

SUPPORTING STATEMENT
FOR OMB CLEARANCE
PART A

NASA Earth to Sky: An Assessment of Global Climate Change in
Visitors to Public Lands

October 22, 2010

Part A: Justification

A.1 Explanation of Circumstances That Make Collection of Data Necessary

The National Aeronautics and Space Administration (NASA) Office of Education, requests that the Office of Management and Budget (OMB) approve, under the *Paperwork Reduction Act of 1995*, a clearance for NASA to conduct data collection efforts related to the evaluation of NASA's Earth to Sky Partnership.

This study (embedded within a larger collaborative effort) will assess if visitors to public lands are benefiting from an interagency partnership, known as Earth to Sky (ETS), by (1) measuring awareness and understanding of global climate change in visitors to national parks and wildlife refuges, and (2) identifying factors that influence program effectiveness. ETS is a NASA-funded partnership between NASA's Space and Earth Science disciplines, the National Park Service (NPS) and US Fish and Wildlife Service (FWS). The partnership actively fosters collaborative work between the science and interpretation/education communities of NPS, FWS, and NASA, with the ultimate goal of enriching the experiences of millions of park and wildlife refuge visitors, by bringing NASA science into the context of the public lands experience. The project was created to facilitate the use of NASA research and resources by NPS and FWS interpreters and educators in their communication with citizens who visit, and are concerned with, our nation's natural, cultural, and historic resources.

A main role of NASA's education and outreach work is to support the agency's scientific efforts. This proposal directly addresses NASA's Strategic Sub-goal 3A: "Study planet Earth from space to advance scientific understanding and meet societal needs." NASA conducts the bulk of the research funded by the US Climate Change Science Program. NASA research plays a critical role in the world's understanding of the causes and consequences of climate change. Through a series of professional development efforts, interpreters and educators were exposed to NASA researchers and research. In this way, informal educators learned about NASA's current data and initiatives related to Earth Systems Science, with an emphasis on global climate change. These participants develop and deliver interpretive and educational programs and products to visitors at parks and refuges nationwide. This research seeks to assess program effectiveness by determining if visitor understanding of climate change increases as a result of their program participation.

A.2 How the Information Will Be Collected, by Whom, and For What Purpose

How Information Will Be Collected and by Whom

Visitor surveys will be administered by members of the ETS Evaluation Team. The team consists of Dr. Theresa Coble, Associate Professor, Stephen F. Austin State University, Dr. David Smaldone, Associate Professor, West Virginia University, and other professional colleagues and or graduate students as required under the direction of the principal investigator, Dr. Coble.

(a) Respondent universe:

This study will administer an onsite survey to approximately 1200 visitors at selected NPS and FWS sites where ETS participants work. Possible survey locations have been identified based on the number and type of programs developed and the potential number of visitors to be reached by programs delivered at the site. In addition, researchers seek to include a diversity of sites and resources.

Potential NPS survey sites include: Kenai Fjords National Park, Yosemite National Park, Everglades National Park, Sequoia & Kings Canyon National Parks, Golden Gate National Recreation Area, Congaree National Park, Mt. Rainier National Park, Bryce Canyon National Park, Indiana Dunes National Lakeshore, Gulf Islands National Seashore, Rocky Mountain National Park, Apostle Islands National Lakeshore, Cuyahoga Valley National Park, Rock Creek Park, Death Valley National Park, and Great Smoky Mountains National Park.

Potential FWS sites include: DeSoto National Wildlife Refuge, Leavenworth Fish Hatchery, Chincoteague National Wildlife Refuge, Patuxent Research Refuge, JN “Ding” Darling National Wildlife Refuge, and several Alaska refuges.

In January 2011, potential research sites will be evaluated based upon the selection criteria and final survey locations will be chosen. Surveys will be administered onsite by evaluation team members at 5-8 of the above locations. Additional surveys may be administered *with the assistance of ETS participants* (and colleagues) at selected sites. Using this method, park and refuge staff will administer surveys to visitors who attend interpretive and educational programs onsite.

(b) Research Methods:

A survey will be administered onsite to visitors who attend interpretive and educational programs and/or who are exposed to interpretive and educational products related to global climate change. A sample of visitors will be drawn from adults and young adults (18 and older) visiting participating parks and refuges during the Summer 2011 study period. Approximately 200 visitors will be surveyed at 5-8 study locations.

(c) Sampling plan/procedures:

At sites with interpretive and educational programs focused on global climate change, researchers will approach all attendees (census sampling) immediately *before* (control group) or *after* (treatment group) selected programs, asking adult visitors to complete the survey onsite. At select locations park or refuge staff will administer the survey to willing participants *before* or *after* exposure to interpretive or educational programs. Additionally, at sites where non-personal interpretive or educational products or services related to global climate change are provided (e.g., site bulletins, brochures, videos, interactive kiosks, waysides, exhibits, etc.), researchers and/or staff members will approach a random sample of visitors *before* and *after* exposure to onsite interpretive and educational products, asking them to complete the survey onsite.

At sites where the effectiveness of non-personal interpretive and educational products related to climate change is assessed, the researcher or staff member will use an “every nth person” sampling approach to approximate the random selection of participants. For example, researchers will approach every 3rd or 5th visitor who reads (or appears to read) a climate change exhibit panel during the sampling

time and ask them to fill out the survey. For other products, such as printed materials, randomly selected visitors will be asked to view or listen to a product and then to complete the survey. For films, a random sample of audience members will be asked to complete the survey either before or after viewing the film. Data will be collected throughout the summer months (June-August) of 2011 at the selected parks and/or wildlife refuges/hatcheries.

(d) Instrument administration:

Onsite surveys will be used to collect the data. Surveys will be self-administered by the visitors. As noted above, after approaching the visitors, they will be asked to participate in the study, and be will notified that participation is voluntary, and results will remain confidential and anonymous. The survey will include questions about: 1) demographics, 2) awareness and understanding of global climate change, 3) interpretive and learning outcomes, and 4) perception of trust in various climate change information sources.

(e) Expected response rate/confidence levels:

The expected response rate should be between 80-90% of approached visitors, due in part to anticipated response rates of greater than 90% among those who attend interpreter or educator-led programs. Previous studies at NPS sites using similar onsite survey methods have obtained high response rates (Coble et al., 2007).

(f) Strategies for dealing with potential non-response bias:

As response rates increase, non-response bias becomes less problematic. However, a contact log will be used to track all visitors who are invited to participate in the study. Simple non-response bias checks comparing participation rates by gender, group size and composition, time of day, etc., will be conducted based on contact log information.

(g) Description of any pre-testing and peer review of the methods and/or instrument (recommended):

The survey instrument has been peer reviewed by several academic experts associated with recreation and park research at both Stephen F. Austin State University and West Virginia University. Survey modifications were made based on peer review comments. In addition, education specialists at NASA, FWS, and the NPS assisted in the survey peer review process. Finally, several items used to assess public attitudes and understandings related to climate change were obtained from survey instruments developed and tested by the Yale Project on Climate Change Communication at Yale University.

For What Purpose

The purpose of this project is to assess if *visitors* to NPS and FWS sites are benefiting from an interagency partnership, known as Earth to Sky, by (1) measuring the awareness and understanding of global climate change among visitors who have and have not been exposed to onsite interpretive and educational programs and products, and (2) identifying factors that influence program effectiveness. An onsite survey will be administered to park visitors to assess their awareness and understanding of global climate change; interpretive and educational outcomes; and their trust in various sources of climate

change information. Data will be collected at 5-8 NPS and FWS sites from June to August, 2011. Results will help NASA and other managers of the Earth to Sky partnership assess the success of the partnership efforts by examining program effects upon the ultimate “end of the pipe” target audience—the public. Results will help project leaders refine project activities and procedures while encouraging continued inter-agency collaboration.

Figure 1: Research Questions, Data, and Methods

Research Questions	Data	Sample	Measures/Domains	Analytic Approach
<u>Climate Change Awareness & Understanding</u>				
(1) What are the baseline levels of global climate change <i>awareness</i> and <i>understanding</i> among visitors who attend onsite interpretive and educational programs and/or who are exposed onsite to interpretive and educational products?	Visitor survey	5-8 sites; approximately 1200 total visitors.	Survey items # 1, 2, 3, 7, 8, 9,10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25,	Descriptive and inferential statistics (e.g., t-tests, analysis of variance, chi-square tests)
(2) As visitors are exposed to global climate change interpretive and educational products and services, <i>in what ways, to what extent</i> and <i>under what circumstances</i> do the observed levels of awareness and understanding increase (or decrease)?				
<u>Interpretive & Learning Outcomes</u>				
(3) What interpretive and learning outcomes do visitors derive as a result of their exposure to global climate change interpretive and educational products and services?	Visitor survey	5-8 sites; approximately 1200 total visitors.	Survey items # 4, 5, 6	Descriptive and inferential statistics (e.g., t-tests, analysis of variance, chi-square tests)
<u>Trust in Information Sources</u>				
(4) Which sources of information about global climate change do visitors trust? Which sources are perceived as more (or less) trustworthy?	Visitor survey	5-8 sites; approximately 1200 total visitors.	Survey items # 21,	Descriptive and inferential statistics (e.g., t-tests, analysis of variance, chi-square tests)
<u>Factors that Influence Observed Outcomes</u>				
(5) What demographic and psychographic factors influence visitor awareness, understanding, interpretive and learning outcomes, and trust in informational sources regarding global climate change?	Visitor survey	5-8 sites; approximately 1200 total visitors	Survey items # 3, 9, 14, 15, 16, 21, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34	Descriptive and inferential statistics (e.g., t-tests, analysis of variance, chi-square tests)

The overall goal of the ETS professional development efforts is to advance NASA’s capability to improve public understanding and appreciation of its science and technology, through professional development for some of our nation’s most accomplished informal educators: National Park Service and other public agency Interpreters and educators. The first ETS workshops were held in 2004. The 2009 and

2010 ETS workshops focused on the research and implications of global climate change and its impacts on natural, cultural, and historic locations.

Accurate, accessible, and personally meaningful information on climate change is critically important to our nation, and is in short supply. Climate change is a complex topic prone to many misperceptions. According to the National Science Foundation (2008), “Although Americans seem to accept climate change, or global warming, as a real phenomenon, most do not seem to have a great deal of concern about it.” A recent Gallup poll (2008) found that only 40% of Americans believe that the effects of global warming will have a serious threat to them in their lifetime. Additionally, the average high-school student fails a quiz on the causes and consequences of climate change.

However, a 2007 study of survey trends addressing public opinion about global climate change indicated that public awareness of the issue had risen dramatically over the past 20 years. While only 39% of the public reported having “heard or read anything about the greenhouse effect” in 1986, by 2006 that number had reached 90%. Much of this increase in awareness is attributed to the increase in media coverage on the issue of global climate change. Although awareness of the issue has risen, a 2006-2007 ABC News study found that only 11% of Americans felt they knew “a lot” about global warming, an increase from 5% in 1997 (Nisbet & Myers, 2007, p.445).

These factors indicate that while awareness has risen, public understanding of the issue of global climate change has not enjoyed the same increase. Clearly there is a need for improved public understanding. This need for accurate and timely information combined with NASA’s topical expertise provided the impetus for creating the ETS climate change workshops. This project aims to address the need for further public understanding of the issue of global climate change by infusing NASA science into the many informal and formal educational opportunities afforded by National Parks and Refuges. These natural and historic locations provide ideal settings for communicating the immediate and obvious effects of climate change, from rapidly melting glaciers, increased intensity and length of fire seasons, to flooding of archeological and historical treasures.

Studies conducted by The Center for Climate Change Communication at Yale University suggest that the messenger or source of climate change information is critical to public understanding of this complex issue. Certain messengers invoke trust while others are treated more skeptically. A 2008 national survey conducted by the Center found that 82% of Americans trusted scientists as a source for climate change information while only 47% trusted mainstream media. This suggests that park and wildlife staff, of which many are scientists as well as educators and interpreters, might offer an ideal avenue by which to funnel climate change information to an uncertain public (Leiserowitz, et.al, 2008, p.42).

Other studies found that encouraging attitudinal change regarding “green” behaviors will not be effective unless people care about the issue personally and are motivated and able to take action about climate change (Ockwell, et. al, 2009, p. 307). Park and wildlife interpreters and educators are trained in program delivery methods that facilitate visitors in making both emotional and intellectual connections to the resources being interpreted. Their theme-based programs are developed with an understanding of their audience and extensive knowledge about the resource. NPS and FWS staff seeks to make their climate change programs relevant to visitors by examining the tangible effects of climate change within their park or refuge. They also engage the visitor through communication and interaction to examine personal behaviors that might impact climate change and offer alternatives to those behaviors. This can be significant because although Leiserowitz et al. (2008), found that most Americans consider themselves fairly well informed about the causes, consequences, and solutions to global warming, more than half said

that they needed more information to form a firm opinion about global climate change and what actions might be taken to curb it.

A.3 Use of Improved Information Technology to Reduce Burden

The data collection plan reflects sensitivity to issues of efficiency, accuracy, and respondent burden. Therefore, the surveys were designed so that only questions not available elsewhere were asked. At this time it is not feasible to obtain high-quality data that captures onsite experiences and outcomes electronically. Thus, surveys will be conducted onsite, in person, using traditional recording procedures.

A.4 Efforts to Identify and Avoid Duplication

This effort will yield data to evaluate visitor outcomes related to their participation in climate change programming provided at national parks, wildlife refuges and fish hatcheries. The evaluation of visitor outcomes provides an important indicator of the effectiveness of the interagency Earth to Sky program. At present, there is no similar evaluation being conducted in the U.S., thus, there is no alternative source to obtain the visitor outcome information.

Also, a variety of research sites will be chosen to ensure maximum variation in the data collected, avoiding unnecessary duplication in research locations and site attributes. Similarly, a variety of interpretive and educational programs and products will be incorporated into the data collection and analysis to further reduce unnecessary duplication.

A.5 Efforts to Minimize Burden on Small Business or Other Entities

The primary entities for the study are visitors to public lands. Burden is minimized for all respondents by requesting only the minimum required to meet study objectives. All primary data collection will be coordinated by the principal investigator, reducing burden to agency staff. No small businesses will be involved as respondents.

A.6 Consequences of Less-Frequent Data Collection

If the proposed data were not collected, NASA would potentially not be able to fulfill some of its objectives regarding their Strategic Sub-goal 3A: “Study planet Earth from space to advance scientific understanding and meet societal needs.” Thus, federal resources might be allocated, and program decisions might be made, in the absence of valid assessments of the effectiveness of current programs to increase public awareness and understanding of NASA-derived global climate change science and information.

A.7 Special Circumstances Requiring Collection of Information in a Manner Inconsistent with Section 1320.5(d)(2) of the Code of Federal Regulations

There are no special circumstances associated with this data collection.

A.8 Federal Register Comments and Persons Consulted Outside the Agency

In accordance with the Paperwork Reduction Act of 1995, NASA published a notice in the Federal Register announcing the agency's intention to request an OMB review of data collection activities. The notice was published on May 19, 2010, in volume 75, number 96, page 28071. A 30-day period for public comments was provided. To date, no comments were received.

The survey instruments were developed by the principal investigator and the evaluation team with input from Earth to Sky project leaders including Ms. Anita Davis from NASA's Office of Education.

A.9 Payments to Respondents

There will be no payments to respondents.

A.10 Assurance of Confidentiality

Every effort will be made to maintain the privacy of respondents, using several procedural and control measures to protect the data from unauthorized use. The evaluation team will follow procedures for ensuring and maintaining confidentiality, consistent with the Family Educational Rights and Privacy Act of 1974 (20 USC 1232g), the Privacy Act of 1974 (P.L. 93-579, 5USC 552a), and the Federal common rule or Department final regulations on protection of human research subjects. Data to be collected will not be released with individual visitor or educator/interpreter information, and data presented will occur only in aggregated form. A statement to this effect will be included in a letter accompanying each survey and will be read to visitors before administering the survey. Respondents will be assured that all information identifying them will be kept confidential, in compliance with the legislation (P.L. 103-382).

The procedures to protect data during information collection, data processing, and analysis activities are as follows:

- All respondents included in the study sample will be informed that the information they provide will be used only for the purpose of this research. Individuals will not be cited as sources of information in prepared reports.
- To ensure data security, all individuals hired by the contractor are required to adhere to strict standards and sign an oath of confidentiality as a condition of employment.
- Hard-copy data collection forms will be delivered to a locked area at the contractor's office for receipt and processing. The contractor will maintain restricted access to all data preparation areas (i.e., receipt, coding, and data entry). All data files on multi-user systems will be under the control of the principal investigators, with access limited to project staff on a "need-to-know" basis only.
- Individual identifying information will be maintained separately from completed data collection forms and from computerized data files used for analysis. No respondent identifiers will be contained in public use files made available from the study, and no data will be released in a form that identifies individuals.

The principal investigator will also have all data collection protocols and surveys reviewed by the Institutional Review Board (IRB) at Stephen F. Austin State University (SFA). Prior to their use, SFA’s IRB will approve all data collection instruments, including the visitor consent forms and visitor assent forms. The IRB will assure that the data collection protocols and procedures, including consent forms, abide by strict confidentiality procedures. See Appendix F and G for draft versions of the consent and assent forms.

A.11 Questions of a Sensitive Nature

The questions included on the data collection instruments for this study do not involve sensitive topics. That is, although the subject of global climate change is sometimes at the center of controversial and politically charged public debates, asking park and refuge visitors to share their personal views and understandings, their reactions to professionally prepared and delivered interpretive and educational programs and products, and their possible subsequent pro-environmental or citizenship behaviors provides an opportunity for these respondents “to be heard”—whatever their point of view may be. Research conducted to elicit respondent attitudes, perceptions and behaviors about topics and behavior that is non-socially censured can be regarded as non-sensitive in nature.

A.12 Estimates of Respondent Burden

Figure 2 presents estimates of the annualized reporting burden for the surveys. The surveys will be administered to approximately 1200 visitors. We will assume an overall response rate of 89 percent, so that we may need to approach approximately 1350 in order to complete 1200 surveys. Estimates for the hour burden are based on time estimates provided by the survey developers of the originals surveys based upon similar surveys used in comparable evaluations.

Figure 2
Estimates of 2011 Annualized Burden Hours and Cost

Data Collection Sources	Number of Respondents ^a	Frequency of Response	Total Minutes per Respondent	Response Burden in Hours	Estimated Cost Per Hour ^b	Costs per Respondent	Total Burden (Costs)
Visitor Surveys	1,200	1	15	322.5	\$109	\$29.44	\$35,333

Notes:

^a Total number of initial contacts 1350. Expected response rate is 89%.

^b Approximately 1/3 of the funds that NASA and NASA-funded project partners allocated to researchers to evaluate the ETS project (i.e., 1/3 of \$106,000 or \$35,333) will be devoted to assessing visitor outcomes.

A.13 Estimates of the Cost Burden to Respondents

There is no annualized capital/startup or ongoing operation and maintenance costs associated with collecting the data. Other than their time to complete the surveys, which is estimated in Figure 2, there are no direct monetary costs to respondents.

A.14 Estimates of Annualized Government Costs

This information collection activity has been developed in the performance of the Prime Contract Number: NNH09CF00C and Subcontract Agreement: S09112-02. The subcontract agreement is a fixed price agreement; therefore, there are no separate costs associated with the development of survey data collection instruments.

A.15 Changes in Hour Burden

This is a new collection of information.

A.16 Time Schedule, Publication, and Analysis Plan

The schedule shown in Figure 3 displays the sequence of activities required to conduct the information collection activities and includes key dates for activities related to data collection, analysis, and reporting.

Figure 3
Time Schedule

Activities and Deliverables	Responsible Party	Date
Chose NPS & FWS sampling sites	Evaluation Team	Winter 2011
Survey Data Collection	Evaluation Team	June – August 2011
Data Analysis of Visitor Survey	Evaluation Team	Fall 2011
Draft Report	Evaluation Team	May 31, 2012

The principle investigators and their team will collect most or all of the data at NPS and FWS sites. Some agency personnel may assist in onsite data collection as well.

The surveys will be used to assess awareness and understanding of global climate change, interpretive and educational outcomes, and perceptions of trust in various sources of global climate change information among visitors. The analysis will incorporate descriptive and inferential statistics to examine outcomes and pinpoint factors that influence observed outcomes. An evaluation report will be prepared based on survey findings.

A.17 Display of Expiration Date for OMB Approval

NASA is *not* requesting a waiver for the display of the OMB approval number and expiration date on the data collection instruments.

A.18 Exceptions to Certification Statement

This submission does *not* require an exception to the Certificate for Paperwork Reduction Act (5 CFR 1320.9).