

Draft Climate Change Preparedness Action Plan Summary Paper

January 2023



Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Climate Change Preparedness Action Plan for Heritage NSW: Summary Paper

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More information

Prepared for Heritage NSW

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Purpose

A draft Climate Change Preparedness Action Plan has been developed for Heritage NSW. It outlines tangible and achievable preparedness actions against each of the draft Climate Change Principles adopted by the Heritage Council of NSW (Heritage Council). This summary paper outlines the key information and draft actions from the action plan. The actions set the direction for how to:

- build the knowledge and capacity of Heritage NSW staff and heritage place owners and managers about climate change and its likely impacts on heritage places, and
- develop practical steps to build the climate change resilience of heritage places and adapt to its impacts.

The action plan will assist Heritage NSW to develop a policy framework for protecting, conserving, and managing state significant heritage places and objects from the impacts of climate change.

The climate in NSW has already changed

NSW is already experiencing the effects of climate change. Warmer temperatures, rising sea levels, changing rainfall patterns and more frequent extreme weather events are now familiar (NSW Government 2022). These changes will have significant consequences for the built and natural environment, as well as the health and wellbeing of the people of New South Wales (NSW).

Cultural heritage in NSW

State significant heritage places and relics/objects in NSW are protected by the *Heritage Act NSW 1977* and the *National Parks and Wildlife Act 1974*.

Heritage in NSW includes all surviving physical remains of past human activity, whether visible, buried or submerged, deliberately planted or managed. It is a precious, irreplaceable resource and it needs to be protected, conserved, and managed for the benefit of present and future generations.

Understanding the risks to heritage places posed by climate change

Climate change brings a range of new challenges to be considered. NSW is already losing heritage places to the impacts of climate change. These impacts are cumulative and will accelerate.

Impacts can be direct, such as site damage or destruction due to storm wash or indirect, such as human responses to direct impacts. For example, heatwave intensity, duration and frequency are all projected to significantly increase across NSW (Argüeso et al. 2015). This in turn is likely to result in the need to modify buildings to make them more liveable. Such indirect impacts of climate change on heritage places need to carefully consider how they impact on heritage values.

Between 2019 and 2022, NSW communities experienced major impacts from bushfire, floods and coastal erosion. These events, a result of or exacerbated by climate change, impacted heritage places and local communities including the eco and cultural economies that support their maintenance.

Building on the range of impacts identified in *Historic Environment and Climate Change in Wales: Sector Adaptation Plan* (2020), Appendix 1 includes an overview the potential impacts that climate change will have on heritage places in NSW.

NSW Government and climate change

The NSW Government has produced several policy documents addressing climate change and its possible impacts. These include the *Climate Risk Ready NSW Guide* (DPIE 2021) and the *NSW Climate Change Adaptation Strategy* (NSW Government 2022). The action plan is consistent with relevant recommendations from these documents and is intended to serve as a heritage specific component of the whole of government approach to climate change action within NSW.

Australia State of the Environment Report: Heritage (2021)

This report found that significant loss of heritage places and values will occur without improved management to provide for a 'diverse, shared, respected and protected heritage, community and individual wellbeing' (McConnell et al. 2021:14).

The report determines that key expected impacts of climate change on heritage will include:

“...ongoing destruction and loss of Indigenous heritage from a range of pressures, including lack of self-determination, poor governance and inadequate protections for all aspects of Indigenous heritage and cultural landscapes, which are highly significant but currently unprotected.

and

...continued degradation of historic heritage values and irreversible loss of historic heritage because of inadequate recognition and protections, in combination with ongoing economic, industry and climate change pressures.”








Vulnerability index











Little has been done to assess the risks from climate change or to measure current impacts on heritage places in Australia, with the exception of assessments of Australia's World Heritage properties (Lin et al. 2021) and Aboriginal and historic sites in Hobart's coastal zone (McConnell and Evans 2017). The *Australia State of the Environment Report* calls for 'comprehensive regional assessments of risk and vulnerability to climate change for all types and levels of heritage, and routine monitoring of condition and impacts for all potentially vulnerable heritage places and protected areas' (McConnell et al. 2021:180).


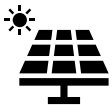




Key climate change preparedness actions linked to the principles



The following tables outline the key actions that are needed to implement the adopted draft climate change principles to address the current and future impacts of climate change impact on heritage places in NSW. The action plan, once adopted by the Heritage Council, will be implemented in accordance with the identified priority levels and timeframes indicated below.

Key climate change preparedness actions

	Action	Priority	Climate Change Principle
	Investigate options for salvaging Aboriginal heritage at high risk of harm from the impacts of climate change in partnership with Aboriginal community stakeholders.	Medium	Principle 2 - Engaging communities
	Establish a future grant funding stream to support emergency works to heritage places in response to extreme weather events related to climate change.	High	Principle 2 - Engaging communities
	Establish a future grant funding stream to support works and projects that help heritage places prepare for the impacts of climate change.	High	Principle 2 - Engaging communities
	Encourage a whole of place or landscape approach to manage the impacts of climate change on heritage places by engaging community stakeholders.	Low	Principle 2 - Engaging communities
	Explore opportunities for partnership with local government to provide assist local heritage item owners on climate change preparedness.	Medium	Principle 2 - Engaging communities
	Promote the Australian Garden History Society's climate resources including the international Climate Change Alliance of Botanic Gardens' <i>Landscape Succession Toolkit</i> for garden owners and those working to preserve NSW cultural landscapes.	Medium	Principle 2 - Engaging communities
	Update the Statement of Heritage Impact statement guidelines and checklists to assist authors of heritage management documents to specifically address the impacts of climate change on heritage values and significant fabric.	High	Principle 3 – Evidence-based decision making

	Action	Priority	Climate Change Principle
	Update the State Heritage Inventory database to enable links to recent reports, heritage impact assessments and other useful material prepared by owners, managers, and consultants to inform the management of the impacts of climate change on heritage places.	Medium	Principle 3 – Evidence-based decision making
	Explore updating the Minimum Standards of Maintenance and Repair to include climate change mitigation and adaptation.	Medium	Principle 3 – Evidence-based decision making
	Invest in, encourage and promote research into the impacts of climate change on heritage places in partnership with relevant scientists and technical experts.	Medium	Principle 3 – Evidence-based decision making
	Develop a pilot study and/or encourage and promote research into the impacts of climate change on traditional sea resources in partnership with the Aboriginal community.	Medium	Principle 3 – Evidence-based decision making
	Explore the feasibility of preparing a climate vulnerability index for heritage places.	Medium	Principle 4 - Assessing risks and resilience
	Encourage owners/managers of heritage places to develop climate change adaptation plans for SHR items.	Medium	Principle 4 - Assessing risks and resilience
	Encourage the inclusion of climate risk assessments in conservation management plans for SHR items.	Medium	Principle 4 - Assessing risks and resilience
	Promote the benefits of regular reviews of asset maintenance plans to ensure they are meeting emerging climate trends.	High	Principle 4 - Assessing risks and resilience
	Develop a guide for heritage place managers/owners to self-assess and manage climate change risk. This guide should include advice on the use of satellite and aerial imagery (including drone photography) to document change over time.	Medium	Principle 4 - Assessing risks and resilience
	Establish an annual forum where managers, owners and heritage advisors can share observations and ideas about the impacts of climate change on heritage places and discuss successful strategies to minimise or prepare for such impacts.	High	Principle 5 - Responsive strategies

	Action	Priority	Climate Change Principle
	<p>Prepare new and updated technical notes for owners and managers on responding to the impacts of climate change, for example:</p> <ul style="list-style-type: none"> • assessing the adequacy of roof drainage and stormwater systems against current and future rainfall intensities • dealing with changes in ground moisture • simple measures for making heritage buildings more energy efficient without adversely impacting heritage values or significant fabric, and <p>the importance of regular maintenance.</p>	Medium	Principle 5 - Responsive strategies
	Explore opportunities to develop heritage policy on the issues arising from energy conservation and net zero initiatives that may have potential adverse impacts on heritage places e.g. rooftop solar and heat pump technology.	High	Principle 5 - Responsive strategies
	Explore opportunities to record built heritage using virtual models or 'digital twins' to assist with the rebuilding of heritage items in fire and flood prone areas.	Low	Principle 5 - Responsive strategies
	Provide guidance to heritage place owners and managers on integrating climate change related risks into existing risk management processes e.g. fire management plans.	Medium	Principle 6 - Integrating management approaches
	Include assessment of climate change risks in <i>Heritage Act 1977</i> applications.	Medium	Principle 6 - Integrating management approaches
	Prepare and promote case studies that highlight the potential approaches that can be taken to minimise current and future impacts of climate change on heritage places.	Medium	Principle 6 - Integrating management approaches

	Action	Priority	Climate Change Principle
	<p>Explore opportunities for owners/managers/consultants to easily add and access climate change information about heritage places into State Heritage Inventory database including:</p> <ul style="list-style-type: none"> • recent impacts of climate change • an assessment of climate risks and resilience, and future management actions to address the impacts of climate change. 	Medium	Principle 6 - Integrating management approaches
	Amend the requirements for Section 60 applications to require information about the statement of significance, current condition and management actions in relation to the impacts of climate change.	Low	Principle 6 - Integrating management approaches

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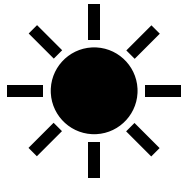
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Appendix 1: Potential impacts of climate change on heritage places in NSW

Weather	Impacts	Impacts on heritage
 <p>Warmer mean temperatures</p>	<p>Rise in sea levels.</p>	<ul style="list-style-type: none"> • Persistent inundation and flooding. • Loss of historic structures. • Destruction of Aboriginal sites such as coastal middens and campsites through storm surge and erosion. • Permanent inundation of intertidal Aboriginal sites such as axe grinding grooves and fish trap sites. • More frequent exposure and loss of Aboriginal traditional burials. • Impact on heritage related coastal economy e.g. heritage tourism. • Loss and inundation of coastal archaeology on foreshore and coast edge e.g. shipwrecks, port infrastructure, seawalls and jetties. • Direct and indirect impacts on historic assets and areas, and their settings from increasing or strengthened engineered/physical protections. • Damage to or loss of heritage value of coastal cultural landscapes due to installation of boulder breakwaters, riprap stone walls and other beach front protections. • Response to managed retreat. • Potential adverse impacts from clean-up operations.

Weather	Impacts	Impacts on heritage
	Ecosystem changes and associated migration and proliferation of pests, diseases and invasive species.	<ul style="list-style-type: none"> • Increased incidence and severity of fungal and insect attack and the impacts on the health of building fabric, occupants and collections/archives e.g. increased habitat for termites will impact NSW alpine huts. • Proliferation and expansion in range of invasive and non-native species. • Change in marine species in response to warmer seas and increased acidification, loss of Aboriginal traditional foods (fish and shellfish) and /or resource gathering locations. • Loss of species already at threshold of tolerance leading to changes in distinctive character of heritage places. • Changing pest and insect regimes leading to damage and loss of heritage plants and gardens in particular loss of cool climate heritage gardens in places like the Blue Mountains and the Southern Highlands.

Weather	Impacts	Impacts on heritage
 <p>Long term drier climate</p>	<p>Drying out, desiccation, shrinkage and erosion.</p>	<p>Subsidence</p> <ul style="list-style-type: none"> Subsidence caused by clay shrinkage to features and structures e.g. buildings, breaches in flood defences, dams and reservoirs, shafts and underground workings, blockages of river courses. <p>Erosion and destabilisation</p> <ul style="list-style-type: none"> Erosion of heritage places exposed by the lowering of lake, inland waterways and river levels. Destabilisation/erosion of earth structures, embankments and cuttings. Destabilisation of tips, historic mine spoil heaps and other industrial remains leading to landslides and increased potential for pollution. Increased erosion from impaired pasture growth caused by desiccation. Increased use of marginal pastures leading to erosion of archaeological remains. Wind-blown movement of marine sediments, e.g. dunes, exposing Aboriginal sites and objects. <p>Drying out</p> <ul style="list-style-type: none"> Lowering of water table causing loss of paleoenvironmental evidence. Changing decay and survival of organic artefacts e.g. trackways, exposure of riverine shipwrecks. Changing use of agricultural land and buildings to cope with water shortages, lack of fodder and poor harvests. Drying and stress to old growth trees, historic trees and plants and their contribution to cultural landscapes. Discovery of new historic assets in desiccated grassland and crops visible as parch and crop marks. Improved humidity levels in buildings.

Weather	Impacts	Impacts on heritage
	More fire danger days and more frequent bushfires.	<p>Built heritage</p> <ul style="list-style-type: none"> • Increased risk of fire in buildings and structures from drier conditions. • Wildfires causing damage to buried and above ground archaeology, buildings and structures. • Increased damage from fire protection measures- increased fire trails and firebreaks. <p>Iconic species</p> <ul style="list-style-type: none"> • Potential loss of Aboriginal iconic animal species, food, totems etc. due to repeated high intensity fires. <p>Vegetation</p> <ul style="list-style-type: none"> • Loss of historic plants either due to fire or changes to plants as a response to fire risk affecting historic landscape character. • Increased risk of erosion after coastal fire damage to surface vegetation and its protective effect.
 <p>Warmer, drier winters</p>	Increased fire danger in spring and summer.	<ul style="list-style-type: none"> • Drier winters may add to fire conditions in the summer months. • May impact on viability of agriculture (where dependent on winter rains) and by extension heritage properties which are active farms. • May increase tourism potential of some regional areas through autumn and winter.

Weather	Impacts	Impacts on heritage
 <p>More frequent extreme weather</p>	<p>Frequent high winds, storms and heat/cold events.</p>	<p>Damage from increased precipitation/high wind events</p> <ul style="list-style-type: none"> Increased unpredictability of weather system such as the El Nino southern oscillation-affecting the ability to prepare for storm events. Storm damage to features, historic buildings, settlements and structures above ground. Wind driven rain and increased humidity with resulting impact on indoor air quality and health of building fabric, occupants and collections/archives. <p>Damage from increased high-energy flooding and storm events</p> <ul style="list-style-type: none"> Turbulent seas leading to damage/scour to underwater, intertidal and coastal archaeology. Increased sediment transport leading to exposure or covering of historic assets. Direct impact from storms causing damage to mature trees and woodland. Cumulative impacts from multiple events. Potential adverse impact from clean-up operations and modifications. Increased maintenance and repair costs. <p>Physical and chemical changes</p> <ul style="list-style-type: none"> Persistent saturation resulting in chemical changes to buried archaeology.
	<p>Extreme heat/drought and cold events.</p>	<ul style="list-style-type: none"> Potential direct and indirect impacts from extremes and fluctuations affecting physical weathering, exacerbating building material and structural problems e.g. freeze/thaw action, shrinkage. Overheating of buildings and potential for unsympathetic additions e.g. poorly designed air conditioning. Changing land use to cope with the impacts of extreme and fluctuating weather conditions. Increased heat and drought impacting on mature trees and woodland.

Weather	Impacts	Impacts on heritage
	More flooding events, increased ground moisture and precipitation.	<p>Increased erosion, scour and other damage</p> <ul style="list-style-type: none"> • Damage to historic buildings, settlements, infrastructure and designed features. • Destabilisation and subsidence of archaeology on the coast edge. • Erosion, damage or loss of buried and above ground archaeological remains. • Increased pressure, scour and damage to water-related features e.g. bridges, overtopping of dams. • Potential adverse impact from clean-up operations and modifications e.g. installation of property flood resilience measures. <p>Physical and chemical changes</p> <ul style="list-style-type: none"> • Persistent saturation resulting in chemical changes to buried archaeology. <p>Destabilisation and pollution</p> <ul style="list-style-type: none"> • Inadvertent pollution episodes from flooding and increased precipitation e.g. historic mine sites. • Destabilisation and subsidence of archaeology on mine spoil and designed features, archaeological deposits and earth structures leading to slippage or collapse. • Potential adverse impact from clean-up operations.