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ARTICLE

A Systematic Literature Review on Climate Change Adaptation Planning for Archaeological Site Management and the Prevalence of Stakeholder Engagement

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Abstract
This article presents a systematic literature review of publications from 2014 to 2021 using "archaeological site" and "climate change" as keywords, in addition to several terms representing forms of stakeholder engagement. Articles were thematically coded to explore trends at the intersection of climate change, archaeology, and local and Traditional stakeholders. Results show that nearly half of the selected publications did not include local and Traditional stakeholder engagement in studies related to climate adaptation planning for archaeological sites. Synthesis of the results with insights gained from other literature on decolonizing archaeology showed that potential reasons for this gap include (1) the academic publishing culture, (2) archaeology as a predominantly Western discipline, and (3) increasingly available tools for climate change adaptation planning for archaeological sites. This article calls on the academic community to consider holistic stewardship using a landscape approach and to use climate change adaptation planning to elevate local and Traditional stakeholder input and values.

Resumen
Este artículo presenta una revisión sistemática de la literatura de las publicaciones en el periodo 2014-2021 utilizando como palabras clave "sitio arqueológico" y "cambio climático", además de varios términos que representan diversas formas de participación de los actores claves. Los artículos fueron codificados temáticamente para explorar las tendencias en la intersección del cambio climático, la arqueología y los actores locales y tradicionales. Los resultados muestran que casi la mitad de las publicaciones seleccionadas no incluían a los actores locales y tradicionales en los estudios relacionados con la planeación para la adaptación al cambio climático en sitios arqueológicos.. Sintetizando los resultados con ideas obtenidas de otra literatura sobre la arqueología descolonizadora, las posibles razones de esta brecha incluyen (1) la cultura editorial académica, (2) la arqueología como disciplina predominantemente occidental, y (3) las herramientas cada vez más accesibles para la planeación para la adaptación al cambio climático de sitios arqueológicos. Este artículo llama a la comunidad académica a considerar una gestión holística utilizando un enfoque de paisaje y utilizar la planeación para la adaptación al cambio climático para elevar los aportes y valores de los actores locales y tradicionales.

Keywords: archaeology; cultural heritage; climate change; Indigenous and Traditional Ecological Knowledge (ITEK); resource management; literature review

Palabras clave: arqueología; patrimonio cultural; cambio climático; conocimiento ecológico tradicional e indígena (ITEK); gestión de recursos; revisión de literature

Climate change impacts are affecting—with increasing intensity—the material, context, and intangible values of archaeological sites (Sesana et al. 2021), requiring specific adaptation planning addressing site exposure and vulnerability (Fatorić and Seekamp 2019; Rockman and Hritz 2020), sensitive site locational information (both culturally and to prevent looting; McCoy 2018), and stakeholder input (Atalay 2012). Archaeological site management differs from other heritage sites because archaeological sites include subsurface materials and hold information about human behavior (Sprinkle 2003). Archaeological sites, however, are not just locations that contain objects of the past to be studied; they are often still the cultural patrimony of living groups of people.

Climate change impacts will affect archaeological sites globally, many of which are situated on publicly owned and managed lands. Therefore, the management of significant and important places will need to be anticipated by those with stewardship responsibilities. For example, tangible heritage sites could experience extreme drought, drier conditions are causing high-intensity fires at Bandelier National Monument in the United States (National Park Service [NPS] 2023), warmer temperatures are melting glacial ice and disturbing artifact assemblages (Hollesen 2022), and sea-level rise and coastal erosion could affect heritage sites on island nations such as Polynesia (McCoy 2018). Tangible and intangible heritage values are continually reconstructed and initiated by social, political, or natural events, and a community's response reflects what is important to them (Seekamp and Jo 2020). However, without preemptive and dynamic planning for climate change impacts, the material cultural, knowledge, and associated traditions could be mismanaged or dominated by an outside power.

Archaeological site significance is determined, in part, by a site's authenticity and integrity—defined and described in the 1972 UNESCO World Heritage Convention—which should be collaboratively determined by culturally associated groups, stakeholders, and technical experts (Egloff 2006). These culturally associated groups include members of Tribal Nations and Native and Indigenous communities with varying sovereignty recognition, as well as other local communities removed from the land. In fact, many of these associated cultural groups have the right to be a part of the management—including knowledge creation and decision-making—of important sites to ensure heritage continuity (see Atalay 2006; Gosden 2012; Gupta et al. 2020; Nalau et al. 2018). The United Nations Declaration on the Rights of Indigenous Peoples (United Nations General Assembly 2007) states that Indigenous peoples have the right to identify, protect, share, manage, and live their cultural heritage; therefore, their input and perspectives on authenticity, integrity, value, and management must be incorporated in site stewardship. Additionally, the Strategic Objectives of the UNESCO World Heritage Convention include the critical importance of Traditional and local communities in heritage site management (UNESCO 2007).[1]

Despite such heritage ties and rights to archaeological sites, the continuity between past and present is often neglected—even for rightsholders—in site management, and the values and knowledge of living descendants is minimized or considered optional. As a form of site management, climate change adaptation must reflect the values, perspectives, and preferences of descendant communities (Nalau et al. 2018), which may not align with agency goals and Western science approaches to archaeology. For this reason, there can be tension between resource managers and local and Traditional stakeholders when resource stewardship is mandated to incorporate Indigenous and Traditional Ecological Knowledge (ITEK[2]) and reflect Indigenous preferences (Khazraee 2018), particularly given that ITEK is infrequently included in scientific inquiry (Whyte et al. 2016) and is often misused or ignored (Valkonen et al. 2017). This neglect can mainly be attributed to the fact that consultation processes, such as those mandated for public land managers in the United States, are based in standardized regulations of cultural resource management and policy, which are rooted in Western science (Newsom et al. 2021).

To enhance the value and contribution of ITEK in heritage and archaeological site management, it has been suggested to weave or braid ITEK and Western science approaches to site stewardship, which can lead to adaptation planning that is more holistic (Andrade et al. 2022; Hotchkiss et al. 2022). Holistic site stewardship, in this case, refers to the integration of cultural and natural resource management (Helmer et al. 2020), as well as the coproduction of approaches found in Western science and

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cultural values and perspectives (Wu et al. 2017). Holistic site stewardship values local and Traditional knowledge and expertise (Armitage et al. 2011; Simpson et al. 2022), and it leads to more sustainable practices (Makondo and Thomas 2018).

National and international organizations that focus on the stewardship of heritage sites and protected areas are robustly promoting (1) ITEK and local and Traditional perspectives as integral to holistic site stewardship (see Dawson et al. 2021; Lander 2021; Orlove et al. 2022; UNESCO 2013a); (2) cultural heritage site stewardship by associated groups as a human right (see United Nations General Assembly 2011); and (3) people-centered approaches to heritage site management (see International Centre for the Study of the Preservation and Restoration of Cultural Property [ICCROM] 2015). Yet the extent to which these guidance documents and policies are being implemented in practice is not well known.

In this article, we explore the prevalence of such increasing calls for incorporation of ITEK in archaeological site stewardship and climate adaptation planning by looking into its prevalence within recent academic literature. It is important to note that stakeholder input is happening within archaeological theory and practice, and that academic literature may not accurately represent current efforts or those that do not include refereed journals. However, analysis of recent academic literature is an important way to get a pulse on topics that are important to researchers and to identify gaps in the body of knowledge and areas where calls to action may not align with current and ongoing research priorities (Petticrew and Roberts 2006). The aim of this article is to systematically review recent literature on the intersection of archaeology and climate change, with a specific focus on the prevalence of local and Traditional stakeholder input in planning and stewardship of archaeological sites.

Research Methods

This article presents a systematic literature review guided by the following research questions:

(1) What recent literature exists about climate change adaptation planning for archaeological sites, and to what extent does this literature include the knowledge and perspectives of local and Traditional stakeholders in site stewardship?
(2) What management suggestions are offered in the literature, and do they include opportunities for working with local and Traditional stakeholders?

The specific objectives of this study are to (1) document the prevalence of academic publications that address climate adaptation planning of archaeological sites and (2) identify the extent to which those publications include or recommend the integration or consideration of local and Traditional input. The systematic literature review will follow the approach adapted by Fatorić and Seekamp (2017) for cultural heritage and resources at risk from climate change (Table 1).

Data collection for this study included the creation of keywords, selection of relevant publications, development of a codebook (see Supplemental Text 1), and coding the selected publications (Steps 2–6). The keywords used to identify the literature (Step 2) consist of three search terms. The first two terms remained consistent for each search query: climat* chang* AND Arch?eolog* site*. The third search term changed with each search.

The databases selected for this study come from the Web of Science, a multidisciplinary platform covering both natural and social sciences, with almost two billion cited references (Clarivate 2022; Step 3). The Web of Science was chosen because it is a popular, open-access platform with multiple indexes used by academic researchers for over 50 years, and therefore a reflection of current and frequently mentioned topics and themes within academia (Clarivate 2022). This database is not all encompassing, but it serves as a hub for researchers to find refereed literature on a topic or idea. All publication titles and keywords from the search were reviewed and abstracts scanned for selection (Step 4). Articles were accepted if they met all the themes of the research question: (1) cultural resource management and (2) climate change as a driver for action. This also aligns with the two consistent search terms of "arch?eolog* site*" and "climat* chang*." Publications accepted based on title and abstract review were downloaded to be coded (Step 4).

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Table 1. Data Collection and Analysis for Systematic Literature Review.

Steps	Process
Step 1: Develop questions	This step develops research questions based on inductive reasoning supported by background research.
Step 2: Create keywords	This step requires the development of search terms based on the objective of the research questions.
Step 3: Conduct search	This step requires selecting an appropriate database, entering key search terms, and determining if results from the search are relevant based on publication titles.
Step 4: Select publications	This step accepts or rejects publications based on a review of their abstract. Accepted publications are downloaded, citations are collected in Excel, and publications are uploaded to NVivo.
Step 5. Analyze publications	This step requires review of each publication, in which a codebook using open coding is created based on the aims of the research question.
Step 6: Establish interrater reliability	This step requires a peer to review a random sample of accepted publications once all publications are coded.
Step 7: Report and discuss	This step uses NVivo to create matrices and other outputs based on file classifications and case codes. Results are analyzed and interpreted by the researcher to identify patterns, gaps, and anomalies.

A codebook (Step 5) for the accepted results of the literature review (i.e., meet the criteria of Step 4) was developed a priori but iteratively revised as new themes emerged, resulting in both inductive and deductive coding. Thematic coding was based on an approach by Fereday and Muir-Cochrane (2006), and it employed deductive codes (a priori) and inductive (emerging themes) codes. Deductive codes included publication year, publication type, heritage resource type, and implicit/explicit/ignored stakeholder engagement. Inductive codes centered on management suggestions. QSR NVivo v10.0, a qualitative data organization software, was used to store the publications and conduct the analysis (Step 6). This software allows for the creation of file codes and classifications, as well as visualizations and outputs (e.g., matrices and graphs across multiple codes and classifications) to help identify trends and patterns.

Interrater reliability (IRR) was employed to enhance data quality of the codebook and iterative coding. Six accepted publications were selected using an online random number generation (https://www.randomizer.org/) and were given to a peer, along with the descriptions of the three deductive themes of climate change, heritage site, and stakeholder prevalence. IRR was only conducted on the three deductive themes because inductive codes were emergent codes that were recorded, described, and refined throughout the review of the publications. Inductive, emergent codes focused on management suggestions and best practices. As described in Hemmler et alia (2022), using a statistical coefficient such as Cohen's Kappa can be helpful for determining interrater reliability, which increases trustworthiness, validity, and rigor of qualitative research methods. After discussing the themes and descriptions with the other rater, the Cohen's Kappa coefficient was calculated both by hand and using R, resulting in 0.97 between the two raters. This coefficient can be interpreted as "almost perfect" (see Gisev et al. 2013).

Protocol for Search Terms

First, we selected the temporal range of our search. Early results from a temporally unconstrained search revealed a spike in publications results after 2013, influencing the decision to describe "recent" publications beginning in 2014 and ending in the year prior to analysis (2021). This decision is also intuitive in that it follows from Fatorić and Seekamp's (2017) seminal literature review on cultural resources and climate change with minimal (two years) overlap. Next, we selected two dependent search terms that are specific to the overarching research question. A third search term was added, replacing the previous independent search term, in each iteration of the search that focused on the

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research question related to management and local knowledge systems. Each accepted publication met the following criteria:

(1) Must focus on the management and planning of archaeological sites, and
(2) Must include climate change and impacts as a driver for management action, planning, or assessment.

To make sure search results included both criteria, the search terms "arch?eolog* site*" and "climat* chang*" were always used. "Site*" was always paired with "arch?eolog*" to eliminate archaeology science and to focus on management of places and resources. Quotation marks are used around phrases and to maintain word order, whereas individual words do not require them. The intention of the phrase "arch?eolog* site*" is to keep the focus on site stewardship and management rather than excavation, testing, or interpretation, which happens when a site is still being investigated. The third search term (variable term) was changed for each search, and 14 additional variable terms were added (see lists below). Terms related to managing archaeological resources include "management," "adapt* plan*," "priorit?ation, priorit*," "framework," "plan*," "steward*," and "framework." The terms related to local and Traditional stakeholder groups included "Traditional knowledge," "Ecological knowledge," "Trib*," and "Native people," "Indigenous," and "communit*."

Coding Strategy and Analyses

When we reviewed abstracts, it became clear that the definitions of some words and phrases needed to be narrowed or broadened given the research question.

(1) An "archaeological site" is defined from a Western science perspective as "the study of past peoples through their material remains. . . . Resources include sites, collections, and documentation associated with excavation and curation activities . . . [and] hold relevance and significance to people today" (NPS 2006). This includes materials at surface or subsurface levels, as well as marine materials. Sites and objects must be in situ and can be partially or completely excavated.
   (a) "Heritage sites" is included as a code in this study as long as archaeological sites are a component of the broader heritage site.
(2) Local and Traditional stakeholders are grouped together for this study, yet there are some important distinctions. "Local stakeholders" refers to communities that give meaning to places or claim cultural connection to sites and landscapes. "Traditional stakeholders" refers to Indigenous, Aboriginal, and Native peoples, who are often colonized or displaced from their ancestral homelands. "Traditional stakeholders" can also refer to sovereign Nations with rights to govern their own heritage, cultural property, and data.
   (a) "Knowledge systems" include local and Traditional stakeholders, and their knowledge systems and ways of conducting science. For this reason, the local knowledge and ITEK knowledge systems were combined conceptually to cast a broader net on differing knowledge systems and ways of life (not just Indigenous Knowledge or Traditional Ecological Knowledge). Epistemic differences between local knowledge and ITEK systems are not addressed, but it is understood that different knowledge systems shape values and priorities in managing heritage sites and places (Taylor and Lennon 2011).
(3) Direct input from local and Traditional stakeholders was easy to capture, yet some publications only mentioned that local groups exist, or they failed to acknowledge them at all; therefore, "stakeholder engagement" is categorized as explicit, implicit, or ignored.

Publications were also assigned case classifications to give a broad scope of the fundamental focus of the study and publication, the archaeological site(s) studied, prevalence of stakeholders, and climate change impacts. Case classifications and their codes are as follows:

(1) Geographic scope: where research is focused or took place.
(2) Publication type: journal article, report, book chapter, et cetera.

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(3) Heritage resource: a stand-alone archaeological site or a heritage landscape.
(4) Climate change impacts: primary or nonprimary driver for action.
(5) Stakeholders: implicit, explicit, or ignored.

Themes and intersections explored from the deductive codes look at accepted publications overall for geographic scope, archaeological sites as the focus or part of a larger heritage site, trends in relevant publications over the selected time period (2014–2021) and climate change as a main driver for action, and the prevalence of local and Traditional stakeholder perspectives. Inductive codes focused on the array of management suggestions. Intersections between inductive and deductive codes looked at relationships between stakeholder prevalence and climate change as a driver for action—and continuity with living descendants—as well as management suggestions that imply opportunities for stakeholder engagement and incorporation of their values.

Results

Results of the keyword searches used 18 unique terms—producing an even 1,500 total results, of which an even 100 ($n = 100$), both coincidental—were selected as relevant publications (see Supplemental Text 2). Overall, there has been an increase in the number of publications related to climate change impacts to archaeological sites (Figure 1). The trend (dotted) line shows an upward trend despite declines in some years. Additionally, there has been an increase in the number of publications in which research or studies conducted have climate change impacts as the main threat or issue to archaeological sites (Figure 2).

Archaeological sites can be treated and managed as individual sites or as part of a heritage site or cultural landscape. The greatest proportion of accepted publications were coded as stand-alone archaeological sites (52%), closely followed by heritage landscapes that include archaeological sites (47%). The category of "other" (1%) included a publication that was focused more broadly on archaeological sites and archival material (Figure 3).

The geographic distribution of the accepted publications by region of the world shows a heavy representation from North America and Europe (Figure 4). This does not refer to the authors' affiliation; categorization of the publication is based on the case study or location where research was being conducted.

Each publication was coded for the relevancy of stakeholders in the research or management recommendations. Stakeholders were coded (deductive or a priori coding) as directly identified and included in the study or management recommendations (explicit), not mentioned but alluded to (implicit), or not mentioned at all (ignored; Figure 5). Approximately half of the accepted publications (48%) ignored stakeholder connection to the sites and did not mention their values or perspectives in site stewardship; almost one-quarter (24%) explicitly mentioned or worked with an associated cultural group; and one-quarter (28%) mentioned or recommended working with local and/or Traditional stakeholders but did not specifically mention or work with any associated cultural groups related to their study.

In the analysis of stakeholder prevalence by year, accepted publications coded as "ignored" had the steepest upward trend (dotted) line, where "implicit" and "explicit" had a flatter increasing trend line (Figure 6). In 2020 and 2021, there were 21 publications accepted for both years that result in "ignored"—making a noticeable increase—with "explicit" and "implicit" numbers decreasing. Proportionally, "ignored" has the highest share for half of the years (2015, 2016, 2019, and 2021) and has an upward trend over the entire span of time.

Stakeholder prevalence in accepted publications (implicit, explicit, or ignored) and their relation to heritage site continuity (connected to living descendants) show a clear connection of explicit stakeholders ($n = 24$) and their current connection to archaeological objects and places ($n = 19$; Table 2). Stakeholder insights (local knowledge and ITEK systems) are included in two-thirds of publications ($n = 16$) that explicitly mention stakeholders ($n = 24$), but they are otherwise low overall (Table 2). In other words, some publications mentioned a site's connection to a local or Indigenous community (connected to living descendants) but did not mention any engagement efforts or inclusion in further planning or decision-making (ignored).

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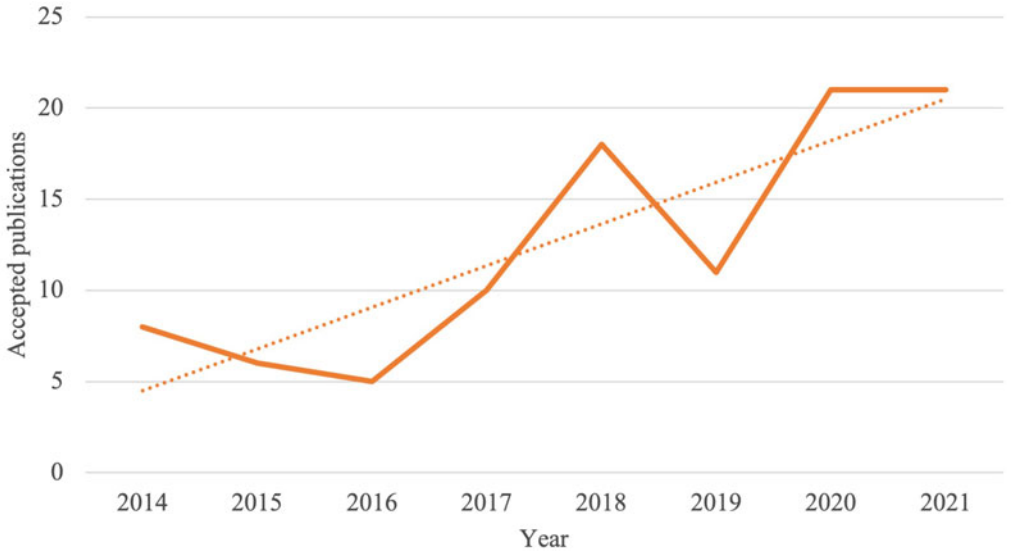

Figure 1. Publication results by year.

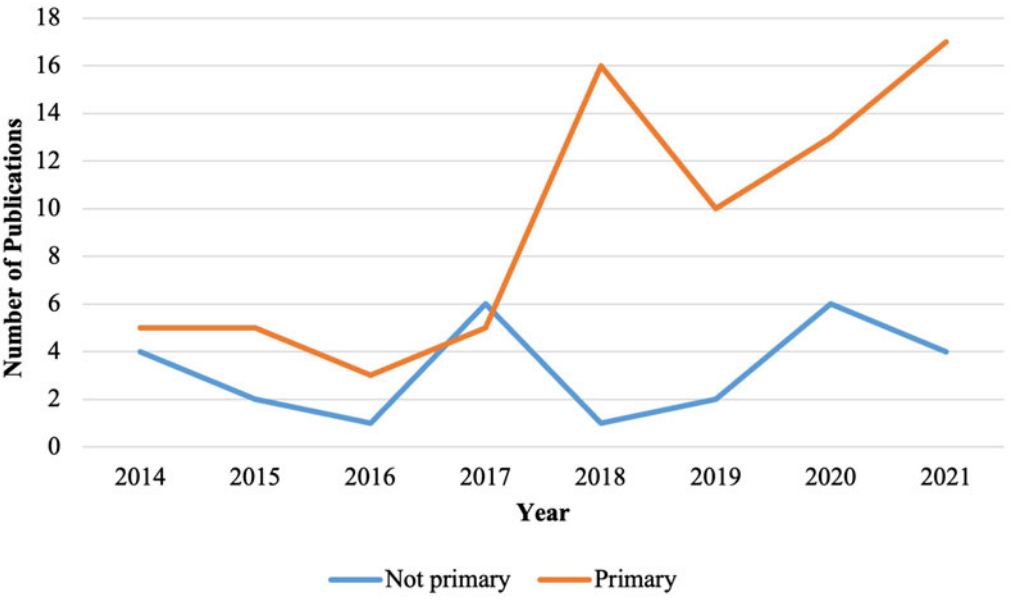

Figure 2. Climate change as a driver for research by year. (Color online)

Over 20 management suggestions were identified in the publications, with the most frequently mentioned suggestions showing up in over 20 publications (Table 3). There were six codes identified (and bolded in Table 3) that imply the intention to work with local and Traditional communities in planning and managing for sites. The most frequently mentioned management suggestion was to use some type of assessment, framework, or structured decision-making tool—coded as "assessments and frameworks"—in over 30 publications. Consultation and engagement ($n = 24$), specifically, ranked number three in terms of frequency, indicating a desire to engage with partners and stakeholders. Other

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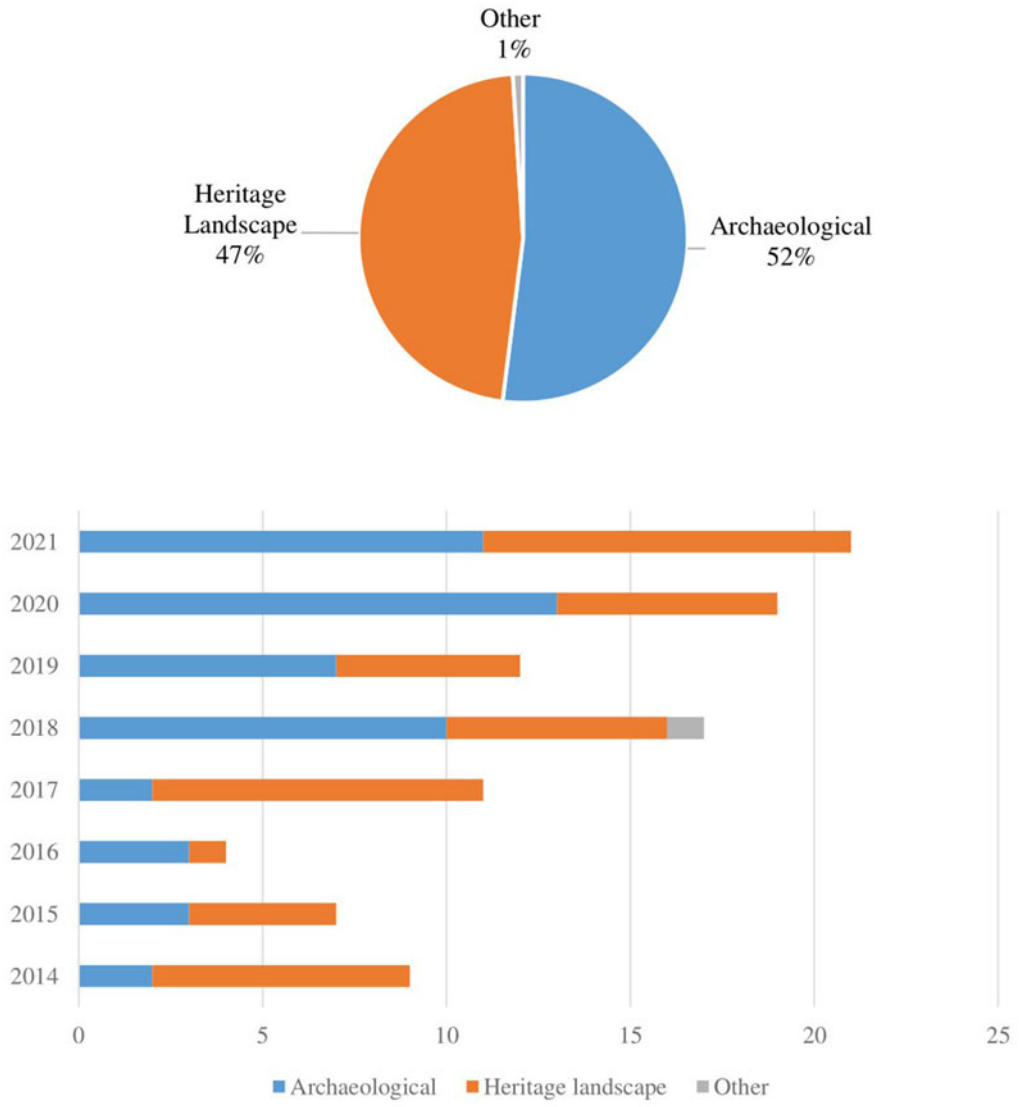

Figure 3. Heritage site type by proportion and by annual proportions. (Color online)

management suggestions that are also related to working with stakeholders included collaborating ($n = 11$), creating training and guidance ($n = 9$), and building relationships with stakeholders ($n = 6$).

Of the 23 codes for adaptation and management suggestions, eight codes centered on the inclusion of stakeholder input in planning and decision-making (see Table 3, code names in bold). Publications that implicitly or explicitly mention stakeholder input are suggesting management and planning actions that have the opportunity to increase meaningful engagement with stakeholders.

Limitations

The use of only one database (Web of Science) in this literature review is both a strength and a limitation. Although comprehensive and recognized, this platform is a strong representation of the body of knowledge in Western science, but it is restricted to academic publications written and submitted through a system designed by Western scientists. Practitioners or nonacademics often share information and best practices through other channels (e.g., non-peer-reviewed articles or nontraditional forms of publishing), including white papers, gray literature, reports, conference presentations and

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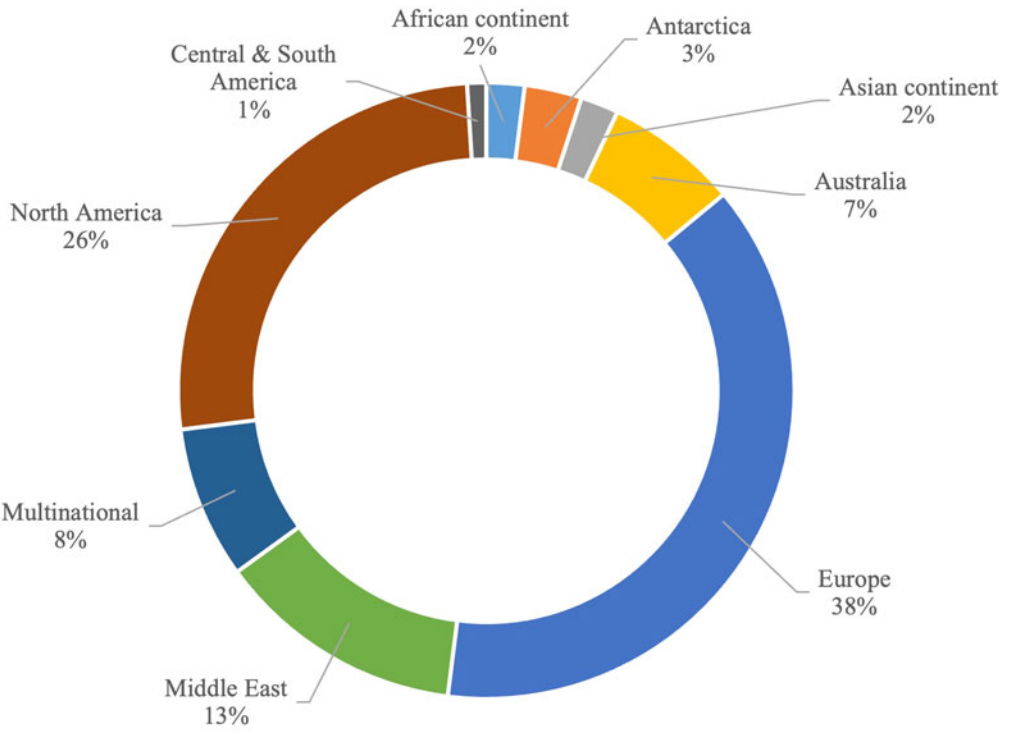

Figure 4. Proportion of publications representing different geographic scopes.

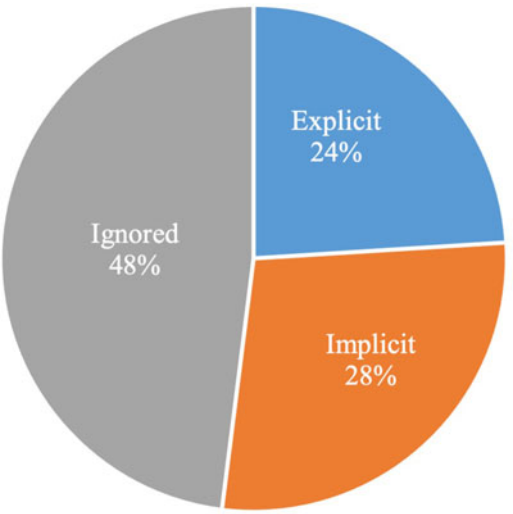

Figure 5. Prevalence of local and Traditional stakeholders mentioned in publications about climate adaptation of archaeological sites.

proceedings, and various formal and informal meetings where information is shared verbally. Moreover, this platform and method of sharing information may not be accessible to, preferred by, or inclusive of Indigenous groups.

Another limitation is that this literature review only covered publications written in English and from a specific time frame (2014–2021). The review shows that in terms of geographical location, the results are most frequently in Europe, which is not unusual in either the heritage sector or academia (Fatorić and Seekamp 2017; McCoy 2018). It is also unsurprising that North America is highly

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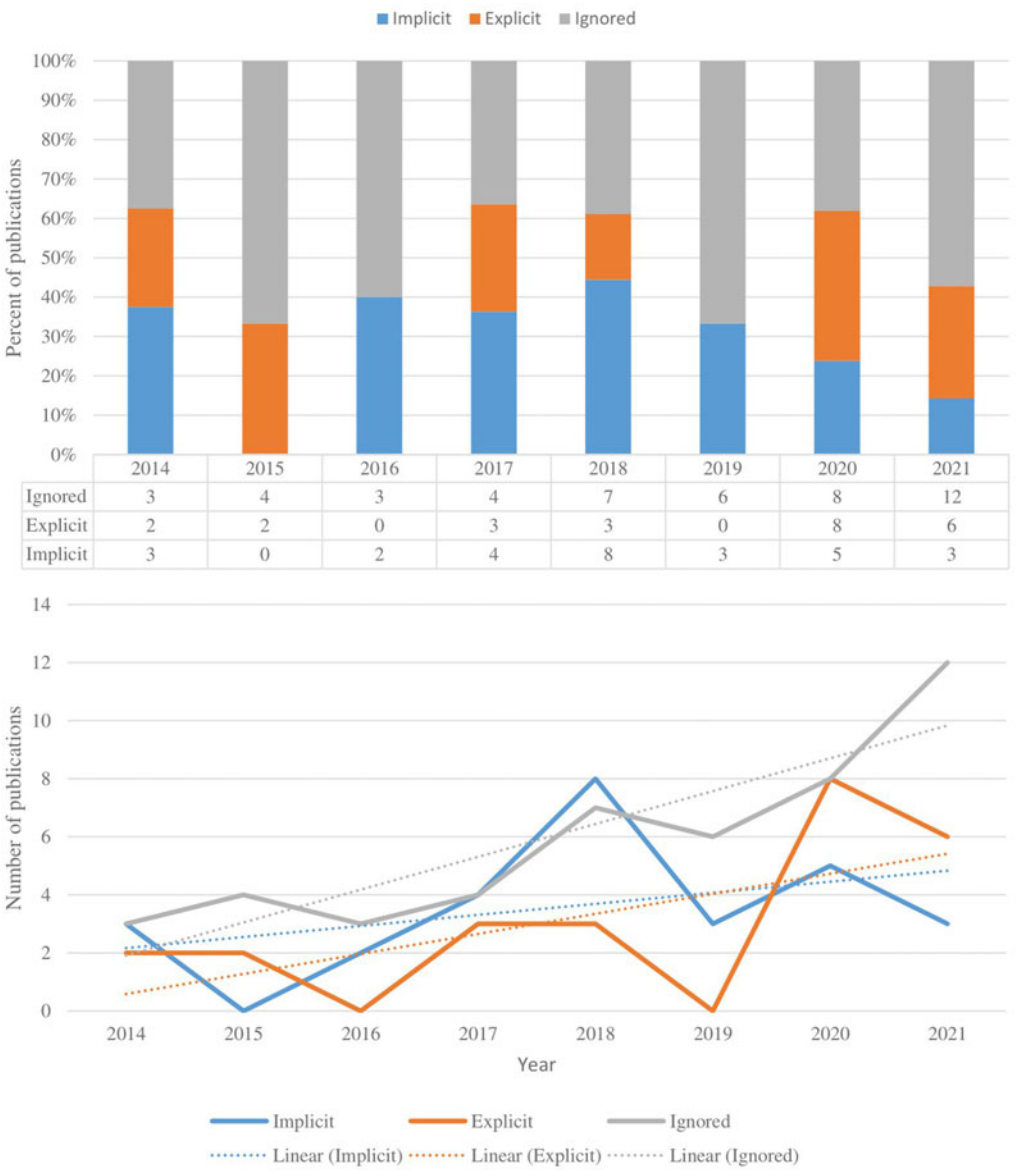

Figure 6. Stakeholder prevalence by year. (Color online)

Table 2. Stakeholder Prevalence Compared to Continuity and Perspectives.

	Connected to Living Descendants	Local Knowledge and ITEK Systems
Stakeholder Prevalence	*n* (% of stakeholder prevalence category)	
Implicit (*n* = 27)	7 (26%)	3 (11%)
Explicit (*n* = 24)	19 (79%)	16 (67%)
Ignored (*n* = 49)	2 (4%)	2 (4%)

represented; the heritage studies field is rooted in European and North American (Western) ideology (McNiven 2016; Winter 2014). As previously mentioned, using a popular platform among Western scientists was intentional to better understand the prevalence of non-Western perspectives and

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Table 3. Management Suggestions ($n = 100$).

Management Suggestions	*n*
Using/creating assessments and frameworks	31
Completing survey and inventory	29
Consultating and engaging with stakeholders	24
Prioritizing sites / determining value	24
Developing planning tools	22
Monitoring sites	22
Using multiple approaches	14
Using geospatial/modeling tools	11
Collaborating	11
Creating training and guidance	9
Preparing for loss	9
Supporting local management	9
Working to improve communication	8
Encouraging citizen science	7
Building relationships with stakeholders	6
Creating protected areas	6
Creating supportive policies	6
Conducting background research	5
Using proxy data	5
Applying for additional funding	3
Developing dynamic, continual processes	3
Using 3D or virtual displays	2
Creating physical barriers or relocating sites	1

Note: Bold indicates references to direct engagement.

wisdom, and to reveal whether archaeologists and cultural heritage researchers in academia are in fact responding to national and international calls for inclusivity and multivocality. One way would be to develop targeted initiatives with international heritage organizations (e.g., International Council on Monuments and Sites, ICCROM, UNESCO) to expand the scope of research, case studies, and available publications. The PANORAMA platform has a collection of case studies, empirical examples, and suggested strategies, but it is not peer reviewed or submitted to an academic journal.[3] Consequently, this platform might not reach the academic community and researchers in this field.

Upon reflection, almost all studies used secondary data in some way, especially when using climate change projections and downscaled (regionalized) models. In mixed methods and interdisciplinary research, secondary data are often used to bridge social and natural sciences (Tobi and Kampen 2018); in this case, accepted publications are incorporating climate science and archaeology/anthropology.

Discussion

Major trends in this study are (1) an increase in publications, with climate change impacts as the primary driver for studies on archaeological site stewardships, and (2) increasing trends of ignored stakeholders, with three-quarters (76%) of accepted publications either ignoring or implicitly mentioning local and Traditional stakeholders. Another noteworthy finding is the categorization of archaeological sites, about half of which were grouped into heritage landscapes ($n = 47\%$). The following

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subsections describe implications of these trends and findings on a larger scale of climate change adaptation planning for archaeological sites, and they identify opportunities for further research in holistic site stewardship and inclusion of local and Traditional stakeholders.

Opportunity for Holistic Site Stewardship

Half of the accepted publications combine archaeological sites with other types of built heritage. In the United States and internationally, guidance for the protection and treatment of heritage site stewardship often separates archaeological sites and buildings, but large areas could include both kinds of sites within its boundaries.[4] Archaeological sites and other built heritage (namely, historic buildings and structures) have important distinctions and similarities that will affect how managers prepare for and respond to climate change impacts. Both archaeological sites and historic buildings have connections to living groups of people that contribute to the sites' meaning, value, and significance, and both need to be interpreted and managed within the greater landscape. However, it is important to note that their stakeholder groups and treatment plans will differ. This study shows an almost even split between archaeological sites and heritage landscapes, indicating fluidity in management between archaeological sites as a stand-alone site or as one included with other historic buildings and structures.

When planning for climate change impacts to the built environment, the conversation leads to the structure of resource management and the separation of cultural and natural resources. In Western science approaches, the natural environment and built environment are managed separately and are considered different disciplines (Verschuuren et al. 2021). However, it is also common to categorize sites into "mixed" sites (UNESCO 1972) or cultural landscapes (Page et al. 1998), which can include both cultural and natural elements, as well as different types of built heritage (e.g., archaeological sites and historic buildings). As mentioned earlier, holistic stewardship practices help address the siloing of cultural and natural resource management, and by looking at sites within the greater landscape, they capture natural and cultural resources, as well as archaeological sites and other built heritage sites (Helmer et al. 2020). A landscape approach can help soften dualities between archaeological sites and historic buildings and help bridge cultural and natural resource management, fostering holistic site stewardship.

Opportunities to Include Local and Traditional Stakeholders

Overall, there is evidence of an increased awareness of stakeholder engagement and incorporation of local knowledge and ITEK systems into climate change adaptation planning; however, the data in this study show a concerning absence of stakeholder input: stakeholders are often implicitly mentioned or completely ignored. Despite a growing, decentralizing movement for more inclusive archaeology theory and practice (Clark and Horning 2019; Hollowell and McGill 2014), site stewardship is rooted in a Western system and is predominately expert driven. Furthermore, literature claims a shift in archaeological theory and practice that is more inclusive in methods, recording, and interpretation (Colwell-Chanthaphonh et al. 2010; Mathers et. al 2004), but it is not reflected in practice. There is a clear call for including stakeholders in several facets of archaeological theory and practice, and this study shows that although there are opportunities to do so (Table 3), there is a lag in explicitly implementing or reporting such inclusion.

Although the literature on climate change adaptation planning for archaeological sites is increasing, it is not necessarily reflecting the imperatives (and often mandates) for including local knowledge and ITEK systems in planning and management of sites. It is evident that local and Traditional communities have been removed from the landscape when they are not mentioned as a part of the research methods or management recommendations. Additionally, the exclusion of these voices is evident when the stewardship focuses exclusively on technical and expert knowledge (or Western science). As climate change impacts worsen and adaptation planning becomes more urgent, resource managers must find ways to effectively and more meaningfully collaborate with local and Traditional stakeholders to plan for the protection, documenting, or loss of sites. When considering funding requests for adaptation and mitigation, meaningful collaboration will also help archaeological-site stewards prioritize sites based on the values of local and Traditional stakeholders (Hotchkiss et al. 2022).

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Despite a lack of explicit mention of stakeholders, results show a variety of management recommendations that include the opportunity for stakeholder engagement. Some of the management suggestions can be directly linked to stakeholders, such as "collaboration" and "building relationships," but some are more subtle. For example, "monitoring sites" can mean having local and Traditional stakeholders as monitors, as described in Carmichael and colleagues (2018). Such breadth in data collection and engagement approaches offers flexibility and the ability for stewards to tailor their approach to be most effective for the site and its stakeholders. Western science and ITEK systems are not opposing or dichotomous (Mazzocchi 2006). Research projects, data collection and documentation, and adaptation planning for archaeological sites can be designed collaboratively (Clark and Horning 2019; Simpson et al. 2022) and should be dynamic in the response to stakeholder values and climate change impacts (Whyte 2013).

Although the geographic scope of the results from the search are largely represented by European and North American publications, we see adaptation planning for archaeological site stewardship addressed globally; however, this literature review suggests that global prevalence within the academic literature is still in its nascent stage, challenging "best practices" contributions. In particular, there were only 21 articles published in 2021, and only 11 articles published in 2019, that were specific to climate change adaptation planning for archaeological sites, and publications have tended to be Euro- and North American–centric since 2014. Moreover, the focus of research continues to be on Western science perspectives rather than on the weaving of multiple knowledge systems, which would enhance inclusivity in climate change adaptation planning (Makondo and Thomas 2018), the framing and reframing of issues (Bohensky and Maru 2011), and strategies for resilience (Thornton and Scheer 2012).

The lack of integration of local and Traditional values, perceptions, and input—or not integrating feedback in a meaningful way—will exacerbate current social and environmental justice issues and Indigenous rights (Aikenhead and Ogawa 2007). Weaving different knowledge systems and perspectives can also help identify gaps in research and policy (Ericksen and Woodley 2005). Management recommendations happening now and for the future must include opportunities for co-creation, collaboration, and comanagement. Creating opportunities for collaboration, participatory research, and relationship building are strategies that managers of heritage sites and protected areas can implement to increase meaningful engagement with local and Traditional stakeholders (Hotchkiss et al. 2022).

An important crux for actual change in collaboration and decolonization of the discipline needs to come from academia, including changes in curricula (Daigle 2019), reducing institutional barriers (Kilian et al. 2019), codesigning research methods (Atalay 2012), and empowering communities (Jurjonas et al. 2020). These structural changes also include students who are working with local and Traditional communities being mentored or supervised by someone who builds and continues relationships beyond those students' graduation as a form of modeling meaning collaboration and engagement. Documenting and sharing practices from and within the research community can create dialogue about success stories of holistic site stewardship and challenge existing policy on archaeological site management. The research community can deconstruct and decolonize existing theory and practice and use climate change adaptation planning to empower and elevate local communities and ITEK systems.

Conclusion

Archaeological site stewardship and climate change adaptation planning must include local and Traditional stakeholders' values, perspectives, and preferences, but recent literature is slow to document stakeholder engagement and relevancy in research and management suggestions. Meaningful engagement and collaboration give more authority to local and Traditional stakeholders over their cultural heritage and address the specific adaptation needs for archaeological sites (Hotchkiss et al. 2022). Low prevalence of stakeholder input does not mean it is not happening; academic literature may not accurately represent current efforts—or efforts that do not necessarily include researchers with expectations to publish in refereed journals. The database used in this study is just one database and does not

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capture non-peer-reviewed research, case studies, or practice. In other words, there is hope that more intentional engagement of local and Traditional stakeholders in climate adaptation planning of archaeological sites is captured in other outlets such as nonacademic research and case studies or through speaking. Furthermore, it is important to note that trends in published literature expose the priorities of funders and researchers.

In this way, this study reveals increasing recognition of the need for climate change adaptation planning for archaeological sites by funders. It is also an opportunity for scholars—both trained in Western science and Indigenous archaeology—to increase theoretical, methodological, and practical guidance for cultural heritage experts and archaeological site stewards. It is time for Western archaeologists to move beyond talking about the importance of stakeholder engagement that incorporates local knowledge and ITEK systems into climate adaptation planning by explicitly performing this type of work and reporting it. That said, this study excluded nonrefereed publications from popular databases and publishing platforms, which may be a more normative standard for not only local and Traditional stakeholders but also the practitioners and researchers collaborating with these communities. Stakeholder groups with non-Western values and perspectives may not desire to share their data and perspectives on mainstream publishing platforms—and likely face substantial hurdles in doing so (Mihesuah and Wilson 2002). Only when we raise awareness in the academic community, teach students and early career researchers of the systemic challenges, empower non-Western academics and Knowledge holders, and demand changes to publication standards and access will non-Western voices and values begin to reach broader audiences (Seekamp et al. 2021).

Despite engagement having a limited presence in the literature, several opportunities for meaningful engagement with local and Traditional stakeholders were identified. For example, Breen and colleagues (2021:8) suggest incorporating stakeholder values, describing a stage of the process to be "designed as a participatory, inclusive engagement process that address the knowledge, understandings, needs, and concerns of all parties associated either directly or indirectly with the [marine protected area]." Another example can be found in Dawson and colleagues (2021), who describe how collaboration can inform citizens of climate change impacts, make the decision-making process more transparent, and empower communities by giving them more tools and influence. Archaeological site stewards who integrate local and Traditional values and perspectives will work toward holistic site stewardship by weaving different knowledge systems and breaking down silos for cultural and natural resource management. Addressing the gap in literature will increase the body of knowledge on climate change adaptation planning for archaeological sites, elevate local and Traditional stakeholder input and meaningful engagement, and foster holistic approaches to archaeological site stewardship.

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Competing Interests. The authors report there are no competing interests to declare.

Supplemental Material. The supplemental material for this article can be found at https://doi.org/10.1017/aaq.2023.97.
Supplemental Text 1. Systematic Literature Review Codebook.
Supplemental Text 2. List of Selected Publications.

Notes

1. See Decision: 31 COM 13A.
2. ITEK is sometimes referred to as Traditional Ecological Knowledge (TEK) or Traditional Knowledge (TK).
3. More about the platform PANORAMA Solutions for a Healthy Planet can be found here: https://panorama.solutions/en/explorer.

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4. Guidance from UNESCO states broad typologies include "urban centres, archaeological sites, industrial heritage, cultural landscapes and heritage routes" (UNESCO 2013b:12). The US National Park Service lists specific plans for the following cultural resource categories: archaeological sites, cultural landscapes, historic and prehistoric structures, museum objects, and ethnographic resources (NPS 1998:Chapter 3).

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