Anthropology Faculty Publications and Presentations

Anthropology

9-2020

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Citation Details

Reframing Native Knowledge, Co-Managing Native Landscapes: Ethnographic Data and Tribal Engagement at Yosemite National Park

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Abstract: Several Native American communities assert traditional ties to Yosemite Valley, and special connections to the exceptional landmarks and natural resources of Yosemite National Park. However, tribal claims relating to this highly visible park with its many competing constituencies—such as tribal assertions of traditional ties to particular landscapes or requests for access to certain plant gathering areas—often require supporting documentation from the written record. Addressing this need, academic researchers, the National Park Service and park-associated tribes collaborated in a multi-year effort to assemble a comprehensive ethnographic database containing most available written accounts of Native American land and resource use in Yosemite National Park. To date, the database includes over 13,000 searchable and georeferenced entries from historical accounts, archived ethnographic notebooks, tribal oral history transcripts and more. The Yosemite National Park Ethnographic Database represents a progressive tool for identifying culturally significant places and resources in Yosemite—a tool already being used by both cultural and natural resource managers within the National Park Service as well as tribal communities considering opportunities for future collaborative management of their traditional homelands within Yosemite National Park. We conclude that the organization of such data, including inherent ambiguities and contradictions, periodically updated with data provided by contemporary Tribal members, offers a rich, multivocal and dynamic representation of cultural traditions linked to specific park lands and resources. Indeed, some Yosemite tribal members celebrate the outcomes as revelatory, and as a partial antidote to their textual erasure from dispossessed lands. In practice however, as with any database, we find that this approach still risks ossifying data and reinforcing hegemonic discourses relating to cultural stasis, ethnographic objectivity and administrative power. By critically engaging these contradictions, we argue that one can still navigate pathways forward—bringing Native voices more meaningfully into the management of parks and other protected spaces, and providing a template useful at other parks for collaboration toward shared conservation goals.

Keywords: Yosemite National Park; ethnographic databases; ethnography; National Park Service; cultural resource management; tribal co-management; Southern Sierra Miwuk; Mono Lake Paiute

1. Introduction

Since the advent of national park creation, United States national parks have provided a globally influential template for the preservation of preeminent natural landscapes. Simultaneously, the U.S. experience with parks underscores fundamental inequities and contradictions that animated these early conservation efforts. Initially, park-boosters such as John D. Rockefeller, Jr. and Theodore Roosevelt supported early park development to set aside lands for their sublime scenic values and recreational potentials for America's leisure class—shaping the priorities and the policies of the early National Park

Service [1]. Guided by a historically inaccurate concept of "wilderness" and treating large swathes of the American landscape as terra nullius, the U.S. set aside keystone parks such as Yellowstone, Yosemite, Grand Canyon and Crater Lake—places long inhabited by Native peoples. Abruptly, these landscapes came to be managed by non-Native peoples like they were uninhabited wild spaces. These were "imagined wildernesses" [2], for they were "inhabited wildernesses" [3]. Nonetheless, federal policy shaped by this colonizing logic contributed to Native displacement, and in turn, Euro-American concepts of wilderness came, over time, to be manifest on the land.

While Native American archaeological sites might be treated as objects of touristic interest in the young National Park Service, as at Mesa Verde, the presence of living Native people was often perceived as an obstacle to national park goals. Indeed, some have suggested that the creation of U.S. national parks was an act of "ethnic cleansing"—a national project that removed people from the landscape, all the while eradicating the memory of their history within these unique places [4]. This phenomenon of physical and textual displacement has been documented among national parks globally [3,5] as well as in specific U.S. parks, with Yosemite National Park being an oft-cited example [2,6,7]. Such displacement of Native peoples from park lands has been said to disrupt human lives and longstanding anthropogenic ecologies within park lands, and to undermine the cultures of Native communities and the heritage of the American nation writ large [8,9]. In response, Native American tribes, as well as academic and administrative writers, have called for an effort to "restore a presence"—not only restoring a material presence of Native peoples and their traditional practices to park lands, but also restoring the knowledge, power and textual representation of Native peoples relating to dispossessed park lands [10]. Through the late 20th and early 21st centuries, this call has reflected not only broad ideological shifts in US public thought and governance, but increasingly practical necessities as well. For in recent decades, the U.S. National Park Service (NPS) has been transformed, becoming the lead agency legally responsible for implementation of several cornerstone federal laws protecting Indigenous cultural sites and the rights of Native people—from the protection of Native American graves, to the protection of "Traditional Cultural Properties" such as sacred sites as part of the National Register of Historic Places. With a retooled mission and a new sense of urgency, the agency has grappled with the meaning of this responsibility and has sought mechanisms to meet it.

Turning to Yosemite National Park, the written record makes it clear: despite 130 years of park management and the gradual removal of all Native residents, Native presence and Native imprints on the landscape endure at Yosemite [11–13]. Several Native American communities—descendants of the park's resident peoples—still assert traditional ties to Yosemite Valley and particular connections to its landmarks and natural resources. Traditional activities such as plant gathering continued in the park for generations after park creation, sometimes openly, but often clandestinely. In recent decades, park managers have demonstrated increasing interest in and recognition of the role that native peoples have had in shaping the landscape. This has been reflected in changing park interpretation, consultation and management efforts. Throughout the late 20th and early 21st centuries, Native American tribes have gained political leverage and attained important roles in influencing park policy. In this period, the NPS has hired a greater number of Native American staff, increased consultation with tribal governments, and explored opportunities for the collaborative management of certain parklands and resources with tribal partners [2] (pp. 16–17). Resource managers have begun incorporating Indigenous perspectives into research, recognizing connections to plants and landscape, and often seeking ways to achieve positive outcomes that achieve both scientific and cultural purposes.

While the tribes possess rich oral traditions of Yosemite, the written record of human activity has been understandably diffuse. Ironically, the written record is now in high demand. In this internationally visible park with its many mandates and constituencies, tribal claims to particular sacred places or plant gathering areas, for example, require substantiation from a written historical record to meet the terms for access set by federal laws and policies. The National Park Service has found itself with an awkward mandate to "restore a presence", including a textual presence, of peoples displaced by the park's creation.

Addressing the need to assemble a written record of Native presence, the authors, in collaboration with the National Park Service and park-associated tribes, directed a multi-year project to assemble a comprehensive ethnographic database containing available written accounts of Native American land and resource use in Yosemite National Park. This tool is already being used by cultural and natural resource managers within the National Park Service, as well as tribal communities, as they consider collaborative management of their traditional homelands within Yosemite National Park and the sharing of Native history with park visitors.

Initially, the NPS approved the development of the Yosemite Ethnographic Database to facilitate basic ethnographic research for park planning, and to identify significant cultural features and culturally significant natural resources that might be legally protected in the course of park planning. In time, however, park managers found less conventional applications for its use. The specific design of the database and the way the data has been organized makes it particularly appealing to natural resource managers who can readily access cultural information in a format familiar to them. The ease of access and newfound perception of cultural data as being approachable and "functional" has supported multidisciplinary research and collaboration and introduced natural resource staff to new perspectives on resources. While the database has proven useful, there are inherent dangers in forcing cultural data into a positivist framework. The database was originally designed as a tool for cultural resource employees with a background that would allow them to comprehend the data, in context; significant challenges arise when this database is used without regard to its context or complexity, and when subjective interpretations are accepted as objective truth.

Databases are at once powerful and increasingly popular tools to support the integration of Native voices, values and knowledge into park management, while being a significant threat to such efforts if used unadvisedly. Therefore, we offer our experiences developing, managing and sharing the Yosemite database as a potentially instructive reference point for other parks and protected lands —at once providing the database as a model, while also seeking to problematize the concept of database production generally. We do so recognizing that natural scientists increasingly seek to adopt ethnographic data in innovative ways, and that other national parks in the United States and beyond now seek to develop their own databases. In these efforts, Yosemite's experiences with both the opportunities and pitfalls of incorporating ethnographic data into park land and resource management prove informative.

Though the quantification of cultural data makes it more accessible to natural resource managers, promoting multidisciplinary studies and facilitating identification of sites for compliance projects, this approach risks ossifying data and reinforcing hegemonic discourses related to cultural stasis, ethnographic objectivity and administrative power. We conclude that contextualizing the data, including its inherent ambiguities and contradictions, by periodically updating it with data from contemporary Tribal members, offers a richer, more multivocal and dynamic representation of cultural traditions linked to specific park lands and resources. Indeed, we recommend employing the database only in conjunction with such a hermeneutic approach—especially in consideration of the weaknesses of other databases and issues within the specific cultural and historical context of Yosemite National Park. A more culturally relativistic and historically contextualized representation of cultural data serves as a partial antidote to the textual erasure of tribal communities from dispossessed lands. Herein, we will discuss both the general issues confronting the use of a positivist framework for using and interpreting cultural information, and will analyze specific issues inherent in such a methodology as it pertains to Yosemite National Park. By critically engaging these contradictions, one can navigate the complex path of bringing Native voices more meaningfully into the management of parks and other protected spaces while simultaneously enhancing opportunities for collaboration toward shared conservation goals. Specifically, the following discussion summarizes pitfalls inherent in adoption of cultural data without attention to nuance, as well as opportunities to incorporate data in useful and meaningful ways both to perform innovative conservation work and to build and foster relationships between resource managers and tribal communities.

2. Materials and Methods

Without a clear written record of their connections, however, tribes and tribal organizations often struggle to meet the legal standards to develop plant-gathering agreements, recover human remains unearthed by park development, and the like—not only at Yosemite, but at other national parks across the nation. Additionally, in the absence of clear mandates and funding sources, U.S. national parks have highly variegated systems for documenting information regarding Native American uses of lands and resources within parks. Most have maintained paper files in various stages of development, often scattered somewhat unpredictably between multiple offices relating to different aspects of Native-park relations; in more recent times, GIS databases and electronic files have taken shape.

In initial efforts to create databases, the NPS has developed a Cultural Resource Inventory System (CRIS) oriented more toward basic compliance and resource management needs. CRIS offers useful but perfunctory data for resource managers regarding the location and identity of specific identified sites. It contains technical data such as location, site condition and resource type. Separate subunits of the database include such basic information for archeological sites, specific built features in the cultural landscapes, ethnographic sites and historic structures [14]. Nuanced ethnographic information is a poor fit for the existing CRIS model and is poorly represented in this format. So too, academic databases such as the Human Resources Area Files (HRAF) provide database tools and models; the database tools and models are maintained by Yale University with contributions from a range of researchers, HRAF indexes and codes covering vast stores of ethnographic knowledge across over 400 cultures with the intention of supporting cross-cultural comparison and study [15]. NPS staff seldom access the HRAF system, however, as this database's general focus on cultures writ large, with few geographically specific details, seldom speaks to the specific needs of park managers.

In this context, within almost every national park, ethnographic data has been aggregated on an ad hoc basis. Certain specific projects, such as infrastructure development in a particular corner of the park, often drive the development of files relating to a particular topic or area within the park. Other topics or places remain unexamined—and, all too often, separate sets of files are spread between multiple offices with no clear way to identify or reconcile them. In this context, the basic CRIS database has been of little use. Anyone seeking to document tribal interests in a particular national park typically has to embark on a significant reconnaissance: moving from office to office within the National Park Service, seeking what information can be found in each, before identifying substantial data gaps that must be filled by recourse to collections outside of the park and to Native knowledge holders. Until recently, this was the case even at Yosemite—among the most visible flagship parks in the U.S. and the world.

Clearly, this situation has been less than ideal. The significance of lands within Yosemite National Park to certain Native American tribes and tribal organizations extends into the deep past and persists into the present. Many Native American communities have ancient and historic associations with landscape features, cultural sites and natural resources within the modern park boundaries. Importantly, these features remain highly significant to park-associated many tribal members to this day. Robust oral traditions demonstrate the enduring significance of traditional ceremonial and plant-gathering sites, of places that were venues for ancestors' activities such as former villages sites, and geographic features associated with precontact tribal oral tradition for example. These oral traditions demonstrate a degree of continuity in precontact activities, and enduring connections not only for entire tribes but for specific Native American families and individuals with direct ties to places within Yosemite. Today, Yosemite National Park recognizes these enduring connections, engaging in legally mandated consultation with seven "traditionally associated" tribes and tribal organizations: the Tuolumne Band of Me-Wuk Indians, the Bridgeport Indian Colony, the Bishop Paiute Tribe, the North Fork Rancheria of Mono Indians, the Picayune Rancheria of Chukchansi Indians, the Mono Lake Kutzadikaa and the Southern Sierra Miwuk Nation (a.k.a. the American Indian Council of Mariposa County). In this context, the absence of a single, coherent organization of ethnographic data has been a serious impediment to

tribal consultation, and to the engagement of tribal interests in the management, preservation and interpretation of places within Yosemite National Park.

This situation inspired the creation of the Yosemite Ethnographic Database, a comprehensive collection that provides easily accessible Yosemite-specific ethnographic data designed to address resource management and research needs. A combination of models inspired the Yosemite database. These include a Bureau of Ocean Energy Management (BOEM) database created in collaboration with the Makah Tribe, Confederated Tribes of Grand Ronde Community of Oregon and Yurok Tribe to address the potential effects of offshore energy development on culturally significant places [16,17]; and comprehensive ethnographic data compilation efforts undertaken by Douglas Deur, Fred York and others for certain Pacific-West regional parks. Deur and an architect of the BOEM database, Eirik Thorsgard, co-managed the initial development of the Yosemite ethnographic database, with much of the work of database design and construction being undertaken by Rochelle Bloom, Mary Feitz and other interns recruited with the support of the National Council for Preservation Education (NCPE). Shared with tribes and park managers alike, the Yosemite Ethnographic Database has brought new transparency to efforts at natural and cultural resource planning, added a potential tool for collaborative park-tribes interpretive and planning efforts, and potentially contributed to broader shifts in park-tribes relations.

The Yosemite Ethnographic Database is a particularly useful tool for conducting research into Native American uses of lands and resources in Yosemite National Park. A broad review of ethnographic and historical literatures facilitated its development, incorporating ethnographic notes and notebooks, tribal consultation records and other materials currently housed in park collections and other repositories. In compiling the database, researchers systematically reviewed written sources for references to lands and resources used, visited or identified by tribal members as significant in Yosemite Valley. From references gathered from over 575 sources, the database comprises over 13,000 entries. It includes data derived from historic reports, early historic accounts written by visitors to Yosemite, ethnographies, ethno-ecological studies, oral histories, historical and contemporary newspaper articles and more. The collected data relates either specifically to Yosemite National Park, to the immediate surrounding area, or represents general regional data related to tribes traditionally associated with the park. Significantly, it is a living database, meant to reflect the dynamic nature of tribal culture. Therefore, information is derived through tribal consultation, and new research is added regularly. The data is largely qualitative and stored in an Excel spreadsheet, with the intention of making it easy to use by a variety of people with differing levels of database and research experience. The database is intended for in-house use and not for global distribution, and though linked to particular landmarks, does not georeference its contents with precise geographical coordinates.

The database provides a wide range of searchable data including information on archeological, hydrological, botanical and other natural and cultural resources with traditional cultural significance to the American Indian tribes and groups traditionally associated with the Park. Some of the specific resource categories include culturally significant and utilized plant and animal species, plant gathering areas, traditional ecological knowledge (TEK) and management (TEM), landscape features described in oral traditions, village sites and other habitation areas, historical and ceremonial sites, bedrock mortars and other archaeological site features, burials and cremation sites and trails. While the database includes references to archaeological sites and material culture, it is not intended to be an archaeological database. These sites and items were included because of their enduring cultural importance to modern tribal communities. In fact, one of the many important functions of the database is to indicate to resource managers that such material sites should not solely be considered relics, but as loci of enduring meaning within living Native societies.

Among the most unique aspects of the database may be its suitability to the needs of the ethnographic data, rather than the reverse. Categories and sub-categories were amended and added to better reflect data collected, allowing inquirers to access it more accurately. As a result, various specific, as well as general, sub-categories were tailored to account for how ethnographic information

is presented in the literature. A breakdown of the different sub-categories can be found in Table 1. The taxonomy for entering resource information involves a narrowing classification scheme: *Resource Type→Resource Subtype→Resource Name→Resource Component.* Entered into the database, an example of this might be: *Flora→Tree→Oak, Black→Acorn.* Table 2 summarizes the various resource types included in the database. Entries can be searched, filtered and sorted by any of the individual subcategories. Entries provide full quotations with relevant information and citations referencing source material. Table 3 provides a sample database entry to demonstrate how information derived from the text is organized into different fields.

Table 1. Excerpt from Ethnographic Database Metadata with Description of Field Content [18].

Field Name	Description	Examples
Tribe/Band	Tribe/band being described *(using terminology and spelling of original document)*	Chow-chilla; Chook-chan-sie; Me-wuk; Tenaya's band of Yosemites
Family/Individual	Family and/or Individual being described	Telles Family; Bridgeport Tom
Resource Type	Broad description of the resource; Kingdom	Flora; fauna; fungi
Resource Subtype	Used to further classify the type of resource, if necessary.	Tree; forb; grass
Resource Name: Common/English	Name of the resource described, in English.	Soaproot; manzanita; mule deer
Resource Component	The specific part of the resource used, as described in the text (in singular form, unless doing so would be grammatically incorrect or unclear)	bark, nut, bone, stem
Resource Name: Scientific/Latin	Resource Name: Scientific/Latin *Note: Names can change over time, include only explicitly what is in the text*	*Quercus kelloggii; Sequoiadendron giganteum*
Resource Name: Native	Resource Name: Native *Note: Specify which language the name is in, if mentioned in the text.*	*Chiikele* (Southern Sierra Miwuk)
Activities	Activities mentioned in the text. If direct quotes are longer than 4 sentences, paraphrase here rather than in "Quotes" column. Be clear and concise about what activities are being referenced, so that they can be found through a document search.	Acorn gathering, acorn pounding, acorn storage, leaching, ceremonial uses, food preparation
Location	Location of resource and/or associated activities, if specified in text. Describe in as much detail as known, for future geospatial referencing in GIS.	Bridalveil Meadow; Sierra Nevada
Period	Time period being described *(if not the same as source publication date)*	Mid-nineteenth century; 1970s; before entry of the Mariposa Battalion
Timing	Timing and duration of resource use/harvest/ management *(specific year(s), time of day, season, etc.)*	Spring; 2–3 times a year; September
Author	Source Author *(Last Name, First Name*	Bates, Craig; Bunnell, Lafayette
Consultant	Tribal "consultant" (if applicable and known)	Captain Dick; Lucy Telles

Table 1. *Cont.*

Field Name	Description	Examples
Quotation	Exemplar Quotations Note: Quotes more than 4 sentences (depending on source/length) should be paraphrased in Activities Column. Direct quotes from informants should be given highest priority and kept intact, where possible. Explain in recorder's notes if there is more pertinent info found in the text.	
Citation	Abbreviated citation for source—full citation goes in bibliography (including page number/s in AAA style).	Bibby 1994: 15–18
Notes	Recorder's Notes	A more extensive description of the acorn leaching and cooking process can be found in Chapter 5, pp. 103–106.

Table 2. Summary of Resource Types [18].

Resource Type	Explanation	Resource Subtypes (Examples)	Resource Name (Examples)	Resource Component (Examples)
Flora	Includes all references to plants	Grass Tree Shrub Forb	Deergrass Oak, Black Manzanita Milkweed	Seed Acorn Berry Fiber
Fauna	Includes all references to animals, mythological or real	Bird Reptile Mammal Insect Fish Shellfish	Eagle Snake Deer Worm, Silk Salmon Oyster	Feather Skin Antler Silk Meat Shell
Fungi	Includes all references to fungi	Mushroom Lichen	Mushroom, White	Cap Stem
Mineral	A solid inorganic substance of natural occurrence		Obsidian Quartz Granite Salt	Arrowhead Mano Pestle
Landscape Feature	A naturally occurring feature or landmark	Mountain Waterfall River Valley	Half Dome Bridalveil Fall Merced River Yosemite Valley	Face Pool Head
Mythology/Oral Traditions	A story passed orally through generations, usually intended to explain the state of the world			
Ethnographic Site	A place which has a cultural, historical, or mythic significance to a group of people (not necessarily an archaeological site)	Cave Ethnographic Village Seasonal Encampment	Bower Cave *Wahhoga*	

Table 2. *Cont.*

Resource Type	Explanation	Resource Subtypes (Examples)	Resource Name (Examples)	Resource Component (Examples)
Archaeological Site	A location where there is physical, material evidence of cultural activity or occupation	Archaeological Site Bedrock Mortar Lithic Scatter	CA-MRP-56	
Structure	Any reference to a structure used or occupied by a cultural group	Ceremonial	Roundhouse	
		Storage	Acorn Granary	
		Dwelling	Bark House	
		Other	Assembly House	
Trail	A historic route used by groups or individuals for travel, trade, etc.		Mono Trail	
Ceremony/Ritual	A ritual or ceremony practiced by a cultural group	Death	Burial	
		Annual	Acorn Harvest	
		Contemporary	Bear Dance	
Astronomical Body	Any variety of stars, satellites, or groupings thereof	Stars	Pleiades	
		Misc. Celestial Body	Moon	
Meteorological Phenomena	Anything relating to weather and/or sky conditions		Snow Rainbow	
Other		Traditional Ecological Management; Social Organization	Burning Pruning Moieties	

Table 3. Sample Entry in Database Demonstrating how Information Derived from the Text is Organized by Field.

Field Name	Sample Entry Information
Tribe/Band	Miwok
Family/Individual	(unspecified)
Resource Type	Flora
Resource Subtype	Tree
Resource Name: Common/English	Oak, California Black
Resource Component	Acorn
Resource Name: Scientific/Latin	*Quercus kelloggii*
Resource Name: Native	*telē'lī* (Plains Miwok, Northern Miwok); *tele'lī* (Central Miwok), *te'lelī* (Southern Miwok)
Activities	Harvesting
Location	Sierra Nevada Region (General)
Period	(unspecified)
Timing	Late Autumn; Early Winter
Author	Barrett, S.A. & E.W. Gifford
Consultant	(unspecified)

Table 3. *Cont.*

Field Name	Sample Entry Information
Quotation	"Acorns were gathered in burden baskets... when they fell from the trees in the late autumn and early winter. Especially in times of shortage, the trees, in which the California woodpecker had drilled holes and stored acorns, were examined and the fresh acorns pried out with a pointed instrument (*welup*, Northern Miwok) of deer antler (*kīʼlī*, Northern Miwok)."
Citation	(Barrett & Gifford 1933:143)
Recorder's Notes	Further detail on acorn harvesting and processing can be found within the text- R.B.

The database also contains columns with checkboxes for the presence or absence of certain attributes, making it easy to filter results for specific topics of interest, or for types of information relevant to research and management decisions. This permits researchers to limit their queries to entries containing certain types of information, such as first-person accounts, traditional ecological knowledge (TEK), harvesting locations, oral traditions, maps or sensitive information necessitating differential access.

While the concept of an ethnographic database is certainly not new, the Yosemite Ethnographic Database offers a unique level of nuance and comprehensiveness for a specific study area. It performs a different function than most, bridging the divide between academia and applied anthropology. In contrast to earlier database development efforts, such as CRIS, the Yosemite Ethnographic Database gathers the majority of all available data on a specific study area and its associated people, organizes it, and makes the associated text searchable. Due to cultural sensitivity, access is limited according to security level, yet the database has applications for both research and compliance. It is intended for use by NPS cultural and natural resource staff, tribal communities and qualified researchers.

3. Results

Current and Potential Uses for Resource Managers

Originally developed for cultural resource staff, the Yosemite Ethnographic Database was intended for conventional and routinized uses of ethnographic data in a public land management context. For example, NPS staff have often used the database to assist in preliminary research to facilitate formal and informal discussions with Native American tribes and organizations regarding lands that may be affected by proposed agency activities. Database applications have included cultural affiliation studies, Traditional Cultural Property (TCP) studies and review of Section 106 undertakings for potential impacts to cultural sites. In addition to being useful to resource staff, the database proves useful in assisting park interpretive staff to locate ethnographic information toward the goal of educating park visitors. Interpretive research requests have included those related to Indigenous placenames for park landmarks, and information needed to contextualize online museum artifact descriptions.

The database has been useful in identifying landmarks within proposed areas that are known or likely to be of significance for contemporary tribal members. The types of information considered in these analyses are diverse. Oral tradition, combined with the archaeological record, provides insight into the distant past—a period undocumented in most post-contact historical and ethnographic literature. Then ethnographic data, mostly in the form of past ethnographic studies, have been useful in providing accounts of Native life at the time of Euro-American contact and in subsequent years. Additional information on the contact era and its aftermath comes from firsthand accounts of early settlers, park visitors and park employees dating from the late 19th century to the present. These perspectives within the database are then combined with consultations with contemporary tribal members, providing their recollections on life, traditions, and family associations within the park over

the past century. Finally, information derived from analyses of historical photographs and paintings depicting village sites and tribal members has augmented evidence for the identification of known or culturally important locations that would otherwise be less accessible.

It soon became evident that the format and usability of the database made it uniquely valuable for natural resource management and multidisciplinary research, beyond being useful for cultural resource management. The database presents a range of opportunities for assisting with protected area and species management, research and decision making; it has been used to incorporate Native perspectives on management of natural resources and entire natural landscapes, and not just resources conventionally designated as "cultural" such as archaeological sites. In part, this reflects the evolution of federal policy, such as National Register of Historic Places guidance on the protection of "ethnographic landscapes" and "traditional cultural properties. It is also a reflection of the growing academic and public appreciation that Native peoples hold the entirety of the landscape and associated species to be significant, while also possessing unique insights into their management.

Biologists and ecologists often wish to incorporate ethnographic information in their studies, as it provides them with a stream of evidence in support of their research, potentially providing insight into species and landscapes predating that provided by recorded scientific studies. Early ethnographic accounts of resource use, as well as descriptions of material culture, lend insight into the presence of, or access to, certain species historically. This has assisted with identification of historical species' presence within study areas, and of historical landscape conditions. Oral traditions have been used to identify both landscape features and animal and plant species that hold significance for associated tribal members. They also provide information on how landscapes and species were utilized and managed, and on cultural beliefs associated with them. The most prominent example of this in recent times is the incorporation of Indigenous information in the form of traditional ecological knowledge (TEK) for ecological restoration projects [8,9]. The ethnographic data within the database provides valuable insight into various techniques that Native resource managers employed to tend different species, as well as the seasonality of these activities.

As it has reframed cultural data in a positivist framework, the database represents the rigorous application of scientific methods to create an objective understanding of the past, thus making it appealing to natural resource managers. Because it more closely correlates with their own quantitative data, they can more easily incorporate this data into their projects. While obviously not a substitute for research or consultation, such tools are useful for facilitating research and aiding in accelerated acquisition of reference material before initiating consultation. It is therefore particularly useful for researchers unfamiliar with the available ethnographic material who would need several months, if not years, to search and synthesize, or even find data relevant to their projects. The database potentially provides researchers with information they might not know how to find, allowing them access to sources they might not otherwise encounter, thus allowing them to approach problems from a different perspective.

4. Discussion

4.1. Caveats and Contradictions

While the database represents the most comprehensive collection of available ethnographic data on Yosemite and has a wide range of applications for cultural and natural resource management, it is important to acknowledge the limitations of this research tool. The development and use of the ethnographic database are rooted in the tenets of positivism that dictate how anthropology can be used in a resource management framework. As is often the case when finding ways for culture to be "useful" within the positivist framework favored by the NPS and other government agencies, it is typically necessary to reframe qualitative and often intangible heritage to make it more readily understood within a Western scientific framework. The emphasis has been on practical applications, turning away from historical understandings of the past to create generalizations about human behavior [19]

(pp. 767–769); [20] (p. 408). By finding ways to make cultural data "quantifiable," it can therefore meet the needs of a compliance driven framework in which objective, scientific rules and generalizations can be formulated [21] (p. 20). This derives from the early days of the discipline when scientific rigor was needed to provide anthropology with legitimacy and acceptance by the wider scientific community.

Assumptions of the ethical neutrality and objectivity of such approaches are rooted in frequently unexamined empiricist paradigms, contributing to the belief that "data can speak without intervening theory" [19] (p. 773). Empiricism requires an unquestioning assumption of the similarity of different cultures and that contextualization and interpretation of data is not necessary. It does not account for the different ways cultures experience and interpret events; it tries to subsume them under a single perspective [21] (p. 19). It also assumes a collection of detached, objective data without the need for interpretation, failing to identify the bias necessarily injected by ethnographers in the construction of data [22] (p. 495); [21] (p. 19). This is particularly problematic when those biases are not explicitly identified and collected data is accepted uncritically.

However, empirical data, with all of its limitations, is more familiar to natural resource managers, and is thus more readily understood and adopted, allowing for incorporation of cultural data among a more diverse group of researchers and in multidisciplinary research. Resource managers tend to want unambiguous, quantifiable data with concrete boundaries that can easily be entered into GIS for mapping. Ambiguous and contradictory information, a hallmark of ethnographic research, does not fit neatly into the framework most Western scientists operate within.

While the database is useful for providing natural resource managers and compliance personnel with a quantitative version of cultural data that is more easily reconciled with the needs of a Western scientific framework, certain characteristics of ethnographic data must be considered and used in a proper manner. Unlike the natural sciences, which allow for unproblematic application of empirical observations, cultural information requires a hermeneutic approach. Though the material manifestations of cultural actions can be observed, social phenomenon are only meaningful through the interpretative lens of relevance to the associated community [22] (p. 495). Using cultural data in an uncontextualized manner ignores underlying contradictions, complexities, and ambiguities, and does not account for theoretical underpinnings. Additionally, disregarding differing perspectives and failing to identify bias results in the creation of false coherent narratives. With access to a tool like the Yosemite database, resource managers risk using only the information that easily "translates" into quantitative data, thus privileging those categories of ethnographic knowledge while ignoring less quantifiable, intangible information not readily engaged or validated by Western science. Complicating this further, even the notion that Indigenous information must be validated through the methods of Western science can be deeply offensive to Indigenous peoples.

The dangers of uncritical imposition of positivism on ethnographic data within certain databases, and the underlying assumptions inherently held by many who create and use such data, can be demonstrated in the criticism of the Human Relations Area Files (HRAF), mentioned earlier in this paper. Wax [21] (p. 19) specifically calls out the Human Relations Area Files (HRAF) as an example of the issues involved with forcing ethnographic data into a positivist framework, referring to it as the "positivistic project par excellence of cultural anthropology." Some of the criticisms are similar to what we have discussed. The HRAF assumes that ethnographers are capable of sufficient detachment to record data objectively, and that the cultures were static and atemporal, permitting creation of a universal system in which different cultural elements could be delineated and organized [21] (p. 19).

Rather than assuming the neutrality of the data, information must be approached critically, without making assumptions about accuracy or "authenticity." Cultural relativism is therefore necessary when considering how to apply ethnographic data, and it is then necessary to "translate" between cultures [19] (pp. 773–774). Particularly in sharing cultural information with personnel who specialize in the natural sciences, it is important to convey the necessity for critical interpretation of data and for rejecting unquestioning empiricism, or the tendency to force data into performing certain functions.

Listing ethnographic data in a database also raises the risk of ossifying it, thus treating it as the final word on resource significance. This may be particularly problematic when the database is employed by natural resource managers tempted to use Indigenous cultural information as they would use natural data. The discipline of anthropology has for generations confronted this tendency, which is rooted in racist assumptions. The issue is often manifested through assertions of the authenticity of only pre-contact traditions, privileging older ethnographic data over information shared by contemporary tribal members and giving the views and interpretations of Euro-American ethnographers primacy over those of tribal members.

It is therefore necessary to avoid reinforcing past prejudices by using ethnographic data in the manner in which one would use natural data. This practice often relates to the historical tendency to equate Native peoples with nature, as represented by the storage of their material culture in natural history museums, by extension imagining their culture as unchanging [20] (p. 187). Connotations of the "noble savage," depicting Indigenous peoples as a part of nature, unchanging and leaving no impact on the landscape, have long been a feature of the discourse at Yosemite [23] (p. 554); [24] (p. 146); [7] (p. 34). The racist view of Native peoples as inherently primitive and culturally static, denying their cultural dynamism, was particularly influential in the nineteenth century and survived into the mid-twentieth century. This belief that their technologies and cultures remained unchanged throughout prehistory allowed for easier ethnographic analogy and projection of interpretation into the distant past [20] (pp. 179, 189, 191). As such, it is important to note that the data recorded in the Ethnographic Database is not the final record of sites and resources significant for Traditionally Associated Tribal peoples. Significance is not static. Rather the database is meant to assist in contextualizing and supplementing information provided by tribal members in consultation, incorporating new data to provide a richer pool of information.

It is also necessary to recognize that this database, like any database concerned with organizing data for resource management, is a fundamentally Western tool of data management; it is first and foremost a research tool intended to facilitate resource management, as well as to support academic study and tribal cultural documentation within the park. While useful to Tribes to supplement their own research relating to traditional resource use, genealogical studies, federal recognition or other actions within a Western framework, it is not in any way meant to replicate or supplant Indigenous methods of knowledge transmission. The database primarily represents a method of packaging data in a way that makes it accessible to park resource managers and permits integration with bureaucratic and scientific management frameworks [25] (p. 10). This has necessarily involved distilling and conveying knowledge using language, epistemologies and methods of transmission through which it was never originally intended, separating it from its cultural context [26] (p. 5).

Certain characteristics are typically ascribed to Western science and Indigenous Knowledge in order to distinguish between the different epistemological frameworks: Western science tends to prioritize hierarchically categorized information that is quantitative, analytical, product-oriented and transmitted textually, while Indigenous Knowledge generally tends to organize information in contexts that are holistic, qualitative, intuitive, process-oriented and transmitted orally [25] (p. 9); [26] (pp. 75–76). In general, the method of transmitting knowledge is different in Western and Indigenous cultures. Western learning involves asking questions and obtaining information from written sources. In contrast, Indigenous learning is undertaken through participation and observation over long periods of time, and is typically transmitted through generations by way of oral tradition that places information in layered social, ecological, and historical contexts [27] (p. xxii); [26] (pp. 23, 33–36). The database takes a compartmentalized approach to organizing knowledge, permitting entries to be entered, filtered and sorted according to ever-narrowing categories of classificatory schemes. This compartmentalization is a key feature of Western frameworks [25] (pp. 5–7). This contrasts with the more holistic, integrated, "gestalt" way of knowing in Indigenous thought, in which different elements cannot be understood separated from the greater whole [27] (p. xxii). Also, while the database allows for new information to be recorded, it conveys written forms of oral traditions and other forms of knowledge that was

traditionally conveyed in oral form. This separates knowledge from the context which gives it meaning and translation from its original language can result in inaccuracy and the inability to articulate certain Indigenous concepts [28] (p. 4); [26] (pp. 69–75); [29] (p. 134). The contents of the database can therefore serve as touchstones, and as points of entry into Indigenous knowledge systems, but are scant representations of the larger whole. Native American representatives using such databases generally perceive both the limitations and the opportunities of such tools—which provide points of entry into discussions of traditional knowledge, rather than meaningfully replicating the vast and interdependent domains of Native knowledge relating to park lands.

Also, importantly, by virtue of being recorded in a government database, one must acknowledge that there is a risk that a database, with its tangibility and academic imprimatur, can become the authoritative reference rather than the original Traditional Knowledge holders [28] (p. 4); [30] (pp. 5–6). In some cases, databases invite the risk of displacing Native ways of knowing, and Native knowledge-holders. Underscoring this point, Stevenson [30] (p. 5) notes:

> The most common practice is to take specific elements of [Traditional Knowledge] that are of interest to the conservation bureaucracy out of context and then insert them into the dominant framework of western scientific knowledge. This procedure almost always entails sanitizing and rendering [Traditional Knowledge] into a form that is palatable, recognizable, and usable to the dominant culture.

As such, by its very nature, this framework risks perpetuating unequal power dynamics and privileging Western knowledge and Western scientific reconceptualization of Indigenous Knowledge [25,28].

4.2. The Context of Ethnographic Study at Yosemite

While it is instructive to offer criticism of positivist frameworks for cultural data in the abstract, an in-depth analysis of the opportunities and constraints at Yosemite offers deeper nuance and insight. An overview of the complexity of Yosemite's cultural data, the park's early historical context and the biases impacting the recording of ethnographic data illustrate the necessity for caution when using the database. This overview entails a discussion aimed at demonstrating the limitations and dangers of selectively harvesting "useful" data that conforms to certain scientific characteristics without an understanding of the deeper context.

The Yosemite database contains early ethnographic data, including a significant amount collected in the mid-19th and early 20th centuries, beginning as soon as Euro-Americans entered Yosemite. Though some might assume the early date of cultural recording mean that are indicative of pre-contact conditions, it is dangerous to use accounts with unknown accuracy or potentially impacted by unknown historical events as direct analogies for the more distant past.

For example, Lafayette Bunnell, a doctor who in 1851 accompanied the Mariposa Battalion, authored the first account describing Yosemite Native lifeways, providing a useful firsthand account of the events and circumstances at contact [31]. In 1851, the Mariposa Battalion, a militia unit, was sent into Yosemite Valley to launch a campaign against its Native inhabitants, an effort representing the first official entry of Euro-Americans into the future park [32] (p. 26); [13] (p. 9); [33] (p. 25). While Bunnell's account included the Native names of geographic features he obtained from translators, the locations of Native trails and the identities of villages he observed on the valley floor, his perspective was much skewed by his role in military operations against the valley's inhabitants. As with many of the early, and even later, recorders of Native lifeways in Yosemite, Bunnell lacked the expertise to reliably comprehend the nuances of the culture he recorded. His lack of fluency in the relevant Native languages and overreliance on potentially untrustworthy translators compounded his shortcomings as a cultural interpreter.

Furthermore, tribal identity itself has long been a complex matter in the Yosemite region. Well before direct Euro-American contact, people from many tribal communities converged at Yosemite. Tribal peoples from east and west of Yosemite Valley—Paiutes, Miwok, Yokuts, Western Mono and

others—often gathered there, married, and shared other long-term economic, social, and kinship connections. With the advent of the Gold Rush and increasing Euro-American settlement of the surrounding region, the population and lifeways of Yosemite associated tribes were impacted—this long before the physical arrival of the newcomers participating in the Mariposa Battalion. Disease had accompanied the influx of Euro-Americans to the wider California region before the military incursion, spreading indirectly into the Yosemite area to decimate Native populations [34]. Major tribal shifts in the generations prior to 1851 are likely to have occurred. Indeed, as an ancient site of Native American settlement, Yosemite became a refuge for families displaced from other parts of California—the new families often integrated into preexisting villages and social networks within the valley [35] (p. 78); [7] (p. 31).

The official arrival of Euro-Americans to Yosemite Valley in the mid- to late nineteenth century further complicated matters, ushering in a period of violence, disease, and displacement of Native peoples throughout the region. In particular, after the entry of the Mariposa Battalion a series of events rapidly impacted and further disrupted the lifeways of Yosemite associated tribal communities—namely a series of violent altercations, some deadly [32] (p. 27); [36] (p. 503). In the early 1850s, attempts had been made to forcibly remove Yosemite's Native inhabitants to the newly created Fresno River reservation [32,33]. This proved unsuccessful, however, as the removed peoples quickly returned [32] (p. 27). But soon after the arrival of the Mariposa Battalion in 1851, Euro-American visitation and settlement flooded the Yosemite region, dramatically affecting Native life and the character of the valley. The latter half of the nineteenth century was thereafter marked by drastic reductions in Native populations, relocation, restrictions on gathering and traditional landscape management and many other changes to social, ceremonial and economic life [32] (p. 27). In 1864, Yosemite Valley was placed under the administration of the state park commission, and then established as a national park in 1890. In short order, further changes came to the people of the valley—especially restricting traditional mobility, access to certain locations, and traditional resource practices like gathering, hunting and landscape management [37] (p. 11); [38] (pp. 16–19); [39] (p. 2).

As subsistence and other cultural activities were relegated to the margins of ancestral lands, Native villages were soon displaced and consolidated into more restricted enclaves. Over the course of the 20th century, the NPS increasingly made residence in the valley contingent on tribal members' employment with the NPS or its concessionaires, with tribal members increasingly engaged in paid employment for collecting and cutting firewood, overseeing maintenance work, assisting in construction, working as interpreters of Native culture, and in other roles. Well into the 1990s, a small number of individuals continued to reside in the valley, allowed to stay by virtue of their status as NPS employees [13] (pp. 105, 111–113); [40] (p. 49); [41] (pp. 205–206).

For these and other reasons, elucidating Yosemite Native identity requires a nuanced approach—an approach obviated by the frequent oversimplifications and misrepresentations within the original ethnographic text. The concept of what constitutes a "Yosemite" Native person has been contested from contact to the present. As early as 1851, Lafayette Bunnell remarked upon the complex nature of Yosemite tribal identity, writing in *Discovery of the Yosemite* [31] (p. 199) that the "Yosemites were a composite band, collected from the disaffected of other bands in that part of California, and what is now Nevada." He further related that Major James Savage, who knew elements of local dialects, asserted that "the dialect in common use among them was nearly as much of a mixture as the components of the band itself, for he recognizes Pai-ute, Kah-we-ah and Oregon Indian words among them."

Early writers passing through Yosemite without this historical context conveyed much more simplistic views of tribal associations with the park, often referring generically to "Yosemite Indians," without attention to specific tribal designation. Alternatively, they simplistically assumed that all tribal peoples belonged to the Southern Sierra Miwok without further comment or clarification. Consequently, even in more recent times, NPS interpretation has continued to accentuate Southern Sierra Miwok in their public depictions of tribal history, with relatively little mention of other communities or the great

complexity of this history. A result of these developments and others has been a persistent uncertainty and debate regarding the identification of tribes historically linked to the park.

Notably, even the name "Yosemite" represents a mistranslation and misunderstanding of the Native people inhabiting the valley. Bunnell originally suggested naming the valley for the Native occupants, whom he understood to be called the "Yosemites." He, and some subsequent observers, later learned the tribe identified themselves as the "Ahwahnechee"; but by then it was too late. The incorrect name was already adopted [36] (pp. 503–504). A diverse set of explanations have been offered regarding what "Yosemite" actually denotes, with possible suggestions including "grizzly bear," "killer," "great hunter" or relating to tribal moieties [35] (p. 4); [42] (p. 59); [43] (p. 2). In general, however, sources agree it was not the name of the tribe.

As database entries are solely a review of available literature, they reflect the biases contained within original source materials. The database employs terminology used in the original sources and makes no assumptions about the accuracy of accounts. As a result, it contains oversimplifications of tribal identity and associations as well as racially insensitive language and stereotypes. Early writers ignored the complexity of both nineteenth and twentieth century tribal identity, erasing the significant presence of various tribes in the park and projecting simplistic understandings into the distant past. In particular, the park has faced accusations of underrepresenting Paiute and other connections to Yosemite Valley. Attempting to use the data to definitively and uncritically identify tribes can have potentially disastrous results. Particularly dangerous implications exist if data is misused to assert affiliation in a way that disenfranchises or misappropriates cultural traditions or connections, potentially erasing complex tribal identities and denying tribal communities rights or recognition based on biased readings of the material.

The information contained in the database also reflects gaps in the ethnographic record. Notably, the written record is incomplete regarding lands and resources of concern to Native American communities. Relevant to this discussion, Anderson [44] (pp. 112–115) details the limitations of ethnohistorical descriptions of California Indian plant species identification, which necessarily impact the available information within the database. Few of the early ethnographers and travelers who documented early resource use among Yosemite Native peoples were trained botanists or ecologists. As a result, much of the recorded information was incomplete, oversimplified, ignored or inaccurate. Early ethnographers often grouped plants together in generic categories since they were unable to identify species. Furthermore, many of these researchers undertook their field work at settlements instead of at traditional resource gathering or management sites and missed crucial details. They often relied upon remembered descriptions from interviews instead of first-hand observation. Another key issue with available plant data is that much of the field work was undertaken exclusively by men who failed, by interest or access, to obtain key information from female Native consultants on a wide range of topics associated with women's knowledge, from gendered social and ceremonial knowledge to the traditional procurement and use of plants.

The database is also especially weak in documenting perspectives of contemporary tribal members whose enduring attachments to Yosemite Valley are essential to understanding the significance of Yosemite Valley resources. In addition, facts that past generations of tribal members viewed as too sensitive to share, or that were simply difficult to convey across cultures, are often omitted from their accounts. Accordingly, available information tends to focus on material objects, underemphasizing intangible values and the deeper cultural importance and meaning of those objects to Native American people.

As a result of both the availability of information and the funding for the project, Yosemite Ethnographic Database materials are largely focused on Yosemite Valley at the expense of other parts of the park. A combination of factors—including accessibility, weather conditions and the absence of certain notable landmarks—mean that other park areas receive less visitation and, consequently, less written attention historically and today. The comparatively scant record of early cultural activity

in more remote parts of the park compounds the skew of data toward tribes closely associated with the western portion of Yosemite.

Furthermore, the ambiguous, conflicting, dynamic, and holistic nature of cultural information does not conform well to a positivist framework. The identification of individual culturally significant lands and resources by consulting itemized entries in the database is inherently reductionist, and must be done advisedly. As Native American communities hold the entirety of Yosemite to be significant, a holistic review would typically indicate that no land or resource within the valley may be deemed culturally *insignificant*. By extension, tribal representatives may reasonably suggest through consultation that the entire valley be construed as one large, contiguous area of significance without differentiating between specific "contributing resources" therein. Again, it is critical to avoid the assumption that places or resources not identified as significant within the database, that the gaps in the maps of such places, are by definition "insignificant." Such matters require a broader understanding, aided by direct engagement with tribes through consultation.

It is also important to recognize the implicit ambiguity of most ethnographic site boundaries, particularly in attempting to assign them distinct spatial locations in a manner conforming to expectations of quantitative data. Many categories of ethnographic sites, including village areas, gathering sites and trails, did not possess distinct boundaries. Perimeters sometimes changed depending on environmental factors and seasonal conditions, differing habitation patterns, and personal preference. As a result, ethnographic villages tend to possess amorphous boundaries that do not necessarily represent the structural components of sites and material culture associated with them. While overlap may exist with archaeological sites, which do have definite boundaries, they are not necessarily the same. Reoccupation of certain desirable sites was inevitable in view of the long occupation history of the valley—especially when combined with the small size of the region and preference for areas with exposure to sunlight, flat ground and proximity to key resources. Additionally, the ethnographic sites listed in the database represent the names and locations as recorded in the late 19th and early 20th centuries, or within living memory of tribal consultants at the time, and do not necessarily represent their identity throughout antiquity.

Plant harvesting areas represent another site category that is difficult to quantify. Gathering patterns have been impacted by a variety of changes since Euro-American settlement and the ensuing creation of Yosemite National Park. Changes in hydrology, construction of park infrastructure, prohibition of traditional ecological management, proliferation of tourists and federal gathering restrictions have altered both the quantity and quality of plants, as well as the locations in which tribal members can gather. The desire to avoid tourists and heavily trafficked areas causes many tribal members to shift their gathering to margins of the valley where they face less scrutiny. This has sometimes meant shifting to less productive or less desirable areas. As such, when harvesting locations are identified within the database, the sites represent preferences of specific tribal members at a specific point in time. While useful for identifying species, personal attachment and cultural continuity, they do not infer static locations, delineated boundaries or the extent of all areas in which plant species are found and gathered. Notably, in past studies and consultation, tribal members were adamant that sites for plant gathering should not be mapped, suggesting that while patterns of plant gathering were intense throughout the valley historically, they must now be highly dynamic in response to changing vegetation conditions and the impacts of park infrastructure, management and visitation on gathering opportunities [45]. To identify and map specific sites in this context may constrain the geography of harvesting options and, by extension, undermine tribes' resource resiliency. Thus, tribal members have indicated that for purposes of plant gathering, the entire valley floor must be considered as one large and integrated whole. As such, in an effort to better reflect the cultural and historical realities of these sites, it is typically more appropriate to provide qualitative descriptions of site locations where necessary, demonstrating their amorphous and dynamic nature.

The use of information contained in oral traditions is also done advisedly. In many cases these were written and transmitted by early visitors to the park or early residents, such as hotelier and

magazine owner James Hutchings, who sought to sensationalize the park and its Native inhabitants [46] (pp. 103–106); [47]. Oral traditions compiled by Hutchings and others [48–51] were often embellished and romanticized, incorporating fantastical elements that would appeal to Western readers. The reality is best exemplified by the response of Choko, Stephen Powers' Yosemite Native consultant, to such versions: "White man too much lie" [52] (p. 368). Furthermore, it is necessary to accept the necessarily ambiguous nature of oral traditions even when they are faithful retellings. By their nature, oral traditions are emblematic of the dynamic nature of culture. Rather than provide a static account, individual storytellers transmit cultural knowledge through the generations with changes that reflect the particular recounting. As such, while the core narrative might provide insight into species presence and management, geological changes, and historic events through creation stories and cautionary tales, direct analogy is inappropriate.

5. Conclusions

Since its inception in 2016, the Yosemite Ethnographic Database has proven to be one potentially useful way to "restore a presence" in national park settings [10]. The database permits specific queries about a variety of topics, such as: information on the identity and enduring significance of archeological sites, the use and significance of culturally significant flora and fauna on park lands, the significance of particular landscapes or places to tribes, specific ceremonial or oral traditions that explain the intangible value of the park and its places to tribes or the places and circumstances of historic events in the park involving Native communities.

With such information in hand, National Park Service managers are able to avoid development impacts on culturally significant sites, negotiate collaborative solutions for plant community management and envision interpretive opportunities with much enhanced speed and clarity. The framework of the database has allowed greater access to information and to an audience beyond National Park Service staff. Additionally, to the extent possible within the protocols for sensitive data, the database democratizes access to knowledge regarding the cultural significance of park lands—returning this knowledge to Native peoples and, at their discretion, a wider range of researchers and interested parties. With roughly 13,000 independent entries on numerous topics, the database brings into any park planning process an unprecedented level of cultural detail—a richness of data about tribal interests that would have been impossible in more conventional planning and tribal consultation efforts. Some tribal members, too, find the database to be an astonishingly useful tool, bringing the knowledge and perspectives of many elder consultants, assembled across the generations, to bear on particular topics in a way few living individuals could offer. Presently, a number of other NPS units in the western United States have requested that the team that constructed the Yosemite Ethnographic Database begin constructing similar databases for their parks as well.

While this approach to Native American historical and cultural data provides tribes and park managers with a powerful tool, it is a tool both unwieldy and potentially hazardous if used without attention to its limitations and sensitivities. Placing so much potentially sensitive cultural information in one place, where it can be immediately beheld and transmitted, is fundamentally problematic. In Yosemite's case, negotiations regarding who may hold or access the database is fraught with uncertainty and enduring distrust. Tribal communities express delight in receiving the database, but fear its diffusion, for example, into the hands of private promoters or potential looters of archaeological sites. In this respect, databases demand negotiated agreements as to restrictions to guide sharing and distribution of information. Prior to Yosemite's database construction, those with nefarious intent had to undertake extensive research, often in multiple collections with their own safeguards, and even the most motivated pillagers often were not successful. Today, they might gain access to a world of information with a few keystrokes. Formal agreements between parks and Native communities are required, and in the case of Yosemite, imminent, if all parties are to provide consent for long-term database development, use and sharing.

While much of the database is derived from publicly accessible materials, some of it is not. Therefore, the Yosemite database contains sensitive data, such as information regarding tribal religious practices and the locations of culturally significant sites. This information cannot be shared with the public, and in many instances perhaps might not be shared with park staffs who have not been granted explicit approval. It is therefore necessary to develop a system and protocol ensuring different levels of access and securing the data. At Yosemite, the data is encrypted and stored on a federal government network; access is limited to specific cultural resource personnel with accredited professional credentials who have been granted clearance. Yosemite tribal partners also have copies of the database. If natural resource managers wish to gain access, they may submit a request for use of a database version without sensitive information. Parks wishing to extrapolate from the Yosemite experience might consider this structure of multi-tier access; alternatively, parks can produce two-tier databases, with highly sensitive information not present in the version that is widely available.

For ease of access, a tool like the Yosemite database has forced a great deal of complex cultural information into a crudely positivist framework. The tool's ease of access therefore requires particular cautions. Certain agency contrivances, such as maintaining standing lists of "ethnographic resources" to be managed on public lands, are useful for compliance with federal laws, but are not an accurate representation of cultural realities. We find that agency database users, such as park resource managers, tend to perceive the items in the database as if they represent the sum total of all Native interests—the alpha and omega of what is of value and must be protected. They tend to focus on static objects of cultural interest—for example, landscapes, archaeological features and plant gathering areas—in curious isolation from the dynamic context of their significance, which is the complexly evolving realities of Native engagement and attachment with park lands. In worst case scenarios, databases can provide land managers with false confidence, and a plausible excuse for not directly engaging Native communities and forming relationships of mutual trust.

Indiscriminate use of the database also risks ossifying ethnocentric biases in the historical and ethnographic written record and privileging the past as recorded largely by Euro-Americans. Using terminology from original texts without interpretation, the database contains recorder bias, even racially insensitive terms, concepts, and stereotypes that cannot be accepted uncritically. In an attempt to address this, the Yosemite database contains a column that includes recorder's notes, allowing for a degree of clarification, though this too is often insufficient and potentially subject to bias. These risks are aggravated when such a tool is employed by an audience with little or no prior exposure to the topic of Native American cultural values and practice, many of whom are likely unaware of the existence of these epistemological problems, let alone of how to navigate them.

Any park or protected area that seeks to produce a database must consider these challenges, then, and develop enduring procedures and guidelines to accommodate Native knowledge and practice within the management and interpretation of park lands. While such tools are meant to simplify and synthesize data for the sake of intelligibility and accessibility, tribal members and anthropologists must be vigilant, contextualizing the data, highlighting its complications, contradictions, and nuances, and anticipating its misuse with proactive policies, procedures, and metadata. In some respects, then, tribes and anthropologists must simultaneously construct and problematize the database.

In doing so, it is necessary to critically examine and openly discuss the specific political, cultural, historical, and theoretical contexts that created the data within the database. The accessible written record is incomplete and does not represent the full extent of issues, values, and places of concern to Native American communities. In many cases, tribal members have deliberately chosen not to share information due to reasons of sensitivity. Moreover, tribal cultures, traditions and preferred locations are dynamic and certain practices, values and cultural geographies change over time. However, explaining these complications to park administrators requires a delicate balance. Contextualization, acknowledging the ambiguity and complexity of ethnographic data, may undermine park managers' trust and use of the database if not conveyed in terms that speak pragmatically to management tradeoffs. For example, simply resorting to academic explanations of the "crisis of representation"

can (and has) undermined NPS use of ethnographic databases and ultimately undermined Native interests in park lands [53]. Conversely, utilizing a database as a tool that parallels broader ongoing conversations between park managers and Native American tribes, facilitated by anthropologists or other cultural resource specialists to provide context, has proven more effective than use of a database alone. A database does not obviate the practical and legal imperatives for direct tribal consultation. Furthermore, through direct engagements tribal members may make contextually appropriate decisions about what is proper to disclose, what is relevant, and what is inadmissible within the context of an ongoing exchange between park managers and park-associated tribes.

Responding to many of these concerns, the Yosemite database has been designed as a living record of cultural significance. It contains both historical and contemporary data and—funding and staffing permitting—continues to be updated with information emerging within ongoing tribal consultation, reflecting the dynamic values and guidance of park-associated tribal communities. Thus, when identifying plant harvesting locations, managers can account for the gradual transformation of those places in the context of climate change, emerging tourist pressures and dynamic tribal plant uses and needs. Indeed, tribal members at Yosemite have resisted mapping of such sites—not so much because of the sensitivity of the data, but because they express a concern that this will "lock them in" to particular gathering areas when the actual pattern of plant gathering has been highly dynamic and adaptive to changing environmental conditions, tourist pressures, and cultural preferences of Native peoples [45]. A place that was good for gathering when anthropologists arrived in the early 20th century, they note, might not be a suitable place for gathering today. In lieu of mapping sites, these tribal members suggest active engagement and ongoing data collection to protect plant gathering interests writ large—a goal achieved by maintaining the ethnographic database continuously over time and allowing the contents to evolve as the cultures and landscapes also evolve. If park staffs collaborate with tribes actively, reviewing database protocols and outcomes together, such databases and their use can be improved over time—eliminating such sources of error and continuously calibrating these tools to fit the cultural, legal and ecological realities of protected lands.

By sincerely seeking to engage Native communities, and by maintaining a pragmatic view of ethnographic data—duly balancing respect for and critique of that data—parks may develop databases with confidence. While recognizing that Native communities as well as landscapes change even as certain relationships endure, databases can be constructed as living documents continuing to evolve over time. Certainly, forcing the particulars of very long-term human relationships with park landscapes into a crude positivist framework is a fraught exercise. Nuances are surely lost in translation, facts become ossified and sensitive information is aggregated in ways laden with both threat and opportunity. Conversations between park managers and tribal representatives therefore must be direct and ongoing regarding places and resources of significance, their meanings, their importance within Native societies and the right ways to document and share this information within and between organizations. Approached in this way, the Yosemite Ethnographic Database has begun to demonstrate the potential for innovative uses of ethnographic data in resource management. While not comprehensive, it encompasses a vast amount of information, allowing for ongoing efforts to incorporate Native values and needs into park planning. The accessibility of the data has facilitated multidisciplinary conservation and restoration undertakings, promoting meaningful collaborations between park resource managers and tribal communities. Critically, the database places tribal interests in a much richer historical and cultural context. It can be used to address longstanding grievances and to meaningfully build long-term relationships between park staffs and Native peoples. Developed as a collaborative tool, the database now helps bring a much enhanced understanding of the significance of Yosemite's resources and landscape to management and conservation efforts—for the benefit of future generations, Native and non-Native alike.

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