



River and Flood Rescue Technician

Course Plan

Course Details

- Description:** This course provides preparation for participants to demonstrate competency in dynamic water rescue. It will familiarize participants with the dynamic water environment and experience and prepare them to safely execute simple to complex rescue techniques.
- Designed For:** Public safety members with river and flood rescue responsibilities
- Authority:** Office of the State Fire Marshal
NFPA 1006 Standard for Technical Rescue Personnel Professional Qualifications (2017)
NFPA 1670 Standard for Operations and Training for Technical Search and Rescue Incidents (2017)
- Prerequisites:** Low-Angle Rope Rescue Operations (LARRO, 2010)
Incident Command Systems 200 (Basic ICS)
State Fire Training Auto Extrication (1996), SFT Vehicle Extrication (2015), or AHJ equivalent
- Corequisites:** None
- Standard:** Complete all activities
- Hours:** Lecture: 10:00
Activities: 30:00
- Hours (Total):** 40:00
- Maximum Class Size:** 24
- Instructor Level:** Primary
- Instructor/Student Ratio:** 1:8 activities, 1:24 lecture
- Restrictions:** It is recommended that participants have completed the requirements of the authority having jurisdiction's (AHJ's) swim test.
- SFT Designation:** FSTEP

Required Resources

Instructor Resources

To teach this course, instructors need:

- NFPA 1006 Standard for Technical Rescue Personnel Professional Qualifications (2017)
- NFPA 1670 Standard for Operations and Training for Technical Search and Rescue Incidents (2017)
- Water Rescue, Principles and Practice to NFPA 1006 and 1670: Surface, Swiftwater, Dive, Ice, Surf, and Flood (2019) Jones & Bartlett Learning, ISBN: 978128404205
- ICS-SF-SAR-020-1, Swiftwater/Flood Search and Rescue Recommended Training, Skills, and Equipment List (current edition)
- ICS-US&R 120-2, Swiftwater/Flood Search and Rescue Operational Systems Description and Law Enforcement Mutual Aid Plan (current edition)
- ICS-US&R 120-1, Urban Search & Rescue Operation System Description (current edition)
- ICS 420-1, Field Operations Guide (current edition)
- DOT-ERG Emergency Response Guidebook (current edition)
- CAL-OES River Flood Rescue Technician (current edition)

Online Instructor Resources

The following instructor resources are available online at

<http://osfm.fire.ca.gov/training/SFTCurriculum>:

- The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act)
- ICS-SF-SAR-020-1, Swiftwater/Flood Search and Rescue Recommended Training, Skills, and Equipment List (current edition) <http://firescope.caloes.ca.gov/ics-usar/ICS-SF-SAR-020-1.pdf>
- ICS-US&R 120-2, Swiftwater/Flood Search and Rescue Operational Systems Description and Law Enforcement Mutual Aid Plan (current edition) <http://firescope.caloes.ca.gov/ics-usar/ICS-USAR-120-2.pdf>
- ICS-US&R 120-1, Urban Search & Rescue Operation System Description (current edition) <http://firescope.caloes.ca.gov/ics-usar/ICS-USR-120-1.pdf>
- ICS 420-1, Field Operations Guide (current edition) https://www.usfa.fema.gov/downloads/pdf/publications/field_operations_guide.pdf
- DOT-ERG Emergency Response Guidebook (current edition)
- CAL-OES River Flood Rescue Technician (current edition)

Student Resources

To participate in this course, instructor may require students to use:

- Water Rescue, Principles and Practice to NFPA 1006 and 1670: Surface, Swiftwater, Dive, Ice, Surf, and Flood (2019) Jones & Bartlett Learning, ISBN: 978128404205

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To participate in this course, students need:

- CAL-OES River Flood Rescue Technician (current edition)
- Personal protective equipment mandated by instructor

Facilities, Equipment, and Personnel

The following facilities, equipment, or personnel are required to deliver this course:

Facilities

- Classroom of adequate size and capability (audio/visual aids) to support classroom training
- Wash areas
- Bathrooms
- Rehabilitation area
- Safe and adequate parking

Site Requirements

- The requesting agency assumes all responsibility, liability, and maintenance for the engineering design, strength, stability, and adequacy of all props including anchor points and tie offs.
- The requesting agency further assumes all responsibility, liability, and maintenance for all tools, equipment, and supplies used at the site for the delivery of RFRT classes. This includes, but is not limited to, props, ropes, rescue hardware and software.
- Before conducting any training in the water, you as the instructor are responsible for ensuring the safety of everyone involved in the training exercise.
- Students should never be put into a position where they must act as the sole rescuers of other students. The very fact that they are taking your class implies that their level of knowledge is not sufficient to operate without direct supervision.
- You should arrive early at the training site to conduct an assessment of conditions. This should consist of a moving body of water suitable for safe water rescue training. The body of water should be no more complex than a class III and should provide a means for safe and effective rescue of both students and instructors. There should be suitable water depth and consistency to perform all required tasks. The bank of the body of water should provide a safe means of ingress and egress. The area of training must be thoroughly familiar to the instructors and all hazards identified and mitigated. You need to scout the training area for hazards such as strainers, sweepers, exposed rebar or other debris that could snag a student. You should assess the area for foot and body entrapment hazards such as underwater ledges and submerged debris and logs. The training area should be preplanned for where the “no go” zone is located. You should have an idea of what the projected water levels should be, and if the waterway is

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influenced by dam release or prone to sudden changes due to hydroelectric activities or precipitation. Ideally the training area should offer a variety of water features so you can take the students through all the skills. The area may have a rapid current and with wave trains. Areas with large holes or other dangerous currents should be avoided. You must always be in a position from which you can rescue your students. Drills, simulations, or training areas where students cannot be rapidly rescued are not suitable and must be avoided.

- There are several websites that will assist with monitoring water flows. The weather needs to be monitored for potential impact on water flows.
- Be cautious when training in small waterways and creeks. These bodies of water do not usually carry heavy flows of water and often are strainer choked and full of debris. Do a complete and comprehensive survey before training in these bodies of water.
- Irrigation canals and any manmade dams must also be carefully scrutinized. These structures often have debris such as rebar and rip rap in them that are hazardous to swimmers. They can also have rapidly changing water levels.
- Low Head Dams are extremely hazardous and should never be used for training purposes. They offer no way out, and rescue is difficult at best. Training in and around them is inviting disaster.

Equipment

Note: When class capacity will exceed 8 students, it is the responsibility of the lead primary instructor to facilitate and manage additional equipment needs based on site constraints and the ability to simultaneously conduct hands-on training with multiple groups and meet the curriculum requirements. The equipment list below is for each 8-student group.

- First aid equipment (AHJ) BLS minimum
- 1 Backboard (long)
- 8 Throw bags
- 4 Rescue boards
- 4 Fins (sets)
- 4 Rescue PFDs (type V, good operational condition)
- 2 Boats (inflatable raft or IRB, types used in AHJ), minimum 12' but ideally 14'
- 16 Paddles
- 2 Pike poles (6'–8')
- 1 Strainer (manmade or natural, must be safe)
- 4 Descent control devices (figure 8 plates, brake bar racks, 3D, and scarab are all acceptable)
- 40 Carabiners (locking)
- 2 Anchor plate
- Edge protection (manufactured or improvised)
- Mechanical rope ascenders (optional)
- 4 Load releasing devices (commercial or field-assembled from 1" tubular webbing)

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- 4 Low stretch/static kernmantle rescue ropes 150' continuous minimum (12.5 mm)—two to three times the span of the gap
- 2 Low stretch/static kernmantle rescue ropes 20' (12.5 mm)
- Pickets, steel or equivalent (optional)
- Sledgehammer (optional)
- 10 Prusik loops, short (8mm)
- 10 Prusik loops, long (8mm)
- 6 Pulleys (Prussik minding)
- 1 Rescue litter
- 8 Webbing, green, 1" x 5'
- 8 Webbing, yellow, 1" x 12'
- 8 Webbing, blue, 1" x 15'
- 8 Webbing, orange, 1" x 20'
- Line capture device (optional)
- 1 Mechanical line throwing device
- Drone (optional)

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. To be determined by the instructor

Activities

1. To be determined by the instructor

Unit 2: River Flood Rescue

Topic 2-1: Managing a Water Rescue Incident

Terminal Learning Objective

At the end of this topic, given a variety of water rescue scenarios, the standards, and the policies and procedures of the AHJ, a student will be able to describe the components of managing a water rescue incident.

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Enabling Learning Objectives

1. Describe the scope and practice and standards
2. Describe rescue priorities
 - Low to high risk
 - Rescue vs. recovery
3. Describe legal considerations and practices
4. Describe the relevant components of the Incident Command System
5. Describe FIRESCOPE ICS-US&R 120-1, 120-2, ICS-SF-SAR-020-1 Operational System Description
6. Describe the actions taken to terminate and demobilize an incident

Discussion Questions

1. When is it appropriate to control or modify the control zones?
2. What are some key ICS positions?
3. What needs to be done to

Activities

1. The instructor must create an activity directing students to review an incident action plan (IAP).
2. The instructor must create an activity directing students to organize and manage a rescue incident including demobilization and termination.

Instructor Notes

1. The instructor will continually refer students to the IAP throughout the course.

Topic 2-2: Describing Dynamic Hydrology

Terminal Learning Objective

At the end of this topic, given a variety of water environments, a student will be able to describe dynamic hydrology as it relates to rivers, channels, and floods.

Enabling Learning Objectives

2. Describe the forces of dynamic water
3. Describe how to determine current speed
4. Describe how to determine cubic feet of water per second in a given river/channel
5. Describe river orientation
6. Identify river/channel features created by moving water
7. Classify rivers
8. Define the following terms:
 - Upstream
 - Downstream
 - River right
 - River left
 - Volume (cubic feet per second)
 - Laminar flow
 - Helical flow

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- Eddies
- Eddy line
- Strainers
 - Sieves
- Pillows
- Upstream and downstream
- Low-head dam
- Hole
 - Smiling/closed
 - Frowning/open
- Hydraulic
- Standing waves (haystacks)
- Aerated water
- Current vector

Discussion Questions

1. How does cubic feet per second (cfs) impact water hydrology?

Activities

1. The instructor must create an activity directing students to identify hydrologic features.

Instructor Notes

1. If the topic is taught in a classroom, it is recommended that the instructor use videos among the visual aids.

Topic 2-3: Evaluating Hazards and Identifying Safe Current Vectors and Safety Zones

Terminal Learning Objective

At the end of this topic, given a variety of water environments, a student will be able to evaluate hazards in moving water, identify safe current vectors for navigation, and locate safety zones.

Enabling Learning Objectives

1. Identify and describe hazards associated with river and flood rescue
2. Identify safe navigation current vectors
3. Identify areas and features that are safe zones in dynamic water environments

Discussion Questions

1. Where are safe zones typically located?
2. When assessing a waterway, what are the most dangerous hazards?

Activities

1. The instructor must create an activity directing students to provide a safety briefing describing the hazards present.

Instructor Notes

1. If the topic is taught in a classroom, it is recommended that the instructor use videos among the visual aids.

Topic 2-4: Managing and Performing a Victim Search

Terminal Learning Objective

At the end of this topic, given a dynamic water emergency, a student will be able to describe the management of and perform a victim search.

Enabling Learning Objectives

1. Describe search fundamentals
 - LAST
 - PLS
 - POD
2. Describe witness management
3. Identify different tools used for searches
4. Describe reconnaissance, hasty (rapid), primary, and secondary search
5. Perform reconnaissance, hasty (rapid), primary, and secondary searches

Discussion Questions

1. What are the differences between the types of searches?
2. What are the elements required for an effective preplan?

Activities

1. The instructor must create an activity directing students to participate in a variety of searches.

Instructor Notes

1. The types of searches are delineated in FIRESCOPE ICS-USAR 120-1.
2. The different types of searches may be land based or water based.
3. One night search is highly recommended.
4. The instructor may have the students evaluate the IAP from earlier in the course as well as maps or other documents.

Topic 2-5: Identifying and Managing a Victim

Terminal Learning Objective

At the end of this topic, given a dynamic water emergency, a student will be able to identify and manage a victim.

Enabling Learning Objectives

1. Describe victim behavior
2. Describe management of family and bystanders
3. Describe medical considerations
4. Demonstrate water rescue c-spine techniques
5. Demonstrate a contact swim with a combative victim
6. Demonstrate a towed swim with a victim

Discussion Questions

1. When does a victim become a patient?
2. What are some methods for handling a combative victim?
3. What are the contact swim priorities?
4. What are the options for and risks involved with immobilizing a patient?

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Activities

1. The instructor must create an activity directing students to perform a contact swim, c-spine management, and a towed swim.

Instructor Notes

1. None

Topic 2-6: Describing and Using Multiple Communication Forms

Terminal Learning Objective

At the end of this topic, given an incident, whistles, and hand signals, a student will be able to describe and use multiple forms of communication used for dynamic water operations.

Enabling Learning Objectives

1. Describe the difficulties of communications in water rescue environment
2. Describe forms of communication and their use
3. Demonstrate forms of communication

Discussion Questions

1. What are the various hand signals or signaling devices?
2. What are barriers involved with each type of communication?

Activities

1. The instructor must create an activity directing students to demonstrate hand signal and whistle use.

Instructor Notes

1. The instructor should refer to the required text, CAL-OES [River Flood Rescue Technician](#).

Topic 2-7: Describing Floods, Hazards, and Evacuation Procedures

Terminal Learning Objective

At the end of this topic, given a variety of incidents, the ICS 420-1 Field Operations Guide, and the DOT-ERG, a student will be able to describe types and causes of floods and describe hazards and evacuation procedures associated with flood rescue operations.

Enabling Learning Objectives

1. Describe types of floods
2. Describe the evolution of a flood
3. Describe utility hazards in flood environments
4. Describe hazardous material exposure, protection, and decontamination
5. Describe flood search, rescue, and evacuation procedures
6. Describe management of pets and livestock

Discussion Questions

1. What types of floods are common in your jurisdiction?
2. What are common types of hazardous materials that a rescuer may be exposed to?
3. What is your AHJ's plan for dealing with household pets and service animals?

Activities

1. To be determined by instructor.

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Instructor Notes

1. Decontamination procedures are described in FIREScope ICS-SF-SAR 020-1 .

Topic 2-8: Describing Rescue of Vehicle Occupants

Terminal Learning Objective

At the end of this topic, given a scenario involving a vehicle in dynamic water, a student will be able to describe the procedures and hazards associated with rescuing occupants.

Enabling Learning Objectives

1. Describe sizing up the factors and hazards relating to a vehicle in moving water
 - Velocity
 - Depth
 - Width
 - Bottom composition
 - Speed of car when it enters the water
 - Angle of car when it enters the water
 - Number and condition of occupants
 - Describe vehicle stability in dynamic water
2. Describe rescue considerations
 - In-water techniques
 - Shore-based techniques
3. Describe victim management

Discussion Questions

1. How would low- to high-risk rescue techniques apply in water vehicle rescue?
2. How do factors such as flow and bottom composition impact the incident?
3. How can removing victims affect vehicle stability?

Activities

1. The instructor must create an activity simulating a vehicle stranded in different moving water situations, directing students to rescue vehicle occupants.

Instructor Notes

1. None

Topic 2-9: Demonstrating Boat Rigging, Handling, Navigation, and Emergency Procedures

Terminal Learning Objective

At the end of this topic, given a nonmotorized rescue boat and equipment, a student will be able to describe and demonstrate rigging and basic handling of, navigation with, and emergency procedures for nonmotorized rescue boats.

Enabling Learning Objectives

1. Describe different types of nonmotorized rescue boats, including but not limited to:
 - Rafts
 - IRBs
 - Jon boats

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2. Describe the components of a boat
3. Describe boat positions
4. Describe navigation options
5. Describe emergency procedures
 - Crew and victim retrieval
 - Parbuckling
 - Boat wraps
6. Demonstrate how to paddle and maneuver a boat
7. Demonstrate how to right a flipped boat
8. Demonstrate how to unwrap a pinned boat

Discussion Questions

1. What are the pros and cons of each type of rescue boat?

Activities

1. The instructor must create an activity directing students to demonstrate rigging, boat handling, navigation, and emergency procedures.

Instructor Notes

1. The instructor may choose to cover recreational boating accidents.

Topic 2-10: Using Personal Protective Equipment

Terminal Learning Objective

At the end of this topic, given personal protective equipment (PPE) and United States Coast Guard (USCG) standards for personal flotation devices (PFD), a student will be able to identify, don, doff, and maintain PPE for water rescue operations.

Enabling Learning Objectives

1. Describe the types and use of PPE
2. Describe USCG standards for PFD
3. Describe the different types of PFD
4. Describe donning and doffing of PPE
5. Demonstrate donning and doffing of PPE
6. Describe proper care and maintenance of PPE

Discussion Questions

1. What types of PPE are appropriate for different types of water environments?
2. How do you care for and maintain PPE?
3. What is the most important piece of PPE?

Activities

1. The instructor must create an activity directing students to select, don, doff, inspect, and demonstrate maintenance of PPE.
2. The instructor must create an activity directing students to perform a PPE check.

Instructor Notes

1. The instructor should ensure students know how to select the correct PPE for different tasks.

Topic 2-11: Operating Basic Rescue Equipment

Terminal Learning Objective

At the end of this topic, given rescue equipment, a victim, and a dynamic water environment, a student will be able to identify and operate basic equipment used for water rescue operations.

Enabling Learning Objectives

1. Describe the equipment used in water rescue
2. Describe the use and limitations of each type of equipment
3. Demonstrate the use of each piece of equipment
4. Deploy throw bag according to NFPA 1006 Standard for Technical Rescue Personnel Professional Qualifications (2017)
5. Describe safety considerations when using each piece of equipment
6. Describe maintenance and storage of each piece of equipment

Discussion Questions

1. What types of equipment are used in dynamic vs. static water conditions?
2. What are the differences of equipment carried between the different types of resources described by ICS FOG?

Activities

1. The instructor must create an activity directing students to select, inspect, and demonstrate the use and maintenance of water rescue equipment.
2. The instructor must create an activity directing students to perform throw bag drills in accordance with NFPA 1006 Standard for Technical Rescue Personnel Professional Qualifications (2017).

Instructor Notes

1. This topic must be conducted in a dynamic water environment.

Topic 2-12: Performing Dynamic Water Rescue Skills

Terminal Learning Objective

At the end of this topic, given a dynamic water environment, PPE, a victim, and rescue equipment, a student will be able to perform rescue skills.

Enabling Learning Objectives

1. Demonstrate how to swim in dynamic water
2. Describe the techniques used for water rescue incidents
3. Select the proper technique for each rescue situation
4. Describe and demonstrate rescue swimmer techniques
 - Basic swim
 - Ferry angle
 - Strainer
 - Eddy hopping
 - Surfing
5. Describe and demonstrate shallow water crossings
6. Describe and demonstrate use of quick release buckle systems (blowout drill)

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7. Describe and demonstrate tethered swimmer operation
8. Describe and demonstrate board rescues
9. Describe and demonstrate foot and body entrapment rescue techniques

Discussion Questions

1. How do you select a rescue technique based on rescue priorities?

Activities

1. The instructor must create an activity directing students to perform a dynamic water rescue swim.
2. The instructor must create an activity directing students to demonstrate quick release buckle system use, tethered swimmer operations, shallow-water crossings, board rescues, and foot and body entrapment rescue techniques.
3. The instructor must create an activity directing students to navigate a strainer.

Instructor Notes

1. The instructor must ensure students perform all the tasks delineated in the enabling learning objectives.

Topic 2-13: Demonstrating Technical Rope Rescue Skills

Terminal Learning Objective

At the end of this topic, given a dynamic water environment, PPE, a victim, and rescue equipment, a student will be able to describe and perform technical rope rescue skills.

Enabling Learning Objectives

1. Describe the technical rope rescue systems used for dynamic water rescue incidents
 - Line-crossing equipment and techniques
2. Select the proper system for each rescue situation
3. Describe and demonstrate tethered boat techniques
 - Two-point
 - Other techniques
4. Describe and demonstrate the use of tension diagonal for victim retrieval
5. Describe and demonstrate the use of a rescue boat on highline systems

Discussion Questions

1. Under what circumstances would multiple tethered boat techniques be required?

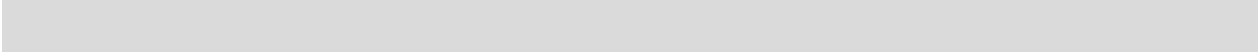
Activities

1. The instructor must create an activity directing students to demonstrate a line crossing.
2. The instructor must create an activity directing students to demonstrate a tension diagonal.
3. The instructor must create an activity directing students to demonstrate boat-tether techniques.
4. The instructor must create an activity directing students to demonstrate a boat on a highline system.

Instructor Notes

1. The instructor must teach at least the two-point tether. If time allows, teach one-point, three-point, and/or four-point.

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- 2. The instructor may choose to have students describe and demonstrate the use of a rescuer on highline systems.
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Time Table

Segment	Lecture Time	Activity Time	Total Unit Time
Unit 1: Introduction			
Topic 1-1: Orientation and Administration			
Lecture	0:30		
Activity 1-1: To be determined by the instructor		0:00	
Unit 1 Totals	0:30	0:00	0:30
Unit 2: River Flood Rescue			
Topic 2-1: Managing a Water Rescue Incident			
Lecture	0:45		
Activity 2-1a: Reviewing an IAP		0:30	
Activity 2-1b: Organizing and Managing an Incident		1:45	
Topic 2-2: Describing Dynamic Hydrology			
Lecture	0:45		
Activity 2-2: Identifying Hydrologic Features		0:30	
Topic 2-3: Evaluating Hazards and Identifying Safe Current Vectors and Safety Zones			
Lecture	0:45		
Activity 2-3: Providing a Safety Briefing		0:30	
Topic 2-4: Managing and Performing a Victim Search			
Lecture	0:30		
Activity 2-4: Searching		3:30	
Topic 2-5: Identifying and Managing a Victim			
Lecture	0:30		
Activity 2-5: Performing In-Water Victim Management		1:30	
Topic 2-6: Describing and Using Multiple Communication Forms			
Lecture	0:30		
Activity 2-6: Using Hand Signals and Whistles		0:15	
Topic 2-7: Describing Floods, Hazards, and Evacuation Procedures			
Lecture	0:40		

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Segment	Lecture Time	Activity Time	Total Unit Time
Activity 2-7: To be determined by the instructor		0:00	
Topic 2-8: Describing Water Vehicle Rescue			
Lecture	0:40		
Activity 2-8: Rescuing Vehicle Occupants		2:00	
Topic 2-9: Demonstrating Boat Rigging, Handling, Navigation, and Emergency Procedures			
Lecture	0:45		
Activity 2-9: Demonstrating Rigging, Handling, Navigation, and Emergency Procedures		1:30	
Topic 2-10: Using Personal Protective Equipment			
Lecture	0:40		
Activity 2-10a: Using PPE		0:15	
Activity 2-10b: Safety Checks		0:15	
Topic 2-11: Operating Basic Rescue Equipment			
Lecture	0:40		
Activity 2-11a: Using Water Rescue Equipment		1:00	
Activity 2-11b: Performing Throw Bag Drills		1:00	
Topic 2-12: Performing Dynamic Water Rescue Skills			
Lecture	0:15		
Activity 2-12a: Performing Dynamic Rescue Swim		1:00	
Activity 2-12b: Demonstrating Dynamic Water Rescue Skills		4:00	
Activity 2-12c: Navigating a Strainer		1:00	
Topic 2-13: Demonstrating Technical Rope Rescue Skills			
Lecture	2:00		
Activity 2-13a: Performing Line Crossing		0:30	
Activity 2-13b: Demonstrating a Tension Diagonal		2:30	

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Segment	Lecture Time	Activity Time	Total Unit Time
Activity 2-13c: Demonstrating Tethering Techniques		1:00	
Activity 2-13d: Demonstrating Highline Systems		5:00	
Unit 2 Totals	9:30	30:00	39:30
Lecture, Activity, and Unit Totals:	10:00	30:00	40:00

Course Totals

Total Lecture Time (LT)	10:00
Total Activity Time (AT)	30:00
Total Course Time	40:00

Acknowledgments

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

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Partners

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.