

# Using the Past to Shape the Future: Contributions of Archaeology to the National Wildlife Refuge System

The science of archaeology can contribute in many ways to excellent science-based refuge management. Cultural resource management and its attendant disciplines of archaeology, anthropology, and history are uniquely equipped to provide information on how ecosystems have changed through time, and aid managers in defining and restoring wildlife habitat. Prehistoric archaeological sites often contain important data on the plants and animals that occupied the places we now call National Wildlife Refuges for thousands of years. Data from archaeological sites can outline the range of “natural” environments that existed prior to modern disturbance and can supply important evidence of past climatic and ecological change, including changes in vegetation and fire frequency.

Traditional ecological knowledge plays a role in developing strong science-based wildlife and habitat management as well. The members of many native and rural communities have unique knowledge and understanding of their local land, water, and animals resources.

Through the discipline of cultural resource management, the FWS can harness traditional ecological knowledge to develop holistic and fully-considered science-based wildlife and habitat management.

Finally, cultural resources play an important role in environmental education, interpretation, and public support. Many non-traditional visitors show up at wildlife refuges for the archaeological and historical places they protect. Cultural resources provide both data and sites through which to educate the public on changes in wildlife populations and the landscapes they inhabit. Many cultural resources are strong visual and emotional attractions to visitors, as the stories of humans interacting with wildlife and habitat are often the most compelling. Below, case studies from several regions highlight the range of completed and ongoing archaeological projects that produce positive benefits for the Refuges where they occur.

## Geo-archaeological Research and Paleoclimate at Lemitar Shelter Sevilleta NWR, New Mexico



Views of the excavation units at Lemitar Shelter.

Geo-archaeological investigations at the Lemitar Shelter site on the Sevilleta National Wildlife Refuge provide a long-term record of climatic change for the region. The research was undertaken by Escondido Research Group, LLC in 2002, with funding from the Argonaut Archaeological Research Fund.

The rockshelter site in San Lorenzo Canyon sits approximately 20 meters above today's active canyon drainage. Excavations reached over four meters below the original ground surface and provided evidence of human site occupation and rock shelter evolution over a 9000-10,000 year period. Indicators of climatic change at the Sevilleta NWR and surrounding region are provided by a variety of data.

Very large boulders at the base of the excavations are actually Pleistocene-age (>10,000 years) roof fall elements that reflect a very wet and cold climate at the time. Subsequently, at about 9000 years ago (early Holocene), deposits of laminar sand strata in the deepest parts of the excavation suggest that the level of the active channel in San Lorenzo Canyon was about 16 m higher than it is today which, in turn, may have precluded human use of the shelter until a later date. A later, mid-Holocene (6000 year old) drought is indicated by upsurges in the wind-borne delivery of carbonate dust to the site. Such a drought, if characterized by only periodic, large scale rain events and flash floods, would have led to the down-cutting of the San Lorenzo channel.

Finally, the presence of periodic, thin mud lenses throughout the stratigraphic profile serve as proxy indicators of relatively moist periods in the Sevilleta Refuge, the more recent of which can be correlated regional precipitation reconstructions based on tree-rings. The geo-archaeological data remind us that the Sevilleta NWR is, and has been, a dynamic landscape over time. (Adapted from a summary prepared by Robert Delo-Russo, PhD)

## The Dismal Key Site: Archaeological Data as a Component of Climate Change Research, Florida



Ten Thousand Islands NWR is located on the southwest Florida Gulf Coast. The refuge is divided into four discrete ecotones - outer islands; back bays and islands; mainland mangrove; and marsh/mangrove. Sea level has risen approximately 22 centimeters since 1930, affecting the lowest elevation areas in each zone. These areas' vegetation will continue to be influenced by the predicted 38-59 centimeter-rise over the next century.

To date, archaeological investigations have primarily focused on precolonial shell works and historic period sites in the outer islands and the back bays and islands. Margo Schwadron, as part of her dissertation research, tested a number of the Ten Thousand Islands shell works, including the Dismal Key Site (8CR27). This site 30-hectare site consists of a single C-shaped shell ring, shell fields, a complex of large shell mounds and ridges, finger ridges and water courts, and a linear midden breakerwater. The complex and modified landscape was built in four phases, beginning ca. 460 B.C. and ending ca. A.D. 900. The artifact assemblage includes Busycon cups, whelk and horse conch shell tools, drilled and undrilled shark teeth, and worked sting ray spines. Fish, such as catfish, black and red drum, sheepshead, snook, jack, and mullet, was a major part of the occupants' subsistence.

The vegetation on the refuge has been heavily influenced by anthropogenic factors. Often the upland vegetation is unique and directly related to human manipulation, occupation, and use. Three other factors have directly influenced vegetation - the construction of the Tamiami Trail or Road in 1928, alteration of the Everglades hydrological regime for flood control and to provide water for agriculture and adjacent communities, and elimination of fire. The portions of the Refuge that are adjacent to the Tamiami Trail are poorly understood archaeologically. Prior to the reintroduction of fire into the system for the purpose of reestablishing a hydrological regime comparable to the one that existed ca. 1940, an archaeological potential model was developed. The model's parameters drew upon M.J. Barry's 2009 vegetation cover maps of the Refuge, NRC's web-based soil maps, and LiDAR imagery. Approximately 25 acres of the 91-acre high potential hammocks or uplands will be tested by the ACOE and the South Florida Water Management District as a component of the Pיצayuan Strand Restoration Project. The Seminole and Miccosukee Tribes have indicated that higher water levels and flow will adversely impact specific sites, such as cemeteries and Green Corn Dance grounds. The archaeological investigations provide us a foundation to accurately monitor such impacts.

## Lower Suwannee and Cedar Keys NWRs: Reconnaissance, Rescue, and Research



Above: West profile, Test Unit 1, Little Bradford Site. The uppermost strata consists of alternating bands of white and brown sands that accreted during past storm surges and other geomorphic processes. Stratum 2 is an organic and very dark brown sand containing eastern oyster and Carolina marsh clam shell, vertebrate faunal material, and pottery. A conventional AMS date of charcoal recovered from the base of this stratum yielded a date of 1810 ± 40 BP. Stratum 3, described as very dark gray fine sand, also contained vertebrate faunal material, shell, and a small amount of pottery that declined in frequency with depth.

Region 4 has partnered with the Laboratory of Southeastern Archaeology at University of Florida since 2009 to conduct long-term archaeological investigations on the Lower Suwannee and Cedar Keys NWRs along the central Gulf Coast of Florida. This area is poorly known archaeologically, though the Suwannee River appears to be a political or cultural divide among major Weeden Island mound centers, such as those at Crystal River and around Tampa Bay, and the maritime-based Calusa chiefdom in the Charlotte Harbor and Ten Thousand Islands area. Dr. Ken Sassaman, principal investigator, uses a three-pronged approach involving reconnaissance, rescue, and research - to address four broad themes across several millennia: environmental change; changing land use; built environment; and interregional networks. Reconnaissance will fulfill agency needs for cultural resource inventory and assessment; rescue will target cultural resources facing imminent destruction; and research will provide the interpretive context for assessing the significance of cultural resources. The unifying goal of all aspects of the proposed program is development of detailed, long-term perspectives on cultural and environmental change, notably the effects of transgressive coastlines on the availability of inhabitable land and biotic resources of human importance.

The Refuges provide unique opportunities to systematically examine the relationships and subsequent response of human culture to climate change, sea-level fluctuations, and evolving ecosystems. The monograph "Lower Suwannee Archaeological Survey 2009-2010 Investigations at Cat Island (8D129), Little Bradford Island (8D132), and Richard Island (8LVI137) that describes the first season of work is available from Rick Kanaski.

## Alaska Maritime NWR: Archaeology Illustrates Dynamics between Climate Change and Natural Resources



A cluster of albatross wing bones found in an archaeological site on Shemya Island.

In region 7, three ongoing archaeological projects on the Alaska Maritime NWR have yielded information on dynamics between temperature change and seabird populations, near-shore kelp forest ecosystem dynamics and function and the long term impacts of human exploitation on the seabirds, sea mammals and fisheries.

The zooarchaeology of early human sites provides a unique window into the biological history of the Aleutian Islands. One of the studies (Causey et al. 2005) focused on the paleoavifauna hunted by early Aleuts who inhabited Amchitka and Buldir Islands (central Aleutians), and Shemya Island (western Aleutians) from about 3,500 years ago to the present. Most of the seabird species recovered from these early sites varied widely in distribution and abundance through time and space.

Pelagic procellariids such as Short-tailed Albatrosses and Short-tailed Shearwaters were present and abundant at most sites and at most times. During periods of increased temperatures and precipitation (e.g., 650-1100 ybp), nearshore foragers such as cormorants and parakeet auklets increased in abundance, but during periods of cooling (e.g., 1800-2100 ybp), piscivorous birds feeding offshore such as murres and kittiwakes predominated. Over three millennia, researchers found that marine bird populations were negatively correlated with temperature and positively correlated with precipitation. They detected hunter-related depletions of populations breeding in accessible colonies at small scales of space and time, but did not observe widespread or long-term effects. They concluded that local oceanography and regional changes in prey bases caused by environmental and climate change in the past had a significant impact on the distribution and abundance of Aleutian marine birds. (adapted from Abstract, Causey et al. 2005)

The results of this paleoavifauna research were presented at the Seabirds as Indicators Symposium in 2006, the purpose of which was to critically examine specific questions about how seabirds indicate change in the marine environment. Invited speakers were chosen to provide a wide range of expertise on different subjects, including demographics, contaminants, ship-based surveys, physiology, and functional ecology. Speakers were also chosen to provide insight from long-term studies in Europe and the Antarctic.



Main-bird transformation figurine.

## The Goetz Site: Changing our Understanding of Ancient Bison Population Distribution - National Elk Refuge, Wyoming



Archaeological excavations at 48TE455, the Goetz site, at the National Elk Refuge in Wyoming have demonstrated that aboriginal peoples were exploiting bison as a food source. Previously, archaeologists believed that populations of bison at this elevation would have been too small to be considered a consistent food source. However, excavation of nine 1m X 1m excavation units during the summers of 2002 and 2003 revealed 10,000 years of human occupation of the area with bison as a component of the diet. Other prey species that have been identified include elk, sheep/deer, black bear, and rodents. The work suggested that the aboriginal plantlife on the refuge was different than today and would have supported a large enough population of bison to be a human prey species. Related interdisciplinary studies have tackled such varied issues as reconstruction of local vegetation change, ecology, migration shifts of bison, stone tool manufacture, and seasonal movement of precontact groups in Jackson Hole. This work was conducted with assistance from Earthwatch volunteers.

## Stillwater NWR: Receding Floodwaters Reveal a Previously Unknown Legacy of Human Occupation in Stillwater Marsh, Nevada



Archaeologists in Nevada got a little help from Mother Nature in better interpreting the prehistory of a desert marsh. In the summer of 1985, the first of 51 large archaeological sites emerged from receding floodwaters at Stillwater Marsh in the Carson Desert, Nevada. Before the floods, existing data suggested little evidence of human sediment in the Carson Desert, the theory being that other areas were more productive for natural resources and therefore more conducive to occupation. But the floods revealed large sites containing cultural debris, features, middens and human remains that mark a continuity of residential occupation in Stillwater Marsh from about 3000 B.P. to at least 700 B.P. If not 300 B.P. The archaeological material has a density and abundance that, with the exception of the nearby Humboldt Lakebed site, has no precedent in the western Great Basin. It is testament to an ecosystem that was rich with freshwater shellfish, mammalian fauna, fish, and birds. This single flood dramatically changed the view of Carson Desert cultural and natural prehistory. Archaeological investigations in Stillwater Marsh, both in the wake of the floods and in future, can be used to explore how environmental conditions, faunal distributions and abundances, and human subsistence and settlement have changed over time.

## Nuwuvi Knowledge-to-Action Promoting Southern Paiute Government-to-Government Consultation and Resource Management in the Spring Mountains National Recreation Area and Desert NWR Complex, Nevada



Pinus monophylla, or singleleaf piñon. Photo by Chris Webber, courtesy of California Academy of Sciences.

traditional ecological knowledge. The project focuses holistically on government-to-government consultation and resource management.

In both areas, piñon/juniper habitats have been traditionally managed by the Nuwuvi people (Southern Paiute and Chemehuevi) for thousands of years using traditional management techniques such as patch burning and what is called whipping the trees-knocking the cones off the trees so they increase the seasonal yields. Nuwuvi know if you don't harvest from the trees and manage the forest or interact with the land, it is not healthy. There needs to be human interaction for things to remain in balance. This, in turn, challenges the way in which the resources are being managed now, which is to leave them alone or do some fire fuel reduction. The project is working to revitalize the tradition not only for potential cultural and ecological reasons, but also to standardize consultation methods with the nations that promote opportunities to interact directly with the Forest Service and with Fish and Wildlife Service on a government-to-government basis.

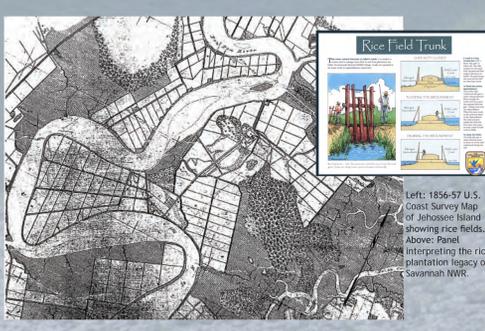
The Nuwuvi Knowledge-to-Action project is funded by the Southern Nevada Public Lands Management Act, referred to as SNPLMA, which is collected by the Bureau of Land Management from selling public land around Las Vegas. Many local federal agencies - Fish and Wildlife, Forest Service, BLM - rely on these funds to support building interpretive facilities or other needed improvements. (Adapted from an NAI interview with Jeremy Spoon)

## Traditional Ecological Knowledge: A Fact Sheet for Service Scientists



Service biologists and tribal affairs liaisons have partnered to produce a fact sheet on Traditional Ecological Knowledge, or TEK. This term refers to evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment. This knowledge is specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry. An increasing number of scientist and Native people believe that Western Science and TEK are complementary.

## Historic Rice Plantations: Adaptive Reuse of a Cultural Resource for the Benefit of Wildlife at Savannah and ACE Basin NWRs



In an area that stretches from the Waccamaw River in South Carolina to the Altamaha River in Georgia, several Refuges are dedicated to managing, improving, or creating habitat for migratory waterfowl as well as wading and shorebirds. Refuges such as Ernest B. Holling ACE Basin NWR in South Carolina and Savannah NWR in Georgia, were created on the footprints of 19th century rice plantations. The Edisto Unit of ACE Basin manages a number of impoundments associated with the dike, ditch or canal, and trunk systems for four historic rice plantations (Grimball's Pineberry and Grove Plantations, Brisbane's Wilderness Plantation, and Aiken's Jehossee Island Plantation). Savannah NWR's impoundments are associated with the rice agricultural infrastructure of 13 plantations.

Following the American Civil War, many of these plantations and their fields were in disrepair. Wet rice production shifted to Louisiana and Arkansas where production and labor costs were much lower. The former plantations transformed from agricultural enterprises into hunting plantations. The rice fields were converted into managed impoundments for waterfowl. Today, our impoundments continue to utilize the 19th century agricultural infrastructure. Water control structures modeled on 19th century rice trunk are used to manage hydrological levels. While the ante-bellum plantation built landscape may not be readily apparent to the casual observer, it forms the basis of the conservation landscape created by the FWS at these Refuges.

## Cathlapoté Archaeological Project, Washington: Using Archaeology to Interpret Cultural and Natural Heritage



Located on Ridgefield NWR in Washington, Cathlapoté is significant as one of the largest Chinookan villages on the Lower Columbia River to remain unscathed by dam construction and modern development in the region. The site has been the focus of archaeological research and public education for more than fifteen years, resulting in a greater understanding of the landscape and culture of the Cathlapoté people who lived on the river for generations before Lewis and Clark first observed the "Quathlapoté Nation" during their down river journey in 1805.

Today, a full-scale replica of a Chinookan-style cedar plankhouse, constructed based archaeological data from the site, serves as the physical infrastructure for interpreting to the public the stories of the land and people of Ridgefield NWR. Completed in 2005, the plankhouse draws over 3000 school students to the Refuge each year on field trips during which they explore not only the culture of the Chinookan people who lived at Cathlapoté, but also the environment from which they procured their sustenance, including houses, food, clothing, tools, and transportation. The structure is also open to the community, tribal members, and tourists alike. As an official site on the Lewis and Clark National Historic Trail and a unique representation of traditional native architecture, it continues to benefit both the local Ridgefield economy as well as the region's economy.

