Supporting Statement B

NPS Preservation Values for Individual Animals

OMB Control Number: 1024-NEW

Collections of Information Employing Statistical Methods

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection methods to be used. Data on the number of entities (e.g., establishments, State and local government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection had been conducted previously, include the actual response rate achieved during the last collection.

Respondent Universe

The potential universe of respondents for this collection will be adult visitors (18 years or older) to one of five National Park Service (NPS) sites (See table 1.1). Based on conversations with NPS staff and park management, these units provide the best settings (geographic/demographic) and key animal species of concern to satisfy the intent of this study, while providing baseline data to inform future efforts at other parks, if needed.

For purposes of describing the respondent universe, visitation data from 2019 is utilized. The 2019 data reflects the most recent year's information that is not impacted by unusual socioeconomic or physical events. Visitation in 2020 and 2021 was dramatically reduced due to COVID. Neither of these years likely provides reliable visitation numbers for 2024 use levels. For these reasons, we have relied on 2019 data as the most reliable for estimating our respondent universe. Using annual (2019) NPS Visitation Statistics (https://irma.nps.gov/Stats/Reports/Park), total visitation to the targeted parks was calculated to be 10,993,042 (see Table 1.1). Each park will be targeted for sampling during its peak month, or alternate months within 5% of this peak month visitation. Peak monthly average visitation volumes are shown in Table 1.1. Standard survey periods will cover ten-day periods within this peak month. Average daily visitation in peak months is calculated based on the number of days in the peak month (31 in the case of these parks). The respondent universe is then represented by the estimated number of visitors at each unit during the sampling period. Using this method,

we estimate that the total respondent universe for this collection is approximately 642,087. Calculations for each park are shown below in Table 1.1.

Table 1.1: Respondent Universe

NPS Unit	Annual Visits 2019	Peak Month Visits 2019	Average Daily visits in peak month	Respondent Universe (10 days)
Yellowstone NP	4,020,287	936,062	30,195	301,950
Anacostia Park	1,210,641	150,013	4,839	48,391
Padre Island NS	576,299	90,626	2,923	29,234
Ozark NSR	1,221,489	266,730	8,604	86,042
Olympic NP	3,964,326	517,058	17,647	176,470
Totals	**10,993,042**	**1,960,489**	**64,208**	**642,087**

Response Rate

This study incorporates two tiers of data collection: a short, on-site survey and a follow-up mail-back/email survey. We expect response rates to remain stable across all 5 parks. We anticipate that 80% of visitors intercepted will agree to participate in the on-site survey. Across all 5 parks, a total of 7,000 contacts (1,400/park) will be intercepted, resulting in 5,600 (1,120/park) completed on-site surveys. Of the 5,600 visitors who complete the on-site survey, we expect 90% (n=5,040; 1,008/park) to agree to participate in the follow-up survey. Of those who agree to participate, we expect a 40% response rate, resulting in 2,000 (400/park) completed mail-back surveys. 400 completed surveys per park will meet the sample size needs for this study.

Based on our estimate, we expect 20% (n=1,400; 280/park) of initial contacts to refuse to participate in the on-site study. Of those non-respondents, we expect 90% (n=1,260; 252/park) will answer the non-response questions (soft refusals) and 10% will fully refuse (hard refusal). Each component of the response rate is described in Table 1.2.

On-site (Intercept) Survey

Based on previous research experience with this methodology (NPS Socioeconomic Monitoring Program (SEM) phase II pilot (*Socioeconomic Pilot Survey, Phase II;* OMB Control #1024-0224; ex. 5/31/2023) and surveys conducted at Zion and Bryce Canyon National Parks in 2021 (OMB Control #1024-0224; ex. 5/31/2023), we anticipate that 80% of visitors contacted during each sampling period will agree to participate in the intercept survey (Table 1.2). Surveyors will aim to

capture as widespread participation as possible by offering the survey both as a hand-out, mail-back, paper survey and as an online, internet-based survey.

Table 1.2: Anticipated Onsite Survey Response Rates

Park Type	Total Number of Visitor Contacts	Completed Onsite Surveys (80% of contacts)	Refusals (20% of contacts)	Completed Non-Response Surveys (90% of soft refusals)	Hard Refusals (10% of soft refusals)
Aquatic	2,800	2,240	560	504	56
Terrestrial	4,200	3,360	840	756	84
Total	**7,000**	**5,600**	**1,400**	**1,260**	**140**

Follow-up (Mail-back/Online) Survey

We estimate that 90% of visitors who complete the intercept survey will agree to participate in a follow-up mail-back/online survey. From that, we anticipate that 40% of those respondents will complete and return the mail-back survey or complete the survey online. Therefore, the following estimates in Table 1.3 are assumed based on visitor contacts from the intercept survey. All visitors who agree to participate in the follow-up survey will have already completed the intercept survey, which includes non-response bias questions. Thus, there will be no extra effort to collect non-response bias responses from respondents who do not participate in the mail-back survey

Table 1.3: Anticipated Follow-up Survey Response Rates

Park Type	Completed Onsite Surveys (see Table1.2)	Accepted Follow-up Surveys (90% of onsite completes)	Completed Follow-up Surveys (40% of accepted surveys)	Follow-up Survey Non-respondents (60% of accepted surveys)
Aquatic	2,240	2,016	806	1,210
Terrestrial	3,360	3,024	1,210	1,814
Total	**5,600**	**5,040**	**2,016**	**3,024**

Using a 95% confidence level, both the intercept/onsite survey and the mail-back/online survey have a margin of error under +/- 5.0%.

2. Describe the procedures for the collection of information including:

- ***Statistical methodology for stratification and sample selection,***
- ***Estimation procedure,***
- ***Degree of accuracy needed for the purpose described in the justification,***
- ***Unusual problems requiring specialized sampling procedures, and***
- ***Any use of periodic (less frequent than annual) data collection cycles to reduce burden.***

Statistical methodology for stratification and sample selection

The sampling plan, instruments, and procedures used to contact visitors within each park will remain consistent across all 5 park units.

A random sampling of visitors will be intercepted while visiting one of the selected NPS sites during a consecutive 10-day sampling period. Intercept times of day will vary by park and established via communication with park staff regarding typical visitation hours. Three-five surveyors will be stationed at each intercept location within each NPS unit (e.g., visitor centers, attraction areas, trailheads, and near park entrances) based on insights from park staff, NPS Visitor Use Statistics, prior research, and professional experience.

Surveys that require intercepting visitors at entrance stations will be conducted by safely flagging them into a designated survey area. Surveyors will be instructed to attempt to intercept every *nth* vehicle passing based on the anticipated volume and number of visitor contacts required at each NPS unit. Where surveying requires intercepting individuals on foot or otherwise outside of their vehicles, visitors traveling past the intercept locations or within the designated survey area will be randomly approached. Surveyors will be instructed to attempt to intercept every *nth* group passing based on the anticipated volume and number of visitor contacts required at each NPS unit. For example, after completing an intercept, the surveyor will be instructed to contact the *nth* following visitor.

Table 2.1: Example ten-day sample schedule

Location 1 (e.g., entrance station)	Initial contacts		
Day	**8:00-12:00**	**12:00-4:00**	**4:00-8:00**
Tuesday	10	20	20
Wednesday	10	20	20
Thursday	10	20	20
Friday	30	30	20
Saturday	30	40	40
Sunday	30	40	40
Monday	15	20	25
Tuesday	15	20	25
Wednesday	15	20	25
Thursday	15	20	25
Tuesday	10	20	25
Wednesday	10	20	25
	0	0	0

Location 2 (e.g., entrance station)	Initial contacts		
DAY	**8:00-12:00**	**12:00-4:00**	**4:00-8:00**
Thursday	10	20	25
Friday	30	30	20
Saturday	30	40	40
Sunday	30	40	40
Monday	15	20	25
Tuesday	15	20	25
Wednesday	15	20	25
Thursday	20	20	25
Subtotal	0	0	0
Grand Total	0	0	0

Estimation procedure

With the exception of the Stated Preference questions (described below), statistical analysis of remaining survey questions will utilize the standard statistical measures of central tendency (mean, median), correlation and tests of differences between groups (t-test, chi-square). All statistical analysis and modeling will be undertaken using the STATA statistical analysis package.

Degree of accuracy needed for the purpose described in the justification

The target sample size for the individual park surveys is 400 complete surveys. This sample is adequate to yield an estimated accuracy level of +/- 5% for standard analyses of mean values. For a sample of 400 responses to the payment card surveys, previous use of this framing and question format analyzed using parametric methods yielded a 95% confidence interval of +/- 14%. Estimation of the confidence interval for the final estimate of individual animal values from the discrete choice question format is more difficult to predict. The resulting estimated values are dependent on the precision of multiple parameters from the model. Prior use of this format in the context of valuing individual deer in MN[1] and water flow in the Grand Canyon yielded 95% C.I.s in the range of +/-25% to +/- 50% (Neher et. al, 2017). All of these stated preference questions precisions are accurate enough for establishing a range of values for lost animals for the NPS.

Unusual problems requiring specialized sampling procedures

None

Any use of periodic (less frequent than annual) data collection cycles to reduce burden

The proposed collection is for one-time collection in each park. Periodic collection is not appropriate for this setting.

Estimation Procedures for Stated Preference Questions

The majority of questions contained in this submission have been employed either as direct copies from the NPS Pool of Known Questions (PKQ; OMB Control Number 1024-0224 – currently under review for renewal), or as functional equivalents in form and intent of those approved questions. Two exceptions are the Stated Preference questions: payment card willingness to pay (WTP) questions and discrete choice willingness to pay questions. These WTP question formats have been previously reviewed and approved by OMB (*Glen Canyon Survey*; OMB Control Number: 1024-0270; expiration: 6/30/2018) and were successfully employed in the context of estimating environmental consequences for the Glen Canyon Long-Term Experimental and Management Plan. Examples of the format and wording of the discrete Choice and Payment Card WTP questions are shown below. There is an example of both terrestrial and aquatic animal valuation survey questions.

[1] The Minnesota survey and associated report were prepared for: Western Transportation Institute, College of Engineering, Montana State University and Nevada Department of Transportation NAS-NRC, for the following larger project: Wildlife Vehicle Collision (WVC) Reduction and Habitat Connectivity Task 1 – Cost Effective Solutions Transportation Pooled-Fund Project TPF-5(358) (Administered by: Nevada Department of Transportation).

The “Cost” levels contained in the discrete choice questions will be selected based on previous survey results as well as consultation with NPS staff. Cost levels (in addition to levels of other attributes) will be distributed amongst survey versions and survey questions using an analytic experimental design program, in order to minimize the variability of resulting estimated parameters.

Discrete Choice Question Estimation Methods

The responses from the Discrete Choice questions will be estimated using a multinomial logit model (MNL). For the MNL models employed for analysis of the choice question response data in this study the random utility function can be defined by

$$U_{ij} = V_{ij} + \varepsilon_{ij}$$

where the subscript i is an index for the individual, the subscript j is an index for the alternative, V_{ij} is a non-stochastic utility function, and ε_{ij} is a random component capturing unobserved characteristics of alternatives and/or individuals. In multinomial discrete choice models, the utility function is assumed to be linear.

The conditional multinomial logit model is defined when choice-specific data are available. The probability that individual i chooses alternative j from among the choices in his choice set C_i is

$$P(y_i = j) = P_{ij} = P\left[x_{ij}'\beta + \varepsilon_{ij} \geq max_{k \epsilon C_i, k \neq j}\left(x_{ij}'\beta + \varepsilon_{ij}\right)\right] = \frac{\exp\left(x_{ij}'\beta\right)}{\sum_{k \epsilon C_i}^{\square} \exp\left(x_{ij}'\beta\right)}$$

where $\mathbf{x}_{ij}$ is a vector of attributes specific to the jth alternative as perceived by the ith individual. It is assumed that there are n_i choices in each individual’s choice set, C_i.

The log-likelihood function of the conditional logit model is

$$¿ = \sum_{i=1}^{N} \sum_{j \epsilon C_i}^{\square} d_{ij} \ln P(y_i = j)$$

Estimated multinomial models can be used to calculate the probability that a choice option with a specific set of attributes will be chosen by a random visitor, as well as the part-worth willingness to pay associated with marginal changes to individual attributes. Letting V_{jn} represent the estimated utility to the nth visitor for the jth choice, estimated utility can be represented as

$$V_{jn} = \sum_{a=1}^{A} \beta_{an} x_{an}$$

Where β is the coefficient associated with each choice attribute and x identifies the choice attribute. It can be continuous (as in case of price attribute) or binary (0 or 1). *a* is the total number of attributes within the alternative. Additionally, the probability that any one alternative will be chosen by the random visitor is estimated as exp(Vjn) for the alternative of interest divided by the sum of the quantities exp(Vjn) for all other alternatives.

To calculate the WTP for each attribute the parameter estimate of that attribute should be divided by parameter estimate of price (with negative sign):

$$WTP_a = \frac{-\beta_a}{\beta_p}$$

Payment Card Question Estimation Methods

Key considerations for the appropriate deployment and scaling of the WTP payment card include:

- **o** Consideration of the cost of entry into the NP units in the context of the wide range of expected total money spent on the trip;
- **o** Consideration of potential centering and range biases;
- **o** Consideration of how many values to include on the card and the nature in which the values presented increase.

The proposed payment card addresses the above considerations by providing a range of 9 potential choices to select from, ranging from $0-$250 or more. A response of $0 indicates that the true WTP of the respondent is some amount located between $0 and $2, the next value provided on the payment card. This relationship extends to all indicated responses; the true WTP is some amount in the interval between the selected value and the next highest amount. More formally, if we let X_{iU} be the maximum amount the ith person would be willing to pay and X_{iL} be the lowest amount the same ith person would not pay, then the true WTP lies on the interval $[X_{iL},X_{iU}]$. If $F(X_i;\beta)$ is the statistical distribution function for WTP of individual i, with a parameter vector β, then the probability that WTP_i lies between two given payment bid amounts is $F(X_{iU};\beta)-F(X_{iL};\beta)$ and the associated log-likelihood function is:

$$\ln(L)=\sum_{i=1}^{n} \ln\left[¿F(X_{iU};\beta)-F(X_{iL};\beta)\right]¿$$

The parametric model of willingness to pay based on payment responses may then be estimated using statistical software (Duffield et al. 2010).

In addition to being appropriate for estimation by parametric modeling, as shown above, the data collected though the payment card question, and the associated average trip willingness to pay those responses imply, can also be estimated non-parametrically using straight-ahead value averaging. This second, more robust, estimation method yields a complementary conservative WTP estimate.

The payment card maxes out at a specific amount based on findings from previous studies. The max value is also set so as not to significantly upward bias the responses. We believe the values provided and the nature of their increase reduces the potential for range and centering bias and will not artificially truncate responses.

3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling, a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.

For visitors agreeing to participate, the intercept survey will be verbally administered by the surveyor and the responses will be recorded via an Android Tablet. If the visitor does not agree, surveyors will thank them for their time, attempt to ask the three non-response bias questions, and then sample the next nth visitor. This process will be standardized across all 5 park units using the protocols established for surveyors.

To maintain intercept response rates as high as practical while collecting the necessary information, the intercept duration is kept under 5 minutes. Through previous direct experiences by the research team, intercepts longer than five minutes generate increased dropout and refusal rates. To further increase response rates for the intercept, surveyors will be strategically located to randomly intercept visitors in locations where visitors are not feeling rushed for time. These locations are identified via communications with park staff.

Following a brief introduction of the purpose of the survey, the potential respondent (adult group member with the most recent birth date) will be asked if they would be willing to take part in the 4-minute survey. The intercept survey will include the questions used as the non-response bias check, as well as basic trip characteristics that apply to their current visit. Four potential outcomes are expected following the request to participate: (1) Complete refusal; (2) Partial refusal, answering non-response questions but nothing further; (3) Complete Intercept, but refuse to take mail-back; and (4) Complete Intercept and take mail-back.

As part of the intercept protocol, surveyors will add a unique identifier to each survey that will be linked to the mail-back survey and the postage-paid envelope.

The final question on the Intercept survey will provide the respondent an opportunity to provide their mail or email address that will be used for the follow-up protocol of the Dillman Tailored Design Method, including reminder protocols for mail-back surveys (Dillman et al., 2014). Respondents will first be asked to provide their mailing address, followed by their email, if home address is refused. Respondents may refuse both physical mailing address and email address and still be provided the mail back survey while on-site. Based on previous information collections (Zion and Bryce National Parks in 2021, OMB Control #1024-0224, Expiration 5/31/2023), it is expected that response rates are highest for those providing mailing addresses, second highest for those providing only an email address, and lowest for those who decline to provide contact information but accept a paper copy of the mail-back survey during the onsite intercept. The combination of these three yields our estimated 40% response rate.

To maximize response rates of the mail back survey, Dillman's Tailored Design Method will be used to provide reminders to those who provided mailing addresses. Similarly timed reminders will be delivered via email to those who provided email addresses. The schedule for mailing/email follow-ups includes a postcard/email one week following initial contact and a final mailing/email two-three weeks after initial contact. Examples of these mailings are attached as supplementary documents in ROCIS.

Addressing Non-Response

Example Introductory Script for Intercept Survey:

"Hello, I am working with [NPS Site] to conduct a 4-minute survey to improve visitor experiences in the park. May I ask you several questions about your [NPS Site] experience?

- ***If NO** – The surveyor will thank the visitor and ask them to answer the non-response bias questions (see below)*
- ***If YES** – The surveyor will begin the intercept visitor survey with the recruited individual after reading the Paperwork Reduction and Privacy Act below. The surveyor will verbally administer the Intercept survey and record responses on an Android Tablet.*
- *Following the intercept survey, the visitor will be asked: "Would you be willing to take a more detailed survey that addresses some current wildlife issues in <PARK UNIT>? We can either give you the survey packet right now with the survey and a postage-paid return envelope or email you a link to the survey online. Would you like to take either the paper survey or*

the online survey for us?"

<u>If YES, I would like to take the paper survey:</u> "Thank you!"

<Give visitor the survey packet and record survey number. Record mailing address.>

<u>If YES, I would like to take the online survey:</u> "Thank you! What is the best email address for us to contact you?" <Record email address>

<u>If NO:</u> "Thank you for answering our questions today."

To account for potential non-response bias, visitors who do not agree to complete either the intercept or mail back/email surveys (those referred to above as soft refusals) will be asked the following questions:

1. "Are you a permanent resident of the United States?"
2. "Which of the following best describes your age (under 30, 30 to 60, over 60)?"
3. " Have you personally ever been driving or riding in a vehicle that has been in a collision with wildlife? [For Terrestrial version]" and "Have you personally ever been to a coastal area where contamination from an oil spill was evident? [For Aquatic version]."

Responses will be analyzed and compared to respondents who completed the entire intercept survey to explore any non-response bias concerns. Because the intercept survey will be linked to the online survey via a unique identifier, respondents who do not complete the mail back/electronic survey will be compared to those who did participate. Thus, non-response bias checks will be conducted on both intercept and mail-back survey respondents. Chi-square tests will be conducted between the respondents and non-respondents to explore and identify any issues of underrepresentation due to non-response bias.

4. Describe any tests of procedures or methods to be undertaken. Testing is encouraged as an effective means of refining collections of information to minimize burden and improve utility. Tests must be approved if they call for answers to identical questions from 10 or more respondents. A proposed test or set of test may be submitted for approval separately or in combination with the main collection of information.

As noted, the current collection and associated survey design is based on a successful implementation of the methods and questions employed in a survey of MN households designed to value deer and turtles. This 2021 study included all major aspects of survey design and testing: cognitive interviews, professional peer review of instruments and methods, pretesting, final survey administration and analysis and reporting. Further, slight

adjustments for audience relevance (NPS visitors) have been made and reviewed by subject matter experts. The very recent use of the currently proposed question framing, and methods provides a real-world successful test of the proposed collection methods. While there are two primary versions of the survey (terrestrial and aquatic) they share all the structure, ordering, explanation and motivation text format, and stated preference question framing as the fully tested MN survey upon which they are based. Further, the terrestrial and aquatic mail-back surveys were pretested with 9 individuals for each survey in order to estimate burden. Survey takers needed an average of 15 minutes to complete the survey, with no discernable difference between the aquatic and terrestrial surveys in terms of completion time. We have assumed 15 minutes of burden per survey for the purposes of this submission.

5. Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

Expert consulted on the statistical aspects of survey and sampling design

Statistical Consultant	Dr. David Patterson Department of Mathematical Sciences University of Montana Missoula, MT 59812
Collection and Analysis Agency	Leslie Richardson National Park Service Fort Collins, CO leslie_a_richardson@nps.gov
Principal Investigator for data collection and analysis	Chris Neher Bioeconomics, Inc. Missoula, MT 59802 406-721-2265 bioecon@montana.com

Literature Cited

Dillman, D.A., Smyth, J. D., & Christian, L.M. (2014). *Internet, Phone, Mail and Mixed-Mode Surveys: The Tailored Design Method* (Fourth edition.). Wiley.

Duffield, J., Patterson, D., & Neher, C. (2010). "What is the Value of a Trip to a National Park? Searching for a Reference Methodology." *W2133 Benefits and Costs of Natural Resources Policies Affecting Public and Private Lands. 22nd Interim Report and Proceedings from the Annual Meeting.* Western Regional Research Publications, Pages 246-275. September 2010.

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