

PREHISTORIC FISHING METHODS OF THE NORTHERN
GREAT PLAINS REGION

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Many of us consider ourselves "fishermen." Many fishermen consider themselves good fishermen. A select few of the good fishermen are professional sport-fishermen, those who pursue big fish for a living. All of these fishermen undoubtedly use modern day rods and reels, often with expensive lures and other equipment that are "guaranteed" to produce a good catch.. Not even the best equipment can ensure a satisfying catch, however. Many times, even the best modern fishermen can dock the boat with nothing to show for his efforts but a cold.

How then does one explain the obvious success of the prehistoric peoples of the Northern Great Plains when it came to catching fish? There is almost always a representative sample of fish scales and bone in most archaeological sites on the Plains, indicating that the people could apparently catch fish at will without the aid of modern equipment, power motors, or even metal fish hooks. The search for a better understanding of how fish were taken is the basic concern of this paper.

Fish are abundant throughout most of the United States, and there have been many studies on their behavior, anatomy, and population patterns which enhance the field of Ichthyology. But the fishing methods themselves have often gone uninvestigated. This paper will focus primarily on the actual practices involved in the taking of fish before the European contact.

The "Northern Great Plains Region" is an area with arbitrary boundaries, and for the purposes of this presentation will include the following subareas of the "Great Plains Region" from Jennings, (1983:203-205):

- Northwestern Plains
- Middle Missouri
- Northeastern Periphery

RESEARCH PROBLEMS

The majority of the existing literature and data that deal with fish seldom discuss methodology. There are several good reasons for this. Fish were not a major form of subsistence for the prehistoric peoples of the Northern Great Plains (Alex 1977:41). Until the time of the European contact, the area was abundant in bigger game including bison, elk, deer and others that made up the bulk of the people's diet. Ethnographic accounts suggest that such an abundance would allow the people to eat their fish fresh, preferring not to dry or store it (Peterson 1980:18). It is believed that this lack of necessity for storing often relegated fishing to a recreative role.

There is an abundance of literature pertaining to the fishing habits of tribes and groups more closely associated with fishing, but on the Plains, the information becomes more and more scarce. This is clearly illustrated in a publication done for the Smithsonian Institution in 1984 entitled "Prehistoric Fishing in Europe and North America," by Charles Rau. An extensive and comprehensive volume for its time, the book goes into great detail about the fishing practices, traditions, and tools of the North American coastal tribes, Alaskan peoples, and indigenous peoples of prehistoric Europe. In a period characterized by archaeological speculation, it was a noteworthy scientific effort, but it gave little or no information on Plains fishing. Such was to be the pattern for many years (Rau 1884).

Since fishing was never a major source of nutrition on the Plains, the evidence is somewhat limited in archaeological sites. This, combined with the fact that many of the artifacts that might have been discovered do not preserve over a long period of time, causes the database to grow very slowly. Many fishing implements and tools were fashioned from or contained parts of, wood, hide, sinew, or woven rope, which would deteriorate very quickly.

The Northern Great Plains Region is not as abundant in fish as other areas of North America (Everman and Cox 1894). The climate of the region varied drastically throughout the year, which restricted the taking of fish to particular times, or "seasons" (Peterson 1980:15-16). The area's main source of water includes the Missouri River and its tributaries; natural lakes of any size are all but nonexistent. This relative lack of water over such a large land area resulted in an obvious devaluation of fish as a source of food. Fish and fishing was often relegated to a recreational means of acquiring a novel meal.

The initial contact by Europeans introduced the horse to the Great Plains tribes. The increase in mobility proportionately increased the people's ability to hunt and follow the great herds of bison and other big game (Rostlund 1952:125). Rostlund believes that the decline in fishing popularity that resulted was reintroduced with the availability of metal fish hooks, and with the annihilation of the bison in later years. With their main source of sustenance gone, the tribes of the Plains turned back to the old ways of fish taking in order to survive.

The information that is available to us is derived from archaeological sites, and from ethnographic and ethnohistoric accounts. The reliability of ethnographic accounts as data, and the difficulties and methods involved in the interpretive studies of fish remains shall be discussed later.

FISHING METHODS

The fishing techniques of the prehistoric peoples of the Northern Great Plains Region varied to fit the need and the particular characteristics of the fish. The majority of the available fish in the region were river-dwellers, and these groups often posed some problems for the early fishermen. To begin with, not all river fish could be effectively taken with a hook (Peterson 1980:19). Many bottom-feeders, such as Sturgeon (Acipenseridae), Buffalofish (Ictiobus spp), and some species of Sucker (Catostomidae), had to be acquired by other methods.

Hook and Line fishing appears to have been a very popular method on the Plains. Several early expeditions tell of Arikara and Mandan Indians fishing from the banks of the Missouri River (Peterson 1980:19; Burroughs 1961). Hook and Line fishing was, and still is, basically a recreational means of taking fish. Given that only a few species could be taken by hook, combined with the fact that only one fish at a time could be caught on a single hook and line, we can conclude that the need for fish must have been low. One slight variation to this is the practice of set-lining, where several hooks are attached to a single line and left untended over night. Setlines, or "trotlines," were usually anchored to a tree limb, or to a "float" made of intestine (Morse 1983:277).

The end of a fishing line need not only contain a hook. Another efficient line fishing implement was the gorge (Alex 1977). Apparently a fish has difficulty in "spitting out" that which it swallows. Realizing this, prehistoric fishermen fashioned smooth, oblong stones with center

grooves for attachment that were rubbed in animal fat or meat, and threw them out as a sort of "lure." Several such gorges were found at the Kimball Site, a Mill Creek site in Western Iowa (Fugle, 1962). Some gorges were spindle-shaped pieces of bone or stone that would stick "cross-ways" in the fish once it was swallowed (Rau 1884). A fish need not always be forced to swallow such unfamiliar objects, however. Some ethnographic accounts speak of using chunks of gristle or meat that would effectively lodge inside the fish (Standing Bear 1931).

In the discussion of fishing with a line, a rather obvious question is often overlooked: "What was used for line?" Although nothing that may have been used would remain preserved, ethnographic accounts tell of the use of horse hair, sinew, and the stringy roots of plants or tree bark (Standing Bear 1931:65-67).

Probably the most efficient practice of making the large catch on the plains was the use of the fish pen, or weir. The Arikara were renowned for their expert use of a "fish trap" along the middle Missouri River Basin (Gilmore 1924; Rostlund 1952). The following is a description from "Arikara Indians of South Dakota" (1941:31), that relates the structure and ritual surrounding the Arikara Fish Trap:

"The fish trap was made in the form of a circular pen, attached to four central posts. Around the posts were four panels of sandbar willows and a detached gate made from twelve sandbar willows. Each panel contained one hundred of these willows, which were sharpened and thrust into the sand of the river bed. . . . outside the circle of the fish-pen four other strong stakes were set to support the panels. The fish trap was set in an eddy beside the main current. For bait, pieces of maggoty meat were used; one tied to the [center support] sapling, and one to each of the four supporting posts. The gate was placed on the downstream side. After the owner of the trap thought he had caught a sufficient number of fish, he would quietly close the gate."

A similar method of catching larger amounts of fish was the employment of a movable net, or seine. An account of early "Dakota" (Yantonnai) use of a seine is provided by Howard (19512:1-3). The seine was manufactured of willow stems, fastened together with buckskin until they roughly resembled a length of modern-day snowfence. The seines were weighted at the bottom with stones so they would drag the

river bottom, and keep the apparatus vertical. The trap was pulled toward the shore, where the ends were quickly closed, entrapping the fish in the center.

The last Wisconsin ice retreat of the late Pleistocene left the Plains with a relatively small amount of water. The area contains a few pot hole lakes in the Northeast Periphery, and the Missouri River and its tributaries. This water shortage left the people with mainly river and streams for fishing.

That is not to say that lake-fishing was non-existent. In an account from the middle of the nineteenth century, Shields gives an account of an intriguing lake-fishing practice by the "savages" of the area. The people would grind up a certain local root that Shields could not identify, and sprinkle the powder on the surface of the small area lakes. After only a few moments, the fish would bob belly-up to the surface, where they were easily collected by the women. The account tells of catches of up to 500 fish in one effort (Shields 1883:340-343).

This practice was (and still is) referred to as stunning, or "poisoning" (although the fish were not killed by the drugs), and was practiced by many tribes throughout North America. (Rau 1884; Perdue 1980). Although Shields' account is somewhat validated by similar testimonies from other areas (Perdue 1980:56), his catch numbers may rank him as one of the great original fish-story tellers.

The use of the spear and the bow and arrow are frequently mentioned in ethnographic and ethnohistoric accounts. Neither of these have been as frequently represented in the archaeological record as other fishing methods, however (Peterson 1980). Early spear points were certainly much too large to use in the taking of fish, and the appearance of the bow and arrow on the Plains did not occur until fairly recently. The use of sharpened sticks or leisters of wood is noted in ethnographic accounts, but such implements would not preserve.

With this succession in mind, the problems associated with linking spears, leisters, bows and arrows, or harpoons can be better understood. To begin with, only a projectile weapon with a stone or bone point would preserve well enough to be recovered by archaeologists. Sharpened sticks or leisters would not be represented in sites, allowing only speculation as to their use. Adding to this dilemma, there have been few points found with the distinctive barb that characterizes fishing points of the coastal tribes (Rau 1884). The subject of whether an arrow may have been used for fishing then falls under the realm of speculation and ethnographic accounts.

There are, however, an abundance of ethnographic accounts concerning the use of the bow and arrow, harpoon, and spear (Rostlund 1969; Landis 1968; Howard 1951; Rau 1884). Howard (1951:3), relates some methods of bow and arrow fishing practiced by an old Yankonnai friend of his:

"Another type of fishing . . . involved the use of a bow and arrow with a cord attached to it. Oscar Howe, the Dakota Indian artist, who is a good friend of Saul's, stated that . . . he would very often fish with the bow and arrow. The customary time for Saul to fish in this manner, according to Howe, was just before daybreak. Saul would . . . shoot at the fish which had come to the surface to feed. This was quite a difficult feat, [for] the refraction of light in the denser medium of water makes the fish often appear to be several inches from their actual position. Saul is one of the last, if not the only living Dakota Indian to fish in this manner. The Woodland tribes of the east and central United States very often fished in this manner."

Ice fishing was popular on the Plains long before the European contact. Landis (1968:192) gives an account of ice fishing in "The Mystic Lake Sioux":

"The fisherman broke a hole in the ice and crouched over it with a blanket to exclude light... A spear was used, and occasionally a bow and arrow, with a string attached to withdraw the arrow. Cold weather fishing was tedious and wearing."

The fishing methods mentioned above are not comprehensive by any means. These are merely the practices that we have physical evidence and/or ethnographic testimony to support. Other methods are assumed to have been used. The "taking of fish by hand," for example, was surely employed, especially at times of flood, or in natural backwater traps along the rivers of the area. (Alex 1977:43). Because no tools are involved, no artifacts may be found to support the assumption that the technique was used prehistorically. To avoid excessive speculation, these methods of fishing are usually passed over or ignored until further justifiable evidence can be produced to validate them.

INTERPRETATIONS FROM ARCHAEOLOGICAL EVIDENCE

Ichthyologists, archaeologists, and physical anthropologists have developed some ingenious methods for deriving answers from the remains of fish. The holistic approach taken by these investigators can serve to enlighten on several key issues about the consumption of fish during prehistoric times. Some of these issues include:

- species of fish represented
- approximate age, size and weight of individual fish
- total number and weight of all fish represented in site
- particular season in which each fish was caught
- annual consumption of fish per prehistoric household

Determining species types from remains is relatively easy. Although there is a total of six different scale types among the fish of the world (3 of which are extinct), there are only two types of fish scales represented on the Great Plains; the cycloid, and ctenoid. Teleosts (bony fishes), have either of these two scale types (Peterson 1980:22). The only other scale types found among modern forms today belongs to the shark, ray and chimaera families; obviously not recently represented on the Northern Great Plains!

Fish that possess the cycloid scale have soft rays and abdominal fins. Some examples of these families include: Esocidae (pike), Hiodontidae (mooneye), and Catostomidae (sucker). Ctenoid scales are found on fish that possess spiny rays and thoracic pelvic fins. Some families in this category include: Percichthyidae (bass), Percidae (perch), and Sciaenidae (drum) (Peterson 1980). The actual differentiating characteristic between the two scale types lies in the presence or absence of ctenii, or tooth-like structures on the posterior portion of the ctenoid scale.

Fish scales grow from the inside (focus), outward in "rings," or circuli. Patterns of circuli form fields, which are used to determine growth patterns. Circuli that mark a year's growth are called annuli, and reveal the age of the fish at the time of death. Fish in temperate regions are poikilothermal, showing periods of rapid and slow growth, depending on the surrounding climate. In temperate regions such as the Plains, the variations in growth caused by the extreme seasons show up clearly on fish scales, allowing researchers to infer the approximate season of the year when the fish was caught. (Casteel 1974:576; Peterson 1980).

Fish bones also provide a wealth of information. Sound formulas have been developed that can help determine the

weight, length, and width of a particular fish from a small number of specific bones. Casteel (1974:76) writes that, once the weight of the fish is determined, through comparative osteological analysis, the relationship between width and length assume the mathematical formula of:

$$\text{---}$$
$$W = L^3 \text{ and } L = 3/W$$

W = Width
L = Length

The approximate amount of total fish at a particular site can be found by counting the occurrence of certain bone elements. For example, if thirty complete mandibles are discovered, then approximately thirty fish are represented in the site.

There are several problems involved when making these calculations. First of all, not all families of fish share the same general shape. A long-nosed gar and a channel catfish of the same length will obviously not share the same width, or weight. It is doubtful that the bones examined in the archaeological lab will absolutely accurately predict the number of fish represented in the site. Fish scales are fairly delicate, especially those of great age. They tend to break easily, rendering them useless for analysis.

Why then, spend so much time and work on a data source that was not even a major food staple for these peoples? Casteel (1974:76) makes the following point in summary:

"Even with the potential problems outlined above, fish scales [and bones] may still provide the archaeologist with a valuable source of information. . . . It seems far better to exploit these potentials, keeping in mind the limitations involved than to simply ignore this type of material when it is present in an assemblage."

RELIABILITY OF ETHNOGRAPHIC AND ETHNOHISTORIC ACCOUNTS

Another intent of this paper is to recognize and address the problems associated with the use of ethnographic and ethnohistoric account data for research. Archaeological research on prehistoric fishing methods relies heavily on such accounts.

The oldest accounts are frequently seen as the most valuable. Most, however, were often written or edited with

a flair for the dramatic and the sensational. Often the information itself was distorted in an attempt to sell copies, or to conform the findings to the speculative dogma of the era. An understanding of this situation is necessary in order to fairly judge the validity of such accounts.

The Speculative Period produced many barriers to the development of New World Archaeology (Willey and Sabloff 1980). Literature dealing with Moundbuilder Myths and questions concerning the origins of the Native Americans abounded. These works were characterized by wild stories with much speculation and sensationalism meant to sell copies and make the writer rich and famous. This type of thinking and lack of scientific approach was the intellectual and formative backbone of the first phase of New World Archaeology. It can therefore be understood that, although the oldest ethnographic accounts are undoubtedly the most desired, that account may very well have been altered to make a better story.

So, are all of our accounts of early fishing nothing but "fish stories"? Not totally. When using such accounts as data in research such as this, the accounts must be thought of as exactly that - data, and treated accordingly.

Any interpretations made from the analysis of archaeological data does, inescapably involve some amount of speculation. An archaeologist validates his interpretations by examining his data empirically, or, looking for patterns. Frequency of occurrence is the key. An archaeologist cannot pick up a chipped stone tool and proclaim "This is a blade tool," unless he has seen many such stone tools before. A single fishing practice may be handled in the same manner. And still there is the room for error. The very best that can be done is to carefully handle the data itself, with prompt publication and presentation of findings, that others may benefit from the work. This might possibly help some patterns develop for them.

SUMMARY

Prehistoric Fishing Methods of the Northern Great Plains Region is a difficult topic of research due to the general lack of published information. It is understandable that researchers choose to devote their attention to the more scientific aspects of the contributions of fish on the Great Plains. Studies that deal with nutritional content of fish, abundance and species of fish available, or morphology of fish remains are dealing with hard data that helps draw correlations with the present-day research in the field of Ichthyology. The research data is also more easily acquired

than that of fishing practices per se. But it has been the intent of this project to examine the more humanistic aspects of the prehistoric fishing process. If we can get a better understanding of how the prehistoric fisherman operated, maybe we can reach some conclusions about modern fishing practices.

Fishing was not, nor was it ever, the most popular means of sustenance on the Plains. It did, however, have an important recreational, and therefore cultural value. The lone fisherman with a hook and line had some form of motivation behind his efforts. The group of people that participated in the trapping of fish with a seine on the James River had some particular motives in mind. What were they? Why did they bother? Perhaps some of the answers can be found in our own world. We have both individual and community fishing happening all around us. If we have a better understanding of the methods employed by the fishermen of the past, and they are consistent with modern methods, then we can draw correlations and make firmer inferences about those who have fished before us.

Ethnographic and ethnohistoric accounts must be used to supplement the archaeological record to form the data base for the research of fishing. Patterns in both sources must be sought in order to add validated theories.

Above all, and most importantly, the study of such practices of ancient Plains cultures must be pursued mainly because it must not be ignored. Just as it would be a tragedy to lose the information and knowledge of prehistoric flint knapping, so too would it be unfortunate to disregard and eventually lose sight of fishing practices of the past. Prehistoric fishing on the Northern Great Plains was not a haphazard, uneducated attempt to catch fish. It was, instead, a meticulous and precise process that carried with it a great amount of traditional cultural significance. To devalue such information is to do a disservice to those people of ages past that worked very hard, and were very worthwhile fishermen.

REFERENCES CITED

- Alex, Lynn Marie
 1977 FISH AND FISHING AT TWO INITIAL MIDDLE MISSOURI SITES. South Dakota Archaeology, Vol. I.
- Brown, Kenneth and Marie, with Ned Hanenberger
 1982 PREHISTORIC STONE TOOLS OF SOUTH DAKOTA: A GUIDE. Special Publication of the South Dakota Archaeological Society, No. 6.
- Burroughs, Raymond
 1961 THE NATURAL HISTORY OF THE LEWIS AND CLARK EXPEDITION. Michigan State University Press.
- Casteel, R.W.
 1974 On the Remains of Fish Scales from Archaeological Sites. AMERICAN ANTHROPOLOGIST, Vol. 39, No. 4.
- Dallman, John E.
 1983 A CHOICE OF DIET. University of Iowa, Iowa City.
- Everman, Barton W. and Ulysses O. Cox
 1894 A Report Upon the Fishes of the Missouri River Basin. COMMISSIONERS REPORT, UNITED STATES COMMISSION OF FISH AND FISHERIES. Part XX.
- Fugle, Eugene
 1962 Mill Creek Culture and Technology. JOURNAL OF IOWA ARCHAEOLOGICAL SOCIETY. Vol. 11, No. 4.
- Gilmore, M.R.
 1924 ARIKARA FISH TRAP. Museum American Indian, Heye Foundation, Indian Notes and Monographs.
- Howard, Hames H.
 1951 Dakota Fishing Practices. MUSEUM NEWS, University of South Dakota, Vol. 12, No. 5.
- Hunter, John D.
 1790 MANNERS AND CUSTOMS OF THE INDIAN TRIBES. Ross and Haines.
- Jennings, Jesse D.
 1978 ANCIENT NORTH AMERICAS. W.H. Freeman and Company, New York.

- Lehmer, Donald J.
 1971 Introduction to Middle Missouri Archaeology,
 ANTHROPOLOGICAL PAPERS 1, National Park Service,
 U.S. Department of the Interior, Washington, D.C.
- Morse, Dan and Phyllis
 1983 ARCHAEOLOGY OF THE CENTRAL MISSOURI VALLEY,
 Academic Press, New York.
- Perdue, Theda
 1980 NATIONS REMEMBERED. Greenwood Press, Westport,
 Connecticut.
- Peterson, John E., II
 1980 SEASONAL EXPLOITATION OF FISH RESOURCES IN THE
 MIDDLE MISSOURI SUB AREA. University of Nebraska,
 Lincoln.
- Ricciuti, Edward R.
 1985 Twenty Centuries of Hooking Fish, INTERNATIONAL
 WILDLIFE, Vol. 15, Jan/Feb.
- Rostlund, Erhard
 1969 Freshwater Fish and Fishing in Native America.
 University of California PUBLICATIONS IN GEOGRAPHY.
 Vol. 9.
- Rau, Charles
 1884 PREHISTORIC FISHING IN EUROPE AND NORTH AMERICA.
 Smithsonian Institution Special Publications.
- Shields, G.O.
 1883 RUSTLING IN THE ROCKIES. Belford and Clark Company.
- Standing Bear, Luther
 1931 MY INDIAN BOYHOOD. The Riverside Press, New York.
- Willey, Gordon and Jeremy Sabloff
 1980 A HISTORY OF AMERICAN ARCHAEOLOGY, W.H. Freeman
 and Company.
- Zimmerman, Larry J.
 1985 PEOPLES OF PREHISTORIC SOUTH DAKOTA. University
 of Nebraska Press, Lincoln.