The Missouri River experienced record flooding during 2011 prompting concerns from fisheries managers about the effects on fisheries in the Missouri River reservoirs. In 1997, a similar but less severe flood event occurred and had negative impacts on the Missouri River reservoirs, especially Lake Oahe. A large percentage of the Rainbow Smelt population in Lake Oahe was lost through Oahe Dam. This species is an important prey fish for Lake Oahe walleyes, and the shortage of prey resource following the 1997 flood resulted in slow growth and high mortality for those fish. Flooding during 2011 resulted in a similar loss of Lake Oahe Rainbow Smelt, and managers are now concerned with the potential for reduced growth rates and increased mortality of the walleye population.

Walleye populations are dynamic in nature, often exhibiting variation over time in size structure (i.e. amount of big and small individuals) and abundance (total number of individuals). These population characteristics are driven by three important processes: recruitment, growth and mortality. Recruitment refers to young fish being reproduced and surviving to enter the fishable, adult population. Walleye populations typically have recruitment every year, but the amount of individuals annually recruited to the adult population (described by fisheries researchers as "year-class strength") varies greatly due to environmental factors such as water levels and spring water temperatures, as well as biotic factors such as predator abundance. Growth is the increase in size of individuals, and is often measured in terms of length or weight. Growth is closely tied to available prey resources. Mortality refers to the rate at which fish are lost from the population and is usually divided into two categories: fishing and natural mortality. Natural mortality is influenced by many factors including disease, predator abundance, and food supply (related to starvation). Fishing mortality varies with the amount of fishing pressure, fishing success, and regulations. Managers have the greatest amount of influence over fishing mortality, and as a result, often focus their efforts on this component of a population. This is the part of the fishery that our tagging study is designed to better understand.

A common method for estimating fishing and natural mortality rates is to tag a sample of the population over multiple years. Fish are outfitted with tags which are visible to anglers who can then report harvesting a tagged fish. The percentage of tagged fish returned by anglers is adjusted for tag shedding and non-reporting (anglers not reporting tags) to estimate the annual rate of angling mortality, known as an exploitation rate. The rates of encounters after the first year of being tagged allow researchers to estimate natural mortality rates. In addition to estimating mortality rates, tagging studies give researchers an idea of fish movement patterns. Each tagged fish is identified by a unique number, so researchers know when and where each fish was tagged, and then ask anglers who report catching a tagged fish where the fish was harvested. Tagged fish are also encountered during annual netting surveys.

The current tagging study was designed to learn how the Lake Oahe walleye population responded to the 2011 flood, and also to better understand natural and angling mortality in "normal" years. Specific questions this project hopes to address include:

- What percentage of the population do anglers harvest in a year?
- How much does angling mortality vary from year-to-year?
- What factors cause angling mortality to vary in Lake Oahe?

- Did walleyes experience high natural mortality following the 2011 flood?
- Did large fish experience greater problems following the 2011 flood than small fish?
- Were walleyes more vulnerable to angling as a result of the reduced prey base?
- Was the entire reservoir affected similarly, or were areas which rely more heavily on Rainbow Smelt as a food source (i.e. lower Lake Oahe) affected more severely?
- Did the experimental regulation enacted in 2013 have an effect?
- How far do Lake Oahe walleyes travel throughout the year?
- Do walleyes return to the same location to spawn every year?
- Do walleyes move differently among different locations of Lake Oahe?

In spring 2013 managers and researchers from South Dakota State University, South Dakota Department of Game, Fish and Parks, and North Dakota Game and Fish Department set out to answer these questions with a large-scale tagging study. A total of 9,176 fish were tagged during April and May at 13 locations in North Dakota and 7 locations in South Dakota (See map). Metal tags (similar to duck bands) were placed on the lower jaw of small fish (< 17 inches) and the upper jaw of large fish (> 17 inches) (Photo). We will tag a similar number of fish during the next 3 springs to document variability over multiple years.

To date, 1,334 tagged walleyes have been reported by anglers. We have seen some interesting results so far. Many fish were harvested very close to where they were tagged, but we have seen some fish make some big moves. The longest move was approximately 298 river miles; this particular fish was tagged just below the Garrison Dam on April 29th and was caught at Okobojo Point on June 1st. We are also observing that fish tagged in the upper part of the reservoir, especially North Dakota locations, are moving greater distances than those tagged further downstream. Interestingly, those fish are not necessarily making large movements downstream; many fish tagged near the North Dakota border in Beaver Bay (see map) have actually moved large distances upstream since being tagged. Many of the questions this study is designed to address will not be answered until we have multiple years of data to analyze. We will continue to release our findings as they come available.

If you catch a tagged fish, you can report the tag by calling us at 605-223-7656, or you can report your tag via email. Please report tags by sending an email to oahetags@gmail.com, and include your name, phone number, tag number, general location, date of catch, and whether or not the fish was harvested. If the fish was released, indicate whether or not the tag was removed from the fish. We sincerely appreciate your cooperation!

Tagging Location	# Tagged	# Harvested	Unadjusted Exploitation (%)
West Shore	26	9	34.6
Peoria Flats	141	27	19.1
Cow Creek	784	113	14.4
Whitlock's Bay	159	30	18.9
Swan Creek	236	46	19.5
Moreau River	1578	208	13.2
Grand River	2000	285	14.3
Cattail Bay	78	15	19.2
Beaver Bay	1717	157	9.1
Cannonball River	416	53	12.7
Eckroth Bottoms	88	17	19.3
Huff Bluffs	392	73	18.6
Bernie's Banks	43	9	20.9
Heskett Station	259	69	26.6
Double Ditch	79	22	27.8
Sanger	21	6	28.6
Washburn	5	0	0.0
Stanton GPA	7	0	0.0
Knife River	56	10	17.9
Garrison Dam Spillway	1091	101	9.3
Overall	**9176**	**1250**	**13.6**
REWARD	394	91	23.1