

Return on Investment Study: Washington Conservation Corps

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Executive Summary

Washington Conservation Corps

AmeriCorps contracted with ICF Incorporated, LLC (hereafter ICF) to explore and quantify the return on investment (ROI) of several programs that rely on AmeriCorps national service as a major resource to sustain operations. ROI analyses have the potential to help AmeriCorps measure the performance of programs and build the base of evidence for future resource allocation decisions. In addition, ROI study results will help AmeriCorps communicate the value of its programming to relevant stakeholders.

This ROI study calculated the benefits of the Washington Conservation Corps' (WCC) conservation activities against its costs. WCC is implemented by the Washington State Department of Ecology, to protect and restore natural areas throughout the state of Washington. WCC operates under the AmeriCorps State and National program in the Environmental Stewardship focus area. WCC is an environmental service program providing opportunities for young adults aged 18 to 25 years old to protect and restore natural habitats for state- and federally-listed species.¹ WCC conducts the following types of restoration projects:

- Removing beach debris and structures that damage shoreline habitat
- Planting, maintaining, and preserving urban and native trees and shrubs
- Restoring marine and nearshore habitat
- Repairing and replanting stream-side habitat
- Building and maintaining backcountry and urban trails
- Constructing trails, bridges, and boardwalks
- Removing invasive weeds
- Monitoring restoration sites and sampling streams

Key Results

This study estimated Washington Conservation Corps' (WCC) ROI to be between \$0.20 and \$33.90 per funder dollar, depending on how long WCC AmeriCorps members experience increased earnings as a result of program participation, as well as the range of estimated benefits provided by ecosystem service improvements. The return on each dollar of federal support for the program is even higher, between \$0.69 and \$118.09. These results are driven by environmental benefits as well as favorable employment and education outcomes for WCC AmeriCorps members in the years following their service.

¹ Veterans can also join WCC up to age 31. State of Washington: Department of Ecology. N.d. About the WCC. Retrieved from: <https://ecology.wa.gov/About-us/Our-role-in-the-community/Washington-Conservation-Corps>.

WCC Impacts: Selected Evaluation Results

Below are high-level findings from WCC's restoration site evaluation in 2014 and 2015 (Watershed Company, 2015) that studied the effectiveness of WCC's restoration efforts.

- Native coverage increased by 9.6 percent at restoration sites compared to 0.4 percent at reference sites in the year following the planting intervention.
- Noxious weed coverage decreased by 15.6 percent at restoration sites compared to a decrease of 1.4 percent at reference sites in the year following the planting intervention.

In addition to completing environmental stewardship projects, WCC members provide disaster services in Washington and across the nation during floods, fires, hurricanes, and other natural disasters.² WCC's 2018–2019 program year had 340 crew members and crew leaders who received hands-on experience building trails, planting native trees, implementing erosion control techniques, restoring critical habitats, and responding to local and national disasters.

Invasive species negatively impact ecosystem services related to agriculture, industry, and human health. Examples of such impacts include the affecting of water purification, pollination, natural pest control, disease regulation, soil fertility, and nutrient and water cycling. Invasive species can also impact cultural services including aesthetic values, recreation, and tourism, in both riparian and upland areas. Decreased biodiversity and species extinctions linked to invasive species threaten the continued delivery and quality of many ecosystem services. (Charles and Dukes, 2006). Via WCC's restoration projects, the program directly removes invasive weeds and restores habitats using native plants, enhancing biodiversity and ultimately improving ecosystem services.

Return on Investment Study Methods

The methodology for the WCC ROI study consisted of the following components:

1. **Measuring and monetizing program benefits.** This included using data from a previous evaluation and other third-party sources to determine the benefits to society, WCC AmeriCorps members, and government. The benefits realized across these three stakeholder groups included:
 - **Society.** Habitat restoration improves ecosystem services provided by the land, which yield long-term benefits to society.

² State of Washington: Department of Ecology. N.d. op. cit.

- **WCC AmeriCorps members.** WCC AmeriCorps members benefit from:
 - a) Living allowances and education awards
 - b) Increased earnings due to reduced unemployment
 - c) Increased lifetime earnings due to increased post-secondary education derived from the use of education awards
- **Government.** Government benefits from income, Social Security, and Medicare tax revenue from WCC AmeriCorps members' increased earnings, and sales tax revenue from the increased economic activity that results from those increased earnings. Government benefits also include reduced spending on corrections, public assistance, and social insurance and increased tax revenue associated with the increased educational attainment of WCC AmeriCorps members that is derived from their use of education awards post-service. Finally, government benefits from tax revenue from WCC AmeriCorps members' living allowances and education awards.

This ROI analysis monetized WCC program benefits in 2019 dollars.

- 2. Estimating forgone benefits (opportunity costs).** This analysis calculated two types of forgone benefits, or opportunity costs. Due to AmeriCorps members' participation in WCC, they forgo wages (and associated tax revenue) they could have earned from other employment. Similarly, because of AmeriCorps and other funders' investment in the WCC program, the funders forgo returns from other investments. These forgone benefits are also referred to as "opportunity costs."

The first forgone benefit comprised the professional opportunity cost to WCC AmeriCorps members for their period of national service, during which they could earn more pay by doing other work and consists of those forgone earnings (and associated tax revenue).

The second forgone benefit comprised the investment opportunity cost which is the forgone return of investing program funds into U.S. Treasury bonds instead of using them to support the WCC program. Both are considered costs of national service that reduce the program benefits monetized.³

For the ROI estimates, the analysis subtracts forgone benefits from program benefits to calculate *net benefits*. The net benefits are then compared to program costs.

- 3. Assessing program funding and costs.** WCC provided program costs, which included federal funds and other leveraged funding. The WCC cost data covered the program year of September 2018 through August 2019.

³ The total professional opportunity cost includes the forgone earnings of members and the taxes associated with those earnings. The federal professional opportunity cost includes only the forgone federal taxes that stem from those earnings. The total investment opportunity cost is the forgone return of all funding while the federal investment opportunity cost is the forgone return of only federal funding.

4. Calculating the ROI. The ROI analysis consisted of three types of ROI calculations: 1) *total benefits per federal dollar*, 2) *total benefits per funder dollar*, and 3) *federal government benefits per federal dollar*. This analysis calculated the value of these three ROI calculations under three scenarios (long, medium, and short-term) representing different assumptions about the persistence of program outcomes. As mentioned above, the benefits used to calculate the ROI are the *net benefits* associated with the program (the program benefits minus the forgone benefits, or opportunity cost). This analysis also calculated three variations of each scenario within low, average, and high estimates of ecosystem service benefits to society.

This analytical framework included only those benefits that could be reasonably monetized given the available data, and that likely would not have occurred without the WCC program. Figure ES 1 shows how WCC program activities can result in WCC AmeriCorps member and government benefits.

Figure ES 1. Benefits to WCC AmeriCorps Members, Government, and Society Derived from WCC

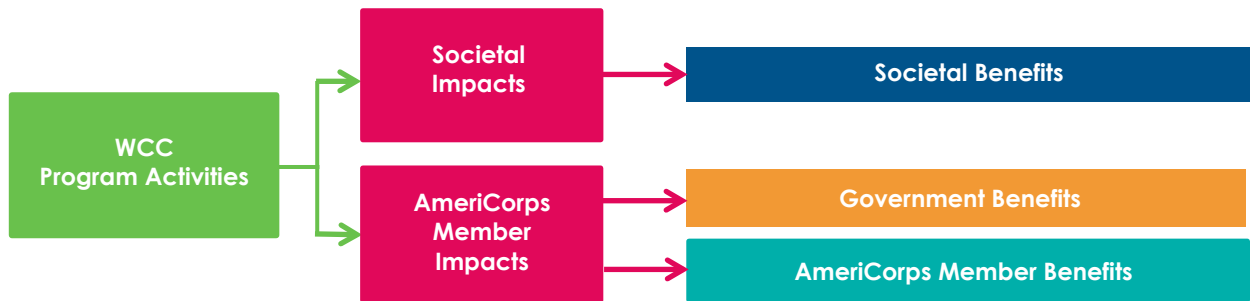


Table ES 1 shows the benefits, forgone benefits (opportunity costs), and costs that are included in each of the three types of ROI calculations.

Table ES 1. Benefits, Forgone Benefits, and Costs Included in the ROI Calculations

ROI Calculation	Benefits	Forgone Benefits	Costs
Total Benefits per Federal Dollar	All societal, WCC AmeriCorps member, and government benefits derived from the program	<ul style="list-style-type: none"> Forgone benefits from total professional opportunity cost Forgone benefits from Federal investment opportunity cost 	<ul style="list-style-type: none"> AmeriCorps federal funding Other Non-AmeriCorps federal funding Total professional opportunity cost Federal investment opportunity cost

ROI Calculation	Benefits	Forgone Benefits	Costs
Total Benefits per Funder Dollar	All societal, WCC AmeriCorps member, and government benefits derived from the program	<ul style="list-style-type: none"> Forgone benefits from total professional opportunity cost Forgone benefits from total investment opportunity cost 	<ul style="list-style-type: none"> AmeriCorps federal funding Other (including match) funding Total professional opportunity cost Total investment opportunity cost
Federal Government Benefits per Federal Dollar	Additional tax revenue generation and reduced spending attributable to the program	<ul style="list-style-type: none"> Forgone benefits from Federal professional opportunity cost Forgone benefits from Federal investment opportunity cost 	<ul style="list-style-type: none"> AmeriCorps federal funding Other Non-AmeriCorps federal funding Federal professional opportunity cost Federal investment opportunity cost

Available data established that WCC AmeriCorps members enjoy increased earnings impacts—due to reduced unemployment—as a result of the WCC program. However, the data did not establish the duration of those benefits. To address a range of possible durations for those benefits, the analysis included three scenarios:⁴

- **Short-term.** This scenario assumed short-term earnings impacts. The assumption here is that the impact is limited to a single year after program exit. This scenario also assumed no long-term or lifetime benefits are realized.
- **Medium-term.** This scenario assumed a longer duration of earnings impacts. The assumption here is that the earnings impact lasts 15 years. A three percent discount rate is applied each year to represent net present value in 2019 dollars.⁵

⁴ These three scenarios consider varying durations of how long increased employment and earnings benefits last for WCC AmeriCorps members. They also consider varying durations for lifetime benefits that stem from the WCC program. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from WCC 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.

⁵ 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 three percent discount rate, see Office of Management and Budget (2003).

This scenario also assumed only half of the net present value of lifetime benefits is realized.

- **Long-term.** This scenario assumed sustained earnings impacts throughout the working years of WCC AmeriCorps members. The assumption here is that the earnings impact lasts 30 years. A discount rate of 3 percent is applied to the earnings each year to represent net present value in 2019 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 national service. The medium-term scenario (i.e., 15 years of sustained employment and earnings benefits) represents the midpoint between these two scenarios.

This analysis also used low, average and high estimates of annual ecosystem service values. The values were based on the range of estimates established in the literature for the relevant land cover types.

Program Benefits, Forgone Benefits, and Program Costs

Table ES 2 shows the estimates of monetized benefits of the WCC program by stakeholder group for each of the three scenarios. Under the short-term scenario, total benefits are estimated to range from over \$8.7 million to over \$31 million. Under the medium-term scenario, the benefits are estimated to range from over \$27 million to over \$311 million. Lastly, under the long-term scenario, the total benefits range from over \$39 million to over \$505 million.⁶

Table ES 2. Program Benefits by Recipient

Recipient	Benefits by Scenario (2019\$)		
	Short term	Medium term	Long term
Society	—	—	—
Low	\$652,966	\$8,028,917	\$13,182,373
Average	\$5,273,492	\$64,843,249	\$106,463,663
High	\$23,746,737	\$291,991,617	\$479,409,924
WCC AmeriCorps Members	\$7,066,627	\$15,893,840	\$21,677,769
Federal Government	\$987,937	\$3,178,886	\$4,798,228
Total			
Low	\$8,707,530	\$27,101,642	\$39,658,370

⁶ The range of values (i.e., low, average, and high) are based on the range of potential impacts, incorporating the lowest and highest estimates established and the average is calculated by averaging all values identified from the literature. The range of per-acre values for each land cover type reflects variations in the estimated values found in the literature.

Recipient	Benefits by Scenario (2019\$)		
	Short term	Medium term	Long term
Average	\$13,328,056	\$83,915,974	\$132,939,660
High	\$31,801,301	\$311,064,342	\$505,885,921

Table ES 3 shows the breakdown of both the professional and investment forgone benefits, or opportunity costs, used in this ROI analysis. The forgone benefits are subtracted from the program benefits (shown above) 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.

The professional forgone benefits includes the post-tax earnings WCC AmeriCorps members forgo—and the associated taxes forgone—due to their participation in the WCC program instead of working. This forgone benefit is consistent across all three scenarios.

The forgone benefits of investment, or opportunity cost, represents the forgone accrued interest from investing WCC program funds (total funding and only federal funding,⁷ separately) into U.S. Treasury bonds instead of into the WCC program. The accrued interest calculated varies by scenario since the analysis matched real interest rates for different maturity levels to each of the three scenarios. The time elapsed on these investments (in years) were also set equal to the number of years represented in each scenario: 1 year for the short-term, 15 years for the medium-term, and 30 years for the long-term.

Table ES 3. Forgone Benefits (Opportunity Cost) by Scenario

Opportunity Cost	ROI Scenario (2019\$)		
	Short term	Medium term	Long term
Professional Opportunity Cost	\$5,714,957	\$5,714,957	\$5,714,957
Forgone Earnings of WCC AmeriCorps Members	\$4,582,857	\$4,582,857	\$4,582,857
Forgone Taxes from Forgone Earnings	\$1,132,100	\$1,132,100	\$1,132,100
Investment Opportunity Cost	\$87,754	\$1,857,991	\$5,094,520
Forgone Accrued Interest on Total WCC Funding	\$62,563	\$1,324,623	\$3,632,051
Forgone Accrued Interest on Federal WCC Funding Only	\$25,191	\$533,368	\$1,462,469
Total Opportunity Cost by Scenario	\$5,802,711	\$7,572,948	\$10,809,477

⁷ Federal funding includes both AmeriCorps funding and other federal funding.

Table ES 4 shows the program cost of WCC by funding source for the September 2018 to August 2019 program year (excluding opportunity costs which are estimated separately). The total cost of the WCC program included funds that supported WCC AmeriCorps member expenses (e.g., living allowance, etc.), program operating costs (e.g., supplies, training, travel, program staff costs), and indirect costs. About 21 percent of program costs (\$2.7 million) were funded by federal government sources, while the remaining consisted of other revenue provided by private funders as well as local and state governments.

Table ES 4. Cost by Funding Source for the 2018–2019 Program Year

Funding Source	Amount (\$)	Percent of Total (%)
AmeriCorps	\$1,704,842	13%
Other Federal	\$1,054,012	8%
State Funding	\$3,950,499	30%
State Interagency Agreements	\$2,642,618	20%
Private/Local/ Tribal Governments	\$3,818,375	29%
Total	\$13,170,346	100%

Note: The expected redeemed education awards post-service are not included in this table. The table includes only funding for the 2018–2019 Program Year.

ROI Results

This analysis developed nine ROI estimates using the three scenarios (short-term, medium-term, and long-term) and the low, average, and high estimates of the ecosystem service values. As noted above, the ROI calculations compare the net benefits of the WCC program with the program costs to calculate the ROI. Table ES 5 shows the gross program benefits, forgone benefits, net benefits, and program costs of the WCC program, along with the results of the three ROI calculations.

Table ES 5. Program Benefits, Net Benefits, and Program Costs by ROI Scenario

Benefits and Costs	ROI Scenario (2019\$)		
	Short term	Medium term	Long term
Total Gross Program Benefits			
Environmental Benefits to Society - Low	\$652,966	\$8,028,917	\$13,182,373
Environmental Benefits to Society - Medium	\$5,273,492	\$64,843,249	\$106,463,663
Environmental Benefits to Society - High	\$23,746,737	\$291,991,617	\$479,409,924
Member Benefits	\$6,774,646	\$14,937,771	\$20,277,157
Federal Government Benefits	\$987,937	\$3,178,886	\$4,798,228
State/Local Government Benefits	\$291,981	\$956,069	\$1,400,612
Total Forgone Benefits (Opportunity Costs)	\$5,802,711	\$7,572,948	\$10,809,477

Benefits and Costs	ROI Scenario (2019\$)		
	Short term	Medium term	Long term
Forgone Benefits to Members (Forgone Earnings Post Taxes)	\$4,095,201	\$4,095,201	\$4,095,201
Forgone Tax Revenue from Members Earnings	\$1,619,755	\$1,619,755	\$1,619,755
Forgone Tax Revenue Federal Government	\$1,132,100	\$1,132,100	\$1,132,100
Forgone Tax Revenue State/Local Government	\$487,655	\$487,655	\$487,655
Forgone Benefits from total investment Interests/Returns (All Funders)	\$87,754	\$1,857,991	\$5,094,520
Forgone Investment Benefits to Federal Government from Funding Provided	\$25,191	\$533,368	\$1,462,469
Program Cost	\$14,603,748	\$14,603,748	\$14,603,748
Federal Government Cost	\$4,192,256	\$4,192,256	\$4,192,256
Non-Federal Government Cost	\$10,411,492	\$10,411,492	\$10,411,492
Total Program Net Benefits (Total Program Gross Benefits – Total Forgone Benefits)			
Low	\$2,904,819	\$19,528,694	\$28,848,893
Medium	\$7,525,346	\$76,343,027	\$122,130,184
High	\$25,998,590	\$303,491,394	\$495,076,445
ROI for Total Benefits per Federal Dollar (Total Net Benefits / Federal Government Cost)			
Low	\$0.69	\$4.66	\$6.88
Medium	\$1.80	\$18.21	\$29.13
High	\$6.20	\$72.39	\$118.09
ROI for Total Benefits per Funder Dollar (Total Program Net Benefits / Total Program Cost)			
Low	\$0.20	\$1.34	\$1.98
Medium	\$0.52	\$5.23	\$8.36
High	\$1.78	\$20.78	\$33.90
Federal Government Benefits per Federal Dollar* (Net Benefits Federal Government / Federal Government Cost)	-\$0.04	\$0.36	\$0.53

* Federal Government Benefits do not include societal benefits from ecosystem services in terms of their fiscal return, which is calculated in the ROI scenarios.

Table ES 6 shows the ROI results for the WCC program. The results are expressed as cost–benefit ratios, while maintaining the ROI terminology. Specifically, these ratios take the form of the sum of monetized net benefits over the sum of program costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every \$1.00 of investment (or program cost).⁸

Table ES 6. ROI Results for WCC

ROI Calculation	Ecosystem Service Value Estimates	ROI Scenario		
		Short term	Medium term	Long term
Total Benefits per Federal Dollar Formula: Total Net Benefits / Federal Government Cost	Low	\$0.69	\$4.66	\$6.88
	Average	\$1.80	\$18.21	\$29.13
	High	\$6.20	\$72.39	\$118.09
Total Benefits per Funder Dollar Formula: Total Net Benefits / Total Costs	Low	\$0.20	\$1.34	\$1.98
	Average	\$0.52	\$5.23	\$8.36
	High	\$1.78	\$20.78	\$33.90
Federal Government Benefits per Federal Dollar Formula: Federal Government Net Benefits / Federal Government Cost		-\$0.04	\$0.36	\$0.53

WCC AmeriCorps produces strong returns in the medium- and long-term scenarios when benefits are included for WCC AmeriCorps members, as well as for federal, state, and local governments. 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—where benefits for only a single year post-program are included—the ROI results indicate that program costs outweigh the benefits. A negative ROI or one that is below \$1 in the first year post-program is common in programs where there is an initial one-time investment made and benefits accrue in the following years. This is because it often requires several years of benefits to recoup the initial investment and generate positive returns. During the program, AmeriCorps members gain the experience, skills, and knowledge that result in future benefits, such as improved employment and wages, which can be sustained throughout their working years. Part of the reason why the ROI calculations show losses in the short-term is because the professional opportunity cost to WCC AmeriCorps members is high given that more than 50 percent of members for the 2018–2019 program year had a bachelor's degree pre-service. This augments the earnings they forgo due to serving in WCC AmeriCorps for one year. Additionally, as noted in the ROI methodology, lifetime benefits that stem from WCC AmeriCorps are not realized in the short-term scenario. Given this, the ROI calculations for the short-term *Total benefits per funder dollar* scenarios under the low and average estimates of the ecosystem service values result in losses. Specifically, every \$1 invested results in a return of \$0.20 to all stakeholders under the short-term scenario considering low ecosystem service values to society and \$0.52 considering

⁸ 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 \$1 invested.

average ecosystem service values to society. For every \$1 the federal government invests, the federal government loses its original \$1 investment plus an additional \$0.04.

Under the medium-term scenario, *total benefits per federal dollar* invested yields \$4.66 to \$72.39, and *total benefits per funder dollar* are anticipated to yield \$1.34 to \$20.78. Given the medium-term scenario, the federal government alone receives \$0.36 back in fiscal returns and savings for every dollar invested, while also generating benefits for society.

Under the long-term scenario, total benefits for every federal dollar invested yields \$6.88 to \$118.09, and all funders are anticipated to receive \$1.98 to \$33.90 in total benefits per dollar invested. Given the long-term scenario, the federal government alone receives \$0.53 back in fiscal returns and savings for every dollar invested, while also generating benefits for society.

The magnitude and direction of the ROI calculations are driven by several factors including:

- **The wide range of ecosystem service values by various land cover types.** Table 3 in the main report presents a range of annual ecosystem service values for relevant cover types. As explained in the ROI Study Limitations section, there are limitations to using ecosystem service valuation related to challenges in estimating ecosystem service benefits.
- **The employment outcomes of WCC 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 (Friedman et al., 2016; Markovitz et al., 2008; Spera et al., 2013; Zeidenberg et al., 2016). According to Friedman et al. (2016), the percentage of AmeriCorps members who were unemployed was 5 percentage points lower six months after serving in AmeriCorps versus the six months before. This gain in employment resulted in increased cumulative earnings and tax revenue.
- **The educational attainment outcomes of WCC AmeriCorps members.** AmeriCorps State and National members receive education awards after serving with an AmeriCorps program. The award is used by a portion of members to help pay for post-secondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional lifetime earnings for WCC AmeriCorps members and additional tax revenue and savings for government.

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 other leveraged funding also contributed to the magnitude of the ROI results. Federal government funding of the WCC program served as a catalyst for private and other government funding. This additional combined private and non-AmeriCorps government funding—amounting to over \$10.4 million for WCC for the 2018–2019 program year—allowed the WCC program to enroll more individuals than otherwise would have been served under the

federal funding alone, leading to greater total benefits realized. Though it may not impact the ROI, because it is a per unit metric, non-AmeriCorps funding leads to greater investment in the WCC program and thus to a greater impact as more individuals are served and increased benefits to society are produced.

Introduction

AmeriCorps contracted with ICF Incorporated, LLC (hereafter ICF) to explore 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 subject of ROI studies for Fiscal Year 2021: Habitat for Humanity AmeriCorps, Washington Conservation Corps, YouthBuild AmeriCorps, and Birth & Beyond's Home Visitation Program. This ROI study measures the benefits of the Washington Conservation Corps (WCC) against its program costs based on the analytical approach and data sources specified in its respective feasibility study.

Study Overview

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. It also provides a brief history of past evaluations, outlines the factors that made this program a strong selection for an ROI study, and identifies a potential set of comparable ROI estimates for the WCC program.
- **ROI Methodology** outlines how this analysis used various data sources to monetize benefits derived from the WCC program, describes its associated program costs, and explains how opportunity costs are calculated.
- **Program Benefits, Forgone Benefits (Opportunity Cost), Program Costs, and ROI Results** provides a detailed description of the benefits, program costs, and opportunity 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

WCC is an environmental service program administered by the Washington State Department of Ecology⁹ that provides opportunities for young adults ages 18 to 25¹⁰ to protect and restore natural habitats for state- and federally-listed species including anadromous fish.¹¹ The WCC program has more than 300 crew members and leaders throughout the State of Washington.¹²

Crew members receive hands-on experience building trails, planting native trees, implementing erosion control techniques, restoring critical habitats, and responding to local and national disasters. AmeriCorps members who serve in WCC engage in service work in small crews of up to half a dozen people to restore natural resource sites. Crew leaders supervise groups and provide guidance on job skills, offer technical knowledge, and arrange field logistics. WCC AmeriCorps members receive a living allowance, insurance, training, and an education award in exchange for their service.¹³

WCC conducts the following types of restoration projects:

- Removing beach debris and structures that damage shoreline habitat
- Planting, maintaining, and preserving urban and native trees and shrubs
- Restoring marine and nearshore habitat
- Repairing and replanting stream-side habitat
- Building and maintaining backcountry and urban trails
- Constructing trails, bridges, and boardwalks
- Removing invasive weeds
- Monitoring restoration sites and sampling streams

In addition to completing environmental stewardship projects, WCC members provide disaster services in Washington and across the nation during floods, fires, hurricanes, and other natural disasters.¹⁴

⁹ WCC is funded through Serve Washington (the Washington State Service Commission), including receiving AmeriCorps funding in the role of subgrantee.

¹⁰ Veterans can also join WCC up to age 31. State of Washington: Department of Ecology. N.d. About the WCC. Retrieved from: <https://ecology.wa.gov/About-us/Our-role-in-the-community/Washington-Conservation-Corps>.

¹¹ Endangered marine species are listed here by NOAA Fisheries' Species Directory: https://www.fisheries.noaa.gov/species-directory/threatened-endangered?title=&species_category=1000000031&species_status=any®ions=1000001126&items_per_page=25&sort=

¹² State of Washington: Department of Ecology. n.d. op. cit.

¹³ State of Washington: Department of Ecology. n.d. op cit.

¹⁴ State of Washington: Department of Ecology. n.d. op. cit.

For the 2018–2019 program year, WCC had 262 full-time, 60 half-time, and 18 quarter-time AmeriCorps members that served as WCC crew members and leaders. The 340 total members, or 297 full-time equivalent (FTE) members, treated 3,265 acres, improved 1,514 acres, planted more than half a million trees, supported more than 450,000 square feet of erosion control, treated more than 600 miles of trail, and improved more than 300 miles of trail.^{15,16}

Invasive species negatively impact ecosystem services related to agriculture, industry, and human health. Examples of such impacts include the affecting of water purification, pollination, natural pest control, disease regulation, soil fertility, and nutrient and water cycling. Invasive species can also impact cultural services including aesthetic values, recreation, and tourism, in both riparian and upland areas. Decreased biodiversity and species extinctions linked to invasive species threaten the continued delivery and quality of many ecosystem services. (Charles and Dukes, 2006). Via WCC's restoration projects, the program directly removes invasive weeds and restores habitats using native plants, enhancing biodiversity and ultimately improving ecosystem services.

WCC Evaluation History

The Watershed Company (2015) measured the effectiveness of the WCC's restoration efforts to increase native plant cover and reduce invasive plant cover at 23 randomly selected restoration sites. The impact evaluation used Before-After, Control-Impact (BACI) statistical analysis to analyze the outcomes of WCC restoration efforts. BACI is an effective method to evaluate natural and human-induced interventions on ecological variables when treatment sites cannot be randomly chosen. This study's treatment involved the planting of native vegetation at each of the 23 restoration sites and WCC employed some method of weed control at 19 of the restoration sites.

Pre-restoration site conditions were recorded at each site. Data collection included: a description of the dominant invasive plants at each site, existing native vegetation conditions, and visual cover estimates for native vegetation, total noxious vegetation, reed canarygrass, knotweed, and other weeds. Variables such as invasive plant removal methods, soil amendments, bare-root or container plants, planting density, and irrigation, were recorded for review in the final evaluation. Post-restoration conditions were recorded immediately following the restoration action (fall/winter 2014) and one-growing season later (late summer 2015). Data collection at reference sites followed a similar protocol to restoration sites. Native and invasive cover estimates,

¹⁵ Washington Conservation Corps (WCC). 2021. Data Request for Return-on-Investment Study. Submitted by Laura Schlabach on March 9 and 24 and June 8, 2021.

¹⁶ "WCC defines 'trails treated' as all trail activities including short-term improvements to existing recreational infrastructure (trail clearance, surface repairs, debris removal) and new constructions, reroutes, or new infrastructure that enhances the sustainability of a trail (including puncheons, boardwalks, bridges, culverts, water bars and steps or stairs). WCC defines 'trails improved' as contributions to public access, safety, improved used of established, approved paths. WCC uses land manager assessments to verify quantitative and qualitative data with respect to this." – WCC (2021). Op. cit.

plant health and vigor, and established photo-points were recorded once in winter 2014 and once in late summer 2015.¹⁷

The outcomes included the following related to native coverage and noxious weed coverage:¹⁸

- Native coverage increased by 9.6 percent at restoration sites compared to 0.4 percent at reference sites the first year following the planting intervention. The average survival for new native plantings in the first year was 72 percent.
- Noxious weed¹⁹ coverage decreased by 15.6 percent at restoration sites compared to a decrease of 1.4 percent at reference sites the first year following the planting intervention.

Both results were statistically significant as shown in Table 1. WCC's Treatment of Native Plant and Noxious Weed Coverage Results After One Year, demonstrating that WCC used effective intervention techniques.

Table 1. WCC's Treatment of Native Plant and Noxious Weed Coverage Results After One Year

Coverage Group	Restoration	Reference	Difference	P value	Significant?
Native Tree and Shrub	9.6% increase	0.4% increase	9.2%	0.03	Yes
Noxious Weed	15.6% decrease	1.4% decrease	14.2%	0.03	Yes

Figure 1 shows the mean percent of native tree and shrub coverage for the restoration and reference sites before and after the intervention. Figure 2 shows noxious weed coverage.

¹⁷ The Watershed Company. 2015. Impact Evaluation 2014-2015: Washington Conservation Corps Restoration Sites (Rep.). Kirkland, WA. Retrieved from https://americorps.gov/sites/default/files/document/2015_10_01_WAStateDeptofEcology_WAConservationCorps_ImpactEvaluationFullReport_ORE.pdf

¹⁸ The Watershed Company. 2015. Impact Evaluation 2014-2015: Washington Conservation Corps Restoration Sites (Rep.). Kirkland, WA. Retrieved from https://americorps.gov/sites/default/files/document/2015_10_01_WAStateDeptofEcology_WAConservationCorps_ImpactEvaluationFullReport_ORE.pdf

¹⁹ Noxious weeds are non-native plants that, due to their aggressive growth and lack of natural enemies, can be highly destructive and difficult to control. Noxious weeds can reduce crop yields, destroy native plant and animal habitat, damage recreational opportunities, clog waterways, lower land values, create erosion problems and fire hazards, and poison humans and livestock. Whatcom County, WA. N.d. What are Noxious Weeds?. Retrieved from: <https://www.whatcomcounty.us/921/What-Are-Noxious-Weeds>.

Figure 1. Average Percent Native Tree and Shrub Coverage Before vs. After Intervention

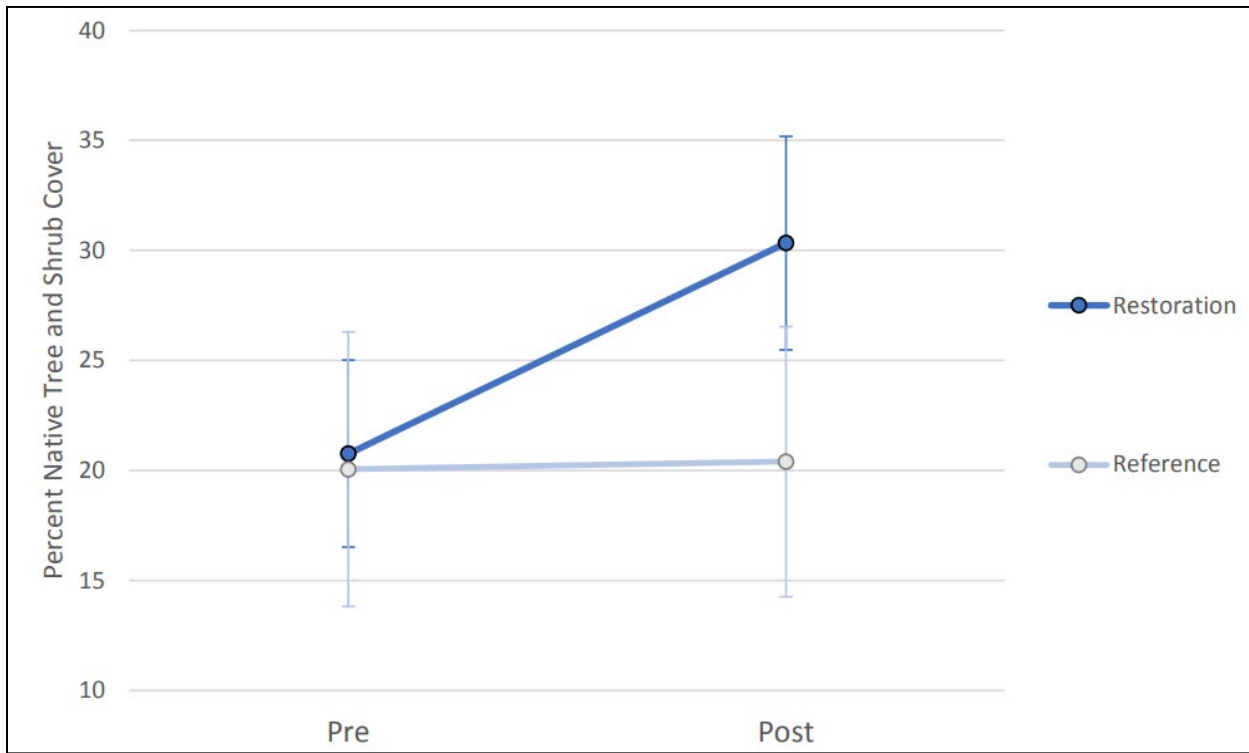
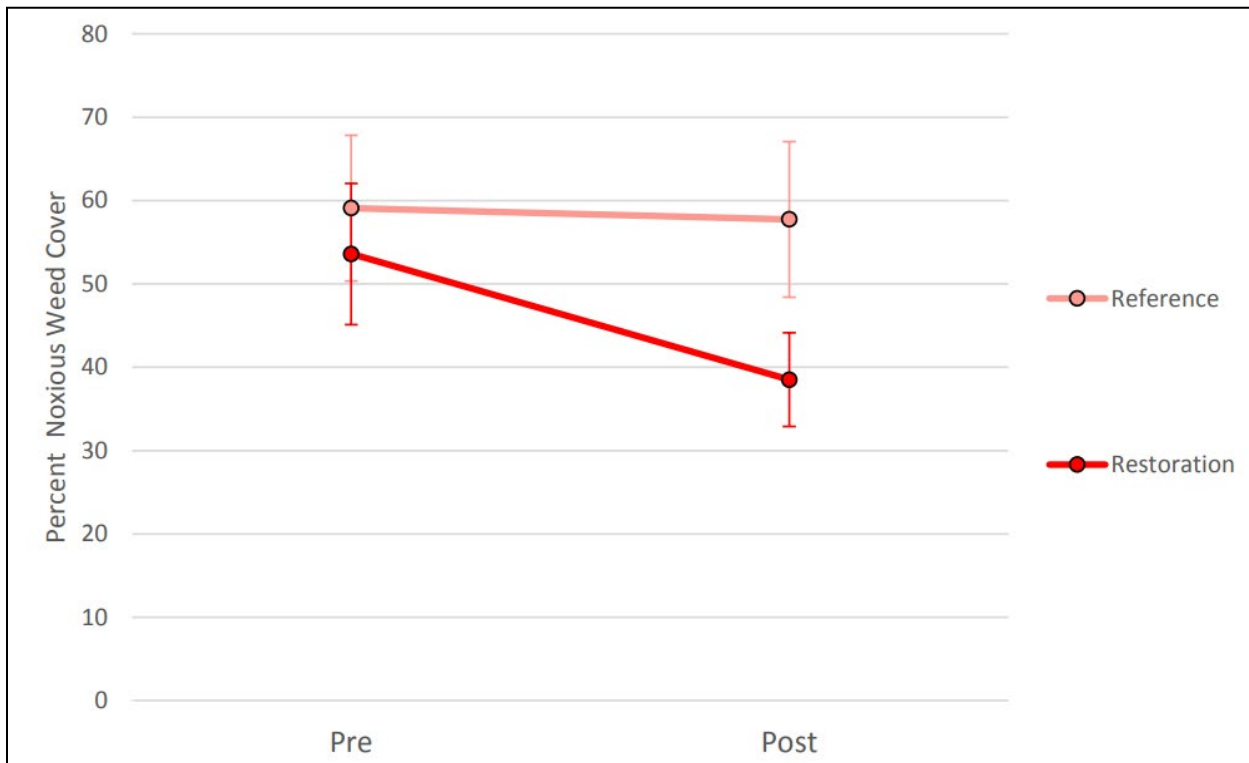


Figure 2. Average Percent Noxious Weed Coverage Before vs. After Intervention



Selection of WCC for the AmeriCorps ROI Project

ICF recommended making the WCC program the subject of an ROI analysis based on a comprehensive feasibility study. This feasibility study delineated the process for monetizing the associated benefits and costs of this environmental stewardship program by analyzing outcomes related to restoring wetlands and riparian corridors. Specifically, the feasibility study noted how the native plant and noxious weed coverage outcomes, included in the Watershed Company (2015), could be included in an ROI for WCC. The improvement of ecosystems through the reduction in noxious weeds and increased native vegetation, can yield increases in societal value from ecosystem service values. Ecosystem service values are the value of improved land cover types based on a variety of benefits to society identified and calculated in the existing literature.

Ecosystem Service Valuation

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.²⁰

Values attributed to ecosystem services can be described as use or non-use values. Use values, provide economic value through direct use by humans. Some direct uses of ecosystem services involve human consumption, such as harvesting timber and other forest products, food, and fuel. Other direct uses, such as viewing wildlife, hiking, and enjoying scenic vistas, do not involve any actual consumption. Human beings also can use ecosystem services indirectly. For example, when people directly use plants and animals, consumptively or non-consumptively, they indirectly use the habitats of those plants and animals. Other examples of indirect use include regulation of water flow, waste assimilation, and climate regulation (i.e., carbon storage and sequestration).²¹

Ecosystem services are commonly divided into four distinct groups:²²

- Provisioning services provide products that are used directly by people, such as food, water, and raw materials
- Regulating services are outputs from the normal functioning of ecosystems that benefit people in direct ways, such as the regulation of climate, air and drinking water quality, soil formation and retention, moderation of extreme events, and biological control

²⁰ De Groot et al. op. cit.

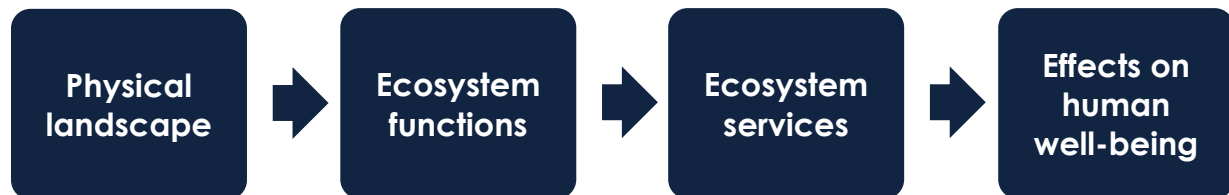
²¹ De Groot et al. op. cit.

²² De Groot et al. op. cit.

- Habitat and supporting services are processes that are necessary for the production of other ecosystem services, such as habitat for plants and animals, conservation of genetic diversity, and cycling of nutrients
- Cultural services provide benefits to people through meaningful interactions with nature, such as aesthetic enjoyment, recreation, spiritual enrichment, and cognitive development

Eastern Sierra Sustainable Recreation and Tourism Initiative (ESSRTI) (2021)²³ applied an “ecosystem services framework” to determine which ecosystem services are commonly identified with land cover types. The first step of the framework was understanding the physical landscape’s ecosystem functions by land cover type. The ecosystem functions are assessed for their capacity to generate ecosystem services, and finally, ecosystem service values indicate the societal impacts and outcomes associated with human well-being. Figure 3 illustrates the process associated with the ecosystem services framework.

Figure 3. Ecosystem Services Framework



ESSRTI (2021) conducted an extensive literature review for values for land cover types and ecosystem services and then used *benefit transfer* methods to adapt the values to their project site in the Eastern Sierra in California. Benefit transfer uses value estimates of ecosystem services from existing studies and applies them to a new context. Two approaches to conducting benefit transfers are *benefit value transfer* and *benefit function transfer*.

Benefit value transfer takes point estimates, or values, from the primary source and applies them to the new project site, assuming the new project site is similar to the primary study site. Benefit function transfer takes the function used to estimate benefits in the original study and applying the function to the new project site. Independent variables in the function are updated with values that reflect the characteristics of the new project site. Benefit function transfer is preferred over benefit value transfer as it allows for the original values to be adapted to a greater degree than is possible with benefit value transfer. Despite these advantages, the data are not always available to conduct benefit function transfers.

²³ Eastern Sierra Sustainable Recreation and Tourism Initiative (ESSRTI). 2021. A Changing Climate: Vulnerability in California's Eastern Sierra. Retrieved from: https://mltpa.org/images/downloads/703_02_AChangingClimate_2021-05-13_FINAL.pdf

As described above, ESSRTI (2021) used both benefit function transfer and benefit value transfer from the literature to estimate a range of annual ecosystem service values by land cover type. The range of values (i.e., low, average, and high) are based on the range of potential impacts, incorporating the lowest and highest estimates established and the average is calculated by averaging all values identified from the literature. Table 3, presented in Section “2. Estimate Ecosystem Service Values”, shows the range of annual ecosystem service values for select and applicable land cover types estimated by ESSRTI (2021). ESSRTI (2021) expects the range to be similar to other ecosystem service analyses applying benefit transfer. The range of per-acre values for each land cover type reflects variations in the estimated values found in the literature.²⁴

As the Eastern Sierras of California are relatively close to Washington State and the ESSRTI (2021) was recently published, the range of values are similarly used applying benefit value transfer to the WCC program’s improved acreage. Additionally, ESSRTI (2021) was developed in partnership with the State of Washington Office of Sustainability and Climate.

Comparable ROI Estimates

ROI studies of other programs that offer similar services provide context for WCC ROI estimates.

The Trust for Public Land (2010) analyzed the costs and benefits of the Land & Water Conservation Fund (LWCF).²⁵ The LWCF funds federal land acquisition by the Bureau of Land Management, Fish and Wildlife Service, Forest Service, and National Park Service. Using a sample of 16 sites that received LWCF funding between 1998 and 2009, The Trust for Public Land analyzed the past and likely future economic returns generated from the sample federal sites and found that every dollar invested generates \$4 in economic value from natural resource goods (e.g., grazing on grasslands) and services (e.g., water filtration, flood protection by wetlands, erosion control, etc.) alone. The study estimated the value of natural resource goods and services based on ecosystem service values in the literature.

There are additional benefits of these conservation efforts that were not included in The Trust for Public Land’s ROI estimates. For example, the federal lands provide local recreation and are vital to local tourism industries. The Trust for Public Land found that more than 10 million people visit these 16 sites annually and spend more than \$500 million in the surrounding local communities. Including these spillover effects would increase the return to society, resulting in a more favorable ROI. Similarly, as described in the ROI Study Limitations Section, recreation and tourism benefits could not be estimated for the restoration and improvements made by WCC due to a lack of

²⁴ ESSRTI states in regard to the use of a range, “We carried this structure through the analysis to emphasize the range of values that ecosystem services provide. The range provided by this analysis is an expected outcome and similar to other analyses of this type.” ESSRTI (2021) p. 31.

²⁵ The Trust for Public Land. (2010). Return on the Investment from the Land & Water Conservation Fund. Retrieved from: <https://www.tpl.org/return-investment-land-and-water-conservation-fund>

available data. Capturing recreation usage such as hiking on improved trails could result in a more favorable ROI in this analysis.

To date, there is little literature on the ROI of conservation efforts that includes a broader array of benefits. However, Funk et al. (2013) estimated the social welfare return of South Africa's Working for Water program—a wetland invasive plant control program—in terms of job creation and training. The study found that the social welfare return was comparable to, or higher than, the ecosystem service return.²⁶ The authors also note that a California-based program designed to control an invasive reed species recently won funding partly by emphasizing its economic benefits as a public works project.

Moreover, conservation efforts may provide additional environmental benefits not captured in ROI studies to date, such as flood protection. For example, Narayan et al. (2016) estimated the economic benefits of coastal wetlands in reducing property damage from storms and flooding in the Northeastern United States.²⁷ Results indicated that salt marsh conservation in New Jersey can reduce average annual flood losses by more than 20 percent. The study estimated that coastal wetlands saved more than \$625 million in flood damages after Hurricane Sandy.

ROI Methodology

The methodology for the WCC ROI study consisted of the following components:

- 1. Measuring and monetizing program benefits.** This included using data from a previous evaluation and other third-party sources to determine the benefits to society, WCC AmeriCorps members, and the government. The benefits realized across these three stakeholder groups include:
 - **Society.** Habitat restoration improves ecosystem services provided by the land, which yield long-term benefits to society.
 - **WCC AmeriCorps members.** WCC AmeriCorps members benefit from
 - a) living allowances and education awards
 - b) increased earnings due to reduced unemployment
 - c) increased lifetime earnings due to increased post-secondary education derived from the use of education awards

²⁶ Funk, J., Matzek, V., Bernhardt, M., & Johnson, D. (2013). Broadening the Case for Invasive Species Management to Include Impacts on Ecosystem Services. *BioScience*, 64(1). doi:10.1093/BIOSCI/BIT004

²⁷ Narayan, S., Beck, M.W., Wilson, P., Thomas, C., Guerrero, A., Shepard, C., Reguero, B.G., Franco, G., Ingram, C.J., Trespalacios, D. (2016). Coastal Wetlands and Flood Damage Reduction: Using Risk

Industry-based Models to Assess Natural Defenses in the Northeastern USA. (Rep.). London: Lloyd's Tercentenary Research Foundation. Retrieved from <https://conservationgateway.org//ConservationPractices/Marine/crr/library/Documents/CoastalWetlandsandFloodDamageReductionReport.pdf>

- **Government.** Government benefits from income, Social Security, and Medicare tax revenue from WCC AmeriCorps members' increased earnings, and sales tax revenue from the increased economic activity that results from those increased earnings. Government benefits also include reduced spending on corrections, public assistance, and social insurance and increased tax revenue associated with the increased educational attainment of WCC AmeriCorps members that is derived from their use of education awards post-service. Finally, government benefits from tax revenue from WCC AmeriCorps members' living allowances and education awards.

This ROI analysis monetized WCC program benefits in 2019 dollars.

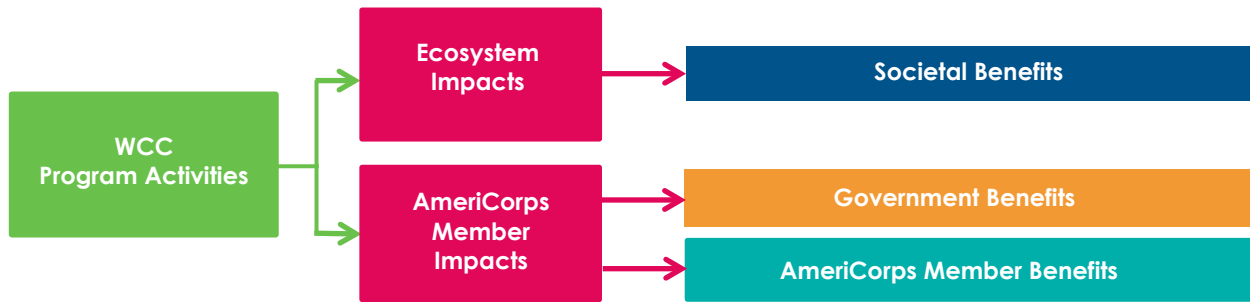
2. **Estimating Forgone Benefits (opportunity costs).** This ROI analysis estimated two types of forgone benefits. The first was the professional opportunity cost to WCC AmeriCorps members for their period of national service, during which they could have earned more pay by doing other work. This included both the forgone earnings of WCC AmeriCorps members and the associated tax revenue for government. The second was the investment opportunity cost for WCC AmeriCorps program funding that could have been used for other purposes. The analysis estimated the investment opportunity cost for both government and private funders based on the forgone return of investing program funds into U.S. Treasury bonds. The rates of return for U.S. Treasury bonds provide a market-based estimate of return for low-risk investments. For the ROI estimates, the analysis subtracted forgone benefits from program benefits to calculate net benefits.
3. **Assessing program costs.** WCC provided program costs for the program year of 2018–2019. WCC costs for the 2018–2019 program year included operating costs, AmeriCorps member expenses, and other indirect costs. Program operating costs captured the majority of expenses which include supplies, training, travel, and program staff costs. AmeriCorps member expenses included the living allowance amounts received during service and the expected education awards received post-service.²⁸
4. **Calculating the ROI.** The ROI analysis included three ROI calculations, each assessed under three scenarios representing different assumptions about the persistence of program outcomes and low, average, and high estimates of ecosystem valuations. The three ROI calculations are:
 - *Total benefits per federal dollar*
 - *Total benefits per funder dollar*²⁹
 - *Federal government benefits per federal dollar*

²⁸ WCC (2021). op. cit.

²⁹ The different funder groups whose investment is in this calculation include the federal government (i.e., AmeriCorps and other federal sources), state and local governments, and other non-government entities.

This analytical framework included only those benefits that could be reasonably monetized given the available data, and that likely would not have occurred without the WCC program. Figure 4 shows how WCC program activities can result in society, WCC AmeriCorps member, and government benefits.

Figure 4. Benefits among WCC AmeriCorps Members, Government, and Society Derived from WCC



Available data established that WCC AmeriCorps members enjoy increased earnings impacts—due to reduced unemployment—as a result of the WCC program. Evaluations have shown that serving in AmeriCorps fosters higher skill acquisition, increased educational attainment, and higher income from increased employment post-national service (Friedman et al., 2016; Markovitz et al., 2008; Spera et al., 2013; Zeidenberg et al., 2016). Freidman et al. (2016) found that unemployment among AmeriCorps members six months after their period of national service was 5 percentage points lower compared to six months before.³⁰ However, the data does not establish the duration of those benefits. To address a range of possible durations for those benefits as well as lifetime benefits, the analysis includes three scenarios:³¹

- **Short-term.** This scenario assumes short-term earnings impacts. The assumption is that impacts are limited to a single year after program exit. This scenario also assumes no long-term or lifetime benefits are realized.

³⁰ See page 56 of Friedman et al. (2016).

³¹ These three scenarios consider varying durations of how long increased employment and earnings benefits last for WCC AmeriCorps members. They also consider varying durations for lifetime benefits that stem from the WCC program. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from WCC 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.

- **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 2019 dollars.³² 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 WCC AmeriCorps members' working years. The assumption is that earnings impacts last 30 years. A discount rate of 3 percent is applied to the earnings each year to represent net present value in 2019 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 national service. 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 program benefits, forgone benefits (opportunity costs) and included WCC program costs, all in 2019 dollars, to assess the ROI of the WCC program. Additional details on the methodology employed and the calculations used for this analysis are in Appendix B: Additional Information on the Methodology.

Program Benefits

The WCC program results in monetizable benefits to society, WCC AmeriCorps members, and the various levels of government. Table 2 summarizes these benefits and data sources by stakeholder group.

³² 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 2. Program Benefits Realized from the WCC Program by Stakeholder Group

Stakeholder Group	Benefits	Data Sources*
Society	<ul style="list-style-type: none"> Increased ecosystem service valuation per acre of WCC restoration sites 	<ul style="list-style-type: none"> WCC (2021) The Watershed Company (2015) Eastern Sierra Sustainable Recreation and Tourism Initiative (ESSRTI) (2021)
WCC AmeriCorps Members	<ul style="list-style-type: none"> AmeriCorps member post-tax living allowances and education awards Additional earnings from reduced unemployment Additional lifetime earnings from increased educational attainment as a result of education awards 	<ul style="list-style-type: none"> WCC (2021) Friedman et al. (2016) U.S. Census Bureau (Current Population Survey (CPS)) (2019) Trostel (2015) NCES (2019a) NCES (2019b) Consumer Price Index (CPI); (BLS, 2021)
Government	<ul style="list-style-type: none"> Tax revenue from increased earnings by WCC AmeriCorps members post-program and sales tax revenue from the induced increased economic activity Tax revenue from living allowances and education awards Reduced spending on corrections, public assistance, and social insurance from increased educational attainment by WCC AmeriCorps members as a result of education awards Additional tax revenue from increased educational attainment by WCC AmeriCorps members as a result of education awards 	<ul style="list-style-type: none"> Consumer Expenditure Survey (BLS, 2020) Social Security tax rate (Social Security Administration (SSA), 2020) Medicare tax rate (SSA, 2019) Combined state and average local sales tax rates (Tax Foundation, 2019) IRS (2020) Trostel (2015) Consumer Price Index (CPI; BLS, n.d.) AmeriCorps (2020)

*Usage of these data sources is discussed in more detail in the subsequent sections. Additionally, tax rates used on WCC AmeriCorps members' increased earnings, their forgone earnings, and their education awards and living allowances are national averages. See Appendix B for a detailed discussion.

A. Monetize Benefits of Ecosystem Restoration

1. Estimate Habitat Improvements Attributable to WCC

This analysis estimated WCC's impact on enhanced and restored habitats in terms of:

- increased native plant species
- decreased invasive plant species

The Watershed Company (2015) study established that the impacts of WCC's restoration actions are statistically significant, demonstrating that the WCC program uses effective interventions to reduce noxious weed coverage and foster increased native plant coverage. Specifically, results indicated that compared to the reference sites, restoration sites increased native coverage by 9.2 percent and reduced noxious weed coverage by 14.2 percent one year after WCC's planting intervention. The study states that they expect native vegetation coverage to continue to increase as planted vegetation grows. Similarly, invasive coverage is expected to continue to decrease as native vegetation becomes established.

2. Estimate Ecosystem Service Values

ICF used an ecosystem service valuation approach to assess the value of goods and services derived from ecosystem improvements by WCC. Ecosystems are dynamic complexes of plants, animals, microorganisms, and the nonliving environment, which interact as functional units. The processes through which ecosystems sustain themselves are known as ecosystem functions. Ecosystem services are the benefits that society receives from ecosystem functions. Some values are tied to direct market activity, such as timber, minerals, food, and fuel. Other values can be derived from indirect or non-market activity, such as climate regulation (i.e., carbon storage and sequestration), waste treatment, water quality and regulation, and recreational activities.

ESSRTI (2021)³³ estimated the value of ecosystem services, taking existing studies and applying them to a different scenario. The report established a baseline, identifying ecosystem services by land cover type and their economic benefits. ESSRTI (2021) estimated, through benefit transfer, the values for various land cover types, applying both benefit function transfer³⁴ and benefit value transfer as applicable.³⁵ Step 3 is ultimately an example of benefit value transfer as we apply the findings of ESSRTI (2021) and apply them to WCC's improved land area. Table 3 presents a range of annual ecosystem service values for select and applicable land cover types. The range of impacts (i.e., low, average, high) is derived from the literature, including the lowest estimate, the highest estimate, and the average of all values identified.

³³ Eastern Sierra Sustainable Recreation and Tourism Initiative (ESSRTI). 2021. A Changing Climate: Vulnerability in California's Eastern Sierra. Retrieved from: https://mltpa.org/images/downloads/703_02_AChangingClimate_2021-05-13_FINAL.pdf

³⁴ Benefit function transfer takes the function used in a previous study (ideally a primary source that estimated the value of ecosystem service benefits in a particular location/case study) to estimate benefits in the new context (ESSRTI, 2021).

³⁵ Benefit value transfer takes point estimates, or values, from a primary source and applies them directly to a different context, under the assumption that the new context is similar to the primary study site (ESSRTI, 2021).

Table 3. Annual Ecosystem Service Values by Land Cover Type (2019\$)³⁶

Land Cover Type	Total Value per Acre per Year		
	Low	Average	High
Coniferous Forest	\$8,922	\$20,926	\$42,482
Deciduous Forest	\$4,671	\$15,889	\$36,512
Grassland	\$8,211	\$17,614	\$30,933
Shrubland	\$8,983	\$18,171	\$30,678
Wetland	\$2,646	\$49,493	\$252,252

Source: ESSRTI (2021)

Further discussion of ecosystem services can be found in Appendix B: Additional Information on the Methodology.

3. Apply Ecosystem Service Valuation to WCC's Improved Acreage

ICF used the benefit value transfer method to apply ecosystem service values from ESSRTI (2021), presented in Table 3, to the land cover types improved by WCC over the course of the 2018–2019 program year (described below). The ROI uses the findings of ESSRTI (2021) because the report:

- Conducted an extensive literature review of values for all land cover types and ecosystem services
- Was developed in partnership with the State of Washington Office of Sustainability and Climate
- Applied a range of values similar to the WCC program's improved acreage
- Was recently published

Next, ICF aligned the WCC data on improved land by land cover type with the land cover types presented in ESSRTI (2021). WCC treated 3,265 acres and improved 1,514 acres during the 2018–2019 program year. WCC defines treated land as acres where invasive species were removed, and the site is prepared for additional restoration activities including planting. WCC improved land by increasing native species coverage and biodiversity, consistent with established land management protocol. To conservatively estimate the value of WCC's restoration efforts, the 1,514 improved acres were ultimately used in conjunction with the net increase of 9.2 percent in native tree and shrub coverage as a result of the intervention (Figure 1).

³⁶ These values were derived from Table 11 in ESSRTI (2021). Op. Cit.

WCC provided land cover types for project sites by percentage:³⁷

- 60 percent riparian/wetland
- 20 percent forested mountains
- 10 percent marine forests
- 10 percent other.

This analysis used the benefit value transfer method to apply low, average, and high ecosystem service values from ESSRTI (2021) to the land cover types improved by WCC. The analysis specifically applied:

- ESSRTI (2021) values for wetlands to the 60 percent of acreage identified by WCC as “riparian/wetland”
- Averaged ESSRTI (2021) values for coniferous, deciduous, grassland, and shrubland land cover types to the 20 percent of acreage identified by WCC as “forested mountains”³⁸
- ESSRTI (2021) values for coniferous forest to the 10 percent of acreage identified by WCC as “marine forests”³⁹
- Averaged ESSRTI (2021) values for coniferous, deciduous, grassland, shrub land, and wetland land cover types to the 10 percent of acreage identified by WCC as “other”

The results of applying the above numbers and values are presented in Table 4.

Table 4. Imputed Annual Ecosystem Service Values per Acre by Land Cover Type (2019\$)

Land Cover Type	Low	Average	High
Riparian/Wetland	\$2,646	\$49,493	\$252,252
Forested Mountains	\$7,697	\$18,150	\$35,151
Marine Forests	\$8,922	\$20,926	\$42,482
Other	\$6,687	\$24,419	\$78,571

³⁷ WCC (2021). op. cit.

³⁸ EPA. 2000. Ambient Water Quality Criteria Recommendations. Rivers and Streams in Nutrient Ecoregion II. Retrieved from: <https://www.epa.gov/sites/production/files/documents/rivers2.pdf>

³⁹ Perakis, Geiser, and Lilleskov. Chapter 9: Marine West Coast Forests. GTR-NRS-80. Retrieved from: <https://www.nrs.fs.fed.us/pubs/gtr/gtr-nrs-80chapters/9-perakis.pdf>

For example, the low range estimate for riparian/wetland ecosystem services is \$2,646 (Table 4). That \$2,646 multiplied by 60 percent of 1,514 improved acres is \$2.4 million. 9.2 percent of \$2.4 million (\$221,146 in Table 5) is the improvement in ecosystem services attributable to the WCC intervention due to improved riparian/wetland acres during the 2018–2019 program year.

Table 5. Annual Ecosystem Service Value of WCC's 2018–2019 Program Year's Improved Land by Type (2019\$)

Land Cover Type	Percent	Low	Average	High
Riparian/Wetland	60	\$221,146	\$4,136,272	\$21,081,375
Forested Mountains	20	\$214,412	\$505,618	\$979,232
Marine Forests	10	\$124,271	\$291,479	\$591,725
Other	10	\$93,136	\$340,123	\$1,094,405
Total	100	\$652,966	\$5,273,492	\$23,746,737

Additional explanation is provided in Appendix B's Apply Ecosystem Service Valuation to WCC's Improved Acreage Section.

B. Monetize Benefits of WCC AmeriCorps Members' National Service

AmeriCorps members who serve with WCC benefit from higher skill acquisition, increased educational attainment, and increased employment post-national service.⁴⁰

1. Estimate Benefits based on FTE WCC AmeriCorps Member Award Amounts

AmeriCorps members serving with WCC realize a benefit from the post-tax living allowances AmeriCorps State and National members are allotted during their public service and the post-tax education awards they receive after service completion. Both are considered taxable income and thus result in increased government revenue.⁴¹

⁴⁰ Relevant studies include:

Friedman, E., Freeman, B., Phillips, B., Rosenthal, L., Robinson, D., Miller, H., & Porowski, A. (2016). AmeriCorps Alumni Outcomes: Final Survey Technical Report. Retrieved from https://americorps.gov/sites/default/files/evidenceexchange/FR_AmeriCorpsAlumniOutcomesFinalTechReport_1.pdf

Zeidenberg, M., Freeman, B., Friedman, E., & Porowski, A. (2016). Results from the National Student Clearinghouse Data Match: New Methods for Assessing AmeriCorps Alumni Outcomes. Retrieved from https://americorps.gov/sites/default/files/evidenceexchange/FR_NatlStudent_ClearinghouseMatch_AlumniOutcomes_2016_1.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? Retrieved from https://americorps.gov/sites/default/files/evidenceexchange/FR_2013_VolunteeringasaPathwaytoEmployment_1.pdf

⁴¹ The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. Retrieved from <https://americorps.gov/members-volunteers/segal-ameri-corps-education-award>

The award amounts (living allowance and education award) were included in the ROI analysis as a direct one-time benefit to FTE WCC AmeriCorps members expected to redeem the award. Further discussion of WCC AmeriCorps member benefits can be found in Appendix B: Additional Information on the Methodology.

2. Estimate Benefits based on FTE WCC AmeriCorps Member Employment Outcomes

Evaluations have shown that serving in AmeriCorps fosters higher skill acquisition, increased educational attainment, and higher income from increased employment post-national service (Friedman et al., 2016; Markovitz et al., 2008; Spera et al., 2013; Zeidenberg et al., 2016). Freidman et al. (2016) found that unemployment among AmeriCorps members six months after their period of national service was 5 percentage points lower compared to six months before.⁴² To monetize this decrease in unemployment, the analysis first determined the demographic distribution of WCC AmeriCorps members who served during the most recent program year in terms of race/ethnicity, gender, age, and education level pre-service using data provided by WCC. The analysis then proceeded to:

1. Estimate FTE WCC 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 March 2019
2. Multiply the 5 percentage-point reduction in unemployment from Freidman et al. (2016) to the number of FTE WCC AmeriCorps members that served during the 2018–2019 program year to estimate the number of additional FTE WCC AmeriCorps members employed post-service
3. Multiply the demographically-weighted per-person average annual earnings by the number of additional FTE WCC AmeriCorps members employed to estimate the total increased earnings attributable to national service

The earnings metrics for WCC AmeriCorps members were applied and discounted based on the short-term, medium-term, and long-term scenarios in net present 2019 dollars. The post-tax AmeriCorps members' projected earnings represents the additional income earned by AmeriCorps members attributable to their participation in the WCC program.

Further discussion of WCC AmeriCorps member benefits can be found in Appendix B: Additional Information on the Methodology.

3. Estimate Benefits based on WCC AmeriCorps Member Educational Outcomes

Another benefit derived from national service is the higher educational attainment of AmeriCorps members. AmeriCorps members in general—as documented in Friedman et al. (2016)—can use their education awards to:

- a) pay for additional post-secondary educational attainment or

⁴² See page 56 of Friedman et al. (2016).

b) repay student loans

Friedman et al. (2016) estimated that 46 percent of AmeriCorps State and National members used their education award to pursue additional post-secondary education while 33 percent used it to repay student loans.⁴³

This analysis estimated the expected increase in lifetime earnings attributable to WCC AmeriCorps members increased educational attainment post-service as a result of using the education award to pay for additional schooling. Based on the findings from Friedman et al. (2016), this ROI analysis estimated the amount in post-tax education awards that WCC AmeriCorps members used to pay for additional educational attainment. The analysis then estimated the value of the additional educational attainment attributable to the education awards in terms of lifetime earnings using data from Trostel (2015). These estimated additional lifetime earnings were included as a benefit to WCC AmeriCorps members.

Further discussion of WCC AmeriCorps member benefits can be found in Appendix B.

C. Tax Revenue Generation and Reduced Spending (Benefits to Government)

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

1. Benefits to Government from the Living Allowance earned by WCC AmeriCorps Members

The living allowance provided to WCC AmeriCorps members during their service term is taxable. This analysis applied relevant tax rates (e.g., federal income, Medicare, Social Security, and sales tax on estimated spending) to the living allowance amount received to estimate this additional government revenue. As WCC conducts conservation work in Washington State and Washington State does not have a state income tax, no state income taxes were incurred on WCC AmeriCorps members' living allowances. The analysis used Washington State sales tax rates to estimate state and local sales tax revenue.

2. Benefits to Government from Increased Earnings by WCC AmeriCorps Members

Government benefits from increased earnings by WCC AmeriCorps members in the form of:

- **Income tax revenue from increased WCC AmeriCorps member earnings post-service.** Federal income taxes, state income taxes, Medicare taxes, and Social Security taxes were estimated for the additional pre-tax earnings of WCC 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 additional pre-tax earnings per WCC

⁴³ Friedman et al. (2016). op. cit. Exhibit VIII-6.

AmeriCorps member. For the state income tax rate, the analysis weighted individual state-level rates by their respective state populations to estimate a nationwide tax rate to apply program-wide. An estimated weighted tax rate for states, nationwide, was leveraged because WCC 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 WCC AmeriCorps member earnings post-service.** To estimate the additional sales tax revenue generated due to the additional post-tax earnings of WCC AmeriCorps members, the combined state and average local sales tax rate for the U.S.—weighted by states' populations—was calculated. Then it was applied to the estimated taxable expenditures for consumers based on the post-service pre-tax earnings of WCC AmeriCorps members using the Consumer Expenditure Survey (BLS, 2021).⁴⁴ The resulting product was then applied to the share of post-tax earnings attributable to serving with WCC AmeriCorps estimate state and local government sales tax revenue.

3. Benefits to Government from Increased Educational Attainment by WCC AmeriCorps Members

Government benefits from increased post-secondary educational attainment by WCC AmeriCorps members. Those benefits include:

- **Tax revenue from education awards.** Education awards provided to WCC AmeriCorps members upon service completion are subject to taxes, resulting in additional government revenue.⁴⁵ This ROI analysis applied federal income, state income, Social Security, and Medicare tax rates to the expected total amount of education awards to be given to WCC AmeriCorps members to estimate these additional taxes. Both estimated proportional federal and state income tax rates were used. Sales taxes were not estimated for education awards given that this award amount cannot be used for consumer purchases.
- **Reduced lifetime spending on corrections, public assistance, and social insurance from increased educational attainment as a result of education awards.** Higher educational attainment is associated with less dependence on government assistance programs and lower incarceration rates (Blagg & Blom, 2018; Harlow, 2003). Because WCC AmeriCorps members increased post-secondary educational attainment, due to the use of the education award, the government spends less.

⁴⁴ To calculate the estimated taxable expenditures, Consumer Expenditure Survey (CES) Table 1203 was used from 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 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>.

⁴⁵ The tax implications of the AmeriCorps member education award are stated here: AmeriCorps. (n.d.). Segal AmeriCorps Education Award. Retrieved from <https://americorps.gov/members-volunteers/segal-ameri-corps-education-award>

For the monetization of these benefits, the analysis paired the expected increase in post-secondary educational attainment of WCC AmeriCorps members with the expected difference in per-person lifetime government cost savings from Medicaid, SNAP, unemployment insurance, worker's compensation, and corrections for individuals with different levels of educational attainment. The latter values were provided by Trostel (2015).

- **Lifetime tax revenue from increased educational attainment as a result of education awards.** The last benefit related to WCC AmeriCorps members captured in this ROI study is the lifetime tax revenue generated from members' higher post-secondary educational attainment due to the use of the education award. Here, the estimated increase in WCC AmeriCorps members' post-secondary educational attainment is paired with the expected difference in per-person lifetime taxes for individuals with different levels of education as provided by Trostel (2015). This lifetime tax revenue includes federal income, state income, property, Social Security, Medicare, and sales taxes derived from use of the education award.

Forgone Benefits (Opportunity Costs)

The analysis incorporated two forgone benefits (opportunity costs) into each of the three ROI calculations for the WCC program: a professional opportunity cost to WCC 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.

Professional Opportunity Cost to WCC AmeriCorps Members

The first forgone benefits (opportunity cost) was the professional opportunity cost to WCC 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 WCC AmeriCorps members would have earned if they did not serve in the WCC program. Specifically, this analysis estimated the weighted average annual earnings of this group as well as their weighted unemployment rate using the demographic distribution of WCC AmeriCorps members for the 2018–2019 program year and ASEC data. 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 WCC AmeriCorps members if they were employed, not serving in the WCC program. The weighted unemployment rate represents how many of the WCC AmeriCorps members would have been unemployed if they did *not* serve in the WCC program. These weighted metrics were first used to estimate the portion of WCC members who would have been employed and then to calculate the aggregate earnings those employed individuals would have made without serving in the WCC program. Namely, they are used to calculate the aggregate post-tax earnings this population would forgo due to serving with WCC for one year. Some of the forgone earnings would have been paid in the form of taxes. To appropriately allocate opportunity costs between WCC AmeriCorps members and government, 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. These taxes combined represent what the various levels of government are forgoing in tax revenue when these individuals decide to serve in the WCC program instead of working for higher pay. The summation of all forgone taxes and the forgone post-tax earnings of WCC 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 the WCC program 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 WCC 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 WCC 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 (OMB, 2020) to each of the scenarios leveraged in this ROI analysis: short-term, medium-term, and long-term.⁴⁶ 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 interest rates are 0.6, 0.8, and 1.0 percent, respectively.⁴⁷ 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 WCC AmeriCorps members' employment and earnings gains are sustained: 1 year, 15 years, and 30 years, respectively. These bonds compound bi-annually according to the Department of

⁴⁶ The analysis used 2018 real interest rates for U.S. Treasury bonds because the WCC AmeriCorps program year analyzed began in 2018.

⁴⁷ OMB Circular No. A-94. 2020. Appendix C. Retrieved from: https://www.whitehouse.gov/wp-content/uploads/2020/12/2020_Appendix-C.pdf and White House. 2020. Budget Assumptions. November 19, 2020. Real Treasury Interest Rates. <https://www.whitehouse.gov/wp-content/uploads/2020/12/discount-history.pdf>

Treasury (n.d.). The forgone accrued interest was calculated for each of the three scenarios if the funding amount used to support WCC was instead invested.⁴⁸

Note that 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. 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 WCC 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 for the WCC program, used for this ROI analysis, include federal, state, local, and private funding to support program operations. The costs are specific to the 2018–2019 WCC program year. WCC costs for the 2018–2019 program year include operating costs, AmeriCorps member expenses, and other costs (shown in Table 6). Operating costs capture the majority of expenses which include supplies, training, travel, and program staff costs. AmeriCorps member expenses include the living allowance and other benefits members receive during service. Other costs are indirect costs incurred by WCC.⁴⁹

Table 6. WCC Program Costs, 2018–2019 Program Year

Cost Category	Cost	Percent of Total (%)
Operating	\$6,784,804	51.5%
AmeriCorps Member Expenses	\$6,028,862	45.8%
Other	\$356,681	2.7%
Total	\$13,170,347	100.0%

Source: WCC (2021)

Table 7 shows the segmentation of WCC program costs by funder.⁵⁰ Total federal funding comprised 21 percent of total funding. WCC indicated that all non-AmeriCorps sources listed contributed funding to support the program. As all individuals serving in

⁴⁸ Department of Treasury. N.d. Interest Rates - Frequently Asked Questions. Retrieved from: <https://home.treasury.gov/policy-issues/financing-the-government/interest-rate-statistics/interest-rates-frequently-asked-questions>

⁴⁹ WCC (2021). op. cit.

⁵⁰ WCC (2021). op. cit.

WCC are AmeriCorps members, all non-AmeriCorps funding is revenue that supports the AmeriCorps program.⁵¹

Table 7. WCC Program Costs by Funder Type, 2018–2019 Program Year

Funder	Funding Provided for the Program Year (\$)	Percent of Total (%)
AmeriCorps	\$1,704,842	12.9%
Federal (non-AmeriCorps)	\$1,054,012	8.0%
State Funding and Interagency Agreements	\$6,593,117	50.1%
Private/Local/ Tribal Governments	\$3,818,375	29.0%
Total	\$13,170,346	100.0%

Source: WCC (2021)

Federal dollars also helped pay for the expected education award amounts granted to WCC AmeriCorps members, post-service. Table 8 shows the total cost of the WCC program as the sum of the program costs and the expected value of education awards redeemed. Please refer to the section in Appendix B for details on the calculation of the expected education award amount.⁵²

Table 8. WCC Program and Expected Education Award Costs (2019\$)

Cost Category	Value	Percent of Total (%)
Program Costs	\$13,170,347	90.2%
Expected Post-service Education Awards Redeemed	\$1,433,402	9.8%
Total Costs	\$14,603,749	100.0%

ROI Study Limitations

Four study limitations are identified below, which derive from a lack of available data, as well as general precautions when valuing ecosystem services and environmental recreation.

⁵¹ WCC (2021). op. cit.

⁵² The education award comes from the National Service Trust. This is a line-item in AmeriCorps's annual budget approved by Congress every year. Thus, the expected education award amounts to be realized by WCC AmeriCorps members post-service is as being supplied by AmeriCorps and thus comes from a federal government funding source. For more information please reference this link: https://americorps.gov/sites/default/files/documents/CNCS%20FY%202021%20Congressional%20Budget%20Justification%20w%20IG%20Message%20%28Final%29_508.pdf.

Limitations to Using WCC Outcomes Data from The Watershed Company (2015)

Watershed Company's 2015 evaluation of effectiveness of the WCC's restoration efforts study the outcomes after the first year following the planting intervention, only covering one growing season. This affects ICF's analysis of medium and long-term benefits resulting from the WCC's restoration activities:

- The study only reflects the results of the intervention after a single growing season, thus long-term impacts of the planting intervention are not captured.
- Invasive noxious weed plant cover thresholds in the established performance standards are typically achieved through ongoing site maintenance, performed at least twice annually. WCC does not conduct ongoing site maintenance, introducing uncertainty about the impacts of restoration actions after the first year.

Limitations on Available Data from WCC

Regarding the data sources used, WCC does not closely track the land cover types (e.g., wetlands) on which they perform ecosystem treatments and improvements. WCC instead was able to provide rough estimates as percentages which were used in this ROI analysis.

In addition, WCC does not collect data on WCC AmeriCorps members' post-service outcomes related to employment, income, and post-secondary education completion. Given this, this analysis used the survey results for AmeriCorps State and National members broadly, provided in Friedman et al. (2016). Friedman et al. (2016) estimated the percent of AmeriCorps members that redeemed the education award and this analysis used this as a proxy for post-secondary education contributable to AmeriCorps. To estimate post-service employment rates and income, this analysis used data from the Current Population Survey's Annual Social and Economic (ASEC) Supplement for March 2019, weighting metrics based on the demographics provided by WCC.

Limitations on Using Ecosystem Service Values

Additionally, there are limitations to using ecosystem service valuation including:⁵³

- The difficulty in examining the long-term value of biodiversity and ecosystem services
- Valuation studies can struggle to recognize the inter-dependency among various ecosystem services
- Ecosystem services are interrelated, and thus care must be taken when monetizing to avoid double counting ecosystem service benefits

⁵³ 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. Retrieved from: <http://www.teebweb.org/wp-content/uploads/Study%20and%20Reports/Reports/Ecological%20and%20Economic%20Foundations/TEEB%20Ecological%20and%20Economic%20Foundations%20report/TEEB%20Foundations.pdf>

- Social and cultural criteria are constrained by methodological limitations

Limitations to Valuing Trail Treatments and Improvements

Lastly, WCC provided data on other services provided by the WCC AmeriCorps members. During the 2018–2019 program year, WCC AmeriCorps members completed the treatment of more than 600 miles of trail and improved more than 300 miles of trail.⁵⁴ Unfortunately there is a lack of data on recreational use of public trails in Washington State. Further, there is a lack of data in the academic literature on the estimated value of trail maintenance and improvement and therefore they were not incorporated into this analysis.

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

The ROI for the WCC program measures the net benefits of the program compared to its costs to determine the return to different stakeholders. This section provides ICF's estimates of program benefits, forgone benefits (opportunity costs), program costs, and resulting ROI.

Program Benefits

Table 9 shows the estimates of monetized benefits of the WCC program by stakeholder group for each of the three scenarios. Under the short-term scenario, if using the low estimate for societal benefits from ecosystem services, WCC AmeriCorps members gain 78 percent of the expected benefits ($\$6,774,646 \div \$8,707,530$). Under the long-term scenario, if using the high estimate for societal benefits from ecosystem services, WCC AmeriCorps members gain 4 percent of the expected benefits ($\$20,277,157 \div \$505,885,921$).

⁵⁴ WCC (2021). op. cit.

Table 9. Program Benefits by Recipient

Recipient		Benefits by Scenario (2019\$)		
		Short term	Medium term	Long term
AmeriCorps Members		\$6,774,646	\$14,937,771	\$20,277,157
Society (via Ecosystem Services)	Low	\$652,966	\$8,028,917	\$13,182,373
	Average	\$5,273,492	\$64,843,249	\$106,463,663
	High	\$23,746,737	\$291,991,617	\$479,409,924
Federal Government		\$987,937	\$3,178,886	\$4,798,228
State & Local Governments		\$291,981	\$956,069	\$1,400,612
Total	Low	\$8,707,530	\$27,101,642	\$39,658,370
	Average	\$13,328,056	\$83,915,974	\$132,939,660
	High	\$31,801,301	\$311,064,342	\$505,885,921

Forgone Benefits (Opportunity Costs)

Table 10 shows the breakdown of the forgone benefits from the professional opportunity cost to WCC AmeriCorps members and the government in net present 2019 dollars. It lists the amount of post-tax earnings members are forgoing—and the associated taxes forgone to government—due to members serving in the WCC program for a service term instead of working. Of note, for the federal government benefits per federal dollar ROI calculation, only the forgone federal income, Social Security, and Medicare taxes will be subtracted from the total federal benefits that are realized due to the WCC program.

Table 10. Forgone Benefits from Professional Opportunity Cost

Forgone Category	Professional Opportunity Cost Amount Across All Scenarios (2019\$)
Post-Tax Earnings for Members	\$4,095,201
Federal Income and Social Security and Medicare Taxes	\$1,132,100
State Income Taxes and Sales Taxes	\$487,655
Total	\$5,714,957

Table 11 lists the investment opportunity cost amounts incurred by each scenario and for when:

- a) Total WCC funds for the program year are invested in U.S. Treasury bonds and
- b) Only federal funding for the WCC program (both program and education award funding) are invested in these bonds.

These opportunity costs are called the total investment opportunity cost and the federal investment opportunity cost, respectively. As mentioned earlier, accrued

interest in this analysis was calculated for two separate funding amounts. Table 11 also lists the 2018 real interest rates and the number of years (with two payments a year) that were used as inputs to calculate the accrued interest value for each scenario.

Table 11. Forgone Benefits from Investment Opportunity Cost by Scenario and Funding Stream

Funding Stream	Forgone Accrued Interest by Scenario (2019\$)		
	Short term	Medium term	Long term
	(0.6% interest rate and 1 year elapsed)	(0.8% interest rate and 15 years elapsed)	(1.0% interest rate and 30 payments)
Total WCC AmeriCorps Funding	\$87,754	\$1,857,991	\$5,094,520
Federal WCC AmeriCorps Funding Only	\$25,191	\$533,368	\$1,462,469

Program Costs

Figure 5 shows the costs incurred by the WCC program by funding source, excluding any expected education awards to be redeemed. The total cost of the WCC program for the 2018–2019 program year was \$13,170,346. The federal government funded 21 percent of WCC program costs (\$2,758,854), while various Washington State agencies funded 50 percent (\$6,593,117) and a mix of private, local, and tribal government funding supplied the remaining 29 percent (or \$3,818,375). WCC indicated that all non-AmeriCorps sources listed contributed funding to support the program, thus the other revenue received is equal to 87 percent of the total funding provided for this program year.

Figure 5. Cost by Funding Source for WCC Program, 2018–2019 Program Year

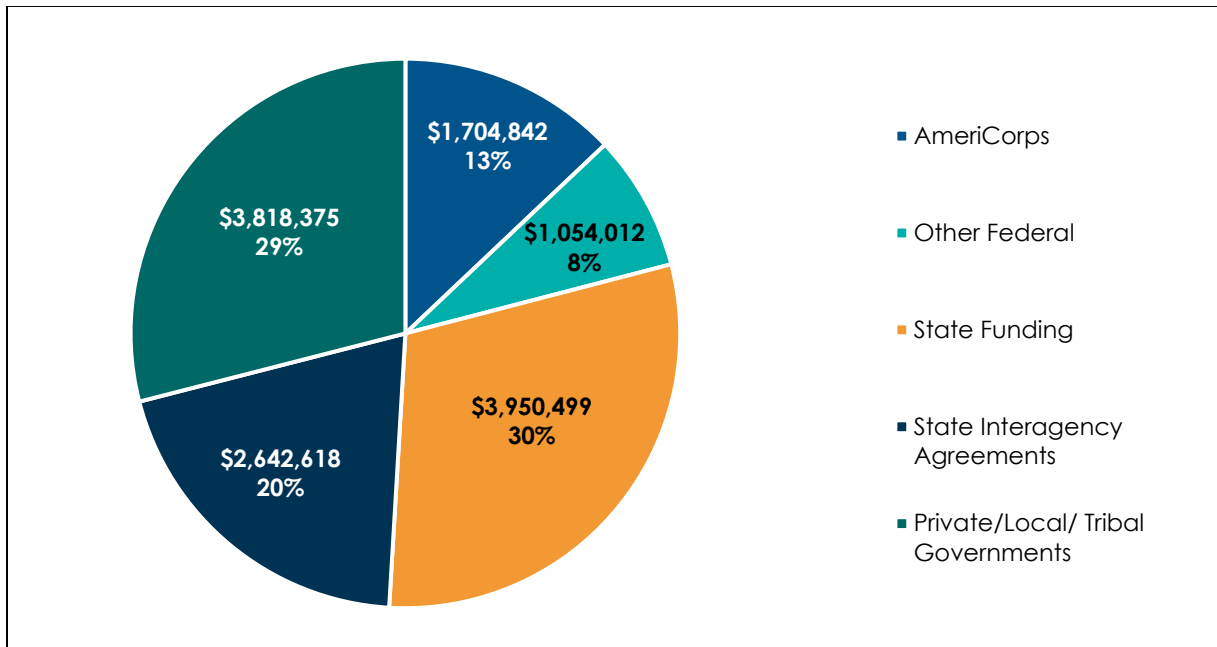
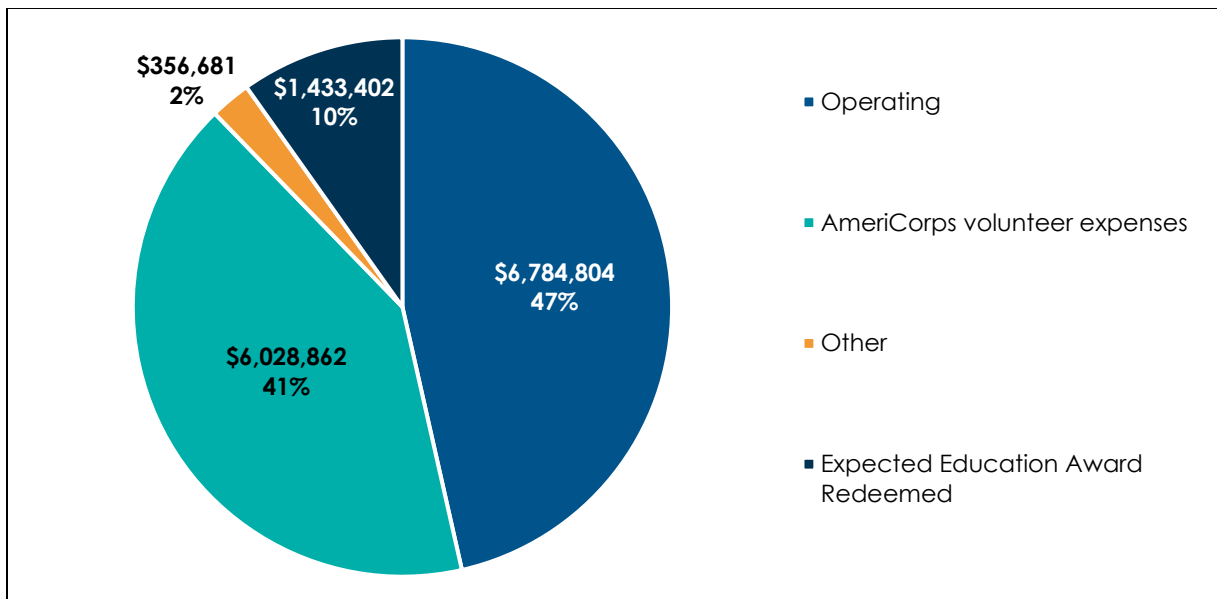


Figure 6 shows the cost of the WCC program by cost category. The total cost of the WCC program for the 2018–2019 program year was \$14,603,749, which includes the program costs and the expected education awards to be redeemed by WCC AmeriCorps members.

Figure 6. Cost by Expenditure Category for WCC Program, 2018–2019 Program Year



ROI Results

Table 12 shows the benefits, forgone benefits (opportunity costs), and costs that are included in each of the three types of ROI calculations.

Table 12. Benefits, Forgone Benefits, and Costs Included in the ROI Calculations

ROI Calculation	Benefits	Forgone Benefits	Costs
Total Benefits per Federal Dollar	All societal, WCC AmeriCorps member, and government benefits derived from the program	<ul style="list-style-type: none"> Forgone benefits from total professional opportunity cost Forgone benefits from Federal investment opportunity cost 	<ul style="list-style-type: none"> AmeriCorps federal funding Other Non-AmeriCorps federal funding Total professional opportunity cost Federal investment opportunity cost
Total Benefits per Funder Dollar	All societal, WCC AmeriCorps member, and government benefits derived from the program	<ul style="list-style-type: none"> Forgone benefits from total professional opportunity cost Forgone benefits from total investment opportunity cost 	<ul style="list-style-type: none"> AmeriCorps federal funding Other (including match) funding Total professional opportunity cost Total investment opportunity cost
Federal Government Benefits per Federal Dollar	Additional tax revenue generation and reduced spending attributable to the program	<ul style="list-style-type: none"> Forgone benefits from Federal professional opportunity cost Forgone benefits from Federal investment opportunity cost 	<ul style="list-style-type: none"> AmeriCorps federal funding Other Non-AmeriCorps federal funding Federal professional opportunity cost Federal investment opportunity cost

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 the WCC program with the program cost to calculate the ROI. Table 13 shows the program gross benefits, forgone benefits, net benefits, and cost of the program, and each of the components, that are used to calculate the three ROIs.

Table 13. Program Benefits, Net Benefits, and Costs by ROI Scenario for WCC

Benefits and Costs	ROI Scenario (2019\$)		
	Short term	Medium term	Long term
Total Gross Program Benefits			
Environmental Benefits to Society - Low	\$652,966	\$8,028,917	\$13,182,373
Environmental Benefits to Society - Medium	\$5,273,492	\$64,843,249	\$106,463,663
Environmental Benefits to Society - High	\$23,746,737	\$291,991,617	\$479,409,924
Member Benefits	\$6,774,646	\$14,937,771	\$20,277,157
Federal Government Benefits	\$987,937	\$3,178,886	\$4,798,228
State/Local Government Benefits	\$291,981	\$956,069	\$1,400,612
Total Forgone Benefits (Opportunity Costs)	\$5,802,711	\$7,572,948	\$10,809,477
Forgone Benefits to Members (Forgone Earnings Post Taxes)	\$4,095,201	\$4,095,201	\$4,095,201
Forgone Tax Revenue from Members Earnings	\$1,619,755	\$1,619,755	\$1,619,755
Forgone Tax Revenue Federal Government	\$1,132,100	\$1,132,100	\$1,132,100
Forgone Tax Revenue State/Local Government	\$487,655	\$487,655	\$487,655
Forgone Benefits from total investment Interests/Returns (All Funders)	\$87,754	\$1,857,991	\$5,094,520
Forgone Investment Benefits to Federal Government from Funding Provided	\$25,191	\$533,368	\$1,462,469
Program Cost	\$14,603,748	\$14,603,748	\$14,603,748
Federal Government Cost	\$4,192,256	\$4,192,256	\$4,192,256
Non-Federal Government Cost	\$10,411,492	\$10,411,492	\$10,411,492
Total Program Net Benefits (Total Program Gross Benefits – Total Forgone Benefits)			
Low	\$2,904,819	\$19,528,694	\$28,848,893
Medium	\$7,525,346	\$76,343,027	\$122,130,184
High	\$25,998,590	\$303,491,394	\$495,076,445
ROI for Total Benefits per Federal Dollar (Total Net Benefits / Federal Government Cost)			
Low	\$0.69	\$4.66	\$6.88
Medium	\$1.80	\$18.21	\$29.13
High	\$6.20	\$72.39	\$118.09

Benefits and Costs	ROI Scenario (2019\$)		
	Short term	Medium term	Long term
ROI for Total Benefits per Funder Dollar (Total Program Net Benefits / Total Program Cost)			
Low	\$0.20	\$1.34	\$1.98
Medium	\$0.52	\$5.23	\$8.36
High	\$1.78	\$20.78	\$33.90
Federal Government Benefits per Federal Dollar* (Net Benefits Federal Government / Federal Government Cost)	-\$0.04	\$0.36	\$0.53
Total Gross Program Benefits			
Environmental Benefits to Society - Low	\$652,966	\$8,028,917	\$13,182,373
Environmental Benefits to Society - Medium	\$5,273,492	\$64,843,249	\$106,463,663
Environmental Benefits to Society - High	\$23,746,737	\$291,991,617	\$479,409,924
Member Benefits	\$6,774,646	\$14,937,771	\$20,277,157
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Forgone Benefits to Members (Forgone Earnings Post Taxes)	\$4,095,201	\$4,095,201	\$4,095,201
Forgone Tax Revenue from Members Earnings	\$1,619,755	\$1,619,755	\$1,619,755
Forgone Tax Revenue Federal Government	\$1,132,100	\$1,132,100	\$1,132,100
Forgone Tax Revenue State/Local Government	\$487,655	\$487,655	\$487,655
Forgone Benefits from total investment Interests/Returns (All Funders)	\$87,754	\$1,857,991	\$5,094,520
Forgone Investment Benefits to Federal Government from Funding Provided	\$25,191	\$533,368	\$1,462,469
Program Cost	\$14,603,748	\$14,603,748	\$14,603,748
Federal Government Cost	\$4,192,256	\$4,192,256	\$4,192,256
Non-Federal Government Cost	\$10,411,492	\$10,411,492	\$10,411,492
Total Program Net Benefits (Total Program Gross Benefits – Total Forgone Benefits)			
Low	\$2,904,819	\$19,528,694	\$28,848,893
Medium	\$7,525,346	\$76,343,027	\$122,130,184
High	\$25,998,590	\$303,491,394	\$495,076,445

Benefits and Costs	ROI Scenario (2019\$)		
	Short term	Medium term	Long term
ROI for Total Benefits per Federal Dollar (Total Net Benefits / Federal Government Cost)			
Low	\$0.69	\$4.66	\$6.88
Medium	\$1.80	\$18.21	\$29.13
High	\$6.20	\$72.39	\$118.09
ROI for Total Benefits per Funder Dollar (Total Program Net Benefits / Total Program Cost)			
Low	\$0.20	\$1.34	\$1.98
Medium	\$0.52	\$5.23	\$8.36
High	\$1.78	\$20.78	\$33.90
Federal Government Benefits per Federal Dollar* (Net Benefits Federal Government / Federal Government Cost)	-\$0.04	\$0.36	\$0.53

* Federal Government Benefits do not include societal benefits from ecosystem services in terms of their fiscal return, which is calculated in the ROI scenarios.

Three different ROI results are calculated for each scenario. Since two of the calculations include benefits to society, the results are expressed as cost–benefit ratios, while maintaining the ROI terminology. Specifically, these ratios take the form of the sum of monetized net 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 \$1.00 of investment (or cost).⁵⁵ See Appendix B for the formulas used to calculate each ROI calculation.

Table 14 summarizes the ROI results for *total benefits per Federal dollar* across the short-term, medium-term, and long-term scenarios and across the low, average, and high ecosystem service value estimates. Under the short term scenario the ROI ranges from \$0.69 for the low ecosystem service value estimate to \$6.20 for the high ecosystem service value estimate. Under the medium-term scenario, *total benefits per federal dollar* invested yields \$4.66 to \$72.39, based on the ecosystem service value, while under the long-term scenario, it yields \$6.88 to \$118.09 for every dollar invested.

⁵⁵ 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 \$1 invested.

Table 14. ROI Results: Total Benefits per Federal Dollar

ROI Calculation by Ecosystem Service Value Estimate	ROI Scenario		
	Short term	Medium term	Long term
Low	\$0.69	\$4.66	\$6.88
Average	\$1.80	\$18.21	\$29.13
High	\$6.20	\$72.39	\$118.09

Table 15 summarizes the ROI results for *total benefits per funder dollar* across the short-term, medium-term, and long-term scenarios and across the low, average, and high ecosystem service value estimates. When all funding is considered the ROI under the low and average ecosystem service value estimate are below \$1.00, indicating that costs outweigh the benefits in the first year after the program for those ecosystem service value estimates. Specifically, every \$1 invested results in a return of \$0.20 to all stakeholders under the short-term scenario considering low ecosystem service values to society and \$0.52 considering average ecosystem service values to society. Under the medium and long-term scenarios for *total benefits per funder dollar*, WCC AmeriCorps produces strong ROI results ranging from \$1.34 to \$33.90 for every dollar of total program investment.

Table 15. ROI Results: Total Benefits per Funder Dollar

ROI Calculation by Ecosystem Service Value Estimate	ROI Scenario		
	Short term	Medium term	Long term
Low	\$0.20	\$1.34	\$1.98
Average	\$0.52	\$5.23	\$8.36
High	\$1.78	\$20.78	\$33.90

Table 16 summarizes the ROI results for *Federal government benefits per federal dollar* across the short-term, medium-term, and long-term scenarios. For this ROI the federal cost of the program outweigh the federal benefits across all ROI scenarios. It should be noted that ecosystem service values estimates are not factored into this ROI, since those benefits are to society and are not realized directly by the federal government; federal government benefits consist of only tax revenue gains and savings in expenditures. The ROI to federal government for the WCC program is largely dependent on the benefits to WCC AmeriCorps members in the form of improved employment and earnings outcomes. When considering the ROI to the federal government alone under the short-term scenario, for every \$1 the federal government invests, the federal government loses its original \$1 investment plus an additional \$0.04. Given the medium-term scenario, the federal government alone receives \$0.36 back in fiscal returns and savings for every dollar invested (or a loss of \$0.64 directly to the federal government). Under the long-term scenario, the federal government alone receives \$0.53 back in fiscal returns for every dollar invested.

A negative ROI or one that is below \$1 in the first year post-program is common in programs where there is an initial one-time investment made and benefits accrue in the following years. This is because it often requires several years of benefits to recoup the initial investment and generate positive returns. During their participation in the WCC program, AmeriCorps members gain the experience, skills, and knowledge that result in future benefits, such as improved employment and wages, which can be sustained throughout their working years. Another reason why the ROI calculations show losses in the short-term is because the forgone benefits in the first year (i.e., professional opportunity cost) to WCC AmeriCorps members is high given that more than 50 percent of members for the 2018–2019 program year had a bachelor's degree pre-service. This augments the earnings they forgo due to serving in WCC AmeriCorps for one year. Additionally, as noted in the ROI methodology, lifetime benefits to members that stem from WCC AmeriCorps are not realized in the short-term scenario, contributing to the negative ROI in that scenario.

Table 16. ROI Results: Federal Government Benefits per Federal Dollar

Federal Government Benefits per Federal Dollar	ROI Scenario		
	Short term	Medium term	Long term
ROI Calculation	-\$0.04	\$0.36	\$0.53

Given the different assumptions of the three scenarios, the respective benefits across the majority of ROI calculations are larger than their associated costs. Regarding federal benefits, the federal government will not recoup their investments fiscally, even over the long term as the ROI is less than a dollar. The wide variation in ecosystem service valuation gives very different results, but even the most conservative estimates yield positive results for society in the medium- and long-term. Additionally, if the true value of benefits is closer to the average or high estimates of ecosystem service values, there could be enormous societal gains per dollar invested. The magnitude and direction of the ROI calculations are driven by several factors including:

- The wide range of ecosystem service values by various land cover types.**
Table 3 presents a range of annual ecosystem service values for the relevant land cover types. As explained in the Ecosystem Service Valuation and ROI Study Limitations sections, there are limitations to using ecosystem service valuation related to challenges in estimating ecosystem service benefits, thus yielding a wide range of potential benefits. Benefit transfer uses value estimates of ecosystem services from existing studies and applies them to a new context. The range of values (i.e., low, average, and high) are based on the range of potential impacts, incorporating the lowest and highest estimates established and the average is calculated by averaging all values identified from the literature.

- **The employment outcomes of WCC 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 (Friedman et al., 2016; Markovitz et al., 2008; Spera et al., 2013; Zeidenberg et al., 2016). According to Friedman et al. (2016), the percentage of AmeriCorps members unemployed was 5 percentage points lower six months after serving in AmeriCorps versus six months before. This gain in employment resulted in increased earnings and tax revenue.
- **The educational attainment outcomes of WCC AmeriCorps members.** AmeriCorps State and National members receive education awards after serving with an AmeriCorps program. The award is used by a portion of members to help pay for post-secondary degrees post-service. The additional educational attainment resulting from the use of the education award generates additional lifetime earnings for WCC AmeriCorps members and additional tax revenue and savings for government.
- **Medium- and long-term accumulation of benefits.** In the short-term, the three ROI calculations are less than 1 because only one year of post-program environmental benefits, employment, and earnings are factored in while the entire program cost is considered. Additionally, the short-term scenario does not include any lifetime benefits in terms of reduced spending on corrections, public assistance, and social insurance or increased tax revenue. As these benefits accumulate over time, the analysis shows positive returns. This is indicated by the ROI results in the medium- and long-term scenarios (15- and 30-years post-program, respectively).

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 other leveraged funding also contributed to the magnitude of the ROI results. Federal government funding of the WCC program serves as a catalyst for private and other government funding. This additional combined private and non-AmeriCorps government funding—amounting to more than \$10.4 million for WCC for the 2018–2019 program year—allowed the WCC program to enroll more individuals than otherwise would have been served under the federal funding alone, leading to greater total benefits realized. Though it may not impact the ROI, because it is a per unit metric, non-AmeriCorps funding leads to greater investment in the WCC program and thus to a greater impact as more individuals are served and increased benefits to society are produced.

Recommendations for Further Research

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

Recommendation 1: Determine the persistence of medium- and long-term impacts of WCC's intervention for society and WCC AmeriCorps members. The Watershed Company (2015) did not measure the persistence of environmental impacts, such as reduced noxious weed coverage and increased native vegetation. Data on those long-term impacts would increase the rigor of ROI analysis of WCC and similar programs. Longitudinal research on medium- and long-term outcomes for WCC AmeriCorps members after service would clarify the extent to which AmeriCorps member benefits persist. Also studying individuals who applied to be AmeriCorps members but did not serve in AmeriCorps would provide a helpful point of comparison.

Recommendation 2: Ensure sample sizes for program evaluations are adequate and random. AmeriCorps grantees are required to conduct evaluations for their programs. To ensure findings are statistically representative, grantees should identify what the appropriate sample size should be for their outcomes. This could be done by conducting a power analysis during the planning phase to determine the required sample size. WCC improved more than 1,500 acres during the 2018–2019 program year and across four different land cover types. Watershed Company (2015) did not take land cover type into consideration for their analysis, a key variable when considering ecosystem services. In order to consider land cover types, a larger sample size would be necessary to provide greater confidence that the outcomes can be attributed to the intervention itself rather than other confounding factors. Additional research on impacts by land cover type could increase the rigor of the ROI analysis. Overall, larger sample sizes in these studies can provide a smaller margin of error, identify outliers in the data, and otherwise measure program impacts more accurately.

Recommendation 3: Monetize value of trail treatment and improvement.⁵⁶ This benefit was not captured in this analysis. During the 2018–2019 program year, WCC AmeriCorps members completed the treatment of more than 600 miles of trail and improved more than 300 miles of trail. Unfortunately, there is a lack of data on recreational use of public trails in Washington State. Further, there is a lack of data in the academic literature on the estimated value of trail maintenance and improvement. Studies that address these gaps in available data would enable future studies to estimate the value of WCC's trail treatment and improvement.

⁵⁶ To restate, "WCC defines 'trails treated' as all trail activities including short-term improvements to existing recreational infrastructure (trail clearance, surface repairs, debris removal) and new constructions, reroutes, or new infrastructure that enhances the sustainability of a trail (including puncheons, boardwalks, bridges, culverts, water bars and steps or stairs). WCC defines 'trails improved' as contributions to public access, safety, improved used of established, approved paths. WCC uses land manager assessments to verify quantitative and qualitative data with respect to this." – WCC (2021). Op. cit.

Recommendation 4: Document outcomes and Impacts 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—it has 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 (UI) 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 proportion of WCC AmeriCorps members pursue higher education and which degrees are completed post-program with the help of the education award. Using degree or employment outcomes data, representative of actual WCC AmeriCorps members from third-party data sources (like NSC) would have increased the accuracy of this ROI analysis.

Recommendation 5: Quantify ripple effects. Earnings impacts on WCC AmeriCorps members and societal impacts from their service 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 increase the resulting ROI. Specifically, the longitudinal impacts of WCC AmeriCorps members 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 service.

Conclusion

Based upon the ROI findings, investment in the WCC program results in largely favorable impacts across a variety of stakeholder groups under the long-, medium-, and most short-term scenarios. Specifically, impacts are realized by WCC AmeriCorps members, various levels of government, and society in general.

The ROI results indicate that under the high-range estimated short-term scenario and all medium- and long-term scenarios, benefits realized by society, WCC AmeriCorps members, and governments predominantly outweigh the investment made by funders (e.g., private funders as well as federal, state, and local governments).

The combined return to WCC AmeriCorps members, governments, and society per federal dollar ranges from \$0.69 to \$6.20 under the short-term scenario; \$4.66 to \$72.39 under the medium-term scenario, and \$6.88 to \$118.09 under the long-term scenario.

Considering all funding (from the various levels of government and other funders), the ROI across all stakeholder groups ranges from \$0.20 to \$1.78 under the short-term scenario; \$1.34 to \$20.78 under the medium-term scenario, and \$1.98 to \$33.90 under the long-term scenario.

Lastly, when considering the ROI to the federal government alone under the short-term scenario, for every \$1 the federal government invests, the federal government loses its original \$1 investment plus an additional \$0.04. Given the medium-term scenario, the federal government alone receives \$0.36 back in fiscal returns and savings for every dollar invested (or a loss of \$0.64 directly to the federal government). Under the long-term scenario, the federal government alone receives \$0.53 back in fiscal returns for every dollar invested.

Appendix A: Program Benefits, Forgone Benefits, and Program Costs Included in Return-on-Investment Calculations

In Table 17, the three rightmost columns indicate by an “X” if the benefit is included in the numerator of a return on investment (ROI) calculation.

Table 17. Program Benefits, Forgone Benefits, and Program Costs Included in the WCC ROI Calculation

Program Benefits, Forgone Benefits, and Program Cost			Total Benefits per Federal Dollar	Total Benefits per Funder Dollar	Federal Government Benefits per Federal Dollar
Program Benefits	Stakeholder Group	Data Sources	X indicates inclusion in the ROI numerator		
Increased ecosystem service valuation per acre of enhanced and restored wetlands and riparian corridors	Host Sites	<ul style="list-style-type: none"> • ESSRTI (2021) • The Watershed Company (2015) 	X	X	—
Increased earnings of national service members due to increased employment and education of AmeriCorps members	AmeriCorps Member	<ul style="list-style-type: none"> • WCC (2021) • Friedman et al. (2016) • U.S. Census Bureau, (n.d.) • BLS (2020) • BLS (2021) 	X	X	—
Increased federal and state income tax revenue due to increased earnings of AmeriCorps members	Federal and state governments	<ul style="list-style-type: none"> • WCC (2021) • Friedman et al. (2016) • U.S. Census Bureau, (n.d.) • BLS (2021) • Tax rate data on Bankrate.com and Taxfoundation.org (2020) 	X	X	X

Program Benefits, Forgone Benefits, and Program 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	<ul style="list-style-type: none"> • WCC (2021) • Friedman et al. (2016) • U.S. Census Bureau, (n.d.) • BLS (2021) • Social Security Administration (2020) 	X	X	X
Increased sales tax revenue due to increased earnings of AmeriCorps members	State and local governments	<ul style="list-style-type: none"> • WCC (2021) • Friedman et al. (2016) • BLS (2020) • BLS (2021) • U.S. Census Bureau, (n.d.) • U.S. Census Bureau, (2019) • Tax rate data on Taxfoundation.org (2020) 	X	X	—
AmeriCorps member post-tax living allowances and education awards	AmeriCorps Member	WCC (2021)	X	X	—
Reduced spending on lifetime public assistance, corrections, and social insurance due to increased educational attainment of AmeriCorps members	Federal, state, and local governments	<ul style="list-style-type: none"> • Trostel (2015) • Zeidenberg et al. (2016) • U.S. Census Bureau (2019) 	X	X	X

Program Benefits, Forgone Benefits, and Program Cost			Total Benefits per Federal Dollar	Total Benefits per Funder Dollar	Federal Government Benefits per Federal Dollar
Forgone Benefits (Opportunity Costs)*	Stakeholder Group	Data Sources	X indicates inclusion in the ROI numerator		
Opportunity Costs of forgone market wages for AmeriCorps members	AmeriCorps Member	<ul style="list-style-type: none"> • WCC (2021) • U.S. Census Bureau (2019) • BLS (2020) 	X	X	—
Opportunity Costs of federal taxes on forgone market wages for AmeriCorps members (e.g., federal income and social security taxes)	Federal government	<ul style="list-style-type: none"> • WCC (2021) • U.S. Census Bureau (2019) • BLS (2020) • BLS (2021) • Tax rate data on Bankrate.com and Taxfoundation.org (2020) • Social Security Administration (2020) 	—	—	X
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	<ul style="list-style-type: none"> • WCC (2021) • BLS (2020) • BLS (2021) • U.S. Census Bureau (n.d.) • U.S. Census Bureau (2019) • Tax rate data on Taxfoundation.org (2020) 	X	X	—

Program Benefits, Forgone Benefits, and Program Cost			Total Benefits per Federal Dollar	Total Benefits per Funder Dollar	Federal Government Benefits per Federal Dollar
Opportunity Cost of Forgone Benefits from total investment Interests/Returns (All Funders)	Federal Government	<ul style="list-style-type: none"> CAPC Office of Management and Budget (OMB) (2020) U.S. Department of Treasury 	X	X	—
	State and Local Government				
	Non-government funders				
Opportunity Cost from Forgone Investment Benefits to Federal Government from Funding Provided	Federal Government	<ul style="list-style-type: none"> CAPC Office of Management and Budget (OMB) (2020) U.S. Department of Treasury 	—	—	X
Program Cost	Stakeholder Group	Data Sources	X indicates inclusion in the ROI numerator		
Federal Government Funding	Federal Government	WCC (2021)	X	X	X
State and local government funding	State and local government	WCC (2021)	—	X	—
Other non-government costs	Non-government funders	WCC (2021)	—	X	—

* Opportunity costs are amounts that are reduced from total benefits realized across ROI calculations. Thus, they represent a negative value in the numerator. Please see the Calculating ROI section of Appendix B for further details.

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 the Washington Conservation Corps (WCC) included the following steps:

- Measuring and monetizing program benefits to WCC AmeriCorps members, the different levels of government, and society
- 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 the WCC program.

Although WCC AmeriCorps members experience positive benefits from the WCC program in terms of increased employment and earnings (described below), available data does 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 2019 dollars.⁵⁷ 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 WCC 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 2019 dollars. This scenario also assumes the entire net present value of lifetime benefits is realized.

⁵⁷ 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.⁵⁸ 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 the WCC program is to measure and monetize the program benefits. As a result of the WCC program, improved ecosystem services benefit society at large and WCC AmeriCorps members and various levels of government also benefit. 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 Society from Ecosystem Service Improvements

Ecosystem Service Valuation

The objective of this analysis was to estimate the economic value for the marginal improvement in ecosystem services resulting from the WCC weeding and planting intervention. Both market and non-market values are included, provided by the land cover types on which the WCC interventions occurred during the 2018–2019 program year.

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.⁵⁹

Values attributed to ecosystem services can be described as use or non-use values. Use values, provide economic value through direct use by humans. Some direct uses of ecosystem services involve human consumption, such as harvesting timber and other forest products, food, and fuel. Other direct uses, such as viewing wildlife, hiking, and enjoying scenic vistas, do not involve any actual consumption. Human beings also can use ecosystem services indirectly. For example, when people directly use plants and animals, consumptively or non-consumptively, they indirectly use the habitats of those

⁵⁸ These three scenarios consider varying durations of how long increased employment and earnings benefits last for WCC AmeriCorps members. They also consider varying durations for lifetime benefits that stem from the WCC program. For example, lifetime benefits in terms of decreased public assistance, social insurance, and corrections costs result from WCC 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.

⁵⁹ De Groot et al. op. cit.

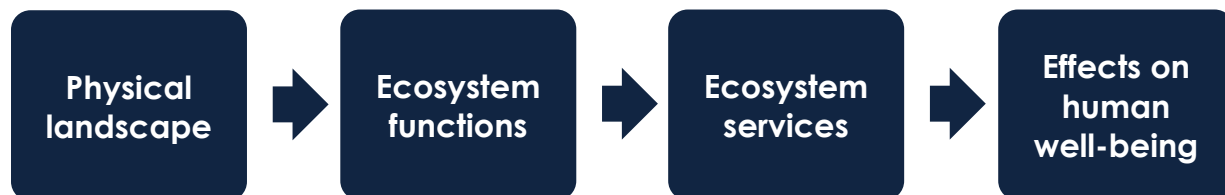
plants and animals. Other examples of indirect use include regulation of water flow, waste assimilation, and climate regulation (i.e., carbon storage and sequestration).⁶⁰

Ecosystem services are commonly divided into four distinct groups:⁶¹

- Provisioning services provide products that are used directly by people, such as food, water, and raw materials
- Regulating services are outputs from the normal functioning of ecosystems that benefit people in direct ways, such as the regulation of climate, air and drinking water quality, soil formation and retention, moderation of extreme events, and biological control
- Habitat and supporting services are processes that are necessary for the production of other ecosystem services, such as habitat for plants and animals, conservation of genetic diversity, and cycling of nutrients
- Cultural services provide benefits to people through meaningful interactions with nature, such as aesthetic enjoyment, recreation, spiritual enrichment, and cognitive development

ESSRTI (2021)'s applied an "ecosystem services framework" to determine which ecosystem services are commonly identified with land cover types. The first step of the framework was understanding the physical landscape's ecosystem functions by land cover type. The ecosystem functions are assessed for their capacity to generate ecosystem services, and finally, ecosystem service values indicate the societal impacts and outcomes associated with human well-being. Figure 7 illustrates the process associated with the ecosystem services framework.

Figure 7. Ecosystem Services Framework



ESSRTI (2021) conducted an extensive literature review for values for land cover types and ecosystem services and then used benefit transfer methods to adapt the values to their project site in the Eastern Sierra in California.

Benefit transfer uses value estimates of ecosystem services from existing studies and applies them to a new context. Two approaches to conducting benefit transfers are benefit value transfer and benefit function transfer. Benefit value transfer takes point estimates, or values, from the primary source and applies them to the new project site, assuming the new project site is similar to the primary study site. Benefit function transfer

⁶⁰ De Groot et al. op. cit.

⁶¹ De Groot et al. op. cit.

takes the function used to estimate benefits in the original study and applying the function to the new project site. Independent variables in the function are updated with values that reflect the characteristics of the new project site. Benefit function transfer is preferred over benefit value transfer as it allows for the original values to be adapted to a greater degree than is possible with benefit value transfer. Despite these advantages, the data are not always available to conduct benefit function transfers.

Table 3, presented in the section on Monetizing Program Benefits, Forgone Benefits (Opportunity Costs), and Program Costs, shows the range of annual ecosystem service values for select and applicable land cover types estimated by ESSRTI (2021). As described above, ESSRTI (2021) used both benefit function transfer and benefit value transfer from the literature to estimate a range of annual ecosystem service values by land cover type. The range of values (i.e., low, average, and high) are based on the range of potential impacts, incorporating the lowest and highest estimates established and the average is calculated by averaging all values identified from the literature. ESSRTI (2021) expects the range to be similar to other ecosystem service analyses applying benefit transfer. The range of per-acre values for each land cover type reflects variations in the estimated values found in the literature.⁶²

As the Eastern Sierras of California are relatively close to Washington State and the ESSRTI (2021) was recently published, the range of values are similarly used applying benefit value transfer to the WCC program's improved acreage. Additionally, ESSRTI (2021) was developed in partnership with the State of Washington Office of Sustainability and Climate.

Apply Ecosystem Service Valuation to WCC's Improved Acreage

This analysis used the benefit value transfer method to apply low, average, and high ecosystem service values from ESSRTI (2021) to the land cover types improved by WCC. The analysis specifically applied:

- ESSRTI (2021) values for wetlands to the 60 percent of acreage identified by WCC as "riparian/wetland"
- Averaged ESSRTI (2021) values for coniferous, deciduous, grassland, and shrubland land cover types to the 20 percent of acreage identified by WCC as "forested mountains"⁶³
- ESSRTI (2021) values for coniferous forest to the 10 percent of acreage identified by WCC as "marine forests"⁶⁴

⁶² ESSRTI states in regard to the use of a range, "We carried this structure through the analysis to emphasize the range of values that ecosystem services provide. The range provided by this analysis is an expected outcome and similar to other analyses of this type." ESSRTI (2021) p. 31.

⁶³ EPA. 2000. Ambient Water Quality Criteria Recommendations. Rivers and Streams in Nutrient Ecoregion II. Retrieved from: <https://www.epa.gov/sites/production/files/documents/rivers2.pdf>

⁶⁴ Perakis, Geiser, and Lilleskov. Chapter 9: Marine West Coast Forests. GTR-NRS-80. Retrieved from: <https://www.nrs.fs.fed.us/pubs/gtr/gtr-nrs-80chapters/9-perakis.pdf>

- Averaged ESSRTI (2021) values for coniferous, deciduous, grassland, shrub land, and wetland land cover types to the 10 percent of acreage identified by WCC as “other”

The results of applying the above numbers and values are presented in Table 18.

Table 18. Imputed Annual Ecosystem Service Values per Acre by Land Cover Type (2019\$)

Land Cover Type	Low	Average	High
Riparian/Wetland	\$2,646	\$49,493	\$252,252
Forested Mountains	\$7,697	\$18,150	\$35,151
Marine Forests	\$8,922	\$20,926	\$42,482
Other	\$6,687	\$24,419	\$78,571

Table 19 presents the added annual value to society from the total acres improved by WCC during the 2018–2019 program year. The results in Table 19 include the low, average, and high per acre values in Table 3 and multiplies them by the 1,514 “improved” acres across the 60 percent riparian/wetland, 20 percent forested mountains, 10 percent marine forests, and 10 percent other land cover types provided by WCC.

Lastly, this analysis multiplied the values by the 9.2 percent increase in native tree and shrub coverage as a result of the WCC planting intervention (Figure 1). The results of the Watershed Company (2015) indicate that compared to the reference sites, restoration sites increased native coverage by 9.2 percent and reduced noxious weed coverage by 14.2 percent one year after WCC’s planting intervention. The study states that they expect native vegetation coverage to continue to increase as planted vegetation grows. Similarly, invasive coverage is expected to continue to decrease as native vegetation becomes established. Thus, the findings indicate that the restorative benefit of WCC’s intervention is a 9.2 percent increase in native coverage. This statistically significant marginal improvement in the local ecosystem is applied to the annual ecosystem service values to estimate the value of that marginal improvement. For example, the low range estimate for riparian/wetland ecosystem services (Table 18) is \$2,646. That \$2,646 multiplied by 60 percent of 1,514 improved acres is \$2.4 million. 9.2 percent of \$2.4 million (\$221,146 in Table 19) is the improvement in ecosystem services attributable to the WCC intervention due to improved riparian/wetland acres during the 2018–2019 program year.

Table 19. Annual Ecosystem Service Value of WCC's 2018–2019 Program Year's Improved Land by Type (2019\$)

Land Cover Type	Percent	Low	Average	High
Riparian/Wetland	60	\$221,146	\$4,136,272	\$21,081,375
Forested Mountains	20	\$214,412	\$505,618	\$979,232
Marine Forests	10	\$124,271	\$291,479	\$591,725
Other	10	\$93,136	\$340,123	\$1,094,405
Total	100	\$652,966	\$5,273,492	\$23,746,737

Additionally, the annual values are discounted and summed to create the short-, medium-, and long-term scenario values, presented in Table 20. The long-term scenario assumes sustained impacts of 30 years, discounted at a 3 percent rate each year to represent net present value in 2019 dollars. The medium-term scenario assumes sustained impacts of 15 years, discounted at a 3 percent rate each year to represent net present value in 2019 dollars. The short-term scenario only reflects the year after the 2018–2019 program year in which ecosystem services are rendered.

Table 20. Total Value of Ecosystem Services to Society (2019\$)

Value of Ecosystem Service	Short term	Medium term	Long term
Low	\$652,966	\$8,028,917	\$13,182,373
Average	\$5,273,492	\$64,843,249	\$106,463,663
High	\$23,746,737	\$291,991,617	\$479,409,924

Benefits to WCC AmeriCorps Members

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

- living allowance and education award
- increased earnings due to reduced unemployment
- increased lifetime earnings due to increased post-secondary education derived from the use of education awards.

Living Allowances and Education Awards

Living allowances are given to AmeriCorps members during their one-year service term to pay for various living expenses, such as housing and groceries. 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 post-secondary 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 post-secondary education is 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 analysis included the post-tax values of the living allowance and the portion of the education award used to repay student loans as WCC AmeriCorps member benefits (Table 21). The portion of the education award used to fund additional post-secondary education is discussed in the following section.

Table 21. WCC AmeriCorps Member Benefits from the Living Allowance and Education Award

Benefit	Post Tax Value (2019\$)	Notes
Living Allowance (net)	\$5,107,477	Post-tax living allowances members receive during service
Education Award (net) Used to Pay Off Student Loans	\$485,873	Post-tax education award amount used to pay off outstanding student loans
Total	\$5,593,350	

Sources: WCC (2021), Friedman et al. (2016)

Increased Lifetime Earnings due to Increased Post-secondary Education Derived from the Use of Education Awards

The AmeriCorps education award pays for some portion of members' increased post-secondary educational attainment, and the future earnings derived from that educational attainment is treated as a direct benefit to WCC AmeriCorps members. To calculate the portion of members' increased educational attainment that is attributable to the WCC program, cost data from the National Center for Education Statistics (NCES, 2019a & NCES, 2019b) were used. Table 22 details the average total cost for each degree type (NCES, 2019a & NCES, 2019b), and the portion of the cost that the post-tax education award amount (i.e., \$4,857 represents \$6,120⁶⁵ before taxes). These percentages were used to estimate the lifetime benefits of post-secondary educational attainment that can be attributed to the education award. For instance, according to NCES (2019a), the average annual cost of a public, in-state, four-year academic institution during the 2018-2019 academic year was \$24,869. This amounts to over \$100,000 for four years if expressed in 2019 dollars. The \$4,857 post-tax education award only represents 5 percent of the cost of that degree, so the WCC program, accordingly, could only be credited with 5 percent of the completion of WCC AmeriCorps members' bachelor's degree post-service.

For additional earnings derived from WCC AmeriCorps members' reduced unemployment, they were calculated annually and then discounted based on the short-term, medium-term, and long-term scenarios in net present 2019 dollars.

For additional earnings derived from WCC AmeriCorps members' increased post-secondary 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 2019 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 one year post-program (i.e., in the short-term scenario).

⁶⁵ This analysis used the 2020 to 2021 AmeriCorps education award amount (\$6,345) but discounts it to net present 2019 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>

Table 22. Average Total Cost of Education and Portion with Using the Education Award by Degree Type

Degree Type ⁶⁶	Average Cost (2019\$)	Percent of Degree Tuition 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%

Source: NCES (2019a), NCES (2019b), WCC (2021)

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 post-secondary degrees estimated to be completed by degree type. The 297 FTE WCC AmeriCorps members 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) indicates 46 percent of AmeriCorps State and National member alumni used their education award to pursue post-secondary degrees after program completion, making the number of FTE WCC AmeriCorps members expected to use the education award to pursue additional post-secondary education 136 members. Friedman et al. (2016) indicates that this 46 percent is comprised of 21 percent using the education award to obtain a bachelor's degree, 23 percent using it for graduate school, and 2 percent using it to attend a technical or vocational training program. This results in the number of FTE WCC AmeriCorps members estimated to pursue some college, a bachelor's degree, and a graduate degree post-service as 6, 62, and 68, respectively, due to using the education award as shown in Table 23.

Next, the difference in the additional lifetime pre-tax earnings from one degree type to the subsequent degree type is estimated using data provided by Trostel (2015), which is shown in the fifth column of Table 23 and expressed in 2019 dollars. For instance, using Trostel (2015) data, the lifetime earnings in 2019 dollars of someone with "some college" is about \$780,000, while that of someone with a bachelor's degree is over \$1.3 million. The difference between these two metrics (roughly \$525,000 as shown in Table 23) represents the additional lifetime earnings realized as a result of gaining a bachelor's degree if some college was already completed. This process was completed for all post-secondary degree types to conservatively estimate the additional lifetime earnings realized by WCC AmeriCorps members due to an increase in educational attainment.

⁶⁶ Costs for some college include tuition and required fees as well as books and supplies for a public, in-state, two-year program; costs for a bachelor's degree include tuition, required fees, books, supplies, and on-campus housing; costs for a graduate degree includes tuition and required fees for a public, two-year graduate program.

Specifically, the lifetime taxes paid amounts were subtracted from the pre-tax additional lifetime earnings amounts to estimate the additional net lifetime earnings, a direct benefit to WCC AmeriCorps members.

To isolate the increase in post-secondary educational attainment specific to members using the education award, the number of WCC AmeriCorps members who used the education award for this purpose by degree type is reduced by the percent of the degree cost that can be covered by the \$3,942 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 post-secondary educational attainment that is credited to the use of the education award post-service. The additional lifetime earnings amount is roughly \$8 million across the FTE WCC AmeriCorps members. Of note, these lifetime earnings are *in addition to* the earnings derived from WCC AmeriCorps members' gains in employment as delineated in the subsequent section. To reiterate, the earnings from WCC 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.

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

	Percent of WCC AmeriCorps Members Expected to Pursue Post secondary Education	FTE WCC AmeriCorps Members	Percent of Degree Tuition Covered by Education Award (%)	Additional Lifetime Earnings of the Degree (pre tax) (2019\$)	Additional Lifetime Earnings from Education Award (pre tax) (2019\$)	Additional Lifetime Earnings from Education Award (post tax) (2019\$)**
Degree Type	[A]	[B]	[C]	[D]	[E] [B] x [C] x [D]	[F]
Expected to Not Use Award for Post-secondary Education	54%	160	NA	NA	NA	NA
Some College*	2%	6	15.8%	\$170,286	\$159,106	\$80,942
Bachelor's Degree	21%	62	4.8%	\$526,201	\$1,560,846	\$841,870
Graduate Degree	23%	68	20.0%	\$467,083	\$6,355,266	\$3,952,341
Total	100%	297			\$8,075,218	\$4,875,153

* Note: WCC's provided data reflected that none of their current members had an associate degree. So to best reflect their education composition, only "Some College" was used in this analysis, reflecting the assumption of 2-years of college.

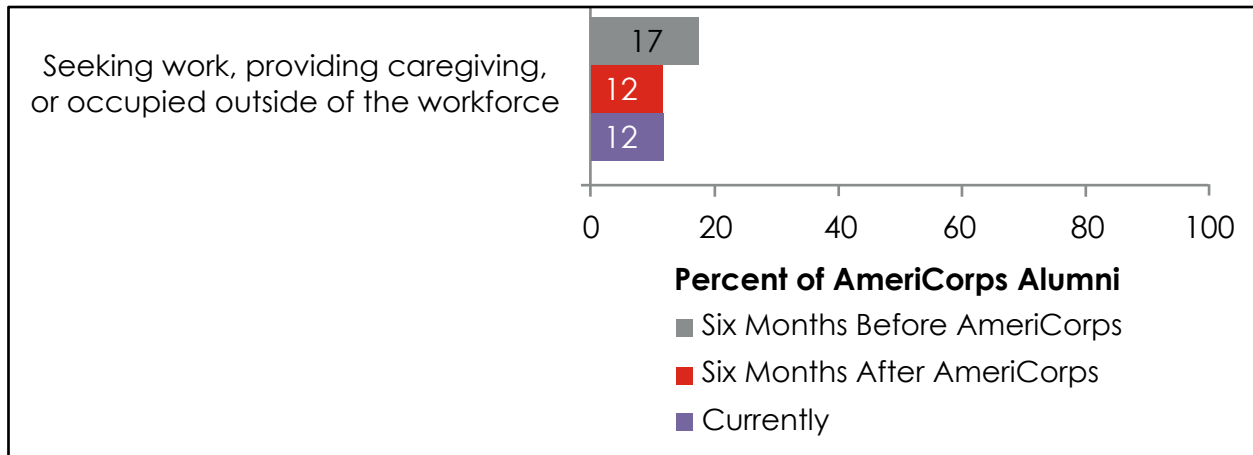
** Note: Lifetime taxes derived from Trostel (2015).

Sources: WCC (2021), Friedman et al. (2016), NCES (2019a & 2019b), Trostel (2015)

Increased Earnings due to Reduced Unemployment

According to Friedman et al. (2016), the percentage of AmeriCorps members unemployed was 5 percentage points lower six months after serving in AmeriCorps compared to six months before. The study did not provide actual employment rates for AmeriCorps members pre- and post-service, but instead provided the unemployment rates shown in Figure 8 (17 percent vs. 12 percent) in which the change between represents a 5 percentage-point decrease.

Figure 8. Unemployment Status Results from Friedman et al. (2016)⁶⁷



Source: Friedman et al. (2016)

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 WCC provide the gender, age, pre-service educational attainment, and race/ethnicity distribution of AmeriCorps members who served in the WCC program for the 2018–2019 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 WCC AmeriCorps members' additional earnings due to the reduced unemployment.

Specifically, the analysis used ASEC data to calculate the per-person average pre-tax annual earnings for 18- to 34-year-olds weighted by the demographic distribution of WCC AmeriCorps members that served during the 2018–2019 program. This value was \$41,151 as shown in Table 24. To estimate the additional pre-tax earnings that stemmed from the reduced unemployment, the \$41,151 annual earnings amount was multiplied by 5 percent. The product represents the per-person expected increase in pre-tax earnings solely derived from the post-service employment gain and thus attributable to the WCC program. The analysis then multiplied this additional earnings amount by the number of WCC AmeriCorps FTEs that served during the most recent program year.

⁶⁷ "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.

This represents the additional income earned by WCC AmeriCorps members due to their national service.

Table 24. Additional Per-Person Pre-tax Earnings for WCC AmeriCorps Members from Reduced Unemployment Based on WCC AmeriCorps Member Demographics

Metric	Value (2019\$)
Average Per-Person Pre-tax Annual Earnings of Employed 18 to 34-year-olds Weighted by WCC AmeriCorps Member Demographics (e.g., gender, race/ethnicity, and education level)	\$41,151
Reduction in AmeriCorps Members' Unemployment	5%
Total Expected Per-Person Increase in Pre-tax Earnings	\$2,058
WCC AmeriCorps Members FTEs	297
Pre-Tax Annual Expected Increase in Earnings for All WCC AmeriCorps Members*	\$610,069*
Post-Tax Annual Expected Increase in Earnings for All WCC AmeriCorps Members	\$495,047

Sources: WCC (2021), Friedman et al. (2016), ASEC (2019)

* This value is undiscounted, thus the values do to sum in the table.

To avoid double counting, the increase in *post-tax* earnings is used to calculate the direct benefit to WCC AmeriCorps members, rather than the increase in *pre-tax* earnings. The *post-tax* annual increase in earnings in Table 24 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 the WCC AmeriCorps members for the three different scenarios—discounted to 2019 dollars using 3 percent (OMB, 2003)—are shown in Table 25. These *post-tax* monetary amounts represent the additional *post-tax* earnings realized due to the employment gain that is solely attributed to the WCC program.

Table 25. Cumulative Additional Post-Tax Earnings Derived from Reduced Unemployment due to Serving in the WCC Program by Scenario

Scenario	Cumulative Additional Post tax Earnings due to Serving in the WCC Program (2019\$)*
Short-term	\$480,629
Medium-term	\$4,766,282
Long-term	\$6,118,590

Sources: ASEC (2019), WCC (2021), Friedman et al. (2016)

* These values are discounted

Benefits to Government

State and Local Government

State and local government benefits from WCC are realized from:

- Additional state income tax revenue from WCC AmeriCorps members' increased earnings due to reduced unemployment
- Additional lifetime state and local taxes due to WCC AmeriCorps members' increased post-secondary educational attainment⁶⁸
- Additional state and local taxes from the living allowance and education award received by these members, where applicable
- Additional state and local sales tax revenue from WCC AmeriCorps members' increased consumption due to reduced unemployment
- Reduced lifetime spending on social insurance and corrections⁶⁹ due to WCC AmeriCorps members' increased post-secondary 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 WCC AmeriCorps members that are solely attributed to the WCC program 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 proportional state income tax as the amount of state income taxes paid per AmeriCorps member divided by their pre-tax earnings. This analysis then calculated the weighted average of these state-specific tax rates—using these states' population from the 5-year estimates of the 2019 American Community Survey—

For additional tax revenue derived from WCC AmeriCorps members' reduced unemployment, living allowances, and education awards, they were calculated using tax rates specific to each per-person monetary amount.

For additional tax revenue derived from WCC AmeriCorps members' increased post-secondary educational attainment—due to using education awards—Trostel (2015) did not provide specific tax rates. Therefore, this analysis treated the increases in tax revenue as lifetime values expressed in 2019 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 one year post-program (i.e., in the short-term scenario).

⁶⁸ 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.

⁶⁹ Reduced spending on public assistance due to members' increased post-secondary 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.).

to estimate a weighted tax rate. While there is not a state income tax in Washington State, an estimated weighted tax rate for states, nationwide, was leveraged for taxes on post-service earnings that stemmed from the reduction in employment because WCC AmeriCorps members may disperse to various locations following their service terms and continue to migrate over the course of their working years.

Lifetime state income tax revenue is also provided by Trostel (2015) by education level. Based on the number of post-secondary degrees estimated to be obtained due to the use of the education award received after serving in the WCC program, additional lifetime state income taxes are realized. Thus, the additional lifetime state income taxes paid values—informed by data from Trostel (2015)—were converted to 2019 dollars and then multiplied by the inferred number of degrees obtained due to the education award, calculated in Table 21.

State governments also receive state income taxes from the education awards WCC AmeriCorps members receive post-service. The analysis estimated the pre-tax education award amount in 2019 dollars (i.e., \$6,120).⁷⁰ Then the analysis multiplied it by the number of FTE WCC AmeriCorps members (i.e., 297) and by the percentage of AmeriCorps State and National member alumni expected to redeem the award and use it to pursue post-secondary education or to repay outstanding student loans (i.e., 79 percent).⁷¹ The resulting product represents the pre-tax cumulative education award amount expected to be received by WCC AmeriCorps members. The portion of this value taxed by state income taxes was estimated using a weighted state income tax rate. Additionally, state income taxes are estimated for the living allowance amounts received by WCC AmeriCorps members during their service term. As Washington does not have a state income tax, no state income taxes are calculated for the service term. 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 that stems from reduced unemployment for state and local governments, the amount of WCC AmeriCorps members cumulative additional *post-tax* earnings that are spent on taxable goods was taxed by a sales tax rate. Specifically, a weighted state and local sales tax was calculated. This analysis first summed the state sales tax rate and the average local sales tax rate for that state by state using data from Tax Foundation (2019). Then using 2019 data from the American Community Survey (U.S. Census Bureau, n.d.), 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 7.43 percent.

⁷⁰ This analysis used the 2020 to 2021 AmeriCorps education award amount (\$6,345) but discounts it to net present 2019 dollars using the Consumer Price Index. For more information about this education award, please see <https://americorps.gov/members-volunteers/segal-ameri-corps-education-award/find-out-more>

⁷¹ Friedman (2016). Op. cit.

To estimate the additional post-tax earnings as a result of reduced unemployment that is spent on taxable goods, data from the Consumer Expenditure Survey (BLS, 2021) are used. These data show the amount of spending on a number of different goods and services by national consumers across several different income brackets. 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 WCC AmeriCorps members. Based on their per-person average pre-tax earnings, this value was 41.3 percent. This proportion was then applied to WCC 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 accordingly to estimate the resulting sales tax revenues that go to state and local governments due to reduced unemployment post-service.

As with the additional lifetime state income taxes, additional lifetime sales taxes realized by state and local governments are provided by Trostel (2015). 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 WCC through lifetime savings in social insurance and corrections—as reported in Trostel (2015)—due to the increase in WCC AmeriCorps members' post-secondary 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 difference in the lifetime 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 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 is 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. correction costs are paid by the federal government and the remaining 91.6 percent is paid by state and local governments. Therefore, almost 92 percent of the lifetime cost savings in corrections due to WCC AmeriCorps members experiencing an increase in secondary and post-secondary 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 WCC 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, where applicable
- Additional lifetime federal taxes due to WCC AmeriCorps members' increased post-secondary educational attainment
- Reduced lifetime spending on public assistance, social insurance, and corrections due to WCC AmeriCorps members' increased post-secondary educational attainment

Federal Income Tax Revenue: To measure federal income tax revenue that stems from reduced unemployment, the additional pre-tax earnings of WCC AmeriCorps members that are solely attributed to the WCC program—as well as the pre-tax living allowance and education award amounts received by WCC 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 Tax Foundation (2020). 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). For WCC AmeriCorps members during the service year, the 2019 federal income tax rate is 10 percent. For WCC AmeriCorps members following the service year, the tax rate used for the education awards and potential future earnings resulting the reduction in unemployment used the 2019 federal income tax rate of 12 percent.

For the additional lifetime earnings of WCC AmeriCorps members that is based on their increase in post-secondary educational attainment—fueled by the use of the education award—Trostel (2015) provides additional lifetime federal income taxes.

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 WCC AmeriCorps members from their reduced unemployment and due to the pre-tax amounts in living allowances and education awards 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 WCC AmeriCorps members to calculate the additional amount of revenue the federal government receives. These rates are also applied to the living allowance and education award amounts received by WCC AmeriCorps members to calculate additional tax revenue. Moreover, additional lifetime Social Security tax revenue realized for the federal government—as a result of WCC AmeriCorps members using their education award to complete different 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 post-

secondary educational attainment of WCC AmeriCorps members after program exit. Specifically, the number of additional post-secondary degrees estimated to be earned by WCC 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 comprised of worker’s compensation and unemployment insurance, as noted earlier), public assistance (e.g., SNAP, Medicaid, TANF, etc.), and corrections.

Table 26 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 26. Government Costs by Educational Attainment Level per Individual’s Lifetime

Source of Government Saving	Some College (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

Sources: Trostel (2015)

As mentioned earlier in this appendix, as a result of the WCC program, the analysis estimated an additional 136 WCC AmeriCorps members would redeem the education award to pursue additional post-secondary education. Assuming all who redeemed the education award completed the pursued post-secondary education, an estimated 6 members will complete some college, 62 will earn a bachelor’s degree, and 68 will earn a graduate degree. 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 2019 dollars. These values are then multiplied by the number of additional post-secondary degrees estimated to be obtained—where appropriate—to represent the total cost savings realized by the federal government due to the WCC 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).

Table 27 shows the tax rates applied to WCC 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 WCC AmeriCorps members upon program completion.

Table 27. 2019 Tax Rates and Ratio of Taxable Expenditures for WCC AmeriCorps members' Earnings, Living Allowances, and Education Awards

Metric	Additional Earnings from reduced unemployment* (%)	Living Allowance & Education Award** (%)	Notes
Estimated Proportional Federal Income Tax	8.16%	4.00%	<ul style="list-style-type: none"> • Tax rates are used which 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	3.04%	2.25%	<ul style="list-style-type: none"> • Tax rates are used which 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%	<ul style="list-style-type: none"> • 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%	<ul style="list-style-type: none"> • Medicare tax rate for employees and employers. • These rates are applied to the pre-tax value of each metric being taxed.
Sales Tax	7.43%	6.39% on the Living Allowance; N/A to the Education Award	<ul style="list-style-type: none"> • The combined state and average local tax rate for each state was summed and weighted based on states' population to calculate a national weighted average sales tax rate. • The rate is applied to the additional post-tax earnings of members.

Metric	Additional Earnings from reduced unemployment* (%)	Living Allowance & Education Award** (%)	Notes
Ratio of Taxable Expenditures per National Consumer	41.29%	57% on the Living Allowance; N/A to the Education Award	<ul style="list-style-type: none"> • Percent 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 the additional earnings of members.

*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: Tax Foundation (2019), Social Security Administration (2020), Consumer Expenditures Survey (BLS, 2021)

Summary of Benefits to Government

Table 28 shows the amount of tax revenue generated and savings in expenditures for state and local versus federal government that are solely credited to the WCC program 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 WCC program impacts.

Table 28. State/Local and Federal Government Benefits by Stakeholder Group and by Scenario

Benefit Type	Benefit (2019\$)		
	Short term	Medium term	Long term
State/Local Government Benefits	\$103,347	\$1,038,395	\$1,533,727
State Income Tax Revenue from Education Awards*	\$36,987	\$36,987	\$36,987
State Income Tax Revenue from Employment	\$18,013	\$178,635	\$229,318
State and Local Sales Tax Revenue from Employment	\$48,347	\$479,444	\$615,473
State Income, Sales, and Property Taxes from Post-secondary Educational Attainment (Lifetime)	\$0	\$325,975	\$651,949
State Savings in Reduced Social Insurance and Corrections Spending from Post-secondary Educational Attainment (Lifetime)	\$0	\$17,355	\$34,710
Federal Government Benefits	\$987,937	\$3,178,886	\$4,798,228
Federal Income Tax, Social Security, and Medicare Tax Revenue from Living Allowance & Education Award*	\$894,280	\$894,280	\$894,280
Federal Income, Social Security, and Medicare Tax Revenue from Employment	\$93,658	\$928,781	\$1,192,299
Federal Income and Social Security Tax Revenue from Post-secondary Educational Attainment (Lifetime)	\$0	\$1,274,058	\$2,548,116
Savings in Reduced Social Insurance, Corrections, and Public Assistance Spending from Post-secondary Educational Attainment (Lifetime)	\$0	\$81,767	\$163,534
Total	\$1,091,285	\$4,217,281	\$6,331,955

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

Measuring Forgone Benefits (Opportunity Costs)

The analysis included two types of forgone benefits, referred to opportunity costs, into each of the three ROI calculations to conservatively estimate the return of the WCC program: forgone benefits from a professional opportunity cost to WCC 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 the WCC program—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 WCC AmeriCorps Members

There is a professional opportunity cost to WCC AmeriCorps members for their period of national service, during which they could have otherwise been working. This includes both the forgone earnings of WCC 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 WCC AmeriCorps members for the 2018–2019 program year—in terms of gender, race/ethnicity, and pre-service education level—and ASEC data to estimate the weighted unemployment rate for this population (i.e., 3.8 percent). This represents how many of these WCC AmeriCorps members would have been unemployed if they did not serve in the WCC program. Using the weighted unemployment rate and the number of FTE WCC AmeriCorps members that served during the 2018–2019 program year, the analysis estimated the number of members that would have been employed without serving in the WCC program based on their demographic characteristics (i.e., 297). Then the analysis multiplied this value by the weighted pre-tax annual earnings listed in Table 24. The methodology to calculate this monetary amount is described in the previous Increased Earnings due to Reduced Unemployment section. These values combined represent what WCC AmeriCorps members would have earned in total if they did *not* serve in the WCC program. Separately, the analysis then multiplied the number of FTE WCC AmeriCorps members that served by the amount they earned during their national service in the form of a living allowance (i.e., \$20,333 per person). This represents the aggregate amount WCC 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 in the WCC program. These values and the formula used to calculate these forgone post-tax earnings are shown in Table 29.

Table 29. Forgone Earnings of WCC AmeriCorps Members for a Service Term

Row	Component	Value	Source
A	FTE WCC AmeriCorps Members	297	WCC (2021)
B	Weighted Unemployment Rate (%)	3.8%	ASEC (2019)
C	Weighted Pre-tax Annual Earnings Per Person (\$)	\$41,151	ASEC (2019)
D	Living Allowance Per Person (\$)	\$20,333	WCC (2021)
E	Total Post-tax Earnings Forgone	\$5,714,957	(A x (1-B) x C) – (A x D)

The second portion of this professional opportunity cost was the forgone taxes associated with the earnings of WCC AmeriCorps members lost for this year of service. Federal income, state income, Social Security, and Medicare taxes specific to the aforementioned per-person weighted pre-tax earnings amount were calculated. Specifically, the estimated proportional federal and state income tax rates used were 8 percent and 3 percent, respectively. The analysis also estimated the sales taxes lost based on the per-person post-tax earnings forgone by the WCC AmeriCorps members.

Using data from the Consumer Expenditure Survey (BLS, 2021), the analysis estimated that based on the per-person weighted pre-tax earnings of WCC AmeriCorps members (i.e., \$41,151), 41 percent of their income would have been spent on taxable goods, as opposed to 57 percent of the living allowance. Then the weighted combined state and local sales tax rate (i.e., 7.34 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 in the WCC program instead of working. The totals for these taxes are listed in Table 30.

Table 30. Forgone Taxes Associated with the Forgone Earnings of WCC AmeriCorps Members for a Service Term

Forgone Taxes	Taxes without Service Term (2019\$)	Taxes Realized from Living Allowance (2019\$)	Post tax Taxes Forgone (2019\$)	
	[A]	[B]	[C]	[A] [B]
Federal Income Taxes	\$936,062	\$241,156	\$694,906	
State Income Taxes	\$350,591	\$0	\$350,591	
Social Security and Medicare Taxes	\$898,402	\$461,208	\$437,194	
Sales Taxes	\$356,085	\$219,021	\$137,064	
Total Taxes	\$2,541,140	\$921,385	\$1,619,755	

In 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 the WCC program—in this ROI calculation. The parts of the professional opportunity cost subtracted from these total federal government benefits include the forgone post-tax federal income taxes (i.e., \$694,906) and the post-tax forgone Social Security and Medicare taxes (i.e., \$437,194). The sum of these two values is called the federal professional opportunity cost. The sum of all the values listed in Table 30 and the forgone post-tax earnings of WCC AmeriCorps members is called the total professional opportunity cost. These naming conventions are referenced in the Calculating ROI section.

Forgone Benefits from Investment Opportunity Cost to Funders

The investment opportunity cost estimates the expected forgone return if funds used to support the activities and positions of WCC 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 funding for the 2018–2019 program year and 2) only federal funding for the WCC program. 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—realized due to the WCC program—is the

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 accrued interest from investing all WCC funds (both federal and non-federal) into these U.S. Treasury bonds. Therefore, the analysis estimated accrued interests across all three scenarios when 1) all WCC funds and 2) only federal WCC funds are invested in U.S. Treasury bonds.

To calculate these accrued interest values, the analysis first matched real interest rates provided by the Office of Management and Budget to each of the scenarios included in this ROI analysis. 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. The analysis applied the 2018 real interest rates due to the implied rate of expenses of WCC described in Table 27.⁷² These real interest rates applied were 0.6, 0.8, and 1.0 percent, respectively.⁷³ Also, the number of years elapsed on these U.S. Treasury bonds was equal to the number of years the different scenarios assumed WCC AmeriCorps members' employment and earnings gains were sustained. These values are 1 year, 15 years, and 30 years for the short-, medium-, and long-term scenarios, respectively. Given that U.S. Treasury bonds compound bi-annually,⁷⁴ the formula used to calculate the accrued interest for each of the three scenarios for the two funding streams is listed in Figure 9, 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 2018 real interest rate, and t equals the number of years elapsed.

Figure 9. 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 investment opportunity cost calculated by scenario and funding stream are listed in Table 31, 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.

⁷² The analysis used 2018 real interest rates for U.S. Treasury bonds because the WCC AmeriCorps program year analyzed began in 2018.

⁷³ Office of Management and Budget (OMB). (2020, November). Circular No. A-94. Appendix C. Retrieved from: https://www.whitehouse.gov/wp-content/uploads/2020/12/2020_Appendix-C.pdf

⁷⁴ Department of Treasury. N.d. Interest Rates - Frequently Asked Questions. Retrieved from: <https://home.treasury.gov/policy-issues/financing-the-government/interest-rate-statistics/interest-rates-frequently-asked-questions> and White House. 2020. Budget Assumptions. November 19, 2020. Real Treasury Interest Rates. <https://www.whitehouse.gov/wp-content/uploads/2020/12/discount-history.pdf>

Table 31. Investment Opportunity Cost Calculation by Scenario and Funding Stream

Metric	Short term		Medium term		Long term	
	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	\$14,603,748	\$4,192,256	\$14,603,748	\$4,192,256	\$14,603,748	\$4,192,256
Forgone Accrued Interest	\$4,802,663	\$1,378,687	\$2,676,349	\$768,292	\$6,619,797	\$1,900,326

* Note: The real interest rates used are the 2018 real interest rates due to the fact that the WCC program year commenced in 2018.

Measuring Program Costs

Table 32 shows the costs of WCC by funding source and cost category. State funding supplies half the funding for the WCC program.

Table 32. Funding Sources and Cost Categories for WCC, 2018–2019 Program Year

Source	Amount (\$)	Details
Cost Categories	\$13,170,347	
Operating	\$6,784,804	Expenses such as supplies, training, travel, and program staff costs
AmeriCorps member expenses	\$6,028,862	Living allowances and other benefits received during service
Other	\$356,681	Indirect costs incurred by WCC
Funding Sources	\$13,170,346	Percent*
AmeriCorps	\$1,704,842	13%
Other Federal	\$1,054,012	8%
State Funding	\$3,950,499	30%
State Interagency Agreements	\$2,642,618	20%
Private/Local/ Tribal Governments	\$3,818,375	29%

Source: WCC (2021)

*Values may not sum due to rounding

Calculating ROI

To calculate the three ROI calculations for the WCC program, the sum of applicable benefits is reduced by the forgone benefits from the professional and opportunity cost (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 aforementioned scenarios: short-term, medium-term, and long-term. Due to the range of benefits derived from ecosystem services, the low, medium, and high estimates are also presented, totaling nine scenarios.

Since the majority of the calculations include benefits to society (i.e., society at large and WCC AmeriCorps members), 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 costs. The ROIs expressed as cost–benefit ratios in this study can be interpreted as the amount of dollars returned for every \$1.00 of investment (or program cost).⁷⁵

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

$$\text{Total Benefits per Federal Dollar} = \frac{(\text{Benefits to WCC AmeriCorps Members} + \text{Benefits to Society} + \text{Benefits to Government}) - (\text{Forgone Benefit from Total Professional Opportunity Cost} + \text{Forgone Benefits from Federal Investment Opportunity Cost})}{(\text{AmeriCorps Federal Funding} + \text{Other Federal Funding})}$$

$$\text{Total Benefits per Funder Dollar} = \frac{(\text{Benefits to WCC AmeriCorps Members} + \text{Benefits to Society} + \text{Benefits to Government}) - (\text{Forgone Benefits from Total Professional Opportunity Cost} + \text{Forgone Benefits from Total Investment Opportunity Cost})}{(\text{AmeriCorps Federal Funding} + \text{Other Federal Funding} + \text{Non-federal Funding})}$$

$$\text{Federal Government Benefits per Federal Dollar} = \frac{(\text{Benefits to the Federal Government}) - (\text{Forgone Benefits from Federal Professional Opportunity Cost} + \text{Forgone Benefits from Federal Investment Opportunity Cost})}{(\text{AmeriCorps Federal Funding} + \text{Other Federal Funding})}$$

⁷⁵ 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 \$1 invested.

Tables 33, 34, and 35 show the total program benefits, forgone benefits (opportunity costs), program costs, and ROI results for each scenario.

Table 33. ROI Calculations for Short-term Scenario

Components	Total Costs and Benefits per Federal Dollar (2019\$)	Total Costs and Benefits per Funder Dollar (2019\$)	Federal Government Costs and Benefits per Federal Dollar (2019\$)
Total Benefits by Range of Impact			
Total Benefits - Low	\$8,707,530	\$8,707,530	\$987,937
Total Benefits - Average	\$13,328,056	\$13,328,056	
Total Benefits - High	\$31,801,301	\$31,801,301	
Total Forgone Benefits (Opportunity Costs)	\$1,157,291	\$5,802,711	\$1,157,291
Total Program Costs	\$4,192,256	\$14,603,748	\$4,192,256
ROI			
Result Low	\$0.69	\$0.20	\$0.04
Result Average	\$1.80	\$0.52	
Result High	\$6.20	\$1.78	

Table 34. ROI Calculations for Medium-term Scenario

Components	Total Benefits per Federal Dollar (2019\$)	Total Benefits per Funder Dollar (2019\$)	Federal Government Benefits per Federal Dollar (2019\$)
Total Benefits by Range of Impact			
Total Benefits - Low	\$27,101,642	\$27,101,642	\$3,178,886
Total Benefits - Average	\$83,915,974	\$83,915,974	
Total Benefits - High	\$311,064,342	\$311,064,342	
Total Forgone Benefits (Opportunity Costs)	\$1,665,468	\$7,572,948	\$1,665,468
Total Costs	\$4,192,256	\$14,603,748	\$4,192,256
ROI			
Result Low	\$4.66	\$1.34	\$0.36
Result Average	\$18.21	\$5.23	
Result High	\$72.39	\$20.78	

Table 35. ROI Calculations for Long-term Scenario

Components	Total Benefits per Federal Dollar (2019\$)	Total Benefits per Funder Dollar (2019\$)	Federal Government Benefits per Federal Dollar (2019\$)
Total Benefits by Range of Impact			
Total Benefits - Low	\$39,658,370	\$39,658,370	\$4,798,228
Total Benefits - Average	\$132,939,660	\$132,939,660	
Total Benefits - High	\$505,885,921	\$505,885,921	
Total Forgone Benefits (Opportunity Costs)	\$2,594,569	\$10,809,477	\$2,594,569
Total Costs	\$4,192,256	\$14,603,748	\$4,192,256
ROI			
Result Low	\$6.88	\$1.98	\$0.53
Result Average	\$29.13	\$8.36	
Result High	\$118.09	\$33.90	

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