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Article

Adaptive heritage: Is this creative thinking or abandoning our values?

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Abstract

Protected areas, such as natural World Heritage sites, RAMSAR wetlands, and Biosphere reserves are ecosystems within landscapes. Each site meets certain criteria that allow it to qualify as heritage or protected. Both climate change and human influence (e.g., incursion, increased tourist visitation) are altering biophysical conditions at many such sites. As a result, conditions at many sites are falling outside the criteria for their original designation. The alternatives are to change the criteria, remove protection from the site, change site boundaries such that the larger or smaller landscape meets the criteria, or manage the existing landscape in some way that reduces the threat. This paper argues for adaptive heritage, an approach that explicitly recognizes changing conditions. We discuss the need to view heritage areas as parts of a larger landscape, and to take an adaptive approach to management of that landscape. We offer five themes of adaptive heritage: 1) treat sites as living heritage, 2) employ innovative governance, 3) embrace transparency and accountability, 4) invest in monitoring and evaluation, and 5) manage adaptively. We offer the Australian Wet Tropics as an example where aspects of adaptive heritage currently are practiced, highlighting the tools being used. This paper offers guidance supporting decisions about natural heritage in the face of climate change and non-climatic pressures. Rather than delisting or lowering standards, we argue for adaptive approaches.

Keywords: natural heritage, World Heritage, protected areas, Outstanding Universal Value (OUV), adaptive heritage, climate change

Introduction

Protected areas (PA) represent long-term decisions to set aside resources for societal benefit. These benefits include ecosystem services like biodiversity, aesthetics, carbon sequestration and water quality. Globally, there are more than 200,000 nationally designated protected areas (PAs) representing less than 15% of the earth's surface (1). Fewer than 1.5% of those PAs are internationally designated, a term that includes natural and mixed World Heritage sites, RAMSAR wetlands and Biosphere Reserves. These <3,000 sites are "the best of the best", locations where attributes are so exceptional, they are seen as worthy of sustained protection for all humankind. Each of these areas has specific characteristics (called OUV, or Outstanding Universal Value in World Heritage terms, 2) that allow the site to qualify as an internationally designated area. Identification and description of those attributes or values initiates long term site management by orienting the public to the values the site represents (3).

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These internationally designated PAs, such as natural World Heritage sites, vary widely in size, but each is an ecosystem within a landscape. In practice, listing a PA as one of the internationally designated categories is a recognition of a threat to its OUV, an attempt to prevent (or reduce the impacts of) change through greater protection by states (4). The logic is that this ecosystem or landscape is of very high societal value and is at some risk; we must take action to prevent degradation, because degradation is change. Change would reduce the value as we currently perceive it to be and we want to avoid that change. This attempt to capture and retain present or historic value is "postcard heritage" which Kimball (4) characterizes by four axioms or guiding assumptions:

- heritage itself contains essential qualities that are at risk,
- designation means that these qualities should be permanently retained,
- these qualities are unrelated to evolution of landscapes or human culture, and
- heritage possesses contingent merit that must be authorized by experts and explained to stakeholders.

In this paper, we use the term "natural heritage" (hereafter heritage) to include a wide range of natural landscapes that have an internationally-designated and described value. The process of listing or designating a landscape as heritage ascribes societal value to the area being listed (5). These locations are perceived to, but actually may not have inherent value independent of the viewer (4). The value, such as the Outstanding Universal Value (OUV) of a World Heritage site, exists to the degree that experts recognize it and assign it to the landscape in question (6). As custodians of heritage, societys' role is to separate the unusual (or unique) landscapes from the common, and to prevent change, to preserve for future generations whatever attributes allow a landscape to qualify as heritage. The argument which often is explicit in such a designation is that the past is good, a threat is present that could affect this past state, the future is either bad or unknowable, and the present needs to be protected against that future. But that judgement is based on the values that are held at the time of inscription. Those very values adopted as reference are mutable as society changes (7). There is indeed no constant reference that defines heritage value; value is based on the subjective judgment of experts at the time of inscription.

Heritage is commonly managed as a static resource

Heritage area managers accept, as their mandate, protecting the attributes for which the landscape was designated. Most often, the view is that we must preserve the conditions of the past that led to the current condition, and avoid the losses to that condition that might occur in the future (7). The Burra Charter (8, Article 3) is often cited as central guidance for managers and suggests we must do 'as much as necessary but as little as possible' to conserve site attributes. However, that guidance poses a serious challenge to the philosophy and practice of heritage management. All sites are subject to landscape evolution and to a range of pressures, such as climate change, encroachment, and invasive species. Managers need a better understanding of how malleable heritage values are, what forces change them and the significance of those changes (9). As site conditions change, the attributes that supported the listing (e.g., the OUV if it is a World Heritage site) may be lost. That conundrum requires us to ask "If a site loses its OUV, is it still World Heritage or heritage quality?" (6, 10). In a current (July 2021) example of that dilemma, the World Heritage Commission is considering placing the Great Barrier Reef on the list of Sites in Danger (11). The Australian government has objected, claiming they have spent billions to protect the reef (12). Clearly, the state party's argument is based on "how hard we tried " rather than the objective qualities of the site and how these may have changed since the original listing in 1980.

We are using the term heritage to include a wide range of protected areas. Natural World Heritage sites are the most visible and best known among such sites. Each World Heritage site is managed to protect its OUV (i.e., its Outstanding Universal Value), an attribute so valuable it should be preserved for all humankind forever. In fact, UNESCO's Operational Guidelines (2) state "…, the permanent protection of this heritage is of the highest importance to the international community as a whole". Heritage managers strive to balance current and emerging societal ideas with policies and guidance that reflect practices and conditions of the past (13, 14, 15). The operational philosophy within which heritage is managed is to ensure a steady state of the values that originally conveyed heritage (5) despite changing local biophysical and societal conditions.

Conserving historic values, longing to retain the past and being apprehensive about the future of a site is characteristically a western view (7). Many African heritage sites (e.g., sacred groves of Nigeria, sacred pools of Katchikally in the Gambia) are viewed as works in progress, as active sites (16) in which heritage is continually being created (and lost) (17). The difference between static and dynamic heritage is not uniformly seen in Asian or African practices, nor is it uniformly absent from western ones (e.g.,18). However, the distinction is useful in framing adaptive management as conditions and values change. Nearly all heritage sites are facing some pressure from climate change. Managers must look to the future and frame both reactive and proactive strategies. Recent work (19, 20, 21) has shown that currently, most responses are reactive, attempting to replace lost values rather than being proactive about potential future values (9, 22). Proactive management will look to the future, assess the risks to the values of the site and adapt their management accordingly.

Landscapes are not static. They have reached their current biophysical condition through landscape evolution, part of which has been influenced by humans (23). There also is an evolution of societal views and values (13), and a causal interaction between human values and landscapes (i.e., the attributes to which we ascribe value guide our behavior, which in turn influences changes in the landscape) (5, 24). Heritage managers recognize that landscapes are not static and that some degree of change in biophysical condition is to be expected. Conceptually, we recognize that variance and build management strategies to retain our heritage sites within our defined "limits of acceptable change" (9). Here the concept of safe operating space (25) is useful in defining the upper and lower boundaries of change that are within the risk appetite and manage to remain within these boundaries. As climate change (and other influences) alters the conditions of heritage landscapes, we will exceed those limits in many cases. The OUV or other heritage value will move out of the "safe operating space" within which the values are resilient (i.e., bounce back from perturbation). The heritage attributes for the site will be lost and in need of redefinition. The site will, in effect, transition from one state into another, a condition from which the first state is isolated (5). The heritage attributes for the site will be lost and in need of redefinition. We will be forced to ask "Is this still valuable as heritage?" and we will be challenged to find credible ways to express our narratives about the history of our heritage sites (26).

Natural heritage is properly managed at the landscape scale

It has become widespread practice to manage heritage sites as discrete patches in the landscape. That scale makes sense from a practical standpoint. A patch (of any spatial scale) is owned and managed by a bureaucratic entity (e.g., a nation state), and that entity has at least some control over activities within the patch. However, that patch always is influenced by conditions in the surrounding landscape and vice versa. We suggest that effective heritage

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management must occur at the landscape scale (defined as the zone of influence on the heritage site) and must be adaptive, an approach we call *adaptive heritage.* In the following sections, we discuss why landscape is the appropriate spatial scale, and discuss what we see as the components of adaptive heritage. We address the conundrum: *When a site loses the attributes that make it heritage, do we de-list or lower our standards*? We close with a series of practices gleaned from the literature that seem to advance the practice of these ideas, and an example where those practices are in place.

The landscape is the greater physical space in which a heritage site resides (9). Heritage sites themselves vary widely in size, at least ranging from Vale de Mai (0.2 km^2) to the Great Barrier Reef (3500 km^2) (27). The landscape includes the surrounding biophysical as well as socioeconomic context within which the heritage site is located (3). Human activities (e.g., agriculture, industrialization, urbanization) and natural activities (e.g., erosion, seismicity) in the surrounding landscape often strongly influence the character of the heritage site and may control the degree to which the site meets the criteria that characterize it as heritage. A landscape-based approach to heritage management is increasingly recognized as being essential for effective heritage management (3, 22, 28, 29). The strength of the landscape approach extends beyond its encompassing scale and includes a focus on flows and linkages among patches (28, 29).

One of the characteristics of landscapes that strongly influences heritage management is that landscapes are dynamic (30). The present condition of a landscape is a product of natural and anthropogenic influences, and these continue to change through time. Heritage sites are affected by off-site anthropogenic influences such as biodiversity use, encroachment, invasive species, water management, carbon emissions and climate change, as well as practices that affect the flows of energy and materials. As Kimball (4, p59) states "Everything arises, persists, and passes away because its temporary existence depends on whatever lineages of phenomena brought it into being, whatever phenomena hold it in place and memory for a time, and whatever phenomena will inevitably cause its undoing". However, beyond biophysical conditions, the values we assign to heritage are themselves dynamic (5).

Landscapes are dynamic entities

The dynamic nature of landscapes and the heritage sites within them requires a management and conservation approach that is sensitive to change (9). In some ways, this is a wicked problem. We are using ever-changing management strategies to reach ever-changing goals (22). Heritage sites are biophysical patches, but their values are social constructs. That is, heritage is a complex socio-ecological system (SES). The most effective approach to understanding and managing a SES is through resilience, adaptability and transformability (31). Transformability, or the ability to cross thresholds into new states is the latter of those three properties and is central to our ideas of adaptive heritage. As biophysical and socioeconomic conditions change, the SES evolves to follow a new trajectory (31) to a new center of attraction, potentially with attributes that do not meet the original criteria for site designation (i.e., it transitions to a new state).

There are several reasons why the dynamic approach to a heritage landscape SES is attractive. Such an approach is science-based but necessarily incorporates human valuation and iterative decision-making (30). The approach is (can be) forward looking, using visioning and scenarios to consider future values and future biophysical conditions (5). An iterative and adaptive approach advances learning, focusing on experimental, untested alternatives (22) from

which new strategies and conditions arise (28). Also, it acknowledges that we do not, cannot know everything. Therefore, we act to the best of our knowledge. We live in learning landscapes where we plan, act, monitor, improve, and repeat. The result, when properly implemented, focuses on adaptive management (i.e., learning from trials), on simultaneous attention to multiple objectives and, critically, on stakeholder involvement (30). Because these trials are implemented at the landscape not the patch scale, stakeholders come from the broader area, increasing the opportunity to define community-wide goals and corrective strategies.

Management of a heritage site (as a SES within a landscape) is an attempt to understand and balance stakeholder needs and values with the landscape trajectory (28, 29). Those stakeholder needs and values must include the criteria used to judge the heritage site when it was first designated (5, 7). The landscape trajectory implies continuity, which differs from static integrity. In fact, continuity recognizes the "continuous process of evolving tangible and intangible heritage expressions in response to changing circumstances – in this sense, change is embraced as a part of the continuity" (7, p. 21). Change in this context includes both the biophysical attributes of the heritage site, and the societal value, the evolving human expression of the ways the site represents something valuable to future generations (18, 33, 34).

The subset of heritage that we are considering here is internationally designated. As such, each heritage site has met the criteria of some designating body, and site management goals are targeted toward, or at least influenced by those criteria. However, there is a striking weakness in the ways those goals are framed and implemented for most such heritage sites: They are spatially and temporally constrained. They inadequately consider the sphere of influence of the surrounding biophysical and cultural landscape, or the temporal changes that influence the heritage site. The landscape approach (i.e., the sphere of influence on the site) necessarily considers the views and values of a range of stakeholders and forces a consideration of tradeoffs and co-benefits in that larger spatial area (9). Such a broader view of spatial area and stakeholders advances inclusivity (35) but adds management complexity. That complexity slows decision-making and reduces the probability of consensus, but advances informed and inclusive decisions. Climate change influences all our heritage landscapes, acting as a threat multiplier (17). As it does so, the need for informed and inclusive decisions increases. Sustaining heritage landscapes is not a linear process, especially as climate change increases climatic variance. That variance creates windows of opportunity and risk that may cause a phase shift from one stability regime to another (31).

As a dynamic resource, natural heritage is always changing

Heritage conservation by necessity works with those windows of risk and opportunity. Our landscapes, as well as the societal values that establish our goals and benchmarks, are continually in a state of flux. Conservation is management of change or risk compatible with predefined objectives in an ever-evolving world (32). In this sense, compatible means changes that retain the heritage values. The framework of continual change and therefore, limits of acceptable change within a safe operating space, poses significant challenges to our (implicit or explicit) goal of maintaining a constant value, continuing to meet the criteria for site OUV (10). Heritage management has traditionally involved setting aside large areas (as RAMSAR wetlands or Biosphere reserves or World Heritage sites) and attempting to prevent degradation by managing threats. Yet, that management approach is static and clearly does not consider either climate change (10), or anthropogenic changes in the surrounding landscape. Managers will be able to affect some but not all those external influences. As those external influences change the

site, managers will be faced with conditions that do not meet the OUV (or other listing criteria). That requires a decision: Do we lower the bar for eligibility or decide the site no longer represents heritage (10)? Do we accept a shifting baseline for heritage? This question requires a societal answer but lies within the philosophical domain of acceptance that all does not remain constant in this world.

On the surface, it seems that "management of change" (9, 13, 36) is the operational philosophy that should guide management. In that sense, heritage becomes a process bounded by the biophysical landscape on one hand and societal values on the other (4, 37). And that process has a momentum, a continual change through time (29), that constrains and empowers management. Heritage conservation becomes an attempt to balance tradeoffs, accommodating some magnitude of change, some deviance from original condition yet retaining some semblance of the values society holds for the site (5, 10)

Adaptive management (in the case at hand, *adaptive heritage*) is the suite of views and practices that allows us to manage that momentum. Viewing a heritage site as a SES recognizes the interaction between the biophysical and the social aspects of the broader landscape and where the site sits in that interactive space. An adaptive approach to these SESs recognizes that the system learns, in the sense that condition and behavior today are a function of condition and behavior in the past (31, 38). That recognition frames our heritage site today as having a place on a trajectory, rather than a static condition. Examples of that trajectory abound. Pastoral heritage, as seen in many parts of North Africa, is maintained only by accepting that both climates and social conditions are continually in a state of flux (17). The current landscapes of the Australian Wet Tropics are a function of centuries of human manipulation through fire (10, 39). Kimball (4) terms this "regenerative conservation", movement to a new state rather than the static view of conserving fixed conditions. Yet, regenerative conservation risks encountering shifting baselines, the need to change heritage criteria to encompass new site conditions.

Ideas for approaching adaptive heritage

In this final section, we offer five themes we suggest would advance adaptive heritage, and a site-specific example where some of these ideas currently are practiced to some degree. Rather than advocating for radical change, we suggest that progress comes from incremental changes at the margin. We argue that a reflective approach, gradually increasing the degree to which these ideas are implemented will increase resilience and advance adaptive management. We begin by considering the fundamental question considered by many and raised most recently by Weber *et al.* (10): As site conditions change and a site fails to meet its heritage criteria (or loses its OUV), do we lower the standards or delist the site? Our argument is that standards are not meaningful if they are adjusted to meet the situation. That is, we do not lower the standards. Rather, governing bodies (e.g., the World Heritage Center) should continue using "Sites in Danger" and other descriptors, perhaps including new judgments such as "Sites in Climatic Transition" (5). Further, to be useful, a standard is judged against objective measures. Returning to the Great Barrier Reef example, if onsite conditions do not meet designation criteria, the site is objectively In Danger. However, that is not and should not be all of the story. A site In Danger, with a national steward investing very heavily in protection and management has a different trajectory than a site without a national champion. It is the responsibility of the oversight bodies to recognize the difference between those two situations. Implementing the principles of adaptive heritage in a Site in Danger will create a positive momentum toward reduced threat.

Five themes of adaptive heritage

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1. Adaptive management

Landscapes, and the stakeholder values that define their management are ever changing. That interaction creates a wicked problem: we are managing for an uncertain end-goal (i.e., “future generations") while all the rules are changing (22). Adaptive management involves the cycle of framing (and communicating) goals, implementing practices that to the best of our knowledge, will meet those goals, monitoring the response of the system to those interventions, evaluating (and communicating) results, revising the goals and practices, and starting again. External factors such as climate change and social practices (e.g., tourism, incursion) cause changes in our practices and their success (40). Climate change specifically will strongly affect many heritage sites, causing changes in species composition and driving the need for adaptive conservation strategies (41). As those changes occur, sites will fail to meet some of the criteria for heritage listing. Seekamp and Jo (5) have suggested a new, perhaps adaptive term for such conditions: World Heritage Sites in Climatic Transformation, a way to frame the cultural values and landscape conditions derived from a WH site (or other protected area).

2. Transparency and accountability

Heritage conservation is always managed at the intersection of biophysical properties and societal value. Stakeholders, from the local to the global supposedly represent that valuation but experts and managers translate that valuation into action. As both landscape condition and valuation evolve, heritage managers have increasing responsibility to communicate clearly and frequently with stakeholders. That clear communication is essential if we expect stakeholders to act within their spheres of influence to sustain positive values of the site. As such, interventions need to have transparent assumptions, precise monitoring (28) and transparent reporting. Heritage sites (and their managers) need to sustain a sense of accountability among stakeholders, supporting experimentation and adaptive management, recognizing that outcomes are questionable. Heritage managers are the focal point of changes because their experience and responsibility provide direct and actionable information about the landscape they manage (35).

3. Monitoring and evaluation

An adaptive approach requires that we assess performance and adjust. Similarly, accountability consists of framing and publicizing goals, actions, and evaluations. Transparency with stakeholders builds credibility and a sense of shared understanding. All those aspects of evaluation require information, which requires monitoring. Collectively, monitoring and evaluation allow managers to set priorities, experiment, and determine effectiveness of various actions (35). We argue that heritage is best managed at the landscape scale, an approach which commonly exists as a wicked problem, requiring nuanced evaluation metrics within and surrounding the site. For example, species attributes (e.g., richness, diversity) are the most common metrics for evaluating natural protected areas (42). Yet, the purpose of monitoring and evaluation is to inform management, to inform a broad stakeholder group, and provide transparency. That requires much more than objective measures of biodiversity. Natural heritage sites are SESs, so monitoring must include the greater landscape. Further, stakeholder characteristics (e.g., economics, cultural background) affect their interest in various performance indicators (35), necessitating a diverse approach to metric selection.

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4. Innovative governance

Historically, many PAs were managed by a team of professionals who were technically skilled and were given a charge (e.g., manage to balance tourism and conservation). Understanding that the heritage site is indeed part of a larger landscape with its attendant range of stakeholders requires framing goals and expectations in a broader context. All heritage areas have management staff, who have responsibility for resources at the site. However, advisory councils and other shared governance approaches empower co-management, shared goals, and a sense of community both among those responsible for management, and within the broader community in the landscape (35). Given that many sites are, or were, home to First Nations people, their role in governance is paramount, and needs to reflect indigenous rather than strictly Western approaches to governance.

5. Living heritage

Most heritage sites are defined based on a series of values present at the time of designation (e.g., OUV in a Word Heritage context) and are managed in a static way to maintain those values. In that sense, the value is defined by past events. The implicit statement is: landscape evolution (and any human influence) has produced a condition we find attractive, and future changes away from that attractive state are to be avoided. Authenticity, a core component of site valuation (e.g., 2) suggests that site conditions must remain close to some defined or imagined prior condition. In contrast, living heritage is a process-based approach in which change through time is an inherent part of value (7). Living heritage suggests that authenticity is not static, but is defined by the intersection of communities (i.e., stakeholders) and site biophysical attributes (7). Living heritage sites are seen as continually in transition, a process that might be termed "transformative continuity" (5). The attribute that makes a living heritage site "authentic" is the degree to which there is congruence between community values and heritage conditions. Rather than seeking to avoid change, managers of living heritage sites seek to advance that congruence. In doing so, managers must separate influences that can be managed (e.g., pests, fire) and ones that cannot (e.g., climate change).

Examples of innovation

Many authors have suggested and/or demonstrated approaches and tools that could advance adaptive heritage (e.g., 42, 43). We close this paper with comments on two promising tools, and an example of a natural heritage site that demonstrates innovation.

- **Heritage tourism**

Part of the expectation for heritage sites is their representation of world heritage values to the general public, often through tourism. However, tourism has to be managed if it is not to be a threat to the OUV, or if the OUV is to be dynamic in the face of increasing tourism to the site. Heritage conservation is an expensive management practice. It involves setting aside lands for conservation, and investing time, energy, and resources in managing those lands to sustain the accepted values. Many sites are in the thrall of tourism, because it is a significant value for heritage sites and tourism revenue sustains many heritage management practices. Global tourism was valued at $2.9 Trillion (USD) in 2019 (44) and heritage tourism accounts for approximately half of that value (45). An economic force of that magnitude drives many decisions, including the risk that tourism becomes so financially attractive it destroys the site. There are opportunities to influence those decisions. At the scale of the individual traveler, tools such as the Climate Footprints of Heritage Tourism are available online (in that case, as a publicly available ArcGIS

StoryMap) (46). In contrast, at the scale of the individual heritage site, there is a positive opportunity to manage in support of tourism values, but a counter-pressure to ensure that the site is managed for an inclusive range of stakeholders. Ecotourism is seen as compatible with many natural heritage sites but often is expensive and exclusive. That raises a conflict requiring attention: how do we sustain low density, low impact tourism and meet societal goals of inclusivity (46)?

- **Regenerative conservation**

Kimball (3) has suggested that heritage conservation would be advanced through the practice of "empty heritage". In his view, all heritage sites are devoid of any inherent quality. Rather, the qualities we ascribe to a heritage site are a function of the values we hold, and those values change with time and among stakeholders. He further suggests that careful examination of those values and the stories supporting them can lead to regenerative conservation. That challenges the definition and many of the applications of heritage conservation. Weber *et al*. (10) among others have shown that the heritage values of the Australian Wet Tropics are indeed the product of thousands of years of human manipulation. Archer *et al*. (47) discuss species that have been absent from certain lowland landscapes since the late Pleistocene, yet those lowlands are returning to pre-Pleistocene conditions due to climate change. If a species absent >10,000 years is introduced to the lowlands, does the species now have heritage value? David Burney (48) and others have spent two decades restoring Makauwahi Cave in Kauai, Hawaii, intending to reconstitute as much as possible of the local ecosystem as it existed before the arrival of humans. Is such a reconstituted landscape of heritage value? If not, what aspects of heritage definition are not met?

An example of adaptive heritage in practice

The Wet Tropics World Heritage Area (WTWHA) rainforest was listed by UNESCO for all four natural criteria in 1988 and it was recognised on the Australian National Heritage list for its cultural values in 2012 (10). The WTWHA contains rainforests that have existed on these mountain ranges for over 130 million years. The site also is home to one of the world's oldest living cultures: Rainforest Aboriginal Peoples have been living here for at least 5,000 years. Before European settlement, the Wet Tropics rainforests were one of the most diversely populated areas of Australia, and the only place where Australian Aboriginal people permanently inhabited a tropical rainforest environment (49). Rainforest Aboriginal people developed a specialised and distinctive cultural heritage as well as traditional food gathering, processing, and land management techniques, shaping the soil, as well as animal and plant species composition and distribution. Landscape management through fire and cultivation shaped the natural values upon which the WTWHA was gazetted in the 1980s, highlighting the role of socio-ecological systems in engaging the natural heritage and the dynamic nature of the landscapes. The challenge remains that the World Heritage listing favoured management policies that restricted Rainforest Aboriginal Peoples' access to its forest environments, favouring botanical novelty and evolutionary trajectories over human history (39). Recent, more enlightened approaches of the Wet Tropics Management Authority have recognised the important role that Rainforest Aboriginal People have and do play in these dynamic landscapes (10). Co-management of the WTWHA by the Australian government and the Abroiginal Peoples has several attributes of adaptive heritage. Management is adaptive and the site clearly is seen as living heritage. Actively engaged citizen and management groups communicate frequently, using monitoring and evaluation to advance transparency and accountability (10).

Conclusions

We suggest that heritage conservation will be advanced by an adaptive approach. We have positioned this argument in the literature that guides heritage valuation, arguing that protected areas are best managed in a landscape context and that both the biophysical and sociocultural aspects of that landscape are subject to continual change. Heritage sites are not cocooned off from those changes. We have offered five themes of an adaptive approach that we suggest would improve the relationship between heritage conservation as a practice and the society (i.e., the societal valuation) that supports such conservation. We also offer guidance, supporting decisions about natural heritage in the face of climate change and non-climatic pressures. As examples, we cite the Great Barrier Reef where adaptive heritage would avoid delisting or lowering standards, and the Wet Tropics, where we see adaptive approaches currently being practiced.

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