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Niobrara National Scenic River Floaters

(Photos by S. Schneider, NPS; L. Hutchinson, NGPC; and S. Shultz, UNO)



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EXECUTIVE SUMMARY

Statewide Familiarity and Use of the Niobrara River

At least 32% of Nebraskans are familiar with the Niobrara River, 15% have floated it, 23% have recreated on it, and 40% know of friends or family who have recreated on it.

Recreational Floating on the Niobrara National Scenic River (NNSR)

Floating the NNSR increased by 2.3% per year from 1993 to 2008 (46,456 floater days), or 8.5% from 2005 to 2008. 73% are from throughout Nebraska and out-of state floaters are primarily from adjacent states (South Dakota, Iowa, and Colorado). The NNSR for recreational floating is a single-site destination without viable substitutes.

Tubes are the most popular floating craft followed by canoes and kayaks. Typical floaters make three float trips every four years lasting two days per trip and 1.3 days floating. Most floaters (98%) either camp along the River or stay in local hotels prior to, during, and after their trips and many of them are part of large groups of people from different home locations. Most (87%) rent floating equipment or use the shuttling and transport services of local outfitters, and 33% buy their groceries locally and 23% eat meals at local restaurants.

Economic Values Associated with Recreational Floating on the NNSR

In 2008, average daily floating-related expenditures (equipment rentals, local lodging and food costs) were \$55 per person/per river floating day, and an additional \$46 per day was expected through secondary (multiplier) effects. Floaters in 2008 spent an average of \$133 per floating day travelling to and from NNSR (vehicle driving costs and travel times). Total economic values associated with floating the NNSR are \$234 per river floating day or \$10.9 million in 2008.

If floating increases at the historic 2.3% annual growth rate per year over the next decade (2009-2018) these economic values (in 2008 dollars), will on average be \$10.5 million/year assuming the historical 2.3% average annual growth in visitation, or, \$14.6 million/year if visitation grows at 8.5% annually (as observed from 2005 to 2008).

Floater Perceptions of Water Flow Levels

23% of floaters stated that low NNSR flows were a primary concern/threat, while 11% were most concerned with litter and potential water quality issues. 40% found conditions 'low/sub-optimal' when they were less than 460 cfs versus 35% when flows were above 460 cfs. 7% of floaters felt that low flows might limit/reduce their future visits while 35% consider flow levels while planning trips and 66% check flows in advance. 4.5% of floaters stated that they would not return to the NNSR with flow levels being similar to what they just experienced.

Current and Potential Economic Losses Due to Low River Flows

Current foregone economic values associated with 4.5% fewer repeat NNSR floaters due to low flows are estimated at \$488,446 per year. Over the next decade these losses are predicted to range from \$471,000 to \$659,000 per year, depending on both visitor growth rates of 2.3% or 8.5%, river flow conditions being 'typical' or 'average' as observed in this last decade.

Based on prior estimates that a future (hypothetical) 100 cfs reduction in NNSR flows will increase the number of 'low and 'non-acceptable' floating days (<460 cfs) by 161% over primary recreation seasons (June-August), or, 250% over full seasons (May-October), corresponding average annual economic losses over the next decade will range from \$759,000 (2.3% growth over a primary season) to \$1.7 million (8.5% growth over a full season).

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1. INTRODUCTION

1.1 Background

The Niobrara River extends 535 miles across northern Nebraska from the Wyoming border to the confluence of the Missouri River in the northeast (Figure 1). It cuts through the 'Sandhills' region of the state where underground aquifers provide continuous and pristine water to the River. It is often referred to as "a mountain stream in a prairie state," characterized by outstanding scenery, ecological and wildlife diversity, and recreational opportunities. Congress recognized these values in 1991 by designating a 76-mile reach east of Valentine as the Niobrara National Scenic River (NNSR). Recreation occurs on the entire Niobrara River but floating is most concentrated on a 30-mile stretch of the NNSR just east of Valentine, Nebraska from Cornell Dam to Norden Bridge (Figures 2 and 3).

Several factors contribute to the NNSR being a highly utilized canoe, kayak and tubing destination including: season-long flows, relatively clear water due to aquifer sources, hard rock (rosebud formation) streambeds, adequate river depths along with a lack of floating hazards, numerous springs and small tributary waterfalls and impressive scenery cutting across biologically-varied ecosystems, and numerous camping and floating opportunities. These recreational amenities are encouraged and promoted due to a mix of federal, state, and private land ownership/control along the River, which ensures relatively easy access to the River, substantial riverfront camping locations, and the availability of floating equipment rentals and outfitter services.

The Niobrara Basin (its contributory watershed) contains a mix of agricultural land uses including livestock production (grazing), and both dryland and irrigated row crops (from both groundwater pumping and direct surface water diversions from two storage reservoirs which deliver irrigation water via canals).

In May 2006, the Nebraska Game and Parks Commission (NGPC) commissioners directed their staff to develop instream flow recommendations for fish, wildlife, and recreation resource needs in the Niobrara River Basin. This resulted in several hydrologic and recreation-based studies that received NGPC funding supported by grants from the Nebraska Environmental Trust (NET) and the National Park Service (NPS). Nebraska instream flow statutes (46-2,116) specify that an instream appropriation must be in the public interest based on: 1) The economic, social, and environmental value of the instream use or uses including, but not limited to, recreation, fish and wildlife, induced recharge for municipal water systems, and water quality maintenance; and 2) The economic, social, and environmental value of reasonably foreseeable alternative out-of-stream uses of water that will be foregone or accorded junior status if the appropriation is granted.

In October 2007, the Nebraska Department of Natural Resources (DNR) made the preliminary determination that much of the Niobrara Basin was 'fully appropriated' since water supplies were deemed insufficient to supply new water users without injuring existing users. This triggered an immediate temporary stay on the issuance of new permits for both surface and groundwater uses, and a stay on the expansion of irrigated acres. The three Natural Resource Districts (NRDs) in the basin and two adjacent NRDs are currently quantifying (i.e. certifying) existing groundwater irrigation uses within their districts and developing integrated management plans for the fully appropriated areas of the Basin.



Figure 1. Location Map of the Niobrara Watershed.



Figure 2. The National Scenic River Portion of the Niobrara National Scenic River

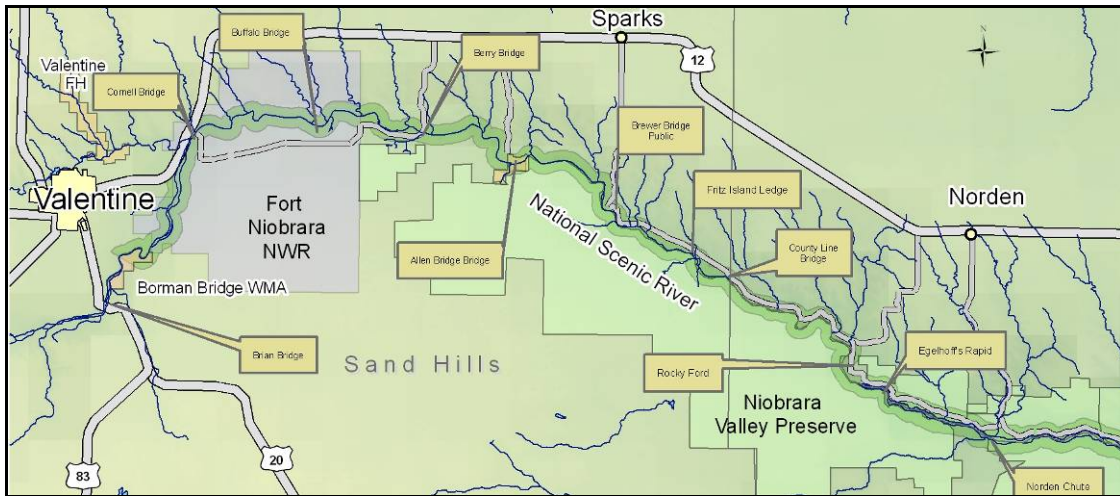


Figure 3. Survey Sites on the Niobrara National Scenic River (Cornell Bridge to Norden Bridge)

(Map Sources: NGPC as presented by Whittaker and Shelby, 2008).

1.2 Purpose and Objectives

The intent of this study was to generate objective and accurate estimates of the social and economic values associated with recreational floating on the NNSR so that the State of Nebraska can evaluate the merits of an instream appropriation application on the Niobrara River for recreation purposes.

The study combines the results of prior recreation studies of the NNSR in conjunction with new surveys of Nebraskans statewide and of NNSR floaters in 2007 and 2008 in order to:

- 1) Determine Nebraskans' knowledge, use and perceptions of the Niobrara River.
- 2) Describe the historical and current characteristics of NNSR recreational floating activities.
- 3) Assess floaters' perceptions of alternative NNSR flow levels.
- 4) Quantify the current (2008) economic value of floating recreation on the NNSR (direct expenditures, multiplier effects and travel costs).
- 5) Estimate both current and potential (future) economic losses associated with sub-optimal (low) flows on the NNSR.

The prior recreation studies utilized include two Niobrara visitor surveys conducted by the Cooperative Park Studies Unit at the University of Minnesota (Lime et al., 1994; Davenport et al., 2002), and a study by Whittaker and Shelby (2008). These studies used existing information, focus groups, and surveys of NNSR outfitters (who rent floating equipment and provide transport and shuttling services to floaters). The goal of this study was to characterize recreational floating activities on the NNSR and to assess the likely impact of future reductions in River flow levels on floating experiences and economic values associated with floating.

Data from a survey administered by the University of Nebraska-Lincoln Bureau of Sociological Research (BSOR) to Nebraskan residents in the fall of 2008 is used to quantify Nebraskans' knowledge and use of the River while adjusting for population across the sampling regions and assumptions concerning potential non-response bias.

The recreation survey undertaken for this study focused on persons floating the River in 2007 and 2008. In 2007, floaters were initially contacted on the River, asked to fill out short survey cards, and were later sent mail surveys. In 2008, surveys were placed on the windshields of floaters' cars with instructions to mail them back.

1.3 Prior Studies

In this section, several prior recreation-based studies that focus on the NNSR, particular the NSR portion of the River are summarized. These include:

- Visitor surveys by the NPS in 1993 and 2001
- Federal government inventories and assessments of the River
- A study evaluating floating recreation and river flows based on outfitter surveys
- A statewide mail survey of Nebraskans by the NGPC and the University of Nebraska Bureau of Sociological Research (BOSR) intended to gauge residents' knowledge and use of the Niobrara River.

University of Minnesota Visitor Surveys (1993 and 2001)

The NPS contracted researchers from the Cooperative Park Studies Unit at the University of Minnesota to undertake visitor use studies of NNSR floaters in 1993 and 2001 (Lime et al., 1994; Davenport et al., 2002). These studies quantified the characteristics of NNSR recreation (origin activities, perceptions and experiences) over an eight-year period.

However, neither of these studies quantified the economic values associated with recreation, nor did they specifically focus on how alternative NNSR flow levels might affect floating activities. Information from each of these prior studies is included in this current report for comparison to the 2007 and 2008 NNSR recreation data. These data include origin of visitors, duration of stays, types of floating crafts used, and numbers of visitors who camped or stayed at local motels. An understanding of how recreational visitation patterns on the NNSR are changing over time is essential to making realistic estimates of future recreation trends and their economic values.

Key findings from the University of Minnesota recreation studies include:

- ❖ *Most NNSR floaters are from Nebraska, part of family groups, have little experience on the Niobrara, have rudimentary boating skills and float the River with tubes, canoes, or kayaks rented from local outfitters.*
- ❖ *80% of floating occurs on Saturdays, 10% on Sundays, and the remaining 10% through the rest of the week. The majority of floating takes place between Memorial Day and Labor Day with peak usage on weekends in July.*
- ❖ *Floating is most frequent between Cornell Bridge and Smith Falls State Park, but there is high use downstream to Rocky Ford. Use from Rocky Ford to Norden Bridge is substantially lower. Floating downstream of Norden Bridge or upstream of Valentine is possible but relatively rare due to braided channels that require frequent portages.*

In 2003, the NPS also contracted with the Cooperative Park Studies Unit at the University of Minnesota to develop a strategy to estimate recreational visits to the NSR (Davenport et al., 2003). Monthly and seasonal daily floater counts for the Cornell to Norden stretch of the River were made based on counts of floaters by workers stationed along the River on randomly selected days throughout the recreation season, mechanized traffic counters, and secondary data sources (primarily registered floater records associated with floating through Fort Niobrara Wildlife Refuge managed by the USFWS).

The University of Minnesota researchers made visitation estimates in 1993 and from 2001 to 2003. From 2004 to present the NPS (with cooperation from the Niobrara Council), has utilized the pre-established methodology to count and estimate monthly floating day estimates which are summarized in Figure 4.

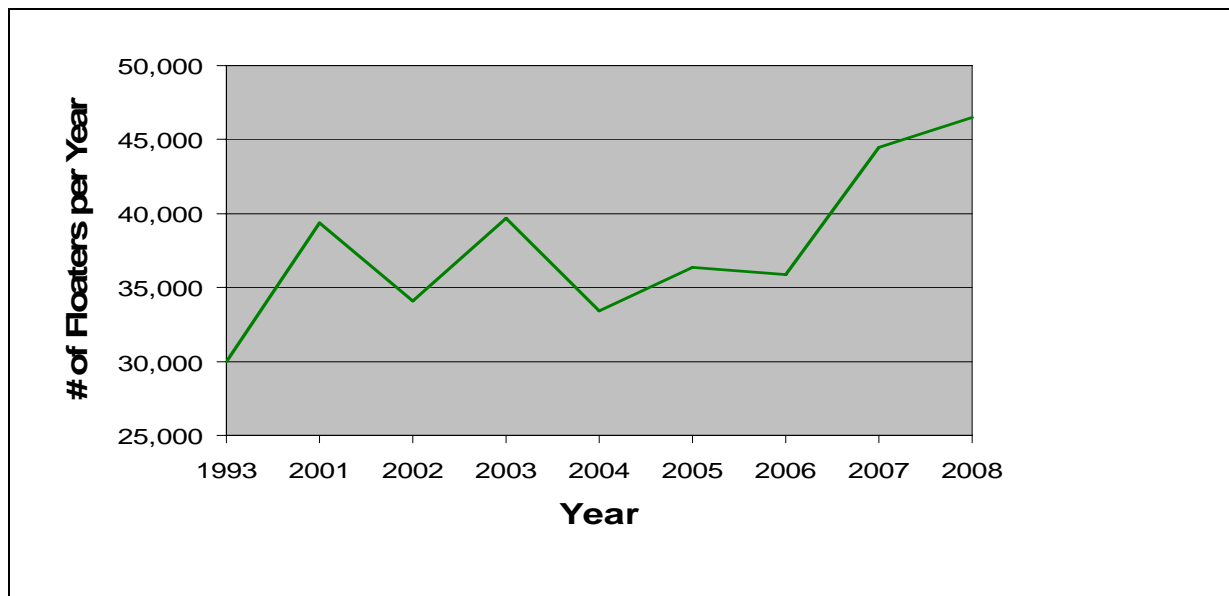


Figure 4. Niobrara National Scenic River Floater-Day Estimates (NPS)

Other Niobrara Studies

In 2006, the USFWS prepared a recreation plan for the Fort Niobrara Wildlife Refuge portion of the River and in 2007, the NPS published a 'General Management Plan and Environmental Impact Statement' for the Niobrara National Scenic River. These documents contain a comprehensive summary of characteristics, uses, and history of the NNSR up to 2006 (including several lawsuits associated with their management of the River). While they identify and describe the biophysical and cultural resources associated with the NSR, they do not explicitly estimate the economic values generated by recreational floating. More recently, the USGS in cooperation with the NGPC published a study focusing on the geomorphology and hydrology of the NNSR (Alexander, Zelt and Schaepe, 2009).

The Whittaker and Shelby (2008) Recreation Study Based on Outfitter Surveys

In April 2007, the NGPC, with funding from the Nebraska Environmental Trust (NET) and the NPS, commissioned study by Whittaker and Shelby of 'Confluence Research and Consulting Incorporated', to document recreational floating activities on the NSR portion of the NNSR and to assess the impact of future reductions in flows on floating experiences. The report released in the spring of 2008, summarized physical and recreational conditions on the River (including analyses of historical hydrologic and usage patterns), reconnaissance-based surveys of the River under different flow conditions, and the results from surveys of river outfitters and other experienced river floaters who were asked to evaluate flow-related characteristics thought to be of concern to floaters. However, the report did not specifically survey recreationists themselves nor did it attempt to quantify the economic values associated with recreational floating. Key findings of the report that are relevant to this economic study include:

- ❖ *NNSR floating is dominated by “scenic boating” rather than “whitewater boating”.*
- ❖ *Four attributes (floatability, safety, aesthetics, and rate of travel) appear most relevant for assessing flows for Niobrara floating opportunities.*
- ❖ *Insufficient flows can eliminate recreation opportunities completely, decrease the number of days those opportunities are provided, or diminish their quality. Low flows increase floatability problems and safety concerns, decrease aesthetics, and decrease the rate of travel (which can adversely affect trip schedules and the amount of time enjoying the River’s values).*
- ❖ *Most NNSR floaters are not “calibrated” [i.e. responsive or sensitive] to flows and depend on outfitters or NPS staff to provide information about which flows are floatable and which provide high quality trips. Outfitters, agency staff, and experienced users can specify those flows.*
- ❖ *Flows between 340 cfs and 460 cfs are floatable, but offer low quality opportunities. Flows below 340 cfs (rarely observed) are considered “non-floatable.”*
- ❖ *Flows higher than 460 cfs provide acceptable floating and flows between 600 and 900 cfs provide optimal floating.*
- ❖ *Prior to Merritt Reservoir (1964), flows were, on average, optimal (600 to 900 cfs) about 79% of the days in the primary recreation season (Jun-Aug).*
- ❖ *Post Merritt Reservoir, flows have, on average, been optimal (above 600 cfs) 42% of the time, low but acceptable (460 to 600 cfs) 39% of the time, and ‘low and non-acceptable’ (<460 cfs) 19% of the time.*
- ❖ *A hypothetical 100 cfs flow reduction during a ‘regular’ flow year, would increase the number of non-acceptable low flow days (below 460 cfs) from 12% to 42% (+250%) over a full recreation season (May-October) and from 18% to 47% (+161%) over a primary recreation season (June-August).*

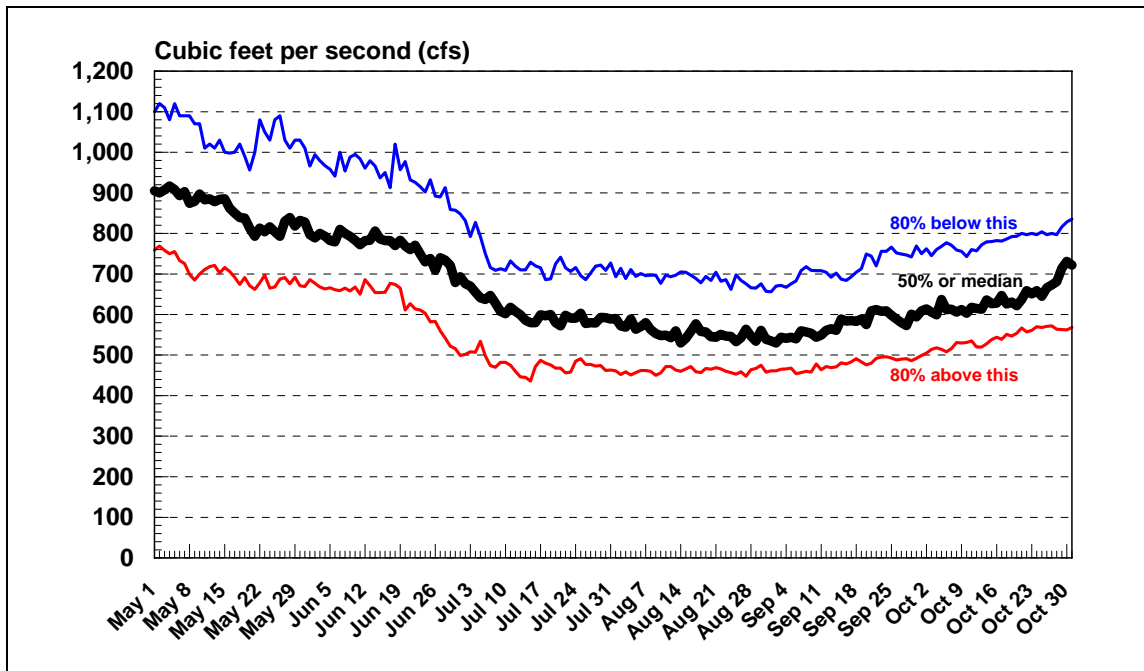


Figure 5. Median Daily Flows from May Through October for the Period of Record (1946 to 2007) at USGS Sparks Gage (06461500). (Whittaker and Shelby 2008)

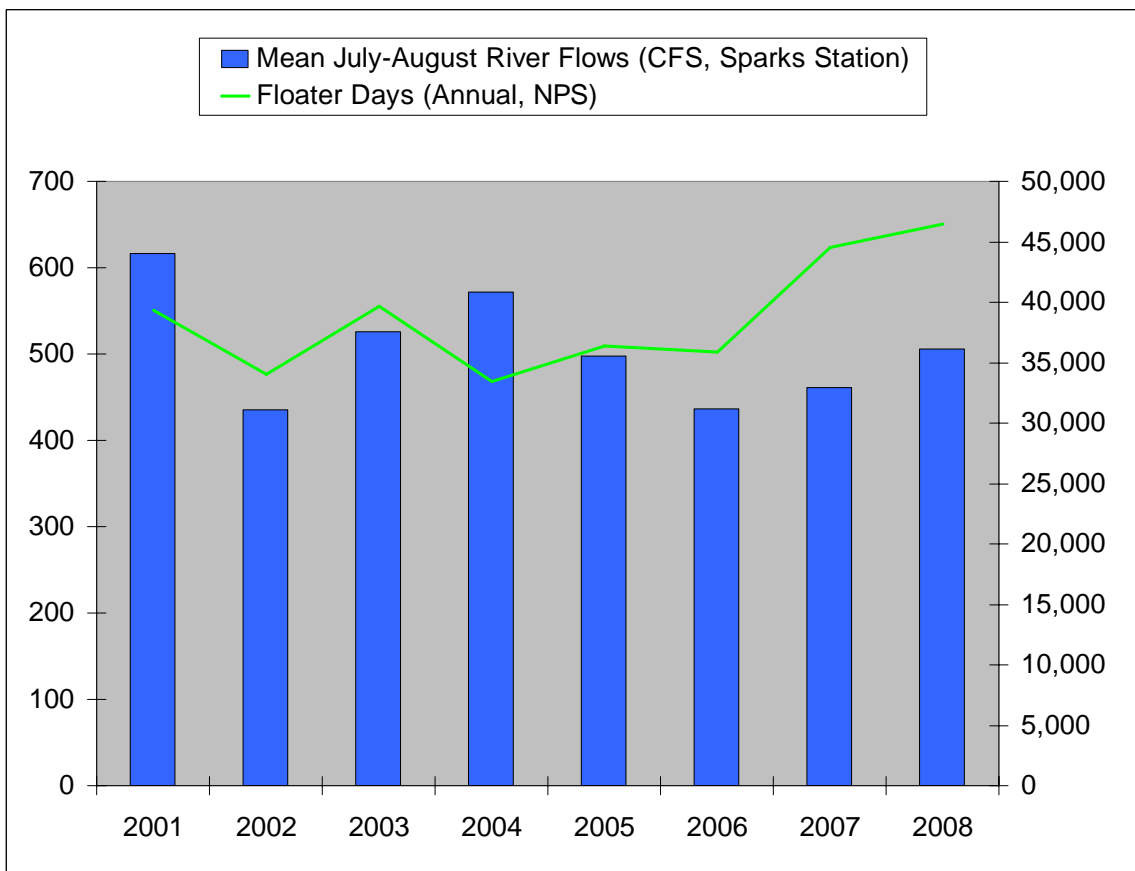


Figure 6. Mean River Flow Levels (July-August) and Annual Floater Days: 2001-08

Based on historical flow data going back to 1947 (Figure 6) median flows during the primary recreation season (June 12 to August 14) range from about 520 cfs to 890 cfs. Focusing only on the last eight years (2001-2008), it can be seen (Figure 6) that median NNSR flows during the primary recreation season (June 12 to August 14) range from 426 to 713 cfs.

Focusing just on the last eight years of NNSR flow data (2001-2008), it can be seen (Figure 6) that median flows during the primary recreation season (June 12 to August 14) range on the NNSR have ranged from 426 to 613 cfs, and that over this time period there has not been a highly correlated relationship between the number of annual floater days and mean July-August flows. That is, although floating days have fallen in some years in conjunction with lower flows, such as between 2001 and 2002 when floater days fell 13% with a 182 cfs (29%) reduction in flow levels, in most other years, flows and floater days are not highly correlated. However, if one looks only at the last three years (2006-2008) a pattern of increasing floater days and flows is apparent.

It is therefore likely that over the last eight years, other factors in addition to flow levels have been influencing the frequency of floating recreation on the Niobrara. It is also interesting to note that over the last eight years that flow levels have been 'acceptable' to optimal (> 460 cfs) about half of the time (in 2001, 2003, 2004, 2005 and 2008) and 'low but still boatable' (< 460 cfs) in the three remaining years. In relation to the years which are the focus of this current study, 2007 was a 'low' or 'sub-optimal' flow year while 2008 was a 'regular' or 'typical' year in terms of flow levels during the peak floating months.

The Statewide Niobrara Opinion Survey

In the fall of 2008, the NGPC commissioned the Bureau of Sociological Research (BOSR) at the University of Nebraska-Lincoln to conduct a statewide mail survey with the purpose of obtaining a better understanding of Nebraskans' knowledge, use and perceptions of the Niobrara River (BOSR, 2008). The survey of 2,850 households statewide was based on a random selection of addresses from the Omaha/Lincoln metro areas, counties surrounding the NNSR, and the remainder of the state. Based on a response rate of 44% (1,261 returned and usable surveys), it was determined that 80% of Nebraskans are familiar with the NNSR, 64% have previously recreated on it (with floating being the most common activity), and that 93% know of friends or family members who have recreated on the River. However, these results are premised on the unlikely assumption that non-respondents have similar knowledge and use patterns as respondents. The survey also found that most of the Nebraskans know about the River and/or have recreated on it and most of them feel that there is currently enough water for current recreation but that in the future that water levels will not be adequate for recreation.

2. METHODS

2.1 Statewide Knowledge and Perceptions of the Niobrara River

Data from the NPGC/BOSR statewide mail survey intended to quantify Nebraskans' knowledge, use, and perceptions of the Niobrara River were re-analyzed to improve their accuracy and relevance. In particular, survey responses were weighted by population (based on U.S. Census Bureau 2007 population figures) within the three survey regions (Omaha/Lincoln, the Niobrara Basin, and the rest of the state). Second, the survey responses focusing on the knowledge and use of the Niobrara River were re-evaluated under the lower bound (i.e. conservative) assumption that non-respondents are not aware of the Niobrara River. A copy of this survey is contained in Appendix A.

2.2. The Niobrara Floater Surveys (2007-08)

A virtually identical survey instrument was given to 2007 and 2008 NNSR floaters but the delivery methods varied each year. In 2007 floaters were contacted on the River, asked to fill out a short survey card, and then mailed a longer follow-up survey, which is hereafter referred to as 'intercept-mail survey'. In 2008, surveys were placed on the windshields of floaters parked cars with instructions to return it by mail and is hereafter referred to as the 'windshield survey'. The survey instrument itself along with the methodologies used in both 2007 and 2008 are summarized below along with detailed descriptions of the methodological approaches used to characterize recreational floating activities on the NNSR and to quantify related economic values. The surveys were virtually identical across years except that the 2007 surveys did not need to include questions contained in the prior survey cards. A Copy of the mail survey instrument is contained in Appendix B

2.3 Intercept-Mail Surveys (2007)

During most of the 2007 recreation season (June 20 through Labor Day), an employee of the NGPC intercepted (approached) recreational floaters on the Cornell to Norden stretch of the NNSR on randomly selected days and at various launch and takeout locations. The purpose of the contact was to elicit floaters (one per party) to fill out a short survey card on site or mail it back to the NGPC.

The survey card questions included trip date and duration, group origin and size, sections of the River floated types of floating crafts utilized, and the frequency of previous floating trips. Respondents were also asked whether they would be willing to participate in a later (follow-up) survey by the NGPC. In March 2008, floaters who agreed to a follow-up survey were mailed a longer (four-page) survey (contained in Appendix A).

Specific questions on the earlier (shorter) card survey and the longer mail survey focused on floater characteristics. These included group sizes, origins, trip duration, and lodging and equipment rental information and other spending patterns; the historical frequency of floating trips. Questions were also included to gauge floater perceptions of water flows and condition; multiple destinations and possible substitute site and finally two open-ended (fill-in the blank) questions eliciting floaters perceived threats and/or needed improvements associated with the NNSR.

The specific design of the majority of the questions were intended to be consistent with questions used for the 1993 and 2001 University of Minnesota visitor surveys in order to evaluate changing recreational visitation patterns over time. Another goal was to estimate accurately both the direct expenditures and travel costs associated with floating trips. Reminder postcards and second (replacement) surveys were re-mailed to initial non-respondents in June.

To avoid biasing respondents, the mail survey did not explicitly state that its purpose was related to NGPC instream flow efforts. The actual survey introduction was:

Dear Niobrara River Recreation Visitor:

After your float/boat trip to the Niobrara River last season you were given a short trip-survey card which you filled out and returned to us. We were pleased that you agreed to answer some follow-up questions about your Niobrara River float trip and have included here a short survey for you to fill out that should take less than 10 minutes to complete. To re-familiarize yourself with the Niobrara River, we have included for you a fold-out map produced by the National Park Service. Please use the postage-prepaid envelope provided to return your completed survey to us. All of your answers will be kept strictly confidential. The purpose of this survey is to help the Nebraska Game and Parks Commission determine the extent of recreational use on the Niobrara River and the economic value of this recreation to the state and local economies.

Thanks in advance for your participation

Richard Holland, Assistant Division Administrator – Nebraska Game and Parks Commission

Most of the survey questions are straightforward and factually based. For example, visitation days, numbers in party, home locations, etc. These questions make up the core of the data needed for the estimation of floating-based expenditures and travel costs. Other questions regarding visitor perceptions of river flow conditions are based on past questions used by Whittaker and Shelby (2008) to evaluate outfitter perceptions of river flow conditions. This information was used to evaluate the temporal characteristics of NNSR floating by comparing visitor and trip characteristics (origins, trip durations, group sizes, floating crafts used, and other factors) in 1993 and 2001 (based on NPS visitor surveys) and 2007/2008 survey data.

The survey contained seven different questions dealing with flow levels on the NNSR distributed throughout the survey and used different formats (including yes/no questions, categorical choices, and open-ended questions). Floater responses to these questions were summarized across all respondents, by different origins and floating craft types, and by different flow levels (actual flow levels that occurred the day of a respondents' float based on river flow data from the USGS Sparks gauge).

Of particular interest is a contingent behavior type of question where respondents were asked: *"If flow levels next season were identical to what you just experienced, would you consider returning the NNSR for a float trip?"*

Such contingent behavior questions have successfully been used in conjunction with revealed preference recreation data (frequency and characteristics of recreational use) to model potential losses in water-based recreation values due to declining water levels in Nevada by Eiswerth et al., (2000), and in the southeastern U.S. (Cordell and Bergstrom, 1993). In particular, such contingent behavior questions have the advantage of simulating the effect of changes in recreation visitation during times when actual resource conditions (i.e. water levels) may not be fluctuating dramatically.

The survey instrument was reviewed by employees of the NGPC and 'pre-tested' on a group of students at the University of Nebraska at Omaha (several of whom were themselves past NNSR recreationists).

Prior to analyzing the mail survey results potential non-response bias was evaluated by comparing the characteristics of card survey respondents who agreed and did not agree to participate in a follow-up survey using paired t-tests. Similar comparisons were made between survey card respondents who returned versus those that did not return the follow-up season 2007 mail survey. Characteristics evaluated included group sizes, trip duration, numbers of previous trips, origins, and craft types used.

In addition to reporting and comparing the mean value of these characteristics by response status, pairwise t-tests or Wilcoxon rank sum tests (in the case of dichotomous variables) were used to evaluate whether potential differences in floater characteristics were statistically significant.

2.4. Windshield Surveys (2008)

A survey identical to the 2007 mail survey but with the inclusion of a few additional questions to obtain the same information contained on the 2007 intercept survey cards, was prepared as a 'windshield survey' for 2008 season floaters. The survey was contained in a clear plastic zip-lock bag along with a small golf-style pencil and a self-addressed return envelope. It was placed on the windshields of the parked cars of likely Niobrara floaters on the Cornell Dam to Norden Bridge stretch of the River over the 2008 season (May 10 through October 15). Paid and/or volunteer research assistants would travel to all of the potential parking and/or camping spots between the Cornell Dam and Norden Bridge and place the windshield surveys on parked cars four days per week (every Thursday and Saturday and other days randomly selected throughout the week). Occasionally surveys were directly handed to floaters in the general vicinity of their cars or campsites.

Verbal and written instructions explicitly noted that the survey was to be filled out after the completing the float trip and that only one survey should be filled out per party. The windshield survey locations included the following sites:

- Cornell Bridge (Fort Niobrara) launch area parking lot
- Berry Bridge launch/takeout and parking area managed by Brewers Canoer & Tubers (and public road parking areas nearby)
- Smith Falls State Park (camping and day-parking areas)
- Brewer Bridge public parking area (managed by the Middle Niobrara NRD)
- Campgrounds and parking areas of the Graham Canoe Outfitters, Dryland Aquatics, Inc., Sharp's Outfitters, Sunny Brook Camp Outfitters, Rocky Ford Outfitters and Rock Barn Outfitters
- The road (auxiliary) parking lot of Stan's Landing
- Parking areas at 'Last Chance' takeout and the Norden Bridge
- Client parking areas outside outfitter offices throughout Valentine.

During a few select time-periods when survey research assistants were unavailable, the surveys were placed on parked cars or distributed directly to River floaters by staff members of the Smith Falls State Parks, the NPS, and the Niobrara Council.

Quantifying Response Rates

It was known prior to the 2008 survey effort that it would be difficult to estimate precisely response rates to this windshield survey because some surveys were likely to be given to non-floaters who parked their cars near river launch/take-out areas. It was also possible that some floaters might receive multiple surveys since some of their vehicles are moved ('shuttled') to different locations along the River over the course of a float day or trip. Therefore, on five specific survey days throughout the 2008 season (July 22, and August 5, 7, 12, and 14), license plate information for all cars that received windshield surveys were recorded in order to identify cars potentially receiving more than one survey and to calculate response rates. Response rates were calculated by comparing the number of surveys given out to unique cars with returned surveys for the days in question. The origin (State) of respondents was also noted to investigate patterns of non-response.

The characteristics of both NNSR floaters and the flow levels they experienced based on 2007 and 2008 surveys were compared by testing whether or not they are statistically different from each other using two-sided t-tests (for continuous variables) and Wilcoxon

rank-sum tests (for dichotomous variables). This information was used to evaluate whether the 2007 and 2008 data can be combined or whether analyses should be done separately.

2.5 Estimating and Predicting the Growth of River Floating Days

Based on reported NPS estimates of river floating days the following compounded annual growth rate (CAGR) formula was used to estimate annual increases in floatation (i.e. growth rates) over the 1993 to 2008 period and the 2006 to 2008 period:

$$\text{CAGR}(t_0, t_n) = \left(\frac{V(t_n)}{V(t_0)} \right)^{\frac{1}{t_n - t_0}} - 1$$

Where $V(t_0)$ is the first year visitation, $V(t_n)$ is the last year visitation, and $t_n - t_0$ are the number of years evaluated.

2.6 Calculating Floating Related Expenditures

Floating related expenditures are estimated based on 2007 and 2008 season survey responses in conjunction with observed NNSR floating equipment shuttling, transport costs, local hotel/cabin and meal costs during the 2008 season. These expenditures are reported on both a per trip and a per river floating day basis.

Equipment Rentals, Shuttle, and Launch/Takeout Expenditures

Equipment rental and outfitter service expenditures are calculated through two alternative approaches. First, equipment rental and outfitter service trips as reported by 2007 and 2008 floaters are divided by the reported number of persons in the surveyed party to generate trip expenditures. This figure is then divided by the number of reported days on the River to obtain an estimate of per person per floater-day equipment costs. Reported equipment rental costs of less than \$8 per person per day (possibly a minimum cost for shuttling or a cooler tube rental) or greater than \$90 per person per floater day were considered outliers and/or reporting errors (since no outfitters charge such fees) and were therefore dropped from the calculations of equipment expenditures. That is, such outlier values are considered to be erroneously reported expenditures by floaters.

Most NNSR outfitters provide clients with a bill/invoice summarizing these expenditures but the invoice totals often include camping fees and sales taxes so it was unclear as to how accurately respondents would be able report this data on the survey. Therefore, to investigate the accuracy of floater-reported equipment rental values an alternative (second) approach was used to estimate equipment rental costs. It involved collecting rental and shuttling cost data from outfitters, and multiplying average equipment and shuttling/transport costs by number of different floating craft types reportedly used by floaters.

Finally, launch/takeout charges for floaters who rented from outfitters were assumed included in their reported expenditures. For non-renters launch/takeout fees are estimated to average \$3.00 per floater per day. This estimate is based on the \$1 per person launch fees at Cornell Bridge, the \$5 per car required State Park entrance fee at Smith Falls State Park, and launch/takeout charges of individual landowners and outfitters that range from \$2 to \$4 per floating craft.

Camping Expenditures

Respondents were asked if they camped the night before, during, and after their river trips. Total camping nights associated with floating were calculated by adding before camping nights (1 or 0) to the number of river floating days reported (in cases when respondents reported camping during or after their river trips). Trip camping expenditures were multiplied by the average number of nights camped by the average per person cost of camping (based on the average of observed campground charges of \$6/per person per night). Camping expenditures were then calculated on a per river day basis by dividing camping costs (per person) by reported river days. Finally, per floater camping costs in 2008 were estimated by multiplying the percentage of all floaters who camped by the total reported floating days in 2008 (a NPS calculation) and the estimated per person per river day camping cost estimate.

Motel/Cabin Expenditures

Motel or cabin night stays of floaters were estimated in an identical fashion to camping nights (by adding reported before float motel/cabin stays to the number of river days when respondents reported staying at hotels during their river trips). Trip motel/cabin expenditures were estimated by multiplying nights stayed by the average price of motels/cabins in Valentine divided by group size (with a maximum group size of four). That is, with group sizes of four or more persons it is assumed that four people shared a room together, which is a conservative assumption, meaning that resulting motel/cabin expenditure estimates are likely lower bound or lower than they actually are. Finally, per person motel/cabin expenditures were calculated on a floater day basis by dividing hotel room expenditures (per person) by reported river days.

Grocery Expenditures

Respondents were asked if they purchased groceries from home (points of origin), locally, or not at all. If respondents stated they purchased groceries both locally and from home, they were assumed to have purchased 50% of their groceries locally. Respondents not answering this question were assumed to have not made any local grocery purchases. Based on reported visitor spending in National Parks in 2007 (Stynes, 2008a), daily grocery expenditures for campers were assumed to be \$15 per person per day (for three meals a day and snacks) while grocery purchases for non-campers were assumed to be \$7 per day (for lunch and snacks only). Therefore per person grocery expenditures over trip duration were calculated by multiplying the percentage of groceries purchased locally (100%, 50% or 0%) by the number of reported river days and the daily estimated expenditure (\$15 for campers or \$7.70 for persons staying at hotels/cabins). Grocery expenditures per river floating day were calculated by dividing per person trip grocery expenditures by reported river days.

It should be noted that these grocery expenditure estimates are considered a lower bound estimate of local spending as they are food and snacks only (i.e. they exclude alcohol, cigarette or gasoline purchases).

Local Restaurant Expenditures

Respondents were asked to report what percentage of their meals were eaten in local restaurants. Locally eaten meal expenditures were estimated by multiplying their reported meal percentages by trip days and the average meal cost of three meals per day in Valentine during the 2008 season (based on surveys of the menus in restaurants in Valentine, NE during the 2008 season) . Local meal expenditures on a per floater day basis were calculated by dividing total per trip meal expenditures by reported river days.

Total Expenditures

Total expenditures per person were calculated by summing all of the above expenditure estimates (equipment rentals and shuttling/transport costs, launch fees, camping and

hotel/cabin expenditures, and estimated amounts spent on local groceries and meals). Both trip and floater day expenditure estimates are reported for both 2007 and 2008. The resulting total daily expenditure value per floater day was then multiplied by NPS annual floating person day estimates to calculate total annual local expenditures associated with 2008 NNSR recreational floating.

2.7 Multiplier Effects

Multipliers are often applied to direct tourism-related expenditures to capture the secondary (spin-off) economic effects of spending. The values of multipliers depend on the nature of spending along with economic interdependencies between sectors of a particular region's economy and, in particular, the amount of spending that is captured locally.

The U.S. Department of Commerce (1992) recommends a multiplier of 1.8 for hotel, lodging and leisure related expenditures in the upper Midwest region. The Nebraska Division of Travel and Tourism Research recommends a multiplier of 2.7 for tourism spending in the State (NEbGuide, 2006). Alternatively, Daniel Stynes, of Michigan State University, a nationally renowned expert in tourism and outdoor recreation expenditure reports a multiplier specific to the NNSR in 2007 of 1.84 (Stynes, 2008: Table A-1) and will be used in the present study. Total expenditures that result from this multiplier should be considered conservative or lower-bound because this multiplier is significantly lower than the multiplier proposed by the Nebraska Division of Travel and Tourism Research and since the expenditures in question are primarily service related and do not include souvenirs, alcohol, or gasoline purchases (all items that are produced outside the region).

2.8 Travel Costs

Travel cost estimates were calculated based on driving costs (mileage) and the opportunity cost of travel (driving times). Each of these travel cost components are regularly used by economists to estimate consumer surplus values associated with outdoor recreation (Freeman, 2003). Although a formal travel cost model using multiple regression for the purposes of estimating consumer surplus values under varying conditions is not estimated in this present study, mean (average) travel costs associated with floating the Niobrara are broadly estimated by adding together average travel costs and equipment rentals (net of launch/takeout fees).

All travel distances and times from floaters home locations (origins) to Brewer Bridge, a centrally located launch/takeout location on NNSR using the 'Google Map' web application. For groups comprised of floaters from multiple origins, average mileages and travel times across origins were calculated. Maximum travel distance of 1000 miles were imposed based on the assumption that such long-distance trips would be more cost effective by flying to airports in the region rather than driving cross-country to the NNSR. As well, all travel times and costs were divided in half when respondents reported that they traveled to major tourism destinations (lakes and rivers and state or national parks) either prior to or after their Niobrara float trip. This median multi-site adjustment is justified because the majority of the sites were approximately half-way between origins and Valentine, or alternatively Valentine was usually half-way from origins to other destinations (particularly since most of these destinations were in the Black Hills area of South Dakota).

Driving costs were first calculated on a per vehicle basis based on return trip mileage from stated origins to the NNSR using the standard federal government mileage cost of \$0.55 per mile (the federal mileage rate in 2007 and 2008). These per car travel costs were then converted to a per-person basis by dividing vehicle driving cost by the reported number of passengers per car (with a maximum of six persons per care allowed). Per person vehicle driving costs were then converted to a river floater day basis by dividing per person vehicle costs by reported river days.

Travel time costs (i.e. opportunity costs) were calculated on a per person basis by multiplying 1/3 the hourly wage rate by roundtrip travel times of all adults within travel parties. Consistent with the recreation economics literature, children were not assigned any travel time opportunity costs. This 1/3 imputed wage rate for adults is a lower bound value than those found in recreation studies (Freeman, 2003; Parsons, 2003). Hourly wage rates were calculated by dividing reported annual household income by two (assuming two earners per household) and then by 2000 (the assumed average number of work hours per year). These per person travel time costs were converted to a river day basis by dividing the per person costs by the reported number of trip days.

2.9 Total Economic Values and Losses

Direct local expenditures made by NNSR floaters in 2008 were used to estimate secondary impacts (via the multiplier) and travel costs all on per person per river floating day basis. This total daily economic value was then multiplied by the total number of floating person days in 2008 (estimate from the NPS) to generate a total economic value associated with Niobrara floating in 2008.

Future economic values associated with Niobrara floating values were estimated by extrapolating current (current being based on 2008 floating and usage) visitation trends to ten years in the future (2009-2018) based on two alternative estimates of future growth in floating visitation. All future losses are reported as present (2008) values by discounting using a 3% 'real' interest rate (which accounts for expected inflation).

Lost economic values due to low flows on the NNSR were estimated by reducing both current (2008) and future (10-year) economic values by the percentage of surveyed floaters who stated that they would not return to the NNSR due to water flows experienced during their 2007 and 2008 trips.

Finally, potential economic losses associated with a hypothetical 100 cfs reduction in NNSR flows during the primary floating seasons of the next 10-years were calculated by assuming that the previously estimated increases in non-acceptable floating days (flows less than 460 cfs), would correspondingly decrease stated non-return rates of floaters. Therefore, return rates would decrease 250% over a full recreation season (May-October), or, 161% over a primary recreation season (June-August). Which particular season to rely on for such flow reduction estimates is open to interpretation. Relying on the primary season estimates more realistically accounts for the period when the majority of floaters visit the NNSR. However, if visitation rates continue to grow in the next decade then floater day trip dates are likely to change (i.e. expand earlier and/or later in the season as a likely response to increased congestion in peak summer months). Therefore, estimates of potential economic losses associated a hypothetical 100 cfs reduction in NNSR flows are reported over both primary and full seasons.

3. RESULTS

3.1 Statewide Familiarity, Use and Perception of the Niobrara River

The percentage of Nebraskan respondents who are familiar with the Niobrara River, have had a recreational experience on it, have floated it, or have knowledge of others who have recreated on it are summarized in Table 1 by the region in which they were surveyed. The final column of the table is a statewide estimate based on weighting responses from each region by their relative populations. The year 2007 population data was obtained from U.S Census Bureau and indicates that the Omaha/Lincoln metro area contains approximately 52% of the residents in the state versus 3% in the counties within the Niobrara River Basin, and 45% in the remainder of the state.

Table 1. Nebraskans' Familiarity and Recreational Use of the Niobrara River*

	Omaha & Lincoln	Niobrara Basin	Rest of NE	Statewide (weighted by population)
Familiarity with the Niobrara	72%	93%	73%	73%
Had a Niobrara Recreational Experience	51%	86%	53%	53%
Floated the Niobrara	35%	55%	30%	33%
Knowledge of Others (Friends/Relatives) that have Recreated on the Niobrara	94%	95%	90%	92%

* Based on a NGPC/BOSR Statewide Survey, October, 2008 (n=1,261)

Even under the assumption that all non-respondents to the survey were un-familiar and/or did not have any recreational experiences with the Niobrara River, these survey results still indicate that many Nebraskans know about and utilize the River. In particular, assigning null (0%) familiarity/use/knowledge values to all non-respondents results in the following estimates: 32% of Nebraskans are familiar with the Niobrara River, 15% have floated on it, 23% having recreated on it, and 40% know of friends or family that recreated on it. Since it is not likely that all non-respondents have no familiarity or use of the Niobrara River, these should be considered very conservative (i.e. lower bound or minimum) values.

3.2 Intercept and Mail Surveys (2007)

From June 27 to October 14 2007, after being intercepted (contacted) on the NNSR, 1,117 floaters completed (in person and/or returned by mail) the short survey cards handed to them along the River. Of these, 998 (89%) agreed to participate in a subsequent (longer and more detailed) survey which was mailed to them in the Spring of 2008.

A comparison of the characteristics of floaters who were willing versus not willing to participate in the follow-up survey is summarized in Table 2. Although non-participants have slightly smaller group sizes and are slightly more likely to use outfitters and tubes, these differences are not statistically significant (based on pairwise t-tests or Wilcoxon rank sum tests in the case of dichotomous variables). Therefore, those not willing to participate in the follow-up survey are not systematically different from those willing to participate. This diminishes the likelihood of non-response bias.

Table 2. Comparisons of 2007 Card Survey Respondents by Their Willingness to Participate in a Follow-up Mail Survey (n=1,117)

	Participants (n= 998)	Non-Participants (n = 119)
Group Size	8.5	8.0
Trip Days	1.2	1.2
Prior Trips	3.3	3.2
Using of Outfitters	95%	97%
% Canoeing	23%	24%
% Kayaking	11%	13%
% Tubing	66%	63%

** No statistical differences in the mean values of participants versus non-participants were found using two-sided t-tests or Wilcoxon rank sum tests (for dichotomous variables) at the 90% confidence level and higher.*

Of the 998 surveys mailed to 2007 season Niobrara floaters, 30 surveys were ‘undeliverable’ and 371 completed surveys were returned resulting in an adjusted response rate of 38%. However, if the earlier non-response rate of 11% is considered (floaters who filled out a short survey but refused to participate in the longer mail survey), the actual response rate to the overall 2007 mail survey effort is only 34% (371 surveys divided by 1,087 contacts with valid addresses). The number of river floating days associated with these 371 surveys (and hence the percentage of all floaters captured by the survey) is 9%.

The characteristics of 2007 mail survey respondents and non-respondents (based on information contained on the preliminary survey cards) are summarized in Table 3. It was possible to make these comparisons because baseline data was collected from the intercept card surveys prior to mailing the longer surveys to floaters.

Table 3. Characteristics of Respondents/Non-Respondents: 2007 Mail Survey

	Respondents (n=371)	Non-Respondents (n=597)
Group Size	8.4	8.6
Trip Days	1.2	1.1
Prior Trips	3.4	3.2
Using of Outfitters	94%	96%
% Canoeing	28%*	21%*
% Kayaking	12%	10%
% Tubing	60% *	69% *
From Nebraska	67%	72%
From Omaha/Lincoln	30%	34%
From the Niobrara Region	3.5%	3.3%

** A statistically significant difference based on a Wilcoxon rank-sum test at the 95% confidence level.*

Respondents and non-respondent characteristics are not statistically significant from each other with the exception that canoeists were more likely to respond to the survey and conversely, tubers were less likely to respond to the survey. This likely indicates that younger persons and/or first time visitors to the Niobrara are less likely to have responded to the survey. Nevertheless, the differences in canoeists and kayakers across respondents

and non-respondents were only around 9% and it is therefore concluded that non-response bias is not a major issue with the 2007 mail survey.

3.3. Windshield Surveys (2008)

A total of 709 ‘windshield’ surveys were collected from 2008 floaters with usable data were returned by mail to the NGPC. It was difficult to precisely determine response rate since surveys were likely given to some non-floaters who parked their cars in launch area parking areas. As well, some floaters may have been given multiple surveys since some of their vehicles are moved (‘shuttled’) to different locations along the River over the course of a float day or trip.

However, response rates and the geographical location of respondents and non-respondents were explicitly recorded on five particular days over the 2008 season. On these days, the number distributed to unique license plate numbers were recorded and compared to actual returned surveys. From this, it appears that 36% of all surveys were returned (Table 4). The number of floater person days (based on reported party size) associated with the 709 surveys is 10,139, which corresponds to 22% of all 2008 river floating days in 2008.

Table 4. Response Rates for Dates When Windshield Surveys (2008) Were Monitored (Based on Recorded License Plate Numbers)

Date	Surveys Distributed	Returned Surveys	Response Rate
July 22	53	19	36%
August 5	40	12	30%
August 7	50	18	36%
August 12	11	6	55%
August 14	23	8	35%
All Dates	177	63	36%

3.4 Floater Characteristics and River Flow Conditions (2007-08)

The characteristics of both floaters and river flow conditions across the 2007 and 2008 surveys are summarized in Table 5. While most of the origins, demographic characteristics, floating crafts, equipment rental, and lodging patterns were similar across years, the 2007 floaters had shorter trips and river days, were more likely to float the river on a Saturday, had a higher number of previous float trips, and purchased more groceries locally than 2008 floaters.

The 2007 season was also characterized by lower river flow levels and this was reflected by floaters’ perceptions of flow conditions. Specifically, 2007 can be considered a ‘dry’ flow year with mean July-August flows of 461 cfs, and mean flows on days floated by respondents of 456 cfs. In contrast, 2008 was an ‘average’ flow year with mean July-August flows of 506 cfs and mean flows on days floated by respondents of 606 cfs.

Correspondingly, 2007 floaters were more likely to consider flow levels relevant to trip decision-making, rate flows as low and sub-optimal, and were less likely to return the following year if flow levels would be identical to what they had just experienced.

Table 5. Differences in the Characteristics of 2007 and 2008 Floaters

	2007 (Mail) (n=366)	2008 (Windshield) (n=709)
Trip Days	2.2*	2.3
River Days	1.2*	1.3
Saturday Trip	44% ⁺	30%
Prior Trips	3.3 *	2.8
Group Size	8.9	9.8
% from Nebraska	69%	71%
% From the Niobrara Basin	5%	7%
# Unique Origins (per group)	1.5 *	1.6
Distance Traveled (miles, r/t)	603	572
Age (categories 1-7)	4.0 *	3.8
Education (categories 1-5)	3.7	3.8
Income (household) (1-6)	4.7	4.7
Children (in group)	46%	47%
Renting Floating Craft	82%	84%
Camped	55%	54%
Stayed in Local Motels/Cabins	28%	30%
Groceries Purchased Locally	37% *	31%
Floaters Using Canoes	15%	15%
Floaters Using Kayaks	10%	10%
Floaters Using Tubes	75%	74%
Floaters Using Tanks	0%	1%
River Flow (cfs)	453 *	606
Low/Sub-Optimal Perceived Flows	44% ⁺	18%
Flows Important for Trips?	39% ⁺	33%
Return Next Year with Similar Flows?	94% ⁺	97%

* Statistically significant difference at the 90% confidence level or higher based on a two-side t-test.

⁺ Statistically significant difference at the 90% confidence level or higher based on Wilcoxon rank sum tests (for dichotomous variables).

3.5 Floater Characteristics and River Recreation: Historical Patterns

Growth in River Floating Days Over Time

Using the compounded growth formula described previously in Section 2.5, river floating days have increased 18% overall from 1993 to 2008 which is 2.3% per year or 8.5% per year over the last three years (2006-2008).

Floaters Origins

The majority of floaters (71%) are from Nebraska and almost half of these are from Omaha and Lincoln (the two largest metropolitan areas of Nebraska) located about 320 miles from the Niobrara (Table 6). The Niobrara Basin is relatively sparsely populated and hence, generates only 5% of the floaters despite its close proximity to the NNSR. The 29% of floaters who are from out-of-state are mostly from the neighboring states of South Dakota, Iowa, and Colorado.

Table 6. The Origin of Floaters: 2007-08

Geographic Location	2007	2008	2007 & 2008 Combined	2007 & 2008 Combined and Weighted by Group Size
Omaha & Lincoln	31%	33%	33%	34%
Niobrara Basin	5%	7%	6%	5%
Rest of Nebraska	33%	30%	31%	32%
Co/WY/MT	3%	5%	4%	4%
South Dakota	16%	13%	14%	15%
IA/MN/KS/MO	10%	11%	10%	9%
Other States	2%	1%	2%	1%

Based on combined data from the 1993 and 2001 NPS surveys, and the 2007 and 2008 floater surveys, it appears that the origin of Niobrara floaters has been relatively constant over time with the exception of slight increases in floaters from South Dakota and rural Nebraska (Figure 7).

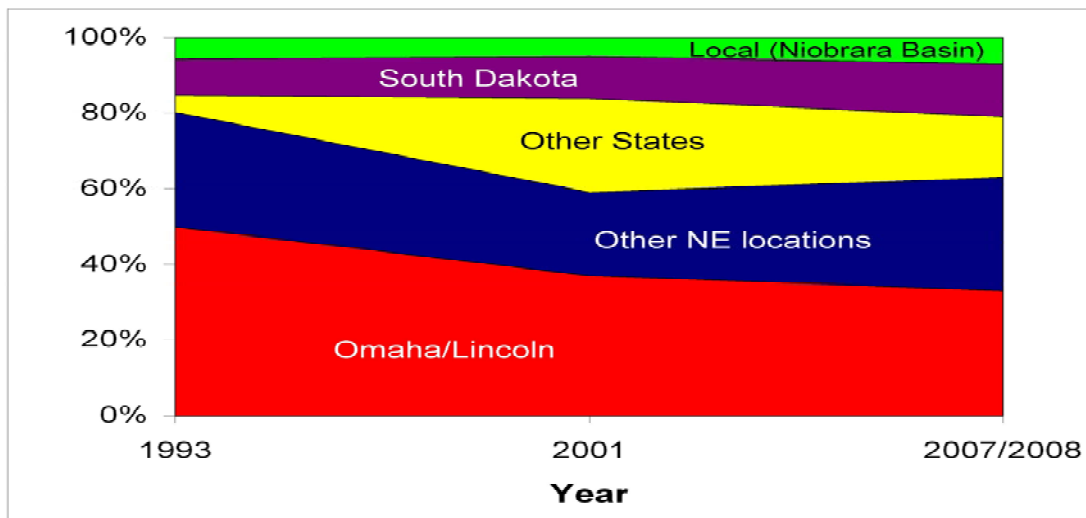


Figure 7. The Origin of Niobrara National Scenic River Floaters

Types of Floating Undertaken by Visitors:

Floating craft usage was virtually identical in 2007 and 2008 with the exception of the emergence of a small number of ‘tanks’ (plastic tubs originally designed as livestock watering tanks) appeared in 2008 (Table 7). Overall, the majority (75%) of floaters used tubes followed by canoes (15%), and kayaks (10%).

Table 7. Types of Utilized Floating Crafts by Year

	2007	2008	2007 & 2008
Canoes	15%	15%	15%
Kayaks	10%	10%	10%
Tubes	75%	74%	74%
Tanks	0%	1%	1%

As shown in Table 8, floating craft preferences vary somewhat by the origin of floaters although in all cases tubes are the most popular floating craft, particularly among South Dakotans. Canoes are generally the second most popular floating craft except for floaters from the Niobrara Basin. In general, kayaks are most often used by out-of-state floaters while tanks which, although rarely used and offered for rent by only a single outfitter during the 2008 season, are most often used by floaters from the Niobrara Basin or the western states of Colorado, Wyoming, or Montana.

Table 8. Utilized Floating Crafts by Origins

	Canoes	Kayaks	Tubes	Tanks
All Floaters	15%	10%	74%	1%
Omaha/Lincoln	14%	10%	75%	1%
Niobrara Basin	12%	15%	70%	3%
Rest of Nebraska (rural NE)	18%	10%	71%	1%
CO/WY/MT	23%	16%	56%	5%
SD	7%	8%	85%	1%
IA/MN/KS	20%	8%	72%	0%
Other States	10%	19%	71%	0%

The use of alternative float crafts over time as shown in Figure 8 demonstrates that relative tube and kayak usage appears to be increasing at the expense of canoe usage. These craft type patterns may be relevant to future NNSR recreation planning decisions since the characteristics and opinions of floaters differ depending on the crafts they use.

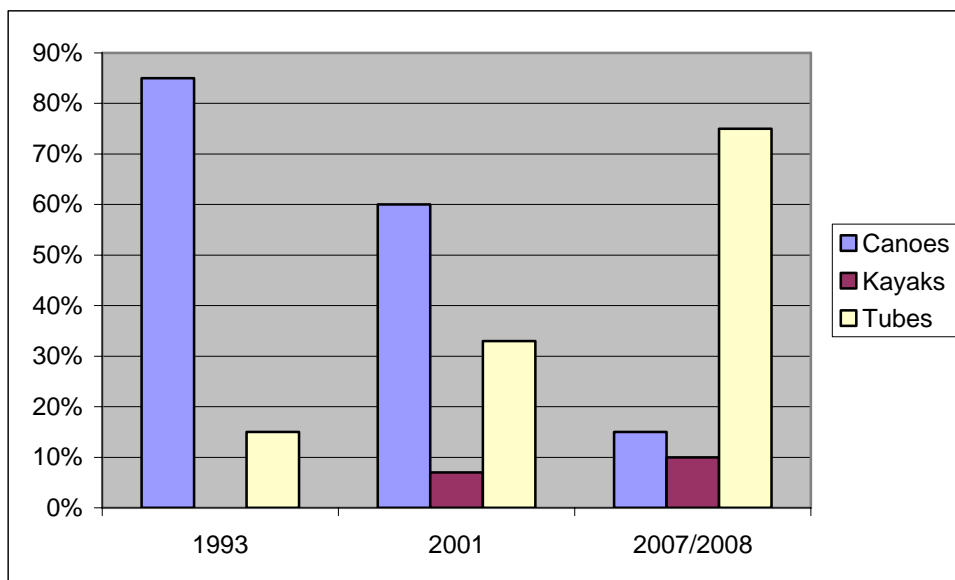


Figure 8. Niobrara Float Craft Usage Over Time

Characteristics of Niobrara Floaters and Float Trips

The average NNSR floater in 2007 and 2008 made 0.7 float trips per year (approximately 3 trips every four years), had trip durations of 2.3 days versus 1.3 floating days, and was accompanied by six other floaters from 1.6 different (unique) origins (Table 9).

As expected, persons living closest to the River (i.e. those from the Niobrara Basin) visit the River most frequently followed by residents from South Dakota and Omaha/Lincoln. However, trip duration, the number of days floating the River, group sizes, and numbers unique origins within groups do not vary much across origins.

Group sizes of NNSR floaters are large (median of 6 in 2007 and 8 in 2008). As in previous years (1993 and 2001), most people who floated the NNSR in 2007 and 2008 did so on weekends, particularly on Saturdays with peak usage occurring during the last week in June to the first week in August.

Niobrara National Scenic River floating groups are frequently comprised of people from different origins (35% of groups have persons from two or more unique origins). Large-sized groups from multiple origins also tend to visit the NNSR more frequently and it is suspected that they do so as part of annual social gatherings and/or family reunions. This is facilitated by the fact that the NNSR is centrally located with respect to many Midwestern cities, yet not particularly close to any single large metropolitan areas. In addition, there are numerous camping locations along the NNSR run by private outfitters that are amenable to car-camping and large group sizes.

Table 9. Average Trip Characteristics (2007-08)

	Trips/Year (2004-2008)*	Trip Days	River Days Per Trip*	Group Size	Unique Origins
All	0.73	2.3	1.3	7	1.6
Omaha/Lincoln	0.54	2.4	1.3	7	1.4
Niobrara Basin	0.95	2.2	1.2	4	1.7
Rest of NE	0.57	2.2	1.2	8	1.7
CO/WY/MT	0.50	2.5	1.4	6	1.8
SD	0.76	2.2	1.2	8	1.7
IA/MN/KS/MO	0.34	2.2	1.2	6	1.6
Other States	0.45	2.1	1.1	2	1.5

* Includes estimated trips for 2008.

3.6. Multi-Site Destinations and Substitute Sites

Multiple Destinations Associated with Niobrara National Scenic River Floating Trips

Only 15% of respondents listed additional destinations visited while traveling to/from the NNSR that are major tourist destinations (state or national parks and or major lakes and rivers). The most common of these destinations were Merritt Reservoir (within 20 miles of Valentine and NNSR), miscellaneous destinations in and around the Black Hills of South Dakota, Chadron and Fort Robinson and Ashfalls State Park. Therefore, NNSR, for the most part, is considered a single-site (unique) destination for most visitors.

Possible Substitutes for Floating NNSR

When asked to report other rivers they had floated in the last five years, 32% of respondents listed 203 different rivers yet no individual river was reported by more than

2.1% of respondents. The 14 most commonly listed rivers are summarized in Table 10. Nebraska Rivers make up about half of this list with the Platte and Dismal Rivers being those most frequently floated. The nearby Middle Loup and Dismal Rivers are fed by aquifers and flow throughout the summer and an outfitter in the area provides services to several thousand floaters on these two Rivers annually. However, they are not as wide as the Niobrara River, have markedly fewer put in and take-out areas, and a lack of public access areas, camping facilities, and outfitter services. They also have vegetative and fence obstacles that can make them relatively dangerous to novice floaters.

Therefore, no viable substitutes for NNSR floating are assumed to exist for residents of Nebraska, and its adjacent states. This is due to the infrequency of reported substitute sites and because reported substitute sites were so different from the Niobrara based on: Proximity (within 300 miles of Valentine); river flow levels (floatable throughout the summer season); suitability for floaters of multiple skill levels; and the availability of extensive camping facilities and outfitter services that can serve large numbers of people.

Table 10. The 14 Most Commonly Reported Substitute Rivers

River and State	Niobrara Floaters Who Reported Floating this River in the Last 5 Years
North Platte (NE)	0.5%
Republican (NE)	0.5%
Green (UT)	0.6%
Calamus (NE)	0.7%
Cedar (IA)	0.8%
Apple (MN)	0.8%
Elkhorn (NE)	0.9%
Snake (ID)	1.0%
Arkansas (CO)	1.1%
Loup (NE)	1.1%
Missouri (SD & NE)	1.7%
Dismal (NE)	1.8%
Platte (NE, CO)	2.1%
Colorado (misc. States)	2.2%

3.7 Floater Perceptions of Flow Levels and River Conditions

There were seven different questions included in the 2007 and 2008 surveys that elicited floaters perceptions of flow levels on the NNSR (see Appendix B) . Responses to each of these seven questions are summarized in Tables 11 through 14.

First, respondents were asked to rank the importance of alternative river characteristics related to the enjoyment of their just completed trip. The four ranking options ranged from 'extremely important' to 'not at all important' and were identical to the River characteristic descriptions used by the Whittaker and Shelby surveys of river outfitters (2008). The results indicate that only a minority of respondents have no concern for flow-based river characteristics and that if 'extremely important and 'very important' ranking categories are combined, time (duration), boatability, and boat traffic jams are the characteristics are of the greatest concern to respondents (Table 11). This contrasts somewhat with the results of Whittaker and Shelby (2008) who posed these same scenarios to river outfitters. They found that safety conditions and aesthetics were deemed the most important characteristics, although boatability was close behind (i.e. virtually tied with) aesthetics.

Table 11. Floater Rankings of River Characteristics Related to Flow Levels

River Characteristics	Importance Ranking (%)			
	Extremely	Very	Slightly	Not
High Water Safety Conditions (excessively fast currents)	19	25	33	12
Low Water Safety Conditions (exposed rocks and portages)	21	38	31	9
Misc. Aesthetics of the Water (clarity, motion, sounds, etc)	18	40	33	9
Boatability (shallow water with frequent paddle hits) snags, dragging, delays, portages)	24	41	23	12
Time Available	20	50	25	5
Rate of Travel	5	30	48	17
Boat Traffic Jams	24	41	23	12
Biting Larvae in Algae	22	31	31	17
Exposed Shoreline Mud	4	21	48	27
The Presence of Rapids	10	35	39	16
Having Multiple Routes through Rapids	6	31	46	18

Second, respondents were asked to specify in two separate questions using a ‘fill-in-the-blank’ or ‘open-ended’ format any threats to floating the NNSR and then separately, any needed improvements for recreational opportunities on the NNSR. Since there were numerous duplications between reported threats and needed improvement by respondents (i.e. respondents reporting the same issue as both a threat and a needed improvement), these two categories were combined for analyses. The resulting respondent-listed threats/improvements hereby referred to as ‘concerns’ and are summarized within nine common themes in Table 12. Approximately 31% of the respondents do not have any concerns, but 23% of respondents listed low flow related issues as concerns.

**Table 12. A Summary of Floater Concerns
(From Open-Ended Questions and Summarized by Nine Categories)**

Threats and Needed Improvements	% Respondents Listing the Concern
None	31%
Low Water Levels/Flows	23%
Littering and Potential Pollution Issues*	11%
Excessive Alcohol Use & Bad Behavior	11%
Congestion and Overdevelopment	11%
Excessive Government Involvement	7%
Infrastructure/Facilities	3%
Financial Costs Associated with Visitation	2%
Miscellaneous Concerns/Threats	1%

* The word potential is used here because the Niobrara currently is not impaired from any industrial or agricultural contaminants (although some respondents were concerned about future pollution threats)

Third, respondents were asked to choose from a list of trip satisfaction descriptors associated with river flow conditions that they experienced (Table 13). Once again, the descriptors were based directly on river flow satisfaction classifications used by Whittaker and Shelby (2008) in their survey of Niobrara River Outfitters. Most floaters (58%) found conditions in 2007 and 2008 to be optimal but 27% found flows to be sub-optimal (low and either satisfactory or unsatisfactory).

These same trip satisfaction measures were also evaluated by four categories of actual flow levels experienced by floaters (Table 14). The four flow levels were based on classifications made by Whittaker and Shelby (2008). The results indicated that floater satisfaction levels decline with flow levels and that 40% of floaters rated conditions as sub-optimal when they floated the River under sub-optimal or low flow conditions (flows between 340 and 459 cfs).

Table 13. Floater Ratings of 2007-08 Flow Conditions*

Classifications	All Floaters	Canoers	Kayakers	Tubers
Low(Unsatisfactory)	1.1	0.4	3.3	1.0
Low(Satisfactory)	26.0	28.6	32.3	23.3
Optimal	58.2	53.9	50.0	65.5
High(Satisfactory)	10.2	12.4	10.0	8.2
High(Unsatisfactory)	0.3	0.4	0.0	0.0
Do Not Know	4.2	4.3	4.4	2.0

* Note that due to different numbers of floaters using different crafts that these percentages should only be summed within columns (not across columns).

Table 14. Floater Ratings of 2007-08 Flow Conditions by Actual Flows*

Classifications**	Low/Non-Acceptable 340-459 CFS	Acceptable 460-599 CFS	Optimal 600-899 CFS	High 900-1200 CFS
Low(Unsatisfactory)	2.0	1.0	0.0	0.0
Low(Satisfactory)	38.1	24.6	8.6	13.4
Optimal	51.2	62.6	62.3	52.2
High(Satisfactory)	4.9	7.0	23.2	32.8
High(Unsatisfactory)	0.3	0.0	1.3	0.0
Do Not Know	3.5	4.8	4.6	1.6

*Based on flow (CFS) readings from the Sparks USGS gauging station # 06461500 and classifications of these flow levels by Whitaker & Shelby (2008).

* Note that due to different numbers of floaters experiencing different flow levels that these percentages should only be summed within columns (not across columns).

Fourth, 11% of 2007 floaters and 6% of 2008 floaters reported that low river flows might limit (i.e. reduce) their future visits to the NNSR versus 12% of floaters who floated the River on a low flow day (flows of 340-459 cfs).

Fifth, 41% of floaters plan the specific details of their trips within 30-days of departure, and 66% check river flow levels prior to arriving (with most checking with outfitters as a source for flow information).

Sixth, 35% of respondents reported that varying flow levels influence their decision to make NNSR trips.

Finally, perhaps the most relevant flow-related question in the survey is the contingent behavior question, which asked respondents if they would return to the NNSR for a float trip next season if flow levels were identical to what they had just experienced. This question forces respondents to consider explicitly future visitation based on actual flow conditions and hence it is the most relevant and/or reliable indicator of potentially lost recreational floater days associated with alternative flow levels.

During the 'dry' year of 2007, 6% of floaters would not return based on their flow level experience (Table 15). This measure falls to 2.9% in 2008, which, again, was a normal (typical) flow year and is 4.5% across both years. The non-return percentages vary by floater type over the 2007 to 2008 period with kayakers having the highest rates of non-return (8.9%), followed by tubers (3.8%) and then canoeists (2.2%). Both out-of-state floaters and first-time floaters have higher non-return percentages than other floaters, particularly during dry years and/or with low flow conditions.

Table 15: Floaters Who Would Not Return Based on 2007-08 Flows

	2007 (dry year)	2008 (regular year)	Both Years
1) All Flows			
- All Respondents	6.0%	2.9%	4.5%
- Out of State Visitors	8.8%	2.9%	5.0%
- First Time Visitors	13.5%	3.2%	5.8%
2) Low (Non-Acceptable) Flows (<460 cfs)			
- All Respondents	7.6%	2.9%	6.2%
- Out of State Visitors	11.0%	0.0%	7.6%
- First Time Visitors	18.3%	3.9%	11.6%

In summary, from the series of seven alternative questions intended to gauge floaters perceptions and opinions concerning alternative flow levels on the NNSR, it appears floaters:

- 1) Recognize and are sensitive to alternative flow levels in that they report relatively lowered satisfaction levels with actual flow conditions.
- 2) Consider flow levels when making trip visitation decisions.
- 3) Will not all return for future floating even with the reasonably high flow levels they experienced during the 2007 and 2008 seasons.

3.8. Floating Related Expenditures

Equipment Rentals and Shuttle/Transport Costs

Among the 87% of floaters who used outfitter services, average (mean) per person per equipment/shuttle expenditures per trip were \$36.20 in 2007 and \$39.00 in 2008 and on a per river day basis these expenditures were \$31.90 in 2007 and \$32.30 in 2008. The average per person per floater day cost of rental/shuttle services of all floaters including the 13% of floaters who provided their own equipment and shuttling/transport services but who had to pay launch and takeout fees, were \$26.70 in 2007 and \$29.00 in 2008.

These figures are slightly lower than manually calculated estimate of \$34 per person per floater day based on reported equipment rental and outfitter services in conjunction with average published equipment rental, shuttling costs, and launch/takeout observed during the 2008 season. Therefore, it is assumed that respondents accurately reported their floating equipment expenditures, and that these slightly lower (and hence lower bound)

respondent-reported equipment rental expenditure figures will be used in all subsequent analyses.

Based on a \$29 per person per floating day estimate during the 2008 season and with a reported 46,456 floaters days (estimate from the NPS), it is estimated that in 2008 \$1.35 million was spent on equipment rentals, shuttles and launch fees. It should be noted that these are direct economic benefits provided to local service providers (outfitters and their employees and landowners).

Camping Expenditures

By weighting the percentage of campers by group size, it was calculated that 61% of floaters camped (59.4% in 2007 and 61.4% in 2008). The average number of nights camped (by those who camped) was 1.6 nights in 2007 and 1.9 nights in 2008. The average number of river days per trip among campers was 1.2 days in 2007 and 1.5 days 2008.

Based on the average observed camping cost in 2008 of \$6 per person per night, floaters who camped spent \$14.00 per person per trip or \$7.80 per river day. Across all floaters (including those who did not camp) per person camping costs were \$4.80 per person per river floating day. Therefore, in 2008, based on an estimated 46,456 reported total river floating days, \$222,989 was spent on camping related to floating.

Motel/Cabin Expenditures

By weighting the percentage of motel/cabin patrons by group size, it was calculated that 29% of floaters stayed in motels/cabins (31% in 2007 and 28.3% in 2008). Their average number of lodging nights was 1.7 in 2007 and 1.6 in 2008. The average number of river days per trip among motel/cabin lodgers was 1.1 in 2007 and 1.2 in 2008.

Based on the average observed motel and cabin costs in 2008 of \$93 per room per night, on average, floaters in 2008 who stayed in motels/cabins spent \$42 per trip (room nights at \$93/night divided by group size with a maximum group size of 4) or \$36 per river day. Across all floaters (including those who did not stay in motels/cabins) per person lodging costs were \$10.20 per person per river floating day. Therefore, in 2008, motel/cabin costs totaled \$473,851.

Local Grocery Expenditures

Floaters purchased 33% of their groceries locally (37% in 2007 and 31% in 2008). Campers reported purchasing 25% of their groceries locally versus 50% for those staying in local motels/cabins and 29% for those not camping or staying at local cabins/motels (i.e. day-trippers).

Based on approximate daily grocery costs of \$15 per person per day for campers and \$7 per person per day for all other floaters (based on NPS estimates of various National Parks nationwide), the average grocery expenditure in 2008 (per trip) was \$18 per trip for all persons who purchased at least some groceries locally. On a per river day basis this equals \$14.40. Among all floaters (including those not making any local grocery purchases), average per person and per river day grocery expenditure were \$6.30. This means that approximately \$292,673 was spent locally on groceries by floaters in 2008.

It should be noted that these grocery expenditure estimates are considered a lower bound estimate of local spending as they are food and snacks only (i.e. they exclude alcohol, cigarette or gasoline purchases).

Local Meal Expenditures

Floaters reportedly ate 28% of their meals locally in 2007 and 23% in 2008. These figures are based on the conservative assumption that respondents who did not answer this question (141 respondents, or 13% of the entire sample) did not eat any meals locally (i.e. they were assigned a value of 0%). As well, a maximum allowable meal percentage of

66.6% was imposed because of the limited number of food service providers on the River. As expected, campers reported eating a lower percentage of their meals in restaurants (11%) versus non-campers (48%).

Daily meal costs during 2008, based on surveys of a mix of local restaurants, averaged \$20 per day. Therefore, the average cost of local meal expenditures for those floaters who reported eating at least some of their meals at local restaurants during the 2008 season is \$11 per trip or \$8.34 per river day. Based on all floaters (including those who did not eat any local restaurant meals), average meal expenditures in 2008 were \$4.4 per person per river floating day or \$204,406 over the 2008 season.

Total Expenditures

Combining all floating expenditures on a per person/per river floating basis results in a total daily expenditures on a per person per floater day basis of \$54.7 per day and in 2008 totaled \$2.5 million (Table 6). About half (53%) of these expenditures are associated with equipment rentals and shuttles followed by motel/cabin rentals (19%), local grocery purchases (12%), camping costs (9%) and local restaurant meals (8%). Applying a secondary impact multiplier of 1.84 to the total floating expenditures generates a total economic impact of \$4.7 million, which includes over \$2.1 million in secondary effects.

Table 16. Niobrara National Scenic River Floating Expenditures in 2008

	Average Per Person Cost For Participating Floaters (per trip)	Average Per Person Cost For Participating Floaters (per river day)	Average Per Person Cost For All Floaters (per river day)*	2008 Expenditures*
Craft Rentals, Shuttles, Launching Fees	\$39	\$32	\$29	\$1,347,224
Camping	\$14	\$7.8	\$4.8	\$222,989
Motel/Cabins	\$42	\$36	10.2	\$473,851
Local Groceries	\$18	\$14.4	\$6.3	\$292,673
Local Restaurant Meals	\$11	\$8.2	\$4.4	\$204,406
Total			\$54.70	2,541,143

* Includes floaters who may not have made any expenditures in a particular category.

3.9 Travel Costs

Distances traveled by Niobrara floaters were similar in 2007 and 2008 and averaged 570 miles round-trip. Using the 2007-2008 federal government mileage-vehicle driving cost of \$0.55 per mile, the costs of driving to the NNSR were \$314 per vehicle, which corresponds to \$100 per person, \$87 per river floating day, and \$4.05 million per year.¹

¹ Approximately 31% of these driving costs are associated with gasoline purchases (assuming 18 mpg fuel efficiency for vehicles driven to the NNSR). The value of this gasoline purchased in Nebraska is estimated to be \$992,000 based on the assumption that all Nebraska floaters (69% of all floaters) buy their gasoline in-state and that out-of-state floaters purchase one-third of their gasoline in Nebraska.

On average floaters spent 10.2 hours traveling to and from the NNSR from their origins. The opportunity cost of travel time (based on one-third of the wages of adult passengers during the drive times) is \$53 per person or \$46 per floater day. Total travel costs are therefore \$133 per person/float day, which is \$6.2 million over the 2008 season. The fact that travel costs associated with NNSR floating are approximately twice as large as direct expenditures is due to the NNSR being so far away from any major metropolitan areas. Combining travel costs with equipment rentals indicated that consumer surplus values associated with NNSR floating are approximately \$162 per person per floater day or approximately \$7.5 million per year. A more rigorous multiple regression approach would more accurately estimate consumer surplus values.

3.10 Total Economic Values Associated with Floating

Combined direct and secondary expenditures and travel costs associated with NNSR floating in 2008 total \$234 per river floater day or \$10.9 million (based on 46,456 floating days)

If over the next ten years (from 2009 to 2018) NNSR floating days continue to increase at the long-term historical average of 2.3% per year, this will generate a total economic value of \$105 million or on average \$10.5 million per year. This figure is \$0.4 million less than the economic value calculated for 2008 because future values are discounted using a 'real' discount rate of 3%. If the 2006 to 2008 annual growth visitation rate of 8.5% is assumed, then economic values over the next decade could be as high as \$146 million or \$14.6 million per year (in 2008 dollars based on a 3% discount rate).

3.11 Foregone Economic Values from Low Flow Levels

During the last eight years (2001-2008), about half of the years have been below average or 'dry' with the other half being 'typical' or 'average' (based on recorded flow levels compared to historical flow records summarized by Whittaker and Shelby, 2008). Since 4.5% of survey respondents across the 2007 (dry) and 2008 (average) seasons stated they would not return based on flow conditions they just experienced, the foregone values resulting from these lost floater days is \$488,446. Over the next decade (2009-2018), this corresponds to a predicted loss of between \$4.7 and \$6.6 million or between \$471,000 and \$659,000 on an average annual basis (all in 2008 dollars), depending on whether visitation growth rates are 2.3% or 8.5% per year respectively.

Applying estimates of increased numbers of 'low' and 'non-acceptable' floating days (<460 cfs) resulting from a hypothetical 100 cfs reduction in Niobrara flows (Whittaker and Shelby, 2008) results in corresponding (percentage based) reductions in economic values. The value of these potential lost economic values depends on whether the analysis is based on the full (May-October) versus the primary (June-August) recreation season. Over a primary recreation season (June-August), the number of low and non-acceptable floating days are predicted to increase from 18% to 47% (a 161% increase) which would result in 10-year foregone economic values ranging from \$7.6 million (\$759,000 per year) with 2.3% visitation growth to \$10.6 million (\$1.1 million per year) with 8.5% visitation growth. Alternatively, over a full recreation season (May-October), foregone 10-year economic values would range from \$11.8 million (\$1.2 million per year) with 2.3% visitation growth, to \$16.4 million (\$1.6 million per year) with 8.5% visitation growth.

However, it should be acknowledged that it is difficult to predict exactly how floaters would respond to hypothetical lower water flows in the future, especially since increased floater numbers and river congestion would likely increase the impact of low flows on floating visitation and hence, recreational expenditures. Therefore, these predictions of low water impacts on foregone economic values of NNSR floating recreation should be considered 'lower-bound' or 'optimistically low' but at the same time, subject to revision based on future observations of how NNSR floaters respond to lower water flows.

4. CONCLUSIONS

This study has confirmed the importance of the Niobrara River as a valued recreational resource to both Nebraskans and out-of-state visitors. Specifically, a high proportion of Nebraskan residents (at least one third) are familiar with the River and many have personally floated it, and/or know of friends and family that have recreated on the River. As well, the number of river floating days on the NNSR has been steadily increasing through the last decade, and from many perspectives, there are no direct substitutes for the NNSR, at least for the residents of Nebraska and the nearby adjacent states of South Dakota, Iowa, and Kansas. That is, there are no other rivers within a single day's drive of these states that offer floating throughout the summer season that are groundwater fed and hence not highly dependent on rainfall levels and surface run-off, and which are complimented by both unique ecosystems and an abundance of both riverside camping and outfitter services that are amenable to large-sized groups.

This study also demonstrated that large economic values are generated by NNSR floating activities (between \$8.7 and \$10.9 million per year depending on whether multiplier effects are included) and almost half of these economic values are associated with local expenditures (equipment rentals, camping and lodging, and local food and meal purchases) combined with secondary (multiplier) effects.

Through a variety of different survey question formats, it was established that NNSR floaters at least in 2007 and 2008, recognized that alternative river flow levels affected the quality of their recreational floating experiences. Many floaters expressed that low flows jeopardize the quality of their recreational experiences. However, only between 2.9% (2008) and 6% (2007) of floaters stated that they would not return to float the River future years if flows were similar to what they had just experienced. The paradox of floaters expressing concern with low flows but still being to return to float under such low flow conditions is likely due to two factors. First, extremely low flows were not observed in 2007 or 2008 and second, the River, even under low flow conditions, is considered by most floaters as a unique and high quality resource without viable substitutes.

Economic losses associated with current flow levels being continued in the next decade are estimated to range from \$4.7 to \$6.6 million (in 2008 dollars) depending on whether annual river floating days grow at long term versus shorter term historical rates. Potentially forgone losses associated with a hypothetical 100 cfs reduction in NNSR flows range from \$7.6 million to \$16.4 million depending on the rate of growth in floating visitation and whether the analyses cover the primary or full recreation seasons. These potential economic losses are substantial but they are likely to be highly dependent on future water flows which themselves will be highly influenced by difficult to predict climatic factors in conjunction with uncertain future irrigation developments in the Niobrara Basin.

These economic losses are likely to be dependent on future visitation growth rates, and how floaters respond to hypothetical low water flows. Floater responses were estimated in this study with a contingent behavior question, which elicited the percent of floaters who would not return to float the NNSR with flows they had just experienced. However, it is likely that increased floater numbers and related river congestion issues in the future would increase the impact of low flows on floaters trip dis-satisfaction levels and hence reduced repeat-visitiation at an even higher rate than estimated over the 2007-2008 seasons. Therefore, the estimates of low water impacts on the economic value of NNSR floating reported in this study should be considered 'lower-bound' or 'optimistically low'. For this reason, it is recommended that the NGPC, the NPS, or others, closely monitor changes in river floating days and floaters' perceptions and opinions of low flows in future years, particularly if flow levels become substantially lower than observed in 2007 and 2008.

In summary, this study has provided objective information and data that can be used by the NGPC to develop instream flow recommendations for the NNSR. In particular, it has been established that the NNSR is considered an important recreation resource to residents

statewide, and that floating generates substantial economic and social values that are influenced by its flow levels.

It is recommended that the recreational floating-based economic values reported here be considered along with other economic values associated with the NNSR when the NGPC formulates and in-stream appropriation request for recreation on the NNSR. These could include consumer surplus values of direct and passive uses of the Niobrara River. Passive uses are often quantified in the form of option or existence values defined as values that persons place on the resource even though they do not directly use it. These values are expected to be relatively high for the Niobrara River because many Nebraskans are familiar with the River and are likely to know of friends or family members who recreate on the River even if they do not recreate on it themselves, and since the NNSR was shown to have few viable substitutes. It is also considered highly relevant to quantify a variety of fish and wildlife-related values on the entire Niobrara River and to evaluate how these values are influenced by alternative River flow scenarios.

Finally, it would also be considered highly relevant to evaluate the out-of-stream values of water in the Niobrara Basin and for these values to be compared to recreation, existence, fish and wildlife values. Preliminary investigations have indicated that the most relevant of these out-of-stream uses is irrigated agriculture. For that reason, a related and ongoing component of this NGPC-University of Nebraska research project is attempting to quantify how irrigation (both potential and rights) contribute to agricultural land values.

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Appendix A

Mail Survey Instrument (BOSR Statewide Mail Survey, October, 2008)



NIOBRARA RIVER SURVEY

Nebraska Game & Parks Commission

We need your help to learn how Nebraskans view the Niobrara River. In this short survey, we would like to know what you think about the river. Your opinions and experiences will help us shape the Nebraska Game and Parks Commission's program and policy development involving the Niobrara River now and in the future.

In order to make this study more scientific, we ask that this survey be completed by the adult (age 19 or older) in your household who most recently celebrated a birthday.

SECTION 1 : The first nine questions of this survey ask you about experience or knowledge you may already have about the Niobrara River.

1. Are you familiar with the Niobrara River, which is located in northern Nebraska?

- Yes
 No → If no, go to Section 2 on the back page

4. Do you think there are any potential risks to future recreational opportunities on the Niobrara River?

- Yes
 No → If no, go to Question 6

2. For each of the following types of recreational activities, please indicate whether or not you have ever . . .

	Yes	No
a. Gone canoeing on the Niobrara River?	<input type="radio"/>	<input type="radio"/>
b. Gone kayaking on the Niobrara River?	<input type="radio"/>	<input type="radio"/>
c. Gone tubing on the Niobrara River?	<input type="radio"/>	<input type="radio"/>
d. Gone fishing along the Niobrara River?	<input type="radio"/>	<input type="radio"/>
e. Gone hunting along the Niobrara River?	<input type="radio"/>	<input type="radio"/>
f. Gone camping along the Niobrara River?	<input type="radio"/>	<input type="radio"/>
g. Taken photographs at the Niobrara River?	<input type="radio"/>	<input type="radio"/>
h. Gone sight-seeing/nature-viewing at the Niobrara River?	<input type="radio"/>	<input type="radio"/>

3. Do you know of any friends or relatives who have ever participated in any recreational activities at the Niobrara River?

- Yes
 No

5. What are the potential risks to recreation on the Niobrara River?

6. Do you think the State of Nebraska should actively be working to preserve water levels (stream flows) to protect recreational opportunities on the Niobrara River?

- Yes
 No → If no, go to Question 8
 Don't know

7. Do you support these efforts even if they impede new future water use (will not affect existing water rights) for agriculture or industry in the river basin?

- Yes
 No
 Don't know



8. Who do you think is responsible for protecting the amount of water usage on the Niobrara River?

Please mark all that apply.

- Citizens
- State senators
- Game & Parks officials
- Natural Resource Districts
- Department of Environmental Quality
- Department of Natural Resources
- Other (Please specify in box below.)

9. Do you believe that the amount of water in the Niobrara River is adequate for . . .	Yes	No	Don't know
a. Current recreational uses?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Future recreational uses?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Current fish and wildlife populations?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Future fish and wildlife populations?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SECTION 2 : The next two questions are related to any stream in Nebraska. Nebraska's Constitution says, "The use of the water of every natural stream within the State of Nebraska is hereby dedicated to the people of the state for beneficial purposes . . ." Common law also recognizes fish and wildlife as Public Trust resources that all states have duties to protect for their citizens. In Nebraska almost 95% of all water consumption goes to irrigation. There are more than 12,000 miles of streams in Nebraska, but only 2% currently have some form of stream-flow protection for fish and wildlife resources.

10. Do you support or oppose protecting adequate stream flows for fish and wildlife?

- Support
- Oppose
- No opinion

11. Do you support or oppose protecting adequate stream flows for recreation uses such as canoeing, swimming, and/or wading?

- Support
- Oppose
- No opinion

SECTION 3 : The last few questions relate to general information about yourself.

12. Are you:

- Male
- Female

13. To which age group do you belong?

- 19-24
- 25-34
- 35-44
- 45-64
- 65 and older

14. Which of the following best describes where you live?

- Major city (100,000 or more)
- Small city (10,000 - 99,999)
- Town (< 10,000)
- Open country (acreage)
- Farm or Ranch

We greatly appreciate the time you have taken to complete this questionnaire. Please use the enclosed, postage-paid envelope to return your completed survey to the Bureau of Sociological Research.



Appendix B
Mail Survey Instrument (NGPC/UNO: 2007 & 2008 Niobrara Floaters)
Note: the format/layout of the actual survey differs from the material here.



Dear Niobrara River Recreation Visitor:

We hope you had a great time on the Niobrara River! We have a short survey that we are asking you to fill out that describes how you felt about your Niobrara River floating trip. It will take less than 10 minutes for you to complete. **PLEASE FILL OUT ONLY 1 SURVEY FORM FOR YOUR TRIP PARTY.** All of your answers will be kept strictly confidential. The goal of this survey to help the Nebraska Game and Parks Commission achieve a better understanding of recreation use and values on the Niobrara.

Thanks in advance for your participation

Richard Holland
(Assistant Division Administrator – Nebraska Game and Parks Commission)

Instructions: Please write your response in the given blanks. If the question requires you to select one or select many responses, please completely darken in the circle by each response.

Section A. This section deals with specific details of your current Niobrara River trip.

1) What was the starting date of your trip? ____ / ____ / 2008

2) How many days did your group spend on the river during this trip? _____

3) How many vehicles were used by your entire party when traveling to the Niobrara River? _____

4) Where (city and state) did each vehicle begin their trip? _____

5) How many people were in your party? _____ 16 years or older
_____ Under 16 years old

6) Approximately how much did you spend:

Equipment rental	\$_____
Shuttle/transport service	\$_____
Combined Equipment/Shuttle	\$_____

7) How many of each watercraft type did your group use?
 _____ Canoe _____ Kayak _____ InnerTube _____ Inflatable Boat
 _____ Other: _____

	Night Before Your River Trip	During Your River Trip	Night After Your River Trip
8) Did You Camp?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9) Stay in a local motel/cabin?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10) Where did you buy groceries and supplies? Locally From home Not applicable

11) What percentage of your meals were eaten in local restaurants? _____ %

12) Please list the other vacation destinations that you visited traveling to or from your Niobrara River trip.

13) What description below best describes the flow conditions during your trip to the Niobrara River? (Select **One**)

- Low water & not satisfactory High water but satisfactory
 Low water but satisfactory High water and not satisfactory
 Optimal water levels Do not know

14) If the flow levels next season were identical to what you just experienced, would you *consider* returning to the Niobrara River for a float trip? Yes No

15) In the table below, please check the level of importance you place on each different river characteristic on the enjoyment of your river trip. Select only one response per row. If you are unsure what any item refers to, leave that row blank.

	Extremely Important	Very Important	Slightly Important	Not At All Important
High Water Safety Conditions (excessively fast currents)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low Water Safety Conditions (exposed rocks and portages)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Misc. Aesthetics of the water (clarity, motion, sounds, etc)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boatability (shallow water with frequent paddle hits, snags, dragging, delays, portages).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time available for visiting Waterfalls or Scenic Areas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rate of Travel (required paddling to reach your destination)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Boat Traffic Jams (at river constrictions)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biting larvae in algae (in shallow shorelines)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rate of Travel (speed of river current as it effects your trip schedule)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exposed shoreline mud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The presence of rapids	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having multiple routes through rapids	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section B. This section asks you general questions about your experiences with the Niobrara River.

16) How many Niobrara River trips did you take during:

___2008 (planned, later this season) ___2007 ___2006 ___2005 ___2004

17) How much advance planning do you do for a typical Niobrara River trip? (Select **One**):

- Less than 24 hours
- More than 24 hours but less than 1 week
- One Week to one month
- One month to six months
- Six months to 12 months
- More than 1 year
- It varies or I do not remember

18) During what month would you prefer to take a Niobrara River trip? (Select **ONE**)

- March
- April
- May
- June
- July
- August
- September
- October

19) Do varying flow levels of the Niobrara River influence your decision to make trips to the Niobrara? Yes No

20) How do you check Niobrara river flow levels? (Check **ALL** that apply)

- Government Website
- Government Office
- Outfitter
- Friend/Word-Of-Mouth
- Other _____

21) What are the main factors that might limit (i.e. reduce) your future visits to the Niobrara River? (Select **ALL** that apply)

- Outfitter costs
- Gas costs
- Local food and lodging costs
- A lack of time
- River congestion (too many other floaters)
- Campground congestion (to many other campers)
- River flow too low
- River flow too high
- Poor conduct and behavior of other river users
- Other (please specify): _____

Have you floated any other rivers besides the Niobrara River in the last 5 years? Please list their names and location (State and nearest town):

Section C. This section asks you some final questions about you. You are not obligated to answer.

- | | | |
|---|--|--|
| 22) What is your gender? | <input type="radio"/> Female | <input type="radio"/> Male |
| 23) What is your age group? | <input type="radio"/> 16-20 | <input type="radio"/> 50-59 |
| | <input type="radio"/> 21-29 | <input type="radio"/> 60-69 |
| | <input type="radio"/> 30-39 | <input type="radio"/> Over 69 |
| | <input type="radio"/> 40-49 | |
| 24) What is the highest level of education you have completed? | <input type="radio"/> Some high school | <input type="radio"/> College graduate |
| | <input type="radio"/> High School graduate or GED | <input type="radio"/> Advanced degree |
| | <input type="radio"/> Some college, business or trade school | |
| 25) What was your <u>total household</u> income (before taxes) last year? | <input type="radio"/> Less than \$15,000 | <input type="radio"/> \$40,000 to \$74,999 |
| | <input type="radio"/> \$15,000 to \$24,999 | <input type="radio"/> \$75,000 to \$99,000 |
| | <input type="radio"/> \$25,000 to \$39,999 | <input type="radio"/> Over \$100,000 |
| 26) Do you feel that there are any threats to recreational opportunities on the Niobrara River? | | |
| <hr/> | | |
| 27) What could be done to improve recreational opportunities on the Niobrara River? | | |
| <hr/> | | |

Thank You for Answering Our Survey!!!

IRB # 178-08-EX

Survey # _____