



# EASTERN SIERRA AVALANCHE CENTER 2021-2022 SEASON REPORT



Avalanche debris in the Paranoids on Mammoth Mountain from an avalanche that ran during control work December 26th. Read more on page 14.

The mission of the **Eastern Sierra Avalanche Center** is to inform and educate the public on avalanche conditions in the backcountry of the Eastern Sierra Nevada of California.



# 2021–2022 ESAC SEASON OPERATIONS



Trish Matheny riding in The Negatives near June Lake. *Photo Steve Mace*

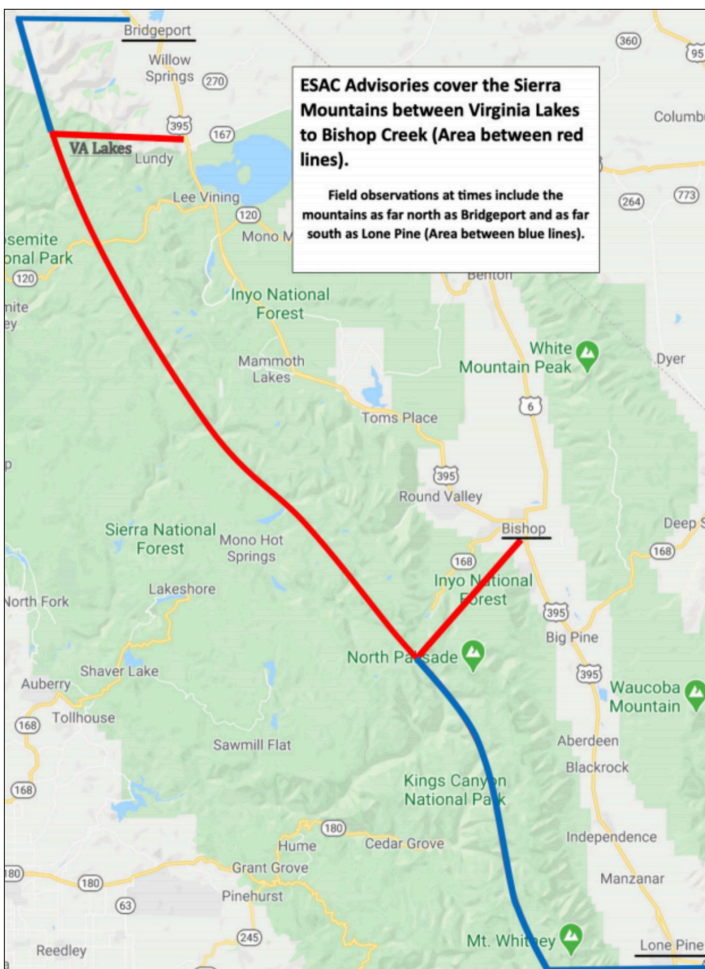
## ESAC OPERATIONS

For 10 years from 2005 to 2015 ESAC operated as a cooperative public/private partnership between the non-profit organization Friends of the Eastern Sierra Avalanche Center (FoESAC) and the Inyo National Forest. This type of partnership is the most common avalanche center model throughout the western United States. In 2015, due to budgetary and bureaucratic restraints, Friends of the Eastern Sierra Avalanche Center made the strategic decision to separate itself from the Forest Service. From this point on ESAC has operated as an independent non-profit avalanche forecasting center led by a 9-member Board of Directors. Through their tireless efforts ESAC has grown immensely over the years. Recent milestones include increased staffing, expanded geographic coverage, web enhancements, expansion of social media presence, and constant adaptations to changing community needs. For the 2021–2022 season ESAC continued to employ three paid forecasters and two administrative staff and for the first time hired two paid observers.



## FORECAST REGION

The Eastern Sierra Avalanche Center covers a 70 mile stretch of the eastern Sierra Nevada from Virginia Lakes in the north, to the mountains outside of Bishop in the south. This large forecast zone is divided by watersheds into ten distinct regions that make up over 1,000 square miles of skiable terrain. While ESAC's advisories do not officially extend beyond these boundaries, observations often get shared on the ESAC website from as far south as Whitney and as far north as Bridgeport. In future seasons there may be a slight change to the northern reaches of this forecast zone, as the Bridgeport Avalanche Center (BAC) has aspirations to grow their zone of coverage from only covering the Bridgeport Winter Recreation Area, to include the rest of the Humboldt-Toiyabe National Forest. This expansion would include the Bridgeport/Twin Lakes area as well as the VA Lakes area. It is a unique situation to have two forecast centers immediately adjacent to one another. ESAC will continue to cooperate with the BAC to ensure good coverage of this zone which is especially popular during the early and late season when road access is open.



## THE PEOPLE OF ESAC

### ESAC BOARD OF DIRECTORS

The Board of Directors is composed of dedicated volunteers from the public and private sectors that share a common passion for promoting safe backcountry travel through the Eastern Sierra. Each board member brings unique expertise and perspective to the table while working to secure funding, plan events, manage operations, and hire and oversee the paid staff.

**Nate Greenberg**—President  
**Forrest Cross**—Vice President  
**Ann Logan**—Secretary  
**Neil Satterfield**—Treasurer  
**McKenzie Long**—Member  
**Michelle Mather**—Member  
**Allan Pietrasanta**—Member  
**Howie Schwartz**—Member  
**Gabe Taylor**—Member

### ESAC SUPPORT STAFF

ESAC employs two part-time support staff. These positions included an Education and Outreach Coordinator and an Administrative Coordinator.



**Rachel Drattler**—Administrative Coordinator  
Rachel spent her early years in the Northeast, until she moved to California after graduating college to pursue her passion for climbing. With a degree in Human Ecology, Rachel has dabbled in numerous industries, traveled extensively throughout the U.S. and abroad in pursuit of remote climbing and skiing adventures. After years of instructing wilderness expeditions for Outward Bound California and Boulder Outdoor Survival School, Rachel has settled into the Eastern Sierra where she now crunches numbers, sends lots of emails, drinks coffee, and calls June Lake “home”.



**Michael Phillips**—Education and Outreach Coordinator  
Mike Phillips is the Education Coordinator for the Eastern Sierra Avalanche Center. Mike grew up skiing and snowboarding on icy ski area slopes in New England and far prefers the softer snow and bigger mountains of the West. He has worked for the Mammoth Mountain Ski Patrol since 2010 and is a lead member of the patrol's Weather and Avalanche Safety Program. Mike has also taught AIARE avalanche courses in the Mammoth area since 2016.

## THE FORECASTING STAFF

ESAC employs three full-time professional avalanche forecasters to conduct the daily operations of the center. The primary objective of the forecaster staff is to publish effective and accurate daily avalanche advisories through the ESAC website. This is a multifaceted job requiring the forecasting staff to collect regular avalanche, snowpack, and weather observations, monitor weather & climate data, and distill field observations from professional and public observers. The forecasters also spearhead regular education events in the Mammoth, Bishop, and June Lake communities throughout the winter season. In addition the forecasters work to develop and maintain relationships throughout the backcountry and avalanche community including with the Bridgeport Avalanche Center, Mammoth Mountain and June Lake Ski Patrols, Mono and Inyo county Search and Rescue, Local Backcountry guide services, and CalTrans road crews.

The ESAC family would like to say farewell and to offer our immense gratitude to both Josh Feinberg and Chris Engelhardt for their many years of service to ESAC.



**Josh Feinberg—Lead Forecaster**

Josh has worked at ESAC for the last 9 years. Originally hired as a forecaster, Josh was promoted to the role of Lead Forecaster in 2018. Josh has a deep connection to the eastern Sierra and to our community. Josh has an intimate knowledge of the eastern Sierra and a feel for the Sierra snowpack honed over years of working as a ski patroller at Mammoth Mountain and skiing countless eastside classics. During his tenure Josh showed sincere dedication to information sharing and to promoting avalanche safety in the eastern Sierra. In his role as the Lead Forecaster, Josh oversaw a period of immense growth in the operations of ESAC. Under his leadership, ESAC began producing daily avalanche advisories, becoming a type 1 avalanche center. Josh also spearheaded our current observer program and has worked tirelessly to expand our reach by fostering community & professional partnerships and promoting outreach through social media & community events.

Thanks Josh!



**Chris Engelhardt—Forecaster**

Chris returned to the eastern Sierra from southwestern Colorado joining the ESAC team as an avalanche forecaster beginning with the 2018–19 season. During his four seasons at ESAC, Chris strove to increase the professionalism of the field staff and always went the extra mile to gather information, reduce uncertainty, and produce a more comprehensive product. Chris knew the importance of communicating information in a clear and concise way and always emphasized the big picture while avoiding getting bogged down in nuance. Chris has a love for the Range of Light that is palpable and a passion for skiing that is unrivaled. We have no doubt that wherever life takes Chris, he will get there on a pair of skis. Thanks Chris!

Josh and Chris both brought expertise, passion, and dedication to avalanche forecasting in the Eastern Sierra and to ESAC, and they will be missed. We wish them the very best in their future endeavors.



**Steve Mace—Forecaster**

Steve took over in the role of acting Lead Forecaster in February after Josh's departure and will be returning to ESAC next season. Steve grew up in Golden, Colorado where he learned to ski at quite a young age. He began to venture outside the gates in his mid-teens and never looked back. While attending college in Durango, he continued to push his skills and knowledge, earning his turns in the San Juan Mountains. He has skied across the globe from Japan to the Himalaya, where he helped start a ski school in Gulmarg, Kashmir. Before joining ESAC In 2018, Steve worked as a ski guide in the Wallowa Mountains of eastern Oregon as well as a member of the Snow Safety department at Mt. Hood Meadows.

**Mike Phillips—Forecaster**

We would like to offer our sincere gratitude to Mike Phillips who stepped up in a huge way this season. In addition to his work as our education and outreach coordinator as well as his full time employment with Mammoth Mountain Ski Patrol, Mike joined the forecasting team in a part time capacity in February. Mike was integral in continued operations of the ESAC field team for the later part of the season and without him it would have been impossible to maintain 7 day a week presence throughout the entirety of the 2021–2022 season. Thank you, Mike!

## PROFESSIONAL OBSERVERS

One of the major challenges to the forecasting team is the large and diverse operating area of the eastern Sierra. With only three forecasters it can be difficult to maintain a consistent presence throughout our sizable forecast area. For the first time in our operating history ESAC was able to hire two paid observers for the 2021–2022 season. These part time employees were incredibly helpful to the forecasting team by maintaining a consistent field presence and contributing professional level observations through the ESAC website.



**Brooke Maushund—Pro Observer**

Needing a break from off-grid solar energy work abroad, Brooke moved to Yosemite “just for the summer” to become a big wall climber four years ago and never left. Building on a love of snow grown through years of ski team and backcountry trips in college, she discovered a route to make her passion her profession through working for the National Park Service on snow and meteorological stations in Tuolumne Meadows. Now a rookie on Mammoth Mountain's Ski Patrol and slowly starting to edge her way into the guiding world, she has her eyes set on a future in the avalanche profession and is loving



building experience with the ESAC team. She still spends her summers in Yosemite, now working on Yosemite Valley’s Search and Rescue team.



**Jonathan Tuttle—Pro Observer**

Jonathan was born and raised in Wisconsin and first ventured to the eastern sierra in winter of 2014–2015 to work for Mammoth Mountain Ski Patrol. The steep mountains and low population density has kept him returning to the area since. Jonathan has worked for Mammoth Mountain Ski Patrol for the past 8 seasons and can typically be found in the backcountry on his days off. During the summer seasons Jonathan has worked as a Hydrologic Technician for the USFS in Idaho and Utah and as the lead guide for a heli glacier guiding company in Juneau, Alaska. Jonathan, his wife and dog reside in Mammoth lakes.

**THE ESAC WEBSITE**

The ESAC website saw a major upgrade for the 2021–2022 season. Countless hours were invested in the construction of this new website during the summer of 2021, and all told this new platform provides a much cleaner and more intuitive user experience. The launch of this new platform was not without challenges and there are several areas where small updates will make an even more positive and useful resource for the public.

**ADVISORIES**

The Center’s website ([www.esavalanche.org](http://www.esavalanche.org)) is the primary vehicle for disseminating avalanche advisories. These advisories are composed of a map showing the forecast area color-coded with the day’s avalanche hazard rating, the bottom line, a detailed avalanche problem section that includes the likelihood and expected size of certain kinds of avalanches along with travel advice, the weather forecast, an in-depth discussion, and links to recent field observations.

The 2021–2022 season kicked off a little earlier than normal with the wettest October on record. A series of atmospheric river events brought periods of heavy rain and mountain snow showers adding up to 1–3 feet of snow along the Sierra crest and 4- 8” of snow water equivalent throughout the range. An initial snowpack summary was published on October 22nd and weekly Snowpack Summaries were published through the first week of December. Our weekly snowpack summaries covered multiple-day periods and danger ratings were not assigned, in accordance with National Avalanche Center guidelines. The first daily advisory was issued on December 9th and continued until April 11th when the center completed its operations for the season. In total, **123 daily avalanche advisories were issued** with the following danger ratings: 9 days of High, 4 days of Considerable, 35 days of Moderate and 75 days of Low. In addition to these daily advisories, **7 early season snowpack summaries were issued** that covered multiple day periods that began on Oct 22nd.

**OTHER FEATURES OF THE WEBSITE**

**OBSERVATION PAGE**

The Observation page is one of the most valuable components of the website. This is where forecasters and members of the public can share point specific snowpack, weather, and avalanche observations. With only three paid forecasters, observations from others play a critical role in developing high-quality avalanche advisories for such a large and variable forecast area. These observations are also visible to the public and help the backcountry community key into specific problems and conditions that may exist in different regions.

Observations

We record observed avalanches as quickly as possible, but **DO NOT** assume a lack of reported avalanches means that no avalanches occurred. We may not see avalanche activity due to poor visibility, and we may not record observed avalanches immediately due to our workload.

2021-22 Season

All Regions

Photos & Video

Search...

Avalanches Observed?

Signs of Instability?

Reset Filters

Showing 1 to 50 of 224 observations

Obs Date	Observer	Region	Location	Avalanches?	Instability?
April 14, 2022	Key Observer	Mammoth Lakes	The Devil's in the Details		
April 12, 2022	Public	Bridgeport	Matterhorn		
April 10, 2022	Public	Mammoth Lakes	Mammoth Pass and Horseshoe Trees		
April 10, 2022	Key Observer	Mammoth Lakes	Horseshoe Lake Weather Observations		
April 9, 2022	Key Observer	Mammoth Lakes	Sherwin Ridge - Weather Observations and Snow Coverage		
April 8, 2022	Key Observer	Mammoth Lakes	McGee High Country obs	Yes	
April 8, 2022	Forecaster	Mammoth Lakes	Mammoth Lakes Basin - Moderate wind, warm temps		
April 7, 2022	Key Observer	Mammoth Lakes	Lakes Basin SE Face Snow Profile and East Face Ski Test		
April 6, 2022	Public	Virginia Creek	Return Lake area, YNP		

**EDUCATION**

This page contains a plethora of useful on-line avalanche education resources, information on local avalanche course providers, and in-depth discussions on how to use the features of ESAC’s website.

**WEATHER SENSOR APPLICATION**

This powerful feature allows any user to easily compare remote weather station data from a dozen different stations across our range in graphical or tabular formats. The user can choose to view a specific weather variable such as precipitation amounts, wind speed and direction, or temperature and compare these values through any time and date range that they select.

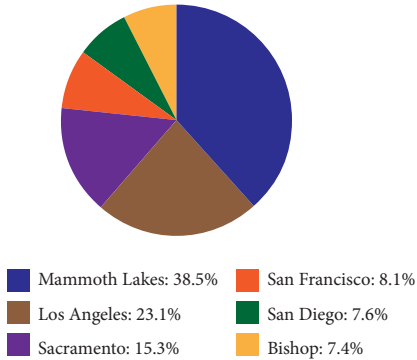
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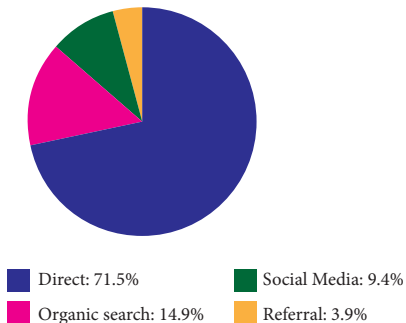
## ESAC WEBSITE ANALYTICS

- The ESAC website had 100,034 user sessions this season, a dramatic increase from last year's 94,007.
- Total users also increased this season to 56,776, a significant increase from last year's 35,605 user sessions.
- Notably, we saw a huge increase in mobile traffic this year. Mobile users made up 78% of our traffic this season up from only 40% last season.
- Average session duration decreased this season to 00:01:58 from 00:02:46 last season.

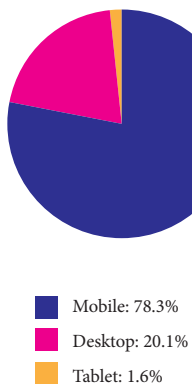
### TOP USER LOCATIONS



### HOW PEOPLE FOUND THE WEBSITE



### DEVICE TYPE

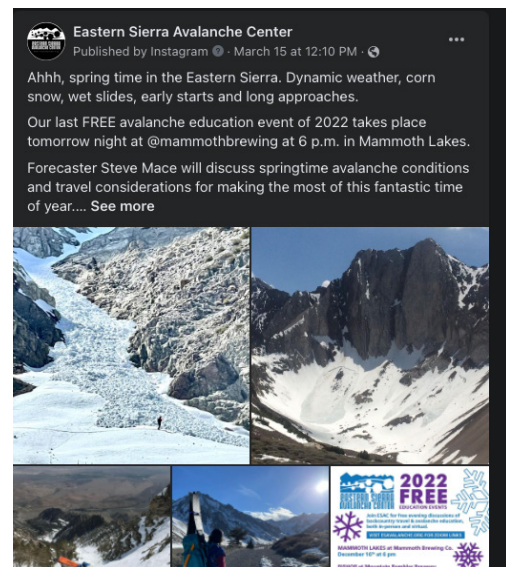


## SOCIAL MEDIA

In addition to posting information on the website, ESAC leverages social media including Facebook ([@easternsierraavalanchecenter](https://www.facebook.com/easternsierraavalanchecenter)) and Instagram ([@esavalanche](https://www.instagram.com/esavalanche)) to provide timely updates and critical information while connecting more broadly with the backcountry community. Educational videos, avalanche advisories, notable field observations, avalanche incidents, and significant condition updates were pushed regularly to ESAC's social media channels. Community engagement with these posts provided an opportunity for healthy conversation and increased public awareness. ESAC recognizes the value of social media in communicating with our user base and conversations are ongoing about how to more effectively leverage these popular platforms for next season.

**Facebook:** 6,500 followers this season, up from 6,023 followers last year.

**Instagram:** 10,700 followers this season, up from 8,051 followers last year.



## NOAA/NATIONAL WEATHER SERVICE AVALANCHE WARNINGS

This was the fourth season that the National Weather Service offices in Reno and Las Vegas issued Avalanche Warnings for the backcountry mountains in ESAC's forecast zone. These warnings are issued at the direction of ESAC's forecasting staff when widespread HIGH or EXTREME avalanche hazard is forecasted. The NWS then publishes these warnings out through various channels, including local radio stations and online platforms, in order to heighten the public's awareness of dangerous avalanche conditions. This collaborative effort between the NWS, the National Avalanche Center, and ESAC began during the 2018–2019 season. This season ESAC issued two Avalanche Warnings. The first during a major storm event December 13th through December 15th and the second during an extreme weather event that occurred from December 23rd to the 27th. Special thanks to Reno weather forecaster Zach Tolby for his extra efforts in making this warning system a reality for ESAC.

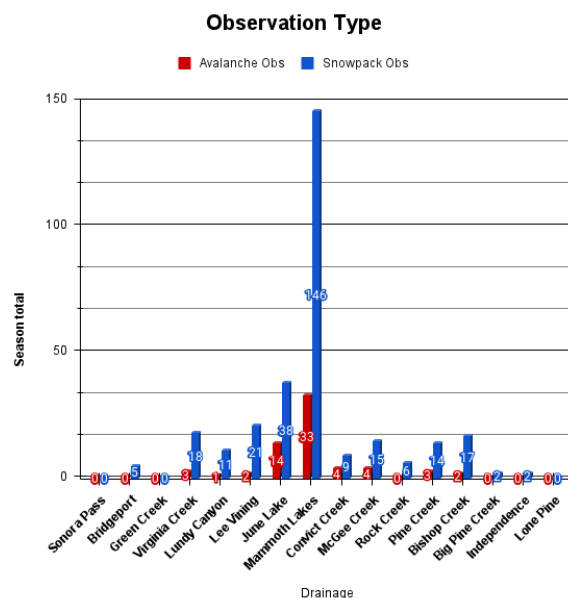


# PUBLIC OBSERVER NETWORK

The Eastern Sierra encompasses a vast amount of mountainous terrain with a very low density of backcountry users compared to other mountainous areas. Getting reliable information on localized weather and the state of the snowpack can be a challenge, and for this reason ESAC relies heavily on observations from others to develop avalanche advisories. ESAC continues to work on ways to encourage industry professionals and recreationalists to submit their snowpack, weather, and avalanche observations. One incentive available to all public observers is thanks to Mammoth Mountaineering Supply and Sage to Summit. These local gear retailers generously donate \$5 in store credit to each observer for every observation they submit through the ESAC website. ESAC introduced our Key Observer program during the 2019–2020 season. This program has been a large success and was continued for the 2020–2021 and 2021–2022 seasons. This select group of local mountain guides, ski patrollers, avalanche educators, and experienced recreationalists committed to submit consistent high-quality observations throughout the season. Together our Key observers submitted **70** observations through the website, about half of this season's publicly submitted observations. We would like to offer our immense gratitude to all of our Key observers for their hard work and commitment to information sharing. Geoff Unger, Ryan Huetter, and Barbara Wanner all went above and beyond this season offering valuable and timely information via the ESAC website and performing well above our expectations.



Key Observer Ryan Huetter collecting snowpit data



Over 370 Snowpack and Avalanche observations were submitted through the ESAC website during the operational period this season. Of these observations, 185 were submitted by 63 different individuals in the ESAC public observer network, 22 were submitted by the two paid observers, and 163 observations were submitted by the three paid forecasters.

## SPECIAL THANK YOU TO OBSERVERS!

ESAC would like to recognize the following individuals for submitting at least 3 observations to the website this season. Those who submitted at least 10 observations appear in **bold**, and those who submitted more than 15 appear with an asterisk\*. We would like to thank everyone who continues to post their observations, we could not do what we do without you!

**Geoff Unger \***  
**Ryan Huetter \***  
**Barbara Wanner\***  
 Jacob Lipman  
 Peter Terwilliger  
 Nick Lozica  
 Michael Mavernick

Mike Galgay  
 Brian Burke  
 Dennis L.  
 Jeremiah Mann  
 Joe Soccio  
 Nick Schley  
 Zac Creager

We would also like to offer our sincere gratitude to the Mammoth Mountain Ski Patrol's Weather program (Michael Philips, Neil Satterfield, Scott Quirsfeld) and June Mountain Ski Patrol's Kelly Miller, Doug Johnson, and Shane Wakefield who share their respective early morning avalanche control work results. Also, a special thank you goes out to the local guide companies Sierra Mountain Guides and Sierra Mountain Center who encourage their guides to share their field observations and professional snowpack assessments with ESAC as well.



# EDUCATION & OUTREACH

ESAC continues to organize and participate in many events throughout the winter which complement our forecast product and support our mission of helping inform and educate backcountry recreationalists about avalanche conditions in the eastern Sierra. ESAC also maintains relationships with local agencies which conduct business in avalanche terrain to collaborate with observations and support employee safety. All of this year's education and outreach events had a virtual component to adapt to ongoing COVID-19 safety precautions. We did have good turnout in person to most events, but online presence decreased as compared to last season during the height of the pandemic. ESAC will continue to adapt to external factors such as this to be able to offer public avalanche safety events to our community.

## SEASON KICK-OFF

After a successful outdoor season kick-off and fundraiser last year consisting of a drive-in movie style event at the Tri-County Fairgrounds in Bishop we decided to do it again on December 3rd 2021. Temperatures were much warmer this year which allowed for better mingling outdoors. The keynote speaker this year was Lake Tahoe local Ming Poon. Ming is a successful, and talented action sports photographer with a great passion for snow and the Sierra Nevada. In addition to fantastic photos, Ming Shared stories about travel abroad and in the High Sierra. The Sierra has played an important role in his development as an artist, athlete and mountain professional. Travel in the mountains is not without its risks no matter where you are, and a careful progression into bigger avalanche prone terrain is important for winter backcountry enthusiasts.

## INTERAGENCY ROUNDTABLE

This year's season kick-off event also featured a couple of other education opportunities for local professionals and the general public. On December 3rd, ESAC hosted its 5th annual interagency roundtable meeting in the Town of Mammoth Lakes. This early-season meeting brings together local agencies and organizations that are affected in some way by avalanches. It's an opportunity for all to share how their winter operations work, how ESAC can be used as a resource, and in what ways we can all support one another. The event also serves as a great professional development opportunity for programs that don't necessarily have in-house avalanche expertise. Workshops on basic avalanche awareness, ESAC resources, Cal-Trans highway avalanche mitigation work, and weather forecasting information from the NWS-Reno office were all well attended. As COVID-19 related safety precautions and restrictions continue to relax, ESAC looks forward to more collaboration with our local industry partners through in-person events and workshops.

## AVALANCHE WORKSHOPS

On December 4th, following the show by Ming Poon, local professionals hosted avalanche workshops for the public in an indoor classroom setting also at the Bishop Tri-County Fairgrounds. Virtual attendance was strong for this event and all participants were treated to great presentations by local scientists and avalanche pros. Thanks to all of this year's presenters for their informative and thoughtful talks.

- Neil Satterfield, Mammoth Mountain Ski Patrol
- Howie Schwartz, Sierra Mountain Guides
- Chris Smallcomb, NWS Reno
- Ned Bair, UCSB
- Steve Mace and Chris Engelhardt, ESAC

## FREE AVALANCHE AWARENESS EVENTS

ESAC was happy to bring back in-person avalanche awareness events this year, in the local communities within the forecast area. We hosted 4 of these free presentations. Many thanks go out to this year's hosts Mammoth Brewing Company, T-Bar Social Club in June Lake, and Mountain Rambler Brewery in Bishop. Topics were wide ranging as usual, and forecasters try to make their presentations pertinent to the time of year and current conditions. All presentations include a season history to date to share insight into the recent forecast and the state of the snowpack.

### 2021-2022 EDUCATION EVENTS

- Backcountry Basics: Chris Engelhardt
- Recent Near Miss Accidents: Josh Feinberg
- Avalanche Basics: Steve Mace
- Spring Avalanche Conditions and Travel Advice: Steve Mace

## CONTINUING AVALANCHE EDUCATION

ESAC supports continuing avalanche education on all levels. Forecasters are invited each season to contribute to local avalanche courses by sharing information about avalanche forecasting in the eastern Sierra and our season history to date. We were invited to participate in several local recreational courses as well as a Pro 1 course hosted by AIARE in February.

## ADOPT-A-SCHOOL PROGRAM

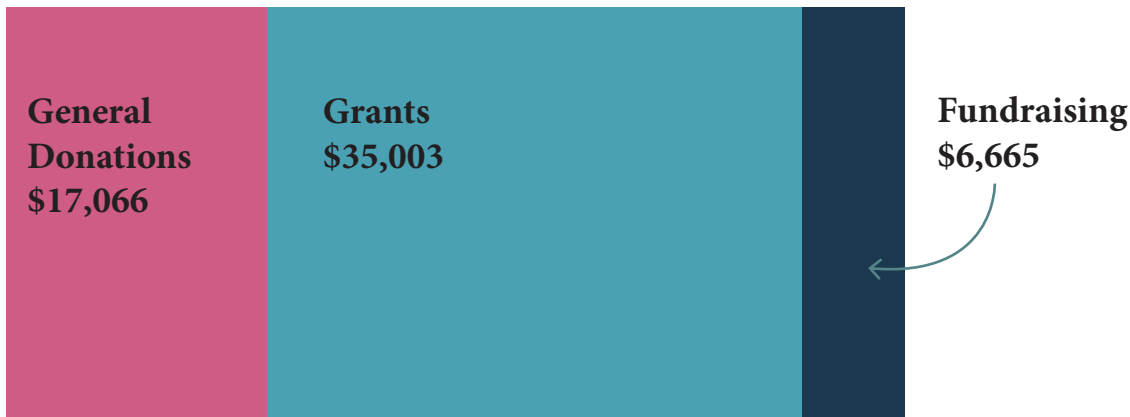
For the second year in a row, ESAC staff gave 4 virtual presentations to Bishop Elementary School 3rd grade science students. The talks focused on basic avalanche phenomenon and avalanche safety tips for these curious kids. Many thanks go out to LADWP who is a supporter of ESAC, for coordinating these in-school opportunities. It's important to plant the seed early in our local school children that the snowy mountains are a treat to have in our backyard but fostering a respect and awareness of potential hazards is imperative.



# 2021-2022 ESAC FINANCIAL SUMMARY

Data reflects ESAC financials from August 1, 2021–April 30, 2022

## INCOME: \$58,735\*



\* Grants received outside of the dates reflected here are not included in this chart. This includes \$40,478.45 from State of CA, Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division

## EXPENSES: \$81,462



## FINANCIAL SUPPORTERS

ESAC is extremely grateful for the individuals, businesses, foundations, and agencies that have contributed to ESAC this season. Without financial support we could not provide avalanche forecasting services. ESAC would like to recognize the following:

### KEY SUPPORTERS

\$5k+ cash or \$10k+ in-kind,  
or a combination



S. Livingston Mather Charitable Fund

### SUSTAINING SUPPORTERS

\$2,500–\$4,999 cash  
or \$5k in-kind or  
a combination

Roussev Family Charitable Fund

### SELECT SUPPORTERS

\$1k–\$2,499 cash or  
\$2,500 in-kind or  
a combination



Eastern Sierra Spirits Project  
Ann Berg

### SUPPORTERS

\$500–\$999 cash  
or \$1,500 in-kind or  
a combination

Steve Alessi  
Chris Benchetler  
Claude Fiddler  
Mark Keller  
Lucky Seven Foundation  
Jeremiah and Mary Mann Family Fund  
Maloof Harmer Giving Fund

Patagonia  
Sage to Summit  
Sans Meal Bar  
Sweetwater Plumbing  
Erik and Cate Wright  
Year One Surf Co



## LOCAL BUSINESSES AND INDUSTRY SUPPORTERS OF EVENTS

ESAC has become known for events with abundant raffle prizes and impressive silent auctions. We would like to extend a huge thank you to the following organizations and individuals for the generous support of ESAC and for making this possible:

Allure Salon and Daryl Hopper

Alpenhof Lodge

Aly Vanko

Ann Piersall Logan

AnneMarie's Home Boutique

Arcade Belts

Beve Beni

Black Sheep Coffee Roasters

Black Tie Ski Rentals

Blazing Shears

Bleu Handcrafted Foods

Cary Clark, ACu

Christian Pondella

Claude Fiddler

Cloudripper Bishop

Convict Lake Resort

Dan Dixon and Level 8 Sales

Designs Unlimited

Devil's Creek Distillery

Eastern Sierra Green Business Program

Eastside Sports

Flylow

Footloose Sports

Gomez

Good Life Cafe

Graphic Conclusions

Hermitage Juice Bar

High Sierra Nutritional Wellness

Holiday Haus

Indy Coffee Roasting

Jake's Family Maple

Jared Rodriquez

Jean Drummon, L.A.C.

Jone's Snowboards

June Lake Brewing

June Shine

Lenny & Larry's

Lesley Byberg

Looney Bean Bishop

Mammoth Brewing Company

Mammoth Chevron

Mammoth Fun Shop

Mammoth Minaret Cinemas

Mammoth Mountain Ski Area

Mammoth Mountaineering Supply

Mammoth Pet Shop

Mammoth Tavern

Mammut

Massage Elevated

McKenzie Long, Cardinal Innovative

Michelle Mather, CMT

Mike Gable, DPT

Miles Weaver

Minaret Chiropractic

Mono Inn

Mountain Hardware

Mountain Rambler Brewery

MUHKA

Nate Greenberg

Owens Valley Distilling Co.

Patagonia

Philips Aesthetic Dermatology

Profile's Salon

Pupfish Cafe

Roberto's

Rocky's Massage

Sierra Mountain Center

Sierra Mountain Guides

Sierra Mountaineering International

Sierra Spine and Wellness

Sierra Star Golf Club

Simply Massage

SKADI

Smoketree Massage & Apothacary

Spellbinder Books

Stefi Luxton

Surefoot

T-Bar Social Club and June Pie

Tarah Garcia

The Powder Room

Tom's Place Resort

Warming Hut

Wave Rave

Mount Dana



# LOOKING FORWARD

**ESAC continues to make changes striving to improve operations** and produce high quality information for the public. Heading into the 2022–2023 season we anticipate a continued increase in backcountry travel in the eastern Sierra. The center is committed to continuing to produce high-quality avalanche advisories seven-days-a-week to keep the public informed of avalanche conditions. ESAC will focus on the following areas this upcoming season:

## STAFFING

ESAC has grown considerably over the past few years. Our operating budget has grown substantially, our user base has grown exponentially, and the 2021–2022 season marked the 4th season ESAC has operated as a type 1 center issuing daily avalanche forecasts. While these have been positive changes, we have identified the need for more centralized leadership. We are excited to announce that Steve Mace will be moving into the role of Director this coming fall. In addition, Rachel Drattler will be taking on additional administrative duties. We are optimistic that these staffing changes will be very beneficial for the future growth of the center. ESAC is also seeking to hire additional forecasting staff to join the team for the 2022–2023 season. Interviews are being conducted in early July.

## OUTREACH AND EDUCATION

ESAC returned to in person education events during the 2021–2022 season however, after the success of our virtual education events during the 2020–2021 season we decided to continue to offer virtual options for attendees. ESAC is committed to continue providing education events to the public of Inyo and Mono Counties and will continue to brainstorm the best methods available to reach more members of the community. In the future we hope to expand our attendance through community outreach as well as by utilizing social media. In addition, we are strategizing ways to better reach motorized backcountry users in the eastern Sierra.

## SOCIAL MEDIA

With the ever-increasing and changing use of social media products such as Facebook and Instagram, ESAC will continue to leverage these platforms to communicate with the public. We recognize the power of these platforms for disseminating information and are excited to explore new ways to share pertinent field observations, educational content, as well as directing backcountry users to the forecast.

## FUNDRAISING AND GRANTS

Rachel Drattler joined the ESAC for the 2020–2021 season as our Administrative Manager. Over the past two seasons Rachel has been an incredible asset to the center and has increased the center's ability to identify and procure funding. It is the hope that Rachel, in conjunction with the ESAC board of directors, will be able to explore new avenues of funding in an effort to bolster the center's reach and capacity and to help ESAC maintain financial stability long into the future.

Strengthening ties with local and regional agencies: ESAC recognizes the link between delivering high-quality products to the backcountry community and the need to generate revenue to support these efforts. This may include offering avalanche forecasting services to regional government agencies and transportation departments. The Center's goal is to foster closer ties to Southern California Edison, Cal-Trans, LA Department of Water & Power, the National Park Service, and US Forest Service. Existing partnerships with Mammoth and June Mountain Ski Areas have proven critical to the Center's success and we hope to continue and strengthen these relationships.

## BEACON BASIN

For many seasons ESAC has partnered with Mammoth Mountain to offer a Beacon Basin free to the public to practice their transceiver search skills. During the 2020–2021 season there were some technical issues rendering the basin non-functional. Supply chain issues prevented us from replacing the system for the 2021–2022 season. We hope to have a new Beacon Basin up and running for the 2022–2023 season.

## WEATHER STATIONS

There is a plethora of reliable weather stations in some parts of the forecast area. Remote weather stations are an integral part of producing accurate avalanche forecasts. Installing additional ridgetop wind sensors and making existing snow depth sensors operational again for next winter would be valuable by increasing the accuracy of our forecasting.



# 2021-2022 EASTERN SIERRA DETAILED SEASON HISTORY

The winter of 2021–2022 marked the Eastern Sierra Avalanche Center's (ESAC) 16th season serving the Eastern Sierra backcountry community, and the fourth season that it has operated as a Type 1 center issuing daily Avalanche Advisories for the majority of the season.

ESAC forecasters issued the first weekly snowpack summary of the season on October 22nd and began issuing daily Avalanche Bulletins on December 9th. Seven-day-per-week operation continued through the remainder of the season, concluding on April 11th. In total, 123 daily avalanche advisories were issued with the following danger ratings: 9 days of High, 4 days of Considerable, 35 days of Moderate, and 75 days of Low. In addition to these daily advisories, seven early season snowpack summaries were issued that covered multiple day periods.

The 2021–2022 season began relatively early with a series of atmospheric river events bringing above average precipitation in October. These early storms brought up to 30" of snow and 4-6" of snow water equivalent (SWE) to the range. Some intrepid backcountry enthusiasts took advantage getting out for their first turns of the year and the region at large celebrated the rising lakes and above average soil moisture.

After a relatively very warm and dry November, snow finally began falling in earnest in early December. December brought one atmospheric river event after another with prolonged periods of intense snowfall. Totalling 163" of snow and over 22 inches of snow water equivalent, accumulations during the month of December accounted for the vast majority of our winter precipitation as a whole. January was the driest on record with zero measurable precipitation in the eastern Sierra. Models suggested the potential for a pattern change during February and March, however the



Approaching Wahoo Gully during a dry part of the season. Photo Steve Mace

strong high-pressure ridge along the California coast continued to deflect major storms north of the forecast area. A few inside slider type events brought periods of light snowfall adding up to about 11" of snow during the months of February and March.

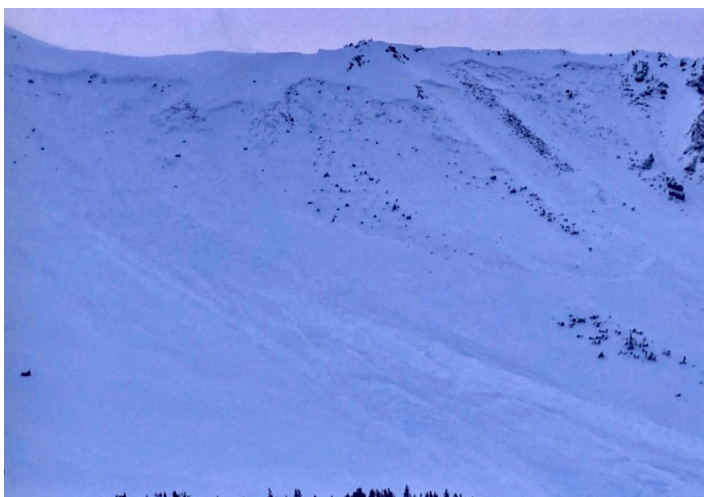
Even with these small storms, our weather pattern was largely dry with periods of record high temperatures. As a result, the snowpack continued to diminish, making for difficult travel and thin coverage. Unsettled weather returned in April. Several strong storm events brought a return to cold temperatures, very strong winds, and significant snow accumulations, particularly at higher elevations and along the Sierra crest. During the month of April, 34" of snow and 3.96" of SWE was recorded at the base of Mammoth Mountain, more than tripling the precipitation recorded during the first 3 months of the year.

Despite the lack of significant precipitation during the heart of winter, it is amazing how well the early season snow held up. For most of the season, coverage was adequate for backcountry travel and the long periods of low avalanche danger opened a wide range of opportunities for the backcountry enthusiast. Variable and challenging surface conditions remained top of mind for the forecast team, and it's fair to say the primary hazard this season was "slide for life" conditions, particularly in the high alpine where smooth, wind-sculpted snow demanded the full gamut of mountaineering equipment & travel techniques.

Most of the Avalanche activity this season occurred during the tremendous December storm cycles. In conjunction with the NWS, ESAC issued two multi-day Avalanche Warnings for the region. In total, the forecast area spent nine days with an avalanche warning in place during extended periods of widespread High



Forecaster Steve Mace enjoying deep December snow on Chicken Wing. Photo Ryan Huetter



Avalanche in the Paranoirs on Mammoth Mountain.

hazard and concerns focusing primarily on Storm Slab, Persistent Slab, and Wind Slab instabilities. Extreme southwesterly winds of 100+ mph accompanied these massive storms, often shifting to the north and continuing at extreme speeds as precipitation waned. Mountain communities from Tahoe to Mammoth were pretty much paralyzed by intense snowfall during the Holiday period and remained quite inundated with large snow banks for much of the winter. Due to the severe nature of the storms, both in snowfall intensity and wind speed velocity, most natural activity was difficult to identify as crowns and even deposition piles were often buried or disguised by wind effects quickly after they occurred. As the season progressed, evidence of widespread large avalanche activity from December could be seen throughout the range. One of the more notable avalanches recorded this season occurred as a result of mitigation efforts on Mammoth Mountain on December 26th. This Deep Persistent Slab avalanche, running on basal facets near the ground, was triggered with artillery on the tail end of a major loading event. It had an average crown depth of 96", a width of 1,000', a run length of 3,500', and a destructive size of D4. (HS-AA-R5-D4-G).

Thankfully no avalanche fatalities occurred during the 2021–2022 season, however this season did see several notable close calls, the bulk of which occurred during December. On December 13th in the Mammoth Lakes Basin, a solo skier was caught, carried and partially buried in an avalanche in the Red Cone area. Thankfully this skier was able to extract themselves and self-evacuate with only superficial injuries. The Avalanche hazard was rated HIGH on the 13th, with periods of very heavy snowfall and strong winds leading to increasing hazard throughout the day.

One of the closest calls in the backcountry occurred on December 23rd in the Sherwins, outside of the town of Mammoth Lakes. Two backcountry skiers were hit by an avalanche while transitioning after deciding mid-slope to abort any further uphill progress. Both members of the party were carried, and one was completely buried. Thankfully, their partner was only partially buried and was able to free themselves, conduct a beacon search, and excavate the fully buried party in time. Neither skier was injured, and they were able to self-evacuate despite losing some equipment in the avalanche. Hazard was listed at HIGH

on the 23rd with 20" of new snow and 2" SWE recorded overnight and continued heavy snowfall during the day.

Another unfortunate event that happened during the storm period was a roof-avalanche that buried two small children in the Mammoth area, sending both to the hospital, one of which had to spend an extended period to recover from their injuries.

Predictably, avalanche activity waned throughout the dry spell in the first part of 2022. Despite the prolonged periods of LOW avalanche hazard, firm "slide for life" conditions persisted during the bulk of the season, and several close calls could be attributed to the firm and slick conditions.

After 42 days of LOW danger in a row, we began to see small precipitation events that led to a few days of elevated hazard and thin wind slab development. On March 20th, during one of these small storms, a group of 4 were caught and carried down the north couloir on Bloody Mountain just south of Mammoth. They triggered it from below while ascending their boot pack. Luckily, this was a small avalanche, and all parties were able to self-arrest and were uninjured.

Most of 2022 was quite warm with pseudo-corn conditions already developing on southerly aspects in January. The real warm-up occurred near the equinox and again at the end of March with record setting daytime highs over 60°F at 10,000 ft. These prolonged periods of very warm temperatures, light winds, and clear sunny skies elevated avalanche hazard to MODERATE, primarily for Wet Loose concerns. These periods also proved to be just about the final death blow to the dwindling lower elevation snowpack. With access receding quickly and thin degraded snowfields disappearing throughout the forecast area, ESAC issued the final forecast of the season on April 11th. In the weeks following the final forecast of the season, several powerful winter storms impacted the Sierra bringing 34" of snow and 3.96" of SWE in the month of April, more than triple the total precipitation during the first 3 months of 2022. Strong spring storms are not uncommon in the Sierra, and backcountry enthusiasts rejoiced with the potential for late season powder turns. The return to winter-like conditions came with a return to winter-like avalanche concerns. Wind Slab and Loose Wet avalanche activity remained the focus. Several natural and human triggered avalanches were reported throughout the forecast area.

In addition to daily avalanche forecasting, the forecasters, along with the ESAC Board of Directors, jointly put considerable energy into outreach and education events. Enjoying excitement following the early season snowfall, ESAC hosted its Annual Season Kick-Off Extravaganza with a drive-in movie night at the Bishop Fairgrounds on December 3rd with Tahoe-based photographer Ming Poon giving a great slideshow of his winter pursuits. Several local businesses, artists, gear companies, and community members gave generous contributions to make the event a huge success. The following day ESAC hosted an Avalanche Workshop day with presentations by local avalanche guides, ski patrollers, snow and avalanche scientists, and ESAC staff. ESAC also organized four mid-season snowpack and education presentations, both in-person and virtually, in the communities of Mammoth Lakes, Bishop, and June Lake. The Mammoth Brewery in Mammoth





### Mount Morrison

Lakes, Mountain Rambler Brewery in Bishop, and the T-Bar Social Club in June Lake were all gracious hosts for the events. In December, ESAC sponsored an interagency roundtable meeting that brought together regional and local public safety officials, first responders, Forest Service leadership, transportation workers, and weather experts to discuss avalanche concerns that exist in the area and ways in which ESAC can provide community support. Additionally, the Center provided targeted avalanche awareness presentations to Inyo County SAR teams, contributed to the Tahoe Backcountry Safety Awareness Week, and sat on a panel discussion during a local showing of the film *Buried*, which documents the major avalanche that occurred in 1982 at Alpine Meadows.

Although the 2021–2022 was not a banner year in terms of snowfall, there were several major milestones accomplished. For the first time, ESAC hired two professional observers, Jonathan Tuttle and Brooke Maushund. These two savvy local skiers have provided the forecast team with valuable observations and helped expand our presence throughout our broad and diverse forecast area. Additionally, ESAC transitioned to a new website and observations platform. This much needed update provides a cleaner, more intuitive, and a more pleasant experience for the user. And lastly, we want to recognize our volunteer Board of Directors, all of whom bring passion and dedication to the team and work tirelessly towards the betterment of the center.



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