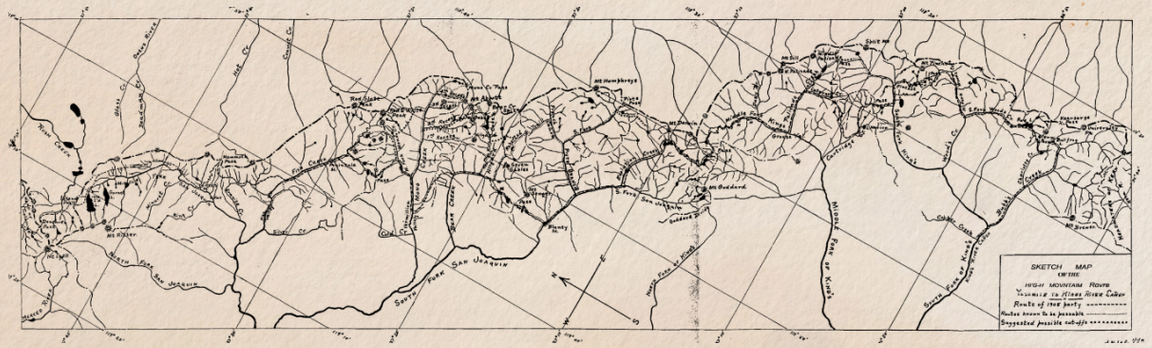

# JMT Wild Journal

## Beyond the Safe Zone

### Risk in the Sierra Nevada Backcountry

Volume 2, Spring 2026




*Hand-drawn map by Joseph LeConte, Jr. on his 1908 thru-hike of the route that became the John Muir Trail.*

# A Historic & Perilous Risk

*Working in the Sierra Nevada along the JMT corridor requires a deep respect for the land itself, and for the realities of operating in such remote landscapes.*

**By Marla Stark**
*President & Chair*

The Sierra Nevada's towering crest of jagged peaks cuts the eastern horizon of California's great Central Valley. As a girl, my father, who was foreman of a large farm and cattle ranch in the agriculturally-rich San Joaquin County, would often point to its white snow-capped outline to emphasize the source of all water for us. I can see how the aptly named Snowy Mountain Range (in Spanish, jagged like a saw) beckoned travelers, including John Muir, as he first made his way on foot in 1868 over Pacheco Pass and the valley floor to Yosemite Valley.

*Members of our 2023 Monitoring Team had to bivouac on the flanks of Mt. Whitney while Hurricane Hillary passed through. They had nearly 6" of rain in one 24 hour period. With JMT Wild's training for this group, they made it through great!*



During the Heroic Age of Exploration in the 1890's while Roald Amundsen and Robert Scott raced to the South Pole, Ernest Shackleton struggled on the Weddell Sea's ice sheets and open waters of the Southern Ocean, and Robert Peary laid claim to the North Pole, intrepid men and women in California explored the remote backcountry of the Sierra Nevada. In its own way, the effort here was nonetheless a perilous journey into remote regions that tested human resolve and resiliency.

*"It took decades for experienced mountaineers, geographical surveyors and hardy souls to reconnoiter and map [what became the JMT]."*

In those days, arriving at the trailheads in Yosemite Valley or Tuolumne Meadows was a multi-day trip by train, stagecoach and pack stock. In the last reaches, advancing over the rocky ground was slow going, a punishment to wagon, coach and animal. Steep, rocky talus passes that were the gateway to the Sierra backcountry exceeded 12,000 feet in elevation, testing both people and horses in the climb and passage.

Theodore Solomons claims to have first conceived of a high Sierra trail in 1884, when he was a teenager on his family farm looking eastward at that range. That trail along the Sierra Nevada's crest running north/south at high elevation is the stuff of one's imagination. It took decades for experienced mountaineers, geographical surveyors and hardy souls to reconnoiter and map. In 1908, Joseph LeConte, Jr. completed the first thru-hike from Yosemite Valley to Kings Canyon, traversing the recently discovered Muir Pass. Located and mapped only the year before by a US Geological Survey expedition, it successfully navigated the seemingly impenetrable Goddard Divide.

*"Despite the challenges of rough geography, extreme weather, and wildfire, the opportunity to steward and restore vital ecosystems and habitats within such remote and protected landscapes is both rare and meaningful."*

While getting to the trailheads today is quick work on paved roads to parking lots, any backcountry traveler must still plan carefully. Everything needed to sustain life, including food, shelter, and clothing, must be packed and carried. Training must be thorough to become physically fit and strong, and to acclimate to the lower oxygen levels of such high elevations. Significant risks of this rugged terrain are encountered in the first miles of trail, and must be anticipated and assumed, with all the safety gear and first aid in hand.



*Joseph LeConte, Jr. and team on top of Glen Pass in Kings Canyon during their 1908 thru-hike.*

These are the regions that the JMT Wilderness Conservancy must navigate and manage to achieve our environmental mission. Working in the Sierra Nevada along the JMT corridor requires a deep respect for the land itself, and for the realities of operating in such remote landscapes. The ruggedness and remoteness shape every aspect of how our team prepares and how restoration work is carried out.

I hope you enjoy reading the articles in this Journal. They were written by JMT Wild's staff about how we have learned to manage the people and projects for effective restoration and safe passage. Despite the challenges of rough geography, extreme weather, and wildfire, the opportunity to steward and restore vital ecosystems and habitats within such remote and protected landscapes is both rare and meaningful. The work completed each season contributes not only to the ecological health of these systems, but also to the long-term preservation of the wild character that defines the central Sierra.

# Perspectives of Remote Landscapes

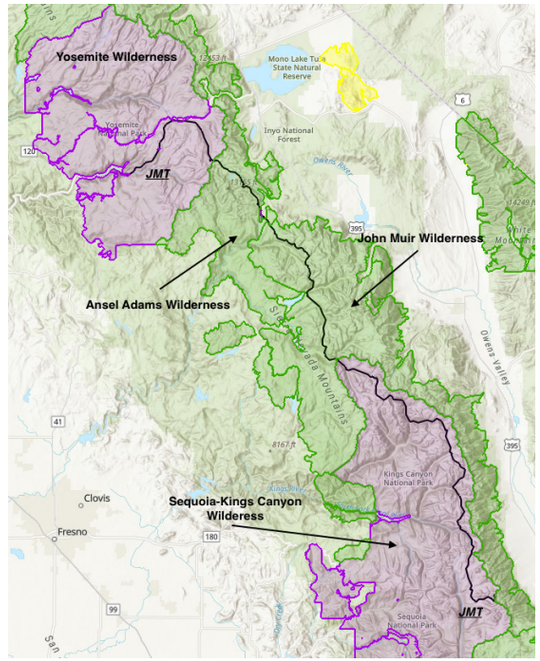
*The protections added through the Wilderness Act ensure that these landscapes remain largely unchanged, but they also require restoration work to be conducted using traditional tools and methods that demand both time and physical effort.*

**By Michael Piatti**
*Project Manager*

For the vast majority of those who travel along the JMT corridor, whether through hiking, day hiking, enjoying one of the increasingly popular multi-day loop trips, or using the trail as an access route to summit a notable peak, the remoteness of the region is one of the defining characteristics that sets it apart from other backcountry experiences. One of the biggest contributors to this sense of remoteness is that approximately 90% of the trail lies within federally designated Wilderness, often referred to as “capital-W” Wilderness. In practical terms for recreation, the Wilderness Act prevents mechanized travel within the boundaries of the four Wilderness areas through which the John Muir Trail passes. Additionally, along the approximately 215 miles of JMT, there are only three locations where a traveler comes within half a mile of a road, all of which occur within the northern quarter of the route.

Considered one of America’s greatest conservation achievements, the Wilderness Act established the National Wilderness Preservation System of 1964, with the goal of preserving landscapes in their natural condition while limiting human impact.






*The four federally designated Wilderness areas of the John Muir Trail.*

The requirements of the Wilderness Act extend far beyond the prohibition of mechanized travel, effectively eliminating the use of any motorized or power-assisted machines or tools. While these protections serve the long-term health of the landscapes they encompass, they can also make any work in remote backcountry settings, in particular our restoration projects, significantly more complex.

All JMT Wild’s restoration projects that are conducted within Wilderness must undergo a process known as a Minimum Requirements Analysis. This thorough procedure ensures that proposed work will not create lasting impacts beyond the intended restoration goals, and that all tools and methods fall within what is permitted under the Act. This is where the non-mechanized requirement becomes particularly relevant. Nearly every aspect of work conducted in Wilderness must rely on traditional means, such as hand tools, and crosscut saws.

*Food stores, camp gear, materials, and tools all must be delivered by pack stock.*

Much of the restoration work we are involved in requires significant physical labor, and strong partnerships with conservation corps to assist with implementation. These projects often require crews of six to eight people deployed for up to 10 weeks at a time, and rely on pack stock to transport tools, camp equipment, and food supplies throughout the field season.

Each summer, JMT Wild deploys more than 25 seasonal staff across this vast landscape to collect key data, restore riparian habitat and meadow ecosystems, and complete historic preservation work. The remote nature of these landscapes, combined with their federal designations, creates a unique set of logistical and safety considerations. When crews of monitoring teams and field stewards enter the backcountry alongside conservation corps partners, it represents the culmination of months of planning designed to ensure that deployments proceed as smoothly, efficiently, and safely as possible.



Pre-season training incorporates lessons specific to the regions where teams will be working during their deployments. These trainings cover a wide range of information, including potential exit routes under different scenarios, the locations of the nearest ranger stations, and available options for evacuation should a situation require it. Even with this preparation, it can be difficult to fully convey the realities of working in such remote environments. Certain sections of trail place crews several days from the nearest trailhead, and even during emergencies, helicopter access may be limited due to weather or geographic constraints. Understanding these realities keeps safety at the forefront of daily decision-making in the field.

*“The remote nature of these landscapes, combined with their federal designations, creates a unique set of logistical and safety considerations.”*

The protections established through the Wilderness Act ensure that these landscapes remain largely unchanged, but they also require restoration work to be conducted using traditional tools and methods that demand both time and physical effort. Implementing projects under these conditions is only possible through extensive coordination between JMT Wild staff, the federal land management agencies, conservation corps partners, and pack stock support teams. Months of planning ultimately translate into crews in the field who must rely on preparation, training, and sound decision-making to safely carry out their work.

# Weather, Altitude, & Hydration

*In this high-altitude environment with frequent, variable weather patterns, preparation and awareness are essential.*

**By Kate Lynch**
*Project Manager*

Our Monitoring Teams begin each day in a beautiful new location along the John Muir Trail. This remote area spans dramatic elevation changes from just over 4,000 feet in Yosemite Valley to the summit of Mount Whitney, the highest point in the continental United States, at 14,505 feet. Along the trail, our teams travel through steep granite basins, meadows and forested valleys, and high alpine passes. While the terrain varies widely, much of the trail sits between roughly 8,000 and 9,000 feet, a truly high elevation environment.

At these elevations, the air is noticeably thinner, making aerobic exertion more difficult. Even the most experienced hikers will notice the difference as they climb to higher altitudes. Oxygen molecules are spread further apart than they are at sea level, meaning that less oxygen reaches the body's tissues with each breath. As elevation increases, the body naturally compensates by increasing respiration and heart rate, making each step along the trail more challenging.

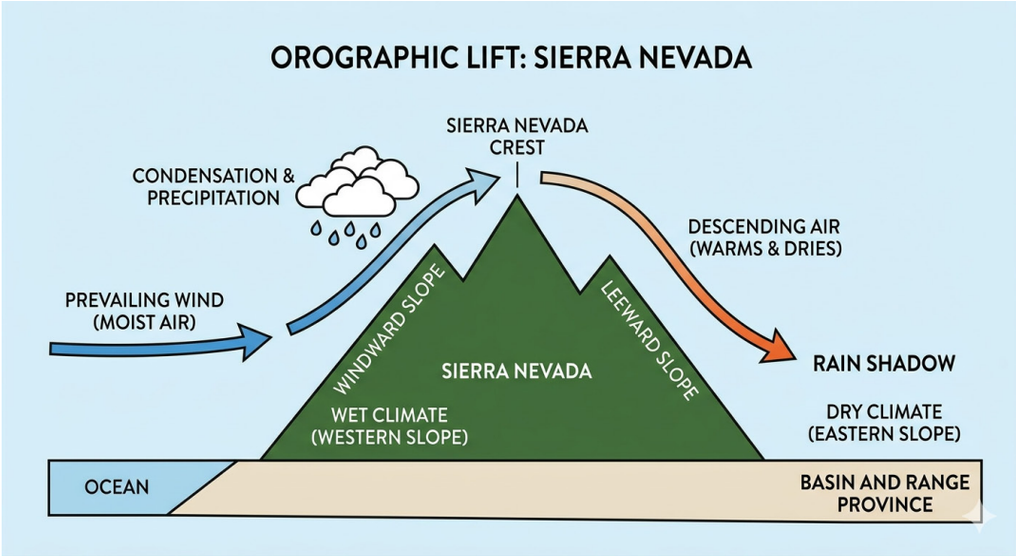
While our bodies adapt to increase oxygen delivery as a necessary physiological response, this also accelerates water loss through breathing and physical exertion. As a result, hydration becomes even more critical for our staff working in the backcountry. Throughout the day, and each evening



*Cumulonimbus clouds, or thunderheads, rapidly form and move quickly in the Sierra Nevada, threatening heavy rains and lightning at close range.*

at camp, it becomes an ingrained part of each team's routine to find a nearby stream or alpine lake to filter water and refill bottles as needed. Though sometimes a bit of a burden, particularly during the long minutes spent squeezing water through the filter, these pauses can also be a wonderful respite, and a welcome moment for team bonding.

The Sierra Nevada is unique as most of the annual precipitation occurs during the wet season from November through April, when Pacific storms bring snow and rain to the range. As moist air masses move eastward from the Pacific Ocean, they are forced upward when they encounter the steep western slopes of the Sierra. This process, known as orographic lifting, causes the air to cool and condense, producing precipitation in the form of rain or snow.




By the time these air masses cross the crest of the mountains, much of their moisture has already been released. As the air descends on the eastern side of the range, it becomes warmer and drier, creating what is known as a rain shadow effect. The effects of this phenomenon are visible across the Sierra, from the lush western slopes to the contrasting desert landscape on the east side. This effect is most pronounced when comparing the average annual precipitation on Mount Whitney (42”) to the floor of Death Valley (less than 2”), just 90 miles to the east.

In the summer, the Sierra Nevada generally experiences more benign weather than its continental counterparts. However, small shifts in weather patterns can bring summer monsoonal activity farther west. Fortunately, summer storms in the Sierra are often short-lived and tend to follow predictable daily patterns. With experience, our teams are able to recognize subtle changes and patterns in the weather throughout the day to prepare for afternoon storms.



*“While the terrain varies widely, much of the John Muir Trail sits between roughly 8,000 and 9,000 feet, a truly high elevation environment.”*

*Clouds condense and converge in the orographic lift at the ridgeline.*

With crews operating in such exposed high alpine environments, weather patterns along the JMT require careful planning and awareness throughout the summer field season. Lightning is often the most significant hazard in exposed alpine environments, particularly near high passes and ridgelines. Dark thunder clouds can begin to build above ridgelines in the early afternoon, a signal that changing weather may be on the way. Backcountry travelers who are unprepared, or fail to be alert or take necessary precautions, have been killed by Sierra lightning strikes.

What can start off as a beautiful clear morning can quickly change in the mountains. Teams may first notice a few seemingly harmless white clouds in the early afternoon. The next time they look up in mid-afternoon, these clouds have doubled in size, growing darker and more intense. Before long, wind speeds pick up, the sky darkens, and eventually heavy precipitation, gusty winds, and thunder and lightning consume the area.

If a team is headed into the backcountry during a period of weather instability, this may mean adjusting work schedules and travel plans, seeking lower ground, and, on occasion, diving into a tent for an afternoon siesta until the storm passes. If a storm comes up suddenly, all of our teams are trained to find safe ground, avoid exposure and tall structures, and assume a crouched position, head down, on the balls of their feet (AKA the “Lightning Crouch”).

Working along the JMT requires a deep respect for the contours of the mountains, peaks and ridges, and how they may effect wind and weather. In this high-altitude environment with frequent, variable weather patterns, preparation and awareness are essential. By ensuring that our teams are well-trained and properly equipped, we help create a safe and effective field environment while operating within one of the most spectacular landscapes in North America.

*With dark thunderheads converging above, it’s good time to look for shelter…*

# Navigating Fire Season

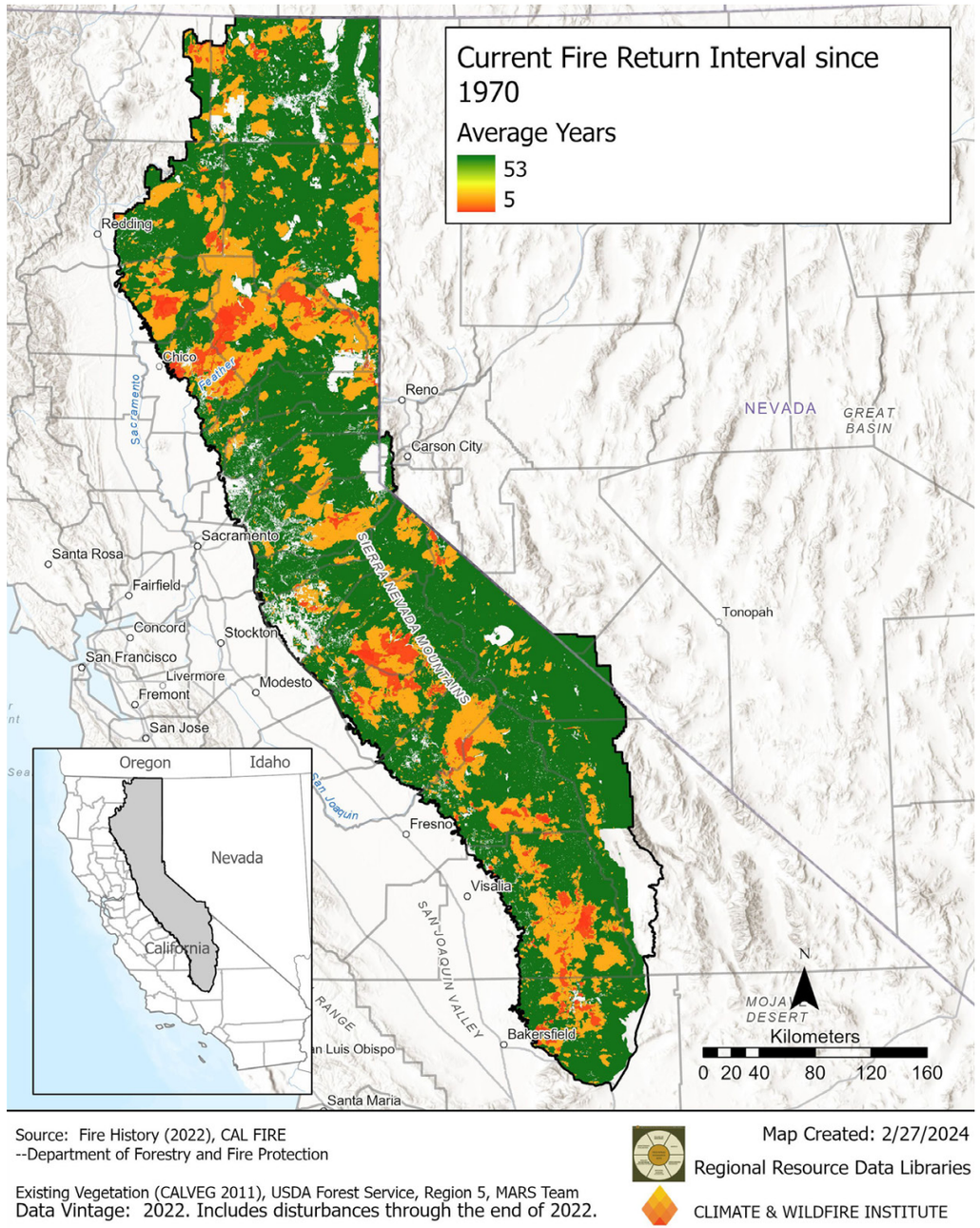
*Flexibility is essential during wildfire season, as conditions can change rapidly, and plans may need to adjust with little notice.*

**By Hayley Reid**
*Project Manager*

For those of us living and working in the western United States, wildfires are an increasingly familiar part of life. Especially prevalent in the forests of the Sierra Nevada, our field teams must prepare for both the barriers to foot traffic presented by wildfire, as well as the dangerous health effects of rapidly rising particulate matter and poisonous gases in the air.

Fire is a natural ecological process in many western landscapes. Historically it has played an important role in shaping forest structure, plant communities, and wildlife habitat. However, in recent decades, wildfires have become more frequent, larger, and much more severe. Climate change, decades of fire suppression, and human land-use patterns have all contributed to these changes.

For much of the 20th century, wildfires were aggressively suppressed across the United States. At the same time, Indigenous burning practices that historically helped keep meadows clear and maintained forest health were largely discontinued. This functionally depleted the natural fire breaks formed by once numerous wet meadow ecosystems. Without periodic low-intensity fires, forests in many areas became denser than their historical structure. Instead of open, park-like forests, many landscapes now contain high fuel loads composed of dense stands of trees, dead wood, and dry vegetation.



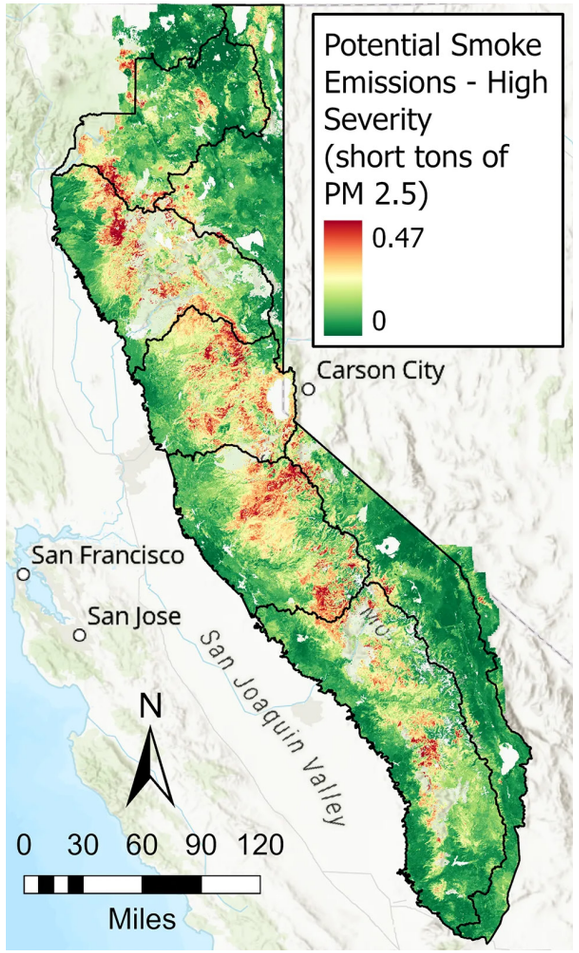
Climate change has further intensified these conditions. Warmer temperatures and prolonged drought reduce the moisture content of vegetation and soils, increasing the flammability of landscapes. Changes in winter precipitation patterns also play an important role. Historically, snowpack in the Sierra Nevada and the wet meadow ecosystems functioned as a natural water reservoir, slowly releasing water throughout the spring and early summer. Today, warming temperatures are leading to earlier snowmelt and, in many years, a reduction in overall snowpack. Earlier melt also leads to longer periods of dry soils and vegetation during the summer months.

These changes contribute to longer and more intense fire seasons. Fires are now starting earlier in the year and burning later into the fall. In addition, periods of high precipitation in preceding years can increase vegetation growth, creating abundant fuels that later dry out and contribute to fire spread.

For those working in the field, wildfire presents several direct and indirect hazards. Fire itself is an obvious danger, but smoke from wildfires can pose serious health risks even when fires are far away.

*"Throughout the season, JMT Wild Staff closely monitor fire activity, weather forecasts, and regional AQI conditions."*

Wildfire smoke is a complex mixture of gases and particulate matter produced by burning vegetation and other materials. The primary pollutant of concern is fine particulate matter known as PM 2.5 (particles that are 2.5 micrometers in diameter or smaller). These particles are extremely small and can travel deep into the lungs and bloodstream.




Exposure to wildfire smoke can irritate the respiratory system and may cause symptoms such as coughing, throat irritation, headaches, fatigue, and difficulty breathing. Smoke exposure has also been linked to cardiovascular effects and eye irritation. Long-term effects of wildfire smoke exposure are still uncertain.

The Air Quality Index (AQI) is an important tool used to communicate health risks associated with air pollution, including wildfire smoke. AQI values are based largely on concentrations of particulate matter in the air and guide how safe it is to be outdoors. As AQI values increase, the potential health risk from smoke exposure also increases.

**Air Quality Index**

| *Air Quality* | *What Should I Do?* |
|---|---|
| **Good** 0–50 | It's a great day to be active outside and a good time to make a plan if worse air quality is in the forecast. |
| **Moderate** 51–100 | Some people are especially sensitive to lower levels of particle pollution and should reduce exposure. For example, limit time outside and avoid strenuous outdoor activity. All sensitive groups should watch for symptoms. |
| **Unhealthy for Sensitive Groups** 101–150 | Sensitive groups should take steps to reduce exposure. Limit time outside, avoid strenuous outdoor activity, and follow tips for cleaner indoor air. Everyone should watch for symptoms as a sign to reduce exposure. |
| **Unhealthy** 151–200 | Everyone should reduce exposure. Limit time outside, avoid strenuous outdoor activity, and follow tips for cleaner indoor air. |
| **Very Unhealthy** 201–300 | Everyone should reduce exposure. Stay inside and filter indoor air to keep it cleaner. Go elsewhere for cleaner air, if needed. |
| **Hazardous** >300 | Everyone should reduce exposure. Stay inside and filter indoor air to keep it cleaner. Go elsewhere for cleaner air, if needed. |



Because our staff spends extended periods working in remote, outdoor landscapes, wildfire awareness and smoke exposure are critical safety considerations. Many of our monitoring crews operate in regions where wildfire activity is common during the field season, and smoke from distant fires can affect air quality even when flames are hundreds of miles away.

At JMT Wild, we take wildfire risk and air quality extremely seriously. Throughout the season, staff closely monitor fire activity, weather forecasts, and regional AQI conditions. If a wildfire occurs near a monitoring team, we assess its proximity and potential risk to crews. Decisions about continuing or suspending field work are made carefully and prioritize the safety of staff above all else.

When smoke is present, but fire does not pose an immediate threat, we rely on established AQI protocols to guide field operations. Monitoring teams carry handheld AQI monitors to track air quality conditions in real time, and KN95 masks are available to reduce smoke exposure when necessary.

Flexibility is essential during wildfire season, as conditions can change rapidly, and plans may need to adjust with little notice. Last season provided a clear example of this reality. Due to risks from the fast approaching Garnet Fire, JMT Wild's Kings Canyon Monitoring Team had to end their final hitch early and quickly evacuate the field.

As wildfire seasons continue to grow longer and more intense, awareness and preparedness are essential. By staying informed, monitoring air quality, and adapting operations when necessary, we can continue our work while protecting the health and safety of our teams in the field.

# The Raw Power of Water

*With such high water levels, hikers that [2023] season faced significant danger in any water crossing.*

**By Moses Castillo**
*GIS Specialist*

In an instant, one misstep can be the difference between life and death during a stream crossing. Across the John Muir Trail, depending on the time of year, hikers can expect to cross a creek, stream, or river at least once per day. The technical difficulty of such crossings differs based on flow, stream bed composition, temperatures, and visibility, which are all subject to the amounts of snowpack from the preceding winter season.

In 2023, California's snowpack reached some of the highest that the Golden State has seen in recorded history. Some Sierra passes had more than 100 feet in snow accumulation. As spring approached, the runoff was early and massive, with high, fast-moving water in every channel. Hikers that entire season faced significant danger in any water crossing, with treacherous snow bridges and heavy run-off from snowmelt still present through August. One engineered suspension bridge with concrete footings was completely blown out. Six people lost their lives in river crossings that year.

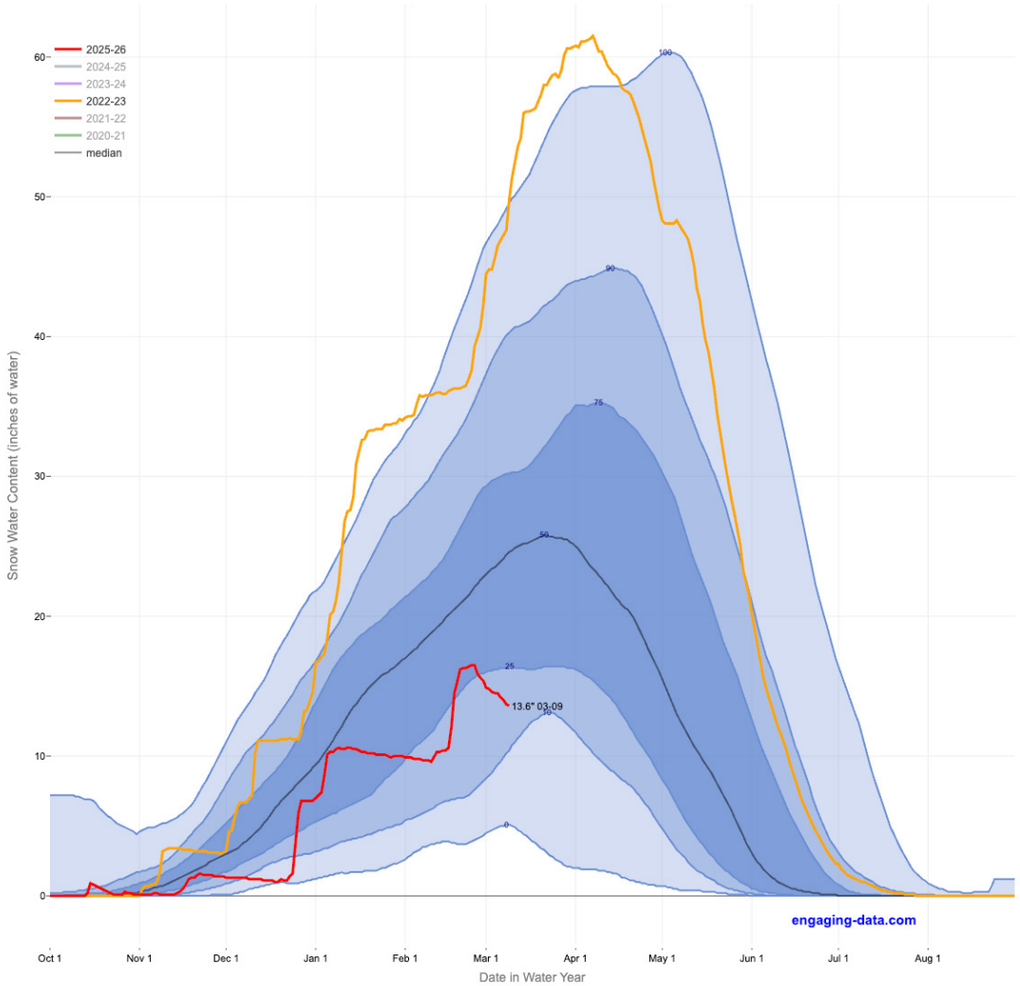
These were the conditions when I embarked on my first field season as one of three interns on the Kings Canyon Monitoring Team. We had attended two weeks of training and orientation, which included techniques for safe water crossings. Our eyes were glimmering with the excitement of being in such a beautifully remote section of the Sierra, animated by the high risks of the waters roaring at historic levels.



*The author, straps unhooked, making a cautious high-water stream crossing.*

**Entire State Snow Water Content**
**vs. Historical (1970–2022) Percentiles**

*2026-03-09 13.6" (55% of historical median, and 54% of April 1 median)*






*The South Fork of the San Joaquin River looked like a rushing torrent of glacial waters in the 2023 season.*

The South Fork of the San Joaquin River originates within Kings Canyon and flows across the western face of the Sierra to reach its confluence with the river's main stem. These waters, as they gain volume and speed, eventually reach San Francisco Bay. Complicating our efforts, many historic tributaries were reactivated that summer to rushing torrents, because of the continuous and sustained snowmelt. Our team was always on high alert when crossing stream channels.

Key considerations when approaching a stream crossing include: a) finding the shallowest point to cross, b) unbuckling all straps on backpacks, hiking poles, etc. before crossing, c) facing partially upstream so that if you fall, you are pushed onto your back by the flow of water, decreasing your chances of drowning, d) avoiding rock hopping since rocks might be slippery or unstable, and e) wearing shoes or water crossing sandals to provide additional grip and to protect your feet from sharp rocks in the stream bed.

*"In an instant, one misstep can be the difference between life and death during a stream crossing."*

Even with all of our pre-season preparation, the risks of stream crossing were prevalent the entirety of the summer. In 2023, these risks were further exacerbated by the lingering rainfall of Hurricane Hilary, which brought heavy rainfall and flash floods even as its force decreased to a tropical storm. Luckily over the course of the season we only experienced one incident while crossing a stream, the consequences of which were mitigated by the training and skills that we were taught in JMT Wild's orientation and training.

Expeditions into the backcountry always carry the inherent risk of accidents and weather-related uncertainties. The best way to avoid accidents is to prepare yourself and to be knowledgeable about the environments that you are entering. At JMT Wild, this training is an essential part of our preparations to enter the backcountry.



*Snow bridges, hard to see and quick to collapse, should be approached with extreme caution.*

# One Missed Step: Injury in the Backcountry

*One missed step can result in serious injury, and relatively minor injuries or conditions can become life-threatening, if not quickly addressed.*

**By Logan Egan**
*Senior Landscape Architect*

When I think about why I love working in the JMT backcountry, I envision the rugged beauty and wildness of the Sierra Nevada, and of my experience of self-reliance, and physical challenge. It pulls me outside of my habitual world of ease, predictability, and perceived safety. Every time I return from the backcountry, I see life from a different and richer perspective.

Of course, the flip side is the potential risk these activities carry. One missed step can result in serious injury, and relatively minor injuries or conditions can become life-threatening if not quickly addressed. This is true not only for our staff and field team, but for all those who venture into these rugged landscapes. It is part of our backcountry ethic to lend a hand in support of federal rangers or SAR personnel whenever we encounter others in an emergency. As an organization that works deep into the backcountry, we take very seriously our obligation to prepare and keep our staff safe and support others in distress, and while achieving our conservation goals for this special place.



*A rocky portion of the JMT descending south from Muir Pass. A simple slip under the weight of a heavy backpack can result in a serious ankle sprain, torn ligament, or cracked knee cap.*

The National Outdoor Leadership School (NOLS) was founded in Sinks Canyon, Wyoming in 1965, and plays an important role in our training and staff skillsets. Today NOLS has become a global nonprofit wilderness education and leadership development organization that has developed many industry-standard curricula, courses, and certifications. We, at JMT Wild, depend on several such certifications and trainings to improve our risk management plan, enable our staff to serve others in emergencies, and keep our field personnel safe.

This year our senior JMT Wild project staff attended the NOLS Risk Management Training to assist with the strategic assessment of JMT Wild's overall risk management plan. With this information in hand, we subsequently reviewed all of our processes and protocols from the top down, and tested emergency response. This training also informed our broader effort to update our Field Safety Handbook, and incorporate risk management across all of our operations.

That said, no matter how carefully we design safety plans and protocols, we must also ensure that our personnel on the ground get the emergency and medical training needed for the backcountry. That takes place through in-office instruction, practice in the field, and mandatory NOLS certifications.

This combination of training and certifications is perfectly suited for work like ours, where medical supplies are limited, support resources are remote or absent, improvised approaches to standard front country procedures may be necessary, and physician-managed hospital care may be delayed by hours or days. In these conditions, JMT Wild's training provides a powerful system for triaging medical emergencies, for stabilizing an injured or ill patient, and for making timely decisions on how best to proceed.

Every member of our seasonal field staff is required to complete the certifications for either NOLS Wilderness First Aid (WFA) or Wilderness First Responder (WFR), both of which are standards within the wilderness medicine community. WFA certification is a 16-hour course that covers the NOLS patient assessment system for the most common injuries that can arise in the backcountry, as well as environmental challenges of altitude, dehydration, and excessive heat or cold.

Our full time Project Managers, our Field Stewards, and at least one member of each Monitoring Team are required to maintain the WFR certification, which is more comprehensive, with courses lasting 9–10 days covering topics in much greater breadth and depth. Graduates of a WFR course can provide care in remote locations for extended periods of time, and with limited resources and intermittent communications. They are ready to make decisions about care, the urgency of evacuation, or a need for additional resources.

We train our field teams to start each day with a basic check-in for any issues of physical or mental health. That is followed by a review of weather and fire conditions, and how to be alert to any changes. Check lists for gear and first aid kits are completed. The next several days' routes are reviewed, highlighting terrain where risks may appear. We encourage everyone to watch the horizon and clouds until it becomes second nature.

Still, all the high-tech gear and advanced training is only as good as an individual's common sense and clear thinking around human limits and the risks of rugged terrain. Knowing limits and being alert to your immediate surroundings is what keeps people out of trouble in the first place. Our in-office training and field orientation are designed to further engage this kind of common sense.

### Skills associated with wilderness medicine include:

- Patient assessment and management in remote settings
- CPR and basic life support
- Wound care and infection management
- Fracture and dislocation stabilization
- Management of hypothermia, heat-related illnesses, and altitude sickness
- Improvisation with limited medical supplies
- Decision-making for evacuation and prolonged patient care
- Environment hazard management (e.g., lightning, water hazards, wildlife encounters)

# Search and Rescue (SAR) & Evacuation

*Our duty is to prepare our field teams with the training to address worst-case scenarios.*

**By Spencer Collom**
*Program Director*

If I were pressed to distill the 2025 Field Season into one succinct lesson, it would be this: there is never a substitute for real experience. I realize this may come across as obvious or too absolute, or hackneyed, but I continue to find our work bumps up against this simple fact time and again. And it's inescapable.

As people hike, climb, ski, and ice skate through the year in these wondrous mountains, most recreationists in the High Sierra have a reasonable understanding of what Wilderness Search and Rescue (SAR) means. SAR is an organized group of people who are dedicated to lifesaving efforts to locate and assist those who are in distress or imminent danger, or are lost.

Because the High Sierra is almost exclusively Wilderness, without cell service, contact with SAR is limited to satellite-enabled mobile devices such as the Garmin inReach. The SOS signal should only be initiated in the context of a genuine emergency scenario. Rescue options and resources are very limited, and there's never a guarantee that a helicopter (the only 'fast' evacuation option) will be immediately available. SAR personnel who must hike the distance (the slower option) may take many hours, or even days, to reach a given backcountry location.

*Search and Rescue helicopter. All photos courtesy of Mono County SAR*

As a nonprofit organization working in the High Sierra region, we know these SAR principles to an even greater extent, and have developed our field policy to reflect that understanding. The most significant policy ensures all of our project staff have either a Wilderness First Aid (WFA) or Wilderness First Responder (WFR) training before they enter the backcountry—meaning they can, at minimum, make smart field decisions in times of emergency. With a WFR, they can even take the role of a "first responder" in the event they encounter people who are injured or ill on the trail. Even before the events of 2025, these trainings have proven their worth.

Over the years, our field teams have experienced lower back and ankle injuries, allergic reactions, ligament tears, and mental health episodes. I, myself, had to evacuate the field in 2024 with a consultant who had developed an abdominal hernia. With these two trainings, there is structure and procedure in place to make sound judgments when responding to these difficult circumstances.

While injuries like strained ligaments, sprained ankles, and surface cuts are routinely managed, 2025 was the first year that JMT Wild experienced a genuine SOS scenario. The circumstances added a layer of complexity and urgency that's impossible to simulate in training.

Two of our Monitoring Teams met in the Pine Creek drainage to assess the riparian terrain. As everyone was heading to their tents for the night, one member rose to their feet too quickly, and fainted—most likely a combination of altitude, fatigue, and dehydration. In falling, they hit their head on a granite rock and were rendered unconscious for a prolonged period.

Suddenly, and entirely unexpectedly, two Monitoring Teams were part of a fairly grave emergency, late at night, at high elevation, in remote and rugged terrain. Thanks to training and preparation, our response was immediate.

First step: moments after the fallen team member was assessed, at roughly 9 PM, the Monitoring Team activated their Garmin inReach SOS function. This alerted the Mono County Sheriff's department (the dispatch location for SAR), as well as my phone, and the entire Project Team. The SOS call also went to our President, who alerted leadership. Within minutes, we were all aware, in communication, and distributing responsibility.

Next step: our staff confirmed a successful line of communication between Mono County SAR dispatch and the Monitoring Teams in the field. SAR took the lead, as their dispatch determined the



*Mono County SAR operations unfold in challenging terrain, and sometimes in the darkness.*

severity of the situation, provided guidance to stabilize the injured person, and determined how and when to evacuate. They communicated with the Monitoring Team leads, and those with similarly advanced medical training in the group.

Next step: once the situation stabilized, I contacted the Monitoring Team member's emergency contacts early in the morning hours, to notify them of the situation. Our Project Managers and I continued communications with the Monitoring Teams, and the injured individual's emergency contacts throughout the night and into the next morning.

The final result: Mono Country SAR determined that, with the injured person stable and closely monitored, the SAR helicopter was not needed and self-evacuation should be considered in the morning. High elevation night landings are incredibly dangerous and rare, so this was not unexpected given the hour. The Monitoring Teams showed tremendous courage responding to the situation, taking shifts to constantly observe the injured member throughout the night.

In the morning, the team felt comfortable to self-evacuate, and slowly hiked out the 10 miles of trail to exit the backcountry. A member of the JMT Wild staff deployed from the trailhead to meet them and facilitate their exit. The group was also joined on the exit trail by one of the emergency contacts, who himself is a capable outdoorsman with Wilderness EMT training.

*"[JMT Wild] staff have either a Wilderness First Aid or Wilderness First Responder training before they enter the backcountry."*

In the end, the Monitoring Team member made a full recovery, thanks to the field team's hands-on response, and the behind-the-scenes support of JMT Wild's leadership. When I state the progression this way, it seems so clean and methodical. But in the moment, it felt raw, and as if time had stopped.

This season, we're using this as an opportunity to inform our overall safety and emergency training within the organization. While some things may be solvable or avoidable, it is our duty to prepare our field teams with the training to address worst-case scenarios.

*There is no "easy way" to exit the backcountry with an injury.*

# The Tetris Game of Packing

*I check carefully to make sure everything is in working order: did my tent rainfly take on any tears during my last trip? Are the batteries in my headlamp running low? Do I have enough calories in my food plan?*

**By Riley Shaper**
*Project Team Coordinator*

On any backcountry trip, personal preparation is an essential component in ensuring safety, comfort, and productivity. Having worked as an intern on a Monitoring Team, a regional Field Coordinator, and now full-time member of the project staff, I've become very familiar with JMT Wild's seasonal preparation and day-before-a-hitch routine. It all starts with fitness and strength training, which I have long since included in my daily routine.

To provide context, our Monitoring Teams are composed of a seasoned team lead and three undergraduate interns with a focus on environmental studies who perform as field technicians. They form a four-person cohort who will work together for the duration of the season—eight weeks. Then there are two Field Coordinators, one for each longitudinal half of the Sierra Nevada, the east and west sides. Field Coordinators handle field logistics, resupply management, repairs and gear issues, and are a key lifeline for confidence in the field. JMT Wild's full-time Project Managers organize everything: the project work, our eight-day out / six-day back field "hitches" and trail routes, data requirements and management, technical gear and computers, seasonal housing, collective food ordering, and team assignments.



For me, getting ready to deploy for a hitch looks something like this:

The first thing I do is locate all of my electronics coming into the field. I take my iPad, Garmin inReach, portable chargers, Kindle, camera, and anything else with a battery, and start the charging process. For some items, this can take all day. This is also the time to download books, music, or in my case, episodes of *Riverdale*. All group gear, such as solar panels and light weight battery packs, are also made ready.

Next, I start thinking about food. I usually begin with a trip to the grocery store to pick up any fresh foods that I'd like to take, usually a block of cheese, a stick of salami, and a package of tortillas. Freeze-dried meals can get old quickly, so if I have time, I'll stop at a fast-food restaurant for extra sauce packets to bring into the field with me. After returning, I pick out my breakfasts, lunches, dinners, as well as snacks, treats, drink mixes, spices, and sauces. I lay out my food day by day so I can count the total number of calories I'll be getting.

*"Every bit of space and ounce of weight counts in the Tetris game of packing."*

I need to squeeze eight days' worth of meals, snacks, and toiletries into an 11.5-liter bear canister. Once I'm confident in my food selection, I repackage everything. Every bit of space and ounce of weight counts in the Tetris game of bear can-packing, and freeze-dried meal bags are typically very bulky, so every meal gets repackaged into a Ziploc. I place small candies like Tootsie Rolls in any empty corners. Even if I don't want them, sharing candy is my favorite way to make friends on the trail.

*Prepping eight-days of fuel, every calorie counts.*

By early afternoon, it's time to meet with the team to go over our game plan for the hitch. While work assignments are shared by Project Managers, each Monitoring Team Lead determines how best to get the work done within the eight days planned in the field. The first step is usually to download the maps of the region we're working in, identify routes we'll be taking and the projects that are underway, and think about potential campsite locations. Then we discuss how to divvy up the work, review the surveys we'll be using, and ensure we have the most up-to-date versions downloaded. This is also our time to talk about weather concerns, or potential meetups in the field with work crews or federal partners.

Before moving on to packing my personal belongings, group gear has to be checked and distributed. The most important piece of group gear is the extensive communal first aid kit.



It's essential to go through each item and ensure that everything has been restocked from the previous hitch. Items like shared communal water bladders, solar panels, and monitoring equipment such as flags are distributed to different team members.

*"By the time we have all group and personal packing done, each person's pack weighs 45–55 pounds with all we need to survive beyond the safe zone.*

Finally, it's time to pack personal gear and belongings. I start by laying out everything I plan to bring: my tent, hiking clothes, layers for warmth and rain, undergarments, camp shoes, sleep and cooking systems, a headlamp, pocket knife, repair and poop kits, sun protection, water bottles and a water filter, a full fuel can, any group gear I'm carrying, all of my fully-charged electronics, a bear canister loaded with food and toiletries, and my stuffed alligator, Barty. I check carefully to make sure everything is in working order: did my tent rainfly take on any tears during my last trip? Are the batteries in my headlamp running low? Did I leave any snacks in jacket pockets during my time off that could attract bears? Once I'm confident I have everything I'll need, I load it all into my backpack.

With my gear squared away, it's time for a big dinner, one last hot shower, and a final catch-up with friends and family before meeting the team and heading out to the trailhead. By the time we have all group and personal packing done, each person's pack weighs 45–55 pounds with all we need to survive beyond the safe zone. By the end of the hitch, we have eaten about 12–14 pounds of food and have a lightness in our steps as we head home.

# How We Train & Prepare

*Preparing a team for a full field season in the backcountry is no easy feat, and it takes dedication and active participation of everyone involved.*

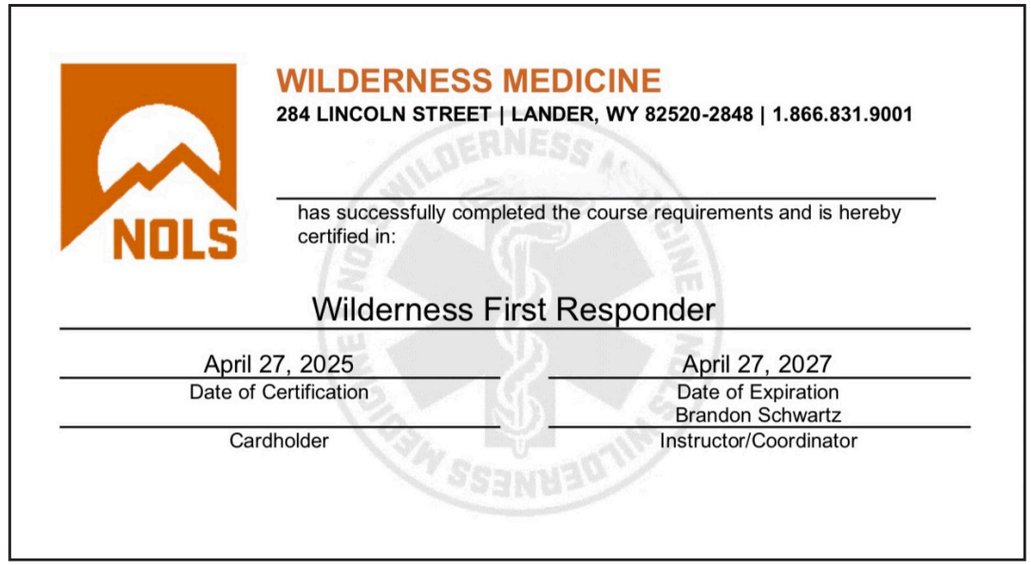
**By Marla Stark, Hayley Reid, & Kate Lynch**

To prepare for risks in the Sierra Nevada backcountry, JMT Wild provides training in three areas:

1. Medical and emergency certifications for its project leadership.
2. Personal medical and emergency training for seasonal employees.
3. Field training and orientation for all field staff with a mix of in-office instruction and backcountry field exercises.

This training extends organization-wide. Each person in JMT Wild's leadership who supervises people in the field is ready to manage risk, emergency, evacuation, sickness, and injury. Similarly, each member of our seasonal field personnel is required to complete a NOLS Wilderness First Aid (WFA) certification. In a mix of classroom lectures and realistic outdoor scenarios, this three-day course teaches the methodology for evaluating the sick or injured. It considers environmental injuries for hypo- or hyper-thermia, lightning strikes, and altitude sickness. Trauma care is reviewed for wound management, spine and head injuries, shock, and fractures. And finally, evacuation planning is considered in the context of decision-making on how to move a patient within the constraints of location, time of day, and weather.





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has successfully completed the course requirements and is hereby certified in:

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| April 27, 2025 | April 27, 2027 |
|---|---|
| Date of Certification | Date of Expiration |
| | Brandon Schwartz |
| Cardholder | Instructor/Coordinator |

Further, before our teams deploy in early July, JMT Wild organizes a mandatory two-week training in Truckee for all seasonal staff. During this time, we review logistics, monitoring skills, backpacking techniques, and our organization's safety practices.

Orientation begins on arrival day, when everyone meets. A good deal of time is spent on icebreakers, setting the tone for the weeks ahead. Over the course of the training, team members are immersed together, learning our rigorous survey methods, technical skills, and medical and safety protocols. By working closely together, they are building relationships that are vital for success in the backcountry.

After these initial introductions and team-building exercises, we move into the meat and potatoes of the training. We review all of our survey protocols, and spend time in field-based scenarios, practicing data collection skills with multiple repetitions.


The backpacking our teams undertake is demanding, and it requires that every member is fully prepared for eight consecutive days in the field. To ensure this, we cover navigation and Garmin systems, backpacking etiquette, and Leave No Trace principles. We demonstrate how to properly pack a backpack, set up a tent and campsite, and manage environmental conditions and weather. Each person also undergoes a gear check before heading out into the field.



Lastly, though perhaps most importantly, we dedicate significant time to safety. We review all organizational safety protocols, including swimming, water crossings, lightning, and air quality. In preparation for worst-case scenarios, we also go over emergency procedures in detail, repeatedly reviewing evacuation routes and available resources for each region.

*“Each person in JMT Wild’s leadership who supervises people in the field is ready to manage risk, emergency, evacuation, sickness, and injury.”*

Our Monitoring Team leads participate in a separate training prior to the start of the season. This includes risk management, leadership development, and psychological first aid, ensuring they are fully prepared to lead crews through a demanding season in the backcountry.

Preparing a team for a full field season in the backcountry is no easy feat, and it takes dedication and active participation of everyone involved. By the time that training is wrapped up, everyone leaves with a bundle of new knowledge, and 26 new friends.

*(Left) Logan Egan, Sr. Landscape Architect (Center) Marla Stark, President & Chair of the Board (Right) Michael Piatti, Project Manager. Summer 2025*

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## our Mission

Working to restore the watersheds, wilderness, and wildlife in the high Sierra Nevada following the John Muir Trail (est. 1915) for all life in California.

## &

## Vision

To advance enduring alpine & forest stewardship along John Muir's "Range of Light"

# JMT

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