

IT'S A SIGN: UNDERSTANDING VARIATIONS IN TELLING INDIGENOUS HISTORIES
WITHIN PUBLIC OUTDOOR SPACES

by

Nizhoni Tallas

Copyright © Nizhoni Tallas 2024

A Thesis Submitted to the Faculty of the

SCHOOL OF NATURAL RESOURCES AND THE ENVIRONMENT

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

2024

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

As members of the Master's Committee, we certify that we have read the thesis prepared by: **Nizhoni Tallas** titled:

and recommend that it be accepted as fulfilling the thesis requirement for the Master's Degree.


[Aaron Lien \(May 6, 2024 11:46 PDT\)](#)

Aaron Lien

Date: May 6, 2024



Matthew Rowe

Date: May 8, 2024


[Aaron Thomas \(May 6, 2024 17:05 MDT\)](#)

Aaron Thomas

Date: May 6, 2024

Final approval and acceptance of this thesis is contingent upon the candidate's submission of the final copies of the thesis to the Graduate College.

I hereby certify that I have read this thesis prepared under my direction and recommend that it be accepted as fulfilling the Master's requirement.


[Aaron Lien \(May 6, 2024 11:48 PDT\)](#)

Aaron Lien

Thesis Committee Chair
School of Natural Resources and the Environment

Date: May 6, 2024



Land Acknowledgement

We respectfully acknowledge the University of Arizona is on the land and territories of Indigenous peoples. Today, Arizona is home to 22 federally recognized tribes, with Tucson being home to the O’odham and the Yaqui. Committed to diversity and inclusion, the University strives to build sustainable relationships with sovereign Native Nations and Indigenous communities through education offerings, partnerships, and community service.

Acknowledgments

Thank you, God, for giving me strength throughout this journey. To my family for being there for me and offering help when I needed it the most—friends who shared their laughter and support. Being a first-generation college student has been challenging, but I am grateful for the numerous mentors who believed in me. Thank you to my advisor, Dr. Aaron Lien, for supporting me throughout this project every step of the way. Thank you, Dr. Matthew Rowe and Dr. Aaron Thomas, for being part of this project and providing valuable feedback. Also thank you to Stephanie Hernandez and Gaberial Vazamim for assisting with photo collection and processing data. You all played an essential role in helping me complete this project.

Reflecting on what I have learned thus far in graduate school, I am left with a sense of urgency for the issues that are impacting Indigenous peoples across the globe. I have grown to enjoy the process of learning, but the journey of using what I learned has just begun, and this paper is the start of that. Thank you to all the Diné and Indigenous scholars who paved this way for me. I hope to continue to make academia a space where other underrepresented scholars are supported and their ideas and passions are embraced.

This research was supported through the Indige-FEWS, Sloan, Office of Student and Engagement and Employment 2021-22 Faculty Challenge Grant Increasing Access to Undergraduate Research, and the Haury Program Native Pathways Graduate Research Award at the University of Arizona. Additionally, through the support of the American Indian Education Fund, Cobell Scholarship, and Office of Navajo Nation Financial Aid Office.

Contents

Abstract.....	7
1. Introduction.....	9
1.1. Displacement of Native American Tribes.....	10
1.2. Interpretative signage.....	11
2. Six R's Framework.....	13
2.1. Applying the Six R's Framework	14
2. Methodology	19
2.1. Location Selection.....	19
2.2. Map	21
2.3. Photos Protocol.....	21
2.4. Data Management	22
2.5. Transcribing photos	23
2.6. Coding.....	24
2.7. Calculating Scores	25
3. Results.....	27
3.1. Results of coding for each R.....	27
3.1.1. Respect	27
3.1.2. Relevance	29
3.1.3. Representation.....	30
4. Synthesis of Sites	31
4.1.1. Grand Canyon North	33
4.1.2. Walnut Canyon.....	34
4.1.3. Inside Mesa Verde	35
4.1.4. Navajo Bridge.....	36
4.1.6. National Park Service Synthesis	38
5. Discussion	39
6. Conclusion/Recommendation	41
Bibliography.....	44
Appendix A: Metadata.....	49
Appendix B: Coding.....	49

Appendix C: Photos	49
Appendix D: Site Synthesized by each R.....	49

List of Figures/Illustrations

Figure 1: Map of selected sites; some of these sites have more than one attached to it.....	21
Figure 2: Example of the Coding process	26
Figure 3: Steps of the Coding process.	26

List of Tables

Table 1: Definition of Respect, with indicators included to show how it was coded in the study.....	15
Table 2: Definition of Relevance with indicators included to show how it was coded in the study.....	16
Table 3: Definition of Representation with indicators included to show how it was coded in the study.	17
Table 4: Six R’s Framework Descriptions (Tsosie et al., 2022).....	18
Table 5: List of study sites and managing agencies.....	20
Table 6: Metadata descriptions and examples.....	23
Table 7: Scores for Respect within all sites, along with indicators.....	29
Table 8: Scores for Relevance within all sites, along with indicators.....	30
Table 9: Scores for Representation within all sites, along with indicators.....	31
Table 10: Scores of all 3 R’s across each site.....	33

Abstract

Interpretation plays a significant role in the visitor experience at cultural sites by painting a picture of the layers of history present in an environment. On public lands in the United States, over 800,000 estimated signs serve various purposes, from wayfinding, safety, and resource protection to interpretation. The large number of visitors to national parks, monuments, and other public lands speaks to interpretive signs' impact on visitors' understanding of these sites and their cultural history. Here I ask, how are Native American histories, cultures, and communities represented on interpretive signage found in areas near the visitor centers of national parks, monuments, and other public lands? Because these areas have very high visitation, the interpretive signage located at them may have a disproportionate impact on visitors' understanding of the cultural history of these sites. To carry out this work, I developed a novel application of the Six R's Framework to conduct content analysis of the text of interpretive signs. I collected photographs of interpretive signs at 14 different sites within the Southwest region. I adapted the Six R's Framework to see how well national parks, monuments, and other public lands include Native American histories and stories.

Overall, I found a large amount of variation from one site to another. No sites managed by US federal agencies showed a consistent presence of respect, representation, and relevance in their interpretive signs. In contrast, Navajo Tribal Park showed the most promise compared to other sites analyzed. There are a variety of reasons why national parks, monuments, and other public lands may have inconsistent interpretations. These include the age of interpretive signage, written mostly in past-tense language that does not share the present-day tribal communities, and use of problematic language choice for example the use of "colonization". This is important for the future of interpretive signage development and ensures that there is a framework in place to measure how well national parks, monuments, and other public lands are engaging and including

authentic stories and histories from Tribal communities. By sharing initial findings of how various locations measure up to a variation of the Six R's framework it will help federal agencies recognize the need to update interpretive signage and form more meaningful relationships with Tribal communities.

1. Introduction

Across all federal public lands, over 800,000 estimated signs serve various purposes, including wayfinding, safety and resource protection, and interpretation (BLM, 2016; NPS, 2009). A small portion of these signs are interpretive signs, which the U.S. Forest Service defines as a communication that shares information describing the significance and historical stories of cultural and natural places to the public (Yamada et al., 2002). The large number of visitors going to national parks, monuments, and other public lands speaks to the impact interpretive signs may have on visitors' understanding of these sites and their cultural history. There are 424 National Parks in the United States. Sixty-three of these are located in the Four Corners region of the United States Southwest. In 2022, the southwestern national parks received approximately 34 million visitors (NPS,2023). Other regional public lands include national monuments managed by various agencies, national forests, and Bureau of Land Management (BLM) lands, all with millions of visitors. Here, we ask how Native American history and communities are represented on interpretive signage in areas near the visitor's centers of national parks, monuments, and other public lands in the Four Corners region. The areas around visitor centers have very high visitation, and the interpretive signage found there may have a disproportionate impact on visitors' understanding of a site's cultural history. To carry out this work, we developed a novel application of the Six R's Framework to conduct content analysis of the text of interpretive signs (Tsosie et al., 2022).

The national parks, monuments, and other public lands of the Four Corners Region of the southwestern US sit on the traditional homelands of 54 Tribal nations (Arizona Department of Education, 2020; New Mexico Secretary State, 2023; Pueblo of Zuni, 2023). For example, Grand Canyon National Park is the traditional homeland of the Havasupai, Hualapai, and Navajo. Each of these Tribal nations has reservations that border the park and also have significant cultural

sites and resources within the park's boundaries rather than their reservations. Several national monuments in the region, including Montezuma's Castle, Casa Grande Ruins, and Tuzigoot National Monuments, are Native American cultural sites designated as national monuments to protect cultural resources. More recently, Bears Ears and Baaj Nwaavjo I'tah Kukveni/Ancestral Footprints of the Grand Canyon National Monument were created to preserve traditional homelands and cultural resources of the region's Tribal nations.

For many national parks and monuments visitors, interpretive signage is crucial in the history and stories they learn about Tribal Nations. Recognizing the weight of interpretive signage is important because interpretive signs have been found to focus primarily on the settler narrative (Mackintosh, 1986, Moscardo & Hughes, 2023). Therefore, reviewing the content of interpretive signage can help identify gaps in how Tribal communities are represented in interpretive signage. If parks and monuments do not have inclusive histories, they may not provide visitors with an opportunity to learn about Tribal Nations, including Tribal histories and stories (Manning et al., 2023). Identifying the need for more inclusive language and adding Tribal communities' stories and histories within interpretive signage will help provide a welcoming space for Tribal members who visit these parks, monuments, and outdoor recreational areas and increase the other communities understanding of Tribal cultures.

1.1. Displacement of Native American Tribes

Tribal nations have been dispossessed of their traditional lands for generations by Western communities. The creation of parks heightened this practice and forced Tribal nations to settle in mostly non-traditional areas and be restricted to that space (Spence, 1999; Wolfley, 2016). In some cases, a common theme that most people believe about national parks and monuments is that nobody lives in these places anymore or that the inhabitants gave the federal

government the land (Fisk et al., 2021; Spence, 1999; UCLA law, 2018, Nabokov & Loendorf, 2004). This is far from the truth, yet people in the United States still believe in this narrative (Benton, 2009; Treuer, 2021). Visitors enjoying these beautiful landscapes and cultural sites sometimes read decades-old information (Bickell, 2020; Omaha & Us, 2022, National Park Service, 1987). The signs may share outdated information and negatively describe the history of Tribal nations. Therefore, visitors may be unsatisfied due to the content of interpretive signage (del Bosque & Martín, 2008). This could lead to receiving critical feedback from visitors and Tribal members (National Park Service, 1987).

Reading interpretive signage that Tribal members write changes the meaning behind the stories and histories about a landscape and allows them to reclaim their stories and share history from their perspective (Binkley, 2015; Enright, 2021). This provides another layer of understanding of what happened at these outdoor sites and allows visitors to not only see a landscape that is full of objects but full of living beings that still need to be cared for (Kimmerer Wall, 2015; Stoffle et al., 2015). In addition, the belief that peoples coexist with nature and are a part of it can be found across many Tribal and Indigenous people's philosophies (Pierotti & Wildcat, 2000; Salmón, 2000; Valkonen & Valkonen, 2014). This lens of seeing the world is not always written within interpretive signage; therefore, there is a lost opportunity to share Indigenous perspectives with visitors (Boiral et al., 2020; McCown, 2008).

1.2. Interpretative signage

Interpretive signage has been used within public outdoor spaces since the establishment of the NPS, national monuments, and other recreation sites. Interpretive signage educates the public about a park's landscape, science, cultural, and historical aspects (Barry, 1986). These topics provide visitors with information that can enhance their understanding and experience of a

park or outdoor location. The construction of these signs follows specific guidelines based on guidebooks and policies established by federal agencies. These guidebooks and policies include sign planning, maintenance, and strategies for sign communications (BLM, 2016; NPS, 2009).

The history of constructing parks, monuments, and recreation areas excluded the narratives of Tribal nations histories and stories. (Rock, 2014). For example, the NPS mission “preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations” (NPS, 2023). The values reflected in this mission may have led interpretive signs to be written with a Western focus, which could be problematic when sharing the history and culture of Tribal nations. The word “preserve” naturally evokes seeing tribal nations in the past tense, which leaves limited dialogue and a lack of focus on including the present-day stories of those tribal communities still living within and adjacent to these parks.

In order to share more about tribal communities within these spaces, the Council for American Indian Interpretation was created to bring their voices into the interpretation profession (Knudson et al., 2003). Despite this, the council has taken little action to change the interpretation. There have been tribal members participating as interpreters at parks, but there is no evidence in the literature of tribal members being part of the writing process when developing signage for these outdoor spaces (Flores et al., 2018; Zotigh, 2020, Binkley, 2015). Also, there is no formal assessment that these agencies use to see how well they share Indigenous peoples' histories and stories within their interpretive signage (Machlis et al., 1986; Wright, 1990, (Ballantyne & Hughes, 2003; National Park Service, 1987). In 1987, the NPS conducted a study that analyzed the current state of signs and made recommendations for improvement (National Park Service, 1987). The NPS has also created advisory boards to receive input from topic

experts, experienced community members, and tribal members (United States Department of the Interior, 2005). These efforts were helpful but there is still need for more informed decision making when planning and implementing new signage.

Signs are a primary way to communicate with visitors while they visit national parks and other public lands (Beck & Cable, 2002). Some visitors cannot receive person-to-person interaction; therefore, they rely on interpretative signs to learn about a place (Coslett & Chalana, 2016)(Hughes & Morrison-Saunders, 2002). Additionally, NPS is a federally funded agency, which limits its ability to define terminology with more than one perspective due to the use of public funding (Dolan, 2020). It also leaves little room for adaptation and understanding from Tribal and underrepresented perspectives (Wolfley, 2016). An example is when there is only one definition for a word (Dolan, 2020), which could potentially exclude other perspectives and other necessary information. This could look like using jargon heavy words that are too technical and do not easily explain the history tied to the area.

2. Six R's Framework

To understand the representation of Tribal culture and histories in interpretive signage, I used a modified version of the Six Rs Framework. This recently developed framework provides an Indigenous research methodology (Tsosie et al., 2022). It was initially developed to evaluate a grant preparation program for Native American Faculty in STEM. In the study, they used various kinds of literature written by Indigenous authors that discussed the importance of Indigenous research methodologies and the need for them within Western research. The use of this literature made it possible for the conceptualization of the Six R's Framework. The researchers used a process of identifying key themes from those papers and synthesized each R into an inclusive definition. The definitions for each R and supporting literature are shown in Table 1.

2.1. Applying the Six R's Framework

The Six R's framework was developed as an Indigenous methodology for use in research (Kills, 2022). I initially intended to use all Six R's to measure how well federal agencies share Indigenous histories, stories, and culture within interpretive signage. When data collection was complete, it was determined that Reciprocity, Relationship, and Responsibility could not be directly identified in a sign because these Rs require supporting information about how the signs themselves were developed. The data needed to support these three R's would require additional primary data collection, such as interviews with the individuals who wrote the sign's contents and determining what was involved in the sign development process. Here, I only consider the outcomes of this process, the signs themselves. Therefore, I analyzed the sign text for only three Rs: Respect, Relevance, and Representation. The reason for choosing these three Rs was the ability to identify them and find supporting evidence from the signs only. Applying these three remaining R's required adaptation of the original framework to form working definitions and indicators identifiable in text-based data. Tables 4-6 share the three R's definitions, indicators, and examples to show how each indicator was presented in the text.

Respect

Three indicators were used for Respect: **Honoring Knowledge**, Content Balance between non-tribal and tribal histories, and *Includes Tribal Names*. **Honoring Knowledge** was mainly focused on how the interpretive signage shared information about Tribal communities, specifically when talking about their connections to the land and any information about the tribal communities in that region. Content Balance between non-tribal and tribal histories was approached by seeing how each interpretive sign shared stories from a non-tribal and Tribal perspective and whether there was a distinct imbalance in how much space was used to focus on the non-tribal histories compared to the tribal histories or were they both given the same amount

of interpretive space on the sign. *Includes Tribal Names* was also an important indicator since this shows how inclusive interpretive signage is when sharing information about the various Tribal communities that live within the park or in the greater region. Below is the Respect table with the noted indicators.

R	Definition	Quote	Honoring Knowledge	Content Balance between non-tribal and tribal histories	Includes Tribal Names
Respect	The sign provides information on tribal histories and includes sections where the knowledge shared by tribal members is honored.	From Walnut Canyon sign number #092620	Significant to Many Before Euro-American settlement, the landscape of the San Francisco Peaks, which includes Walnut Canyon, was an area used by all of the region's tribal groups	<u>The canyon's wildlife, including birds, has important roles in many native traditions and lifeways. We are guests here today. Please visit with respect.</u>	<i>(Hopi, Zuni, Navajo, and Southern Paiute).</i>

Table 1: Definition of Respect, with indicators included to show how it was coded in the study.

Relevance

Two indicators were used for Relevance: **Cultural Terminology** and Use Correctly.

Cultural Terminology identified the use of language specifically speaking about Tribal communities, not only from a historical perspective but also information that is still relevant to that Tribal community today. Used correctly looked at how that information was used correctly in terms of language usage and the choice of words in describing those histories and stories.

Below, is the Relevance table with the noted indicators.

R	Definition	Quote	Cultural Terminology	Used Correctly
Relevance	The sign has relevant information about the tribal	From Grand Canyon North Rim, sign number 141624	Ancestral Pueblo people began farming corn,	<u>The Kaibab Band of Southern Paiute Indians have called the North Rim</u>

	communities there. It uses cultural terminology correctly and respectfully.		beans, and squash nearby over 900 years ago.	<u>of the canyon home for centuries-planting gardens, collecting fruit, and hunting deer and rabbits. It is their ancestral homeland. Visitors continue to travel here to experience the solitude, cool air, and wilderness.</u>
--	---	--	---	--

Table 2: Definition of Relevance with indicators included to show how it was coded in the study.

Representation

Five indicators were used for Representation: **Includes one tribal community**, Includes two or more tribal communities, *Language used in past tense*, **Language used in the present tense**, and *Native Language used*. The first and second indicators **Includes one tribal community** was identified within the interpretive signage, and if there were two or more tribal communities included, then that was noted. The third indicator *Language used in the past tense* was identified if there were any words that were used in past tense. The fourth indicator, **Language used in the present tense**, was noted to see how often interpretive signage used the present tense to describe the present-day Tribal communities and how they use and live within the park, monument, or outdoor recreational area still today. The fifth indicator, *Native language used*, helped identify how often interpretive signage included language from the Tribal communities, which shows how represented various Tribal communities are within the signage.

Below is the Representation table with the noted indicators.

R	Definition	Quote	Includes one tribal community	<u>Includes two or more tribal communities</u>	<i>Language used in past tense</i>	Language used in the present tense	<i>Native Language used</i>
Representation	The sign includes tribal communities within the region, and there is Native language	From Sand Canyon sign number 162118	N/A	<u>Hopi Taos Pueblo Acoma Pueblo</u>	<i>Some sections were excavated by archaeologists from 1983 to 1993, then reburied to</i>	But it remains very much alive for modern Pueblo people.	<u>Hopi</u> word for this area, <i>kiiseo</i>

	usage				<i>preserve the site.</i>		
--	-------	--	--	--	---------------------------	--	--

Table 3: Definition of Representation with indicators included to show how it was coded in the study.

The Six R's is a versatile framework and helps to show benefits that come from using an Indigenous research methodology to understand systematic issues impacting Tribal nations. Balazs and Morello-Frosch (2013) adapted the framework and used three Rs to guide their research on two case studies, the Northern California-Household Exposure Study (HES) and the San Joaquin Valley Drinking Water Study (DWS). The HES studied the household exposure assessment of air and dust from an oil refinery. The DWS study was a collaboration process between the Community Water Center and the University of California, Berkeley and focused on access to clean water. Both case studies used three of the six Rs, Rigor, Relevance, and Reach. These three Rs played a role in strengthening the research design and emphasizing community engagement. In this example, the researchers wanted to understand the role of Community-Based Participatory Research (CBPR) while collecting data and working with communities (Balazs, 2013). Another example used 4 Rs: Respect, Relevance, Reciprocity, and Responsibility (Kirkness et al., 2001). In this article, the authors shared the challenges of First Nation and Native students attending higher education institutions. Another study focused on developing a framework for Early Childhood Research that included 5 R's, Relevance, Relationship, Respect, Reciprocity, and Responsibility (Peterson et al., 2023). In this research, the authors adjusted research methodologies and adopted the 6 R's framework to make the project more relevant for the communities. This methodology was appropriate for the study because the project was looking at the inclusivity of Indigenous stories and histories within interpretive signage.

Respect	Showing respect to Indigenous communities is recognizing their knowledge, traditions, core values, particular worldview, and cultural integrity (adapted from Kirkness & Barnhardt, 1991; Steinhauer, quoting Cree Elders, 2002).
Relationship	Relationship is seeing the connection that Indigenous people have with one another, ancestors and future generations but also with the land and nature. This could only be built by trust and honesty over time. (Cajete 2000; Kovach 2008; Wilson 2001, 2008; Kimmerer, 2013)” (Tsosie et al., 2022).
Relevance	“Relevance is being closely connected or appropriate to the education, experiences, perspectives, priorities, and ways of knowing, living, and doing in Indigenous communities (Goody, 1982, as quoted in Kirkness & Barnhardt, 1991; Kovach, 2008; Stanton et al., 2019)”(Tsosie et al., 2022).
Reciprocity	The process of exchanging knowledge between one another from a place of intentionality. This encourages all parties to build relationships that provide a space for respectful community engagement. (Tsosie et al., 2022).
Responsibility	Responsibility is holding each party accountable for the knowledge and the communities they are building trust with. “Indigenous communities are responsible for their own narratives, stories, people, and histories, in the present and for future generations. We are responsible for the reciprocal relationships we have with Indigenous communities, the Earth, and all that is a part of them”(Tsosie et al., 2022).
Representation	Representation is having a presence at the table. When Indigenous communities are represented, it empowers them to identify and share what is relevant and important to their people. It allows the voice of the community and each participant to be heard. (Kovach, 2008; Deloria & Wildcat, 2001.)” (Tsosie et al., 2022).

Table 4: Six R’s Framework Descriptions (Tsosie et al., 2022).

These definitions were used to understand tribal and non-tribal faculty engagement and how to enhance those engagements and collaboration among faculty (Tsosie et al., 2022).

This paper reports on the results of a study assessing how Tribal communities are presented in the context of interpretive signs at national parks, monuments, and other outdoor recreational areas in the southwest that provide the public with opportunities to engage in outdoor recreation activities. The application of the Six R’s framework to this study of interpretation and how NPS, monuments, and outdoor recreational sites share Indigenous histories and stories is novel. In my work, I apply the Six R’s Framework to address the research

question: how well does interpretive signage include tribal voices, history, and stories within public outdoor spaces?

2. Methodology

The objective of this study is to understand language patterns utilized in interpretive signage and educational displays by assessing patterns found throughout the National Park Service (NPS), Bureau of Land Management (BLM), and U.S. Forest Service (USFS) displays. I used the Six R's Framework to assess to what extent interpretive displays include Respect, Representation, and Relevance regarding tribal communities in the US Southwest. To carry out this work, I developed a coding system to analyze various interpretive signs from parks and monuments, determined how well each site shows each of the three R's, and conducted a qualitative evaluation of sign content within sites, across sites, and federal land management agencies. Including one tribal park made it possible to identify language use differences between majority and tribal communities.

2.1. Location Selection

In spring 2022, I identified study locations throughout the Southwest. Sites were selected to provide good geographic distribution across the region. The Southwest United States, generally defined as the Four Corners Region of Arizona, Utah, Colorado, and New Mexico, has 63 National Parks. Arizona has 22, New Mexico has 15, Utah has 13, and Colorado has 13 National Parks (NPS, October 13, 2023). Of the 63 National Parks in the Four Corners region, I studied 10. Two additional sites managed by the Bureau of Land Management, one other site managed by the United States Forest Service, and one site managed by Navajo Nation Tribal Parks were also included (Table 2). All the sites included some aspect of education or

interpretation. Specific sites were strategically chosen along travel routes to optimize time and resources and to diversify locations that different federal agencies managed.

Park/Monument Name	Agency
Grand Canyon North Rim	NPS
Sand Canyon National Monument	BLM
Kaibab Plateau Visitor Center	USFS
Walnut Canyon	NPS
Outside Mesa Verde exhibit	NPS
Inside Mesa Verde exhibit	NPS
Kaibab Band of Paiute Indians Pipe Spring National Monument	NPS
Canyon of the Ancients National Monument	BLM
Cliff Palace within Mesa Verde National Park	NPS
Indoor Montezuma Castle National Monument exhibit	NPS
Outdoor Montezuma Castle National Monument exhibit	NPS
Indoor Tuzigoot Exhibit National Monument	NPS
Navajo Bridge Interpretive Center	NPS
Monument Valley Navajo Nation Tribal Park	NPS

Table 5: List of study sites and managing agencies

It was essential to include interpretive signage not only from outdoor exhibits but from indoor exhibits, too. There was a difference in what information was presented outdoors and indoors. Indoors, there were more artifacts, and information about these artifacts was written on the interpretive signage. Also, including information about the creation and management of a site

was often present on indoor exhibits. Interpretive signage outdoors focused more on the history of the region and the ancestral sites that present along the trails. Navajo Nation Tribal Park was chosen since it is owned and managed by the Navajo Nation, which influences how signs are written and the park's administrative structure.

2.2. Map

Map of 14 chosen Sites found within the Four Corner's Region

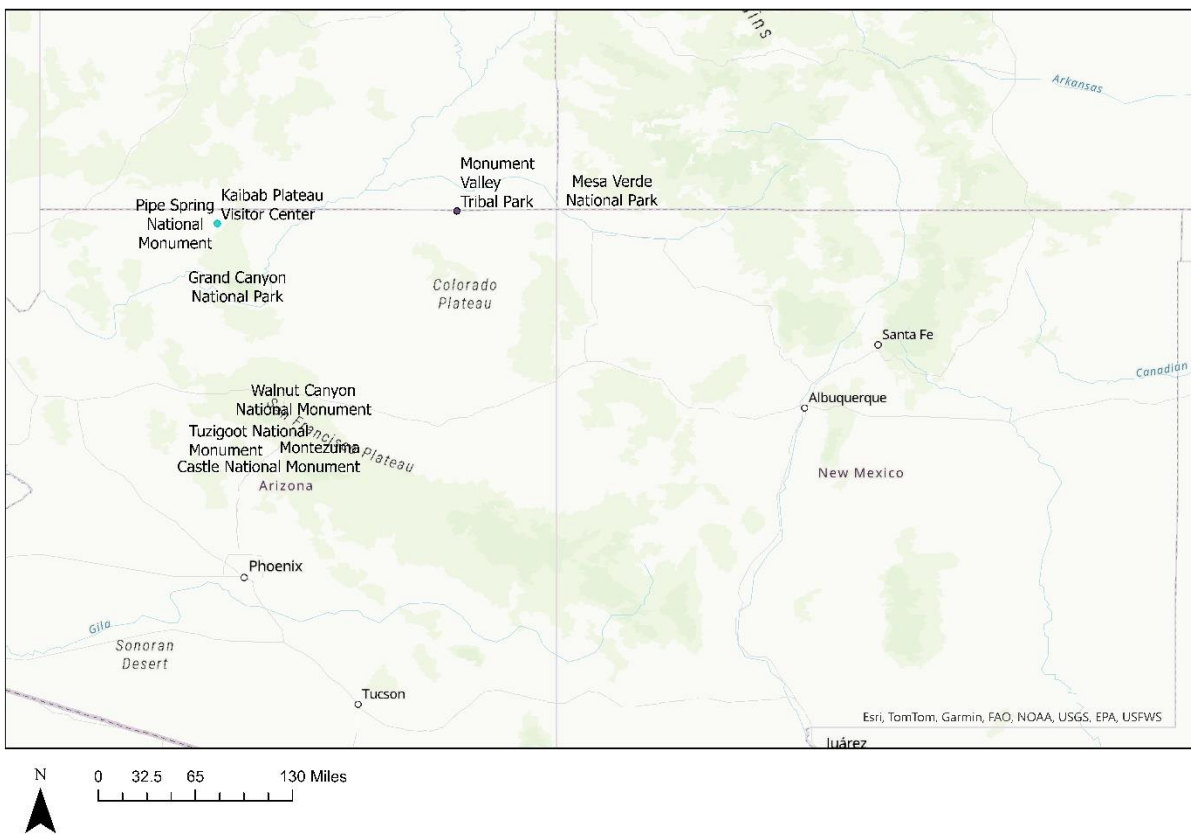


Figure 1: Map of selected sites; some of these sites have more than one attached to it.

2.3. Photos Protocol

The data was collected during the Summer and Fall of 2022. We focused on data collection in and around visitor centers. Many people visit these areas, which often contain a

high concentration of interpretive signs. Data collection involved visiting each park site, walking around the main visitor center and any short interpretive trails nearby to identify signs, and taking photos of signs as they were encountered. Undergraduate students assisted with photo collection and the production of metadata from the photos.

A protocol was established before the data was collected. The protocol required moving any barriers covering the sign, shading the general area to the best of our ability if there was any glare from the sun, and taking the photos horizontally or vertically to ensure the text was captured clearly. If some challenges or barriers were out of our control, including too much sunlight, shade, glass covering text, different fonts, and faded lettering, taking closer pictures of each section of an interpretive sign helped provide a clearer picture to transcribe.

While actively taking the photos, we initially entered the closest designated trail's start and followed the interpretive signage's natural flow until the end. When this process was completed, pictures of the interpretive signage in the visitor's center exhibit were taken, if any. After each trip, I gathered and uploaded photos to a shared Google Drive folder.

2.4. Data Management

All photo data was stored on Google Drive. Each site received its own folder. To ensure organization and clear data collection, a metadata sheet to track background information about each photo was developed. The columns were narrowed down based on what information was important to know about each photo and what details would provide a holistic view of each photo. Table 3 shows all metadata fields, describes each field, and gives an example from our dataset. All metadata was stored on Google Drive.

Column name	Description	Example
Image Order (Place_Date_###)	This is essential information to include to ensure everyone can find the correct photo and keep track of the photo using the last three digits.	Grand Canyon North Rim_08/06_859
Link to Image	Paste the link of the photo in the excel sheet. This is important because we need to find the photo easily.	https://drive.google.com/drive/u/0/folders/1J9e0xkvvGF-1YqxN4YzQLlqSReFGB-yc
Type of site? e.g. National Park, State Park, Nation Monument, etc.	Including the type of site will help distinguish it from others	National Park Service
Park Name (Single or Multiple Unit)	This is important for some of the bigger sites we will also take photos of. For instance, the Grand Canyon has multiple visitor points therefore distinguishing each part will help keep track of what portion we have already been to.	Grand Canyon National Park-North Rim/Multiple Unit
Who manages this location? e.g. National Park Service, Forest Service, BLM, etc.	Including this detail in the Excel will help us see which entity manages this park.	National Park Service: If multiple lists those too
Outside or Inside the exhibit	This is important to include in the Excel sheet since it shares whether the sign was posted outside or inside the visitor center.	This sign was outside
Native Language Usage (Yes or No)	Native language use is important since we are looking at what type of language is used within these signs. Include a yes answer, even if it's just one word.	No
Year the sign was written or N/A	Including the listed date that the sign was written or was set up on display will give us an idea of how old the signs are and what is the typical time frame of when the parks to replace them	This sign has no date therefore, it's N/A
Type of signage (e.g. outdoor sign describing an area, outdoor sign describing a particular thing that can be viewed from the location of the sign, or indoor sign as part of an exhibit)	Explain the purpose of this particular sign; is it meant to describe the history, trail name, culture, etc., of the site it is located in? This is important because we will see if this has an impact on the language that is used on this particular sign.	This sign is used to describe other locations around the Grand Canyon that visitors can visit, it shows a map that visitors can see how far each site is from the Grand Canyon North Rim Visitor Center.

Table 6: Metadata descriptions and examples

2.5. Transcribing photos

The next step was transcribing the photos using an Image to Text online application. We uploaded pictures to the application's website, creating a transcription based on machine reading

of the sign text. This transcript was then copied into an Excel spreadsheet. For small file sizes below 1 MB, we used the site [Image to Text \(Extract Text From Image\)](#) using the JPG to Word function. If the image was larger than 1 MB, the Image to Text application rejected the image. When Image to Text rejected an image, I used a separate application to compress the file size and then attempted to use Image to Text again. If Image to Text still rejected the photo, we used an alternative application, [Image to Text Converter - Convert Picture to Text \(prepostseo.com\)](#). I cropped out the photo's background for photos that did not transcribe well. This was best for unclear pictures or if the text was organized in columns. If the automated transcription failed, the photo was manually transcribed. All photo transcripts were stored within their designated folder in Google Drive.

For this project, photos to included in the analysis had information relevant to cultural or historical interpretation. Signs solely about providing directions, hours of operation, contact, and safety information were excluded from my analysis. All photos were retained within each designated site photo folder on Google Drive.

2.6. Coding

This research used thematic methodology to understand the frequency of themes in each sign. Thematic analysis “is a method for identifying, analyzing, organizing, describing, and reporting themes found within a data set” (Nowell et al., 2017). This methodology helped adapt the Six R’s framework and provided a foundation for understanding how to code the data.

The initial step was to create an Excel spreadsheet with a column for the data identifier, a column for the transcription of each sign, and columns as placeholders for specific indicators unique to each R, as shown in Tables 4-6. The metadata sheet columns within Table 3 were copied for each site for each R, and to prevent confusion between Rs, they were given different colors.

Respect was Red, Relevance was Yellow, and Representation was Dark Blue. For each R, the sites were evaluated separately. An Excel sheet was created for each R for all 14 sites, for a total of 42 Excel sheets. If a sign had an indicator present, the text matching the indicator was highlighted. If a sign did not have any of the indicators or lacked the presence of the indicators, then it was marked as not available (N/A). A column within the coding sheet was used to add comments or make notes on why a particular indicator was chosen when it was not easily noticeable. Notes were also taken on any language that may be perceived as insensitive or problematic for Tribal communities in the region.

2.7. Calculating Scores

To determine the overall presence or absence of each R for each site, I calculated the total number of indicators present at each site. This process required adding all the instances where an indicator was recorded from the Excel sheets across each site and finding the total number of indicators per site, per sign, and for each R. These totals were divided by the total possible indicator score and multiplied by 100 to produce a percentage. This was done for each site, each sign, and each indicator within each R Excel sheet.

Once the calculations were done for each specific indicator within each site, the total overall possible score was calculated to produce a percentage of an overall score for each site. This was done by taking the Total overall score from all the signs and dividing it by the total possible overall score, multiplied by 100. Figure 1 is an example of the process using Respect. Figure 2 shows the overall coding process for the three Rs.

Example of Coding Process for the R: Respect							
Identifier	Transcript Clip	Honoring Knowledge	Content balanced between non-tribal and tribal histories	Includes tribal names	N/A	comments on why I chose this column	Mark Count
20220806_141248	Early in the twentieth century, wealthy ladies and gentlemen yearning for a peek at the fabled Grand Canyon found few urban comforts along its northern rim. While visitors on the South Rim relaxed in the luxurious accommodations of the cliff-hugging El Tovar, visitors to the isolated North Rim braved the outdoors in canvas tents.				X	They talk about the early twentieth century in Anglo terms but does not include what was happening with tribal communities at that time.	0

Total Score	2	1	6
Total Possible Score for each R	10	10	10
	2/10	1/10	6/10
Percentage for each R	20%	10%	60%

Sum (Total Mark Score)	9	Total Possible Score	27	Total Mark Score/Total Possible	9/27	33.33%
------------------------	---	----------------------	----	---------------------------------	------	--------

Figure 2: Example of the Coding process.

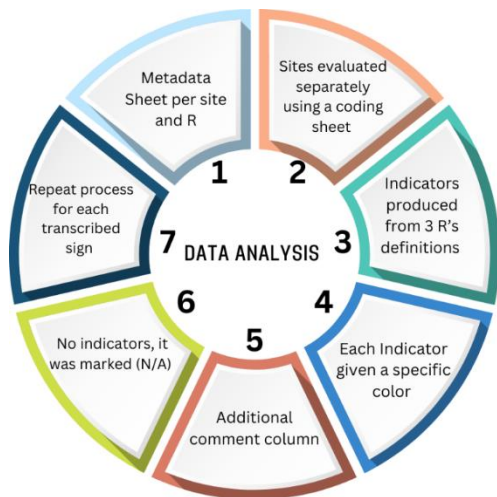


Figure 3: Steps of the Coding process.

3. Results

We took pictures of interpretive signage from 6 National Parks, 5 National Monuments, 1 United States Forest Service site, 1 Bureau of Land Management site, and 1 Navajo Nation Tribal Park. 447 total photos were taken during data collection. The parks or monument that scored the lowest on all R's was Navajo Bridge, reaching the maximum overall score of 10.52% in the Relevance category, and Kaibab Visitor Center, which scored below 30% for all three R's and the lowest for Representation, 14.66%. The site that scored the highest was Monument Valley Tribal Park, which scored above 90% in Respect and Relevance.

The types of interpretive signage evaluated ranged from wayside signs to educational displays describing the history of the park. The signs shared the history of the ancestral peoples, the landscape, and the cultural significance of an area. Specifically, at Monument Valley Tribal Park, the signs included a timeline that showed significant events for the Navajo people. There were several signs that shared stories from community members and used the Navajo language throughout those stories. The focus was on interpretive signage that shared the area's history and included information about how the park was formed, who participated in developing the park, and significant dates. The signs primarily aimed to educate the public about the area's history, what significant structures were built by tribal communities, and how those communities are still living there.

3.1. Results of coding for each R

3.1.1. Respect

Specifically looking at the R, Respect, the highest percentage across indicators was for *Honoring Knowledge* and *Includes Tribal Names*, with three sites scoring 100% for each theme. Those sites were Walnut Canyon, Cliff Palace, and Monument Valley Tribal Park for the

Honoring Knowledge theme, and Sand Canyon, Canyon of the Ancients, and Cliff Palace for the *Include Tribal Names* theme. The theme that contained the most percentages below 25% was the *Content Balance of Non-Tribal and Tribal Histories*, the lowest coming from Kaibab Visitor Center (0%), Sand Canyon (0%), Cliff Palace (0%), and the outdoor exhibit of Montezuma Castle (0%). The theme with the highest percentages, about 75%, was the inclusion of *Tribal Names*. The only site that received above 75% for all themes was Monument Valley Tribal Park, with the highest percentage coming from the *Honoring Knowledge* theme.

Respect			
Locations	Honoring Knowledge	Content balanced between non-Tribal and Tribal histories	Includes Tribal names
Grand Canyon North	20%	10%	60%
Sand Canyon	90%	0%	100%
Kaibab Visitor Center	33.33%	0%	55.55%
Walnut Canyon	100%	30%	40%
Outside Mesa Verde	40%	20%	60%
Inside Mesa Verde	40%	10%	85%
Pipesprings	59.25%	14%	48.14%
Canyon of the Ancients	68.75%	12.50%	100%
Cliff Palace	100%	0%	100%
Indoor Montezuma Castle	84.61%	15.38%	84.61%
Outdoor Montezuma Castle	73.33%	0%	46.67%
Indoor Tuzigoot	70%	20%	55%
Navajo Bridge	7.14%	7.14%	0%
Monument Valley Tribal Park	100%	78.57%	92.86%

Table 7: Scores for Respect within all sites, along with indicators

3.1.2. Relevance

Relevance contained two themes: *Cultural Terminology* and *Was it Used Correctly*. Based on the percentage, most parks and monuments scored above 75% within the *Cultural Terminology* theme. Six sites scored highly: Grand Canyon National Park North Rim (80%), Sand Canyon (83.33%), Canyon of the Ancients (88.23%), Cliff Palace (100%), Indoor Montezuma Castle (76.92%), and Monument Valley Tribal Park (100%). The sites that scored below 25% for both themes were Kaibab Visitor Center (23.52%) and Navajo Bridge (10.52%). The Outside Mesa Verde site showed a 50%/50% balance between the two themes. Cliff Palace was the only site to score 100% for both themes, due to only one outdoor sign.

Relevance		
Locations	Cultural Terminology	Used correctly
Grand Canyon North	80%	80%
Sand Canyon	83.33	66.66%
Kaibab Visitor Center	23.52%	23.52%
Walnut Canyon	37.50%	31.25%
Outside Mesa Verde	50%	50%
Inside Mesa Verde	61.90%	57.14%
Pipesprings	56.66%	53.33%
Canyon of the Ancients	88.23%	58.82%
Cliff Palace	100%	100%
Indoor Montezuma Castle	76.92%	69.23%

Outdoor Montezuma Castle	52.17%	26.08%
Indoor Tuzigoot	48.48%	45.45%
Navajo Bridge	10.52%	10.52%
Monument Valley Tribal Park	100%	93.33%

Table 8: Scores for Relevance within all sites, along with indicators.

3.1.3. Representation

Representation had the most indicators out of the three Rs: *Includes one Tribal community, Includes two or more Tribal nations, The language used in past tense, Language used in the present tense, and Native Language used.* It was the only R where Monument Valley Tribal Park did not score above 75%. National parks and monuments mostly scored below 25%. The parks that scored above 75% were Canyon of the Ancients and Cliff Palace. The areas where these sites scored the highest included *Includes one Tribal community* and *language used in the present tense*. The theme where all sites scored below 25%, except one, Monument Valley Tribal Park (41.17%), was *Native Language Used*. The sites that scored 0% were Grand Canyon North, Kaibab Visitor Center, Walnut Canyon, Outside Mesa Verde, Inside Mesa Verde, and Cliff Palace. The second theme with most sites scoring below 25% was, *Includes two or more Tribal nations*, with the lowest scores of 0% coming from Grand Canyon North, Inside Mesa Verde, Cliff Palace, and Navajo Bridge. Cliff Palace, which scored 100% in *Includes one tribal community* and *language used in the present tense* scored 0% in the rest of the three themes.

Representation					
Locations	Includes one Tribal community	Includes two or more Tribal nations	The language used in past tense	Language used in the present tense	Native Language used
Grand Canyon North	33.33%	0%	73.33%	33.33%	0%
Sand Canyon	33.33%	50%	50%	50%	16.67%
Kaibab Visitor Center	26.66%	20%	26.67%	0%	0%
Walnut Canyon	11.76%	11.76%	23.52%	17.64%	0%
Outside Mesa Verde	55.55%	22.225	44.44%	33.335	0%
Inside Mesa Verde	63.33%	0%	53.33%	13.33%	0%
Pipesprings	40.54%	10.18%	18.91%	10.81%	13.51%
Canyon of the Ancients	76.47%	23.52%	23.52%	17.64%	17.64%
Cliff Palace	100%	0%	0%	100%	0%
Indoor Montezuma Castle	18.75%	31.25%	12.50%	37.50%	12.50%
Outdoor Montezuma Castle	22.72%	13.62%	9.09%	22.72%	4.54%
Indoor Tuzigoot	29.03%	12.90%	3.22%	29.03%	12.90%
Navajo Bridge	15.78%	0%	0%	0%	5.26%
Monument Valley Tribal Park	70.58%	11.76%	0%	29.41%	41.17%

Table 9: Scores for Representation within all sites, along with indicators.

4. Synthesis of Sites

Parks and monuments mostly scored below 25% overall when all three R's were considered together. The parks above 75% were Monument Valley Tribal Park and Cliff Palace. Monument Valley Tribal Park focused on the connection Navajo people have with the land and provided a timeline of events that made it easier for visitors to see the Navajo Nation's

progression and critical events. It included names of key figures who impacted the Navajo Nation and integrated cultural values within those signs. While capturing those signs, tribal members were working in various positions and taking visitors on guided tours. This showed the value that the Navajo Nation Tribal Parks have for stories and the importance of sharing them with visitors. Cliff Palace, on the other hand, was only accessible through a single overlook and only one interpretive sign was analyzed. The sign was placed at a significant ancestral site that the Pueblos of New Mexico still hold sacred today. The sign shared how their knowledge, skills, and traditions were passed down from one generation to the next and the significance of having this sight still available for community members to visit. This section provides a synthesis of the findings from analyzing the 3 Rs together at a selection of representative sites.

Overall 3 R's Score per site			
Locations	Respect	Relevance	Representation
Grand Canyon North	33%	53.33%	29.33%
Sand Canyon	60%	75%	34.28%
Kaibab Visitor Center	29.62%	23.52%	14.66%
Walnut Canyon	56.67%	6.25%	10.58%
Outside Mesa Verde	43.33%	60%	11.11%
Inside Mesa Verde	41.67%	59.52%	25.33%
Pipe Springs	41.14%	55%	18.91%
Canyon of the Ancients	60.41%	79.41%	31.76%
Cliff Palace	66.67%	100%	40%
Indoor Montezuma Castle	61.53%	73.07%	22.50%
Outdoor Montezuma Castle	40%	39.13%	72.72%
Indoor Tuzigoot	46.67%	48.48%	17.41%
Navajo Bridge	4.76%	10.52%	3.15%
Monument Valley Tribal Park	90.47%	90%	29.41%

Table 10: Scores of all 3 R's across each site.

4.1.1. Grand Canyon North

The Grand Canyon is considered one of the world's seven natural wonders and is home to 11 affiliated Tribal communities. The signs at this site shared information about the Grand Canyon, focusing on the lodge and colonial settlers' history of expeditions into the canyon. Additionally, the signs mentioned the presence of Tribal communities within the canyon, such as the Southern and Kaibab Paiutes, and Pueblos. Most of the signs used Tribal names, which was respectful to the Tribal communities that live in the area. In this way respect was conveyed by the inclusion of these Tribal communities and the renaming of significant locations throughout the Canyon.

The signs showed relevance by including cultural information that Tribal members may see as relevant to their communities. This includes information on farming, foraging, and using various plants within the region.

People of the North Rim People have lived seasonally on the canyon edge for thousands of years. It is cool in the summer and water is close by. Ancestral Pueblo people began farming corn, beans, and squash nearby over 900 years ago. The Kaibab Band of Southern Paiute Indians have called the North Rim of the canyon home for centuries-planting gardens, collecting fruit, and hunting deer and rabbits. It is their ancestral homeland. Visitors continue to travel here to experience the solitude, cool air, and wilderness (Photo I.D. 141624).

Another sign described the service a tribal member provided when a colonial settler expedition inside the Grand Canyon was happening; this is important because it shows that they may not have been able to successfully navigate the Grand Canyon without help from Tribal communities in the region.

Representation of Tribal histories and stories was limited because they did not fit into the historical theme these signs were trying to tell. Most of the signs presented were in the past tense, but that is as expected since their purpose was to discuss history. Present-tense language could help visitors understand that the Tribal communities here have called the Grand Canyon home for centuries.

4.1.2. Walnut Canyon

Walnut Canyon signage provides much information that honors the cultures of those who call that region their home. The signs mentioned tribal names from Hopi, Puebloan, Zuni, Navajo, and Southern Paiute languages. All of these tribes are tied to that land. The signs also shared information about those ties and the relationship between tribal communities and Walnut Canyon since time immemorial. They discuss the community and how ancestral members gathered food and water. Additionally, there was a content balance between sharing tribal and settler histories to provide a complete picture for visitors.

Significant to Many Before Euro-American settlement, the landscape of the San Francisco Peaks, which includes Walnut Canyon, was an area used by all of the region's tribal groups (Hopi, Zuni, Navajo, and Southern Paiute). Walnut Canyon remains a favorite place to collect plants for medicinal, ceremonial, and everyday use. The canyon's wildlife, including birds, has important roles in many native traditions and lifeways. We are guests here today. Please visit with respect" (Photo I.D. 092616).

The information provided on the quoted sign shared cultural terminology/knowledge about ancestral communities. It is relevant for tribal members today to learn about this and to take a role in influencing how these stories are being told. The signs shared more than the

surface-level one-line explanation of tribal communities in the area, exposing visitors to more information.

These signs were shared in present tense language, which speaks not only to the tribal communities' histories but also to their present-day communities. Also, the mention of multiple tribes and the use of their native language incorporates a more diverse story of Walnut Canyon.

4.1.3. Inside Mesa Verde

The inside exhibits of the Mesa Verde Visitor Center included signs that spoke to the past and present-day tribal communities in the region. These signs mentioned the types of farming methods Pueblo tribal communities have done in the past and the numerous cultural uses of plants. There was also information on the history of the creation and motivation to establish the park, which included information on early park advocates, archeologists, and President Theodore Roosevelt. The honoring of knowledge theme was seen through these efforts, providing a space for tribal community members to share their perspectives of place and how non-tribal people saw the land. By including this information, the signs revealed more about the histories and stories that Mesa Verde had to share.

The signs also showed high scores for Relevance through information about both Ancestral Pueblo and present-day, including tribal communities within the region. However, this information was somewhat written from an outsider's perspective. Nonetheless, it still gives essential information on the ten-plus tribal communities that are supporting the park's efforts. Some signs were translated into Spanish, but no signs were translated into Pueblo languages or another tribal language of a community that lives in the region.

Representation of tribes was present in interpretive information, but often lacked context that could have helped make the representation of tribal communities clearer. The use of present

tense language was seen throughout the signage, which supported the idea that tribal communities did not just disappear from the Mesa Verde area. However, one problematic sign shared the story of an early colonial scientist from Sweden who collected and transported 600 cultural items aboard. The sign does not provide any information on whether these items were repatriated back to the tribes. The histories of Mesa Verde and the life of Ancestral Pueblo were represented, but the use of quotes from current-day tribal members could have been added to the stories being shared.

4.1.4. Navajo Bridge

This site did not show Respect or include histories of the tribal communities within the region. The information shared was predominantly the “progress: that the Navajo Bridge brought about by allowing for the “colonization” of Arizona. The signs also did not show much Relevance to tribal communities. The only exception was a brief mention of a Navajo family who operated the Lee’s Ferry for a time.

Representation in the signs was skewed toward the construction of the Navajo Bridge and the history of “explorers” coming through the region. There was only one inclusion of a tribal community, the Navajo. There was little to no use of Native language on the signs.

“To the founder John Doyle lee who with superhuman effort and in the face of almost insurmountable obstacles maintained this ferry which made possible the colonization of Arizona” (Photo I.D. 6514).

“John Deering (Bih Bitoodnit Nez) born in 1870 of the Deer Water Clan, his wife Susie Deering, born in 1878, of the Maii Deeshgiizhinii Clan, and their nine children, pioneered the areas of the Gap, Cooper Mine, Cedar Ridge, Bitter Spring, Page, Marble Canyon, Lee's Ferry. Bih Bitoodnii Nez transported supplies and U.S. mail from

Flagstaff to Salt Lake City and supported his family by raising live stock and hunting in the Kaibab and Dixie National Forests. John Deering operated the Lee's Ferry and maintained the historic trail until the historic Navajo Bridge was constructed in 1929. He died April 18, 1956 in Cedar Ridge, Arizona” (Photo I.D. 101348).

4.1.5. Park Differences

The choice to include a tribal park was important for this study because it allowed an analysis of the differences in how interpretive signage is written within a tribal-managed park compared to non-Tribal managed parks and sites. Photos were taken at Monument Valley Tribal Park. The signage clearly showed respect (90.47%) to the Navajo people. It shared stories and histories relevant (90%) to the community. The Tribal park focused on telling authentic histories. The signage used the Navajo language, and throughout the signs, it shared the government structure of the Navajo Nation, the significance of moviemaking within Monument Valley, and cultural stories and practices still being used today.

“Monument Valley the Buttes

Geologists say that great layers of sediments once covered this region. First, streams from a mountain range more ancient than the Rocky Mountains deposited layers that hardened into the siltstones and shales that now form the valley floor...

According to Diné oral tradition, as told by prominent local elder Mr. John Holliday, the present earth's surface was formed after floodwaters welled up from worlds below. Deities, animals, and the ancestors of today's humans emerged from below through a giant reed... (Photo I.D. 808).

On the other hand, NPS, BLM, and FS tend to focus on the history of an area but struggle to show representation from tribal communities from the region. For example, the use of language and verbiage in NPS signage and Monument Valley Park was distinguishable. NPS

signage tends to be written in past tense and uses outdated terminology. Monument Valley Tribal Park includes the present-day life of Navajos and history that speaks to the people's resilience within the region. This can be seen from the data where Monument Valley Tribal Park scored 90% for Respect and Relevance. In comparison, NPS parks and monuments scored between 30%-60% for Respect and Relevance and 10%-30% for Representation. This shows there's a gap in how interpretive signage is being produced within NPS. Highlighting those differences could help identify areas where parks, monuments, and other outdoor recreational areas can improve.

4.1.6. National Park Service Synthesis

The National Park Service managed most of the sites chosen for this study. The percentages of each R identified in the interpretive signage at NPS sites painted a picture of points of improvement, areas where there were gaps in information, and opportunities to enhance verbiage. Some sites showed evidence of addressing tribal histories and culture, but others still have a long way to go. The NPS often lacked Representation: most scored below 25%. Sites often focused on the stories of one tribe and not all the tribes present in the region. The language used within the signs was mainly past tense, and there was a lack of cultural stories from the tribal communities, indicating that NPS focuses on sharing history but in a way that is not as inclusive to tribal communities. The NPS also rarely included tribal language in interpretive signage.

The NPS in some places shows evidence of working towards being more inclusive of tribal communities. This can be seen in the Southwest region's recently updated interpretive signage at Walnut Canyon, Tuzigoot National Monument, Pipe Springs National Monument, and several more. At Grand Canyon, the NPS is building a Native American Interpretation Center where people can learn about the communities within the region. Tribal members have been

invited to participate in the process and contribute to the educational development of interpretation so that their narratives are included.

It appears most of the signs managed by NPS have not been updated for decades due to the quality of language and the condition of the interpretive signs. However, many of the signs did not have a date when the information was written and had no names of those who contributed to their development. A record or date may help to ensure that the information being shared is updated and that visitors are not misled by old information.

The two other agencies included in this study were the United States Forest Service and the Bureau of Land Management. A single site was analyzed by both agencies; therefore, it cannot be concluded if these agencies are doing well in including tribal histories and stories within interpretive signage. However, the data shows that the Forest Service-managed site Kaibab Visitor Center scored lower than 25% for Relevance and Representation. Also, the Bureau Land Management site, Sand Canyon, showed an average score of 75% for Relevance, 60% for Respect, and 34.28% for Representation. These sites may need to review their interpretive signage and consider how they engage with tribal communities in the area.

5. Discussion

This study adapted the Six R's framework to evaluate the interpretive signage at national parks, monuments, and other public lands using three of the Six R's: Respect, Relevance, and Representation. The evaluation of these three R's revealed critical differences between sites, as well as areas with high potential for improvement, including tribal histories and stories. The use of past-tense language when sharing information about tribal communities, who lived and still live in the study region, could mislead visitors to believe that tribal communities are not there anymore. Use of inappropriate terminology or words that are no longer acceptable could also

impact visitors and Tribal community's experiences. This includes the words like "colonization," "explorer," and "discovered." Finally, there is also clear evidence interpretive signs have not been updated or maintained based on the content of the signage. This in turn, results in content that is irrelevant to tribal communities and a bias toward Western-focused stories about current tribal communities.

According to the Wayside Guide for NPS, creating a sign is a process that requires deep consideration during development process (National Park Service 2002, NPS, 2009). In the Wayside Guide, NPS shared four factors that make an excellent sign: "a significant landscape feature with a well-documented story; at least one compelling, site-specific, reproducible-quality graphic that illuminates the story; a safe, accessible place for visitors; and routine maintenance of the site and the sign" (NPS, 2009). Acknowledging these factors, it may be beneficial for NPS to consider adding updated terminology to best share stories of parks, monuments, and other outdoor recreational areas. As stated within the guide, a wayside sign lasts, on average, five years and will need replacing; this could be an opportunity for NPS to update information and terminology used within interpretive signage (NPS, 2009).

Although I went to 14 sites in the Four Corners region, there is more to see, read, and take photos of. These data are a pilot to see the range of concerns regarding what information is being shared within interpretive signage. Using more of the Rs to analyze how these sites score could be beneficial. However, to use the three other R's, it is best to interview Park staff, managers of these sites, and interpreters who focus on developing signage and educating the public, especially community members who have stories and history to tell. Carrying out such a process could support efforts to make these outdoor sites more welcoming to tribal communities and enhance visitor's experiences.

In the BLM National Signs Handbook and Waysigns Exhibit Guide, there was a lot of focus on creating physical signs. However, the handbook and guide does not have in-depth content on how to engage tribal communities. Acknowledging this is important for managers because there needs to be more of a presence from the local tribal communities before planning and implementing interpretive signage. Developing tribal stories and histories is just as important as Western narratives and Western history. The National Park Service is working towards a more inclusive understanding of the history of the parks and other outdoor spaces, so in a way, this research is assisting in that effort. The staff within NPS, BLM, and the FS could make room to form these relationships with tribal communities that live within these outdoor sites and adjacent.

6. Conclusion/Recommendation

Adapting the Six R's framework proved useful in understanding interpretive signage and its connections to sharing tribal histories and stories. Each R (Respect, Relevance, and Representation) was given indicators based on their definitions. By using a method of coding, it was possible to see how each site compared to another. By understanding the history of colonization and the role parks, monuments and recreational sites played in sharing that story, it is only right for NPS, BLM, and FS to take an active role in providing resources and opportunities for interpretive signage to be updated and reflect tribal communities today. Having a form of evaluation or measurement like the one used in this study could help park managers understand how effective and inclusive their interpretive signs are. Eventually, this leads to holding agencies accountable and using it to start meaningful relationship-building and dialogues.

New Zealand provides a useful example of how NPS can move towards methods of respectful inclusion, including incorporation of cultural knowledge within interpretation. New Zealand has seen significant positive results from its efforts (Carr, 2004). According to the Department of Conservation, New Zealand has adopted practices that build on the interests of the Tangata Whenua within its National Parks. New Zealand's first park, Ruapehu and Tongariro was gifted by Chief Te Heuheu Tukino (Marshall, 2015). Despite this, western-focused perspectives were also common within New Zealand's National Parks. It was not until the Conservation Act of 1987 that a treaty was formed to co-manage protected areas and to consult with the Maori to establish strategies to develop relevant interpretation (Marshall, 2015). Learning from the process that New Zealand incorporated, the U.S. can gain an understanding of some effective management practices to influence the improvement of interpretive signage within the parks, monuments, and recreation areas.

The U.S. could benefit from the approaches that New Zealand implemented to create a well-rounded understanding of visitor's enjoyment. Compared to the United States and other countries, New Zealand has progressive legislation and treaties that ensure that Indigenous people are represented throughout the whole process and decision-making. "no decision is made without them" (Ferretti-Gallon et al., 2021). An encouraging process that could assist in making interpretive signage more inclusive of tribal communities in the Southwest and in the United States.

Currently, the U.S. is working towards establishing co-stewardship and co-management plans with tribal communities. Co-stewardship involves federal agencies and tribal communities working together to form agreements on how tribal and federal land will be managed (U.S. Department of Interior, 2024). Co-management involves actively engaging tribal communities in

decision-making and sharing management responsibilities with federal and nonfederal entities (Murray, 2023). Both have differences but share the same sentiment of wanting to improve relationships between federal agencies and Tribal Nations. Currently, NPS, BLM, and the FS have a tribal consultation process but not one that is robust; their consultation process involves proposing their project to tribal communities and asking permission to conduct that work instead of first reaching out to the tribal community members and giving them the power to guide the proposal writing process with their needs in place. Additionally, federal agencies should approach working with tribal communities differently since they are considered another Nation, not another stakeholder. Therefore, the emphasis is on the government-to-government relationship and the intentionality needed when collaborating with tribal communities. Including the framework discussed in this paper could assist in developing respectful, relevant, and representative procedures that could benefit federal agencies and Tribal Nations.

Building an effective evaluation process with federal agencies and Tribal Nations could transform the way we approach the inclusion of Tribal histories and stories on interpretive signage and future management policies. Understanding the use of the Six R's framework could be a great start to that process, and including the other three R's could add even more information about the current state of interpretation within National Parks, monuments, and outdoor recreational areas. The hope is to continue the movement toward the inclusivity of Tribal histories and stories within these outdoor spaces.

Bibliography

- 22 *Federally Recognized Tribes in Arizona*. (2020, November 4). Arizona Department of Education. <https://www.azed.gov/oie/22-federally-recognized-tribes-arizona>
- 23 *NM Federally Recognized Tribes in NM Counties | Maggie Toulouse Oliver—New Mexico Secretary of State*. (n.d.). Retrieved July 27, 2023, from <https://www.sos.nm.gov/voting-and-elections/native-american-election-information-program/23-nm-federally-recognized-tribes-in-nm-counties/>
- Beck, L., & Cable, T. T. (2002). *Interpretation for the 21st Century: Fifteen Guiding Principles for Interpreting Nature and Culture*. Champaign, Ill. : Sagamore Pub.; . 2002.
<https://web-s-ebshost-com.ezproxy4.library.arizona.edu/ehost/ebookviewer/ebook?sid=fd1b9fdd-ddcf-4736-96ba-0a18a7bda5ba%40redis&vid=0&format=EB>
- Benton, G. M. (2009). From principle to practice: Four conceptions of interpretation. *Journal of Interpretation Research*, 14(1), 7–32.
- Bickell, L. (2020). *Analysis of Interpretive Exhibits at Montana State Parks Visitor Centers*. Field to Frame Interpretive Planning and Design.
- BLM. (2016). *National Sign Handbook| Bureau of Land Management*. Bureau of Land Management.
- Boiral, O., Heras-Saizarbitoria, I., & Brotherton, M.-C. (2020). Improving environmental management through indigenous peoples' involvement. *Environmental Science & Policy*, 103, 10–20. <https://doi.org/10.1016/j.envsci.2019.10.006>
- Carr, A. (2004). Mountain Places, Cultural Spaces: The Interpretation of Culturally Significant Landscapes. *Journal of Sustainable Tourism*, 12(5), 432–459.
<https://doi.org/10.1080/09669580408667248>

- Coslett, D. E., & Chalana, M. (2016). National Parks for New Audiences: Diversifying Interpretation for Enhanced Contemporary Relevance. *The Public Historian*, 38(4), 101–128.
- Ferretti-Gallon, K., Griggs, E., Shrestha, A., & Wang, G. (2021). National parks best practices: Lessons from a century's worth of national parks management. *International Journal of Geoheritage and Parks*, 9(3), 335–346. <https://doi.org/10.1016/j.ijgeop.2021.05.004>
- Fisk, J. J., Jacobs, L. A., Russo, B. U. K., Meier, E., Nakachi, 'Alohi, Spencer, K. K. P., Kaulukukui-Narikawa, K., Datta, A. W., & Quiocho, K. (2021). Cultivating sovereignty in parks and protected areas: Sowing the seeds of restorative and transformative justice through the #LANDBACK movement. *Parks Stewardship Forum*, 37(3). <https://doi.org/10.5070/P537354734>
- Flores, D., Falco, G., Roberts, N. S., & III., Valenzuela, F. P. (2018). Recreation equity: Is the Forest Service serving its diverse publics? *Journal of Forestry*. 116(3): 266-272., 116, 266–272. <https://doi.org/10.1093/jofore/fvx016>
- Kills, R. L. T., Anne D. Grant, Jennifer Harrington, Ke Wu, Aaron Thomas, Stephan Chase, D'Shane Barnett, Salena Beaumont Hill, Annjeanette Belcourt, Blakely Brown, and Ruth Plenty Sweetgrass-She. (2022, April 25). The Six Rs of Indigenous Research. *Tribal College Journal of American Indian Higher Education*. <https://tribalcollegejournal.org/the-six-rs-of-indigenous-research/>
- Kimmerer Wall, R. (2015). *Braiding Sweetgrass*. <https://milkweed.org/book/braiding-sweetgrass>
- Knudson, D. M., Cable, T. T., & Beck, L. (2003). *Interpretation of Cultural and Natural Resources*. Venture Pub.
- Machlis, G., Ham, S., Robinson, G., Leicester, M., Cawood G., H., Huggins, R. J., Contor, R. J.,

- Sontag, W. H., Briggles, W. J., Kryston, C. E., Sharpe, G. W., Sharpe, W. A., McDonough, M. H., Lewis, W. J., Field, D. R., Winkler, W. C., Olson, J. K., Hardy, E. C., Owen, W., ... Silverman, M. J. (1986). *Interpretive Views*.
- Mackintosh, B. (1986). *Interpretation in the National Park Service: A Historical Perspective*.
<http://archive.org/details/interpretationin00mack>
- Manning, R., Diamant, R., Mitchell, N., & Harmon, D. (2023). *A National Park System for the 21st Century*.
- Marshall, K. (2015, May 4). *General Policy for National Parks full content*.
<https://www.doc.govt.nz/about-us/our-policies-and-plans/statutory-plans/statutory-plan-publications/national-park-management/general-policy-for-national-parks/general-policy-for-national-parks-full-content/>
- McCown, R. S. (2008). EVALUATION RESEARCH TO SUPPORT NATIONAL PARK SERVICE 21ST CENTURY RELEVANCY INITIATIVES. *NPS Conservation Study Institute Northeast Region Office of Interpretation and Education, University of Vermont*.
- Moscardo, G., & Hughes, K. (2023). Rethinking Interpretation to Support Sustainable Tourist Experiences in Protected Natural Areas. *Journal of Interpretation Research*, 28(1), 76–94. <https://doi.org/10.1177/10925872231158988>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, 16(1), 1609406917733847. <https://doi.org/10.1177/1609406917733847>
- NPS. (2009). *Wayside Exhibits: A Guide To Developing Outdoor Interpretive Exhibits*. National Park Service, U.S. Department of the Interior.
- NPS. (2023). *What We Do (U.S. National Park Service)*. <https://www.nps.gov/aboutus/index.htm>

Omaha, M. A. 601 R. D., & Us, N. 68102 P. 402 661-1804 C. (2022). *2022 Annual Report—Lewis & Clark National Historic Trail (U.S. National Park Service)*.

<https://www.nps.gov/lecl/learn/news/2022-annual-report.htm>

Pierotti, R., & Wildcat, D. (2000). Traditional Ecological Knowledge: The Third Alternative (Commentary). *Ecological Applications*, *10*(5), 1333–1340.

<https://doi.org/10.2307/2641289>

Pueblo of Zuni. (n.d.). Retrieved July 27, 2023, from <http://www.ashiwi.org/>

Rock, E. (2014, May 12). High Country News—Parks for All—The National Park Service struggles to connect with a changing America. *Eagle Rock School & Professional Development Center*. <https://eaglerockschool.org/high-country-news-parks-for-all-the-national-park-service-struggles-to-connect-with-a-changing-america/>

Salmón, E. (2000). Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship. *Ecological Applications*, *10*(5), 1327–1332.

<https://doi.org/10.2307/2641288>

Simpson, J. R. (2023). Mind the Gap: How to Promote Racial Diversity Among National Park Visitors. *VERMONT JOURNAL OF ENVIRONMENTAL LAW*, *17*.

Spence, M. D. (1999). *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks*. Oxford University Press, Incorporated.

<http://ebookcentral.proquest.com/lib/uaz/detail.action?docID=241399>

STATS - Welcome to Visitor Use Statistics. (n.d.). Retrieved April 23, 2023, from

<https://irma.nps.gov/Stats/>

Stoffle, R. W., Arnold, R., Frank, M., Cornelius, B., Miller, L., Charles, J., Kane, G., Ruuska, A. K., & Vlack, K. V. (2015). *Ethnology of Volcanoes: Quali-Signs and the Cultural*

Centrality of Self-Voiced Places.

Treuer, D. (2021, April 12). *Return the National Parks to the Tribes*. The Atlantic.

<https://www.theatlantic.com/magazine/archive/2021/05/return-the-national-parks-to-the-tribes/618395/>

UCLA law. (2018, March 1). *By Force of Expectation by Alyosha Goldstein—UCLA Law*

Review Discourse. UCLA Law Review. <https://www.uclalawreview.org/by-force-of-expectation/>

Valkonen, J., & Valkonen, S. (2014). Contesting the Nature Relations of Sámi Culture. *Acta*

Borealia, 31(1), 25–40. <https://doi.org/10.1080/08003831.2014.905010>

Wolfley, J. (2016). Reclaiming a Presence in Ancestral Lands: The Return of Native Peoples to

the National Parks. *Natural Resources Journal*, 56(1), 55–80.

Wright, B. (1990). *A Field Guide for Evaluating National Park Service Interpretation*.

Yamada, A., Ostergaard, D., Jilbert, M., & Brunswick, N. (2002). *Scenic Byways: A Design for*

Roadside Improvements. USDA Forest Service San Dimas Technology and Development Center.

Zotigh, D. (2020, August 25). *How Native Americans Bring Depth of Understanding to the*

Nation's National Parks | Smithsonian Voices | National Museum of the American Indian

Smithsonian Magazine. <https://www.smithsonianmag.com/blogs/national-museum-american-indian/2020/08/25/natives-interpreting-national-parks/>

Appendix A: Metadata

DOI 10.17605/OSF.IO/5W4N8

Appendix B: Coding

DOI 10.17605/OSF.IO/5W4N8

Appendix C: Photos

DOI 10.17605/OSF.IO/5W4N8

Appendix D: Site Synthesized by each R

DOI 10.17605/OSF.IO/5W4N8