



National Institute of
Environmental Health Sciences
Worker Training Program

Impact Evaluation of Workforce Development in Underemployed and Unemployed Communities

The NIEHS Environmental Career
Worker Training Program

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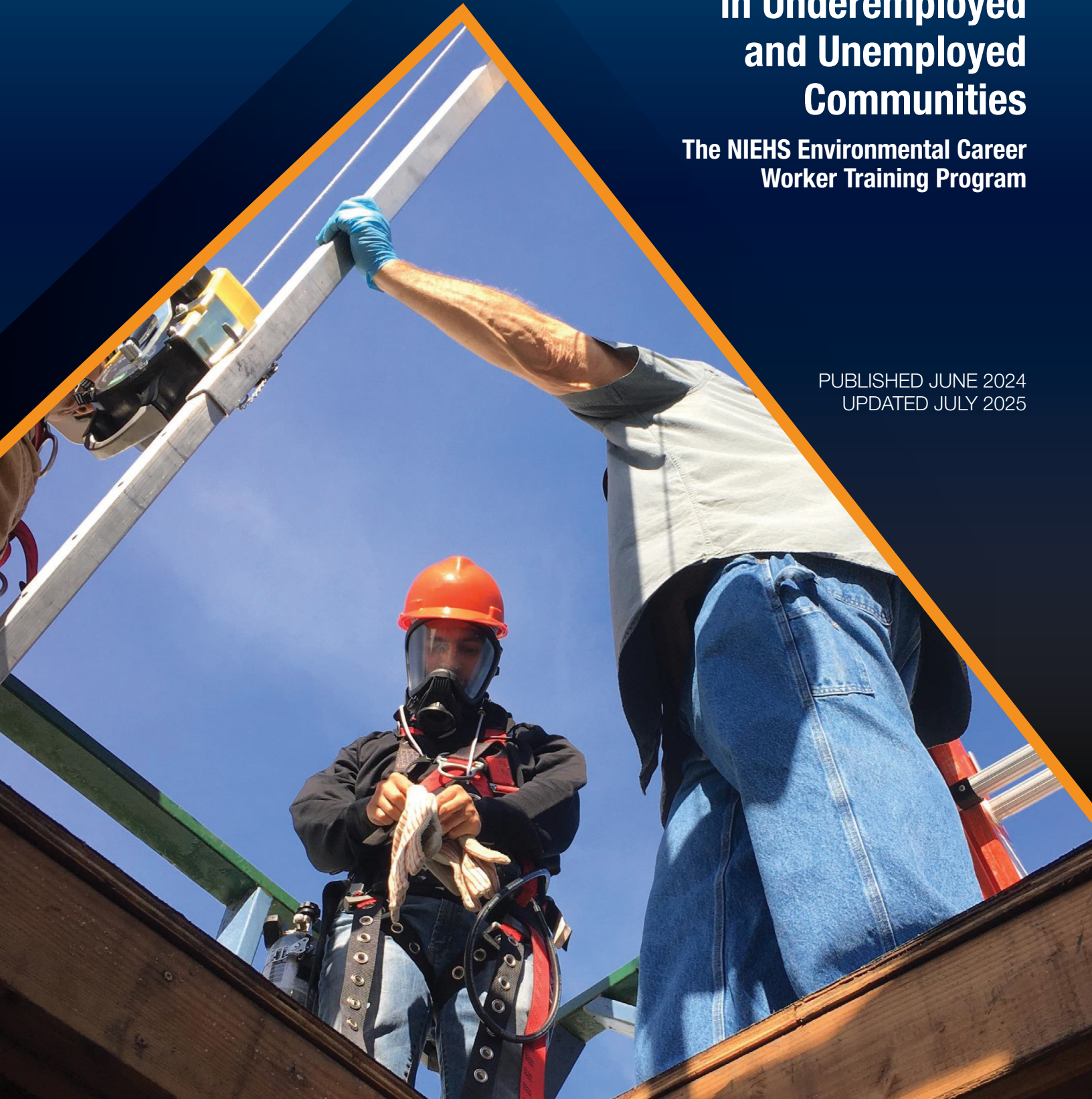


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PREFACE

The National Institute of Environmental Health Sciences (NIEHS) Environmental Career Worker Training Program (ECWTP) funds nonprofit organizations to provide training opportunities for individuals who are unemployed or underemployed to obtain employment and engage in community improvement efforts. Today, this distinctive, results-driven program reaches workers in more than 30 communities across 15 states and U.S. territories.

Part of the broader NIEHS Worker Training Program (WTP), the ECWTP provides comprehensive training to increase economic opportunities for trainees and to help them identify and secure meaningful employment in environmental cleanup, hazardous waste handling, emergency response, and labor-based work, such as construction. Specifically, the ECWTP aims to increase sustainable employment opportunities, promote economic development, address occupational and environmental exposures, and help revitalize their communities.

Notably, the ECWTP provides vital, and often the first, marketable workplace skills for many program graduates. Individuals typically enter the ECWTP with low levels of education and work experience, including some with troubled backgrounds and time spent in prison. To address these challenges, the program delivers one-of-a-kind pre-employment and life skills training in areas such as confidence building, financial responsibility, job readiness, and workplace dynamics. Life skills training prepares workers to build successful careers by instilling valuable and necessary career-focused personal characteristics. Many ECWTP-funded organizations (hereafter referred to as award recipients or grantees) provide pre-employment training through pre-apprenticeships; they also provide occupational health and safety training geared towards common hazards in the environmental and construction fields. Graduates often receive occupational health and safety certifications that lead to notably high employment rates compared to non-graduates. Further, life skills training fosters professional development and social support mentorship to empower trainees with information related to job readiness and financial education. Altogether, pre-employment and life skills training provides participants with the skills necessary to perform a future job safely and improves their prospects for a sustainable career in their field of choice.

As of 2023, the program has provided training to over 14,500 individuals and boasts a 72% average employment rate among graduates.

The origin of the ECWTP stems from the September 20, 1994, U.S. House of Representatives Conference Report 103-311 that authorized \$3 million for the program and established how the funds should be used and administered.

The following report is a comprehensive impact evaluation of the ECWTP that includes results from an economic impact study and a qualitative evaluation. The economic impact study was designed and conducted by a university economist who has expertise examining workforce-related economic impacts. The qualitative evaluation was planned and led by a trained public health program evaluator and a WTP health scholar-practitioner. Together, these experts have decades of education and experience designing, conducting, evaluating, and publishing myriad environmental and public health evaluations with direct application to challenges of today.

EXECUTIVE SUMMARY

The National Institute of Environmental Health Sciences (NIEHS) Environmental Career Worker Training Program (ECWTP) funds nonprofit organizations to provide training opportunities for individuals who are underemployed or unemployed to obtain employment and engage in community improvement efforts. Today, this distinctive, results-driven program reaches workers in more than 30 communities across 15 states and U.S. territories.

This executive summary provides an overview of a comprehensive impact evaluation report – composed of an economic impact study and qualitative program evaluation – that was initiated to demonstrate how the ECWTP increases employment opportunities for individuals, addresses occupational and environmental exposures, and helps revitalize their communities. The ECWTP benefits many aspects of society. The evaluation shows that the worker training model provided by the ECWTP could be scaled up to serve more people successfully.



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Economic Impact Study

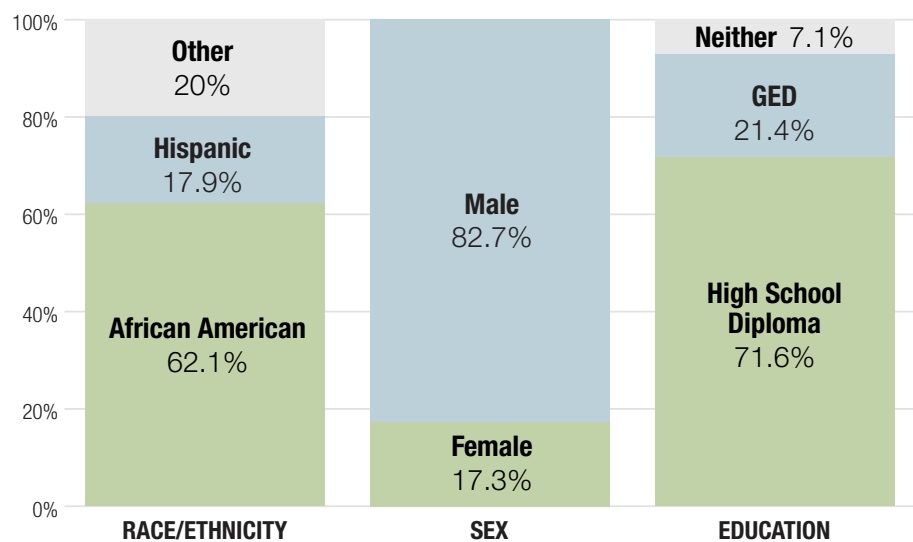
The study¹ quantifies the economic impact of the ECWTP from 2014 to 2022.

This economic impact study was conducted by an economist at the University of Wisconsin Oshkosh. Information about the trainees,² including their demographic characteristics and pre- and post-program employment statuses, was obtained from data submitted by ECWTP award recipients. Wages and weekly hours data were also collected, then benchmarked against a national dataset from the U.S. Bureau of Labor Statistics (BLS).

The study compares the career outcomes of approximately 3,800 ECWTP graduates with the outcomes of non-graduates and non-trainees who have similar demographic characteristics.

Trainee Demographics

Based on a sample of approximately 3,600 graduates and non-graduates from 2014-2022



The study results are listed below, along with the approximate value-added for direct and indirect benefits. Direct benefits refer to monetary benefits and cost savings that arise as a result of the ECWTP's impact on graduates. These direct benefits are cumulative estimates based on conservative assumptions and values. Therefore, the estimated returns and impacts could be higher. Indirect benefits include effects that accrue to third parties, such as the federal government, or effects that must be treated quantitatively differently than the direct benefits. All values and estimates, for direct and indirect benefits, have been inflation-adjusted to 2023 dollars.

- ¹ The update follows the methodological approach of the initial economic impact study conducted in 2015. It also includes data from the 2020 COVID-19 pandemic, when many ECWTP award recipients had to pause and adapt their training to remote learning.
- ² For the purpose of this study, the term "trainee" refers to a participant in a training program, while the term "non-trainee" refers to individuals who share demographic characteristics with trainees but are not enrolled in a training program. Non-trainee data was obtained from a national dataset from BLS. The terms "graduate" and "non-graduate" refer to trainees who completed and did not complete the program, respectively.

Direct Effects and Benefits Across Study Years, 2014-2022

- 1. **Effect on earnings:** Recognizing that program effects likely continue over a career, the evaluation analyzed the potential for effects on earnings over time. ECWTP graduates earn higher compensation than non-graduates throughout their lives in these ways: higher likelihood of employment, more hours worked, and higher hourly compensation. The effect on earnings is the difference in the current values of lifetime earnings between graduates and non-graduates. The estimated current value of the ECWTP’s effect on the lifetime earnings of a single graduate is \$221,329. **Multiplied by 3,800 graduates, the effects on earnings totals nearly \$841.1 million.**
- 2. **Safety and related cost savings:** ECWTP award recipients typically provide safety and health-focused training. Such courses may reduce the risk of workplace injuries and, therefore, injury-related costs that could otherwise be incurred. **These estimated cost savings total approximately \$7.3 million.**
- 3. **Hiring cost savings:** Training programs offered by ECWTP award recipients often help graduates with the hiring process by identifying employer matches and can reduce recruitment costs that employers might otherwise incur. **Employer savings in recruitment costs are estimated to be about \$2.5 million.**
- 4. **Crime cost savings:** Many program participants have criminal records, which can make it harder to find and keep a job. However, improved and lasting employment can lead to fewer crime-related activities. **The evaluation projects lower incarceration and victimization costs – \$42.9 million in combined savings over the analysis period – due to the ECWTP.**

Cumulative Value Added by the ECWTP³



The economic impact of the ECWTP, known here as the cumulative value added, refers to the approximate monetary benefit to the economy that arises from the program’s interventions. The cumulative value added over the study’s duration (2014 to 2022) was calculated by summing the program’s estimated direct benefits, including the ECWTP’s positive effect on earnings and the cost savings related to safety, hiring, and crime.

According to the study, the ECWTP added a cumulative value of \$893.8 million across the study period of nine years, or approximately \$99.3 million annually on average. In comparison, the federal government dedicated \$3.5 million to fund the ECWTP in 2021. Therefore, the results show that the ECWTP returns approximately 28 times the invested amount back into the economy.

3 All numbers rounded to the nearest one-tenth.

Indirect Effects and Benefits

The ECWTP also has several indirect effects.

5. **Effects on federal taxes and transfers:** The increased employment and earnings of ECWTP graduates increase the tax revenues the federal government⁴ collects while simultaneously reducing the transfer payments the federal government makes in social assistance programs. **The increased tax revenues and decreased transfer payments buttress the federal government budget by approximately \$445.8 million.**
6. **Matching funds and community involvement:** The success of training programs offered by ECWTP award recipients motivates and secures cash and in-kind donations from many community organizations. **Cash and in-kind donations are estimated to be about \$5.5 million per year. These resources help the ECWTP continue to succeed in its overall mission.**
7. **2020 COVID-related unemployment savings:** The ECWTP may have contributed to helping workers, at least in 2020, to sustain and/or find employment by teaching workers valuable job skills and typically placing graduates in industries and occupations that were more insulated from COVID-19 job losses. **The estimated benefit of avoiding unemployment comes to more than \$6.9 million during 2020.**

Overall, including the indirect benefits provides a more complete accounting of the economic impact of the ECWTP. The calculation for cumulative value added (mentioned in the previous section) does not include the indirect benefits mentioned here, such as tax revenues, transfer payments, matching funds and in-kind donations, and COVID-19 related savings.⁵



\$445.8M

Effects on
Taxes and
Transfers



\$5.5M

Matching Funds
and Community
Involvement (annual)



\$6.9M

2020
Covid-Related
Unemployment
Savings

⁴ This study focuses on the overarching, national benefit of the ECWTP, and thus uses federal tax revenues in this calculation.

⁵ Effect on taxes and transfers are considered an indirect cost savings benefit to the federal government, rather than a direct benefit from the ECWTP (NIEHS 2015). Matching funds and community involvement, as well as COVID-19 impacts, were not included in the calculation because both refer to annual benefits rather than cumulative ones.

Qualitative Evaluation

The qualitative evaluation illustrates the societal benefits to the program's participants and their communities through narrative accounts. Sources of data for the qualitative evaluation include annual progress reports from ECWTP award recipients, narrative accounts from trainees, and interviews with principal investigators and program coordinators of ECWTP grants.

The data were coded and analyzed for themes by two evaluators to ensure validity and reliability of findings. The following overarching themes were synthesized from the data:

1. **Partnerships:** The ECWTP has fostered and supported partnerships among award recipients, community leaders, and over 200 community-based organizations, leading to recruitment and job placement of trainees.
2. **Basic life skills:** The ECWTP nurtures trainees with skills that build confidence and empowerment, which are central to the program's success.
3. **Societal benefits:** The ECWTP leads graduates to experience several personal and professional benefits, including: building a life after experiencing incarceration, homelessness, and unemployment; giving back to the community; gaining the ability to buy or rent a home, pay for family expenses, or support their children's education; providing a path towards leadership positions; and feeling supported by the program to move forward in life.
4. **Supporting at-increased-risk populations:** The ECWTP has focused on persons with limited resources and educational opportunities, including people experiencing homelessness, people who were formerly incarcerated, and people experiencing underemployment or unemployment.
5. **Evaluation:** Evaluation is a major component of the ECWTP, and such robust examinations have shown continued success and meaningful strategies for improvement.
6. **Recruitment:** Award recipients leverage partnerships to reach and recruit individuals. ECWTP award recipients may need to explore training for new environmental careers in the future to strengthen recruitment efforts in different locations and communities.
7. **Job placement arrangements:** Trusted relationships between the award recipients and their communities helped maintain a high job placement for ECWTP graduates.
8. **Adaptation:** Award recipients often adapt technical occupational health and hazardous materials (Hazmat) safety training for the unique learning needs of ECWTP audiences, allowing more people to benefit from the trainings.
9. **Community:** ECWTP graduates can give back to society by using their training in environmental careers to invest and improve their own communities.



Building a Life and Career

The ECWT program has this sort of amazing ability to reach participants who are coming out of challenging situations. Whether it's unemployment, homelessness, or correctional facilities, you are giving them tools that they can go out and use in their careers and lives.



Results of the ECWTP qualitative evaluation show many positive results that stemmed from the ability of the award recipients to recruit and effectively train individuals to be successful, enter the workforce, and work in their communities to create impactful change (Figure 2).



Figure 2. Conceptualization of ECWTP's impacts.

INTRODUCTION

Program Background

In 1994, Congress authorized \$3 million for a program to provide instruction and job skills to individuals from underemployed communities to help them obtain careers in environmental cleanup, emergency response, and hazardous waste removal. The program, which was renamed the ECWTP in 2014, has served over 14,500 people to date.

The ECWTP provides funding to organizations and their community partners who are charged with training individuals in basic construction skills, hazardous waste, asbestos and lead abatement, and other safety and health training. Moreover, the program's funding provides pre-employment training in job and life skills, such as confidence building and financial responsibility, to help trainees find good jobs and become productive members of society.

Some partner training programs also enroll trainees in apprenticeship appointments that provide participants with on-the-job training that further prepares them for fruitful and sustainable careers. Similarly, trainees also receive mentorship and counseling support to provide direction and develop confidence. Finally, the success of the ECWTP rests in the trust built between ECWTP award recipients and the community organizations that deliver the training.

Methodology

Economic Impact Study

The economic impact study aims to quantify and record the economic benefits of the program between 2014 and 2022. It serves to validate public resource expenditures on the ECWTP's objectives and outcomes. Sources of data for the study included demographic and labor market characteristics of trainees, including their pre- and post-program employment statuses. Additionally, ECWTP award recipients provided wage and weekly work hours data, which are benchmarked against a national dataset from the U.S. Bureau of Labor Statistics (BLS).

The study quantifies the tangible economic impact of the ECWTP from 2014 to 2022 and serves as an update to the initial economic impact report published in November 2015. The updated study was conducted by an economist, Benjamin Artz, Ph.D., from the University of Wisconsin Oshkosh. For the purpose of this study, the term "trainee" refers to a participant in a training program, while the term "non-trainee" refers to individuals who share demographic characteristics with trainees but are not enrolled in a training program. Non-trainee data was obtained from a national dataset from BLS. The terms "graduate" and "non-graduate" refer to trainees who completed and did not complete the program, respectively.

The update closely follows the methodological approach of the initial economic impact report published by NIEHS in November 2015,⁶ which was based on data from the origination of the ECWTP in 1995 through 2013. The 2015 economic impact analysis and report utilized data from 9,605 trainees who participated in the program between 1995 and 2013. During this timeframe, the program averaged a 70% job placement rate (NIEHS 2015). The updated 2023 analysis and study contain data from 2014 through 2022. It is important to recognize that the COVID-19 pandemic caused many ECWTP award recipients to pause and adapt their training programs to a socially distant learning environment during much of 2020.

Between 2014 and 2022, the ECWTP provided job and skills training for more than 4,500 people, approximately 3,800 of whom graduated from the program. The objective of the study is to compare the career outcomes of the 3,800 ECWTP graduates with the outcomes of non-graduates and non-trainees. Thus, the economic impact of the ECWTP is an estimate of how much graduates' careers were improved compared to what their careers would likely have been absent the ECWTP. It is also an estimate of the program's overall return to the economy based on increased earnings for graduates; increased tax revenue; and savings related to safety, hiring, and crime reduction. Essentially, the analysis estimates the economic value of the program's goals: "The NIEHS ECWTP funds nonprofit organizations, or grantees, to deliver both pre-employment and life skills training... Each grantee provides training to empower workers with the skills, knowledge, and resources needed for placement and success in environmental careers... With new skillsets, trainees become experts in their field and leaders in their respective workplaces and communities (NIEHS 2022b)."

The study closely follows the outline, structure, and approach of the original 2015 study, with some adjustments designed to improve the readability of the report. These adjustments are outlined in section 1D in the Economic Impact Study Findings and do not substantially alter the update's results. The author began by collecting and organizing the data submitted by the award recipients. Under the ECWTP

⁶ There are notable differences between the two studies that affect the results. There were more years and more trainees in the original study. Substantial inflation between the two study's periods greatly appreciates the dollar values. Methodology and assumption differences between the two studies also affect the results, as the original study applied the ECWTP value-added to all trainees, while the current study only applies the ECWTP value-added to program graduates.



Photo courtesy of the Western Region Universities Consortium.

funding agreements, award recipients are required to collect and post these data yearly in the WTP data management system. These data are often not formatted in a way that facilitates statistical analyses. Beginning in spring 2023, award recipients reformatted the data to make it more usable. These data include dates of the program, participant race, age, sex, education level, program completion indicators, pre- and post-program employment status, and a description of any post-program employment. Additional data include annual progress and evaluation reports from ECWTP award recipients. Award recipients submitted a voluntary short questionnaire to program graduates to collect additional data about earnings and instances of workplace injury or illness. It is important to note that all data were anonymized by the award recipients so that the economist and this report's audience have no means by which to identify the individuals who participated in the training.

Each section within the Economic Impact Study Findings relies on the data from award recipients as much as possible. However, some sources of the ECWTP's benefits to society cannot be quantified using these data. In these instances, the economist relied on alternative data sources and measures taken from the established literature. All external sources of data are noted in the report.

Qualitative Evaluation

The qualitative evaluation aims to illustrate the unquantifiable benefits to the program's participants and their communities through narrative accounts. Sources of data for the qualitative evaluation included annual progress reports from ECWTP award recipients, narrative accounts from trainees, and interviews with principal investigators and program coordinators of ECWTP grants or awards.

Principal investigators for ECWTP award recipients were invited to participate in a voluntary interview. The open-ended interview questions (see Appendix) were shared before the meeting, and the principal investigator was given the opportunity to include other people in the interview who may have been able to better address the questions. The meetings were held on Microsoft Teams and recorded with participant consent. WTP Director Sharon Beard, who has managed the ECWTP for over 25 years, also attended the interviews.

Identifying information captured during the interviews was removed or paraphrased if requested by the participants during their review of the draft report.

All six ECWTP award recipients (100%) agreed to be interviewed (Table 1), and 11 individuals participated in the interviews. Interviews were conducted in February 2023 and ranged from 23 to 43 minutes, averaging 35 minutes long.

Table 1: Participants of program evaluation and interviews

ECWTP Award Recipient/Organization*	Participants (n=11)
Atlantic Center for Occupational Health and Safety Training	1
Historically Black Colleges and Universities Consortium	1
The Center for Construction Research and Training	2
Sustainable Workplace Alliance	1
Historically Black Colleges and Universities Consortium (Texas Southern University)	1
OAI, Inc.	3
United Steelworkers	1
Western Region Universities Consortium	1

**There were six ECWTP award recipients in 2023. Texas Southern University and Deep South Center represent the same consortium, and the participants were the two co-principal investigators of the grant. The United Steelworkers were represented by Make the Road New York. Make the Road New York was an ECWTP partner organization (sub-award recipient) for the United Steelworkers prior to 2020 and is currently a partner organization/sub-award recipient under the Atlantic Center.*

NVivo software was used to organize interview transcripts for qualitative analysis. The evaluation was coordinated through Office of Management and Budget clearance that exists in the agreements between principal investigators and NIEHS. No ethics review was required, as it is considered a program evaluation.

A trained evaluator⁷ conducted and transcribed the interviews. From there, per Creswell (2023), the evaluator organized and prepared the data for analysis, read all data, coded and sorted the data, identified themes, and interpreted and meaningfully represented the data. A second trained evaluator⁸ independently reviewed the transcript codes and themes to ensure validity and reliability of findings. We used Gibbs' (2007) qualitative reliability procedures to ground our coding approach, including carefully checking transcripts for obvious errors, ensuring consistency in the application of codes, coordinating communication between the two evaluators, and cross-checking all work. No pre-identified codes were used for analysis.

Existing annual progress reports provided to NIEHS by the award recipients between 2015 and 2022 were reviewed to determine if key themes that emerged from the interviews could also be identified in the progress reports. We used the triangulation of different data sources to build evidence for themes, abundant with rich descriptions to offer readers an element of shared experiences.

Moreover, the interview participants received a draft of the results and were provided an opportunity to provide edits to improve the accuracy of this report and to verify that our results resonated with their experiences (Creswell 2023).

7 The evaluator had been with WTP as a contractor since 2020 and the prior year engaged in evaluating WTP's Opioids and the Workplace program. The evaluator had been using a mixed-method approach for WTP evaluations, including evaluations of the COVID-19 program and Small Business Innovation Research component.

8 The co-evaluator has over 30 years of experience in emergency medical services, public health, healthcare leadership, emergency management, and as graduate-level faculty at multiple universities.

RESULTS

Economic Impact Study Findings

Summary of Economic Benefits

This update quantifies a range of ECWTP benefits to graduates and to society overall.

1. **Effect on earnings.** Recognizing that program effects likely continue over a career, the evaluation analyzed the potential for effects on earnings over time. ECWTP graduates earn higher compensation than non-graduates throughout their lives in these ways: higher likelihood of employment, more hours worked, and higher hourly compensation.
2. **Safety and related cost savings.** ECWTP award recipients typically provide safety and health-focused training. Such courses may reduce the risk of workplace injuries and, therefore, injury-related costs that could otherwise be incurred.
3. **Hiring cost savings.** Training programs offered by ECWTP award recipients often help graduates with the hiring process by identifying employer matches and can reduce recruitment costs that employers might otherwise incur.
4. **Crime cost savings.** Many program participants have criminal records, which can make it harder to find and keep a job. However, improved and lasting employment can lead to fewer crime-related activities. The evaluation projects lower incarceration and victimization costs due to the ECWTP.
5. **Effects on taxes and transfers.** The increased employment and earnings of ECWTP graduates increase the tax revenues the federal government collects while simultaneously reducing the transfer payments the federal government makes in social assistance programs.
6. **Matching funds and community involvement.** The success of training programs offered by ECWTP award recipients motivates and secures cash and in-kind donations from many community organizations. These resources can help the ECWTP continue to succeed in its overall mission.
7. **2020 COVID-related unemployment savings.** The ECWTP may have contributed to helping, at least in 2020, to more readily sustain and/or find employment by teaching workers valuable job skills and typically placing graduates in industries and occupations that were more insulated from COVID-19 job losses. Consequently, unemployment due to COVID-19 likely did not reduce the earnings of ECWTP graduates as much compared to the earnings of non-trainees.

Additional large and unquantifiable benefits to society of the ECWTP include environmental and social benefits. Many individuals obtain training that aids them in finding jobs that benefit the environment, including jobs in environmental cleanup, hazardous waste removal, and other environmental jobs. Moreover, ECWTP graduates often find job matches in socially beneficial occupations such as education, health care, emergency response, and public service. While the environmental and social benefits that accrue from ECWTP graduates in these valuable occupations are not quantifiable with the available data, it is nonetheless important to note the benefits are likely substantial.

Trainees also illuminate additional, unquantifiable personal benefits from the ECWTP training in testimonials and expanded interviews. Sustained employment in well-compensated and rewarding careers provides priceless benefits, such as security, stability, and happiness, to graduates and their families.

The following sections highlight the financial returns on investment we see from the ECWTP. These are illustrated in Table 2 below.

Table 2: ECWTP Benefits Summary

	2014 – 2022
Effect on earnings (present value)	\$841.1 million
Safety and related cost savings	\$7.3 million
Hiring cost savings	\$2.5 million
Crime cost savings	\$42.9 million
Effects on taxes and transfers	\$445.8 million
Matching funds and community involvement	\$5.5 million
2020 COVID-related unemployment savings	\$6.9 million

1. Effects on Earnings

1A. Employment Effects

Workers' lifetime earnings increase with greater time spent employed. The ECWTP has a substantial impact on the employment rate of its graduates. We demonstrate this impact by comparing the employment rates of graduates who completed a training program between 2014 and 2022 with trainees who started the training program but did not complete it. Table 3 provides summary statistics for a sample (n=3,656) of the 4,500 trainees who did and did not complete the program, with specific rates based on demographic characteristics such as race, education levels, and employment status prior to the training program.

Table 3: Employment Data Summary Statistics

	Sample data (n = 3,656)	Completed program (graduate) (n = 3,338)	Did not complete program (non-graduate) (n = 318)
Demographic characteristics			
Female	17.26%	17.47%	15.09%
African American	62.14%	62.07%	62.89%
Hispanic	17.89%	18.03%	16.35%
Average age in years (standard deviation)	32.17 (10.36)	32.39 (10.42)	29.88 (9.37)
Education levels			
High school diploma	71.55%	71.84%	68.55%
GED	21.36%	21.00%	25.16%
Neither	7.08%	7.16%	6.29%
Employment measures			
Employed after program	76.37%	82.47%	12.26%
Unemployed before program	61.95%	61.17%	70.13%
Underemployed before program	34.49%	35.41%	24.84%

Table 3 describes three important characteristics of the individuals in the sample. First, the sample primarily comprises African American individuals. Fully 62% of this sample is African American compared to only 13.6% of the overall U.S. population (U.S. Census Bureau 2022). Second, the sample's individuals have less formal education than the general American public. By 2019, approximately 90% of Americans (and 88% of African Americans) over age 25 had completed four years of high school education or more, whereas only 72% of the sample had done so. Finally, the African American unemployment rate averaged 6.7% from 2017 through 2019 (the final three years pre-COVID in this sample). The pre-ECWTP unemployment rate in the sample is much higher, at roughly 62%. It is clear from these data that ECWTP trainees face higher rates of unemployment and have lower levels of formal education than a typical

African American individual in the U.S. It is also worthwhile to note the differences between this sample of participants and the original economic impact study's participants. Specifically, compared to the 2015 study:

- Women now make up 17.3% of ECWTP participants, compared to 12.5% in the 2015 study.
- The racial and ethnic distribution is more varied, with 20% of this sample reporting they are not African American or Hispanic, compared to only 7.5% in the previous study.
- The average age of ECWTP participants is 32 years, compared to an average of 27 years in the previous study.
- 93% of participants in the current study had a high school diploma or GED, compared to only 83% in the 2015 study.
- Only 62% of the current participants were unemployed prior to starting a training program, compared to 82% of participants in the 2015 study.

With regards to the current study, ECWTP graduates are more likely to obtain employment compared to non-graduates. After the training, 82.5% of graduates were employed whereas only 12.3% of non-graduates obtained a job. Program completion, rather than just partial participation, seems to be rewarded in the labor market. The skills development and training acquired from fully completing the ECWTP likely improves worker productivity, more so than partial completion. Program completion may also act as a signal that ECWTP graduates are innately or inherently more productive and reliable in the labor market (Spence 1973). The vast improvement in employment after program completion highlights the importance of encouraging trainees to complete the training program.

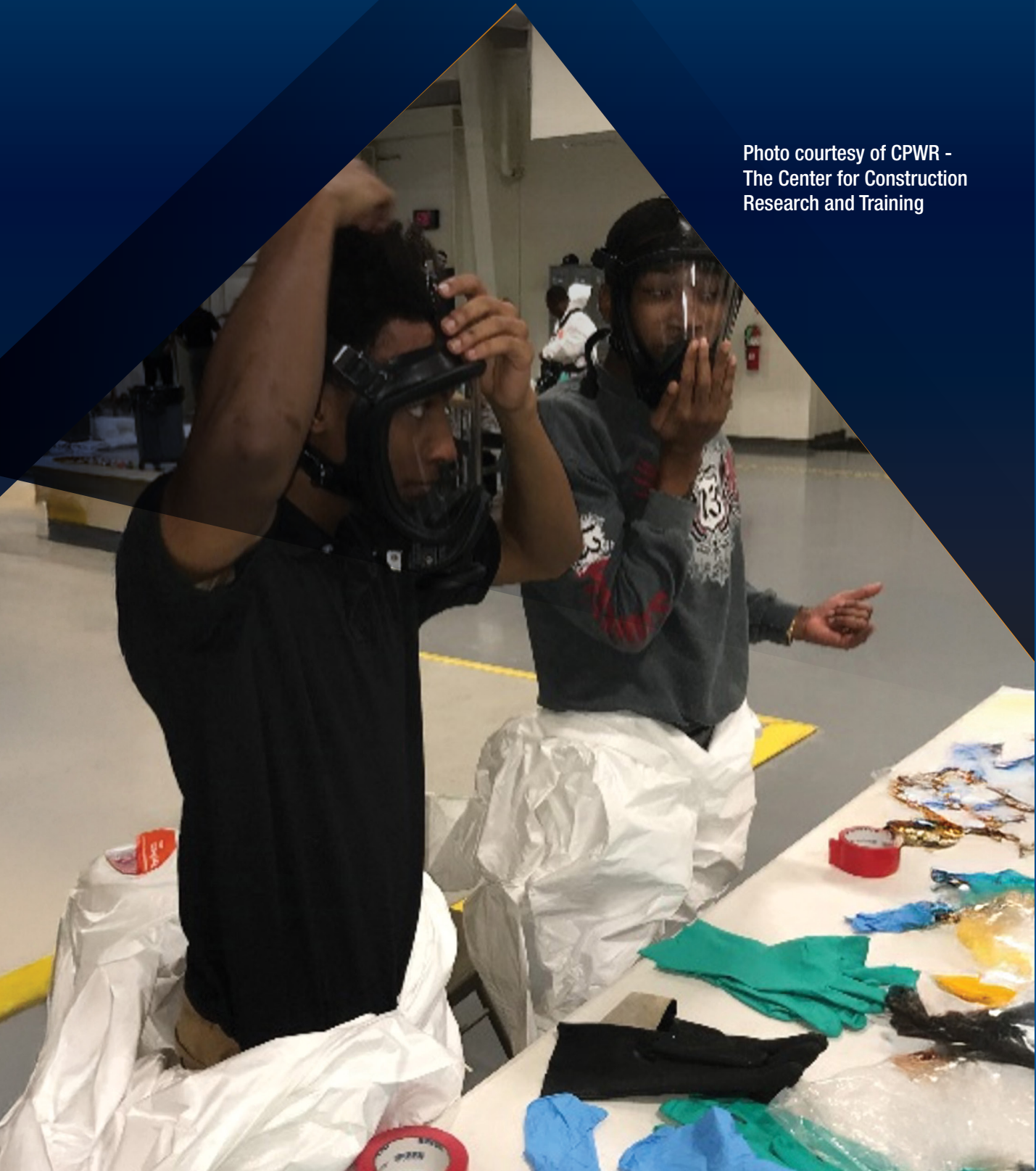
Summary statistics like those in Table 3 cannot tell the whole story because the sample is non-random, and participation in the ECWTP may be affected by characteristics that are not being analyzed. For example, an ECWTP trainee may be influenced to join the program because they know a friend who graduated and benefited from the experience. A randomized controlled trial, which uses participants from the general population, could pinpoint the true causes of the observed benefits of the ECWTP. Unfortunately, random control trials are not possible or practical here.

Instead, using a regression analysis on the data can control for characteristic differences between the graduate and non-graduate populations to better isolate the effects of the ECWTP on employment. This analysis can remove the influence that some, but not all, worker characteristics might have on the estimated benefits of the ECWTP by using controls. Controls in the data include educational differences, pre-program employment status differences, sex, race/ethnicity, age, and geographical region.

While an ordinary least squares regression is the typical technique in which controls are incorporated into a statistical comparison of groups (in this case, program graduates and non-graduates), the response variable, or dependent variable, is binary (employed or not employed). Ordinary least squares regression is not a trustworthy tool for estimating binary dependent variables, so a probit⁹ model is a better approach for estimating employment probabilities between the two groups while incorporating all the control variables (Hoetker 2007).

9 Probit is a unit of probability based on deviation from the mean of a standard normal distribution. Each category of a variable (for instance, both male and female categories) cannot be included in a regression to avoid perfect collinearity between variables. The estimate of a category (female) is that category's effect relative to the omitted category (male); for instance, in Table 4, women are 4.72 percentage points less likely than men to be employed.

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The Center for Construction
Research and Training



Graduation from a training program offered by ECWTP award recipients is highly correlated with employment after program completion. Table 4 below provides marginal effects, which estimate how strongly ECWTP completion affects graduate employment, calculated from the probit estimates. The marginal effect corresponding with ECWTP completion is approximately 0.53 (Table 4). This means that the proportion of ECWTP graduates with employment is 53 percentage points higher than the proportion of ECWTP non-graduates with employment, even after controlling for variables that likely correlate with post-program employment probabilities. This estimate is quite large and significant, but somewhat smaller in size than the difference in unconditional employment rates for which variables were not controlled, presented in Table 3 (82.47% - 12.26% = 70.21%). The smaller 53% employment rate effect is either due to the addition of the control variables to the model or potential non-linear relationships between program completion and post-program employment. The p-values in Table 4 reveal whether one can safely reject a hypothesis that there is no relationship between ECWTP completion and post-program employment. A p-value of less than 0.05 indicates that there is a statistically significant relationship between variables. The lower the p-value, the greater the significance. Because the p-value for the ECWTP completion variable is effectively 0, there is clearly a statistically significant relationship, suggesting that completing the ECWTP does correlate significantly with increased employment rates. Moreover, the effect size of 52.52 percentage points is very large, and is practically and economically significant.

Table 4: Probit employment estimation

	Marginal effect estimate (standard error)	P-value
Completed ECWTP	0.5252*** (0.0201)	<0.001
Unemployed before ECWTP	-0.0962*** (0.0140)	<0.001
High school diploma	0.0694*** (0.0226)	0.002
GED	0.0617** (0.0249)	0.013
Female	-0.0472*** (0.0155)	0.002
African American	-0.0143 (0.0166)	0.389
Hispanic	0.0208 (0.0204)	0.309
Age	0.0007 (0.0006)	0.221

Notes: Observations = 3,656. *** and ** represent statistical significance at the 1% and 5% levels, respectively. The probit estimation includes both year and award recipient fixed effects.



Left: Individual behind the wheel of equipment. Photo courtesy of Sustainable Workplace Alliance.

Right: Photo courtesy of OAI, Inc.

1B. Hours Worked Effects

Workers' lifetime earnings increase the more hours worked per week since most, if not all, of the post-ECWTP careers are typically paid per hour. The increase in hours worked per week post-ECWTP relative to pre-ECWTP can stem from two sources. First, increased productivity and job skills make ECWTP graduates more valuable to employers, so employers hire graduates to work more hours. Second, workers experiencing unemployment and working zero weekly hours pre-ECWTP necessarily demonstrate increased hours worked post-ECWTP after securing employment.

To determine the hours worked effect, ideally one would subtract hours worked post-training to those worked pre-training, but the data do not allow for this simple comparison since many trainees are experiencing unemployment at the start of ECWTP training and working zero hours. However, without ECWTP training, individuals might eventually find work, leading to steady-state weekly work hours. Therefore, additional data are necessary to estimate what trainees' regular weekly work hours would be without ECWTP training. These data, which come from the 2017-2019 U.S. Bureau of Labor Statistics Current Population Surveys (CPS), are the most recent from before the COVID-19 pandemic. The years 2017 – 2019 provide sufficient variation in U.S. worker data while avoiding the pandemic's enormous influence on the labor market, which would bias the pre-ECWTP training hours estimates in unpredictable ways.

Using these CPS data, an ordinary least squares regression estimates a model where hours worked depends upon the participant characteristics listed in Table 3.¹⁰ The regression estimates how strongly each participant characteristic corresponds to hours worked. The hours worked estimate is calculated by substituting the average value of each characteristic into the regression and then extrapolating the estimated weekly hours that the average trainee would have likely worked before receiving ECWTP training. This process estimates that a person similar to the typical ECWTP trainee would have worked 37.52 hours per week prior to training. Data from a short questionnaire sent to 243 ECWTP graduates provides an average weekly hours worked post-ECWTP training of 40.36 hours. Consequently, ECWTP training increases weekly work hours by an estimated 2.84 hours, a substantial increase of nearly 8%.

¹⁰ Specifically, the regression's independent variables include age, age squared, education level, sex, prior work history, and race/ethnicity. These are common controls in standard labor market research.

1C. Wage Effects

Program graduates earned more per hour than those who did not receive ECWTP training. The increase in hourly wages from the ECWTP can be captured by comparing wages post-training with those earned pre-training. However, just as in the previous Hours Worked Effects section, this comparison is complicated because many workers experiencing unemployment prior to training lacked an hourly wage. The change from earning \$0 per hour for people experiencing unemployment pre-training to a positive wage post-training is one way the ECWTP can boost wages. Another path is through the training's enhancement of productivity and job skills. Employers are likely to pay higher wages to reflect the increased value the ECWTP training provides.

In order to find the ECWTP wage effects, a similar process to the hours worked effect in the previous section is used. Turning again to the 2017 – 2019 CPS data, the natural log of hourly wages is regressed on the same Table 3 controls included in the hours worked regression.¹¹ The average characteristics of the ECWTP trainees are substituted into the regression and multiplied by their corresponding marginal effects to estimate the natural log of the hourly wage an ECWTP trainee would have likely earned prior to enrolling in the training program. This wage estimate is \$13.39 per hour in approximately 2018 dollars. Adjusting for inflation, the estimate is \$16.11 in 2023 dollars.¹² However, this estimate only concerns worker income. Employees may also earn compensation in the form of fringe benefits. Employers' cost of paying worker benefits constituted approximately 32% of total hourly earnings in 2018 (BLS 2018). Adding this to the hourly wage estimate brings the total hourly earnings estimate to \$23.69.

The pre-ECWTP training hourly earnings estimate of \$23.69 is then compared to the average hourly earnings calculated from the short graduate questionnaire. Since the questionnaire was collected in spring 2023, it does not require inflation adjustment. Employer benefit costs in spring 2023 amounted to approximately 31% of total hourly earnings. Thus, the questionnaire's calculated average hourly wage of \$21.66 yields a total hourly compensation of \$31.39. This suggests that the ECWTP increases hourly compensation by an estimated \$7.70, or 32.5%.

11 The natural log of hourly wages is often used to better capture the non-linear distribution of workers' wage profiles.

12 The inflation adjustment involves dividing the "all items in U.S. city average, all urban consumers, seasonally adjusted" Consumer Price Index (CPI) in March 2023 by the June 2018 CPI (the approximate average in the CPS data) and then multiplying by the \$13.39 wage estimate. This amounts to $(302 / 251) * \$13.39 = \16.11 .

1D. Cumulative Effect on Earnings

Sections 1A – 1C provide calculations of each earnings portion individually: employment probability, hours worked, and hourly wages. This section combines these three pieces to estimate a cumulative or total impact of the ECWTP on earnings. Moreover, it is incomplete to end the analysis at the point of hire immediately after the program has ended. Since the benefits of the ECWTP accumulate over time but also depreciate, its lifetime benefits must be incorporated. Thus, this section also accommodates the potential future benefits by discounting them back into present value terms.

First, the potential depreciation of the ECWTP training over time needs to be accounted for in conservative estimates. The literature depreciates human capital gains using geometric growth formulas, and Weber (2014) estimates that the human capital earnings depreciation from education and training programs averages 1.5% annually. Consequently, the hourly wage premium, or the difference between graduates and non-trainees, from the ECWTP in any given week “t” is calculated using equation (1).

$$ECWTP \text{ hourly wage premium}_t = \$7.70 \times (1 - 0.015)^{t/52} \quad (1)$$

Conservatively, the ECWTP wage premium depreciates by 1.5% towards zero dollars at an exponential weekly rate of $t/52$.

Additionally, the weekly hours worked premium can depreciate as the gap between ECWTP graduates and non-trainees narrows over time. In conservative estimates, each week presents a probability that an ECWTP graduate could lose their premium work hours job and perhaps not find another with a work hour premium. In this way, non-trainees can approach and reach parity with graduates in terms of weekly work hours, in conservative estimates, over time. The average weekly job layoff and discharge rate across the collected data between 2014 and 2022 is 0.3%, or 15.6% annually.¹³ Therefore, the weekly work hours premium obtained from ECWTP training in any given week “t” is calculated using equation (2).

$$ECWTP \text{ weekly work hours premium}_t = 2.84 \times (1 - 0.156)^{t/52} \quad (2)$$

This equation depreciates the weekly hours worked premium by 15.6% towards zero hours at an exponential rate of $t/52$. In total, after combining the wage and hours premiums’ formulas, the weekly earnings of an employed graduate in any given week “t” is calculated using equation (3).

$$ECWTP \text{ graduate earnings}_t = \{\$23.69 + \$7.70 \times (1 - 0.015)^{t/52}\} \times \{37.52 + 2.84 \times (1 - 0.156)^{t/52}\} \quad (3)$$

The average earnings per week of a non-trainee, and therefore without the wage and hours premiums, are calculated using equation (4).¹⁴

$$Non - trainee \text{ earnings} = \{\$23.69 \times 37.52\} \quad (4)$$

¹³ Rate calculated from data from the BLS Job Openings and Labor Turnover Survey (total private layoffs and discharges series for 2014 – 2022).

¹⁴ One might believe that these formulas may evolve differently over time across ECWTP training participants vs. non-participants. However, any differences between the comparison groups are included in these baseline calculations, and for simplicity these differences are assumed to not evolve, or change in substantial ways, over time.

An estimate of the graduate lifetime earnings premium requires future incomes to be discounted into present values using a discount rate. A standard approach is to use the U.S. Treasury 30-year bond interest rate as a reasonable discount rate. The current rate is approximately 3.8% and discounts equations (3) and (4) above by calculating equations (5) and (6) (Federal Reserve Board 2023).

$$\text{Discounted future graduate earnings} = \frac{\text{equation}(3)}{1.038^{t/52}} \quad (5)$$

$$\text{Discounted future non – trainee earnings} = \frac{\text{equation}(4)}{1.038^{t/52}} \quad (6)$$

One cannot presume that, once employed, a worker remains employed constantly throughout their career, earning a weekly income 100% of the time. Rather, workers take leaves of absence or are without jobs at various times and for various reasons throughout their 35-year career.¹⁵ Indeed, the average employment rate for prime-age workers between 25-54 years across the CPS data range of 2017 – 2019 is 79%.¹⁶ However, there is a notable difference in the baseline (starting) employment rate between ECWTP graduates and non-graduates. Graduates begin their post-ECWTP careers with an employment rate of 82.5%, whereas non-graduates begin with an employment rate of only about 12.3%. Those not employed (17.5% for graduates and 87.7% for non-graduates) are considered unemployed for simplicity and average 23 weeks in unemployment throughout the CPS data's 2017 – 2019 years.¹⁷ Each week, the unemployed graduates and non-graduates alike face a 1/23 likelihood of getting hired. Over time, week by week, increasingly higher proportions of non-graduates obtain employment, and the employment rates among both graduates and non-graduates adjust to eventually converge on the long-term “steady-state” average employment rate of 79%. This process is outlined in equation (7) below. Each week's employment rate equals the previous week's employment rate plus the remaining unemployed workers multiplied by the probability the unemployed workers find jobs (1/23).

$$\text{Employment \%}_t = \text{Employment \%}_{t-1} + (0.79 - \text{Employment \%}_{t-1}) \times \left(\frac{1}{23}\right) \quad (7)$$

15 The average age in the sample is 32 years. Subtracting this from the Social Security Administration's “normal” retirement age of 67 yields the length of the average career.

16 Average rate calculated from St. Louis Federal Reserve data (Federal Reserve of St. Louis 2023a).

17 Average unemployment calculated from BLS Table A-12 (BLS n.d.-a).

Whereas the employment rate of graduates begins near 79% and reaches it very quickly, the non-graduate employment rate takes approximately two years to reach the long-term 79% employment rate. Figure 1 demonstrates these transitions.

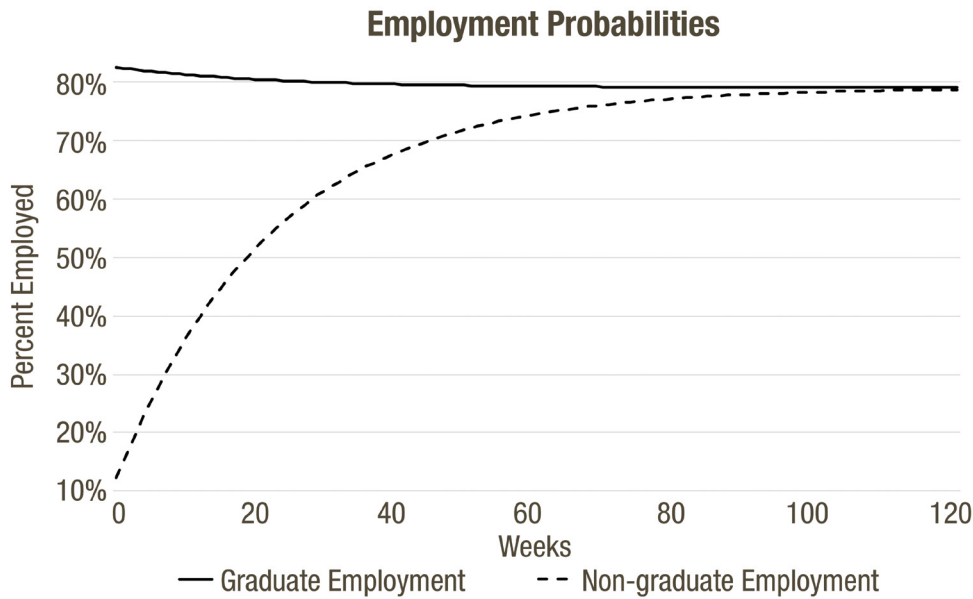


Figure 1. Employment Probabilities

Figure 1 shows that ECWTP graduates have a 70% higher probability of employment at the outset of their careers relative to non-graduates, as shown in the summary statistics in Table 3.¹⁸ ECWTP graduates begin at nearly the long-term employment rate for working age adults in the U.S., but it takes approximately two years for non-graduates to reach the long-term employment rate. Thus, there is a higher likelihood that graduates will work more weeks throughout their career than non-graduates. The earnings formulas above, equations (5) and (6), must therefore be multiplied by the employment rate (equation 7) to account for the periodic removal from the labor market and income accumulation of all workers, and for the slower growth in employment rates for non-graduates. The final accumulated lifetime earnings net benefit of ECWTP is calculated in equation (8), noting the subtraction in the equation is summed over a 35-year career.

$$ECWTP \text{ cumulative earnings effect} = \sum_{t=1}^{52 \times 35} \{ (Graduate \text{ Emp } \%)_t \times \text{equation (5)} - (Non - graduate \text{ Emp } \%)_t \times \text{equation (6)} \} \quad (8)$$

The combined cumulative effect of ECWTP on lifetime earnings per participant in present value terms is estimated to be \$221,329 in 2023 dollars.

In the domain of this update to the original report, ECWTP award recipients trained approximately 3,800 graduates, bringing the total employment benefit of the ECWTP from 2014 – 2022 to an estimated \$841.1 million (\$221,320 x 3,800 graduates).

¹⁸ Incorporating the probit adjusted 52.5% marginal effect rather than the 70% marginal effect reduces the accumulated lifetime earnings net benefit by \$15.4 million, a reduction of only 1.8%.

2. Effects on Safety and Related Costs

Data from the ECWTP trainee questionnaire offer some evidence that ECWTP trainees experience injuries at a similar rate to U.S. workers. In the trainee questionnaire of 243 workers, only five reported a workplace-related injury in the last three months. This amounts to only about 2% in three months' time, which means at most there is an 8% likelihood of injury over the course of a year. This is equivalent to the rate in U.S. survey evidence found by Artz and Heywood (2015). However, individual injuries likely vary dramatically in severity and cost. Perhaps a more accurate measure of workplace-related injuries and their corresponding costs comes from employer-reported data. Employers likely hold higher thresholds of injury severity before reporting, whereas workers may report minor injuries in surveys. Consequently, this study assesses the safety-related cost savings from ECWTP training using employer-reported injury statistics extracted from government data and estimates from the literature.

Annually across all industries, and specifically in construction, there is a 2.8% probability that any given worker gets injured, as reported by employers (BLS 2020). U.S. surveys of individual workers point to a higher annual injury rate of 8% among blue-collar occupations (Artz and Heywood 2015). Programs such as the ECWTP that train workers for careers in occupations with increased risk, like construction jobs, tend to reduce workers' risk of injury. This reduction in injury risk is difficult to estimate, but an average of several studies in the literature that measure the effect of safety training programs on injury rates place that reduction at approximately 14%. Therefore, the likelihood of an employer-reported injury after ECWTP training may decrease from 2.8% per year to roughly 2.4% per year.¹⁹

Every work-related injury faces costs, and these vary dramatically depending on the job and severity of injury. Costs include medical and emergency services, employee and employer productivity losses, insurance costs, and lost quality of life. Miller and Galbraith (1995) estimate the average inflation-adjusted cost of an occupational injury in the U.S. to be approximately \$29,000. After accounting for the estimated 0.4 percentage point reduction in injury probabilities between ECWTP graduates and non-trainees, the 1.5% annual depreciation of the human capital gained from safety training in the ECWTP, and discounting the future benefit of the safety training by 3.8%, the ECWTP's estimated effect on safety-related costs is approximately \$1,928 of savings per worker.²⁰

The ECWTP saved approximately \$7.3 million in safety-related costs (\$1,928 x 3,800 graduates).

19 Bena et al. (2009) estimate a 16.5% reduction in injury rates at construction sites of a high-speed rail line, Shoenfisch et al. (2017) estimate a 13% reduction among carpenter injury rates, and Dong et al. (2004) estimate a 12% reduction among construction laborers in Washington State.

20 The per-worker annual cost differential first amounts to subtracting the 1.5% annually depreciated, 2.8% probability of a non-trainee being injured minus the 2.4% probability a trainee is injured, then multiplying by the average injury cost of \$29,000, then annually discounting by 3.8%, and finally summing across the average number of years of a worker's career (35).

3. Effects on Hiring Costs

ECWTP training often includes job placement and matching efforts, potentially reducing the hiring costs employers pay to recruit and train workers. Hiring costs include the efforts necessary to search for and find an employee, but also those costs associated with training the new employee. Inflation-adjusted estimates for hiring blue collar skilled workers range from about \$2,900 in the first of such studies (Oi 1962),²¹ to \$3,168 in an extensive study out of the University of California, Berkeley (Dube et al. 2010), to more than \$6,700 among Swiss construction workers (Blatter et al. 2012).²² Due to its conservative approach, this study utilizes the relatively low \$3,000 hiring cost estimate per job. It is important to note that the ECWTP placement efforts do not occur in every scenario, nor do they entirely abate the lofty adaptation costs employers pay to train and incorporate a new worker. Blatter et al. (2012) estimate that only 26% of hiring costs accumulate pre-hire, so ECWTP job placement efforts may only alleviate 26% of the \$3,000 hiring cost estimate; it is unclear how much ECWTP training alleviates post-hire, firm-specific training costs. Therefore, each job placement post-ECWTP training saves employers \$780 in hiring costs related to job search. As shown in Table 3, 82.5% of the sample's workers were placed after training.

The total hiring cost savings of the ECWTP amounts to \$2.5 million (\$780 x 82.5% x 3,800 graduates).

4. Effects on Crime-Related Costs

Many of the participants receiving ECWTP training have criminal records. For instance, one award recipient reports that 26% to 72% of trainees report having a criminal record across its four geographic regions. Another award recipient reports non-trainee recidivism rates of up to 50% in its region. At another award recipient's location, 78% of program trainees have a criminal record.

A history of incarceration can have a significant negative impact on finding and sustaining employment. Indeed, people with a prior criminal record are roughly 50% less likely than people without a criminal record to be considered for open job positions after applying (Pager 2003; Schnepel 2016). Thus, a substantial quantity of ECWTP graduates with criminal records should have significant trouble finding and keeping jobs. However, ECWTP graduates largely do well in the job market. Graduates with a prior criminal record seemingly outperform non-trainees with a prior criminal record in employment. This is largely because the ECWTP trains workers for skilled positions rather than simply giving people with a prior criminal records low-wage jobs, which is a problematic approach of some transitional jobs programs (Valentine and Redcross 2015).

In order to assess the impact that ECWTP training has on crime-related costs, criminal activity and its costs among trainees must be estimated. The available data do not contain information on all trainee criminal backgrounds. Some award recipients do provide this information, but the proportions of students with criminal backgrounds vary dramatically as noted above. Thus, the study turns to the literature for guidance on how much training programs such as ECWTP reduce recidivism and future incarceration. Then, the reduction in criminal activity is multiplied by the cost of that criminal activity, both to the victims of the crime and also the cost to the justice system. Combining the reduced cost to victims and the justice system yields the total crime related savings due to the ECWTP training programs.

²¹ Oi (1962) suggested hiring costs amount to three weeks of wage payments.

²² Though referencing a similar market-based economy in Switzerland rather than the U.S. in particular, the Blatter et al. (2012) study provides hiring cost estimates specifically for the industry many ECWTP graduates enter.

Due to the substantial differences in the proportion of trainees with a criminal background across award recipients and regions, this study assumes a 33% proportion of trainees with criminal records. This value is somewhat in the middle of award recipient reports, and is also an overall estimate of the adult African-American felony conviction rate (Shannon et al. 2017). A 4 percentage point reduction in criminal activity due to training programs such as ECWTP is taken from an average of the most recent studies (post-2010) in a meta-analysis from Schuster and Stickle (2023). The cost of crimes on victims is difficult to estimate, but many researchers have published a variety of findings. One reputable report from the U.S. Department of Justice (Miller et al. 1996) places the average discounted present value cost of a crime on a victim at roughly \$20,000 (in 2023 inflation-adjusted dollars). This estimate includes tangible costs such as medical costs, property loss, victim services, and lost productivity, but also nonmonetary or unquantifiable costs such as fear, pain, suffering, and lost quality of life. Note that this estimate corresponds with crimes that are discovered and prosecuted. There are a number of crimes that go uncaught, and these no doubt incur victim costs as well. Piehl and Dilulio (1995) find that people convicted of a crime, at the median, commit 12 crimes in the year before they are eventually caught. Therefore, victimization costs of the typical person convicted of a crime are $\$20,000 \times 12 = \$240,000$ annually. The cost of crimes to society (incarceration costs, legal system costs, etc.) is simplest to estimate using an inflation-adjusted average incarceration cost per inmate of approximately \$42,000 (Mai and Subramanian 2017).

The crime-related savings can then be calculated by first reducing the proportion of offenders post-ECWTP training to be 4 percentage points less than the assumed 33% of non-trainees who may engage in criminal activity. This 4 percentage point reduction corresponds with an estimated $0.04 \times 3,800 = 152$ fewer people engaging in criminal activity. Multiplying these 152 graduates by the \$240,000 annual victimization cost and adding the average incarceration cost per inmate of \$42,000 yields a total crime-related costs savings due to ECWTP training of $152 \times (\$240,000 + \$42,000) = \$42.9$ million.

5. Effects of Taxes and Transfers

Employed people with higher incomes are certainly better off individually, both financially and otherwise. Society also benefits from the increase in tax revenue paid through the higher incomes, as well as the reduction in government expenditures typically paid out to individuals with lower incomes. ECWTP graduates' increased tax payments and decreased government program receipts both serve to strengthen the government's budget. Notably, the COVID-19 pandemic wreaked havoc on both taxes and transfers. Tax payments largely decreased as individuals lost their jobs, while transfers enormously increased, particularly for those who lost their jobs. For example, unemployment insurance increased dramatically during this time period. The economic impact of ECWTP training during the COVID-19 pandemic is discussed in more depth in section 7.

In this section, the study applies tax and transfer rates during pre-COVID times (2019) to the increased lifetime earnings of ECWTP graduates to determine how much society earns in taxes and saves in transfers due to the ECWTP. According to 2019 Congressional Budget Office data on means-tested transfers and federal and payroll income taxes arranged by household income quintiles, transfer expenditures to workers decline by \$0.28 per additional dollar of income, whereas taxes paid by workers increase by \$0.25 per additional dollar of income. Multiplying these rates by the additional discounted lifetime earnings of ECWTP graduates of \$221,329 estimates that each ECWTP graduate will pay \$55,332 more in taxes over their career while receiving \$61,972 fewer dollars in transfers.

In present value terms, the cumulative societal savings from the ECWTP is estimated to be \$445.8 million [(\$55,332 + \$61,972) x 3,800 graduates].

6. Matching Funds and Community Involvement

ECWTP award recipients receive support, both monetary and non-monetary, from many local organizations to aid in achieving the programs' objectives. Six award recipients provided information regarding this support: Center for Construction Research and Training (CPWR), Historically Black Colleges/Universities and Communities Consortium (HBCUC), OAI, Inc., Sustainable Workplace Alliance (SWA), Atlantic Center for Occupational Health and Safety Training (Atlantic COHST), and Western Region Universities Consortium (WRUC). Most of this support comes in the form of dollar funds, but all award recipients also report receiving in-kind non-monetary donations from their local communities to help fulfill training needs. These range from food and transportation assistance, as well as support staff to apprenticeship training, guest instructors, career counseling, and outreach/recruitment.

According to the award recipients, they receive approximately \$5.5 million in annual funds from sources outside the NIEHS funding.²³ Slightly less than half of these funds were awarded to WRUC, while more than \$1 million each was awarded to OAI, Inc. and CPWR. In addition, more than \$200,000 of in-kind non-monetary gifts are received each year, but this is, admittedly, a rough estimate provided by some of the award recipients. The in-kind gift estimate almost certainly understates the actual in-kind benefits received, because award recipients did not provide estimates of many in-kind contributions' dollar values. The dollar funds and in-kind transfers aid the ECWTP award recipients in providing training opportunities to more students. Moreover, the gifts help ECWTP trainees to succeed by helping them attend classes and aiding them in their career searches. It is clear these community efforts positively impact the students and help the ECWTP award recipients to succeed.

7. COVID-19 Impacts

The influence of COVID-19 on the economic impact of training programs offered by ECWTP award recipients must be noted. First and foremost, training programs suffered substantial enrollment and instructional challenges. Most, if not all, were forced to temporarily shut down their in-person services and training, and transition to a remote learning format. Some award recipients needed to trim their services and reduce their numbers of trainees.²⁴ The COVID-19 labor market also proved challenging, as the job placement rate in 2020 was only 59%, far lower than the 82% placement rate found in these data. This likely reduced the overall potential economic impact of training programs, specifically the cumulative earnings estimates in section 1D. Second, COVID-19 caused mass layoffs, and high unemployment as a result. Workers trained with valuable job skills tend to remain unemployed for shorter time periods, perhaps as many as three weeks less (Osikominu 2021), so ECWTP graduates likely fared better in the job market during the COVID-19 pandemic. Moreover, the most common industry for ECWTP graduates is construction, and that industry's jobs only contracted by 6.6%²⁵ in the second quarter of 2020, the

23 The author notes that this number sums award recipient responses to a questionnaire that requests the dollar amount of non-NIEHS funding per year. However, some of the responses may mistakenly indicate one-time gifts rather than annual contributions, but the author takes the responses at face value in order to construct this sum.

24 In the data provided, 572 individuals started the programs in 2019, but only 408 started in 2020.

25 Seasonally adjusted percent of gross job gains minus percent of gross job losses for the construction sector in the U.S. (BLS 2021a)

pandemic's height. For those non-trainees who are demographically similar to ECWTP graduates, the largest industry is likely leisure and hospitality, which saw 41.1%²⁶ job losses during the same time period.²⁷ Overall, 15.7% of workers experienced unemployment in 2020.²⁸ Thus, ECWTP graduates were less likely to be unemployed during the pandemic, and if they suffered a job loss, were more likely and more quickly able to exit unemployment. Indeed, the construction industry reached its pre-pandemic employment levels by December 2021, whereas leisure and hospitality had yet to reach its pre-pandemic employment level as of June 2023.

Quantifying the economic impact of training programs in the COVID labor market is imprecise, but this study nevertheless attempts to estimate the lost earnings due to COVID-related job losses for ECWTP graduates versus a demographically similar group of non-trainees. First, reflecting the fact that not all ECWTP graduates are in construction and not all non-trainees are in leisure and hospitality, the approach averages each respective industry's unemployment rate with the overall unemployment rate to compute a conservative likelihood of unemployment for each group; 11.2% for ECWTP graduates and 28.4% for non-trainees. Second, the expected number of weeks spent unemployed by each group is 12.6 for the non-trainee group and 9.6 for the ECWTP graduate group.²⁹ Third, estimated weekly earnings for each group are computed using the formulas in section 1D. These come to \$1,266.90 for ECWTP graduates and \$888.85 for non-trainees. Finally, the approach multiplies the likelihood of unemployment, the expected number of weeks of unemployment, and the weekly earnings to estimate the earnings loss due to COVID. The difference between the two groups provides an estimated supplemental benefit of graduating from the ECWTP.³⁰ An ECWTP graduate is expected to lose \$1,356.09 due to COVID's labor market impact, whereas a non-trainee is expected to lose \$3,180.66, implying that the ECWTP preserved \$1,824.57 of income per individual during the initial COVID wave. Given ECWTP's 3,800 graduates, COVID's estimated negative impact on earnings is approximately \$6.9 million less than it otherwise could have been.

8. Effects on Environment and Social Related Benefits

As in the original 2015 study, the broader social and environmental benefits to society of the ECWTP are not calculable with the data collected through the ECWTP. A non-trivial proportion of ECWTP participants are trained in skills meant to improve the environment and society in general. Indeed, fully 2%, 1%, 6%, and 10% of graduates take jobs in lead abatement, hazardous waste removal, asbestos abatement, and other green or environmental jobs, respectively. An additional 2% of graduates seek careers in public service, education, health care, public transportation, security, community outreach, and similar occupations with explicit social benefits.³¹ The original 2015 Economic Impact Study outlined the benefits

26 Seasonally adjusted percent of gross job gains minus percent of gross job losses for the hospitality sector in the U.S. (BLS 2021a)

27 The Atlantic COHST discovered that 35% of one of its 2020 sessions had been employed in the leisure and hospitality sector.

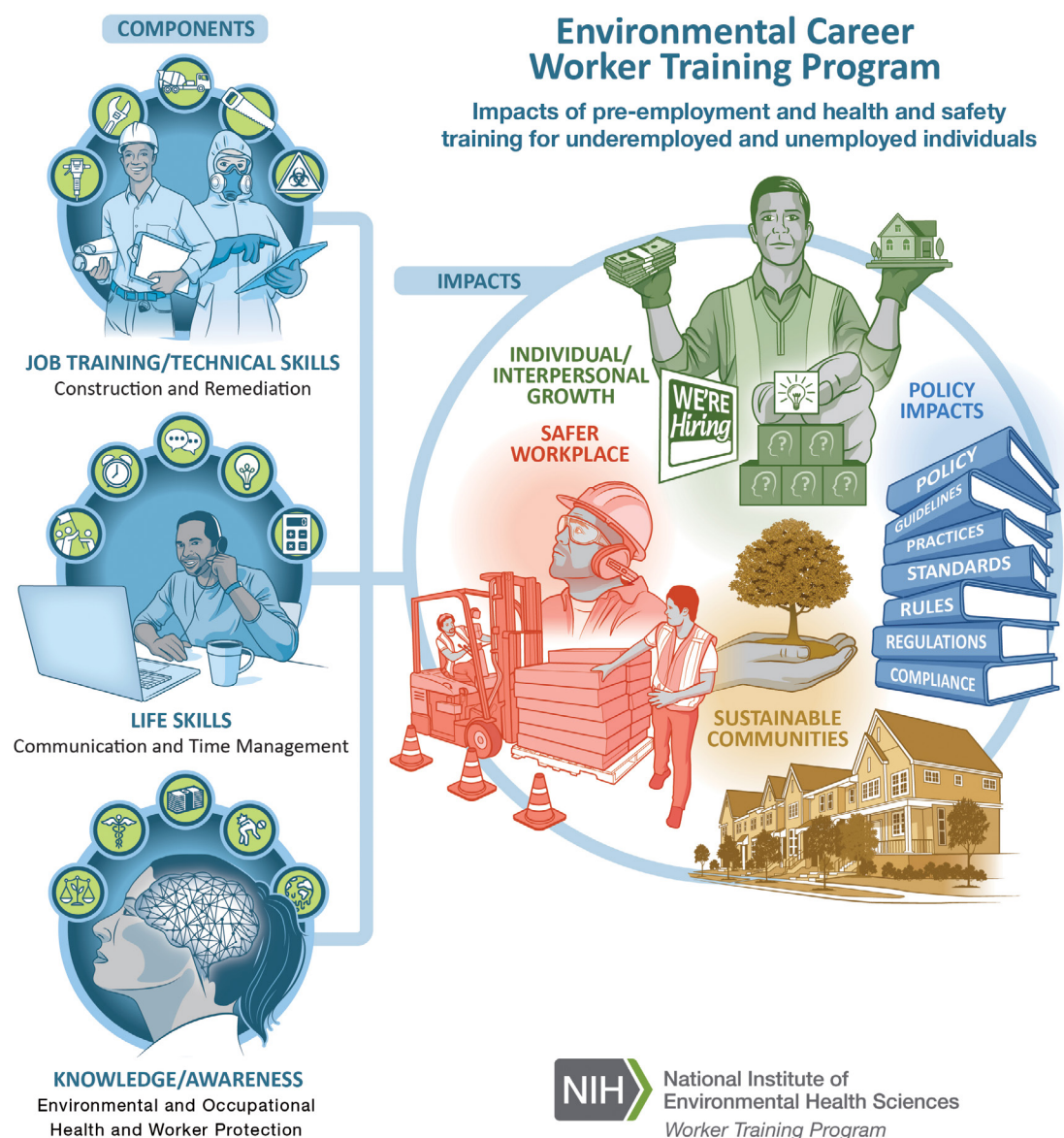
28 The work-experience unemployment rate includes those looking for work during the year as a percent of those who worked or looked for work during the year (BLS 2021b).

29 The 12.6 weeks is the average across all months throughout 2020 according to the Federal Reserve of St. Louis (2023b).

30 Note that this does not include potential differences in unemployment insurance or the Pandemic Unemployment Assistance payments that many unemployed workers received during this period. The substantial variance in who received these payments, when, and in what amount prevents its inclusion in this analysis. Moreover, the difference described here is already somewhat incorporated into the existing value computed in section 1D, but the severity of the job market disruption due to COVID warrants a special addendum to the computations in section 1D. This estimate also only considers the initial potential job loss and unemployment duration due to the pandemic's beginning in 2020; labor market disruptions attenuated but continued throughout 2021.

31 Note that these percentages represent minimum proportions. Many workers in the data did not divulge their occupation nor

to society of such important work but could not capture or measure the unique contribution of ECWTP-trained individuals. Regardless, it is important to reiterate how training workers to develop environment- and society-improving skills provides relevant organizations with the required workers necessary to perform these valuable tasks.



The image above shows the components and impacts of the Environmental Career Worker Training Program. Photo courtesy of the National Clearinghouse for Worker Safety and Health Training.

provide enough specific information to identify an occupation in a particular environmental field.

Qualitative Evaluation Findings

Summary of Qualitative Evaluation Findings

- **Partnerships:** The ECWTP has fostered and supported partnerships among award recipients, community leaders, and over 200 community-based organizations, leading to recruitment and job placement of trainees.
- **Basic life skills:** The ECWTP nurtures trainees with skills that build confidence and empowerment, which are central to the program's success.
- **Societal benefits:** The ECWTP leads graduates to experience several personal and professional benefits, including: building a life after experiencing incarceration, homelessness, and unemployment; giving back to the community; gaining the ability to buy or rent a home, pay for family expenses, or support their children's education; providing a path towards leadership positions; and feeling supported by the program to move forward in life.
- **Supporting populations at risk:** The ECWTP has focused on people experiencing homelessness, people who were formerly incarcerated, people experiencing underemployment or unemployment, and women in trades. This concentrated effort has created job opportunities and improved lives.
- **Evaluation:** Evaluation is a major component for the ECWTP, and such robust examinations have shown continued success and meaningful strategies for improvement.
- **Recruitment:** Award recipients leverage partnerships to reach and recruit individuals. ECWTP award recipients may need to explore training for new environmental careers in the future to strengthen recruitment efforts in different locations and communities.
- **Job placement arrangements:** Trusted relationships between the award recipients and their communities helped maintain high job placement for ECWTP graduates.
- **Adaptation:** Award recipients are able to often adapt technical occupational health and Hazmat safety training for the unique learning needs of ECWTP audiences, allowing more people to benefit from the trainings.
- **Community:** ECWTP graduates can give back to society by using their training in environmental careers to invest and improve their own communities.

Key Themes

Key themes from the analysis of interviews and annual progress reports include partnerships within the community and among other NIEHS award recipients, the benefits of basic life skills training, societal benefits, supporting at-increased-risk populations, key evaluation results, recruitment practices, and job placement arrangements. Some illustrative quotes that support the key themes are provided in the following sections. Content from the progress reports that illustrate these key themes are outlined in the Appendix.

1. Partnerships

Interview participants described how partnerships are a critical piece of the program, from providing referrals to the hiring of graduates to meet local workforce needs and demands. The collaborative nature of the WTP model is a key reason the ECWTP is successful. The engagement among award recipients, program administrators, and other stakeholders at meetings, technical workshops, National Trainers' Exchanges, and community outreach conferences and workshops has helped to promote a shared mission for workforce development and job training in environmental careers. The partnerships are not limited to the existing community but expand to other award recipients and the broader NIEHS community created through ECWTP, as the following quotes illustrate:

“ Partnerships are a critical piece of the program. They provide supportive services, they provide referrals, maybe they hire our graduates...so partnerships are a key aspect which helps the program...to meet local workforce needs and demands.”

“ A true strength of the consortia and network of grantees at large that NIEHS has built, is they don't see each other as competition, they see each other as sharing a mission to create strength in their communities and nationwide. For me, that was striking. You don't typically see that kind of unity ... and that comes from NIEHS and the work it has done, building that kind of structure to work collaboratively across the program as well.”

2. Basic Life Skills

Vital Nature of Basic Life Skills: Basic life skills training has always been a vital aspect of the ECWTP, and has allowed the program to impact thousands of trainees in communities. Basic life skills training and other pre-employment training are fundamental to the success of the trainees, as they effectively address barriers to accessing sustainable employment opportunities. Mentoring and counseling are also essential because they provide a social support network for trainees.

Some interview participants described how the basic life skills component, in addition to the occupational health and safety training, has been a key strength of the program. The basic life skills training helps trainees tackle issues that affect them in and out of the workplace. This finding was further supported by how the participants spoke about their trainers and case managers and their effectiveness in delivering all levels of support:

“ Our secret sauce for this program is the basic life skills training. That includes going back to the basics in mathematics and study skills. The trainees really need that pre-Hazmat class to get them up to speed.”

“ Before we even get to the technical training, we have the first six weeks trying to get the population we are trying to reach into the mindset, the work ethic, the routine...of getting the job, keeping the job, and advancing on the job. In some cases, individuals who may not have had that experience come to us. So, we have to get them into that idea of what it means to be on time...what it means to be responsible, what it means to be ready to work.”

3. Societal Benefits

Societal benefits are considered the impacts of the program that are not strictly economic returns or income and earnings. These societal benefits are the impacts of the ECWTP on trainees' lives that are best captured qualitatively and anecdotally.

WTP reviewed award recipients' annual progress reports from the past three years to better understand the benefits from the program for individual participants. The key themes that emerged were:

- Building a life and career after incarceration, homelessness, or unemployment.
- Helping and giving back to their community.
- Gaining ability to buy a home or rent sustainably, pay for children's education, etc.
- Starting a path toward a leadership position.
- Attaining life skills and social services benefits.
- Feeling supported and helped to move forward in life.

A list of examples to support each key theme provided by the award recipients is presented in the Appendix.

Examples of how the ECWTP provides societal benefits, beyond increasing income, were shared as a strength. These often included stories of how the program improved income stabilization, job satisfaction, life satisfaction, and attitudes:

“ For example, a student in his mid-thirties worked for a moving and storage company — a very low paying...very labor-intensive, dead-end job. After graduating from the ECWTP, he quickly got a different job and, in addition to his normal duties, because of his ECWTP training. They wanted him to do the daily safety walk-through. He did that with pride...he gets up in the morning to go to work, his head held high. It's the little things like that we don't track — we track income, but his quality of life improved as well.”

“ Sitting down with those women at the North America's Building Trades Unions conference...it was empowering for them and us. We followed up with them after the conference, and one of them was saying 'we are the power tools of the ECWT.' They felt empowered, and women in this profession now were going to make the changes they wanted to have for themselves and the people coming behind them. The community they live in — the community you, NIEHS, created — is a real community.”

4. At-Increased-Risk Populations

ECWTP focuses on populations lacking educational opportunities and develops strategies to reach these groups. One example includes training community health workers as a way to educate people in the community about environmental and occupational hazards:

“ Our job-placed graduates see their hourly wage increase by an average \$18 in the first three years after graduating. The participants in our training program are predominately women, many of whom have been out of the workforce for a long time or are trying to find employment in the U.S. for the first time. The Community Health Worker trainees also learn critical knowledge and skills on the U.S. job search process and workplace culture, and the program provides a space to improve their English, build their self-confidence, and pursue career exploration.”

“ The ECWT program has this sort of amazing ability to reach participants who are coming out of challenging situations. Whether it's unemployment, homelessness, or correctional facilities, you are giving them tools that they can go out and use in their careers and lives.”

“ In terms of the community, a lot of the students may have a record or have been in trouble with the law, and our counselors and job developers and our teachers work with them. That's built into the program. Some programs may not have that sensitivity to consider things that may happen inside of families which can complicate training or on the job.”

“ Many of those trainees are coming from these tiny Alaskan villages. Giving them this training and support around environmental and Hazmat issues that they can bring back to these villages adds a whole other kind of impact there, because those communities are so small and tightly knit, and need these kinds of skills and expertise. Training just one or two people from a village can have a huge impact in terms of a way a village operates when it comes to environmental hazards, the way waste is managed, and the response to disasters.”

5. Evaluation

Evaluation is a central component of ECWTP and key to showing the results and accomplishments of the program. Interview respondents shared key findings. Their evaluations included some long-term cohort follow-ups and various methods along the socioecological model, which can be used to identify training influences along the individual, interpersonal relationships, organizational, community, and societal or public policy level.

“ We did...long-term survey, and we went back to people who did the program 10 years ago. We found 30% of them had purchased a home...41% said they had additional retirement savings in addition to their pension. Twenty percent said they paid for their child's education. Thirty-four percent said they paid off a loan. Seventy-five percent said they were very confident or extremely confident that, if they hadn't reached one of their goals already, they were going to. We asked them what kind of debt they currently have — a mortgage, a car loan, a student loan, whatever — and 31% said they had none.”

Text from progress reports for three award recipients is shared below to illustrate the importance of evaluation.

CPWR: To evaluate their ECWTP program, CPWR used a comprehensive process to provide 360-degree feedback on effectiveness from major program stakeholders. The evaluation used multiple methods for data sources, such as focus groups, interviews, and questionnaires. Findings from the assessment suggest that CPWR's ECWTP program is successfully meeting each of the NIEHS review criteria and significantly impacting their graduates and the communities where they work and live. The results support effective recruitment from target populations, screening and enrollment of students, and excelling in training provided in terms of their content and learning and teaching methods. Trainees most often report Basic Life Skills as the most important aspect of the training program, and staying in consistent contact and communication with trainers long after graduation. Longitudinal results of the CPWR ECWTP evaluation process have been used to demonstrate program effectiveness spanning over two decades on graduates and the communities in which they live and work (Sarpy and Vaughn 2016; Sarpy et al. 2020; Sarpy et al. 2022; Sarpy et al. 2023; Sarpy and Surtees 2023.)

OAI, Inc.: OAI's evaluation measured levels of effective training and change in behavior of the target audience along the socioecological model. Student progress was evaluated through demonstration of skill knowledge by passing technical exams needed for licenses and certifications and showing their competency in donning personal protective equipment and use of tools and equipment. Results show there was a positive transfer of occupational health and safety knowledge from classroom to practical use. At an intrapersonal level, 100% of participants felt they would use information learned to support their family members' health and safety, and 93% felt empowered as an environmental ambassador. All participants felt better about themselves after learning information, and all participants responded that they would use the safety information learned in class on the work site.

Atlantic Center for Occupational Health and Safety: The New York City District Council of Carpenters conducted an evaluation of their pre-apprenticeship program, known as BuildingWorks, which is primarily funded by NIEHS ECWTP. A survey was conducted in fall 2019 among 74 of the 249 individuals who completed the ECWTP training between 1996 to 2018. The survey consisted of 10 items that referred to work experience and financial and life milestones. The majority of respondents were working consistently with high wages and were very confident about their financial future and reported high job satisfaction. Most respondents indicated participation in the ECWTP has significantly impacted their career.

The New York City District Council of Carpenters Evaluation Summary of Responses

- 78% of the respondents indicated they joined a local union after completing the ECWTP and are still active. Of the 74 who responded, 58 are carpenters, 16 are in other trades including 11 electricians with Local 3, and one is in construction management. The respondents ranged from first year apprentices to journey level, and the wages they reported reflected this.
- 25% indicated they earned between \$50,000 and \$74,999 annually, which we estimate as average earnings for apprentices. 51% earned above \$75,000, which we estimate as average base earnings of advanced apprentices and journeymen.
- All respondents indicated they had multiple long-term financial goals (such as purchasing a home), and 84% have achieved at least one of their goals. When asked how confident they were in reaching their goals, 86% indicated they are “very confident” or “extremely confident.”
- The respondents also appear to have a high degree of job satisfaction: 75% indicated they were happy with their chosen career, 51% indicated they are proud of the work they do, and 40% plan to retire doing what they are doing now.

6. Recruitment Practices

Respondents shared how they recruit candidates and the demographics of those populations. Award recipients use community partnerships to reach audiences, canvass through community events, develop flyers, advertise on the radio, and post on social media platforms. Multiple award recipients reflected on how competition among other workforce development groups has led to challenges in recruitment:

“ About 30% of enrollees into our training program are from that sort of low-income population. They are receiving public assistance or SNAP or food stamps, SSI, or are living in public housing. Also, we have more than 50% receiving Medicare or Medicaid, or another 15-18% who don't have any health insurance at all. About 72% have received no more than a high school diploma...and they are coming in with a \$15,000 annual income average. About 40% were unemployed at the time of enrollment.”

“ There is a lot of competition from similar programs to the ECWTP but from the manufacturing sector, IT sector, or even healthcare...we are wondering if the future focus on environmental and construction careers could be expanded into other areas — for instance, manufacturing.”

“ Environmental job opportunities that are available to folks are not necessarily the high road job opportunities that we want them to have. There is a little bit of a struggle there. We want to get people into environmental careers to meet the environmental component of this program, but also there is that important piece of making sure we are preparing people for real, solid career pathways. There seems to be some opportunity as a grantee community to revisit...what we consider, today in 2023, environmental careers.”

“ It comes down to reaching out to other community-based organizations, being able to have relationships with other faith-based organizations, and just creating strong partnerships with those similarly invested in making a difference in the lives of others.”

7. Job Placement Arrangements

Respondents were questioned about how pre-apprenticeship programs, first-hire ordinances, and community benefit agreements have affected their communities and opportunities for individuals to obtain environmental careers. Recognizing not all award recipients may have these job placement arrangements in place, the evaluator also asked what limitations exist in developing such arrangements and how NIEHS may remedy those barriers.

“ In our effort to train more people, we are doing smaller cohorts of people for shorter amounts of time so we can do more training...every month, we have 15 people ready to start the apprenticeship.”

“ During the COVID-19 pandemic, because there was such an emphasis on health and safety, the community was looking at centers such as JobTrain to be the bearer of safety information. These training programs are seen as centers for trusted sources of information in the community.”

“ For our ECWTP consortium, the first-hire ordinance has become a strong benefit for those that were trained with our new partner, RecycleForce in Indianapolis, especially during the pandemic. RecycleForce received a contract, and all their trainees in Indianapolis were able to benefit from the first-hire ordinance. And 100% of those were citizens re-entering the workforce after incarceration, so you can see the value there.”

“ Regarding the placement of our graduates, many of them are in jobs with good wages, but they are in non-union shops. We've been able to work with unions, but there are still some challenges we have to overcome.”

DISCUSSION

There are many workforce development and job placement programs nationally across occupations and industries, especially since the passage of the Federal Manpower Development and Training Act in 1962. Such programs exist amongst the U.S. federal government, state governments, and nonprofit organizations. However, not all are effective in delivering job training, and, on average, costs exceed benefits if only focused on job training (State of Washington 2015). Therefore, coupling job training with work experience and assistance programs may help improve the effectiveness of such programs, as demonstrated by the ECWTP. Furthermore, programs like the ECWTP could be successfully scaled upwards into a larger, more expanded audience while retaining its benefits.

The review of other workforce development programs can help contextualize the importance of the ECWTP and its model of job training and wrap-around or life skills services, which are fundamental to the program's success. For example, a RAND Corporation evaluation (Baird et al. 2019) of a labor career workforce development program in New Orleans, Louisiana, found the program provided meaningful results in wage growth, job satisfaction, and return on investment. However, employers and trainees mentioned the need for strengthening soft skills, hands-on experience, and job counseling.

ECWTP has positively and consistently enhanced pre-employment skills and health and safety training for residents of communities with lower income or a lack of educational opportunities. ECWTP has also steadily supported individuals, workplaces, and their communities; and has established hiring agreements that have expanded opportunities for individuals to identify, obtain, and thrive in environmental careers.

Additionally, relationships are essential in workforce development programs (Weigensberg et al. 2012). Relationships with employers and training providers help build and maintain effective workforce development programs. Community engagement leads to referral into the programs and supportive services that may be beyond the capacity of the training organization alone.

Partnerships are an important part of ECWTP as they allow the award recipients to connect with organizations and groups within their communities. These partnerships played pivotal roles in supporting recruitment and job placement for their trainees. Partnerships were defined by those within their communities and with other WTP-funded organizations to help reach a wider national audience and assist in resource sharing. ECWTP's focus on job training, supportive services, and partnerships with employers and the community brings about meaningful change and substantial benefits to graduates and their workplaces.

The recruitment of trainees can include traditional models, such as advertisements on the radio or in newspapers. However, our evaluation shows that the partnerships that ECWTP award recipients have within their communities help them reach a broader set of individuals. By investing in their communities, the ECWTP and trainees can use the program to give back to those communities. The benefits of partnerships can apply to larger metropolitan areas and rural communities. For example, the Alaskan rural village programs train a small number of individuals, but their impacts across their communities are substantial as those communities are small and need those kinds of skills and expertise. In small Alaskan communities, residents are typically on the front lines of disaster response and involved in collateral duty tasks outside of their usual responsibilities. For example, when there are shortages of trained waste management technicians, residents conducting collateral duties in these rural villages face elevated risks from environmental contamination. Training a few persons from such a village can heavily impact village operations as they relate to environmental hazards and the management of waste and disaster response, as captured in a 2022 NIEHS Partnerships for Environmental Public Health webinar on safety and health training for American Indians and Alaska Natives in the western U.S. (2022c).

ECWTP partnerships include pre-apprenticeship programs, first-hire ordinances, and community benefit agreements for some respondents. Some pre-apprenticeship examples include the Carpenter's BuildingWorks and CPWR's [Building Pathways](#). CPWR's JobTrain provides an example on first-hiring partnerships from collaborations with local employers based on trust in the trained graduates. The employers recognize JobTrain's important work in the community and its status as a provider of educational and job training services. Partnerships with contractors and local government have also helped employ graduates in the East Palo Alto area. The Historically Black Colleges and Universities Consortium has developed formal arrangements with contractors to hire graduates in environmental remediation and construction fields and other related industries. These examples help underscore the importance of partnerships built on trust and the leveraging of expertise and well-trained individuals to achieve high job placement in their respective communities. These relationships continue to support the ECWTP as a model for workforce development to ensure programs are achieving high job placement in lucrative, successful environmental careers. Some of these relationships exist informally and are not written into any contract or formal agreement because they rely on trust leveraged in the community. However, even without formal agreements, the ECWTP has maintained high job placement. This may be due to the higher qualifications and certifications graduates obtain from the program, making them more marketable for career opportunities.

Respondents described the significance of life skills development. The ECWTP provides an opportunity for trainees to develop basic life skills for in and out of the workplace. Such skill development helps ECWTP trainees get hired and leads to healthier and safer lives.

The ECWTP contributes to societal benefits besides higher wages and stable careers. There are examples from the interviews and supported by review of annual progress reports that the ECWTP helps graduates build a life and career after incarceration, homelessness, or unemployment; enables graduates to help and give to the community; helps graduates gain the ability to buy or rent a home, pay for family expenses, and fund children's education; provides a path towards leadership positions for graduates; and helps graduates feel supported by the program to move forward in life.

The ECWTP could be successfully scaled upwards into a larger, more expanded audience while retaining its benefits. One reason why programs similar to the ECWTP do not produce the same results at scale is because the original model is applied to a sample of people that would be most likely to deliver favorable outcomes (List 2022). After scaling to a broader sub-sample of the population, the program's impact weakens and perhaps even disappears. The two ECWTP economic impact studies feature different samples of people over different time periods, but crucially, the samples are also different demographically. The current study features an older and more educated sample with more women and less pre-ECWTP unemployment and underemployment. One might therefore expect the ECWTP model to have a smaller economic impact on the current study's sample. However, the effect is largely equivalent. This demonstrates that the ECWTP provides beneficial effects for many different demographics that represent a broader population, and therefore serves as evidence that worker training programs like the ECWTP may be successful at a larger scale.

There are limitations to the economic impact study. Most prominent is the lack of longitudinal data that tracks ECWTP graduates' outcomes over time. Without longitudinal data, we can only assume that the program benefits remain over time, although we conservatively depreciate these benefits to account for this limitation. The study also lacks a full accounting of the matching funds and involvement from the community. Those data are incomplete at best, thus reflecting the conservative nature of the estimates the economic impact study produces.

A strength of the economic impact study is the high response rate and engagement among the ECWTP award recipients. The study benefits from a large sample of the full population of program graduates, which increases the statistical power of the estimates. Moreover, the study makes a number of assumptions that bias downward the economic impact estimates, yet the impact remains quite substantial and positive. As such, the actual economic impact may be larger.

Limitations of the qualitative evaluation include only being able to interview nine participants per question. Therefore, respondents were limited to either the principal investigator or a designated representative. During some interviews, the participants mentioned other people in their organization who were ideal candidates to discuss further topics. Future investigations into the ECWTP should involve other representatives, such as the trainers, to gather other perspectives.

Strengths of the qualitative evaluation include the unique chance to review multiple data streams, such as interviews, progress reports, and evaluation documents, which reinforced the quantitative findings. The inclusion of the participants reviewing the draft report, known as member checking, ensured accuracy of the findings and interpretations.

CONCLUSION

This report demonstrates the economic impacts of the ECWTP and the lived experiences of graduates who successfully complete the program.

The ECWTP has economic benefits that cover a range of dimensions, including increased earnings, reduced work-related injury costs, reduced job search and hiring costs, and reduced crime-related victimization and incarceration costs. Other monetary benefits include increased government tax revenues, reduced social assistance transfer payments, donations from community organizations, and benefits related to COVID-19 due to lower unemployment rates and durations among ECWTP graduates.

This report first focuses on the tangible economic impact of the ECWTP from 2014 – 2022 and then highlights the experiences of those who participated in it. It estimates that the ECWTP added a cumulative value of \$893.8 million across the study period of nine years, or \$99.3 million annually.³² Given that government funding in 2021 for the ECWTP was approximately \$3.5 million, the study results show that the ECWTP returns approximately 28 times the amount invested in the program into the economy overall. The study predicts that expansion of the ECWTP into new communities would bring valuable monetary and non-monetary benefits alike.

The economic impact study's approach and assumptions are largely conservative. The approach also does not incorporate spending or expenditure multipliers that quantify the accumulated effect from additional spending in an economy; for example, one graduate's additional income leads to additional spending, which leads to others' additional income and the subsequent additional spending, etc. Moreover, the cumulative estimate noted above does not include the less direct or unquantifiable benefits that likely accrue from training programs. Many of these positive impacts are highlighted by the qualitative evaluation section in the report. Both extensive interviews and award recipient progress reports outline how the ECWTP helps graduates build rewarding careers and lives in more ways than merely increased income. Indeed, graduates demonstrate increased housing and family stability, confidence and pride, community involvement, and progress toward leadership positions. This report clearly outlines a large economic impact and the notable, positive experiences of participants in a federally funded program that far exceeds the government's investment. The authors conclude that funding the ECWTP is warranted and that the program's expansion should be explored.

³² This value does not include the tax revenues, transfer payments, community donations, or COVID-19-related savings due to their indirect benefit as a result of the ECWTP.



Photo courtesy of the Sustainable Workplace Alliance.

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APPENDIX

Interview Questions

1. Please introduce yourself and share your experiences with ECWTP, especially any evaluation results that you think are useful.
2. What are the key strengths of ECWTP and in particular the program you are involved in?
3. What are the key weaknesses of ECWTP, and can they be remedied with stronger program interventions or changes?
4. To help understand recruitment practices and activities, has the ECWTP impacted pre-employment and health and safety training for your underserved communities? If so, how? If not, why not?
5. To help understand outcomes along the socioecological model, has your ECWTP supported individuals, workplaces, and their communities? If so, how? If not, why not?
6. If applicable, how have pre-apprenticeship programs (or first-hire ordinances and community benefit agreements) impacted your communities and opportunities for individuals to obtain environmental careers?
7. Is there anything else you want to share about ECWTP?

Progress Reports

Review of the grantee annual progress reports from 2015 to 2022 provided evidence to support the key themes that emerged from the interview data. A few examples from the progress reports are shared to provide context (Table 5).

Table 5. Progress Report selected findings for emerged key themes

Key Theme	Selected Progress Report Statements
Partnerships	<ul style="list-style-type: none"> • Building Pathways rely heavily on employer partners to assist with the applicant interview process and to host field trips. Employers also participate in an employer panel presentation for each class to discuss their journey in the industry, market predictions, and expectations for a successful trades worker. These industry partners also participate in conducting mock interviews. And, most importantly, they employ program graduates in both interim and apprenticeship positions. • WRUC has achieved these accomplishments through extensive partnerships in our region. In Los Angeles, LOSH is collaborating with Women In Non Traditional Employment Roles (WINTER), a non-profit organization in South Los Angeles, to prepare women for employment in construction and related fields.
Basic life skills	<ul style="list-style-type: none"> • Amanda had a history of chronic unemployment. Amanda feels the training she received greatly helped to build her confidence and equip her with the tools needed to succeed not only in construction, but in life in general. • Alavarado credits BuildingWorks for really preparing him for union work and life in general indicating that before he did the program it was tough for him to make it to work or anywhere for a 7:00 AM start.
Societal benefits	<ul style="list-style-type: none"> • He was homeless, sleeping in the woods. The program was able to help Derrick get his living situation squared away. • Podcast on ECWTP and story of trainee Rocio Treminio-Lopez, who was the first Latino-American woman elected as mayor in Maryland.
Supporting at-increased-risk populations	<ul style="list-style-type: none"> • The OAI ECWT Consortium understands it is individual student successes that combine to define the achievement of a program. Many students come to ECWT programs as ex-offenders, recovering addicts, homeless, or lacking the necessary education to advance. Successful students enroll in the ECWT program not only to learn technical skills and improve their academic abilities, but also to make a difference in their personal lives, their families' lives and their communities.
Evaluation Results	<ul style="list-style-type: none"> • Upon completion of the CPWR-provided health and safety training, 100% of students said they could identify unsafe work conditions and would inform a supervisor in such instances and would not resume work until the safety hazard was mitigated. Prior to taking the training, none of the students had any experience or knowledge of how to identify and remediate hazardous materials but, after completion of training,
Recruitment Practices	<ul style="list-style-type: none"> • MRNY reached out to hundreds of unemployed and chronically underemployed individuals in the New York City metropolitan area. To assist in connecting to target populations, MRNY outreach and recruitment efforts utilized local partnerships with community-based organizations (CBOs) providing adult education and workforce services, as well as partnerships with public libraries, NYC Workforce1 Career Centers, community-based health providers, community college-based adult learning centers, and health advocacy, workforce development, worker training and adult education provider networks. MRNY also reached out to Community Health Worker (CHW) training graduates and community members on waiting lists. The bulk of outreach was accomplished through social media, emailing, mailing and calls, and through extensive flyering and flier drop-offs.

Key Theme	Selected Progress Report Statements
Job Placement Arrangements	<ul style="list-style-type: none"> Once Akeem completed Constructing Hope's job placement program, he was instantly placed in a carpenter's union apprenticeship while still doing residential remodeling every evening after work. Richard graduated in February 2019 and as one of the top five students in his class, was given direct entry into the Carpenters Union.

Societal Benefits by Key Theme from Progress Reports

The trainees discuss the following themes in their stories of being a part of ECWTP. Story examples and trainee quotes are provided.

Building a life and career after incarceration, homelessness, unemployment, or leaving high school before graduation

- Video testimony from various participants in two sites under the Western Region Universities Consortium, the [Washington State Building and Construction Trades Council's King County Pre-Apprenticeship Construction Education \(PACE\) program](#) (prior ECWTP partner) in Seattle and [Constructing Hope](#) in Portland, Oregon.
- L. Pickett had been living in hotels with his three children as a single parent for nearly three years. Prior to enrolling into the Ready to Work pre-apprenticeship program, he felt hopeless and discouraged. He heard about the program from a friend and the two of them encouraged each other to complete the program, even arriving to class at least two hours early every day. Since graduating from the program, Pickett has been working with the Painter's Union and has realized his goal of moving his family into a two-bedroom apartment.
- J. Chavez is a 36-year-old single Hispanic father who was living in a shelter with his two children in East Palo Alto, California. As one of the top five students in the class, Chavez was automatically chosen for direct entry into the Carpenters Union. He is now employed with CECO Concrete Construction as a carpenter apprentice building concrete forms for the construction of a new medical building at Stanford University and is earning \$29 an hour. He is grateful for the opportunity given through the Project Build program.
- T. Sturdivant went from unemployed to serving as a business agent for OPCMIA Local Union 633 with duties such as organizing and serving as a liaison between members and contractors.
- Riley was incarcerated for the past 25 years prior to joining ECWTP. While incarcerated, he obtained his GED and later an associate degree in business management. However, he said it had been extremely difficult to get work. Riley was accepted into the ECWTP and that's when things turned around for him. He earned the Perfect Attendance Award at the virtual graduation with a monetary value of over \$700. He did very well in basic skills and technical training. Shortly after graduation, a job opportunity opened for Riley at Camellia Bean Company working on the assembly line with a starting pay of \$13.00 per hour. The good thing about his job is that it is a permanent position with full benefits after 90 days and opportunities for advancement.
- Prior to the training, Sumi was unemployed. Now she is earning \$38,000 a year plus benefits. She said the training provided her with an excellent opportunity to enter the health field as a community health worker and to grow and do the work that she is happiest with.

- T. McCarter carefully considered his options after serving 14 long years in a prison in downstate Illinois. He chose OAI to gain knowledge and increase his skills and chances of employment. McCarter's hard work during training paid off. After graduating and attending an OAI Employer's Forum, he received three job offers, one of which was with UPS. McCarter accepted the UPS offer, and within 60 days of being employed with the company, he was promoted to a supervisor position with a starting annual salary of \$60,000 plus benefits. "OAI is not just a school for training, but a family and organization that really helps people," McCarter said.
- V. Brown spent 25 years in the Texas Department of Corrections. He was then in a minimum wage job. After participating in the Dallas ECWTP CitySquare's construction training program, he was offered a construction job with WEBBER, the General Contractor for the SM Wright Highway Construction Project in southern Dallas. He started work as a laborer earning \$12.00 per hour.
- Kelly was determined to complete the program and he demonstrated that nothing would stand in his way, not even homelessness. He lived in his fiancé's automobile until his old coach from the university gave him a key to the gym so he could wash-up and get some sleep. Kelly's attendance was good though he was late sometimes. He did very well in his classes and obtained all certifications. Kelly received the Survivor Award at the virtual graduation. Because of his determination and hard work, he was one of the first graduates to obtain employment. He accepted a permanent position with Battelle CCDS in Columbus as a COVID-19 Response PPE Decontaminator. They use a Critical Care Decontamination System™ to address the current shortage of critical personal protective equipment across the U.S. Kelly is now earning \$25 dollars an hour with full benefits. He along with his fiancé and baby have a wonderful new start in life.

Helping and giving back to their community

- From A. Jones who participated in the Flint, Michigan, program and has been an apprentice for two different contractors involved in the water remediation in Flint. For one, he removed and replaced lead water lines to Flint residents' homes; for the other, he worked on the construction of the new Genesee County Water Treatment Plant. "The best part about all of this is that I was invited by my 8-year-old son to visit his classroom, where he presented me with an award," said Jones. "It says, 'Thanks Dad, for making our water safe.' That's what means the most to me."
- Alavarado has worked on many job sites throughout the New York City area including public housing buildings. He regularly visits BuildingWorks classes and speaks to students about his experiences.
- In 2019, Compass Rose Collaborative received a call from alumni trainee C. Emerson's parole agent who stated that Emerson was not doing so well. He was advised to call Mr. Romero from the Compass Rose Collaborative before he got into trouble. The program reconnected with Emerson in August 2019 and within three days got him hired to help with the Malibu Fires. Emerson completed his fire assignment after seven months of working at the Malibu Fires.
- Today, T. Sturdivant serves as a business agent for OPCMIA Local Union 633. He now serves on a variety of state, industry, and contractor association committees and gives back to the next generation of trainees by sharing his story with each pre-apprentice cohort at Local 633.
- Williams volunteered to participate in the production of a [video developed to educate women](#) on the careers available within the unionized construction industry. The video was produced by the Association of General Contractors of Michigan and the Bricklayers & Allied Craftworkers Apprenticeship & Training Fund.

- R. Coyotl decided to pursue a career in health and participated in the ECWTP Community Health Worker training. She learned the importance of teaching communities the importance of good health and healthy lifestyles. She is proud to know that she is helping her community while pursuing her professional goals. This training has helped boost her self-confidence and taught her how to talk to people about their wellbeing and access to healthcare.
- Myers is an example that perseverance and hard work will always pay dividends. She gained a newfound sense of confidence and drive during the program and obtained employment in the solar industry prior to graduation. She began her new career with Re-Think Solar and within 12 weeks, her wages increased from minimum wage to \$18 per hour. Myers is one of a few women working in the solar industry and can be found proudly wearing her pink hard hat on solar worksites.

Ability to buy a home or rent sustainably, pay for children's education, buy a car, retire, etc.

- Gomez graduated from the apprenticeship and became a journeyman in 2001. He purchased his first home the same year and has since upgraded to a larger house. He has four children and one started attending college in 2017. Gomez is 10 years away from retirement.
- Coleman recently reported that he earns over \$100,000, has purchased a home, and paid for his child's education. He stated that he is very confident about his financial future and indicated that he has investments in addition to retirement savings. Feeling of being supported and assisted with steps forward in life.
- Today, Williams is working as a refractory bricklayer and confined space supervisor, thanks in large part to her ECWTP training. She was able to relocate her family in Flint to better housing and purchase a reliable vehicle.
- E. Dobbs owns a car, has retirement savings and investments outside of his retirement plan. He has paid off loans and maintains a good credit score.

Providing a path towards a leadership position in their career

- Parrish is currently a journeyman carpenter and as a foreman and is responsible for hiring and managing new workers on a site. He also serves as a shop steward for his local union, assuring that members are working in a safe environment.
- Podcast on ECWTP and story of trainee Martanaze Hancock, who currently works for UIC Government Services as a health, safety, and environmental specialist where he manages the health and safety program for over 3,000 employees on several contracts spread throughout the U.S.
- Podcast on ECWTP and story of trainee Rocio Treminio-Lopez, who is the first Latino-American woman elected as mayor in Maryland.
- Three female graduates from the Flint ECWTP, including Williams, were selected to represent the Michigan BAC in the September 2018 "Women Build: Exploring Careers in Construction" event held in Perry, Michigan which was organized by the Women in Skilled Trades (WIST) organization. Besides Williams, Shanell Tiggs (BAC Bricklayer Apprentice from 2017-2018 cohort) and Lanae Bell (BAC

Restoration Apprentice from 2017-2018 cohort) served as panelists as well as mentored participants in a hands-on bricklaying project.

- I. Smith had a history of chronic under-employment. Recently, she was hired by Total Safety, a leading global provider in industrial safety services and equipment strategies, which has 176 locations nationwide. Today, Smith is a project manager at Total Safety making \$28 an hour with benefits. This position gives her the opportunity to travel around the country with a team of experts, who provide clients with project management for gas detection, confined space entry, fall protection, and emergency response.
- J. Fallen from the Chicago Program began employment with an engineering and construction firm originally as an Administrative Assistant. Due to the certifications earned during training, the employer had her undergo training as a Water Treatment Specialist. She has worked on four projects so far and has received recognition for her work product and attention to detail. “There has even been preliminary discussion around possible promotion including program manager.”

Life skills and social services benefits

- During the program, Alvarado stated he learned and developed a strong work ethic. He said the Carpentry instructors taught him that if you do everything correct and work hard, eventually you will get more efficient, work faster and safer, and he has experienced this on the job. Alvarado credits BuildingWorks for really preparing him for union work and life in general, indicating that before he did the program it was tough for him to make it to work or anywhere for a 7:00 AM start.
- J. Chavez is a 36-year-old single Hispanic father who was living in a shelter with his two children in East Palo Alto, California. Chavez came to JobTrain seeking employment opportunities as well as services for both him and his children. He worked with JobTrain’s Supportive Service Center to get a housing voucher for his family and enrolled in the Project Build program. He was also able to receive legal counseling and advocacy for CalFresh benefits during his breaks while attending training.
- Brown developed a personal financial plan with help and encouragement from the Dallas ECWTP’s financial empowerment coach. The plan included obtaining a driver’s license and filing his 2016 federal income tax. Both goals were quickly achieved. These relatively simple accomplishments made his work more secure and contributed to his feelings of empowerment.

Feelings of being supported and helped by the program to move forward in life

- Pickett is incredibly grateful to the program offered by the BWC and the UCLA LOSH program. “I feel like a man now,” Pickett said. “I can provide for my family. I would have never dreamt of this opportunity. Thank you, guys, so much.”
- “I appreciate you Mr. Romero,” Emerson said. “You’ve had a big positive impact on my life. I will not forget you and what you do for us.”
- Sturdivant said he does not know where he would be right now if not for the ECWTP. He said it was life-changing, providing him with an opportunity to pursue a sustainable and meaningful career in the construction industry. His pride in the program was clear as he named the various projects he was involved in building in and around the Twin Cities. “I’m grateful for the career this program gave me, but the safety training is what keeps you in the career,” he said.
- “I am a bricklayer,” Williams said. “I make a difference. If it wasn’t for the training at ECWTP and effort

put in by all of the training coordinators, I wouldn't be where I've always wanted to be today. I don't have a job — instead I have a career. I can say I'm certified and experienced to go on a job site and do what I was trained to do. If not that, then better. I know safety hazards. Chemicals, slips, trips, falls, confined spaces, oxygen levels, air hazards, how to lay the perfect brick, and how to carry myself as a tradeswoman.”

- Riley is thrilled to have an opportunity to move forward with his life. He said he is thankful for the Deep South Center for giving him a chance for a new lease on life. The ECWTP is exactly what he needed, and he is grateful for the leadership and support he received throughout the program and after.
- Prior to the training, C. Myers reported her insecurity about returning to the classroom as an adult and balancing the demands of attending training while caring for her three children as a single mother. Despite her doubts, Myers ended up earning the overall highest test scores in her training class. She expressed gratitude for her peers and the OAI staff for pushing and believing in her even when she found it difficult to believe in herself.
- Brown often expresses how thankful he is for the encouragement he received during the program, as well as post-graduation. This encouragement helped him recognize that he was angry, hopeless, and discouraged prior to and in the beginning of the training because of his prior trials and tribulations. He is very excited about his career path with one of the largest infrastructure companies in Texas and is now learning everything that he can for further advancement.



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