



Analysis: Economic and Financial Benefits of Building an Indoor Swift Water Training Facility

This analysis is an overview of economic benefits related to a proposed Swiftwater Training Facility that can support an EDA Grant application. It evaluated qualitative benefits of the tank and calculates the regional, economic benefit of an average U.S. municipality.

The analysis concludes that building a Swiftwater Training Facility and providing it to public agencies and maritime industries will result in a 10-year economic gain of approximately \$49 million and an annual economic gain averaging \$4 million.

Section I. Project: Indoor Swiftwater Training Facility

Background

This proposal references the construction and operation of an Indoor Swiftwater Training Facility designed to enhance regional emergency response capabilities, workforce development, and economic resilience in Brunswick, Georgia. The project includes elevating the flood-prone site by 2 feet, installation of underground utilities (power, water, sewer), and construction of a parking lot. This facility will provide critical, specialized training for Swiftwater rescue and emergency response, supporting job creation and economic growth.

A Swiftwater Training Facility in the region would build regional skills, education, and employability by providing standardized, credentialed training in high-demand rescue across maritime industries. Trainees gain nationally recognized certifications which improve job prospects and local safety. This type of facility draws agencies, private business users, and students from across the country, boosting workforce pipelines in public safety.

Such a facility would also boost resilience and the economic structure of distressed communities in the region. The program upgrades would lower responder injury, improve survival rates, quicken flood response, and reduce recovery time after flooding. This would help households and employers in vulnerable neighborhoods return to work and normal operations faster.



Section II. Modeled Economic Outcomes

This specific economic analysis estimates the range of possible economic, regional gain over a 10-year period from the construction and ongoing business of an indoor swift water training (SWT) facility. Historical data was gathered from studies, reports and federal databases to examine the possible economic, regional benefit of the proposed project. A Monte-Carlo economic analysis was run based on national averages to model the pessimistic, optimistic, and most probable annual gain as well as the gain over the next 10 years.

APPROACH: Modeled Economic Project Outcomes

Data was gathered in the following, listed categories that affect local and regional economic outcomes.

- **A. Regional Draw of Facility Users**
 - o Out-of-State Trainees
 - o Expected Trainee Capacity and Project Income
 - o Regional Reputation
- **B. Disaster Relief**
 - o Value of Saved Lives
 - o Medical Costs
- **C. Impact on First Responders**
 - o Insurance
- **D. Jobs Impact**
 - o Construction
 - o Facility Personnel
 - o Private Sector

A. Regional Draw of Facility Users

With a local, reliable SWT program, departments will not have to pay for trainees to travel for SWT. The proposed facility will offer advanced SWT year-round including during the off-seasons or inclement weather. Expected trainees and emergency rescue departments traveling into the community will influence the local economy.

Out-of-State Trainees

To discern a conservative estimate of program trainee numbers, this analysis took data from published class schedules and observed sign-up rates for SWT providers in the U.S. offering basic to advanced courses. These courses are primarily outdoors and



include the Swiftwater Safety Institute (SSI)¹, Rescue 3 International², The Whitewater Center³, National Rescue and Response Institute (NRRI)⁴ and Capital Tech Rescue (CTR)⁵. NFPA-certified swift water training is available seasonally depending on the location.

Outdoor SWT programs typically run from March-October. Subtracting federal holidays, there are 170 workdays during that seasonal time. Assuming one class is run per day, the range of estimated annual trainees was found by dividing the workdays by the number of students and then multiplying by the course duration. Number of classes = (170/course duration) x class size. We added the ranged numbers and divided by 2 to record the mean of each program. Our total range is the average result.

Table 1: SWT Annual Trainees based on current established outdoor facilities.

Provider	Class Size (trainees)	Course Duration (days)	Estimated Annual Trainees	Mean of Annual Trainees
SSI	15	2-5	510-1,275	892
Rescue 3 International	5-12	2-5	170-1020	595
Whitewater	10-24	1-3	560-4,080	2,320
NRRI	12+	2-4	672-2,040	1,356
CTR	8-16	2-4	336-1,360	848
Range	5-24	1-5	170-4,080	2,125
Annual Range of Estimated Trainees	595-2,320			

Table 2 looks at federal GSA per diem rates and the standard lodging rate for the continental U.S. for per diem food⁶, lodging⁷, and spending costs. Total = Meals and Incidental + Lodging.

¹ Swiftwater Safety Institute. "SSI Courses." "Course Info". [link](#) . Accessed 2025.

² Rescue 3 International. "Courses." [link](#) . Accessed 2025.

³ Whitewater Center. "Swiftwater Rescue." [link](#). Accessed 2025.

⁴ National Rescue & Response Institute. "Courses." [link](#) . Accessed 2025.

⁵ Capital Technical Rescue. "Tech Rescue Courses." [link](#). Accessed 2025.

⁶ U.S. General Services Administration. "Meals and Incidental Expenses (M&IE) Breakdown." [link](#) . Accessed 2025.

⁷ Clark, Eric. "GSA Per Diem Rates for Federal Workers Will Increase This Fall." GovExec. [link](#) . Accessed 2025.



Table 2: Cost per Trainee per Day

Category	Standard Rate
Meals and Incidental	\$68-92
Lodging	\$110-234
Local, Daily Spending Per Trainee	\$178-326

SWT Program leaders have been quoted estimating that 50-80% of SWT trainees come from out of state⁸. The range is confirmed in SWT deployment guides from FEMA and the West Virginia National Guard⁹. Using the range of estimated annual trainees from Table 1 (595-2,320) and applying 50-80%, **the range of annual traveling trainees coming from out of state to of current outdoor SWT programs is 297-1,856 per year.**

These outdoor programs run from March to October. A year-round program with an indoor facility would increase training 33%. If we increase the estimated annual trainees by 33%, that gives us 791-3085 annual trainees. **If we apply 50%-80%, we have an estimated 395-2,468 travelling trainees per year with an indoor SWT program.** SWT classes range from 2-4 days. This analysis used the BEA RIMS II output multipliers for travel and tourism (1.5x-2.0x)¹⁰ and applied it to the estimated spending of 30-864 annual, out-of-state trainees.

Total = travelling trainees x per diem x class length x multiplier. We found the total economic gain for outdoor versus indoor program and the difference is our total economic benefit.

Table 3: Travelling Trainee Benefit Summary = Annual Economic Gain

Category	Outdoor Program	Indoor Program
Annual Trainees	595-2,320	791-3,085
Annual Travelling Trainees	297-1,856	395-2,468

⁸ Clendenin, Kevin. "Beaches to the Mountains: First Responders Get Specialized Training for Flood Disasters." WCHS-TV. [link](#) . Accessed 2025.

⁹ National Guard Bureau. "Troops Dive Into Training to Earn FEMA Level 1 Certification." [link](#) . Accessed 2025.

¹⁰ U. S. Bureau of Economic Analysis (BEA). "Regional Input-Output Modeling System (RIMS II): An Essential Tool for Regional Developers and Planners. User's Guide." (page 3-8) [link](#). U.S. Dept. of Commerce, 2023. Accessed 2025.



Per Diem Spending	\$178-326	
Class Length	1-5 days	
Total Travel Funds Spent	\$52,866-3,025,280	\$70,310-4,022,840
BEA Multiplier	1.5x-2.0x	
Annual Economic Gain	\$33,375-\$6,050,560	\$105,465-8,045,680
Total Economic Benefit Upgrading to an Indoor SWT	\$72,090-\$1,995,120	

Expected Trainee Capacity and Project Income

The numbers provided in this section are taken from 6 different training locations in the United States. These locations are outdoors and have limited training capacity due to inclement weather and seasonal considerations. The proposed project will be an indoor facility with the capability of simulating a variety of rescue scenarios including year-round nighttime, storm, and vehicle rescues while not being limited by environmental conditions. We can conservatively estimate 250 workdays per year, with 15 students per class, and NFPA-certified classes averaging at \$400/person. The average Swiftwater, NPFA-certified course lasts 3 days. The center will be able to run two classes/day in a morning and afternoon periods.

250 Workdays x 2 periods = 500 periods/3 period-long courses = 166 courses x \$400 x 15 trainees = \$996,000.

We applied the BEA output multiplier for Educational Services (1.35x-1.7x)¹¹.

Table 4: Projected Tuition Revenue and Impact

Category	Detail/Metric
Annual Number of Classes	166
Annual Workdays	250
Trainees per Class	15
Average Class Cost	\$400

¹¹ See BEA, “RIMS II” (page 2-11).



Class Periods per Day	2
Annual Tuition Revenue	\$996,000
Total Annual Economic Benefit	\$1,344,600-\$1,693,200

These calculations were not included in the final monte Carlo simulation.

Regional Reputation

Many studies from L. William Seidman Research Institute¹², Sherbrooke Fire Department¹³ and the National Library of Medicine¹⁴ cite regional reputation as a financial multiplier.

It's documented in these studies that regional reputation from new emergency response training centers significantly helps attract other industries, boost community competitiveness for federal/state grant funding, and give businesses confidence to remain or relocate into the area due to reduced risk. However, the numerical data needed to create a conservative and specific range for the purpose of this analysis was not available for the purpose of this analysis.

B. Disaster Relief

"Flooding is the most common environmental hazard in the world, accounting for approximately 50% of all global natural disasters."¹⁵ A local, well-trained Swiftwater task force has been shown to directly lower medical system cost-burdens by reducing response times, fatalities, and serious injuries.

Value of Saved Lives (VSL)

According to the EPA's Mortality Risk Valuation Estimates, the average VSL is \$10.7 million, with a standard deviation of \$7.2 million.¹⁶ A conservative estimate for the region would be \$3.5 million. According to CDC and NOAA data, West Virginia experiences some of the highest flood fatality rates in the country. State-level reports cite 34 statewide flood deaths over 15 years, reflecting an average of about 2 per year.¹⁷

¹² Hoffman, Dennis, et al. "University Contribution Report." (page 5) L. William Seidman Research Institute, Center for Competitiveness and Prosperity Research, W. P. Carey School of Business, Arizona State University. [link](#). Accessed 2025.

¹³ Municipality of the District of St. Mary's—Sherbrooke. "Sherbrooke Fire Department." (page 5-12) [link](#). Accessed 2025.

¹⁴ Clarke, et al. "The costs of improving health emergency preparedness: A systematic review and analysis of multi-country studies." National Institutes of Health, [link](#). Accessed 5 Sept. 2025.

¹⁵ Wettstein, Zachary S., et al. "Emergency Care, Hospitalization Rates, and Floods" (Table 2, pages 5-6) JAMA Network Open. [link](#). Accessed 2025.

¹⁶ U.S. Environmental Protection Agency, "Guidelines for Preparing Economic Analyses" Appendix B - Mortality Risk Valuation Estimates. (pg. B-2) [link](#).

¹⁷ Douglas, Eric, "W. Va. Among Most Flood Susceptible in Nation" WV Public Broadcasting. [link](#).



According to a FEMA study that surveyed 63 fire departments and found that having an advanced, Swiftwater, local team can “increase survival rates and decrease mortality”.¹⁸ We can conservatively estimate that to be a 33% reduction based on percentage reductions in a study measuring emergency responses during floods.¹⁹

Annual lives saved = Avg. Annual Deaths x Fatality Reduction Estimate = 2 x 0.33 = 0.66

Annual Regional Benefit = Annual lives saved x VSL = 0.66 x \$3.5 million = \$2.31 million

Table 5: Value of Saved Lives during a Flood

Category	Detail/Metric
Average Annual Deaths	2
Fatality Reduction Estimate	0.33
Annual Lives Saved with Advanced SRT Team in Place	0.66
Estimated Value of a Saved Life	\$3.5 million
Total Economic Benefit	\$2.31 million

Medical Costs

According to a study published in Nature Medicine, the average U.S. county experiences 0.4 flood events that cause significant medical impact every year²⁰. Floods result in a 4.8% increase in emergency department (ED) visits and a 7.4% increase in hospitalizations among affected Medicare beneficiaries²¹. The average zip-code tabulation area (ZCTA)-level cost was \$13,053 for ED visits and \$51,355 for hospitalizations per flood event. This costs a region approximately \$64,000 annually in flood-induced medical costs. This data is taken from Medicare records and does not include costs to patients with private insurance.

¹⁸ Koener Jr., Lyle N., “Identifying a Swiftwater Rescue Program for the Eau Claire Fire Department”. Executive Fire Officer program, National Fire Academy. (page 11-12) [link](#).

¹⁹ Wang, Zhiqiang, et al. “Analysis of Flood Evacuation Process in Vulnerable Community with Mutual Aid Mechanism...” International Journal of Environmental Research and Public Health, vol. 17, no. 2. [Link](#).

²⁰ Taborda, Anna, et al. “Large Floods Drive Changes in Cause-Specific Mortality in the United States.” Nature Medicine, vol. 30, 2025 (pp. 1–14). [link](#). Accessed 2025.

²¹ See Wettstein, “Emergency Care, Hospitalization Rates, and Floods”. [Link](#). (Table 2 and 3)



Advanced Swiftwater rescue means fewer prolonged exposures that can result in hypothermia, injury, and complications. It also reduces delayed trauma, ICU and extended hospital stays. According to studies published by FEMA²², JAMA²³, and the NIH²⁴, effective swift water operations will reduce the combined volume and severity of post-flood medical cases. A study published by the National Hazards Center ran a simulation of disaster preparedness and found that well-trained first responder presence in the community reduced preventable deaths by 89%, average emergency response times went down by 77%, and average patient treatment wait times decreased by 38%²⁵. We can conservatively estimate a 15% reduction in medical burden (e.g. avoidable ED visits, preventable complications, untreated injury) with improved rapid response. We applied the BEA multiplier for medical costs (1.45-1.92)²⁶.

Annual Post-Flood Medical Burden = ED Visit Costs + Hospitalization Costs. Total = (Medical Burden - (15% x Medical Burden)) x Multiplier.

Table 6: Estimated Annual Flood-Induced Medical Cost Avoided: Indoor SWT

Category	Detail/Metric
Annual Post-Flood Medical Burden	\$64,000
Medical Cost Reduction with Local Swift Water Task Force	15%
Estimated Flood Medical Cost with Local, Advanced Task Force	\$54,000
Annual Flood-Induced Medical Cost Savings	\$9,600
BEA Multiplier	1.45-1.92
Total Annual Economic Benefit	\$13,920-\$18,432

²² U.S. Fire Administration. “Frederick County Division of Fire and Rescue Services Swift Water Rescue Program.” (pages 15-17) [link](#) . Accessed 2025.

²³ See Wettstein, “Emergency Care, Hospitalization Rates, and Floods”. [Link](#). (pages 4-8).

²⁴ Alfadhel, Ali, Alakeel, Abdulaziz, Almutairi, Abdullah, et al. “A Cross-Sectional Study on the Flood Emergency Preparedness of Healthcare Workers in Saudi Arabia.” International Journal of Environmental Research and Public Health. [link](#) . Accessed 2025.

²⁵ Kintziger, Kristina, et al. “Public Health Computer Simulation Tool to Support Disaster Preparedness in Rural Communities.” (page 24) Natural Hazards Center, University of Colorado Boulder, 2023, [link](#). Accessed 2025.

²⁶ See BEA, “RIMS II” (pages 3-5).



C. Impact on Swiftwater First Responders

Training for swift water rescue can be so dangerous that instructors have reported reducing the intensity of the training for safety compliance²⁷. This creates another problem, because advanced-level techniques are not regularly practiced. When an emergency responder answers the call, having never practiced advanced techniques, “rescue efforts...can quickly turn tragic.”²⁸.

Swift water training is routinely described as high risk, low frequency. Bumps, bruises, sprains, broken bones and immersion injuries are common with outdoor swift water training²⁹. This can be a financial drain on a department. A study done looking at a 10-year period in Frederick County, MD estimated that emergency responders constitute approximately 10% of all swift water deaths³⁰. According to an article in Fire and EMA Leader Pro, a firefighter is 4 times more likely to die during a water rescue than in a structure fire³¹. Drowning injuries are among the most expensive for departments and average \$774,145 per incident in legal and medical fees and missed work according to NIST research³². The cost of non-fatal flood-based hospitalizations averaged \$343,112. Many incidents go unreported and there are not enough peer reviewed data to create a range on the financial impact of these swift water-related injuries.

Over a 10-year period, one major county department reported 82 training-related injuries that translated to \$262,000 in direct medical expenses, 667 missed workdays, and backfill costs that, when added to damage and injury costs, average \$100,000 per year.³³ This was an average of \$46,000 per year in trainee injury-related costs. The same department documented \$32,745 in repair and replacement costs for damaged and lost equipment during training, not including expendables like ropes, PFDs and helmets), translating to \$3,300 per year³⁴. To calculate backfill we subtracted reported incident costs from the reported \$100,000, to get \$70,950. Considering some ambiguity in the reported 100,000, we can conservatively estimate backfill costs at \$35,000.

²⁷ Hager Loomer, Anna. “Running the River Stupid: Swiftwater Rescue Training Proves Relevant to Leading Middle Schoolers, a Teacher Discovers.” Outdoor Sport Institute Blog. [link](#). Accessed 2025.

²⁸ National Park Service. “Swiftwater Rescue Manual (Revised September 23, 2012). (page 10) Mountain Rescue Association. [link](#). Accessed 2025.

²⁹ Brown, Keith. “Swift-Water Awareness Is Important for All Responders.” EHS Today. [link](#). Accessed 2025.

³⁰ Riley, Christopher. “Risk Reduction for Flood Water Events” [link](#). City of Portsmouth Fire, Rescue and Emergency Services, Portsmouth, VA. Accessed 2025.

³¹ Fire & EMS Leader Pro. “Some Thoughts on Flashfloods and Swift Water Rescue.” [link](#). Accessed 2025.

³² Butry, David T., Webb, David, Gilbert, Stanley, Taylor, Jennifer. “The Economics of Firefighter Injuries in the United States.” National Institute of Standards and Technology Technical Note 2078. Pg. 11. [link](#). Accessed 2025.

³³ Duke, Deputy Fire Chief Andrew L. et al., “Swift Water Rescue Training Incident, 9200 Old Dominion Drive, Great Falls, Close Call Report,” Fairfax County Fire and Rescue Department, April 2014. (page 5) [link](#). Accessed August 1, 2025.

³⁴ See Duke et al., “SWT Incident”. [Link](#).



Table 7: Financial Strain on Fire Departments Related to Swift Water Training Incidents

Category	Amount per Incident
Drowning Related Injury	\$774,145
Non-fatal SWT Hospitalizations	\$343,112
	Estimated Annual Amount
Direct Medical Expenses	\$26,200
Backfill Costs	\$35,000
Lost/Damaged Equipment During Training	\$3,275

Injury and equipment loss incidents are inevitable in the uncontrollable nature of river training. The fully controlled environment of the proposed project would eliminate the costs of SWT medical burden and lost/damaged equipment. We applied the BEA RIMS II multiplier applied to money saved in a company (1.4-1.8)³⁵.

Total Reported Incident Costs = Direct Medical Expenses + Backfill Costs + Lost/Damaged Equipment. Total Benefit = Total Reported Incident Costs x Multiplier.

Table 8: Annual Fire Department Savings with Indoor Facility

Category	Annual Amount
Total Reported Incident Cost	\$64,475
Total Annual Economic Benefit	\$96,713-128,950

Insurance

Research commissioned by NIST estimates that firefighter injuries nationwide cost between \$1.6 billion and \$5.9 billion annually, factoring in insurance payments, medical expenses, and administrative work. This results in an annual loss of approximately \$50,000-\$200,000 per department³⁶. Of the reported incidents, firefighter drowning injuries were the costliest at \$744,145 per incidence³⁷. Cost includes, but is not limited to, insurance, medical claims, legal costs, and lost productivity in the field and in training. Departments with no recorded trainee injuries see direct reductions in insurance premiums and claims cost.

³⁵ See BEA, "RIMS II" (page 3-8).

³⁶ See Butry et al. "Economics of Firefighter Injuries..." (page i). [Link](#).

³⁷ See Butry et al. "Economics of Firefighter Injuries..." (page 10). [Link](#).



Numerical Data specifically related to swift water training injuries and fatalities is not well-documented because swift water incidents are typically grouped with various firefighting injuries. The numerical data to directly analyze insurance claims related to swift water injury during training was not available, so not included in the final calculations.

D. Jobs Impact

The following analysis looks at the economic and regional growth impacts related to the construction of an indoor SWT facility costing approximately \$3.5 million to construction in one year.

Construction

We used BEA RIMS II Type II final-demand multipliers for construction jobs, which is 22.68 jobs per \$1 million spent. We used the final-demand earnings multiplier for the construction, which is \$1.80 per \$1 spent.³⁸ The proposed project’s construction is \$3.5 million.

The following salaries are taken from the BLS to look at the salaries dispersed over the course of construction. For the sake of calculating indirect and induced job growth, we defined the annual wage of direct and indirect jobs created as \$46,000-\$49,000 based on U.S. Bureau of Labor Statistics (BLS) reports³⁹.

Construction Jobs = 22.68 x (\$3.5 million/\$1 million). First Year Benefit = Construction Jobs x Salary x Multiplier.

Table 9: Construction Salary Regional Gain

Category	Detail/Metric
Construction Jobs	79 Jobs
BLS Estimated Salary	\$46,000-\$49,000
Regional Gain from Salaries	\$3,634,000-\$3,871,000
First Year Construction Economic Benefit	\$6,300,000

³⁸ See BEA, “RIMS II” page 3-6)

³⁹ U.S. Bureau of Labor Statistics. “Construction Laborers.” Occupational Employment and Wages, May 2023. [link](#) . Accessed 2025.



Facility Personnel and Revenue

Direct employment at the swiftwater training program is projected to grow from an initial 15 full-time equivalent (FTE) positions (including instructors, administrative staff, maintenance, and safety personnel) to approximately 25 FTEs by year ten.

To maintain an objective, conservative look at the employment growth, we looked at the average personnel increase and pay in similar programs.

Outdoor SWT programs typically run from March-October (66.7% of the year), with schedule changes around inclement weather. An indoor facility would run year-round, boosting business by an estimated 33%.

This analysis looked at the facility operations of Fayetteville Technical Community College, Whitewater Rescue Institute, Texas A&M Engineering Extension Service (TEEX)., and the Pennsylvania State Swift Water Program, as well as the standard industry model. All wage and salary information are sourced directly from the BLS, using the most recent Occupational Employment and Wage Statistics (OEWS), Occupational Outlook Handbook (OOH), and the Standard Occupational Classifications for each facility role.

Totals represent the sum of personnel, and the average all listed salaries.

Table 10: Indoor Program Facility Personnel

Position	Number of Personnel	Salary
Director	1	\$78,130-\$102,340 ⁴⁰
Full-time Instructors	4	\$72,500-\$116,500 ⁴¹
Technical/Maintenance Staff	4	\$34,520-\$53,720 ⁴²
Support Personnel	2	\$34,520-\$53,740
Safety Compliance Officer	1	\$56,180-\$100,340 ⁴³
Totals	12	(average) \$68,479

**Full-time instructor roles are specialized. The BLS does not have a separate SOC code. Use*

⁴⁰ U.S. Bureau of Labor Statistics. "Occupational Employment and Wages, May 2023: Facilities Managers." [link](#) . Accessed 2025.

⁴¹ U.S. Bureau of Labor Statistics. "Emergency Management Directors." Occupational Outlook Handbook. [link](#) . Accessed 2025.

⁴² See BLS, "Occupational Employment and Wages." [Link](#).

⁴³ See BLS, "Occupational Employment and Wages." [Link](#).



Table 11: Indoor Facility Jobs Increase

Category	Number of Personnel	Average Salary
Indoor Facility Increase (33%)	5	\$68,479
Total Gain		\$342,395
Multiplier		1.5-2.0
Total Annual Economic Benefit		\$513,593-684,790

Results

Using a Monte Carlo simulation, the calculated total economic benefits were run 10,000 times, factoring construction salary only into the first year.

Table 12: Summary of Totals

Category	Construction Cost	Multiplier Used	One Year Economic Impact
First Year Construction (Table 8)	\$3.5 Million	\$1.8/\$1 in Calculated Salary	\$6.3 Million
Category	Direct Economic Gain	Multiplier Used	Total Annual Economic Gain
Travelling Trainees (Table 3)	\$17,444-997,560	1.5-2.0	\$72,090-\$1,995,120
Value of Saved Lives (Table 5)	\$2,310,000	NA	\$2,310,000
Medical Relief (Table 6)	\$9,600	1.45-1.92	\$13,920-\$18,432
Department Savings (Table 8)	\$64,475	1.4-1.8	\$96,713-\$128,950
Jobs Increase (Table 11)	\$342,395	1.5-2.0	\$513,593-684,790

**Traveling Trainees Direct Economic Gain Calculated using the delta of Annual Economic Gain (Table 3)*



Monte Carlo Simulation

Table 12: **10-year** Total Regional Impact

Scenario	Total Impact
Pessimistic	\$39,318,399
Mean	\$49,250,846
Optimistic	\$56,191,381

Table 13: **Annual** Regional Economic Gain:

Year	Pessimistic (\$)	Mean (\$)	Optimistic (\$)
1		6,300,000	
2	3,302,870	4,065,579	4,845,379
3	3,305,486	4,081,135	4,845,216
4	3,289,667	4,060,834	4,837,640
5	3,304,127	4,078,004	4,852,192
6	3,306,628	4,079,194	4,841,968
7	3,299,406	4,074,913	4,851,096
8	3,303,634	4,070,243	4,835,235
9	3,307,546	4,076,495	4,839,656
10	3,296,165	4,064,449	4,842,999

Conclusion

Swift water rescue is one of the most dangerous calls an emergency responder can answer. Most first responders are required to receive basic SWT, with most departments in flood-prone areas requiring regular refresher courses and/or advanced training. It can be very difficult to find safe places to train, with many trainees traveling out of state annually. Classes need to revolve around the seasons, the weather, and the water quality. These unpredictable factors, paired with potential trainee injury, create a conundrum between softening training to secure trainee safety or intensifying it to help that future responders effectively protect themselves and their communities in a flood.

An indoor, fully controlled, advanced-level SWT facility will draw trainees from around the country, creating significant economic gain for any flood-prone region. Over a 10-year period, the facility shows substantial return potential with conservative scenarios. This analysis shows measurable gains in local employment, public safety capacity, and



multi-regional coordination. The projected reductions in post-disaster medical costs show the facility's role as a critical resilience asset. A facility such as this not only reinforces emergency response infrastructure but maintains broader regional sustainability.

Bibliography

1. Abdus Salam, et al. "The Impact of Natural Disasters on Healthcare and Surgical Services in Low- and Middle-Income Countries." *Annals of Medicine and Surgery*, vol. 85, no. 8, 2023. Accessed July 2025.
2. Alfadhel, Ali, Alakeel, Abdulaziz, Almutairi, Abdullah, et al. "A Cross-Sectional Study on the Flood Emergency Preparedness of Healthcare Workers in Saudi Arabia." *International Journal of Environmental Research and Public Health*. Accessed August 2025.
3. Brown, Keith. "Swift-Water Awareness Is Important for All Responders." *EHS Today*, 10 Mar. 2008. Accessed July 2025.
4. Capital Technical Rescue. "Tech Rescue Courses." Accessed August 2025.
5. Clark, Eric. "GSA Per Diem Rates for Federal Workers Will Increase This Fall." *GovExec*. Accessed August 2025.
6. Clarke, et al. "The costs of improving health emergency preparedness: A systematic review and analysis of multi-country studies." *National Institute of Health*. Accessed August 2025.
7. Clendenin, Kevin. "Beaches to the Mountains: First Responders Get Specialized Training for Flood Disasters." *WCHS-TV*. Accessed August 2025.
8. Douglas, Eric, "W. Va. Among Most Flood Susceptible in Nation" *WV Public Broadcasting*.
9. Duke, Deputy Fire Chief Andrew L., et al. "Swift Water Rescue Training Incident, 9200 Old Dominion Drive, Great Falls, Close Call Report." *Fairfax County Fire and Rescue Department*, April 2014. Accessed August 2025.
10. Fire & EMS Leader Pro. "Some Thoughts on Flashfloods and Swift Water Rescue." Accessed August 2025.
11. Frederick County Division of Fire and Rescue Services. "Swift Water Rescue Program." *U.S. Fire Administration*. Accessed July 2025.
12. Hager Loome, Anna. "Running the River Stupid: Swiftwater Rescue Training Proves Relevant to Leading Middle Schoolers, a Teacher Discovers." *Outdoor Sport Institute Blog*. Accessed September 2025.
13. Hoffman, Dennis, et al. "University Contribution Report." *L. William Seidman Research Institute, Center for Competitiveness and Prosperity Research, W. P. Carey School of Business, Arizona State University*. Accessed July 2025.



14. Kintziger, Kristina, et al. "Public Health Computer Simulation Tool to Support Disaster Preparedness in Rural Communities". Natural Hazards Center, University of Colorado Boulder, 2023. Accessed September 2025.
15. Koerner Jr., Lyle N. Identifying a Swiftwater Rescue Program for the Eau Claire Fire Department. Executive Fire Officer Program, National Fire Academy, 28 May 1998. Accessed October 2025.
16. Municipality of the District of St. Mary's, Sherbrooke. "Sherbrooke Fire Department." Accessed July 2025.
17. National Guard Bureau. "Troops Dive Into Training to Earn FEMA Level 1 Certification." Accessed August 2025.
18. National Park Service. "Swiftwater Rescue Manual (Revised September 23, 2012)." Mountain Rescue Association. Accessed August 2025.
19. Peek-Asa, et al. "Flood-related work disruption and poor health outcomes among university students." Accessed September 2025.
20. Qiao Liu, et al. "Global, Regional and National Trends and Impacts of Natural Floods, 1990–2022." Bulletin of the World Health Organization, vol. 102, no. 6, 2024. Accessed August
21. Rescue 3 International. "Courses." Accessed July 2025.
22. Riley, Christopher. "Risk Reduction for Flood Water Events" City of Portsmouth Fire, Rescue and Emergency Services, Portsmouth, VA. Accessed 2025.
23. Swiftwater Safety Institute. "SSI Courses." Accessed July 2025.
24. Taborda, Anna, et al. "Large Floods Drive Changes in Cause-Specific Mortality in the United States." Nature Medicine, vol. 30, 2025. Accessed August 2025.
25. U.S. Bureau of Economic Analysis. "Regional Input-Output Modeling System (RIMS II): An Essential Tool for Regional Developers and Planners. User's Guide." U.S. Department of Commerce, 2023. Accessed August 2025.
26. U.S. Bureau of Labor Statistics. "Construction Laborers." Occupational Employment and Wages, May 2023. Accessed September 2025.
27. U.S. Bureau of Labor Statistics. "Emergency Management Directors." Occupational Outlook Handbook. Accessed August 2025.
28. U.S. Bureau of Labor Statistics. "Facilities Managers." Occupational Employment and Wages, May 2023. Accessed August 2025.
29. U.S. Bureau of Labor Statistics. "Usual Weekly Earnings of Wage and Salary Workers, Second Quarter 2025." Accessed August 2025.
30. U.S. Environmental Protection Agency, "Guidelines for Preparing Economic Analyses" Appendix B - Mortality Risk Valuation Estimates. Accessed Oct 2025.
31. U.S. General Services Administration. "Meals and Incidental Expenses (M&IE) Breakdown." Accessed August 2025.
32. Wang, Zhiqiang, et al. "Analysis of Flood Evacuation Process in Vulnerable Community with Mutual Aid Mechanism: An Agent-Based Simulation Framework." International Journal of Environmental Research and Public Health, vol. 17, no. 2. Accessed October 2025.



33. Whitewater Center. "Swiftwater Rescue". Accessed September 2025.
34. Wettstein, Zachary S., et al. "Emergency Care, Hospitalization Rates, and Floods." JAMA Network Open. 2025; 8(3):e250371. Accessed July 2025.
35. Yang, Zhengyu, Huang, Wenzhong, McKenzie, Joanne E., Xu, Rongbin, Yu, Pei, Wu, Yao, et al. "Hospitalization Risks Associated With Floods in a Multi-Country Study." Nature Water, 3, 561-570, 2025. Accessed August 2025.