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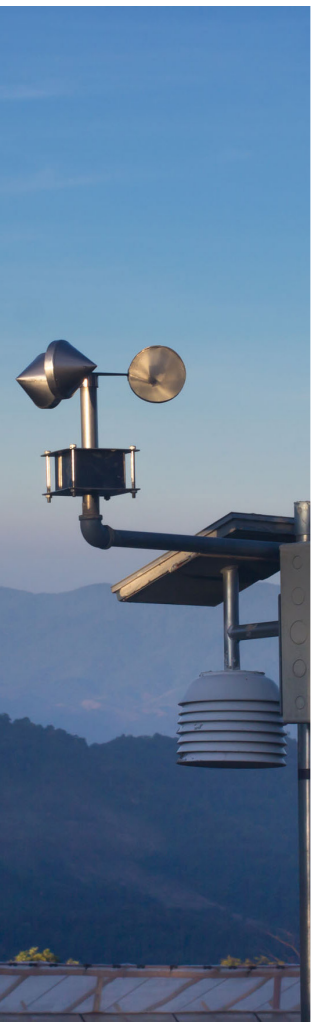
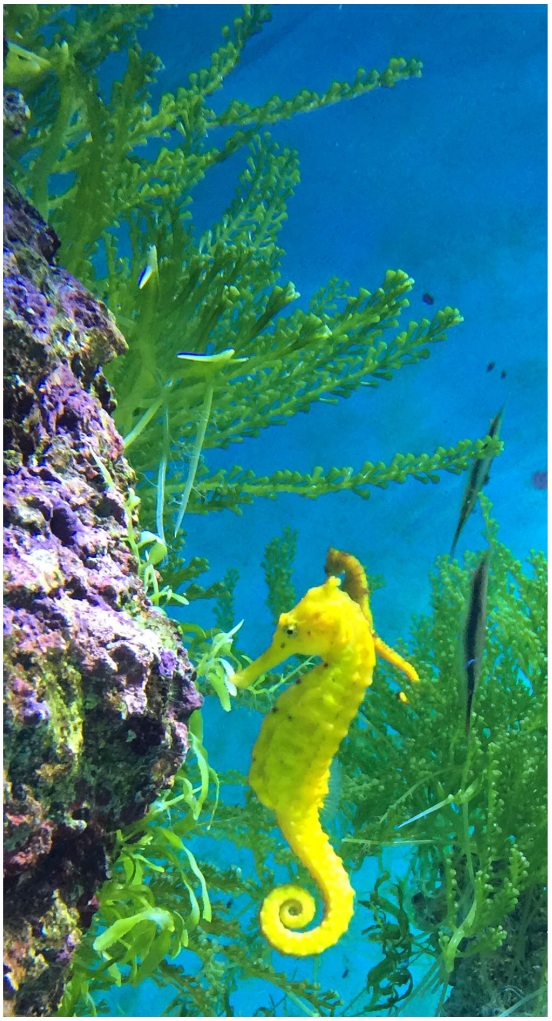
Evaluation Support Services

National Oceanic and Atmospheric Administration





Final Report

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Evaluation Support Services

National Oceanic and Atmospheric Administration

Final Report

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Abbreviations and Acronyms

CSC	Cooperative Science Centers
EPP/MSI	Educational Partnership Program with Minority-Serving Institutions
FRD	fuzzy regression discontinuity
GSP	Graduate Scholarship Program
HUSP	Hollings Undergraduate Scholarship Program
NOAA	National Oceanic and Atmospheric Administration
NSF	National Science Foundation
OEd	Office of Education
OMB	Office of Management and Budget
QR	quick response
RDD	regression discontinuity design
REU	Research Experiences for Undergraduates scholarship program
SPMTS	Student and Performance Measures Tracking System
SSIO	Student Scholarship Internship Opportunity System
STEM	science, technology, engineering, and mathematics
URM	underrepresented minority
USP	Undergraduate Scholarship Program

Executive Summary

This report presents the results of an evaluation of two National Oceanic and Atmospheric Administration (NOAA) Office of Education (OEd) scholarship programs designed to train students in NOAA mission fields.[1] NOAA contracted with Insight Policy Research (Insight) to conduct this study to determine the effectiveness of these programs and identify opportunities for enhancing the impact of each program. The results of this study indicate positive associations between receipt of a scholarship and the likelihood of holding an advanced degree, enrolling in graduate studies, and expressing interest in working in a NOAA office or facility. Moreover, scholarship recipients perceived great value in both the internship and financial aid components of the programs. The findings presented in this report include statistical results outlining program effectiveness and a summary of feedback from scholarship recipients regarding their experiences applying for and participating in the scholarships. The report concludes with recommendations for program management, overall improvements, and future scholarship evaluations.

A. Background

Since 2000, NOAA OEd has overseen two scholarship programs: the Hollings Undergraduate Scholarship Program (HUSP) and the Educational Partnership Program with Minority-Serving Institutions (EPP/MSI). Although both programs share the broad aim of increasing student education and training in NOAA mission fields, EPP/MSI focuses particularly on providing such opportunities to students from minority communities underrepresented in the sciences. Whereas HUSP provides support only in the form of scholarships to undergraduate students, EPP/MSI offers support through multiple vehicles, including Cooperative Science Centers established at minority-serving institutions. This report focuses on HUSP and two components of EPP/MSI, the Undergraduate Scholarship Program (USP) and the Graduate Sciences Program (GSP).[2]

The primary purpose of this evaluation is to identify the effects of the HUSP and EPP/MSI scholarships and assess how scholarship recipients (hereafter referred to as scholars) performed on specific educational, professional, and research outcomes. More specifically, this study examines whether scholars gained knowledge and training in NOAA mission fields and the extent to which the scholarships shaped the academic and career trajectories of scholars. A secondary purpose of this study is to provide scholar feedback that can be used for program management and overall improvement.

Insight surveyed 2,881 individuals who applied for HUSP and/or EPP/MSI scholarships between 2006 and 2014. The study team used a regression discontinuity design (RDD) analysis to compare the outcomes for scholars with those for nonrecipients (individuals who applied for but did not receive a scholarship). RDD is a strong methodological alternative to experimental design; it allowed the study team to adjust for selection bias between scholars and nonrecipients by using an assignment strategy based on cutoff score. Scholars and nonrecipients were surveyed regarding their aspirations and achievements since they applied for the scholarships. The survey was administered primarily online with telephone and mail follow-up. The RDD approach did not yield conclusive results because the data were insufficient to power the analyses as a result of sample size and measurement considerations. The study

[1] NOAA mission fields encompass a wide range of disciplines, including social sciences and science, technology, engineering, and mathematics (STEM) fields.

[2] GSP was eliminated in July 2012 as a result of Executive Order 13562 (see NOAA, n.d.-b).

team also conducted (1) descriptive qualitative analyses, (2) descriptive quantitative analyses, and (3) simple logistic regressions. The logistic regressions provide statistical findings to supplement the RDD results. To control for known group differences, the multivariate analyses included covariates for age, gender, race/ethnicity, and application year. Application year was included to account for cohort-related differences in selection rates and application scores.

B. Findings

The evaluation results indicate the HUSP and EPP/MSI scholarships foster knowledge and training in NOAA mission fields and support students' educational trajectories. This section presents findings regarding (1) the impacts of the programs on knowledge and training, (2) the academic and career trajectories of scholars, and (3) scholar feedback on the programs. Findings show positive associations with the scholarship programs on several outcomes.

1. Knowledge and Training

NOAA scholars received hands-on training and research opportunities. On average, scholars reported authoring more publications and presentations and gaining more hands-on experience relative to nonrecipients. For example, scholars reported authoring 1.3 publications on average compared to nonrecipients' 0.6 publications. The results for these outcomes are significant when controlling for individuals' sex, race/ethnicity, age, and application year.

2. Academic and Career Trajectories

Participation in the NOAA scholarship is associated with positive academic outcomes and greater interest in NOAA research. Scholars were more likely on average to hold an advanced degree, be enrolled in graduate study, and express interest in working in a NOAA office or facility compared with nonrecipients. For example, 45 percent of scholars held an advanced degree compared to 28 percent of nonrecipients. Scholars and nonrecipients did not differ in their likelihood of holding a highest degree in a NOAA mission field, pursuing graduate study in a NOAA mission field, being employed, or being employed in a NOAA mission field.

3. Program Feedback

Scholars perceived great value in both the internship and financial aid components of the scholarship programs. Of those surveyed, 44 percent of scholars reported that the scholarships shaped their career trajectories by providing the opportunity to work with a NOAA mentor and build a professional network, which positively influenced their career trajectories in NOAA fields. Furthermore, as noted by 34 percent of scholars, the monetary support allowed them to focus on their studies rather than on paying tuition. In addition, 32 percent of scholars noted that the hands-on research experience provided through the scholarship made a different in their lives. However, 75 percent of scholars also reported encountering challenges during the program. The most commonly reported challenges were logistical (e.g., finding housing during the internship period) and project specific (e.g., poorly defined projects). Although mentorship was generally perceived to be a positive aspect of the internship experience, 3 percent of scholars reported receiving no mentorship or guidance.

C. Conclusions and Recommendations

The analyses suggest there is a positive association between receipt of a NOAA scholarship and several specific and important outcomes, including publications, presentations, hands-on experience, enrollment in graduate study, achievement of an advanced degree, and continued interest in NOAA topics. Furthermore, scholars reported that the internship experience positively influenced their career trajectories. However, there is no evidence that the scholarships have a significant causal effect on indicators of knowledge, training, and educational trajectories. These indicators include mentoring support; the receipt of applied technology experience; and employment beyond the effects of gender, race, and application year on these outcomes. The NOAA scholarship opportunities provide important research experience and mentoring for participants, but statistical findings do not identify the scholarship as the only mechanism responsible for scholars' positive outcomes and must consider that unobserved individual characteristics were also responsible.

The results, including program feedback provided by scholars, identify areas for programmatic improvements, opportunities to adjust the ways program performance is measured, and opportunities for additional program activities. Based on the results of this evaluation, the study team recommends refining how NOAA mission fields are defined, creating and enforcing mentorship processes, and facilitating postprogram employment.

Chapter 1. Introduction

Insight Policy Research (Insight) conducted an evaluation of two scholarship programs overseen by the National Oceanic and Atmospheric Administration's (NOAA) Office of Education (OEd). With more than 12,000 personnel worldwide, NOAA's mission is "to understand and predict changes in climate, weather, oceans, and coasts, to share that knowledge and information with others, and to conserve and manage coastal and marine ecosystems and resources" (NOAA, n.d.-a). NOAA OEd is a staff office within the Office of Under Secretary of Commerce for Oceans and Atmosphere (the NOAA Administrator) and is charged with advancing education in NOAA mission fields[3] both within the organization and among the public. OEd approaches this task in a variety of ways, including coordinating educational activities across NOAA, collaborating with universities, partnering with schools and organizations, and offering competitive grant and scholarship programs.

This report focuses on two OEd scholarship programs that aim to train scholars in NOAA mission fields: the Hollings Undergraduate Scholarship Program (HUSP) and the Educational Partnership Program with Minority-Serving Institutions (EPP/MSI). Two components of EPP/MSI, the Undergraduate Scholarship Program (USP) and the Graduate Sciences Program (GSP), are examined in this report. In 2015, the study team surveyed scholarship applicants to assess their aspirations, achievements, and experiences. This report provides data on the educational, professional, and research outcomes of NOAA scholarship recipients (hereafter referred to as scholars). When possible, these outcomes are compared with those for individuals who applied for but did not receive a scholarship (hereafter referred to as nonrecipients) using regression discontinuity design (RDD) and, later, multivariate analyses. The report also summarizes scholars' feedback on the scholarship programs and concludes by providing recommendations for outcomes measurement, program improvement, and future scholarship evaluations.

A. Overview of NOAA Scholarship Programs

NOAA OEd has accepted applications for HUSP since 2005, for EPP-USP since 2001, and for EPP-GSP since 2000. This section describes the background and goals of these programs.

1. HUSP

Since its inception in 2005, HUSP has provided support to more than 1,200 competitively selected undergraduates in NOAA mission fields. Each scholar receives 2 academic years of tuition support (currently up to $9,500 per year); a 10-week paid summer internship at a NOAA facility; a NOAA mentor; and a travel, housing, and conference participation allowance. HUSP scholars, who have been selected from more than three hundred 2-year and 4-year institutions to date, conduct research at NOAA facilities across the United States. HUSP has four key goals:

- Increase student training in oceanic and atmospheric science, research, technology, and education, and foster multidisciplinary training opportunities.
- Increase public understanding of and support for stewardship of the ocean and atmosphere, and improve environmental literacy.

[3] NOAA mission fields encompass a wide range of eligible disciplines, including social sciences and science, technology, engineering, and mathematics (STEM) fields.

- Recruit and prepare students for public service careers with NOAA and other natural resource and science agencies at Federal, State, and local levels of government.
- Recruit and prepare students for careers as teachers and educators in oceanic and atmospheric science, and improve scientific and environmental education in the United States.[4]

2. EPP/MSI

The goal of EPP/MSI, broadly, is to advance the education of students from underrepresented minority communities in NOAA mission fields and to create a diverse and highly qualified future workforce in NOAA mission fields. Over the past 15 years, EPP/MSI has provided support for research and education to more than 30 minority-serving institutions, or MSIs,[5] and more than 1,900 undergraduate and graduate students studying at MSIs. Until recently, the program had three main components: the Undergraduate Scholarship Program (USP), the Graduate Sciences Program (GSP), and Cooperative Science Centers (CSCs). GSP was eliminated in 2012.[6] The majority of EPP/MSI students have been supported through CSCs, but approximately 245 individual students have been supported by NOAA directly through USP and GSP. This evaluation examines the impacts of USP and GSP.

More than 186 undergraduate scholars have received USP awards since 2001. This program provides individual students at MSIs with financial support for 2 years of undergraduate study (up to $9,500 per year) in NOAA mission fields. It also offers two 10-week summer internships at NOAA facilities; a NOAA mentor; and a travel, housing, and conference participation allowance.

Fifty-nine graduate students at MSIs received support through GSP between 2000 and 2012. GSP provided support for up to 2 years of graduate study for master's students and up to 4 years of graduate study for doctoral students, as well as travel and training opportunities. Students who successfully completed GSP were eligible for transition to employment at NOAA. Although GSP was recently eliminated, NOAA has established a similar initiative, the Graduate Research & Training Scholarship Program; however, this program is limited to students studying at CSC institutions and does not offer a transition to federal employment.

Although the CSCs are beyond the scope of this evaluation, they make up the largest of the three EPP/MSI components, both in funding and number of students reached. The CSCs were established in 2001 and currently include 24 university campuses. Each of the current four CSCs is funded for up to $15 million over 5 years; has a distinct educational and scientific focus, defined mission, and partner institutions; and is affiliated with a primary NOAA Line Office.

[4] See NOAA, n.d.-c
[5] The U.S. Department of Education defines minority-serving institutions as any of the following: Alaskan Native-serving institutions, Hispanic-serving institutions, Historically Black Colleges and Universities, Native Hawaiian-serving institutions, and tribal colleges and universities.
[6] GSP was eliminated in July 2012 as a result of Executive Order 13562 (see NOAA, n.d.-b).

B. Purpose of the Evaluation

This study has three key purposes. The first is to identify the impacts of the HUSP and EPP/MSI scholarships. Broadly, the study team addressed two overarching impact research questions:

- To what extent do NOAA scholars gain knowledge and training in NOAA mission fields?
- Do the NOAA scholarships shape scholars' academic and career trajectories?

The evaluation assesses whether HUSP and EPP/MSI scholars performed better on specific educational, professional, and research outcomes compared with nonrecipients. The study team considered whether more scholars than nonrecipients have graduated with postsecondary degrees in NOAA mission fields, attended graduate school, earned degrees in NOAA mission fields, pursued careers in NOAA mission fields, and gained research skills and experience in NOAA mission fields. These outcomes indicate whether HUSP and EPP/MSI have successfully met their long-term goals to date.

A secondary purpose of the evaluation is to summarize scholars' feedback on the HUSP and EPP/MSI scholarship process. Broadly, the study team addressed several overarching process research questions:

- What do scholars value about the NOAA scholarship experience?
- What challenges do scholars experience while participating in the program?
- What comparable programs provide similar experiences for scholars?

A final purpose is to provide recommendations that identify areas best targeted for future investment. These recommendations speak to program management and overall improvement. By identifying how and in what ways HUSP and EPP/MSI have helped serve student scholars and how these programs can be improved, NOAA can further refine its programming and target efforts for future investment.

C. Organization of Report

The remainder of this report builds on the background information provided in this introductory chapter, summarizing the methodology and results of this study and discussing the conclusions that can be drawn from the findings. Chapter 2 describes the study methodology, including a discussion of the study team's initial review of key NOAA documents, data collection methods, and data analysis procedures. Chapter 3 describes the findings regarding the impact of receiving a scholarship on applicants' knowledge and training. Chapter 4 describes the findings regarding the impact of receiving a scholarship on applicants' academic and career trajectories. Chapter 5 summarizes the findings regarding scholars' program feedback. Chapter 6 presents a summary of the overarching findings and recommendations for program management and overall improvement. Finally, chapter 7 provides recommendations for future scholarship evaluations.

Chapter 2. Methodology

NOAA contracted with Insight to provide evaluation support for this study. The study team used three phases of data collection and analysis intended to provide NOAA with critical information on key outcomes associated with its two scholarship programs to date:

- Phase 1: Review NOAA records to ensure the evaluation research questions match NOAA objectives and to increase familiarity with NOAA data-tracking efforts.
- Phase 2: Collect data through an online survey fielded with both scholarship recipients and nonrecipients.
- Phase 3: Provide regression discontinuity design (RDD) results supplemented by descriptive and multivariate analyses.

The approach provided NOAA with updated logic models, current contact information for NOAA scholarship alumni, and a summative evaluation of the NOAA scholarship programs. The online survey provided the data necessary for the summative evaluation using applicants who applied for a NOAA award but did not receive it (nonrecipients) as a comparison group.

A. Document Review

The study team conducted a thorough review of key documents it received from NOAA, including program handbooks, reports, existing surveys, and external evaluations. Insight also carefully examined NOAA's existing data tracking systems (the Student and Performance Measures Tracking System, or SPMTS) for both HUSP and EPP/MSI to identify areas in which measures might overlap and whether additional measures would need to be created. The document review process familiarized the study team with the programs' objectives and priorities; facilitated the team's refinement of the HUSP and EPP/MSI logic models; and informed the development of research questions that align with the programs' priorities.

1. Logic Models

As part of the document review, the study team worked with NOAA to make the following revisions to the HUSP and EPP/MSI logic models:

- **HUSP logic model updates.** The study team refined the intended outputs to reflect the desired results of specific activities rather than the measures of those activities. For example, rather than generate a count of student-mentor meetings, the revised outputs focus on the preferred results of those meetings: scholars collaborate with mentors on research projects. The study team suggested dividing program activities according to which individuals (scholars or mentors) would complete those activities. Finally, the study team removed redundancies from the short-, medium-, and long-term outcomes so the same outcome was not noted more than once.

- **EPP/MSI logic model updates.** The study team refined the intended outputs to reflect the desired results of the specific activities rather than the measures of those activities. For example, rather than generate a count of MSI student participants, the revised outputs focus on the desired results of their participation, such as greater awareness on MSI campuses of NOAA science. The study team incorporated activities for USP and GSP scholars as well as CSC faculty/students. Graduate student activities were addressed in the CSC logic model. The study team edited the activities and outputs to reflect whether an EPP/MSI scholar, mentor, or CSC staff would accomplish the activity. Finally, the study team omitted the components involving the K–12 community because this approach did not apply to all CSCs.

The resulting HUSP and EPP/MSI logic models are provided in appendices A and B, respectively. Insight used these updated models to help develop research questions focusing on both the process and impact of NOAA's scholarship programs and to inform the data collection strategy for this evaluation. The study team focused on the educational, professional, and research outcomes identified as short-, medium-, and long-term outcomes in the logic models. The process of revising the logic models helped the study team to identify areas in which additional measures may need to be tracked for future study.[7]

2. Research Questions

Insight developed two categories of research questions to guide the evaluation of each NOAA scholarship program (see table 1). The first category examines impact (questions that focus on outcomes identified in the logic models) and the second examines process (questions that focus on overall program feedback from scholars on how they viewed their experiences with NOAA).

The answers to the research questions are intended to provide a sense of program effectiveness and can be used for purposes of program management and overall improvement.

Table 1. Research Questions by Program

	HUSP
Impact	1. To what extent do scholars gain knowledge and training in NOAA mission fields? a. How many publications and presentations do scholars and mentors co-author? b. To what extent do scholars collaborate with NOAA mentors? c. To what extent do scholars develop applied knowledge of NOAA-related technology and research?
	2. Does the scholarship shape scholars' academic and career trajectories? a. What is the distribution of scholars across NOAA-related majors? b. What percentage of scholars become educators on NOAA-related topics? What percentage of scholars enroll in graduate study in NOAA-related disciplines? c. What percentage of scholars become professionals in NOAA-related fields?
Process	1. What do scholars value about their HUSP experiences? 2. What challenges do scholars experience while participating in the program? 3. What comparable programs provide similar experiences for scholars? 4. What areas would be best to target for future investment?

[7] Several measures are included in the logic models to reflect the activities, outputs, and outcomes of the programs, which are initiated by several sources (NOAA administrators, mentors, and students). Providing data on all these measures (particularly for CSCs) is beyond the scope of this evaluation.

EPP/MSI: GSP and USP	
Impact	1. To what extent do scholars gain knowledge and training in NOAA mission fields? a. How many publications and presentations do scholars and mentors co-author? b. To what extent do scholars collaborate with NOAA mentors? c. To what extent do scholars develop applied knowledge of NOAA-related technology and research?
	2. Does the scholarship shape scholars' academic and career trajectories? a. What is the distribution of scholars across NOAA-related majors? b. What percentage of scholars enroll in or complete graduate study in NOAA-related disciplines? c. What percentage of scholars become professionals in NOAA-related fields?
Process	1. What do scholars value about their GSP/USP experiences? 2. What challenges do scholars experience while participating in the program? 3. What comparable programs provide similar experiences for scholars? 4. What areas would be best to target for future investment?

These questions address three broad categories of outcomes: knowledge and training for scholars, academic and career trajectories of scholars, and program feedback provided by scholars. Chapters 3–5 (which describe the evaluation findings) focus on questions related to assessing the performance of the scholarship programs on these three types of outcomes. Chapter 6 (which explains the study conclusions) discusses areas for future investment.

B. Data Collection

This section describes the survey methodology used to collect information from both scholars and nonrecipients. The survey included all individuals who applied for a HUSP or EPP/MSI scholarship between 2005 and 2014. Insight used a web-based survey with telephone and mail follow-up to collect data from scholars and nonrecipients between October 2015 and January 2016.

1. Sample

All individuals who applied for HUSP and EPP/MSI scholarships between 2005 and 2014 were considered eligible for the study (N = 3,273).[8] There were 1,383 eligible scholars, of whom 1,139 (82 percent) had contact information available (i.e., address, email, or telephone information). There were 1,890 eligible nonrecipients, of whom 1,742 (92 percent) had contact information available.

Of individuals in the eligible sample, 827 NOAA scholars (764 HUSP scholars, 13 EPP-GSP scholars, and 50 EPP-USP scholars) and 818 nonrecipients completed the survey. Table 2 summarizes the survey completion rates for the two groups. As shown, 73 percent of scholars and 47 percent of nonrecipients who were sent the survey completed it.[9]

[8] Those who were deceased (two nonrecipients and one scholar) or who reported they did not recall applying for a NOAA scholarship (four nonrecipients and three scholars) were excluded from the eligible population.

[9] Including applicants who could not be contacted and were excluded from the survey population (n = 392) results in a response rate of 60 percent for scholars and 43 percent for nonrecipients (excluding ineligible applicants from the denominator).

Table 2. Completion Rates by Applicant Group

	Eligible population (*N*)	Survey population (*N*)	Completed surveys (*N*)	Partially completed surveys (*N*)	Total percent completed[b]
All scholars	1,383[a]	1,139	798	29	72.6
HUSP	1,148	1,045	740	24	73.1
EPP-GSP	52	19	12	1	68.4
EPP-USP	177	71	46	4	70.4
Nonrecipients	1,890	1,742	725	93	47.0

[a] The number of recipients of individual scholarships does not match the number of individuals in the total eligible population or survey universe of scholars; this is because no data were available on scholarship type for some nonrespondents. Among scholar respondents, there were five cases for which the self-reported scholarship type differed from that in NOAA SPMTS data; for these cases, NOAA SPMTS data rather than respondent reports were used. Data were not available regarding the specific NOAA scholarship programs to which nonrecipients applied.

[b] Percent completed is the sum of partially and fully completed surveys divided by the survey population (applicants who could be contacted for the survey).

The survey completion rate was substantially higher among scholars than nonrecipients. This may have been because the survey was more salient for those who had received scholarships. Recipients may have also felt more inclined to help NOAA by taking part in the study. Both response rates, however, are in line with the expected range for similar surveys.

Further information on the demographic characteristics of the sample used for the analyses appears in section C, part 6 of this chapter.

2. Contact Information Update and Verification Process

NOAA OEd, which maintains the SPMTS, made the data available to the study team, providing contact information and award status for both scholars and nonrecipients. Much of the contact information was missing, and the study team assumed many people would have changed phone numbers and email addresses and moved since applying for the scholarships, so the team verified and/or updated the contact information for all sample members via an external vendor (Lexis Nexis) prior to the start of data collection. Lexis Nexis maintains large databases of publically available data that can be searched to update and/or confirm contact information.

Despite this effort, full contact information (i.e., address, telephone, and email information) could not be obtained for many individuals. Prior to the Lexis Nexis search, complete information was available for 702 of the 1,387 scholars (about 51 percent) and 498 of the 1,896 nonrecipients (about 26 percent). Following the Lexis Nexis search, complete information was available for 903 scholars and 1,003 nonrecipients. When possible, the study team attempted to reach individuals through multiple means of contact to increase the likelihood of success with at least one contact method. Because many of the potential respondents were students, they were considered a fairly mobile population; multiple attempts were made to contact them through various modes to improve the likelihood of establishing contact.

3. Survey Instrument Development

Two survey instruments were developed for the study: one instrument for past or present scholarship recipients (the Scholarship survey) and a separate instrument (the Pathway survey) for nonrecipients.

Both surveys contained questions related to respondents' knowledge, training, and educational and career trajectories designed to address the key study questions and basic demographic questions. The Scholarship survey included additional questions to gather program feedback and determine how receiving the scholarship may have affected recipients' academic and career trajectories. The time to complete the web-based survey was estimated to be 25 minutes for the Scholarship survey and 15 minutes for the Pathway survey. Draft surveys were reviewed and pilot tested by individuals at NOAA and members of the study team. Recommendations from the pilot testing were incorporated into the final instruments, presented in appendices C (Scholarship survey) and D (Pathway survey) of this report. The surveys were submitted for Office of Management and Budget (OMB) approval July 9, 2015. OMB approved the surveys September 2, 2015 (OMB Control 0648-0721) and assigned the surveys an expiration date of September 30, 2018.

4. Overview of Data Collection

The study team began contacting the survey sample in October 2015 with a personalized prenotification letter sent via mail and email to both scholars and nonrecipients. The prenotification letter announced the upcoming survey and helped the study team confirm potential respondents' email addresses (for example, by identifying invalid email addresses). Table 3 summarizes all the data collection activities and events, including the dates of prenotification contact and survey administration. The web survey was launched November 5, 2015, with an expected close date of November 20, 2015, when telephone follow-up calls to nonresponders were scheduled to begin.

The study team extended the survey's administration until the end of December after potential respondents indicated they were traveling for the holidays or preparing for final exams during the original fielding period. In response to this feedback, the study team extended the web survey window by an additional 6 weeks to allow more time for follow-up via phone and email with the goal of improving response rates. The survey web link was maintained until January 5, 2016.

For the first invitation, potential respondents were sent an email and a postal letter communicating the nature and purpose of the study and information about how to access the survey link. The invitation contained a link to the online survey and provided an individualized token (password) to access the survey. To facilitate navigation to the survey from mobile devices, a quick response code was added to the survey invitation. Between November 13, 2015, and December 15, 2015, five reminder emails were sent to nonresponders. Beginning December 8, 2015, trained telephone interviewers began placing follow-up calls to nonresponders to complete the survey by telephone. The telephone follow-up continued until December 30, 2015.

Table 3. Survey Timeframe

Data collection effort	Dates
Prenotification contact (emails and letters)	October 13, 2015
Invitations to the survey (emails and letters)	November 5, 2015
Reminder emails	November 13, 2015–December 15, 2015
Telephone follow-up for nonresponders	December 8, 2015–December 30, 2015
End of data collection	January 5, 2016

Appendix E provides copies of the data collection materials with customized text for scholars and nonrecipients, including the following:

- Postal and email prenotifications used to communicate the nature and purpose of the study to sample members
- Postal and email invitations to sample members providing a link and password to complete the web-based survey
- Follow-up emails and reminders to sample members encouraging them to complete the survey[10]
- Web pages where sample members could log in to access the survey
- Answers to frequently asked questions used by telephone interviewers

Further technical notes regarding the fielding of the survey are provided in appendix F, section A.

C. Data Analysis

This section describes the study's three-step analytic approach. The team first examined the quantitative descriptive statistics. Second, the team conducted the RDD analysis. To supplement the regression discontinuity results, the team provided additional multivariate models using logistic regression with the variables available. Finally, qualitative analyses were conducted on the open-ended survey responses. The section concludes with a summary of the key variables examined.

1. Descriptive Quantitative Analyses

For a basic understanding of the survey data, the study team examined the descriptive statistics of outcome and control variables for both scholar and nonrecipient respondents. The team examined data for the overall scholarship recipient group and two subsamples of that group: HUSP recipients and EPP-USP recipients. The analytic sample size for EPP-GSP recipients was too small to provide reliable data. Therefore, the 13 EPP-GSP respondents were included in analyses involving all scholars but were not discussed separately in the results.[11] Complete descriptive results in appendix H provide frequencies for EPP-GSP respondents. Detailed data regarding the type of scholarship (HUSP or EPP/MSI) to which nonrecipients initially applied were not available, thus precluding the creation of subsamples for the nonrecipients. For all inferential analyses described in the report, the study team did not separate findings by scholarship program, given the lack of a comparison group among nonrecipients.

2. Regression Discontinuity Design

Considering potential selection bias associated with using linear regression models to estimate the NOAA scholarship program effects, the study team used an RDD. Regression discontinuity assigns a firm threshold—such as a score—above and below which an intervention occurred. Analyses then measure

[10] Actual survey completion time was less than expected: about 10 minutes for the Pathway survey and 15 minutes for the Scholarship survey. Based on actual completion time data, the study team revised the time estimates in the reminder communication, which may have improved response rates.

[11] The study team did not include the EPP-GSP scholars with the EPP-USP scholars. The team elected to include the EPP-GSP scholars with the overall scholar groups because the GSP recipients were likely to be at different stages of their career trajectories. See section D of this chapter for additional information.

the extent to which an effect occurred for the treatment group that did not occur for the control group. The regression discontinuity approach is a rigorous design that can be applied to quasi-experimental evaluations to estimate program impact as an alternative to randomized control trials. Regression discontinuity allows for statistically adjusting for any apparent differences between groups at the preprogram stage, yielding unbiased estimates of postprogram differences. For this evaluation, the study team implemented a less precise approach to regression discontinuity, known as fuzzy regression discontinuity (FRD), because there was not a firm threshold above and below which all applicants were awarded NOAA scholarships. The threshold score used varied from year to year by number and quality of applications reviewed. Moreover, defined selection factors not measured in the score, such as diversity of academic institutions, type of institutions, and academic majors, sometimes influenced decisions for up to 10 percent of the selected scholars.

The FRD model provided a picture of scholars and nonrecipients within a range, or window, of application scores. The NOAA scholarship program committee assigns each applicant an application score ranging from 0 to 100. Rather than examining individuals based on whether they received awards, the FRD model was used to seek a pattern of improvement among individuals with similar application scores who received scholarships. If the model were to identify a significant effect, this pattern would reflect award status. The FRD analyses presented are based largely on individual application scores. It is reasonable to assume that whether an applicant received a score slightly above or below a specific cutoff point was relatively random. Therefore, treatment and control groups were defined by whether applicants' scores were above or below the cutoff point within a narrow window. The analyses considered whether individuals with scores around the cutoff window were more comparable than the original treatment and comparison groups defined by award status (i.e., all scholars and all nonrecipients).

3. Regression Models

The study team used linear regression to estimate average group differences of scholar and nonrecipient respondents. The linear regression results also were used to help in modeling the FRD analyses. Simple regression provides a method of analysis for programs in which individuals are not assigned to treatment groups but instead are selected into participation. Participation does not rely on the assumption that subjects were randomly assigned to treatment (i.e., received a NOAA scholarship) and comparison groups (i.e., did not receive a NOAA scholarship). Simple regression allows the estimation of whether differences in award status remain significant among survey participants after controlling for individual and contextual characteristics, but it does not allow the examination of causality associated with an individual's award status. Results using this regression approach were prone to selection bias when estimating the effects of the NOAA scholarships. For example, other characteristics associated with receiving an award (e.g., ability, institutional prestige, financial support) may also influence whether an individual has a successful outcome. Therefore, the simple regression estimates indicated correlation rather than causality.

The regression models took the basic form of

$$y_i = \alpha + \gamma T_i + W_i\delta + \theta yr_i + \varepsilon_i \,, \qquad (1)$$

where y_i was the outcome for applicant *I*; α was a constant intercept; T_i was the treatment indicator, with 1 for scholars and 0 for nonrecipients; W_i was a vector of the background variables of age, gender, and race/ethnicity; yr_i were a set of dummy coded year indicators of the year of application for

applicant *I*; and ε_i was the error term (which captured unobservable individual characteristics of applicant *i*). Initial models included the average application score, adjusted for the changing cutoff score each year, and a nonlinear treatment of the application score. However, because the application score (ranging from 0 to 100) was a predominant factor in the selection of awardees, this variable was omitted from the simple regression analyses since it was highly correlated with award status. In short, the application score captured much of the effect of award status, given that individuals with higher application scores received awards.

In the final analyses, the study team estimated two simple regression models. The first model included an indicator for whether the individual received a NOAA award and an indicator for the year in which the individual applied for the award. Inclusion of the year indicator facilitated control for any potential cohort effects. The second model included the award and year indicators as well as control variables for age, gender, and race/ethnicity.[12]

4. Descriptive Qualitative Analyses

Responses to open-ended survey questions were coded in NVivo 11, a software program used for qualitative analysis. After importing the responses into NVivo, the study team analyzed them using a thematic coding scheme. To develop the initial coding scheme, multiple analysts independently reviewed a subset of the responses and proposed a set of themes that emerged across responses to each open-ended survey question. Those analysts then met to discuss the proposed themes and agree on a master list of themes.

Using the master list of themes developed, multiple researchers then independently coded a new randomly selected portion of responses to each open-ended survey question. Any differences in coding were discussed, and the coding scheme was revised as necessary to enhance clarity and accuracy. Another randomly selected portion of data was then separately coded by researchers using the revised coding scheme. This process was repeated as necessary for each open-ended survey question until an acceptable level of intercoder agreement was achieved (greater than 75 percent match), thus indicating that the resulting coding scheme was a reliable instrument.

Once the coding scheme was finalized, all responses were coded by the lead coder. Responses were then analyzed to examine potential trends across and within scholarship types and identify any notable quotations. The most frequently cited themes used in the qualitative analyses reported in chapter 5 follow.

- What differences receiving the NOAA scholarship made in scholars' lives
  - Career plans: Recipient solidified or confirmed future career plans after NOAA scholarship/internship
  - Financial aid: Reference to financial aid, tuition assistance, "allowed me to graduate," etc.
  - Graduate school plans: Recipient planned to attend graduate school as a result of the NOAA scholarship/internship experience

[12] The study team considered several interaction effects to better understand how outcomes varied for individuals of a particular gender or race/ethnicity who received an award. The study team omitted these interactions from the final models because they indicated a poor model fit. Most likely, the low sample sizes associated with race/ethnicity in particular limited the results. These supplemental analyses are available upon request.

- Hands-on research experience: Reference to research experience or technical training
- Mentorship: Reference to mentor support or connections
- Networking: Reference to professional networking or collaboration

- Why scholars would recommend the NOAA scholarship program to other students
  - Financial aid: Reference to financial aid, tuition assistance, or paid internship
  - Hands-on research experience: Reference to research experience or technical training
- Challenges scholars encountered during their scholarship experience
  - Logistics and taxes: Reference to difficulty finding housing, moving, transportation, schedules, and accommodating or anticipating tax payments
  - Mentorship: Reference to mentorship
  - Program-related problems: Reference to aspects of the scholarship program (e.g., regulations or guidelines unclear, insufficient time allocated for internship, problems with the final presentation/conference)
  - Project-related issues: Reference to aspects of the project (e.g., project was poorly defined, no access to equipment or technology, challenges related to nature of field research, not enough or too much work)

A comprehensive list of thematic codes and brief definitions is provided in appendix G.

5. Key Quantitative Variables

Based on the NOAA logic models and evaluation research questions, the study team selected several outcomes and predictive characteristics of survey respondents. An overview of each key variable follows; further details regarding the coding of these variables are provided in appendix F, section B.

a. Knowledge and training in NOAA mission fields

The first set of research questions for both scholarship programs addresses applicants' experience with mentoring, hands-on training, conference presentations, and publications. To address these questions, the study team examined the following five self-reported outcome variables:

- Number of peer-reviewed publications; multivariate models estimate the odds of authoring zero, one, or more than one publication
- Number of conference/professional presentations; multivariate models estimate the odds of authoring zero, one, or two or more presentation(s)
- Extent to which respondents agreed they received support from a mentor in the field; multivariate models estimate two mutually exclusive categories: (1) strongly disagree, disagree, neither agree nor disagree, and (2) agree or strongly agree[13]

[13] The measures of mentoring differed slightly for scholars and nonrecipients. Scholars were asked to report the extent to which they agreed that their mentors provided guidance when they needed it. Nonrecipients were asked to rate the extent to which

- Extent to which respondents agreed they gained hands-on research experience in the field; multivariate models estimate two mutually exclusive categories: (1) strongly disagree, disagree, neither agree nor disagree, and (2) agree or strongly agree [14]
- Extent to which respondents agreed they learned to use relevant technologies in the field; multivariate models estimate two mutually exclusive categories: (1) strongly disagree, disagree, neither agree nor disagree, and (2) agree or strongly agree [15]

b. Academic and career trajectories

The second set of research questions for both scholarship programs addressed applicants' educational and professional plans and achievements. To address these questions, the study team examined the following eight self-reported outcome variables:

- Highest level of educational attainment [six mutually exclusive categories: (1) current undergraduate, (2) bachelor's degree only and not enrolled in a graduate program, (3) bachelor's degree and enrolled in a graduate program, (4) master's degree only, (5) master's degree and enrolled in a graduate program, and (6) doctorate or professional degree][16]
- Earned highest degree in a NOAA mission field (yes or no)[17]
- Currently enrolled in a graduate or professional program [two mutually exclusive categories: (1) bachelor's and currently enrolled in a graduate program, and (2) master's and currently enrolled in a graduate program (measure excludes current undergraduates)]
- Currently enrolled in a graduate or professional program in a NOAA mission field
- Interested in pursuing graduate study in a NOAA mission field
- Employed full or part time
- Employed full or part time in a NOAA mission field
- Employed in a NOAA line office or facility[18]
- Interested in pursuing employment in a NOAA mission field

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they agreed that they received support from mentors in their fields. See appendix F, section B for the full list of survey questions.

[14] The measures of hands-on experience differed slightly for scholars and nonrecipients. Scholars rated the extent to which they agreed that the scholarship program "gave me hands-on experience in a NOAA-related field." Nonrecipients rated the extent to which they agreed they "gained hands-on research experience in my field." See appendix F, section B for the full list of survey questions.

[15] The measures of technology experience differed slightly for scholars and nonrecipients. Scholars rated the extent to which they agreed the scholarship program "afforded me the opportunity to develop knowledge of NOAA-related technology." Nonrecipients rated the extent to which they agreed they "learned to use technologies that are relevant to my field." See appendix F, section B for the full list of survey questions.

[16] Multivariate analyses focused on whether individuals had earned an advanced degree. Analyses excluded current undergraduates and EPP-GSP scholars.

[17] NOAA administrators identified several fields that fell within the NOAA mission: computer and information sciences, communications, education, engineering, law, agricultural sciences, biomedical sciences and environmental health, mathematics, atmospheric science, chemistry, geological sciences, marine sciences, physics, anthropology, archaeology, economics, geography, political science, public policy, urban affairs, and environmental policy.

[18] Given the small sample size for individuals employed in a NOAA office or facility (N = 98), the study team could not assess this outcome in multivariate analyses because of low reliability and a high standard error.

c. *Contextual variables*

The study team included five additional variables to measure individual and contextual characteristics:

- Application year or cohort (2006 to 2014)
- Average application score, 0 to 100, in FRD analyses (later dropped from analyses because of collinearity with study group)
- Gender (male, female)
- Race/ethnicity (Black/African American, Hispanic, White, Asian, Other)
- Age

6. Analytic Sample

The study team compared characteristics of the scholar and nonrecipient respondents to determine if the samples had similar distributions on characteristics such as gender and race/ethnicity.[19] These key demographics, as well as respondents' application years and application scores, appear in table 4 and are discussed later in this section, highlighting differences between HUSP and EPP/MSI scholars. The results provided in table 4 also appear in table H.1 in appendix H and include the sample size for each cell. The largest differences between scholar and nonrecipient respondents overall were related to race (with a higher proportion of Whites in the scholar group than the nonrecipient group) and age (with scholars being older on average than nonrecipients). These variables were included in the multivariate analyses as control variables. This approach enabled the study team to assess the impact of the scholarship program on the outcomes once the variables were taken into account. The study team was unable to provide nonresponse bias analysis for the entire eligible population because demographic data were not available for nonrecipients. See table H.1 in appendix H for further details on the analytic sample.

Table 4. Respondent Characteristics by Group

Variable	All scholars	HUSP scholars	EPP-GSP scholars	EPP-USP scholars	Nonrecipients
	Percent				
Race/Ethnicity					
Did not specify/missing	2.3	2.2	0.0	4.2	15.7
Black/African American	6.9	2.8	23.1	64.6	4.4
White	78.7	84.1	38.5	6.3	69.3
Hispanic/Latino	5.2	3.8	38.5	18.8	4.5
Asian	3.4	3.6	0.0	2.1	2.7
Other[1]	3.5	3.6	0.0	4.2	3.4
Gender					
Did not specify/missing	2.4	2.4	0.0	4.2	12.4
Female	56.4	56.1	69.2	56.3	51.1
Male	41.2	41.5	30.8	39.6	36.6

[19] Nonrecipients were more likely to skip the demographic questions or to indicate they would prefer not to specify their gender, race/ethnicity, or age (6–16 percent of nonrecipients versus 2–4 percent of scholars).

Variable	All scholars	HUSP scholars	EPP-GSP scholars	EPP-USP scholars	Nonrecipients
			Percent		
Age					
Did not specify/missing	3.9	3.6	7.7	8.3	6.4
Younger than 21	0.2	0.3	0.0	0.0	0.9
21–23	34.3	34.0	0.0	43.8	40.0
24–25	19.6	19.8	0.0	22.9	22.6
26 or older	42.0	42.3	92.3	25.0	30.2
Application year					
Did not specify/missing	2.4	0.4	100.0	8.3	0.0
2006	0.2	0.3	0.0	0.0	0.0
2007	17.2	18.5	0.0	2.1	0.0
2008	10.4	10.6	0.0	10.4	9.9
2009	9.8	10.3	0.0	4.2	15.3
2010	10.8	11.2	0.0	8.3	11.4
2011	10.3	10.1	0.0	16.7	15.7
2012	12.1	12.0	0.0	18.8	2.6
2013	14.3	13.9	0.0	20.8	19.8
2014	12.6	12.8	0.0	10.4	25.4
Mean					
Average application score	90.5	91.0	.	81.5	76.2

Note: *N*s for this table are available in table H.1 in appendix H. Because of small sample sizes, multiple categories are combined into "Other": American Indian/Native Alaskan, Native Hawaiian or other Pacific Islander, and individuals of two or more races.

a. Application year

None of the nonrecipients who applied for scholarships in 2006 and 2007 responded to the survey. HUSP scholars reported applying in 2006 through 2014, and EPP-USP scholars reported applying in 2007 through 2014. Among scholars, 39 percent of respondents received an award between 2012 and 2014. Among nonrecipients, 48 percent of respondents applied between 2012 and 2014. Most respondents (60 percent of scholars and 75 percent of nonrecipients) received or applied for scholarships between 2010 and 2014. Additional analyses indicated no trends over time by application year in applicant race/ethnicity or field of study as indicated in tables H.13 and H.14 in appendix H.

b. Average application score

NOAA provided application score data for each applicant, with a minimum application score of 24 and a maximum of 100. The application score serves as a measure of the applicant's comprehensive qualification and is used as one basis for award. As expected, scholars' average application scores were higher than nonrecipients' scores. Among HUSP and EPP-USP scholars, application scores averaged 90 percent or higher, whereas application scores for nonrecipients averaged 76 percent.

c. Gender

Overall, scholar respondents were somewhat more likely to be female (56 percent) than nonrecipient respondents, who were more evenly split between females and males (51 percent female). Similar percentages of HUSP and EPP-USP scholar respondents were female (56 percent).

d. Race/Ethnicity

There were more differences across groups with regard to the racial/ethnic distribution. In particular, 79 percent of scholar respondents were White compared with 69 percent of nonrecipient respondents. However, the racial/ethnic distribution varied by scholarship type. Among HUSP scholars, the majority of respondents identified as White (84 percent). The majority of EPP/MSI scholars identified as Black or Hispanic/Latino, consistent with the program's focus on serving students from underrepresented minority communities. Sixty-five percent of EPP-USP scholars and 23 percent of EPP-GSP scholars identified as Black, whereas 19 percent and 39 percent, respectively, identified as Hispanic/Latino.

e. Age

There was a small age difference between scholar and nonrecipient respondents. Scholars were slightly older than nonrecipients, with 42 percent of scholars indicating they were 26 or older compared with 30 percent of nonrecipients. The large majority of survey respondents were older than 21. HUSP scholars were older on average compared with EPP-USP scholars. Approximately 34 percent of HUSP scholars were aged 21–23 compared with 44 percent of EPP-USP scholars and 40 percent of nonrecipients.

D. Limitations and Considerations

Limitations related to sample size and survey response affected the program-level distinctions in the multivariate analyses. First, EPP-GSP scholars were not well represented among survey respondents. The study team was able to obtain contact information for only 19 of the 59 program participants. Of these 19 participants, 12 provided complete survey responses. This number does not offer an adequately representative sample for analysis. Therefore, descriptive findings for EPP-GSP should be treated conservatively. EPP-GSP scholars did not have application scores that would allow for inclusion in the FRD.

Second, it was not possible to use the multivariate results to compare scholarship recipients and nonrecipients across program type. The study team was unable to identify which scholarship program the nonrecipients applied to originally. Furthermore, the small sample size limited subgroup analyses. The limited sample size was particularly problematic with respect to the FRD analysis, which required a greater number of cases around the cutoff window to power the analyses. The study team realizes the programs have distinct backgrounds and goals and has highlighted differences across HUSP and EPP-USP in the descriptive results when possible.

Third, selection effects and sample bias may have influenced the outcomes measured in this report. The bulk of the survey data reflect outcomes for scholars and nonrecipients in 2010 through 2014. Therefore, results may be more representative of later applicant cohorts. The majority of respondents (both scholars and nonrecipients) were younger than 26. As a result, outcomes related to full-time employment and graduate study may not yet be fully realized.

Fourth, several unmeasured characteristics may have affected the outcomes measured in this report. In particular, analytic models do not consider the socioeconomic status of respondents' families and other possible confounding variables such as academic performance and ability. These characteristics have long been associated with the extent to which individuals achieve many of the outcomes—education and employment—addressed in this report.

Finally, the open-ended program feedback variables reflected the opinions of only some of the scholar respondents. Between 70 and 80 percent of the scholars that completed a survey provided any open-ended feedback. This feedback was largely positive and may reflect some social desirability bias on the part of scholars in their effort to please the organization conducting the study (NOAA).

Chapter 3. Findings: Knowledge and Training

This chapter addresses the extent to which scholars gained knowledge and training in NOAA mission fields compared with nonrecipients. The data presented in this chapter examine outcomes for NOAA scholars and applicants from 2006 through 2014. NOAA scholars included HUSP and EPP/MSI USP and GSP recipients.

The study team identified five outcomes measuring the extent to which scholars gained knowledge and training in NOAA mission fields as a result of participating in the scholarship programs.

Table 5. Summary of Significant Knowledge and Training Results by Outcome

Outcome	Regression without control variables[a]	Regression with control variables[b]	FRD[c]
Publications	↑	↑	–
Presentations	↑	↑	–
Perceived mentor support/involvement	–	–	–
Perceived hands-on experience	↑	↑	–
Perceived applied technology experience	–	–	–

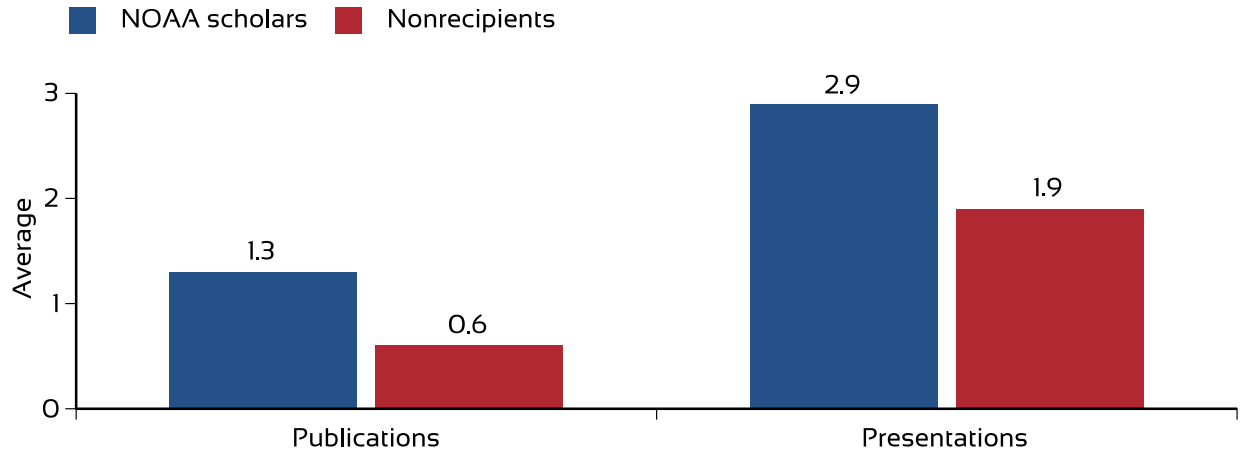
[a] Regression without controls models included an indicator for award status and a control for application year.
[b] Regression with controls models included an indicator for award status and controls for age, gender, race/ethnicity, and application year.
[c] FRD models established a cutoff window based on the application score and controls for age, gender, race/ethnicity, and application year.
Note: ↑ indicates significantly greater results ($p < .05$) for NOAA scholars compared with nonrecipients; – indicates no significant difference in results for NOAA scholars compared with nonrecipients

For each outcome, the study team provides discussion of the descriptive and simple regression findings. FRD findings for knowledge and training outcomes are nonsignificant. The study team failed to identify any outcome with a measurable difference related to award status for those individuals with scores around the predicted cutoff. This may be because no significant relationship exists or because the data were not sufficient to power an FRD analysis. The FRD approach requires sufficient numbers of observations close to the cutoff points of the application score; therefore, it is possible too few observations were available to detect the program effects with FRD. The standard errors of the estimates were large, which indicated the relevant effects were estimated with low precision. As a result, this chapter does not provide additional details on the FRD findings. The FRD results for knowledge and training are provided in table H.7 in appendix H. Detailed results for the descriptive and multivariate analyses also are presented in appendix H and referenced in the text.

A. Publications and Presentations

Bivariate and multivariate comparisons suggested that scholars reported authoring more publications and presentations compared with nonrecipients: 2.9 versus 1.9 publications and 1.3 versus 0.6 presentations (see figure 1). EPP-USP scholars reported more presentations compared with HUSP scholars (3.5 and 2.8, respectively), but fewer publications (0.6 and 1.3, respectively).

Figure 1. Average Numbers of Publications and Presentations Reported by NOAA Scholars and Nonrecipients



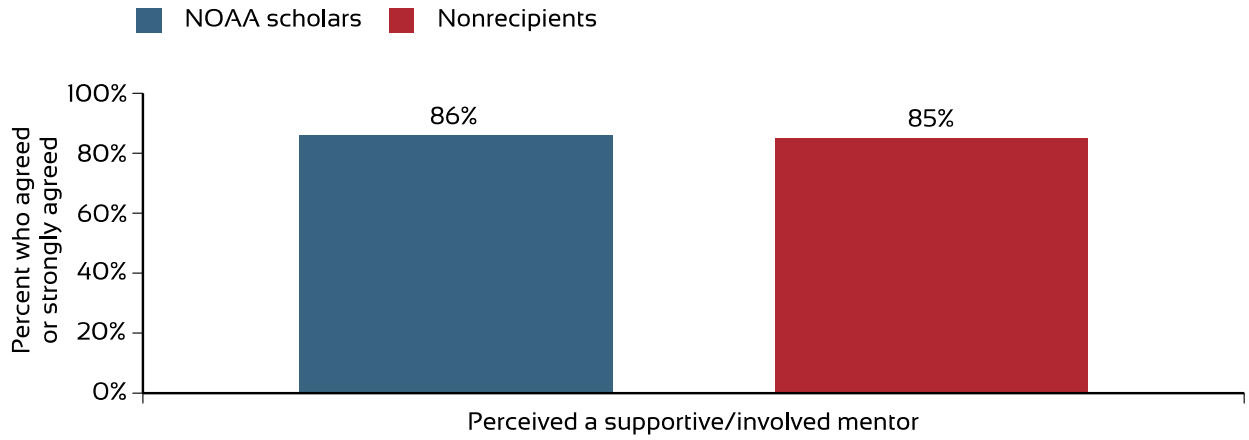
Note: Differences in average numbers of publications and presentations were significant in logistic regression models with control variables.

Based on multivariate results controlled for age, sex, race/ethnicity, and application year, NOAA scholars were more likely to have delivered two or more presentations and more than one publication relative to nonrecipients. These results are shown in table H.4 in appendix H. Multivariate results also suggested that Black/African American respondents were more likely to report delivering more than two presentations. Older respondents were less likely to report two or more presentations compared with individuals 23 or younger. With regard to publications, women were less likely to report authoring more than one publication compared with men. Also, women were less likely to deliver more than two presentations relative to men.

B. Mentoring Support

Descriptive and multivariate statistics indicated that scholars and nonrecipients perceived a similar level of support from mentors in their respective fields as shown in the bivariate percentages in figure 2. The majority of scholars and nonrecipients (86 and 85 percent, respectively) agreed or strongly agreed they received mentoring support. Most respondents reported support from mentors regardless of scholarship status, and the multivariate results suggested that race/ethnicity, gender, age, or application year do not predict perceptions of mentoring support.

Figure 2. Mentor Support Perceived by NOAA Scholars and Nonrecipients



Note: Differences between scholars and nonrecipients in mentor support/involvement were nonsignificant in multivariate regression models and FRD analyses.

When examining descriptive findings among NOAA scholars, 61 percent of EPP-USP scholars strongly agreed that they received mentoring support compared with 55 percent of HUSP scholars. Similarly, 5 percent of HUSP scholars disagreed or strongly disagreed with the statement that they received mentoring support compared with 0 percent of the EPP-USP.

C. Hands-On Experience and Knowledge of Technology

Scholars were more likely to agree they gained hands-on experience[20] in the field compared with nonrecipients after controlling for race/ethnicity, sex, and age. The majority (96 percent) of scholars said they agreed or strongly agreed that they received hands-on experience compared with 85 percent of nonrecipients. Similarly, more nonrecipients (8 percent) than scholars (2 percent) said they disagreed or strongly disagreed that they received hands-on experience.

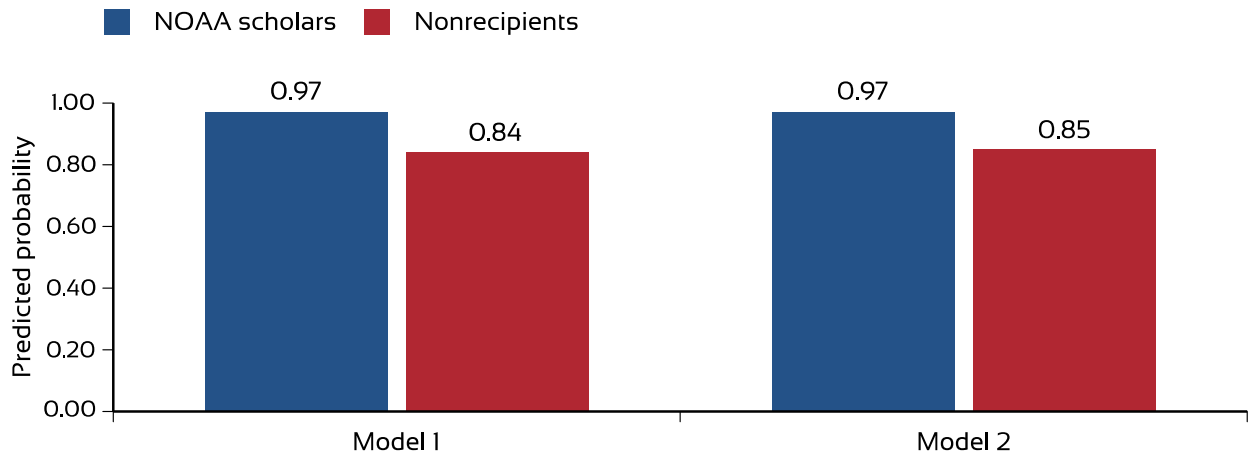
Multivariate analysis also indicated that White respondents were more likely to agree or strongly agree that they received hands-on experience relative to Hispanic/Latino respondents. Among NOAA scholars, receipt of hands-on experience and applied technology varied by scholarship program. More EPP-USP scholars (68 percent) strongly agreed that they received training in applied technology compared with HUSP scholars at 57 percent. However, more HUSP scholars (73 percent) strongly agreed that they received hands-on experience compared with EPP-USP scholars at 71 percent.

Figure 3 provides a visual interpretation of the multivariate results for hands-on experience. Model 1 shows the predicted probability that scholars and nonrecipients would agree they received such experience, controlling for scholarship year. Model 2 shows the predicted probability that scholars and nonrecipients would indicate agreement, holding other variables (race/ethnicity, gender, age, and year) at the sample mean. In both models, there is a high level of agreement among each group. At the same

[20] The measures of hands-on experience differed slightly for scholars and nonrecipients. Scholars rated the extent to which they agreed that the scholarship program "gave me hands-on experience in a NOAA-related field." Nonrecipients rated the extent to which they agreed they "gained hands-on research experience in my field." See appendix F, section B for the full list of survey questions.

time, scholars were more likely to indicate agreement, although accounting for basic demographic characteristics slightly diminishes that probability.

Figure 3. Predicted Probability of Respondents Agreeing or Strongly Agreeing They Gained Hands-On Experience in the Field



Note: Model 1 included an indicator for award status and a control for application year. Model 2 included an indicator for award status and controls for age, gender, race/ethnicity, and application year. Both models yielded significant differences between NOAA scholars and nonrecipients.

There was no difference in the percentages of scholars and nonrecipients who agreed or strongly agreed they were trained in NOAA-related technologies (80 percent).[21]

[21] The measures of perceived access to technology differed slightly for scholars and nonrecipients. Scholars rated the extent to which they agreed the scholarship program "afforded me the opportunity to develop knowledge of NOAA-related technology." Nonrecipients rated the extent to which they agreed they "learned to use technologies that are relevant to my field." See appendix F, section B for the full list of survey questions.

Chapter 4. Findings: Academic and Career Trajectories

As students complete their NOAA scholarships and progress through their careers, of particular interest is the extent to which scholars continue to engage in work related to NOAA mission fields. The outcomes identified in this chapter highlight students' academic and career trajectories in NOAA mission fields. Table 6 provides a snapshot of multivariate results for each of the eight outcomes related to respondents' education and employment.

Table 6. Summary of Academic and Career Trajectory Results by Outcome

Outcome	Regression without control variables[a]	Regression with control variables[b]	FRD[c]
Earned advanced degree	↑	↑	–
Earned highest degree in NOAA mission field	–	–	–
Enrolled in graduate study	↑	↑	–
Enrolled in graduate study in NOAA mission field	–	–	–
Interested in graduate study in NOAA mission field	–	–	–
Employed full or part time	–	–	–
Employed in NOAA mission field	–	–	–
Interested in working in NOAA office or facility	↑	↑	–

[a] Regression without controls models included an indicator for award status and a control for application year.
[b] Regression with controls models included an indicator for award status and controls for age, gender, race/ethnicity, and application year.
[c] FRD models established a cutoff window based on the application score and controls for age, gender, race/ethnicity, and application year.
Note: ↑ indicates significantly greater likelihood ($p < .05$) for NOAA scholars compared with nonrecipients; – indicates no significant difference in likelihood for NOAA scholars compared with nonrecipients

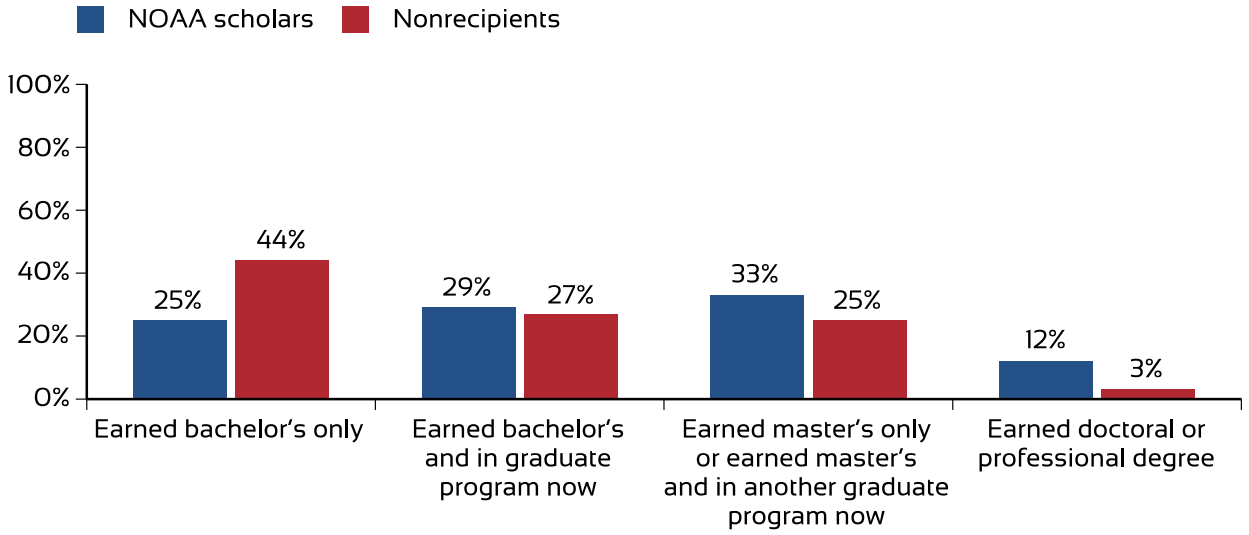
For both academic and career trajectory outcomes, this chapter discusses descriptive and simple regression findings, but not FRD findings because they were nonsignificant. Detailed results are presented in appendix H.

A. Education

1. Highest Level of Educational Attainment

Excluding current undergraduate students and EPP-GSP scholars, who by definition have pursued an advanced degree, scholars were more likely to hold an advanced degree (master's, doctoral, or professional degree) compared with nonrecipients in both descriptive and regression analyses. Approximately 75 percent of scholars reported that they held or were currently pursuing an advanced degree compared with 56 percent of nonrecipients as shown in figure 4. About three-quarters of both HUSP scholars (75 percent) and EPP-USP scholars (72 percent) held or were currently pursuing an advanced degree. Table H.2 in appendix H provides a detailed breakdown of responses by scholarship type.

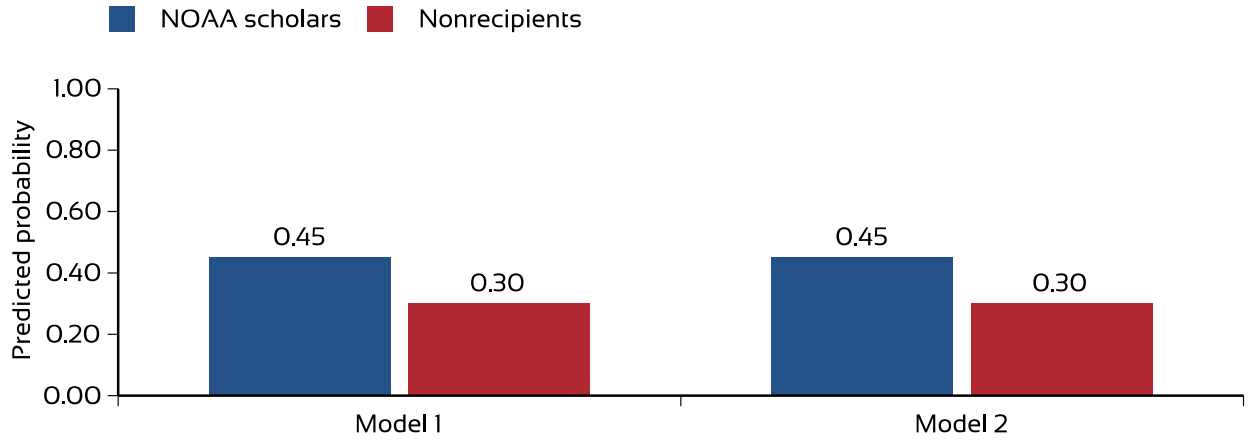
Figure 4. Highest Degree Earned Among NOAA Scholars and Nonrecipients



Note: Logistic regression models indicated scholars were more likely to hold an advanced degree compared with nonrecipients. This outcome was not tested in FRD models.

Figure 5 illustrates the multivariate results for predicted level of educational attainment; these results are provided in table H.4 in appendix H. The multivariate models to predict the highest level of education achieved by scholars and nonrecipients used ordered logistic regression with four possible levels and excluded current undergraduate students. Figure 5 shows calculations of the predicted probability of scholars and nonrecipients achieving an education level of 2 or higher, defined as holding at least a master's degree.

Figure 5. Predicted Probability of NOAA Scholars and Nonrecipients Holding at Least a Master's Degree



Note: Model 1 included an indicator for award status and a control for application year. Model 2 included an indicator for award status and controls for age, gender, race/ethnicity, and application year. Both models yielded significant differences between NOAA scholars and nonrecipients.

2. Earned Highest Degree in a NOAA Mission Field

Next, the study team addressed whether those individuals with degrees, excluding current undergraduates, held a degree in a NOAA mission field. Approximately 86 percent of scholars held a bachelor's or higher degree in a NOAA mission field compared with 78 percent of nonrecipients. Among those individuals holding a degree in a NOAA mission field, 45 percent of scholars held an advanced degree compared with 28 percent of nonrecipients. However, these findings were only marginally significant ($p < 0.10$) in the multivariate models. Gender was a significant predictor of degree in a NOAA field, with women being less likely than men to hold a degree in such a field.

Among NOAA scholars, 87 percent of HUSP scholars held a degree in a NOAA mission field compared with 75 percent of EPP-USP scholars. Among those scholars with degrees in a NOAA mission field, 44 percent of HUSP scholars held a NOAA-related advanced degree compared with 26 percent of EPP-USP scholars.

3. Major and Field

The majority of scholars and nonrecipients graduated having earned a highest degree in the physical sciences. Among those individuals with a degree in one of the nine broad NOAA mission-related fields, there was no difference in the percentage of scholars versus that of nonrecipients with a degree in physical sciences (56 and 55 percent, respectively). The second most common discipline in which both scholars and nonrecipients earned degrees was life sciences (22 and 23 percent, respectively). Relatively few scholars or nonrecipients graduated with degrees in communication, education, or law.

4. Graduate Study

Excluding current undergraduate students, NOAA scholars were more likely to report current enrollment in a graduate or professional program. At the time of the survey, 35 percent of scholars compared with 25 percent of nonrecipients were enrolled in graduate study. This difference was supported in multivariate analyses with controls.

However, among current graduate students, there was essentially no difference in the percentage of scholars versus that of nonrecipients enrolled in a NOAA mission field (85 and 83 percent, respectively). Multivariate analyses confirmed this result. Similarly, scholars and nonrecipients were equally likely to report interest in pursuing graduate study in a NOAA mission field. Here, multivariate analyses also indicated that Black/African American respondents were less likely than White respondents to report interest in pursuing a graduate degree in a NOAA field.

B. Professional Employment

1. Employment Status

Eighty-six percent of scholars and 87 percent of nonrecipients who responded to the survey were either employed or current undergraduates.[22] As shown in table H.6 in appendix H, award status was not significantly related to employment in a NOAA mission field. Consistent with national labor statistics,

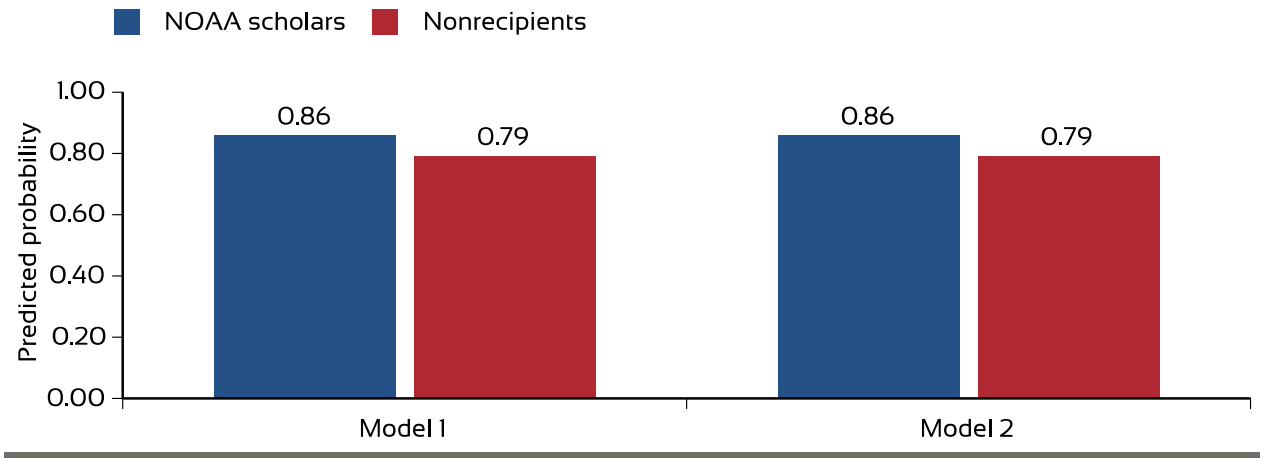
[22] Of survey respondents, 64 scholars and 92 nonrecipients reported they were seeking employment.

African Americans were less likely to be employed than Whites, and women were less likely to be employed than men (U.S. Department of Labor, 2016).

Among employed individuals, 66 percent of scholars and 68 percent of nonrecipients were employed in a NOAA mission field. Award status was not significantly related to employment in a NOAA field. Black/African American respondents and female respondents were less likely to be employed in a NOAA mission field compared with White respondents and male respondents, respectively.

Though findings on employment were inconclusive, scholars were more likely to report an interest in working in a NOAA office. Approximately 84 percent of scholars and 79 percent of nonrecipients expressed interest in pursuing employment in a NOAA mission field. This difference was significant with controls for respondent characteristics as illustrated in figure 6. This finding suggests that in some cases, individuals not currently employed in a NOAA mission field (discussed earlier in this section) may have had interest in but not an opportunity to work in such a field. The multivariate analyses indicated Black/African American respondents were less likely to report interest relative to White respondents, and Hispanic/Latino respondents were more likely to express interest relative to White respondents.

Figure 6. Predicted Probability of Reporting Interest in Working in a NOAA Office or Facility



Note: Model 1 included an indicator for award status and a control for application year. Model 2 included an indicator for award status and controls for age, gender, race/ethnicity, and application year. Both models yielded significant differences between NOAA scholars and nonrecipients.

2. Education Professionals

NOAA program objectives also include recruiting and preparing students for careers as teachers and educators in oceanic and atmospheric science. Among both scholars and nonrecipients, the most frequent employers were educational institutions. The next most common sectors to employ both groups were government and private industry. Survey results indicated a minimal difference between the percentages of NOAA scholars and nonrecipients in education professions. Among respondents who were employed, 42 percent of NOAA scholars and 37 percent of nonrecipients were employed by an educational institution. Among those individuals employed by an educational institution, 10 percent of scholars and nonrecipients reported they were primary or secondary teachers.

However, when examining respondents who were employed in NOAA mission fields specifically, the difference between groups becomes more striking. Fifty-two percent of NOAA scholars compared with 39 percent of nonrecipients were employed by an educational institution in a NOAA mission field.

Chapter 5. Findings: Program Feedback

The analyses described in this chapter address the following three research questions regarding processes associated with providing the NOAA scholarship programs:

- What do scholars value about their NOAA scholarship experiences?
- What challenges do scholars experience while participating in the program?
- What comparable programs provide similar experiences for scholars?

Detailed results are presented in appendix H, table H.9.

A. Value of the Scholarship Experience

Responses overwhelmingly indicated that scholars perceived a positive impact from the scholarship on their lives. First, 95 percent of scholars rated the overall NOAA scholarship experience as "valuable" or "very valuable."[23] Second, 99.7 percent of scholars indicated that they would recommend their programs to other students.[24] Finally, the majority of scholars agreed or strongly agreed that the NOAA experience led to several positive outcomes, including growth in their professional networks (87 percent), hands-on experience in a NOAA field, increased interest in a NOAA career (77 percent), and better preparation for entering the workforce (92 percent).

Research Experience, Financial Aid, and Professional Skills

Being a minority, first-generation, low-income student, EPP has changed my life greatly. I was able to gain experience in my field of study. More importantly, with the experiences I have gained during my summer internships, I was able to figure out what I was interested in. I was able to shape my future goals. The scholarship I received from EPP helped me very much to pay for tuition and housing at my university. With the scholarship, I did not have to take out as many loans. I am very grateful for that. Overall, EPP gave me exposure to the professional/research world and made me more prepared for life after graduation.

—EPP-USP Scholar

The majority of scholars said they applied for the scholarship for the internship opportunity. Scholars also rated the financial aid from the scholarship as valuable, but to a lesser degree than the internship.

1. Internship Opportunity

a. Applying for the scholarship

The internship opportunity provided through the NOAA scholarships was a central component of students' decisions to apply to the program. When asked whether financial aid or the internship was more important in the decision to apply, 61 percent of scholars selected the internship opportunity as "more important" than financial aid as illustrated in figure 7.[25] In particular, 84 percent of EPP-USP recipients rated the internship opportunity as more

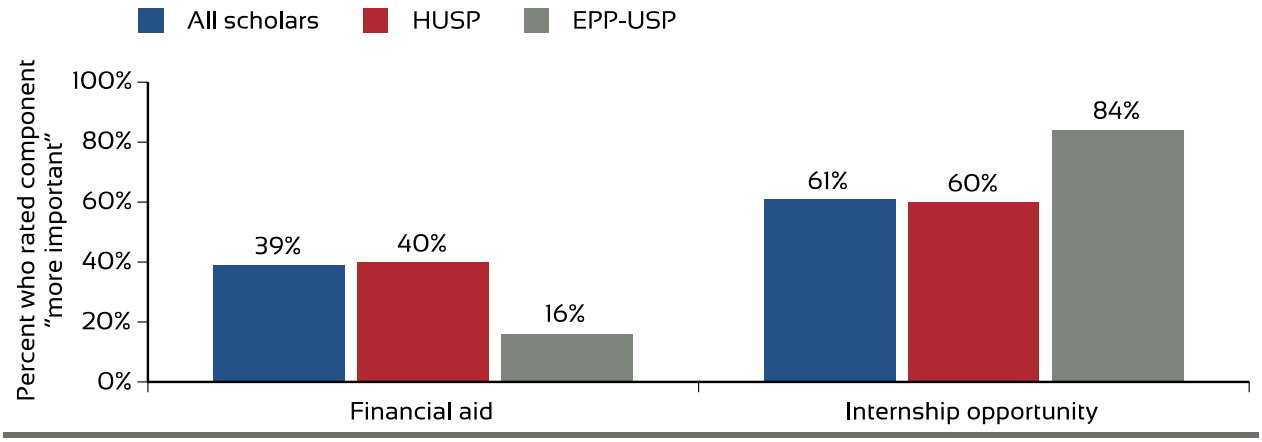
[23] Scholars were asked the following question: "For the following items, please rate how valuable each component of the [SCHOLARSHIP NAME] experience was to you: Overall NOAA scholarship experience."

[24] Scholars were asked the following question: "Would you recommend the [SCHOLARSHIP NAME] to other students? Yes or no." One of the two scholars who did not recommend the program explained that the scholarship schedule did not align well with the academic quarter system at the scholar's school, which shortened the timeline during which the scholar was to complete a productive, meaningful research project.

[25] For only this question, scholars were required to choose between financial aid/tuition and the internship opportunity. Scholars were asked the following question: "When evaluating the [SCHOLARSHIP NAME] opportunity, please select which

important than financial aid, compared with 60 percent of HUSP recipients who rated the internship opportunity as more important than financial aid. This finding may be explained by the fact that EPP-USP includes two summer internships, whereas HUSP provides only one.

Figure 7. Percentage of Scholars Who Rated Either Financial Aid or the Internship Opportunity as More Important in Decision To Pursue the NOAA Scholarship Opportunity



Note: Scholars were asked the following question: "When evaluating the [SCHOLARSHIP NAME] opportunity, please select which scholarship component was *more important* to you." Scholars were required to choose between financial aid/tuition and the internship opportunity.

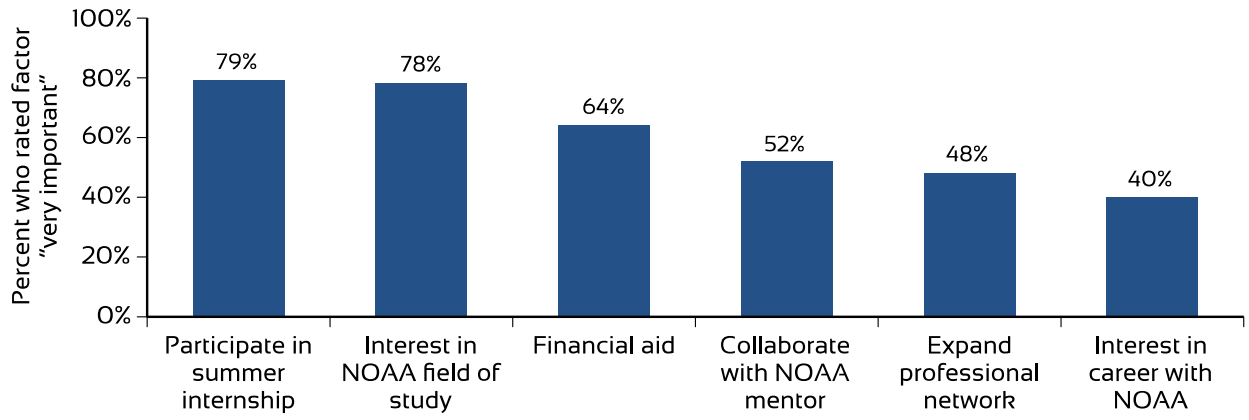
Financial aid is another key component of NOAA scholarship experiences. Although only 31 percent of scholars rated financial aid to be more important than the internship opportunity when evaluating the NOAA scholarship opportunity, as noted in figure 7, 64 percent of scholars reported that financial aid was "very important" in the decision to pursue the scholarship opportunity.

Scholars also rated how important each of six factors was in their initial decisions to apply. Here, scholars rated each factor separately on a scale of 1 (not at all important) to 5 (very important).[26] For each of the six factors (financial aid, internship, NOAA career, NOAA field, professional networking, and mentoring), between 40 and 79 percent of scholars rated each component as "very important" as illustrated in figure 8. Again, the largest percentage of scholars (79 percent) selected the summer internship as very important, followed closely by interest in a NOAA field at 78 percent. A higher percentage of EPP-USP recipients (95 percent) than HUSP recipients (78 percent) rated the opportunity to participate in a summer internship as very important. Table H.9 in appendix H provides a breakdown of the survey results by scholarship type.

scholarship component was *more important* to you." In subsequent questions, scholars could rate more than one component as important.

[26] Scholars were asked the following question: "Please indicate how important the following factors were in your decision to pursue the [SCHOLARSHIP NAME] opportunity: financial aid, opportunity to participate in a summer internship, interest in pursuing a career with NOAA, interest in a NOAA-related field of study (e.g., STEM fields), opportunity to expand professional network, and opportunity to collaborate with a NOAA mentor."

Figure 8. Factors Rated as Very Important by Scholars in Decision To Pursue the NOAA Scholarship Opportunity

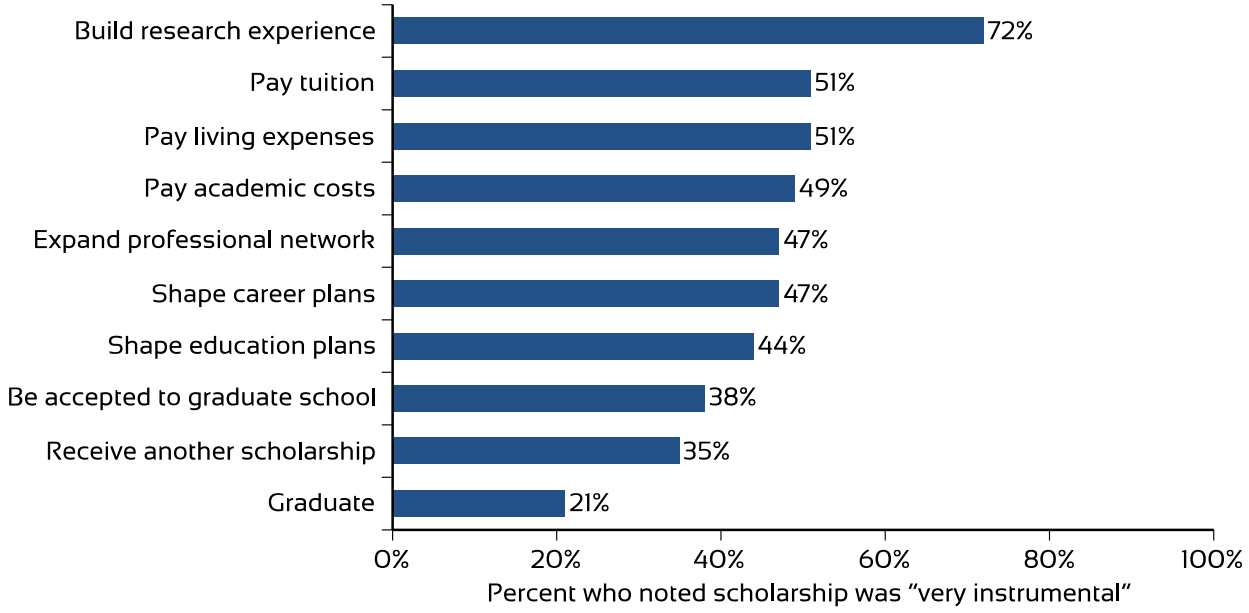


b. Gaining research experience

Receiving the scholarship and participating in an internship also helped scholars to achieve other important outcomes. The majority of scholars highlighted receiving research experience as a key benefit of the NOAA scholarship.[27] For example, 72 percent of scholars said the NOAA scholarship was "very instrumental" in building research experience as shown in figure 9. A higher percentage of EPP-USP recipients (84 percent) compared with HUSP recipients (72 percent) reported that the NOAA scholarship was very instrumental in building research experience. In contrast to the high ratings for research experience, approximately half of scholars considered the program very instrumental in accomplishing the other nine outcomes: graduating, paying tuition, paying for academic costs, paying for living costs, expanding professional networks, obtaining another scholarship, being accepted to graduate school, or shaping future education and career plans. Eighty percent of scholars said the internship was a "very valuable" component of the scholarship experience. Half of the scholars also felt that presenting work and learning about the research process were very valuable components of the scholarship. See figure 10 for these results. Finally, 73 percent of scholars strongly agreed that the scholarship gave them hands-on experience in a NOAA-related field.

[27] Scholars were asked the following question: "Please indicate how instrumental the [SCHOLARSHIP NAME] was in achieving each of the following (where 1 indicates *not at all instrumental* and 5 indicates *very instrumental*): Graduating, paying tuition, paying for academic-related costs (books, materials, fees), paying for living costs (rent), building my research experience, expanding my professional network, getting another scholarship/fellowship, getting accepted to graduate school, shaping my future education plans, and shaping my future career plans."

Figure 9. Scholars Who Reported That the NOAA Scholarship Experience Was Very Instrumental in Achieving Specific Outcomes



Eighty-one percent of scholars who responded to the survey responded to an open-ended question asking what differences receiving the NOAA scholarship made in their lives (see table H.10 in appendix H for a summary of these results). In their responses to this question, 30 percent of these scholars cited the hands-on research experience they gained.[28] Other less commonly reported responses highlighted several key outcomes related to the internship experience: knowledge of how NOAA offices and employment work; growth in technological and academic skills; and exposure to new research on the environment and other NOAA-specific topics (e.g., natural sciences, computational science, hydrology).

Marketable Research Experiences

[The scholarship] gave me the valuable learning and research experience needed to take my education to the next level. This program also provided me with the research experiences that allowed for me to have a well-rounded and competitive resume. This, no doubt, played a major part in making me a competitive applicant for graduate school.

–EPP-USP Scholar

Receiving the Hollings Scholarship truly shaped the future of my career. My internship and research project introduced me to the technology, issues, people, and mentors that helped me identify what I wanted to do as a career.

–HUSP Scholar

In their open-ended responses, 39 percent of scholars who recommended the scholarship to others referenced the opportunity to participate in hands-on research as a key incentive. This was the second most commonly cited reason to recommend the program after financial aid. Scholars emphasized the value of the rare opportunity to conduct real-world, hands-on research with respected scientists as an undergraduate student. Table H.11 in appendix H presents a summary of the reasons scholars said they would recommend the scholarship.

[28] All percentages for open-ended responses use the total number of scholars that provided a response to that specific question. For example, 30 percent refers to 204 responses out of the total 673 scholars who answered the question on what differences the NOAA scholarship made in their lives.

Valuable Guidance and Support

When it came time to apply for graduate school, my research mentor supported my application with a letter of recommendation and also offered advice on how to choose which program and a graduate advisor to work with. This was a huge help!

–HUSP Scholar

Good mentoring factored into scholars' views on a positive research experience. When responding to the open-ended question, 15 percent of scholars noted that the mentoring they received through the NOAA scholarship made a positive difference in their lives. Many of those scholars reported that their mentors provided valuable guidance and support regarding their educational and professional progression. For example, mentors helped scholars identify graduate programs that might be a good fit, introduced scholars to colleagues with whom they might work, and wrote recommendation letters for scholars. Several scholars indicated that they sustained their relationships with their mentors after concluding their internships and continued to benefit from their guidance; a subset of those continued to work with their mentors (e.g., as graduate students, postdoctoral fellows, laboratory technicians). Finally, inspired by the mentorship they received, some scholars expressed a desire to become NOAA mentors themselves.

Lasting Mentor Relationships

My NOAA mentor has greatly influenced my career and education path: She recruited me as a lab technician for several months before I began graduate school, is part of my dissertation committee, and we have continued to collaborate on research projects for the past 6 years.

–HUSP Scholar

2. Financial Aid

Easing the affordability of higher education

When scholars were asked how instrumental the NOAA scholarship was in supporting various achievements, about half reported that it was "very instrumental" with respect to paying tuition (51 percent); paying living costs, such as rent (51 percent); and paying academic-related costs, such as for books (49 percent). A higher percentage of EPP-USP recipients (64 percent) compared with HUSP recipients (48 percent) felt the NOAA scholarship was very instrumental in paying academic-related costs. Scholars cited these financial benefits more frequently than any other aspect of the scholarship except for building research experience as shown in figure 9. Moreover, 56 percent of scholars said that the ability to pay tuition was a "very valuable" component of the scholarship as illustrated in figure 10.

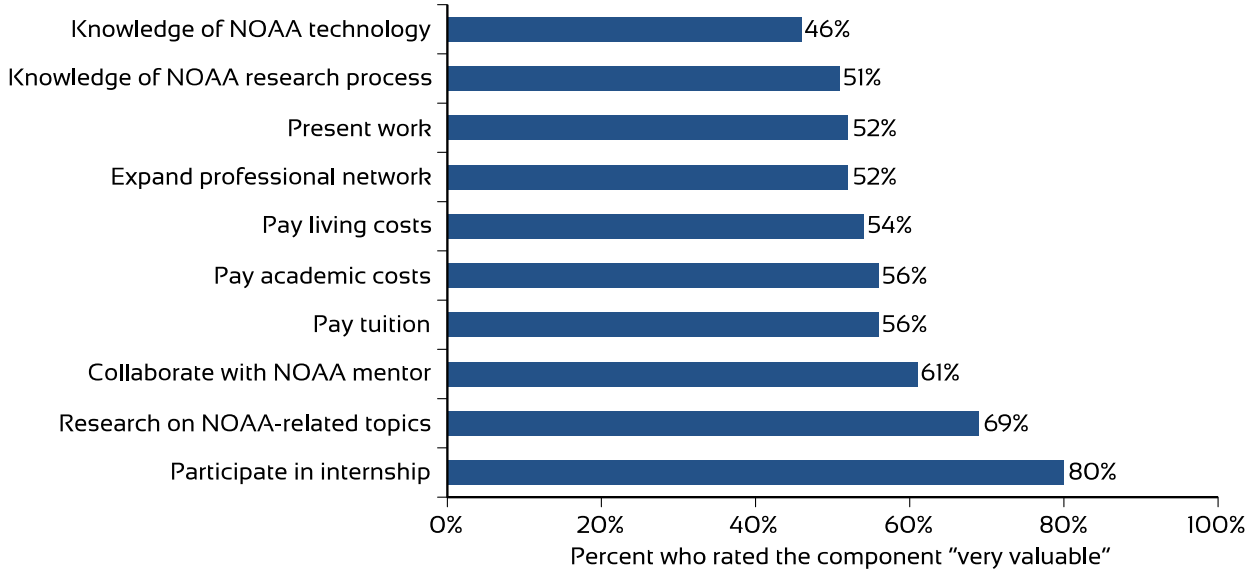
When responding to the open-ended question about the differences receiving the NOAA scholarship made in their lives, 33 percent of scholars referenced the financial aid they received. This financial assistance freed many students from having to work to support their education, afforded them the opportunity to focus entirely on their research, and eliminated or reduced the need for student loans. When scholars who reported that they would recommend the NOAA scholarship program to other students were asked why they would endorse it, half of them cited the generous financial aid package. Scholars were very impressed with the scholarship's duration and timing (i.e., spanning the final 2 years of undergraduate education) as well as the total amount of financial aid offered.

Reducing Financial Stress

I was able to stay in school while supporting my family without having to take on extra jobs. As a result of being able to focus solely on my studies, I was able to graduate Summa Cum Laude and get into a good graduate school. A direct result of getting into that school is that I am now working as a post doc … Without the financial stress paying for school lifted, I [might] not be where I am today.

–HUSP Scholar

Figure 10. Percentage of Scholars Who Rated a Component of the Scholarship as Very Valuable



3. NOAA-Related Career Trajectories

Other valued aspects of the scholarship related to shaping scholars' career trajectories, particularly as career paths related to mentoring and building professional networks. Sixty-one percent of scholars described mentor collaboration as a "very valuable" component of the internship, and 52 percent cited professional networking as a very valuable component as shown in figure 10.[29] A higher percentage of EPP-USP recipients (73 percent) than HUSP recipients (60 percent) felt that mentor collaboration was very valuable. Similarly, three-quarters of EPP-USP recipients reported that professional networking was very valuable compared with just half of HUSP recipients. A breakdown by scholarship type is provided in table H.9 in appendix H.

Career Path Traces Back to HUSP

The HUSP made a HUGE difference in my life: personal, academic, professional, and with professional networking. I can definitely say I would not be where I am today (pursuing a master's degree in marine sciences and working with one of NOAA's contractor companies)… if I hadn't received this scholarship award hands down! My summer internship with the HUSP allowed me to discover [how] I wanted to focus my professional career … I have continued to work with the NOAA office I had my internship with off and on throughout the years.

–HUSP Scholar

In their open-ended responses, scholars most frequently shared that the scholarship shaped their career trajectories (44 percent), facilitated admittance to graduate school (38 percent), and provided networking opportunities (26 percent). Many scholars noted that the scholarship helped solidify or refine their existing career plans by exposing them to real-world research. Scholars noted that they used networking connections and mentorship supports as they continued on to graduate school or full-time employment. Scholars

[29] The study team ran supplemental multivariate analyses on select outcomes and used program feedback variables as predictors. Preliminary results indicate that scholars' perceptions of strong mentoring support during their NOAA internship were associated with reports of earning an advanced degree, controlling for sex, age, race/ethnicity, and year of application.

indicated that being introduced to a broad network of like-minded peers, mentors, and other NOAA scientists was invaluable, and many reported relying on this network for graduate school recommendation letters or to secure employment.

A small proportion of scholars (6 percent) said they changed fields entirely as a result of the scholarship experience. After conducting hands-on research during the internship, some scholars reported that they realized their interests lay in a different scientific field (e.g., geographic information systems rather than meteorology) or decided against a career conducting research in favor of pursuing another occupation related to environmental science (e.g., switched from conducting environmental research to pursuing environmental law). Regardless of the particular career or field change, every scholar credited the NOAA scholarship for exposing them to the world of research early on and expressed gratitude that the decision to switch course occurred early in their careers.

B. Challenges of the Scholarship Experience

Scholars provided overwhelmingly positive feedback for the attitudinal questions provided in the survey. Scholars provided additional, more specific feedback to the open-ended question on challenges they faced during the scholarship experience (see table H.12 in appendix H for a summary of these results).[30] This section highlights challenges associated with internship logistics, project-specific problems, and program-related issues.

1. Logistics

The most commonly discussed challenges involved logistics, with 16 percent reporting issues associated with moving to a new city. Among the 95 responses in this category, the vast majority related to finding housing, finding affordable housing, or securing transportation when buying a car for a summer internship in a remote location was not an option. Other less frequent responses described issues related to payments, trip planning and flight cancellations, and travel reimbursement.

Regarding another aspect of scholarship logistics, scholars reported they were not provided adequate or updated information about how to file their taxes correctly in relation to receiving the scholarship. Consequently, some scholars mistakenly assumed that taxes would be deducted automatically from their stipends or claimed scholarship income incorrectly.

Logistical Challenges

… It was very difficult to acquire housing in another State when [I was] not present. Even though I was given 3 days to search, it was still difficult. I think there should be a database or references for NOAA scholars for housing. The database should include housing spots from previous scholars. It would be very helpful.

–EPP-USP Scholar

2. Project-Specific Challenges

Issues related to specific projects were the next most frequently reported challenges. Challenges associated with mentoring and additional project-specific problems are both included under this umbrella, although they are highlighted separately later in this report (see table H.12 in appendix H).

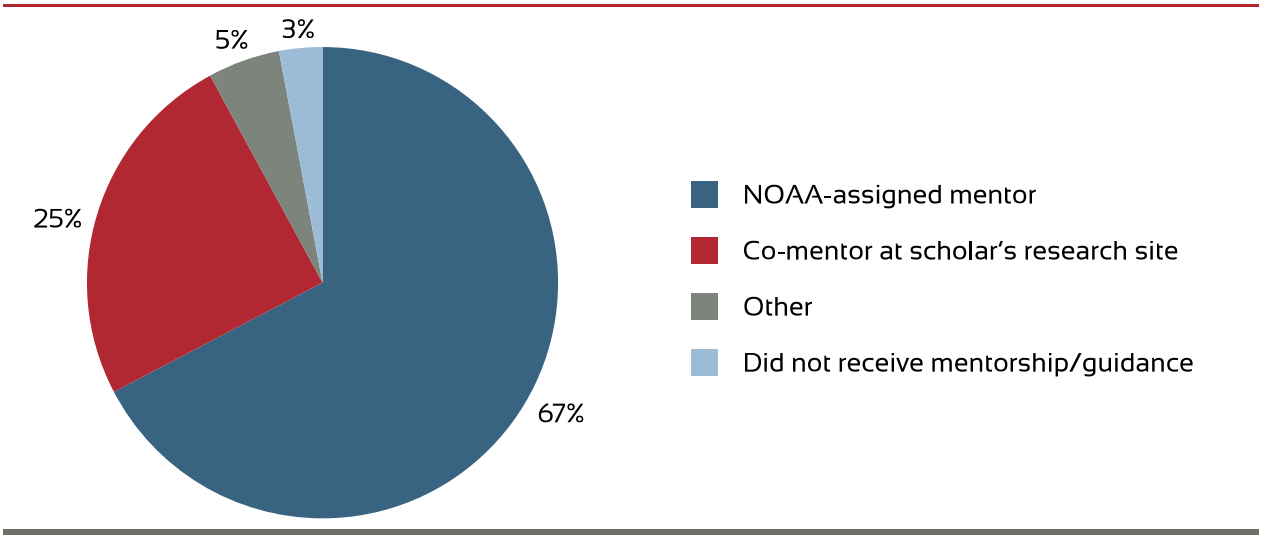
[30] Scholars were asked the following question: "Please describe any challenges you encountered during your [SCHOLARSHIP NAME] experience."

Both project-related challenges and poor mentoring were highlighted by 13 percent of respondents; in some cases, there was overlap in individual scholars' mention of challenges in these areas.[31]

a. Mentoring

The study team collected data on who provided mentoring during the scholarship and how frequently scholars met with those mentors.[32] Overall, only 6 percent of scholars strongly disagreed, disagreed, or neither agreed nor disagreed that the scholarship provided a supportive mentor relationship. Most scholars (68 percent) indicated that they received mentorship from a NOAA-assigned mentor or a co-mentor at the scholar's research site, but as shown in figure 11, an important minority (3 percent) did not feel that they received any mentorship/guidance. Although a few HUSP and EPP-GSP scholars said they did not receive any mentorship, no EPP-USP scholars reported a similar lack of mentorship (see table H.12 in appendix H).

Figure 11. Scholar Reports of Who Provided Them the Most Mentorship and/or Guidance

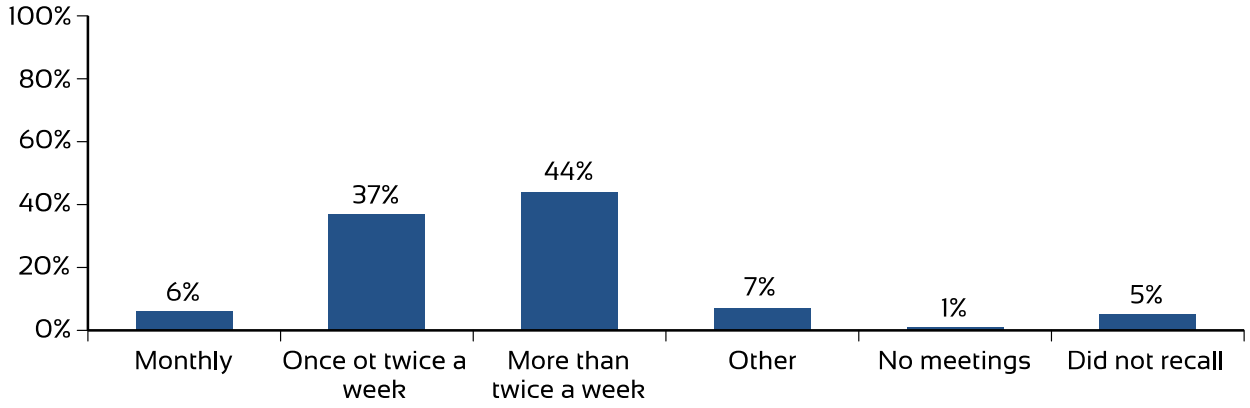


Relatedly, although most scholars (81 percent) described meeting with their mentors to discuss their research projects at least once a week, 1 percent said they did not meet with their mentors at all (see figure 12).

[31] Approximately 15 percent of reports of poor mentoring were also coded as project-related challenges.

[32] Scholars were asked to respond to the following question: "During your [SCHOLARSHIP NAME] experience, who was the person that provided you with the most mentorship and guidance? Note: For any questions that refer to mentorship, please refer to the person with whom you principally worked and engaged with most during your scholarship experience, regardless of whether that person was your NOAA-assigned mentor." Response options were as follows: (1) My NOAA-assigned mentor; (2) A co-mentor at my research site; (3) Other (please specify); and (4) I do not feel that I received mentorship/guidance during my internship. Scholars were also asked the following question: "NOAA is interested in learning more about the training opportunities you were given as a result of receiving the [SCHOLARSHIP NAME]. Please indicate whether you strongly disagree (1) or strongly agree (5) with the following statements: My mentor was supportive of my NOAA research project(s); The [SCHOLARSHIP NAME] afforded me the opportunity to develop knowledge of NOAA-related technology; My mentor was actively involved in my NOAA research training; My mentor was available to me whenever I needed guidance."

Figure 12. Reported Frequency of Scholar-Mentor Meetings



Scholars also reported some collaboration with mentors on publications, with 0.6 collaborative publications on average. Similarly, scholars reported 1.2 collaborative presentations on average.

In open-ended responses, 13 percent of scholars indicated their mentors were either absent or inattentive in some way. However, 15 percent of scholars highlighted mentorship as a way in which the experience made a difference in their lives. In their feedback on challenges, several scholars reported that their mentors were "hands-off"; consequently, they felt lost or were not as productive as they wished to be. In some cases, mentors worked remotely from different offices and were not accessible to scholars.

Infrequent Mentoring

My main NOAA mentor was present very infrequently, and this led to a lot of uncertainty with my project. Other staff who served as my co-mentors did not feel it was their place to step in for my mentor (who was their boss). Ultimately, the research project did not meet my expectations and was not publishable. I also did not feel as though my relationship with my NOAA mentor was adequate to ever ask him for a recommendation letter, though I have asked my co-mentor.

–HUSP Scholar

b. Poorly defined projects

After mentoring challenges, the most common project-related challenges included poorly defined research projects, a lack of access to key equipment or data, and not enough time to complete research projects. There were 78 responses on project-related challenges. Of these 78 scholars, 20 indicated that their projects were poorly defined; they did not receive clear parameters for their projects, faced difficulty having a research project or topic approved, worked on several small projects, or did not understand the work they were supposed to complete. Thirteen scholars indicated there was not enough time to complete the research project or field work and present their results at the end of the summer. Moreover, 11 scholars with project-related challenges cited a lack of key equipment, an inability to use the software they needed, or trouble obtaining access to the lab to conduct research. Additional feedback focused on not having enough work, not doing field work when it was preferred, and other expected challenges that occur during the

Unclear Expectations

I feel like the research I was tasked with performing under my summer internship was poorly defined, especially for an undergraduate student, and led to it not being as fruitful as other internships. Also, I had trouble getting security access for my research internship for almost the duration of the internship.

–HUSP Scholar

research process.

3. Program-Related Challenges

Although not among the most commonly reported challenges, 6 percent of scholars identified issues that NOAA could target for program improvement purposes. For example, several scholars who reported challenges explicitly referred to the scholarship's payment structure and procedures. They said disbursements from the NOAA contractor disbursing scholarship payments were frequently late, forcing some scholars to take out additional loans to cover tuition and living expenses until the payments arrived. A small number of scholars indicated that they received insufficient or incorrect information from NOAA about program requirements. One scholar noted that the program's manual contained contradictory or incorrect information, and the scholar could not reach NOAA for clarification. Finally, approximately 6 percent of scholars indicated that their interactions with NOAA OEd staff were difficult; staff were reportedly unresponsive or even rude. Though less frequently mentioned by scholars, these challenges may represent straightforward, solvable problems that NOAA could target to improve the scholarship experience overall.

C. Comparable Programs

Scholars were asked whether they had pursued any scholarships or fellowships other than those offered by NOAA. Scholars who had applied for multiple awards provided the names of non-NOAA scholarships or fellowships and indicated whether they received those awards. The majority of respondents did not apply for any other scholarships; only about one in five pursued one or more other awards. Those who did report that they sought funding elsewhere applied for an average of 1.5 other scholarships.[33]

Scholars identified 77 different categories of scholarship programs (see table H.13, appendix H). Excluding NOAA scholarship programs (e.g., a EPP-USP recipient also applying for HUSP) and university-specific scholarship programs (e.g., students applying for funding from their home universities), the most commonly reported scholarship programs included the National Science Foundation's (NSF) Research Experiences for Undergraduates (REU) program, the Barry Goldwater Scholarship, and the Morris K. Udall and Stewart L. Udall Scholarship. Brief descriptions of each of these programs follow.

1. NSF REU Program

NSF REU scholarships accounted for one in five of the other awards that NOAA scholars pursued. Forty-six percent of NOAA scholars' NSF REU applications were successful. Thus, 9 percent of the other awards received by NOAA scholars were NSF REU scholarships. NSF's REU program is similar to NOAA's EPP-USP and HUSP in that it supports hands-on research participation by undergraduate students.[34] However, REU students gain research experience through a variety of mechanisms rather than a relatively standardized summer internship experience. Furthermore, REU students receive indirect, rather than direct, funding. NSF awards funding to the sites that offer students research experience, and students apply to an REU-funded site rather than directly to NSF. This funding approach is similar to that used by NOAA's CSCs and their affiliated faculty and students.

[33] Note that this could be an underestimate, as the maximum number of possible responses was five. Seven respondents provided the maximum number of responses.
[34] For more information on the REU scholarship program, see https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517&from=fund

2. Goldwater Program

Goldwater scholarships accounted for 17 percent of the additional scholarships that NOAA scholars pursued. Forty-five percent of NOAA scholars' Goldwater applications were successful. Thus, 5 percent of the other awards received by NOAA scholars were Goldwater scholarships. The Goldwater Foundation funds college sophomores and juniors who intend to pursue research careers in the natural sciences, mathematics, and engineering.[35] Similar to NOAA's EPP-USP and HUSP, this program provides scholars $7,500 annually for up to 2 years. However, the program includes no specific research or internship component.

3. Udall Program

Eleven percent of the additional scholarships NOAA scholars pursued were Udall scholarships. Thirty-seven percent of NOAA scholars' Udall applications were successful. Thus, 4 percent of the other awards received by NOAA scholars were Udall scholarships. The Udall Foundation also provides funding (up to $7,000) to college sophomores and juniors, but with a specific focus on leadership, public service, and commitment to issues related to Native American nations or to the environment.[36] The program also includes a 5-day scholar orientation conference during which scholars work together on a case study and network with other scholars and Udall alumni. Furthermore, scholars gain access to the Udall Alumni Association, a network of more than 2,000 alumni that is designed to facilitate the sharing of innovative ideas, professional advice, and job and internship opportunities.

NOAA nonrecipients were asked to indicate the names of up to three scholarships they had ever been awarded. More than half of NOAA nonrecipients (57 percent) said they had received a scholarship; those in receipt of awards by other programs reported 1.9 other scholarships on average.[37] However, survey responses by nonrecipients may not provide a representative list of comparable programs because nonrecipients' responses included scholarships received within an unlimited timeframe (i.e., graduate, undergraduate, and high school scholarships), and responses were limited to scholarships that nonrecipients actually received. Nearly two-thirds (62 percent) of the scholarships received by NOAA nonrecipients were university specific (e.g., students funded by their home universities). In contrast to NOAA scholars, only 3 percent of the scholarships received by NOAA nonrecipients were NSF REU awards, and less than 1 percent were Goldwater or Udall scholarships.

[35] For more information on the Barry Goldwater Scholarship program, see https://goldwater.scholarsapply.org
[36] For more information on the Morris K. Udall and Stewart L. Udall Scholarship program, see https://www.udall.gov/OurPrograms/Scholarship/Scholarship.aspx
[37] Note that this could be an underestimate, as the maximum number of possible responses was three. In all, 151 respondents provided the maximum number of responses.

Chapter 6. Summary and Program Recommendations

This evaluation of NOAA OEd's HUSP and EPP/MSI scholarships collected information from both NOAA scholars and nonrecipients to assess the effectiveness of the scholarship programs. These findings can help NOAA set priorities for program improvements and highlight areas of success. This chapter summarizes key findings and shares recommendations for augmenting the already successful measurement of program outcomes and addressing potential programmatic changes.

A. Summary of Findings

The Year 2 evaluation targeted two key research questions for both HUSP and EPP/MSI, which are addressed in this section.

1. To what extent do scholars gain knowledge and training in NOAA mission fields?

More than three-quarters of scholars indicated that the internship component was very important to the initial decision to apply. After controlling for respondent characteristics, NOAA scholars reported authoring more publications and presentations relative to nonrecipients and receiving higher levels of hands-on technological experience in the field relative to nonrecipients. Findings suggest that scholars perceived greater hands-on experience relative to nonrecipients in addition to authoring more publications and presentations. Combined with scholars' positive open-ended responses on the research experiences provided through the NOAA scholarship, results indicate that the NOAA summer internship creates an opportunity to develop hands-on experience. However, there is some variation within individual experiences during the summer internship as to the extent to which scholars gain useful experience.

In contrast, multivariate results showed no measureable difference in the receipt of mentor support. Given the emphasis that NOAA programs place on mentorship through the internship selection process, there may be additional opportunity to improve this component of scholars' experience throughout their participation in a NOAA scholarship program. This suggestion is addressed in greater detail in the recommendations section of this chapter (section B).

2. Does the scholarship shape scholars' academic and career trajectories?

Scholarship receipt is associated with improvements in two academic outcomes. Relative to nonrecipients, scholars were more likely to have earned an advanced degree or be enrolled in graduate study.

One employment outcome showed a significant association with scholarship receipt. Scholars were more likely to show interest in working in a NOAA office or facility. However, NOAA scholars were no more likely to be employed full time than were nonrecipients, and scholars were less likely to be employed full time in a NOAA mission field.

Education and employment outcomes are highly contextual, related to individual ability, circumstances, and background. Still, scholars' open-ended feedback suggests that scholarship receipt may influence academic and career trajectories when scholars receive high-quality mentorship; for example, many mentors helped scholars identify graduate programs that might be a good fit, introduced scholars to colleagues with whom they might work, and wrote recommendation letters for scholars.

Controlling for individual characteristics, scholars were more likely than nonrecipients to express interest in pursuing study and work related to NOAA topics. This finding suggests the NOAA scholarship programs provide experiences that encourage participants to persist in NOAA mission fields.

When controlling for individual characteristics, scholars were no more likely to earn a highest degree in a NOAA mission field, pursue graduate study in a NOAA field, be interested in graduate study in a NOAA field, be employed, or be employed in a NOAA field. Multivariate regression findings do not provide any indication as to whether the scholarship or scholars' individual ability/contextual circumstances led to improved outcomes. The broad definition of NOAA fields limits the results related to employment and career trajectories. A recommendation for improvement is discussed later in this chapter.

3. What challenges do scholars encounter during the program?

Most commonly, scholars reported logistical issues associated with moving to a new city. For example, scholars experienced challenges finding affordable housing or securing convenient transportation to work. Next, scholars' open-ended responses suggested that the quality of the mentorship may vary. Eighty-six percent of scholars reported having a supportive mentor, and 94 percent of scholars agreed that their mentor was supportive of their NOAA research project; however, a small percentage of scholars (3 percent) did not feel that they received mentorship/guidance at all. Additionally, 13 percent of scholars described experiencing additional project-specific challenges related to mentoring problems. These problems surrounded the specific research that scholars conducted and issues related to completing their work.

4. What are the overall findings?

The lack of significant findings using the quasi-experimental design intended for this study indicate that there is not a measurable causal relationship between participation in a NOAA scholarship program and any of the measured outcomes. However, other data collected provide opportunity to draw additional inferences. NOAA has successfully identified promising candidates, and aspects of the program are related to important outcomes such as graduate education and employment in NOAA fields. However, the evaluation was unable to pinpoint the extent to which participation in a NOAA scholarship program predicted scholars' subsequent successes. Key elements of the scholarship programs (e.g., participation in an internship, working with a mentor) appear to be related to future success. The scholarship serves as an effective signaling mechanism to identify applicants who have higher potential to be successful in their education, research, and career pursuits in NOAA mission fields.

B. Areas for Future Investment

Insight based its recommendations on the assessment of the key strengths and weaknesses of the NOAA scholarship programs as well as on scholars' program feedback.

1. Refine the definition of NOAA mission fields

Several HUSP and EPP/MSI goals hinge on appropriately defining NOAA mission fields. For example, EPP/MSI aims to train, educate, and graduate scholars in NOAA mission fields. For the purpose of this evaluation, NOAA administrators identified several fields they deemed to be within the NOAA mission: computer and information sciences, communications, education, engineering, law, agricultural sciences, biomedical sciences and environmental health, mathematics, atmospheric science, chemistry, geological sciences, marine sciences, physics, anthropology, archaeology, economics, geography, political science,

public policy, urban affairs, and environmental policy. Because of the broad definition of NOAA fields, the majority of both scholars and nonrecipients received degrees in NOAA mission fields. It is possible that a true difference between scholars and nonrecipients may not have been detected because the list of NOAA mission fields was overly inclusive.

The study team recommends revising the list of NOAA mission fields to be more precise. The implementation of this recommendation could be nuanced. First, additional research should address the extent to which scholarship applicants are reflected across these fields. Second, it may be in NOAA's interest to attract applicants from a wide variety of fields and then steer scholars toward a more specific range of fields for graduate study and employment. In effect, NOAA could consider a tiered list of mission fields, casting a wide net for undergraduate study and a more refined approach for graduate study and employment. At a minimum, the study team suggests excluding communication, computer science, law, and social sciences—majors rarely endorsed among survey respondents. Or, if these are relevant areas to key aspects of the NOAA mission, scholarship program administrators should consider increasing attention to student applicants who majored in those fields.

2. Create and enforce mentorship standards

Mentorship is a key component of both the HUSP and the EPP/MSI logic models. Given that scholars consistently rated the internship opportunity to be one of the most valued components of the programs, it follows that future investments should focus on ensuring the continued high quality of the internship program. Mentoring is a key component of the internship, and although most scholars (86 percent; see figure 2) reported having a supportive mentor, it is worth noting that NOAA scholars did not perceive greater mentor support relative to nonrecipients.

Approaches to Mentoring in Undergraduate Research Experiences

Give students a voice in the relationship. Solicit student feedback, seek students' suggestions for key goals, foster student participation in weekly meetings, and ask students what methodological techniques or applied experiences they gained through mentoring (Quaye & Harper, 2014).

Set clear expectations and provide technical and emotional support. Mentors should offer students intellectual training on research methods, protocols, key resources, and specific requirements for the use of technology. Mentors also need to show an interest in students' accomplishment of tasks and their personal lives. Setting clear expectations can provide parameters for both these activities (Shanahan, Ackley-Holbrook, Hall, Stewart, & Walkington, 2015).

Require student reporting. Students should report regularly to mentors in one-on-one meetings; students should track their activities over the course of the internship in daily or weekly logs; and each week, students should provide plans for their activities in the coming week (Seeling & Choudhary, 2016; Shanahan et al., 2015)

Discuss findings and relevant research with students. Mentors should engage students to help them understand the overall purpose of applied experiences, discuss results of faculty research and other relevant literature, and encourage students to synthesize findings (Linn, Palmer, Baranger, Gerard, & Stone, 2015).

Push students to provide more advanced support. After a suitable amount of time to observe an intern's ability, mentors should push the student to engage in more complicated tasks that will expand the student's knowledge of experimental methods and assign more responsibility (Seeling & Choudhary, 2016).

NOAA mentors are expected to engage in a variety of activities that in turn should yield a host of positive outputs and outcomes for NOAA scholars. However, the results of this evaluation show that the quality of the mentorship scholars received varied widely. Furthermore, scholars did not perceive greater mentor support/involvement relative to nonrecipients.

The study team recommends that NOAA develop a standard definition for mentorship and conduct a rapid feedback survey of NOAA scholars early in the internship experience to assess whether they are being properly mentored. Research suggests that written guidelines that explicitly lay out the

expectations, duties, and responsibilities of both NOAA scholars and their mentors would improve mentoring relationships. Scholarship program administrators could provide mentors and scholars with the tools to develop standards for the nature of the mentor/protégé relationship together at the beginning of the internship, including key goals and milestones (Keyser et al., 2008).

Feedback should be solicited early and often during the internship process to quickly identify mentoring relationships that are not meeting expectations. A short survey of NOAA scholars' satisfaction at week 2 of the mentorship would enable program administrators to identify any potentially problematic situations. Once high-risk cases have been identified, NOAA could provide strategies to improve communication. Such strategies could include holding more frequent meetings or a goal-setting meeting, or identifying key challenges. NOAA OEd could also require scholars and their mentors to report on the progress of the goals and milestones they developed together as part of the internship plan, as described earlier in this section (Keyser et al., 2008). Currently, NOAA requires mentors to submit a midterm mentor assessment form rating students' ability and contributions to the project. The Internship Experience Survey for scholars provides only two questions related to mentoring. Early solicitation of feedback would enable scholarship program administrators to intervene in the mentoring relationship if necessary.

Developing a Mentorship Survey

1. Design a short (not longer than 10 minutes) survey in an online platform (e.g., Survey Monkey) to be fielded after week 2 of students' 6-week internship.
2. Track student responses based on email address or require students to enter their names.
3. For sample questions for students, consider including five to seven closed-ended questions and one open-ended response. The survey must be short to ensure prompt participation and ease the burden of NOAA OEd staff who review the responses. Questions might take the following forms:
   - Has your mentor provided clear expectations for your work over the course of the internship?
   - Have you identified goals for your summer research experience?
   - How many times have you met with your mentor so far?
   - Have you scheduled your next meeting with your mentor?
   - Have you experienced any mentorship challenges so far? If so, please describe.
4. In analysis, responses could be triaged to quickly identify cases that could require additional attention. For instance, if a student answers two or more questions in a way that suggests the relationship could be improved, NOAA staff would follow up with respondents. Alternatively, mentors could discuss a version of these questions edited to reflect students' perspective with scholars early in the internship experience.

3. Facilitate post-program employment

Although both HUSP and EPP/MSI focus on preparing scholars for careers, NOAA scholars were no more likely than nonrecipients to be employed full time, and scholars were less likely to be employed full time in a NOAA mission field. To better address this objective, the study team recommends that scholarship administrators identify and implement strategies to help scholars secure employment after the program ends. One potential strategy would be to establish an alumni network, thus facilitating recruitment of NOAA scholars by program alumni or other individuals in NOAA fields who may be searching for qualified candidates. Relatedly, scholarship program administrators might consider developing a job bank platform where alumni could post employment opportunities for NOAA scholars' consideration. Several outcomes also suggested that women and minority communities might face additional challenges in the labor market in NOAA mission fields. Effort to improve support for these students may offer additional benefits to the programs. Some comparable scholarship programs provide potential models for such resources. For example, the Udall scholarship program provides access to the Udall Alumni Association, a network of more than 2,000 alumni that is designed to facilitate the sharing of innovative ideas, professional advice, and job and internship opportunities.

The survey that scholars complete at the end of the program also presents an opportunity to identify appropriate strategies. By asking outgoing NOAA scholars what resources they would find helpful, NOAA administrators might be able to pinpoint gaps that should be addressed and potential approaches to do so.

4. Improve program measurement and evaluation

There are some improvements that could be made to program measurement to facilitate future evaluations of the effectiveness of NOAA scholarship programs. As OEd continues to collect data from program applicants and track scholar information with the SPMTS (Student and Performance Measures Tracking System) database, data collection could focus on several of the program activities rather than only long-term outcomes on employment and careers. For example, NOAA could collect information from scholars on their hands-on research and applied technology experiences. Scholars could discuss the particulars of the experience, the types of equipment used, details about their research, and information on the role the student played for the project. Scholars could also provide additional information on their level of knowledge related to NOAA's mission, programs, and activities. This type of information could be used to provide mentors and field offices with suggestions as well as to measure program success.

There is limited evidence in the literature that scholarships have an impact on students' long-term education and employment outcomes. Rather, findings have shown that scholarships provide short-term results by way of reducing the time to degree completion and encouraging persistence in postsecondary education (Mayer, Patel, & Gutierrez, 2015). In this way, the NOAA scholarship program is performing similarly to other scholarship programs with regard to measurable results. Other research has shown that undergraduate research programs encourage students to remain in the pipeline toward a professional career. For example, participation in undergraduate research in science, technology, engineering, and mathematics (STEM) fields increases students' probability of indicating plans to enroll in a graduate program (Eagan et al., 2013). Therefore, NOAA should collect additional information on students' career plans as they complete the scholarship experience.

As shown in the results included here, there are substantial roadblocks to education and employment among particular groups of students (women and minority communities). Though not tested, socioeconomic status is positively associated with education and employment, some of the key outcomes highlighted in this report. NOAA should collect additional information on applicants' background characteristics that could be used for future evaluations. Such information would also help identify to what extent NOAA scholars compare with a broader national population of students regarding individual and contextual characteristics. Finally, more detailed information on students' individual characteristics could help NOAA direct additional resources to women, minority community, or other (not yet specified) populations to place resources where they would be most beneficial.

Chapter 7. Future NOAA Scholarship Evaluations

As NOAA OEd continues to serve students through its HUSP and EPP/MSI scholarships, there will be additional opportunities to explore each program's impact on student research experiences and career trajectories. As the programs develop, additional efforts should focus on the key outcomes outlined in the HUSP and EPP/MSI logic models provided in appendices A and B, respectively. These outcomes should be approached with students' ages and cohorts in mind; there is an important causal relationship between the length and the trajectory of an individual's career.

A. Background: Estimating the Impact of Scholarship Programs

This section summarizes the current peer-reviewed literature on the achievements of scholarship programs that offer financial aid and/or research experiences for undergraduates. In a survey of about 300,000 postsecondary students at more than 500 institutions, the National Survey of Student Engagement (NSSE) found that approximately 50 percent of college seniors reported participating in an internship or field experience during college (NSSE, 2016). Therefore, given that students partake in other financial and research opportunities, it may be challenging to identify a direct impact of the NOAA scholarship programs.

The study team examined 14 peer-reviewed articles published between 2002 and 2015 that highlighted evaluation outcomes for scholarship programs offering research experiences or financial aid to undergraduates. The following two sections describe the findings regarding the common methodological approaches and outcome variables highlighted in the literature. These findings both contextualize the results of this evaluation of the HUSP and EPP/MSI scholarship opportunities and inform future program evaluations.

1. Methodological Approaches

Experimental design is typically the gold standard in evaluation research. In experimental design, researchers randomly assign participants to either a treatment or control group. Because of this, researchers can be confident that any differences between groups are because of the intervention—in this case, the scholarship—rather than underlying group differences such as motivation or ability. Given that random assignment is rarely an option for scholarship programs, it is not surprising that only one of the studies used experimental design. Mayer and colleagues (2015) randomly assigned at-risk students who exhibited financial need to either a program group (eligible to earn performance-based scholarships) or a control group (not eligible to earn performance-based scholarships). They found that across the six program sites, students who received financial aid showed improved academic progress and were modestly more likely to complete degrees after 5 years relative to students in the control group (Mayer et al., 2015).

When random assignment is not possible, quasi-experimental design is an alternative for estimating the impact of scholarship programs while maintaining methodological rigor. Quasi-experimental studies compare scholarship recipients with nonrecipients but do not randomly assign participants to the scholarship or control group. Researchers try to identify similar individuals and account for any measurable baseline differences. Seven of the articles the study team reviewed described studies that used quasi-experimental designs, making this the most common evaluation approach identified.

Similar to the evaluation of the NOAA scholarships described in this report, DesJardins and McCall (2006, 2008) used a fuzzy regression discontinuity (FRD) approach to evaluate the Gates Millennial Scholarship (GMS), a program that provides full-tuition scholarships with the goal of improving access to and success in higher education for low-income, high-achieving minority students. The authors leveraged students who applied to but did not participate in GMS as a comparison group. Similar to the study team's findings for this evaluation using a regression discontinuity design (RDD), DesJardins and McCall (2008) had inclusive findings for one cohort because the sample size was too small and the data was insufficient to power an analysis. Results for the second cohort indicated that scholarship recipients had lower loan debt, worked fewer hours during college, and were more likely to aspire to a doctoral degree.

Nonexperimental design, which does not include a comparison group, is the least rigorous but most accessible form of program evaluation. Depending on program needs and the outcomes of interest, it is often a sensible and cost-effective methodology. There are a number of ways to approach nonexperimental design in program evaluation. One such approach is a pre-post program evaluation, something NOAA already incorporates into its internship experiences. Two studies we reviewed leveraged baseline data in addition to postprogram data; they used pre-post designs to investigate changes in key outcomes from before to after students' participation in NSF's REU program. For instance, Gonzalez-Espada and LaDue (2006) surveyed students about their graduate school plans, career plans, and perceived potential for scientific research both prior to and after they completed their summer research experiences. The study found that post-research experience, more of the students reported plans to attend graduate school than they did pre-research experience, but they did not change their responses regarding their career plans and perceived potential to become a research scientist.

Other approaches to nonexperimental design may involve a review of program and participant accomplishments to date. Such studies would not necessarily incorporate baseline (i.e., preprogram) data. For example, Beninson and colleagues (2011) surveyed principal investigators at NSF REU sites regarding REU participant demographics and program-related components, including enrichment activities, recruitment methods, and the measures of program success used at each site. Results indicated that most participants have been female and recruited from non-Ph.D.-granting institutions, and the racial diversity of participants has increased over the years. Findings also highlighted a variety of enrichment activities implemented by REU sites, including scheduled lab meetings, seminars, workshops, and end-of-program symposia at which students present their work.

2. Outcomes Highlighted in Literature

The study described in this report faced unique challenges in that it aimed to examine both the financial aid component and the internship/research component of NOAA's scholarship programs. By contrast, the extant literature has typically focused on either the impacts of monetary support or undergraduate research experiences. The financial or research focus of a scholarship influences the outcomes researchers choose to examine.

Studies that examined the impact of financial support provided by scholarship programs have highlighted financial indicators (e.g., amount of loan debt, hours worked while in college) and basic academic outcomes (e.g., college enrollment, retention, academic progress such as number of credits earned). By contrast, studies that focused on the effects of research experiences provided by scholarship programs have assessed more advanced academic outcomes. For example, several of the evaluations of scholarship programs offering research experiences for undergraduates have examined

outcomes such as graduate school attendance, career plans, and attitudes toward science and/or research.

Although the NOAA scholarships provide both financial aid and research experiences, their goals, implementation, and administration are similar to those for programs that offer research experiences. Therefore, it is appropriate that the study described in this report focused on advanced academic and career outcomes as well as the impact on scholars' knowledge and training in NOAA-mission fields. Given the wide number of outcomes available, future evaluations could benefit from more detailed collection of data on activities and further refinement of key program outcomes based on the findings in this evaluation and program priorities.

B. Recommendations for Future Evaluations

In this section, we briefly summarize some of the drawbacks of using RDD and suggest several steps for future evaluations. Taken together, these steps offer a strategy for conducting the next NOAA OEd evaluation and selecting the method or methods that will best suit program goals.

1. Refine and target key program outcomes

The first step in the process of developing a new evaluation requires refining outcomes of interest for the programs and highlighting specific measures to track these outcomes. The process of refinement should focus on the areas in which the NOAA scholarships are expected to have the greatest impact and the outcomes that are most closely tied to specific activities associated with the NOAA scholarships.

Future evaluations should build on the results from this evaluation to target key program outcomes of interest. The broad approach taken in the current evaluation provides an overview of the educational traits and trajectories of NOAA scholars. Results indicate that scholars were actively engaged in research and publishing, presenting at conferences, and gaining hands-on technology experience in the field. Each of these outcomes is tied to specific activities associated with the HUSP and EPP/MSI scholarships. Other results indicate that NOAA scholars were likely to receive graduate degrees and express an interest in working in a NOAA office. Although there are positive findings relating to scholars' graduate education, measures of graduate education may be tied to several individual and institutional factors beyond the activities scholars engage in during their program experiences. Finally, survey data and scholars' open-ended responses indicate that research experiences gained through HUSP and EPP/MSI could be a promising area of focus for future outcomes. Once key outcomes of interest are determined during the initial phase of future evaluations, additional measures (perhaps not used in the current evaluation) should be explored.

After using existing data to help define key outcomes of interest, high-priority outcomes and potential measures could be discussed with NOAA staff through qualitative data collection (e.g., interviews). Furthermore, depending on what specific areas are targeted, NOAA OEd should consider conversations with current scholars and interns. This phase of the evaluation approach does not have to include an extensive number of conversations. A carefully selected sample of in-depth interviews could help shape which measures would be most effective and least burdensome. For example, is there information future recipients could share upon application (e.g., transcripts) that would aid in future evaluation efforts? If encouraging scholars to take more advanced NOAA-related courses is an outcome of interest, OEd could consider using student transcripts submitted at application and then at graduation to identify whether scholars pursued additional coursework in oceanography or atmospheric sciences in the last year of school.

2. Include Cooperative Science Centers

The current evaluation did not capture information about a significant component of EPP/MSI, the Cooperative Science Centers (CSCs). Similar to HUSP, EPP-USP, and EPP-GSP, CSCs also offer substantial research experiences for undergraduate and graduate students. These CSC research experiences are often ongoing and can be coupled with coursework, unlike the shorter summer internships. Incorporating feedback from faculty and students of the centers would enrich future program evaluations. Furthermore, including CSCs would provide more data on outcomes related to students of color. For this evaluation, 78 percent of the NOAA scholars for whom data was available were White, whereas only 16 percent of the scholars identified with races/ethnicities underrepresented in the sciences. These figures were driven largely by the number of participants in HUSP, given that 88 percent of the EPP/MSI scholars identified with underrepresented groups.

There are several methods available for soliciting feedback from CSCs and including them in the evaluation; however, the timing of EPP/MSI grants to the centers must be factored into the evaluation schedule. Potential approaches for outreach could include online feedback through a survey, the review of extant data such as annual reports and CSC external evaluations, and in-depth interviews with CSC faculty and students. Direct conversations with these faculty and students are likely to provide important information about which outcomes and measures might best incorporate the diverse goals and priorities of CSCs.

3. Choose the appropriate method to answer different questions

It is important to select a methodological approach well suited to highlighting the refined program outcomes and anticipated measures. The most rigorous approach is not always the best fit; it is possible that a more methodologically rigorous approach would not provide the most important information. This section describes some possibilities for an evaluation approach, but the best fit depends on the feedback on program outcomes and CSC priorities targeted in previous steps. This section also offers several methodological suggestions.

a. Quasi-experimental designs to assess impact

Regression discontinuity

The RDD approach used for the present study leveraged individuals who applied for, but did not receive, a NOAA scholarship as a comparison group. This method for selecting a comparison group yielded a group with more similarities to NOAA scholars than a group that would have been selected simply by using national averages for students in science and technology fields. The RDD analyses allowed the study team to approximately estimate the causal effects of receiving a NOAA scholarship for the population with an application score close to the cutoff point. However, the small sample size within the cutoff window reduced the statistical power for the RDD approach. Thus, the RDD yielded inconclusive findings with no measurable differences between NOAA scholars and nonrecipients.

Fortunately, the data were sufficient to examine associations between receipt of a NOAA award and key outcomes using multiple linear regression analyses. There are several possible explanations for the similarities observed among scholars and nonrecipients and the lack of statistically significant results from the RDD analyses. This method could be replicated, but would likely have similar results:

- First, the sample size for the RDD analyses was not large enough to yield substantive results. This is primarily because of the small number of applicants to the NOAA scholarship program, which reduced the ability to power the analyses. The sample size was also affected by missing contact information and nonresponse (particularly for nonrecipients). Sample size is a challenging problem to address because outside of growing the program over time and increasing the number of applicants, there are few avenues to powering analyses using these particular comparison groups. Moreover, the response rates for the survey were typical, particularly among individuals that did not receive a scholarship. The study team does not have recommendations to improve response rates given that the survey already included a telephone follow-up component.
- Second, the "fuzzy" design that was employed as a result of the unpredictability of the assignment of applicant score created a wider range of possible outcomes within the applicant pool. The wider window reduced the likelihood of identifying whether scholars showed more advantageous outcomes relative to nonrecipients. Should NOAA wish to consider an RDD approach again, the study team would recommend developing a rubric that takes into account the institutional prestige and the institutional diversity of applicants when scoring applicants. This approach would yield a more direct correlation between applicant scores to award decisions, in turn reducing the analytic threshold and increasing the likelihood of identifying meaningful results.
- Third, the outcomes related to a NOAA mission field (e.g., degree in a NOAA mission field, employment in a NOAA mission field) were too broad and did not allow for sufficient variation within the sample. In other words, the overly inclusive definition of a NOAA mission field significantly reduced the diversity of responses among respondents for those outcomes. For example, regardless of whether they receive a NOAA scholarship, most physical science majors will remain in the physical sciences as they continue their educational careers. Those who change fields will likely move to another science and technology field, all of which were included as NOAA mission fields. A NOAA scholarship would be more likely to influence choices at a much finer level—i.e., changing one's focus from meteorology to marine biology. However, analysis at such a fine level of detail would also reduce an already small sample size.
- Finally, there are a number of other contextual factors, family characteristics, and experiences that shape individuals' research experiences and education and career trajectories. It is challenging to assign responsibility for progression through the educational system or in a career to a single event and exhaustively control for these other factors. For example, as noted earlier in this chapter, a majority of postsecondary students participate in undergraduate research experiences (NSSE, 2016), and it is challenging to control for all such experiences.

Matched comparison

Using a matched comparison group also falls within a quasi-experimental design framework. There are numerous methods for creating matched comparison groups; for example, propensity score weighting or matching. Propensity score matching provides an opportunity to generate a comparison group, controlling for factors beyond receipt of a NOAA scholarship award that would otherwise predict the outcome. For example, if the analysis were designed to examine whether students received greater mentoring gains through the scholarship award, the analysis would establish a score for key factors such as student ability, grade point average, participation in other research experiences, faculty-student ratio at the university, and other predictive measures. This approach would require access to an administrative dataset with those variables or the costly creation of a new dataset. Once the matched

comparison was identified, investigators would need to recruit participants and collect the same data that they collected from scholars. Without incentives for nonrecipients, there may be high attrition or nonresponse. The issues that would reduce the ability to power the analysis, described earlier in this section, would also remain.

b. Cost-benefit or cost-effectiveness analysis to estimate the value of the scholarships in later income return on educational investment analysis

To the extent NOAA OEd is interested in the employment and income of participants, this approach would help quantify the effect of different program components and activities (e.g., financial aid, mentorship, internships). A cost-benefit analysis would require assigning economic value to the outcomes of interest. This type of work[38] would quantify and monetize the program costs and outcomes to estimate a return on investment. This approach would also allow a comparison of the effect of different types of programs or activities on similar outcomes.

c. Descriptive studies to track program and participant accomplishments

Other options could take a more simplistic and low-cost approach to measuring program successes (and challenges) and participant outcomes. If possible, extant data (application files) could be used to measure participant characteristics, and participants could provide additional information after completion of the scholarship program. Depending on the outcomes of interest, this approach might involve pre- and posttest evaluations of scholars at several stages of the scholarship experience (not limited to the internship). Analyses could also simply highlight the extent to which scholars succeed across the intended outcomes. This approach would also provide an opportunity to ensure that the program met goals for increased diversity and assistance to historically underrepresented groups. Descriptive analyses could examine both short- and long-term outcomes. For example, one of the expected outcomes is for graduates to become educators, enroll in graduate study, or become professionals. A descriptive analysis of scholar progeny networks could describe their publication networks and the number of students supervised.

[38] See recent work on Kalamazoo Promise (Bartik, Hershbein, & Lachowska, 2016), a place-based higher education scholarship that was estimated to produce an 11-percent return on investment.

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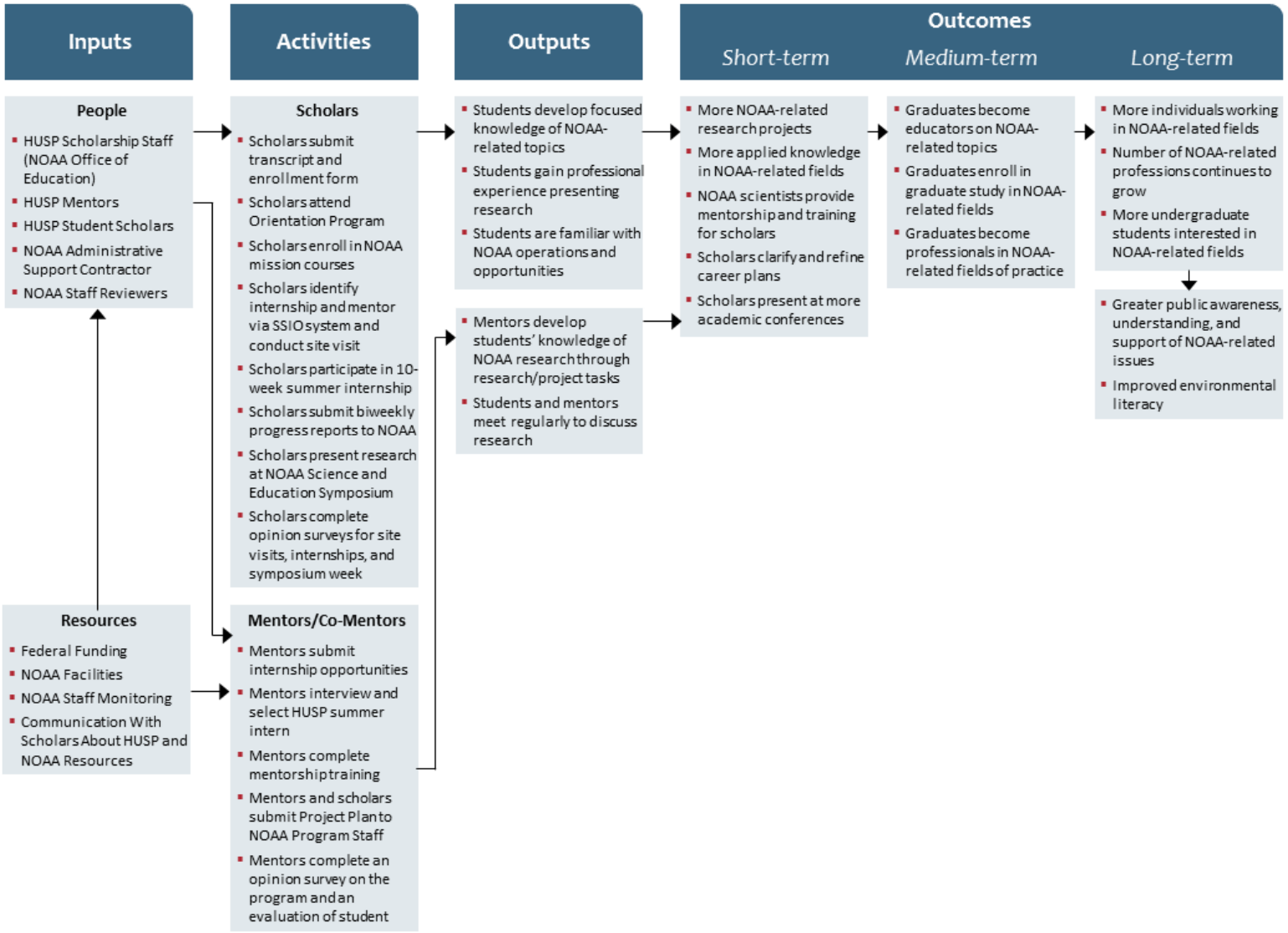
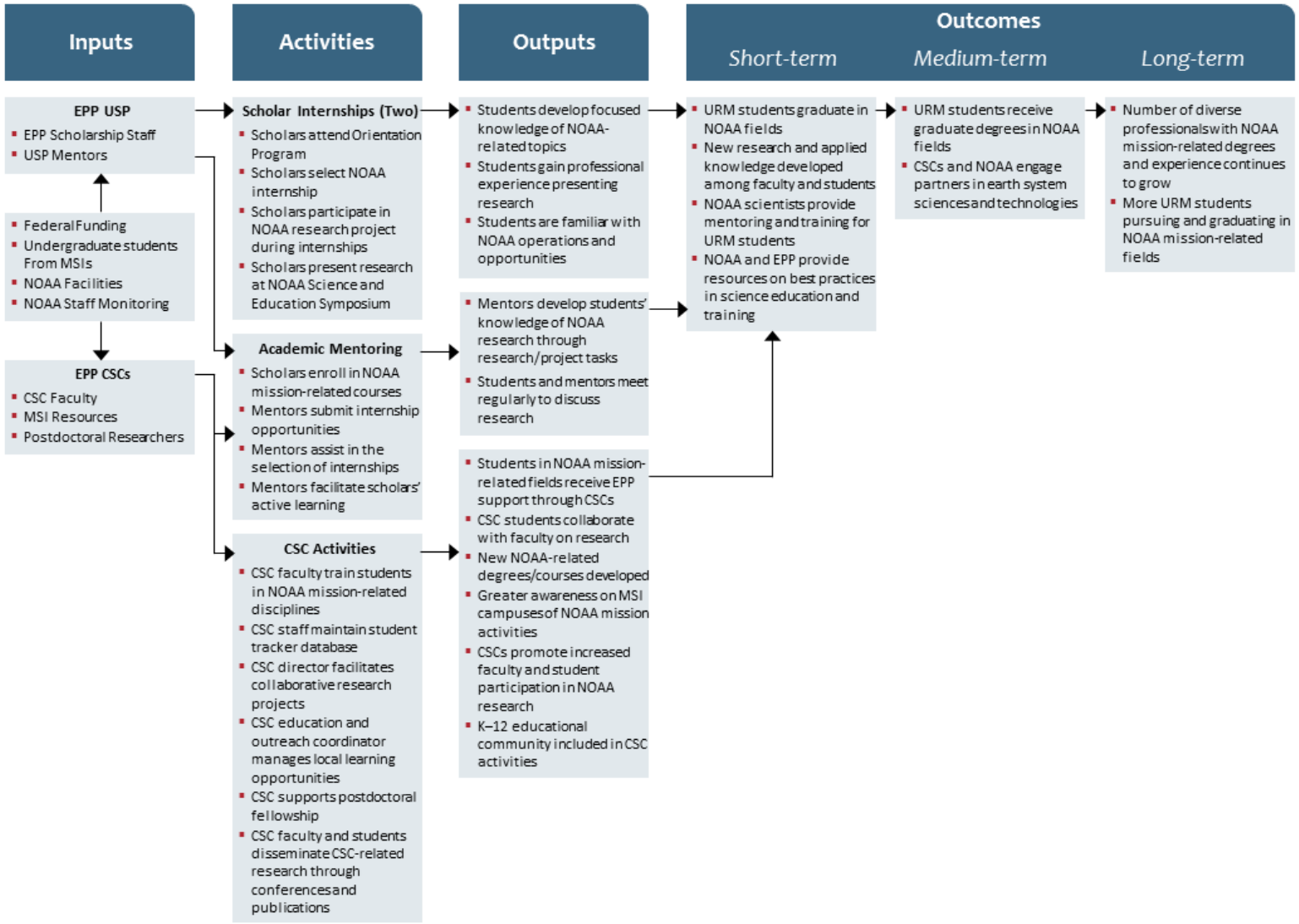
Appendix A. HUSP Logic Model



Note: SSIO system = Student Scholarship Internship Opportunity system

Appendix B. EPP/MSI Logic Model



Note: URM = underrepresented minority

Appendix C. Scholarship Survey (for NOAA scholars)

Dear Respondent,

This survey is voluntary. The National Oceanic and Atmospheric Administration's Office of Education is currently conducting an evaluation of two of its scholarship programs: the Educational Partnership Program (EPP) and the Ernest F. Hollings Undergraduate Scholarship Program (HUSP). One key component of this evaluation is to conduct an online survey of all scholarship recipients. As a scholarship recipient, you can provide valuable insight into the impact of these scholarship programs. This survey will ask about your educational and career choices as well as your views on how receiving the scholarship may have affected your academic and career pathways.

The survey will take approximately 16 minutes. Your responses are very important to ensuring that NOAA's Office of Education successfully meets its long-term goals, and we thank you for your participation.

Your participation, while critical to our success, is entirely voluntary. Though your responses are not confidential, rest assured that no individually identifiable information will be included with any responses and that the data will be reported only in summary form and maintained in a highly secure manner.

Paperwork Burden Statement

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 16 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

Q1 Please select any of the following NOAA Office of Education scholarship programs to which you have **applied:**

- Educational Partnership Program with Minority-Serving Institutions Undergraduate Scholarship Program (EPP-USP)
- Educational Partnership Program with Minority-Serving Institutions Graduate Sciences Program (EPP-GSP)
- Ernest F. Hollings Undergraduate Scholarship Program (HUSP)
- None of the above

Q2a When applying for the NOAA Office of Education scholarship(s) you indicated, how many other scholarships or fellowships did you apply for simultaneously?

- None
- 1
- 2
- 3

- 4
- 5

Q2b Please list the name of the scholarship(s)/fellowship(s), the year(s) in which you applied, and the year(s) it was awarded (if applicable): SKIP LOGIC – SHOW IF Q2a (NOT= 0)

Name	Application year	Awarded (Yes/No)	Year awarded
First scholarship/fellowship	[Drop-down list: 2000–2015]	[Drop-down list: Yes/No]	[Drop-down list: 2000–2015]
Second scholarship/fellowship	[Drop-down list: 2000–2015]	[Drop-down list: Yes/No]	[Drop-down list: 2000–2015]
Third scholarship/fellowship	[Drop-down list: 2000–2015]	[Drop-down list: Yes/No]	[Drop-down list: 2000–2015]
Fourth scholarship/fellowship	[Drop-down list: 2000–2015]	[Drop-down list: Yes/No]	[Drop-down list: 2000–2015]
Fifth scholarship/fellowship	[Drop-down list: 2000–2015]	[Drop-down list: Yes/No]	[Drop-down list: 2000–2015]

Application Experiences_A (Block heading not seen by respondents)

SHOW IF Q1 = 1 – This is for Q3a to Q4a

Q3a NOAA is interested in understanding why you chose to apply for the **Educational Partnership Program with Minority-Serving Institutions Undergraduate Scholarship Program (EPP-USP)**.

Please indicate *how important* the following factors were in your decision to pursue the **Educational Partnership Program with Minority-Serving Institutions Undergraduate Scholarship Program (EPP-USP)** opportunity:

	Not at all important 1	2	3	4	Very important 5
Financial aid					
Opportunity to participate in a summer internship					
Interest in pursuing a career with NOAA					
Interest in a NOAA-related field of study (e.g., STEM fields)					
Opportunity to expand professional network					
Opportunity to collaborate with a NOAA mentor					

Q4a When evaluating this **Educational Partnership Program with Minority-Serving Institutions Undergraduate Scholarship Program (EPP-USP)** opportunity, please select which scholarship component was *more important* to you:

- Financial aid/tuition
- Internship opportunity

Application Experiences_B (Block heading not seen by respondents)

SHOW IF Q1 = 2 – This is for Q3b to Q4b

Q3b–Q4b Same as Application Experiences_A except for **EPP/MSI Graduate Sciences Program (EPP/MSI GSP)**

Application Experiences_C (Block heading not seen by respondents)

SHOW IF Q1 = 3 – This is for Q3c to Q4c

Q3c–Q4c Same as Application Experiences_A except for **Ernest F. Hollings Undergraduate Scholarship Program (HUSP)**

Q5 Please select the NOAA scholarship(s) you were ***awarded***:

- EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)
- EPP/MSI Graduate Sciences Program (EPP/MSI GSP)
- Ernest F. Hollings Undergraduate Scholarship Program (HUSP)
- I was not awarded a scholarship

Award Experiences_A (Block heading not seen by respondents)

HIDE IF Q5 (NOT= 1) – This is for Q6a to Q7a

Q6a When were you awarded the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)**?

- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014

Q7a Have you completed the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)**?

- Yes
- No

Award Experiences_B (Block heading not seen by respondents)

SHOW IF Q5 (NOT = 2) – This is for Q6b to Q7b

Q6b–Q7b Same as Award Experiences_A except for **EPP/MSI Graduate Sciences Program (EPP/MSI GSP)**

Award Experiences_C (Block heading not seen by respondents)

SHOW IF Q5 (NOT = 3) – This is for Q6c to Q7c

Q6c–Q7c Same as Award Experiences_A except for **Ernest F. Hollings Undergraduate Scholarship Program (HUSP)**

Q8 Please indicate your current employment status: SKIP LOGIC – IF Q8 = 3 SKIP TO Q12; IF Q8 = 4 SKIP TO Q10)

- I am employed full time.
- I am employed part time.
- I am not currently employed and am not actively seeking employment.
- I am not currently employed but am actively seeking employment.

Q9 Which of the following best describes your current employment situation? SKIP LOGIC – IF Q9 = 1 or 2 or 3 or 5 or 7, SKIP TO Q9b; IF Q9 = 6 SKIP TO Q10; IF Q9 = 8 or 9 or 10 or 11 SKIP TO Q9c

- **Government**: U.S. Federal Government (including contractors)
- **Government**: State and Local (including contractors)
- **Non-Federal NOAA Partnership Programs** (e.g., Coastal Zone Management Program, National Estuarine Research Reserve, Cooperative Institutes, Sea Grant College Program)
- **Educational Institution**: College or University
- **Educational Institution**: NOAA collaborative research program (e.g., Cooperative Institute, Cooperative Science Center, Sea Grant College Program)
- **Educational Institution**: Elementary/Middle/High School
- Private, for-profit/Industry
- Nonprofit/Nongovernmental Organization (NGO)
- Self-Employment
- International Organization
- Other (please specify): _____

Q9a Which of the following best describes your current academic position?

- Instructor/Lecturer
- Assistant Professor
- Associate Professor
- Professor
- Research Faculty
- Other (please specify): _____

Q9b Do you currently work at a NOAA office or facility? SKIP LOGIC – IF Q9b = 3 SKIP TO Q9c)

- Yes, I am a Federal NOAA employee.
- Yes, I am a NOAA contractor.
- No, I am not employed by NOAA in any capacity.

Q9b1 Please select your NOAA Line Office: SKIP LOGIC SHOW IF :(Q9B = 1 or Q9B = 2)

- National Weather Service (NWS)
- Office of Oceanic and Atmospheric Research (OAR)
- National Ocean Service (NOS)
- National Marine Fisheries Service (NMFS)
- National Environmental Satellite, Data and Information Service (NESDIS)
- Office of Marine and Aviation Operations (OMAO)
- Office of the Under Secretary (USEC)

Q9b2 In which year did you begin your NOAA employment? SKIP LOGIC SHOW IF :(Q9B = 1 or Q9B = 2)

- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012

- 2013
- 2014
- 2015

Q9c Please select the field(s) in which you are currently employed:

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q9c1 Please select the Business Management/Administration field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 1

- Accounting
- Business/Managerial Economics
- Business Administration and Management
- Finance

- Management Information Systems/Business Statistics
- Organizational Behavior
- Other

Q9c2 Please select the Communication field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 2

- Mass Communication/Media Studies
- Other (please specify): _____

Q9c3 Please select the Computer and Information Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 3

- Computer Science
- Information Science and Systems
- Other (please specify): _____

Q9c4 Please select the Education–Research and Administration field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 4

- Educational Statistics/Research Methods
- Counseling Education/Counseling and Guidance
- Curriculum and Instruction
- Educational Administration and Supervision
- Educational Assessment/Testing Measurement
- Other (please specify): _____

Q9c5 Please select the Education–Teacher Education field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 5

- Pre-Elementary/Early Childhood Teacher
- Elementary Teacher
- Secondary Teacher
- Other (please specify): _____

Q9c6 Please select the Education–Teaching field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 6

- Literacy and Reading
- Mathematics
- Science
- Social Science
- Other (please specify): _____

Q9c7 Please select the Education–Other Education field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 7

Q9c8 Please select the Engineering field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 8

- Aerospace, Aeronautical, Astronautical
- Bioengineering
- Chemical
- Civil
- Communications
- Computer Electrical, Electronics
- Industrial and Manufacturing
- Mechanical
- Environmental
- Ocean
- Agricultural
- Systems
- Other (please specify): _____

Q9c9 Please select the Humanities field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 9

- Archaeology
- Foreign Language
- History
- Letters
- Other (please specify): _____

Q9c11 Please select the Life Sciences–Agricultural Sciences/Natural Resources field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 11

- Environmental Science
- Horticulture
- Fishing and Fisheries Science and Management
- Food Science and Technology
- Forest Sciences and Biology
- Natural Resources/Conservation
- Soil Sciences
- Plant Sciences
- Other (please specify): _____

Q9c12 Please select the Life Sciences–Biological/Biomedical Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 12

- Biochemistry
- Biology
- Biomedical
- Bioinformatics
- Biotechnology
- Ecology
- Evolutionary Biology
- Genetics/Genomics
- Marine Biology and Biological Oceanography
- Plant
- Toxicology
- Zoology
- Other (please specify): _____

Q9c13 Please select the Life Sciences–Health Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 13

- Environmental Health
- Medicinal/Pharmaceutical Sciences
- Veterinary Sciences
- Nursing Science
- Other (please specify): _____

Q9c14 Please select the Mathematics field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 14

- Applied
- Computing Theory and Practice
- Geometry
- Statistics
- Topology/Foundations
- Other (please specify): _____

Q9c15 Please select the Physical Sciences–Astronomy field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 15

- Astronomy
- Astrophysics
- Other (please specify): _____

Q9c16 Please select the Physical Sciences–Atmospheric Science and Meteorology field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 16

- Atmospheric Chemistry and Climatology
- Atmospheric Physics and Dynamics
- Atmospheric Science, Meteorology
- Meteorology
- Other (please specify): _____

Q9c17 Please select the Physical Sciences–Chemistry field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 17

- Analytical Chemistry
- Chemistry
- Organic Chemistry
- Physical Chemistry
- Other (please specify): _____

Q9c18 Please select the Physical Sciences–Geological and Earth Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 18

- Geology
- Geological and Earth Sciences
- Geophysics and Seismology
- Seismology
- Other (please specify): _____

Q9c19 Please select the Physical Sciences–Ocean/Marine Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 19

- Marine Sciences
- Oceanography, Chemical and Physical
- Hydrology and Water Resources
- Other (please specify): _____

Q9c20 Please select the Physical Sciences–Physics field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 20

- Physics
- Applied Physics
- Plasma
- Other (please specify): _____

Q9c21 Please select the Psychology field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 21

- Clinical Psychology
- Counseling
- Health and Medical Psychology
- Other (please specify): _____

Q9c22 Please select the Social Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q9c = 22

- Anthropology
- Demography
- Econometrics
- Economics
- Geography
- Political Science and Government
- Public Policy
- Sociology
- Urban Affairs and Urban Planning
- Natural Resource/Environmental Policy
- Other (please specify): _____

Q10 Which of the following career trajectories are you interested in pursuing in the future? (Select all that apply) SKIP LOGIC SHOW IF Q8 = 4

- Government: U.S. Federal Government (including contractors)
- Government: State and Local (including contractors)
- Non-Federal NOAA Partnership Programs (e.g., Coastal Zone Management Program, National Estuarine Research Reserve, Cooperative Institutes, Sea Grant College Program)
- Educational Institution: College or University
- Educational Institution: NOAA collaborative research program (e.g., Cooperative Institute, Cooperative Science Center, Sea Grant College Program)
- Educational Institution: Elementary/Middle/High School
- Private, for-profit/Industry
- Nonprofit/Nongovernmental Organization (NGO)
- Self-Employment
- International Organization
- Other (please specify): _____

Q11 In which *field(s)* are you interested in pursuing work? (Select all that apply) SKIP LOGIC SHOW IF Q8 = 4

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q11a–Q11u Please select the [Q11 Choices] field(s) in which you are interested in pursuing work:

[Questions Q11a through Q11u list the same field options as Q9c1 through Q9c22.]

Q12 Would you ever consider pursuing a career with NOAA in the future? SKIP LOGIC SHOW IF Q9b (NOT = 1)

- Yes
- No
- Unsure

Q13 Please indicate your highest level of educational attainment: SKIP LOGIC IF Q13 = 1 SKIP TO Q15

- I am currently an undergraduate student.
- Bachelor's degree
- Master's degree
- Doctoral degree
- Professional degree

Q13a In which field(s) did you earn your [Q13 degree]? Select all that apply.
(Note: Select multiple fields only if you majored in more than one field, but *do not include* any minor fields of study. Select only the field(s) that appear(s) on your diploma.)

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q13a1–Q13a22 Please select the [Q13a Choices] field(s) in which you earned your degree:

[Questions Q13a1 through Q13a22 use the same field choices and question ordering as Q9c1 through Q9c22.]

Q14 Are you currently enrolled in a graduate or professional program? SKIP LOGIC SHOW IF Q13 = 2 OR Q13 = 3; IF Q14 = 2 SKIP TO Q15

- Yes
- No

Q14a Please select the graduate or professional program in which you are currently enrolled: SKIP LOGIC SHOW IF Q13 = 2 OR Q13 = 3

- Master's degree (e.g., M.A., M.B.A., M.S.)
- Doctoral degree (e.g., Ph.D., D. Sc.)
- Law degree (e.g., J.D.)
- Medical degree (e.g., M.D.)
- Other (please specify): _____

Q14b Please select your graduate or professional field of study from the following list: SKIP LOGIC SHOW IF Q13 = 2 OR Q13 = 3; Hide If Q14 = 2 or Q14A = 3 or Q14A = 4

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry

- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q14b1–Q14b22 Please select the [Q14b Choices] field(s) of study from the following list:

[*Questions Q14b1 through Q14b22 use the same field choices and question ordering as Q9c1 through Q9c22.]*

Q15 Are you interested in attending graduate or professional school? SKIP LOGIC SHOW IF Q14 = 2

- Yes
- No
- Unsure

Q15a If you were to attend graduate or professional school, please select your desired field of study from the following list: SHOW IF :(Q15 = 1 or Q15 = 3)

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry

- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q15a1–Q15a22 Please select the [Q15a Choices] field(s) from the following list:

[Questions Q15a1 through Q15a22 use the same field choices and question order as Q9c1 through Q9c22.]

Q16 Excluding any manuscripts that are currently under preparation, how many peer-reviewed publications have you authored or co-authored?
(Note: Please include any manuscripts that are *currently submitted/under review*.)

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q16a On how many of these publications did you collaborate with a NOAA employee, contractor, or mentor? SHOW IF Q16 (NOT = None)

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q17 How many manuscripts do you have *currently under preparation*?

- None
- 1
- 2
- 3
- 4

- 5
- More than 5

Q17a On how many of these manuscripts did you collaborate with a NOAA employee, contractor, or mentor? SHOW IF Q17 (NOT = None)

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q18 How many presentations have you given at conferences or professional meetings in your field?

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q18a How many of these presentations were collaborations with a NOAA employee, contractor, or mentor? SHOW IF Q18 (NOT = None)

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Scholarship Experiences_A (Block heading not seen by respondents)

HIDE IF Q5 (NOT = 1) – This is for Q19a to Q28a2

Q19a During your **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** experience, who was the person that provided you with the most mentorship and/or guidance?

(Note: For any questions that refer to mentorship, please refer to the person with whom you principally worked and engaged with the most during your scholarship experience, *regardless of whether that person was your NOAA-assigned mentor.*)

- My NOAA-assigned mentor
- A co-mentor at my research site
- Other (please specify): _____
- I do not feel that I received mentorship/guidance during my internship.

Q20a On average, how often did you meet with your mentor to discuss matters related to your **USP** research project(s)?

- Monthly
- Once a week
- Twice a week
- More than twice a week
- Other (please specify): _____
- I did not meet with my mentor to discuss my research project.
- I do not recall how often I met with my mentor.

Q21a NOAA is interested in learning more about the training opportunities you were given as a result of receiving the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)**. Training opportunities could include the time you spent with your mentor, learning a new technology, or learning about the research process.

Please indicate whether you agree or disagree with the following statements:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
My mentor was supportive of my NOAA research project(s).					
The **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** afforded me the opportunity to develop knowledge of NOAA-related technology.					
My mentor was actively involved in my NOAA research training.					
My mentor was available to me whenever I needed guidance (e.g., answered questions, provided assistance when needed).					

Q22a NOAA is also interested in understanding how your **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** experience may have provided you with work-related experience. Work-related experiences could include developing a professional network of scholars and researchers, developing skills that could be applied in work-related settings, and gaining experience in the scientific field.

Please indicate whether you agree or disagree with the following statements:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
My professional network grew after receiving the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP).**					
The **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP) gave me hands-on experience in a NOAA-related field.**					
My interest in pursuing a NOAA-related career increased after receiving the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)**.					
As a result of receiving the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)**, I am more prepared to enter the workforce.					

Q23a Please indicate *how instrumental* the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** was in achieving each of the following (where "1" indicates *Not at all instrumental* and "5" indicates *Very instrumental*):

	Not at all instrumental 1	2	3	4	Very instrumental 5	N/A
Graduating						
Paying tuition						
Paying for academic-related costs (e.g., books, materials, fees)						
Paying for living costs (e.g., rent)						
Building my research experience						
Expanding my professional network						
Getting another scholarship/fellowship						
Getting accepted into graduate school						
Shaping my future education plans						
Shaping my future career plans						

Q24a After the completion of your **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** experience, did you apply for any additional scholarships or fellowships? SHOW IF Q7A = 1

- Yes
- No

Q24a1 After the completion of your **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** experience, did you receive any additional scholarships or fellowships? SHOW IF Q24A = 1

Please list the scholarship/fellowship name and the year it was awarded:

Name	Award year

Q25a For the following items, please rate *how valuable* each component of the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** experience was to you:

	Not at all valuable 1	2	3	4	Very valuable 5	N/A
Ability to pay tuition						
Opportunity to collaborate with a NOAA mentor						
Ability to pay for academic-related costs						
Ability to pay for living costs						
Opportunity to participate in a research internship						
Opportunity to conduct research on NOAA-related topics						
Opportunity to develop applied knowledge of NOAA-related technology						
Opportunity to expand your professional network to include NOAA staff and mentors						
Opportunity to develop applied knowledge of NOAA-related research processes						
Opportunity to present my work to an audience of peers and mentors						
Overall NOAA scholarship experience						

Q26a What difference has receiving the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** made in your life?

_____

Q27a Please describe any challenges you encountered during your **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** program experience:

_____

Q28a Would you recommend the **EPP/MSI Undergraduate Scholarship Program (EPP/MSI USP)** program to other students?

- Yes
- No

Q28a1 Why? Please describe: SHOW IF Q28A = 1

_____

Q28a2 Why not? Please describe: SHOW IF Q28A = 2

_____

Scholarship Experiences_B (Block heading not seen by respondents)

HIDE IF Q5 (NOT = 2) – This if for Q19b to Q28b2

Q19b–Q28b2 Same as Scholarship Experiences_A except for **EPP/MSI Graduate Sciences Program (EPP/MSI GSP)**

Scholarship Experiences_C (Block heading not seen by respondents)

HIDE IF Q5 (NOT = 3) – This if for Q19c to Q28c2

Q19–Q28c2 Same as Scholarship Experiences_A except for **Ernest F. Hollings Undergraduate Scholarship Program (HUSP)**

Q29 What is your age?

- Younger than 18
- 18–20
- 21–23
- 24–25
- 26 or older
- Prefer not to specify

Q30 What is your gender?

- Female
- Male
- Prefer not to specify

Q31 What is your race/ethnicity? (Select all that apply)

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander
- White
- Prefer not to specify

Thank You

In order to ensure continued support for NOAA programs, NOAA's Office of Education requests that you take a few moments at this time to update your information by using the NOAA Voluntary Alumni Update System (VAUS). By clicking the link below, you are automatically redirected to the VAUS system, where you will be prompted to create a VAUS login account. The VAUS provides a mechanism to edit and add to your student record in the Student and Performance Measures Tracking System. Updating your student record will take no more than 7 minutes, and any information you provide will be reported in aggregate form only. Your information will be kept confidential and will not be shared with anyone outside of NOAA. Additionally, any updates you provide via the NOAA VAUS system will not in any way be connected with your responses to the NOAA Scholarship survey.

Thank you in advance for your assistance in helping NOAA to report the impact of its education programs. Please click this link to begin: https://oedwebapps.iso.noaa.gov/studentstracker/vaus/

Appendix D. Pathway Survey (for nonrecipients)

Dear Respondent,

This survey is voluntary. The National Oceanic and Atmospheric Administration's Office of Education is currently conducting an evaluation of its programs. One key component of this evaluation is to conduct an online survey of any individuals who have expressed an interest in NOAA mission-related fields. As an individual who has expressed interest in NOAA mission-related fields in the past, you can provide valuable insight on matters critical to this evaluation.

This brief survey will ask about your educational and career choices. The survey will take approximately 15 minutes to complete. Your responses are very important to this evaluation's success, and we thank you for your time.

Your participation, while critical to our success, is entirely voluntary. Though your responses are not confidential, rest assured that no individually identifiable information will be included with any responses and that the data will be reported only in summary form and will be maintained in a highly secure manner.

Paperwork Burden Statement

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 15 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

Q1 Have you ever received an academic scholarship or fellowship?

- Yes
- No

Q2 Please list the name of the scholarship(s)/fellowship(s) you were awarded, and specify the year the scholarship(s)/fellowship(s) was/were awarded. SKIP LOGIC – SHOW IF Q1 = 1

Name	Year

Q3 Please indicate your current employment status: SKIP LOGIC – IF Q3 = 3 SKIP TO Q7; IF Q3 = 4 SKIP TO Q5

- I am employed full time.
- I am employed part time.
- I am not currently employed and am not actively seeking employment.
- I am not currently employed but am actively seeking employment.

Q4 Which of the following best describes your current employment situation? SKIP LOGIC – IF Q4 = 1 or 2 or 3 or 5 or 7, SKIP TO Q4b; IF Q4 = 6 SKIP TO Q7; IF Q4 = 8 or 9 or 10 or 11 SKIP TO Q4c

- Government: U.S. Federal Government (including contractors)
- Government: State and Local (including contractors)
- Non-Federal NOAA Partnership Programs (e.g., Coastal Zone Management Program, National Estuarine Research Reserve, Cooperative Institutes, Sea Grant College Program)
- Educational Institution: College or University
- Educational Institution: NOAA collaborative research program (e.g., Cooperative Institute, Cooperative Science Center, Sea Grant College Program)
- Educational Institution: Elementary/Middle/High School
- Private, for-profit/Industry
- Nonprofit/Nongovernmental Organization (NGO)
- Self-Employment
- International Organization
- Other (please specify): _____

Q4a Which of the following best describes your current academic position?

- Instructor/Lecturer
- Assistant Professor
- Associate Professor
- Professor
- Research Faculty
- Other (please specify):_____

Q4b Do you currently work at a NOAA office or facility?

- Yes, I am a Federal NOAA employee.
- Yes, I am a NOAA contractor.
- No, I am not employed by NOAA in any capacity.

Q4b1 Please select your NOAA Line Office: SKIP LOGIC – SHOW IF Q4b = 1 or Q4b = 2

- National Weather Service (NWS)
- Office of Oceanic and Atmospheric Research (OAR)
- National Ocean Service (NOS)
- National Marine Fisheries Service (NMFS)
- National Environmental Satellite, Data and Information Service (NESDIS)
- Office of Marine and Aviation Operations (OMAO)
- Office of the Under Secretary (USEC)

Q4b2 In which year did you begin your NOAA employment? SKIP LOGIC – SHOW IF Q4b = 1 or Q4b = 2

- 2000
- 2001
- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014

Q4c Please select the field(s) in which you are currently employed:

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering

- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q4c1 Please select the Business Management/Administration field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 1

- Accounting
- Business/Managerial Economics
- Business Administration and Management
- Finance
- Management Information Systems/Business Statistics
- Organizational Behavior
- Other

Q4c2 Please select the Communication field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 2

- Mass Communication/Media Studies
- Other (please specify):_____

Q4c3 Please select the Computer and Information Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 3

- Computer Science
- Information Science and Systems
- Other (please specify):_____

Q4c4 Please select the Education–Research and Administration field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 4

- Educational Statistics/Research Methods
- Counseling Education/Counseling and Guidance
- Curriculum and Instruction
- Educational Administration and Supervision
- Educational Assessment/Testing Measurement
- Other (please specify):_____

Q4c5 Please select the Education–Teacher Education field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 5

- Pre-Elementary/Early Childhood Teacher
- Elementary Teacher
- Secondary Teacher
- Other (please specify):_____

Q4c6 Please select the Education–Teaching field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 6

- Literacy and Reading
- Mathematics
- Science
- Social Science
- Other (please specify):_____

Q4c7 Please select the Education–Other Education field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 7

_____

Q4c8 Please select the Engineering field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 8

- Aerospace, Aeronautical, Astronautical
- Bioengineering
- Chemical

- Civil
- Communications
- Computer Electrical, Electronics
- Industrial and Manufacturing
- Mechanical
- Environmental
- Ocean
- Agricultural
- Systems
- Other (please specify):_____

Q4c9 Please select the Humanities field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 9

- Archaeology
- Foreign Language
- History
- Letters
- Other (please specify):_____

Q4c11 Please select the Life Sciences–Agricultural Sciences/Natural Resources field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 11

- Environmental Science
- Horticulture
- Fishing and Fisheries Science and Management
- Food Science and Technology
- Forest Sciences and Biology
- Natural Resources/Conservation
- Soil Sciences
- Plant Sciences
- Other (please specify):_____

Q4c12 Please select the Life Sciences–Biological/Biomedical Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 12

- Biochemistry
- Biology
- Biomedical
- Bioinformatics

- Biotechnology
- Ecology
- Evolutionary Biology
- Genetics/Genomics
- Marine Biology and Biological Oceanography
- Plant
- Toxicology
- Zoology
- Other (please specify):_____

Q4c13 Please select the Life Sciences–Health Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 13

- Environmental Health
- Medicinal/Pharmaceutical Sciences
- Veterinary Sciences
- Nursing Science
- Other (please specify):_____

Q4c14 Please select the Mathematics field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 14

- Applied
- Computing Theory and Practice
- Geometry
- Statistics
- Topology/Foundations
- Other (please specify):_____

Q4c15 Please select the Physical Sciences–Astronomy field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 15

- Astronomy
- Astrophysics
- Other (please specify):_____

Q4c16 Please select the Physical Sciences–Atmospheric Science and Meteorology field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 16

- Atmospheric Chemistry and Climatology
- Atmospheric Physics and Dynamics
- Atmospheric Science, Meteorology

- Meteorology
- Other (please specify):_____

Q4c17 Please select the Physical Sciences–Chemistry field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 17

- Analytical Chemistry
- Chemistry
- Organic Chemistry
- Physical Chemistry
- Other (please specify):_____

Q4c18 Please select the Physical Sciences–Geological and Earth Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 18

- Geology
- Geological and Earth Sciences
- Geophysics and Seismology
- Seismology
- Other (please specify):_____

Q4c19 Please select the Physical Sciences–Ocean/Marine Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 19

- Marine Sciences
- Oceanography, Chemical and Physical
- Hydrology and Water Resources
- Other (please specify):_____

Q4c20 Please select the Physical Sciences–Physics field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 20

- Physics
- Applied Physics
- Plasma
- Other (please specify):_____

Q4c21 Please select the Psychology field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 21

- Clinical Psychology
- Counseling
- Health and Medical Psychology
- Other (please specify):_____

Q4c22 Please select the Social Sciences field(s) in which you are currently employed: SKIP LOGIC – SHOW IF Q4c = 22

- Anthropology
- Demography
- Econometrics
- Economics
- Geography
- Political Science and Government
- Public Policy
- Sociology
- Urban Affairs and Urban Planning
- Natural Resource/Environmental Policy
- Other (please specify):_____

Q5 Which of the following career trajectories are you interested in pursuing in the future? (Select all that apply) SKIP LOGIC – SHOW IF Q3 = 4

- Government: U.S. Federal Government (including contractors)
- Government: State and Local (including contractors)
- Non-Federal NOAA Partnership Programs (e.g., Coastal Zone Management Program, National Estuarine Research Reserve, Cooperative Institutes, Sea Grant College Program)
- Educational Institution: College or University
- Educational Institution: NOAA collaborative research program (e.g., Cooperative Institute, Cooperative Science Center, Sea Grant College Program)
- Educational Institution: Elementary/Middle/High School
- Private, for-profit/Industry
- Nonprofit/Nongovernmental Organization (NGO)
- Self-Employment
- International Organization
- Other (please specify):_____

Q6 In which field(s) are you interested in pursuing work? (Select all that apply.) SKIP LOGIC – SHOW IF Q3 = 4

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education

- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q6a–Q6u Please select the [Q6 Choices] field(s) in which you are interested in pursuing work:

[These questions follow the same format as questions Q4c1 through Q4c22, except they are seen only by respondents that reported they were not currently employed by actively seeking employment in Q3.]

Q7 Would you ever consider pursuing a career with NOAA in the future? SKIP LOGIC – HIDE IF Q4b = 1

- Yes
- No
- Unsure

Q8 Please indicate your highest level of educational attainment: SKIP LOGIC – IF Q8 = 1 SKIP TO Q10

- I am currently an undergraduate student.
- Bachelor's degree
- Master's degree
- Doctoral degree
- Professional degree

Q8a In which field(s) did you earn your [Q8]? Select all that apply.

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q8a1–Q8a22 Please select the [Q8a Choices] field(s) in which you earned your [Q8 Degree]:

[The fields and answer options for the Q8a1 through Q8a22 are the same as those listed for fields in Q4c1 through Q4c22.]

Q9 Are you currently enrolled in a graduate or professional program? SKIP LOGIC – SHOW IF Q8 = 2 or Q8 = 3

- Yes
- No

Q9a Please select the graduate or professional program in which you are currently enrolled: SKIP LOGIC – SHOW IF Q9 = 1

- Master's degree (e.g., M.A., M.B.A., M.S.)
- Doctoral degree (e.g., Ph.D., D.Sc.)
- Law degree (e.g., J.D.)
- Medical degree (e.g., M.D.)
- Other (please specify):_____

Q9b Please select your graduate or professional field of study from the following list: SKIP LOGIC – SHOW IF Q9 = 1

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q9b1–Q9b22 Please select the [Q9b Choices] field(s) from the following list:

[The fields used in Q9b1 through Q9b22 are the same as the fields identified in Q4c1 through Q4c22.]

Q10 Are you interested in attending graduate or professional school? SKIP LOGIC – SHOW IF Q9 = 2; SKIP LOGIC – IF Q10 = 2 SKIP TO Q11

- Yes
- No
- Unsure

Q10a If you were to attend graduate or professional school, please select your desired field of study from the following list: SKIP LOGIC – SHOW IF Q9 = 2

- Business Management/Administration
- Communication
- Computer and Information Sciences
- Education–Research and Administration
- Education–Teacher Education
- Education–Teaching Fields
- Education–Other Education
- Engineering
- Humanities
- Law
- Life Sciences–Agricultural Sciences/Natural Resources
- Life Sciences–Biological/Biomedical Sciences
- Life Sciences–Health Sciences
- Mathematics
- Medicine
- Physical Sciences–Astronomy
- Physical Sciences–Atmospheric Science and Meteorology
- Physical Sciences–Chemistry
- Physical Sciences–Geological and Earth Sciences
- Physical Sciences–Ocean/Marine Sciences
- Physical Sciences–Physics
- Psychology
- Social Sciences
- Other

Q10a1–Q10a22 Please select the [Q10a Choices] field(s) from the following list:

[The fields used in Q10a1 through Q10a22 are the same as the fields identified in questions Q4c1 through Q4c22.]

Q11 Excluding any manuscripts that are currently under preparation, how many peer-reviewed publications have you authored or co-authored?

(Note: Please include any manuscripts that are *currently submitted/under review.)*

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q12 How many manuscripts do you have *currently under preparation?*

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q13 Approximately how many presentations have you given at conferences or professional meetings in your field?

- None
- 1
- 2
- 3
- 4
- 5
- More than 5

Q14 We are interested in learning more about any training opportunities you may have received in your field.

Please indicate whether you agree or disagree with the following statements:

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree
I have worked with or received the support of a mentor who is active in my field.					
I have learned to use technologies that are relevant to my field.					
I have gained hands-on research experience in my field.					

Q15 What is your age?

- Under 18
- 18–20
- 21–23
- 23–25
- 26 or older
- Prefer not to specify

Q16 What is your gender?

- Female
- Male
- Prefer not to specify

Q17 What is your race/ethnicity? (Select all that apply.)

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander
- White
- Prefer not to specify

Appendix E. Supporting Materials

A. Postal Letter Invitation (scholar version)

UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary of Commerce
for Oceans and Atmosphere
Washington, D.C. 20230

Dear [Name],

I am writing to ask you to participate in an evaluation of the Ernest F. Hollings and the Educational Partnership Program Undergraduate Scholarship Programs. This evaluation is being carried out for the NOAA Office of Education by Insight Policy Research and IMPAQ International. One key component of this evaluation is an online survey of all scholarship recipients that asks about your educational and career choices and your views on how receiving the scholarship may have affected your academic and career pathways. The survey will take less than 25 minutes. Your participation, although voluntary, is critical to our success. The data collected will be reported only in summary form and will be maintained in a highly secure manner.

Below, please find the instructions for accessing and completing the survey online. You may access the survey by scanning the QR code below with your smartphone or tablet. You'll need an application that can read QR codes from the Google Play Store (if you're using an Android device) or the App Store (if you're using an Apple device). There are many free options. After downloading this application, simply point your device's camera at this code when prompted.

[QR Code]
OR
Navigate to this website: [URL]
Please use [TOKEN] to enter the survey.

I ask that you respond by November 20, 2015. Thank you in advance for your time and effort. Please do not hesitate to contact NOAAscholarshipsurvey@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

Sincerely,

Marlene Kaplan

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 25 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

B. Postal Letter Invitation (nonrecipient version)

UNITED STATES DEPARTMENT OF COMMERCE
The Under Secretary of Commerce
for Oceans and Atmosphere
Washington, D.C. 20230

Dear [Name],

I am writing to ask for your participation in an evaluation of education programs of the National Oceanic and Atmospheric Administration (NOAA). Insight Policy Research and IMPAQ International have partnered with NOAA to conduct this research. A key component of this study is a brief online survey tracking the career trajectory of individuals who have expressed an interest in NOAA mission-related fields. The survey will ask questions about your educational and career choices. Your participation is extremely important to our success and the survey should take less than 15 minutes to complete. Your participation, although voluntary, is critical to our success. The data collected will be reported only in summary form and will be maintained in a highly secure manner.

Below, please find the instructions for accessing and completing the survey online. You may access the survey by scanning the QR code below with your smartphone or tablet. You'll need an application that can read QR codes from the Google Play Store (if you're using an Android device) or the App Store (if you're using an Apple device). There are many free options. After downloading this application, simply point your device's camera at this code when prompted.

[QR Code]
OR
Navigate to this website: [URL]
Please use [TOKEN] to enter the survey.

I ask that you respond by November 20, 2015. Thank you in advance for your time and effort. Please do not hesitate to contact NOAApathway@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

Sincerely,

Marlene Kaplan

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 25 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

C. Preinvitation, Email Invitation, and Reminder Email (scholar version)

Preinvitation Email

Subject Line: Upcoming NOAA Survey

Dear **[Name],**

I am writing to invite you to take part in an important study sponsored by the Office of Education (OEd) here at the National Oceanic and Atmospheric Administration (NOAA). I urge you, as a recipient of a scholarship, to participate in this effort by completing a brief online survey (no more than 25 minutes) that asks about your experiences as a scholarship recipient as well as your career pathways.

Insight Policy Research (Insight) and IMPAQ International (IMPAQ) have partnered with NOAA to evaluate the **Educational Partnership Program and the Ernest F. Hollings Undergraduate Scholarship Program**. While this survey is voluntary, your participation is critical to the success of this evaluation. We ask that you please take time from your busy schedule to assist us in better understanding the impact of these programs as well as their strengths and weaknesses. Responses to this survey are not confidential, though no individually identifiable information will be included with any responses, and every effort will be made to minimize the extent to which identities of respondents can be inferred from the data during reporting. Within approximately a month, you should receive an email from IMPAQ with a link to the survey.

In the meantime, we at NOAA OEd have our own alumni network. We would appreciate your help in updating your current employment and contact information in our database. Your information will be kept private, and the information you provide will not be shared with outside vendors. You can access the update form at the link below.

NOAA Office of Education Voluntary Alumni Update System (VAUS) at
https://oedwebapps.iso.noaa.gov/studentstracker/vaus.

Should you have any questions about this evaluation, feel free to contact me at marlene.kaplan@NOAA.gov. I thank you in advance for taking part in this evaluation, which will help to support future NOAA scholarship recipients.

Sincerely,

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 25 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns about the contents or the status of your individual submission of this questionnaire, email marlene.kaplan@NOAA.gov.

Invitation Email

Subject Line: Link to the NOAA Scholarship Program Survey

Dear **[Name]**,

I am writing to ask you to participate in an evaluation of the Ernest F. Hollings and the Educational Partnership Program Undergraduate Scholarship Programs. This evaluation is being carried out for the NOAA Office of Education by Insight Policy Research and IMPAQ International. One key component of this evaluation is an online survey of all scholarship recipients that asks about your educational and career choices and your views on how receiving the scholarship may have affected your academic and career pathways. The survey will take less than 25 minutes. Your participation, although voluntary, is critical to our success. The data collected will be reported only in summary form and will be maintained in a highly secure manner.

Below, please find the instructions for accessing and completing the survey online.

To complete the survey, please go to [link].
Please use [TOKEN] to enter the survey.

I ask that you respond by **November 20, 2015**.

Thank you in advance for your time and effort. Please do not hesitate to contact NOAAscholarship@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

Sincerely,

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 25 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

Reminder Email (for nonrespondents only)

Subject Line: REMINDER: NOAA Scholarship Program Survey

Dear **[Name],**

This is a quick reminder to please go online and complete the National Oceanic and Atmospheric Administration (NOAA) Scholarship Program Survey.

You are receiving this email because your survey responses have not been submitted.
Please remember to click "submit" at the end to complete your survey.

NOAA is very interested in your educational and career trajectories in NOAA mission-related fields. Your responses are very important to ensuring that NOAA's Office of Education successfully meets its long-term goals.

To complete the survey, please go to [link].
Please use [TOKEN] to enter the survey.

Thank you in advance for your time and effort and for submitting your responses on or before **November 20, 2015**. Please do not hesitate to contact NOAAscholarship@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

Sincerely,

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 25 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

D. Preinvitation, Email Invitation, and Reminder Email (nonrecipient version)

Preinvitation Email

Subject Line: Invitation to Participate in a NOAA Survey

Dear **[Name],**

I am writing to invite you to take part in an important study sponsored by the Office of Education (OEd) here at the National Oceanic and Atmospheric Administration (NOAA). I urge you, as someone who has expressed an interest in a NOAA mission-related career, to participate in this effort by completing a brief online survey (10–15 minutes) that asks about your career pathways and any scholarships you may have received.

Insight Policy Research (Insight) and IMPAQ International (IMPAQ) have partnered with NOAA to explore NOAA-related career trajectories. While this survey is voluntary, your participation is critical to the success of this evaluation. We ask that you please take time from your busy schedule to assist us in better understanding the impact of these programs as well as their strengths and weaknesses. Responses to this survey are not confidential, though no individually identifiable information will be included with any responses, and every effort will be made to minimize the extent to which identities of respondents can be inferred from the data during reporting. Within a week, you should receive an email from IMPAQ with a link to the survey.

Should you have any questions about this evaluation, feel free to contact me at marlene.kaplan@NOAA.gov. I thank you in advance for taking part in this evaluation, which will help to support future NOAA scholarship recipients.

Sincerely,

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 15 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns about the contents or the status of your individual submission of this questionnaire, email Marlene Kaplan at marlene.kaplan@NOAA.gov.

Invitation Email

Subject Line: Link to the NOAA Education Survey

Dear **[Name],**

I am writing to ask for your participation in an evaluation of education programs of the National Oceanic and Atmospheric Administration (NOAA). Insight Policy Research and IMPAQ International have partnered with NOAA to conduct this research. A key component of this study is a brief online survey tracking the career trajectory of individuals who have expressed an interest in NOAA mission-related fields. The survey will ask questions about your educational and career choices. Your participation is extremely important to our success and the survey should take less than 15 minutes to complete. Your participation, although voluntary, is critical to our success. The data collected will be reported only in summary form and will be maintained in a highly secure manner.

Below please find the instructions for accessing and completing the survey online.

To complete the survey, please go to [link].
Please use [TOKEN] to enter the survey.

I ask that you respond by **November 20, 2015**.

Thank you in advance for your time and effort. Please do not hesitate to contact NOAApathway@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

Sincerely,

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 15 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

Reminder Email (for nonrespondents only)

Subject Line: REMINDER: NOAA Education Survey

Dear **[Name],**

This is a quick reminder to please go online and complete the National Oceanic and Atmospheric Administration (NOAA) Pathway Survey.

You are receiving this email because your survey responses have not been submitted.
Please remember to click "submit" at the end to complete your survey.

NOAA is very interested in your educational and career trajectories in NOAA mission-related fields. Your responses are very important to ensuring that NOAA's Office of Education successfully meets its long-term goals.

To complete the survey, please go to [link].
Please use [TOKEN] to enter the survey.

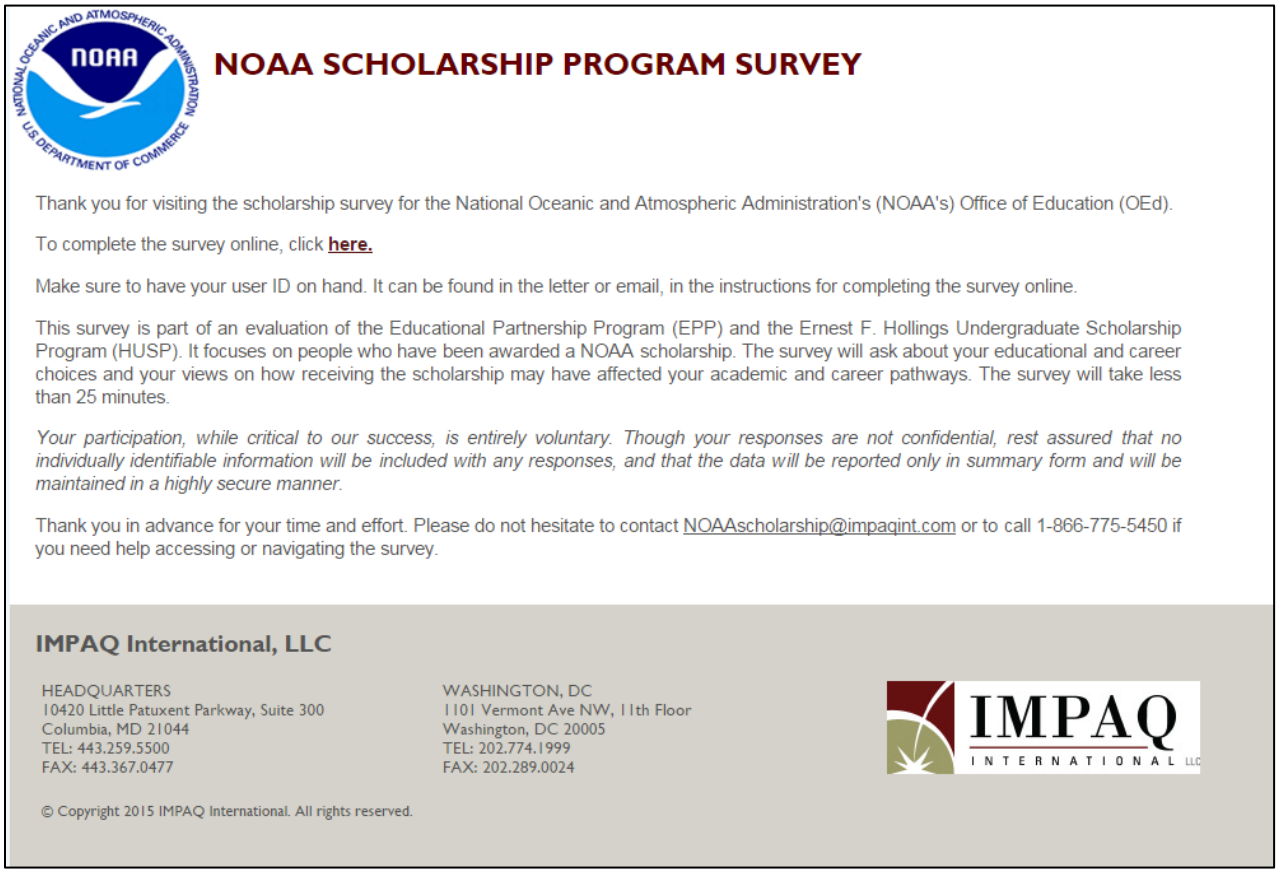
Thank you in advance for your time and effort and for submitting your responses on or before **November 20, 2015**. Please do not hesitate to contact NOAApathway@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

Sincerely,

Marlene Kaplan
Deputy Director of Education
National Oceanic and Atmospheric Administration

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0648-0721. The time required to complete this voluntary survey is estimated at 15 minutes, including the time to review instructions, search existing data resources, gather the data needed, and complete and review the information collection. If you have any comments or concerns regarding this burden estimate or any other aspect of this collection of information, email Marlene Kaplan at marlene.kaplan@noaa.gov.

E. web Survey Login Page (scholar version)



NOAA SCHOLARSHIP PROGRAM SURVEY

Thank you for visiting the scholarship survey for the National Oceanic and Atmospheric Administration's (NOAA's) Office of Education (OEd).

To complete the survey online, click **here.**

Make sure to have your user ID on hand. It can be found in the letter or email, in the instructions for completing the survey online.

This survey is part of an evaluation of the Educational Partnership Program (EPP) and the Ernest F. Hollings Undergraduate Scholarship Program (HUSP). It focuses on people who have been awarded a NOAA scholarship. The survey will ask about your educational and career choices and your views on how receiving the scholarship may have affected your academic and career pathways. The survey will take less than 25 minutes.

Your participation, while critical to our success, is entirely voluntary. Though your responses are not confidential, rest assured that no individually identifiable information will be included with any responses, and that the data will be reported only in summary form and will be maintained in a highly secure manner.

Thank you in advance for your time and effort. Please do not hesitate to contact NOAAscholarship@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

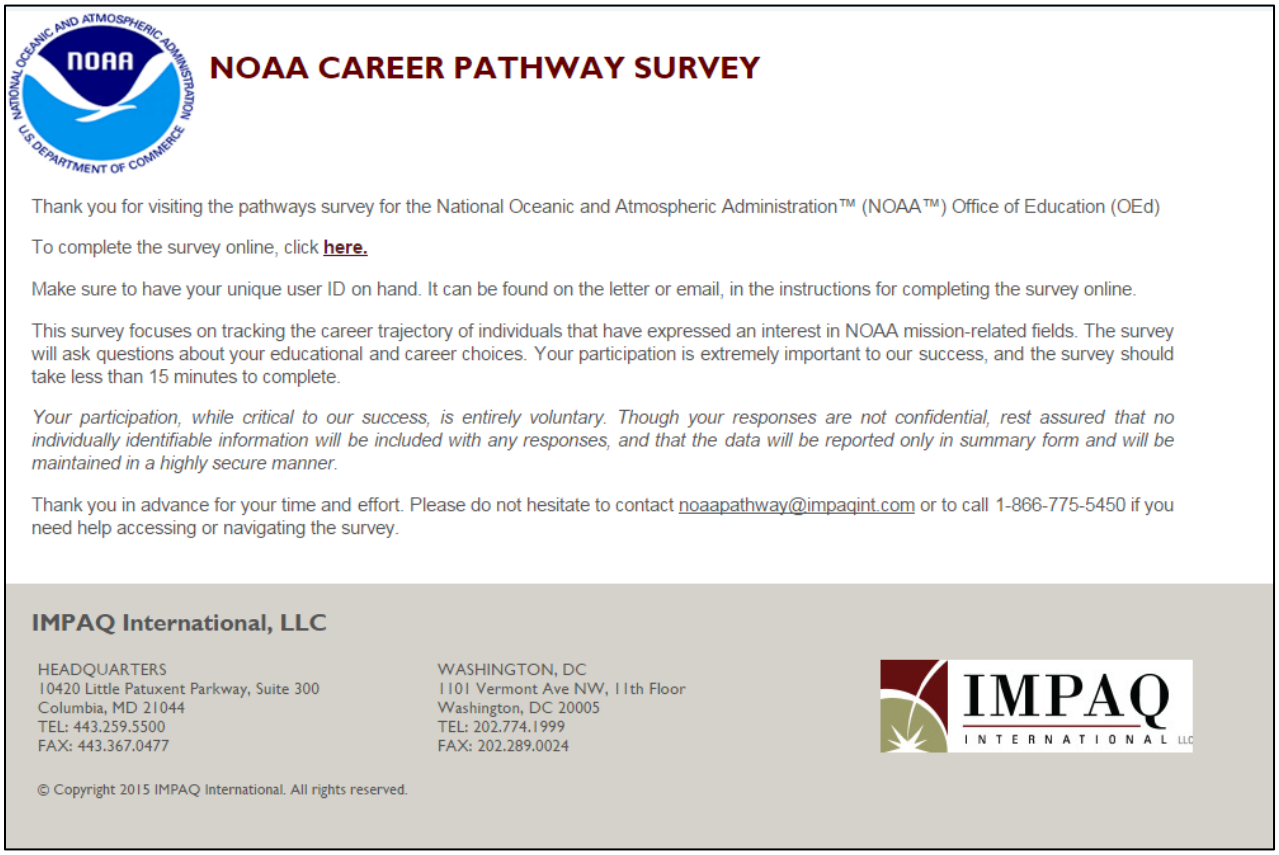
IMPAQ International, LLC

HEADQUARTERS
10420 Little Patuxent Parkway, Suite 300
Columbia, MD 21044
TEL: 443.259.5500
FAX: 443.367.0477

WASHINGTON, DC
1101 Vermont Ave NW, 11th Floor
Washington, DC 20005
TEL: 202.774.1999
FAX: 202.289.0024

IMPAQ INTERNATIONAL LLC

F. web Survey Login Page (nonrecipient version)



NOAA CAREER PATHWAY SURVEY

Thank you for visiting the pathways survey for the National Oceanic and Atmospheric Administration™ (NOAA™) Office of Education (OEd)

To complete the survey online, click **here.**

Make sure to have your unique user ID on hand. It can be found on the letter or email, in the instructions for completing the survey online.

This survey focuses on tracking the career trajectory of individuals that have expressed an interest in NOAA mission-related fields. The survey will ask questions about your educational and career choices. Your participation is extremely important to our success, and the survey should take less than 15 minutes to complete.

Your participation, while critical to our success, is entirely voluntary. Though your responses are not confidential, rest assured that no individually identifiable information will be included with any responses, and that the data will be reported only in summary form and will be maintained in a highly secure manner.

Thank you in advance for your time and effort. Please do not hesitate to contact noaapathway@impaqint.com or to call 1-866-775-5450 if you need help accessing or navigating the survey.

IMPAQ International, LLC

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10420 Little Patuxent Parkway, Suite 300
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TEL: 443.259.5500
FAX: 443.367.0477

WASHINGTON, DC
1101 Vermont Ave NW, 11th Floor
Washington, DC 20005
TEL: 202.774.1999
FAX: 202.289.0024

IMPAQ INTERNATIONAL LLC

G. NOAA Frequently Asked Questions (scholar version)

1. What's the purpose of the NOAA Scholarship survey?

The National Oceanic and Atmospheric Administration's Office of Education is currently conducting an evaluation of two of its scholarship programs: the Educational Partnership Program and the Ernest F. Hollings Undergraduate Program. One key component of this evaluation is to conduct an online survey of all scholarship recipients. As a scholarship recipient, you can provide valuable insight into the impact of these scholarship programs.

2. Why was I selected for this survey?

You're being asked to respond to this survey because you were a scholarship recipient for the Educational Partnership Program and/or the Ernest F. Hollings Undergraduate Program.

3. What's IMPAQ International?

IMPAQ International is a social science research firm located in Columbia, Maryland. NOAA has contracted with Insight Policy Research, a small business located in Arlington, Virginia, and IMPAQ to conduct the NOAA survey on their behalf.

4. I don't do surveys. I'm not interested.

I can understand that. Even so, we hope you'll consider participating in this survey because your responses are very important to ensuring that NOAA's Office of Education successfully meets its long-term goals.

5. Do I have to take this survey?

No, this survey is voluntary. If you do decide to take the survey, you don't have to answer any questions that you don't want to answer.

6. How do I know that the information I give will be kept private?

Your participation, while critical to our success, is entirely voluntary. Though your responses are not confidential, rest assured that no individually identifiable information will be included with any responses and that the data will be reported only in summary form and will be maintained in a highly secure manner.

7. How do I know this is a legitimate survey?

The National Oceanic and Atmospheric Administration's Office of Education is currently conducting an evaluation of two of its scholarship programs: the Educational Partnership Program and the Ernest F. Hollings Undergraduate Program. If you would like more information on this survey or the scholarship programs, please contact Marlene Kaplan at marlene.kaplan@NOAA.gov.

8. What questions will I be asked?

This survey will ask about your educational and career choices, as well as your views on how receiving the scholarship may have affected your academic and career pathways.

You do not have to answer any questions that you do not want to answer.

9. Whom do I contact with problems accessing the survey?

If you have any comments or concerns about the contents or the status of your individual submission of this questionnaire, email NOAAscholarship@impaqint.com or call 1-866-775-5450.

10. Can I do this survey from my mobile device?

This survey is compatible with multiple mobile devices and can be completed on a smartphone, tablet, or other mobile device. If you have any comments or concerns about the contents or the status of your individual submission of this questionnaire, email NOAAscholarship@impaqint.com or call 1-866-775-5450.

11. I deleted the email; how do I access the survey?

You can access the survey by going to noaascholarship.com. You will need your access code to enter the survey. Please contact our technical support team at NOAAscholarship@impaqint.com or call 1-866-775-5450 to obtain your access code.

12. I didn't actually get a NOAA scholarship.

Please accept our apologies for the confusion. NOAA is launching a major study of the Hollings and Educational Partnership Program scholarships that includes surveys of 3,000 students who were either recipients or applicants to our programs. Unfortunately, your information was improperly recorded. I will ensure we correct our records and hope you will still participate in the survey as an applicant. Survey results will be used to better understand and manage these programs.

H. NOAA Frequently Asked Questions (nonrecipient version)

1. What's the purpose of the NOAA Pathway survey?

The National Oceanic and Atmospheric Administration's Office of Education is currently conducting an evaluation of its programs. One key component of this evaluation is to conduct an online survey of any individuals who have expressed an interest in NOAA mission-related fields. As an individual who has expressed interest in NOAA mission-related fields in the past, you can provide valuable insight on matters critical to this evaluation.

2. Why was I selected for this survey?

You're being asked to respond to this survey because as an individual who has expressed interest in NOAA mission-related fields in the past, you can provide valuable insight on matters critical to this evaluation.

3. What's IMPAQ International?

IMPAQ International is a social science research firm located in Columbia, Maryland. NOAA has contracted with Insight Policy Research, a small business located in Arlington, Virginia, and IMPAQ to conduct the NOAA survey on their behalf.

4. I don't do surveys. I'm not interested.

I can understand that. Even so, we hope you'll consider participating in this survey. As an individual who has expressed interest in NOAA mission-related fields in the past, you can provide valuable insight into matters critical to this evaluation and your responses are very important to this evaluation's success.

5. Do I have to take this survey?

No, this survey is voluntary. If you do decide to take the survey, you don't have to answer any questions that you don't want to answer.

6. How do I know that the information I give will be kept private?

Your participation, while critical to our success, is entirely voluntary. Though your responses are not confidential, rest assured that no individually identifiable information will be included with any responses, and that the data will be reported only in summary form and will be maintained in a highly secure manner.

7. How do I know this is a legitimate survey?

The National Oceanic and Atmospheric Administration's Office of Education is currently conducting an evaluation of its programs. One key component of this evaluation is to conduct an online survey of any individuals who have expressed an interest in NOAA mission-related fields. If you would like more information on this survey or the scholarship programs, please contact Marlene Kaplan at marlene.kaplan@NOAA.gov to get more information.

8. What questions will I be asked?

This brief survey will ask about your educational and career choices. The survey will take approximately 15 minutes to complete and your responses are very important to this evaluation's success. You do not have to answer any questions that you do not want to answer.

9. Whom do I contact with problems accessing the survey?

If you have any comments or concerns about the contents or the status of your individual submission of this questionnaire, email NOAApathway@impaqint.com or call 1-866-775-5450.

10. Can I do this survey from my mobile device?

This survey is compatible with multiple mobile devices and can be completed on a smartphone, tablet, or other mobile device. If you have any comments or concerns about the contents or the status of your individual submission of this questionnaire, email NOAApathway@impaqint.com or call 1-866-775-5450.

11. I deleted the email; how do I access the survey?

You can access the survey by going to noaapathway.com. You will need your access code to enter the survey. Please contact our technical support team at NOAApathway@impaqint.com or call 1-866-775-5450 to obtain your access code.

Appendix F. Technical Notes

This section provides technical notes for the study methodology.

A. Fielding the web Survey

1. Prenotification Contact

Beginning October 13, 2015, all individuals from both scholarship recipients and nonrecipients for whom the study team had at least one email address were sent prenotification emails providing advance notice about the study and survey. All individuals from both groups with an available postal address were mailed a prenotification invitation. To help increase the number of responses, prenotification correspondence (emails and letters) was sent from a NOAA email address or a NOAA postal return address.

2. Invitation to the Survey

Beginning November 5, 2015, all individuals for whom the study team was able to obtain email and postal contact information were sent both an email and a postal letter inviting them to participate in the study. If the email was returned as undeliverable, the study team attempted to obtain a valid email address and resend the email to that address.[39] If the postal letter was returned as undeliverable, the study team attempted to obtain a valid postal address and resend the notification letter to that address. Similar to the prenotification materials, the formal study invitations were sent from a NOAA email address or a NOAA postal return address.[40] There was only one person for whom the study team did not have either an email address or a postal address (Scholarship group individual). The study team contacted this person by telephone to invite the individual to participate in the survey.

3. Reminder Emails

Following the survey launch, the study team attempted to email potential respondents reminders about the survey between November 13 and December 15, 2015.

4. Survey Window Extension

The web survey was originally scheduled to close November 20, 2015. However, response rates were lower than anticipated (13 percent for the Pathway group and 35 percent for the Scholarship group), so, after consultation with NOAA, the survey team extended the survey window to January 5, 2016.

[39] Approximately 25 percent of the email addresses were found to be invalid for both scholarship recipients and nonrecipients; prenotification emails sent to these addresses were returned as undeliverable.

[40] Approximately 15 percent of the postal addresses for scholarship recipients and 17 percent of those for nonrecipients were found to be invalid; prenotification letters sent to these addresses were returned as undeliverable. Notifications were re-sent to different postal addresses for 63 recipients and 84 nonrecipients.

5. Telephone Follow-Up for Nonresponders

Beginning December 8, 2015, trained telephone interviewers began intensive follow-up calls to nonresponders. During these telephone calls, respondents were urged to complete the survey online or asked if they wanted to complete the survey at that time with the interviewer present. In the latter case, the interviewer read the questions to the respondent and completed the survey for the respondent online. The telephone follow-up calls continued until December 30, 2015. Telephone interviewers completed 72 surveys (52 Pathway surveys and 20 Scholarship surveys).

6. End of Survey Window

The survey web link remained open until January 5, 2016, at which time the survey link was closed and data collection was complete. All data were reviewed and a final survey data file was created for analysis.

B. Description of Variables Used in the Analyses

1. Knowledge and Training in NOAA Mission Fields

Peer-reviewed publications. Respondents reported the number of peer-reviewed publications they had authored or co-authored. Respondents' reports of publications were coded as 0 to 5, with 6 equal to reports of "more than 5" publications. In multivariate analyses, the outcome is coded 0 to 2, with 2 equal to reports of more than one publication.

Conference/professional presentations. Respondents reported the number of presentations given at conferences or professional meetings in their respective fields. The variable is topcoded at 5, so respondents who reported "more than 5" presentations were coded as 5. In multivariate analyses, the outcome was coded from 0 to 3, with 0 equal to no presentations, 1 equal to one presentation, and 2 equal to two or more presentations.

Mentor support. The measurement of mentoring varies by respondent group. NOAA scholars rated the extent to which they agreed a mentor was "available to me whenever I needed guidance" (e.g., answered questions, provided assistance when needed). Nonrecipients rated the extent to which they agreed they had "worked with or received the support of a mentor who is active in my field." Both groups responded on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). For multivariate analyses, mentor support was coded as a dichotomous variable, with 0 indicating responses of "disagree," "strongly disagree," and "neither," and 1 indicating responses of "agree" or "strongly agree."

Use of technology relevant to NOAA mission fields. Questions regarding the use of technology varied by respondent group. NOAA scholars rated the extent to which they agreed that the scholarship program "afforded me the opportunity to develop knowledge of NOAA-related technology," whereas nonrecipients rated the extent to which they agreed that they "learned to use technologies that are relevant to my field." Both groups responded on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). For multivariate analyses, use of technology was coded as a dichotomous variable, with 0 indicating responses of "disagree," "strongly disagree," and "neither," and 1 indicating responses of "agree" or "strongly agree."

Hands-on experience in the field. The measurement of hands-on experience varied by respondent group. NOAA scholars rated the extent to which they agreed the scholarship program "gave me hands-on experience in a NOAA-related field," whereas nonrecipients rated the extent to which they agreed they "gained hands-on research experience in my field." Both groups responded on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). For multivariate analyses, hands-on experience was coded as a dichotomous variable, with 0 indicating responses of "disagree," "strongly disagree," and "neither," and 1 indicating responses of "agree" or "strongly agree."

2. Academic and Career Trajectories

Highest level of educational attainment. Respondents' reports of highest degree achieved ranged from 1 to 7, ordered as follows: currently an undergraduate student, bachelor's degree only, bachelor's degree and enrolled in a graduate program, master's degree only, master's degree and enrolled in another master's program, master's degree and enrolled in a doctoral program, and doctoral or professional degree.

In multivariate analyses, the outcome focused on individuals that were currently enrolled for or had already earned an advanced degree. Four levels were examined: bachelor's degree only, bachelor's degree and enrolled in a graduate program, master's degree only or master's degree and enrolled in a graduate program, doctoral or professional degree.

Highest degree earned in a NOAA mission field. This variable excluded current undergraduates and was coded dichotomously, with 1 indicating "yes" and 0 indicating "no."

Currently enrolled in a graduate or professional program. This variable excluded current undergraduates and was coded dichotomously, with 1 indicating "yes" and 0 indicating "no." The reference group (0) reflects individuals that holding a bachelor's degree only. Multivariate analyses allow for multiple categories, where intercepts account for individuals with a bachelor's but enrolled in graduate school, individuals with a master's degree, and individuals with a doctorate or professional degree.

Currently enrolled in a graduate or professional program in a NOAA mission field. This variable excluded individuals not currently enrolled in a graduate or professional program and was coded dichotomously, with 1 indicating "yes" for a NOAA mission field and 0 indicating "no."

Interested in pursuing graduate study in a NOAA mission field. This variable excluded individuals currently enrolled in graduate study and was coded dichotomously, with 1 indicating "yes" and 0 indicating "no."

Employed full or part time. This variable excluded current undergraduate students and was coded dichotomously, with 1 indicating "yes" for full- or part-time employment and 0 indicating "no."

Employed full or part time in a NOAA mission field. This variable excluded individuals not currently employed and was coded dichotomously, with 1 indicating "yes" for full- or part-time employment in a NOAA field and 0 indicating "no."

Employed in a NOAA line office or facility. This variable was coded dichotomously, with 1 indicating "yes" and 0 indicating "no."

Interested in pursuing employment in a NOAA mission field. This variable excluded individuals who were current NOAA Federal employees or currently not employed. Respondents answered the question, "Would you ever consider pursuing a career with NOAA in the future?" This variable was coded dichotomously, with 1 indicating "yes," and 0 indicating "no" or "unsure" when the respondent would not ever consider or was unsure about ever pursuing a career with NOAA.

3. Contextual Variables

Application year ranged from 2006 to 2014 with 1 year as the interval. The team included the year variable in statistical models to control for varying applicant groups across year cohorts.

Average application score is a score for each applicant (for both scholarship recipients and nonrecipients) assigned by the NOAA scholarship program committee at the time of application review. The score can be a continuous number ranging from 0 to 100; in these data, the minimum score was 24 and the maximum score was 100. Each year, the committee considers several important factors (e.g., academic performance, college, discipline) related to the award and then assigns each applicant a score. The application score serves as a measure of the applicant's comprehensive qualification and is used as one basis for award. Once an application score is determined for each applicant, the committee ranks that year's applicants according to their application scores and uses the application scores as a major criterion to determine the number of awards. Within each year, only applicants scoring above a certain cutoff point receive the award. The cutoff points vary from year to year. The committee does have some flexibility in awarding the scholarship; approximately 10 percent of the awards also take into account factors such as balance of institutions; geography; discipline (e.g., inclusion of social science or education); and representation of scholarship recipients from community colleges. The application score served as an important control and benchmark variable in the FRD analyses.

Gender was coded as follows: 0 equal to "male" and 1 equal to "female."

Race/Ethnicity was coded as follows: 0 equal to "White," 1 equal to "Black/African American," 2 equal to "Hispanic/Latino," and 3 equal to "American Indian, Alaska Native, Asian, Native Hawaiian, other Pacific Islander, or Other."

Age was coded as follows: 0 equal to "younger than 21," 2 equal to "21–23," 3 equal to "24–25," and 4 equal to "26 or older."

Appendix G. Qualitative Coding Scheme

What differences receiving the NOAA scholarship made in scholars' lives

Thematic code	Brief definition
Career Plans	Recipient solidified or confirmed future career plans after NOAA scholarship/internship
Changed Fields	Recipient changed fields after NOAA scholarship/internship
Confidence	Reference to increase in confidence or self-esteem (e.g., in own skills, public speaking, research)
Content Knowledge	Recipient developed or refined content knowledge in NOAA field
Environmental Stewardship and Education	Reference to gaining a sense of environmental stewardship, using NOAA platform to communicate about environmental issues, teaching or performing outreach, or having the opportunity to work on an environmental issue
Financial Aid	Reference to financial aid, tuition assistance, "allowed me to graduate," etc.
Graduate School Plans	Recipient planned to attend graduate school as a result of NOAA scholarship/internship
Hands-On Research Experience	Reference to research experience or technical training
Interest	Recipient developed or refined interest in field or research topic
Internship Experience	Reference to the opportunity to participate in an internship
Make Friends	Reference to making friends
Mentorship	Reference to mentorship
Networking	Reference to networking or collaborating
NOAA Employment	Explicit reference to plans for future employment, desire to be employed by NOAA, or already having secured NOAA employment
NOAA Experience	Reference to experience in or exposure to NOAA or Federal/government agency
Personal Growth	Reference to personal development or growth, or social outcomes (e.g., met my husband during HUSP)
Resume Builder	Reference to NOAA scholarship/internship as an asset to resume
Skills	Recipient developed or refined skills (generic or specific skills)
Travel	Reference to traveling to exotic locations or somewhere recipient had never been, etc.
Other	Catchall code for any response not able to be categorized under other codes

Why scholars would recommend the NOAA scholarship program to other students

Thematic code	Brief definition
Career Plans	Recipient solidified or confirmed future career plans after NOAA scholarship/internship
Changed Fields	Recipient changed fields after NOAA scholarship/internship experience
Confidence	Reference to increase in confidence or self-esteem (e.g., in own skills, public speaking, research)
Content Knowledge	Recipient developed or refined content knowledge in NOAA field
Financial Aid	Reference to financial aid, tuition assistance, "allowed me to graduate," etc.
Graduate School	Recipient planned to attend graduate school as a result of NOAA scholarship/internship
Hands-On Research Experience	Reference to research experience or technical training
Interest	Recipient developed or refined interest in field or research topic

Thematic code	Brief definition
Internship Experience	Reference to the opportunity to participate in an internship
Make Friends	Reference to making friends
Mentorship	Reference to mentorship
Motivation to Excel	Reference to how scholarship encouraged the student to excel academically
Networking	Reference to networking or collaborating
NOAA Employment	Explicit reference to plans for future employment, desire to be employed by NOAA, or already having secured NOAA employment
NOAA Experience	Reference to experience in or exposure to NOAA or Federal/government agency
NOAA-Credited Opportunity	Recipient credited NOAA scholarship/internship with a desired post-scholarship outcome (e.g., employment, graduate school acceptance, fellowship)
Prestige	Reference to prestigious nature of NOAA scholarship/internship
Resume Builder	Reference to NOAA scholarship/internship as asset to resume
Skills	Recipient developed or refined skills (generic or specific skills)
Travel	Reference to traveling to exotic locations or somewhere recipient had never been, etc.

Challenges scholars encountered during the NOAA scholarship program experience

Thematic code	Brief definition
Bad Fit	In retrospect, recipient felt the internship was a bad fit (e.g., personal reasons, interests, location)
Difficulty Finding a Mentor	Reference to problems locating a willing mentor in desired topic area
Difficulty Selecting an Internship	Reference to challenges of selecting an internship location (e.g., finding an internship that matches major and interest)
Finances	Reference to difficulty receiving stipends in the correct amounts or on time, covering expenses, and/or securing reimbursement for covered expenses; difficulty with Regis (payment contractor)
Isolation	Reference to feeling isolated or alone
Lack of Confidence	Reference to lack of self-confidence (e.g., skills, speaking, research ability)
Learning Curve	Reference to challenges of learning new skills or managing the steep learning curve
Logistics	Reference to difficulty finding housing, moving, transportation, schedules, etc.
NOAA Office Staff	Negative reference to NOAA OEd staff (e.g., unresponsive, information was incomplete)
Poor Mentoring	Reference to problematic aspects of mentor/mentee relationship (e.g., mentor was unsupportive, unresponsive)
Program-Related Problems	Reference to problematic aspects of scholarship program (e.g., regulations or guidelines unclear, insufficient time allocated for internship)
Project-Related Issues	Reference to problematic aspects of the project (e.g., project was poorly defined)
Scholarship Schedule	Reference to difficulty scheduling other activities not related to NOAA scholarship at same time as scholarship (e.g., other scholarships, study abroad)
Racial Tension	Reference to racial tensions perceived during NOAA scholarship/internship
Taxes	Reference to difficulty managing taxes
Workload and Time Management	Reference to challenge of balancing workload or difficulty managing time
Other	Catchall code for any response not able to be categorized under other codes

Appendix H. Results Tables

Table H.1. Respondent Characteristics

Variables	All scholars		HUSP		EPP				Nonrecipients	
					GSP		USP			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Race/Ethnicity										
Did not specify/Missing	19	2.3	17	2.2	0	0	2	4.2	128	15.7
Black/African American	57	6.9	21	2.8	3	23.1	31	64.6	36	4.4
White	651	78.7	640	84.1	5	38.5	3	6.3	567	69.3
Hispanic/Latino	43	5.2	29	3.8	5	38.5	9	18.8	37	4.5
Asian	28	3.4	27	3.6	0	0	1	2.1	22	2.7
Other[1]	29	3.5	27	3.6	0	0	2	4.2	28	3.4
Gender										
Did not specify/Missing	20	2.4	18	2.4	0	0	2	4.2	101	12.4
Female	466	56.4	427	56.1	9	69.2	27	56.3	418	51.1
Male	341	41.2	316	41.5	4	30.8	19	39.6	299	36.6
Age										
Did not specify/Missing	32	3.9	27	3.6	1	7.7	4	8.3	49	6.4
Younger than 21	2	0.2	2	0.3	0	0	0	0	7	0.9
21–23	284	34.3	259	34.0	0	0	21	43.8	306	40.0
24–25	162	19.6	151	19.8	0	0	11	22.9	173	22.6
26 or older	347	42.0	322	42.3	12	92.3	12	25.0	231	30.2
Application year										
Missing	20	2.4	3	0.4	13	100.0	4	8.3	0	0
2006	2	0.2	2	0.3	0	0	0	0	0	0
2007	142	17.2	141	18.5	0	0	1	2.1	0	0
2008	86	10.4	81	10.6	0	0	5	10.4	81	9.9
2009	81	9.8	78	10.3	0	0	2	4.2	125	15.3
2010	89	10.8	85	11.2	0	0	4	8.3	93	11.4
2011	85	10.3	77	10.1	0	0	8	16.7	128	15.7
2012	100	12.1	91	12.0	0	0	9	18.8	21	2.6
2013	118	14.3	106	13.9	0	0	10	20.8	162	19.8
2014	104	12.6	97	12.8	0	0	5	10.4	208	25.4
Average application score	722	90.5	681	91.0	0	0	37	81.5	809	76.2

[1] Because of small sample sizes, "Other" includes American Indian/Native Alaskan, Native Hawaiian or other Pacific Islander, or individuals of two or more races.

Table H.2a. Comparison of NOAA HUSP and EPP/MSI Recipients and Nonrecipients on Publication and Presentation Outcomes

Outcome	NOAA scholars								Nonrecipients	
	All		HUSP		EPP					
					GSP		USP			
	n	Mean	*n*	Mean	*n*	Mean	*n*	Mean	*n*	Mean
Average number of publications, manuscripts, and presentations										
Publications	802	1.3	741	1.3	12	2.8	44	0.6	725	0.6
Manuscripts	802	0.9	741	0.9	12	1.6	44	0.4	723	0.6
Presentations	802	2.9	741	2.8	12	4.6	44	3.5	722	1.9

Note: *N*s vary because of survey nonresponse.

Table H.2b. Comparison of NOAA HUSP and EPP/MSI Recipients and Nonrecipients on Key Education and Employment Outcomes

Outcome	NOAA scholars								Nonrecipients	
	All		HUSP		EPP					
					GSP		USP			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Mentoring[1]										
Received mentoring support										
Strongly disagree	12	1.5	12	1.6	0	0.0	0	0.0	26	3.6
Disagree	28	3.5	27	3.7	1	8.3	0	0.0	31	4.3
Neither	75	9.4	68	9.2	3	25.0	4	9.1	53	7.4
Agree	248	31.0	229	31.0	3	25.0	13	29.6	219	30.4
Strongly agree	437	54.6	403	54.5	5	41.7	27	61.4	392	54.4
Experiential learning										
Applied technology										
Strongly disagree	3	0.4	3	0.4	0	0.0	0	0.0	20	2.8
Disagree	20	2.5	20	2.7	0	0.0	0	0.0	15	2.1
Neither	63	7.9	61	8.3	2	16.7	0	0.0	38	5.3
Agree	252	31.6	230	31.3	6	50.0	14	31.8	279	38.7
Strongly agree	459	57.6	422	57.3	4	33.3	30	68.2	369	51.2

Outcome	NOAA scholars								Nonrecipients	
	All		HUSP		EPP					
					GSP		USP			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Hands-on experience										
Strongly disagree	3	0.4	2	0.3	1	8.3	0	0.0	27	3.7
Disagree	10	1.3	10	1.4	0	0.0	0	0.0	28	3.9
Neither	18	2.3	17	2.3	0	0.0	1	2.3	53	7.3
Agree	190	23.8	170	23.1	5	41.7	12	27.3	200	27.7
Strongly agree	577	72.3	538	73.0	6	50.0	31	70.5	414	57.3
Education										
Highest degree										
Current undergraduates	119	14.8	106	14.3	0	0.0	11	25.6	192	26.5
Bachelor's only	170	21.2	159	21.4	0	0.0	9	20.9	236	32.6
Bachelor's and enrolled in graduate program	196	24.4	184	24.8	0	0.0	11	25.6	144	19.9
Master's only	139	17.3	128	17.2	4	33.3	7	16.3	85	11.7
Master's and enrolled in master's program	24	3.0	21	2.8	0	0.0	3	7.0	16	2.2
Master's and enrolled in doctoral program	67	8.3	66	8.9	1	8.3	0	0.0	33	4.6
Doctoral or professional degree	88	11.0	79	10.6	7	58.3	2	4.7	18	2.5
Advanced degree										
Bachelor's only	170	24.9	159	25.0	0	0.0	9	28.1	236	44.4
Bachelor's and enrolled in graduate program	196	28.7	184	28.9	0	0.0	11	34.4	144	27.1
Master's only or master's and enrolled in another graduate program	230	33.6	215	33.8	5	41.7	10	31.3	134	25.2
Doctoral or professional degree	88	12.9	79	12.4	7	58.3	2	6.3	18	3.4
Highest degree in a NOAA field[2,3]										
No	95	13.7	86	13.3	0	0.0	9	25.0	125	21.6
Yes	601	86.4	559	86.7	12	100.0	27	75.0	453	78.4

Outcome	NOAA scholars								Nonrecipients	
	All		HUSP		EPP					
					GSP		USP			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
If hold a degree in NOAA field, by mission field										
Computer and Information Sciences	7	1.2	6	1.1	0	0.0	1	3.7	7	1.6
Communication	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
Education	8	1.3	7	1.3	0	0.0	0	0.0	8	1.8
Engineering	63	10.5	55	9.8	0	0.0	8	29.6	51	11.3
Law	10	1.7	10	1.8	0	0.0	0	0.0	3	0.7
Life Sciences	133	22.1	119	21.3	6	50.0	6	22.2	106	23.4
Mathematics	27	4.5	22	3.9	0	0.0	5	18.5	12	2.7
Physical Sciences	334	55.6	321	57.4	6	50.0	7	25.9	248	54.8
Social Sciences	19	3.2	19	3.4	0	0.0	0	0.0	17	3.8
If hold a degree in NOAA field, by degree[2,3]										
Bachelor's	334	55.6	311	55.6	0	0.0	20	74.1	328	72.4
Master's	194	32.3	183	32.7	5	41.7	6	22.2	113	24.9
Doctoral/Professional	73	12.2	65	11.6	7	58.3	1	3.7	12	2.7
Currently enrolled in graduate or professional program[3,4]										
Bachelor's only (comparison)	170	37.2	159	37.0	0	0.0	9	39.1	236	55.0
Bachelor's and enrolled in graduate program	196	42.9	184	42.8	0	0.0	11	47.8	144	33.6
Master's and enrolled in graduate program	91	19.9	87	20.2	1	100.0	3	13.0	49	11.4
Current graduate students enrolled in a NOAA field[2,3,5]										
No	41	14.7	38	14.4	1	100.0	2	15.4	32	16.6
Yes	238	85.3	226	85.6	0	0.0	11	84.6	161	83.4
Interested in pursuing graduate study in NOAA mission fields										
No	423	57.0	387	56.8	9	75.0	24	54.6	307	58.7
Yes	319	43.0	294	43.2	3	25.0	20	45.5	216	41.3

Outcome	NOAA scholars								Nonrecipients	
	All		HUSP		EPP					
					GSP		USP			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
Employment										
Current employment status										
Government[6]	129	16.0	112	15.1	11	91.7	6	13.6	90	12.3
Educational institution	254	31.6	244	32.8	1	8.3	8	18.2	201	27.5
Private[6]	124	15.4	116	15.6	0	0.0	8	18.2	159	21.7
Nonprofit or international organization	33	4.1	30	4.0	0	0.0	2	4.6	39	5.3
Other	67	8.3	63	8.5	0	0.0	4	9.1	51	7.0
Nonemployed, current undergraduate	83	10.3	72	9.7	0	0.0	9	20.5	97	13.3
Nonemployed, current graduate student	68	8.5	62	8.3	0	0.0	6	13.6	42	5.7
Nonemployed	47	5.8	45	6.1	0	0.0	1	2.3	53	7.2
If employed in an educational institution, by type										
College education	221	87.0	216	88.5	1	100.0	4	50.0	178	88.6
Elementary/Middle/High school	25	9.8	20	8.2	0	0.0	4	50.0	19	9.5
NOAA collaborative research program	8	3.1	8	3.3	0	0.0	0	0.0	4	2.0
Employment in a NOAA field[2,7]										
No	204	33.6	185	32.7	2	16.7	15	53.6	169	31.8
Yes	403	66.4	380	67.3	10	83.3	13	46.4	363	68.2
If employed in a NOAA field,[2,7] by sector										
Government[6]	115	28.5	101	26.6	9	90.0	5	38.5	74	20.4
Educational institution	208	51.6	205	54.0	1	10.0	2	15.4	140	38.6
Private[6]	80	19.9	74	19.5	0	0.0	6	46.2	95	26.2
Nonprofit or international organization	0	0.0	0	0.0	0	0.0	0	0.0	27	7.4
Other	0	0.0	0	0.0	0	0.0	0	0.0	27	7.4
Employed in NOAA office or facility										
Yes		10.1	57	8.9	11	91.7	2	5.4	28	3.8
Federal employee	36	5.2	23	3.6	11	91.7	2	5.4	16	2.2
Contractor	34	4.9	34	5.3	0	0.0	0	0.0	12	1.6

Outcome	NOAA scholars								Nonrecipients	
	All		HUSP		EPP					
					GSP		USP			
	n	%	*n*	%	*n*	%	*n*	%	*n*	%
No	626	89.9	586	91.1	1	8.3	35	94.6	704	96.2
Interested in pursuing employment in a NOAA mission field										
No	20	2.6	18	2.5	0	0.0	1	2.4	41	5.8
Yes	647	84.2	607	84.3	1	100.0	36	85.7	563	79.1
Unsure	101	13.2	95	13.2	0	0.0	5	11.9	108	15.2

[1] The measurement of "mentoring" varied by respondent group. Scholarship respondents rated the extent to which they agreed "my mentor was actively involved in my NOAA research training," whereas nonrecipients rated the extent to which they agreed "I have worked with or received the support of a mentor who is active in my field."
[2] NOAA-related fields refer to the following: communications; computer science; education (excluding education research and administration, pre-elementary teaching, literacy and reading teaching, or "other" types of education degrees); engineering; law; agricultural and natural sciences (excluding horticulture, food science, and "other" natural sciences); biology (excluding biochemistry, biomedical, and "other" biological sciences); environmental health; mathematics; atmospheric sciences and meteorology; chemistry; geology; ocean and marine sciences; physics; and social sciences (excluding demography and sociology). If respondents selected a NOAA-related broad field but selected no subfield, then they were coded as working in a NOAA-related field.
[3] Excludes current undergraduates
[4] Excludes individuals who earned a doctorate or professional degree
[5] Of current graduate students who took the survey, 85 percent of scholars were enrolled in a NOAA field.
[6] Government employment includes non-Federal NOAA partnership programs. Private employment includes self-employed individuals.
[7] Excludes nonemployed respondents either seeking or not seeking employment
Note: *N*s vary because of survey nonresponse.

Table H.3. Logistic Regression Coefficients for Knowledge and Training

Indicators[1]	Delivered more than two presentations[2]		Authored or co-authored more than one peer-reviewed publication[2]		Agreed or strongly agreed to having a mentor actively involved		Agreed or strongly agreed to receiving hands-on experience in the field		Agreed or strongly agreed to using technologies in the field	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept 3										
	-1.54*** (0.13)	-1.44*** (0.14)	†	†	†	†	†	†	†	†
Intercept 2										
	-0.77*** (0.12)	-0.67*** (0.14)	-2.85*** (0.17)	-2.70*** (0.19)	†	†	†	†	†	†
Intercept 1										
	0.03 (0.12)	0.14 (0.14)	-1.73*** (0.16)	-1.58*** (0.18)	1.95*** (0.19)	2.01*** (0.22)	2.02*** (0.22)	2.09*** (0.26)	2.26*** (0.22)	2.91*** (0.27)
Awarded										
Yes	0.59*** (0.11)	0.56*** (0.11)	0.58*** (0.12)	0.57*** (0.12)	0.13 (0.16)	0.14 (0.16)	1.67*** (0.25)	1.68*** (0.26)	0.02 (0.20)	0 (0.20)
No (reference group)										
Race/Ethnicity										
Black/African American		0.50** (0.22)		-0.39 (0.25)		-0.35 (0.30)		-0.44 (0.39)		-0.13 (0.39)
Hispanic/Latino		0.22 (0.22)		0.18 (0.25)		0.62 (0.44)		-0.77** (0.35)		0.34 (0.48)
Other		0 (0.19)		0.29 (0.21)		-0.16 (0.28)		-0.2 (0.36)		-0.41 (0.30)
White (reference group)										
Sex										
Female		-0.18* (0.10)		-0.28** (0.11)		-0.07 (0.15)		0.06 (0.19)		-0.85*** (0.20)
Male (reference group)										

Indicators[1]	Delivered more than two presentations[2]		Authored or co-authored more than one peer-reviewed publication[2]		Agreed or strongly agreed to having a mentor actively involved		Agreed or strongly agreed to receiving hands-on experience in the field		Agreed or strongly agreed to using technologies in the field	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Age										
24–25		-0.45* (0.24)		0.03 (0.29)		0.11 (0.39)		-0.15 (0.46)		-0.84* (0.47)
26 or older		-0.45* (0.25)		-0.25 (0.31)		-0.1 (0.39)		-0.17 (0.43)		-0.26 (0.46)
23 or younger (reference group)										
Observations[3]		1,446		1,448		1,444		1,443		1,441

[1] The study team included year indicators with 2014 as the reference year (not shown).
[2] The presentation variable was coded with four levels; therefore, there are three intercept thresholds. The publication variable is coded with three levels, so there are two intercept thresholds. All other outcome variables are binary; hence, there is only one intercept threshold.
[3] The number of observations accounts for listwise deletion, for which individuals with missing data on any one of the independent variables (award status, race/ethnicity, sex, or age) were excluded from the analyses.
Note: ***$p < 0.01$, **$p < 0.05$, * $p < 0.1$; † Not applicable for these analyses
Note: Standard errors are in parentheses.

Table H.4. Logistic Regression Coefficients for Academic Trajectories

Variable[1]	Earned advanced degree[2]		Earned highest degree in NOAA mission field		Currently enrolled in graduate or professional program[2]		Enrolled in graduate or professional program in NOAA mission field		Expressed interest in graduate study in NOAA mission field	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept 3										
	-4.44*** (0.47)	-4.41*** (0.48)	†	†	†	†	†	†	†	†
Intercept 2										
	-2.13*** (0.46)	-2.10*** (0.47)	†	†	-2.81*** (0.49)	-2.86*** (0.50)	†	†	†	†
Intercept 1										
	-0.71 (0.45)	-0.67 (0.46)	2.29*** (0.74)	2.58*** (0.76)	-0.87* (0.48)	-0.90* (0.49)	1.56 (1.10)	1.6 (1.12)	1.97*** (0.29)	2.05*** (0.31)
Awarded										
Yes	0.65*** (0.12)	0.66*** (0.12)	0.37* (0.20)	0.36* (0.20)	0.69*** (0.14)	0.67*** (0.14)	0.35 (0.29)	0.4 (0.30)	-0.14 (0.14)	-0.13 (0.14)
No (reference group)										
Race/Ethnicity										
Black/African American		0.21 (0.25)		0.14 (0.42)		0.45 (0.28)		-0.63 (0.50)		-0.70** (0.30)
Hispanic/Latino		0.43 (0.27)		-0.07 (0.42)		0.70** (0.31)		-0.61 (0.50)		-0.34 (0.30)
Other		-0.21 (0.23)		-0.04 (0.36)		0.04 (0.26)		-0.72 (0.48)		0.15 (0.24)
White (reference group)										

Variable[1]	Earned advanced degree[2]		Earned highest degree in NOAA mission field		Currently enrolled in graduate or professional program[2]		Enrolled in graduate or professional program in NOAA mission field		Expressed interest in graduate study in NOAA mission field	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Sex										
Female		-0.12 (0.11)		-0.38** (0.18)		-0.04 (0.13)		0.19 (0.27)		-0.03 (0.13)
Male (reference group)										
Age										
24–25		0.41 (0.28)		0.11 (0.43)		0.37 (0.29)		0.01 (0.58)		-0.35 (0.31)
26 or older		-0.08 (0.31)		-0.42 (0.47)		-0.19 (0.35)		0.21 (0.76)		-0.28 (0.34)
23 or younger (reference group)										
Observations[3]		1,148		1,152		847		457		1,141

[1] The study team included year indicators with 2014 as the reference year (not shown).
[2] The number of observations accounts for listwise deletion, for which individuals with missing data on any one of the independent variables (award status, race/ethnicity, sex, age, or application score) were excluded from the analyses.
[3] The level of educational attainment is coded with four levels; therefore, there are three intercept thresholds. The currently enrolled in a graduate or professional program variable is coded with three levels, so there are two intercept thresholds. All other outcome variables are binary; hence, there is only one intercept threshold.
Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Note: Standard errors are in parentheses.

Table H.5. Logistic Regression Coefficients for Career Trajectories

Indicators[1]	Currently employed		Employed in NOAA mission field		Interested in working at NOAA office	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept						
	-1.17** (-0.51)	-0.98* (-0.52)	0.58*** (0.20)	0.91*** (0.23)	1.81*** (0.19)	1.71*** (0.21)
Awarded						
Yes	0.06 (0.14)	0.09 (0.14)	-0.17 (0.14)	-0.18 (0.15)	0.46*** (0.16)	0.51*** (0.16)
No (reference group)						
Race/Ethnicity						
Black/African American		-0.53* (0.27)		-0.53* (0.29)		-0.64** (0.27)
Hispanic/Latino		-0.50 (0.30)		0.03 (0.31)		1.00** (0.47)
Others		-0.28 (0.26)		0.08 (0.27)		-0.37 (0.25)
White (reference group)						
Sex						
Female		-0.26* (0.13)		-0.41*** (0.14)		0.19 (0.14)
Male (reference group)						
Age						
24–25		-0.04 (0.30)		-0.08 (0.32)		0.41 (0.38)
26 or older		0.17 (0.35)		-0.12 (0.32)		0.42 (0.40)
23 or younger (reference group)						
Observations[2]		1,150		1,074		1,411

[1] The study team included year indicators with 2014 as the reference year (not shown).
[2] The number of observations accounts for listwise deletion, for which individuals with missing data on any one of the independent variables (award status, race/ethnicity, sex, age, or application score) were excluded from the analyses.
Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Note: Standard errors are in parentheses.

Table H.6. FRD Estimators of the Effects of a NOAA Award on Knowledge and Training

FRD method	Delivered no presentations	Authored no publications	Perceived little hands-on experience in the field	Perceived low mentor support
Conventional[1]	1.85 (4.42)	1.37 (2.43)	3.41 (4.01)	-1.13 (1.36)
Bias-corrected[2]	2.5 (4.42)	0.83 (2.43)	3.65 (4.01)	-1.52 (1.36)
Robust[3]	2.5 (6.17)	0.83 (3.70)	3.65 (5.10)	-1.52 (1.82)
Observations	**476**	**482**	**399**	**466**

[1] Conventional FRD was used to estimate the effects of the NOAA award on the outcomes.
[2] Bias-corrected FRD was used to estimate the effects of the NOAA award on the outcomes.
[3] Local-polynomial FRD point estimators were used to estimate the effects of the NOAA award on the outcomes.
Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Note: Standard errors are in parentheses.

Table H.7. FRD Estimators of the Effects of a NOAA Award on Academic Plan Outcomes

FRD method	Reported the lowest education category (undergraduate)	Earned degree in NOAA mission field	Enrolled in graduate study in NOAA mission field	Expressed interest in graduate study in NOAA mission field
Conventional[1]	0.06 (1.01)	-0.38 (0.91)	0.22 (1.11)	0.44 (0.35)
Bias-corrected[2]	-0.33 (1.01)	-0.27 (0.91)	0.08 (1.11)	0.46 (0.35)
Robust[3]	-0.33 (1.34)	-0.27 -1.17	0.083 (1.62)	0.46 (0.46)
Observations	**553**	**402**	**215**	**225**

[1] Conventional FRD was used to estimate the effects of the NOAA award on the outcomes.
[2] Bias-corrected FRD was used to estimate the effects of the NOAA award on the outcomes.
[3] Local-polynomial FRD point estimators were used to estimate the effects of the NOAA award on the outcomes.
Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Note: Standard errors are in parentheses.

Table H.8. FRD Estimators of the Effects of a NOAA Award on Career Plan Outcomes

FRD method	Employed full time	Employed in NOAA mission field	Showed interest in working at NOAA office
Conventional[1]	0.01 (0.76)	0.21 (1.45)	-0.38 (0.43)
Bias-corrected[2]	-0.26 (0.76)	-0.15 (1.45)	-0.33 (0.43)
Robust[3]	-0.26 (0.97)	-0.15 (1.89)	-0.33 (0.62)
Observations	**556**	**401**	**485**

[1] Conventional FRD was used to estimate the effects of the NOAA award on the outcomes.
[2] Bias-corrected FRD was used to estimate the effects of the NOAA award on the outcomes.
[3] Local-polynomial FRD point estimators were used to estimate the effects of the NOAA award on the outcomes.
Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Note: Standard errors are in parentheses.

Table H.9. Program Feedback Outcomes

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
Preprogram reasons for applying								
When evaluating this scholarship opportunity, please select which scholarship component was more important to you:								
Financial aid	305	38.7	293	39.9	5	50.0	7	15.9
Internship opportunity	484	61.3	442	60.1	5	50.0	37	84.1
Please indicate how important the following factors were in your decision to pursue the NOAA scholarship program:								
Financial aid								
Not at all important (1)	12	1.5	10	1.4	0	0.0	2	4.6
2	29	3.6	27	3.7	0	0.0	2	4.6
3	76	9.6	72	9.7	1	8.3	3	6.8
4	169	21.3	156	21.1	3	25.0	10	22.7
Very important (5)	509	64.0	474	64.1	8	66.7	27	61.4
Opportunity to participate in a summer internship								
Not at all important (1)	5	0.6	3	0.4	2	16.7	0	0.0
2	9	1.1	9	1.2	0	0.0	0	0.0
3	24	3.0	22	3.0	2	16.7	0	0.0
4	132	16.6	128	17.3	2	16.7	2	4.6
Very important (5)	625	78.6	577	78.1	6	50.0	42	95.5
Interest in pursuing a career with NOAA								
Not at all important (1)	25	3.1	23	3.1	0	0.0	2	4.6
2	61	7.7	59	8.0	0	0.0	2	4.6
3	176	22.1	170	23.0	1	8.3	5	11.4
4	215	27.0	203	27.5	0	0.0	12	27.3
Very important (5)	318	40.0	284	38.4	11	91.7	23	52.3
Interest in a NOAA-related field of study (e.g., STEM field)								
Not at all important (1)	2	0.3	2	0.3	0	0.0	0	0.0
2	9	1.1	9	1.2	0	0.0	0	0.0
3	31	3.9	30	4.1	0	0.0	1	2.3
4	132	16.6	124	16.8	1	8.3	7	15.9
Very important (5)	621	78.1	574	77.7	11	91.7	36	81.8

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
Opportunity to expand professional network								
Not at all important (1)	10	1.3	10	1.4	0	0.0	0	0.0
2	42	5.3	41	5.6	1	8.3	0	0.0
3	131	16.5	122	16.5	2	16.7	7	15.9
4	231	29.1	224	30.3	1	8.3	6	13.6
Very important (5)	381	47.9	342	46.3	8	66.7	31	70.5
Opportunity to collaborate with a NOAA mentor								
Not at all important (1)	13	1.6	13	1.8	0	0.0	0	0.0
2	37	4.7	35	4.7	1	8.3	1	2.3
3	119	15.0	115	15.6	0	0.0	4	9.1
4	213	26.8	199	26.9	3	25.0	11	25.0
Very important (5)	413	51.9	377	51.0	8	66.7	28	63.6
Postprogram perceptions								
For the following items, please rate how valuable each component of the scholarship experience was to you:								
Ability to pay tuition								
Not at all valuable (1)	34	4.3	32	4.4	0	0.0	2	4.6
2	38	4.8	35	4.8	1	8.3	2	4.6
3	92	11.6	87	11.8	0	0.0	5	11.4
4	158	20.0	152	20.7	0	0.0	6	13.6
Very valuable (5)	445	56.3	407	55.4	11	91.7	27	61.4
N/A	24	3.0	22	3.0	0	0.0	2	4.6
Opportunity to collaborate with a NOAA mentor								
Not at all valuable (1)	4	0.5	4	0.6	0	0.0	0	0.0
2	20	2.5	20	2.7	0	0.0	0	0.0
3	80	10.1	76	10.4	3	25.0	1	2.3
4	202	25.6	188	25.7	3	25.0	11	25.0
Very valuable (5)	478	60.6	440	60.0	6	50.0	32	72.7
N/A	5	0.6	5	0.7	0	0.0	0	0.0
Ability to pay for academic-related costs								
Not at all valuable (1)	13	1.6	13	1.8	0	0.0	0	0.0

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
2	30	3.8	29	3.9	0	0.0	1	2.3
3	90	11.3	84	11.4	1	8.3	5	11.4
4	201	25.3	193	26.2	2	16.7	6	13.6
Very valuable (5)	447	56.4	407	55.2	9	75.0	31	70.5
N/A	12	1.5	11	1.5	0	0.0	1	2.3
Ability to pay for living costs								
Not at all valuable (1)	17	2.1	15	2.0	0	0.0	2	4.6
2	33	4.2	30	4.1	1	8.3	2	4.6
3	108	13.6	103	14.0	0	0.0	5	11.4
4	188	23.7	182	24.7	2	16.7	4	9.1
Very valuable (5)	426	53.8	388	52.7	9	75.0	29	65.9
N/A	20	2.5	18	2.5	0	0.0	2	4.6
Opportunity to participate in a research internship								
Not at all valuable (1)	1	0.1	1	0.1	0	0.0	0	0.0
2	3	0.4	3	0.4	0	0.0	0	0.0
3	26	3.3	23	3.1	3	25.0	0	0.0
4	126	15.9	118	16.0	3	25.0	5	11.4
Very valuable (5)	630	79.5	586	79.6	5	41.7	39	88.6
N/A	6	0.8	5	0.7	1	8.3	0	0.0
Opportunity to conduct research on NOAA-related topics								
Not at all valuable (1)	4	0.5	4	0.5	0	0.0	0	0.0
2	6	0.8	6	0.8	0	0.0	0	0.0
3	58	7.3	53	7.2	4	33.3	1	2.3
4	168	21.2	161	21.9	2	16.7	5	11.4
Very valuable (5)	550	69.4	506	68.7	6	50.0	38	86.4
N/A	7	0.9	7	1.0	0	0.0	0	0.0
Opportunity to develop applied knowledge of NOAA-related technology								
Not at all valuable (1)	10	1.3	10	1.4	0	0.0	0	0.0
2	28	3.5	27	3.7	1	8.3	0	0.0
3	131	16.5	123	16.7	6	50.0	2	4.6

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
4	240	30.3	231	31.3	1	8.3	8	18.2
Very valuable (5)	365	46.0	327	44.4	4	33.3	34	77.3
N/A	19	2.4	19	2.6	0	0.0	0	0.0
Opportunity to expand professional network to include NOAA staff and mentors								
Not at all valuable (1)	9	1.1	9	1.2	0	0.0	0	0.0
2	30	3.8	30	4.1	0	0.0	0	0.0
3	106	13.4	105	14.3	0	0.0	1	2.3
4	229	28.9	215	29.2	4	33.3	10	22.7
Very valuable (5)	412	52.0	371	50.3	8	66.7	33	75.0
N/A	7	0.9	7	1.0	0	0.0	0	0.0
Opportunity to develop applied knowledge of NOAA-related research processes								
Not at all valuable (1)	5	0.6	5	0.7	0	0.0	0	0.0
2	21	2.6	21	2.9	0	0.0	0	0.0
3	111	14.0	106	14.4	5	41.7	0	0.0
4	241	30.4	225	30.5	1	8.3	15	34.1
Very valuable (5)	404	50.9	369	50.1	6	50.0	29	65.9
N/A	11	1.4	11	1.5	0	0.0	0	0.0
Opportunity to present work to an audience of peers and mentors								
Not at all valuable (1)	9	1.1	9	1.2	0	0.0	0	0.0
2	23	2.9	21	2.9	2	16.7	0	0.0
3	130	16.5	120	16.4	5	41.7	5	11.4
4	215	27.2	205	27.9	1	8.3	9	20.5
Very valuable (5)	407	51.5	373	50.8	4	33.3	30	68.2
N/A	6	0.8	6	0.8	0	0.0	0	0.0
Overall NOAA scholarship experience								
Not at all valuable (1)	2	0.3	2	0.3	0	0.0	0	0.0
2	4	0.5	4	0.5	0	0.0	0	0.0
3	35	4.4	35	4.8	0	0.0	0	0.0
4	164	20.7	156	21.2	3	25.0	5	11.4
Very valuable (5)	587	74.0	539	73.1	9	75.0	39	88.6

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
N/A	1	0.1	1	0.1	0	0.0	0	0.0
Please indicate how instrumental the scholarship program was in achieving each of the following:								
Graduating								
Not at all instrumental (1)	189	23.9	185	25.1	1	9.1	3	6.8
2	124	15.7	122	16.6	0	0.0	2	4.6
3	155	19.6	145	19.7	4	36.4	6	13.6
4	118	14.9	111	15.1	0	0.0	7	15.9
Very instrumental (5)	164	20.7	133	18.1	6	54.6	25	56.8
N/A	41	5.2	40	5.4	0	0.0	1	2.3
Paying tuition								
Not at all instrumental (1)	61	7.7	59	8.0	0	0.0	2	4.6
2	38	4.8	38	5.2	0	0.0	0	0.0
3	95	12.0	87	11.8	2	16.7	6	13.6
4	176	22.2	165	22.4	2	16.7	9	20.5
Very instrumental (5)	406	51.2	374	50.8	8	66.7	24	54.6
N/A	17	2.1	14	1.9	0	0.0	3	6.8
Paying for academic related costs (e.g., books, materials, fees)								
Not at all instrumental (1)	34	4.3	34	4.6	0	0.0	0	0.0
2	39	4.9	38	5.2	0	0.0	1	2.3
3	123	15.5	114	15.5	2	16.7	7	15.9
4	192	24.2	183	24.8	3	25.0	6	13.6
Very instrumental (5)	391	49.3	356	48.3	7	58.3	28	63.6
N/A	14	1.8	12	1.6	0	0.0	2	4.6
Paying for living costs (e.g., rent)								
Not at all instrumental (1)	56	7.1	53	7.2	1	8.3	2	4.6
2	45	5.7	40	5.4	1	8.3	4	9.1
3	101	12.8	93	12.7	2	16.7	6	13.6
4	172	21.7	163	22.2	1	8.3	8	18.2
Very instrumental (5)	401	50.7	370	50.3	7	58.3	24	54.6
N/A	16	2.0	16	2.2	0	0.0	0	0.0

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
Building my research experience								
Not at all instrumental (1)	8	1.0	8	1.1	0	0.0	0	0.0
2	9	1.1	8	1.1	1	8.3	0	0.0
3	50	6.3	47	6.4	3	25.0	0	0.0
4	148	18.7	138	18.8	3	25.0	7	15.9
Very instrumental (5)	572	72.2	531	72.2	4	33.3	37	84.1
N/A	5	0.6	4	0.5	1	8.3	0	0.0
Expanding my professional network								
Not at all instrumental (1)	11	1.4	11	1.5	0	0.0	0	0.0
2	33	4.2	31	4.2	0	0.0	2	4.6
3	124	15.6	118	16.0	3	25.0	3	6.8
4	251	31.7	234	31.8	3	25.0	14	31.8
Very instrumental (5)	371	46.8	340	46.1	6	50.0	25	56.8
N/A	3	0.4	3	0.4	0	0.0	0	0.0
Getting another scholarship/fellowship								
Not at all instrumental (1)	62	7.8	57	7.7	2	16.7	3	6.8
2	58	7.3	52	7.1	1	8.3	5	11.4
3	127	16.0	119	16.2	3	25.0	5	11.4
4	154	19.4	150	20.4	0	0.0	4	9.1
Very instrumental (5)	274	34.6	251	34.1	2	16.7	21	47.7
N/A	117	14.8	107	14.5	4	33.3	6	13.6
Getting accepted to graduate school								
Not at all instrumental (1)	34	4.3	28	3.8	4	33.3	2	4.6
2	21	2.7	19	2.6	0	0.0	2	4.6
3	75	9.5	70	9.5	1	8.3	4	9.1
4	159	20.1	151	20.5	0	0.0	8	18.2
Very instrumental (5)	302	38.1	283	38.5	2	16.7	17	38.6
N/A	201	25.4	185	25.1	5	41.7	11	25.0
Shaping my future education plans								
Not at all instrumental (1)	19	2.4	15	2.0	3	25.0	1	2.3

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
2	38	4.8	36	4.9	1	8.3	1	2.3
3	117	14.8	112	15.3	0	0.0	5	11.4
4	247	31.3	232	31.6	2	16.7	13	29.6
Very instrumental (5)	349	44.2	322	43.9	3	25.0	24	54.6
N/A	20	2.5	17	2.3	3	25.0	0	0.0
Shaping my future career plans								
Not at all instrumental (1)	8	1.0	6	0.8	0	0.0	2	4.6
2	29	3.7	29	3.9	0	0.0	0	0.0
3	117	14.8	109	14.8	2	16.7	6	13.6
4	258	32.6	245	33.3	2	16.7	11	25.0
Very instrumental (5)	375	47.3	342	46.5	8	66.7	25	56.8
N/A	5	0.6	5	0.7	0	0.0	0	0.0
Please indicate whether you agree or disagree with the following statements about work-related experiences:								
My professional network grew after receiving the scholarship								
Strongly disagree	4	0.5	4	0.5	0	0.0	0	0.0
Disagree	21	2.7	20	2.7	0	0.0	1	2.3
Neither agree nor disagree	77	9.7	74	10.1	1	8.3	2	4.6
Agree	288	36.5	265	36.1	4	33.3	19	43.2
Strongly agree	400	50.6	371	50.5	7	58.3	22	50.0
The scholarship gave me hands-on experience in a NOAA-related field								
Strongly disagree	2	0.3	1	0.1	1	8.3	0	0.0
Disagree	10	1.3	10	1.4	0	0.0	0	0.0
Neither agree nor disagree	18	2.3	17	2.3	0	0.0	1	2.3
Agree	187	23.6	170	23.1	5	41.7	12	27.3
Strongly agree	574	72.6	537	73.1	6	50.0	31	70.5
My interest in pursuing a NOAA-related career increased after receiving the scholarship								
Strongly disagree	10	1.3	9	1.2	1	8.3	0	0.0
Disagree	42	5.3	39	5.3	0	0.0	3	6.8
Neither agree nor disagree	126	15.9	122	16.6	2	16.7	2	4.6

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	%	*n*	%	*n*	%	*n*	%
Agree	240	30.3	221	30.0	3	25.0	16	36.4
Strongly agree	374	47.2	345	46.9	6	50.0	23	52.3
As a result of receiving the scholarship, I am more prepared to enter the work force								
Strongly disagree	1	0.1	1	0.1	0	0.0	0	0.0
Disagree	10	1.3	10	1.4	0	0.0	0	0.0
Neither agree nor disagree	52	6.6	48	6.5	1	8.3	3	6.8
Agree	264	33.3	245	33.3	5	41.7	14	31.8
Strongly agree	465	58.7	432	58.7	6	50.0	27	61.4
Would you recommend the scholarship program to other students?								
Yes	789	99.7	733	99.7	12	100.0	44	100.0
No	2	0.3	2	0.3	0	0.0	0	0.0
During your scholarship experience, who was the person that provided you with the most mentorship and/or guidance?								
NOAA-assigned mentor	536	67.5	498	67.5	6	50.0	32	72.7
A co-mentor at my research site	196	24.7	183	24.8	3	25.0	10	22.7
Other	37	4.7	34	4.6	1	8.3	2	4.6
Did not receive mentorship/guidance	25	3.1	23	3.1	2	16.7	0	0
On average, how often did you meet with your mentor to discuss matters related to your NOAA research project(s)?								
Monthly	50	6.3	41	5.6	6	50.0	3	6.8
Once or twice a week	291	36.7	272	36.9	3	25.0	16	36.4
More than twice a week	350	44.1	327	44.4	2	16.7	21	47.7
Other	54	6.8	53	7.2	1	8.3	0	0.0
No meetings	7	0.9	6	0.8	0	0.0	1	2.3
Did not recall	41	5.2	38	5.2	0	0.0	3	6.8
Please indicate whether you agree or disagree that your mentor was supportive of your NOAA research project(s):								
Strongly disagree	5	0.6	5	0.7	0	0.0	0	0.0
Disagree	10	1.3	10	1.4	0	0.0	0	0.0
Neither agree nor disagree	30	3.8	26	3.5	2	18.2	2	4.6
Agree	183	23.1	171	23.2	2	18.2	10	22.7
Strongly agree	564	71.2	525	71.2	7	63.6	32	72.7

Outcome	All scholars		HUSP		EPP-GSP		EPP-USP	
	n	Mean	*n*	Mean	*n*	Mean	*n*	Mean
Collaborative publications with a NOAA employee, contractor, or mentor	413	0.65	386	0.62	8	2.00	19	0.63
Collaborative manuscripts with a NOAA employee, contractor, or mentor (average)	388	0.48	367	0.45	9	1.44	12	0.75
Collaborative presentations with a NOAA employee, contractor, or mentor (average)	630	1.26	581	1.18	11	3.09	38	1.95

Table H.10. Major Thematic Categories for Open-Ended Responses on What Differences Receiving the Scholarship Made in Recipients' Lives

Code	HUSP (*N* = 619)		EPP-USP (*N* = 42)		EPP-GSP (*N* = 12)		Total across all programs (*N* = 673)	
	%	*n*	%	*n*	%	*n*	%	*n*
Career Plans	44	272	29	12	83	10	44	294
Graduate School	40	246	17	7	0	0	38	253
Financial Aid	34	211	19	8	25	3	33	222
Hands-On Research Experience	32	196	19	8	0	0	30	204
Networking	26	162	24	10	17	2	26	174
NOAA Experience	26	158	21	9	25	3	25	170
Internship Experience	19	119	19	8	0	0	19	127
Interest	16	96	14	6	8	1	15	103
Mentorship	15	92	14	6	0	0	15	98
NOAA Employment	11	67	7	3	83	10	12	80
Skills	11	65	14	6	8	1	11	72
Confidence	8	47	10	4	0	0	8	51
Resume Builder	7	46	2	1	0	0	7	47
Travel	7	46	2	1	8	1	7	48
Changed Fields	6	40	2	1	0	0	6	41
Content Knowledge	6	38	7	3	0	0	6	41
Make Friends	6	38	2	1	0	0	6	39
Personal Growth	4	22	2	1	0	0	3	23
Environmental Stewardship	3	16	0	0	0	0	2	16
Other	1	8	0	0	0	0	1	8

Table H.11. Major Thematic Categories for Open-Ended Responses on Reasons Scholars Would Recommend the Scholarship Program to Others

Code	HUSP (*N* = 620)		EPP-USP (*N* = 39)		EPP-GSP (*N* = 13)		Total across all programs (*N* = 672)	
	%	*n*	%	*n*	%	*n*	%	*n*
Financial Aid	51	319	23	9	31	4	49	332
Hands-On Research Experience	40	249	31	12	8	1	39	262
Networking	30	183	23	9	8	1	29	193
NOAA-Credited Opportunity	27	167	23	9	0	0	26	176
Career Plans	20	127	8	3	38	5	20	135
Internship Experience	18	111	10	4	8	1	17	116
NOAA Experience	17	107	28	11	8	1	18	119
Graduate School	8	51	5	2	8	1	8	54
Mentorship	8	50	10	4	8	1	8	55

Code	HUSP (*N* = 620)		EPP-USP (*N* = 39)		EPP-GSP (*N* = 13)		Total across all programs (*N* = 672)	
	%	*n*	%	*n*	%	*n*	%	*n*
Travel	7	43	5	2	0	0	7	45
Skills	6	37	23	9	8	1	7	47
Interest	5	31	5	2	0	0	5	33
Prestige	4	27	3	1	0	0	4	28
Content Knowledge	4	25	8	3	0	0	4	28
Make Friends	3	20	0	0	8	1	3	21
Resume Builder	2	15	0	0	0	0	2	15
NOAA Employment	2	12	3	1	23	3	2	16
Motivation to Excel	1	8	5	2	0	0	1	10
Other	51	7	3	1	15	2	1	10
Confidence	40	6	3	1	0	0	1	7
Changed Fields	30	5	0	0	0	0	1	5

Table H.12. Major Thematic Categories for Open-Ended Responses on Challenges Encountered During the Scholarship Experience

Code	HUSP (*N* = 544)		EPP-USP (*N* = 34)		EPP-GSP (*N* = 10)		Total across all programs (*N* = 598)	
	%	*n*	%	*n*	%	*n*	%	*n*
Logistics	17	93	6	2	20	2	16	97
Project-Related Issues	14	76	3	1	10	1	13	78
Poor Mentoring	13	71	12	4	0	0	13	75
Learning Curve	10	57	21	7	0	0	11	64
Program-Related Problems	9	50	0	0	30	3	9	53
Workload and Time Management	8	41	3	1	20	2	7	44
Difficulty Selecting Internship	7	37	6	2	0	0	7	39
NOAA Office Staff	7	36	0	0	0	0	6	36
Finances	6	32	0	0	20	2	6	34
Bad Fit	6	30	0	0	0	0	5	30
Other	4	24	0	0	0	0	4	24
Scholarship Schedule	4	24	0	0	0	0	4	24
Difficulty Finding Mentor	3	15	0	0	0	0	3	15
Taxes	2	13	0	0	0	0	2	13
Isolation	2	10	0	0	0	0	2	10
Lack of Confidence	2	10	6	2	0	0	2	12
Racial Tension	0	1	3	1	0	0	0	2

Table H.13. Other Scholarship Programs To Which Scholars Applied

Scholarship program	*n*	%[a]
National Science Foundation Research Experience for Undergraduates	34	0.2
NOAA scholarship programs[b]	31	0.18
Barry Goldwater Scholarship	29	0.17
University-specific scholarship programs	27	0.16
Morris K. Udall and Stewart L. Udall Scholarship	19	0.11
American Meteorological Society scholarships[c]	9	0.05
Environmental Protection Agency scholarships[d]	9	0.05
Department of Energy Scholarships	7	0.04
National Weather Association scholarship programs[e]	6	0.04
Other (non-REU) NSF scholarships	5	0.03
Student Career Experiences Program[f]	4	0.02
Unknown	3	0.02
Department of Defense Science, Mathematics, and Research for Transformation Scholarship	2	0.01
Department of Energy Global Change Education Program	2	0.01
Marine Technology Society Scholarship	2	0.01
National Aeronautics and Space Administration programs[g]	2	0.01
National Weather Centers Research for Undergraduates	2	0.01
Significant Opportunities in Atmospheric Research and Science	2	0.01
Society of Women Engineers Scholarship	2	0.01
Study Abroad Programs	2	0.01
The American Institute of Aeronautics and Astronautics	2	0.01
Woods Hole Oceanographic Summer Student Fellowship	2	0.01
Aircraft Operations Center	1	0.01
Alabama Space Grant Consortium	1	0.01
Alaska SeaLife Center	1	0.01
All Saints	1	0.01
American Chemical Society	1	0.01
American Fire Association	1	0.01
American Society of Mechanical Engineers Student Scholarships	1	0.01
Annie's Sustainable Agriculture Scholarship	1	0.01
Armed Forces Communications and Electronics Association	1	0.01
Association of Women in Science	1	0.01
Atmospheric Science in the Gulf Coast Region	1	0.01
Bering Straits Scholarship	1	0.01
Berkeley Student Cooperative Housing Scholarship	1	0.01
Boren	1	0.01
CIRI Foundation Scholarship	1	0.01
DAAD Research Internship in Science and Engineering	1	0.01
Davies	1	0.01
Dolphin	1	0.01
Fink Scholarship	1	0.01
Frank and Thompson	1	0.01

Scholarship program	*n*	%[a]
Freeman Asia scholarship	1	0.01
Fulbright Summer Institute	1	0.01
Geoscience Scholarship	1	0.01
Gillman international scholarship	1	0.01
Glamour Scholarship	1	0.01
Daniel B. Goldberg scholarship	1	0.01
Hawaii Community Foundation Scholarship	1	0.01
International Brotherhood of Teamsters Scholarship	1	0.01
Jeffrey Good	1	0.01
Kawerak Inc. Scholarship	1	0.01
KFC scholars program	1	0.01
Mellon Mays Undergraduate Fellowship	1	0.01
Mickey Leland	1	0.01
Minority Biomedical Research Support Program	1	0.01
Mote Marine	1	0.01
Na Ho'okama Scholarship	1	0.01
National Hydropower Association	1	0.01
National Merit Finalist	1	0.01
NCDC	1	0.01
Nebraska IDeA Network for Biomedical Research Excellence	1	0.01
Norfolk Foundation	1	0.01
Norton Sound Economic Development Scholarship	1	0.01
Oklahoma Medical Research Foundation Flemming Scholar	1	0.01
Our World Underwater Scholarship Society/American Academy of Underwater Sciences Scientific diving internship	1	0.01
Presidential International Travel Fellowship	1	0.01
Rawlings Cornell Presidential Research Scholar	1	0.01
RESESS	1	0.01
Sam Walton Scholarship	1	0.01
Society of Naval Architects and Marine Engineers Scholarship	1	0.01
Society of Engineering Geophysicists	1	0.01
Space Dynamics Science and Engineering Program	1	0.01
The Chancellor Leadership	1	0.01
Truman	1	0.01
Ty Cobb Educational Foundation scholarship	1	0.01
Wisconsin Space Grant Consortium Undergraduate Research Award	1	0.01

[a] Out of total *n* = 171 students who reported applying to a scholarship program
[b] Includes the following scholarships: 26 HUSP, 2 EPP-USP, 1 EPP-GSP, 1 Nancy Foster, and 1 unspecified
[c] Includes the following scholarships: 3 named scholarships (specific scholarships not specified), 2 undergraduate, 1 freshman, 1 graduate, and 2 unspecified
[d] Includes the following scholarships: 5 Greater Research Opportunity, 2 STAR, 1 undergraduate, and 1 unspecified
[e] Includes the following scholarships: 2 Arthur C. Pike, 2 Pam Daale, 1 Phillips Family, and 1 named scholarship (specific scholarship not specified)
[f] Includes the following scholarships: 1 National Weather Service, 1 NOAA, and 2 unspecified
[g] Includes the following scholarships: 1 Astronaut Fellowship Program and 1 Develop program

Table H.14. Scholar and Nonrecipient Race/Ethnicity by Application Year

Scholar and nonrecipient race/ethnicity	2006		2007		2008		2009		2010		2011		2012		2013		2014	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Scholar																		
Did not specify/Missing	0	0.0	6	4.2	0	0.0	0	0.0	1	1.1	6	7.1	0	0.0	5	4.2	1	1.0
Black/African American	0	0.0	2	1.4	6	7.0	4	4.9	10	11.2	8	9.4	7	7.0	7	5.9	6	5.8
White	1	50.0	126	88.7	71	82.6	69	85.2	65	73.0	62	72.9	75	75.0	92	78.0	83	79.8
Hispanic/Latino	0	0.0	2	1.4	1	1.2	4	4.9	3	3.4	2	2.4	13	13.0	7	5.9	5	4.8
Asian	0	0.0	3	2.1	4	4.7	3	3.7	3	3.4	4	4.7	4	4.0	4	3.4	3	2.9
Other[1]	1	50.0	3	2.1	4	4.7	1	1.2	7	7.9	3	3.5	1	1.0	3	2.5	6	5.8
Scholar: HUSP																		
Did not specify/Missing	0	0.0	6	4.3	0	0.0	0	0.0	1	1.2	6	7.8	0	0.0	3	2.8	1	1.0
Black/African American	0	0.0	1	0.7	2	2.5	2	2.6	7	8.2	3	3.9	1	1.1	3	2.8	1	1.0
White	1	50.0	126	89.4	71	87.7	68	87.2	65	76.5	60	77.9	74	81.3	90	84.9	83	85.6
Hispanic/Latino	0	0.0	2	1.4	0	0.0	4	5.1	2	2.4	1	1.3	11	12.1	4	3.8	5	5.2
Asian	0	0.0	3	2.1	4	4.9	3	3.9	3	3.5	4	5.2	4	4.4	4	3.8	2	2.1
Other[1]	1	50.0	3	2.1	4	4.9	1	1.3	7	8.2	3	3.9	1	1.1	2	1.9	5	5.2
Scholar: EPP-USP																		
Did not specify/Missing	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	20.0	0	0.0
Black/African American	0	0.0	1	100.0	4	80.0	2	100.0	3	75.0	5	62.5	6	66.7	4	40.0	3	60.0
White	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	25.0	1	11.1	0	0.0	0	0.0
Hispanic/Latino	0	0.0	0	0.0	1	20.0	0	0.0	1	25.0	1	12.5	2	22.2	3	30.0	0	0.0
Asian	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	20.0
Other[1]	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	10.0	1	20.0
Pathway																		
Did not specify/Missing	0	0.0	0	0.0	14	17.3	21	16.8	19	20.4	19	14.8	1	4.8	24	14.8	30	14.4
Black/African American	0	0.0	0	0.0	5	6.2	5	4.0	0	0.0	7	5.5	2	9.5	7	4.3	10	4.8
White	0	0.0	0	0.0	51	63.0	90	72.0	67	72.0	90	70.3	17	81.0	110	67.9	142	68.3
Hispanic/Latino	0	0.0	0	0.0	6	7.4	3	2.4	2	2.2	6	4.7	0	0.0	11	6.8	9	4.3
Asian	0	0.0	0	0.0	4	4.9	1	0.8	3	3.2	1	0.8	1	4.8	6	3.7	6	2.9
Other[1]	0	0.0	0	0.0	1	1.2	5	4.0	2	2.2	5	3.9	0	0.0	4	2.5	11	5.3

[1]Because of small sample size, "Other" includes American Indian/Native Alaskan, Native Hawaiian or other Pacific Islander, or individuals of two or more races.

Table H.15. Scholar and Nonrecipient Field of Study by Application Year

Field of study	2006		2007		2008		2009		2010		2011		2012		2013		2014	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Scholars																		
NOAA degree[1]	2	100.0	113	81.3	76	88.4	69	87.3	74	86.1	69	82.1	82	87.2	98	92.5	1	100.0
Business Management/Administration	0	0.0	0	0.0	0	0.0	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Communication	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Computer and Information Sciences	0	0.0	2	1.4	0	0.0	4	5.1	1	1.2	3	3.6	4	4.3	5	4.7	0	0.0
Education	0	0.0	4	2.9	1	1.2	5	6.3	1	1.2	2	2.4	0	0.0	0	0.0	0	0.0
Engineering	0	0.0	17	12.2	8	9.3	11	13.9	8	9.3	5	6.0	12	12.8	11	10.4	0	0.0
Engineering: Environmental[2]	0	0.0	1	0.7	1	1.2	4	5.1	0	0.0	0	0.0	3	3.2	2	1.9	0	0.0
Engineering: Ocean[2]	0	0.0	2	1.4	0	0.0	2	2.5	0	0.0	0	0.0	1	1.1	0	0.0	0	0.0
Humanities	0	0.0	2	1.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.9	0	0.0
Law	0	0.0	7	5.0	1	1.2	3	3.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Life Sciences	2	100.0	31	22.3	18	20.9	15	19.0	19	22.1	17	20.2	25	26.6	30	28.3	0	0.0
Life Sciences: Environmental Science and Marine Biology[2]	1	50.0	13	9.4	10	11.6	8	10.1	6	7.0	13	15.5	16	17.0	14	13.2	0	0.0
Mathematics	0	0.0	3	2.2	3	3.5	5	6.3	4	4.7	4	4.8	8	8.5	9	8.5	0	0.0
Physical Sciences	1	50.0	59	42.5	49	57.0	32	40.5	46	53.5	45	53.6	44	46.8	55	51.9	1	100.0
Physical Sciences: Atmospheric Science and Meteorology[2]	0	0.0	34	24.5	26	30.2	16	20.3	16	18.6	15	17.9	17	18.1	26	24.5	1	100.0
Physical Sciences: Ocean and Marine Sciences[2]	1	50.0	11	7.9	11	12.8	6	7.6	11	12.8	17	20.2	17	18.1	19	17.9	0	0.0
Psychology	0	0.0	0	0.0	0	0.0	1	1.3	2	2.3	1	1.2	1	1.1	0	0.0	0	0.0
Social Sciences	0	0.0	4	2.9	1	1.2	5	6.3	4	4.7	2	2.4	3	3.2	0	0.0	0	0.0
Other	0	0.0	2	1.4	3	3.5	4	5.1	2	2.3	2	2.4	6	6.4	4	3.8	0	0.0
Environmental Science and Marine Sciences[3]	1	50.0	24	17.3	20	23.3	20	25.3	17	19.8	27	32.1	34	36.2	34	32.1	0	0.0
Atmospheric Science and Meteorology[4]	0	0.0	34	24.5	26	30.2	16	20.3	16	18.6	15	17.9	17	18.1	26	24.5	1	100.0
Non-NOAA fields degree	0	0.0	26	18.7	10	11.6	10	12.7	12	14.0	15	17.9	12	12.8	8	7.6	0	0.0

Field of study	2006		2007		2008		2009		2010		2011		2012		2013		2014	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Nonrecipients																		
NOAA degree[1]	0	0.0	0	0.0	57	78.1	90	76.3	71	84.5	95	79.8	15	75.0	105	79.6	20	62.5
Business Management/Administration	0	0.0	0	0.0	0	0.0	0	0.0	1	1.2	2	1.7	0	0.0	2	1.5	0	0.0
Communication	0	0.0	0	0.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0	1	0.8	1	3.1
Computer and Information Sciences	0	0.0	0	0.0	1	1.4	0	0.0	4	4.8	1	0.8	1	5.0	5	3.8	0	0.0
Education	0	0.0	0	0.0	4	5.5	1	0.9	1	1.2	2	1.7	0	0.0	3	2.3	0	0.0
Engineering	0	0.0	0	0.0	5	6.9	20	17.0	8	9.5	7	5.9	2	10.0	13	9.9	2	6.3
Engineering: Environmental[2]	0	0.0	0	0.0	0	0.0	4	3.4	3	3.6	1	0.8	1	5.0	2	1.5	1	3.1
Engineering: Ocean[2]	0	0.0	0	0.0	0	0.0	1	0.9	1	1.2	0	0.0	0	0.0	2	1.5	0	0.0
Humanities	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.8	1	5.0	2	1.5	1	3.1
Law	0	0.0	0	0.0	0	0.0	1	0.9	3	3.6	0	0.0	0	0.0	0	0.0	0	0.0
Life Sciences	0	0.0	0	0.0	17	23.3	23	19.5	19	22.6	30	25.2	4	20.0	36	27.3	6	18.8
Life Sciences: Environmental Science and Marine Biology[2]	0	0.0	0	0.0	7	9.6	11	9.3	8	9.5	13	10.9	1	5.0	19	14.4	3	9.4
Mathematics	0	0.0	0	0.0	4	5.5	3	2.5	2	2.4	6	5.0	0	0.0	4	3.0	0	0.0
Physical Sciences	0	0.0	0	0.0	29	39.7	47	39.8	44	52.4	55	46.2	9	45.0	54	40.9	12	37.5
Physical Sciences: Atmospheric Science and Meteorology[2]	0	0.0	0	0.0	17	23.3	19	16.1	16	19.1	22	18.5	3	15.0	17	12.9	4	12.5
Physical Sciences: Ocean and Marine Sciences[2]	0	0.0	0	0.0	4	5.5	13	11.0	14	16.7	17	14.3	3	15.0	19	14.4	5	15.6
Psychology	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Social Sciences	0	0.0	0	0.0	3	4.1	5	4.2	0	0.0	3	2.5	0	0.0	5	3.8	1	3.1
Other	0	0.0	0	0.0	0	0.0	5	4.2	4	4.8	3	2.5	2	10.0	6	4.6	2	6.3
Environmental Science and Marine Sciences[3]	0	0.0	0	0.0	11	15.1	25	21.2	24	28.6	27	22.7	5	25.0	39	29.6	9	28.1
Atmospheric Science and Meteorology[4]	0	0.0	0	0.0	17	23.3	19	16.1	16	19.1	22	18.5	3	15.0	17	12.9	4	12.5
Non-NOAA fields degree	0	0.0	0	0.0	16	21.9	28	23.7	13	15.5	24	20.2	5	25.0	27	20.5	12	37.5

[1] Data for individuals with degrees in NOAA fields were categorized into 13 subfields. Individuals may have multiple degrees in more than 1 subfield; the sum of frequencies across the 13 subfields does not always equal to the frequency of individuals with degrees in a NOAA field.

[2] Only majors related to atmospheric science, meteorology, ocean science, and environmental science within the subareas are presented. Other nonrelated majors in the same subarea are not shown.

[3] This category includes individuals who reported degrees in one of the following fields: (1) Engineering: Environmental; (2) Engineering: Ocean; (3) Life Science: Environmental Science and Marine Biology; or (4) Physical Sciences: Oceanic and Marine Sciences.

[4] This category includes individuals who reported degrees in the field of Physical Sciences: Oceanic and Marine Sciences.

Table H.16. Education and Employment Status of Atmospheric Science and Meteorology Degree Holders and Any Degree Holders

Education and employment status	Atmospheric Science and Meteorology degree[4]								Any degree[4]							
	All scholars		HUSP		USP		Pathway		All scholars		HUSP		USP		Pathway	
	n	%	*n*	%	*n*	%	n	%	*n*	%	*n*	%	n	%	*n*	%
Degree type																
Current undergraduates	0	0	0	0	0	0	0	0	0.0	0	0.0	0	0.0	0	0	0.0
Bachelor's only	20	12.9	20	13.3	0	0	37	38.1	170	24.9	159	25.0	9.0	28.1	236	44.4
Bachelor's and enrolled in graduate program	42	27.1	41	27.3	1	33.3	24	24.7	196	28.7	184	28.9	11.0	34.4	144	27.1
Master's only	40	25.8	39	26	1	33.3	21	21.6	139	20.3	128	20.1	7.0	21.9	85	16
Master's and enrolled in another master's program	4	2.6	4	2.7	0	0	2	2.1	24	3.5	21	3.3	3.0	9.4	16	3
Master's and enrolled in doctoral program	29	18.7	28	18.7	0	0	9	9.3	67	9.8	66	10.4	0	0	33	6.2
Doctoral or professional degree	20	12.9	18	12	1	33.3	4	4.1	88	12.9	79	12.4	2.0	6.3	18	3.4
Employment in a NOAA field[1,2]																
No	24	18.2	24	18.8	0	0.0	17	20.7	189	33.1	171	32.2	14	53.8	134	30.4
Yes	108	81.8	104	81.3	2	100.0	65	79.3	382	66.9	360	67.8	12	46.2	307	69.6
Current employment status																
Government[3]	38	24.5	34	22.7	2	66.7	16	16.3	126	18.4	110	17.2	5.0	15.2	80	14.8
Educational institution	56	36.1	56	37.3	0	0.0	22	22.5	236	34.4	226	35.4	8.0	24.2	146	27.0
Private[3]	24	15.5	24	16.0	0	0.0	29	29.6	123	17.9	115	18.0	8.0	24.2	145	26.9
Nonprofit or international organization	2	1.3	2	1.3	0	0.0	4	4.1	33	4.8	30	4.7	2.0	6.1	36	6.7
Other	12	7.7	12	8.0	0	0.0	12	12.2	53	7.7	50	7.8	3.0	9.1	38	7.0
Nonemployed, current undergraduate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nonemployed, not current undergraduate	23	14.8	22	14.7	1	33.3	15	15.3	115	16.8	107	16.8	7.0	21.2	95	17.6

[1] NOAA-related fields refer to the following: communications; computer science; education (excluding education research and administration, pre-elementary teaching, literacy and reading teaching, or "other" types of education degrees); engineering; law; agricultural and natural sciences (excluding horticulture, food science, and "other" natural sciences); biology (excluding biochemistry, biomedical, and "other" biological sciences); environmental health; mathematics; atmospheric science and meteorology; chemistry; geology; ocean and marine sciences; physics; and social sciences (excluding demography and sociology). If respondents selected a NOAA-related broad field but selected no subfield, then they were coded as working in a NOAA-related field.
[2] Excludes nonemployed respondents, either seeking or not seeking employment
[3] Government employment includes non-Federal NOAA partnership programs. Private employment includes self-employed individuals.
[4] Given that they did not yet hold a degree, current undergraduates were excluded from the analyses.
Note: *N*s vary because of survey nonresponse.

Table H.17. Education and Employment Status of Environmental Science and Marine Sciences Degree Holders and Any Degree Holders

Education and employment status	Environmental Science and Marine Sciences degree[4]								Any degree[4]							
	All scholars		HUSP		USP		Pathway		All scholars		HUSP		USP		Pathway	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Degree type																
Current undergraduates	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bachelor's only	56	30.4	54	31.2	2	40.0	65	46.4	170	24.9	159	25.0	9.0	28.1	236	44.4
Bachelor's and enrolled in graduate program	67	36.4	65	37.6	2	40.0	44	31.4	196	28.7	184	28.9	11.0	34.4	144	27.1
Master's only	27	14.7	25	14.5	1	20.0	18	12.9	139	20.3	128	20.1	7.0	21.9	85	16.0
Master's and enrolled in another master's program	3	1.6	3	1.7	0	0.0	6	4.3	24	3.5	21	3.3	3.0	9.4	16	3.0
Master's and enrolled in doctoral program	11	6.0	11	6.4	0	0.0	7	5.0	67	9.8	66	10.4	0	0.0	33	6.2
Doctoral or professional degree	20	10.9	15	8.7	0	0.0	0	0.0	88	12.9	79	12.4	2.0	6.3	18	3.4
Employment in a NOAA field[1,2]																
No	41	27.7	36	26.5	4	66.7	32.0	28.6	189	33.1	171	32.2	14	53.8	134	30.4
Yes	107	72.3	100	73.5	2	33.3	80.0	71.4	382	66.9	360	67.8	12	46.2	307	69.6
Current employment status																
Government[3]	36	19.5	31	17.9	0	0.0	26.0	18.6	126	18.4	110	17.2	5.0	15.2	80	14.8
Educational institution	66	35.7	64	37.0	1	16.7	44.0	31.4	236	34.4	226	35.4	8.0	24.2	146	27.0
Private[3]	23	12.4	21	12.1	2	33.3	25.0	17.9	123	17.9	115	18.0	8.0	24.2	145	26.9
Nonprofit or international organization	8	4.3	7	4.1	1	16.7	13.0	9.3	33	4.8	30	4.7	2.0	6.1	36	6.7
Other	15	8.1	13	7.5	2	33.3	4.0	2.9	53	7.7	50	7.8	3.0	9.1	38	7.0
Nonemployed, current undergraduate	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Nonemployed, not current undergraduate	37	20.0	37	21.4	0	0.0	28	20.0	115	16.8	107	16.8	7.0	21.2	95	17.6

[1] NOAA-related fields refer to the following: communications; computer science; education (excluding education research and administration, pre-elementary teaching, literacy and reading teaching, or "other" types of education degrees); engineering; law; agricultural and natural sciences (excluding horticulture, food science, and "other" natural sciences); biology (excluding biochemistry, biomedical, and "other" biological sciences); environmental health; mathematics; atmospheric sciences and meteorology; chemistry; geology; ocean and marine sciences; physics; and social sciences (excluding demography and sociology). If respondents selected a NOAA-related broad field but selected no subfield, then they were coded as working in a NOAA-related field.

[2] Excludes nonemployed respondents, either seeking or not seeking employment

[3] Government employment includes non-Federal NOAA partnership programs. Private employment includes self-employed individuals.

[4] Given that they did not yet hold a degree, current undergraduates were excluded from the analyses.

Note: *N*s vary because of survey nonresponse.