **Place**
- **Structures**
 - Bridge
 - Building
 - Transport infrastructure
- **Underwater**
 - Shipwreck
 - Submerged
 - Intertidal
 - Partially submerged
 - Fully submerged



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It is important to note that many sites are characterised by features of many of the site types listed above. For the purposes of this summary, only the principal type used during recording was retained. Further to this, as additional information becomes available about specific resources these types are refined or corrected to better characterise the resource.

Within the inventory of the national estate there are 50 144 recorded sites as at 31/12/2018 across all categories (figure 2). This is an increase of 1 468 sites when compared to period ending December 2017 (figure 1). The analysis performed for the 2017 report illustrated the need to find a mechanism through which the gaps in the inventory of the national estate can be closed. In particular there was very little information recorded on sites within the Free State, Northern Cape and North West provinces.

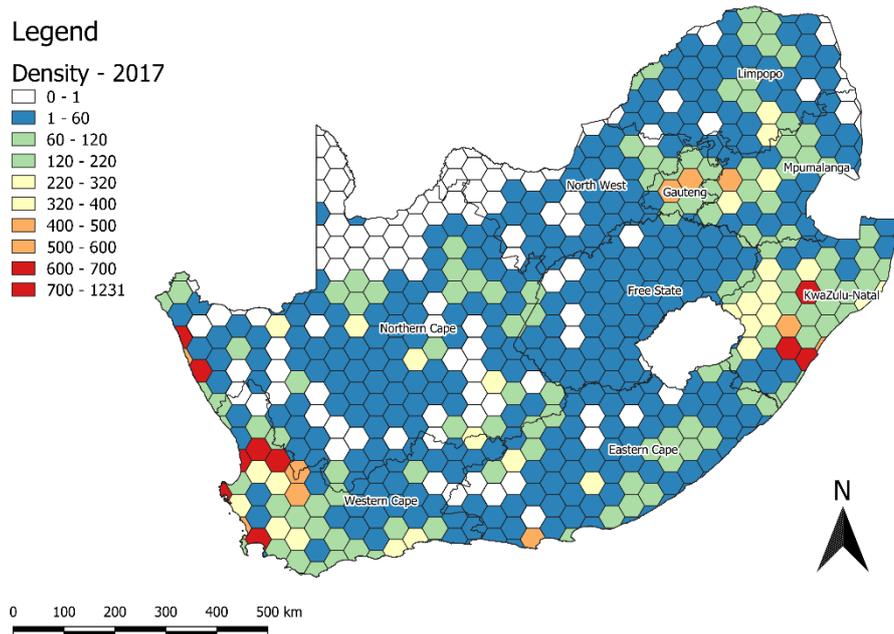


Figure 1: Density of recorded sites as at end 2017

Through developments occurring throughout South Africa, and submitted to SAHRA as Heritage Impact Assessments (HIAs), 37.9% of new sites were added to the inventory.



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Legend

Density - 2018

- 0 - 1
- 1 - 60
- 60 - 120
- 120 - 220
- 220 - 320
- 320 - 400
- 400 - 500
- 500 - 600
- 600 - 700
- 700 - 1231

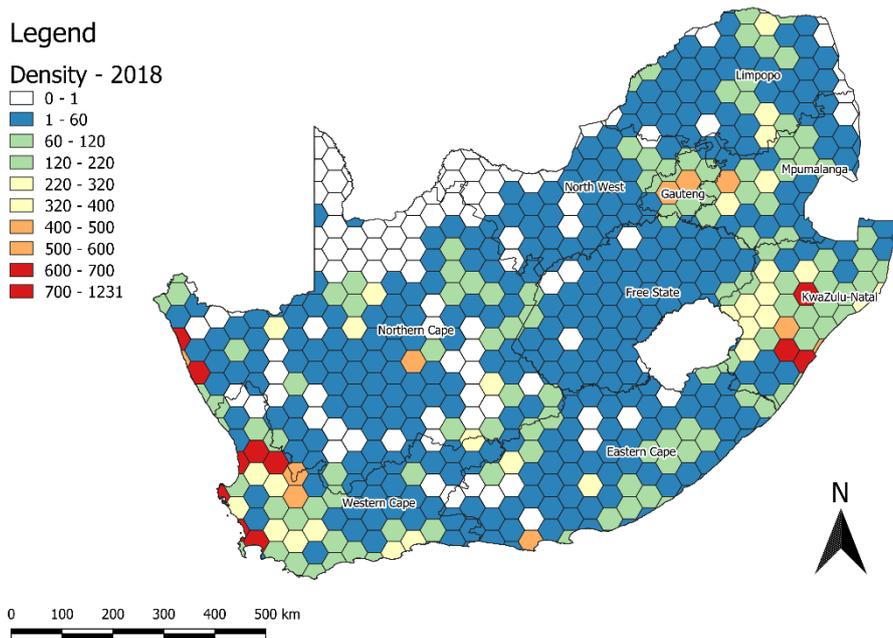


Figure 2: Density of recorded sites as at end 2018

The types of sites recorded is summarised as follows;



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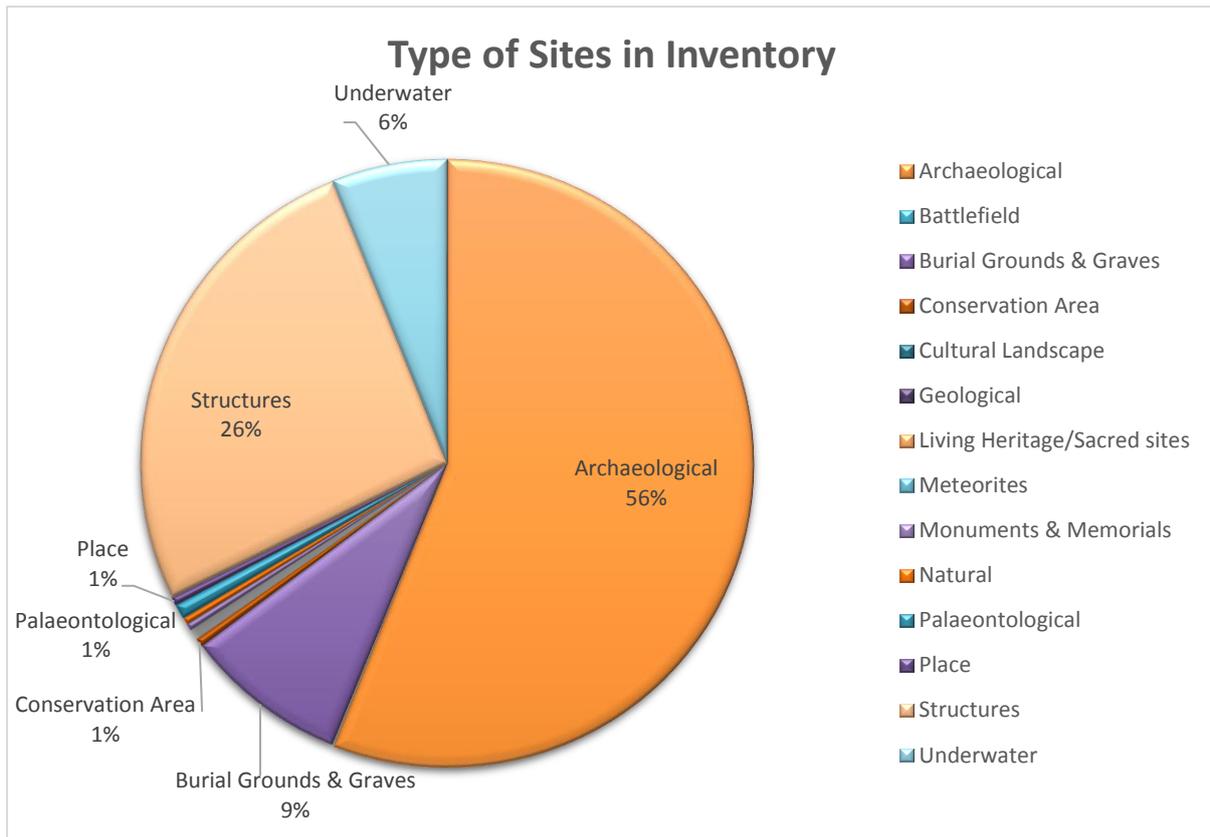


Figure 3: Breakdown of types of sites within the inventory of the national estate

4.1.1 Shipwrecks and Maritime Heritage Resources

During the current reporting period, SAHRA augmented its Maritime and Underwater Cultural Heritage (MUCH) Geographical Information System (GIS) with additional wreck coordinates, site survey data, and three-dimensional photogrammetry models of wreckage along the coast (Figure 4). Although the 3-D models have yet to be fully integrated with the GIS, they are already proving to be invaluable site monitoring and recording tools that allow SAHRA to form baseline condition assessments that can be compared to earlier data as well as future 3-D models.



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Figure 4: 3-D Model of a Portion of the wreckage of *Thomas T Tucker* (1942), Cape Point, Western Cape

Eight hundred and sixteen (816) shipwrecks in SAHRA's database have been assigned coordinates in the GIS. These records assist in the assessment of impacts to MUCH resources during offshore development and provide SAHRA with the opportunity to impose no-go areas around shipwreck sites to prevent disturbance.

Progress made on the MUCH GIS over the last two years has allowed SAHRA to provide the Directorate of Ocean Conservation Strategies of the Department of Environmental Affairs with South Africa's first offshore shipwreck sensitivity heatmap, which indicates the relative sensitivity of different areas along the coast and allows this data to inform Marine Spatial Planning at its onset (figure 5).

In June 2018, SAHRA's MUCH unit hosted a field school through the University of Cape Town's (UCT) Archaeology Department at the Still Bay Fish Traps National Heritage Site. The aim of the exercise was twofold; to provide students specialising in archaeology with practical tools for surveying MUCH sites, and to produce updated spatial data of the fish traps cluster for baseline assessment and future site monitoring purposes. A total of two out of 24 fish traps were mapped during the field school.

The MUCH GIS is an ongoing project and aims to include further mapping at the Still Bay Fish Traps site to allow effective monitoring and maintenance protocols to be put into place, as well as expansion of the 3D photogrammetry models.



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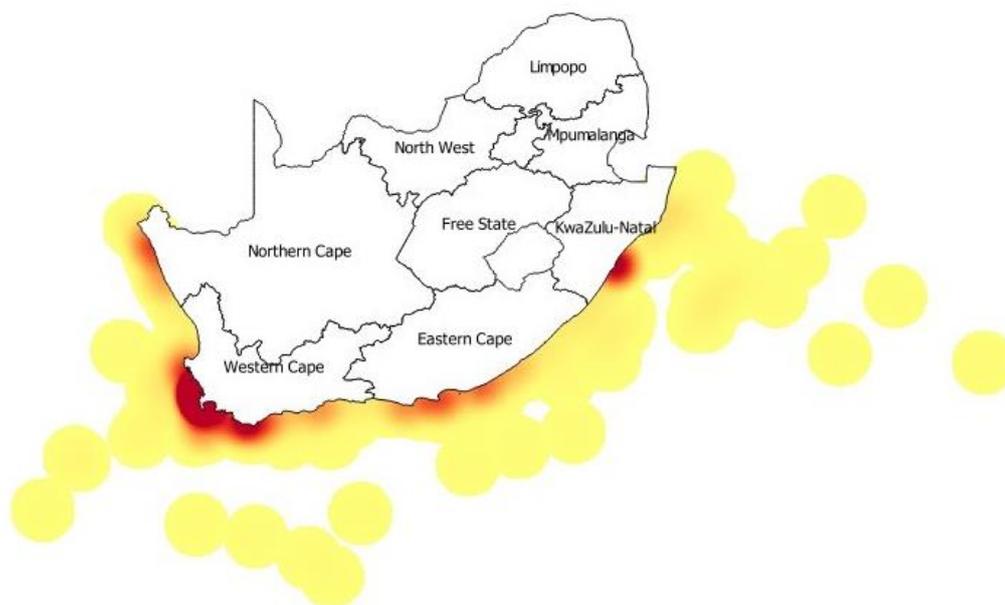


Figure 5: Shipwreck sensitivity map

4.2 Movable Resources

SAHRA is mandated to regulate the movement of heritage objects in South Africa. For SAHRA to fulfil this mandate, NHRA empowers SAHRA to publish a List of Types (LoT) of Heritage Objects that describes the objects that may not be exported without a permit issued by SAHRA. The first LoT was gazetted on 25 of October 2002 and this was superseded by the LoT gazetted on 6 December 2002 that has been in place since then. It has become evident that the current List must be reviewed because it is not inclusive and representative of all the types of objects that are protected and to make it more user-friendly.

Meetings were held both internally and with the stakeholders over a number of years including a seminar that was held on 19 March 2015 and the new draft was further circulated to interested and affected parties, including the South African Museums Association (SAMA). Following much consultation, discussion and review, SAHRA is satisfied that the reviewed draft is a major improvement on the current LoT and would inform Customs officials and the public at large of the types of objects that are protected that may not be exported without a permit from SAHRA. Section 32(4) of the NHRA requires SAHRA to obtain the approval of the Minister before gazetting the LoT. Furthermore, section 32(5)(b) (i & iii) requires SAHRA to call for public submissions/comments through provisional



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publication of the LoT in the Government Gazette. SAHRA has complied with the provisions of the NHRA and will be gazetting the new reviewed LoT which will apply to anyone who want to export heritage objects meeting the threshold as stipulated in the list. After the LoT have been gazetted, the South African Revenue Services' Prohibited and Restricted List would be updated, accordingly.

The inventory currently holds 52 981 movable heritage resources, or "heritage objects". This is a 43.41% increase from the number reported in the 2017 report. Currently there is no mandated nomenclature under which all heritage objects must be categorised when being recorded in the inventory of the national estate. This presents a challenge in the analysis of these resources and will need to be addressed going forward. The above-mentioned revised LoT presents such an opportunity and a programme to categorise the objects currently within the inventory will need to be established.

5. Declared Resources

SAHRA, a PHRA, or any member of the public can identify places or objects with special significance to the nation, province or community and nominate them for declaration. The process of declaration is to provide recognition and ongoing protection of the values and qualities that provides this significance.

5.1 National Heritage Sites

SAHRA is tasked with the identification of places with qualities so exceptional that they are of special significance to the nation as a whole. Declaring these places as National Heritage Sites is a formal mechanism to recognise and protect the authenticity and integrity of nationally, and often universally, significant cultural heritage resources.

The below graph charts the declaration of National Heritage Sites since the first declaration under the NHRA in 2002. Similar to the discussion on the overall content of immovable heritage resources recorded in the inventory, the National Heritage Sites have been categorised and summarised according to the standard taxonomy employed within the inventory.



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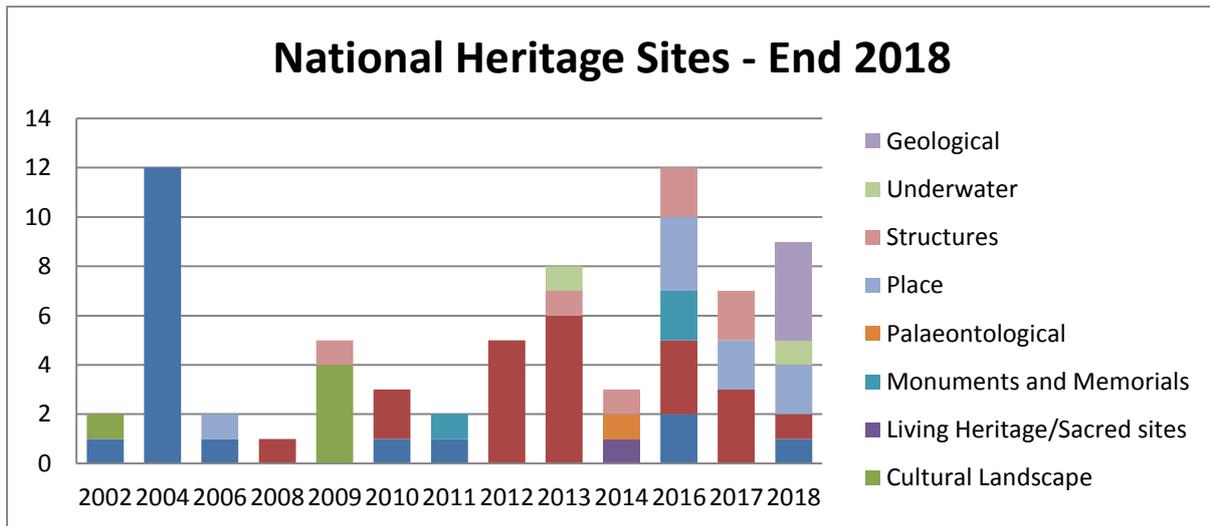


Figure 6: National Heritage Sites declared per year

Figure 7 below, provides a breakdown of all National Heritage Sites broken down by type;

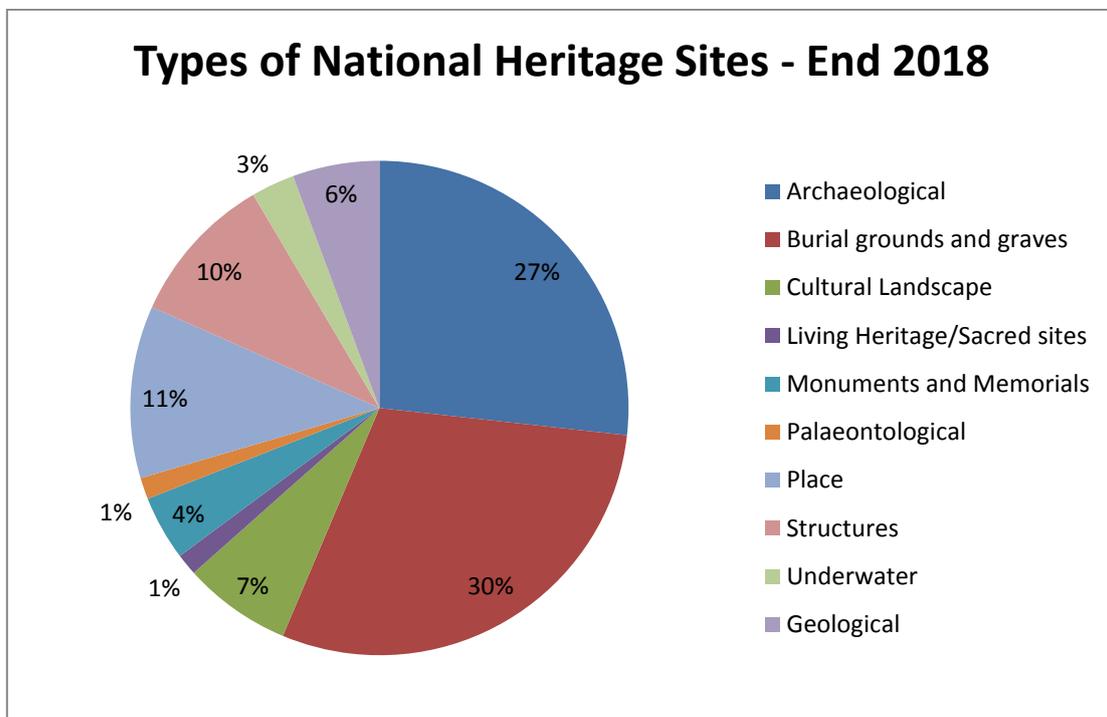


Figure 7: Types of National Heritage Sites



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5.2 Specifically Declared Objects/Collections

Certain types of heritage objects or collections of heritage objects which are considered to be special, unique or endangered may be Specifically Declared. Any member of the public may nominate an object or collection for declaration; however, this declaration can only be carried out by SAHRA and cannot be performed at a provincial level.

Under the National Monuments Act (Act no. 28 of 1969) objects and collections could be declared as national monuments and cultural treasures. In terms of the NHRA, all previously declared movable national monuments and cultural treasures are heritage objects.

Figure 8 shows the number of objects/collections declared between 1936 and 2018. Noting that no heritage objects have been declared within the 2018 calendar year. Currently, there are 45 specifically declared heritage objects/collections.

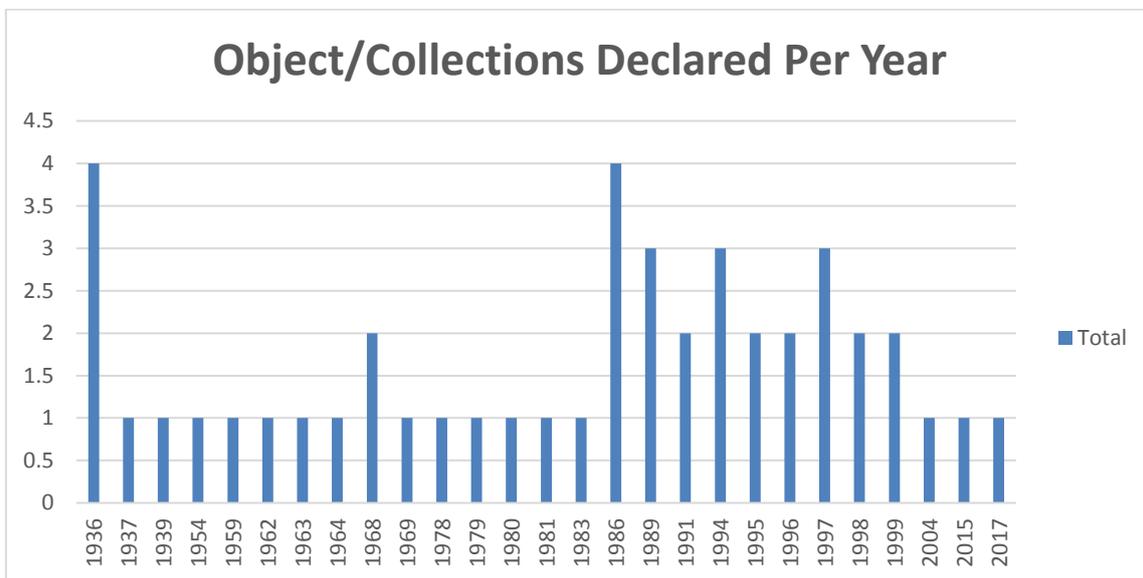


Figure 8: Objects/Collections declared per year



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5.3 Provincial Heritage Sites

In order to compile this report, all Provincial Heritage Authorities were requested to verify the datasets present within the inventory of the national estate in order to ensure accuracy of data as well as the inclusion of any new sites declared within the 2018 calendar year.

As with the 2017 report, many of the provincial authorities either did not respond to the call for verification, or were unable to verify the datasets supplied to them. Therefore only those datasets which were verified will be discussed here as the baseline established in the 2016 and 2017 reports remain current for this report.

Variations within the data may occur year on year due to a number of factors such as corrections established through the proceeding, verifications, and the declaring of Provincial Heritage Sites as National Heritage Sites.

KwaZulu-Natal maintains their own legislation for the protection of heritage resources within the province. The differences inherent with the National and Provincial legislation have been accounted for and described within the section pertaining to the KwaZulu-Natal Amafa and Research Institute and the verification of resources.

5.3.1 Heritage Western Cape (HWC)

Heritage Western Cape has provided verification of the dataset of Provincial Heritage Sites currently recorded within the Western Cape Province on SAHRIS.

Figure 9 below shows the breakdown of declarations that have occurred within the Western Cape, per year, from the earliest period of formalised declarations in South Africa occurring from 1936 through to the close of 2018, noting that all declarations occurring between 1936 and 1999 were performed under the National Monuments Council and its predecessors (figure 10) , whilst all declarations post 2000 were performed under Heritage Western Cape (figure 11).

As recorded on SAHRIS there are 1283 declared Provincial Heritage Sites within the Western Cape.



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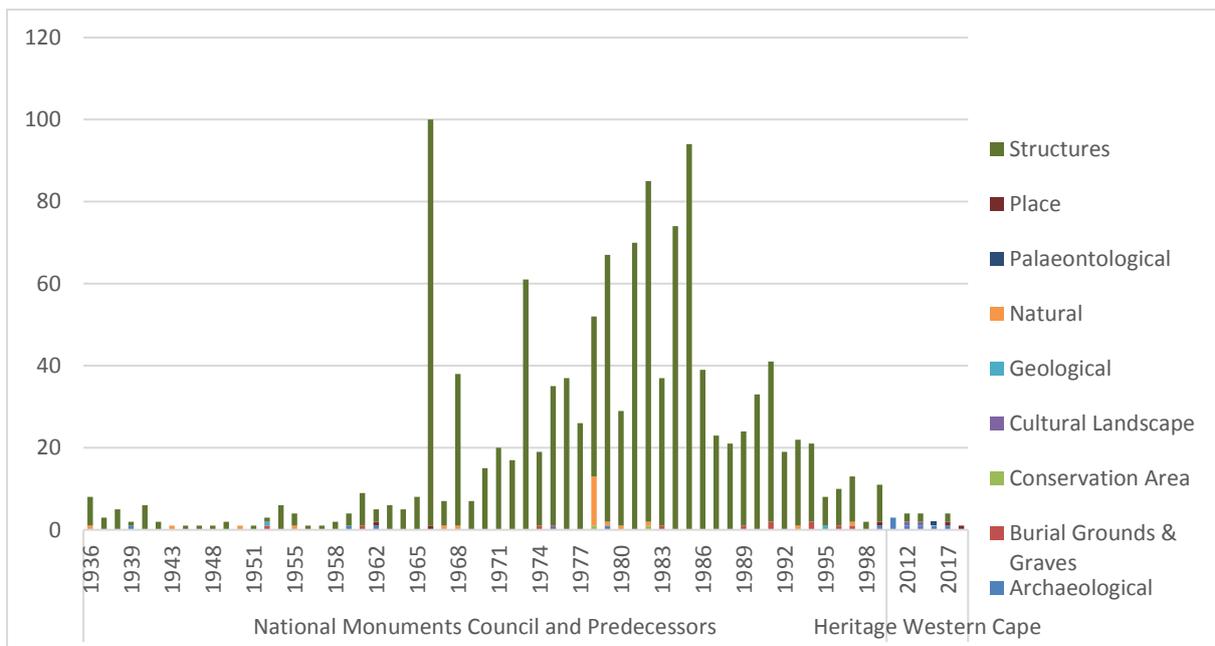


Figure 9: Provincial Heritage Sites declared per year within the Western Cape. This graph includes declarations made under the National Monuments Council and its predecessors (1936 – 1999), as well as Heritage Western Cape (2000 – onwards).

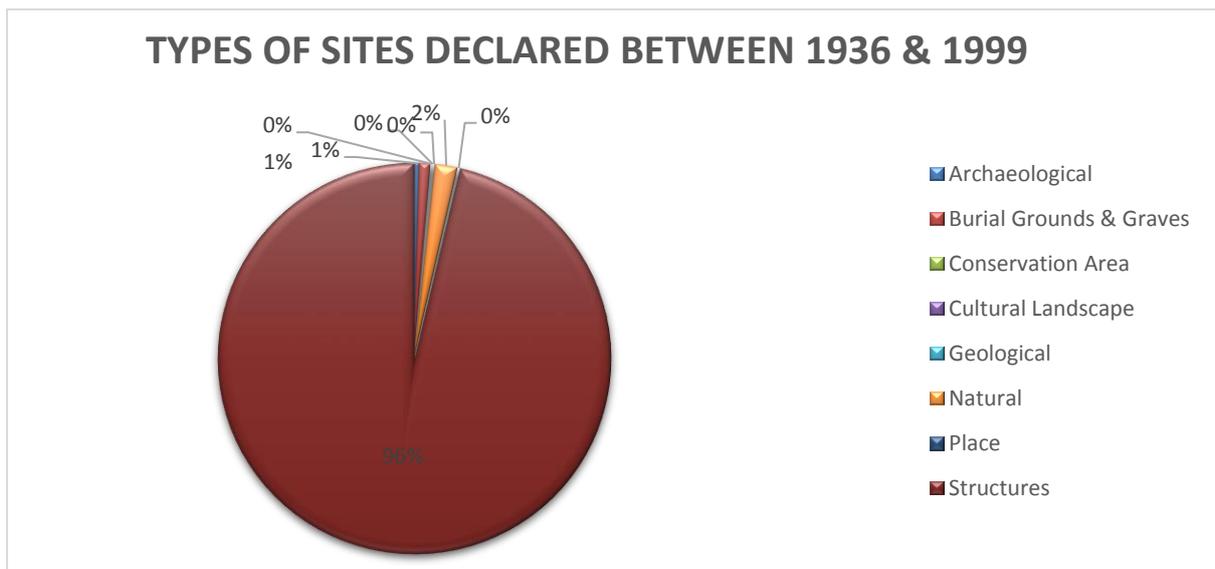


Figure 10: Types of sites declared under the National Monuments Council and its predecessors



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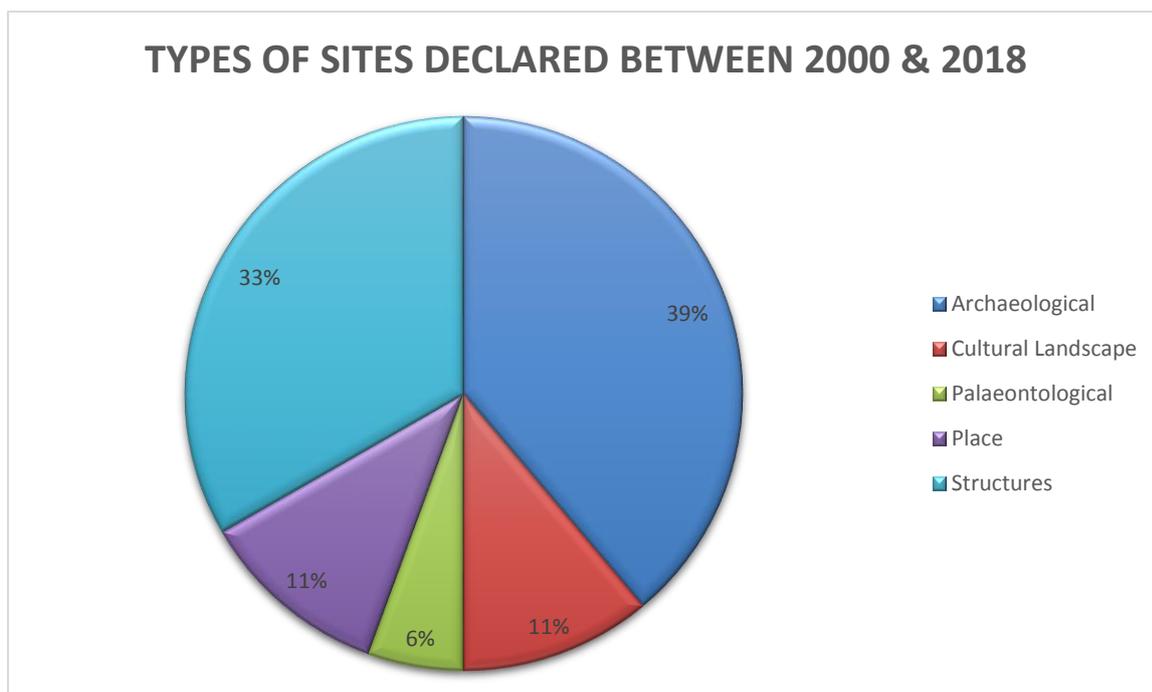


Figure 11: Types of sites declared under Heritage Western Cape

5.3.2 KwaZulu-Natal Amafa and Research Institute (AMAFA)

KwaZulu-Natal Amafa and Research Institute has supplied a comprehensive verification of resources, inclusive of location refinements and name changes, within the KwaZulu-Natal province declared under National legislation and under the KwaZulu-Natal AMAFA and Research Institute Act, Act No. 5 of 2018 (KZNARIA).

KwaZulu-Natal presents a unique case with South Africa as they maintain their own provincial legislation for the management of heritage resources. This legislation makes provision for the declaration of Heritage or Provincial Landmark sites under sections 44 and 45 of the KZNARIA, depending upon the ownership of the site. Further to this, special protections are afforded to Graves of members of the Royal Family, Battlefields, public monuments and memorials, as they are automatically granted Heritage or Provincial Landmark status. Furthermore; all resources with Heritage or Provincial Landmark status are regarded as Grade II resources under the NHRA.

Noting the above, all resources regardless of status as either a Heritage or Provincial Landmark will, for the purposes of this report, be considered as Provincial Heritage Sites under the NHRA.



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For the purposes of this report only 291 resources have been included. 88 resources were excluded due to either overlap with existing declared areas or further clarity being required on current declaration/landmark status.

Due to the nature of automatic protections and special status afforded to certain categories of heritage resources under the KZNARIA we have been unable to produce a breakdown of types of “declared” resources per year gazetted as there is no gazette through which to establish a date range.

The graph below shows the breakdown of site types of declared sites in KwaZulu-Natal.

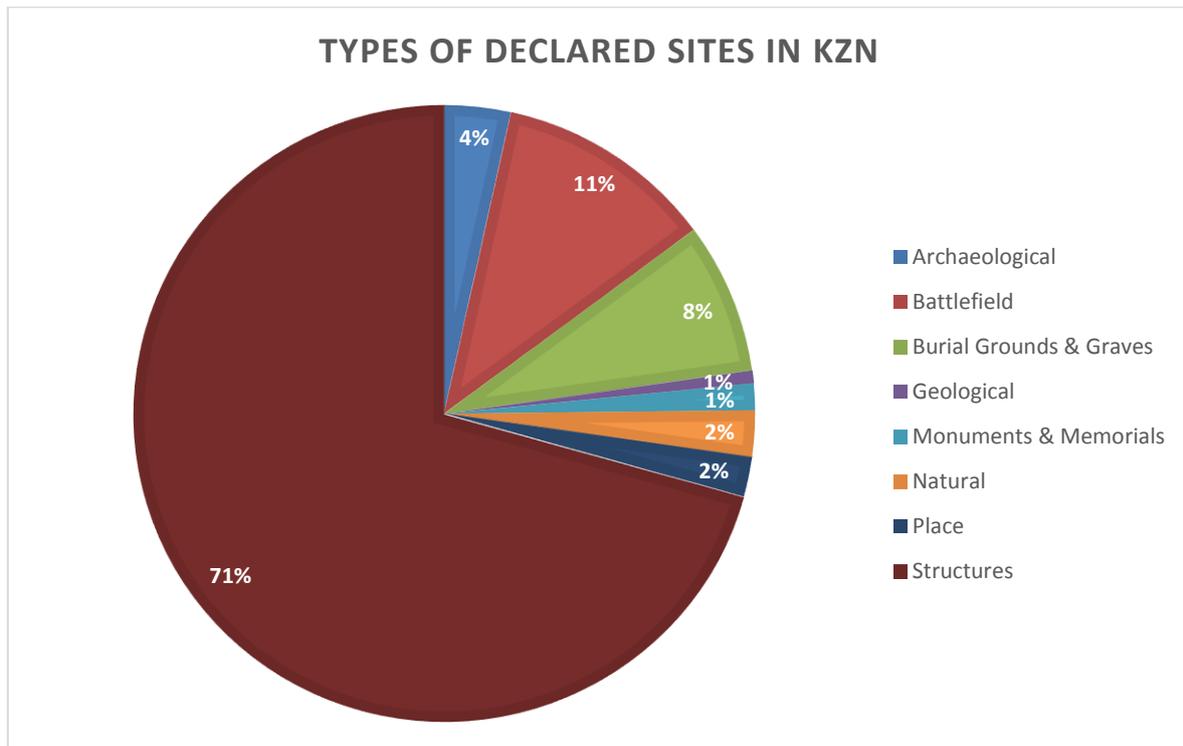


Figure 12: Types of Provincial Heritage Sites within KwaZulu-Natal

5.3.3 North West Provincial Heritage Resources Authority (NWPHERA)

North West Provincial Heritage Resources Authority have verified the dataset of Provincial Heritage Sites currently recorded on SAHRIS.



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There are 51 declared provincial heritage sites that have been declared since 1937 within the North West Province, noting that no new declarations have occurred since the promulgation of the NHRA.

The graph below (Figure 11) shows the breakdown of declarations that have occurred per year.

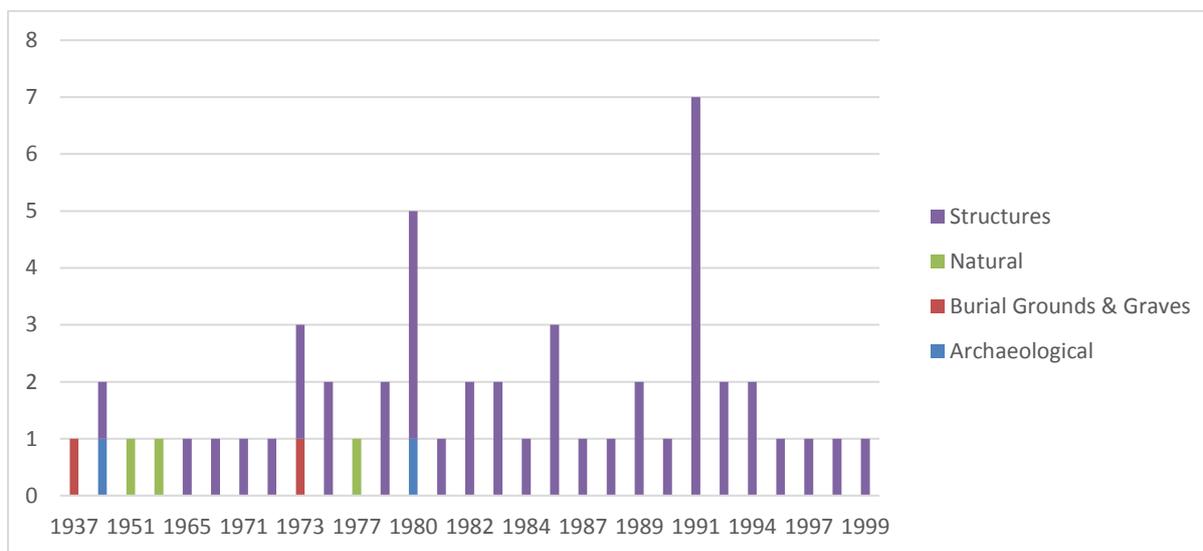


Figure 13: Provincial Heritage Sites declared per year in the North West Province

6. Identifying Risks Affecting Heritage Resources

The management of heritage resources in South Africa often requires a level of prioritisation considering the limited financial and human resources available to provincial authorities across the country. This prioritisation should ideally be based on a level of data analysis that will allow the relevant authority to gauge the levels of risk affecting a particular resource and the likelihood of the risk occurring.

Risks come in many forms, some natural, such as fire and seismic activity, or anthropogenic, such as vandalism and the uncontrolled encroachment of development. The identification and acknowledgement of these risks will allow for mitigating plans to be implemented in order to retain the significance of an affected heritage resource (UNESCO, 2010).

The importance of heritage inventories in the management of risk is a well-established principle internationally (Meyers, 2016). The discussion and maps that follow represents a pipeline towards the utilisation of the inventory of the national estate as a risk identification tool, further work will need to be conducted before a full risk assessment model can be generated. The discussions below serve as potential avenues for further investigation.



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6.1 Natural Disaster

Recent fires in the Western Cape have affected a number of heritage resources, such as the Provincial Heritage Site; Old Toll House on Montagu Pass (SAHRIS SiteID: 28838). This illustrates the importance of identifying the risks associated with natural disasters, such as earthquakes, fires, flooding and sea level rise, and putting measures into place to mitigate these risks where possible.

6.1.1 VeldFire

Fire causes both direct and indirect damage to heritage resources. This may be through the destruction of sites or objects, or secondary damage from smoke, heat or water damage from firefighting efforts (Stovel, 1998).

The impacts of recent fires on heritage properties within the Western Cape serves as a reminder of the importance of risk identification, mitigation and recovery planning.

In 2010 the CSIR produced a veld fire risk report for South Africa (Forsyth et al, 2010). This report highlighted the need for provincial risk assessments and management planning for veld fire. The map below shows the locations of National Heritage Sites relative to the overall veld fire risk assessment.



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Legend

- ▲ National Heritage Sites
- Provincial Heritage Sites

VeldFire Risk

- Extreme
- High
- Medium
- Low

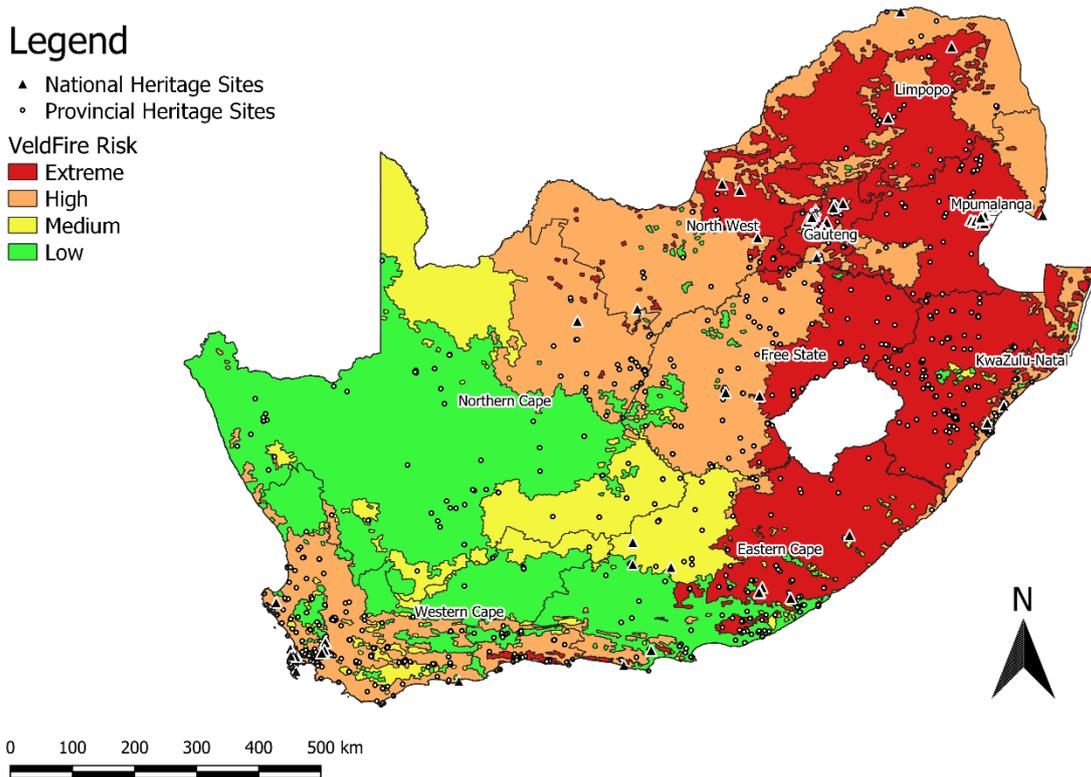


Figure 14: VeldFire risk analysis

Based on this assessment we can determine that 58.39% of National Heritage Sites fall within an area of extreme risk, with 29.93% in high risk areas.

In terms of Provincial Heritage Sites, 64.05% are located within areas of High to Extreme risk.

This assessment is based on high level national data and requires further unpacking based on provincial and local risk assessments to determine real risk, however it does highlight the need to be cognisant of potential VeldFire risk in management planning for the conservation of these resources.

6.1.2 Seismic Susceptibility

In comparison to the global seismic standards, South African seismicity is rated in the moderate to low range due to the relatively stable African crust (Brandt, 2011). South Africa experiences a scatter of seismic foci with a wide range of seismic intensity, as measured on the Modified Mercalli Scale (MMS). The cause of the scatter has been attributed to natural occurrences resulting from geological and geomorphological processes; these occurrences have resulted in earthquake events within the



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country (Brandt, 2011). However, it must be noted that in South Africa seismicity can also be attributed to anthropogenic activity, such as mining (Brandt, 2011).

Under the control of the Council for GeoScience (CGS), seismological data (consisting of historic accounts of earthquake events; historic earthquake seismicity records and seismic monitoring of mining regions) has been consolidated to produce maps illustrating seismic hazards based on seismic intensity (Brandt, 2011). The below map presents seismic intensities in relation to National and Provincial Heritage Sites.

Legend

- ▲ National Heritage Sites
- Provincial Heritage Sites

Seismic Intensities

- IV
- V
- VI
- VII
- VIII

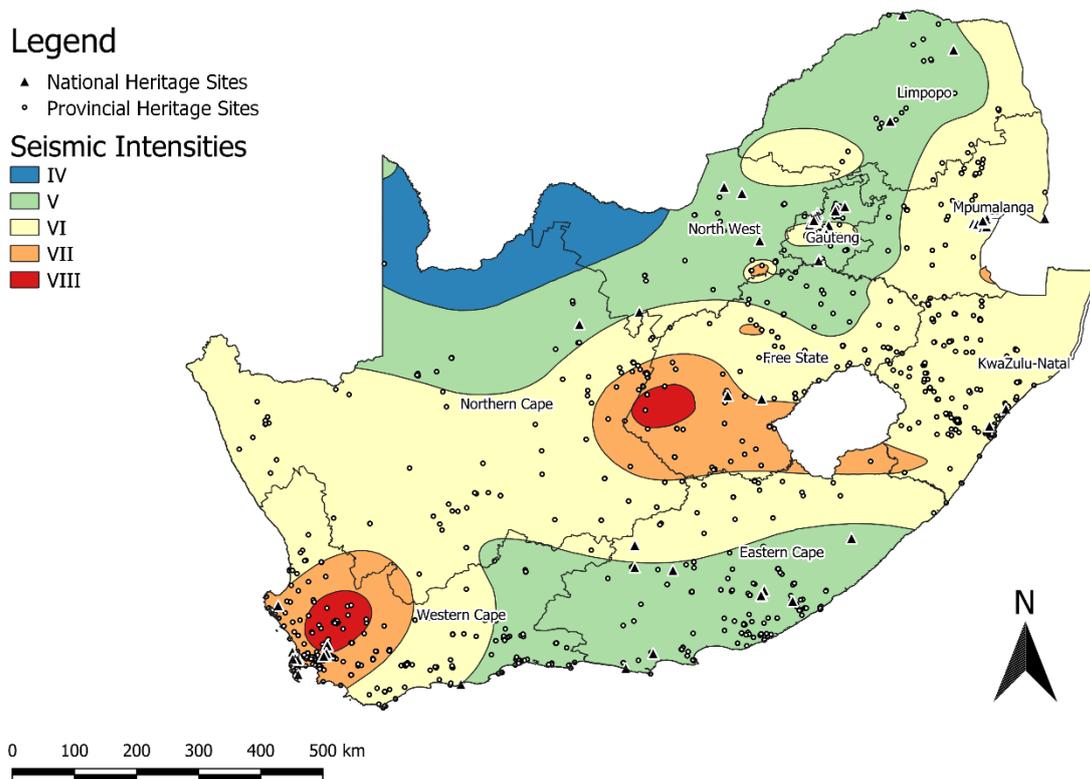


Figure 15: Seismic risk analysis

Based on the above map (figure 13), 30% of provincial heritage sites are within the moderate (V) intensity level; 27% are within strong (VI) intensity level; 36% are within very strong (VIII); 7% are within the severe (VIII) intensity level. Therefore 93% of the PHS are found within the moderate to very strong regions of seismic intensity. With respect to the National Heritage Sites, 40% fall within the moderate (V) intensity level; 23% are within the strong (VI) intensity level; 15% are within very



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strong (VII) intensity level and 22% are within the severe (VIII) intensity level. Therefore 60% of the NHS are found within the strong to severe regions of seismic intensity.

According to the MMS intensity index an seismicity within a moderate to severe range results in structural movement which could induce secondary hazards such as rockfalls and landslides. Based on the analysis, it can be concluded that an occurrence of an earthquake or tremor with seismic intensity measuring in the moderate to severe level (V – VIII) 75% of declared heritage sites will be at risk. Thus, seismic hazard is a viable risk to monitor in heritage management.

This model can be further accentuated through further research into the types of heritage resources within high risk areas, and the materials with which they are constructed, in order to determine real risk levels and the frequency to which these resources should be monitored.

Table 0-1: Modified Mercalli Intensity Scale, adapted from *Severity of an Earthquake, USGS General Interest Publication, 1989, website: https://pubs.usgs.gov/gip/earthq4/severity_text.html (accessed: 18/03/2019).*

Intensity Level	Shaking	Description
IV	Light	Light tremors; No structural movement
V	Moderate	Movement of unstable structures and objects
VI	Strong	Structural movement with slight damage
VII	Very Strong	Structural movement; considerate damage to fragile structures
VIII	Severe	Structural movements; great damage to fragile structures; major damage to stack structures including monuments

6.1.3 Flood Risk

Flood risk is considered to be one of the most important risk factors affecting cultural heritage globally (Bedeaux et al 2018). The risk posed by flooding to cultural heritage exists both as direct and indirect factors such as the destabilisation of structures through the movement of water, soil erosion, alteration of landscape features, damage to moisture sensitive heritage objects, and depositional damage from flood debris (Stovel, 1998).



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Understanding the potential risk for flooding of sites can allow relevant authorities to plan mitigation strategies to prevent or minimise the impact that would result in a loss of heritage resources.

The South African National Space Agency (SANSA) has developed a potential flood map using the Height Above Nearest Drainage (HAND) product, which uses river channels as a zero point for elevation. This map provides an indication of areas that will be inundated when water level rises by 1, 3 and 5 meters above the river channel (SANSA, 2015).

The spatial dataset for identified heritage sites is point data, in order to counter for this a 100m buffer was applied to all points to provide an area of potential intersection between the flood map and the sites dataset.

Legend

-  Sites Within Flood Risk Area
-  Sites Outside Flood Risk Area
-  5m Flood Potential

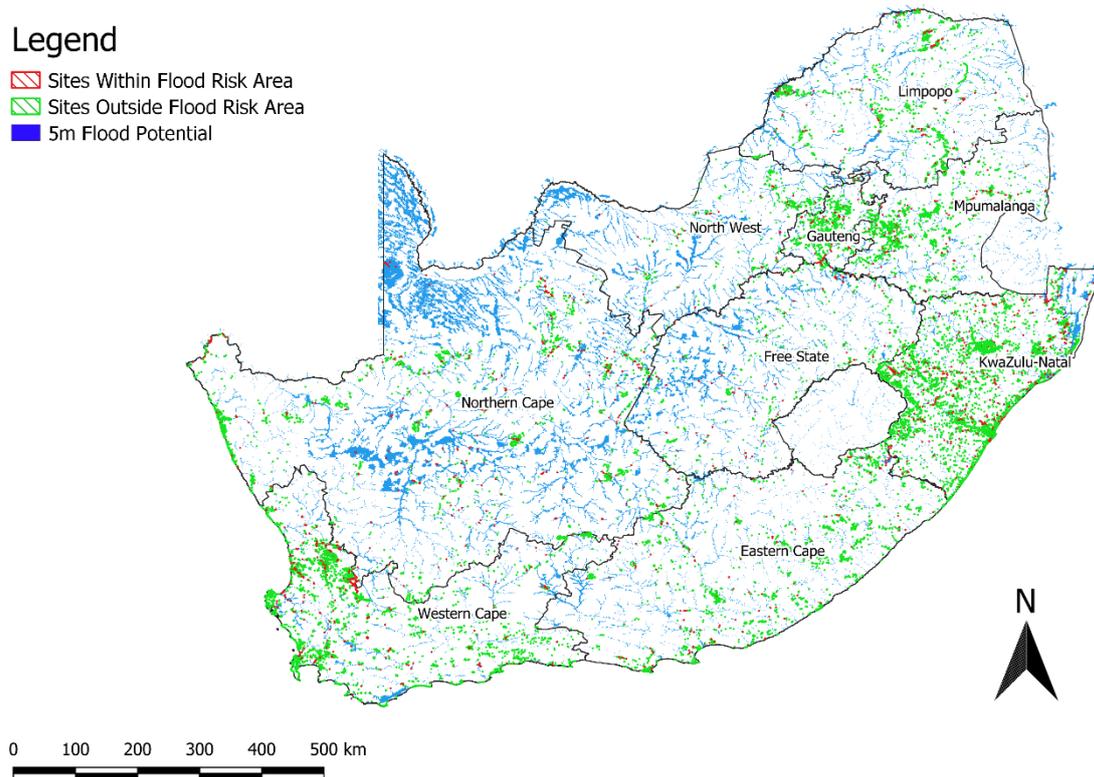


Figure 16: 5m Flood risk analysis

Based on the 5m flood projection 11.78% of all identified resources fall within an area that could potentially be impacted by flood from river channels. This analysis does not however take into account other factors such as flooding potential of urban areas with insufficient drainage or coastal resources



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that may be impacted by rising sea levels or storm surges. These climate change related risks require greater consideration for future analysis and planning.

6.2 Anthropogenic Risk

Human induced risk can include categories such as vandalism, looting, civil unrest, infrastructure failure, uncontrolled development, inadequate maintenance, and terrorism (Stovel, 1998; UNESCO, 2010). Each of these categories present a credible risk to cultural heritage, however due to availability of data, only uncontrolled development will be discussed here. As further data becomes available these areas will be expanded upon.

6.2.1 Uncontrolled Development

The formalised development process provides mechanisms for the identification of heritage resources and management of the impact the development will have on the resource. Section 38 of the NHRA is designed to integrate with other vital pieces of legislation such as the National Environmental Management Act (NEMA) (Act 2017 of 1998) and the Mineral and Petroleum Resources Development Act (MPDRA) (Act 28 of 2002). As part of the process to assess the impact a potential development may have on the landscape and population of an area, a heritage practitioner is required to survey and identify any and all resources that fall within the area that may be impacted by the proposed development, and then make recommendations as to the mitigation, protection or destruction of the identified resources.

When uncontrolled development occurs, this mechanism is circumvented, thereby resulting in the potential loss of both known and unknown resources. Examples of such uncontrolled development include illegal mining activities and expansion of informal settlements.

Whilst datasets pertaining to illegal mining activities are not available at present, the South African National Space Agency (SANSA) has provided spatial data pertaining to the location and boundaries of informal settlements in a number of key municipalities.

The primary dataset used for this analysis was last updated in 2011, with the Western Cape portion being updated in 2016, which presents the risk of using outdated data to establish whether any known resources are at risk from expanding informal settlement. In order to counter this, a 1km buffer was added to the informal settlements dataset. From this analysis 1.83% of all identified resources are potentially at risk from expanding informal settlements. As this analysis is based on identified resources, the low percentage of known resources at risk of being impacted by informal development is unsurprising considering that that traditional impact assessment protocols would not have been undertaken as expansion takes place, and the informal settlements dataset covers only 48 municipalities. Noting the limitation of the dataset a further analysis was done including only



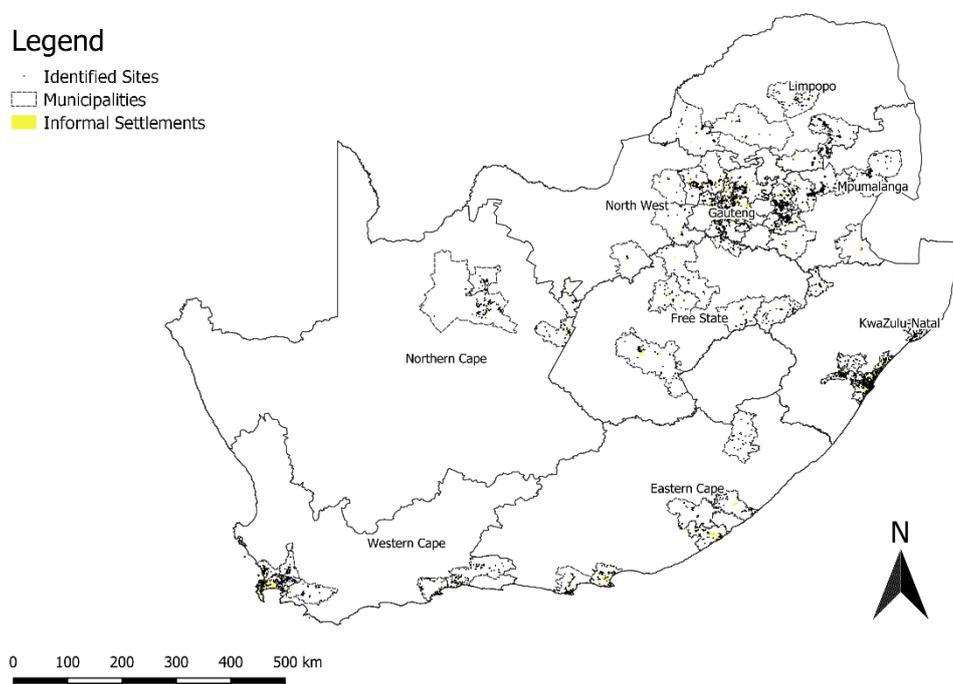
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resources from within municipalities where the informal settlement dataset was present. This produces a result of 6.27% of known resources being within a 1km radius of the boundary of mapped informal settlements.

Legend

- Identified Sites
- Municipalities
- Informal Settlements



7. Way Forward

The discussions above highlight only a few of the potential risk factors that affect cultural heritage in South Africa. It is evident from the discussion above that further work is required before a full risk model can be established, chief amongst this is the establishment of a protocol for the categorisation of potential risk and impact amongst the identified risk categories in order to better understand the real risk affecting heritage resources, examples of which can be types of building material and their susceptibility to degradation under seismic activity, rates of expansion of uncontrolled development, and the incorporation of local fire risk models to assess risk at a local level. The final result of which should provide for a risk based approach to the prioritisation of management actions.



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8. References

- Bedeaux, D.G., Amsing, E.B.J. van 't Wout., T. Augustyn, A.M. 2018. Is cultural heritage life saving? Case study analysis to the relation between flood risk management and cultural heritage. IAIA18 Conference Proceedings. Environmental Justice in Societies in Transition. *38th Annual Conference of the International Association for Impact Assessment*. Durban. South Africa. 16-19 May 2018.
- Brandt, M. 2011, Seismic Hazard in South Africa, Pg:1-21; In *Council for GeoScience Report, report no.: 2011-0061*, South Africa: Bellville, Cape Town.
- Forsyth, G., Kruger, F., Le Maitre, D .2010. *National veldfire risk assessment: Analysis of Exposure of Social, Economic and Environmental Assets to veldfire Hazards in South Africa*. CSIR-National Resources and the Environment, Pretoria.
- SANSA. 2015. *Post-Flood And Flood Risk Analysis*. Retrieved from: http://atlas.sansa.org.za/atlas-post_flood_analysis.html (Accessed 12 March 2019).
- Stovel, H. 1998. *Risk preparedness: a management manual for world cultural heritage*. Retrieved from: http://www.iccrom.org/pdf/ICCROM_17_RiskPreparedness_en.pdf (Accessed 20 March 2019).
- UNESCO. 2010. *Managing Disaster Risks for World Heritage*. Paris: UNESCO, 2010.
- USGS. 2019. *The Modified Mercalli Intensity Scale*. Retrieved from: <https://earthquake.usgs.gov/learn/topics/mercalli.php> (Accessed 12 March 2019).