



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

POWERTECH USA, INC.

(Dewey-Burdock
In Situ Uranium Recovery Facility)

Docket No. 40-9075-MLA

ASLBP No. 10-898-02-MLA-BD01

Hearing Exhibit

Exhibit Number:

Exhibit Title:



Cultural landscapes and ethnographic cartographies: Scandinavian-American and American Indian knowledge of the land[☆]

Rebecca S. Toupal *, M. Nives Zedeño , Richard W. Stoffle , Patrick Barabe

BARA, Department of Anthropology, P.O. Box 210030, University of Arizona, Tucson, AZ 85714, USA

Abstract

Recent ethnographic studies have provided a basis from which federal land managers can identify and protect cultural landscapes. We have combined the use of geographic information systems with traditional ethnography to collect, analyze, and present data descriptive of spatially large and complex landscapes. Through a brief discussion of two recent landscape studies involving American Indians in southern Nevada and Scandinavian-American folk fishers in Isle Royale, MI, we present a cultural landscape approach to land management that promotes cooperative decision-making, co-management, and partnerships. Relevant methods are suggested for collecting and analyzing cultural landscape data that aids land management decision-making. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Cultural landscapes; Landscape perception; Geographic information system; Co-management; American Indians; Folk fishers; Ethnographic cartography; Ethnographic resources

1. Introduction

A popular belief in the western perception of natural resource management is that natural environments are those untouched by people, and conservation of them requires protection from people. This is a dangerous contention; one that is perpetuated as fact with the increasing urbanization of rapidly growing human populations. Many of those environments that we perceive to be 'natural' and requiring protection from people, however, are often the products of traditional cultural uses and practices (Blackburn and Anderson, 1993; Gorham, 1997; Smiley, 1997). These are cultural landscapes that require the continuation of traditional uses by those people whose lifeways created and sustained them. Prohibiting their use, consequently, can result in degradation by means of protection. By acknowledging

that traditional human–nature relationships are contributors to healthy ecosystems, we open doors to co-management and partnerships that achieve protection of both natural and social systems.

For the past 30 years, ethnographers at the Bureau of Applied Research in Anthropology (BARA), University of Arizona in Tucson, have fostered cooperation between federal agencies and communities involved with natural and cultural resource assessments. These projects, predominantly with American Indian tribes, but also with Euro-American communities, sought higher levels of protection of natural and cultural resources through cooperative decision-making, co-management, or partnerships (Stoffle et al., 1988, 1990a,b, 2000a; Stoffle, 1990; Stoffle and Evans, 1990; Sommers et al., 1994; Toupal, 2000).

Based on the experiences of these projects, our team has developed a cultural landscape approach to resource protection that works well within the parameters of recent natural and cultural resource management legislation and policies, particularly those to which federal agencies must be responsive. Our approach advances incorporation of cultural perceptions of American Indian and Euro-American communities with

[☆] The views in this paper are those of the authors and not necessarily those of the agencies involved.

* Corresponding author. Tel.: +1-520-6219607; Fax: +1-520-6219608.

E-mail addresses: rst@u.arizona.edu (R.S. Toupal), mzedeno@u.arizona.edu (M.N. Zedeño), rstoffle@u.arizona.edu (R.W. Stoffle).

management decision-making and within policy constraints by drawing on the strengths and weaknesses of the landscape assessment approaches of Copps (1995); Page (1998) and Yamin and Metheny (1996), on the interpretation of Yaffee (1994) of the role of culture in land management; and on the landscape perception research of Tuan (1974) and Zube et al. (1982). Relative to current theoretical perspectives on natural resource use and the role of people in the landscape, we have drawn also on the approaches of Hufford (1994) and Low (1994) to cultural conservation, and on the landscape ecology investigations of Gorham (1997); Meine (1997); Nassauer (1997) and Smiley (1997).

Underlying our approach is the recognition that, until recently, consultations and resource inventories with American Indian and Euro-American communities were limited to material culture such as artifacts, sites, features, and crafts. As face-to-face interactions with people from such communities increased, a host of other equally significant natural resources, including plants, animals, minerals, landforms, water, and air, came to be recognized.

The core of our methodology is based on extensive fieldwork with elders and cultural experts who were chosen by their respective tribes and communities to participate in the assessments. We use the term 'ethnographic resources' to represent the broad range of natural and cultural materials identified in the assessments. This term implies a conceptual organization of both features and places that are linked to the traditional practices, values, beliefs, history, and ethnic identity of a community. Ethnographic resources, consequently, must be evaluated in terms of their connections to one another, to the people who use them, and to the land that sustains them. Based on these characteristics of ethnographic resources, we use the terms 'ethnographic landscape' or 'cultural landscape' to convey the network of connections among people, places, and resources (Zedeño et al., 1997; Zedeño, 2000).

Developing a research design that explicitly addresses the identification of ethnographic landscapes is one of the greatest challenges of landscape research. Since they constitute social and symbolic constructions of the natural environment, ethnographic landscapes do not correspond necessarily to material evidence of land and resource use as do archaeological or historic landscapes (Pendery, 1998). This phenomenon is particularly true among American Indian tribes and Euro-American communities whose traditional lifeways did not significantly modify the land in a permanent, or an archaeologically obvious, manner. Reliable identification of ethnographic resources, consequently, requires cooperation between the cultural groups and federal agencies of a particular land management project. In doing so, the foundation is laid for cooperative decision-making and management.

Through trial and error, we developed three field-interview forms specific to resources, places, and landscapes. When used together, these forms provide a 'progressive contextualization' (Vayda, 1983) of resources, of places where resources are found, and of the connections among places within a specific study area. Three versions of the resource-specific form — plants, animals, and rock art — were developed for projects conducted for the National Park Service (NPS) (Stoffle et al., 1994), the Bureau of Reclamation (Stoffle et al., 1995), and the US Department of Energy (Stoffle et al., 1990b). These forms are used to record uses, meanings, and connections of each resource.

The place-specific form is used to record site use history and types of ethnographic resources associated with site use including water, plants, animals, minerals, landforms, and archaeological remains. With this form, the ethnographer can elicit detailed information on material, behavioral, and spiritual connections among resource types, and between each resource and a place. It was used initially in Zion National Park and Pipe Spring National Monument (Stoffle et al., 1994). The 'Zion form' has since been successfully applied in six federally funded projects that involved tribes in the West and Midwest regions.

We designed the landscape form with input from Indian people involved in early assessment projects. This form frames place- and resource-specific information in a broader regional context. With this form, we investigate origin and migration traditions, ethnic group settlement and land use history, and specific use patterns of the natural topography. Data on trail systems, including travel across land and through water, and ceremonial trails associated with songs, drum circles, dreaming, pilgrimages, and individual quests, are crucial also to unraveling complex cultural connections between places and resources.

Data collection is enhanced further through the use of geographic information system (GIS) base maps during the landscape interviews. Averaging 2 feet × 3 feet, the base maps contain a minimum of detail, such as land forms, waterways, and roads, so that informants are not hampered in their descriptions of the landscape by irrelevant attributes. Our informants have found the maps to be a stimulating and satisfying vehicle for describing their landscapes.

We began using GIS as part of our methodology in order to make the collected data more accessible and operational for land managers. Analysis of the interview and map data is made manageable further through the use of an ACCESS database and an EXCEL spreadsheet. Types of connections, the source of data collection, i.e. forms or maps, and specific sites or features can be coded in a GIS format from which visual representations are conveyed. As a systematic research strategy, this approach aids conceptualization of the

cultural contexts of resource use. It also clarifies for land managers the complexity of the ethnographic resources they are responsible for protecting (Stoffle et al., 1997, 2000b).

We will illustrate the use and potential benefits of this combined methodology of ethnography and GIS with two recent projects. The first project involves Native Americans and the US Air Force at Nellis Air Force Base in Nevada. The second project involves Scandinavian-American fishermen and the National Park Service at Isle Royale National Park.

2. Ethnographic assessment of Wellington Canyon and Pintwater Cave

The Nellis Air Force Base and Range Complex (NAFB) complies with the federal mandate of government-to-government consultation with culturally affiliated Native American tribes and organizations through its Native American Interaction Program (NAIP). Our team contracted with the NAIP manager company, Science Applications International Corporation, to document ethnographic resources and assess the cultural significance of two American Indian sites: Wellington Canyon and Pintwater Cave (Fig. 1).

In a preliminary assessment of Wellington Canyon and Pintwater Cave, Indian ethnographers identified cultural and historical connections that, in their view, required further study (Arnold, 1998). A request was made, consequently, for a systematic ethnographic study of both sites. The study team included a NAIP committee, composed of several American Indian ethnographers, staff from the Center for Applied Spatial Analysis (CASA) at the University of Arizona, and BARA ethnographers. The NAIP committee reviewed the study design, assisted with field interviews, and reviewed the preliminary draft of the resulting report (Stoffle et al., 2000b). CASA staff customized a systematic mapping technique to aid our team in recording cultural landscape data in a GIS format.

2.1. Methods

Ethnographic landscape work entails working on-site and closely with the people of the landscape. Our methodology, therefore, is guided by the following objectives.

1. To let Indian people evaluate the sites or resources first-hand.
2. To furnish as much background information on the site as possible (e.g. maps, archaeological reports, photographs) to assist them in their evaluation.

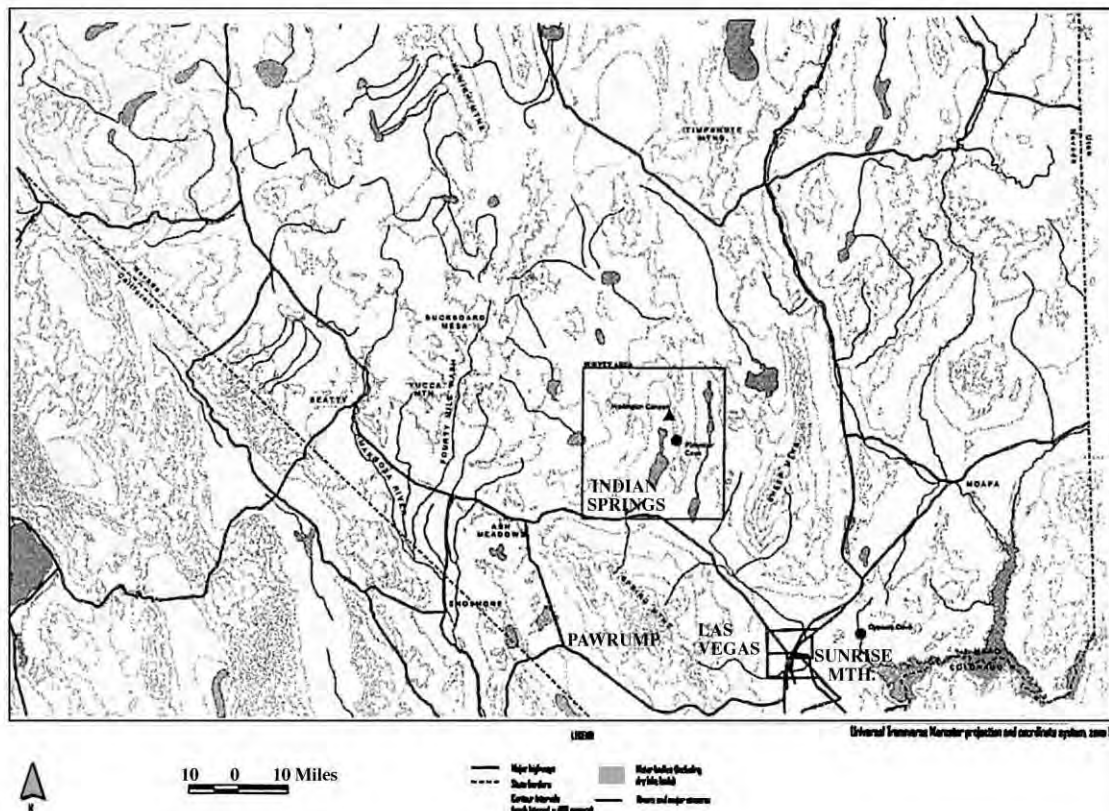


Fig. 1. Location map for Wellington Canyon and Pintwater Cave study.

3. To provide a standardized instrument for data collection that reflects their concerns, their areas of knowledge, and that matches their ability with the English language.
4. To give them the opportunity to speak freely by including open-ended response opportunities in the interviews.
5. To develop a system of data-recording that captures, to the greatest extent possible, all comments and recommendations, consequently, facilitating further analysis and reporting tasks.

The site visit, involving tribal elders, is the most important aspect of data collection because seeing what is being studied is a mnemonic stimulus for assessing specific resources (Stoffle et al., 1990a). Respondents often recognize familiar landscape features and biotic communities, recall oral histories, and relate resources to traditional practices more thoroughly than if questioned off-site. Our respondents were encouraged to set their own pace and take as much time as they felt was necessary before beginning the interviews.

Fifteen representatives from tribes of Southern Paiute, Western Shoshone, Owens Valley Paiute, and Mohave ethnic groups participated in the field research, which involved 1-day visits to each site with agency personnel and our team. The three types of interview instruments were used in conjunction with tape recorders and GIS base maps to collect systematic and detailed information for each site including plants, rock art, landmarks, and relationships among these features. Information on types of use, by whom, and when was gathered as well.

The respondents were asked to mark on the maps any places that they perceived to be connected with the study sites, and to explain the connections, which were found to include both spiritual and physical connections. Data from the site and rock art forms along with selections from tape recordings were entered into an ACCESS database. Data from the landscape form was coded in GIS format and overlaid on electronic versions of the base maps.

In order to visualize the spatial extent of landscape connections identified by representatives, a GIS database was adapted from responses recorded during the map interview, as well as from those indicated in the site-specific forms. Sites and site connections identified by the representatives were catalogued in an EXCEL database that included the form with which the connection was identified, i.e. site, rock art, or landscape form, or map. An aggregate response matrix was used to build a coordinate matrix that concatenates the locational coordinates, place names, and survey source of the connections. The coordinate matrix data was used to create GIS map layers for use in ARC/INFO and ARCVIEW software.

Two map layers, one of points indicating the locations of sites mentioned by respondents and one of linear connections between sites, were created from the spreadsheet database. When overlaid separately on the base map, the connection data identified with the site, landscape, and rock art forms, and the maps reveal both commonly and uniquely identified connections. An aggregate connectivity of the data from all the interviews provides a regional view of the landscape connections. Approximately 25% of the identified locations were outside the bounds of the base map, which, consequently, was extended to include those sites in the final representations.

The use of the GIS database also provides the ability to visualize categories of connections within a cultural landscape. Ceremonial relationships between sites, for example, might be represented, or links between traditional natural resource use areas and settlement locations. Such categorizations can inform land managers of the importance of resources and use areas, and of the potential impacts of land use decisions.

2.2. Results

The findings from the site studies include site interpretations, identification of themes, regional patterns, and significant resources. Isolated site interpretations, however, were shown to be inadequate in that these lacked consideration of the associations between sites. This inadequacy became apparent during a comparison of the resulting data maps for the individual forms and for the base maps. For land managers, these findings substantiate the need for cooperation with local groups, as well as the need for more than a rapid cultural assessment of resources.

While individual responses reflected a degree of idiosyncratic variation, site interpretations were consistent and revealed an underlying cultural rationale shared by all the ethnic groups — Southern Paiute, Western Shoshone, Owens Valley Paiute, and Fort Mohave. Their interpretations also reiterate earlier statements by tribal representatives about other rock art sites and caves in the region.

Pan-ethnic cultural themes, or ‘core themes’, provide the land manager with some consistent understandings of the lands and resources for which he/she is responsible. It must be remembered that the individual site interpretations, which underlie these themes, reflect both group and personal beliefs and feelings about place and resources. ‘Core themes’, consequently, convey collective knowledge about traditional site and resource use. The individuality of interpretations was illustrated in the gender-based differences that consistently were noted for both sites. These findings provide guidance for land managers as to the kinds of considerations

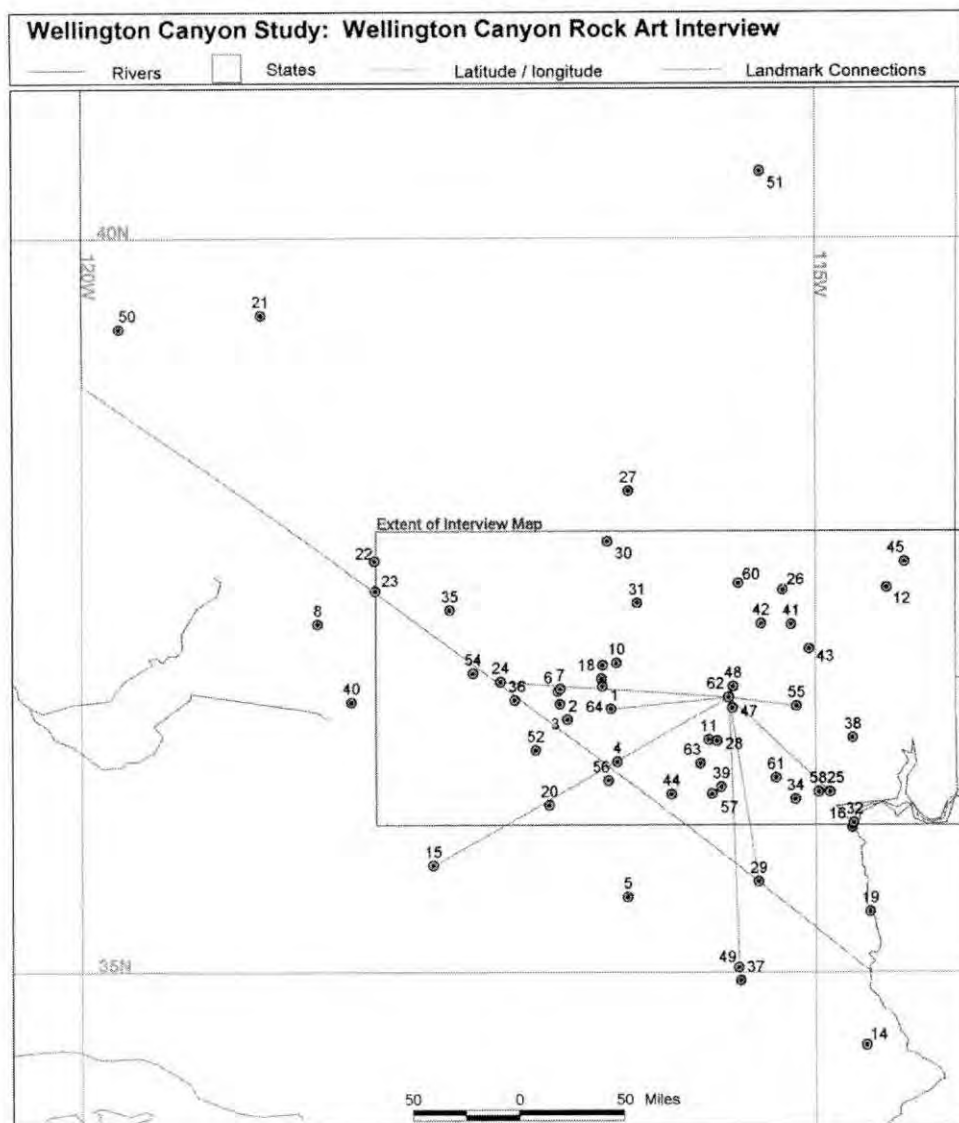


Fig. 2. Connectivity map for Wellington Canyon Rock Art interview.

The themes identified in this study speak overwhelmingly of rituals conducted at the sites and of everyday life activities. Specific themes we found for Wellington Canyon include shamanism, rain-making, hunting rituals and activities, millenary rituals, curing rituals, and coming-of-age ceremonies. These activities are associated in particular with location, available resources, and rock art. Specific themes we found for Pintwater Cave, a spirit home, include origin traditions, seeking knowledge, seeking power and visions, ritual offering, shelter, hunting, and storage. These activities are associated with the cave as a rock formation, its topography and elevation, and surrounding natural resources.

Differences between the data layers of the individual surveys and the aggregate layers reveal the geographic extent of connected places, and illustrate a network of interconnectivity within that geographic context. An unexpected result, which suggests a triangulation effect

of the forms and maps, was that differences occurred between the data collected with the forms (Fig. 2) and that collected with the maps (Fig. 3). Both linear and networked connections were found, further indicating that our system of data collection captures a level of cultural detail that is not possible under rapid cultural assessment nor under standard western resource assessment techniques. By using the three forms and base maps, we were able to identify and explain the inter-relationships among sites and features that comprise the cultural landscape. Were we to rely on fewer forms, the results would be a simplistic linear representation that reduces the cultural landscape to narrow corridors of physical features.

This finding extends to the sites themselves. Only partial interpretation of the sites of a cultural landscape can be made when they are studied separately and in isolation. Fuller interpretations and site-to-site associa-

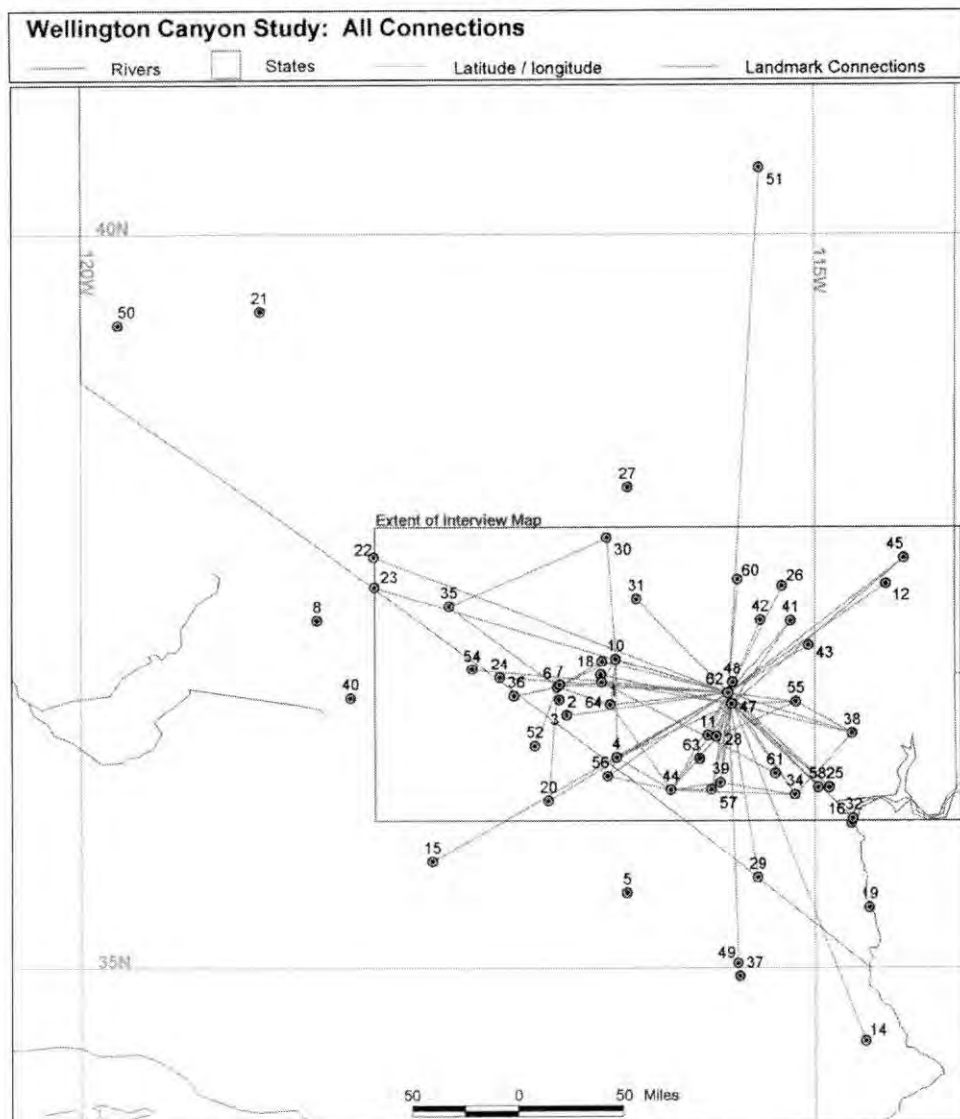


Fig. 4. Aggregate connectivity map for Wellington Canyon and Pintwater Cave.

required to achieve adequate protection of the natural and cultural resources of concern. The second interpretation would be more manageable from a cooperative standpoint. A core team of representative interests could work with smaller groups of jurisdictions and ownerships to achieve adequate protection through cooperative decision-making. The third interpretation suggests that the two study sites are the management focus and, consequently, at a jurisdiction and ownership level at which cooperative management is more readily achieved.

When we synthesized the site interpretations for Wellington Canyon and Pintwater Cave, and compared these with the ethnographic information collected in earlier studies, a regional pattern emerges that links the cave, the rock art, and the nearby springs as an integrated ceremonial resource cluster. Literature searches

and previous studies conducted by our team suggest that this cluster may constitute a formalized ceremonial activity locus that occurs repeatedly in the region and functions as a node in the cultural landscape. This finding suggests an indicator for land managers of the presence of cultural resources, and of the need to involve affiliated groups in the planning and management of the area. The tribal representatives identified numerous resources in connection with the ceremonial resource cluster including one particularly significant resource, the bighorn sheep. In the Mojave Desert, the southern Great Basin and the western Colorado Plateau, representations of the creation being and spirit helper as a bighorn sheep are commonly associated with rain-making rituals (Whitley, 1998).

In the present case, the Pintwater Range as a discrete topographic unit contains several intimately connected

sites: Wellington Canyon, Pintwater Cave, Tim Spring, and Sand Spring. Since only two of these sites have been systematically interpreted, additional work at the other sites is needed to more fully explain the cultural significance of all sites in the area. Further interpretation will be enhanced also by interviewing additional members of each ethnic group to provide a number sufficiently balanced to capture an adequate range of site interpretations.

3. Ethnographic assessment of Isle Royale National Park

A BARA ethnographic team contracted with the National Park Service to conduct an ethnohistoric study of commercial fishing at Isle Royale National Park, located in western Lake Superior, MI (Fig. 5). This study identified a single Scandinavian-American ethnic cultural landscape that encompassed all of Isle Royale and its waters from distances of 4–12 miles off shore.

The purpose of the research was (1) to identify the presence or absence of a Scandinavian-American cultural landscape and, if present, to (2) portray that landscape through historic and contemporary voices of the fishermen and their families. Past success collecting data with the landscape and site forms, and area maps, led us to apply all three during the on-site interviews with descendants of the historic fishing families. The results indicate the presence of an historic Scandinavian-American folk fishing cultural landscape, as well as the degree to which it persists today.

The cultural landscape of the Scandinavian-American folk fishermen began in the late 1880s when fishermen from other ethnic groups left the fisheries of the North Shore of Minnesota and Isle Royale to go to work with lumber and mining companies on the mainland. For the next 120 years, Scandinavian-American folk fishermen and their families lived on and fished from Isle Royale, primarily from April to November each year. Most families wintered in Scandinavian-American communities along the North Shore, although during the depression more of them spent the winter in their island homes as a way to keep down expenses and indebtedness. The Washington Harbor and Rock Harbor areas of Isle Royale were home to communities of as many as 20 fishing families at any given time. Many other fishermen established or occupied isolated fish camps that could be found in almost every sheltered harbor along the Isle Royale shoreline. During the first decades of the 1900s, as many as 50 families and 100 fishermen fished the Isle Royale waters.

3.1. Methods

We used three interview forms in this project, two of which were modified from the site and landscape forms already described, and one new form specific to an ethnohistoric account of folk fishing. Wording in the landscape and site forms was modified to make sense to the fishermen while maintaining the basic premise of the question. The phrase ‘creation place’, for example, was changed to ‘homeland’, which parallels the concept of a point of origin.



Fig. 5. Location map for Isle Royale fishing study.

The landscape interviews were held at a variety of places around Isle Royale including in fishermen's homes, on their boats, and near their families' fish camps. Site interviews were conducted at 12 of the more recently used fish camps as identified by the fishermen and historic accounts. These interviews were held on-shore within the fish camp when possible, and within the harbor of the fish camp when no dock was available. Two maps, one of a regional scale that included the mainland and one of Isle Royale, were used during the landscape interviews to aid explanations of connections and extent of the folk fishing landscape.

The interview and map data were entered into an ACCESS database for comparison and compilation with past fishermen's oral histories held by NPS that had been entered into a separate ACCESS database. We took a different approach to entering the interview and map data than that used in the Nellis study since numerous GIS data layers, including fish camps, have been developed at Michigan Technical University, in Houghton, MI. The interview and map data were consequently transcribed into topographic software that is compatible with the ARCINFO and ARCVIEW GIS. Additional layers of site and connection information can be developed from the topographic database that can be incorporated into the current GIS database.

3.2. Results

The data gathered with the landscape form included locations of fish camps and communities, relationships between the fishing families within those communities and among the fish camps throughout Isle Royale, and connections between these places and other communities and places on the mainland. The data provided on the area maps included locations of fish camps, reef and deep-water fishing grounds, and land trails, water routes, and recreational areas used by the fishermen and their families. The site data included descriptions and boundaries of the fish camps, which included the fishing grounds, the important resources and uses of each site, the condition of the resources and sites, and management recommendations for the resources and sites.

When the three data sets were combined they documented uses, meanings, and relationships at the site, island, and regional levels; a structural pattern that respectively parallels American Indian landscape layers of landmarks, ecoscapes, and regional landscapes. The regional landscape comprises Isle Royale, the North Shore of Minnesota, the shorelines from Duluth through the Upper Peninsula of Michigan, and that portion of Lake Superior circumscribed by the shores of the mainland and extending to the northern edge of historic Isle Royale folk fishing grounds. The combined

data sets also revealed the extent of the relationships between sites and other places, and the centrality of the cultural landscape in the lives of the fishermen and their descendants.

The Scandinavian-American fishermen of Isle Royale lived and worked together in an interesting blend of competition and cooperation that reflected their friendly yet independent natures. Territories were claimed on a first-come, first-served basis but areas often had shared boundaries or were shared to a certain extent, sometimes between family and bachelor camps (Fig. 6). Mapping these areas from the site form and island map data revealed a contiguous area of Scandinavian-American fishing territories encircling Isle Royale and extending from 4 to 12 miles into Lake Superior (Fig. 7).

Each fishing family had its own home area and fishing grounds, although some families shared docks, icehouses, fish houses and the work that was involved with each one. They would cut trees for buildings, docks, buoy sticks, and other construction needs, and chop and store ice for packing their catches later. In addition to work, families gathered for recreational activities, particularly the Fourth of July when they held large celebrations at several sites around Isle Royale.

The Isle Royale fishing communities had strong connections to each other, to many communities in Minnesota and Michigan, and back to Scandinavian homelands through family, social, and economic relationships. These communities included places where family members and friends lived, where the freight boats that picked up the catches at Isle Royale originated, and where fishermen voted and obtained fishing licenses. In addition to relationships, these connections are supported by land trails, water trails, stories, and geologic and environmental features. The land trails were important for recreational and social purposes, supporting strong ties between the fishing families outside of those associated with the dangerous work of fishing.

The fishermen used water trails (routes) for fishing and social purposes. Some of the women had their own water trails for fishing and socializing. The distance traveled for fish depended on the size of the fisherman's boat, the season, the underwater topography, weather conditions, and the price of gas. The fishermen also used landmarks to help them navigate other fishermen's waters with which they were less familiar. The water trails were special because they were handed down through the families, and not known by everyone. Connections among landforms extend from the Island to the mainland and expand the Scandinavian-American folk fishing landscape with water routes, trade routes, mainland towns, and streams where fish spawning and stocking occur.

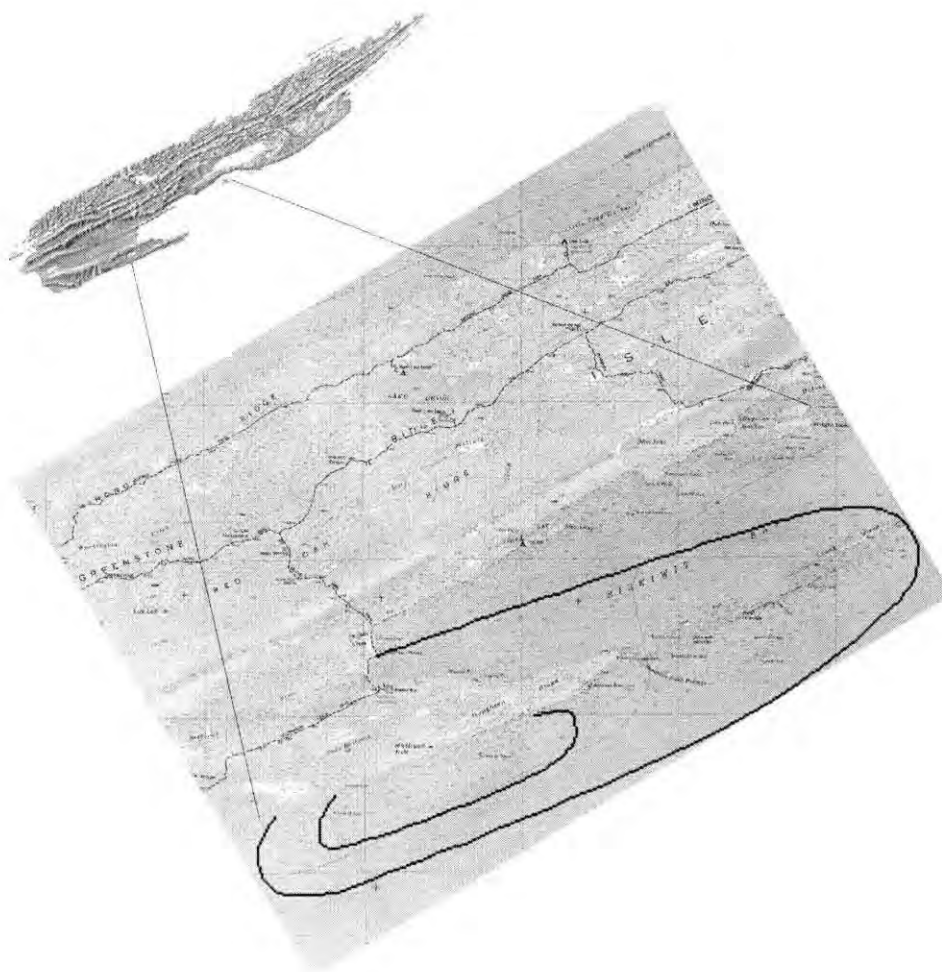


Fig. 6. An example of shared fishing grounds between a fishing family and a bachelor whose fishing grounds are within those of the family.

Environmental similarities between Isle Royale and the Scandinavian homelands include aspects of climate, topography, and fishing. Details of local environments, fish species, fishing technology, and fishing styles vary somewhat but overall the environments and lifestyles of both places are quite similar. Several of these factors influenced Scandinavian fishermen to come to Isle Royale, including the climate, topography and geology, and the fish. The similarities of environments and lifestyles were enough to allow them ready adaptation to their new homes.

The cultural landscape of the Scandinavian-American folk fishermen is comprised of vertical and horizontal elements in three types of ecoscapes: terrestrial, maritime, and underwater or submerged. The terrestrial landscape is made up of a small clearing for each fish camp, a house and other buildings, small gardens of flowers and/or vegetables, the shoreline, and open spaces. This landscape accommodates the basic needs of living including natural resources. Trails, plants, animals, rivers, landmarks, and views provide for recreation, food and material gathering, navigation, scenery,

and shelter. Shorelines are transitional between the terrestrial and maritime landscapes, as well as between the terrestrial and underwater landscapes.

The maritime landscape begins with the fish house, net house, net reels, and oil areas. This landscape is also transitional between the terrestrial and underwater landscapes through docks, boats, shorelines, and rivers. Sheltered harbors and coves, channels, small islands, island points, open water, and sounds aid the fishermen in their pursuit of a livelihood and provide a setting in which to teach new generations of fishermen. Sheltered harbors and coves provide protection from storms, small islands and island points provide territorial markers and landmarks for navigation, rivers provide spawning areas for some species of lake fish, and sloping beaches provide a place to pull boats out of the water for repairs or winter storage. Waves on the shore, birds calling, and lighthouses guide fishermen in foggy weather.

Underwater landscapes began at the dock cribs that the fishermen constructed from native rock and logs. From the calm water of the sheltered harbors, the

fishermen sailed or motored in small wooden boats to fish habitats of rock reefs, shallow, sandy bottoms, or deep waters. There they set gill nets or hooklines to catch lake trout, whitefish, and herring. Some fishermen went out 4–8 miles from shore but often concentrated their efforts in less than 100 feet of water. They followed the same routes to their fishing areas and knew the terrain below those routes better than anyone else. Many of their descendants today still know those routes and will use them, while others avoid them. Shipwrecks of freight boats that once serviced the fishermen are a part of the underwater landscape that reflects the dangers of sailing unknown waters. Shipwrecks also are part of the overall cultural landscape through story telling and salvaging of materials for use in fish camps.

Three distinct events had the greatest impact on the Scandinavian-American folk fishermen and their landscapes. The first was the establishment of Isle Royale National Park in 1931. Although fishing practices did not change immediately, land ownership did as the Park acquired funds in 1940 to purchase the private property on the Island. Fishing families who accepted the terms were granted life leases that eventually affected the terrestrial landscapes. Families could no longer remove the volunteer saplings from the clearings around the buildings effectively shrinking that open space and sense of place. Views of the lake were also reduced and wives could not watch for their husbands returning from their nets. Such changes escalated as

fishermen and their wives passed away and their children could not inherit the life leases.

The second event was the accidental introduction of sea lamprey to Lake Superior in the 1950s. This exotic species decimated the lake trout population to the point that the Michigan Department of Natural Resources (DNR) curtailed lake trout fishing until it could control the lamprey and restock the trout. The underwater landscape was altered biologically; however, the greatest impact to the fishermen was the loss of use of that landscape in traditional ways.

In 1965, when there were only five fishing families left on Isle Royale, the Michigan DNR made a regulation change to assessment fishing. The remaining fishermen were assigned fishing areas or allotments and catch limits. Since that time, the allotment program has all but ended and only one fisherman remains. Most of the remaining terrestrial landscapes have continued to change as previously described. The underwater landscapes remain for those who continue to visit their places by boat but the use of those landscapes is much less intimate, being limited now to sport fishing, chartering, and the stories the descendants share with their grandchildren and visitors.

The limited impacts of the fishermen's uses of their landscapes has faded over the years but, where they can still be found, the areas are quite small and confined to the former terrestrial and maritime landscapes. During the heyday of the fishermen, there was so little negative impact to the wilderness character of the Island that

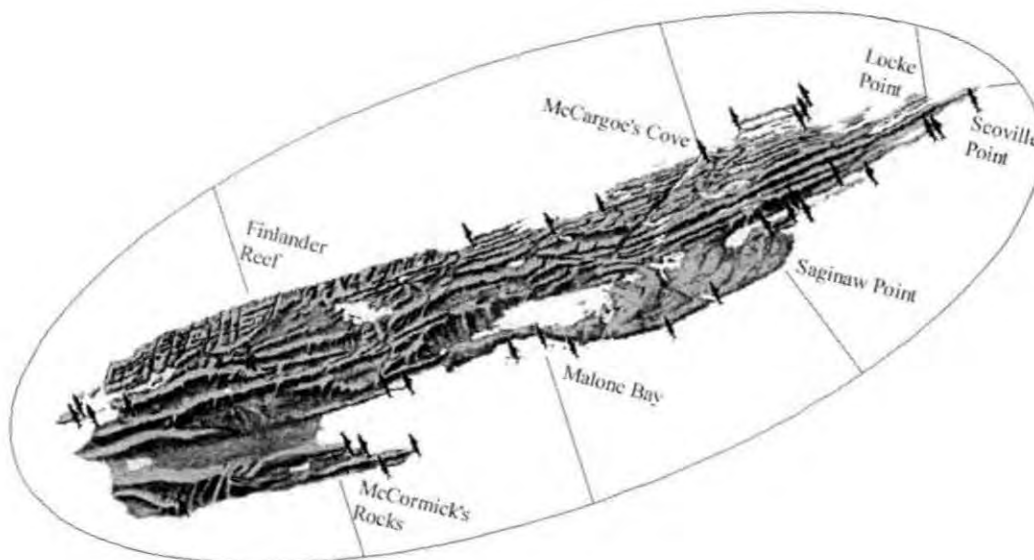


Fig. 7. Contiguous fishing grounds, each segment shared by multiple fish camps, of the Scandinavian-American folk fishermen.

ecological evaluators for NPS went so far as to attribute the high quality of the wilderness character to the presence and activities of the fishermen (Wallis, 1960). Such an evaluation contradicts popular negative conceptions of consumptive resource use, and is significant to the debate of human–nature relationships and the resultant impacts.

Descendants still consider Isle Royale to be their home, and they retain much of the knowledge recorded by the Park Service with their parents and grandparents over 40 years ago. They remain in touch with the cultural landscape by continuing to visit the Island regularly. Several of them have marine livelihoods that keep them in touch with the Island and their landscapes on a regular basis. Of particular note is the way in which the Scandinavian-American fishermen continue to observe the Fourth of July, which was so important to them on Isle Royale. These celebrations were transferred eventually from Isle Royale to Grand Marais, MN, where many of the descendants reside today. Although these celebrations are now held in August and known as the ‘Fisherman’s Picnic’, they reflect a continuity of culture that is often lost to contemporary management and policy decisions.

From the park’s inception, the opportunity has existed for a partnership or co-management arrangement that would preserve the traditional lifestyle of the Scandinavian-American fishermen and, over the years, individuals on both sides have indicated a desire for such an agreement. The benefits of such an arrangement would include more than protection of the fishermen’s traditional way of life; it would provide accurate portrayals of their lifestyle as part of the park’s interpretive program, and could aid fishery management through a research assessment fishing project. The complexity of the issues, however, continue to challenge a move in that direction.

4. Summary

Systematic ethnographic landscape research has the potential for providing useful management tools for a variety of federal land management situations. The results of such research complement archaeological, historical, and folklorist studies of material culture, contribute to landscape perception studies, and aid conceptualization of the cultural contexts in which resources were and are used. In addition to complementing these research areas, ethnographic landscape research can improve cross-cultural appreciation for the heritage of American Indian tribes and Euro-American communities. It is this injection of the cultural into natural resource management that enhances our efforts to accommodate nature in our developed and undeveloped landscapes. As Nassauer (1997), p. 6) puts it:

“Science may give us normative criteria for new landscape patterns, culture will give us the realized design”.

Connections between resources and people transcend spatial and formal boundaries since the cultural significance of resources may derive from specific ceremonial and/or secular uses, from the place where they are found, and from stories or songs that talk about a place and its resources (Stoffle et al., 1997). Our studies have documented, for example, the existence of six nested levels of cultural landscapes for the Indian people in the American Southwest: eventsapes, holy lands, regional landscapes, ecoscapes, songsapes, and landmarks. This finding further emphasizes that ethnographic resources must be evaluated in terms of their connections to one another, to the people who use them, and to the land that sustains them. Nested landscapes also have a practical benefit in that these aid land managers’ understandings of the complexity of the ethnographic resources they are responsible for protecting (Stoffle et al., 1997, 2000b).

The NAFB, Isle Royale, and other studies conducted by our team illustrate how ethnographers can inform and enhance the ecosystem stewardship goals of federal land management agencies in ways that are compatible with contemporary management tools such as GIS. The data from these studies can be used to facilitate management alternatives of co-management and partnerships (Toupal, 2000). Characterized by a sharing of decision-making, knowledge, and power, such alternatives are sanctioned by federal legislation and agency mandates for natural and cultural resource management.

Ethnographic data also can inform and enhance land managers’ responses to often-conflicting natural and cultural resource management legislation and policies. In both the NAFB and Isle Royale studies, the data suggest a variety of additional management alternatives that have greater potential to resolve policy conflicts and be ethically satisfying. At Isle Royale, for example, both NPS mandates of preservation and public enjoyment could be addressed through a continuation of the fishermen’s lifestyle that included cultural interpretive activities. The remaining cultural resources associated with the Scandinavian-American fishery could be preserved and maintained by the fishermen. The wilderness aspect of the Island would remain since the fishermen’s lifestyle was credited with preserving that in pre-park times. The public would have the opportunity to learn about the culture of the Island first-hand rather than through books and historic photographs.

By providing the ability to visualize categories of connections within a cultural landscape, such as ceremonial relationships between sites, or links between traditional use areas and settlements, ethnographers can provide data to land managers that helps them achieve a deeper understanding of the importance of

resources and use areas. They can better evaluate the potential impacts of their land use and management decisions not only on the land, but also on the people of the land. The themes found at Wellington Canyon and Pinwater Cave, for example, inform NAFB that their management decisions for either area actually affect both areas.

The findings from the NAFB study illustrate the importance of considering site interpretations within the context of their relationships to and connections with other sites. The different connection results from each of the interview forms and base map provide clear illustration of the importance of this method of evaluation. The integration or triangulation of ethnographic data from multiple sites parallels and complements both natural science methods and the concept of ecosystem management.

When integration of the data does not occur, the connections within the cultural landscape are reduced to narrow corridors. Although seemingly easy to manage, and familiar as a parallel to the wildlife corridors of natural science, landscape connections are as sensitive as wildlife to constraints. Limiting the connections between Wellington Canyon and Pinwater Cave, for example, can result in the reduction or loss of the cultural functions and continuity of the landscape; ceremonies only partially completed are not ceremonies. When treated narrowly, landscape connections parallel wildlife corridors that are designed for a single species. They become stagnant, endangered, and reflect management toward homogeneity and away from ecosystems and biodiversity (Meine, 1997).

It is when data from multiple sites are integrated that regional clusters of resources and use areas are revealed as complexes that exceed simple aggregation of their parts (Hufford, 1994; Low, 1994). It is the existence of a regional pattern that suggests a recurrence of the pattern in adjacent areas of similar resources. The complexes explain and reveal the role of people in ecosystems and how seeming natural ecosystems are the result of traditional cultural uses of the resources of those ecosystems.

The Isle Royale study illustrates that these concepts and aspects of cultural landscapes are not limited to American Indian people. Euro-American cultural landscapes also exist as natural environments seemingly untouched by people. Contemporary approaches to Euro-American cultural landscapes, however, also are rooted in western science-based theories of landscape architecture and landscape archaeology (Yamin and Metheny, 1996; Page, 1998). It is the physical constructs and man-made landforms that are managed for, rather than the people, and connections that created and sustained these resources within a cultural landscape complex.

The belief that natural environments are always untouched by people is a dangerous one. As human populations have increased dramatically during recent history, those environments that we believe are natural and untouched are often the product of traditional cultural uses and practices (Blackburn and Anderson, 1993; Gorham, 1997; Smiley, 1997). Until we accept the possibility that natural environments have been and can be created and sustained by people, both American Indian and Euro-American cultural landscapes remain at risk.

References

- Arnold, R., 1998. Trip report and preliminary cultural assessment of the Wellington Canyon area of the Nellis Air Force Range. American Indian Ethnographic Report prepared for Nellis Air Force Base and Science Applications International Corporation, Las Vegas Indian Center, Las Vegas, NV.
- Blackburn, T.C., Anderson, K., 1993. Introduction: managing the domesticated environment. In: Blackburn, T.C., Anderson, K. (Eds.), *Before the Wilderness: Environmental Management by Native Californians*. Ballena Press, Menlo Park, CA.
- Copps, D.H., 1995. *Views from the Road: A Community Guide for Assessing Rural Historic Landscapes*. Island Press, Washington, DC.
- Gorham, E., 1997. Human impacts on ecosystems and landscapes. In: Nassauer, J.I. (Ed.), *Placing nature: culture and landscape ecology*. Island Press, Washington, DC.
- Hufford, M. (Ed.), 1994. *Conserving Culture: A New Discourse on Heritage*. University of Illinois Press, Urbana, IL.
- Low, S.M., 1994. Cultural conservation of place. In: Hufford, M. (Ed.), *Conserving Culture: A New Discourse on Heritage*. University of Illinois Press, Urbana, IL.
- Meine, C., 1997. Inherit the grid. In: Nassauer, J.I. (Ed.), *Placing Nature: Culture and Landscape Ecology*. Island Press, Washington, DC.
- Nassauer, J.I. (Ed.), 1997. *Placing Nature: Culture and Landscape Ecology*. Island Press, Washington, DC.
- Page, R.P., 1998. *Cultural Landscapes Inventory Professional Procedures Guide*. National Park Service, USDI, Washington, DC.
- Pendery, S., 1998. Intersection of interest. *Common Ground* 3 (2/3), 54.
- Smiley, J., 1997. Farming and the landscape. In: Nassauer, J.I. (Ed.), *Placing Nature: Culture and Landscape Ecology*. Island Press, Washington, DC.
- Sommers, L., Lockwood, Y., MacDowell, M., Stoffle, R., 1994. Folklife assessment within the Michigan low-level radioactive waste siting process. In: Hufford, M. (Ed.), *Conserving Culture: A New Discourse on Heritage*. University of Illinois Press, Urbana, IL.
- Stoffle, R.W. (Ed.), 1990. *Cultural and Paleontological Effects of Siting a Low-Level Radioactive Waste Storage Facility in Michigan*. University of Michigan, Institute for Social Research, Ann Arbor, MI.
- Stoffle, R.W., Evans, M.J., 1990. Holistic conservation and cultural triage: American Indian perspectives on cultural resources. *Human Organization* 49 (2), 91–99.
- Stoffle, R., Traugott, M., Harshbarger, C., Jensen, F., Evans, M.J., Drury, P., 1988. *Superconducting Super Collider at the Stockbridge, Michigan Site: Community Support and Land Acquisition*. University of Michigan, Institute for Social Research, Ann Arbor, MI.

- Stoffle, R.W., Halmo, D., Evans, M.J., Olmsted, J., 1990a. Calculating the cultural significance of American Indian plants: Paiute And Shoshone ethnobotany At Yucca Mountain, Nevada. *American Anthropologist* 92 (2), 416–432.
- Stoffle, R.W., Halmo, D., Olmsted, J., Evans, M.J., 1990. Native American Cultural Resource Studies at Yucca Mountain. Institute for Social Research, University of Michigan, Ann Harbor, MI.
- Stoffle, R.W., Austin, D., Halmo, D., and Phillips, III, A., 1994. Ethnographic Overview and Assessment: Zion National Park, Utah and Pipe Spring National Monument, Arizona. Bureau of Applied Research in Anthropology, University of Arizona, Tucson, AZ.
- Stoffle, R.W., Austin, D., Fulfroost, B., Phillips, III, A., Drye, T., 1995. ITUS, AUV, TE'EK (Past, Present, and Future): Managing Southern Paiute Resources in the Colorado River Corridor, Glen Canyon Recreation Area. Bureau of Applied Research in Anthropology, University of Arizona, Tucson, AZ.
- Stoffle, R.W., Halmo, D., Austin, D., 1997. Cultural landscapes and traditional cultural properties: a southern Paiute view of the Grand Canyon and Colorado River. *American Indian Quarterly* 21 (2), 219–249.
- Stoffle, R.W., Halmo, D., Evans, M., 1999. Puchuxwavaat Uapi (to know about plants): traditional knowledge and the cultural significance of southern Paiute plants. *Human Organization* 58 (4), 416–429.
- Stoffle, R.W., Loendorf, L., Austin, D., Halmo, D., Bullets, A., 2000. Ghost dancing the Grand Canyon. *Current Anthropology* 41 (1), 11–38.
- Stoffle, R.W., Toupal, R.S., Zedeño, M.N., 2000. The Isle Royale 'Folkefiskerisamfunn: Familier som levde av fiske' — an ethnohistory of the Scandinavian folk fishermen of Isle Royale National Park. Draft Report, Bureau of Applied Research in Anthropology, University of Arizona, Tucson, AZ.
- Stoffle, R.W., Zedeño, M.N., Eyrieh, J., Barabe, P., 2000. The Wellington Canyon Ethnographic Study at Pintwater Range, Nellis Airforce Base. Nevada. Report prepared for US Air Force and Science Applications International Corporation. Bureau of Applied Research in Anthropology, University of Arizona, Tucson, AZ.
- Toupal, R.S., 2000. Cowboys and conservation: the influence of private landowners on the success of conservation partnerships in the Western United States. *High Plains Applied Anthropologist* 20 (1), 53–66.
- Tuan, Y.-F., 1974. *Topophilia: A Study of Environmental Perception, Attitudes, and Values*. Columbia University Press, New York.
- Vayda, A., 1983. Progressive contextualization: methods for research in human ecology. *Human Ecology* 11, 265–281.
- Wallis, O.L., 1960. An Evaluation of the Fishery Resources of Isle Royale National Park. National Park Service, Washington, DC.
- Whitley, D., 1998. Finding rain in the desert: landscape, gender, and far-western North American rock art. In: Chippendale, C., Tacon, P. (Eds.), *The Archaeology of Rock Art*. Cambridge University Press, Cambridge.
- Yaffee, S.L., 1994. *The Wisdom of the Spotted Owl*. Island Press, Washington, DC.
- Yamin, R., Metheny, K.B. (Eds.), 1996. *Landscape Archaeology: Reading and Interpreting the American Historical Landscape*. The University of Tennessee Press, Knoxville, TN.
- Zedeño, M.N. (Ed.), 1999. Scholars of the BAE: Exploring the roots of American anthropology. *Journal of the Southwest* (special issue) 41 (3).
- Zedeño, M.N., Triadan, D., 2000. Ceramic evidence for community reorganization and change in East-Central Arizona. *Kiva* 65 (3), 215–233.
- Zedeño, M.N., Austin, D., Stoffle, R.W., 1997. Landmark and landscape: a contextual approach to the management of American Indian resources. *Culture and Agriculture* 19 (3), 123–129.
- Zedeño, M.N., 1994. Sourcing Prehistoric Ceramics at Chodistaas Pueblo, Arizona: The Circulation of People and Pots in the Grasshopper Region. *Anthropological Papers of the University of Arizona* 58, Tucson, AZ.
- Zedeño, M.N., 1997. Landscape, land use, and the history of territory formation: an example from the Puebloan Southwest. *Journal of Archaeological Method and Theory* 4 (1), 67–103.
- Zedeño, M.N., 1998. Defining correlates for ceramic circulation in the prehistoric Puebloan Southwest. *Journal of Anthropological Research* 54, 461–476.
- Zedeño, M.N., 2000. On what people make of places: a behavioral cartography. In: Schiffer, M.B. (Ed.), *Social Theory in Archaeology*. University of Utah Press, Salt Lake City, UT.
- Zube, E.H., Sell, J.L., Taylor, J.G., 1982. Landscape perception: research, applications, and theory. *Landscape Planning* 9 (1), 1–33.

Rebecca S. Toupal, MLA, is a Ph.D. candidate in the School of Renewable Natural Resources at the University of Arizona. She has a B.Sc. in Forestry/Range Management from the University of Montana and a Master in Landscape Architecture from the University of Arizona. For her MLA thesis, she conducted an investigation of successful conservation partnerships in the western United States, from which she subsequently published an article (Toupal, 2000). She has worked with the Bureau of Applied Research in Anthropology (BARA) for 3 years on ethnohistoric and ethnographic research with Scandinavian fishermen from Isle Royale National Park, MI, and with Tohono O'odham elders and contemporary officials in southern Arizona. Her dissertation research is an investigation of the potential use of cultural landscape concepts for natural resource management purposes.

Dr M. Nieves Zedeño is an archaeologist with specialization in Southwestern archaeology, ethnohistory, and the contemporary ethnography of cultural resources. She has worked for 6 years at BARA on environmental and cultural assessment projects with American Indians and federal agencies, acting as the senior researcher on several of them. She has worked directly and successfully with many American Indian tribes in the Southwest, building long-term consultation partnerships. Dr Zedeño has published a monograph and a number of articles regarding American Indian cultural landscapes (Zedeño, 1997, 2000; Zedeño et al., 1997), archaeology (Zedeño, 1994, 1998; Zedeño and Triadan, 2000) and history of anthropology (Zedeño, 1999). She is currently directing an ethnographic resource assessment for three national parks in Arizona and New Mexico, and co-directing a multi-park project in the Great Lakes region with Dr Stoffle.

Dr Richard W. Stoffle is a senior cultural anthropologist at BARA. Dr Stoffle has worked on American Indian environmental issues since 1976, when he participated in the first American Indian social impact assessment in the United States. This project was for an Environmental Impact Study of the Devers–Palo Verde powerline proposed to run from the Buckeye Atomic power plant near Phoenix, AZ, to the Palo Verde substation of Southern California Edison in California. Since that first study, Dr Stoffle has worked successfully with more than 80 American Indian tribes and most federal agencies to represent Indian environmental issues in land management decisions. Dr Stoffle has two recent articles that reflect his current scholarly partnerships with Indian people (Stoffle et al., 2000, 1999).

Patrick Barabe has a B.Sc. in Geography and a M.A. in Anthropology. He has worked as a geographic information systems research specialist for the Center for Applied Spatial Analysis. His GIS expertise led to the development of connectivity analysis of ethnographic data. He presently is serving in the Peace Corps in Africa.