Return on Investment Study: Nevada Conservation Corps

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Executive Summary

Program Description

Nevada Conservation Corps (NCC) is an environmental service program of the Great Basin Institute dedicated to promoting field research and direct conservation service.

NCC has utilized AmeriCorps support for its conservation work since 1999. NCC supports Nevada's communities and public lands by deploying forestry teams to mitigate fire threats, reduce the spread of invasive species, and restore and re-designate trails. In addition, monitoring and assessment teams capture critical data on the condition of forest and rangeland health.

AmeriCorps, the federal agency for volunteerism and national service, provides opportunities for Americans to serve their country domestically, address the nation's most pressing challenges, improve lives and communities, and strengthen civic engagement. Each year, the agency invests more than $800 million in grants for local nonprofit, community, tribal, and state organizations; places more than 250,000 AmeriCorps members and AmeriCorps Seniors volunteers in intensive service roles; and empowers millions more to serve as long-term, short-term, or one-time volunteers. Learn more at AmeriCorps.gov.

To better understand the impact of the program in relation to costs, AmeriCorps commissioned a return on investment (ROI) analysis by ICF, an independent research firm. ROI analyses of national service programs estimate the monetary value of benefits that a program generates per dollar invested. Due to the impacts of the COVID-19 pandemic, the most recent regular service year was used; in this case it was the 2018–2019[1] program year.

Benefits resulting from this program are expected to accrue over an extended period. For that reason, ROI estimates may be low or even negative in the short-term, but positive in the medium- and long-terms.

Overview of Benefits and Costs

To calculate the ROI, the program benefits were identified, quantified, and compared to the program's costs. This ROI study advances novel strategies for monetizing outcomes associated with preserved ecosystem services, for reduced carbon dioxide equivalents[2] emissions from reduced wildfire acres burned, and for discounting ecosystem benefits over regrowth periods. Benefits of NCC include:

[1] The 2018–2019 program year spans September 2018–August 2019.

[2] Carbon dioxide equivalents refers to the total greenhouse gas warming impact from varied sources of emissions represented as an estimate of the comparable tonnage of carbon dioxide necessary to generate the same greenhouse gas warming effect. For example, 1 ton of methane has a carbon dioxide equivalent value over 100 years of 21 tons of carbon dioxide. (Schimel et al., 1995).

- **Benefits to various stakeholders of reduced wildfire damage, environmental improvements, and greater trail access.** NCC uses AmeriCorps members to perform fuel reduction treatments[3] on at-risk sites to reduce severity of wildfires, remove invasive species to increase benefits to society from ecosystems, and build and maintain trails that provide health and recreational benefits. The societal benefits of NCC can be attributed to three key functions of the organization: wildfire mitigation, habitat improvements, and maintenance of trail systems.
- **Additional earnings by AmeriCorps members.** Serving in AmeriCorps leads to increased wages and reduced unemployment post-national service through skill acquisition, as well as increased educational attainment post-service.
- **Living allowances, stipends, and education awards.** AmeriCorps members receive living allowances and stipends during their national service and receive a Segal AmeriCorps Education Award after successful completion.
- **Increased tax revenue for government**. Federal, state, and local governments receive more income tax revenue from increased AmeriCorps member earnings post-service, as well as additional sales tax revenue related to those earnings. Federal and state governments also realize tax revenue from the taxable living allowances, stipends, and education awards provided to AmeriCorps members.
- **Reduced lifetime spending on corrections, public assistance, and social insurance**. Because of the increase in secondary and postsecondary educational attainment for AmeriCorps members, federal and state governments spend less on these items.

In addition, federal government funding of NCC serves as a catalyst for other funding, specifically that from state and local governments. This additional funding allows NCC to operate at a larger scale than otherwise would have been possible under the federal funding alone. Though it may not impact the ROI, because it is a per-unit metric, match funding leads to greater investment in NCC and thus to greater impact.

The analysis uses a combination of estimates from NCC and peer-reviewed literature to quantify the reduction of burned acres from wildfires. The peer-reviewed literature and NCC estimates are used to:

- Calculate values of ecosystem benefits that are preserved. This is accomplished by using literature estimates for ecosystem services per acre based on ecosystem type and the characteristics of the treated acres.
- Estimate how benefits decline over time as flammable material regrows following treatment. This is accomplished using literature estimates on the regrowth of plants following wildfire reduction treatments.

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[3] NCC's fuel reduction treatments include mechanical thinning where potential fuel for wildfires is removed to increase ecosystems' resilience to wildfires.

There are also a few limitations to the analysis that should be noted. Following some wildfires, FEMA (and private) funds are spent to aid in recovery efforts. NCC's efforts on wildfire reduction treatments could result in the mitigation of those severe wildfires and lead to subsequent saving of those funds. However, the current literature lacks the linkages to establish causality between treated acres and the saving of federal (and private) funds. We acknowledge that there may be some additional savings as a result of NCC's activities that are not quantified in this model.

Lastly, due to the regrowth of plant matter over time following fuel reduction treatments, carbon sequestration will occur. Future work on the wholistic benefits of these treatments should examine the potential for additional reductions over time of ecosystem benefits due to carbon sequestration from regrowth.

Program costs for the NCC program totaled $1,921,647 and came from the following sources:

- Federal government (AmeriCorps)
- Federal government (Non-AmeriCorps)
- State and local government
- Tribal governments
- Private
- Other

ROI Results

Table ES-1 shows the ROI results. Each row represents a different ROI calculation depending on which benefits are considered (all benefits or only benefits to the federal government) and which funding is considered (only federal funding or all funding).

The analysis used three different scenarios to estimate benefits under different assumptions. Specifically, the study assumed that increased earnings attributable to the programs last for 1 year (short-term scenario), 15 years (medium-term scenario), or 30 years (long-term scenario).

For the portion of the benefits analysis that measured ecosystem benefits, this study used low, average, and high estimates of those benefits based on the literature. Doing so allowed for the uncertainty involved in monetizing ecosystem benefits.

The ROIs are presented as dollars returned for every dollar of investment.

Table ES-1. ROI Estimates

ROI calculation	ROI scenario		
	Short-term	Medium-term	Long-term
Total benefits per federal dollar*			
With low ecosystem benefits	$1.17	$8.35	$11.48
With average ecosystem benefits	$2.58	$24.02	$32.02
With high ecosystem benefits	$6.57	$68.46	$90.28
Total benefits per funder dollar*			
With low ecosystem benefits	$0.98	$7.08	$9.75
With average ecosystem benefits	$2.20	$20.66	$27.55
With high ecosystem benefits	$5.66	$59.17	$78.04
Federal government benefits per federal dollar	**$0.04**	**$0.17**	**$0.23**

*These ROI estimates are provided based on low, average, and high estimates of ecosystem benefits to society.

The program produces strong returns for the medium- and long-term scenarios when benefits to AmeriCorps members, program participants, and state/local governments are included. This is indicated by the results of the *total benefits per federal dollar* and the *total benefits per funder dollar* ROI calculations for these two scenarios. In the short-term scenario—which only includes benefits for 1 year post-program—the ROI of $0.98 for the *total benefits per funder dollar* calculation with the low set of ecosystem benefit estimates is just below the break-even point on funding invested. All other total benefit scenarios and ecosystem benefit levels show positive returns.

The *federal government benefits per federal dollar* calculations estimate losses for all three scenarios. NCC is a program that is intended primarily to generate benefits to society, rather than benefits to the federal government, so these results are consistent with the design of NCC. In addition, existing data and literature on the causal relationships between acres burning and the expense of federal funds are lacking and do not make it possible to attribute post-wildfire recovery savings to the federal government, but to the extent that a wildfire that leads to FEMA assistance is avoided, there would be added savings from reduced government expenditures by FEMA.[4] Including FEMA expenditure savings resulting from a reduction in wildfires would lead to a higher ROI for the federal government than this analysis estimates.

[4] The potential for these federal savings would also extend to private funds (from private insurance companies or individuals), and the same limitations apply to those savings.

The magnitude of the positive ROI estimates in the medium- and long-term scenarios is driven by the following factors:

- **Reduction in wildfire-related costs.** Societal benefits from reduced severity of wildfires accrue but diminish over time as vegetation regrows and generates more potential fuel.
- **Increased benefits from ecosystems from reduced invasive species.** Societal benefits accrue but diminish over time as invasive species return.
- **Benefits from trail maintenance and creation.** Societal benefits from access and use of trails accrue over time but diminish as trails naturally deteriorate.
- **Educational attainment outcomes of AmeriCorps members**. After serving in the AmeriCorps program, AmeriCorps members receive an education award, which is used by a portion of members to help pay for postsecondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional earnings for AmeriCorps members.
- **Employment outcomes of AmeriCorps members.** Past studies establish that AmeriCorps members experience increased employment and increased earnings post-service.

Introduction

AmeriCorps contracted with ICF Incorporated, LLC (hereafter ICF) to research and quantify the return on investment (ROI) of several programs that rely on national service—specifically AmeriCorps—as a major resource to sustain operations. ROI analyses measure the performance of programs and build the base of evidence for future resource allocation decisions. ROI study results demonstrate the value of AmeriCorps programming to relevant stakeholders.

This project began with a comprehensive literature review and preliminary assessments of whether ROI analyses were feasible for five national service programs. These feasibility studies included thorough reviews of these programs' recent evaluations, detailed logic models, proposed ROI analysis methodologies for each program, and a scorecard mechanism that determined the viability of conducting an ROI analysis for each selected program.

Upon completion of five feasibility studies, AmeriCorps selected four programs to be the subjects of ROI studies for fiscal year 2022: Breakthrough Central Texas's Austin program, Nevada Conservation Corps (NCC), SBP, and Washington State Department of Veterans Affairs Vet Corps. This ROI study measures the benefits of NCC's activities against costs.

This study is organized into five sections:

- ***Program Description*** describes the program's design, activities, and objectives, along with the role that national service (specifically AmeriCorps) plays in its operation. This section also provides a brief history of past evaluations, outlines the factors that made this program a strong selection for an ROI study, underscores the population this program serves, and identifies a set of ROI estimates for programs that are similar to NCC.
- ***ROI Methodology*** outlines how this analysis used various data sources to monetize benefits derived from NCC activities, describes its associated program costs, and explains how opportunity costs were calculated.
- ***Benefits, Forgone Benefits (Opportunity Cost), Program Costs, and ROI Results*** provides a detailed description of the program benefits, forgone benefits (opportunity cost), and program costs that are inputs into the ROI analyses and presents the results of the three ROI calculations across different assumptions.
- ***Recommendations for Further Research*** explores ways AmeriCorps and others could further build the evidence base for this program and similar programs, including how to address limitations of this study.
- ***Conclusion*** summarizes key points from the ROI study overall.

Program Description

The Great Basin Institute (GBI) is an interdisciplinary field studies organization that promotes environmental research, education, and conservation throughout the West. NCC, a program of GBI, is an environmental service program dedicated to promoting field research and direct conservation service. NCC has utilized AmeriCorps support for its conservation work since 1999. AmeriCorps funds for NCC are awarded through Nevada Volunteers, the state service commission for allocating AmeriCorps funds to meet needs throughout the state. NCC supports Nevada's communities and public lands by deploying forestry teams to mitigate fire threats, reduce the spread of invasive species, and restore and re-designate trails.

NCC's program activities include crew-based services that reduce wildland fire threat through fuel reduction. NCC members treat and abate noxious weeds and perform tasks such as post-fire re-seeding and native plant reintroduction. Corps members also perform trail management and creation to provide recreational value to the public. To support agency decision-making, NCC's assessment, inventory, and monitoring teams evaluate and characterize forest and range health conditions and provide data to determine restoration efficacy.

Due to the impacts of the COVID-19 pandemic, the most recent regular service year was used; in this case it was the 2018–2019[5] program year.

Population Served

From 1999 to 2019, NCC successfully placed 1,934 AmeriCorps members in the field, serving some 453,268 volunteer hours. In addition, NCC's service-learning efforts have mobilized approximately 10,963 students in one-time or ongoing volunteer projects. GBI's International Conservation Volunteer Exchange program has led 436 international volunteers in 51,230 hours of environmental service, providing a global exchange of Nevada volunteers and volunteers worldwide. Currently, more than 320 NCC volunteers are engaged in environmental and community service across Nevada. Table 1 shows NCC AmeriCorps member demographic data for September 2018 through August 2019, the program year studied in this ROI analysis.[6]

Table 1. NCC AmeriCorps Member Demographics

Demographic category	Percentage of NCC AmeriCorps members
Gender	
Male	54.3%
Female	43.3%
Gender queer	2.4%

[5] The 2018–2019 program year spans September 2018–August 2019.

[6] Scott Scherbinski, NCC contact, personal communication, February 10, 2022. Hereafter, all instances of NCC referenced as a data source were retrieved from this communication.

Demographic category	Percentage of NCC AmeriCorps members
Race/Ethnicity	
White	78.7%
Hispanic	9.1%
Asian	5.5%
Two or more races	3.7%
Other	3.0%
Age	
20–24	62.4%
25–29	26.1%
30 and older	11.4.%

Note: Numbers may not sum due to rounding.

NCC Evaluation History

This section provides an overview of NCC's evaluation history. NCC's program evaluations do not quantify per-acre reductions in burn likelihoods for treated areas, ecosystem benefits from activities, or benefits to society from trail maintenance and creation. Rather, this analysis uses administrative data from NCC and other sources to estimate those and other benefits.

Great Basin Institute – Nevada Conservation Corps – Evaluation Report 2019-2020[7]

This evaluation studied the efficacy of the NCC fuel reduction treatments to reduce the fire regime condition class (FRCC) at 210 sites over the course of 2019 and 2020. Fuel reduction treatments were characterized as silvicultural treatments aimed at increasing within-stand heterogeneity (Reinhardt et al., 2008), thereby increasing the resilience to potential disturbance of the stand by prioritizing a diversity of species, sizes, and age classes (Stephens et al., 2018). The study evaluated mean FRCC rating at 35 treatment and control sites during each of three sampling periods (once during 2019 and twice during 2020).

To evaluate the effectiveness of the treatments, treatment sites were matched to a comparison group and FRCC values were measured before and after the treatment period using the Brown's Planar Intercept Method (Center for Program Evaluation, 2020). Comparison sites were selected based on their slope aspect, plant species, and plant density. To normalize the measured values and increase comparability between

[7] Center for Program Evaluation. (2020). *Great Basin Institute – Nevada Conservation Corps – Evaluation Report 2019 – 2020*. Reno, NV. https://americorps.gov/sites/default/files/document/GreatBasinInstitute.21ES231073.Evidencedoc3_EDITED_508.pdf

sites, the mean FRCC value for pre- and post-treatment was adjusted to account for the pre-treatment FRCC during the statistical analysis.

The study found that, due to fuel reduction efforts, FRCC ratings on treated plots decreased compared to the untreated sites (Table 2). The result of the ANCOVA statistical test was that the treatment sites had a mean difference in FRCC of -0.386, which was statistically significant with a p-value of less than 0.001.

Table 2. Adjusted and Unadjusted Intervention Means and Variability for Post-Intervention FRCC With Pre-Intervention FRCC as a Covariate

	Unadjusted			Adjusted	
	N	*M*	*SD*	*M*	*SE*
Treatment	105	2.10	.31	2.06	.03
Comparison	105	2.39	.55	2.44	.03

Note: N = number of participants, M = mean, SD = standard deviation, SE = standard error

Selection of NCC for the AmeriCorps ROI Project

ICF recommended making NCC's program the subject of an ROI study based on a recent evaluation that documented outcomes related to wildfires and on NCC administrative data and conservation literature that could be used to monetize program impacts. Notably, this ROI study pioneers strategies for monetizing outcomes associated with reduced carbon dioxide equivalents emissions and for discounting ecosystem benefits over regrowth periods.

Comparable ROI Estimates

ROI studies of programs that offer similar services provide context for NCC ROI estimates. Table 3 summarizes information across studies.

Mason et al. (2006) estimated the ROI of mitigation efforts in moderate-risk[8] areas to be \$1.04 and high-risk[9] areas to be \$2.42 for every dollar spent. The study estimated the ROI of fuel reduction treatments based on reduced firefighting costs, fatalities avoided, facility losses avoided, and reduced loss of timber resources.

Jones (2021) analyzed the costs and benefits of wildfire mitigation treatments related to preserving municipal watersheds and the societal benefits they provide. These treatments were classified as general canopy treatments (in which potential fuels were mechanically thinned and clear cut)[10] and surface fuel treatments (such as prescribed

[8] Moderate-risk areas are defined in Mason et al. (2006) as areas where a wildfire is expected to burn in the next 60 years.

[9] High-risk areas are defined in Mason et al. (2006) as areas where a wildfire is expected to burn in the next 30 years.

[10] Canopy treatments of mechanical thinning and clear cutting are treatments where potential wildfire fuel is removed from the area by cutting off branches or cutting down trees.

burns, lop and scatter, and mastication).[11] To assess the benefits of the program, Jones modeled wildfire behavior pre- and post-treatment. The analysis found that every dollar invested yielded between $0.67 and $3.88 in benefits. The analysis estimated benefits that included reduced property loss, reduced recovery and rehabilitation costs, reduced suppression costs, increased recreation, and conservation of endangered species.

A number of additional studies measure the ROI for programs that focus on reducing invasive species and trail maintenance and creation efforts:

- Zavaleta (2000) estimated the ecosystem services[12] lost as a result of invasive species presence. The study estimated the ROI of protecting these ecosystem services to be between $1.36 and $2.12.
- The Watershed Company (2015) conducted an effectiveness study on Washington Conservation Corps, an AmeriCorps-supported program similar to NCC. Their findings suggested that the treatments increased native tree and shrub presence by 9.2 percent and decreased noxious weed presence by 14.2 percent after 1 year.
- ICF (2021) conducted an ROI study of Washington Conservation Corps, finding an ROI of $1.80 (short-term) to $29.13 (long-term) for every federal dollar spent and an ROI of $0.52 (short-term) to $8.36 (long-term) for every total funder dollar spent.

Other studies measure the social benefits derived from the maintenance of trail systems:

- Wang et al. (2005) conducted a cost–benefit analysis of trail use in Nebraska and its relationship with health costs associated with inactivity. Per-capita annual costs of trail use included trail maintenance and creation, equipment, and travel, while per-capita annual direct benefit examined the medical benefit of using the trails. The study found that every dollar of investment in trails for physical activity led to $2.94 in direct medical benefit.
- Oh and Hammitt (2010) derived other use benefits of trails at a state park in South Carolina. Benefits were calculated based on the community's willingness to pay for park services using the double-bounded contingent valuation method. The study found that the economic benefit characterized by willingness to pay for entry to the recreation area was $4.76 per visit. Oh and Hammitt

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[11] Surface treatments of prescribed burns, lop and scatter, and mastication are methods whereby potential wildfire fuel at ground level is removed from the area by burning it, lowering density of fuel loads, and reducing fuel to small pieces, thereby increasing the health of remaining trees.

[12] Ecosystems are dynamic environments housing plants, animals, microorganisms, and the nonliving interacting as a single unit. Services rendered naturally by an ecosystem can benefit humans who ultimately value these services. Some ecosystem service values are directly tied to market activity, such as extractive activities (e.g., timber production, mining, food, etc.). Other values may be indirectly, or not at all, tied to market activity. Values of goods and services that fall outside of market activity are called *non-market values*. See de Groot, Fisher, and Christie (2010).

compared the estimated value of visitor benefits to park costs, estimating the ROI for trail maintenance to be between $1.15 and $1.72.

Table 3. Relevant ROI, Willingness to Pay, and Bridge Studies and Their Findings

Study	Forest treatments/ study area	Benefits/cost savings evaluated	Net benefits/cost savings per acre	ROI estimate*
Mason et al. (2006)	Wildfire fuel reduction through forest thinning	Reductions in firefighting, fatalities, facility losses, loss of timber; willingness to pay for fire risk reduction	Benefits: $1,401/acre (high risk), $606/acre (moderate risk), Costs: $580/acre	$2.42 in benefits per unit of investment in high-risk forest $1.04 in benefits per unit of investment in moderate-risk forest
Jones et al. (2021)	General canopy treatments (e.g., mechanical thinning) and surface fuel treatments (e.g., prescribed fire)	Source water protection; reduced property loss, recovery and rehabilitation costs, and fire suppression costs; increased recreation and endangered species values	Benefits: $670–$3,880 per acre Costs: $1,000 per acre	$0.67 to $3.88 in benefits per unit of investment
Zavaleta (2000)	Ecosystem services lost as a result of noxious weed presence	Avoided loss of ecosystem services	Benefits: $4,317–$6,728 per acre Costs: $3,174 per acre	$1.36 to $2.12 in benefits per unit of investment
The Watershed Company (2015)	Efficacy of restoration efforts to restore native plants and remove noxious weeds	9.2% increase in native vegetation and 14.2% decrease of noxious weeds following treatment	N/A	N/A

Study	Forest treatments/ study area	Benefits/cost savings evaluated	Net benefits/cost savings per acre	ROI estimate*
ICF (2021)	Restoring native plants and removing noxious weeds	Increased ecosystem services; AmeriCorps member living allowances and education awards, additional earnings from reduced unemployment, and increased educational attainment; reduced spending on corrections, public assistance, and social insurance	$8.7 million to over $505 million	$1.80 to $8.84 in benefits per funder dollar
Wang et al. (2005)	Health benefits of trails	Direct medical benefit of trails	$2.94 of health benefit for $1 invested	$2.94 in benefits per unit of investment
Oh and Hammitt (2010)	Recreational value of trails	Willingness to pay for recreational use of trails	$4.76 per visit	N/A

*The ROI estimate was not complete in each analysis, but rather done by the team using the ROI formula: ROI = total net benefits / total net costs.

ROI Methodology

The methodology for estimating NCC's ROI study consisted of the following components:

1. **Measuring and monetizing program benefits**. This included using program data provided by NCC, publicly available data, and other third-party sources to determine the benefits to NCC AmeriCorps members; federal, state, and local governments; and society.
2. **Estimating forgone benefits (opportunity costs).** This ROI analysis estimated two types of forgone benefits. The first was the professional opportunity cost to NCC AmeriCorps members for their period of national service, during which they could have earned more pay by doing other work. The second was the

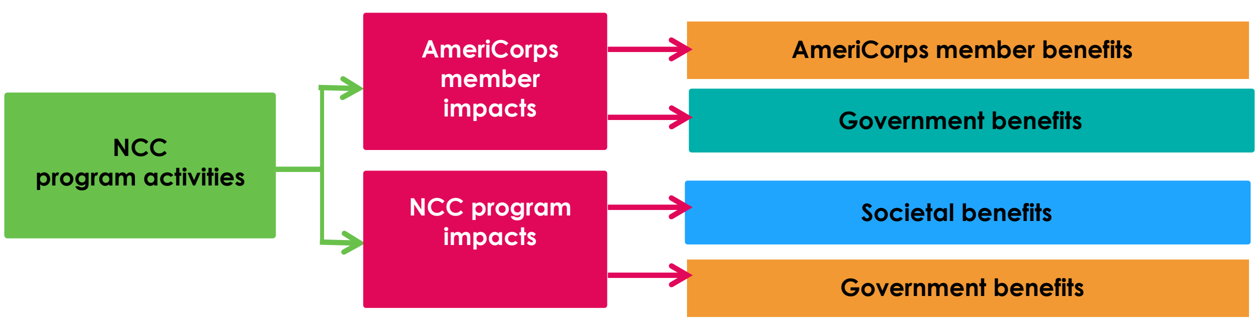
investment opportunity cost for NCC AmeriCorps program funding that could have been used for other purposes.

3. **Assessing program costs.** NCC provided program costs for the program year of September 2018–August 2019. NCC costs for the 2018–2019 program year include operating costs, AmeriCorps member expenses, non-AmeriCorps member expenses, and other indirect costs. AmeriCorps member expenses included the living allowance amounts received during service.

4. **Calculating the ROI.** The ROI analysis includes three ROI calculations, each assessed under three scenarios representing different assumptions about the persistence of program outcomes:
   - Total benefits per federal dollar
   - Total benefits per funder dollar[13]
   - Federal government benefits per federal dollar

This analytical framework includes only those benefits that could be reasonably monetized given the available data and that likely would not have occurred without NCC activities. Figure 1 shows how NCC program activities can result in benefits to NCC AmeriCorps members; federal, state, and local governments; and society.

Figure 1. Benefits Among Stakeholder Groups From NCC



Available data establish that NCC AmeriCorps members enjoy earnings impacts as a result of serving with NCC. However, the data do not establish the duration of those benefits. To address a range of possible durations for those benefits, the analysis includes three scenarios:[14]

[13] The different funder groups whose investment is in this calculation include the federal government (i.e., AmeriCorps) and match funding from state and local governments.

[14] These three scenarios consider varying durations of how long increased employment and earnings benefits last for NCC AmeriCorps members. They also consider varying durations for lifetime benefits that stem from NCC. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from NCC AmeriCorps members' higher educational attainment post-service. The analysis estimates lifetime benefits differently in the three scenarios. Specifically, the net present value of the entire lifetime benefit is realized for the long-term scenario, half of the net present value of the lifetime benefit is realized for the medium-term scenario, and no lifetime benefit amount is realized for the short-term scenario.

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that earnings impacts are limited to a single year after program exit. This scenario also assumes no lifetime benefits are realized.
- **Medium-term.** This scenario assumes a longer duration of earnings impacts. The assumption is that earnings impacts last 15 years. A 3 percent discount rate is applied each year to represent net present value in 2020 dollars.[15] This scenario also assumes only half of the net present value of lifetime benefits is realized.
- **Long-term.** This scenario assumes sustained earnings impacts throughout NCC AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A 3 percent discount rate is applied each year to represent net present value in 2020 dollars. This scenario also assumes the entire net present value of lifetime benefits is realized.

The long-term scenario (i.e., 30 years of sustained employment and earnings benefits) represents roughly a lifetime of working years for a given person while the short-term scenario assumes benefits for only the year after program participation or service is completed. The medium-term scenario (i.e., 15 years of sustained employment and earnings benefits) represents the midpoint between these two scenarios.

Monetizing Program Benefits, Forgone Benefits (Opportunity Costs), and Program Costs

This analysis monetized an array of benefits and included NCC program costs and expected opportunity costs—all in 2020 dollars—to assess the ROI of NCC. Additional details on the methodology employed and the calculations used for this analysis are in Appendix B.

Program Benefits

Outcomes of NCC result in monetizable benefits to NCC AmeriCorps members; federal, state, and local governments; and society. Table 4 summarizes these benefits and data sources by stakeholder group.

[15] The Office of Management and Budget (1992) defines a discount rate as, "The interest rate used in calculating the present value of expected yearly benefits and costs" (p. 18). Regarding the 3 percent discount rate, see Office of Management and Budget (2003).

Table 4. Benefits Realized From NCC by Stakeholder Group

Stakeholder group	Benefits
NCC AmeriCorps members	• Additional earnings from reduced unemployment • Post-tax living allowances
Federal, state, and local governments	• Tax revenue from increased earnings by NCC AmeriCorps members post-program and sales tax revenue from the induced increased economic activity • Tax revenue from living allowances • Reduced lifetime spending on corrections, public assistance, and social insurance from increased educational attainment by NCC AmeriCorps members • There are likely other benefits to FEMA/HUD from reduced spending on wildfire disaster relief funding; however, limitations exist to incorporating those benefits currently.
Society	• Wildfire reduction benefits, including: 1) ecosystem services preserved, 2) reduced human health impacts, and 3) reduced carbon dioxide emissions • Increased benefits from ecosystem services due to unburned areas as well as ecosystem restoration activities • Increased health outcomes from reduced particulate matter and access to trails • There may be other benefits to private insurers/individuals from reduced spending on recovery following wildfire disasters; however, limitations exist to incorporating those benefits currently.

ICF conducted a multi-step methodology for estimating the ROI for NCC, beginning with estimation of program benefits, forgone benefits (opportunity costs), and program costs. Program benefits include benefits to society, as well as benefits to AmeriCorps members and federal, state, and local governments. Due to the COVID-19 pandemic, NCC experienced disruptions to their program activities in the most recent program years. Therefore, ICF used 2019 data to complete the ROI calculation.

Benefits to AmeriCorps Members

NCC AmeriCorps members benefit from increased likelihood of employment post-national service and from living allowances.[16]

Post-Tax Living Allowances (Benefits to NCC AmeriCorps Members)

NCC AmeriCorps members receive living allowances during their national service. The living allowances are taxable income and thus result in increased government revenue.[17] The post-tax living allowance was included in the ROI analysis as a direct one-time benefit to NCC AmeriCorps members.

Additional Earnings From Reduced Unemployment (Benefit to NCC AmeriCorps Members)

Evaluations have shown that serving in AmeriCorps fosters higher skill acquisition, increased educational attainment, and higher income from increased employment post-national service.[18] Freidman et al. (2016) found that unemployment among AmeriCorps members 6 months after their period of national service was 5 percentage points lower compared to 6 months before serving.[19] To monetize this decrease in unemployment, the analysis first collected data on the demographic distribution of NCC AmeriCorps members who served during the most recent program year in terms of race/ethnicity, gender, and age pre-service using data provided by NCC. The analysis then proceeded to:

1. Estimate NCC AmeriCorps members' per-person average annual earnings (weighted by the above demographics) using data from the Current Population Survey's Annual Social and Economic (ASEC) Supplement for 2020 (U.S. Census Bureau, 2020)
2. Multiply the 5-percentage-point reduction in unemployment from Freidman et al. (2016) by the number of NCC AmeriCorps members who served during the most recent program year to estimate the number of *additional* NCC AmeriCorps members employed post-service
3. Multiply the demographically weighted per-person average annual earnings by the number of additional NCC AmeriCorps members employed to estimate the total increased earnings attributable to national service

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[16] Relevant studies include Markovitz et al., 2008; Spera et al., 2013; Friedman et al., 2016; Zeidenberg et al, 2016.

[17] The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. https://americorps.gov/members-volunteers/segal-americorps-education-award/find-out-more

[18] Relevant studies include: Markovitz et al., 2008; Spera et al., 2013; Friedman et al., 2016; Zeidenberg et al, 2016.

[19] See page 56 of Friedman et al. (2016).

The earnings metrics for NCC AmeriCorps members were applied and discounted based on the short-term, medium-term, and long-term scenarios to represent net present 2020 dollars. The post-tax NCC AmeriCorps members' projected earnings represent the additional income earned by AmeriCorps members attributable to serving with the NCC program.

Benefits to Government

The benefits to NCC AmeriCorps members result in benefits to the various levels of government.

Tax Revenue From Increased Earnings by NCC AmeriCorps Members

State, local, and federal governments benefit from increased earnings by NCC AmeriCorps members. Those benefits include:

- **Income tax revenue from increased earnings by NCC AmeriCorps members post-service.** Federal income taxes, state income taxes, Medicare taxes, and Social Security taxes were estimated for the additional pre-tax earnings of NCC AmeriCorps members based on 2019 rates. For both federal and state income taxes, the analysis estimated proportional tax rates representing the share of earnings paid in taxes.

  To estimate proportional tax rates that reflect federal- and state-level progressive tax brackets and standard deductions, the amount of total taxes paid was divided by the pre-tax earnings per NCC AmeriCorps member. For the state income tax rate, the analysis weighted individual state-level rates by their respective state populations to estimate a weighted national tax rate to apply program-wide. A weighted national tax rate was used because NCC AmeriCorps members may disperse to various locations nationwide following their service terms and continue to migrate over the course of their working years.

- **Sales tax revenue from the increased economic activity that results from increased earnings by NCC AmeriCorps members post-service**. To estimate the additional sales tax revenue generated due to the additional post-tax earnings of NCC AmeriCorps members, the combined state and average local sales tax rate for the United States—weighted by states' populations—was calculated. This analysis applied that rate to the estimated taxable expenditures of NCC AmeriCorps members based on their post-service pre-tax earnings using Consumer Expenditure Survey data (U.S. Bureau of Labor Statistics, 2021).[20] The resulting product was then applied to the share of post-tax earnings attributable to serving with NCC to estimate state and local government sales tax revenue.

[20] To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CE) Table 1203 was used from the U.S. Bureau of Labor Statistics (2021). This table lists the annual expenditure means by pre-tax income tax brackets. Thus, the pre-tax earnings of NCC AmeriCorps members were used instead of their post-tax earnings to calculate this metric. Please visit this site for more details: https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income

Tax Revenue From Living Allowances Received by NCC AmeriCorps Members

The living allowance provided to NCC AmeriCorps members during their service term is taxable income. This analysis applied a proportional federal income tax rate as well as Medicare and Social Security tax rates to the pre-tax living allowance amount received by NCC AmeriCorps members for the most recent program year. The analysis also applied a sales tax rate to the estimated taxable expenditures of NCC AmeriCorps members based on their post-tax living allowance amount to estimate additional state and local government revenue.

Benefits to Society

The societal benefits of NCC can be attributed to three key functions of the organization: wildfire mitigation, habitat improvements, and maintenance of trail systems.

Wildfire Reduction Benefits Attributable to NCC

Evaluations and peer-reviewed literature show that fuel reduction treatments like those conducted by NCC reduce the likelihood of an area burning by 7 percent (Cochrane et al., 2012; Center for Program Evaluation, 2020). To monetize this reduced likelihood of burning, the analysis first determined the number and composition of acres treated based on NCC data.

The analysis estimated the number of acres prevented from burning each year using the number of acres treated by NCC and multiplying them by the estimates of burn reduction from Cochrane et al. (2012). The analysis then calculated societal benefits related to those preserved acres using various other literature that establishes ecosystem services values, avoided health damages, and avoided carbon dioxide equivalents emission costs from wildfires on a per acre basis:

1. **Ecosystem services preserved through fuel reduction treatments.** The Rim Fire report (Batker et al., 2013) establishes a range of ecosystem services that are lost from each acre burned during a wildfire, which range in aggregate value from $392.76 to $2,890.25. To reflect that burned acres regrow following wildfires, the analysis reduced ecosystem service benefits incrementally with the estimated amount of regrowth (Bartels et al., 2016). The analysis assumes that the value of this benefit decreases by 84 percent by the end of the study period (roughly 1.2 percent per year for the first 10 years and roughly 3.7 percent per year thereafter).[21]
2. **Human health benefits from reduced air particulates from smoke.** Moeltner et al. (2013) estimated that the health impacts from wildfires range from $51 per acre to $708 per acre based on location and severity of the burn. This analysis uses their estimate of $467 per acre for zone 3 based on the similar geographic

[21] Bartels et al. (2016) found that areas burned have 10 percent regrowth by year 10 and 84 percent regrowth by year 30. This analysis used constant values of roughly 1.2 percent per year for the first 10 years and roughly 3.7 percent per year thereafter to reach those regrowth values in years 10 and 30. This method was applied to all three wildfire reduction benefits outlined in this section.

location to NCC's activities. To reflect that fuel reduction treatment effectiveness decreases over time as fuel accumulates naturally, the analysis reduced health benefits with the estimated amount of regrowth (Bartels et al., 2016). The analysis assumes that the value of this benefit decreases by 84 percent by the end of the study period (roughly 1.2 percent per year for the first 10 years and roughly 3.7 percent per year thereafter).

3. **Benefits from reduced carbon dioxide equivalents emissions**. Carbon dioxide equivalents emissions result in costs to society measured by the social cost of carbon of $47.76 in 2020 dollars (Interagency Working Group, 2013), which estimates the value of lost benefits to global society from the emission of 1 ton of carbon dioxide equivalents. (These lost benefits include impacts to agricultural productivity, human health, property damage from flood risk, and ecosystem services due to climate change.) Total carbon dioxide equivalents emissions were estimated from a range of values based on varying assumptions of the ground cover and ecosystem type, from 0.023 tons of carbon per acre burned (Guo et al., 2019) to 1.75 tons of carbon per acre burned (Arora and Melton, 2018). For example, a forest has significant potential emissions and a desert less potential emissions. Using a set of low, average, and high estimates of carbon dioxide emissions per acre allows this analysis to incorporate uncertainty about the specific mix of land types treated by NCC. To reflect that the fuel reduction treatment effectiveness decreases over time as fuel accumulates naturally, the analysis reduced benefits from avoided carbon dioxide equivalents emissions with the estimated amount of regrowth (Bartels et al., 2016). The analysis assumes that the value of this benefit decreases by 84 percent by the end of the study period (roughly 1.2 percent per year for the first 10 years and roughly 3.7 percent per year thereafter).

Table 5 presents the discounted benefits of ecosystem services to society over the three scenarios and three environmental impact levels due to wildfire reduction treatments during the 2018–2019 program year.

Table 5. Value of Ecosystem Services Preserved Through Fuel Reduction Treatments (2020$)

Value of ecosystem services	Short-term	Medium-term	Long-term
Low	$79,884	$694,234	$709,110
Average	$323,955	$2,815,328	$2,875,653
High	$587,854	$5,108,743	$5,218,211

Table 6 presents the discounted health benefits to society over the three scenarios due to wildfire reduction treatments during the 2018–2019 program year.

Table 6. Value of Human Health Benefits From Reduced Air Particulates From Smoke (2020$)

Value of health benefits	Short-term	Medium-term	Long-term
All impact levels*	$94,984	$825,459	$843,147

*This benefit is estimated based on a single value per acre, rather than low, average, and high per-acre impact levels.

Table 7 presents the discounted benefits from reduced carbon dioxide equivalents emissions over the three scenarios and three potential carbon dioxide equivalent emission levels due to wildfire reduction treatments during the 2018–2019 program year.

Table 7. Value of Benefits From Reduced Carbon Dioxide Equivalents Emissions (2020$)

Value of emission reduction benefits	Short-term	Medium-term	Long-term
Low*	$222	$1,933	$1,975
Average*	$8,611	$74,834	$76,437
High*	$17,000	$147,734	$150,900

*These impact levels represent low, average, and high estimates of the amount of carbon released per acre from wildfires.

Habitat Improvement Benefits Attributable to NCC

Restoration of habitats, which reduces invasive species presence and increases native species presence, increases ecosystem services to society (Zavaleta, 2000; The Watershed Company, 2015). To monetize the increase in ecosystem services due to NCC programming, the analysis first determined the number and composition of acres restored based on NCC-provided data. The analysis then proceeded to:

1. Estimate the value per acre of various ecosystem types by including varying ranges of ecosystem services in each of the low, average, and high estimates (ESSRTI, 2021)
2. Multiply the estimated value per acre by the NCC-provided ecosystem acres treated
3. Discount the stream of benefits based on regrowth estimates (Bartels et al., 2016). The cumulative decrease is 84 percent by the end of the study period (roughly 1.2 percent per year for the first 10 years and roughly 3.7 percent per year thereafter)

Table 8 presents the discounted benefits to society over the three scenarios and three environmental impact levels generated by the ecosystem restoration activities during the 2018–2019 program year.

Table 8. Total Value of Ecosystem Restoration Services (2020$)

Value of ecosystem services	Short-term	Medium-term	Long-term
Low	$944,483	$10,528,732	$13,803,733
Average	$3,390,172	$37,792,323	$49,547,763
High	$10,770,788	$120,068,557	$157,416,320

Trail Maintenance and Creation Benefits Attributable to NCC

Trails are associated with increased health (Wang et al., 2005) and enjoyment (Oh and Hammitt, 2010) for individuals who use them. To monetize this aspect of NCC's work, the analysis first determined the number of miles of each trail and the state in which those trails were located based on NCC-provided data. The analysis then proceeded to:

1. Estimate per-mile total benefits for trails using health outcome values (Wang et al., 2005) and recreational use values (Oh and Hammitt, 2010)
2. Estimate per-year maintenance costs for backcountry hiking and biking trails (Echelberger and Plumley, 1986) to be used as a flat discount rate for benefits accrued following the maintenance or construction year to generate a net benefit value
3. Multiply the number of miles of trail in each state maintained or created by the net benefits

Table 9 presents the discounted benefits to society from trail maintenance and creation activities during the 2018–2019 program year over the three scenarios.

Table 9. Total Value of Trail Maintenance and Creation Services (2020$)

Source of benefit	Short-term	Medium-term	Long-term
Health benefits	$1,626	$11,031	$17,603
Recreation benefits	$182	$1,238	$1,976

Forgone Benefits (Opportunity Costs)

The analysis incorporated two forgone benefits (opportunity costs) into each of the three ROI calculations for NCC: a professional opportunity cost to NCC AmeriCorps members and an investment opportunity cost to funders. The forgone benefits are subtracted from the program benefits to calculate the net benefits of the program. Those net benefits are then compared to program cost to calculate the ROI. These forgone benefits are referred to as the *professional and investment opportunity costs*.

<u>Professional Opportunity Cost to NCC AmeriCorps Members</u>

The first forgone benefit (opportunity cost) was the professional opportunity cost to NCC AmeriCorps members for their period of national service, during which they could otherwise be working and earning higher pay. To calculate this, this analysis estimated what NCC AmeriCorps members would have earned if they did not serve in NCC.

Specifically, this analysis estimated the weighted average annual earnings of this group as well as their weighted unemployment rate using ASEC data and the demographic distribution of NCC AmeriCorps members for the 2018–2019 program year. The demographics included were gender, age, race/ethnicity, and pre-service highest level of education. The weighted average annual earnings represent the expected earnings of the NCC AmeriCorps members if they were employed, not serving in NCC. The weighted unemployment rate represents how many of the NCC AmeriCorps members would have been unemployed if they did not serve in NCC. These weighted metrics were first used to estimate the portion of NCC members who would have been employed and then to calculate the aggregate earnings those employed individuals would have made without serving in NCC. Namely, they are used to calculate the aggregate post-tax earnings this population would forgo due to serving with NCC for 1 year. Some of the forgone earnings would have been paid in the form of taxes. To appropriately allocate opportunity costs between NCC AmeriCorps members and state and federal governments, the analysis estimated the reduced tax revenue for federal income, state income, Social Security, and Medicare taxes. The analysis also estimated the reduction in sales tax from reduced consumption. Combined, these taxes represent what the various levels of government are forgoing in tax revenue when these individuals decide to serve in NCC instead of working for higher pay. The summation of all forgone taxes and the forgone post-tax earnings of NCC AmeriCorps members is called the *total professional opportunity cost*.

It is important to note that in the *federal government benefits per federal dollar* ROI calculation, only federal government (not total) benefits are included. Given this, only federal components of the professional opportunity cost are subtracted from all federal government benefits (i.e., forgone federal income, Social Security, and Medicare taxes) realized as a result of NCC in this ROI calculation. The parts of the professional opportunity cost removed from these total federal government benefits include the federal income, Social Security, and Medicare taxes forgone due to NCC AmeriCorps members forgoing earnings during their service year. The summation of these forgone federal taxes is called the *federal professional opportunity cost*.

Investment Opportunity Cost to Funders

The second opportunity cost used in this ROI analysis is an investment opportunity cost. It estimates the expected forgone return if all funds used to support NCC during the 2018–2019 program year were invested in U.S. Treasury bonds instead. To calculate this, the analysis matched the 2018 real interest rates provided by the Office of Management and Budget (2020) to each of the scenarios leveraged in this ROI analysis: short-term, medium-term, and long-term.[22] The rates of return for U.S. Treasury bonds provide a market-based estimate of return for low-risk investments. The real interest rate for the 3-year maturity is used for the short-term scenario, the average between the 10-year and 20-year maturity rates is used as the rate for the medium-term scenario, and the 30-year maturity rate is used for the long-term scenario. These real

[22] The analysis used 2018 real interest rates for U.S. Treasury bonds because the NCC AmeriCorps program year analyzed began in 2018.

interest rates are 0.6 percent, 0.8 percent, and 1.0 percent, respectively (Office of Management and Budget, 2020). Also, the number of time periods elapsed on these bonds is equal to the number of years the short-term, medium-term, and long-term scenarios assume NCC AmeriCorps members' employment and earnings gains are sustained: 1 year, 15 years, and 30 years, respectively. These bonds compound biannually, according to the U.S. Department of the Treasury (2019). The forgone accrued interest was calculated for each of the three scenarios if the funding amount used to support NCC was instead invested (U.S. Department of the Treasury, 2019). Note that for 1) the *federal government benefits per federal dollar* calculation and 2) the *total benefits per federal dollar* ROI calculation, the investment opportunity cost subtracted from the benefits in these calculations is the forgone accrued interest from investing only the federal funds into these U.S. Treasury bonds. This is called the *federal investment opportunity cost*. This is because these ROI calculations only include federal government (not total) program costs. For the other ROI calculation estimated in this analysis, the investment opportunity cost subtracted from the benefits realized is the accrued interest from investing all NCC funds (both federal and non-federal) into these U.S. Treasury bonds. This is called the *total investment opportunity cost*. See Appendix B for details.

Program Costs

The costs used in this analysis are specific to the 2018–2019 NCC program year. NCC costs for the 2018–2019 program year include operating costs, AmeriCorps member expenses, and other costs (shown in Table 10). Operating costs capture the majority of expenses, which include construction-related expenses, in-kind labor, and other program staff costs. AmeriCorps member expenses include the living allowance and other benefits members receive during service. Other costs are indirect costs incurred by NCC from engaging volunteers not associated with AmeriCorps.

Table 10. NCC Program Costs, 2018–2019 Program Year

Cost category	Value
Operating	$318,415
AmeriCorps member expenses	$1,172,164
Other	$431,068
Total	**$1,921,647**

Source: NCC (2022)

ROI Study Limitations

Study limitations include the inability to capture all benefits that stem from NCC due to the lack of data to demonstrate robust causal relationships between the treatments and damages that would result in private costs (homeowner and private insurer) or costs to the federal government (FEMA or HUD funds used following a wildfire disaster).

Approximate Federal/Non-Federal Cost Split

Due to the program structure of NCC, the organization tracks costs by the organization's fiscal year, making it challenging to determine the federal/non-federal split for a given AmeriCorps grant year. Based on information provided by NCC, the analysis assumed 80 percent federal funding and 20 percent non-federal funding based on review of workweeks from the abutting fiscal years. This approximation may differ slightly from the actual cost structures for the program over the 2018–2019 program year.

Insufficient Data to Attribute Post-Wildfire Recovery Savings to Government and Private-Sector Entities

Post-wildfire recovery is typically funded by a combination of federal, state, and local government sources. These sources could include private costs to homeowners, costs to private insurance firms, and costs to FEMA and HUD that result from their activities following a severe wildfire. The relative amounts differ by wildfire event. In addition, there is insufficient data to determine the per-acre cost of recovery funding by funding source. This is due to a lack of data defining the causal relationship between the acre prevented from burning by NCC and savings to the federal government on disaster relief. Because of these limitations, the analysis could not break out federal government savings on post-wildfire recovery due to NCC's work. To provide conservative ROI estimates for the *federal government benefits per federal dollar* calculation, the analysis assumed *none* of the government savings on post-wildfire recovery were to the federal government. The resulting ROI calculation is likely an underestimate given the exclusion of that benefit.

Program Benefits, Forgone Benefits (Opportunity Cost), Program Costs, and ROI Results

This section provides estimates of program benefits, forgone benefits (opportunity costs), and program costs, along with the ROI results.

Program Benefits

Table 11 shows NCC benefits by stakeholder group for each of the three scenarios. Benefits to society are provided based on low, average, and high estimates of ecosystem benefits.

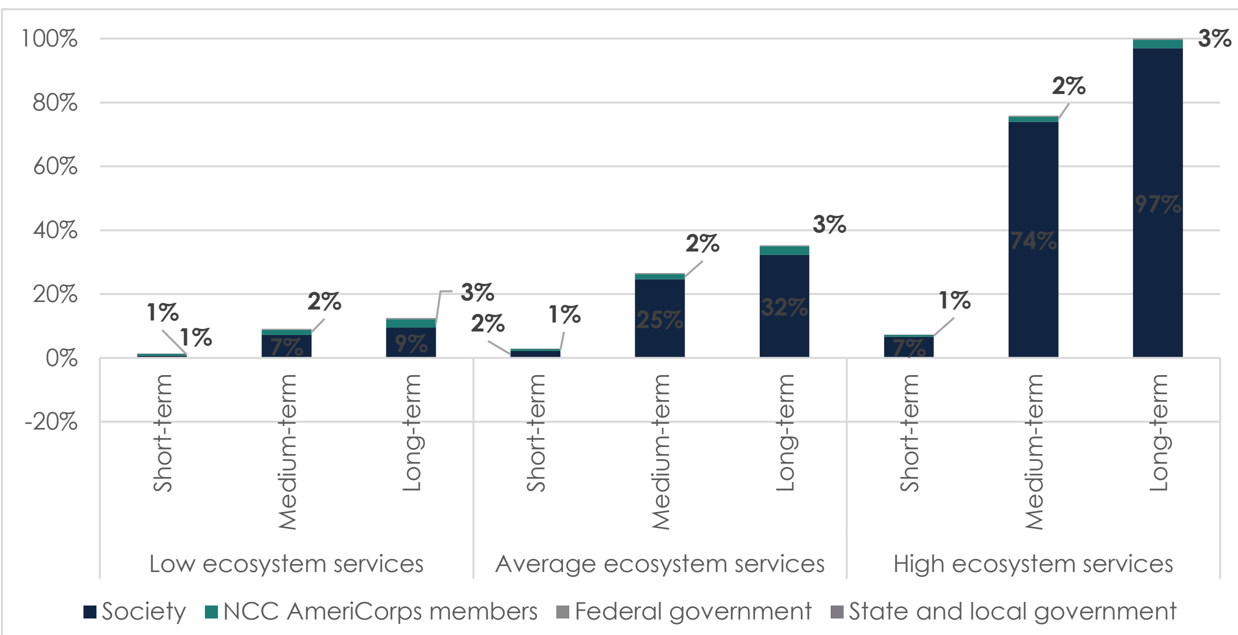
Table 11. Benefits by Recipient

Recipient		Benefits by scenario		
		Short-term	Medium-term	Long-term
AmeriCorps members		$1,059,168	$2,805,903	$4,563,965
Federal government		$74,382	$331,383	$437,632
State & local governments		-$76,990	$63,983	$209,979
Society	Low*	$1,121,382	$12,492,846	$16,382,284
	Average*	$3,819,530	$42,570,752	$55,816,033
	High*	$11,472,433	$127,882,344	$167,664,106
Total	**Low***	**$2,177,942**	**$15,694,115**	**$21,593,861**
	Average*	**$4,876,090**	**$45,772,021**	**$61,027,609**
	High*	**$12,528,993**	**$131,083,613**	**$172,875,683**

*These benefit estimates include ecosystem benefits based on low, average, and high estimates from the literature.

Figure 2, Program Benefits by Stakeholder Group, shows the breakdown of program benefits by stakeholder group over the three time scenarios examined in this report. As a result of the large ecosystem service benefits to society that accrue over time, a majority of benefits for the medium- and long-term scenarios are attributed to society.

Figure 2. Program Benefits by Stakeholder Group



Note: Values for federal government and state/local government are not displayed. The percentages of total benefits realized by each of those stakeholders is below 1 for all ecosystem service ranges.

Forgone Benefits (Opportunity Costs)

Table 12 shows the breakdown of the forgone benefits from the professional opportunity cost to NCC AmeriCorps members and state and federal governments in net present 2020 dollars. It provides the amount of post-tax earnings that members forgo to serve with NCC, along with the associated taxes forgone. This is called the *total professional opportunity cost*. For the *federal government benefits per federal dollar* ROI calculation, the forgone federal income, Social Security, and Medicare taxes were subtracted from the total federal benefits that are realized due to the NCC program.

Table 12. Forgone Benefits From Professional Opportunity Cost

Forgone category	Professional opportunity cost amount across all scenarios (2020$)
Post-tax earnings	$246,861
Federal income, Social Security, and Medicare taxes	$97,917
State income taxes	$43,396
State sales taxes	$95,867
Total	**$484,040**

Table 13 lists the forgone benefits from the investment opportunity cost incurred by scenario. The table shows two versions of the investment opportunity cost, based on:

a) Total NCC program funds invested in U.S. Treasury bonds. This version was used in the *total benefits per federal dollar* and *total benefits per funder dollar* ROI calculations.

b) Only federal NCC program funds (both program and education award funding) invested in U.S. Treasury bonds. This version was used in the *federal government benefits per federal dollar* ROI calculation.

Table 13 column headers list the 2019 real interest rates and the number of years elapsed (with two payments a year). These values were used to calculate the forgone accrued interest value for each scenario.

Table 13. Investment Opportunity Cost by Scenario and Funding Stream

Funding stream	Forgone accrued interest by scenario		
	Short-term (1.30% interest rate and 1 year elapsed)	Medium-term (1.45% interest rate and 15 years elapsed)	Long-term (1.50% interest rate and 30 years elapsed)
Total NCC program funding	$13,312	$281,854	$772,829
Federal NCC program funding only	$11,535	$244,231	$669,669

Program Funding

Table 14 shows the funding sources of NCC for the 2018–2019 program year. NCC is partly funded through fees charged to federal agencies other than AmeriCorps and other non-federal groups for its services, and funding does not directly match costs in a given program year. During the 2018–2019 program year, NCC ran a small surplus.

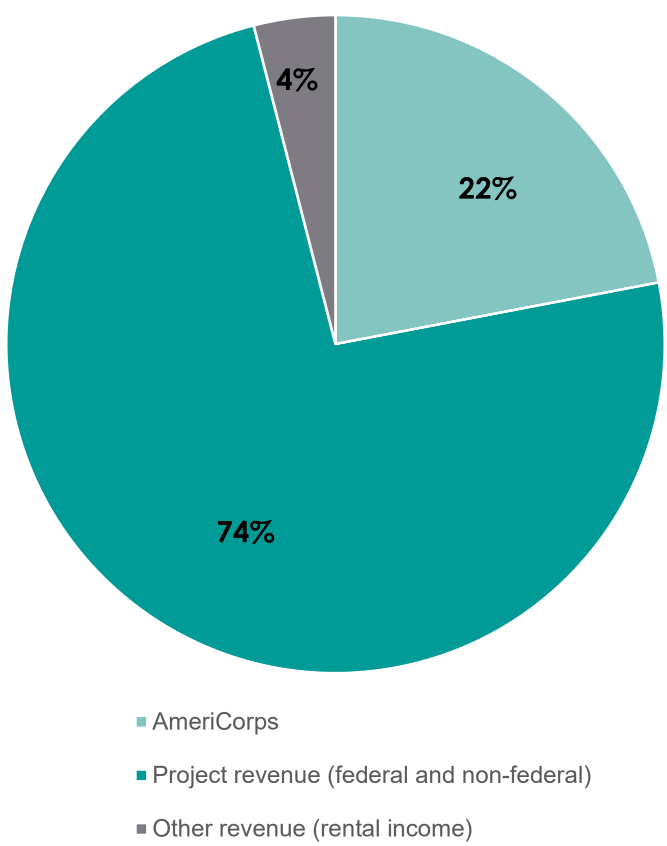
Table 14. Program Funding by Source for NCC

Funder	Funding provided for the program year
AmeriCorps	$443,078
Project revenue (federal and non-federal)	$1,511,489
Other revenue (rental income from lease of office space)	$72,619
Total	**$2,027,185**

Note: Numbers may not sum due to rounding.

Figure 3, Program Cost by Funding Source, shows the breakdown of program funding by source shown in Table 14.

Figure 3. Program Cost by Funding Source



Due to the program structure of NCC, the organization tracks costs by the organization's fiscal year, making it challenging to determine the federal/non-federal split for a given AmeriCorps grant year. After consultation with NCC, the analysis assumed 80 percent federal funding and 20 percent non-federal funding based on review of workweeks from the abutting fiscal years. Based on that assumption, federal funding for NCC was approximately $1.6 million, including AmeriCorps grant funds and the fees for service projects paid by federal agencies other than AmeriCorps. This federal funding estimate was used in the *federal government benefits per federal dollar* ROI calculation.

ROI Results

This analysis developed three ROI estimates using the three scenarios (short-term, medium-term, and long-term). As noted above, the ROI calculations compare the net benefits of NCC activities with program costs to calculate the ROI. Table 15 shows the program gross benefits, forgone benefits, net benefits, and costs of NCC programming that are used in three ROI calculations.

Table 15. Program Benefits, Net Benefits and Program Costs by ROI Scenario

	ROI scenario		
Costs/benefit	**Short-term**	**Medium-term**	**Long-term**
Program cost	**$2,215,361**	**$2,215,361**	**$2,215,361**
Federal government cost	$1,919,647	$1,919,647	$1,919,647
Non-federal government cost	$295,714	$295,714	$295,714
Total program gross benefits	**$17,467,298**	**$186,542,577**	**$245,721,610**
Environmental benefits to society – low	$1,121,382	$12,492,846	$16,382,284
Environmental benefits to society – medium	$3,819,530	$42,570,752	$55,816,033
Environmental benefits to society – high	$11,472,433	$127,882,344	$167,664,106
Member benefits	$1,056,560	$3,201,269	$5,211,576
Federal government benefits	$74,382	$331,383	$437,632
State/local government benefits	-$76,990	$63,983	$209,979
Total forgone benefits (opportunity costs)	**-$497,351**	**-$765,892**	**-$1,256,868**
Forgone benefits to members (forgone earnings post-taxes)	-$246,859.86	-$246,859.86	-$246,859.86
Forgone tax revenue from members' earnings	-$237,178.76	-$237,178.76	-$237,178.76
Forgone tax revenue federal government	-$97,916.50	-$97,916.50	-$97,916.50
Forgone tax revenue state/local government	-$139,262.25	-$139,262.25	-$139,262.25

	ROI scenario		
Costs/benefit	**Short-term**	**Medium-term**	**Long-term**
Forgone benefits from total investment interests/returns (all funders)	-$13,312	-$281,854	-$772,829
Forgone benefits from federal government investment/returns	-$9,770	-$206,863	-$567,207
Total program net benefits (total program gross benefits – total forgone benefits)			
Net benefits members (member benefits – forgone benefits members)	$1,056,560	$3,201,269	$5,211,576
Net benefits federal (federal government benefits – forgone tax revenue federal government – forgone benefits from federal government investment/returns)	$74,382	$331,383	$437,632
Net benefits state/local government and other funders (state/local government benefits – forgone tax revenue state/local government)	-$76,990	$63,983	$209,979
ROI for total benefits per federal dollar ([net benefits federal government + environmental benefits] / federal government cost)*			
With low ecosystem benefits	**$1.17**	**$8.35**	**$11.48**
With average ecosystem benefits	**$2.58**	**$24.02**	**$32.02**
With high ecosystem benefits	**$6.57**	**$68.46**	**$90.28**
ROI for total benefits per funder dollar ([total program net benefits + environmental benefits] / program cost)*			
With low ecosystem benefits	**$0.98**	**$6.92**	**$9.47**
With average ecosystem benefits	**$1.98**	**$20.49**	**$27.27**
With high ecosystem benefits	**$5.43**	**$59.00**	**$77.76**
Federal government benefits per federal dollar (net benefits federal government / federal government cost)	**$0.04**	**$0.17**	**$0.23**

*These ROI estimates are provided based on low, average, and high estimates of ecosystem benefits to society.

Table 16 shows the ROI results. Each row represents a different ROI calculation depending on which benefits are considered (all benefits or only benefits to the federal government) and which funding is considered (federal funding only or all funding).

For the portion of the benefits analysis that measured ecosystem benefits, this study used low, average, and high estimates of those benefits based on the literature. Doing so allowed for the uncertainty involved in monetizing ecosystem benefits.

The analysis used three different scenarios to estimate benefits under different assumptions. Specifically, the study assumed that increased earnings attributable to the programs last for 1 year (short-term scenario), 15 years (medium-term scenario), or 30 years (long-term scenario).

The ROIs are presented as dollars returned for every dollar of investment.

Table 16. ROI Results for NCC

ROI calculation	ROI scenario		
	Short-term	**Medium-term**	**Long-term**
ROI for total benefits per federal dollar ([net benefits federal government + environmental benefits] / federal government cost)*			
With low ecosystem benefits	$1.17	$8.35	$11.48
With average ecosystem benefits	$2.58	$24.02	$32.02
With high ecosystem benefits	$6.57	$68.46	$90.28
ROI for total benefits per funder dollar ([total program net benefits + environmental benefits] / program cost)*			
With low ecosystem benefits	$0.98	$7.08	$9.75
With average ecosystem benefits	$2.20	$20.66	$27.55
With high ecosystem benefits	$5.66	$59.17	$78.04
Federal government benefits per federal dollar (net benefits federal government / federal government cost)	**$0.04**	**$0.17**	**$0.23**

*These ROI estimates are provided based on low, average, and high estimates of ecosystem benefits to society.

The program produces strong returns for the medium- and long-term scenarios when benefits to AmeriCorps members, program participants, and state/local governments are included. This is indicated by the results of the *total benefits per federal dollar* and the *total benefits per funder dollar* ROI calculations for these two scenarios. In the short-term scenario—which only includes benefits for 1 year post-program—all of the ROI results indicate a positive return on funding invested in the program. The ROI of $0.98 for the *total benefits per funder dollar* calculation with the low set of ecosystem benefit estimates is just below the break-even point on funding invested. All other scenarios and ecosystem benefit levels show positive returns.

The *federal government benefits per federal dollar* calculations estimate losses for all three scenarios. NCC is a program that is intended primarily to generate benefits to society, rather than benefits to the federal government, so these results are consistent with the design of NCC. In addition, existing data do not make it possible to attribute post-wildfire recovery savings to the federal government, such as savings in FEMA disaster recovery expenditures. (See ROI Study Limitations on page 18.) Including these potential savings in expenditures would lead to a higher ROI for federal government than this analysis estimates.

The magnitude of the positive ROI estimates in the medium- and long-term scenarios is driven by the following factors:

- **Reduction in wildfire-related costs.** Societal benefits from reduced severity of wildfires accrue but diminish over time as potential fuel reaccumulates.
- **Increased ecosystem service values from reduced invasive species.** Societal benefits from increased ecosystem services accrue but diminish over time as invasive species return.
- **Benefits from trail maintenance and creation.** Societal benefits from access and use of trails accrue over time but diminish as trails naturally deteriorate.
- **Educational attainment outcomes of AmeriCorps members.** After serving in the AmeriCorps program, AmeriCorps members receive an education award, which is used by a portion of members to help pay for postsecondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional earnings for AmeriCorps members.
- **Employment outcomes of AmeriCorps members.** Past studies establish that AmeriCorps members experience increased employment and increased earnings post-service.

Government funding serves as a catalyst for private funding of evidence-based social services programs. For the ROI calculations of 1) *total benefits per federal dollar* and 2) *total benefits per funder dollar*, AmeriCorps's requirement of match funding also contributed to the magnitude of outcomes. Federal government funding of NCC serves as a catalyst for other funding, specifically that from state and local governments. This additional funding—amounting to about $386,064 for NCC for the studied program year—allowed NCC to operate at a larger scale than otherwise would have been possible under the federal funding alone. Though it may not impact the ROI because it is a per-unit metric, match funding leads to greater investment in NCC and thus to greater impact.

Recommendations for Further Research

Future ROI studies for national and community service programs, such as the NCC program, can be strengthened in several ways.

Recommendation 1: Determine the persistence of short- and long-term impacts for program participants and AmeriCorps members. The persistence of impacts, such as earnings or employment, is often not measured in evaluations because it requires long-term tracking. Although a scenario-based approach that accounts for variations in the persistence of impacts can be used, as was completed in this ROI analysis, rigorous research on the long-term impact of programming will enable AmeriCorps to determine a single value for ROI calculations and avoid relying on the scenario-based approach. For example, Friedman et al. (2016) reported the unemployment status of AmeriCorps member alumni 6 months before service, 6 months after service, and during the summer of 2016. The authors indicate that data for the latter timepoint was collected anywhere from 3 to 11 years after service completion, depending on the

AmeriCorps member alumni cohort (i.e., 2005, 2010, or 2013). The varying data collection periods for the cohorts makes it difficult to measure the duration of benefits. Thus, instead of collecting outcome measures at a time that varies by AmeriCorps member or program participant, studies should track outcomes of interest at the same intervals, multiple times after program or service completion, to provide greater insight into the duration and consistency of benefits.

Recommendation 2: Document outcomes using third-party data sources. Using third-party data, along with or in place of self-reported data, can also improve the accuracy of program outcome measurements. While self-reported data are easier to obtain—especially via the use of survey instruments—they have several disadvantages. Some answers may be exaggerated, respondents may not answer honestly, and response biases could affect results. AmeriCorps programs should—where possible—leverage data from third-party sources either to provide data for their program evaluation or to corroborate findings from self-reported data. For example, if employment and earnings outcomes are of interest, unemployment insurance data—which are submitted by employers—could be used to verify members' wages or employment status post-service. Additionally, if degree completion data are of interest, such as in the case of this ROI analysis, data from the National Student Clearinghouse (NSC) could be used to verify what portion of NCC AmeriCorps members pursued higher education and which degrees were completed post-program with the help of the education award. Were degree or employment outcomes data available from third-party data sources (like NSC), those data may make more precise ROI estimates possible.

Recommendation 3: Quantify ripple effects. Earnings impacts on program participants and AmeriCorps members likely have positive benefits for those individuals' families and surrounding communities. Rigorous research on those potential ripple effects would enable AmeriCorps to capture a broader array of benefits of this and other programs, which would be expected to result in an increased ROI. Specifically, the longitudinal impacts on program participants could be collected alongside the ripple effects their outcomes have on their families and communities to determine how long these indirect impacts are sustained after program participation or completion. For instance, studying how NCC program participation impacts parents' employment status, educational attainment, substance or alcohol use, as well as mental and physical health would result in a more comprehensive ROI estimate.

Recommendation 4: Quantify federal disaster funding from wildfire. FEMA has funded significant recovery efforts following wildfires in recent years. These funds are primarily allocated for temporary and recovery housing for individuals whose homes were destroyed. Additional research on the relationship between federal disaster funding and wildfire characteristics (such as acreage burned and proximity to population centers) would allow researchers to estimate the extent to which NCC's wildfire reduction results in federal cost savings in the form of reduced FEMA spending.

Recommendation 5: Quantify the change in value of regrowth due to carbon sinks. As forests and other ecosystems regrow following a wildfire, the carbon consumed in plant growth is drawn out of the atmosphere. Currently, this analysis assumes that after a full period of regrowth, there would be a net-zero impact on carbon dioxide equivalents emissions in the atmosphere. Future additions to this methodology should examine the nuances of regrowth carbon storage to determine if this assumption is valid.

Recommendation 6: Quantify private funds used for wildfire restoration. Private funds from property owners and insurance companies are used to restore property damage caused by wildfires. Additional research on the relationship between private funding and wildfire characteristics (such as population density near wildfire locations, as well as causal links from specific acres burning to property damage occurring) would allow researchers to estimate the impact of NCC's activities on private funds spent on wildfire recovery efforts.

Conclusion

Based upon these findings, investment in the NCC program results in favorable impacts, especially under the medium- and long-term scenarios as benefits to government and society accumulate.

Appendix A: Program Benefits, Forgone Benefits, and Program Costs Included in ROI Calculations

In Table 17, the three columns on the right indicate by an "X" if the program benefits, forgone benefits (opportunity cost), or program cost is included in the numerator or denominator of a return on investment (ROI) calculation.

Table 17. Program Benefits, Forgone Benefits, and Program Costs Included in ROI Calculations

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Benefit	**Stakeholder group**	**Data sources**	**X indicates inclusion in the ROI numerator**		
Avoided costs to society from wildfires	Society	• NCC • Cochrane et al. (2002)	X	X	
Avoided costs to government from wildfires	Federal, state, and local governments	• NCC • Batker et al. (2013) • Moeltner et al. (2013)	X	X	
Increased ecosystem services	Society	• Dodds et al. (2008) • The Watershed Company (2015)	X	X	
Health and recreational benefits of trails	Society	• Oh et al. (2010) • Wang et al. (2005)	X	X	

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Increased earnings of national service members due to increased employment and education of AmeriCorps members	AmeriCorps members	• NCC • Friedman et al. (2016) • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-a) • U.S. Bureau of Labor Statistics (2019-b)	X	X	
Increased federal and state income tax revenue due to increased earnings of AmeriCorps members	Federal and state governments	• NCC • Friedman et al. (2016) • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-a) • Tax rate data on Bankrate.com and Loughead (Tax Foundation, 2020)	X	X	X

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Increased Social Security and Medicare tax revenue due to increased earnings of AmeriCorps members	Federal government	• NCC • Friedman et al. (2016) • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-a) • Social Security Administration (2020)	X	X	X
Increased sales tax revenue due to increased earnings of AmeriCorps members	State and local governments	• NCC • Friedman et al. (2016) • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-a) • U.S. Bureau of Labor Statistics (2021) • Loughead (Tax Foundation, 2020)	X	X	
AmeriCorps member living allowances and education awards	AmeriCorps members	• NCC	X	X	

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Reduced spending on lifetime public assistance, corrections, and social insurance due to increased educational attainment of AmeriCorps members	Federal, state, and local governments	• Trostel (2015) • Zeidenberg et al. (2016) • U.S. Census Bureau (2019-a)	X	X	X
Forgone benefits (opportunity costs)	**Stakeholder group**	**Data sources**	**X indicates inclusion in the ROI denominator**		
Opportunity costs of forgone market wages for AmeriCorps members	AmeriCorps members	• NCC • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-b)	X	X	X

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Opportunity costs of federal taxes on forgone market wages for AmeriCorps members (e.g., federal income and Social Security taxes)	Federal government	• NCC • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-a) • U.S. Bureau of Labor Statistics (2019-b) • Tax rate data on Bankrate.com and Loughead (Tax Foundation, 2020) • Social Security Administration (2020)	X	X	X

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Opportunity costs of state and local taxes on forgone market wages for AmeriCorps members (e.g., state income and state/local sales taxes)	State and local government	• NCC • U.S. Census Bureau (2019-a) • U.S. Bureau of Labor Statistics (2019-a) • U.S. Bureau of Labor Statistics (2019-b) • U.S. Bureau of Labor Statistics (2021) • Loughead (Tax Foundation, 2020)	X	X	X
Opportunity costs of federal funders	Federal government	• AmeriCorps • U.S. Department of the Treasury (2019)	X	X	X
Opportunity costs of other program funders	Non-government funders	• NCC • U.S. Department of the Treasury (2019)		X	

Benefit or cost			Total benefits per federal dollar	Total benefits per funder dollar	Federal government benefits per federal dollar
Program cost	**Payer**	**Data sources**	**X indicates inclusion in the ROI denominator**		
AmeriCorps grant costs (excluding living allowances and education awards provided to AmeriCorps members)	Federal government (AmeriCorps)	• AmeriCorps	X	X	X
AmeriCorps member living allowances and education awards	Federal government (AmeriCorps)	• AmeriCorps	X	X	X
Nevada Conservation Corps costs	NCC	• NCC		X	
Other federal government funding (not provided by AmeriCorps)	Federal government	• NCC	X	X	X
State and local government funding	State and local government	• NCC		X	
Other non-government costs	Non-government funders	• NCC		X	

Appendix B: Additional Information on the Methodology

This appendix provides additional details on the methodology used for this study, as a supplement to the methodology section in the main report. It describes the steps used to calculate the return on investment (ROI), the results of interim calculations that contribute to the ROI calculations, and assumptions that underlie the analysis.

Methodology Overview

Calculating the ROI for NCC included the following steps:

- Measuring and monetizing program benefits to NCC program participants, NCC AmeriCorps members, and the different levels of government
- Estimating forgone benefits (opportunity costs)
- Assessing program costs
- Calculating the ROI

This ROI analysis included only those benefits that could be reasonably monetized given the available data and that likely would not have occurred without NCC.

Although NCC AmeriCorps members experience positive benefits from NCC in terms of increased employment and earnings (described below), available data do not establish how long these specific impacts are sustained over time. To address a range of possible durations for those benefits, three scenarios were developed for this ROI study:

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that earnings impacts are limited to a single year after program exit. This scenario also assumes no lifetime benefits are realized.
- **Medium-term.** This scenario assumes a longer duration of earnings impacts. The assumption is that earnings impacts last 15 years. A 3 percent discount rate is applied each year to represent net present value in 2020 dollars.[23] This scenario also assumes only half of the net present value of lifetime benefits is realized.
- **Long-term.** This scenario assumes sustained earnings impacts throughout NCC AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A 3 percent discount rate is applied each year to represent net present value in 2020 dollars. This scenario also assumes the entire net present value of lifetime benefits is realized.

[23] The Office of Management and Budget (1992) defines a discount rate as, "The interest rate used in calculating the present value of expected yearly benefits and costs" (p. 18). Regarding the 3 percent discount rate, see Office of Management and Budget (2003).

There are some differences between the three scenarios. One is the length of time that increased employment—and earnings associated with that employment—are sustained. The other is what portion of lifetime benefits, when applicable, are realized.[24] For each ROI calculation, three estimates using the three scenarios were developed, which is shown in greater detail in the Calculating ROI section.

Measuring Program Benefits

The first step in calculating the ROI for NCC is to measure and monetize the program benefits. NCC program participants, NCC AmeriCorps members, and various levels of government benefit from NCC activities. These benefits were identified through an extensive literature review and data collection process. The methods used to measure benefits for each of these stakeholder groups are described below.

Benefits to the NCC AmeriCorps Members

The NCC AmeriCorps members who provide services as part of NCC experience benefits due to their national service. This analysis estimated the following benefits:

- Living allowance
- Increased earnings due to reduced unemployment

Living Allowance and Education Award

Living allowances are given to AmeriCorps members during their 1-year service term to pay for various living expenses—such as housing and groceries—and they sometimes include members' workers' compensation and health insurance when applicable. Regarding education awards, according to Friedman et al. (2016), a significant portion (i.e., 46 percent) of AmeriCorps State and National member alumni use them to pay for additional postsecondary education at colleges, graduate schools, and technical/vocational schools, while others (i.e., 33 percent) use them to pay off outstanding student loans. The remaining 21 percent do not use their education awards.

Both the living allowances and education awards (considered one-time benefits that are not discounted or spread over time) are taxable and represent member benefits. However, only the portion of education awards used by members to pay off existing student loans is considered a direct member benefit. The portion that is utilized to pursue further postsecondary education is only used in calculating members' additional lifetime earnings due to the increased educational attainment they experience post-service from using the education award. This is done to avoid double counting. This

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[24] These three scenarios consider varying durations of how long increased employment and earnings benefits last for NCC AmeriCorps members. They also consider varying durations for lifetime benefits that stem from NCC. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from NCC AmeriCorps members' higher educational attainment post-service. The analysis estimates lifetime benefits differently in the three scenarios. Specifically, the net present value of the entire lifetime benefit is realized for the long-term scenario, half of the net present value of the lifetime benefit is realized for the medium-term scenario, and no lifetime benefit amount is realized for the short-term scenario.

analysis included the post-tax values of the living allowance and the portion of the education award used to repay student loans as NCC AmeriCorps member benefits, which are listed in Table 18. The portion of the education award used to fund additional postsecondary education is discussed in the following section.

Table 18. NCC AmeriCorps Member Benefits From the Living Allowance and Education Award

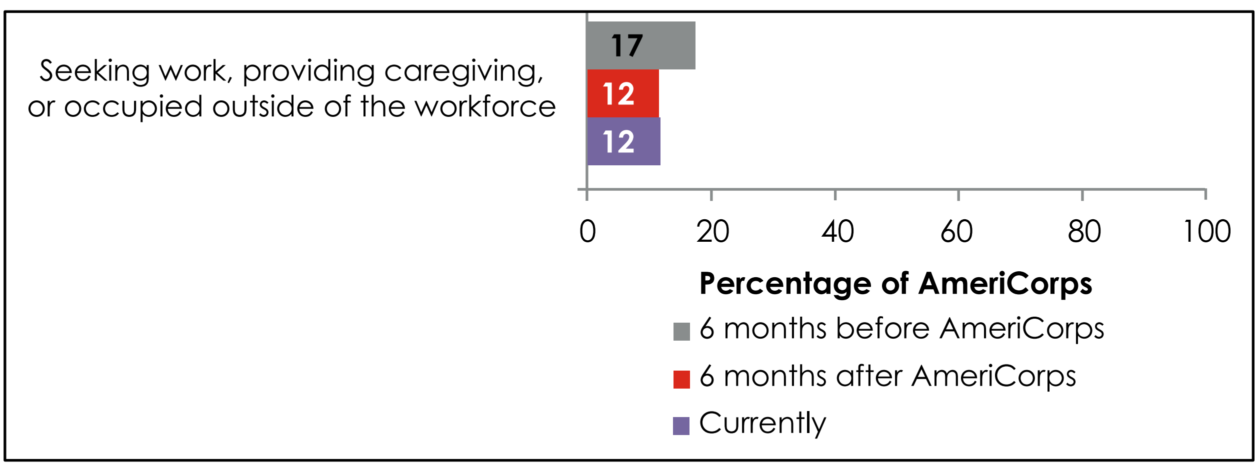
Benefit	Post-tax value	Notes
Living allowance	$989,185	Post-tax living allowances members receive during service
Education award used to pay off student loans	$101,988	Post-tax education award amount used to pay off outstanding student loans
Total	**$ 1,091,173**	

Sources: Friedman et al. (2016) and NCC (2022)

Increased Earnings Due to Reduced Unemployment

According to Friedman et al. (2016), the percentage of AmeriCorps members unemployed was 5 percentage points lower 6 months after serving in AmeriCorps compared to 6 months before serving. The study did not provide actual employment rates for AmeriCorps members pre- and post-service but instead provided the unemployment rates shown in Figure 4 (17 percent vs. 12 percent) in which the change between them represents a 5-percentage-point decrease.

Figure 4. Unemployment Status Results from Friedman et al. (2016)



Source: Friedman et al. (2016)[25]

[25] "Currently" refers to the summer 2016 survey. Respondents were from the 2005, 2010, and 2013 AmeriCorps cohorts, so respondents varied in how much time had elapsed since their AmeriCorps service.

A direct member benefit from being employed post-service is additional income earned. To monetize this 5-percentage-point decrease in unemployment, ICF requested that NCC provide the gender, age, pre-service educational attainment, and race/ethnicity distribution of AmeriCorps members who served with the NCC program for the most recent program year. Based on those demographics, the analysis used annual average earnings data from the Current Population Survey's Annual Social and Economic (ASEC) Supplement for March 2019 to estimate NCC AmeriCorps members' additional earnings due to the reduced unemployment (U.S. Census Bureau, 2019-b).

Specifically, the analysis used ASEC data to calculate the per-person pre-tax average annual earnings for 18- to 34-year-olds weighted by the demographic distribution of NCC AmeriCorps members who served during the 2018–2019 program year. This value was $28,982 as shown in Table 19. The analysis then multiplied the 5-percentage-point decrease in unemployment from Friedman et al. (2016) by the number of NCC AmeriCorps member full-time equivalents (FTEs) who served during the most recent program year (i.e., 61). This estimated the number of *additional* NCC AmeriCorps member FTEs employed due to national service (i.e., 2). To estimate the additional pre-tax earnings that stemmed from the reduced unemployment, the $88,032 annual earnings amount was multiplied by the additional number of NCC AmeriCorps members employed post-service. This represents the additional income earned by NCC AmeriCorps members due to serving with NCC.

Table 19. Additional Pre-Tax Earnings for NCC AmeriCorps Members From Reduced Unemployment Based on NCC AmeriCorps Member Demographics

Metric	Value (2020$)
Average per-person pre-tax annual earnings of employed 18- to 34-year-olds weighted by NCC AmeriCorps member demographics (e.g., gender, race/ethnicity, and pre-service education level)	$28,982
Reduction in AmeriCorps members' unemployment	5%
Total expected increase in earnings, per member	$1,449
NCC AmeriCorps Member FTEs	61
Cumulative additional pre-tax earnings	**$88,032***
Cumulative additional post-tax earnings	**$73,178**

*This value is undiscounted; thus, the values do not sum in the table.
Sources: NCC (2022), Friedman et al. (2016), and U.S. Census Bureau (2019-b)

To avoid double counting, the additional *post-tax* earnings are used to calculate the direct benefit to NCC AmeriCorps members, rather than the additional *pre-tax* earnings. The post-tax annual earnings in Table 19 excludes payroll taxes (e.g., federal and state income, Social Security, and Medicare). The payroll tax rates used are described in more detail in the Benefits to Government section.

Based on these calculations, the cumulative additional post-tax earnings for NCC AmeriCorps members for the three different scenarios—discounted to 2020 dollars using data from the Office of Management and Budget (2003)—are shown in Table 20. These monetary amounts represent the additional post-tax earnings realized due to the employment gain that is solely attributed to NCC.

Table 20. Cumulative Additional Post-Tax Earnings Derived From Reduced Unemployment Due to Serving With NCC by Scenario

Scenario	Cumulative additional post-tax earnings due to serving with NCC (2020$)
Short-term	$1,056,560
Medium-term	$3,201,269
Long-term	$5,211,576

Sources: NCC (2022), Friedman et al. (2016), U.S. Census Bureau (2019-b), and Office of Management and Budget (2003)

Increased Lifetime Earnings Due to Increased Postsecondary Education Derived From the Use of Education Awards

The AmeriCorps education award pays for some portion of members' increased postsecondary educational attainment, and the future earnings derived from that educational attainment are treated as a direct benefit to NCC AmeriCorps members. To calculate the portion of members' increased educational attainment that is attributable to NCC, this analysis used cost data from the National Center for Education Statistics (NCES). Table 21 details the average total cost for each degree type and the portion of the cost that the post-tax education award amount represents (i.e., $5,234 represents $6,155 before taxes[26]). The analysis used these percentages to estimate the lifetime benefits of postsecondary educational attainment that can be attributed to the education award. For instance, according to NCES (2020), the average annual cost of a public, in-state, 4-year academic institution during the 2018–2019 academic year was $24,869. This amounts

Additional earnings derived from NCC AmeriCorps members' *reduced unemployment* were calculated annually and then discounted based on the short-term, medium-term, and long-term scenarios in net present 2020 dollars.

For additional earnings derived from NCC AmeriCorps members' *increased postsecondary educational attainment*—due to using education awards—Trostel (2015) did not provide data on how earnings accrue over time. Therefore, this analysis treated the increases in earnings as lifetime values expressed in 2020 dollars. The analysis assumed 100 percent of those lifetime earnings accrued by year 30 (i.e., in the long-term scenario), 50 percent accrued by year 15 (i.e., in the medium-term scenario), and nothing accrued 1 year post-program (i.e., in the short-term scenario).

[26] This analysis used the 2020 to 2021 AmeriCorps education award amount ($6,345) but discounted it to net present 2020 dollars using the Consumer Price Index. For more information about this education award, please see https://americorps.gov/members-volunteers/segal-americorps-education-award/find-out-more.

to more than $100,000 for 4 years if expressed in 2020 dollars. The $4,857 post-tax education award only represents 5 percent of the cost of that degree, so NCC, accordingly, could only be credited with 5 percent of the completion of NCC AmeriCorps members' bachelor's degrees post-service.

Table 21. Average Total Cost of Education and Portion Attributable to Education Award by Degree Type

Degree type[27]	Average cost (2020$)	Percentage of degree total cost covered by post-tax education award
Some college	$30,824	15.8%
Bachelor's degree	$101,948	4.8%
Graduate degree	$24,342	20.0%

Sources: AmeriCorps (n.d.), U.S. Bureau of Labor Statistics (2019-a), NCES (2019), and NCES (2020)

To determine the future lifetime earnings (and later, the associated lifetime taxes, which are described in the Benefits to Government section) realized due to the use of the education award post-service, the analysis first determined the number of additional postsecondary degrees estimated to be completed by degree type. The 61 NCC AmeriCorps member FTEs who served during the 2018–2019 program year were distributed by the education award use findings listed in Friedman et al. (2016) across the degree types. Specifically, Friedman et al. (2016) reported 46 percent of AmeriCorps State and National member alumni used their education award to pursue postsecondary degrees after program completion. This makes the number of NCC AmeriCorps member FTEs expected to use the education award to pursue additional postsecondary education roughly equal to 28. Specifically, Friedman et al. (2016) indicated that the 46 percent comprises 2 percent using the education award to attend a technical or vocational training program, 21 percent using it to obtain a bachelor's degree, and 23 percent using it for graduate school.[28] This results in the number of NCC AmeriCorps members estimated to *pursue*—due to using the education award—an associate degree, a bachelor's degree, or a graduate degree post-service to be roughly 1, 13, and 14, respectively. These values are shown in Table 22.

[27] Costs for an associate degree include tuition, required fees, books, and supplies for a public, in-state, 2-year program; costs for a bachelor's degree include tuition, required fees, books, supplies, and on-campus housing for a public, in-state, 4-year program; costs for a graduate degree include tuition and required fees for a public, in-state, 2-year program.

[28] This analysis considers the use of the education award to attend a technical or vocational training program from Friedman et al. (2016) to be synonymous with using it to pursue an associate degree.

Table 22. Estimates of the Number of Postsecondary Degrees Pursued Using the Education Award by Degree Type

Degree type	Total NCC AmeriCorps member FTE count	Percentage estimated to pursue postsecondary education according to Friedman et al. (2016)	Number of degrees pursued using the education award
Associate degree	61	2%	1
Bachelor's degree	61	21%	13
Graduate degree	61	23%	14
All degrees	—	**46%**	**28**

Note: Numbers may not sum due to rounding.

Sources: AmeriCorps (n.d.), NCC (2022), U.S. Bureau of Labor Statistics (2019-a), Friedman et al. (2016), NCES (2020), and NCES (2019)

Next, the difference in the additional lifetime pre-tax earnings from one degree type to the subsequent degree type was estimated using data provided by Trostel (2015), which is shown in the fifth column of Table 23.[29] For instance, using Trostel (2015) data, the lifetime earnings of someone with an associate degree is about $875,000, while that of someone with a bachelor's degree is almost $1.3 million. The difference between these two metrics (roughly $417,000, as show in Table 23) represents the additional lifetime earnings realized as a result of gaining a bachelor's degree if an associate degree was already completed. This process was completed for all postsecondary degree types to conservatively estimate the additional lifetime earnings realized by NCC AmeriCorps members due to an increase in postsecondary educational attainment. Trostel (2015) also included data on lifetime taxes paid, which was then used to estimate the post-tax lifetime earnings that would be realized per additional postsecondary degree received. Specifically, the lifetime taxes paid were subtracted from the pre-tax additional lifetime earnings amounts to estimate the additional post-tax lifetime earnings, a direct benefit to NCC AmeriCorps members.

[29] For an associate degree, comparisons were made between metrics for a high school diploma and those for an associate degree. For a bachelor's degree, comparisons made were between metrics for an associate degree and those of a bachelor's degree. For a graduate degree, comparisons made were between metrics for a bachelor's degree and those of a master's degree.

Table 23. Additional Earnings From AmeriCorps Members' Use of the Education Award

Degree type	Percentage of NCC AmeriCorps members expected to pursue post secondary education	FTE NCC AmeriCorps members	Percentage of degree tuition covered by education award	Additional lifetime earnings of the degree (pre-tax)	Additional lifetime earnings from education award (pre-tax)	Additional lifetime earnings from education award (post-tax)
Expected to not use award for postsecondary education	54%	33	N/A	N/A	N/A	N/A
Associate degree	2%	1	15.8%	$170,286	$32,749	$16,660
Bachelor's degree	21%	13	4.8%	$526,201	$321,269	$173,282
Graduate degree	23%	14	20.0%	$467,083	$1,308,105	$813,511
Total	**100%**	**61**	**—**	**—**	**$1,662,123**	**$1,003,453**

Note: Numbers may not sum due to rounding.

Sources: AmeriCorps (n.d.), U.S. Bureau of Labor Statistics (2019-a), NCC (2022), Friedman et al. (2016), NCES (2020), NCES (2019), and Trostel (2015)

To isolate the increase in additional lifetime earnings specific to members using the education award, the number of NCC AmeriCorps members who used the education award for this purpose by degree type was reduced by the percentage of the degree cost that can be covered by the post-tax education award received post-service, displayed in the fourth column of Table 23. Then, this amount is applied to the 2019 additional lifetime earnings by degree type to calculate the additional lifetime earnings realized by AmeriCorps members from their increase in postsecondary educational attainment that is credited to the use of the education award post-service. The additional lifetime earnings amount is roughly $1.66 million across the FTE NCC AmeriCorps members. Of note, these lifetime earnings are in addition to the earnings derived from NCC AmeriCorps members' gains in employment as delineated in the subsequent section. To reiterate, the earnings from NCC AmeriCorps members' reduced unemployment differs depending on the scenario (i.e., short-term, medium-term, and long-term) since it is uncertain how long these earnings will persist. For the net lifetime earnings—and all lifetime benefits in this ROI analysis—the entire amount is realized in the long-term, half of it is realized in the medium-term, and no amount is realized in the short-term.

Benefits to Government

State and Local Government

State and local governments benefit from:

- Additional state income tax revenue from NCC AmeriCorps members' increased earnings due to reduced unemployment
- Additional lifetime state and local taxes due to NCC AmeriCorps members' increased postsecondary educational attainment[30]
- Additional lifetime state and local taxes due to NCC program participants' increased secondary educational attainment[31]
- Additional state and local taxes from the living allowance and education award received by these members
- Additional state and local sales tax revenue from NCC AmeriCorps members' increased consumption due to reduced unemployment

> Additional tax revenue derived from NCC AmeriCorps members' *reduced unemployment, living allowances, and education awards* was calculated using tax rates specific to each per-person monetary amount.
>
> For additional tax revenue derived from NCC AmeriCorps members' *increased postsecondary educational attainment*—due to using education awards—as well as from NCC program participants' *increased secondary educational attainment*, Trostel (2015) did not provide specific tax rates. Therefore, this analysis treated the increases in tax revenue as lifetime values expressed in 2020 dollars. The analysis assumed 100 percent of those lifetime tax revenues accrued by year 30 (i.e., in the long-term scenario), 50 percent accrued by year 15 (i.e., in the medium-term scenario), and nothing accrued 1 year post-program (i.e., in the short-term scenario).

- Reduced lifetime spending on social insurance and corrections[32] due to NCC AmeriCorps members' increased postsecondary educational attainment

State income tax revenue: To measure income tax revenue generation that stems from reduced unemployment for state governments (any local income taxes are not included), the additional pre-tax earnings of NCC AmeriCorps members that are solely attributed to NCC are taxed by a weighted, estimated proportional state income tax rate. This tax rate considers state-specific progressive tax brackets and standard deduction amounts. Based on the taxable income, the analysis estimated the

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[30] This benefit was calculated using lifetime tax revenue data from Trostel (2015). These values summed lifetime state income taxes, lifetime property taxes, and lifetime sales taxes by education level.

[31] Ibid.

[32] Reduced spending on public assistance due to NCC AmeriCorps members' increased postsecondary educational attainment is included as a federal government benefit, not a state and local government benefit. This is because public assistance includes programs funded at the federal level (e.g., TANF, etc.).

proportional state income tax for each state as the amount of state income taxes paid per NCC AmeriCorps member divided by their pre-tax earnings. This analysis then calculated the weighted average of these state-specific tax rates—using these states' populations from the 5-year estimates of the 2019 American Community Survey—to estimate a weighted national tax rate (U.S. Census Bureau, 2019-a). A weighted national tax rate was used because NCC AmeriCorps members may disperse to various locations nationwide following their service terms and continue to migrate over the course of their working years.

Lifetime state income tax revenue values are also provided by Trostel (2015) by education level. Based on the number of postsecondary degrees estimated to be obtained due to the use of the education award received after serving with the NCC program, additional lifetime state income taxes are realized. Thus, the additional lifetime state income taxes paid values—informed by data from Trostel (2015)—were first converted to 2020 dollars. The analysis then multiplied them by the inferred number of degrees obtained using the education award.

State governments also receive state income taxes from the education awards NCC AmeriCorps members receive post-service. The analysis estimated the pre-tax education award amount in 2020 dollars (i.e., $6,120).[33] Then the analysis multiplied it by the number of NCC AmeriCorps member FTEs expected to redeem the award and use it to pursue postsecondary education or to repay outstanding student loans, based on findings from Friedman et al. (2016). The result represents the pre-tax cumulative education award amount expected to be received by NCC AmeriCorps members. The portion of this value taxed by state income taxes was estimated using a weighted state income tax rate specific to the per-person education award amount. Additionally, state income taxes were estimated for the living allowance amount received by NCC AmeriCorps members during their service term using tax rates specific to the per-person value. The different rates used for these member benefits are enumerated in Table 25.

State and local sales tax revenue: To measure sales tax revenue generation for state and local governments that stems from reduced unemployment, a weighted state and local sales tax rate was applied to the amount of NCC AmeriCorps members' cumulative additional *post-tax* earnings that are available to be spent on taxable goods. To establish a weighted state and local sales tax, this analysis first summed the state sales tax rate and the average local sales tax rate for each state using data from Cammenga (2020). Then using 2019 data from the American Community Survey (U.S. Census Bureau, 2019-a), these state-level combined state and local sales tax rates were weighted based on the population of each state. The resulting weighted average sales tax rate used in this analysis was 7.34 percent.

[33] This analysis used the 2020 to 2021 AmeriCorps education award amount ($6,345) but discounted it to net present 2020 dollars using the Consumer Price Index. For more information about this education award, please see https://americorps.gov/members-volunteers/segal-americorps-education-award/find-out-more.

To estimate the additional post-tax earnings as a result of reduced unemployment that was spent on taxable goods, data from the Consumer Expenditure Survey (U.S. Bureau of Labor Statistics, 2021) were used. These data show the amount of spending on a number of different goods and services by national consumers across several different pre-tax income brackets.[34] The proportion of earnings that is spent on taxable goods (such as alcoholic beverages, housekeeping supplies, apparel, etc.) was then calculated for consumers with incomes that matched the per-person average pre-tax earnings of NCC AmeriCorps members. This value was 41.3 percent. This proportion was then applied to NCC AmeriCorps members' cumulative additional *post-tax* earnings to calculate the post-tax monetary amount they spend on taxable goods. Then the sales tax rate (i.e., 7.43 percent) was applied to estimate the resulting sales tax revenues that go to state and local governments due to NCC AmeriCorps members' reduced unemployment post-service.

Trostel (2015) also provides additional lifetime state and local sales tax values by education level. Using these values, the analysis calculated the additional sales tax revenue realized by state and local governments as a result of NCC AmeriCorps members using their education award to achieve higher postsecondary educational attainment post-service. These values represent a direct benefit to state and local governments in the form of increased tax revenue.

State and local government cost savings: State and local governments also benefit from NCC programming through lifetime savings in social insurance and corrections—as reported in Trostel (2015)—due to the increase in NCC AmeriCorps members' postsecondary educational attainment after program exit. Of note, social insurance includes unemployment insurance and workers' compensation. To calculate these lifetime non-federal government savings, the analysis first calculated the decrease in social insurance and corrections costs (and thus, savings) from one education level to the subsequent education level using data from Trostel (2015) and then multiplied these monetary amounts by the number of additional postsecondary degrees estimated to be obtained due to the use of the education awards.

To determine what portion of this differential represents lifetime cost savings to state or local governments versus the federal government, a different method was employed for each of these cost savings areas. For social insurance, 50 percent of lifetime unemployment insurance cost savings and all the lifetime cost savings for workers' compensation are apportioned to state and local governments (Oswald, 2018). Regarding reductions in lifetime corrections spending, the portion between the federal and state or local governments was determined based on data from Hyland (2015). Specifically, this report found that 8.4 percent of U.S. corrections costs is paid by the federal government and the remaining 91.6 percent is paid by state and local

[34] To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CE) Table 1203 was used from the U.S. Bureau of Labor Statistics (2021). This table lists the annual expenditure means by pre-tax income tax brackets. Thus, the pre-tax earnings of NCC AmeriCorps members were used instead of their post-tax earnings to calculate this metric. Please visit this site for more details: https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income.

governments. Therefore, almost 92 percent of the lifetime cost savings in corrections due to NCC AmeriCorps members experiencing an increase in postsecondary educational attainment post-service are allocated to state and local governments.

Federal Government

The federal government benefits from:

- Additional federal income, Social Security, and Medicare tax revenue from NCC AmeriCorps members' increased earnings due to reduced unemployment
- Additional federal income, Social Security, and Medicare taxes from the living allowance and education award received by these members
- Additional lifetime federal taxes due to NCC AmeriCorps members' increased postsecondary educational attainment
- Additional lifetime federal taxes due to NCC program participants' increased secondary educational attainment
- Reduced lifetime spending on public assistance, social insurance, and corrections due to NCC AmeriCorps members' increased postsecondary educational attainment

Federal income tax revenue: To measure federal income tax revenue that stems from reduced unemployment, the additional pre-tax earnings of NCC AmeriCorps members that are solely attributed to NCC—as well as the pre-tax living allowance and education award amounts received by NCC AmeriCorps members—are taxed by a federal income tax rate. The rates used are estimated proportional tax rates that consider the standard deductions and progressive tax brackets specific to federal income taxes as provided by El-Sibaie (2019). To reiterate, an estimated proportional tax rate equals the total amount of taxes estimated to be paid divided by the pre-tax amount of the value to be taxed (e.g., per-person average pre-tax earnings). The specific federal income tax rates used for these different benefits are enumerated in Table 25. Of note, different tax rates were used because they were specific to the per-person pre-tax earnings, living allowance, and education award amounts.

For the additional lifetime earnings of NCC AmeriCorps members that are based on their increase in postsecondary educational attainment—fueled by the use of the education award—Trostel (2015) provides additional lifetime federal income tax values.

Social Security and Medicare tax revenue: Social Security and Medicare tax revenue are measured as fiscal gains as a result of the additional pre-tax earnings of NCC AmeriCorps members from their reduced unemployment and as a result of the pre-tax living allowances and education awards amounts received by members. However, tax rates specific to each revenue source are used. Social Security and Medicare use flat tax rates, 6.2 percent and 1.45 percent, respectively; thus, these rates are applied to the additional pre-tax earnings of NCC AmeriCorps members to calculate the additional amount of revenue the federal government receives. These same rates are also applied to the living allowance and education award amounts received by NCC AmeriCorps members to calculate additional tax revenue. Moreover, additional lifetime

Social Security tax revenue realized for the federal government—as a result of NCC AmeriCorps members using their education award to complete a higher education degree type post-service—is provided by Trostel (2015).

Federal government cost savings: The federal government realizes cost savings in public assistance, social insurance, and corrections due to the increased postsecondary educational attainment of NCC AmeriCorps members after program exit. Specifically, the number of additional postsecondary degrees estimated to be earned by NCC AmeriCorps members post-service as well as data from Trostel (2015) were used to estimate the federal government portion of lifetime cost savings on social insurance (which is composed of workers' compensation and unemployment insurance, as noted earlier), public assistance (e.g., SNAP, Medicaid, TANF, etc.), and corrections.

Table 24 shows the lifetime costs to the federal versus the state and local governments for each of these areas—where applicable—by education level in 2012 dollars as presented in Trostel (2015). The differences in these lifetime costs from one education level to the next represent cost *savings* per degree obtained.

Table 24. Government Costs by Educational Attainment Level per Individual's Lifetime

Source of government cost	Associate degree (2012$)	Bachelor's degree (2012$)	Graduate degree (2012$)
Public assistance	**$38,617**	**$14,480**	**$9,394**
Social insurance	**$8,897**	**$5,863**	**$4,732**
Federal	$3,652	$2,660	$2,090
State/local	$5,246	$3,204	$2,643
Corrections	**$4,055**	**$1,190**	**$725**
Federal	$341	$100	$61
State/local	$3,714	$1,090	$664

Note: Numbers may not sum due to rounding.
Source: Trostel (2015)

As mentioned earlier in this appendix, as a result of NCC, the analysis estimated an additional 28 NCC AmeriCorps members would redeem the education award to *pursue* additional postsecondary education. Based on the portion of degree costs covered by the post-tax education award, this analysis calculated that an additional associate degree, bachelor's degree, and graduate degree would be *obtained* due to NCC. To conservatively calculate the federal government's lifetime savings associated with these education gains, the differences between the public assistance, federal social insurance, and federal corrections lifetime costs for these education levels and those that precede them are calculated and then expressed in 2020 dollars. These values are then multiplied by the number of additional postsecondary degrees estimated to be obtained—where appropriate—to represent the total cost savings realized by the federal government due to the NCC program. As previously mentioned where discussing the state and local governments' allocation of the reduction in lifetime social insurance and corrections expenditures, the federal government receives 50 percent of the lifetime cost savings in unemployment insurance (part of social insurance; Oswald, 2018), and more than 8 percent of the lifetime cost savings in corrections (Hyland, 2015). These federal government savings are shown in Table 24.

Table 25 shows the tax rates applied to NCC AmeriCorps members' additional pre-tax and post-tax earnings (derived from reduced unemployment), depending on the type of revenue being calculated. It also enumerates the tax rates used for the pre-tax living allowance and education award amounts received by NCC AmeriCorps members during their service term or upon service completion, respectively.

Table 25. 2020 Tax Rates and Ratio of Taxable Expenditures for NCC AmeriCorps Members' Earnings, Living Allowances, and Education Awards

Metric	Rate for additional earnings & education award*	Rate for living allowance & education award**	Notes
Estimated proportional federal income tax	6.55%	3.68%	• Tax rates are used that consider the progressive tax brackets and standard deductions specific to federal income taxes. • These rates are dependent on and applied to the pre-tax value of each metric being taxed.
Estimated proportional state income tax	2.67%	2.20%	• Tax rates are used that consider the progressive tax brackets and standard deductions specific to each state's income taxes. Each state's tax rate is weighted based on the state's population and summed to estimate a weighted national average. • These rates are dependent on and applied to the pre-tax value of each metric being taxed.
Social Security tax	6.20%	6.20%	• Social Security tax rate for employees and employers. • These rates are applied to the pre-tax value of each metric being taxed.
Medicare tax	1.45%	1.45%	• Medicare tax rate for employees and employers. • These rates are applied to the pre-tax value of each metric being taxed.

Metric	Rate for additional earnings & education award*	Rate for living allowance & education award**	Notes
Sales tax	7.34%; N/A to the education award	6.39%; N/A to the education award	• The combined state and average local tax rate for each state was summed and weighted based on states' populations to calculate a national weighted average sales tax rate. • The rate is applied to the additional post-tax earnings of members as well as their post-tax living allowance amount.
Ratio of taxable expenditures per national consumer	41.29%; N/A to the education award	57%; N/A to the education award	• Percentage of post-tax earnings spent on taxable goods and services that is used to calculate sales tax from post-tax earnings. • Ratio is dependent on the pre-tax value of members' additional earnings or the pre-tax living allowance amount.

*These rates are only used for the portion of the education award used to repay outstanding student loans.
**These rates are only used for the portion of the education award used for additional schooling.
Sources: Cammenga (2020), Social Security Administration (2020), U.S. Bureau of Labor Statistics (2021), and El-Sibaie (2019)

Summary of Benefits to Government

Table 26 shows the amount of tax revenue generated and savings in expenditures for state and local versus federal government that are solely credited to NCC and calculated using the methods described above. These government revenue and savings amounts are benefits that are included in the three ROI calculations, and they are derived from NCC program impacts.

Table 26. State/Local and Federal Government Benefits by Stakeholder Group and by Scenario

Benefit type	Benefit		
	Long-term	Medium-term	Short-term
State/local government benefits	**$384,828**	**$199,508**	**$15,163**
State income tax revenue	$77,622	$42,333	$9,396
State and local sales tax revenue	$173,015	$86,508	$5,767

Benefit type	Benefit		
	Long-term	Medium-term	Short-term
State income, sales, and property taxes from postsecondary educational attainment (lifetime)	$134,191	$67,095	$0
State savings in reduced social insurance and corrections spending from postsecondary educational attainment (lifetime)	$7,144	$3,572	$0
Federal government benefits	**$1,106,083**	**$653,931**	**$191,693**
Federal income, Social Security, and Medicare tax revenue from living stipend and education award*	$169,568	$169,568	$169,568
Federal income, Social Security, and Medicare tax revenue from employment	$375,049	$187,525	$12,502
Federal income, Social Security, and Medicare tax revenue from postsecondary educational attainment (lifetime)	$3,327	$17,769	$9,624
Federal savings in reduced social insurance, corrections, and public assistance spending from postsecondary educational attainment (lifetime)	$558,139	$279,070	$0
Total	**$1,490,911**	**$853,439**	**$206,856**

*Living allowances and education awards are one-time taxable payments. The resulting tax revenue does not vary by scenario.

Note: Numbers may not sum due to rounding.

Benefits to Society

Society benefits from NCC's activities in the form of these distinct benefits:

- Wildfire reduction benefits attributable to NCC
- Habitat improvement benefits attributable to NCC

- Trail maintenance and creation benefits attributable to NCC

Wildfire Reduction Benefits Attributable to NCC

Society benefits from the reduction in wildfires resulting from NCC's fuel reduction treatments in three distinct ways:

- Ecosystem services preserved through fuel reduction treatments
- Human health benefits from reduced air particulates from smoke
- Benefits from reduced carbon dioxide equivalents emissions

Using the 7.2 percent estimate in burn reduction from fuel reduction treatments presented in Cochrane et al. (2012) and the 2,825 acres treated from NCC (2022), this analysis estimated that in the first year 203.39 acres are prevented from burning as a result of NCC's efforts.

Ecosystem services preserved through fuel reduction treatments

The literature provides varying estimates of the value of ecosystem services. This analysis used low, average, and high estimates of those benefits to allow for the uncertainty involved in monetizing ecosystem benefits. For the low ecosystem value estimate, an estimated $393 per acre (Batker et al., 2013) was multiplied by the 203.39 acres preserved to generate an annual benefit of $79,883 per year. For the average ecosystem value estimate, an estimated $1,593 per acre (Batker et al., 2013) was multiplied by the 203.39 acres preserved to generate an annual benefit of $323,951 per year. For the high ecosystem value estimate, an estimated $2,890 per acre (Batker et al., 2013) was multiplied by the 203.39 acres preserved to generate an annual benefit of $587,848 per year. These annual estimates were then reduced using the Bartels et al. (2016) regrowth metrics (10 percent regrowth during the first 10 years and 84 percent total regrowth over 30 years). These values were then discounted with other streams of benefits to generate the net present values presented in Table 5 of the main report.

Human health benefits from reduced air particulates from smoke

Using the per-acre health costs from wildfire burning of $467 per acre (Moeltner et al., 2013) and the 203.39 acres preserved, this analysis estimated annual health benefits from reduced air particulates from smoke to be $94,983. These annual estimates were then reduced using the Bartels et al. (2016) regrowth metrics (10 percent regrowth during the first 10 years and 84 percent total regrowth over 30 years). These values were also discounted with other streams of benefits to generate the net present values presented in Table 6 of the main report.

Benefits from reduced carbon dioxide equivalents emissions

The literature provides varying estimates of the quantity of carbon dioxide equivalents emissions produced when an acre of similar composition to those NCC treats is burned. Carbon dioxide equivalents emissions are avoided due to 203.39 acres not burning as a result of NCC's efforts. This analysis used low, average, and high estimates from the literature to allow for the uncertainty involved in monetizing those avoided costs.
To place a dollar value on these benefits, this analysis multiplies the variable carbon

dioxide equivalents emissions under each scenario by the social cost of carbon. (This analysis adjusted the $43 in 2013 dollars reported in the Interagency Working Group [2013] to $47.76 in 2020 dollars). For the low carbon impact estimate, an estimated $1 per acre (Guo et al., 2019) is used, which results in $203 per year. For the average carbon impact estimate, an estimated $42 per acre (Guo et al., 2019; Arora and Melton, 2018) is used, which results in $8,542 per year. For the high carbon impact estimate, an estimated $93 per acre (Arora and Melton, 2018) is used, which results in $17,084 per year. These annual estimates are then reduced using the Bartels et al. (2016) regrowth metrics (10 percent regrowth during the first 10 years and 84 percent total regrowth over 30 years). These values are then discounted with other streams of benefits to generate the net present values presented in Table 7 of the main report.

Habitat Improvement Benefits Attributable to NCC

Society benefits from the ecosystem service values resulting from NCC's ecosystem restoration activities. Using NCC's reported treatment acres of 83 acres in forested mountains and 1,866 acres of other ecosystem designations, this analysis applied them to the value per acre for each of those types of ecosystems for each of the three ecosystem levels. For the low ecosystem level, forested mountains are given $7,697 per acre (ESSRTI, 2021) of ecosystem services, and other ecosystem designations are given $6,687 per acre (ESSRTI, 2021), which aggregate to $944,483 per year. For the average ecosystem level, forested mountains are given $18,150 per acre (ESSRTI, 2021) of ecosystem services and other ecosystem designations are given $24,419 per acre (ESSRTI, 2021), which aggregate to $3,390,172 per year. For the high ecosystem level, forested mountains are given $35,151 per acre (ESSRTI, 2021) of ecosystem services and other ecosystem designations are given $78,571 per acre (ESSRTI, 2021), which aggregate to $10,770,788 per year. These annual estimates are then discounted using the Bartels et al. (2016) regrowth metrics (10 percent regrowth during the first 10 years and 84 percent total regrowth over 30 years). These values are then discounted with other streams of benefits to generate the net present values presented in Table 8.

Trail Maintenance and Creation Benefits Attributable to NCC

Society enjoys health and recreational benefits from NCC's trail maintenance and creation. Using NCC's reported 552.91 miles of trails created or maintained and the sum of the health and recreation value per mile of trails ($3.27 per mile[35]), this analysis calculates annual benefits of $1,808. This estimate is reduced in subsequent years by the annual maintenance cost of $822 for backcountry trails (Echelberger and Plumley, 1986). These values are then discounted with other streams of benefits to generate the net present values presented in Table 9.

Summary of Benefits to Society

Table 27 shows the benefits to society that are solely credited to NCC and calculated using the methods described in the main report.

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[35] $2.94 per mile in health benefits (Wang et al., 2005); $0.33 per mile in recreation benefits (Oh and Hammitt, 2010).

Table 27. Societal Benefits by Impact Category and by Scenario

Benefit type	Benefit		
	Short-term	Medium-term	Long-term
Wildfire reduction			
With low ecosystem benefits	$175,091	$1,521,626	$1,554,231
With average ecosystem benefits	$427,550	$3,715,620	$3,795,237
With high ecosystem benefits	$699,838	$6,081,936	$6,212,257
Ecosystem restoration			
With low ecosystem benefits	$944,483	$10,528,732	$13,803,733
With average ecosystem benefits	$3,390,172	$37,792,323	$49,547,763
With high ecosystem benefits	$10,770,788	$120,068,557	$157,416,320
Trail access			
Health benefits	$1,626	$11,031	$17,603
Recreation benefits	$182	$1,238	$1,976
Total – with low ecosystem benefits	**$1,121,382**	**$12,492,846**	**$16,382,284**
Total – with medium ecosystem benefits	**$3,819,530**	**$42,570,752**	**$55,816,033**
Total – with high ecosystem benefits	**$11,472,433**	**$127,882,344**	**$167,664,106**

Measuring Forgone Benefits (Opportunity Costs)

The analysis included two types of forgone benefits, referred to as *opportunity costs*, in each of the three ROI calculations to conservatively estimate the return of NCC: forgone benefits from a professional opportunity cost to NCC AmeriCorps members and forgone benefits from an investment opportunity cost to funders. Each of these forgone benefit (opportunity cost) types is subtracted from the total program benefits—that stem from NCC—to calculate net benefits. Net benefits are then compared to the program cost to calculate each ROI. The methodologies used to calculate these two forgone benefits (opportunity costs) are described below.

Forgone Benefits From Professional Opportunity Cost to NCC AmeriCorps Members

There is a professional opportunity cost to NCC AmeriCorps members for their period of national service, during which they could have otherwise been working. This includes both the forgone earnings of NCC AmeriCorps members for their service term and the forgone taxes associated with those lost earnings. To calculate this, the analysis first used the demographic distribution of NCC AmeriCorps members for the 2018–2019 program year—in terms of gender, age, race/ethnicity, and pre-service education level—and ASEC data to estimate the weighted unemployment rate for this population (i.e., 4.2 percent). This represents how many of these NCC AmeriCorps members would have been unemployed if they did not serve with NCC. Using the weighted unemployment rate and the number of NCC AmeriCorps member FTEs who served during the 2018–2019 program year (i.e., 61), the analysis estimated the number of members who would have been unemployed without serving with NCC based on their demographic characteristics (i.e., 2). Then the analysis multiplied this value by the weighted post-tax annual earnings. This is derived from the pre-tax annual earnings listed in Table 19. The methodology used to calculate this latter monetary amount is described in the previous Increased Earnings Due to Reduced Unemployment section. The post-tax amount subtracts all applicable payroll taxes (e.g., federal income, state income, Medicare, and Social Security). The product of multiplying 2 by the weighted post-tax annual earnings represents what NCC AmeriCorps members would have earned in total if they did *not* serve with NCC. Separately, the analysis then multiplied the number of NCC AmeriCorps member FTEs who served by the amount they earned during their national service in the form of a post-tax living allowance (i.e., $19,295 per person). This represents the aggregate amount NCC AmeriCorps members earned during their service term. The difference between what they would have earned if they did not serve and what they did earn because they served equals the total post-tax earnings forgone due to serving with NCC. These values and the formula used to calculate the forgone post-tax earnings are shown in Table 28.

Table 28. Forgone Earnings of NCC AmeriCorps Members for a Service Term

Row	Component	Value	Source
A	NCC AmeriCorps member FTEs	61	NCC (2022)
B	Weighted unemployment rate	5.9%	U.S. Census Bureau (2019-b) & NCC
C	Weighted post-tax annual earnings per person (2020$)	$28,982	U.S. Census Bureau (2019-b), U.S. Bureau of Labor Statistics (2019-a), & NCC
D	Post-tax living allowance per person	$19,295	AmeriCorps (2020)
E	Total post-tax earnings forgone (2020$)	$484,039	[A x (1 – B) x C] – (A x D)

Note: Numbers may note sum due to rounding.

The second portion of this professional opportunity cost was the forgone taxes associated with the earnings of NCC AmeriCorps members lost for this year of service. Federal income, state income, Social Security, and Medicare taxes specific to the per-person weighted pre-tax earnings amount were calculated. Specifically, the estimated proportional federal and state income tax rates used were 7.3 percent and 2.8 percent, respectively. The analysis also estimated the sales taxes lost based on the per-person post-tax earnings forgone by the NCC AmeriCorps members. Using data from the Consumer Expenditure Survey (U.S. Bureau of Labor Statistics, 2021), the analysis estimated that based on the per-person weighted pre-tax earnings of NCC AmeriCorps members (i.e., $35,687), 44.9 percent of their income would have been spent on taxable goods, as opposed to 53.1 percent of the living allowance. Then the weighted combined state and local sales tax rate (i.e., 7.43 percent)—used earlier in this analysis to calculate government benefits—was applied to the difference in expected spending on taxable goods to represent the resulting sales tax revenue lost due to individuals serving with NCC instead of working for higher pay. The totals for these taxes are listed in Table 29.

Table 29. Forgone Taxes Associated With the Forgone Earnings of NCC AmeriCorps Members for a Service Term

Forgone taxes	Taxes without service term (2020$)	Taxes realized from living allowance (2020$)	Net taxes forgone (2020$)
Federal forgone taxes (i.e., federal professional opportunity cost)	**$230,689**	**$132,772**	**$97,917**
Federal income taxes	$103,989	$43,101	$60,888
Social Security and Medicare taxes	$126,700	$89,671	$37,029
Non-federal forgone taxes	**$93,614**	**$45,649**	**$47,965**
State income taxes	$43,396	$0	$43,396
Sales taxes	$50,218	$45,649	$4,569
Total taxes	**$324,302**	**$178,421**	**$145,881**

Note: Numbers may not sum due to rounding.

For the *federal government benefits per federal dollar* ROI calculation, only federal government (not total) benefits are included. Because of this, only federal components of the professional opportunity cost are subtracted from all federal government benefits—realized due to NCC—in this ROI calculation. The parts of the professional opportunity cost subtracted from these total federal government benefits include the forgone net federal income taxes (i.e., $60,888) and the net forgone Social Security and Medicare taxes (i.e., $37,029). The sum of these two values is called the *federal professional opportunity cost*. The sum of all the values listed in Table 29 and the forgone post-tax earnings of NCC AmeriCorps members is called the *total professional* *opportunity cost*. These naming conventions are referenced in the Calculating ROI section.

Forgone Benefits from the Investment Opportunity Cost to Funders

The investment opportunity cost estimates the expected forgone return if funds used to support the activities and positions of NCC AmeriCorps members during the most recent program year were invested in U.S. Treasury bonds instead. An investment opportunity cost is calculated for two different funding streams: 1) all NCC program funding for the 2019–2020 program year and 2) only federal funding for the same program year. This is done because two of the three ROI calculations only have federal (not total) program costs included. Thus, for 1) the *federal government benefits per federal dollar* and 2) the *total benefits per federal dollar* ROI calculations, the investment opportunity cost subtracted from the benefits in these calculations is the forgone accrued interest from investing *only* the federal funds into these U.S. Treasury bonds. For the other ROI calculation, the investment opportunity cost subtracted from the benefits realized is the forgone accrued interest from investing *all* NCC program funds (both federal and non-federal) into these U.S. Treasury bonds. Therefore, the analysis estimated forgone accrued interests across all three scenarios when 1) all NCC program funds and 2) only federal NCC program funds are invested in U.S. Treasury bonds.

To calculate these forgone accrued interest values, the analysis first matched 2019 real interest rates provided by the Office of Management and Budget (2020) to each of the scenarios included in this ROI analysis. The analysis used 2019 real interest rates for U.S. Treasury bonds because the NCC program year analyzed began in 2019. The real interest rate for the 3-year maturity was used for the short-term scenario, the average between the 10-year and 20-year maturity rates was used as the rate for the medium-term scenario, and the 30-year maturity rate was used for the long-term scenario. These real interest rates were 0.6 percent, 0.8 percent, and 1.0 percent, respectively (Office of Management and Budget, 2020). Also, the number of years elapsed on these U.S. Treasury bonds was equal to the number of years the different scenarios assumed NCC AmeriCorps members' employment and earnings gains were sustained. These values are 1 year, 15 years, and 30 years for the short-term, medium-term, and long-term scenarios, respectively. Given that U.S. Treasury bonds compound biannually, according to the U.S. Department of the Treasury (2019), the formula used to calculate the forgone accrued interest for each of the three scenarios for the two funding streams is listed in Figure 5, where *A* equals the forgone accrued interest (e.g., the investment opportunity cost), *P* equals the amount of one of the funding streams, *r* equals the 2019 real interest rate, and *t* equals the number of years elapsed.

Figure 5. Compound Interest Formula Used to Calculate Investment Opportunity Cost

$$A = P\left(1 + \frac{r}{2}\right)^{t*2} - P$$

Based on this formula, the forgone benefits from the investment opportunity cost calculated by scenario and funding stream are listed in Table 30, along with their associated inputs. The forgone accrued interest amounts for all funding are called the *total investment opportunity costs* while that for federal funding only are called the *federal investment opportunity costs*. These naming conventions are referenced in the Calculating ROI section.

Table 30. Forgone Benefits From Investment Opportunity Cost Calculation by Scenario and Funding Stream

	Short-term		Medium-term		Long-term	
Metric	All funding	Federal funding only	All funding	Federal funding only	All funding	Federal funding only
Real interest rate	0.6%		0.8%		1.0%	
Years elapsed	1		15		30	
Funding amount	$2,215,361	$1,919,647	$2,215,361	$1,919,647	$2,215,361	$1,919,647
Forgone return (accrued interest)	**$436,193**	**$377,969**	**$281,854**	**$244,231**	**$772,829**	**$669,669**

Note: The real interest rates used are the 2018 real interest rates because the NCC program year commenced in 2018.

Measuring Program Costs

Table 31 shows the costs of NCC by funding source.

Table 31. Funding Sources and Amounts for NCC (2018–2019)

Funding Source	Amount	Percentage of total
Cost categories	**$1,921,647**	
Operating	$318,415	20.4%
AmeriCorps member expenses	$1,172,164	0.4%
Non-AmeriCorps member expenses	$431,068	1.6%
Funding sources	**$2,027,185**	
AmeriCorps	$443,078	22%
Project revenue (federal and non-federal)	$1,511,489	75%
Other*	$72,619	4%

*The "Other" funding identified above includes revenue from rental of an office space.
Note: Numbers may not sum due to rounding.
Source: NCC (2022)

Calculating ROI

To complete the three ROI calculations for NCC, the sum of applicable program benefits is reduced by the forgone benefits, or the professional and investment opportunity costs (where appropriate), and then compared to the cost of the program. As described previously, these three ROI calculations are calculated for each of the three scenarios: short-term, medium-term, and long-term.

Since two of the calculations include benefits to society (e.g., NCC AmeriCorps members, children of NCC program participants, etc.), the results are expressed as cost–benefit ratios, while maintaining the ROI terminology. Specifically, these ratios take the form of the sum of monetized benefits over the sum of applicable program costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every dollar of investment (or program cost).[36]

The formulas used to calculate each of the three ROIs are shown below:[37]

$$\text{Total Benefits per Federal Dollar} = \frac{\begin{array}{c}\text{(Benefits to Non-Government Stakeholders + Benefits to Government) –}\\ \text{(Forgone Benefits From Total Professional Opportunity Cost + Forgone Benefits}\\ \text{From Federal Investment Opportunity Cost)}\end{array}}{\text{(AmeriCorps Federal Funding)}}$$

$$\text{Total Benefits per Funder Dollar} = \frac{\begin{array}{c}\text{(Benefits to Non-Government Stakeholders + Benefits to Government) –}\\ \text{(Forgone Benefits From Total Professional Opportunity Cost + Forgone Benefits}\\ \text{From Total Investment Opportunity Cost)}\end{array}}{\text{(AmeriCorps Federal Funding + Non-Federal Match Funding)}}$$

$$\text{Federal Government Benefits per Federal Dollar} = \frac{\begin{array}{c}\text{(Benefits to the Federal Government) – (Forgone Benefits From Federal}\\ \text{Professional Opportunity Cost + Forgone Benefits From Federal Investment}\\ \text{Opportunity Cost)}\end{array}}{\text{(AmeriCorps Federal Funding)}}$$

Table 32, Table 33, and Table 34 show the total benefits; opportunity costs; program costs; and ROI results for the short-, medium-, and long-term scenarios, respectively.

36 ROIs can be expressed in percentages or as ratios, such as in this study. Although not shown as a ratio in the results, the ROIs in this study show the amount of return for every dollar invested.

37 Non-government stakeholders in this ROI analysis include NCC AmeriCorps members and the children of NCC program participants.

Table 32. ROI Calculations for Short-Term Scenario

Components	Total costs and benefits per federal dollar (2020$)	Total costs and benefits per funder collar (2020$)	Federal government costs and benefits per federal dollar (2020$)
Total benefits by range of impact			
With low ecosystem benefits	$2,252,325	$2,177,942	$74,382
With average ecosystem benefits	$4,950,473	$4,876,090	
With high ecosystem benefits	$12,603,376	$12,528,993	
Total forgone benefits (opportunity costs)	**-$107,687**	**-$497,351**	**-$107,687**
Total program costs	**$1,919,647**	**$2,215,361**	**$1,919,647**
ROI			
Result – low	**$1.17**	**$0.98**	**$0.04**
Result – average	**$2.58**	**$2.20**	
Result – high	**$6.57**	**$5.66**	

Table 33. ROI Calculations for Medium-Term Scenario

Components	Total costs and benefits per federal dollar (2020$)	Total costs and benefits per funder dollar (2020$)	Federal government costs and benefits per federal dollar (2020$)
Total benefits by range of impact			
With low ecosystem benefits	$16,025,497	$15,694,115	$331,383
With average ecosystem benefits	$46,103,404	$45,772,021	
With high ecosystem benefits	$131,414,995	$131,083,613	
Total forgone benefits (opportunity costs)	**-$304,779**	**-$765,892**	**-$304,779**
Total program costs	**$1,919,647**	**$2,215,361**	**$1,919,647**
ROI			
Result – low	**$8.35**	**$7.08**	**$0.17**
Result – average	**$24.02**	**$20.66**	
Result – high	**$68.46**	**$59.17**	

Table 34. ROI Calculations for Long-Term Scenario

Components	Total costs and benefits per federal dollar (2020$)	Total costs and benefits per funder dollar (2020$)	Federal government costs and benefits per federal dollar (2020$)
Total benefits by range of impact			
With low ecosystem benefits	$22,031,493	$21,593,861	$437,632
With average ecosystem benefits	$61,465,241	$61,027,609	
With high ecosystem benefits	$173,313,315	$172,875,683	
Total forgone benefits (opportunity costs)	**-$665,123**	**-$1,256,868**	**-$665,123**
Total program costs	**$1,919,647**	**$2,215,361**	**$1,919,647**
ROI			
Result – low	**$11.48**	**$9.75**	**$0.23**
Result – average	**$32.02**	**$27.55**	
Result – high	**$90.28**	**$78.04**	

Appendix C: Results by Year

Table 35 shows the breakdown of costs and benefits over a 30-year period. Program activities create a stream of benefits over time for AmeriCorps members, the federal government, state and local governments, and society. Opportunity costs that occur from participation in the program apply to the first year, and forgone benefits to funders accrue over time. Program costs are expended in the first year only.

Table 35. NCC Benefits and Costs per Year

Benefits and costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Benefits – low	**$2,582,081**	**$1,147,725**	**$1,079,815**	**$1,016,709**	**$958,101**	**$903,710**	**$853,267**	**$806,526**
Benefits – medium	**$5,280,229**	**$3,662,730**	**$3,423,812**	**$3,201,043**	**$2,993,380**	**$2,799,848**	**$2,619,532**	**$2,451,580**
Benefits – high	**$12,933,132**	**$10,796,175**	**$10,072,218**	**$9,396,590**	**$8,766,152**	**$8,177,966**	**$7,629,285**	**$7,117,537**
AmeriCorps member benefits	$1,260,197	$90,673	$93,393	$96,195	$99,081	$102,054	$105,115	$108,269
Federal government benefits	$145,274	$5,940	$6,118	$6,302	$6,491	$6,686	$6,886	$7,093
State and local government benefits	$55,229	$6,659	$6,859	$7,064	$7,276	$7,495	$7,719	$7,951
Society benefits – low	$1,121,382	$1,044,453	$973,445	$907,147	$845,253	$787,476	$733,546	$683,214
Society benefits – medium	$3,819,530	$3,559,458	$3,317,442	$3,091,482	$2,880,532	$2,683,614	$2,499,811	$2,328,268
Society benefits – high	$11,472,433	$10,692,902	$9,965,847	$9,287,028	$8,653,303	$8,061,733	$7,509,564	$6,994,224
Forgone benefits (opportunity costs)	**$742,535**	**$32,239**	**$32,239**	**$32,239**	**$32,239**	**$32,239**	**$32,239**	**$32,239**
Forgone benefits to members	$484,039	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue	$237,179	$0	$0	$0	$0	$0	$0	$0
Federal taxes	$97,917	$0	$0	$0	$0	$0	$0	$0
State/local taxes	$139,262	$0	$0	$0	$0	$0	$0	$0
Forgone benefits from total investments (all funders)	$11,547	$17,463	$17,463	$17,463	$17,463	$17,463	$17,463	$17,463
Forgone benefits from federal investments	$9,770	$14,776	$14,776	$14,776	$14,776	$14,776	$14,776	$14,776
Program costs	**$1,921,647**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government costs	$1,535,582	$0	$0	$0	$0	$0	$0	$0
Non-federal costs	$386,064	$0	$0	$0	$0	$0	$0	$0

Table 35, cont. NCC Benefits and Costs per Year

Benefits and costs	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16
Benefits – low	**$763,254**	**$723,235**	**$670,217**	**$621,902**	**$577,955**	**$538,065**	**$501,941**	**$469,317**
Benefits – medium	**$2,295,194**	**$2,149,625**	**$1,959,452**	**$1,785,028**	**$1,625,203**	**$1,478,905**	**$1,345,139**	**$1,222,983**
Benefits – high	**$6,640,316**	**$6,195,371**	**$5,616,179**	**$5,084,067**	**$4,595,568**	**$4,147,460**	**$3,736,747**	**$3,360,646**
AmeriCorps member benefits	$111,517	$114,862	$118,308	$121,857	$125,513	$129,278	$133,157	$137,151
Federal government benefits	$7,306	$7,525	$7,751	$7,983	$8,223	$8,469	$8,723	$8,985
State and local government benefits	$8,189	$8,435	$8,688	$8,949	$9,217	$9,494	$9,779	$10,072
Society benefits – low	$636,243	$592,413	$535,470	$483,113	$435,002	$390,823	$350,283	$313,109
Society benefits – medium	$2,168,182	$2,018,802	$1,824,705	$1,646,239	$1,482,250	$1,331,663	$1,193,481	$1,066,775
Society benefits – high	$6,513,304	$6,064,549	$5,481,432	$4,945,277	$4,452,615	$4,000,219	$3,585,089	$3,204,437
Forgone benefits (opportunity costs)	**$32,239**	**$32,239**	**$32,239**	**$32,239**	**$32,239**	**$32,239**	**$52,415**	**$52,415**
Forgone benefits to members	$0	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue	$0	$0	$0	$0	$0	$0	$0	$0
Federal taxes	$0	$0	$0	$0	$0	$0	$0	$0
State/local taxes	$0	$0	$0	$0	$0	$0	$0	$0
Forgone benefits from total investments (all funders)	$17,463	$17,463	$17,463	$17,463	$17,463	$17,463	$28,392	$28,392
Forgone benefits from federal investments	$14,776	$14,776	$14,776	$14,776	$14,776	$14,776	$24,023	$24,023
Program costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government costs	$0	$0	$0	$0	$0	$0	$0	$0
Non-federal costs	$0	$0	$0	$0	$0	$0	$0	$0

Table 35, cont. NCC Benefits and Costs per Year

Benefits and costs	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24
Benefits – low	**$439,943**	**$413,588**	**$390,039**	**$369,096**	**$350,576**	**$334,310**	**$320,139**	**$307,918**
Benefits – medium	**$1,111,577**	**$1,010,125**	**$917,887**	**$834,175**	**$758,354**	**$689,832**	**$628,062**	**$572,535**
Benefits – high	**$3,016,569**	**$2,702,114**	**$2,415,050**	**$2,153,305**	**$1,914,957**	**$1,698,220**	**$1,501,440**	**$1,323,081**
AmeriCorps member benefits	$141,266	$145,504	$149,869	$154,365	$158,996	$163,766	$168,679	$173,739
Federal government benefits	$9,255	$9,532	$9,818	$10,113	$10,416	$10,729	$11,050	$11,382
State and local government benefits	$10,374	$10,685	$11,006	$11,336	$11,676	$12,027	$12,387	$12,759
Society benefits – low	$279,049	$247,867	$219,346	$193,282	$169,488	$147,789	$128,022	$110,038
Society benefits – medium	$950,682	$844,403	$747,193	$658,361	$577,266	$503,311	$435,945	$374,655
Society benefits – high	$2,855,674	$2,536,392	$2,244,357	$1,977,491	$1,733,868	$1,511,699	$1,309,323	$1,125,200
Forgone benefits (opportunity costs)	**$52,415**	**$52,415**	**$52,415**	**$52,415**	**$52,415**	**$52,415**	**$52,415**	**$52,415**
Forgone benefits to members	$0	$0	$0	$0	$0	$0	$0	$0
Forgone tax revenue	$0	$0	$0	$0	$0	$0	$0	$0
Federal taxes	$0	$0	$0	$0	$0	$0	$0	$0
State/local taxes	$0	$0	$0	$0	$0	$0	$0	$0
Forgone benefits from total investments (all funders)	$28,392	$28,392	$28,392	$28,392	$28,392	$28,392	$28,392	$28,392
Forgone benefits from federal investments	$24,023	$24,023	$24,023	$24,023	$24,023	$24,023	$24,023	$24,023
Program costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government costs	$0	$0	$0	$0	$0	$0	$0	$0
Non-federal costs	$0	$0	$0	$0	$0	$0	$0	$0

Table 35, cont. NCC Benefits and Costs per Year

Benefits and costs	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Benefits – low	**$297,514**	**$288,800**	**$281,664**	**$275,999**	**$271,709**	**$268,702**
Benefits – medium	**$522,781**	**$478,364**	**$438,881**	**$403,958**	**$373,251**	**$346,439**
Benefits – high	**$1,161,719**	**$1,016,034**	**$884,804**	**$766,896**	**$661,261**	**$566,928**
AmeriCorps member benefits	$178,952	$184,320	$189,850	$195,545	$201,411	$207,454
Federal government benefits	$11,723	$12,075	$12,437	$12,811	$13,195	$13,591
State and local government benefits	$13,142	$13,536	$13,942	$14,360	$14,791	$15,235
Society benefits – low	$93,697	$78,869	$65,435	$53,283	$42,311	$32,423
Society benefits – medium	$318,964	$268,433	$222,652	$181,242	$143,853	$110,160
Society benefits – high	$957,902	$806,103	$668,575	$544,180	$431,864	$330,649
Forgone benefits (opportunity costs)	**$52,415**	**$52,415**	**$52,415**	**$52,415**	**$52,415**	**$52,415**
Forgone benefits to members	$0	$0	$0	$0	$0	$0
Forgone tax revenue	$0	$0	$0	$0	$0	$0
Federal taxes	$0	$0	$0	$0	$0	$0
State/local taxes	$0	$0	$0	$0	$0	$0
Forgone benefits from total investments (all funders)	$28,392	$28,392	$28,392	$28,392	$28,392	$28,392
Forgone benefits from federal investments	$24,023	$24,023	$24,023	$24,023	$24,023	$24,023
Program costs	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Federal government costs	$0	$0	$0	$0	$0	$0
Non-federal costs	$0	$0	$0	$0	$0	$0

References

AmeriCorps. (n.d.). *Education Award find out more*. AmeriCorps. https://americorps.gov/members-volunteers/segal-americorps-education-award/find-out-more

Arora, V. K., Melton, J. R. (2018). Reduction in global area burned and wildfire emissions since 1930s enhances carbon uptake by land. *Nature Communications*. 9. https://doi.org/10.1038/s41467-018-03838-0

Bartels, S. F., Chen, H. Y.H., Wulder, M. A., White, J. C. (2016). Trends in post-disturbance recovery rates of Canada's forests following wildfire and harvest. *Forest Ecology and Management*. *361*,194–207. https://doi.org/10.1016/j.foreco.2015.11.015

Batker, D., Christin, Z., Schmidt, R., de la Torre, I. (2013). *The economic impact of the 2013 Rim Fire on natural lands*. Earth Economics. https://www.hcd.ca.gov/grants-funding/docs/earth_economics_rim_fire_report_11.27.2013.pdf

Cammenga, J. (2020, January 15). *State and local sales tax rates, 2020*. Tax Foundation. https://taxfoundation.org/2020-sales-taxes/

Center for Program Evaluation. (2020). *Great Basin Institute – Nevada Conservation Corps – Evaluation Report 2019 – 2020*. Reno, NV. https://americorps.gov/sites/default/files/document/GreatBasinInstitute.21ES231073.Evidencedoc3_EDITED_508.pdf

Cochrane, M. A., Moran, C. J., Wimberly, M. C., Baer, A. D., Finney, M. A., Beckendorf, K. L., Eidenshink, J., Zhu, Z. (2012). Estimation of wildfire size and risk changes due to fuels treatments. *International Journal of Wildland Fire*. https://doi.org/10.1071/WF11079

De Groot, R., B. Fisher, and M. Christie. (2010). *The economics of ecosystems and biodiversity, ecological and economic foundations*. United Nations Environment Programme, Geneva, Switzerland. http://www.teebweb.org/wp-content/uploads/Study%20and%20Reports/Reports/Ecological%20and%20Economic%20Foundations/TEEB%20Ecological%20and%20Economic%20Foundations%20report/TEEB%20Foundations.pdf

Dodds, W. K., Wilson, K. C., Rehmeier, R. L., Knight, G. L., Wiggam, S., Falke, J. A., Dalgleish, H. J., Bertrand, K. N. (2008). Comparing ecosystem goods and services provided by restored and native lands. *Bioscience*. *58*(9), 837–845. https://doi.org/10.1641/B580909

Eastern Sierra Sustainable Recreation and Tourism Initiative (ESSRTI). (2021). *A changing climate: Vulnerability in California's Eastern Sierra*. https://mltpa.org/images/downloads/703_02_AChangingClimate_2021-05-13_FINAL.pdf

Echelberger, H. E., Plumley, H. J. (1986). *Anatomy of backcountry management costs*. United States Department of Agriculture Forest Service. Research Paper NE-575. https://doi.org/10.2737/NE-RP-575

El-Sibaie, A. (2019, November 14). *2020 tax brackets*. Tax Foundation. https://taxfoundation.org/2020-tax-brackets/

Friedman, E., Freeman, B., Phillips, B., Rosenthal, L., Robinson, D., Miller, H., & Porowski, A. (2016). *AmeriCorps alumni outcomes: Final survey technical report*. Corporation for National and Community Service (now AmeriCorps). https://americorps.gov/sites/default/files/evidenceexchange/FR_AmeriCorpsAlumniOutcomesFinalTechReport_1.pdf

Guo, M., Li, J., Wen, L., Huang, S. (2019). Estimation of CO_2 emissions from wildfires using OCO-2 data. Atmosphere. 10(1), 581. https://doi.org/10.3390/atmos10100581

Hyland, S. S. (2015). *Justice expenditure and employment extracts, 2015 - Final*. https://bjs.ojp.gov/library/publications/justice-expenditure-and-employment-extracts-2015-final

Interagency Working Group on Social Cost of Carbon, United States Government. (2013). *Technical support document – technical update of the social cost of carbon for regulatory impact analysis – under Executive Order 12866*.

Jones, K. W. (2021, November 24). Estimating the societal benefits from wildfire mitigation activities in a payments for watershed services program in Colorado. https://doi.org/10.32942/osf.io/z9skm

Loughead, K. (2020, February 4). *State individual income tax rates and brackets for 2020*. Tax Foundation. https://taxfoundation.org/state-individual-income-tax-rates-and-brackets-for-2020/

Markovitz, C., Schneider, G., Jastrzab, J. A., & Frumkin, P. (2008, April). *Improving lives and communities: Perspectives on 40 years of VISTA service*. Corporation for National and Community Service (now AmeriCorps). https://americorps.gov/sites/default/files/evidenceexchange/FR_Imprv_LivesComm_40YrsVISTASvc_2008_1.pdf

Mason, C. L., Lippke, B. R., Zobrist, K. W., Bloxton Jr, T. D., Ceder, K. R., Comnick, J. M., ... & Rogers, H. K. (2006). Investments in fuel removals to avoid forest fires result in substantial benefits. *Journal of Forestry*, *104*(1), 27–31.

Moeltner, K., Kim, M. K., Zhu, E., Yang, W. (2013). Wildfire smoke and health impacts: A closer look at fire attributes and their marginal effects. *Journal of Environmental Economics and Management*. *66*(3), 476–496. http://dx.doi.org/10.1016/j.jeem.2013.09.004

National Center for Education Statistics (NCES). (2019). *Digest of education statistics. Table 330.50. Average and percentiles of graduate tuition and required fees in degree-granting postsecondary institutions, by control of institution: 1989-90 through 2018-19*. https://nces.ed.gov/programs/digest/d19/tables/dt19_330.50.asp

National Center for Education Statistics (NCES). (2020). *IPEDS Data Explorer. Average costs (in constant 2019 dollars) associated with attendance for full-time, first-time degree/certificate-seeking undergraduates at Title IV institutions operating on an academic year calendar system, and percentage change, by level of institution, type of cost, control of institution, residency, and student housing: United States, academic years 2017–18 and 2019–20*. https://nces.ed.gov/ipeds/Search?query=&query2=&resultType=all&page=1&sortBy=date_desc&overlayTableId=27425

Office of Management and Budget. (1992, October 29). *Circular A-94: Guidelines and discount rates for benefit–cost analysis of federal programs, transmittal memo no. 64*. https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A94/a094.pdf

Office of Management and Budget. (2003, September 17). *Circular A-4*. https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf

Office of Management and Budget. (2020, November 19). *Budget assumptions. Nominal treasury interest rates for different maturities (from annual budget assumptions for the first year of the budget forecast)*. https://www.whitehouse.gov/wp-content/uploads/2020/12/discount-history.pdf

Oh, C. & Hammitt, W. (2010). Determining economic benefits of park trails: Management implications. *Journal of Park and Recreation Administration. 28*(2), 94–107.

Oswald, J. (2018, March 29). *What does an unemployment claim cost an employer?* Unemployment Insurance Services. https://www.unemployment-services.com/unemployment-claim-cost-employer/

Reinhardt, E.D., Keane, R.E., Calkin, D.E., & Cohen, J.D. (2008). Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. *Forest Ecology and Management. 256*, 1997–2006. https://doi.org/10.1016/J.FORECO.2008.09.016

Schimel, D., Alves, D., Enting, I., Heimann, M., et al. (1995). Radiative forcing of climate change. In *Climate Change 1995: The Science of Climate Change*, (pp. 65-132). Contribution of Working Group I. Second Assessment Report of the Intergovernmental Panel on Climate Change. https://www.ipcc.ch/report/ar2/wg1/

Social Security Administration. (2020). *Fact sheet: 2020 Social Security changes*. https://www.ssa.gov/news/press/factsheets/colafacts2020.pdf

Spera, C., Ghertner, R., Nerino, A., & DiTommaso, A. (2013). *Volunteering as a pathway to employment: Does volunteering increase odds of finding a job for the out of work?* https://americorps.gov/sites/default/files/evidenceexchange/FR_2013_VolunteeringasaPathwaytoEmployment_1.pdf

Stephens, S.L., Collins, B.M., Fettig, C.J., Finney. M.A., Hoffman, C.M., Knapp, E.E., North, M.P., Safford, H., & Wayman, R.B. (2018). Drought, tree mortality, and wildfire in forests adapted to frequent fire. *Bioscience* 8, 77–88. https://doi.org/10.1093/BIOSCI/BIX146

Trostel, P. (2015). *It's not just the money: The benefits of college education to individuals and to society*. Lumina Foundation. https://www.luminafoundation.org/files/resources/its-not-just-the-money.pdf

U.S. Bureau of Labor Statistics. (2019-a). *Consumer Price Index*. https://www.bls.gov/cpi/

U.S. Bureau of Labor Statistics. (2019-b). *Occupational employment and wage statistics*. https://www.bls.gov/oes/tables.htm

U.S. Bureau of Labor Statistics. (2021, May 27). *Consumer Expenditure Surveys tables (CE)*. https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income

U.S. Census Bureau. (2019-a). *American Community Survey (ACS)*. https://www.census.gov/programs-surveys/acs

U.S. Census Bureau. (2019-b). *Current Population Survey's Annual Social and Economic (ASEC) Supplement for March 2019*. https://www.census.gov/data/datasets/time-series/demo/cps/cps-asec.2019.html

U.S. Census Bureau. (2019-c). *2019 Current Population Survey (CPS)*. https://www.census.gov/programs-surveys/cps.html

U.S. Census Bureau. (2020). *Current Population Survey's Annual Social and Economic (ASEC) Supplement for 2020*. https://www.census.gov/data/datasets/time-series/demo/cps/cps-asec.2020.html

U.S. Department of the Treasury. (2019). *Interest rate statistics*. https://home.treasury.gov/policy-issues/financing-the-government/interest-rate-statistics

Wang, G., Macera, C. A., Scudder-Soucier, B., Schmid, T., Pratt, M., & Buchner, D. (2005). A cost-benefit analysis of physical activity using bike/pedestrian trails. *Health Promotion Practice*. 6(2), 174-179.

The Watershed Company. (2015). Impact evaluation 2014–2015: Washington Conservation Corps restoration sites. https://americorps.gov/evidence-exchange/impact-evaluation-2014-2015-washington-conservation-corps-restoration-sites

Zavaleta, E. (2000). Valuing ecosystem services lost to Tamarix invasion in the United States. In H. A. Moody and R. J. Hobbs (Eds), *Invasive Species in a Changing World* (Chapter 12). Washington, D.C.: Island Press. https://books.google.com/books?hl=en&lr=&id=hCoJiTo7I3wC&oi=fnd&pg=PA261&ots=OOnnz0GwJt&sig=4DJXDAwE6bREcfxiSrjOzZv_6ss#v=onepage&q&f=false

Zeidenberg, M., Freeman, B., Friedman, E., & Porowski, A. (2016). *Results from the National Student Clearinghouse data match: New methods for assessing AmeriCorps alumni outcomes*. Abt Associates. https://americorps.gov/sites/default/files/evidenceexchange/FR_NatlStudent_ClearinghouseMatch_AlumniOutcomes_2016_1.pdf