Recent Changes in the Ethnobotany of Standing Rock Indian Reservation

Shelly Kathereine Kraft

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RECENT CHANGES IN THE ETHNOBOTANY
OF STANDING ROCK INDIAN RESERVATION

by

Shelly Katherene Kraft

Bachelor of Arts, University of North Dakota, 1986

A Thesis
Submitted to the Graduate Faculty
of the
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in partial fulfillment of the requirements
for the degree of
Master of Arts

Grand Forks, North Dakota
May 1990
This thesis submitted by Shelly Katherene Kraft in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota has been read by the Faculty Advisory Committee under whom the work has been done, and is hereby approved.

[Signatures]

This thesis meets the standards for appearance and conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

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Dean of the Graduate School
Title _RECENT CHANGES IN THE ETHNOBOTANY OF THE_
               _ROCK INDIAN RESERVATION_

Department   Geography

Degree       Master of Arts

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This is dedicated to the memory and spirit of four people who have taught me to never walk so fast that the wind could not blow away my footprints. To Dorthy Lentz, Harry Swift Horse, and my Grandmothers.
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Thanks to everyone for what you have given me and Mitaku Oyase!
ABSTRACT

Gathering and preserving wild fruits and vegetables for food and medicine, especially from the wooded bottomlands, was a traditional part of the Lakota culture. Plant use among the Lakota has been greatly reduced and in some cases, completely eliminated by the damming of the Missouri River by Oahe Dam. This dam, which forced the Lakota of Standing Rock Reservation to give up their homes in the bottomlands in violation of their treaty rights of 1868 had a considerable impact on the biogeography of the Standing Rock Indian Reservation. In January 1960, almost 200 Indian families were evacuated from their homes adjacent to the Missouri River and relocated in new homes to pursue new lifestyles on the remaining marginal prairies of their reservation.

In Missouri River Basin Investigation (MRBI) report 138, timber, game, and wild plants were stated as resources basic to survival of the Indians of Standing Rock Reservation. The report also stated that by destroying these resources the Indians would be forced to become more dependent on welfare or on a wage-earning income.

After interviewing several Lakota elders, I concluded that the distribution of at least twenty-six plants has been reduced or eliminated from Standing Rock Reservation due to the flooding of the bottomlands. It was also concluded that the loss of knowledge of wild plant usage among these people has resulted in an aspect
of Lakota culture rapidly being diminished. This proved to be true when all of
the elders interviewed could not remember most of the plants that were utilized
by their parents or grandparents. They directly attributed this to the lack of
availability because of the Oahe Reservoir.

Loss of plants as food and medicinal sources and timber for fuel because of the
construction of the Oahe Dam created a socio-economic setback for the Lakota.
They could no longer rely on these once widely abundant resources. Therefore,
the Lakota were forced to become less dependent on a subsistence based directly
on natural resources and more dependent on a wage-earning economy off
the reservation or to welfare.
The Pick-Sloan Plan of 1944 paved the way for decades of manipulation of the Missouri River. As part of this plan, dams were constructed in several locations on the Missouri River, creating some of the largest man-made lakes in North America. The intent of the Pick-Sloan Plan was to control flooding along the length of the river, to improve navigation, to generate hydroelectric power, and to provide potential water resources for irrigation. In addition to these potential benefits, reservoirs also had created environmental and cultural impacts. Not the least of these impacts was the displacement of many people and the loss of critical biological resources. More than 55,000 acres of Indian lands in North and South Dakota were inundated by the Oahe Reservoir (figure 1) (Lawson 1982) and the distribution of natural vegetation on Standing Rock Indian Reservation markedly changed from pre-impoundment times. 90% of the timber and 60% of the other native wild plants have been lost (MRBI Report no. 138, 1954).

Use of native wild fruits and vegetables, especially from wooded bottomlands, has been a tradition of Lakota culture for hundreds of years. Plants were collected and used by the Lakota for medicine and food and knowledge of each plant's use was passed from generation to generation by elders. Distribution of many native plants has been reduced to a few isolated sites, limiting access to...
Figure 1. Changes in stream channel and land that was lost to inundation by the Oahe Reservoir (modified after USGS Bulletin 575, 1914).
plants which at one time were widely utilized. Knowledge regarding plant utilization among the Lakota is rapidly diminishing. With this loss, an important part of Lakota culture is in danger of being forgotten. Loss of plants as free food and medicinal sources and of timber for lumber and fuel has also created a socio-economic set-back for the Lakota.

No previous study regarding the ethnobotany of the Lakota Indians has been undertaken, nor has there been an attempt made to consider the impact of the Oahe Reservoir on the ethnobotany of the Lakota. Importance of plant use in the social and economic structure of Lakota culture has varied through time. Changes in Lakota plant use does not necessarily indicate a change in Lakota lifestyle due to acculturation, rather it could indicate the loss of plant habitat and consequently use due to government projects like the Oahe Reservoir.

It is the intent of this research to provide a thorough look at past plant utilization among the Lakota Indians of Standing Rock Reservation prior to the inundation by the Oahe Reservoir. It is the intent to describe the socio-economic impacts of the Oahe Reservoir on the ethnobotany of the Lakota.
LITERATURE REVIEW

The importance of ethnobotany has been recognized for decades. The study of ethnobotany combines the knowledge of three fields: anthropology, biology (botany), and geography in which the concern is with the inter-relationships between people and plants (Barrow 1900; Carter 1950). Ethnobotany presents the opportunity to grasp a better understanding of Native peoples' cultural beliefs, morals, and cultural position of various tribes in a given region (Harshberger 1896; Gilmore 1932; French 1981).

Some of the earliest botanical studies conducted on the Northern Great Plains were not done by botanists, but by explorers, artists, and missionaries who made note of the flora of the regions in which they were traveling. Prince Maximilian of Wied, John Bradbury, Meriwether Lewis and William Clark, Pierre Antoine Tabeau, and Francis Antoine Larocque were just a few who recorded plant usage in their journals (Thwaites 1906; 1904; Lewis 1947-1948; Tabeau 1939; Larocque 1934).

These studies show that hundreds of plants were utilized by Native people for food, medicine, religion, and technology. This plant utilization has drawn the attention of many researchers. Some examples of regional studies of plant uses include: Edward Castetter (1935); and Edith Van Allen Murphey's (1959) work in the Southwest; Elias Yanovsky (1936); Virgil Vogel (1970); and Michael Weiner's (1972) studies which dealt with general Indian plant utilization; and
Waldo Wedel's (1941) work of the Central Great Plains. Investigations of individual tribes and their plant use have been conducted by: George Bird Grinnell (1905) and Jeffery Hart (1981) who researched with the Cheyenne; Rev. Eugene Buechel's (1970) study of the Lakota; Gilbert Livingstone Wilson's (1977) work of Hidatsa gardening and ethnobotany; Francis Densmore (1918); (1974) who recorded Ojibwa and Sioux plant use; along with Huron Smith (1932) who later observed Ojibwa use; Melvin Randolph Gilmore (1913); (1977) who observed plant use among the Sioux, Arikara and Pawnee Indians; Edwin Thomas Denig (1961); (1967) who lived with the Assiniboine and recorded some Arikara ethnobotany; Alex Johnston's (1970) work with the Blackfoot; and Patrick Munson (1981) who looked at Osage and Lakota plant use.

Several ecological studies were conducted prior to the impoundment of the Oahe Reservoir. O.A. Stevens (1945) recorded 52 species of vascular plants in the impoundment area. Of these 52 species, only 16 were not found in a survey conducted 30 years later by Keammerer, Johnson, and Burgess (1975). The latter found that the most represented species were in the Compositae family and secondly, Gramineae family. In comparison to Steven's (1963) work, Keammerer, Johnson, and Burgess (1975) found the flora of North Dakota bottomlands included 50.9% of the families, 29.3% of the genera, and 19.2% of the species of Stevens' botanical list (1975, 10).

Johnson, Burgess, and Keammerer (1976) looked at the impact on plant diversity resulting from the elimination by the Oahe development of spring flooding. They were able to determine that the areal extent of floodplain forestry and its diversity, including understory, was adversely affected by stream
meander reduction directly associated with damming of the river (1976, 81-82).

Gerald T. Hart and Associates (no date) conducted ecological and land valuation surveys on Standing Rock Reservation so land could be classified for the purpose of determining market value. This was done by studying the predominant natural vegetation and its value as grazing or crop land (n.d., 46).

Similar studies were conducted in other areas of the Great Plains where reservoir development was to occur: Woodbury, Durrant, and Flowers' (1959); (1969) studied impoundment lands of the Flaming Gorge Reservoir; Hackenberg (1976) looked at the impact of economic development of the Colorado River Basin on tribal life; and Meyer (1968) looked at Fort Berthold and the Garrison Dam.

No analysis of the Standing Rock Sioux ethnobotany was conducted before or after the Oahe Dam was constructed. Perhaps through this study and previous ones, plant utilization and diversity will be investigated more extensively prior to economic development of a region. The inundation of land not only affects the diversity of plants but also the availability of resources for the people who are dependent on the plants and animals of that area. This study will attempt to demonstrate the significance of how plants and their utilization by a specific group of people are adversely affected when their land base is inundated by reservoir development.
The Indians who occupy the Standing Rock Reservation speak a Siouan Linguistic dialect. There are four major divisions of the Sioux people: Assiniboine, Dakota, Yankton - Yanktonai, and the Lakota, each speaking their own dialect (figure 2) (Lowie 1954, 10; Robinson 1974, 19-27; Bryde 1971, 236-250). This study will deal strictly with the Lakota.

Pre-Reservation

The Lakota Indians were numerically the largest of the four Siouan groups. They also were the most nomadic group, following the migrational patterns of the bison (Hassrick 1964, 64). Bison hides were used for tipis and robes while the meat was consumed as food and the bones made into utensils (Walker 1980, 138-139). Along with the buffalo, native wild plants played a very important role in every aspect of Lakota culture during pre-reservation times. It was during this period that the Lakota were free to travel throughout the Great Plains hunting and gathering native wild plants (figure 3).
<table>
<thead>
<tr>
<th>Eastern Sioux</th>
<th>Middle Sioux</th>
<th>Western Sioux</th>
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<tr>
<td><strong>DAKOTA</strong></td>
<td><strong>NAKOTA</strong></td>
<td><strong>LAKOTA</strong></td>
</tr>
<tr>
<td>Santee</td>
<td>Yankton</td>
<td>Teton</td>
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1. Mdewakanton  
2. Wahpekute    
3. Wahpeton     
4. Sisseton

5. Yankton  
6. Yanktonais

7. Lakota *

* Seven Tribes of the Lakota

1. Oglala    
2. Brule      
3. Minneconjous  
4. Hunkpapa   
5. Two Kettle 
6. Blackfoot 
7. Sans Arc

Figure 2: Tribal Divisions or Seven Council Fires of the Sioux.
Figure 3: Territorial boundaries of the Sioux Indians prior to 1850, including neighboring tribes (modified after Howard 1966).
Berries such as *Prunus virginiana* L., *Prunus americana* Marsh., and *Shepherdia argentea* (Pursh) Nutt., were harvested (Hassrick 1964, 203-204). Root vegetables including *Psoralea esculenta* Pursh., and *Helianthus tuberosus* L. were collected and dried for utilization during winter months. *Allium textile* A. Nels. & Macbr. along with *Pleurotus ulmarius* and *Falcata comosa* (L.) Kuntze., also were gathered and relished. These natural resources accounted for a major portion of the Lakota diet. (Wing & Brown 1979, 93).

Utilization of these resources has observed by several early explorers, missionaries and others. Lewis and Clark recorded the gathering of *Psoralea esculenta* (Lewis 1947-1948, 203). Tipsina was a prize subsidiary food which was collected in the spring (Lowie 1954, 20). Edwin Thompson Denig recorded in 1835 the use of *Helianthus tuberosus* and *Falcata comosa*, which were gathered by the Lakota along the banks of many rivers (Denig 1961, 11). The common name for *Falcata comosa* is mouse bean because these plants were gathered by a small mouse (*Microtus pennsylvanicus*) commonly known as the meadow mouse or bean mouse (Gilmore 1925, 181-183). The Lakota called these mice the "Hintunka people". These "mouse people" stored their beans underground in cache pits for a winter supply of food. The Lakota collected these beans from cache pits and replaced the beans with other food such as corn or seeds for the mice. The Lakota were thankful to the Hintunka people for gathering and storing the beans. Melvin Gilmore recorded a legend which tells how the Lakota people feel toward the bean mouse:

A certain woman plundered the storehouse of some Hintunka people (bean mice). She robbed them of their entire food supply without giving them anything in return. The next night this woman heard a woman down in the woods crying and saying, 'Oh, what will my poor children
do now?' It was the voice of the Hintunka woman crying over her hungry children.

The same night the unjust woman who had done the wrong had a dream. In her dream Hunka, the spirit of kinship of all life, appeared to her and said: 'You should not have taken the food from the Hinturka people. Take back the food to them, or some other in its place, or else your own children shall cry from hunger.'

Next morning the woman told her husband of this vision, and he said, 'You better do as Hunka tells you to do.' But the woman was hardhearted and perverse, and would not make restitution for the wrong she had done.

A short time afterward a great prairie-fire came, driven by a strong wind, and swept over the place where the unjust woman and her family were camping. The fire consumed her tipi and everything it contained, and the people barely escaped with their lives. They had no food nor shelter; they wandered destitute on the prairie, and the children cried from hunger (Gilmore 1925, 183-184).

Lewis and Clark (1804) previously had observed mouse beans being gathered and eaten: "Those people gave us to eate bread made of Corn & Beens, also Corn & Beans boil. a large Been (of) which they rob the mice of the Prairie (who collect & discover it) which is rich & verry nurrising..."

The Lakota believe that Tunkasila or Wakan Tanka (Great Spirit or God) created all things and is within all things (Walker 1980, 75). Therefore, all life forms which comprise the universe are viewed as one, so all things are equal from the smallest animal to humans. Mother earth nourishes all living things from the insects, to plants, to animals, to all humans (DeMallie 1984, 312). Tobacco is a sacred offering and is given to honor plants and animals who give of themselves so
that the people may live. This also helps insure a good harvest for the next year (Left Hand August, 1986).

According to Lone Man, a Sioux warrior:

All herbs and roots were made for the benefit of animals or man ... all are carefully tested, and if one is found to be a cure for a certain disease, it should be regarded as a gift from God, and intended especially as a remedy for that disease. It should be reverenced, and this reverence should be closely observed, as without it the herb will have no effect. Because of the reverence due to these medical herbs certain songs are used expressing this feeling (Malis 1985, 254-255).

During the growing season wild plant food was generally plentiful unless there were drought conditions. However, during the winter season the availability of food was extremely limited with the exception of such berries as Rosa arkansana Porter., hips which were eaten when other kinds of food were scarce (Denig 1961, 12). It was during this pre-reservation era that the Lakota Indians were content and a very successful self-sufficient people. Unfortunately, after the establishment of reservations, the Lakota, like all the Sioux Indians, were forced to become dependent on government annuities, limited as they were (Andrist 1964, 168-169, 338).
Establishment of Reservation Life

The Sioux Indian Reservation originally was established under the Fort Laramie Treaty of 1851 which also was known as the "One Big Reservation Policy" (Prucha 1975, 84-85). In 1868, re-negotiation of the treaty established the boundaries of the Great Sioux Reservation (figure 4). This treaty provided for the first allotment of lands to individual Indian families (Andrist 1964, 133). Once on the reservation, the Lakota were required to become farmers and in return would receive their treaty ration obligations (Prucha 1975, 110-114).

In 1887, once again the Sioux Indian Reservation lost Indian lands when the one big reservation was subdivided into five small reservations. Consequently, Standing Rock Sioux Indian Reservation was established (Andrist 1964, 349). At this time Indian land again was allotted and Indian land was lost. The Dawes Act (Allotment Act), removed half of Standing Rock Reservation from Sioux ownership and sold it to non-Indians (Utley 1984, 247). Under the act, one hundred-sixty acres of sparsely vegetated rangeland or forty-to-eighty acres of irrigable land was distributed to the head person of each family. Unfortunately, funds for the purpose of irrigation were not forthcoming (Costo and Henry 1977, 171). Those families who were fortunate enough to receive land in the Missouri River bottomlands were able to harvest native wild fruits, vegetables and timber unlike the families who were relocated on the uplands (Iron Shield, August 1988). The Lakota, like all other Indians, were forced to become "domestic dependent entities" or wards of the government as John Marshall stated in 1831 in the Cherokee Nation v. Georgia case (Commager 1948, 255-258).
Figure 4: Reduction of Sioux Indian lands from 1868 to 1890 (Utley 1984:250).
Much had changed for the Lakota people in such a short period of time as Ralph K. Andrist states:

And so, as 1877 ended, in all the Great Plains, from Canada south there was no longer a free tribe or a 'wild' Indian. It had not taken long; in 1840 the boundary of the permanent Indian Country had been completed and the Great Plains were to belong forever to the Indians. A mere thirty-seven years later every solemn promise had been broken and no bit of ground large enough to be buried in remained to any Indian that could not - and probably would - be arbitrarily taken from him without warning (Andrist 1964, 300).

The Big Muddy and the Oahe Dam

The Missouri River is the longest waterway in North America. It derives its nickname, "Big Muddy", from the large quantity of suspended sediment which it transports (Arthur 1950, 13). The Big Muddy has eluded man's technological efforts to control it for many years. It has either produced too much flow, causing the disastrous floods of 1844, 1881, 1943, and 1951, or not enough especially during the severe droughts of the 1860's, 1890's, 1920's, and 1930's (Lawson 1982, 3-4).

Originally, the flood control controversy of the Missouri River was negotiated
under the Missouri Valley Authority (MVA), which was patterned after Senator George W. Norris' Tennessee Valley Authority (TVA) program (Meade 1952, 9). The MVA offered the first federally coordinated program for the Missouri River and was placed under the control of the Department of the Interior's Bureau of Reclamation. Several years later specific flood control projects were started. In 1943, Congress directed the Corps of Engineers to create a flood control plan under the supervision of Colonel Lewis A. Pick, of the Omaha Division of the Corps of Engineers (Lawson 1973, 4-5). Pick's plan gave irrigation primacy over navigation as a result of the O'Mahoney-Millikin amendment which was concerned mainly with navigation (Keyser 1946, 10). As the navigation-irrigation controversy continued, the Bureau of Reclamation proposed their own plan in 1944. This plan was lead by W. Glenn Sloan, who was Assistant Director of the Bureau's district office in Billings, Montana (Lawson 1973, 7-8).

The "Sloan Plan" emphasized irrigation and hydroelectric power development; however, this plan brought much criticism, too. After much negotiating, the Corps of Engineers and the Bureau of Reclamation joined forces on October 16, 1944, at the request of President Roosevelt, to develop a universal proposal. In November of 1944, a proposal was given to Congress known as the "Pick-Sloan Plan" (Meade 1952, 19). This joint plan addressed all major concerns even though there was still some opposition (Arthur 1950, 13-14, 32). Congress passed the bill and it was incorporated into the Flood Control Act of 1944 and became the first Missouri River Basin development plan to receive Congressional authorization (US Army Corps of Engineers 1947, 5) (Meade 1952, 9). According to the Missouri Basin Survey Commission, the overall
objective of resource development and control of the Missouri River should be:

To enhance economic opportunity for the people of the basin, improve their welfare, and enlarge their contribution to the Nation. To achieve this objective, the Commission specified the following program goals: Watershed management and land conservation, flood control, forestry, irrigation, electric power, domestic and industrial water supply, navigation, stream bank stabilization, pollution abatement, mosquito control, drainage, fish and wild life, recreation, industrial development and the salvage of scientific resources (Missouri Basin Survey Commission 1953, 7).

The Pick-Sloan Plan, renamed the Missouri River Basin Development Project, intended to alter the Missouri River and control flooding through the construction of 107 dams. The backbone of this plan was six key dams (Lawson 1982, 20). These six dams were built at designated locations on the Missouri in Montana (Fort Peck), North Dakota (Garrison), and South Dakota (Oahe, Fort Randall, Gavin's Point and the Big Bend) (Keyser 1946, 20).

Construction of these dams was to be undertaken by the Corps of Engineers and ultimately would affect twenty-three separate Indian reservations. Six of those reservations would be reduced considerably in size as a result of these water projects (Lawson 1973, 18).

The Pick-Sloan Plan was presented to the Lakota as a "fait accompli". Reservation lands were negotiated and taken through Public Law 870 which states the government had the right to authorize and direct individual negotiations with the Sioux Indians. Just compensation for lands taken, improvements and
interests, as well as costs for relocation and rehabilitation would be provided. The Corps of Engineers and the Department of the Interior would conduct appraisals of tribal and individual land tracts. They were to appraise elements such as standing timber, mineral rights, severance damage and the current use of land tracts in question (Statutes at Large, LXIV, 1093-95, 1950) (MRBI Report 124, 1951, 37-39).

To try and determine what adverse effects inundation would have on the Indian people and their lands, the Bureau of Indian Affairs organized the Missouri River Basin Investigations Projects (MRBI). The duties of MRBI were to conduct reservation surveys and appraisals concerning the anticipated social and economic damages which would occur following inundation (MRBI Report 108, 1974, ii) (Lawson 1973, 22). Even though the Oahe Dam was not located on Indian property, the Oahe Reservoir flooded more Indian land than any other public works project in the country (Lawson 1982, 50).

The Oahe Dam and Reservoir

Construction of the Oahe Dam began in September 1948 approximately 12 miles northeast of Pierre, South Dakota. This dam received its name from an Indian mission nearby established by Reverend Thomas Riggs in 1873 (United States Department of Army Corps of Engineers 1972, 1-4). The dam itself stretches 9,300 feet across the Missouri River (MRBI Report 124, 1951, 36). The height of the dam was increased from the originally 192 feet to 245 feet, which increased the output of the power plant from 500,000 to 595,000
kilowatts. Maximum pool level also increased by the time the project was completed (MRBI Report 29, 1958, 3-4). The Oahe Dam was the third major Pick-Sloan project undertaken and the second largest earth-filled dam in the world when it was completed, making the Oahe Reservoir the largest reservoir on the Missouri River. Oahe Reservoir is deeper than Lake Erie and longer than Lake Ontario, and it stretches more than 250 miles from the dam to just south of Bismarck, North Dakota (Lawson 1976, 205-206). At a final cost of over $340 million, the Oahe Dam and Reservoir went well beyond original estimated costs. The Oahe project overran its predicted cost estimate of $72,800,000 by more than 359% (figure 5) (Morgan 1971, 36).

On August 17, 1962 President John F. Kennedy formally dedicated the dam which caused the loss of more than 204,124 acres of Sioux lands (Lawson 1982, 134, 179).
Cost Increases of Corps of Engineer Projects

Name of Project
Oahe Reservoir (North and South Dakota)

Cost Estimate at the Time Project was Authorized
$72,800,000

Amount Spent Through Fiscal Year 1966
$334,000,000

Percentage Overrun
359% (Which is the second highest overrun project of the Corps.)

Figure 5: Modified from Morgan, Dams and Other Disasters. 971, 36. Originally in the Atlantic, April 1970.
STANDING ROCK INDIAN RESERVATION IS LOCATED ON THE NORTH DAKOTA - SOUTH DAKOTA BORDER APPROXIMATELY AT THE CENTER OF THE NORTH AMERICAN CONTINENT (FIGURES 6). THE LANDSCAPE OF THIS REGION IS PREDOMINANTLY GLACIATED PRAIRIE AND ROLLING HILLS. SOUTH AND WEST OF THE MISSOURI RIVER, THE LAND BECOMES MORE RUGGED WITH ANGULAR BUTTRESSES AND HILLS. THE CLIMATE OF THE REGION IS DISTINCTLY CONTINENTAL WITH AN AVERAGE ANNUAL TEMPERATURE OF 43 DEGREES FAHRENHEIT AND AN AVERAGE TEMPERATURE RANGE OF 17 DEGREES FAHRENHEIT IN JANUARY TO 73 DEGREES FAHRENHEIT IN JULY. THESE BROAD ANNUAL RANGES ATTEST TO THE CONTINENTAL NATURE OF THE CLIMATE.

PRECIPITATION IN THE FORM OF RAIN, SLEET AND SNOW AVERAGES ONLY AROUND 15 INCHES ANNUALLY (JENSEN 1974, 2, 21,41).

NATURAL VEGETATION OF THE REGION CONSISTS MOSTLY OF MIXED GRASS PRAIRIES INCLUDING SUCH DOMINANT SPECIES AS ANDROPOGON SCOPARIUS Michx., LITTLE BLUE STEM; STIPA VIRIDULA Trin., GREEN NEEDLE GRASS; AND AGROPYRON SMITHII Rydb., WESTERN WHEAT GRASS. IN ADDITION TO THE EXPANSES OF MIXED-GRASS PRAIRIE IN THE REGION, THERE ARE WOODED DRAWS AND RIPARIAN WOODLANDS. COMMON WITHIN THESE PLANT COMMUNITIES ARE SPECIES SUCH AS PRUNUS VIRGINIANA L., CHOKE CHERRY; AMELANCHIER ALNIFOLIA Nutt., JUNE BERRY; PRUNUS AMERICANA Marsh., WILD PLUM; AND SHERPHERDIA ARGENTEA (Nutt.) Greene., BUFFALO-BERRY; VITIS VULPINA L., WILD GRAPE.

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Figure 6: Study area, showing Standing Rock Reservation straddling North and South Dakota.
Some of the more dominant shrubs and trees growing in these areas are *Acer negundo* L., Box elder; *Corylus americana* Walt., American Hazel-nut; *Cornus stolonifera* Michx., Red-Osier dogwood; *Populus deltoides* Marsh., Cottonwood; *Fraxinus pennsylvanica* Marsh. var. *subintegerrima*, Green Ash; *Quercus macrocarpa* Michx., Bur Oak; *Ulmus americana* L., American Elm; and *Salix sp.* Willow. In low lying areas of the Missouri floodplain that were not inundated, semi-aquatic species exist such as *Glyceria septentrionalis* Hitchc., and *Glyceria striata* (Lam.) Hitchc. In standing water *Typha latifolia* L., cattail and *Equisetum arvense* L., Common horsetail are prevalent and several *Salix sp.* grow along the shifting sand banks.

Procedures employed in this study were drawn from several earlier anthropological and ethnographic investigations. These earlier studies utilized one of three approaches: 1) the researcher employed archival data exclusively (Wedel 1941 and Weiner 1972); 2) the researcher collected plants and interviewed people about their uses (Smith 1932 and Gilmore 1977); 3) the researcher obtained plants and used archival information on plant use but never interviewed anyone for corroboration (Kindscher 1987 and Medsger 1939).

For this study, a combination of techniques was used. This methodology consisted of collecting and identifying plant specimens and then determining their traditional usage through archival sources. In addition, numerous interviews were conducted with knowledgable Lakota elders (Appendix A) to corroborate archival findings and to determine additional usage previously unreported.
Archival data on plant use by the Lakota was extracted from several major works, including: *The History of the Lewis and Clark Expedition* by Meriwether Lewis and William Clark, *Travels in the Interior of North America, Early Western Travels, 1748-1846*, *Maximilians's Travels in North America* edited by Reuben Thwaites, *Uses of Plants by the Indians of the Missouri River Region* by Melvin Gilmore and *Lakota Names and Traditional Uses of Plants by Sicangu (Brule) People in the Rosebud Area, South Dakota* by Dilwyn Rogers. The latter was a study based on Father Eugene Buechel's collection of plants from the Rosebud area of South Dakota around 1920. These sources provided information on plants and their use prior to the flooding of the Missouri River Valley.

Time also was spent reviewing Melvin Gilmore's correspondence at the North Dakota Heritage Center in Bismarck, North Dakota. Unfortunately, most of Gilmore's plant collection which is housed at the State Historical Society of North Dakota has had little care and the specimens are largely unidentified and lack detailed collection data. However, there is another collection of Gilmore's plants at the Museum of Anthropology in Ann Arbor, Michigan; it includes some of Gilmore's field notes and folklore concerning plant use among the Lakota Indians of Standing Rock Indian Reservation. Unfortunately, these plants are not well documented nor cataloged (Ford 1988, personal comm.). Another collection recently has been uncovered at the Nebraska Historical Museum which is not well cataloged either.

Several visits ranging from one to two weeks in length were undertaken during 1987 and 1988 to Standing Rock Indian Reservation. Plant habitat was observed and plant specimens collected from the reservation. Photographs were taken of each species in its natural environment. Location sites of collected plants were
plotted on county topographic maps (Appendix B). This field procedure was based on the earlier work of Fosberg (1960).

A number of sources were used for identification of plant species: Angier 1978; Dickinson and Lucas 1983; Elliot 1976; Gleason and Cronquist 1963; Rogers 1980; Stevens 1963; Vogel 1970; and Weiner 1972. Identification of plant specimens was corroborated by comparisons with specimens in the herbarium at the University of North Dakota with the assistance of herbarium curator Dr. John LaDuke.

Interviews were the most important procedure of the methodology since they were the primary method of determining plant species elimination and reduction. Two types of interviews were conducted with fifteen Lakota elders (Appendix A) with a combined total of twenty-five interviews being conducted. These two types of interviews were based upon Crane and Angrosine's (1974) methods of anthropological/ethnographical interviews. Nine formal interviews were conducted in which conversations were both tape recorded and recorded in a field note book. Sixteen informal interviews also were conducted where conversations were recorded only in a field note book. The main criteria used to determine who would be interviewed were: 1) those people who were personally affected by the inundation; 2) those people involved in the negotiations for lands taken; or 3) people who met both criteria. Elders were chosen because they generally had more knowledge of plant collection and use than did younger people.

During both types of interviews, specific questions were asked about plants (figure 7), yet the interview was not rigid in structure so that elders being interviewed could elaborate about the past and current ethnobotany of the Standing Rock Indian Reservation.
1. Do you remember collecting any plants along the Missouri Riverbottomlands?

2. What plants were these and how were the plants that you remember being utilized?

3. Of the plants that you and your family used to collect, do you feel that any of these plants have been reduced or eliminated from the reservation?

4. Do you feel that the plants that are available are abundant?

5. Are these plants easily accessible?

Figure 7: Sample of the questions that were used in Interviewing Lakota elders.
An interpreter was present during several of the interviews because of the difficulty of translating the old dialect of Lakota into English. Some Lakota names were not deciphered at the time of the interviews, so Earl Bullhead from Bullhead, South Dakota, was contacted for help in translating. Photographs of plants were used for plant recognition when translation was a problem and/or no English translation was known. This procedure gave the opportunity for identification of plants which might have disappeared following the inundation of the area.

After talking with the elders, I collected as many of the plants which were discussed as possible. A total of 36 sites (Appendix B) were visited along the present day banks of the Missouri River, the uplands, draws, and ravines both on and off the reservation. Most of the Lakota elders who were interviewed were too old to participate in the fields work. However, Lorraine Left Hand joined the field trip to Rattlesnake Butte in South Dakota where she pointed out many plants which are now reduced in range. Combined, these sources gave a more comprehensive overview of plant species which have been reduced in distribution (Appendix C) or lost (Appendix D) due to the Oahe reservoir.
RESULTS AND DISCUSSION

A total of 70 specimens representing 43 species were collected in the field, photographed, and later identified in the herbarium at the University of North Dakota. The following checklist of species represents the combined results of field collection, herbarium identification, interview comments, and usage determined by other researchers. Plants which have been utilized by the Lakota are listed in systematic order, sequenced after the taxonomy of the Great Plains Flora Association (1986) and Cronquist (1981). Lakota names are based on those used by the elders and on Rogers (1980).

CHECKLIST OF SPECIES

NON-VASCULAR CRYPTOGRAMS

1. Pleurotaceae
   a. Pleurotus
      1. *Pleurotus ostreatus*
         Oyster mushroom

   peta yuhala - the one who has the fire that is small
Habitat - growing on trees along the Missouri
Usage - eaten fresh and roasted (Gilmore 1916, unpublished letter housed at the North Dakota State Heritage Center; Rogers 1980, 14; Father Bears Heart August 1987, personal communication).

2. **Pleurotus ulmarius**

*Elm cap mushroom*

cannakpa - tree ear

Habitat - grows on elm, cottonwood and box elder trees along the Missouri River.
Usage - eaten fresh and roasted (Gilmore 1916, unpublished letter housed at the North Dakota State Heritage Center; Red Bird August 1987, personal communication; One Feather August 1987, personal communication).

Gilmore collected a specimen of this *Pleurotus ulmarius* which is presently housed at the Museum of American Indian, Heye Foundation, NY #12/6271.

These mushrooms are also put in soups (Red Bird August 1987, personal communication; Lentz April 1986, personal communication).

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**VASCULAR CRYPTOGRAMS (Pteridophytes)**

1. **Equisetaceae (Horsetail)**
   a. *Equisetum*
      1. **Equisetum arvense** L.
         *Field Horsetail*

wanyecahu tanka - stem like a big arrow
wanyechau swula - small, fine arrow

Habitat - Moist soils along streams or river banks and lakeshores.
Usage - used like sandpaper for scouring and polishing (Rogers 1980, 17) (Gilmore nd, NDSHSC).
Division PINØPHYTA (Gymnosperms)
1. Cupressaceae (Cypress)
a. Juniperus
  1. juniperus virginiana L.
      Red or dwarf cedar

Hante - cedar

Habitat - prairie hillsides and rocky, sandy soils
Usage - leaves and twigs were burned as incense in some ceremonies such as funerals (Raymond February 1989, personal communication).

The leaves were used in a tea to produce a sweat (Lewis & Clark 1987, 460).

Leaves also were burned to smudge one’s body and home. Through inhaling the smoke, cedar helps clear headcolds (Rogers 1980, 18) (Raymond February 1989, personal communication).

A tea from the leaves and berries helped relieve coughs (Nurge 1971, 6; Corlett 1935, 322).

Crushed berries were added to meats, soups, and stews to add flavor (One Feather August 1987, personal communication).

The berries also were eaten at times to help relieve thirst (Swift Horse August 1987, personal communication).

In 1850, Red Cloud made a decoction from the leaves and berries as a cure for the Asiatic cholera epidemic among the Lakota (Corlett 1935, 322).
Division MAGNOLIOPHYTA (Flowering Plants)

Class Magnoliopsida (Diocots)

1. Ulmaceae (Elm)
a. Ulmus
   1. Ulmus americana L.
      American elm
      p'e - elm
      Habitat - along streams and open woodlands.
      Usage - wood was used for fuel, building, and posts (Swift Horse August 1987, personal communication).

2. Urticaceae (Nettle)
a. Urtica
   1. Urtica dioica L.
      Stinging nettle
      canicahpe hu - wood to knock something down stem
      Habitat - moist woods, along stream banks and thickets.
      Usage - roots were used to make a tea for pain in the stomach (Buechel 1983, 118).

3. Fagaceae (Oak)
a. Quercus
   1. Quercus macrocarpa Michx.
      Bur oak
      utahu can - acorn stem tree
      Habitat - valley floors along rivers and upland woods.
      Usage - acorns were chopped, cooked over a fire and in meats and soups (One Feather August 1987, personal communication; Red Bird August 1987, personal communication).
4. Cacteeae (Cactus)
   a. Opuntia
      1. Opuntia humifusa (Raf.) Raf.
         Prickly pear

         unheela blaska - flat cactus

         Habitat - prairies and rock ledges.
         Usage - the fruit was eaten fresh, stewed and also dried for winter use (One Feather August 1987, personal communication).

         In 1804, Tabeau claimed the red fruit of th prickly pear was valued more than the chokecherry. He observed the fruit being eaten fresh and also dried in the sun. Dried fruit was added to fat and pulverized meat to make pemmican (Abel 1939, 94).

         The inside of the prickly pear was eaten for thirst (Left Hand August 1987, personal communication).

         A stem of the cactus was cut in half and applied to rattlesnake bits to draw out the poison (Wills 1946, 14; Left Hand August 1987, personal communications).

5. Malvaceae (Mallow)
   a. Sphaeralcea
      1. Sphaeralcea coccinea (Pursh) Rydb.
         Scarlet mallow

         heyoka tapejuta - heyoka's medicine

         Habitat - dry prairies and plains
         Usage - Heyoka medicine men would rub the juices of the root on their tohands prevent their hands from burning in fire or boiling water (Wills 1946, 14; Swift Horse August 1987, personal communication; Gilmore 1913, 362).
6. Salicaceae (Willow)
   a. Populus
      1. Populus x acuminata Rydb.
         Cottonwood
         canyah'u - peel off wood
         Habitat - riparian along rivers and streams
         Usage - Both Lewis & Clark (1804) and Father De Smet (1841) observed the bark of the cottonwood being given to horses for food (Lewis 1947-1948, 147; Chittenden & Richardson 1950, 1390).
         The boughs and bark were given to horses during the winter for food (Father Bears Heart August 1987, personal communication).
         Cottonwoods also were used for fuel, building and posts (Swift Horse August 1987, personal communication).

   b. Salix
      1. Salix exigua Nutt.
         subsp. interior (Rowlee) Cronq.
         Sandbar willow
         cohwanjica sasa - low, thin willow
         wahpe'wizilya - incense leaf
         Habitat - along stream banks, alluvial bars and other wet places.
         Usage - branches were used in the construction of the sweatlodge and the peeled bark was used to tie together the poles (Left Hand August 1987, personal communication).
         The bark was used for fevers and headaches (Rogers 1980, 94) and also for tobacco (Deloria 1988, 17).
2. *Salix missouriensis* Bebb-Ryder
Diamond willow

cohwanjica tanka - large willow

Habitat - stream banks, flood plains especially along major river courses.
Usage - the wood was carved for canes and staffs (Running Elk August 1987, personal communication; St. John August 1987, personal communication).

The wood also was considered the best for fuel and cooking since it burned hot and all night long (Wills 1949, 25).

7. Capparaceae (Caper)
a. *Cleome*
   1. *Cleome serrulata* Pursh.
   Bee-plant

   wahpe'h'eh'e - ragged leaf

   Habitat - river bottoms and sandy prairie soils.
   Usage - boiled leaves and young flowers were eaten as greens (Rogers 1980, 61).

   Both Bradbury (1809-1811) and Maximilian (1832-1834) collected specimens of the bee-plant which was used as a tea for fevers (Weiner 1972, 62).

8. Brassicaceae (Mustard)
a. *Brassica*
   1. *Brassica oleracea*
   Wild cabbage

   wahpe'yutapi - leaf to eat

   Habitat - along river bottomlands.
   Usage - eaten as greens and with other foods (Iron Shield August 1988, personal communication) (Gilmore unpublished manuscript, nd. Museum of Anthropology, Ann Arbor, Michigan; Gabe August 1988, personal communication; Rogers 1980, 41).
9. Grossulariaceae (Currant)
   a. Ribes
         Wild black currant
         capceyazala - beaver taking in its berries
         Habitat - moist ravines and stream banks
         Usage - eaten fresh and dried for later use during times
                 of scarcity (Chase Alone August 1988, personal
                 communication; Gabe August 1988, personal
                 communication).
         Both Father De Smet in 1841 and Francis
         Denig in 1836 observed wild currants along the
         river and its tributaries (Chittenden & Richardson
         1905, 1390; Denig 1975, 583).
         Tabeau (1804) and Catlin (1830's) also
         referred to the abundance of currants and
         gooseberries along these streams (Abel 1939,
         93 and Catlin 1973, 72).

       Missouri gooseberry
       wichagnashka - gooseberry
       Habitat - moist open woods and thickets
       Usage - eaten fresh and dried for later use during times
               of scarcity (Iron Shield August 1988, personal
               communication; Chase Alone August 1988, personal
               communication).
       In 1806, Lewis and Clark recorded that an
       Indian woman had brought them gooseberries to
       eat (Lewis 1947-1948, 311).
   Buffalo currant

   wica'gnaskahu - male frog stem

   Habitat - edges of thickets and stream banks
   Usage - eaten fresh and dried for later use during times of scarcity (Red Bird August 1987, personal communication; Gabe August 1988, personal communication; Running Elk August 1987, personal communication).

   The stems of this bush were used to make arrows (Rogers 1980, 58).

10. Saxifragaceae (Saxifrage)
    a. *Heuchera*
       1. *Heuchera richardsonii* R. Br.
          Alum root

          canhlo'hsnasnala - herb bare (of leaves)

          Habitat - hillsides on the prairie, rocky woods and openings in woods
          Usage - root was used in a tea for diarrhea (Rogers 1980, 94) (Densmore 1918, 269).

          The root also was dried and ground into powder which was applied to sores as an astringent (Rogers 1980, 94; and Buechel 1970, 520).

11. Rosaceae (Rose)
    a. *Amelanchier*
       1. *Amelanchier alnifolia* Nutt.
          Juneberry

          wipazutkan - refers to a thing used to crack bones

          Habitat - open prairie ravines, open woods or brushy areas
          Usage - petals, leaves and small stems are steeped for a tea (Lentz April 1986, personal communication).
Berries are eaten fresh and dried for later use during times of scarcity (Left Hand August 1987, personal communication; One Feather August 1987, personal communication).

Stems were used for arrows because they did not break easily (Rogers 1980, 90; Lewis 1947-1948, 205).

b. Fragaria

1. *Fragaria vesca* L.
   Woodland strawberry
   
   _takanhecala_ - like sinew, refers to string-like runners

   Habitat - thicketts and woodlands, stream banks and ravines

   Usage - Denig (1836), observed strawberries being collected and eaten by the Lakota people on the prairies (1961, 12; 1975, 583).

   Fruits are eaten fresh or used with other foods (Iron Shield August 1938, personal communication; Red Bird August 1987, personal communication; Father Bears Heart August 1987, personal communication).

   A tea was made from the green leaves (Rogers 1980, 90).

c. Prunus

   Wild plum
   
   _kantahu can_ - plum tree

   Habitat - woodlands, thicketts, prairie ravines and stream banks

   Usage - fruits are eaten fresh and dried for use during times of scarcity. Women would get together and socialize as they sucked the pits from the plums and spread them out to dry in the sun (Robinson 1974, 221).
Lewis and Clark (1804), observed the great quantities of plum along the rivers as did Edwin Thomas Denig in 1836 (Thwaites 1893, 3, 119; 1961, 22).

A sauce was made from the plums as a type of dessert (Gilmore 1912, 364; Rogers 1980, 90).

The inner bark was used to cure mouth sores and also was applied to infected wounds (Angier 1978, 297-298).

Roots were used as a disinfectant and to get rid of worms (Vogel 1970, 175-176).

The berries were used as a dye for quills or other items (Densmore 1974, 371).

2. Prunus virginiana L.

Choke cherry

canpa'hu - bitter wood stem

Habitat - open woods, thickets and ravines

Usage - the berries were gathered and eaten fresh (Denig 1975, 583; Chase Alone August 1988, personal communication).

Berries were also pounded into paste and molded into patties which were dried in the sun. These patties were used in soup and stews (Wills 1946, 14).

With the addition of cornstarch and sugar to the berries, an excellent pudding is made known as "wo'japi" (Swift Horse August 1987, personal communication; Lentz April 1986, personal communication).

The inner bark was dried and pulverized to get rid of headaches (Angier 1978, 279).
A tea from the fruit and inner bark was used for diarrhea (Corlett 1935, 325).

A tea also was made from the leaves during the Sun Dance (Lentz April 1986, personal communication; Left Hand July 1988, personal communication).

A chokecherry branch bundle is tied to the sacred Sun Dance pole (Left Hand July 1988, personal communication; Malis 1978, 118).

Small pieces of branches are sucked or chewed to help relieve thirst during the Sun Dance (Left Hand July 1988, personal communication).

c. Rosa

1. *Rosa arkansana* Porter
   Prairie wild rose

   onjinjintka hu - wild rose bush

   Habitat - open woodlands, thickets and prairies
   Usage - petals are used for a tea and also to make jam (One Feather August 1987, personal communication; Lentz April 1986, personal communication).

   Roots are boiled for a stronger tea (Weist August 1988, personal communication).

   Rose hips were eaten in times of scarcity and usually were collected in the fall (Deloria 1988, 46; Left Hand August 1987, personal communication).

   Dried rose hips were added to soups and stew or eaten alone (Gabe August 1988, personal communication; Weist August 1988, personal communication).
12. Fabaceae (Bean)
   a. Amorpha
      1. **Amorpha canescens** Pursh.
         Lead plant
         
         zilka'tacan'- the bird's wood or tree
         
         **Habitat** - open woods and prairies
         **Usage** - leaves were used for a tea and for smoking like tobacco (Rogers 1980, 70).

   b. Amphicarpa
      1. **Falcata comosa** (L.)Kuntze. / (Amphicarpa bracteata)(L.)Fern.
         Ground bean, Mouse bean or Hog peanut
         
         maka ta omnicha - ground bean
         
         **Habitat** - moist woodlands and along rivers
         **Usage** - beans were collected from the meadow or wood mouse (*Microtus pennsylvanicus wahema*) storage pits and corn given in replacement (One Feather August 1987, personal communication; Iron Shield August 1988, personal communication; Father Bears Heart August 1987, personal communication; Gilmore 1925, 181; Lewis 1947-1948, 203).

   c. Glycyrrhiza
      1. **Glycyrrhiza lepidota** Pursh.
         Wild licorice
         
         winawizi cik'ala - little jealous woman (burs take hold of a man) or little bur
         
         **Habitat** - moist areas, stream valleys and prairie ravines
         **Usage** - root was chewed for toothaches (Gabe August 1988, personal communication; Wills 1937, 10).
In 1804, Lewis and Clark observed wild licorice being collected and utilized (Coues 1893, 824).

Francis Densmore (1911-1914, recorded that the root was roasted in hot embers; the center of the root was separated from the strong ligament. The center was thus eaten and tasted like a sweet potato (1919, 263).

The root is also used in doctoring the sick (Left Hand July 1988, personal communication; and Densmore 1918, 263).

Father Buechel, missionary on Pine Ridge in the early 1900's, observed the root being used for the flu (1970, 587).

d. Psoralea

1. *Psoralea esculenta* Pursh.

Indian turnip, tipsina, Indian breadroot

**linpsila** - wild turnip

**Habitat** - stream valleys, open woodlands and prairie hillsides

**Usage** - tipsina was widely used throughout the Plains. The tuberous root is almost pure starch and was a favorite food of the Lakota (Medsger 1939, 186; Malis 1972, 20; Turner 1981, 2340).

The root was dug in June and July in which it was peeled and eaten raw or cooked in soups and stew (Abel 1939, 98; Lentz August 1986, personal communication; Lewis 1947-1948, 301-313).
Great quantities of this root were dried for winter use by braiding the peeled roots together and hanging them to dry. The roots also could be sliced and spread out in the sun to dry (Gilmore 1987, 190; Swift Horse August 1987, personal communication; Iron Shield August 1988, personal communication; Wiest August 1988, personal communication; Stevens 1965, 103).

Edwin Thomas Denig stated that tipsina was dried and pounded and added to other foods (1975, 583).

Tabeau recorded that tipsina was being traded to the Arikara for corn and also sold to white settlers (Abel 1939, 98; Ewers 1968, 21; Medsger 1939, 186-187).

While collecting the tipsina, mothers would tell their children to observe the branching form of the tops of the plant and say:

See, they point to each other. Now here is one: notice the directions in which its arms are pointing. If you go along in these directions and look closely you will find other plants in line with the direction of each pointing arm (Gilmore 1987, 171).
13. Elaeagnaceae (Oleaster)
a. Elaeagnus

1. **Shepherdia argentea** (Pursh) Nutt.
   Buffalo berry
   *mastinca pute'can* - rabbit lip tree

   **Habitat** - stream banks and ravines
   **Usage** - Buffalo berries were collected in abundance (Lewis 1947-1948, 35; Turner 1981, 2342).

   Larocque (1805) and Catlin (1830's) make reference to the buffaloberries along the rivers (ed. Hazlitt 1934, 12; 1973, 73).

   Tabeau recorded the use of these berries; he refers to them as "the fat of the buffalo" (Abel 1939, 96-97).

   The berries were eaten fresh and dried for later use (Chase Alone August 1988, personal communication; Left Hand August 1988, personal communication).

   The berries which were to be used during the winter were crushed into patties and dried in the sun (Deloria 1988, 223).

14. Cornaceae (Dogwood)
a. Cornus

1. **Cornus stolonifera** Michx.
   Red osier dogwood
   *cansasa* - red wood or red bark

   **Habitat** - river banks and swampy, wet places
   **Usage** - inner bark was mixed with tobacco for smoking (Swift Horse August 1987, personal)
communication; Buechel 1983, 123; Father Bears Heart August 1987, personal communication; Lewis 1947-948, 163).

On April 12, 1805, Lewis and Clark recorded the abundance of dogwood growing along the Missouri River (Ibid., 217).

15. Vitaceae (Grape)
   a. Parthenocissus
      1. Parthenocissus quinquefolia (L.) Planch.
         Virginia creeper

         cani'yuwi - curly wood

         Habitat - thickets, open woods and ravines
         Usage - root was used for a tea for headaches (Buechel 1983, 119).

   b. Vitis
      1. Vitis vulpina L.
         Wild grape

         cunwi'yapehe iyuwi - wood used with wind around vine or tangled vine.

         Habitat - low woods, stream banks and thickets
         Usage - the fruits (cunwi'yapehe), were eaten fresh and the juice was pressed out and made into a sauce which was mixed with Opuntia humifusa, Psoralea esculenta and corn flour (Abel 1939, 95; Denig 1975, 408).

         Lewis and Clark (1804) also recorded the abundance and use of wild grapes along the river banks (Thwaites 1893, 107).
Irene Iron Shield's father would pull the vines down from the deciduous trees so they could collect the grapes (August 1988, personal communication).

Pieces of the vine are sucked or chewed to help relieve thirst during the Sun Dance (Left Hand July 1988, personal communication; Iron Shield August 1988, personal communication).

15. Aceraceae (Maple)
   a. Acer
      1. *Acer negundo* L.
         Box elder
         cansuska - crawling up and looking for sweet sap
         Habitat - stream banks and low woodlands
         Usage - the sap was used to make a maple like syrup and sugar (Lewis 1947-1948, 205).

16. Caprifoliaceae (Honeysuckle)
    a. Viburnum
          Highbush cranberry
          Habitat - open woods along streams
          Usage - fruits were eaten fresh and also cooked in soups (Rogers 1980, 64).
17. Asteraceae (Sunflower)
a. Achillea
   1. Achillea millefolium L.
      Yarrow

      Hante' canhlogan - hante' weed

      Habitat - grasslands and open woods
      Usage - a tea was made from the entire plant and used to treat menstrual and urinary disorders (Rogers 1980, 49).

      The plant was dried and chewed to make a poultice for the healing of wounds or sores (One Feather August 1987, personal communication; Rogers 1980, 49).

b. Artemisia
   1. Artemisia ludoviciana Nutt.
      var. ludociciiana
      White sage

      peji'hota - grey herb

      Habitat - open prairie and along some streams.
      Usage - a tea is made for diarrhea, colds and sore throats. The tea can be sweetened with sugar (Left Hand August 1987, personal communication).

      Sage is used to smudge one's body and home to ward off evil spirits. A person's pipe is also wrapped in sage for the same reason (Raymond January 1989, personal communication).
Bracelets and head wreaths are made of sage and worn during the Sun Dance (Rogers 1980, 36; Left Hand July 1988, personal communication).

c. Echinacea

1. *Echinacea angustifolia* DC.
Purple coneflower

*icahi pe he* - something to knock something down

*Habitat* - open rocky prairies and plains

*Usage* - root was chewed for toothaches and also to cure tonsillitis.
It acts like novocaine (Densmore 1918, 389). The powdered root was rubbed directly on the affected tooth (Left Hand August 1987, personal communication).

A poultice was made for wounds and sores (Swift Horse August 1987, personal communication).

The root also was used for rattlesnake bite and bee stings. It was chewed and then applied directly to the affected area (Rogers 1980, 51; and Gilmore nd., NSDHS #1 30 67).

d. Helianthus

1. *Helianthus tuberosus* L.
Jerusalem artichoke

*pangi' hu* - the stalk which is also edible

*Habitat* - open or shaded, moist areas

*Usage* - eaten fresh and dried for use during times of scarcity (Iron Shield August 1988, personal communication; Gabe August 1988,
Gilmore recorded that the Jerusalem artichoke was found near the river bank along the Missouri (Unpublished manuscript, nd. Museum of Anthropology, Ann Harbor, Michigan).

Class Liliopsida (Monocots)
1. Araceae (Arum)
   a. Acorus
      1. Acorus calamus L.
         Sweetflag
         
         sinkpe'tawaote - muskrat's food
         hohwa' - refers to the leaves
         sunkace or sunkce' - refers to the root

         Habitat - swamps and marshes
         Usage - roots are chewed for coughs, toothaches and sore throats
                  (Gabe August 1988, personal communication; Nurge 1971, 61).

         The leaves, young shoots and stems were eaten as food
                  (Rogers 1980, 21).

         A tea is made from the root
                  which is taken for high blood pressure and diabetes (Weist August 1988, personal communication).

         A tea was also made for cramps in the arms and legs (Rogers 1980, 21).
2. Commelinaceae (Spiderwort)
   a. Tradescantia
      Spiderwort

      canhlogan panpan'la - soft or tender herb

      Habitat - sandy, drier soils on the prairie
      Usage - the blue flowers provided a blue-jelly like paste used for
               painting moccasins (Buechel 1983, 117).

      Stems and leaves were eaten as an herb (Rogers 1980, 23).

      Young men in love sang to the Spiderwort as if it were his
      sweetheart expressing his feelings toward her:

      Wee little dewey flower,
      So blessed and so shy;
      Thou'rt dear to me, and for
      My love for thee I'd die.
      (Gilmore nd. NDSHS #13067).

3. Poaceae (Grass)
   a. Hierochloe
      1. *Hierochloe odorata* (L.) Beauv.
      Sweetgrass

      peji’wacanga - sweetgrass

      Habitat - wet meadow, sloughs and marshes
      Usage - the grass is sweet smelling and
               is braided into long strands.
               These strands are burned to
               smudge one's body and home to
               induce the presence of guardian
               spirits which is opposite of
               *Artemisia ludoviciana* which
               drives off evil spirits (Raymond
Sweetgrass also was used as perfume (Left Hand August 1987, personal communication; Gilmore nd. NDSHS #13067).

4. Typhaceae (Cat-tail)
   a. Typha
      1. *Typha latifolia* L.
         Cat-tail
         hintkan - hairy
         wihuta hu - lower border of tent stem
         Habitat - nonsaline habitats
         Usage - pollen was used as flour (Gabe August 1988, personal communication).
         The fluffy tops were used as padding for diapers and cradleboards for babies (Gilmore 1913, 359; Buechel 1970, 168, 177, 584; Left Hand August 1987, personal communication).
         Young shoots were eaten fresh or cooked with meat and recorded as tasting similar to cucumbers (Rogers 1980, 40).

5. Liliaceae (Lily)
   a. Allium
      1. *Allium textile* A. Nels. & Macbr.
         Wild onion
         psni sica’mna - bad smelling onion
         Habitat - prairie and open woods
         Usage - eaten fresh, cooked in stews and stored for later use (Iron Shield August 1988, personal communication).
Lewis and Clark recorded collecting and eating wild onion (Lewis 1947-1948, 216).

Onion juice was boiled into a thick syrup and taken for colds and throat irritations (Rogers 1980, 25).

A bruised wild onion applied to a bee sting instantly relieved the pain. A wild onion poultice was used for croup and pneumonia (Vogel 1970, 306).

Wild onion is said to prevent scurvy (Wills 1937, 5).

b. Yucca

1. *Yucca glauca* Nutt.

Yucca

hupestola - sharp pointed stem

Habitat - prairies
Usage - root was boiled and used as a substitute for soap. Boiled root was also rubbed in the hair as a shampoo and was said to help the hair grow (Buechel 1970, 190; Left Hand August 1987, personal communication; One Feather August 1987, personal communication).

The pointed leaves were bound together to make a fire-drill and the dried stem was peeled to form a hearth to start a fire (Gilmore 1913, 358; Rogers 1980, 30).

Flower buds and the flowers were eaten fresh or cooked (Ibid).
The remaining species are being over exploited due to limited distribution. Results of this study indicate that twenty-six plant species have been eliminated or reduced to geographically isolated areas by the flooding of wooded bottomlands. Exploitation pressures may result in further reduction and perhaps even extirpation. The plants which have been eliminated completely from Standing Rock Indian Reservation are *Falcata comosa*, *Salix missouriensis*, *Heirchloe odorata*, *Brassica oleracea*, *Pleurotus ostreatus*, *Acornus calamus*, and *Pleurotus ulmarius*. These species were endemic to the flood plain of the river. There are many other plants species which are thought to have been eliminated, but because of a lack of knowledge and difficulty in translating from "old" Lakota to "new" Lakota or to English, it is impossible to fully assess the actual status of these plants.

The loss of these plants has had a tremendous effect on the Lakota, especially for the people who lived along the Missouri River bottomlands because, they were the people who utilized these plants the most. All fifteen Lakota elders who were interviewed specifically mentioned the great loss of *Falcata comosa*. The bean of this plant was apparently utilized by most of the Lakota people. The bean is very nutritious and was abundant prior to inundation. The importance of this species has been documented widely. Lewis and Clark (Lewis 1947-1948, 203; and Gilmore (1925, 181) gave special attention to its utilization and considered it to be quite tasty.
Richard LaRoche, Jr. recalled that during negotiations for the Lower Brule Reservation, a congressman laughed when Lower Brule representatives asked $6.00 per bushel for the value of the mouse bean. Consequently, the Brule Indians were required to collect samples which were submitted to the University of Maryland where the value of the bean was verified (Lawson 1982, 125-126).

Standing Rock Sioux who resided in the bottomlands of the Missouri River were the most adversely affected by the formation of the reservoir. They not only had to relocate, but they also lost their principal source of native plants.

Plant foods like *Pleurotus ostereatus*, *Falcata comosa*, *Helianthus tuberosus* and many others must now be purchased at the tribal grocery stores or through welfare. This shift in lifestyle from a gathering to a purchasing economy has resulted in significant changes in the way of life for many Lakota. Many plants were not totally eliminated but drastically reduced on the reservation. Plants which were abundant prior to flooding are now found in small isolated sites on the reservation. Included in this category are such plants as *Fragaria vesca*, *Allium textile*, *Vitis vulpina*, *Viburnum trilobum*, *Prunus virginiana*, *Shepherdia argentea*, and *Ribes spp.*. These plants must also be purchased now, adding to the cost of feeding a family.

Inundation eliminated the bottomland timber on the reservation, forcing the Sioux to purchase wood for fuel and for building or to buy pre-existing homes. Due to the already low to non-existent income of many of these people, they were forced to become more dependent on the Federal government.
Along with the loss and reduction of plants, knowledge about plant usage is continually eroding. Knowledge of plant use as food, in medicine, in religion, and in technology is held by the elders. Traditionally this knowledge was passed to the next generation. As some important plants become less available, or are totally eliminated, knowledge of their use declines and may eventually be lost altogether.
CONCLUSIONS

According to Lakota elders surveyed and observations made in the field, Oahe Reservoir has reduced the diversity of plants species and restricted their distribution on the Standing Rock Reservation. At least 7 species have been completely eliminated (Appendix A) from the reservation and many others were drastically reduced (Appendix B). Some plant species are less available because of their limited distribution. Prior to inundation, the distribution of plant species was documented as abundant by Keammerer, Johnson, and Burgess (1975). Just south of Bismarck, North Dakota, the wooded bottomlands of the Missouri River are rich in plant species, a similar diversity existed along the Missouri River on Standing Rock Reservation prior to inundation. Wooded bottomlands along the Missouri River no longer exist on Standing Rock Reservation, which has eliminated the habitat and drastically reduced many documented species from the reservation. It is therefore concluded that the distribution of natural vegetation on Standing Rock Reservation has been markedly changed from pre-impoundment times because of the Oahe Reservoir.

Loss of plant resources due to the Oahe Reservoir, either through extirpation or isolated distribution, has disrupted Lakota use. Inaccessibility of plant localities has virtually made it impossible for many Lakota people to utilize any remaining plant resources. Plant stress caused by over harvesting is also contributing to a reduced number of plants that now exist.
Diminished availability and therefore use is resulting in a loss of tradition as documented in the interviews. Every Lakota elder interviewed stated that both knowledge and use of wild plants has and continues to diminish rapidly. The knowledge of many plants has no longer been passed down and eventually has become lost to their culture. This was evident when interviewing elders. Many remembered their parents or grandparents collecting and using specific plants but today they could not recall the names of most plants. These elders attribute this loss of traditional culture directly to the lack of availability or inaccessibility, which they most recently attributed to the Oahe Reservoir.

In Missouri River Basin Investigations Report no. 138, timber, game and wild plants were stated as resources basic to the survival of the Lakota Indians of Standing Rock Reservation. If these resources were destroyed, the Indians would become less dependent on subsistence based directly on natural resources and more dependent on a wage earning economy or welfare (1954, 16). This has been the case with the Lakota. The loss and reduction of plant species has created a socio-economic impact for the Lakota Indians. According to the Lakota elders interviewed, self-sufficiency along with self-worth dropped drastically when people who were reliant on farming or ranching bottomlands were forced to move to small communities which themselves had been relocated.

Loss and reduction of plants as free food sources, natural medicines, timber for building, and fuel created an economic set-back. These resources now had to be purchased which put an added burden on many already financially strapped families. People were forced to move into towns where government resources
are more readily available. Job opportunities are very slim on the reservation due to lack of development. The few jobs that do exist on the reservation are government related jobs such as the Bureau of Indian Affairs. However, there are only so many of these jobs. If people are going to be displaced through government projects, then rehabilitation for these people should include jobs so that they can remain self-sufficient and keep their self-esteem. Thus, they will not become more reliant on the government welfare system such as the government predicted with the Lakota. It is the belief of the elders interviewed that poor living conditions on the reservation have intensified because of the deterioration of their natural environment for which they were dependent on.

Another aspect is the overall view of one's environment and one's well-being within that environment. To the Lakota, the land is sacred including the plants which were given to them by the Great Spirit. When their lands were inundated, all aspects of Lakota life were affected. Impoundment of Lakota lands for the Oahe has and is having an impact on Lakota culture. Therefore, it is important to look at the cultural and environmental impacts of a project like the "Pick-Sloan" Plan before they are enforced. As brought out in this study, not only is land lost but so are plant species and many aspects of the culture of the people who were dependent on that land. A Cheyenne River Sioux rancher explains their impact well:

I'd been hard up and I was waiting for my money, never realizing what we were losing. We look back now to see that we lost everything ... we had the best part of our life in that area (Lawson 1982, 159).
Dam construction has been going on for decades and in the process plant species and diversity have been affected along with animal habitat and human culture. Even though plant diversity had generally been observed by Stevens (1945), no comprehensive study of the plants had been undertaken. Plant diversity has been drastically reduced due to the Oahe Reservoir. According to Steven (1945), 52 plant species were observed prior to impoundment. Through this study at least 26 species have been drastically reduced or eliminated from this area. This shows that the diversity of at least 1/2 of the plant species which existed along the bottomlands have been affected by the reservoir. The people who lived in the areas had not been interviewed about the plants they were utilizing in the taking area or how the lost of land could affect them. Perhaps if a more indepth study regarding plant diversity and reproduction had been undertaken along with an understanding of the people who utilized these plants, we could have learned how significant ethnobotany is to the Lakota culture.
APPENDICES
APPENDIX A

People Interviewed
<table>
<thead>
<tr>
<th>PEOPLE INTERVIEWED</th>
<th>TYPE OF INTERVIEW</th>
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<tbody>
<tr>
<td>Philamein One Feather</td>
<td>Formal and Informal</td>
</tr>
<tr>
<td>McLaughlin, SD</td>
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</tr>
<tr>
<td>Harry Swift Horse</td>
<td>Formal and Informal</td>
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<td>Cannonball, SD</td>
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<tr>
<td>Edna Red Bird</td>
<td>Formal</td>
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<tr>
<td>McLaughlin, SD</td>
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<td>Father Bears Heart</td>
<td>Formal and Informal</td>
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<tr>
<td>Wakpala, SD</td>
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<tr>
<td>Evelyn Gabe</td>
<td>Formal and Informal</td>
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<tr>
<td>Fort Yates, ND</td>
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<tr>
<td>Irene Iron Shield</td>
<td>Formal and Informal</td>
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<tr>
<td>McLaughlin, SD</td>
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<tr>
<td>Lorraine Left Hand</td>
<td>Formal and Informal</td>
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<td>Virgil Running Elk</td>
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<td>Roxanne Chase Alone</td>
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<tr>
<td>Calvin Flying Bye</td>
<td>Informal</td>
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<tr>
<td>Little Eagle, SD</td>
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<tr>
<td>Jeanette (Grey Eagle) Wiest</td>
<td>Formal and Informal</td>
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<tr>
<td>RR, Little Eagle, SD</td>
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<td>Art Raymond</td>
<td>Informal</td>
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<td>Grand Forks, ND</td>
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<tr>
<td>Earl Bullhead</td>
<td>Informal</td>
</tr>
<tr>
<td>Grand Forks, ND</td>
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</tbody>
</table>
APPENDIX B

Plant Collecting Localities
OFF-RESERVATION SITES IN NORTH DAKOTA

Oliver County, ND
South of Cross Ranch, T143N, R80W, Sec. 7

Morton County, ND
South of Fort Lincoln, T137 N, R80W, Sec. 5
South of Huff, T136N, R79W, Sec. 7

Grant County, ND
Southwest of Flasher, T134N, R85W, Sec. 26

Stark County, ND
Southwest of Dickinson, T137N, R97W, Sec. 17

Bowman County, ND
South of Haley Dam, T129N, R99W, Sec. 32

Slope County, ND
West of White Butte, T134N, R100W, Sec. 35

Emmons County, ND
Along Highway 1804, T134N, R79W, Sec. 13
Along Highway 1804, T133N, R79W, Sec. 6
Along FAS 1503, T129N, R79W, Sec. 3
Southeast of Linton, T132N, R77W, Sec. 22
ON-RESERVATION SITES IN NORTH DAKOTA

Sioux County, ND

South of Cannon Ball, T134N, R79W, Sec.27
South of Cannon Ball, T133N, R79W, Sec.2
North of Selfridge, T130N, R82W, Sec.22
North of Ft. Yates, T131N, R80W, Sec.35
North of Ft. Yates, T132N, R80W, Sec.8
North of Ft. Yates, T132N, R80W, Sec.9
South of Ft. Yates, T129N, R79W, Sec.30
South of Ft. Yates, T130N, R80W, Sec.23
Spencer Mesa, T132N, R82W, Sec.28
South of Shields, T131N, R84W, Sec.26
South of Solen, T133N, R81W, Sec.10

OFF-RESERVATION SITES IN SOUTH DAKOTA

Stanley County, SD

North of Oahe Dam, T N, R E, Sec.

ON-RESERVATION SITES IN SOUTH DAKOTA

Corson County, SD

Southwest of Little Eagle, T20N, R27E, Sec.32
Southeast of Little Eagle, T20N, R27E, Sec.25
Southeast of Wakpala, T20N, R30E, Sec.33
Northeast of Wakpala, T20N, R20E, Sec.22
Southeast of Mahto, T21N, R28E, Sec.27
Southeast of McLaughlin, T21N, R27E, Sec.9
Northwest of McLaughlin, T22N, R26E, Sec.13
South of Bullhead, T21N, R24E, Sec.23
Northeast of Kennel, T22N, R29E, Sec.11
Northwest of Kennel, T23N, R29E, Sec.25
South of Thunder Hawk, ND, T23N, R17E, Sec.14
Rattlesnake Butte, T20N, R29E, Sec.8
Along the Grand River, T20N, R23E, Sec.3
Northeast of Mobridge, T18N, R30E, Sec.27
APPENDIX C

Known Plant Species Reduced
Plant species which were drastically reduced on Standing Rock Reservation:

- *Equisetum arvense*
- *Quercus macrocarpa*
- *Populus x acuminata*
- *Ribes americanum*
- *Ribes missouriense*
- *Ribes odoratum*
- *Amelanchier alnifolia*
- *Fragaria vesca*
- *Prunus americana*
- *Prunus virginiana*
- *Psoralea esculenta*
- *Shepherdia argentea*
- *Cornus stolonifera*
- *Vitis vulpina*
- *Fraxinus pennsylvanica*
- *Helianthus tuberosus*
- *Viburnum trilobum*
- *Typha latifolia*
- *Allium spp.*
APPENDIX D

Known Plant Species Eliminated
Plant Species which were eliminated from Standing Rock Reservation:

Pleurotus ostreatus
Pleurotus ulmarius
Salix missouriensis
Brassica oleracea
Falcata comosa
Acornus calamus
Heirochloe odorata


__________. 1916. (September, 28). Letter in Gilmore Papers, North Dakota State Historical Society #30-205.


__________. 1926. Indian Food Products from Native Wild Plants. *Good Health.* (October) 61:12-13,28.


__________. no date. *Food Consists of Several Different Varieties.* 8p. ms., Gilmore Papers, Museum of Anthropology, Ann Arbor.


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